1. Identification Information
1.1Citation 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: 20040726
  8.4 Title: CREEK Project's Internal Creek Habitat Survey for Eight Creeks in the North Inlet Estuary, South Carolina: January 1998.
  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 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/
8.11 Larger work citation
8. Citation Information
  8.1 Originator: Richard Dame
  8.1 Originator: Dave 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.
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: The CREEK Project (January 1996 – June 2000) was an ecological research program that investigated relationships between oysters and other estuarine subcomponents including nekton, microzooplankton, phytoplankton, oyster diseases, and water chemistry. See cross reference section - this metadata file.

1.2 Description
  1.2.1 Abstract:

A group of eight intertidal creeks with high densities of oysters, Crassostrea virginica, in North Inlet Estuary, South Carolina, USA were studied using a replicated BACI (Before - After Control - Incident) design in which all creeks are sampled simultaneously. The study known as the CREEK Project began in January 1996. Based on preliminary geomorphological observations of North Inlet creeks, by fall of 1996, eight creeks similar in size and configuration were selected for the study. Geomorphological observations were made in four stages ranging from general to detailed: 1) a general reconnaissance and the selection of the eight creeks, 2) Chris Corbett and Leroy Humphries conducted detailed survey of the internal geomorphology of the selected eight creeks using GIS equipment, 3) Leah Gregory produced a oyster reef map and oyster biomass determination, and 4) Dennis Allen measured and classified all creek bottoms (referred to as Internal Creek Habitat Survey). In January 1997, after the first three stages were complete, oysters were added or removed from each creek to equalize oyster biomass at 8 grams dry body weight per cubic meter of bank full water volume in each creek. This stage of the project is referred to as the "pre-manipulation" period where all creeks have the same amount of oyster biomass. Sampling of water and nekton began in March 1997. In February 1998, about one year after the first set of water quality, chemistry, nekton and other measurements were made, living oysters were removed from four of the eight creeks (creeks 1, 4, 5, and 8), resulting in zero dry body weight per cubic meter of water at bank full volume. This was done to investigate the role of oyster reefs in controlling levels of dissolved and particulate materials in the water and to evaluate relationships between living oysters and nekton in the creeks. During the year following oyster removal, all measurements made in the first year were repeated. The second year of the project during which four of the creeks were without oyster

biomass was known as the "manipulation" stage. The BACI analysis was used to compare data between the two years.

In January of 1998, 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 the 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 length of the main creek and each tributary. A diagram depicting the methods and morphology was created and is called "InternalCreekDiagram". 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. When the data were analyzed along with the other creek morphological characteristics and nekton data, the internal creek habitat categories were condensed from 16 bottom types to two bottom types: mud and shell. The creek bottom types were also divided up on the Nalgene field data sheets by their general location in the creek such as left or right fork, in a pool, and in a submerged area.

External characteristics just outside the study creeks were also surveyed in January of 1998. These features also may influence the nekton entrance into the intertidal creek. 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. Whereas, 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 fifteen meters downstream of the mouths of each intertidal creek. A diagram depicting the methods and morphology was created and is called "ExternalCreekDiagram". The same procedure identified for characterizing bottom area and types inside of the intertidal creeks was used for characterizing the area outside of the mouths. Like the internal creek categories, the external creek habitat categories were condensed from 16 bottom types to two.

1.2.2 Purpose: The CREEK Project Habitat survey was initiated in January 1998 to determine what percentage of mud, shell, and live oyster reef made up of each of the eight creek bottoms in the North Inlet Estuary system, Georgetown, South Carolina. The Habitat types were used to help relate how and if the bottom habitat type influenced the nekton utilization of the creek.

1.2.3. Supplemental Information:
Significant Publications and Presentations:

Testing the role of oyster reefs in the structure and function of tidal creeks with a replicated ecosystem scale experiment: system level variability and response to removal of oysters. (Dame, R.F., E. Koepfler, L. Gregory, T. Prins, D.M. Allen, D. Bushek, D. Edwards, B. Kjerfve, A. Lewitus). 2nd International Conference on Shellfish Restoration. Hilton Head, SC. November 1998. Presented by R. Dame.

