# CISNet Project's Water Quality Monitoring Database

| | | |
|---|---|---|
| Year Released to Public | 2005 | |
| Distribution URL for file | http://links.baruch.sc.edu/data/accessfiles/CISNet_Water_Quality_&_Chemistry_Monitoring_1999_2001.zip | |
| **DATASET TITLE:** | CISNet Project's Phytoplankton Pigment Monitoring Database for the North Inlet and Ace Basin Estuaries, South Carolina: 1999-2001 | |
| **INVESTIGATOR INFORMATION :** | **Investigator 1** | **Data Manager** |
| **First Name** | Raphael | Franklin |
| **Last Name** | Tymowski | Anoruo |
| **Address line 1** | PO Box 1630 | USC Baruch Marine Field Lab |
| **Address line 2** | USC Baruch Marine Field Lab | PO Box 5484 |
| **Address line 3** | | |
| **City** | Georgetown | Georgetown |
| **State** | SC | SC |
| **Zip Code** | 29442 | 29442 |
| **Country** | USA | USA |
| **OTHERS:** | Ken Hayes, Dwayne Porter, James Morris, John Jensen, Alan Lewitus, Madilyn Fletcher, Peter Noble | |
| **DATA FILE INFORMATION:** | ***This condensed metadata is from the original, more extensive metadata*** created on 12/14/2005 by Ginger Ogburn-Matthews.<br><br>If needed, the original may be accessed at: **http://links.baruch.sc.edu/data/CISNet/CISNet.WaterQuality/metadata/CISNET.WATQUAL.1999-2001.METADATA.pdf**<br><br>Links and email addresses in the original have not been updated as those locations and people may no longer be available.<br><br>The data manager identified on this page should be contacted for any questions about the data. | |
| **Data File Name** | Phytoplankton_Pigment_Monitoring_for_North_Inlet_&_ACE_Basin__CISNet__.zip | |
| **Beginning Date** | 27-Jul-1999 | |
| **End Date** | 18-Sep-2001 | |
| **Number of Data Records** | 150 | |
| **RESEARCH LOCATION:** | North Inlet Estuary | |
| **Geographic Description** | The North Inlet Estuary lies east of the uplands of Hobcaw Barony (also known as the Belle W. Baruch Property).<br>The Estuary is located in Georgetown County, South Carolina. Sample Sites for the North Inlet Estuary are located within the following bounding coordinates: West -79.256, East -79.174, North 33.349, and South 33.299. The ACE Basin is named for its three rivers, the Ashepoo, Combahee, and Edisto, all of which empty into the St. Helena Sound. The ACE Basin Estuary is located south of Charleston, in Charleston and Beaufort Counties, South Carolina. Sample Sites for the ACE Basin Estuary are located within the following bounding coordinates: West -80.418, East -80.324, North 32.560, and South 32.484. | |
| **Location Bounding Box** | | |
| **West Bounding Coordinate** | -80.418 | |
| **East Bounding Coordinate** | -79.174 | |
| **North Bounding Coordinate** | 33.349 | |
| **South Bounding Coordinate** | 32.484 | |
| **OR if single point location** | | |
| **Latitude** | | |
| **Longitude** | | |
| **Elevation** | | |
| **TAXONOMIC COVERAGE:** | | |
| **Taxonomic Protocols** | | |
| **Organisms studied** | Phytoplankton | |

**KEYWORD INFORMATION**

**KEYWORDS:** ammonia, carbon, chlorophyll, coastal, creek, dissolved, estuarine, estuarine communities, estuary, intertidal creek, light profiles, marsh, nitrate, nitrite, nitrogen, nutrient loading, nutrients, orthophosphate, oxygen, pH, phosphorous, salinity, salt marsh, suspended solids, tidal, water sample, water temperature, ace basin estuary, ashepoo river, beaufort county, charleston county, clambank creek, coastal, combahee river, east coast, edisto river, georgetown county, north inlet estuary, old man creek, south carolina, southeast coast, town creek, usa, water column

