# Large Mesozooplankton (Motile Epibenthos) Data for the North Inlet Estuary LTER DATABASE

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| Year Released to Public | 2008 | | |
| Distribution URL for file | http://links.baruch.sc.edu/data/accessfiles/Large_Motile_Epibenthic_Mesozooplankton_0_5mm_20mm__known_as_EPI_1988_2003.zip | | |
| **DATASET TITLE:** | Long-Term Large Mesozooplankton (Motile Epibenthos) Data for the North Inlet Estuary, Georgetown, South Carolina: 1981-2003 | | |

| **INVESTIGATOR INFORMATION :** | **Investigator 1** | **Investigator 2** | **Data Manager** |
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| **OTHERS:** | Tracy Buck, Lynn Barker, Ginger Ogburn_Matthews |

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| **Data Set Credit** | **Supported by the National Science Foundation, Long-Term Ecological Research Program (LTER), under grants DEB 8012165 and BSR 8514326. Subsequent funding, from 1993 through 2003, was from the National Oceanic and Atmospheric Administration (NOAA) through the Office of Ocean and Coastal Resource Management, Estuarine Reserves Division (initial award number NA270R0322-01 October 15, 1992).** |
| **DATA FILE INFORMATION:** | ***This condensed metadata is from the original, more extensive metadata*** created on 7/18/2008 by Ginger Ogburn-Matthews.<br><br>If needed, the original may be accessed at: **http://links.baruch.sc.edu/Data/EPI/metadata/EPIBENTHOS%201981-2003%20METADATA.pdf**<br><br>Links and email addresses in the original have not been updated as those locations and people may no longer be available.<br><br>The data manager identified on this page should be contacted for any questions about the data. |
| **Data File Name** | Large_Motile_Epibenthic_Mesozooplankton_0_5mm_20mm__known_as_EPI_1988_2003.zip |
| **Beginning Date** | 20-Jan-1981 |
| **End Date** | 22-Dec-2003 |
| **Number of Data Records** | 5196 |

| **RESEARCH LOCATION:** | North Inlet Estuary | Debidue (DD) | Bread and Butter (BB) |
|---|---|---|---|
| **Geographic Description** | The North Inlet Estuary is located on the southeastern coast of the United States, approximately 10 kilometers east of Georgetown, South Carolina. The North Inlet Estuary is a bar-built Class C type estuary (Pritchard, 1955) and is a relatively small tidal estuary (area = 2630 hectares). It is composed of numerous winding tidal creeks dominated by Spartina alterniflora and is considered a pristine tidal estuary due to minimal anthropogenic impacts. The watershed drains a 24.8 square kilometer area of mostly pine forest and a moderately developed residential watershed to the north. Town Creek is a high salinity creek dominated by semi-diurnal tides. Rain input, primarily runoff, depresses salinities briefly (hours - days) depending on duration and frequency. Water temperatures mirror local air conditions: warm temperate. | The DD (Debidue) site near Town Creek mouth and the Inlet is characterized by a high energy sandy bottom with regular ridges and swales. Depth along the tow path averaged 3 to 4 meters at sampling time. The bottom is sand with little or no hard substrate (shell, rock). Seasonal growths of bryozoan and algae occur. Generally, little or no organic matter is collected in the epibenthic sled. The DD epibenthos tow path site was located at the confluence of Town Creek and Debidue Creek. The 100 m tow path followed a transect beginning at a fixed point on Debidue Island and followed the shoreline due south (approximately 5 meters from shore) in line with a large, heavily-vegetated dune on North Island. The tow path terminated on a line with the boilers of a sunken ship and the tip of Debidue Island (looking to the NE). Each tow lasted approximately 5 minutes depending on tidal velocity. Debidue Site: Begin of tow: 33°19'54.2" N, 79°09'57.8" W; End of tow: 33°19'46.0" N, 79°09'56.8" W. | The BB (Bread and Butter) site is located along Town Creek approximately 2 km from the inlet mouth. At this location the creek is bounded by extensive Spartina alterniflora marshes. The intertidal zone is covered by clusters of the American oyster (Crassostrea virginica), shell rubble and intermittent muddy flats. The bottom supports seasonal growths of sponges, algae, hydroids, bryozoans, and soft corals, as well as, oysters. Much of the bottom habitat is sandy mud covered by varying accumulations of detrital plant and fecal material. Depth along the tow path ranges from 2 to 4 meters at sampling time. The BB epibenthos tow path site is located along the western shoreline of Town Creek adjacent to the mouth of Clambank Creek. Each of the tows began at a small (1 m wide) drainage creek about 50m south of Clambank Creek confluence. The tow was started about 5 m from the edge of the marsh and ended about 30 m from the edge of the marsh. The tow path extended to a line between the Clambank tower and the first small drainage southwest of Boze's Creek mouth. Each tow lasted approximately 5 minutes depending upon tidal velocity. Bread and Butter Site: Begin of tow: 33°19'50.5" N, 79°11'18.5" W; End of tow: 33°20'00.1" N, 79°11'14.7" W. |

