Important!

This is the "CREEK Project: RUI: the Role of Oyster Reefs in the Structure and Function of Tidal Creeks. A Project Overview" *original metadata*, created 2/25/2005 by Ginger Ogburn-Matthews. *Links and email addresses* in this document *have not been updated* as those locations and people may no longer be available. *Condensed metadata* is available for each subproject of this study.

Questions about the data should be addressed to the data manager identified on the *condensed metadata* forms.

1. Identification Information

1.1 Citation

8. Citation Information

8.1 Originator: Richard Dame
8.1 Originator: David Bushek
8.1 Originator: Dennis Allen
8.1 Originator: Don Edwards
8.1 Originator: Alan Lewitus
8.1 Originator: Eric Koepfler
8.1 Originator: Bjorn Kjerfve
8.1 Originator: Leah Gregory
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, Department of Marine Science, and Department of Statistics of the University of South Carolina
8.2 Publication Date: 20000730
8.4 Title: CREEK Project: RUI: the Role of Oyster Reefs in the Structure and Function of Tidal Creeks. A Project Overview.
8.6 Geospatial Data Presentation Form: NSF proposal
8.8 Publication Information:
8.8.1 Publication Place: Baruch Marine Field Laboratory, Georgetown, SC
8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina
8.9 Other Citation Details: This is a large 5-year monitoring program which contains multiple subprojects involving the study of the role of other estuarine subcomponents such as nekton, microzooplankton, phytoplankton, oyster diseases, and water chemistry. See cross reference section - this metadata file.
8.10 Online linkage: http://links.baruch.sc.edu/data/

1.2 Description

1.2.1 Abstract:

A group of eight tidal creeks dominated by oysters, *Crassostrea virginica*, in North Inlet, South Carolina, USA were studied using a replicated BACI (Before - After Control - Incident) design in which all creeks are sampled simultaneously. Before the pre-manipulation year, oyster biomass in each creek was manipulated so that all eight creeks had an equal oyster biomass to water volume ratio of 8 grams dry body weight of oysters per cubic meter. Detailed geomorphological observations were made on each creek as the study began. Nutrients and chlorophyll *a* were measured weekly in each creek and exhibited seasonal and inter-annual influences.
Phytoplankton pigment levels were measured with high-performance liquid chromatography (HPLC). Intensive planktonic - microbial loop and nekton samplings were conducted seasonally. Oyster growth was measured monthly. In the second or manipulation year, the role of oysters was tested by removing them from four creeks. Planktonic abundance and dispersal of the oyster parasite, *Perkinsus marinus*, nekton abundance and biomass, oyster biomass, growth and survival, changes in water chemistry, and phytoplankton pigment levels were also investigated in the tidal creeks during this manipulation year.

1.2.2 Purpose:

The CREEK Project was initiated in order to investigate the hypothesis that oyster reefs control the structure and function of intertidal creeks. In order to verify the outcome of the project, other variables (i.e. water chemistry, chlorophyll a, suspended sediment, nekton, and phytoplankton) were monitored to provide ecosystem level information and understanding about the role of oyster reefs.

1.2.3 Supplemental Information:

Significant Publications and Presentations: ([1] indicates undergraduate)

Dame R, Bushek D, Allen D, Edwards D, Lewitus A, Koepfler E, Gregory L. 2002. The ecosystem approach to sustainable bivalve management. *Aquatic Ecology* 36:51-65.
Dame R, Bushek D and Prins T. 2001. The role of suspension feeders as ecosystem transformers in shallow coastal environments. In K. Reise (Ed),*The Ecology of Sedimentary Coasts.* Springer-Verlad,Berlin. pp.11-37.

[1]Green R, Bushek D and Dame R. 1998. The spatial distribution of the parasite, *Perkinsus marinus*, in the oyster *Crassostrea virginica* along the intertidal creeks of North Inlet estuary, South Carolina. National Conference on Undergraduate Research (NCUR) XII:1423-1426.

Lewitus A, Koepfler E and [1]Pigg R. 2000. Use of dissolved organic nitrogen by a salt marsh phytoplankton bloom community. *Arch. Hydrobiol. Spec. Issues Adv. Limnol.* 55:441-456.

[1]Potthoff M and Allen DM. 2003. Site fidelity, home range and tidal migrations of juvenile pinfish, *Lagodon rhomboides*, in salt marsh creeks. *Environmental Biology of Fishes* 67:231-240.

[1]Wetz M, Lewitus A, Koepfler E and [1]Hayes K. 2002. Impact of the Eastern oyster *Crassostrea virginica* on microbial community structure in a salt marsh estuary. *Aquatic Microbial Ecology* 28:87-97.

There were many individual student projects that were also undertaken during the Creek Study. The student's name, the year(s) it was done, and the project description is listed below. No formal metadata will be written up on the projects; to obtain more information, please contact any of the PIs listed as an "Originator" in the above Citation Information section.

