

1. Identification Information

1.1 Citation

8. Citation Information

8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina

8.1 Originator: North Inlet – Winyah Bay (NIW) National Estuarine Research Reserve

8.1 Originator: D. Allen

8.1 Originator: E. Chipouras

8.2 Publication Date: 20020701

8.4 Title: North Inlet – Winyah Bay (NIW) National Estuarine Research Reserve Meteorological Data, North Inlet Estuary, Georgetown, South Carolina: 1997 – 1999.

8.6 Geospatial Data Presentation Form: comma delimited text and MS Excel spreadsheet in yearly files

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA

8.8.2 Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, Baruch Marine Field Lab, University of South Carolina

8.9 Other Citation Details: These data were collected under the auspices and protocols of the NIW National Estuarine Research Reserve but are not considered official System-Wide Monitoring Program (SWMP) data. SWMP Weather was implemented in 2001. This database and the associated metadata are the Baruch Institute's versions, are independent of the NERR/CDMO versions, and follow Baruch's quality control and assurance procedures in addition to NIW NERR protocols.

8.10 Online Linkage: <http://links.baruch.sc.edu/data/>

1.2.1 Abstract:

The North Inlet Estuary and the adjacent lower northeastern section of Winyah Bay Estuary were designated as part of the National Estuarine Research Reserve System in 1992. The North Inlet - Winyah Bay (NIW) NERR's environmental monitoring program began running under the auspice of the NERR program in June 1993. In 1995, the NERR program began a System-Wide Monitoring Program that set protocols for monitoring the estuarine environment. Collection protocols for weather data were not developed until 1997, and the NIW site's data collection procedures changed from the previous 15 years to follow these new guidelines. The NIW meteorological data were collected on a 15-minute, hourly and 24-hour basis beginning July 2, 1997, in North Inlet Estuary, Georgetown County, SC. Readings were taken 24 hours a day, every day of the year, except when individual probes or the entire meteorological station were down. The station includes sensors for air temperature, relative humidity, photosynthetically active solar radiation (LiCor sensor), barometric pressure, wind speed, wind direction, solar radiation (Eppley sensor), and rain. All sensors were scanned every 5 seconds to generate 15-minute totals for rain and LiCor solar radiation, and hourly and 24-hour averages for all other parameters. Fifteen-minute instantaneous readings were also collected for all parameters except rain and LiCor. Only the 15-minute data for 1997 through 1999 are available. All LiCor data were removed because they were found to be incorrect (See Supplemental Information and Anomalous Data Sections).

1.2.2 Purpose:

The National Oceanographic and Atmospheric Administrations' (NOAA) National Estuarine Research Reserve System (NERRS) implemented the NERR System-wide Monitoring Program (SWMP) in order "to identify and track short-term variability and long-term changes in the integrity and biodiversity of representative estuarine ecosystems and coastal watersheds for the purpose of contributing to effective national, regional, and site specific coastal zone management." The first component, and the initial focus, of this comprehensive plan is the monitoring of abiotic factors such as water quality and meteorological parameters.

The principal objective of this dataset is to monitor and archive meteorological data for the North Inlet - Winyah Bay NERR in order to observe environmental variability, changes, or trends over time, for use in short and long-term studies at North Inlet, and for comparisons to other NERR sites. As part of the NERR System-wide monitoring program, this information will also contribute to effective national, regional, and site specific coastal zone management.

1.2.3 Supplemental Information:

Both the CR10X datalogger program and the data collection schedule have been modified over the course of the dataset as problems with the weather station were addressed or attempts were made to produce a better dataset. The datalogger program contains information that is unique to each sensor, and as a result, is modified as sensors are changed out and calibrated, or when a new sensor model is added to the weather station. In addition, the data collection procedure dictated by the program was modified over the course of the dataset as problems with the collecting procedure were addressed. Some information on the changes made to the program (from 1997 through 1999) was documented in a

“log” at the beginning of the program; unfortunately, this log was incomplete and not all versions of the program were archived. The existing program versions are located in the NERR MET 97-99 Documentation Notebook, which is kept on-site at the Baruch Marine Lab and overseen by Baruch’s Data Manager. Every attempt was made by the Data Manager to correlate any anomalous or missing data with changes that were made to the program; this is recorded in the Anomalous Data and/or Missing Data documentation.

LiCor Solar Radiation Data:

The LiCor solar radiation sensor is a component of the weather station, however, throughout the dataset there were problems with the sensor and the protocol for data collection from the sensor. As a result, all LiCor data have been determined to be inaccurate and removed from this dataset. For further documentation of the rationale behind removing the LiCor data, see the Anomalous Data Section or the LiCor Documentation provided in the NERR MET 97-99 Documentation Notebook.

In addition, the CR10X datalogger program was rewritten on 10/19/1997 to change any reading less than zero to zero in the raw data. These readings may indicate an incorrect multiplier, calibration issues that should be addressed, or sensor malfunctions. Since the values were manipulated in the raw data, it was impossible to determine their cause and make an informed decision as to whether or not they should remain in the edited dataset. On 4/17/2002, Baruch’s data managers met with representatives from the Southeastern Regional Climate Center of the South Carolina DNR, representatives from the CDMO, and two NERR technicians to discuss this and other matters. As a result of this meeting, a formal recommendation was made to the CDMO to cease the manipulation of these values at the data collection level (raw data) and to instead handle the matter at the data management editing level where informed decisions can be made and documented. The CDMO and the Data Management Committee reviewed the recommendation, agreed with it, and will begin implementing it in January of 2003.

Relative Humidity Data:

The CR10X datalogger program was rewritten on 10/19/1997 to change any reading over 100% to 100% in the raw data. Before this change was made there were often readings recorded at over 100. These readings may indicate super saturation of the air, calibration issues that should be addressed, or even sensor malfunctions. As long as the values were manipulated in the raw data, it was impossible to determine their cause and make an informed decision as to whether or not they should remain in the edited dataset. On 4/17/2002, Baruch’s data managers met with representatives from the Southeastern Regional Climate Center of the South Carolina DNR, representatives from the CDMO, and two NERR technicians to discuss this and other matters. As a result of this meeting, a formal recommendation was made to the CDMO to end the manipulation of these values at the data collection level (raw data) and to instead handle the matter at the data management editing level where informed decisions can be made and documented. The CDMO and the Data Management Committee reviewed the recommendation, agreed with it, and will begin implementing it in January of 2003.

Wind Speed Data:

The wind speed data from 7/2/1997 through 12/31/1999 does not contain zero wind speed readings (with the exception of one month during that time). During this time, the sensor’s offset number was recorded when there was no wind. The offset number is the threshold from which the sensor can first recognize wind and, when it appears in the data, represents a zero. Each sensor model has its own offset number, so the value recorded in place of zero differed throughout the dataset. See the Anomalous Data Section for more information on the wind speed data recorded during specific time periods.

Wind Direction Data:

As mentioned above, the wind sensor from 1997-1999 did not use a conditional statement to set the wind speed to zero if there was no wind. As a result, there were no zero wind speed readings and the wind speed offset number was reported as a wind speed reading instead. It is likely that during these times a wind direction was recorded as well, when in fact, there can be no wind direction if there is no wind speed. As a result, users should be aware of possible 15-minute instantaneous wind direction readings taken when the wind speed offset number was recorded.

1.3 Time Period of Content:

9.3 Range of Dates/Times

9.3.1 Beginning Date: 19970702

9.3.3 Ending Date: 19991231

1.3.1 Currentness Reference

Observed

1.4 Status:

1.4.1 Progress: Complete

1.4.2 Maintenance and update frequency: As needed

99.1.5.1 Description of Geographic Extent:

Oyster Landing pier in Crab Haul Creek – 33:20:58 Lat., 79:11:34 Long.

This tidal marsh creek resides in the North Inlet Estuary. The North Inlet Estuary lies east of the uplands of Hobcaw Barony (also known as the Belle W. Baruch Property). To the north of the Estuary is the Debordieu Colony Property. The Estuary is located in Georgetown County, South Carolina.