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| **Location Bounding Box** | | | | | |
| **West Bounding Coordinate** | -79.27 | | | | |
| **East Bounding Coordinate** | -79.153 | | | | |
| **North Bounding Coordinate** | 33.366 | | | | |
| **South Bounding Coordinate** | 33.296 | | | | |
| **OR if single point location** | | | | | |
| **Latitude** | | | | | |
| **Longitude** | | | | | |
| **Elevation** | | | | | |

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| **TAXONOMIC COVERAGE:** | | | | | |
| **Taxonomic Protocols** | | | | | |
| **Organisms studied** | motile epibenthic invertebrates, fish, larval fish | | | | |

**KEYWORD INFORMATION**

**KEYWORDS:**

Abundance, Motile Inverterbrates, Animals, Epibenthos, Coastal, Ecosystems, Estuarine, Estuary, Long-Term, Long-Term Ecolological Researc, LTER, Epibenthic, Marsh, Monitoring Data, Salt Marsh, Taxa, Larval Shrimp, Macrozooplankton, Larval Fish, Tidal Creek, Life Stage, Recruitment, Counts, Zooplankton, Atlantic Coast, Bread and Butter Creeek, Coastal, Debidue Creek, Debordieu Colony, East Coast, Georgetown County, Hobcaw Barony, North Inlet Estuary, South Carolina, Southeast Coast, Town Creek, North Linlet, USA, Epibenthic, Day, Biweekly, Fornightly, Month, Year, Animals, Epibenthic Animals, Collection, Class, Family, Genus, Invertebrates, Multiple Species, Species, Crustaceans, Pericaridae, Amphipods, Mysids, Chaetognaths, Hydromedusae, Shrimps,Crabs, Fishes, Zooplankton, Larval Shrimp, Larval Crab, Larval Fish

**ABSTRACT:**

**Abstract:** Three consecutive tows of an epibenthic sled fitted with a 365-micron mesh net were used to collect small (1-20 mm) motile animals from just above the bottom of two estuarine tidal creek stations (designated BB and DD) every two weeks at the midday low tide in the North Inlet Estuary, SC. Since previous field studies indicated that stage of tide and time of day affected organism abundance in the epibenthic sled stations, it was necessary to make collections about every 14 days when the same tide stage occurs at the same time of day to keep these variables "constant". Thus, three sequential tows (known as replicates A, B, and C) were made with the same apparatus with the direction of the ebbing current along the same tow path when the end of the ebbing tide occurred near noon. Collections from 1981 through 1984 at a sandy inlet (DD) and a major marsh creek (BB) location allowed for a comparison of two habitat types. Beginning in 1985, only the BB site continued its biweekly triplicate sampling. The same gear, field deployment, and tow path have been used since sample number one, made on January 20, 1981. Physical data including air temperature, surface and bottom water temperature and salinity, dissolved oxygen, and water velocity and light penetration from the water's surface to the bottom at 50 cm intervals were recorded just before the epibenthic collections. These parameters are listed in the **EpiPhysicals81-2003** digital file. Pericarid crustaceans (i.e. mysids, amphipods), chaetognaths, hydromedusae, larval shrimps, crabs, and fishes dominated the epibenthic catches. From 1981 through 1984 all organisms were identified under a microscope to species or lowest possible taxa for both sampling sites, BB and DD; larval fish species were measured and counted, and shrimp life stages were noted and counted. Beginning in 1985 with sample 100, the taxa categories counted were merged into fewer categories in order to speed up processing. Samples with a great number of organisms were split before taxa categories were counted. Counts were adjusted by the number of times the sample was split, and then converted to numbers per cubic meter of water filtered before average numbers per sample were calculated.

**Purpose:** Initially and in the short-term (1981-1984), this study was initiated to determine seasonal and inter-annual changes in the taxonomic/life stage composition and abundance of small motile epibenthic invertebrates and fishes (1-20 mm in length) in the major sub-tidal habitats of North Inlet estuary. In the long-term, this study was to document the long-term variability and trend in the composition and abundance of estuarine motile epibenthic invertebrates and larval fish populations within the North Inlet Estuary and to use the data to compare with other estuarine sites in the nation and in the world.