Use of intertidal salt marsh creeks by nekton; relationships to creek morphology. (Bushek, D., D.M. Allen, B. King, and B. Milan). International Symposium on Concepts and Controversies in Tidal Marsh Ecology. Vineland, NJ. April 1998. Poster.

Geomorphological determinants of nekton use among intertidal marsh creeks. (Allen, D.M., D. Bushek, R. Dame, L. Gregory, B. Milan and E. Koepfler). American Fisheries Society. September 1999. Charlotte, NC.

National Conference for Undergraduate Research. April 1999. An intertidal mesocosm to test bottom preferences of three motile estuarine species. (Milan, B., D.M. Allen, R. Young, R. Dame and A. Blair)

CREEK Morphology: Physical Dimensions of Creeks 1 through 8 North Inlet. (Corbett, C. and L. Humphries). In-House Report. August 27, 1997. Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina, Columbia, SC.

Estuarine Research Federation (ERF) September 1999. New Orleans, LA.

Linking habitat features and nekton use of intertidal creeks. (Allen, D.M., D. Bushek, R. Dame, B. Milan, and E. Koepfler)

Fish and shrimp use of intertidal habitats: a mesocosm approach. (Milan, B., D.M. Allen, R. Young, O. Akman, A. Blair, R. Dame)

Southeastern Estuarine Research Society (SEERS).

Does the geomorphology of intertidal creeks affect nekton use? (Allen, D.M., D. Bushek, R. Dame, L. Gregory, and B. Milan). Athens, GA. March 1998. Delivered by D. Allen.

Factors affecting nekton use of intertidal creeks. (Allen, D.M., D. Bushek, L. Gregory and B. Milan). Georgetown, SC. October 1998. Presented by D. Allen.

Comparison of length frequency distributions of dominant fishes adjacent intertidal creeks. (A. Blair, D.M. Allen, and B. Milan). Georgetown, SC. October 1998. Poster.

An intertidal creek mesocosm to test bottom type preferences of three mobile estuarine species. (Milan, B., D.M. Allen, R.F. Young, and A.C. Blair). Georgetown, SC. October 1998. Presented by B. Milan.

Nekton biodiversity in intertidal creeks. (Allen, D.M., D. Bushek, B. Milan, B. Brost, M. Potthoff and R. Dame). Jacksonville, FL. April 1999.

Seasonal changes in the fish community associated with subtidal oyster shell. (Lehnert, R. and D.M. Allen). Jacksonville, FL. April 1999.

Other Creek Datasets

Several other datasets were collected over varying periods during the four years. Oyster biomass data was collected to determine the natural average biomass of oysters within intertidal creeks so that all creeks could be adjusted to that average level and subsequently to monitor changes in oyster biomass since elucidating the role of oysters was the primary purpose of the overall study. Intensive planktonic - microbial loop sampling and experiments were conducted in selected creeks at various times. Collections of all nekton in creeks during bankfull neap tides were conducted seasonally during two years of the project, one pre-manipulation year and one post-manipulation year. Oyster growth was measured monthly during the same period of nekton collections. Infection intensities of the oyster parasite, *Perkinsus marinus*, were made in fall of the pre-manipulation year and once following the manipulation. See the Creek Project Overview documentation for information on publications, presentations, and other undergraduate and graduate research project topics.

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 (1997-2000).

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 or in the printed version of the Creek
Project Overview documentation that is in a Project notebook at the BFML.

1.3 Time Period of Content:
  9.3 Range of Dates/Times
   9.3.1 Beginning Date: 19980101
   9.3.3 Ending Date: 19980131

  1.3.1 Currentness Reference: Ground condition.

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:
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.

1.5.1.1 West Bounding Coordinate: -79.192
1.5.1.2 East Bounding Coordinate: -79.167
1.5.1.3 North Bounding Coordinate: 33.350
1.5.1.4 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:	COASTAL
1.6.1.2 Theme Keyword:	CREEK
1.6.1.2 Theme Keyword:	CREEK PROJECT
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:	INTERTIDAL CREEK
1.6.1.2 Theme Keyword:	MARSH
1.6.1.2 Theme Keyword:	SALT MARSH
1.6.1.2 Theme Keyword:	INTERTIDAL HABITAT
1.6.1.2 Theme Keyword:	FIELD EXPERIMENT
1.6.1.2 Theme Keyword:	HABITAT SURVEY
1.6.1.2 Theme Keyword:	OYSTER SHELL
1.6.1.2 Theme Keyword:	MUD BOTTOM
1.6.1.2 Theme Keyword:	NEKTON UTILIZATION

  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: BOTTOM
        1.6.3.2 Stratum Keyword: BENTHIC

1.6.4 Temporal
        1.6.4.1 Temporal Keyword Thesaurus: None
        1.6.4.2 Temporal Keyword: 1998

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: 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:
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.