Undergraduate students	Year	Project Description
Heather Hostetler	2000	Terrapin utilization of tidal creeks
Mike Wetz	1999-2001	Phytoplankton Ecology (Isolated pool phytoplankton) and effects of oyster grazing on microbial food web structure
Mike Potthoff	1999	Oyster recruitment post-manipulation, pinfish site fidelity, benthic core biomass analysis, and nekton follow up for Beth Brost
Emily Butsic	1999-2000	Dermo disease distribution post-manipulation
Beth Brost	1999-2000	Nekton ecology, experiments in lab with habitat choice chambers
Brian Milan	1997-1999	Nekton ecology (Nekton Habitat Utilization)
Carrie Burdick	1998-1999	Fecal transmission of Dermo
Jodi Brewster	1998-1999	Modelling Dermo disease transmission
Amy Sabo	1998	Oyster growth rates
Kristine Johnston	1998	Flow dynamics
Barbara Castellion	1997-1998	Nutrient cycling in linear, flow-thru flume
Chris DeFranco	1997-1998	Oyster growth
Becky Green	1997-1998	Dermo disease distribution pre-manipulation
Jennifer Raphan	1997-1998	Oyster settlement pre-manipulation
Ryan Pigg	1997-1998	Use of dissolved organic nitrogen by North Inlet phytoplankton
Becky King	1996-1998	Oyster ecology
Leroy Humphries	1996-1997	Creek geomorphology
Amy Anderson	1996-1997	Oyster and other invertebrate biomass
Bonnie Willis	1995-1997	Microbial food web dynamics
Ken Hayes	1995-1997	Regulation of microbial food web functioning by grazing and organic substrates.

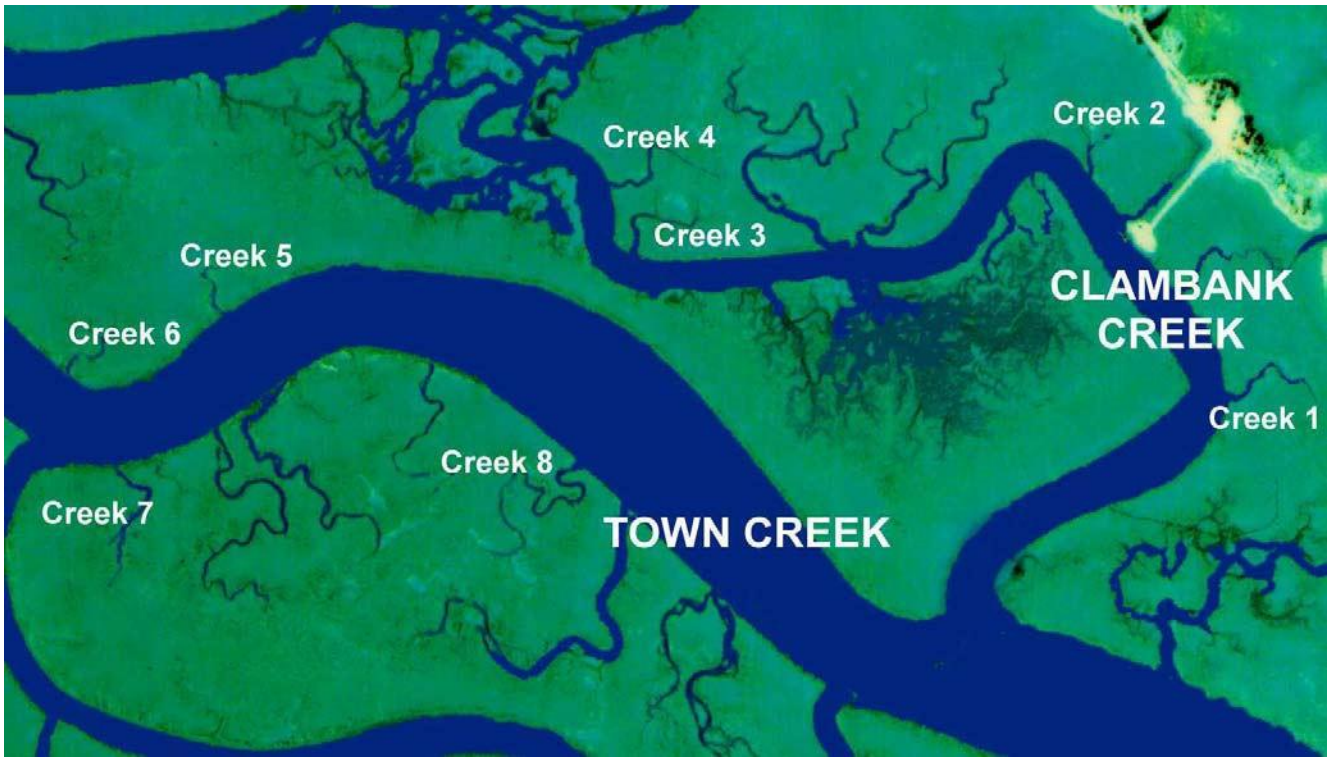
Graduate Students	Year	Project Description
Becky Ellin	1998-2000	Planktonic transmission of Dermo disease
Sarah Crawford	1998-1999	The Importance of Oysters in Tidal Creeks: Design and Analysis of an Ecological Experiment

Summary of important results:
Although covering 25-70% (avg.40%) of intertidal creek bottoms, oysters do not dominate faunal biomass or the remineralization of nutrients.
Totally unexpected was the finding that summer nekton (fishes, shrimps, crabs) biomass is higher than oyster biomass.

Nekton prefer certain creeks to others and these distributions are related to creek shape, mean depth, flooding and discharge rate, and distance to upland ridge, but not creek size (volume, area, or length).
A tag/recapture study by a student found that pinfish migrated into flooding creeks but did not move among creeks.
El Niño, a global environmental event, was clearly evident from the analysis of three years of weekly chlorophyll and nutrient data (1997-00).
Utilizing limited literature values and preliminary experiments, a simple budget for ammonium indicated that nekton inputs were considerably greater than oyster excretion as a source to intertidal creeks.