**METHODS:**

**Field Collection Procedures and Protocols (Overall Epibenthic Zooplankton Field Collection Protocol)**

Since previous field studies indicated that stage of tide and time of day affected organism abundance at the epibenthic sled stations, it was necessary to make collections about every 14 days when the same tide stage occurs at the same time of day to keep these variables "constant". Thus, three sequential tows were made with the same apparatus along the same tow path when the end of the ebbing tide occurred near noon. Replicated biweekly measurements were made to allow for statistical comparisons of means among dates. Comparisons of abundance between years provided information on long term trends. Collections at a sandy inlet and a major marsh creek location allowed for a comparison of two habitat types. The same gear, field deployment, and tow paths have been used since sample no. 1.

A series of three sequential tows were made at each of 2 stations at two week intervals 1.5 to 2 hours prior to low tide. All collections were made during the late morning (9 - 11 am) hours. An epibenthic sled (see description) was towed behind an outboard boat motoring approximately 2 knots faster than the ebbing tidal current. All tows were made moving with the tidal flow along a marked tow path 100 m in length. Tows usually lasted approximately 5 minutes depending upon tidal velocity.

Volume of water filtered was estimated with a torpedo shaped *General Oceanics flowmeter* model 2040 mounted in the mouth of the net. Flowmeter readings were recorded before and after each tow. Upon sample retrieval, the contents of the net were concentrated in the removable cod end and transferred into a pre-labeled Nalgene jar and 100% buffered formalin stained with Rose Bengal added to bring the final concentration to 5 - 10% formalin. In the event of a large catch of sponge, algae, shell, or an oversized organism (greater than or equal to 1 liter volume), the sample was poured into a bucket and the excess material rinsed, noted, and discarded. The remaining sample was then sieved through a fine mesh net (less than or equal to 365 micron), placed in a pre-labeled jar, and preserved. Samples were returned to the lab for analysis.

**Epibenthic Sled Gear Description:** The apparatus consists of a rectangular steel frame (51 x 30 cm) mounted on 3 skis which orient the mouth of a #2 (365 micron) Nitex, 1/2 meter mouth diameter standard conical plankton net perpendicular to the creek bottom. The apparatus does not dig into the sediment, but does collect soft-bodied sessile invertebrates (sponges, bryozoans, etc.) in addition to small motile organisms within 30 cm of the bottom. A 12 meter tow rope tied to the leading point of the sled chassis allowed for the best contact between the skis and the bottom along most of the tow paths. See online web photos and drawings for more information at http://links.baruch.sc.edu/Data/EPI/metadata/EPIMetadata.html.

For complete detailed information for biweekly sampling cruises for all fauna, including vendors for nets, and other important information for Estuarine sampling, go to the 2008 documentation: "Protocols for Biweekly Fauna Cruise" in the Metadata section of the Archival notebook or online at the link above.