1.14 Native Data Set Environment
Data are in Microsoft Excel 2000 Professional and csv formats. Metadata are in MS Word 2000 Professional and txt formats. Data and figures are in EXCEL and jpg formats.

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 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: Volume19:1, pages 361-369.

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: Alan Lewitus
  8.1 Originator: Don Edwards
  8.1 Originator: Eric Koepfler
  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 Statistics of the University of South Carolina
  8.2 Publication Date: 200201
  8.4 Title: Ecosystem response to bivalve density reduction: management implications
  8.6 Geospatial Data Presentation Form: Scientific publication
  8.8 Publication Information:
   8.8.1 Publication Place: Netherlands
   8.8.2 Publisher: Aquatic Ecology
  8.9 Other Citation Details: Volume36:1, pages 51-65.

1.15 Cross Reference:
8. Citation Information
  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: Department of Marine Science, Coastal Carolina University
 8.1 Originator: Belle W. Baruch Institute for Marine and Coastal Sciences
 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: 1997-2000.
 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: 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: Unpublished material
 8.4 Title: CREEK Project's <u>Microzooplankton</u> 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

1.15 Cross Reference:
 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: 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 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
8.9 Other Citation Details: CREEK Morphology: Physical Dimensions of Creeks 1 through 8 North Inlet. (Corbett, C. and L. Humphries). In-House Report. August 27, 1997. Belle W. Baruch Institute for Marine Biology and Coastal Sciences, University of South Carolina, Columbia, SC.
 8.10 Online linkage: http://links.baruch.sc.edu/data/

1.15 Cross Reference:
8.1 Originator: Dennis Allen
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: 2004
8.4 Title: CREEK Project's Nekton Monitoring Database for Eight Creeks in the North Inlet Estuary, South Carolina: 1997-1998.
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   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: 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:
Each habitat type was estimated in each square meter of "below bankfull" creek bed. Estimates will differ among evaluators, but the same evaluators were used in all eight creek beds. The accuracy of the final measurements are unknown, but the evaluators went up the creek bed meter by meter, so they were careful to measure the entire creek up to its headwaters.

  2.1.2 Quantitative Attribute Accuracy Assessment
      2.1.2.1 Attribute Accuracy Value
Mud   unknown
Oyster Shell   unknown

Parameter	Number of Decimal Places
Internal Values	0 (measured in square meters)
External Values	0 (measured in square meters)

2.1.2.2 Attribute Accuracy Explanation
No study was done to determine how efficient the sampling was for the habitat survey. Investigators estimate that the accuracy of habitat type for each creek was greater than 95%. But since the equipment and technique were very consistent from creek to creek, the variability from this should be equal among all creek habitat data.

2.2 Logical Consistency Report:
In the file, IntValues, Creek 1 had a couple of errors. The last number in column E, 11 m^2, was not included in the column E's sum of 131 m^2 therefore the corrected sum is 142 m^2, which includes the value of 11 m^2. Further, the sum for column L was listed as 21 m^2; however, this sum does not include the value of 1 m^2 (Clambank to posts before frame), therefore the corrected sum should be 22 m^2. The overall total for Creek 1 was listed as 570 m^2; however, the actual values total to 568 m^2. These values were verified by the Rescue Data Manager in 2004 and were corrected in the file: FinalIntValues.

Creek 2 Mud was listed as 65 m^2; however the total is listed as 75 m^2. According to the Nalgene field data sheets mud should be listed as 75 m^2 and not 65 m^2. These values were verified by the Rescue Data Manager in 2004 and were corrected in the file: FinalExtValues.