**ABSTRACT:**

**Abstract:**

***EPA/NOAA/NASA CISNet Partnership***

The Coastal Intensive Site Network (CISNet) was developed by the U.S. Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA), and National Aeronautics and Space Administration (NASA) and is composed of intensive, long-term monitoring and research sites around the U.S. marine and Great Lakes coasts. The EPA and NOAA's focus for funding within the CISNet partnership is to support research and monitoring programs, and in particular, those that utilize ecological indicators and investigate the ecological effects of environmental stressors. NASA's funding focus is the development of remote sensing capabilities that can enhance and supplement the in situ research and monitoring programs selected for funding by the EPA and NOAA. The CISNet partnership has three main objectives:

1. To develop a sound scientific basis for understanding ecological responses to anthropogenic stresses in coastal environments, including the interaction of exposure, environment/climate, and biological/ecological factors in the response, and the spatial and temporal nature of these interactions,

2. To demonstrate the value of developing data from selected sites intensively monitored to examine the relationships between changes in environmental stressors, including anthropogenic and natural stresses, and ecological response, and

3. To provide intensively monitored sites for development and evaluation of indicators of change in coastal systems.

Summers, Kevin, Andrew Robertson and Barbara Levinson. 2000. Development of the Coastal Intensive Site Network (CISNet). Environ. Monit. Assess. 64(1):379-390. (ERL,GB 1076).

***Baruch's CISNet Project***

The Belle W. Baruch Institute for Marine and Coastal Sciences received funding under the CISNet EPA/NOAA/NASA partnership to further these objectives. Baruch's CISNet project originally proposed to investigate two very different estuaries, North Inlet and Winyah Bay. However, after conducting a preliminary assessment of several South Carolina estuaries, investigators decided to include portions of the ACE Basin Estuary instead of Winyah Bay. While the North Inlet and ACE Basin estuaries are similar in terms of salinity, temperature, and tidal exchange, they differ in terms of the influence of the freshwater drainage basin. North Inlet is a relatively small estuary with minimal fresh water input (nutrient impoverished); ACE Basin is larger and is characterized by a much greater riverine drainage influence (a highly fertile estuary). As a result, they display extreme differences in nutrient loading, nutrient dynamics, and productivity. Baruch's aim was to address the differences in nutrient loading between these two estuaries, and the expected impact on the regulation of their food webs, by addressing these three main hypotheses:

1. The composition and abundance of ACE Basin and North Inlet bacterial and phytoplankton communities will differ and will vary as functions of nutrient availability.

2. Bacterial and phytoplankton communities form associations which vary in complexity (species diversity) as a function of nutrient availability.

3. At a landscape-scale, remote sensing of the concentration of chlorophyll in emergent wetland vegetation will provide a quantitative index of wetland condition, and will demonstrate differences in nutrient loading among estuaries.

Several subprojects were initiated to address these hypotheses. Information on the other subprojects that make up Baruch's CISNet project can be found below under "Other CISNet Datasets". Information on the relevant subproject follows:

***CISNet Water Quality Monitoring Subproject***

Water quality samples were collected seasonally along salinity gradients at 5 locations in the ACE Basin Estuary, and 5 locations in the North Inlet Estuary. Samples were taken bimonthly from July to September 1999, from April to October 2000, and from March to September 2001. Water temperature, salinity, pH, specific conductivity, and dissolved oxygen values were measured, and samples were analyzed for nutrients (Total Nitrogen Whole, Total Nitrogen Filtered, Total Phosphorus Whole, Total Phosphorus Filtered, Dissolved Organic Carbon, Nitrate-Nitrite, Orthophosphate, Ammonia, and Silicate), suspended solids (Total and Organic), and chlorophyll a. Light profiles were also recorded. These samples were taken in tandem with the phytoplankton pigment and bacterial samples used for other CISNet subprojects.

