Long-Term Low Tide Monitoring Data for Fishes, Shrimps, & Crabs LTER DATABASE

Year Released to Public	2004		
Distribution URL for file	http://links.baruch.sc.edu/data/accessfiles/Low_Tide_Motile_Nekton_20mm_Fishes_Shrimps_&_Crabs_known_as_OLFISH_1983_2003.zip		
DATASET TITLE:	Long-Term Low Tide Monitoring Data for Fishes, Shrimps, & Crabs in Oyster Landing Creek, North Inlet Estuary, Georgetown, South Carolina: 1983-2003.		
INVESTIGATOR INFORMATION :	**Investigator 1**	**Investigator 2**	**Data Manager**
First Name	Dennis	Paul	Franklin
Last Name	Allen	Kenny	Anoruo
Address line 1	Baruch Marine Field Laboratory	Baruch Marine Field Laboratory	Baruch Marine Field Laboratory
Address line 2	University of SC	University of SC	University of SC
Address line 3	PO Box 1630	PO Box 1630	PO Box 1630
City	Georgetown	Georgetown	Georgetown
State	SC	SC	SC
Zip Code	29442	29442	29442
Country	USA	USA	USA
OTHERS:	Ginger Ogburn-Matthews		
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 2/22/2005 by Ginger Ogburn-Matthews. If needed, the original may be accessed at: **http://links.baruch.sc.edu/Data/OLLT.Nekton/metadata/OLLT.Nekton.Metadata.pdf** Links and email addresses in the original have not been updated as those locations and people may no longer be available. The data manager identified on this page should be contacted for any questions about the data.		
Data File Name	Low_Tide_Motile_Nekton_20mm_Fishes_Shrimps_&_Crabs_known_as_OLFISH_1983_2003.zip		
Beginning Date	15-Apr-1983		
End Date	31-Mar-2003		
Number of Data Records	22901		
RESEARCH LOCATION:	Hobcaw Barony	Oyster Landing (OL)	OB
Geographic Description	The Hobcaw Barony property is bordered by the Debordieu Colony property and Highway 17 to the north. Winyah Bay borders the Hobcaw Barony peninsula to the south and west. It is located in Georgetown County, South Carolina, USA. The North Inlet Estuary lies east of the uplands of Hobcaw Barony and contains Crab Haul Creek, where the Oyster Landing pier and research site are located.	The Oyster Landing (originally named OA, now called OL) nekton-sampling site is a small intertidal creek pool, which is practically isolated from the rest of the creek during an average low tide. The bottom substrate is primarily muddy with scattered oyster shells. After a heavy rain, a soft, fluffy, flocculent layer settles near and in the deepest portion of the pool. The pool is surrounded by Spartina alterniflora along the steepest banks, and live oyster reefs occur on one side of the pool's inflow and outflow (block net sites). From 1980 to about 1993, the pool was 13.7 meters wide and 22.4 meters long, and the maximum depth was 90 centimeters on an average low tide. The upstream block net site was 7.0 meters wide, and its depth averaged 20 centimeters. The downstream blocknet site was 6.2 meters wide and also averaged about 20 centimeters in depth. These measurements were taken in 1988. In September 1989, Hurricane Hugo's surge scoured the creek bed and pool, removing most of the mud and accumulated organic material, and leaving a sandy-hard bottom ("hardpan"). In subsequent years, the mud and detritus accumulated at a high rate. In the mid-1990s through the early 2000s, the pool continuously migrated north, and the southwest side of the pool silted in with pluff mud. This may have been related to the vertical expansion of the oyster reef on the downstream side of the pool and the resulting reduced outflow from the pool during the ebbing tide. In February 1995, a 3-D survey of the pool determined that, due to the accumulation of mud on the southwestern side in particular, the water volume of the pool decreased by half during low tide conditions. This condition persists at the time of this metadata preparation (2004). The water quality of the Oyster Landing pool is influenced drastically by external conditions: Salinity ranges from zero parts per thousand during heavy rains to greater than 35 parts per million during droughts, extremely high tides, or strong easterly winds. Water temperatures range from 3 degrees Celsius in winter to 38 degrees Celsius during the summer months. The headwaters of this tidal creek originate from a nearby surrounding forest (approximately 1000 meters from the OL pool). During drought conditions, the creek beds in the forest dry up, thereby preventing freshwater input from the forest.	The OB sampling site of the LTER Oyster Landing project is about 100 meters downstream from the regular OL (OA) sampling site. This site was sampled only during the first year of the study (samples 1-26, April 1983 through April 1984). The OB pool occurs slightly downstream of the junction of Oyster Landing creek and the manmade drainage creek (causeway canal). This pool is not nearly as isolated as the OL tidal pool during low tide. The dimensions of the pool are about 15 meters by 20 meters and approximately 1.3 meters in depth at low tide. The inflow and outflow areas of this pool have average depths of about 60 cm during a good low tide. An oyster bar lines the northern bank while very soft mud occurs on the opposite shore. A mosaic of soft and hard mud intermixed with oyster shells dominates the pool bottom. Spartina alterniflora is the dominant plant surrounding the OB site.
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			
TAXONOMIC COVERAGE:			
Taxonomic Protocols			
Organisms studied	nekton, zooplankton, epibenthos, benthic macrofauna, meiofauna		

