(NERR) Estuarine Surface Water Nutrient, Suspended Sediment, and Chlorophyll a Data for the North Inlet and Winyah Bay Estuaries

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Distribution URL for file	http://links.baruch.sc.edu/data/accessfiles/Water_Quality_NERRWQ_Baruchs_data_101993_122002_NERR_SWMP_data_1993_2002.zip				
DATASET 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				
INVESTIGATOR INFORMATION :	**Investigator 1**	**Data Manager**			
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DATA FILE INFORMATION:	***This condensed metadata is from the original, more extensive metadata*** created on 4/20/2004 by Ginger Ogburn-Matthews. If needed, the original may be accessed at: **http://links.baruch.sc.edu/Data/WATQUAL93-02/Metadata/NERRWQ.1993-2002.FGDC.METADATA.pdf** Links and email addresses in the original have not been updated as those locations and people may no longer be available. The data manager identified on this page should be contacted for any questions about the data.				
Data File Name	Water_Quality_NERRWQ_Baruchs_data_101993_122002_NERR_SWMP_data_1993_2002.zip				
Beginning Date	25-Oct-1993				
End Date	31-Dec-2002				
Number of Data Records	451852				
RESEARCH LOCATION:	North Inlet Estuary	Clambank Creek (CB)	Debidue Creek (DC)	Oyster Landing (OL)	Thousand Acre (TA)
Geographic Description	The North Inlet-Winyah Bay National Estuarine Research Reserve is located on the southeastern coast of the United States on the Atlantic Ocean in two tidal estuaries, North Inlet and Winyah Bay, near Georgetown, South Carolina. The North Inlet estuary, located approximately 10 km east of Georgetown, is a bar-built Class C type estuary (Pritchard, 1955). The North Inlet estuary is composed of numerous winding tidal creeks, and is considered a pristine tidal estuary due to minimal anthropogenic impacts. The watershed drains a 24.8 km2 area of mostly pine forest and a moderately developed residential watershed to the north. The Winyah Bay estuary, classified as a Class B type estuary by Pritchard (1955), which originates in the Blue Ridge Mountains of North Carolina, is one of the largest river-estuary ecosystems on the Eastern Seaboard. It is located 14.4 km south of the mouth of North Inlet Estuary. Winyah Bay drains the sub-basins of 6 major rivers, which are heavily impacted by agriculture, mining, and industry. The rivers drain approximately 46,736 km2 of uplands and marshes.	The Clambank Creek monitoring site is located roughly in the center of the NIW reserve. The site is surrounded by a Spartina marsh and drains associated uplands. Salinity ranges from 0 to 36. The bottom is mostly comprised of oyster shell hash and some fine sediment. This site is considered pristine and is influenced by its close proximity to the Inlet mouth.	The Debidue Creek monitoring site is located in an ocean-dominated Spartina marsh that was formerly surrounded by pine-dominated uplands. The site is approximately 1 km south of the Debordieu Colony, a large development built on man-made canals that drain into the northern portion of Debidue Creek, and as a result, may be considered an impacted site. Salinity can range from 0 to 36 parts per thousand and average tidal flux is approximately 2 meters. The creek has an average depth of 2.2 m MHW and an average width of 70 m MHW at the sample site. The bottom is mostly comprised of oyster shell hash with some fine sediment and detritus.	The Oyster Landing monitoring site is considered a fairly pristine and undisturbed area. Samples are collected at the end of the Oyster Landing pier from the floating dock, which is adjacent to the location of the NIW NERR weather station. The pier stretches into the upper reaches of Crab Haul Creek in the mid-western portion of North Inlet and is approximately 2.8 km from the headwaters of Crab Haul Creek. The creek drains pine forested uplands and wetlands. Salinity can range from 0 to 36 parts per thousand and average tidal flux is approximately 1.4 m. The creek has an average depth of ~2 m MHW and an average width of ~150m MHW at the sample site. The bottom is mostly comprised of oyster shell hash with some fine sediment and detritus.	The Thousand Acre monitoring site is located in Thousand Acre marsh tidal creek, near the creek mouth. Prior to 7/19/1999, the sampling location was approximately 30 meters northeast of the west bridge of Thousand Acre marsh. Heavy siltation near the creek bank caused inaccurate measurements at this original site and, on 7/19/1999, the sampling location was moved and samples were collected at the NW corner of the west bridge, about 15 meters from the mouth of the creek. At this new location, creek depth is approximately 2 meters MHW and creek width is approximately 10 meters. The creek empties into the northeastern side of the midportion of Winyah Bay and drains the Thousand Acre Marsh and surrounding pine forested uplands and vegetated wetlands. Salinity ranges from 0 to 26 parts per thousand and tidal flux is approximately 1meter. The bottom is mostly composed of fine sediments and detritus. Georgetown, the homeport for a number of heavy industries, including a steel plant, paper mill, chemical plant, and a coal fired plant. Most are located on the southern side of Winyah Bay, 5 km upstream from the Thousand Acre site. A public sewage treatment plant, which discharges into the bay, is also located in Georgetown.
Location Bounding Box					
West Bounding Coordinate					
East Bounding Coordinate					
North Bounding Coordinate					
South Bounding Coordinate					
OR if single point location					
Latitude		33.3339	33.3603	33.3494	33.2992
Longitude		-79.193	-79.1681	-79.1928	-79.26
Elevation					
TAXONOMIC COVERAGE:					
Taxonomic Protocols					
Organisms studied					