**Purpose:**

The Water Quality Monitoring portion of Baruch's CISNet project was initiated to assess and compare nutrient loading in the Ace Basin and North Inlet estuaries, to correlate this nutrient and baseline water quality information with phytoplankton and bacterial community analyses, and to compare and contrast the effect of differences in nutrient loading on bacterial and phytoplankton community structure within and between estuaries.

**METHODS:**

**Field Collection Procedures and Protocols (Phytoplankton Pigment Field Collection Protocol**

As part of the CISNet database, one-liter bottles were used to collect water samples in triplicate (a, b, and c), approximately mid-way between the daytime high and low tide stages, from a depth of 0.5 meters below the surface. This depth was chosen based on a preliminary CISNet subproject that determined there was little or no difference in pigment results for samples collected from 0.5 meters below the surface and those collected 0.5 meters above the sediment (see the CISNet: Weekly Monitoring at North Inlet database for these data). Light profiles were determined and salinity and water temperature measurements were taken at the time of sample collection. Sample bottles were immediately placed on ice and rushed to the laboratory for processing. The triplicate samples were processed for nutrients, suspended solids, and chlorophyll (see the CISNet: Water Quality Monitoring at North Inlet and ACE Basin database for these data). One of the triplicate samples (a) was analyzed for phytoplankton pigment levels using HPLC. Samples were collected on a bimonthly basis from July to September 1999, from April to October 2000, and from March to September 2001.

**Laboratory Procedures and Protocols (Phytoplankton Pigment Sample Processing and HPLC Analysis)**

The water samples were filtered using a 25-millimeter glass fiber grade F (GF/F) filter, with a vacuum of 10 inches mercury or less, within a couple hours of collection. The filter and the algae it contained were stored in a -80 degree Celsius freezer until the samples were needed. From this freezer, each sample (filter with algae) was placed into a glass vial. The HPLC technician added 2 milliliters of HPLC grade acetone and agitated the mixture with a vortex mixer for about 20 seconds, or until the filter broke down. The filter and algae "slurry" were then placed in a -20 degree Celsius freezer overnight. The next morning, the sample was vortexed again and then syringe filtered through a 0.2 micron pore size PTFE membrane. The filtrate was stored at -20 degrees Celsius until it was analyzed, usually within a day or two. Analysis was conducted using a Beckman System Gold HPLC (125 pump unit and 168 detector), initially with the Beckman Gold software (1999 samples) and later with the 32 Karat Gold software (2000 and 2001 samples), following the method of Van Heukelem and Thomas (2001) specific for the Agilent XDB C8 column.

**VARIABLE DESCRIPTIONS:**

| Variable Name | Variable Description | Units | Measurement Scale | Code Information | Number Type |
|---|---|---|---|---|---|
| Date | the month day and year that the sample was collected, not necessarily processed or analyzed | 1-12, 1-31, 1999-2001 | datetime | | |
| CISNET# | the sample designation for the CISNet project. Each sampling event (may have occurred over 2 days) was given a number. | 1-15, | nominal | | integer |
| Site (ace3) | sample designation information. Site refers to sample locations 1-5 at either ace (ACE Basin) or ni (North Inlet).. | ace or ni, 1-5, a | nominal | ace = ACE Basin\|\| ni=North Inlet | |
| Time (hh:mm) | the Eastern Standard Time that the water temperature, salinity, pH, specific conductivity, and dissolved oxygen readings were taken. The approximate time that all 3 replicates were collected for the specified sample. | 00:00 – 23:59 | datetime | | real |
| TEMP | water temperature as regarded at 0.5 meters depth, in degrees Celsius. | 12.0 – 32.2 degrees Celsius | ratio | | real |
| SAL (refract) | salinity as measured from a water sample (taken at 0.5 meters depth) in parts per thousand with a refractometer. | 0 – 37 parts per thousand | ratio | | real |
| SAL (Hydrolab) | salinity as recorded in parts per thousand by the Hydrolab Datasonde, at 0.5 meters depth. | 0.8 – 36.7 parts per thousand | ratio | | real |
| pH | pH as recorded by the Hydrolab Datasonde at 0.5 meters depth. | 6.3 – 8.3 | ratio | | real |
| SpCond | specific conductivity as recorded in milliSiemens/centimeter by the Hydrolab Datasonde, at 0.5 meters depth. | 1.6 – 55.2 milliSiemens/centimeter | ratio | | real |
| DO (milligrams/Liter) | dissolved oxygen as recorded in milligrams/Liter by the Hydrolab Datasonde, at 0.5 meters depth. | 1.9 – 9.6 milligrams/Liter | ratio | | real |
| DO (percent saturation) | dissolved oxygen as recorded in milligrams/Liter by the Hydrolab Datasonde at 0.5 meters depth. | 28.0 – 121.5 percent saturation | ratio | | real |
| TNW | nitrogen and phosphorus levels as measured in micromoles/Liter | 20– 98 micromoles/Liter | ratio | T = Total (i.e. after alkaline persulfate oxidation / digestion)<br>N or P = element of interest (i.e. phosphorus or nitrogen) | real |
| TNF | nitrogen and phosphorus levels as measured in micromoles/Liter | 17– 76 micromoles/Liter | ratio | F or W = whether measurement was from a filtrate having passed through a precombusted 0.7 micrometer GFF Whatman glass fiber filter. | real |

