

Jobos Bay (JOB) National Estuarine Research Reserve Meteorological Metadata

January - December 2002

Latest Update: **February 8, 2023**

I. Data Set & Research Descriptors

1) Principal investigator(s) & contact persons

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2) Entry verification

Collected data is verified (QA/QC), using the CDMO Weather Data Management Program.

a) Data Input Procedures:

The 15-minute, 1-hour average, and 24-hour meteorological data was downloaded from each instrument of the weather station to a Campbell Scientific CR10X datalogger. The CDMO Data Logger Program (nerr30.csi) was loaded into the CR10X datalogger that controls the sensors and data collection schedule (see 2b of the Entry Verification section for the data collection schedule). The CR10X was then interfaced with the PC208W software supplied by Campbell Scientific.

Data was downloaded through a storage module, at the beginning of every month, via a direct connection to a computer located in Jobos Bay Laboratory. The data was saved as a monthly raw data file (RAWjan02.dat) onto a separate hard drive and backed up onto Zip disk and CD. 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 NERR Meteorological Data Collection Schedule (see 2b of the Entry Verification section for the data collection schedule). The WDMP automatically imports and converts 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 Appendix G for the CDMO Meteorological Data Collection Error/Anomalous Data Criteria). Finally, it produces error and summary reports. Any anomalous data was investigated and noted below in the Anomalous Data Section. All data corrections performed are noted in the Data Correction Section below. Common errors noted in the monthly error report include wind speeds below the 0.5 m/s criteria, temperature change greater than 3 C in a 15 minute period, and precipitation difference greater than 5mm in 15 minutes. All errors of this type were double checked with other data that could support such "anomalous" weather changes and noted in the sections that follow. Both raw data files and Access databases

were saved on Compact Disc.

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 (Campbell Weather Station):

The principal objective is to record long-term meteorological data to track changes in meteorological conditions that can be associated to changes in estuarine habitats and conditions. A secondary objective is to promote the access and use of reliable baseline information by federal and local agencies, universities, researchers, educators and local communities to enhance the process by which they make decisions regarding their daily activities. This data is also invaluable in the identification and development of future monitoring and research activities.

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. The data is downloaded from the storage module to the laboratory computer by direct connection. Sensors on the weather station are inspected periodically for damage or debris. If any are found, sensors are repaired and/or cleaned. The rain gauge tends to collect the most debris and needs to be cleaned every few days. Sensors are removed and sent to Campbell Scientific for calibration at a minimum of every two years. There were no other analyses done on the meteorological data.

5) Site location and character:

The Jobos Bay National Estuarine Research Reserve (JBNERR) is located on the southern coastal plain of the island of Puerto Rico, the reserve is within the West Indies geographical area. JBNERR is formed by two major components: (1) Mar Negro, located on the western margin of the Bay, and (2) Cayos Caribe, a chain of 15 tear-shaped islets located to the southeast. The Mar Negro component comprises the bulk of the Reserve, and consists of mangrove forests and a complex system of lagoons and channels interspersed with salt and mud flats. Coral reefs and sea grass beds, with small beach deposits and upland areas fringe Cayos Caribe mangrove islands.

The weather station is situated in front of the Visitor's Center, located in the community of Aguirre, Salinas, Puerto Rico. The Wind Sentry, Temperature and Humidity sensor, Barometric Sensor and LiCor Sensor are all located on a 10m aluminum tower following the descriptions outlined in the CDMO Manual V 4.0. The Tipping Bucket Rain gauge is located to the SW side of the tower. The sensors were wired to the CR10X following the protocol in the CDMO Manual.

A description of the specific sampling station follows:

The weather station is located in front of JBNERR Visitor's Center. Its coordinates are latitude 17° 57' 23.34"; longitude 66° 13' 22.56".