Map of the eight creek sites can be found at
http://links.baruch.sc.edu/data/CREEK/CreekOysterBiomass/OysterBio.htm

Map of the eight creek sites is below:



1.3 Time Period of Content:
9.3 Range of Dates/Times
9.3.1 Beginning Date: 199611
9.3.3 Ending Date: 200005

1.3.1 Currentness Reference
Ground condition; however, depending on the subproject and which variable was being analyzed, data values were determined a few days to several months after samples were collected.

1.4 Status:
1.4.1 Progress: complete
1.4.2 Maintenance and update frequency: As needed

1.5.1 Description of Geographic Extent:

All eight creeks reside in North Inlet estuary, four off of Clambank Creek, and four off of Town Creek. The North Inlet Estuary (33.20'N, 79.10'W) lies east of the uplands of Hobcaw Barony (also known as the Belle W. Baruch Property). The Estuary is located in Georgetown County, South Carolina.

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:	AMMONIA
1.6.1.2 Theme Keyword:	BIOMASS
1.6.1.2 Theme Keyword:	BACTERIA
1.6.1.2 Theme Keyword:	CHEMISTRY
1.6.1.2 Theme Keyword:	CHLOROPHYLL A
1.6.1.2 Theme Keyword:	COASTAL
1.6.1.2 Theme Keyword:	CRASSOSTREA VIRGINICA
1.6.1.2 Theme Keyword:	CARBON
1.6.1.2 Theme Keyword:	CRAB
1.6.1.2 Theme Keyword:	CREEK PROJECT
1.6.1.2 Theme Keyword:	DISSOLVED ORGANIC CARBON
1.6.1.2 Theme Keyword:	ECOSYSTEMS
1.6.1.2 Theme Keyword:	ESTUARINE COMMUNITIES
1.6.1.2 Theme Keyword:	ESTUARINE
1.6.1.2 Theme Keyword:	ESTUARY
1.6.1.2 Theme Keyword:	FISH
1.6.1.2 Theme Keyword:	FIELD EXPERIMENT
1.6.1.2 Theme Keyword:	INORGANIC SUSPENDED SOLIDS
1.6.1.2 Theme Keyword:	SEDIMENTS
1.6.1.2 Theme Keyword:	WATER CHEMISTRY
1.6.1.2 Theme Keyword:	TIDAL CREEK
1.6.1.2 Theme Keyword:	LIVE BIOMASS
1.6.1.2 Theme Keyword:	MARSH
1.6.1.2 Theme Keyword:	MICROZOOPLANKTON
1.6.1.2 Theme Keyword:	MICROBIAL LOOP
1.6.1.2 Theme Keyword:	NITRATE
1.6.1.2 Theme Keyword:	NITRITE
1.6.1.2 Theme Keyword:	NUTRIENT CHEMISTRY
1.6.1.2 Theme Keyword:	NUTRIENT CYCLING
1.6.1.2 Theme Keyword:	NITROGEN
1.6.1.2 Theme Keyword:	ORTHO PHOPHATE
1.6.1.2 Theme Keyword:	OYSTERS
1.6.1.2 Theme Keyword:	PHOSPHATE
1.6.1.2 Theme Keyword:	PHOSHORUS
1.6.1.2 Theme Keyword:	PHYTOPLANKTON
1.6.1.2 Theme Keyword:	SALINITY
1.6.1.2 Theme Keyword:	SHRIMP
1.6.1.2 Theme Keyword:	SALT MARSH
1.6.1.2 Theme Keyword:	SUSPENDED SEDIMENT
1.6.1.2 Theme Keyword:	STOP NET
1.6.1.2 Theme Keyword:	TOTAL SUSPENDED SOLIDS
1.6.1.2 Theme Keyword:	WATER TEMPERATURE
1.6.1.2 Theme Keyword:	WATER QUALITY

1.6.2 Place

1.6.2.1 Place Keyword Thesaurus: None
1.6.2.2 Place Keyword: NORTH INLET ESTUARY
1.6.2.2 Place Keyword: SOUTH CAROLINA
1.6.2.2 Place Keyword: TOWN CREEK
1.6.2.2 Place Keyword: CLAMBANK 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

1.6.3 Stratum

1.6.3.1 Stratum Keyword Thesaurus: None
1.6.3.2 Stratum Keyword: WATER COLUMN
1.6.3.2 Stratum Keyword: SURFACE WATERS
1.6.3.2 Stratum Keyword: BENTHOS
1.6.3.2 Stratum Keyword: BENTHIC
1.6.3.2 Stratum Keyword: BOTTOM

1.6.4 Temporal

1.6.4.1 Temporal Keyword Thesaurus: None
1.6.4.2 Temporal Keyword: 1996
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: 2000
1.6.4.2 Temporal Keyword: 1996-2000

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

1.8 Use Constraints:
Following academic courtesy standards, the PIs (originators), the University of South Carolina's Belle W. Baruch Institute for Marine and Coastal Sciences, Coastal Carolina University, 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, Coastal Carolina University, Baruch Institute and Coastal Carolina 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.