KEYWORD INFORMATION

KEYWORDS: coastal, conductivity, datalogger, depth, dissolved oxygen, ecosystems, estuarine, estuary, hydrolab, long-term, long-term ecological research, marsh, national estuarine research reserve, nerr, percent saturation, ph, salinity, salt marsh, specific conductivity, swmp, system-wide monitoring program, tidal creek, tide, turbidity, water level, water quality, water temperature, ysi, atlantic coast, clambank creek, coastal, crab haul creek, debidue creek, debordie colony, east coast, georgetown county, hobcaw barony, north inlet, north inlet-winyah bay nerr, oyster landing, south carolina, southeast coast, thousand acre marsh, thousand acre marsh tidal creek, thousand acre rice field, winyah bay, usa, water column,

ABSTRACT:

Abstract:
The North Inlet Estuary and the adjacent lower northeastern section of the Winyah Bay Estuary were designated as part of the National Estuarine Research Reserve System in 1992. The North Inlet-Winyah Bay (NIW) NERR's water quality monitoring program began on October 25, 1993. The System-Wide Monitoring Program (SWMP) was initiated in 1995 to set protocols for monitoring the estuarine environment at all NERR sites. Water quality data for the NIW NERR were collected under these protocols throughout the rest of the dataset. Four sites were chosen to best represent pristine and impacted locations within the reserve and data were collected using dataloggers (automated instruments used to record water quality indicators). The Oyster Landing site is located near the center of the reserve and the Clambank site is located on a waterway that receives run-off from the undeveloped area of the reserve, both are considered pristine. The Debidue Creek and Thousand Acre sites are located in waterways that receive run-off from heavily developed areas. Dataloggers were mounted in 4 inch diameter PVC pipes, strapped to treated 2 inch by 6 inch boards, and then attached with stainless steel bands to a piling at each site. The PVC pipes that house the dataloggers have two large cut out "windows" near the bottom to give the probes direct contact with the water column. A stop bolt placed through the PVC pipe below the windows keeps the datalogger exactly one foot (30 cm) above the creek bottom. Measurements of water temperature, specific conductivity, salinity, dissolved oxygen (percent saturation and mg/L), water level, pH, and turbidity were taken every 30 minutes over collecting periods of approximately two weeks. The two-week sampling period was chosen based on the expected battery life of the datalogger and to minimize the impact of biofouling on the individual probes. At the end of the collecting period the dataloggers were brought to the laboratory, the data were downloaded, and the instruments were cleaned and recalibrated following the relevant service manual and SWMP protocols. Post-calibration readings were also taken from each instrument in fresh standard to determine if any of the probes exhibited drift. After approximately 24 hours of down time, the dataloggers were re-deployed. Down time was minimized whenever possible by using extra dataloggers in rotation for back-to-back deployments. This database and metadata document 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.