KEYWORD INFORMATION

KEYWORDS:

KeywordThesaurus

earth science, biosphere, zoology, arthropods, aquatic habitat, benthic habitat, estuarine habitat, zoology, fish, invertebrates, wetlands, marshes, abundance, coastal, ecosystems, estuarine, estuary, standard length, life stage, lter, marine invertebrates, marine vertebrates, fish biomass, nin010, north inlet, recruitment, salt marsh, south carolina, species abundance, species composition, estuarine invertebrates, estuarine vertebrates, north america, north inlet estuary, south carolina, sc, oyster landing, east coast, crab haul creek, georgetown county, atlantic coast, hobcaw barony, benthic, water column, intertidal, crab, crustacean, invertebrates, vertebrates, fish, nekton, shrimp, multiple species, fish community, crab community

ABSTRACT:

Abstract:

Seine samples of the nekton community were taken every 2 weeks with a 6-millimeter mesh bag seine at low tide, in an intertidal creek pool in the Oyster Landing basin, a finger creek off Crab Haul Creek. From April 15, 1983 through April 19, 1993, two seine tows were completed during each sampling event. Initially [samples I through 26 (April 15, 1983 through April 16, 1984)], two tows were completed at two sites, OA and OB. For the remainder of the database, both tows were conducted only at the OA site, which was renamed OL. From May 4, 1993 through the end of this database, the sample was reduced to one seine tow. The seine collections were taken to a processing laboratory where the field technicians identified and sorted the nekton to species (when possible). Total number (abundance), length, and weight (biomass) measurements for each species were recorded. Between 1984 and 1988, collection efficiency data were obtained seasonally in order to determine the efficacy of the regular sampling procedures. On efficiency sample dates, an additional 12 to 14 sweeps (tows) of the low tide pool were made following the standard tows. For the last two efficiency dates, the 15 sweeps were followed with a rotenone treatment to ensure that all individuals present were collected. All of the efficiency data, as well as physical data (water temperature, salinity, dissolved oxygen, etc.) collected prior to each sample event, were included in the database as ancillary data files. Species length/weight and *Callinectes* spp. sex data occur periodically in the early to mid-1980s raw data sheets and in the early LTER digital files. These data are not available in the final rescued 2005 database or on the web site. However, these data can be attained by accessing: 1) the raw data sheets stored at the Baruch Marine Field Laboratory (BMFL), 2) the scanned images of these sheets which are archived on the OL.LowTideNekton.1983-2003.RAW Archive CD, or 3) the MAINFRAME directory/files on the OL.LowTideNekton.1983-2003.PROCESS CD.