1.9 Point of Contact:
10.2 Contact Organization Primary
10.2.1 Contact Organization: Department of Marine Science, Coastal Carolina University
10.2.2 Contact Person : Dr. Richard Dame
10.3 Contact Position: Professor
10.4 Contact Address
10.4.1 Address Type: Mailing Address
10.4.2 Address: Department of Marine Science, POB 261954
10.4.2 Address: Coastal Carolina University
10.4.3 City: Conway
10.4.4 State or Province: South Carolina
10.4.5 Postal Code: 29528
10.4.6 Country: USA

10.5 Contact Voice Telephone: (843) 349-2216
10.7 Contact Facsimile Telephone: (843) 349-2926
10.8 Contact_Electronic_Mail_Address: dame@coastal.edu
10.9 Hours of Service: 8 am - 5 pm Mon.- Friday
10.10 Contact Instructions: If not available via telephone, please send short e-mail message.

1.12 Data Set Credit:
Funding was provided by the National Science Foundation, grant DEB_95_0957 to Coastal Carolina University and the University of South Carolina's Belle W. Baruch Institute, with Dr. Richard Dame as project director. Numerous researchers and students contributed to these datasets.

1.15 Cross Reference:
8. Citation Information
8.1 Originator: Richard Dame
8.1 Originator: David Bushek
8.1 Originator: Dennis Allen
8.1 Originator: Leah Gregory
8.1 Originator: Don Edwards
8.1 Originator: Alan Lewitus
8.1 Originator: Sarah Crawford
8.1 Originator: Eric Koepfler
8.1 Originator: Bjorn Kjerfve
8.1 Originator: Theo Prins
8.1 Originator: Chris Corbett
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, Department of Marine Science, and Department of Statistics of the University of South Carolina
8.2 Publication Date: 20000730
8.4 Title: The experimental analysis of tidal creeks dominated by oyster reefs: the premanipulation year
8.6 Geospatial Data Presentation Form: Scientific publication
8.8 Publication Information:
8.8.1 Publication Place: unknown
8.8.2 Publisher: Journal of Shellfish Research
8.9 Other Citation Details: Vol.19:1, pages 361-369.

1.15 Cross Reference
8.1 Originator: David Bushek
8.1 Originator: Richard Dame
8.1 Originator: Leah Gregory
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences and Department of Statistics of the University of South Carolina
8.2 Publication Date: 20030808
8.4 Title: CREEK Project's Oyster Biomass Database for Eight Creeks in the North Inlet Estuary, South Carolina
8.6 Geospatial Data Presentation Form: comma delimited digital data and 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
8.10 Online linkage: http://links.baruch.sc.edu/data/

1.15 Cross Reference:
8. Citation Information:
8.1 Originator: Richard Dame
8.1 Originator: Leah Gregory
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences and Department of Statistics of the University of South Carolina
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.2 Publication Date: 20000701
8.4 Title: CREEK Project's Water Chemistry, Chlorophyll a, and Suspended Sediment Weekly Monitoring Database for Eight Creeks in the North Inlet Estuary, South Carolina
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: 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
8.10 Online linkage: http://links.baruch.sc.edu/data/

1.15 Cross Reference:
8. Citation Information
8.1 Originator: Richard Dame
8.1 Originator: Leah Gregory
8.1 Originator: Dennis Allen
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences and Department of Statistics of the University of South Carolina
8.2 Publication Date: 2003
8.4 Title: CREEK Project's Nekton Seasonal Monitoring Database for Eight Creeks in the North Inlet Estuary, South Carolina
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: Baruch Marine Field Laboratory, Georgetown, SC
8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina
8.10 Online linkage: http://links.baruch.sc.edu/data/

1.15 Cross Reference:
8. Citation Information
8.1 Originator: Alan Lewitus
8.1 Originator: Raphael Tymowski
8.1 Originator: Ivy Collins
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences and Department of Statistics of the University of South Carolina
8.2 Publication Date: 20050228
8.4 Title: CREEK Project's Phytoplankton Pigment Monitoring Database for Eight Creeks in the North Inlet Estuary, South Carolina: 1997-1999
8.6 Geospatial Data Presentation Form: comma delimited digital data and Microsoft Excel spreadsheet
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
8.10 Online linkage: http://links.baruch.sc.edu/data/

1.15 Cross Reference:
8. Citation Information
8.1 Originator: Richard Dame
8.1 Originator: Alan Lewitus
8.1 Originator: Eric Koepfler
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences and Department of Statistics of the University of South Carolina
8.2 Publication Date: 2004
8.4 Title: CREEK Project's Microzooplankton Seasonal Monitoring Database for Eight Creeks in the North Inlet Estuary, South Carolina
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: Baruch Marine Field Laboratory, Georgetown, SC
8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina
8.10 Online linkage: http://links.baruch.sc.edu/data/

1.15 Cross Reference:
8. Citation Information
8.1 Originator: Richard Dame
8.1 Originator: David Bushek
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences and Department of Statistics of the University of South Carolina
8.2 Publication Date: 2004
8.4 Title: CREEK Project's Oyster Disease Monitoring Database for Eight Creeks in the North Inlet Estuary, South Carolina
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: Baruch Marine Field Laboratory, Georgetown, SC
8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina
8.10 Online linkage: http://links.baruch.sc.edu/data/

