Annual Report—C13401-A02

Biscayne Bay Coastal and Nearshore Community Baseline Study to Develop Biological Performance Measures

Part I

Faunal Density and Community Composition of the Nearshore Zone

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Part II

Spatial and Temporal Patterns in the Coastal Creek/Open Wetland Flats Community

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Year-2 Annual Report to the South Florida Water Management District
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OVERVIEW

Loss and degradation of coastal wetlands and nearshore estuarine habitat is a long-term threat to ecological function and productivity of Biscayne Bay. The ecology is dependent upon the quantity, quality, timing, and distribution of freshwater inflow. The Comprehensive Everglades Restoration Plan (CERP) and the Lower East Coast Regional Water Supply Plan (LECRWSP) could affect freshwater flow to Biscayne Bay. Special projects in CERP will be designed to restore estuarine habitat in Biscayne Bay that has been diminished by past and current water management practices. Both CERP and LECRWSP require periodic assessments to evaluate the effect of new CERP projects as they are implemented. Scientifically based performance measures based on biological communities are needed to quantify change, and benchmarks are needed to indicate whether restoration is succeeding. Scientific workshops have revealed a lack of essential information about coastal wetlands and nearshore biological communities with which to develop performance measures, and guide the design of the Biscayne Bay projects. In an effort to acquire some of this essential information, the National Marine Fisheries Service in collaboration with the U.S. Geological Service and National Audubon Society developed the "Biscayne Bay Coastal and Nearshore Community Baseline Study" so as to develop biological performance measures. As part of this effort, the National Audubon Society was contracted to implement a study of the spatial and temporal patterns in the coastal creek/open wetland flats fish community. This is the second quarterly report for the second year of that study.

Objectives of this project are to: (1) quantify fish and macroinvertebrate density and diversity in the shallow nearshore habitat in Biscayne Bay using throw-traps, commercial shrimp vessels (roller-frame trawls), and pull-nets; (2) compare pink shrimp population dynamics between shallow (< 1 m) water nearshore zones and the deeper (> 1 m) zone fished by the live-bait roller-frame fleet; (3) evaluate the influence of salinity on fish and macroinvertebrate community structure and pink shrimp population dynamics in Biscayne Bay; (4) compare density estimates and faunal assemblages based on data from three types of sampling gear.

This work was undertaken with funding from the South Florida Water Management District (SFWMD) and with in-kind contributions of human resources by the National Marine Fisheries Service (NMFS), Southeast Fisheries Science Center, the U.S. Geological Survey, Center for Water and Restoration Studies, and the Audubon Tavernier Nature Center. The work is being accomplished through a joint project agreement between SFWMD and NMFS. The funds are used to support a memorandum of agreement with the U.S. Geological Survey (USGS) and a contract with the Audubon Tavernier Nature Center. In addition, NMFS employs two full-time biological assistants on this project through University of Miami, Rosenstiel School of Atmospheric Science, Cooperative Institute for Marine and Atmospheric Studies (CIMAS).

Throw-trap sampling in South Biscayne Bayis under the direction of Dr. Michael Robblee (USGS). Sampling with the roller-frame trawl and the pull-net in the bayis

under the direction of Dr. Joan Browder (NMFS). Sampling with drop nets and other methods in the coastal wetlands is under the direction of Dr. Jerome Lorenz (Audubon Tavernier Science Center). The first two activities collect small fish and invertebrates (shrimp and crabs) comprising the epibenthic community. Progress and results are described in Part I of this report. The third activity collects both estuarine and freshwater fish in the upper tidal creeks and shallow pools of coastal brackish and adjacent freshwater wetlands. Progress and results are described in Part II of this report.

Progress on Tasks – Part I *(NMFS and USGS)*

Year-1 results were presented in the Year-1 annual report. Year 1 included design, organization, field collections, sample processing (sorting, identification, and counting), data entry, summarization, and preliminary analyses. Summarization and preliminary analysis of the datasets, as they had progressed by the end of the first year, were presented in progress reports during Year 1 and the Year-1 annual report (Browder et al. 2004).