In the file, ExtValues, Creeks 1 and 4 had discrepancies and it has not been determined why they exist. The categories for sparse-medium (B, F, J, N) and dense-reef (C, D, G, H, K, L, O, P) were labeled incorrectly in the EXTERNAL.BOTTOMSURVEY.SUMMARYC1-8.1998 file. The categories were corrected in the FinalExtValues to represent sparse-medium as (B, C, F, G, J, K, N, O) and dense-reef as (D, H, L, P).
The following list represents the discrepancies from creeks 1 and 4:

Incorrect Original Final ExtValues:

	Mud (A, E, I, M)	Sparse-Medium (B, F, J, N)	Dense-Reef (C, D, G, H, K, L, O, P)
Creek 1	49	66	6
Creek 4	27	28	0

Data Rescue 2004 Corrected FinalExtValues:

	Mud (A, E, I, M)	Sparse-Medium (B, C, F, G, J, K, N, O)	Dense-Reef (D, H, L, P)
Creek 1	42	47	6
Creek 4	16	2	0

2.3 Completeness Report: There are no missing data in this database.

2.5 Lineage
  2.5.1 Methodology
    2.5.1.1 Methodology Type: Field Collection Procedures and Protocols
    2.5.1.3 Methodology Description: Overall Field Collection Protocol
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. The bottom types of all eight creeks were recorded on Nalgene field data sheets.

Additional internal geomorphological characteristics that were measured included: cross-sectional area at the mouth, number of branches (forks or tributaries), number of changes in direction of the creek axis that exceeded 10%, number of pools remaining 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. Whereas, 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 fifteen meters downstream of the mouths of each intertidal creek. The axis of this fixed 25 m dimension was perpendicular 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 procedures identified for characterizing bottom area and types inside of the intertidal creeks was used for characterizing the area outside of the mouths.

See the creek diagrams that describe how the internal (file called InternalCreekDiagram) and external creek (file called ExternalCreekDiagram) and pool habitats were surveyed. These are available on Baruch's website and also as part of the printed-out metadata (See Appendix) that resides at the Baruch Marine Field Laboratory.

2.5.1 Methodology
2.5.1.1 Methodology Type: Laboratory Procedures and Protocols
2.5.1.3 Methodology Description: Field Data Processing and Analysis
The field measurement data were used to generate percent values for proportions of the various bottom types. Some of these survey measurements were combined with the Total Station survey measurements done by Corbett, et al. (1997) to create addition-derived variables describing the geomorphology of the creeks. When the data were analyzed along with the other creek morphological characteristics and the nekton data, the creek habitat categories were condensed from 16 bottom types to two bottom types: mud and shell.

2.5.1.4   Methodology Citation:
8.1 Originator: Leroy Humphries
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, University of South Carolina
8.2 Publication Date: 19970827
8.4 Title: CREEK Morphology: Physical Dimensions of Creeks 1 through 8 North Inlet.
8.6 Geospatial Data Presentation Form: In-house Report
8.8 Publication Information:
8.8.1 Publication Place: USC, Columbia, SC
8.8.2 Publisher: Belle W. Baruch Institute for Marine and Coastal Sciences, University of South Carolina

2.5.3: Process Step
2.5.3.1 Process Description:

Overall Description: Original workup
The creek habitat categories of all eight creeks that were recorded on Nalgene field data sheets for the internal creek survey were summarized by the PI by creek on individual sheets of notebook paper; however, the external creek survey was compiled into one summary table with all eight creeks on one sheet of notebook paper. The internal creek habitat categories were condensed from 16 bottom types to 2 bottom types: mud and shell. The external creek habitat categories were originally condensed from 16 bottom types to 3 bottom types: mud, sparse-medium, and dense-reef. For data analysis, these were later condensed to two: mud and shell.

Data Rescue Process Description: 2004 workup
Data Capture and Processing of Original Raw and Final Data Files and Documentation (April 2004)
Obtained original raw hardcopy Nalgene field data sheets, creek survey maps, line drawings, and internal and external habitat summary tables from PI, Dennis Allen. The Nalgene field data sheets and other raw data were scanned and saved in the DIRECTORY: CREEKHABSURVEY.RAW.