**Field Collection and Protocols (Physical Field Data Collection)**
Field technician(s) recorded physical data in waterproof Field Notebooks prior to Epibenthos collections. These data were hand entered into a separate digital data file named: **FaunaPhysicals81-03**. Field observations about water, weather, wind, etc were also included in the Field Notebook. Water observations would include water color, clarity, and water from Winyah Bay intruding into the North Inlet system. Comments included about anything unusual such as unusually high or low tide, or storm events that might have an effect on the sample data. A conductivity meter was used to determine the surface and bottom water temperature and water salinity values. Beginning on June 16, 1993 (sample 308) these variables and depth were measured with a Hydrolab water quality instrument. Prior to this time, depth values were estimated from the 0.5 meter marked zooplankton nets. On September 28, 1993, dissolved oxygen measurements were made with the Hydrolab probe. Underwater light readings were taken with a LI-COR LI-193SB Underwater Spherical Quantum Sensor using a LI-COR LI- 185B Quantum/Radiometer/Photometer. To OPERATE: First, the FUNCTION knob was turned to "Sensor in air", and light measurements of the surrounding air were made. Then the FUNCTION knob was turned to "Sensor in water", and light measurements in water were made at the surface and at 50cm depth increments, down to the bottom. The RANGE knob was placed either on multiples of 10 (10, 100, 1000, 1x104) or 3 (3, 30, 300, 3000, 3x104). Each time the RANGE knob was placed on the lowest possible scale without the needle pegging out at the high or low end. Then the reading was recorded, depending on the RANGE knob: if the Range was on the 10-scale, then the reading was taken from the top of the dial (values 0 to 1.0); if on the 3-scale, the reading was taken from the bottom of the dial (values 0 to 3). The correct value is read directly 1981-2003 Epibenthos Metadata Page 37 of 51 7/18/2008 off of the meter, based on the Range value (or scale). Both the RANGE value and SCALE value were recorded in the field notebook, and then converted to the correct PAR value within the physical dataset spreadsheet. Recording these numbers rather than recording only the PAR value allows for detection of possible errors due to reading the wrong scale. The value is determined directly by using the RANGE to determine what the SCALE is reading. For example: a SCALE of 300 would indicate that the bottom scale (0-3) should be read as 0-300; therefore, a reading of 1.25 from the bottom scale would indicate of PAR value of 125 µmol s-1 m-2. Beginning on December 29, 2005, a LI-COR Model LI-1400 datalogger replaced the LICOR LI-185B Quantum/Radiometer/Photometer. This datalogger allows for sensor-specific multipliers to be stored in the datalogger and then a direct digital readout of PAR in µmol s-1 m-2 is given. This direct reading is what was recorded in the field notebook. During the period between 12/29/05 and 7/21/06, the "light in air" value was measured using a LI-COR Model LI-192SA Underwater Quantum Sensor rather than the LI-193SB Spherical Quantum Sensor. The LI-193SB was still used for the **underwater** PAR measurements during this period, and was then used to make the "light in air" reading as well beginning again on 8/7/06. Water velocity was measured in meters per second using a Marsh McBirney Model 201D Portable Water Current Meter. The sensor (dark bulb above torpedo-shaped weight) was deployed into the water, and beginning at the water's surface (determined by the ring attachment: when it reaches the surface of the water) water velocity readings were measured and at ½ depth meter increments (marked on the cable) until the bottom was reached. Each measurement reading was allowed to stabilize before it was recorded.

**Labratory Procedures and Protocols (Lab Analysis)**
Prior to counting, the sample is sieved through a 365µm mesh sieve, rinsed with water, and the 10% formalin/saltwater solution is saved for archiving the sample after processing. For the 1981-1984 samples, the rinsed sample was placed in a graduated beaker and sample volume recorded. In the event the volume of settled material was excessive (greater than or equal to 100 ml), the sample was divided with a plankton splitter until a workable fraction was obtained (never less than 12.5% of original volume). From 1985 onward, enough water was added to the beaker to the dilute sample for ease of ID. The need of sample splitting was determined either through scanning a couple of petri dish "plates" or visual inspection of the sample in the beaker. If it needed splitting, then the sample was poured into the plankton splitter, and split up to 3 times
depending on the density of organisms within the sample. All samples were then poured into a plastic petri dish and sorted under the microscope. Sorting is done under a binocular dissecting microscope at 6 - 12X. All organisms of appropriate size (greater than or equal to 365 micron) are enumerated. (See Section **5. Entity and Attribute Information** for a listing of common taxa) During the first year (1/20/81-1/9/82), 100 of each species of mysids, decapod larvae, juveniles, and adults; cumaceans; stomatopods; isopods; fish eggs, larvae, and juveniles (up to 100 per species per replicate) and rare organisms were isolated. All isolated specimens were stored by appropriate taxon in labeled flint vials and preserved in 10% formalin buffered and stained with Rose Bengal. Vials were stored by station and cruise for future analysis and reference. Following sorting and enumeration the counted sample was recombined with the unsorted portion (if any), placed in a labeled 500 ml flint jar, preserved with buffered and stained 10% formalin solution and stored for future reference.

**Labratory Procedures and Protocols (Subsampling of samples and taxonomic groups)**
Sub-categories (dominant genera) of unidentified shrimp and fish larvae were determined by the following procedures. The unidentified shrimp larvae category was subdivided into the following sub-categories: penaeid post-larvae, Palaemonetes spp., Alpheus spp., Upogebia spp., Callianassa spp. and others. The larval fish category was subdivided into *Leiostomus xanthurus*., *Anchoa* spp., *Gobiosoma* spp., *Lagodon rhomboides*, and other fish larvae (includes yolk sac larvae, larvae, postlarvae, and juveniles). In 1981-1982: The replicate with the largest counts of unidentified shrimp larvae was selected and recounted. At least 10 total unidentified shrimp larvae (USL) were necessary for a recount. Up to 100 randomly selected shrimp larvae were counted and the percentages of each sub- category were derived. The resulting percentages were then used to estimate the proportion of the total unidentified shrimp larvae in each replicate that the dominant genera comprised. The newly generated numbers of individuals were treated as count data and used to generate means and error terms for each subcategory as though those sub-categories were actually counted.