6) Data collection period:

The current weather station was deployed in 1999. Data has been collected for years 2000, 2001 and 2002. All data collected since year 2000 has been edited using the CDMO Weather 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 is collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data is 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:

Jobos Bay NERR system-wide monitoring program has four YSI's continuous sampling stations (s9,s10,s19,s20) that collect long term water quality data, every 30 minutes, to track changes in water quality in the Bay. Parameters include temperature, dissolve oxygen (% saturation, mg/L), specific conductivity, salinity, depth, pH and turbidity. Stations 9 and 10 were selected to represent sites that could compare human impact gradients, with Station 9 being an impacted site and station 10 the reference site. Stations 19 and 20 were just recently established (July 2002) to compare an ecosystem gradient.

Station 19 was deployed over sea grass beds, *Thalassia testudinum*, in the bay and station 20 was deployed over sea grass bed communities near Cayos Caribe coral reefs.

II. Physical Structure Descriptors

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

LiCor Quantum Sensor

Model # LI190SB

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

Operating Temperature: -40 to 65°C

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

Light spectrum wavelength: 400 to 700 nm

Date of last calibration: 07-22-99

Wind Sentry

Model # 03001

Range: 0-50 m/s; 360° mechanical

Date of last calibration: 08-16-99

Temperature and Relative Humidity

Model #: HMP35C

Operating Temperature: -35 to +50°C

Temperature Measurement Range: -35 to +50°C

Temperature Accuracy: ± 0.2 °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: 07-24-99

Barometric Sensor

Model # CS-105

Operating Range: Pressure – 600 to 1060 mb

Temperature: -40 to +60C

Humidity: non-condensing

Accuracy: ± 0.5 to 6.0 mb (+20-60C)

Stability: ± 0.1 mb per year

Date of Last calibration: 05-16-99

Tipping Bucket Rain Gauge
Model #: RG-2000-C
Range: 0.254 mm
Accuracy: 1.0% at <14"/hr
Date of Last calibration: 8-14-01

10) Coded variable indicator and variable code definitions:

Site definitions: JB = Jobos 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.

All relative humidity data (RH) from January 1 through July 9 0830 was eliminated because the protective cap was not removed from the humidity sensor, resulting in inaccurate readings.

January 2002

All relative humidity data (RH) for this month was eliminated. The technician that assembled the Weather Station forgot to remove the protection cap of the humidity sensor causing erroneous readings during all the month. The erroneous data was erased and the values were exchanged for the code 55555 on the Arrays 101,150, 241, 243 and 244.

Array	Date	Day	Time	Error Message
101	1	1	100	Technician changed 101 Array data at 1 (1) 100 to 31 (31) 2400
150	1	1	15	Technician changed 150 Array data at 1 (1) 15 to 31 (31) 2400
241	1	1	2400	Technician changed 241 Array data at 1 (1) 2400 to 31 (31) 2400
243	1	1	2400	Technician changed 243 Array data at 1 (1) 2400 to 31 (31) 2400
244	1	1	2400	Technician changed 244 Array data at 1 (1) 2400 to 31 (31) 2400

The following data appear to be correct:

Array	Date	Day	Time	Error Message
150	29	29	1545	Air temp difference from 29 (29) 1545 (27.668) to 29 (29) 1600 (24.387) is greater than 3.0 degrees C

February 2002

All relative humidity data (RH) for this month was eliminated. The technician that

assembled the Weather Station forgot to remove the protection cap of the humidity sensor causing erroneous readings during all the month. The erroneous data was erased and the values were exchanged for the code 55555 on the Arrays 101, 150, 241, 243 and 244.