1.5.2 Bounding Rectangle Coordinates:

1.5.2.1 West Bounding Coordinate: -79.192

1.5.2.2 East Bounding Coordinate: -79.167

1.5.2.3 North Bounding Coordinate: 33.350

1.5.2.4 South Bounding Coordinate: 33.327

1.6 Keywords

1.6.1 Theme

1.6.1.1 Theme Keyword Thesaurus:	None
1.6.1.2 Theme Keyword:	Weather
1.6.1.2 Theme Keyword:	Meteorological
1.6.1.2 Theme Keyword:	Climate
1.6.1.2 Theme Keyword:	Coastal
1.6.1.2 Theme Keyword:	Estuary
1.6.1.2 Theme Keyword:	Ecosystem
1.6.1.2 Theme Keyword:	Marsh
1.6.1.2 Theme Keyword:	Salt Marsh
1.6.1.2 Theme Keyword:	Tidal Creek
1.6.1.2 Theme Keyword:	NERR
1.6.1.2 Theme Keyword:	SWMP
1.6.1.2 Theme Keyword:	Air Temperature
1.6.1.2 Theme Keyword:	Wind Speed
1.6.1.2 Theme Keyword:	Barometric Pressure
1.6.1.2 Theme Keyword:	Relative Humidity
1.6.1.2 Theme Keyword:	Solar Radiation
1.6.1.2 Theme Keyword:	Photosynthetically Active Radiation
1.6.1.2 Theme Keyword:	PAR
1.6.1.2 Theme Keyword:	Rain
1.6.1.2 Theme Keyword:	Precipitation
1.6.1.2 Theme Keyword:	Wind Direction

1.6.2 Place

1.6.2.1 Place Keyword Thesaurus:	None
1.6.2.2 Place Keyword:	North Inlet
1.6.2.2 Place Keyword:	North Inlet Estuary
1.6.2.2 Place Keyword:	South Carolina
1.6.2.2 Place Keyword:	Atlantic Coast
1.6.2.2 Place Keyword:	Oyster Landing
1.6.2.2 Place Keyword:	Crab Haul Creek
1.6.2.2 Place Keyword:	East Coast
1.6.2.2 Place Keyword:	Southeast Coast
1.6.2.2 Place Keyword:	Coastal
1.6.2.2 Place Keyword:	Georgetown County
1.6.2.2 Place Keyword:	USA

1.6.4 Temporal

1.6.4.1 Temporal Keyword Thesaurus:	None
1.6.4.2 Temporal Keyword:	1997
1.6.4.2 Temporal Keyword:	1998
1.6.4.2 Temporal Keyword:	1999
1.6.4.2 Temporal Keyword:	1990s
1.6.4.2 Temporal Keyword:	15 Minutes
1.6.4.2 Temporal Keyword:	Hour
1.6.4.2 Temporal Keyword:	Day
1.6.4.2 Temporal Keyword:	Week
1.6.4.2 Temporal Keyword:	Month
1.6.4.2 Temporal Keyword:	Year

1.7 Access Constraints:

None; however, it is strongly recommended that these data be directly acquired from the Belle W. Baruch Institute for Marine Biology and Coastal Research and not indirectly through other sources which may have changed the data in some way.

1.8 Use Constraints:

According to the Belle W. Baruch Institute for Marine Biology and Coastal Research:

Following academic courtesy standards, the PI (originators), the North Inlet – Winyah Bay NERR site, the University of South Carolina's Belle W. Baruch Institute for Marine Biology and Coastal Research, and Grantor (see Data Set Credit section) should be fully acknowledged in any subsequent publications in which any part of these data are used. Use of the data without completely reading and understanding the metadata is not recommended. The Baruch Institute, Baruch Institute researchers, and Grantor are not responsible for the use and/or misuse of data from this database. See the section on Distribution Liability for more information.

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.

1.9 Point of Contact:

10.2 Contact Organization Primary

10.2.1 Contact Organization:	Univ. of South Carolina's Baruch Institute
10.2.2 Contact Person:	Ginger Ogburn-Matthews
10.3 Contact Position:	Research Data Manager & Analyst

10.4 Contact Address

10.4.1 Address Type:	Mailing Address
10.4.2 Address:	USC Baruch Marine Field Laboratory
10.4.2 Address:	P.O. Box 1630
10.4.3 City:	Georgetown
10.4.4 State or Province:	South Carolina
10.4.5 Postal Code:	29442
10.4.6 Country:	USA

10.5 Contact Voice Telephone: (843) 546-6219

10.7 Contact Facsimile Telephone: (843) 546-1632

10.8 Contact Electronic Mail Address: ginger@belle.baruch.sc.edu

10.9 Hours of Service: 8:30 am to 4:30 pm Mon.- Friday

1.11 Data Set Credit:

Data collection has been supported by the University of South Carolina (USC) and the National Oceanic & Atmospheric Administration (NOAA) through the Office of Ocean and Coastal Resource Management, Estuarine Reserves Division (initial award number NA270R0322-01 October 15, 1992). The North Inlet – Winyah Bay National Estuarine Research Reserve, overseen by the USC's Belle W. Baruch Institute for Marine Biology and Coastal Research, is in charge of gathering, managing, and distributing these data for research, education, and coastal zone management purposes. Several researchers, technicians, and data managers contributed to the dataset.

1.14 Native Data Set Environment:

Raw CR10X data files are in comma delimited (.csv) format. These data files were then read into Microsoft Excel software and edited. The final files are in a tabular text (.csv) format.

Related NIW NERR/Baruch Meteorological Databases:

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.1 Originator: North Inlet – Winyah Bay (NIW) National Estuarine Research Reserve

8.1 Originator: Dennis Allen

8.1 Originator: Wendy Allen

8.1 Originator: Erik Smith

8.1 Originator: Andrew Lohrer

8.1 Originator: Chris Buzzelli

8.1 Originator: Amy Cook

8.1 Originator: Tracy Buck

8.1 Originator: Jennifer Keesee

8.1 Originator: Jennifer Jarrell

8.2 Publication Date: 20060331

8.4 Title: North Inlet – Winyah Bay (NIW) National Estuarine Research Reserve Meteorological Data, North Inlet Estuary, Georgetown, South Carolina: 2000 – 2004.

8.5 Edition: Second Edition

8.6 Geospatial Data Presentation Form: comma delimited digital data and Microsoft Excel spreadsheet in yearly files

8.7 Series Information

8.7.1 Series Name: Baruch Institute's Meteorological Database for the North Inlet Estuary, South Carolina

8.7.2 Issue Identification: January 1, 2000 – December 31, 2004

8.8 Publication Information:

8.8.1 Publication Place: Baruch Marine Field Laboratory, Georgetown, SC USA

8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.9 Other Citation Details: The 2001-2004 data were collected under the auspices and protocols of the National Estuarine Research Reserve's (NERR's) System-Wide Monitoring Program (SWMP) for the North Inlet – Winyah Bay (NIW) Reserve, which is hosted by the Baruch Marine Field Lab. The 2000 data were collected under NIW NERR auspices and protocols, but were not considered official SWMP data. This database and metadata document are Baruch Institute's versions, created by Baruch's data managers, and follow Baruch's quality control and assurance procedures in addition to NIW NERR and CDMO protocols. Both data and metadata vary from the NERR/CDMO versions.

8.10 Online linkage: <http://links.baruch.sc.edu/data/>

8.11 Larger Work Citation:

8. Citation Information:

8.1 Originator: National Oceanic and Atmospheric Administration (NOAA)

8.1 Originator: Office of Ocean and Coastal Resource Management (OCRM)

8.1 Originator: National Estuarine Research Reserve System (NERR)

8.2 Publication Date: 1995

8.4 Title: NERR System-Wide Monitoring Program (SWMP)

8.6 Geospatial Data Presentation Form: tab delimited text (spreadsheet)

8.8 Publication Information:

8.8.1 Publication Place: Georgetown, South Carolina

8.8.2 Publisher: NERR Centralized Data Management Office

8.10 Online Linkage: <http://nerrs.noaa.gov/Monitoring/> or <http://nerrs.noaa.gov/Monitoring/History.html>

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.1 Originator: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve

8.1 Originator: Dennis Allen

8.1 Originator: Wendy Allen

8.1 Originator: Erik Smith

8.1 Originator: Andrew Lohrer

8.1 Originator: Chris Buzzelli

8.1 Originator: Amy Cook

8.1 Originator: Tracy Buck

8.1 Originator: Jennifer Keesee

8.2 Publication Date: 2005

8.4 Title: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve Meteorological Data, North Inlet Estuary, Georgetown, South Carolina: 2001-2004.