Year-2 results are presented in the present Year-2 annual report. Data summarizations and analyses in this report include data collected in Year-1 and Year-2. With this Year-2 annual report, we will have fully completed tasks 1-9, which consist of 7 quarterly reports and 2 annual reports.

Part I. Element A: Sampling epibenthic fauna and habitat in Biscayne Bay with throw trap.

Throw-trap Study *(USGS).* Preliminary sampling was completed in June and July 2002 and scheduled collections were initiated coincident with trawl sampling in October 2002. The 11 bi-monthly collections scheduled for Year 1 and Year 2 were completed with the October 2004 sample collection, and sample processing and data entry have been completed. With this report data summarization is complete through the September 2004 collection. At this time, Year 1 and Year 2 components of the throw-trap element of the project, including sampling design, planning, staffing, procurement, data collection, and data analysis, are 100% completed. In addition, throw-trap samples were collected in December 2004.

Part I. Element B: Sampling epibenthic fauna in Biscayne Bay with trawl.
Trawl Study *(NMFS).* Bi-monthly sampling with the roller-frame trawl began in August 2002 and ended in February 2004. While the August 2002 collection was the first collection and initially viewed as preliminary, the data are comparable to other collections in most respects and the data were included in the database (as Trawl Collection 0). Sample processing, data entry, and data analysis are 100% completed.

Part I. Element C: Sampling epibenthic fauna in Biscayne Bay with pull-net.

Pull-net Study *(NMFS)*. Sampling with the pull net (hand-pulled mini-trawl) was conducted on an approximately monthly schedule from July 2003 through October 2004, which was more than the bi-monthly sampling schedule prescribed in the Agreement (amendment 1). Sampling during December and September 2004 was not possible because of weather, and sampling in June, although conducted twice during the month (because there were two full moons), covered fewer stations because of poor weather. (Pull-net sampling was particularly vulnerable to the weather because it is conducted at night, and evening storms make night navigation and sampling in the water hazardous. Sample processing and data entry have been completed. At this time 100% of the pull-net element of the project is completed. Sample processing, data entry, data summary, and analysis are also completed.

Part I. Task 9 Update

Sample processing and data entry for Year-1 was completed December 31, 2004. The emphasis of the past few months has been in completing and refining data sets, preparing summary information, and conducting analyses for inclusion in the Year-2 Annual Report. In addition to analysis of each dataset, we also conducted some analyses comparing collections from the three data sets. Summarized data and analytical results included in this report cover both the first and second year of data collection.

Progress on Tasks – Part II Coastal Wetland Fish Community *(Audubon)*

Part II tasks were completed and are described in detail in the body of the report. Summary extracts are given below.

Part II. Element A

Per the scope of work, in Year 1, two new fixed sampling sites, designated MB (Manatee Bay) and CS (Card Sound) were established in the coastal creek/wetland flat habitat associated with southern Biscayne Bay. In addition there is a third site in southern Biscayne Bay (BS, Barnes Sound), which was established in 1992 and is sampled under contract with Everglades National Park; however, these data are also pertinent to this study and are included in this report. Extensive field reconnaissance activities were conducted to locate appropriate sites. The sites were chosen primarily for the potential impact of CERP related projects on their hydrology and on a physical similarity to the existing sites described in Lorenz et al. (1997).

Year 1 and Year 2 sampling was conducted at the MB and CS sites, as per agreement. Sampling months were September, November, and December 2002 and January, February, March, April, and June 2003 of both years (2002-2003 and 2003-2004), as scheduled. The BS site was also sampled on the same sampling schedule both years.

In Year 2, the Turkey Point site was established, and sampling at this site commenced on the same schedule as the other sites.

Fish collections using the $9m^2$ drop trap were made at permanent sites MB and CS in yrs 1 and 2. Fish collections using a modified $4m^2$ drop net were made at TP (FP&L land) in year 2. We have completed 100% of the contractual obligations for Tasks 1-9.