Array	Date	Day	Time	Error Message
101	1	32	100	Technician changed 101 Array data at 1 (32) 100 to 28 (59) 2400
150	1	32	15	Technician changed 150 Array data at 1 (32) 15 to 28 (59) 2400
241	1	32	2400	Technician changed 241 Array data at 1 (32) 2400 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

The following data appears to be correct:

Array	Date	Day	Time	Error Message
102	4	35	2100	Wind speed is less than 0.5 m/s from 4 (35) 2100 to 5 (36) 900
102	17	48	1900	Wind speed is less than 0.5 m/s from 17 (48) 1900 to 18 (49) 800
102	18	49	1900	Wind speed is less than 0.5 m/s from 18 (49) 1900 to 19 (50) 700
102	25	56	2000	Wind speed is less than 0.5 m/s from 25 (56) 2000 to 26 (57) 1000

March 2002

All relative humidity data (RH) for this month was eliminated. The technician that assembled the Weather Station forgot to remove the protection cap of the humidity sensor causing erroneous readings during all the month. The erroneous data was erased and the values were exchanged for the code 55555 on the Arrays 101,150, 241, 243 and 244.

Array	Date	Day	Time	Error Message
101	1	60	100	Technician changed 101 Array data at 1 (60) 100 to 31 (90) 2400
150	1	60	15	Technician changed 150 Array data from 1 (60) 15 to 1 (60) 715
150	1	60	745	Technician changed 150 Array data at 1 (60) 745 to 31 (90) 2400
241	1	60	2400	Technician changed 241 Array data at 1 (60) 2400 to 31 (90) 2400
243	1	60	2400	Technician changed 243 Array data at 1 (60) 2400 to 31 (90) 2400
244	1	60	2400	Technician changed 244 Array data at 1 (60) 2400 to 31 (90) 2400

The following hourly and daily data were deleted on March 1 due to the power down at 0800, resulting in 5 second data loss:

Array	Date	Day	Time	Error Message
101	1	60	800	Technician changed 101 Array data at 1 (60) 800
102	1	60	800	Technician changed 102 Array from 1 (60) 800
241	1	60	2400	Technician changed 241 Array data at 1 (60) 2400
242	1	60	2400	Technician changed 242 Array data at 1 (60) 2400
243	1	60	2400	Technician changed 243 Array data at 1 (60) 2400
244	1	60	2400	Technician changed 244 Array data at 1 (60) 2400

The following data appears to be correct:

Array	Date	Day	Time	Error Message
151	28	87	515	Precip difference from 28 (87) 515 (6.604) to 28 (87) 530 (1.016) is greater than 5 mm

102	10	69	2000	Wind speed is less than 0.5 m/s from 10 (69) 2000 to 11 (70) 800
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102	28	87	1900	Wind speed is less than 0.5 m/s from 28 (87) 1900 to 29 (88) 900
102	29	88	1900	Wind speed is less than 0.5 m/s from 29 (88) 1900 to 30 (89) 900

April 2002

All relative humidity data (RH) for this month was eliminated. The technician that assembled the Weather Station forgot to remove the protection cap of the humidity sensor causing erroneous readings during all the month. The erroneous data was erased and the values were exchanged for the code 55555 on the Arrays 101,150, 241, 243 and 244.

Array	Date	Day	Time	Error Message
101	1	91	100	Technician changed 101 Array data at 1 (91) 100 to 30 (120) 2400
150	1	91	15	Technician changed 150 Array data at 1 (91) 15 to 30 (120) 2400
241	1	91	2400	Technician changed 241 Array data at 1 (91) 2400 to 30 (120) 2400
243	1	91	2400	Technician changed 243 Array data at 1 (91) 2400 to 30 (120) 2400
244	1	91	2400	Technician changed 244 Array data at 1 (91) 2400 to 30 (120) 2400

The following data appears to be correct:

Array	Date	Day	Time	Error Message
150	7	97	1345	Air temp difference from 7 (97) 1345 (27.804) to 7 (97) 1400 (24.464) is greater than 3.0 degrees C
151	20	110	830	Precip difference from 20 (110) 830 (2.032) to 20 (110) 845 (13.97) is greater than 5 mm
151	20	110	845	Precip difference from 20 (110) 845 (13.97) to 20 (110) 900 (5.588) is greater than 5 mm
151	20	110	900	Precip difference from 20 (110) 900 (5.588) to 20 (110) 915 (.508) is greater than 5 mm
151	20	110	915	Precip difference from 20 (110) 915 (.508) to 20 (110) 930 (10.16) is greater than 5 mm
151	20	110	930	Precip difference from 20 (110) 930 (10.16) to 20 (110) 945 (3.302) is greater than 5 mm
102	12	102	2000	Wind speed is less than 0.5 m/s from 12 (102) 2000 to 13 (103) 800
102	21	111	1700	Wind speed is less than 0.5 m/s from 21 (111) 1700 to 22 (112) 800
102	22	112	2000	Wind speed is less than 0.5 m/s from 22 (112) 2000 to 23 (113) 800
102	23	113	2000	Wind speed is less than 0.5 m/s from 23 (113) 2000 to 24 (114) 800
102	25	115	1900	Wind speed is less than 0.5 m/s from 25 (115) 1900 to 26 (116) 800
102	26	116	1600	Wind speed is less than 0.5 m/s from 26 (116) 1600 to 27 (117) 800

May 2002

All relative humidity data (RH) for this month was eliminated. The technician that assembled the Weather Station forgot to remove the protection cap of the humidity sensor causing erroneous readings during all the month. The erroneous data was erased and the values were exchanged for the code 55555 on the Arrays 101,150, 241, 243 and 244.

Array	Date	Day	Time	Error Message
101	1	121	100	Technician changed 101 Array data at 1 (121) 100 to 31 (151) 2400
150	1	121	15	Technician changed 150 Array data at 1 (121) 15 to 31 (151) 2400
241	1	121	2400	Technician changed 241 Array data at 1 (121) 2400 to 31 (151) 2400
243	1	121	2400	Technician changed 243 Array data at 1 (121) 2400 to 31 (151) 2400
244	1	121	2400	Technician changed 244 Array data at 1 (121) 2400 to 31 (151) 2400

The following data appears to be correct:

Array	Date	Day	Time	Error Message
151	29	149	2115	Precip difference from 29 (149) 2115 (2.286) to 29 (149) 2130 (14.732) is greater than 5 mm
151	29	149	2145	Precip difference from 29 (149) 2145 (15.24) to 29 (149) 2200 (4.826) is greater than 5 mm
102	1	121	2000	Wind speed is less than 0.5 m/s from 1 (121) 2000 to 2 (122) 800

June 2002

All relative humidity data (RH) for this month was eliminated. The technician that assembled the Weather Station forgot to remove the protection cap of the humidity sensor causing erroneous readings during all the month. The erroneous data was erased and the values were exchanged for the code 55555 on the Arrays 101,150, 241, 243 and 244.

Array	Date	Day	Time	Error Message
101	1	152	100	Technician changed 101 Array data at 1 (152) 100 to 30 (181) 2400
150	1	152	15	Technician changed 150 Array data at 1 (152) 15 to 30 (181) 2400
241	1	152	2400	Technician changed 241 Array data at 1 (152) 2400 to 30 (181) 2400
243	1	152	2400	Technician changed 243 Array data at 1 (152) 2400 to 30 (181) 2400
244	1	152	2400	Technician changed 244 Array data at 1 (152) 2400 to 30 (181) 2400

The following data appears to be correct:

Array	Date	Day	Time	Error Message
150	5	156	1045	Air temp difference from 5 (156) 1045 (26.365) to 5 (156) 1100 (23.271) is greater than 3.0 degrees C
150	11	162	1015	Air temp difference from 11 (162) 1015 (28.153) to 11 (162) 1030 (25.124) is greater than 3.0 degrees C
151	4	155	45	Precip difference from 4 (155) 45 (.508) to 4 (155) 100 (7.874) is greater than 5 mm
151	4	155	100	Precip difference from 4 (155) 100 (7.874) to 4 (155) 115 (1.778) is greater than 5 mm
151	11	162	1045	Precip difference from 11 (162) 1045 (6.096) to 11 (162) 1100 (.254) is greater than 5 mm
151	18	169	330	Precip difference from 18 (169) 330 (2.032) to 18 (169) 345 (12.954) is greater than 5 mm
151	18	169	345	Precip difference from 18 (169) 345 (12.954) to 18 (169) 400 (1.016) is greater than 5 mm