8.6 Geospatial Data Presentation Form: comma and tab delimited text (spreadsheet) in yearly files

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina

8.8.2 Publisher: NERR Centralized Data Management Office

8.9 Other Citation Details: These data were collected under the auspices and protocols of the National Estuarine Research Reserve's (NERR's) System-Wide Monitoring Program (SWMP). This is the NERR/CDMO version of the database.

8.10 Online Linkage: <http://cdmo.baruch.sc.edu>

8.11 Larger Work Citation:

8. Citation Information:

8.1 Originator: National Oceanic and Atmospheric Administration (NOAA)

8.1 Originator: Office of Ocean and Coastal Resource Management (OCRM)

8.1 Originator: National Estuarine Research Reserve System (NERR)

8.2 Publication Date: 1995

8.4 Title: NERR System-Wide Monitoring Program (SWMP)

8.6 Geospatial Data Presentation Form: tab delimited text (spreadsheet)

8.8 Publication Information:

8.8.1 Publication Place: Georgetown, South Carolina

8.8.2 Publisher: NERR Centralized Data Management Office

8.10 Online Linkage: <http://nerrs.noaa.gov/Monitoring/> or <http://nerrs.noaa.gov/Monitoring/History.html>

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.1 Originator: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve

8.1 Originator: Dennis Allen

8.1 Originator: Wendy Allen

8.1 Originator: Andrew Lohrer

8.1 Originator: Tracy Buck

8.1 Originator: Jennifer Keesee

8.1 Originator: Jennifer Jarrell

8.2 Publication Date: Unpublished material

8.4 Title: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve Meteorological Data, North Inlet Estuary, Georgetown, South Carolina: 2000.

8.6 Geospatial Data Presentation Form: comma and tab delimited text (spreadsheet) in a yearly file

8.9 Other Citation Details: These data were collected under the auspices and protocols of the NIW National Estuarine Research Reserve but are not considered official System-Wide Monitoring Program (SWMP) data. SWMP Weather was implemented in 2001. This is the NIW NERR version of the database.

1.15 Cross Reference:

8. Citation Information

8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina

8.1 Originator: F.J. Vernberg

8.1 Originator: B. Kjerfve

8.1 Originator: W.K. Michener

8.2 Publication Date: 20011219

8.4 Title: Long Term Ecological Research (LTER) Climate Data with Water Parameters from North Inlet Meteorological Station, North Inlet Estuary, Georgetown, South Carolina: 1982-1996.

8.5 Edition: Second Edition

8.6 Geospatial Data Presentation Form: comma delimited digital data and MS Excel spreadsheet

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA

8.8.2 Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, Baruch Marine Field Lab, University of South Carolina

8.9 Other Citation Details: LTER Data Set Code: NIN001

8.10 Online Linkage: <http://links.baruch.sc.edu/data/>

8.11 Larger Work Citation:

8. Citation Information:

8.1 Originator: W.K. Michener (Editor)

8.1 Originator: A.B. Miller (Editor)

8.1 Originator: R. Nottrott (Editor)

8.2 Publication Date: 1990

8.4 Title: Long-Term Ecological Research Network Core Data Set Catalog

8.6 Geospatial Data Presentation Form: catalog in book and on-line form

8.8 Publication Information:

8.8.1 Publication Place: Columbia, South Carolina USA

8.8.2 Publisher: Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina

8.9 Other Citation Details: Published for the Long-Term Ecological Research Network

1.15 Cross Reference:

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.1 Originator: W. K. Michener

8.1 Originator: D. Taylor

8.2 Publication Date: 20030627

8.4 Title: Long-Term Ecological Research (LTER) National Weather Service Station Data for the North Inlet Estuary, Georgetown, South Carolina: 1986 – 1996

8.5 Edition: Second Edition

8.6 Geospatial Data Presentation Form: comma delimited digital data and MS Excel spreadsheet

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA

8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.9 Other Citation Details: LTER Data Set Code NIN002

8.10 Online linkage: <http://links.baruch.sc.edu/data/>

8.11 Larger Work Citation:

8. Citation Information

8.1 Originator: W.K. Michener (Editor)

8.1 Originator: A.B. Miller (Editor)

8.1 Originator: R. Nottrott (Editor)

8.2 Publication Date: 1990

8.4 Title: Long-Term Ecological Research Network Core Data Set Catalog

8.6 Geospatial Data Presentation Form: catalog in book and on-line form

8.8 Publication Information:

8.8.1 Publication Place: Columbia, South Carolina, USA

8.8.2 Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina

8.9 Other Citation Details: Published for the Long-Term Ecological Research Network

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina

8.1 Originator: North Inlet – Winyah Bay National Estuarine Research Reserve (NIW NERR)

8.1 Originator: Belle W. Baruch Institute of Coastal Ecology and Forest Science

8.2 Publication Date: 200301

8.4 Title: Long-Term Rainfall Monitoring Database (RAINDAZE) for Hobcaw Barony and the North Inlet Estuary, Georgetown, South Carolina: 1978 – 2001.

8.5 Edition: First Edition

8.6 Geospatial Data Presentation Form: comma delimited digital data and MS Excel spreadsheet

8.7 Series Information

8.7.1 Series Name: Baruch Institute's Meteorological Database for the North Inlet Estuary, South Carolina

8.7.2 Issue Identification: April 1, 1978 – December 31, 2001

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA

8.8.2 Publisher: The Belle W. Baruch Institute for Marine Biology and Coastal Research, Baruch Marine Field Lab, University of South Carolina

8.9 Other Citation Details: The 1997 through 2001 data were collected under the auspices and protocols of the NIW National Estuarine Research Reserve as part of the NERRMET databases.

8.10 Online linkage: <http://links.baruch.sc.edu/data/>

Other NIW NERR/Baruch Databases:

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.1 Originator: North Inlet-Winyah Bay (NIW) National Estuarine Research Reserve

8.1 Originator: Dennis Allen

8.1 Originator: Andrew Lohrer

8.1 Originator: Evan Chipouras

8.1 Originator: Nicole Rutherford

8.1 Originator: Chris Spruck

8.1 Originator: Chris Aadland

8.1 Originator: Jennifer Jarrell

8.2 Publication Date: 20031121

8.4 Title: North Inlet-Winyah Bay National Estuarine Research Reserve's (NERR) Estuarine Water Quality Data for the North Inlet and Winyah Bay Estuaries, Georgetown, South Carolina: 1993-2002

8.5 Edition: First Edition

8.6 Geospatial Data Presentation Form: comma delimited digital data and MS Excel spreadsheet in yearly files

8.7 Series Information

8.7.1 Series Name: Baruch Institute's Water Quality Long-Term Monitoring Database for the North Inlet and Winyah Bay Estuaries, South Carolina

8.7.2 Issue Identification: October 25, 1993 - December 31, 2002

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA

8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.9 Other Citation Details: These data were collected under the auspices and protocols of the North Inlet-Winyah Bay NERR. The National Estuarine Research Reserve's (NERR's) System-Wide Monitoring Program (SWMP) protocols took effect in 1995. This database and the associated metadata are the Baruch Institute's versions, are independent of the NERR/CDMO versions, and follow Baruch's quality control and assurance procedures in addition to NERR SWMP protocols.

8.10 Online linkage: <http://links.baruch.sc.edu/data/>

8.11 Larger Work Citation:

8. Citation Information:

8.1 Originator: National Oceanic and Atmospheric Administration (NOAA)

8.1 Originator: Office of Ocean and Coastal Resource Management (OCRM)

8.1 Originator: National Estuarine Research Reserve System (NERR)

8.2 Publication Date: 1995

8.4 Title: NERR System-Wide Monitoring Program (SWMP)

8.6 Geospatial Data Presentation Form: tab delimited text (spreadsheet)

8.8 Publication Information:

8.8.1 Publication Place: Georgetown, South Carolina

8.8.2 Publisher: NERR Centralized Data Management Office

8.10 Online Linkage: <http://nerfs.noaa.gov/Monitoring/> or <http://nerfs.noaa.gov/Monitoring/History.html>

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

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8.1 Originator: Jennifer Jarrell

8.1 Originator: Andrew Lohrer

8.1 Originator: Evan Chipouras

8.1 Originator: Tracy Buck

8.1 Originator: Chris Buzzelli

8.2 Publication Date: 2005

8.4 Title: North Inlet-Winyah Bay National Estuarine Research Reserve's (NERR) Estuarine Water Quality Data for the North Inlet and Winyah Bay Estuaries, Georgetown, South Carolina: 1995-2004

8.6 Geospatial Data Presentation Form: comma and tab delimited text (spreadsheet) in yearly files

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA

8.8.2 Publisher: NERR Centralized Data Management Office

8.9 Other Citation Details: These data were collected under the auspices and protocols of the North Inlet-Winyah Bay NERR. The National Estuarine Research Reserve's (NERR's) System-Wide Monitoring Program (SWMP) protocols took effect in 1995. This is the NERR/CDMO version of the database.