Purpose:

The purposes of this long term study were to: 1) determine the abundance, biomass, and length frequency patterns of nekton over seasons, years, and decades, 2) relate the nekton data to coincidentally collected physical/environmental data and determine factors affecting distribution and occurrence, and 3) correlate the nekton data to other biotic data from North Inlet, including zoooplankton, epibenthos, benthic macrofauna, and meiofauna.

METHODS:

FIELD collections

One quarter (1/4) inch bag seine collections for sampling fishes, shrimps, and crabs were collected on a biweekly basis beginning on April 15, 1983 to March 31, 2003. Low tide nekton sampling dates were scheduled so that there were no less than 10 days or more than 18 days between samplings. Also, these sampling dates were scheduled in close proximity to the regular LTER faunal cruises (usually within 4 days). Seine collections of organisms occurred in the afternoon, at about the same time of day (between 1200 and 1600) and during the same tidal stage (at dead low tide). Two technicians would walk to within 5 meters of the sampling pool and then walk around the pool, through the Spartina grass via the marsh, swinging wide around the pool itself so as not to "spook" the fish present there. When they reached the inflow and outflowconstriction areas of the pool, a 6 mm (1/4 inch) mesh net was stretched across these sections of the creek as quickly as possible. This would, in effect, 'block off' the pool and prevent fishes from entering or exiting. The lead line of each block net was secured into the sandy bottom, and oyster shells (which prevented the lead line from lying properly on the bottom) were removed. After the pool was secured with the block nets and the physical data were recorded, a 15.24 meter long 1.22 wide 6 millimeter mesh bag (4ft x 4ft) seine was pulled across the pool, beginning on the east side and moving to the western shore (against the ebbing tide). Fish, shrimp, and crab were placed in 5 gallon buckets, in coolers, or in 20 gallon plastic bags. The second seine haul, moving in the opposite direction (west to east), was taken immediately after emptying the first seine haul. Organisms from the second seine were placed in separate buckets or bags. Both seine hauls were takenimmediately to the laboratory for sorting and processing.

FIELD Physical Data

Air and water temperatures were measured prior to seine collections with a mercury filled thermometer. Additional water temperature data collection began on a continuous basis in January 1985 and ended December 1992. Continuous water temperature readings were recorded on a paper scroll by a Ryan brand thermograph, which was deployed in the deepest hole of the pool. At low tide, the thermograph measured the surface water temperature in the pool, and at an extreme high tide the thermograph would be submerged as much as one meter. Beginning on 11/26/85, the relative water level of the pool was measured between the two rebar poles, which held the downstream block net up. The measurement was made with a 10 centimeter marked wooden staff or a meter stick; it was not referenced to sea level or tide data, but measurements were taken in the same location prior to each sampling. Pool water level measurements using the wooden staff ended July 28, 1992. Salinity was determined to the nearest part per thousand with a refractometer, either in the laboratory or in the field, until August 31, 1993. Beginning on November 4, 1986, dissolved oxygen (D.O.) was measured in milligrams per liter with a calibrated D.O. meter. From August 24, 1987 through February 22, 1993, D.O. was determined by a modified version of the classical Winkler procedure (Strickland and Parsons, 1972), and a D.O. meter was no longer used. Turbidity or water clarity measurements began on February 28, 1991, using a secchi disk attached to a 10cm-marked rope. Beginning on September 14, 1993, water temperature, salinity, and dissolved oxygen were measured using a Scout DataSonde Brand water quality unit; depth measurements began on April 27, 1995. YSI brand water quality units were used for the same parameters beginning in 2002.

LABORATORY Nekton Processing

Except for the first 26 samples, each seine haul was processed separately in the laboratory. Organisms were placed into a
1/4" mesh dip net or large colander pan, rinsed with seawater, and sorted by species into separate containers until the entire seine sample was completely sorted. If there were more than one life stage (size class) of a transient species, then the size classes were also sorted out (this occurred mostly for Spot, White and Striped Mullet, and the Mojarras). If over 100 individuals of a particular species/size class were captured, 100 individuals were randomly selected and measured (if less than 100, all were measured). The total weight for each species/size class was measured to the nearest tenth of a gram. The total number of individuals of a particular species was determined by counting (if the number was less than 120). However, if the total number of individuals was larger than 120, then the 100