1981-1982: In the data rescue process in June of 2006, if there was an actual count number for one of the subcategories (usually Penaeids and Callianassids) on the original counting sheet, it was placed into the newer 32 category counting sheet. The remaining subcategory numbers were based on their percent (from procedure above) X (total number of USL –the actual subcategory count). Fish larvae were identified and counted on the original counting sheet and were transferred to the 32 category counting sheet.
1983-84: All sub-categories (unidentified shrimp and fish larvae) for each replicate were counted.

May 1, 1985 through Nov. 14, 1986 (samples 107-145): The same procedure to create count numbers for shrimp larvae subcategories in 1981-82 was used to generate numbers for unidentified shrimp larvae and larval fish sub-categories. Fish larvae were misplaced for the 1986 February and March cruises 126-129 before sub-categories could be counted. Also, it was determined that in April and May of 1986 (samples 130 through 133), Pinfish and Spot were not counted as part of the subcategory count procedure described earlier. Therefore, there are missing data for these subcategories.In 2003, Tracy Buck and Sarah Foose reviewed winter samples from Nov. 1985 - Nov. 1986, to verify Spot and Pinfish identifications and counts. These new numbers were placed into the final database. Since there were no raw count sheets to verify numbers from, no actual numbers could be obtained for the all the subcategories (like in the 1981-1982 2006 Data Rescue Process, see above), except those winter samples that the Epi-Counting Research Specialists (Buck & Foose) provided.

December 2, 1986 through April 3, 1989 (samples 146-204): All sub-categories of unidentified shrimp and unidentified fish larvae were counted for each replicate. In 2003, the subcategory data for fall-winter of 1987, all of 1988, and up through April 3, 1989 were verified by Sarah Foose. April 18, 1989 through December 19, 1991 (samples 205-271): The same procedure that was used in 1981-82 was used to generate numbers for the shrimp and larval fish subcategories. The Fall 1989 through winter 1990 and Fall of 1991 fish larvae were re-counted by Sarah Foose and Tracy Buck. The 1989, 1990, 1991 all fish subcategory counts were verified in 2003 by Sarah Foose. No additional data rescue was performed on these data in 2006, since there were no original count sheets to verify the numbers.

1987-1994: In 2003, the winter samples (Nov-May) of these years were reviewed by Tracy Buck and Sarah Foose for Larval fish identification/count verification (Primarily Spot and Pinfish). If incorrect, the new numbers were placed into the final bwkepiXX.dat database. They also verified numbers within the subcategory, Penaeid Shrimp Larvae, for summer samples from 1987-1994.

**Count data processing (Calculation of numbers of taxa per cubic meter)**
Raw sample sheets contained raw counts of phyla, class, family, genera, and/or species for all organisms encountered. Total numbers of organisms per sample/replicate were calculated using the following 2 equations:

Equation 1: Total Organisms — n = raw count
MF = multiplication factor for subsampling (sample splits)
n x MF = T — T = total organisms per sample/replicate

Equation 2: Water Volume — revs/tow = flowmeter revolutions per tow
revs/meter = average flowmeter calibration
revs/tow x A(m2) = V(m3) — A(m2) = area of net mouth which is 0.13 m2
revs/meter

The values for the parameters for these equations were entered into the data entry sheet, and the SAS program calculated the final numbers.

**Laboratory Procedures and Protocols of Ancillary Data(Lab Length Analysis of Larval Fishes)**
From 1/21/84 - 1/4/85, up to 100 of each species of fish larvae were isolated from each sample date and station. The first 100 encountered in replicates A, B, or C were placed in labeled

vials and stored until length measurements were made. Larvae were measured using vernier calipers for larger specimens (> or = 10mm) or an ocular micrometer for small specimens (< or = 10mm). Standard Lengths (SL) and Notochord Lengths (NL) were recorded to the nearest 0.1mm with the ocular micrometer. Fish Egg Diameters (ED) were measured and recorded to the nearest 0.01mm. Ocular Units of the three microscopes used to determine sizes were calibrated to millimeters at different magnifications. This calibration sheet was scanned in 2008, and the image is located in the Ancillary Data Folder.