8.10 Online linkage: <http://cdmo.baruch.sc.edu>

8.11 Larger Work Citation:

8. Citation Information:

8.1 Originator: National Oceanic and Atmospheric Administration (NOAA)

8.1 Originator: Office of Ocean and Coastal Resource Management (OCRM)

8.1 Originator: National Estuarine Research Reserve System (NERR)

8.2 Publication Date: 1995

8.4 Title: NERR System-Wide Monitoring Program (SWMP)

8.6 Geospatial Data Presentation Form: tab delimited text (spreadsheet)

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8.8.1 Publication Place: Georgetown, South Carolina

8.8.2 Publisher: NERR Centralized Data Management Office

8.10 Online Linkage: <http://nerfs.noaa.gov/Monitoring/> or <http://nerfs.noaa.gov/Monitoring/History.html>

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina

8.1 Originator: North Inlet-Winyah Bay (NIW) National Estuarine Research Reserve

8.1 Originator: Bill Johnson

8.1 Originator: Alan Lewitus

8.1 Originator: Drew Lohrer

8.1 Originator: Dennis Allen

8.1 Originator: Danny Taylor

8.1 Originator: Tonia Robinson

8.1 Originator: Virginia Ogburn-Matthews

8.2 Publication Date: 20030328

8.4 Title: North Inlet-Winyah Bay National Estuarine Research Reserve's (NERR) Estuarine Surface Water Nutrient, Suspended Sediment, and Chlorophyll a Data for the North Inlet and Winyah Bay Estuaries, Georgetown, South Carolina: 1993-2001

8.6 Geospatial Data Presentation Form: comma delimited digital data and MS Excel spreadsheet

8.7 Series Information

8.7.1 Series Name: Baruch Institute's Water Chemistry, Chlorophyll a, and Suspended Sediment Long-Term Monitoring Database for the North Inlet Estuary, South Carolina

8.7.2 Issue Identification: June 1, 1993 - December 31, 2001

8.8 Publication Information:

8.8.1 Publication Place: Georgetown, South Carolina, USA

8.8.2 Publisher: Belle W. Baruch Institute for Marine Biology and Coastal Research, University of South Carolina

8.9 Other Citation Details: These data were collected under the auspices and protocols of the North Inlet-Winyah Bay NERR. The National Estuarine Research Reserve's (NERR's) System-Wide Monitoring Program (SWMP) instated their protocols in the year 2002. This database and the associated metadata are the Baruch Institute's versions, are independent of the NERR/CDMO versions, and follow Baruch's quality control and assurance procedures in addition to NIW NERR protocols.

8.10 Online linkage: <http://links.baruch.sc.edu/data/>

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences

8.1 Originator: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve

8.1 Originator: Wendy Allen

8.1 Originator: Chris Buzzelli

8.1 Originator: Tracy Buck

8.1 Originator: Bill Johnson

8.1 Originator: Jennifer Keese

8.1 Originator: Sarah Foose

8.2 Publication Date: 2005

8.4 Title: North Inlet - Winyah Bay (NIW) National Estuarine Research Reserve (NERR) Estuarine Surface Water Nutrient and Chlorophyll a Data for the North Inlet and Winyah Bay Estuaries, Georgetown, South Carolina: 2002-2004

8.6 Geospatial Data Presentation Form: comma and tab delimited text (spreadsheet) in yearly files

8.8 Publication Information:

8.8.1 Publication Place: Georgetown, South Carolina

8.8.2 Publisher: NERR Centralized Data Management Office

8.10 Online Linkage: <http://cdmo.baruch.sc.edu>

8.9 Other Citation Details: These data were collected under the auspices and protocols of the North Inlet-Winyah Bay NERR. The National Estuarine Research Reserve's (NERR's) System-Wide Monitoring Program (SWMP) protocols took effect in 2002. This is the NERR/CDMO version of the database.

8.11 Larger Work Citation:

8. Citation Information:

8.1 Originator: National Oceanic and Atmospheric Administration (NOAA)

8.1 Originator: Office of Ocean and Coastal Resource Management (OCRM)

8.1 Originator: National Estuarine Research Reserve System (NERR)

8.2 Publication Date: 1995

8.4 Title: NERR System-Wide Monitoring Program (SWMP)

8.6 Geospatial Data Presentation Form: tab delimited text (spreadsheet)

8.8 Publication Information:

8.8.1 Publication Place: Georgetown, South Carolina

8.8.2 Publisher: NERR Centralized Data Management Office

8.10 Online Linkage: <http://nerrs.noaa.gov/Monitoring/> or <http://nerrs.noaa.gov/Monitoring/History.html>

1.15 Cross Reference:

8. Citation Information

8.1 Originator: Dr. Dennis Allen

8.1 Originator: Ginger Ogburn-Matthews

8.1 Originator: Paul Kenny

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.1 Originator: North Inlet – Winyah Bay National Estuarine Research Reserve (NIW NERR)

8.2 Publication Date: 20040930

8.4 Title: Long-Term Low Tide Monitoring Data for Fishes, Shrimps, & Crabs in Oyster Landing Creek, North Inlet Estuary, Georgetown, South Carolina: 1983-2003.

8.5 Edition: Second

8.6 Geospatial Data Presentation Form: comma delimited digital text data and Microsoft Excel spreadsheets. Documentation is in Microsoft Word and text formats.

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA

8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.9 Other Citation Details: The 1983 through June 1993 data were collected under the auspices and protocols of the Long-Term Ecological Research (LTER) Program. This database called, NIN10 - LTER Oyster Landing Biweekly Fish Sampling, was originally published on the LTER Program's website from 1993 to 1996. Data collected from June 1993 through 2003 was collected under the auspices of the North Inlet - Winyah Bay National Estuarine Research Reserve's monitoring program.

8.10 Online linkage: <http://links.baruch.sc.edu/data>

1.15 Cross Reference:

8. Citation Information

8.1 Originator: Dr. Dennis Allen

8.1 Originator: Virginia Ogburn-Matthews

8.1 Originator: Paul Kenny

8.1 Originator: Tracy Buck

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.1 Originator: North Inlet – Winyah Bay National Estuarine Research Reserve (NIW NERR)

8.2 Publication Date: unpublished material

8.4 Title: Long-Term High Tide Marsh Enclosure Data for Fishes, Shrimps, & Crabs in Oyster Landing Basin, North Inlet Estuary, Georgetown, South Carolina: 1994-2004.

8.6 Geospatial Data Presentation Form: comma delimited digital text data and Microsoft Excel spreadsheets. Documentation is in Microsoft Word and text formats.

1.15 Cross Reference:

8. Citation Information:

8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.1 Originator: Dr. Dennis Allen

8.1 Originator: Lynn Barker

8.1 Originator: Ginger Ogburn-Matthews

8.1 Originator: Paul Kenny

8.1 Originator: Tracy Buck

8.2 Publication Date: 2006

8.4 Title: Long-Term Motile Epibenthic Macrozooplankton Data for the North Inlet Estuary, Georgetown, South Carolina: 1981-2003

8.5 Edition: Second

8.6 Geospatial Data Presentation Form: comma delimited text and MS Excel spreadsheet

8.7 Series Information

8.7.1 Series Name: Baruch Institute's Epibenthic Macrozooplankton Long-Term Monitoring Database for the North Inlet Estuary, South Carolina.

8.7.2 Issue Identification: January 20, 1981 – December 22, 2003

8.8 Publication Information:

8.8.1 Publication Place: Belle W. Baruch Marine Field Laboratory, Georgetown, South Carolina, USA

8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

8.9 Other Citation Details: Funded by the National Science Foundation's (NSF) Long Term Ecological Research (LTER) Program (LTER Data Set Code NIN008) and by the National Oceanic and Atmospheric Administration's (NOAA) National Estuarine Research Reserve (NERR) Program.