1.15 Cross Reference:
8. Citation Information
8.1 Originator: Richard Dame
8.1 Originator: Bjorn Kjerfve
8.1 Originator: Chris Corbett
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences, Department of Marine Science, and Department of Statistics of the University of South Carolina
8.2 Publication Date: 2004
8.4 Title: CREEK Project's Tidal Creek Geomorphology Database for Eight Creeks in the North Inlet Estuary, South Carolina
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: Baruch Marine Field Laboratory, Georgetown, SC
8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina
8.10 Online linkage: http://links.baruch.sc.edu/data/

1.15 Cross Reference:
8. Citation Information
8.1 Originator: Dennis Allen
8.1 Originator: David Bushek
8.1 Originator: Brian Milan
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences and Department of Statistics of the University of South Carolina
8.2 Publication Date: Unpublished material
8.4 Title: CREEK Project's Internal Creek Habitat Survey for Eight Creeks in the North Inlet Estuary, South Carolina
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet

1.15 Cross Reference:
8. Citation Information
8.1 Originator: Richard Dame
8.1 Originator: David Bushek
8.1 Originator: Department of Marine Science, Coastal Carolina University
8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences and Department of Statistics of the University of South Carolina
8.2 Publication Date: 2004
8.4 Title: CREEK Project's Oyster Growth and Survival Monitoring Database for Eight Creeks in the North Inlet Estuary, South Carolina
8.6 Geospatial Data Presentation Form: comma delimited digital data and spreadsheet
8.8 Publication Information:
8.8.1 Publication Place: Baruch Marine Field Laboratory, Georgetown, SC
8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina
8.10 Online linkage: http://links.baruch.sc.edu/data/

2. Data Quality Information
2.1 Attribute Accuracy
2.1.1 Attribute Accuracy Report:
The accuracy of the data values for each subproject is detailed in each subproject's metadata.

2.2 Logical Consistency Report: not applicable

2.3 Completeness Report:
Missing values are usually a result of aborted samplings (i.e. boat or weather problems); other missing values are due to samples being lost or contaminated. Very few sampling dates were missed. Missing data are listed in each subproject's metadata.

2.5 Lineage
2.5.1 Methodology
2.5.1.1 Methodology Type: Statistical Design
2.5.1.3 Methodology Description: Statistical Field Design of Creeks
A replicated BACI (Before-After Control-Impact) design with eight similar tidal creeks as replicates was used for this Creek project. Creeks were additionally assigned to one of four blocks based on their physical locations within the estuary and suspected or known spatial differences at this scale. Blocking was deemed important because Clambank Creek creeks drain an upland area whereas Town Creek creeks do not border any uplands, and because there is a salinity gradient from north to south with those creeks further south more likely to experience low salinity spillover from Winyah Bay during "freshets". The "Before Manipulation Year" began in March 1997 and ended in February 1998. The "After Manipulation Year" began in March 1998 following the removal of oysters from 4 randomly selected creeks, two each in Clambank and Town Creeks. Thus, the CREEK study satisfies a number of concerns raised by Hurlbert (1984): (1) there are control creeks; (2) the creeks are replicated; and (3) the

creeks are sampled repeatedly, both before and after the intervention. In addition, the design heeds the recommendation of Stewart-Oaten *et al.* (1986) by sampling all creeks simultaneously. The statistical analysis after the intervention year is an adaptation of Stewart-Oaten *et al.'s* (1986) proposed analysis.

2.5.1.4 Methodology Citation:

8. Citation Information
8.1 Originator: Hurlbert, S.H
8.2 Publication Date: 1984
8.4 Title: Pseudoreplication and the design of ecological field experiments
8.6 Geospatial Data Presentation Form: scientific publication
8.8 Publication Information:
8.8.1 Publication Place: unknown
8.8.2 Publisher: Ecological Monographs
8.9 Other Citation Details: Volume 54: pages 187-211

2.5.1.4 Methodology Citation:

8. Citation Information
8.1 Originator: Stewart-Oaten, A., W.W. Murdoch and K.R. Parker
8.2 Publication Date: 1986
8.4 Title: Environmental Impact Assessment: "pseudoreplication" in time?
8.6 Geospatial Data Presentation Form: scientific publication
8.8 Publication Information:
8.8.1 Publication Place: unknown
8.8.2 Publisher: Ecology
8.9 Other Citation Details: Volume 67: pages 929-940

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Tidal Creek Morphology

A detailed topographic/bathymetric survey of each creek and its basin was conducted utilizing a Topcon total station. All elevations were referenced to a common datum that are in turn referenced to eight USGS permanent benchmarks. These data generated estimates of creek length, width, cross-sectional area at mouth, surface area, and water volume.

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Plankton and Microbial Loop sampling

The planktonic food web in the experimental system was examined using a series of bioassay experiments. Replicate samples were collected at a morning mid-ebb tide at each of the eight experimental creeks and dispensed into 1-liter acid-cleaned polycarbonate bottles.

2.5.1 Methodology
2.5.1.1 Methodology Type: Laboratory Collection Procedures and Protocols
2.5.1.3 Methodology Description: Plankton and Microbial Loop

Samples were incubated under various treatments designed to examine the effect of substrate enrichment or reduced grazing pressure on phytoplankton community biomass (chlorophyll *a*). The treatments included 4 μM NH_4 addition, 20 μ M glycine addition, and a 20:1 dilution treatment used to reduce grazing pressure on phytoplankton by decreasing encounter rates between microzooplankton and phytoplankton prey (Landry and Hassett 1982). Lewitus *et al*. (1998) have found, from experiments involving serial dilution of North Inlet water, that a 20:1 dilution fell within the range where grazer reduction over 72 hours was saturated. Bottles were incubated in raceways containing flowing estuarine water to simulate tidal creek temperatures. Overhead fluorescent cool white bulbs provided uniform irradiance adjusted to a light/dark cycle simulating natural conditions. Water samples were mechanically stirred (gently) at uniform rates between bottles. Chlorophyll *a* was measured daily at mid-day over the 72-hour time course.