102	6	157	2000	Wind speed is less than 0.5 m/s from 6 (157) 2000 to 7 (158) 800
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July 2002

All relative humidity data (RH) from July 1 to July 9 was eliminated. The technician that assembled the Weather Station forgot to remove the protection cap of the humidity sensor causing erroneous readings during all the month. The erroneous data was erased and the values were exchanged for the code 55555 on the Arrays 101,150, 241, 243 and 244. Error was corrected on July 9, 02 @ 8:45.

Array	Date	Day	Time	Error Message
101	1	182	100	Technician changed 101 Array data from 1 (182) 100 to 9 (190) 800
150	1	182	15	Technician changed 150 Array data from 1 (182) 15 to 9 (190) 845
241	1	182	2400	Technician changed 241 Array from 1 (182) 2400 to 8 (189) 2400
243	1	182	2400	Technician changed 243 Array data from 1 (182) 2400 to 8 (189) 2400
244	1	182	2400	Technician changed 244 Array data from 1 (182) 2400 to 8 (189) 2400

The following data appears to be correct:

Array	Date	Day	Time	Error Message
150	9	190	845	Air temp difference from 9 (190) 845 (29.2) to 9 (190) 900 (34.689) is greater than 3.0 degrees C
151	7	188	2100	Precip difference from 7 (188) 2100 (.254) to 7 (188) 2115 (5.842) is greater than 5 mm
102	11	192	2000	Wind speed is less than 0.5 m/s from 11 (192) 2000 to 12 (193) 800
102	30	211	2100	Wind speed is less than 0.5 m/s from 30 (211) 2100 to 31 (212) 900

August 2002

The following data appears to be correct:

Array	Date	Day	Time	Error Message
150	30	242	1700	Air temp difference from 30 (242) 1700 (29.395) to 30 (242) 1715 (25.496) is greater than 3.0 degrees C
151	11	223	30	Precip difference from 11 (223) 30 (.254) to 11 (223) 45 (6.604) is greater than 5 mm
102	1	213	1900	Wind speed is less than 0.5 m/s from 1 (213) 1900 to 2 (214) 900
102	11	223	2000	Wind speed is less than 0.5 m/s from 11 (223) 2000 to 12 (224) 800

September 2002

The following data appears to be correct:

Array	Date	Day	Time	Error Message
150	7	250	1200	Air temp difference from 7 (250) 1200 (30.249) to 7 (250) 1215 (27.049) is greater than 3.0 degrees C
150	15	258	1145	Air temp difference from 15 (258) 1145 (30.508) to 15 (258) 1200 (26.718) is greater than 3.0 degrees C
150	24	267	1215	Air temp difference from 24 (267) 1215 (32.331) to 24 (267) 1230 (28.787) is greater than 3.0 degrees C
150	24	267	1245	Air temp difference from 24 (267) 1245 (27.591) to 24 (267) 1300 (24.015) is greater than 3.0 degrees C
150	24	267	1245	Rel hum difference from 24 (267) 1245 (72.624) to 24 (267) 1300 (100) is greater than 25%
151	15	258	2100	Precip difference from 15 (258) 2100 (8.89) to 15 (258) 2115 (3.302) is greater than 5 mm
151	15	258	2115	Precip difference from 15 (258) 2115 (3.302) to 15 (258) 2130 (11.176) is greater than 5 mm
151	15	258	2130	Precip difference from 15 (258) 2130 (11.176) to 15 (258) 2145 (.254) is greater than 5 mm
151	25	268	345	Precip difference from 25 (268) 345 (.254) to 25 (268) 400 (13.97) is greater than 5 mm
151	25	268	400	Precip difference from 25 (268) 400 (13.97) to 25 (268) 415 (2.286) is greater than 5 mm
102	1	244	1800	Wind speed is less than 0.5 m/s from 1 (244) 1800 to 2 (245) 900
102	2	245	1900	Wind speed is less than 0.5 m/s from 2 (245) 1900 to 3 (246) 900
102	3	246	1900	Wind speed is less than 0.5 m/s from 3 (246) 1900 to 4 (247) 800
102	4	247	1900	Wind speed is less than 0.5 m/s from 4 (247) 1900 to 5 (248) 800
102	5	248	2000	Wind speed is less than 0.5 m/s from 5 (248) 2000 to 6 (249) 800
102	6	249	2000	Wind speed is less than 0.5 m/s from 6 (249) 2000 to 7 (250) 800
102	17	260	1800	Wind speed is less than 0.5 m/s from 17 (260) 1800 to 18 (261) 900
102	18	261	1600	Wind speed is less than 0.5 m/s from 18 (261) 1600 to 19 (262) 1000
102	20	263	1900	Wind speed is less than 0.5 m/s from 20 (263) 1900 to 21 (264) 800
102	25	268	1800	Wind speed is less than 0.5 m/s from 25 (268) 1800 to 26 (269) 900
102	26	269	1700	Wind speed is less than 0.5 m/s from 26 (269) 1700 to 27 (270) 900
102	27	270	2000	Wind speed is less than 0.5 m/s from 27 (270) 2000 to 28 (271) 900