8.10 Online linkage: <http://links.baruch.sc.edu/data/>

2. Data Quality Information

2.1 Attribute Accuracy

2.1.1 Attribute Accuracy Report

Information on the accuracy of these sensors was taken from the relevant Campbell Scientific Instruction manual or sensor manufacturer's (if not Campbell) instruction manual. These manuals are stored on site at the Baruch Marine Field Lab and maintained by the NERR Weather Research Specialist. Copies of the pertinent information from each manual are also available in the NERR MET 97-99 Documentation Notebook. For additional documentation on the sensors and the dates they were in use, see the Field Methodology Description section.

Air Temperature:

Sensor: Temperature and Relative Humidity

Model #: HMP45C

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

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

HMP35C*

-35°C to $+50^{\circ}\text{C}$

$\pm 0.4^{\circ}\text{C}$ from -24°C to $+48^{\circ}\text{C}$

Relative Humidity:

Sensor: Temperature and Relative Humidity

Model #: HMP45C

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

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

Temperature Dependence of RH Measurement: $\pm 0.05\%$ RH/ $^{\circ}\text{C}$

Typical Long Term Stability of RH sensor: better than 1% RH per year

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

HMP35C*

0-100%

same

$\pm 0.04\%$ RH/ $^{\circ}\text{C}$

same

unkn

*The HMP35C was in use throughout most of this dataset.

LiCor Solar Radiation:

Sensor: LiCor Quantum Sensor - Model # LI190SB

Absolute Calibration: $\pm 5\%$ traceable to the US National Bureau of Standards

Sensitivity: Typically $8\ \mu\text{A}$ per $1000\ \mu\text{moles s}^{-1}\text{ m}^{-2}$

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

Temperature Dependence: $\pm 0.15\%$ per $^{\circ}\text{C}$ maximum

Response Time: $10\ \mu\text{s}$

Range: 0-2000

Barometric Pressure:

Sensor: Barometric Pressure Sensor - Model #: CS105

Operating Range: Pressure: 600-1060 mb

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

Accuracy: $\pm 0.5\text{mb}$ @ 20°C

$\pm 2\text{ mb}$ between 0°C and $+40^{\circ}\text{C}$

$\pm 4\text{ mb}$ between -20°C and $+45^{\circ}\text{C}$

$\pm 6\text{ mb}$ between -40°C and $+60^{\circ}\text{C}$

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

Wind Speed:

Sensor: Wind Speed and Direction, Wind Sentry - Model #: 03001

Wind Speed Operating Range: 0 to 50 m/s (0 to 112 mph), gust survival at 60 m/s

Wind Speed Threshold: 0.5 m/s (1.1 mph)

Wind Speed Accuracy: to within 2% (if calibrated properly)

Wind Direction:

Sensor: Wind Speed and Direction, Wind Sentry - Model #: 03001

Wind Direction Range: 360° mechanical, 355° electrical (5° open)

Wind Direction Threshold: 0.8 m/s (1.8 mph) at 10° displacement

1.8 m/s (4.0 mph) at 5° displacement

Wind Direction Accuracy: $\pm 5^{\circ}$ or better (if calibrated properly)

Eppley Solar Radiation:

Sensor: Eppley Black and White Pyranometer - Model # 8-48

Sensitivity: 10 microvolts/watt-meter⁻²

Temperature Dependence: $\pm 1.5\%$ constancy from -20°C to +40°C

Linearity: $\pm 1\%$ from 0 to 1400 watts meter⁻²

Calibration: to within $\pm 1\%$

Range: 0-2

Rain:

Sensor: Sierra-Misco Tipping Bucket Rain Gauge - Model #: 2500

Calibration: 0.25 mm

Accuracy: $\pm 1.0\%$ at 2inches/hr

2.1.2 Quantitative Attribute Accuracy Assessment

2.1.2.1 Attribute Accuracy Value

For Final dataset only NERRMET.YYYY.Final.15.xls and NERRMET.YYYY.Final.15.csv.

<u>Variable</u>	<u>Number of Decimal Places</u>	<u>NOAA Required Resolution*</u>
Date/Time (mm/dd/yy hh:mm)	0	
Jday	0	
Air Temperature	1	0.1°C
Relative Humidity	0	
LiCor Solar Radiation	1	
Barometric Pressure	0	
Wind Speed	1	0.1 m/s
Wind Direction	0	
Eppley Solar Radiation	3	
Rain	1	0.2 mm

*This information was obtained at <http://lwf.ncdc.noaa.gov/oa/climate/research/crn/crninstr.html>

See the Supplemental Information Section for accuracy reporting issues with the Licor, Relative Humidity, Wind Speed and Direction values.

2.1.2.2 Attribute Accuracy Explanation

The attribute accuracy values above were based on the accuracy, resolution, and range of measurement information available for each sensor. The number of decimal places published in the final database is meant to best represent the precision and accuracy of the data.

Date/Time: The date and time values are integers and have no decimal places assigned to them, they are accurate to the whole number.

Jday: The Julian date values are integers and have no decimal places assigned to them, they are accurate to the whole number.

Air Temperature: Based on the accuracy of both sensors used ($\pm 0.2^\circ\text{C}$ and $\pm 0.4^\circ\text{C}$), it was determined that a number in the hundredths place would not be accurate. Values were rounded to the nearest 10th (1 decimal place).

Relative Humidity: Based on the accuracy of both sensors used ($\pm 3\%$ RH at 90-100% RH) and the uncertainty of calibration ($\pm 1.2\%$ RH), it was determined that a number in the tenths place would not be accurate. Values were rounded to the nearest whole number.

LiCor Solar Radiation: Based on the uncertainty of calibration (to within 5% of full range) and the range of measurement (0-2000), an error of 100 millimoles/M² is possible in the calibration process. An expert in the field of solar radiation (Jim Morris, Univ. of South Carolina) recommended that reporting values with one decimal place would be more than sufficient for research use. Values were rounded to the nearest 10th (1 decimal place).

Barometric Pressure: Based on the accuracy of the sensor ($\pm 2\text{mb}$ between 1°C and +40°C, higher at more extreme temperatures), it was determined that a number in the tenths place would not be accurate. Values were rounded to the nearest whole number.

Wind Speed: Based on the threshold (0.5m/s) and the accuracy (within 2% of full scale) of the sensor, it was determined that a number in the hundredths place would not be accurate. Values were rounded to the nearest 10th (1 decimal place).

Wind Direction: Based on the threshold (1.8m/s at 5° displacement) and the accuracy ($\pm 5^\circ$) of the sensor, it was determined that a number in the tenths place would not be accurate. Values were rounded to the nearest whole number.

Eppey Solar Radiation: Based on the uncertainty of calibration (to within $\pm 1\%$) and the range of measurement (0-2), it was determined that a number in the thousandths place could still be valuable. An expert in the field of solar radiation (Jim Morris, Univ. of South Carolina), recommended that three decimal places be maintained in the final data set. Values were rounded to the nearest 1000th (3 decimal places).

Rain: Based on the accuracy ($\pm 1.0\%$ at 2inches/hr) and the minimum amount of rain recorded by the sensor (0.25mm), it was determined that a number in the hundredths place would not be accurate. Values were rounded to the nearest 10th (1 decimal place).

2.2 Logical Consistency Report:

Not applicable

2.3 Completeness Report:

The Data Manager verified the data files for typographical errors.

Specific data availability information may be found in the Missing Data Document (5 pages long), called “NERRMET.97-99.MissingData”. This section identifies data that are missing from the dataset (1997-1999) as well as erroneous/anomalous data that were removed by the Data Manager. For a justification of data removal, the user is referred to the Anomalous Data Document. Missing data values are represented by periods in the dataset.

The Anomalous Data Document (7 pages long), called “NERRMET.97-99.AnomalousData” does the following: 1) identifies data that have been determined to be inaccurate and removed from the final data set by the Data Manager, 2) provides justification for the removal of the inaccurate data, and 3) identifies “questionable” data. Questionable or suspect data are data that may be compromised in quality but remain in the data set. Data that have been removed from the final data set are still present in unedited and/or raw data files.

The NERRMET.97-99.MissingData and NERRMET.97-99.AnomalousData, along with the final data and .jpg graphics files, have been published on-line at <http://www.baruch.sc.edu> and in the NERR MET 97-99 Documentation Notebook.