2.5.1.4 Methodology Citation:

8. Citation Information
8.1 Originator: Landry, M.R. and R.P. Hassett
8.2 Publication Date: 1982
8.4 Title: Estimating the grazing impact of marine micro-zooplankton
8.8 Publication Information:
8.8.1 Publication Place: unknown
8.8.2 Publisher: Marine Biology
8.6 Geospatial Data Presentation Form: scientific publication
8.9 Other Citation Details: Volume 67: pages 283-288

2.5.1.4 Methodology Citation:

8. Citation Information
8.1 Originator: Lewitus, A.J., E.T. Koepfler and J.T. Morris
8.2 Publication Date: 1998
8.4 Title: Seasonal variation in the regulation of phytoplankton by nitrogen and grazing in a salt-marsh estuary
8.6 Geospatial Data Presentation Form: scientific publication
8.8 Publication Information:
8.8.1 Publication Place: unknown
8.8.2 Publisher: Limnology and Oceanography

8.9 Other Citation Details: Volume 43: pages 636-646

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Nekton Abundance and Biomass

Nekton seasonal abundance and biomass were determined for each creek. Simultaneous collections of nekton were made with block nets set at early morning slack high tide at all eight creek mouths. Catches were removed from the block nets, and pools within each creek bed were seined at low tide to provide a complete assessment of fish and motile macroinvertebrate use of the creeks. To investigate the role of oyster reefs on nekton, live oysters were removed from creeks 1, 4, 5, and 8. In 1998, all eight creeks were again sampled for nekton, following the same procedures established in 1997. All samples were frozen.

2.5.1 Methodology
2.5.1.1 Methodology Type: Laboratory Collection Procedures and Protocols
2.5.1.3 Methodology Description: Nekton Abundance and Biomass

To determine species biomass and abundance, pool samples from 1997 and 1998 were thawed and animals were sorted by species. Most animals were identified by genus and species; however some were identified only to the genus level. A Fish Measuring Board (FMB) was used to obtain SL (in mm) data for each member of a species up to 100. Biomass (in grams) data was obtained first for the 100 members, and then for the entire species sample. Species abundance was then determined by the FMB. This procedure was completed for each species in the pool sample. For block nets, samples were thawed and sub-sampled following the preceding guidelines. Total species biomass and abundance were extrapolated from sub-sample data using the FMB.

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Oyster Biomass

Pre-manipulation refers to the period of time that data were collected from the intertidal creeks after adjusting all eight creek oyster biomass to 8 grams dry body weight per cubic meter and before removal of oysters from the four manipulated creeks. Post-manipulation is that period following removal of oysters from the four manipulated creeks. Survey maps were used to determine the contours of the creeks, the volume of water in the creeks, and the location of oyster reefs within the creeks. Before the pre-manipulation year observations began, the area of each creek covered by oyster reef was measured from field surveys. Oysters from 10 quadrats (0.25^2) distributed at different elevations along the length of each creek were collected and total dry body weight per quadrat averaged for each creek. Oyster biomass for

each creek was then estimated by multiplying the average biomass per quadrat by the area of oyster reef in each creek. Oysters were then redistributed among creeks by hand to yield an oyster biomass of 8 grams dry body weight per cubic meter of water volume in each creek. Oyster biomass estimates were made from converting length measurements to dry body weight using the allometric relationship published in Dame 1972. The grams dry body per cubic meter relationship was used because it more realistically describes the benthic-pelagic coupling of the oysters to the water column (Dame 1993).

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: Dame, R.F.
8.2 Publication Date: 1972
8.4 Title: Comparison of various allometric relationships in intertidal and subtidal American oysters
8.6 Geospatial Data Presentation Form: Scientific publication
8.8 Publication Information:
8.8.1 Publication Place: unknown
8.8.2 Publisher: Fishery Bulletin US
8.9 Other Citation Details: Volume 70: pages 1121-1126

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: Dame, R.F.
8.2 Publication Date: 1993
8.4 Title: Bivalve filter feeders and coastal and estuarine ecosystem processes.
8.6 Geospatial Data Presentation Form: Book
8.8 Publication Information:
8.8.1 Publication Place: New York
8.8.2 Publisher: Springer Verlag
8.9 Other Citation Details: Page 579

2.5.1 Methodology
2.5.1.1 Methodology Type: Laboratory Collection Procedures and Protocols
2.5.1.3 Methodology Description: Oyster Biomass
Biomass to length relationships determined by Dame (1972) were used to calculated dry body biomass.

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: Dame, R.F.
8.2 Publication Date: 1972
8.4 Title: Comparison of various allometric relationships in intertidal and subtidal American oysters
8.6 Geospatial Data Presentation Form: Scientific publication
8.8 Publication Information:
8.8.1 Publication Place: unknown
8.8.2 Publisher: Fishery Bulletin US
8.9 Other Citation Details: Volume 70: pages 1121-1126

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Water Chemistries, Suspended solids, Chl a
Water samples were taken once a week from each study creek for chemical analysis. The samples were taken approximately mid-way between the daytime high and low tide stages. Water samples were taken from the center of each creek mouth at a depth of 1 m below the surface, but not closer than about 0.3 m to the bottom. Triplicate samples were collected from each creek and all creeks were sampled within 45 minutes. The sample bottles were immediately placed in ice and rushed to the laboratory for analysis. Temperature was measured at each site as samples were collected.