October 2002

Values were edited for Array 150 for relative humidity for day 24 from 1945 to 2215, 2300 and 2330, and exchanged for 55555. The sensor was not functioning, indicating humidity values near 0% during the night and under a short period of rain.

Array	Date	Day	Time	Error Message
101	24	297	2000	Technician changed 101 Array data from 24 (297) 2000 to 24 (297) 2400
150	24	297	1945	Technician changed 150 Array data from 24 (297) 1945 to 24 (297) 2215
150	24	297	2300	Technician changed 150 Array data from 24 (297) 2300
150	24	297	2330	Technician changed 150 Array data from 24 (297) 2330

The following data appears to be correct:

Array	Date	Day	Time	Error Message
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150	10	283	1400	Air temp difference from 10 (283) 1400 (26.907) to 10 (283) 1415 (23.808) is greater than 3.0 degrees C
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151	10	283	1415	Precip difference from 10 (283) 1415 (6.096) to 10 (283) 1430 (11.684) is greater than 5 mm
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151	10	283	1430	Precip difference from 10 (283) 1430 (11.684) to 10 (283) 1445 (4.318) is greater than 5 mm
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151	24	297	1930	Precip difference from 24 (297) 1930 (.762) to 24 (297) 1945 (6.35) is greater than 5 mm
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151	24	297	1945	Precip difference from 24 (297) 1945 (6.35) to 24 (297) 2000 (.254) is greater than 5 mm
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102	1	274	2000	Wind speed is less than 0.5 m/s from 1 (274) 2000 to 2 (275) 800
-----	---	-----	------	--

102	2	275	2000	Wind speed is less than 0.5 m/s from 2 (275) 2000 to 3 (276) 800
-----	---	-----	------	--

102	6	279	2000	Wind speed is less than 0.5 m/s from 6 (279) 2000 to 7 (280) 800
-----	---	-----	------	--

102	7	280	1800	Wind speed is less than 0.5 m/s from 7 (280) 1800 to 8 (281) 800
-----	---	-----	------	--

102	9	282	1800	Wind speed is less than 0.5 m/s from 9 (282) 1800 to 10 (283) 800
-----	---	-----	------	---

102	12	285	1900	Wind speed is less than 0.5 m/s from 12 (285) 1900 to 13 (286) 900
-----	----	-----	------	--

102	13	286	1700	Wind speed is less than 0.5 m/s from 13 (286) 1700 to 14 (287) 800
-----	----	-----	------	--