2.5 Lineage

2.5.1 Methodology:

2.5.1.1 Methodology Type: Field Collection Procedures and Protocols

2.5.1.3 Methodology Description

Meteorological data were collected on a 15-minute, hourly, and 24 hour basis beginning on July 2, 1997 at Oyster Landing Pier. Readings were taken 24 hours a day, every day of the year, except when individual sensors or the entire meteorological station were down. NERR’s “CDMO Operations Manual” and operation manuals supplied by Campbell Scientific were used as guidelines for assembling meteorological data. The CDMO Operations Manual Version 4.0 can be found on the CDMO web site (<http://cdmo.baruch.sc.edu>) under General Information.

The weather station is located at the end of an 800-foot boardwalk (pier) ending in Crab Haul Creek. The wind speed and direction, temperature and humidity, barometric pressure, and Eppey solar radiation sensors were located on a 10m aluminum weather station tower which was mounted to the pier head. During the time frame of this dataset, the LiCor sensor and rain gauge were located next to each other on a small eastern-extending platform off of the boardwalk, just before the pier head (see Anomalous Data Document). After about October 1999, the weather tower was reduced to approximately 3.5 m high. This was done because of the difficulty of dropping the 10m tower for maintenance. As of 8/11/1999, the sensors were wired to the CR10X following the protocol outlined in the CDMO Manual (Version 4.0).

Weather Station Components:

1. 16' x 18" weatherproof enclosure, Campbell Scientific
2. PS512M 12 volt power supply with charging regulator and two 9-pin connectors, Campbell Scientific
3. 10162 Enclosure Relative Humidity Sensor, Campbell Scientific
4. CR10X Measurement and Control Module (Datalogger), Campbell Scientific
 - a. Dates in use: 7/97 – 12/31/99
5. HMP35C Temperature and Relative Humidity Probe, Campbell Scientific, with:
 - a. Thermistor
 - b. Capacitive relative humidity sensor, Vaisala

- c. Dates in use: 7/97 – 8/11/99
- HMP45C Temperature and Relative Humidity Probe, Campbell Scientific, with:
 - a. Platinum Resistance Temperature Detector (PRT)
 - b. HUMICAP 180 capacitive relative humidity sensor, Vaisala
 - c. Dates in use: 8/11/99 – 12/31/99
- 6. 03001-5 R.M. Young Wind Sentry Set, Campbell Scientific, with:
 - a. 03101-5 Anemometer
 - b. 03301-5 Vane
 - c. Dates in use: 7/97 – 12/31/99
- 7. CS105 Barometric Pressure Sensor, Campbell Scientific, with:
 - a. Barocap silicon capacitive pressure sensor, Vaisala
 - b. Dates in use: 7/97 – 12/31/99
- 8. 2500 Tipping Bucket Rain Gauge, Sierra-Misco Environment Ltd.
 - a. Dates in use: 7/97 – 12/31/99
- 9. 8-48 Eppley Black and White Pyranometer, The Eppley Lab, Inc.
 - a. Dates in use: 6/30/98 – 12/31/99
- 10. LI-190SB Quantum Terrestrial Radiation Sensor, LICOR, Inc.
 - a. Dates in use: 7/97 – 12/31/99

The sensors comprising the weather station changed throughout the data collection period. The dates in use above apply to the sensor model, not to individual sensors of the same model. Spare sensors were kept as back-ups and utilized if/when the primary sensor was sent to Campbell Scientific for repairs or calibration. These spares may be identical or older models.

Most sensors have a specific multiplier and/or offset number that must be incorporated into the Campbell Scientific CR10X datalogger collection program setup. They become components of the datalogger program and are essential to the collection of accurate information. Each time a sensor was changed, the program was modified to include the correct multiplier and offset number. The sensors used during a particular time frame and their multipliers were documented thoroughly in order to verify the accuracy of data. An Excel workbook was created with separate worksheets for each parameter's sensors. Each worksheet also contains any pertinent information on the multipliers or offsets in use for each sensor and how they were obtained. The Excel workbook was updated as sensor changes were made and is published on the NERRMET97-99 compact disk. A text version of the workbook is included in the Metadata posted on the Baruch website (<http://www.baruch.sc.edu>) and in the comment section of the CR10X program.

The CDMO Data Logger Program (nerr30.csi), loaded onto a Campbell Scientific CR10X datalogger, controls the sensors and data collection schedule. Five-second data (data were based on a 10-second interval from 7/2/97 to 8/22/97) from each instrument on the weather station are downloaded and used to produce 15-minute sample points (instantaneous readings) and hourly and 24-hour averages for the air temperature, relative humidity, barometric pressure, wind speed, and wind direction parameters. For the rain and LiCor solar radiation data, the 5-second data are used to generate 15-minute totals. The Eppley solar radiation data are only recorded as a 15-minute instantaneous reading. Maximum and minimum readings for the day, and the time that they occurred, are recorded for the air temperature, relative humidity, LiCor solar radiation, barometric pressure, and wind speed parameters, as well as the system's battery voltage. All 5-second data are discarded.

Beginning on 7/2/1997, the Campbell Scientific meteorological system and CR10X datalogger provided raw data via PC208W software to a personal computer in the Baruch Marine Lab. This software is located on a computer in the Baruch Marine Lab, to which the data are uploaded (every 5 minutes) via a short haul modem.

2.5.1.4 Methodology Citation:

8. Citation Information

8.1 Originator: National Estuarine Research Reserve System, Centralized Data Management Office

8.1 Originator: Belle W. Baruch Institute for Marine Biology and Coastal Research

8.1 Originator: V. Ogburn-Matthews

8.1 Originator: M.E. Crane

8.1 Originator: W. Jefferson

8.1 Originator: T.D. Small

8.1 Originator: D. Porter

8.2 Publication Date: 20000207

8.4 Title: CDMO Operations Manual, Version 4.0

8.6 Geospatial Data Presentation Form: Published Manuscript

8.8 Publication Information

8.8.1 Publication Place: Belle W. Baruch Marine Laboratory, Georgetown, SC

8.8.2 Publisher: National Estuarine Research Reserve System, Centralized Data Management Office

2.5.1.4 Methodology Citation:

8. Citation Information

8.1 Originator: Campbell Scientific Corporation

8.2 Publication Date: Unknown

8.4 Title: Sensor operation manuals

8.6 Geospatial Data Presentation Form: Manual

8.8 Publication Information

8.8.1 Publication Place: Logan, UT

8.8.2 Publisher: Campbell Scientific Corporation

2.5.1.4 Methodology Citation:

8. Citation Information

8.1 Originator: W.E. Thompson

8.1 Originator: S. Ross

8.2 Publication Date: 19970115

8.4 Title: North Carolina National Estuarine Research Reserve Meteorological Monitoring Program – Standard Operating Procedure for Collection of Data and Maintenance of Equipment

8.6 Geospatial Data Presentation Form: Published Manuscript

8.8 Publication Information

8.8.1 Publication Place: Wilmington, NC

8.8.2 Publisher: North Carolina NERR

2.5.1.4 Methodology Citation:

8. Citation Information

8.1 Originator: National Weather Service

8.2 Publication Date: 19960700

8.4 Title: Automated Surface Observing System Manual

8.6 Geospatial Data Presentation Form: Manual

2.5.1.4 Methodology Citation:

8. Citation Information

8.1 Originator: Environmental Protection Agency

8.2 Publication Date: 1995

8.4 Title: EPA Quality Assurance Handbook for Air Pollution Measurements Systems

8.6 Geospatial Data Presentation Form: Manual

8.9 Other Citation Details: Volume IV: Meteorological Measurements

2.5.1.4 Methodology Citation:

8. Citation Information

8.1 Originator: LTER Climate Committee

8.2 Publication Date: 19860600

8.4 Title: Standardized Meteorological Measurements for LTER Sites

8.6 Geospatial Data Presentation Form: Published Manuscript

2.5.1.4 Methodology Citation:

8. Citation Information

8.1 Originator: The American Association of State Climatologists

8.2 Publication Date: 19851000

8.4 Title: Heights and Exposure Standards for Sensors on Automated Weather Stations

8.6 Geospatial Data Presentation Form: Published Manuscript

8.8 Publication Information

8.8.1 Publication Place: The State Climatologist, Publication of the American Association of State Climatologists

8.8.2 Publisher: The American Association of State Climatologists

2.5.3.1 Process Description

In 1997, 98, and 99, raw comma delimited data were saved in approximate monthly blocks, directly from the datalogger, as “NERRMET.MMMYY.RAW.dat” files. In 1999, these files were then saved onto a separate hard drive and backed up onto the Baruch Marine Lab server. The monthly files were then imported into Excel, sorted by array number, and saved as “NERRMET.MMMYY.SORTED.xls” files. These files required a great deal of editing due to complex difficulties with the collection procedure. For this reason, only the 15-minute data were edited and made available to the public in a final dataset. It is recommended that the hourly and 24-hour data be reconstructed from the edited (final version) 15-minute data in order to avoid revisiting the same editing difficulties. Do not try to rescue the hourly and 24-hour data from the raw or process files; there are difficulties with this data that have not been detailed in this document.