In the process folder, CREEKHABSURVEY.PROCESS, the Rescue Data Manager created MS Excel spreadsheet files from the internal and external creek original Nalgene field data sheet values. The file, ExtValues, was created using the file, BOTTOMSURVEY.SUMMARYC1-8.1998.EXT, which was the original raw external notebook paper. Further, all of the data was compiled into one Excel file for the internal data and one for the external data. Internal and external graphs of the creek bottom coverage area (in square meters) data were created for all eight creeks. In addition, two general creek diagrams were created to describe how the internal and external creek and pool habitats were surveyed.

Data Verification and Creation of Final Rescued Databases (June 2004)
The folder, CREEKHABSURVEY.FINAL, contains the final graphics, documentation, and verified internal and external Excel data files. The file, FinalExtValues, was derived from the original Nalgene field data sheets that were used in the field and the file contains two spreadsheets labeled ExtIDS and FinalExtValues. ExtIDS contains a list of symbols that were used to identify external creek bottom types on the Nalgene field data sheets. The Data Manager used the Nalgene field data sheets to recalculate the discrepancies and the correct totals are represented in the spreadsheet, FinalExtValues. The files: IntValues and FinalIntValues were created using the files: CREEK1A.SUMMARY.INT - CREEK8.SUMMARY.INT. Further, the file: FinalIntValues contains two spreadsheets labeled IntIDS and FinalIntValues. IntIDS contains a list of symbols that were used to identify the internal creek bottom types on the Nalgene field data sheets. The Data Manager recalculated the totals on the summary sheets from the files CREEK1A.SUMMARY.INT - CREEK8.SUMMARY.INT and the correct totals are represented within the FinalIntValues spreadsheet. Graphs of the internal and external creek bottom habitat survey were created to show the creek bottom coverage (in square meters) for all eight creeks. The files: InternalCreekDiagram and ExternalCreekDiagram were created to depict a general internal and external creek bottom survey, respectively.

2.5.2.3 Process Date: 20040601

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

Creek = The numbering identification of each tidal creek within North Inlet Estuary where water 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 (located in the Supplemental Information).

Listed below are definitions of measured and derived physical variables of intertidal creeks used in the analyses of creek hydrogeomorphology and relationships between physical features and nekton. Bank-full elevation refers to the top of the creek banks and edge of the *Spartina* marsh.

<div align="center">

Size

</div>

Length: length of the main creek plus tributaries. Measurements along the centerlines of the main channel and all tributaries (from the mouths to the ends where the channel bottom rises to the bank full elevation) were summed to create this variable. Doubling of the length values provides a measure of creek edge.

Width: mean width of the main channel of the creek. Distances between banks were measured every 10m from the mouth to the end of the main creek to determine mean width. The measurements were made at the bank-full elevation.

Depth: mean depth of the main channel. Vertical distances between the flooded water surface (bank full level) and creek bottom were measured at the same transects used to determine mean width.

Cross-section: area of the cross-section of the creek mouth. This variable was calculated from multiple linear measurements of the vertical plane that defined the mouth of the creek. Vertical measurements were based on bank full elevation.

Bottom area: total area of bottom of all types in the main creek and all tributaries. A survey using one meter square quadrats and tape measure generated total bottom area. All roughly horizontal surfaces between creek banks were included.

Variables related to tide

Elevation: surveyed elevation of the creek mouth relative to the mean low water level.

Volume: volume of the creek (including tributaries) at bank full tide level. Calculations were based on survey measurements of creek length, width, and depth at bank full.

Landscape

Drainage area: area of intertidal marsh and mudflats between the edge of the creek and the estimated furthest distance flooding waters move outward before encountering flooding waters from adjacent drainage basins. The boundaries were estimated from high resolution aerial photographs.

Location: shortest linear distance from the creek mouth to the nearest upland forest edge. Distances were determined from high resolution aerial photographs.

Shape

Branches: number of tributaries extending from the main creek channel.

Bends: number of locations at which the axis of the main channel changes direction by more than ten degrees.

Slope: slope of the regression line based on bottom elevation at 10m intervals from the mouth to the end of the main channel (where the bottom attains bank full elevation).

Bottom Features

Roughness: irregularity of the bottom based on the coefficient of variation associated with mean depth.