102	14	287	1900	Wind speed is less than 0.5 m/s from 14 (287) 1900 to 15 (288) 800
-----	----	-----	------	--

102	20	293	1900	Wind speed is less than 0.5 m/s from 20 (293) 1900 to 21 (294) 800
-----	----	-----	------	--

102	21	294	1900	Wind speed is less than 0.5 m/s from 21 (294) 1900 to 22 (295) 800
-----	----	-----	------	--

102	23	296	1900	Wind speed is less than 0.5 m/s from 23 (296) 1900 to 24 (297) 800
-----	----	-----	------	--

102	30	303	2000	Wind speed is less than 0.5 m/s from 30 (303) 2000 to 31 (304) 800
-----	----	-----	------	--

November 2002

The following data appears to be correct:

Array	Date	Day	Time	Error Message
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150	17	321	1400	Air temp difference from 17 (321) 1400 (29.998) to 17 (321) 1415 (24.905) is greater than 3.0 degrees C
-----	----	-----	------	--

102	2	306	2000	Wind speed is less than 0.5 m/s from 2 (306) 2000 to 3 (307) 900
-----	---	-----	------	--

102	6	310	1900	Wind speed is less than 0.5 m/s from 6 (310) 1900 to 7 (311) 900
-----	---	-----	------	--

102	7	311	2000	Wind speed is less than 0.5 m/s from 7 (311) 2000 to 8 (312) 900
-----	---	-----	------	--

102	8	312	2000	Wind speed is less than 0.5 m/s from 8 (312) 2000 to 9 (313) 800
-----	---	-----	------	--

102	12	316	2000	Wind speed is less than 0.5 m/s from 12 (316) 2000 to 13 (317) 800
-----	----	-----	------	--

102	27	331	1900	Wind speed is less than 0.5 m/s from 27 (331) 1900 to 28 (332) 800
-----	----	-----	------	--

102	28	332	2000	Wind speed is less than 0.5 m/s from 28 (332) 2000 to 29 (333) 900
-----	----	-----	------	--

102	29	333	2000	Wind speed is less than 0.5 m/s from 29 (333) 2000 to 30 (334) 900
-----	----	-----	------	--

December 2002

The following data appears to be correct:

Array	Date	Day	Time	Error Message
150	2	336	1515	Air temp difference from 2 (336) 1515 (30.406) to 2 (336) 1530 (26.922) is greater than 3.0 degrees C
150	2	336	1630	Air temp difference from 2 (336) 1630 (27.698) to 2 (336) 1645 (24.596) is greater than 3.0 degrees C
150	4	338	1415	Air temp difference from 4 (338) 1415 (29.836) to 4 (338) 1430 (26.276) is greater than 3.0 degrees C
150	12	346	1200	Air temp difference from 12 (346) 1200 (27.702) to 12 (346) 1215 (23.905) is greater than 3.0 degrees C
150	24	358	1200	Air temp difference from 24 (358) 1200 (27.964) to 24 (358) 1215 (24.847) is greater than 3.0 degrees C
151	16	350	215	Precip difference from 16 (350) 215 (.762) to 16 (350) 230 (6.096) is greater than 5 mm
102	14	348	2000	Wind speed is less than 0.5 m/s from 14 (348) 2000 to 15 (349) 900
102	16	350	1700	Wind speed is less than 0.5 m/s from 16 (350) 1700 to 17 (351) 1000
102	17	351	1900	Wind speed is less than 0.5 m/s from 17 (351) 1900 to 18 (352) 1000
102	18	352	1900	Wind speed is less than 0.5 m/s from 18 (352) 1900 to 19 (353) 1000
102	21	355	1900	Wind speed is less than 0.5 m/s from 21 (355) 1900 to 22 (356) 1000
102	22	356	1900	Wind speed is less than 0.5 m/s from 22 (356) 1900 to 23 (357) 900
102	25	359	2000	Wind speed is less than 0.5 m/s from 25 (359) 2000 to 26 (360) 1000
102	26	360	1700	Wind speed is less than 0.5 m/s from 26 (360) 1700 to 27 (361) 800

12) Missing data:

Arrays:

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

January 2002

None

February 2002

None

March 2002

The following error message was caused when the data was downloaded from the storage module.