Task 9 Update:

Summarization and analysis were conducted during the Task 9 period and an annual report was prepared.

PART I

FAUNAL DENSITY AND COMMUNITY COMPOSITION OF THE NEARSHORE ZONE

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1.1.0 INTRODUCTION

Western nearshore Biscayne Bay is the part of South Biscayne Bay most likely to be affected by changes in the quantity, timing, or spatial distribution of freshwater flows from the mainland. A characterization of the epibenthic community of western nearshore South Biscayne Bay is needed to provide baseline conditions for planning mitigation and restoration projects and for evaluating the effects of future upstream water management changes. Part I of this Year-2 Annual Report describes the epibenthic fauna in terms of species composition, density, variation in density in space and time, and probable factors influencing density variation. Benthic vegetation, a recognized influence on the epibenthic fauna, also is characterized in this report. Benthic vegetation is described in terms of a suite of metrics and examined in terms of influencing factors. Potential relationships of the fauna and the vegetation to salinity are given special emphasis in analytical design and reporting because salinity patterns are likely to be affected by changes in freshwater inflow.

Three types of gear were used in this study to sample the epibenthic fauna. The gear types—throw-trap, roller-frame trawl, and pull-net—are described in the methods section. The results section includes not only results based on each gear type but also a comparison of the throw-trap to each of the other gear. Sampling the benthic vegetation was conducted in conjunction with throw-trap sampling. Sampling with the throw-trap also included a reference area in the eastern nearshore zone adjacent to Elliott Key. This eastern nearshore area was expected to be relatively unaffected by any changes in freshwater inflow from the mainland and could potentially provide a regional context for evaluating changes occurring over time in the western nearshore area. A comparison of eastern and western nearshore areas is included in this report.

1.2.0 METHODS

The components of this section are a description of the study area, a description of the three types of gear and sampling methods, and an overview of the statistical methods analyses employed in Part I.

1.2.1 Study Area

The study area is located along the western nearshore of southern Biscayne Bay between Shoal Point (Chicken Key) to the north and Turkey Point to the south and includes a reference site located in the nearshore of eastern Biscayne Bay adjacent to Elliott Key (Figure 1). The mainland of this region is generally mangrove fringed. Offshore the study area includes commercial roller-frame trawled bottom while the inshore includes untrawled seagrass and algal-covered bottom. The Black Creek Jetty near Black Point splits the study area roughly in two. The University of Miami hydrodynamic model (Wang et al. 2003) suggests that a gradient in salinity exists from inshore to offshore and that salinities of 12 psu frequently occur within the nearshore zone south of the Black

Creek Jetty but less frequently north of the canal and in adjacent deeper (beyond 3-ft-contour) waters. The study area is part of Biscayne National Park.

1.2.2 Sampling Design and Strata

Our experimental design employed a stratified random sampling approach to characterize the nearshore zone within the study area (Figure 1). There are two geographic strata (GEOZONE; N, S), one north and the other south of the line of spoil, known as Black Point Jetty, and channel that extends into the Bay from Black Creek south of Black Point. There are three salinity strata (SALZONE: 1, 2, and 3; low, medium, and high frequency of occurrence of 12 ‰, respectively), which were delineated based on an analysis of salinity variation in a 4-year time series (20-minute time step) of simulated salinity data from the RSMAS Biscayne Bay hydrodynamic model (Wang et al. 2003). There are two depth strata within the study area (DEPTHZONE; Inside, Outside) defined as inside and outside the 3-ft (0.93-m) contour, respectively. The hydrodynamic model indicated the absence of SALZONE 1 north of Black Point; therefore we sampled in five distinct zones (ZONE: 1S, 2S, 3S, 2N, and 3N). In addition, we defined a nearshore sampling stratum (< 3-feet deep) along the western shore of Elliott Key opposite to (approximately on the same latitude as) the study area in southern Biscayne Bay. Impacts of altered hydrology due to upstream water management modifications are not expected to affect this eastern shoreline of Biscayne Bay. This stratum, sampled randomly, will serve as a reference or "control" to aid in assessing changes observed along the western nearshore mainland.