Pools: number of depressions ($>5m^2$) in the intertidal creek bed that hold at least 10cm of water at low tide.

Submerged area: area of creek bottom (pools) covered by at least 10cm of water at low tide.

Oyster area: area of creek bottom with living oysters and/or whole shell regardless of the composition of the underlying sediment. Qualifying quadrats ranged from dense oyster reef to muddy areas with sparse clusters or shell patches.

Mud area: area of creek bottom with unconsolidated sediment but without oysters. Qualifying quadrats ranged from uniform areas of soft mud to shelly sand without whole shell. Mud area plus oyster area equals total bottom area.

Outside oyster area: area of intertidal bottom with living oysters and/or whole shell immediately outside of the creek mouth. The area calculation was based on the distance between the center of the intertidal creek mouth and the low tide mark at the edge of the subtidal creek (width) and a standard 25m length (10m upstream and 15m downstream from the centerline).

Proportions

Percent bottom submerged: a ratio, submerged bottom area to (total) bottom area.

Percent oyster bottom: a ratio, oyster bottom area to total bottom area.

Percent outside oysters: a ratio, area of oysters outside of the creek mouth to total area outside of the creek mouth.

Other Ratios

Conduit: a ratio: drainage area to (total) bottom area. Creeks with high ratios had large drainage areas relative to the size of the creek (as indicated by bottom area).

Axial dominance: a ratio: length of the main channel axis to the cumulative total length of all tributaries.

Steepness: a ratio: total volume of water at bank full level to total bottom area. Creeks with high ratios tended to have square lateral profiles with steeper banks.

Fringe: a ratio: surface area at bank full to total bottom area. Creeks with high ratios tended to have more shallow fringing areas.

Flow: a ratio: cross-sectional area at the mouth to total volume of water at bank full tide. Creeks with high ratios tended to have large mouths relative to the volume of the creek; these creeks filled and emptied more slowly than others.

Meander: a ratio: number of directional changes in the main channel axis (bends) to the length of the main channel.

Split: a ratio: number of branches to the length of the main channel.

The following list of habitat categories and their letter code designation applies to both internal and external Nalgene field data sheets; these sheets were scanned and their images occur in the **CREEKHABSURVEY.RAW** directory: in the **FIELDSURVEYSHEETS.INT** and **FIELDSURVEYSHEETS.EXT** directories:

	No Shell	Low Density - sparse	Medium – clusters	Dense - Reef
Soft Mud (Knee Deep)	A	B	C	D
Sandy Mud (Ankle Deep)	E	F	G	H
Shelly Mud (Firm, Larger Pieces)	I	J	K	L
Shelly Sand (Firm, Hash)	M	N	O	P

The symbols defined below were recorded onto the raw internal Nalgene field data sheets by the field technicians, which occur in the directory: **FIELDSURVEYSHEETS.INT**. These symbols were helpful in describing where creek bottom types occurred in each creek.

($\#$) and (#) = Submerged bottom

$\#^{\#}$ = Number of times that specific creek bottom type was observed, i.e. $(2)^3 = 2m^2$ was found 3 times

$(\#)^s$ = Subtidal

LF = Left Fork

RF = Right Fork

Creek 1 frame to pool 1:

$(\#)^1 = (pool\ bottom)^1$

Creek 2 inside frame:

($\#$) = Left fork facing southwest (sw)

$\boxed{\#}$ = Right fork facing sw

(#) = Submerged

Creek 3 nekton board to end of pool and Creek 8 to back creek:

$\#^T$ = Total for a single estimate, i.e., 20^T was a best estimate of how many square meters were present.

Creek 6 frame to upper end:

$(\#)^1$ = Submerged area in pool 1

$(\#)_1$ = Submerged area not in pool 1
LF = Left Fork Submerged
RF = Right Fork Submerged
Creek 7 frame to upper:
$(\#)^{>2}$ = Deeper than 2 ft.
$(\#)^{>2+}$ = A lot deeper than 2 ft.

The condensed categories listed below occur in IntIDs file in the directory:
CREEKHABSURVEY.FINAL/FINAL.DATA:

Mud = A, E, I, M
Shell = B, C, D, F, G, H, J, K, L, N, O, P

The symbol defined below was recorded on the raw external Nalgene field data sheets, which occurs in the directory: **FIELDSURVEYSHEETS.EXT**. This symbol was helpful in separating uptide and downtide creek bottom types.