2.5.1 Methodology
2.5.1.1 Methodology Type: Laboratory Procedures and Protocols
2.5.1.3 Methodology Description: Water Chemistry, Chlorophyll *a*, Suspended Solids

Salinity values were determined after the water sample was brought back into the laboratory, by placing the water from the sample onto a hand-held refractometer. Seventy-five to 500 ml of the water samples were filtered through a pre-weighed pre-combusted Whatman GFF 0.7 µm (nominal pore size) glass fiber filter usually within one hour of the water sample collection at the Baruch Marine Field Laboratory's Water Chemistry Lab to separate the particulates from the water. Samples were shaken up first before filtering began; the amount of water filtered was determined by how much sediment and other solids were in the sample. In the winter in the absence of phytoplankton blooms and when sedimentation was low, up to 400 ml were filtered. In the summer and usually after heavy rains less water was filtered; the determining factor was to get a good sample of suspended solids on the filter from the water sample in order to get beyond the minimum detection limits of the total suspended solids analysis.

A 0.7 µm (nominal pore size) glass fiber filter was used throughout the entire study to determine the cutoff between dissolved and particulate constitutes in the water sample. The filtered water is then run through a Technicon Analyzer. The following water chemistry analysis used filtered aliquots (< 0.7 µm): ammonia, nitrate, ortho phosphate, total nitrogen, total phosphorus, and dissolved organic carbon. What remained on the 0.7 µm filters were used for the Suspended solids and Chlorophyll *a* analysis. For more details on Water Chemistry, Chlorophyll *a*, and suspended solids laboratory procedures and citations, please refer to the metadata for this subproject.

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Phytoplankton Pigment Field Collection Protocol

Water samples collected for chemical analysis (Water Chemistry, Chlorophyll *a*, and Suspended Solids) were also used for phytoplankton pigment analysis. The samples were taken in triplicate (A, B, and C) approximately mid-way between the daytime high and low tide stages, from the center of each creek mouth, and at a depth of 1 m below the surface, but not closer than about 0.3 m to the bottom. Water temperatures were measured as the samples were taken (see Creek Water Chemistry data) and all samples were collected within 45 minutes. Sample bottles were immediately placed on ice and rushed to the laboratory for processing. Samples were collected on a weekly basis, however, not all samples were processed for pigments. In 1997 and 1998 duplicate samples (A and B) were processed. In 1999 only one sample (B) was used. Water samples were processed for pigments more frequently in summer months and least frequently in winter months. Processing frequency varied from every couple of months to every couple of weeks.

2.5.1 Methodology
2.5.1.1 Methodology Type: Laboratory Procedures and Protocols
2.5.1.3 Methodology Description: 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, initially with the Beckman Gold software and later with the 32 Karat Gold software, following the method of Van Heukelem and Thomas (2001) specific for the Agilent XDB C8 column.

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: Laurie Van Heukelem
8.1 Originator: Crystal S. Thomas
8.2 Publication Date: 2001
8.4 Title: "Computer-assisted high-performance liquid chromatography method development with applications to the isolation and analysis of phytoplankton pigments"

8.6 Geospatial Data Presentation Form: Scientific Publication
8.8 Publication Information:
8.8.1 Publication place: unknown
8.8.2 Publisher: Journal of Chromatography A
8.9 Other Citation Details: Volume 910, pages 31-49

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: Beckman Coulter, Inc.
8.2 Publication Date: 2002
8.4 Title: Beckman Coulter System Gold HPLC literature
8.6 Geospatial Data Presentation Form: various published manuals
8.8 Publication Information:
8.8.1 Publication place: Fullerton California
8.8.2 Publisher: Beckman Coulter
8.9 Other Citation Details: www.beckmancoulter.com

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Oyster Disease Monitoring
In August 1997, 10 oysters were collected from each of three to five discrete reefs located along the main stem of each creek. Oysters were collected during low tide and the distance from the creek mouth, creek depth, temperature and salinity were recorded. Samples were returned to the laboratory and refrigerated until processed for Perkinsus marinus infection intensity. Following the experimental removal of virtually all oysters from the experimental creeks, oysters that recruited into both experimental (removal) and control creeks were subsequently sampled using the same 1997 methodology in fall of 1999. Percent prevalence and weighted prevalences were calculated and compared among experimental and removal creeks and with respect to distance from mouth and depth of reef at collection site.

2.5.1 Methodology
2.5.1.1 Methodology Type: Laboratory Procedures and Protocols
2.5.1.3 Methodology Description: Oyster Disease Monitoring
Samples were returned to the laboratory and refrigerated until processed for Perkinsus marinus infection intensity. P. marinus infection intensity was determined using Ray's fluid thioglycollate medium (RFTM) assay (Ray, SM 1966).