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 water quality 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 in Winyah Bay, and for comparisons to other NERR sites. As part of the NERR System-wide monitoring program, coastal managers will also use this data to make informed decisions on local and regional issues.

METHODS:

Laboratory Procedures and Protocols (Laboratory Protocol)
At the end of the collecting period the dataloggers were brought to the laboratory, the data were downloaded, and the instruments were cleaned and recalibrated following the appropriate datasonde/datalogger service manual and SWMP protocols.

Hydrolab Datasonde 3:
At the end of each two-week period, the Datasonde3 is brought back into the laboratory for downloading, cleaning, any maintenance that may be necessary, and recalibration. These procedures are carried out according to the methods as described in the Hydrolab Datasonde 3 Operating Manual, in sections 3 and 7 (this manual has been archived with the NERRWQ Notebooks at the Baruch Marine Field Laboratory). After approximately six hours of down time, the datasondes were redeployed for another two-week period.

YSI 6000 UPG/YSI 6600
At the end of each sampling interval, the dataloggers are brought back to the laboratory and the data were downloaded. Before cleaning the instruments, post-calibration readings were taken from each to determine if any of the probes exhibited drift. The instruments were then cleaned and recalibrated following the methods described in the relevant YSI Operators Manual (manuals for both the 6000 UPG and 6600 have been archived with the NERRWQ Notebooks at the Baruch Marine Field Laboratory and as part of the NERRWQ Published CD) and the SWMP protocols detailed in the "NERR SWMP YSI Standard Operating Procedures, version 3.0" or the "CDMO Operations Manual, version 4.0". Thesed ocuments may be found at **http://cdmo.baruch.sc.edu/geninfo.html**. The pH probe was calibrated using a two-point method and either 4,7 or 7,10 standards. The turbidity probe calibration also used a two-point method with 0 &100 Nephelometric Turbidity Units standards. Specific conductivity was calibrated using a one-point method and a 10 milliSiemens/centimeter standard, which was purchased through either Fisher Scientific or YSI Incorporated. The turbidity wiper and dissolved oxygen membrane were replaced after each deployment. After approximately 24 hours of down time for cleaning, recalibration, and to allow the DO membrane to relax overnight, the YSI dataloggers were redeployed.

VARIABLE DESCRIPTIONS:

Variable Name	Variable Description	Units	Measurement Scale	Code Information	Number Type
Date	The date on which the readings were recorded in mm/dd/yyyy format.	1 – 12, 1 – 31, 1993 – 2002	datetime		
Time	The Eastern Standard Time that the current water temperature, specific conductivity, salinity, dissolved oxygen (percent saturation and milligrams/Liter), depth, pH, and turbidity readings were recorded. Time is reported in hh:mm format and readings were taken on the hour and half hour.	00:00 – 23:30	datetime		
Temp	Water temperature as recorded in degrees Celsius by the Hydrolab datasonde or YSI datalogger	0.3 – 37.2	ratio		
SpCond	Specific conductivity as recorded in milliSiemens/centimeter by the Hydrolab datasonde or YSI datalogger.	0.1 – 60.0	ratio		real
Salinity	Salinity as recorded in parts per thousand by the Hydrolab datasonde or YSI datalogger.	0.0 – 40.2	ratio		real
DO (percent saturation)	Dissolved Oxygen as recorded in percent saturation by the Hydrolab datasonde or YSI datalogger.	0.0 – 264.0	ratio		real
DO (milligrams/Liter)	Dissolved Oxygen as recorded in milligrams/Liter by the Hydrolab datasonde or YSI datalogger	0.0 – 21.1	ratio		real
Depth	Depth as recorded in meters by the Hydrolab datasonde or YSI datalogger.	. -0.31 – 3.23	ratio		real
pH	pH as recorded by the Hydrolab datasonde or YSI datalogger.	5.2 – 9.9	ratio		real
Turbidity	Based on the accuracy and resolution of the sensors, as reported by YSI for the 6000 UPG and 6600 dataloggers, turbidity readings are reported in Nephelometric Turbidity Units to the nearest whole number.	. -10 – 2172	ratio		real