Circled numbers refer to uptide: $(\#)$

The condensed categories listed below occur in the directory: **DATA.EXT:**
Mud = A, E, I, M
Sparse-Medium = B, C, F, G, J, K, N, O
Dense-Reef = D, H, L, P

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:
Dataset Identification names:
CREEK Habitat Survey
CREEK Internal Habitat Survey
CREEK Project Habitat Survey

Final Rescued and Archived Directory and File Names (July 2004)

Directory: CREEKHABSURVEY.RAW: (Total size 13.1 Mb, 5 Folders, 60 files)
CONTENTS: All files in the Directories below are scanned images from the original data sheets
      and are in the .jpg format.
      Directory: DATA.EXT: This directory contains the external creek bottom survey summary and raw
sketches of all 8 creeks and all files are in .jpg format.
            BOTTOMSURVEY.SUMMARYC1-8.1998.EXT
            MAP.CREEK1.EXT - MAP.CREEK8.EXT

      Directory: DATA.INT: This directory contains the internal creek bottom surveys from all 8 creeks
and all files are in .jpg format.
            CREEK1A.SUMMARY.INT – CREEK8.SUMMARY.INT

      Directory: FIELDSURVEYSHEETS.EXT: This directory contains the external creek Nalgene
field data sheets and all files are in .jpg format.
            FSS.CREEK1.EXT - FSS.CREEK8.EXT

      Directory: FIELDSURVEYSHEETS.INT: This directory contains the internal creek Nalgene field
data sheets and notes regarding Creek 4. All files are in .jpg format.
            FSS.CREEK1A.INT - FSS.CREEK8D.INT
            CREEK4NOTES.INT

      Directory: CREEKFIGURES: This directory contains creek diagrams for all 8 creeks and water
depth data notes. All files are in .jpg format.
            CREEK1 - CREEK8
            WATERDEPTHDATANOTES

Directory: CREEKHABSURVEY.PROCESS: (Total size 153 Kb, 1 Folders, 7 files)
CONTENTS: This directory contains the original internal and external data files and diagrams detailing creek
      morphology and terminology used in the habitat survey. The files,ExtValues and IntValues, are in
      Microsoft excel workbook format and .csv Format. The file, CreekIntExtDiagrams, is in Microsoft
powerpoint format.
      Directory: Graphics: this directory contains internal and external habitat survey graphs in Microsoft excel
format.
            ExtGraphics
            IntGraphics

Directory: CREEKHABSURVEY.FINAL： (Total size 1.69 Mb, 3 Folders, 24 files)
CONTENTS: This directory contains the corrected/final internal and external digital data files, final
      documentation, and diagrams detailing creek morphology and terminology used in the habitat survey.
      Directory: FINAL.DOCUMENTATION: the file is in Microsoft word format, text, .pdf
            CREEKHABSURVEY.FINAL

      Directory: FINAL.DATA: all files are in Microsoft excel and Comma Separate Value (.csv) format.
FinalExtValues is a digital file, which contains tabs within the spreadsheet named ExtIDS and
FinalExtValues. ExtIDS contains a list of symbols that were used to identify external creek bottom
types. FinalExtValues contains the final external creek habitat data values.
The digital file, FinalIntValues, contains tabs within the spreadsheet named IntIDS and
FinalIntValues. IntIDS contains a list of symbols that were used to identify the internal creek bottom types,
and FinalIntValues contains the final internal creek habitat values.

      Directory: FINAL.GRAPHICS: all files are in .jpg format.
InternalCreekDiagram and ExternalCreekDiagram contain a general, overhead diagram of the internal and
external creek features respectively.
The following files contain external creek habitat data:
            DowntideExt
            UptideExt
            TotalExt

The following files contain internal creek habitat data:
Creek1Int - Creek8Int
TotalInt
SummaryInt

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: EXCEL (.XLS), WORD (.DOC), .CSV, .TXT (text only), Powerpoint (ppt) and jpg.
      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: 20040601
  7.2 Metadata Review Date: 20040817
  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