The QA/QC and process steps performed to produce the final dataset are as follows:

NERRMET.MMMYY.SORTED.xls files:

1. Each monthly file was sorted by array number and the file was edited for problems in transfer from the raw data.
 - a. Once in Excel, it was determined that missing data in one column often resulted in the shifting over of the consecutive columns. These data were rescued from the raw files when possible.
2. The 15-minute arrays (150, 151, and 112), hourly arrays (101, 102, 103, 104, and 105), and the 24-hour arrays (241, 242, 243, 244, 245, and 246) were cut and pasted into consecutive rows in separate worksheets entitled “15min”, “hourly”, or “24hour”.

For 15-Minute Data Only:

1. Dates and times were verified between all arrays and array identifiers and extra date and time columns were removed.
2. The columns were centered and given headings.
3. Missing data were marked with a “.”. Markers for missing data, such as –99999 and –6999, entered by earlier data editors were also found and replaced with a “.”.
4. Columns for any missing parameters were added (and filled with “.” markers) so that each worksheet contained the same parameters, even if they were not in use at the time.
 - a. For example: the Eppley sensor wasn’t added until 6/30/98.
5. All LiCor solar radiation data were removed (See Anomalous Data Section).
6. Columns were formatted to retain the appropriate number of decimal places for the accuracy and sensitivity of the sensor.
 - a. These formats were determined to be appropriate by the Baruch data managers, based on each sensors accuracy, precision, and range of measurement.
 - b. The columns are formatted but still retain the original values in the Excel version of the final files.
7. Prior to 4/3/99 the rain sensor only reported a reading during rain events. These data were all cut and pasted into the appropriate date/time row location and the cells in between rain events were filled with zeros.
 - a. If the meteorological system was not functioning at the time, as evidenced by missing data for all of the other sensors, it was assumed that the rain sensor was not functioning either and these cells were filled with missing data markers.
 - b. After 4/3/99, the sensor recorded zeros when there was no rain, so this step was not necessary.
8. Monthly files were renamed as “NERRMET.MMMYY.EDIT.xls.”
 - a. These files still retain the hourly and 24-hour data but they have not been edited and should not be used.
9. All NERRMET.MMMYY.EDIT.xls files were combined into one worksheet for each year.
10. Verified that all dates and times were present and not repeated.
11. A date/time formatted column was inserted.
 - a. In this format, the recorded time of 2400 becomes 0000 on the following day. For instance, 7/2/1997 at 24:00 becomes 7/3/1997 at 00:00.
12. All parameters were graphed in SigmaPlot (version 8.0) in 6 month time periods and visually checked for outliers or trends indicating anomalous data. These files were saved as “NERRMET.YYYY.M-M.FINAL.GRAPHICS”, where M-M=1-6 (Jan-Jun) or 7-12 (Jly-Dec).
13. All questionable data were reported in the Anomalous Data Section.
 - a. When data were determined to be inaccurate, they were removed by the Data Manager and recorded in the both the Anomalous and Missing Data Sections.
 - b. All anomalous data and inaccurate/removed data were correlated with explanations from the comment portion of the data collection program, or any other documentation, whenever possible.
14. All other instances of missing data were identified and reported in the Missing Data Section.

- a. These instances were correlated with their cause whenever documentation was available.
- 15. Changed the LiCor 15-min total units to millimoles/M².
- 16. The files were saved as "NERRMET.YYYY.15.FINAL.xls".
 - a. These are annual files containing only 15-minute data (no hourly or 24-hour data).

In determining if data appeared to be erroneous or anomalous, the Data Manager used the CDMO's Weather Data Management Program (WDMP) as a guideline. The WDMP's criteria (relevant to 15-minute data) for flagging erroneous or anomalous data are as follows:

The WDMP flags any data that does not meet the following error criteria:

Air Temp:

- 15 minute sample not greater than *max* for the day
- 15 minute sample not less than the *min* for the day
- 15 minute sample not greater than 3.0 degrees C from the previous 15 minutes

Relative Humidity:

- Not changed by more than 25% from the previous 15 minutes

Rainfall:

- Rain not greater than 5 mm in 15 minutes
- No rain for the month

Wind Speed:

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

Wind Direction:

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

Pressure:

- Pressure greater than 1040 mb or less than 980 mb
- Pressure changes greater than 5 mb per hour

Program: CDMO Weather Data Management Program (WDMP)

Data Set: NIW NERR Meteorological

Program Authors: Mark E. Crane and Danna Dowdy

Principle Investigator: National Estuarine Research Reserve System, Centralized Data Management Office

Program Definition: This program reads a raw, comma delimited file created by the datalogger and converts it to an Access database. Within the database, the program checks the data against predetermined error criteria for anomalous data and produces error and summary reports.

Input: Data is read into the program from a "flat" (comma delimited) file produced by the CR10X datalogger.

2.5.2.3 Process Date: 200204

3. Spatial Data Organization Information

3.1 Indirect Spatial Reference:

North Inlet Estuary which is part of Hobcaw Barony is located in Georgetown County, South Carolina, USA

3.2 Direct Spatial Reference Method: Point

5. Entity and Attribute Information

5.2 Overview Description

5.2.1 Entity and Attribute Overview:

For “NERRMET.MMMYY.EDIT.xls” files only:

<u>Variable</u>	Type (total size of value.# of decimal places)	<u>Range of Measurement (min-max)</u>
J Day	Integer	1–365
Time	Integer	15–2400, 15-minute increments
Air Temperature	Real (5.1)	–40.0–+60.0 Degrees C
RH	Real (3.0)	0–100% Saturation
Licor	Real (6.1)	0.0 to approx. 2000.0 millimoles/M ²
BP	Real (4.0)	600–1060 millibars
Wind Speed	Real (4.1)	0.0–50.0 m/s
Wind Direction	Real (3.0)	0–360° mechanical, 0 – 355° electrical
Eppley	Real (5.3)	0.000–2.000 Langley’s/minute, 280 – 2800 nm
Rain	Real (4.1)	0.0–25.0 millimeters

For “NERRMET.YYYY.15.Final.xls” files only:

<u>Variable</u>	Type (total size of value.# of decimal places)	<u>Range of Measurement (min-max)</u>
Date/Time (mm/dd/yy hh:mm)	Integer	1 – 12, 1 – 31, 1997 – 1999, 0:00 – 23:45
J Day	Integer	1 – 365
Air Temperature	Real (5.1)	–40.0 – +60.0 Degrees C
RH	Real (3.0)	0 – 100% Saturation
Licor	Real (6.1)	0.0 to approx. 2000.0 millimoles/M ²
BP	Real (4.0)	600 – 1060 millibars
Wind Speed	Real (4.1)	0.0 – 50.0 m/s
Wind Direction	Real (3.0)	0 – 360° mechanical, 0 – 355° electrical
Eppley	Real (5.3)	0.000 – 2.000 Langley’s/minute, 280 – 2800 nm
Rain	Real (4.1)	0.0 – 25.0 millimeters

5.2.2 Entity and Attribute Detail Citation:

Definitions were developed by the NERRS CDMO and Baruch Institute’s researchers, data managers, and technicians; no published standards for entity definitions were used to define the entities used in this dataset. However, some of the entity type definitions are standard for the field of climatology and meteorology.

Entity Type Definition:

For “NERRMET.MMMYY.EDIT.xls” files only:

J Day = Julian day that the measurement was recorded.

Time = Time on the 24 hour clock that the measurement was recorded.

Air Temperature = The air temperature recorded at the designated 15-minute interval.

RH = The relative humidity recorded at the designated 15-minute interval.

Licor = The total amount of photosynthetically active radiation measured over the preceding 15 minutes, calculated with 180 instantaneous observations.