individuals, which were selected to be measured, were also weighed together, giving a subsample weight. The total number of individuals was calculated from the total weight and subsample weight for that species. All bony fishes were measured to standard length (SL), decapod crabs were to carapace width (CW), decapod shrimp to carapace length (CL), and squids to mantle length (ML). All lengths were taken to the nearest millimeter. After lengths and weights had been recorded for each species, a representative number of individuals from each species were preserved in glass jars filled with 10 % buffered formalin. All sample jars were labeled with collection information and were placed with the other archived samples. When catches were so large that all the nekton could not be processed the same day, the organisms were preserved in formalin (primarily in 1983), covered in airtight plastic bags and placed in cold storage overnight, or frozen in seawater and worked up within the next several days.

Trained technicians were used to identify the nekton species. Identifications were also made by the use of identification keys. Uncertain species identifications were verified by professionals. Fishes, shrimps, and crabs were identified to species in most samples. *Alpheus spp.* and *Callinectes* spp. were identified only to genus. *Callinectes* spp. is mainly *Callinectes sapidus.* Due to the difficulty of the identification of the juvenile life stage of some fishes, the juvenile life stage of the following were also identified only to genus: *Astroscopus* sp., *Menticirrhus* sp., *Urophycis* sp., and if less than 30 mm SL, *Eucinostomus* spp. Rarely or occasionally, *Alosa*, *Anchoa*, *Paralichthys*, *Prionotus, Syngnathus* young-of-the-year were only identified to genus. See the **Attribute Accuracy Report** and the **Entity and Attribute Information** sections for more detailed information about species names and occurrences.

Nekton Modifications in sample processing procedures from Sample #136 (09/23/1988) to #152 (05/18/1989)

The purpose of these procedural changes was to reduce the amount of time spent processing samples on collection day during the nine months of the year that only two or three people were available to help. At the same time, we ensured that sufficiently large sample sizes were processed in order to maintain the integrity of the long-term dataset and conduct the same kinds of analyses and comparisons that were possible with the complete processing of both hauls. No changes in the field collection protocol were made.

From biweekly sample #136 (9-23-88) to #152 (5-18-89), the following processing procedure was used for the second seine haul (OLII), no changes were made to the haul number 1 (OLI) procedure:

1. If the volume of second seine haul (OLII) was less than or equal to 4 gallons (80% of a 5 gallon bucket), the entire collection was processed according to the procedure used for OLI. Regardless of the volume of OLII, the total weight of the catch was recorded.

2. If the volume of OLII was greater than 4 gallons, the total weight of the catch was recorded, and 20% of the total weight of that collection was sorted by species and the following information was recorded:

A. Total number of individuals of each species
B. Weight (biomass) of each species
C. Lengths of individuals according to these criteria:

1. If lengths for 30 or more individuals of a species were obtained from OLI, no additional lengths were taken from OLII. This minimum of 30 was based on the requirement for most statistical comparisons of two samples (e.g. K-S test) to have an n > 25.

2. If lengths for more than 15 but less than 30 individuals of a species were obtained from OLI, we measured as many additional individuals from OLII as necessary to increase the sample size to greater than 30 (if possible, even if specimens needed to be isolated from the 80% of OLII not sorted).

3. If lengths for less than 15 individuals were available from OLI, no additional lengths were taken from OLII. (If there were not 15 in OLI, it is unlikely a large enough sample (n > 25) could be obtained with what is present in OLII).