**Laboratory Procedures and Protocols of Ancillary Data(EpiMacroZooplankton and Protocols of Ancillary Data)**

16 x 20 mm plastic Petri dishes were washed in 70% acetone and dried in a drying oven at 60°C. Aluminum pans were weighed on a Cahn 29 Electrobalance, and the weights were recorded after one minute. The pans were placed in labeled Petri dishes and put into the drying oven for 24 hours. They were removed from the oven and immediately placed in the desiccator. Fifteen minutes were allowed for the pans to cool to room temperature. The aluminum pans were removed from the dishes and weighed on the Electrobalance. The weight was recorded after one minute. The pans were placed back into the petri dishes, and the dishes were replaced in the oven to dry for an additional six hours. The pans were then reweighed. Since no significant difference was found between the two weights, it was decided that weights could be measured after 24-hr. Organisms were isolated and rinsed in distilled water to remove excess salts. They were placed in pre-weighed aluminum pans and dried for 24-hours at 60°C. Pans with the organisms were placed in the desiccator for fifteen minutes, then weighed and the weights recorded after one minute. Dry weights were then calculated.

**VARIABLE DESCRIPTIONS:**

| Variable Name | Variable Description | Units | Measurement Scale | Code Information | Number Type |
|---|---|---|---|---|---|
| DATE | date that the sample was collected (not necessarily processed or analyzed) in mm/dd/yyyy format. | 1-12, 1-31, 1981-2003 | datetime | | |
| STATION | two letter code designation for the tidal marsh creek, within North Inlet Estuary, where the Epibenthic sample was collected. (BB = Bread and Butter site, DD = Debidue site) | BB, DD | nominal | | |
| SAMPLE | the sample number, assigned in sequential order (in increments of 1), to the Epibenthic collection, based on date. | 1-673 | ordinal | | integer |
| SAMTIME | the Eastern Standard Time that the Epibenthic sample was collected in hhmm military 24 hour format. | 0807 - 1452 | datetime | | |
| REPLICAT | the replicate letter, assigned in sequential order (in increments of 1 letter), to each “replicated” tow for each sample/date. The replicate was a sequential tow, one right after another, not taken simultaneously with the other replicates. | A, B, C | nominal | | |
| FLOWNO | a unique number given to each flowmeter before deployment. Used as an identification mark. | 1300 – 9623 no units (an ID No.) | ordinal | | integer |
| RPM | flowmeter revolutions per meter. This value is determined by calibrating each flowmeter. An average number of revolutions is taken at slow, medium, and fasting walking speeds over 25 meters in a swimming pool. | 29.50 – 39.00 revolutions per meter | ratio | | real |
| DATECAL | is the date that the flowmeter was calibrated. Needed because the same flowmeter could be used over the years, but the calibration value (RPM) could change. | 1-12, 1-31, 1980-2002 | datetime | | |
| FLOSTART | the initial reading of the flowmeter before tow deployment. | 0172 - 999926 | ratio | | integer |
| FLOEND | the end reading of the flowmeter after tow deployment. | 9393 - 1009597 | ratio | | integer |
| RPT | flowmeter’s revolutions per tow and is calculated by subtraction: FLOEND – FLOSTART | 2198 - 17500 | ratio | | integer |
| SPLITS | the number of times the sample was split before organisms were identified and counted. There were no partial splits. | 0 - 4 | ratio | | integer |
| XFACTOR | a multiplication factor based on number of times the sample was split; the taxa or category should be multiplied by this XFACTOR to account for the entire sample. Example: if the total sample was split once (1 time), only half of the sample was processed, so the taxa or category should be multiplied by 2. | 1, 2, 4, 8, 16 | ratio | | integer |
| NO3M | number per cubic meter and is the volume of water filtered by the sample net during each tow. It is determined by the calculation: RPT/RPM*0.13m2 (area of net mouth). | 7.83 – 64.32 | ratio | | real |
| Taxon Abundance | Counts per sample were converted to the number of individuals per cubic meter of water volume by dividing the taxa abundance by the NO3M for each replicate. See list below for taxa/category definitions. | | ratio | | real |
| HYDROMED | Hydromedusae | 0.00 – 53.33 number per cubic meter | ratio | | real |
| CHAETOGN | Chaetognaths | 0.00 – 206.84 number per cubic meter | ratio | | real |
| GASTROPO | Gastropods | 0.00 – 2.22 number per cubic meter | ratio | | real |
| BIVALVES | Bivalves | 0.00 – 28.59 number per cubic meter | ratio | | real |
| STOMATOP | Stomatopods | 0.00 – 2.23 number per cubic meter | ratio | | real |