Array	Date	Day	Time	Error Message
150	1	60	730	Missing 150 Array (15 minute data)

April 2002

None

May 2002
None

June 2002
None

July 2002
None

August 2002
None

September 2002
None

October 2002
None

November 2002
None

December 2002
None

13) Other remarks:

Arrays:

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

Precipitation:

During the initial years of NERRS SWMP weather data collection the CR10X programming was inconsistent in how precipitation values were recorded. For most reserves, zeros were not recorded when rainfall had not occurred between 2001-2003, instead no rainfall was represented by a blank cell. The CDMO verified which datasets were impacted by this issue for the 2001-2006 datasets and inserted zeros when the metadata indicated that no precipitation occurred and data were not missing for other reasons. In some cases, zero values for precipitation data were evaluated and removed where the metadata confirmed that no rainfall should have been in the dataset. The pre-2007 data did not go through a thorough QAQC process again at that time (in addition to previous QAQC); however, if discrepancies were noticed between what was documented in the metadata and what was in the dataset, additional updates may have been made. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout early 2023.

Rain Events:

January

Date	RainAmount (mm)
6	.254
13	.254
14	.254
16	.254
18	.254
22	1.016
23	.508
25	1.778
27	.508
28	3.810
31	.254

"Monthly Total" 9.1

February

Date	RainAmount (mm)
1	1.016
3	2.540
19	.762
24	1.270

"Monthly Total" 5.6

March

Date	RainAmount (mm)
1	1.016
8	.508
13	.508
18	.254
23	1.016
27	3.048
28	10.922
29	1.778
30	1.524

"Monthly Total" 20.6

April

Date	RainAmount (mm)
3	4.318
4	4.064
6	9.652
7	13.208
15	1.778
16	1.778
20	48.006
21	17.780

"Monthly Total" 100.6

May

Date	RainAmount (mm)
18	1.016
22	.762
23	.254
27	8.890
28	1.270
29	39.624
30	10.414
31	6.604

"Monthly Total" 68.8

June

Date	RainAmount (mm)
2	2.794
3	6.858
4	28.702
5	14.732
8	.508
9	.508
11	9.906
13	3.302
14	.254
17	8.128
18	28.194
21	9.144
27	4.572

"Monthly Total" 117.6

July

Date	RainAmount (mm)
2	.762
7	11.684
8	.254
14	14.986
17	.254
28	.762
29	.254

"Monthly Total" 29.0

August

Date	Rainamount (mm)
6	3.048

7	.508
8	2.286
10	.254
11	14.732
14	.762
16	5.842
18	.508
29	6.350
30	8.890
31	9.652

"Monthly Total" 52.8

September

Date	RainAmount (mm)
1	5.334
7	3.048
10	.508
14	.254
15	49.530
16	5.588
24	5.334
25	26.162
26	.762
28	.762
29	1.016
30	4.318

"Monthly Total" 102.6

October

Date	Rainamount (mm)
2	1.778
4	1.016
8	2.286
10	26.162
11	7.112
12	.254
15	.508
16	.762
24	7.366
25	.254
26	2.286
27	.254
30	.508
31	1.524

"Monthly Total" 52.1

November

Date	Rainamount (mm)
8	.508
10	2.286
11	16.002
13	1.270
17	5.588
18	.254
19	.508
21	.508
22	1.016
23	3.556
26	.762

"Monthly Total" 32.3

December	
Date	RainAmount (mm)
1	1.270
2	3.048
4	.762
5	3.556
6	.254
9	1.778
10	4.572
11	3.810
12	5.588
13	.254
14	.254
15	4.064
16	13.970
18	4.826
20	.254
21	.508
24	1.016
25	.508

"Monthly Total" 50.3