Variables for data analysis:
Total catch biomass: no change, OLI + OLII = total

Total number of individuals: OLI (no change) + OLII (based on adjusted counts of species from 20% of OLII catch) = total

Total number of species: only number of species in OLI will be used

Number of individuals by species: OLI (no change) + OLII (based on adjusted counts from 20% of OLII, equals 5 times OLII subsample) = total

Biomass of each species: OLI (no change) + OLII (based on adjusted weights from 20% of OLII, equals 5 times OLII subsample) = total

Length of species: up to 100 individuals from OLI (no change) + additional data from OLII for less common species

LABORATORY & FIELD (Nekton Modifications in sample processing procedures from 06/2/89 sample #153 to 03/31/2003 sample #495)

#153 OLI: 5 buckets collected: two buckets totally worked up and 13.3% (by weight) of other three buckets worked up. OLII subsampled according to earlier protocol.
#155 OLII lengths only taken for those species in OLI with between 15 and 30 lengths, abundance and biomass are correct for total
#157 Only ½ of OLI catch sorted and worked up, rest subsampled, OLII subsampled by protocols
#159 OLI & OLII all species worked up; shrimps were subsampled
#160 OLI & OLII all species worked up; shrimps were subsampled
#179 OLII subsampled by weight, not by protocol above
#194 January 31, 1991: First catch using Fish Measuring Board to work up species lengths and data entry for weights. Also measured catch with original meter stick method; K-S test showed no differences between the length distributions.
#203 OLII subsampled by weight not by protocol (fish had rotted)
#204 OLI & OLII shrimp subsampled by weight
#205 - #249 OLI & OLII began releasing fish in field and counting the number of buckets released. We were killing too many fish that were not going to be processed (were subsampled). Weights of buckets were recorded when taken into lab for processing. Numbers of individuals for both hauls were adjusted in the Easy Entry program after calculations were tallied from species weights.
OLI: two to three buckets kept for lab processing
OLII: no more than two buckets were kept for lab processing.
#250 - #495 The second seine haul (OLII) was dropped all together. Statistics showed that the first seine haul (OLI) was sufficient to represent the species and life stages occurring in the pool. In addition, as part of the North Inlet-Winyah Bay NERR sampling protocol, only two five-gallon buckets were kept for the first seine haul sampling processing. Total weight was determined by the weight of the buckets taken into the lab to be processed, plus the weight of the buckets released in the field.

VARIABLE DESCRIPTIONS:

Variable Name	Variable Description	Units	Measurement Scale	Code Information	Number Type
Date	the calendar date that the nekton sample was taken, not necessarily processed.	mm=01-12, dd=01-31, yyyy=1983-2003; month, day, year	datetime		
Sample	the sample number of the nekton seine collection. The first sample was numbered 1, the second was numbered 2, and the rest were numbered consecutively up to the end of the project.	1 to 495, sequential number in ascending order	nominal		integer
Site	physical collection site where the seine tows were made.	OA, OB, OL	nominal		
Replicate	replicate number; however, it represents a sequential seine haul rather than a true replicate. The first haul (Replicate 1 also known as OLI) was made in one direction across the intertidal pool, and the second haul (Replicate 2 also known as OLII) was made in the opposite direction. This continued up to 15 seine hauls for the efficiency study; replicate 16 contained the total amount of poisoned fish that were collected after the application of Rotenone. Replicate 16 ended when no more fish floated to the top to be dipped up.	1 to 16, sequential numbering	nominal		integer
Species (code)	the species code number that was assigned to the species collected. There was no particular order given to this assigned numbering system. As new species were collected, they were added to the end of the numbering list. See list below.	1 to 149, sequential numbering	nominal		integer
Name	the scientific name given to each species or genera collected in each seine haul and site/replicate per date.	scientific name (genus and species)	nominal		
Totwt	the total weight of each species or genera collected in each seine haul and site/replicate per date.	0.0 to 486400.0 grams	ratio		real
Totnum	the total number or abundance of each species or genera collected in each seine haul and site/replicate per date.	0 to 60408 individuals (abundance number)	ratio		real
Len1	the length in millimeters for the first individual of each species measured. Fish were measure to standard length (SL), shrimp were measured to carapace length (CL), crabs to carapace width (CW), and skates and rays to wing width (WW). If only one individual of a species was collected, then only Len1 would have a number in it.	20 to 400 millimeters standard length	ratio		real
Len2	the length in millimeters for the second individual of each species measured. Up to 100 individuals of each species per site/seine/replicate were measured; the length of the 100th individual would be variable Len100.	20 to 400 millimeters standard length	ratio		real