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| UNIDSHRI | PALAELAR+ALPHELAR+CALLILAR+UPOGELAR+PENAEPLA+All other unidentified shrimp larvae (except Trachypenaeus: juveniles and adults were considered as OTHASHR = Other adult shrimp); see below for definitions of shrimp larvae code names | 0.00 – 96.04 number per cubic meter | ratio | | real |
| ACETES | Acetes spp. (all life stages, but were mostly adult shrimp) | 0.00 – 351.15 number per cubic meter | ratio | | real |
| LUCIFER | Lucifer spp. (all life stages, but were mostly adult shrimp) | 0.00 – 13.04 number per cubic meter | ratio | | real |
| PERICLIM | Periclimenes spp. (all life stages, but were mostly adult shrimp) | 0.00 – 4.49 number per cubic meter | ratio | | real |
| LATREUTE | Latreutes spp. (all life stages, but were mostly adult shrimp) | 0.00 – 4.49 number per cubic meter | ratio | | real |
| OTHASHR | Other adult shrimp (all other adult shrimp that were not counted in the Acetes, Lucifer, Periclimenes, or Latreutes spp. categories). Note: Total Adult Shrimps = ACETES+LUCIFER+PERICLIM+LATREUTE+OTHASHR | 0.00 – 27.52 number per cubic meter | ratio | | real |
| CRABMEGA | Crab megalopae+crab juveniles | 0.00 – 241.55 number per cubic meter | ratio | | real |
| PINNOTHE | Pinnotherid juveniles | 0.00 – 43.23 number per cubic meter | ratio | | real |
| GAMAMPH | Gammarid amphipods | 0.00 – 269.50 number per cubic meter | ratio | | real |
| CAPAMPH | Caprellid amphipods | 0.00 – 39.73 number per cubic meter | ratio | | real |
| ISOPODS | Isopods | 0.00 – 4.80 number per cubic meter | ratio | | real |
| CUMACEAN | Cumaceans | 0.00 – 54.06 number per cubic meter | ratio | | real |
| MYSIDS | Mysids | 0.00 – 1496.04 number per cubic meter | ratio | | real |
| FISHEGGS | Fish eggs | 0.00 – 14.85 number per cubic meter | ratio | | real |
| UNIDFLAR | GOBYLAR+ANCHOLAR+LEIOSLAR+LAGODLAR+All other unidentified fish larvae; see below for definitions of fish larvae code names. These would include yolk sac larvae, larval, post-larval and juvenile stages. | 0.00 – 267.86 number per cubic meter | ratio | | real |
| OTHERS | Other animals; includes the following: leeches, nudibranchs, sea spiders (pycnogonids), brittlestars, adult fish, adult crabs, polychaetes, and others. | 0.00 – 42.80 number per cubic meter | ratio | | real |
| TOTEPI | HYDROMED+CHAETOGN+STOMATOP+UNIDSHRI+ACETES+ LUCIFER+ PERICLIM+ LATREUTE+OTHASHR+CRABMEGA+ PINNOTHE+GAMAMPH+CAPAMPH+ISOPODS+ CUMACEAN+ MYSIDS+FISHEGGS+UNIDFLAR+OTHERS. Bivalves and gastropods were not consistently counted; therefore, they were not included in the Total Epibenthos calculation for the entire 1981-2003 database. | 0.40 – 1594.49 number per cubic meter | ratio | | real |
| PALAELAR | Palaemonetes spp.larvae | 0.00 – 48.73 number per cubic meter | ratio | | real |
| ALPHELAR | Alpheus spp.larvae | 0.00 – 46.72 number per cubic meter | ratio | | real |
| CALLILAR | Callianassa spp.larvae | 0.00 – 11.90 number per cubic meter | ratio | | real |
| UPOGELAR | Upogebia spp.larvae | 0.00 – 9.00 number per cubic meter | ratio | | real |
| PENAEPLA | Penaeus spp.postlarvae | 0.00 – 5.72 number per cubic meter | ratio | | real |
| GOBYLAR | Goby larvae | 0.00 – 259.82 number per cubic meter | ratio | | real |
| ANCHOLAR | Anchoa spp. Larvae | 0.00 – 11.60 number per cubic meter | ratio | | real |
| LEIOSLAR | Leiostomus xanthurus larvae | 0.00 – 13.71 number per cubic meter | ratio | | real |
| LAGODLAR | Lagodon rhomboides larvae | 0.00 – 10.64 number per cubic meter | ratio | | real |
| CRUISE# | the Epibenthos sample number, assigned in sequential order (in increments of 1). | 1-568 | nominal | | integer |
| MONTH | month that the sample was collected (not necessarily processed or analyzed) in mm format. | 1-12 (mm) | datetime | | integer |
| Day | day that the sample was collected (not necessarily processed or analyzed) in dd format. | 1-31 (dd) | datetime | | integer |
| Year | year that the sample was collected (not necessarily processed or analyzed) in yyyy format. | 1981-2003 (yyyy) | datetime | | |
| Time | Eastern Standard Time that the physical variables were sampled in hhmm (military 24 hour) format. | 0745-1436 (hhmm; 24 hour) | datetime | | |
| Depth | water depth as measured from the marked lines on the 153 micron zooplankton nets. | 1-12, 1-31, 1981-2003 | ratio | | integer |
| BTEMP, BSAL, BDO | bottom water temperature (°C), salinity, and dissolved oxygen (mg/L) measured prior to the Epibenthos tows. These were measured at the stationary 153 µm zooplankton BB sample collection site. | BTEMP(4.00-35.20 degrees Celsius), BSAL(16.00-37.80 parts per thousand), BDO(2.67-13.80 milligrams per liter) | ratio | | real |