| | | | | | | |
|---|---|---|---|---|---|---|
| TPW | nitrogen and phosphorus levels as measured in micromoles/Liter | 0.31 – 6.92 micromoles/Liter | ratio | F = (filtered aliquot) measurements taken from a filtrate passed through a precombusted 0.7 micrometer GFF Whatman glass fiber filter.<br><br>W = (whole aliquot) the sample was taken straight from the water sample bottle and analyzed.<br><br>TNW = Total Nitrogen Whole<br><br>TNF = Total Nitrogen Filtered<br><br>TPW = Total Phosphorus Whole<br><br>TPF = Total Phosphorus Filtered | real | |
| TPF | nitrogen and phosphorus levels as measured in micromoles/Liter | -0.59 – 2.15 micromoles/Liter | ratio | | real | |
| DOC | Dissolved organic carbon levels as measured in milligrams Carbon/Liter from a filtered aliquot (as described above). | 0.3 – 70.0 milligrams Carbon/Liter | ratio | | real | |
| NN | Nitrate-nitrite levels as measured in micromoles/Liter from a filtered aliquot (as described above). | 0.00 – 18.92 micromoles/Liter | ratio | | real | |
| OP | Ortho phosphate levels as measured in micromoles/Liter from a filtered aliquot (as described above). | 0.01 – 1.42 micromoles/Liter | ratio | | real | |
| NH4 | Ammonia levels as measured in micromoles/Liter from a filtered aliquot (as described above). | 0.00 – 11.33 micromoles/Liter | ratio | | real | |
| SI | silicate levels as measured in micromoles/Liter from a filtered aliquot (as described above). | 0.6 – 104.0 micromoles/Liter | ratio | | real | |
| TSS | Total suspended sediments or solids; anything such as zooplankton, algae, sand, etc. that stays on the 0.7 micrometer GFF Whatman filter after filtering the water sample, as measured in milligrams/Liter. TSS = total dried sample weight minus the filter weight divided by the volume of water sample filtered. | 3.7 – 174.2 milligrams/Liter | ratio | | real | |
| OSS | Organic suspended sediments (solids) as measured in milligrams/Liter; OSS = total dried sample weight - oxidized weight (weight of filter and the inorganic material which would not volatilize at 450 degrees C) divided by the volume of water sample filtered. | 1.1 – 31.1 milligrams/Liter | ratio | | real | |
| CHLA | Chlorophyll a levels as measured fluorometrically in micrograms/Liter | 0.46 – 68.26 micrograms/Liter | ratio | | real | |
| Light Profile | light penetration at varying depths, measured with a light meter. | 0 – 4961 (no units) | ratio | | integer | |