BP = The barometric pressure recorded at the designated 15-minute interval.

Wind Speed = The wind speed recorded at the designated 15-minute interval.

Wind Direction = The wind direction (the wind is coming from) recorded at the designated 15-minute interval.

Eppley = The instantaneous solar radiation (wavelengths between 280 and 2800 nm) recorded by the Eppley black and white pyranometer at the designated 15 minute interval. Note: the sensor does NOT subtract reflection from the ground.

Rain = The total amount of rain measured over the preceding 15-minutes, calculated with 180 observations.

For NERRMET.YYYY.15.FINAL.xls files only:

Date/Time = the date and time (on the 24 hour clock) that the measurement was recorded. The hour 2400 was modified to 0000 of the following day so that it would be recognized as a valid date/time by both Microsoft and SigmaPlot (graphing) software.

J Day = Julian day that the measurement was recorded.

Air Temperature = The air temperature recorded at the designated 15-minute interval.

RH = The relative humidity recorded at the designated 15-minute interval.

Licor = The total amount of photosynthetically active radiation measured over the preceding 15 minutes, calculated with 180 instantaneous observations.

BP = The barometric pressure recorded at the designated 15-minute interval.

Wind Speed = The wind speed recorded at the designated 15-minute interval.

Wind Direction = The wind direction (the wind is coming from) recorded at the designated 15-minute interval.

Eppey = The instantaneous solar radiation (wavelengths between 280 and 2800 nm) recorded by the Eppey black and white pyranometer at the designated 15 minute interval. Note: the sensor does NOT subtract reflection from the ground.

Rain = The total amount of rain measured over the preceding 15-minutes, calculated with 180 observations.

6. Distribution Information

6.1 Distributor:

10.2 Contact Organization Primary

10.1.2 Contact Organization:

Univ. of South Carolina's Baruch Institute

10.1.1 Contact Person:

Ginger Ogburn-Matthews

10.3 Contact Position:

Research Data Manager & Analyst

10.4 Contact Address

10.4.1 Address Type:

Mailing Address

10.4.2 Address:

USC Baruch Marine Field Lab

10.4.2 Address:

PO Box 1630

10.4.3 City:

Georgetown

10.4.4 State or Province:

South Carolina

10.4.5 Postal Code:

29442

10.4.6 Country:

USA

10.5 Contact Voice Telephone:

(843) 546-6219

10.7 Contact Facsimile Telephone:

(843) 546-1632

10.8 Contact Electronic Mail Address:

ginger@belle.baruch.sc.edu

10.9 Hours of Service:

8:30 am to 4:30 pm EST/EDT Mon.- Friday

6.2 Resource Description:

Data Set Identification names:

North Inlet – Winyah Bay NERR Meteorological Data

North Inlet Weather

North Inlet MET Station Data

NERRMET database

Identification of Directories and Files:

The NERRMET.PUBLISH CD contains the complete Final 1997-1999 database; including all final data, graphics, and metadata files. The PUBLISH CD contains the following files in the following directories:

FINAL.1997-1999.DOCUMENTATION (Directory Size: 461 KB, 9 files)

NERRMET.97-99.FGDC.METADATA.doc (this document)

NERRMET.97-99.FGDC.METADATA.txt

NERRMET.97-99.MissingData.doc

NERRMET.97-99.MissingData.txt

NERRMET.97-99.AnomalousData.doc

NERRMET.97-99.AnomalousData.txt

NERRMET.97-99.Sensors.doc

NERRMET.97-99.Sensors.xls

NERRMET.97-99.Sensors.txt

FINAL.1997-1999.DATA (Directory Size: 17.7 MB, 6 files)

NERRMET.1997.15.FINAL.xls
NERRMET.1997.15.FINAL.csv
NERRMET.1998.15.FINAL.xls
NERRMET.1998.15.FINAL.csv
NERRMET.1999.15.FINAL.xls
NERRMET.1999.15.FINAL.csv

FINAL.1997-1999.GRAPHICS (Directory Size: 21.5 MB, 32 files)

1997.7-12.AirTemp.jpg
1997.7-12.BarPres.jpg
1997.7-12.Rain.jpg
1997.7-12.RelHum.jpg
1998.1-6.AirTemp.JPG
1998.1-6.BarPres.JPG
1998.1-6.Eppley.JPG
1998.1-6.Rain.JPG
1998.1-6.RelHum.JPG
1998.1-6.WindDirSpeed.JPG
1998.1-6.WindSpeed.JPG
1998.7-12.AirTemp.JPG
1998.7-12.BarPres.JPG
1998.7-12.Eppley.JPG
1998.7-12.Rain.JPG
1998.7-12.RelHum.JPG
1998.7-12.WindDirSpeed.JPG
1998.7-12.WindSpeed.JPG
1999.1-6.AirTemp.JPG
1999.1-6.BarPres.JPG
1999.1-6.Eppley.JPG
1999.1-6.Rain.JPG
1999.1-6.RelHum.JPG
1999.1-6.WindDirSpeed.JPG
1999.1-6.WindSpeed.JPG
1999.7-12.AirTemp.JPG
1999.7-12.BarPres.JPG
1999.7-12.Eppley.JPG
1999.7-12.Rain.JPG
1999.7-12.RelHum.JPG
1999.7-12.WindDirSpeed.JPG
1999.7-12.WindSpeed.JPG

The NERRMET.PROCESS CD contains the complete final database as well as all raw and process data, metadata, and graphics files.

6.3 Distribution Liability:

According to the Belle W. Baruch Institute for Marine Biology and Coastal Research:

The datasets are only as good as the quality assurance and quality control procedures outlined in the Metadata. The user bears all responsibility for its subsequent use in any further analyses or comparisons. No warranty expressed or implied is made regarding the accuracy or utility of any data collected, managed, or disseminated for general or scientific purposes by the Belle W. Baruch Institute for Marine Biology and Coastal Research. This disclaimer applies both to individual use of the data and aggregate use with other data. It is strongly required that these data be directly acquired from the Belle W. Baruch Institute for Marine Biology and Coastal Research and not indirectly through other sources which may have changed the data in some way. It is strongly recommended that careful attention be paid to the contents of the metadata file associated with these data. Neither the Belle W. Baruch Institute for Marine

Biology and Coastal Research, nor the National Oceanic & Atmospheric Administration's Office of Ocean and Coastal Resource Management, Estuarine Reserves Division shall be held liable for the use and/or misuse of the data described and/or contained herein.

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

The dataset 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.

6.4 Standard Order Process

6.4.2. Digital Form

6.4.2.1 Digital Transfer Information

6.4.2.1.1. Format Name: EXCEL (.XLS) or WORD (.DOC) format as well as .CSV or .TXT (text only) format.

6.4.2.1.2 Format Version Number: Microsoft Office Professional 2000

6.4.2.1.6 File Decompression Technique: No compression applied

6.4.2.2 Digital Transfer Option

6.4.2.2.1 Computer Contact Information

6.4.2.2.1.1 Network Address

6.4.2.2.1.1.1 Network Resource Name: <http://links.baruch.sc.edu/data/>

6.4.3 Fees: None

6.5 Custom Order Process:

If requesting Non-digital (Paper (hard copy) printout), a fee of \$50 per hour (with a one-hour minimum) plus the cost of supplies will be imposed. As an offline option, CD-ROMs are available at the cost of \$5.00 each. This fee pays for the CD, the creation of the CD, and mailing charges.

7. Metadata Reference Information

7.1 Metadata Date: 20020522

7.2 Metadata Review Date: 20050523

7.4 Metadata Contact:

10.2 Contact Organization Primary

10.1.2 Contact Organization:

Univ. of South Carolina's Baruch Institute

10.1.1 Contact Person:

Ginger Ogburn-Matthews

10.3 Contact Position:

Research Data Manager & Analyst

10.4 Contact Address

10.4.1 Address Type:

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10.4.2 Address:

USC Baruch Marine Field Lab

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PO Box 1630

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Georgetown

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(843) 546-1632

10.8 Contact Electronic Mail Address:

ginger@belle.baruch.sc.edu

10.9 Hours of Service:

8:30 am to 4:30 pm EST/EDT Mon.- Friday

7.5 Metadata Standard Name:

Content Standard for Digital Geospatial Metadata, Part 1: Biological Data Profile

7.6 Metadata Standard Version: FGDC-STD_001.1-1999