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|---|---|---|---|---|---|
| STEMP, SSAL, SDO | surface water temperature (°C) salinity, and dissolved oxygen (mg/L) measured prior to the Epibenthos tows. These were measured at the stationary 153 µm zooplankton BB sample collection site. | STEMP(3.30-35.10 degrees Celsius), SSAL(5.90-37.60 parts per thousand), SDO(2.68-13.70 milligrams per liter) | ratio | | real |
| VEL-50, VEL-150, VELABBOT, BVEL | water velocity readings (m/s) at 50 cm and 150 cm depths, and water velocities at one level above the bottom and at the tidal creek bottom. The reading one level above the bottom could be 5 to 50 cm above the bottom depth. | VEL-50(0.02-0.85 meters per second), VEL-150(0.00-0.75 meters per second), VELABBOT(0.00-0.69 meters per second), BVEL(0.00-0.52 meters per second) | ratio | | real |
| LIGHT-50, LIGHT-150, LIGHTABBOT, BLIGHT | light measurement values (units = µmol s-1 m-2) of the ambient water at 50 and 150 cm depths, and ambient water light values at one level above the bottom and at the tidal creek bottom. The reading one level above the bottom could be 5 to 50 cm above the bottom depth. | LIGHT-50(0.12-2500.00 micromoles per second per square meter), LIGHT-150(0.50-1100.00 micromoles per second per square meter), LIGHT ABBOT(0.00-440.00 micromoles per second per square meter), BLIGHT(0.00-380.00 micromoles per second per square meter) | ratio | | real |
| LOCATION | two letter code designation for the tidal marsh creek, within North Inlet Estuary, where the Epibenthic sample was collected. (BB = Bread and Butter site, DD = Debidue site) | BB, DD | nominal | | |
| TYPE | Type of sampling collection-database type. EPI = Epibenthos | EPI | nominal | | |
| GEARTYPE | Type of sampling collection gear and net mesh used: ES365 = Epibenthic Sled; 365 micron mesh. | ES365 | nominal | | |
| LENGTH | length measurement of each individual of each species type, measured by vernier calipers or ocular micrometer. Ocular Units of the three microscopes used to determine sizes were calibrated to millimeters at different magnifications. This calibration sheet was scanned in 2008, and the image is located in the **FishLarvaeData** Folder. | 0.01 to 20.00 millimeters | ratio | | real |
| WEIGHT | weight measurement of each individual of each species type. This field was blank in each species data files, so it is assumed that the weights of individuals were not taken. | Fields are blank; does not occur in data files | ratio | | real |
| MEASTYPE | The type of measurement that was made on each individual. Designations: Standard Lengths (SL), Notochord Lengths (NL), Fish Egg Diameters (ED). | ED, NL, SL | nominal | | |
| A,B,C | Epibenthos Replicate A, B, or C's adjusted Myrophis counts for the sample/replicate. Tows were sequential. | A(0-29), B(0-35), C(0-26) | ratio | | integer |
| FREQUENCY | sample size (n); is the number of replicates (A, B, C) per sample/date which was used to calculate the mean. | 1,2,3 | ratio | | integer |
| MMYROPHIS | Average number (#/m3) of Myrophis per sample/date, using the Myrophis81-08AdjCnts data file. | 0.00 – 1.67 average number per cubic meter | ratio | | real |
| STDMYROPHIS | Standard deviation calculated using the Myrophis81-08AdjCnts data file | 0.00 – 0.55 standard deviation #/m3 | ratio | | real |