2.5.1.4 Methodology Citation:
8. Citation Information
8.1 Originator: Ray, S.M.
8.2 Publication Date: 1966
8.4 Title: A review of culture method for detecting Dermocystidium marinum with suggested modifications and precautions
8.6 Geospatial Data Presentation Form: Scientific publication
8.8 Publication Information:
8.8.1 Publication Place: unknown
8.8.2 Publisher: Proceedings of the National Shellfisheries Association
8.9 Other Citation Details: Volume 54: pages 55-69

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Internal and External Creek Habitat Survey
The internal habitats of all eight intertidal creeks (4 in Clambank Creek, 4 in Town Creek) were surveyed manually (on foot) using tape measures during low tide. One tape was positioned along the central axis of the creek and a shorter tape was used to determine width of the creek bottom (from the lowest points of adjacent creek banks) perpendicular to the axis. The widths were determined every one meter along the lengths of the main creek and each tributary.

A one meter by one meter PVC quadrat was used to determine the bottom type of every square meter of each creek. Classification was based according to 16 bottom types. Bottom sediments without living oysters were classified as soft mud, sandy mud, shelly mud, and shelly sand. Twelve other categories were based on low density shell, medium clusters, or dense aggregates of living oysters present on those four sediment types. These data were used to generate percent values for proportions of the various bottom types. Aggregates of these data were used to create three general categories of bottom types: percent mud, percent hard bottom without shell, and percent oyster (live).

Additional internal geomorphological variables included: cross-sectional area at the mouth, number of branches (forks of tributaries), number of changes in direction of the creek axis that exceeded 10%, number of pools at low tide, distance to next closest intertidal creek mouth, and the area of submerged bottom at low tide.

External characteristics just outside the study creeks were also surveyed. Bottom types were determined for the intertidal area between the mouth of each intertidal creek and the mean low water (MLW) mark at the edge of the adjacent subtidal creek. Wheras the distance between the mouth and MLW varied among sites, the lateral extent of the area used for this set of bottom type analyses was defined as ten meters upstream and ten meters downstream of the mouths of each intertidal creek. The axis of this fixed 20 m dimension was perpedicular to the mouth of the intertidal creek, and the width of this area from the mouth to MLW varied from 2-9 m at the different locations. The same procedure identified for charcterizing bottom area and types inside of the intertidal creeks was used for characterizing the area outside of the mouths.

Some of these survey measurements were combined with the total station survey measurements done by Corbett, et al. to create addition-derived variables describing the geomorphology of the creeks.

2.5.1 Methodology
2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
2.5.1.3 Methodology Description: Oyster Growth and Survival

During the pre-manipulation year, oyster growth and survivorship were observed by placing plastic mesh bags containing 25 marked and measured oysters in each of the eight experimental tidal creeks. As the creeks are ephemeral and tidal exposure is a critical factor in bivalve physiology, bags were placed at four approximately equidistant locations along the mainstem of each creek at approximately the same measured elevation. Summer observations were between July and October, and fall-winter observations were from October to February.

2.5.1 Methodology
2.5.1.1 Methodology Type: Laboratory Collection Procedures and Protocols
2.5.1.3 Methodology Description: Oyster Growth and Survival

Growth was measured as change in length to the nearest 0.1 mm.

2.5.3 Process Step
2.5.3.1 Process Description

The processing steps taken to create each database for the entire project are detailed in each subproject's metadata. Each subproject had its own PI and students associated with it, and the PI was in charge of overseeing their own database management, including quality assurance/quality control procedures, statistical analysis, and documentation.

2.5.3.3 Process Date: 20000727

2.5.3 Process Step
2.5.3.1 Process Description

Data Rescue and Dissemination Project: The Baruch Institute's data manager oversaw the Creek Project Overview and Subproject metadata creation and the creation of the CD and a notebook, which contains all of the data, metadata, and graphics. The raw data sheets are scanned into a .jpg format and archived onto CD as raw data. CDs are housed in the fireproof cabinet in the data manager's office at the Baruch Marine Field Laboratory. Final data are posted to Baruch's Web Site and metadata are posted to the Isite Node for National Clearinghouse distribution.

2.5.3.3 Process Date: 20031117

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

Each subproject had its own database attribute naming conventions, abbreviations, and meanings. See each subproject's metadata for details. But, there were some names and meanings common to the entire Creek project.

Creek = numbering identification of each tidal creek within North Inlet Estuary where samples were collected; creeks 1-4 were creeklets running into Clambank Creek; creeks 5-8 were creeklets running into Town Creek. See map for creek numbering and location within North Inlet Estuary.

Date = month/day/year (mm/dd/yyyy) that the sample was collected (not necessarily processed or analyzed)

5.2.2 Entity and Attribute Detail Citation

Definitions were developed by the Baruch Institute's and Coastal Carolina University'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 estuarine ecology.

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:

NSF CREEK Project
CREEK Project Overview
CREEK Project Proposal

Directory: OVERALL CREEK PROJECT:

File: OVERALLCREEKPROJECT.FINAL.FGDC is a metadata file in MICROSOFT WORD and TXT format

6.3 Distribution Liability:

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 and Coastal Sciences. 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 and Coastal Sciences 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 and Coastal Sciences, Coastal Carolina University, nor the National Science Foundation shall be held liable for the use and/or misuse of the data described and/or contained herein.

6.4 Standard Order Process
6.4.2. Digital Form
6.4.2.1 Digital Transfer Information
6.4.2.1.1. Format Name: WORD (.DOC) 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
6.4.2.2.1.1 Computer Contact Information
6.4.2.2.1.1.1 Network Address
6.4.2.2.1.1.1.1 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: 20000727
7.2 Metadata Review Date: 20050225
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:	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

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