Throw-trap and roller-frame trawl sampling occurred on a bi-monthly schedule. Preliminary sampling occurred in July and August 2002. Sampling sites were distributed roughly proportionally among the five strata and randomly sited within each stratum without regard to presence or absence of seagrass or algae. Based on the October 2002 collection, the number of samples in each stratum was adjusted slightly in order that statistical comparisons among strata could be made. The throw-trap was used to sample 54 (48 in October 2002) sites on the western side of the Bay and 10 additional randomly selected sites in the Elliott Key control stratum; the Elliott Key stratum was sampled only with the throw-trap. The roller-frame trawl was used to sample 24 of the same sites sampled by the throw-trap, all located outside the 3-ft contour because shallower water was inaccessible to the trawl vessel. Sampling occurred between August 2002 and February 2004. As the roller-frame trawl under-sampled the zone of highest salinity fluctuation and lowest overall salinity, the pull-net was added to the project before the end of the first year to augment the sampling effort. Pull-net sampling occurred on a near-monthly schedule between July 2003 and October 2004. Twenty samples were collected with the pull-net each month during the full moon, 10 each north and south of Black Creek Jetty. We co-located pull-net sampling with throw-trap sampling in the shallower water where and when possible; use of the pull-net was restricted to the shallowest depths, and accessible locations varied with the tide. Sampling at the same sites with the different gear improved the precision of gear comparisons. Throw-trap sampling was conducted during daytime over the course of 4-5 days, whereas sampling with the roller-frame trawl was conducted during nighttime and typically during a single

night. Pull-trawl sampling was conducted at night over two consecutive days. Throw-trap sampling preceded sampling with the other gear because it was the gear least likely to interfere with subsequent sampling in the same area.

1.2.3 Sampling Gears and Protocols

Throw-trap. The throw-trap samples one square meter of bottom and can be used in water depths from a few centimeters to more than 3 meters; all depths occurring in the study area are accessible to the throw-trap (i.e. DEPTHZONE I and O). The throw-trap consists of an open-ended 1-m^2 aluminum box, 45 cm deep, with panels of nylon netting (3-mm stretch mesh DELTA netting) attached on parallel edges at the top of the throw-trap. Each panel of netting is large enough to cover the top of the throw-trap when it is used in water deeper than 45-cm. After the trap is dropped in place it is cleared of animals using a 1-m wide frame sweep net of 3-mm mesh that fits snugly inside the throw-trap. Preliminary sampling was conducted to determine the number of sweeps needed to sample the throw-trap effectively. Four sweeps were determined to clear the throw-trap of all pink shrimp and greater than 95% of fish and caridean shrimp (Figure 2). SCUBA is used while clearing the trap in water deeper than about 3 ft. The throw-trap has the advantage of sampling a well-defined area where the bottom type and vegetation cover are more likely homogeneous. This facilitates relating density and fish and invertebrate community composition to the habitat with associated habitat measurements. The throw-trap is most effective at collecting organisms that shelter in benthic habitats with vegetative cover whether seagrass or algae and is less effective for collecting organisms in the water column or organisms that swim away when disturbed.

Commercial roller-trawl. The commercial roller-frame trawl consists of a metal frame with a roller on the bottom. The frame supports a net of 1-inch stretch mesh netting with a cod-end of half-inch stretch mesh netting. The roller-frame trawl used in this study is the same gear used by the bait shrimp fishery in Biscayne Bay, with one exception. In this study the standard commercial net was fitted with an outer fine-mesh "sock" to retain animals that pass through the one-inch stretch mesh of the commercial roller-frame trawl. The "sock" is 3-mm stretch mesh netting, the same as used with the throw-trap, and necessary to facilitate the roller-frame trawl/throw-trap comparison. Organisms caught in the trawl net and in the sock were processed separately to allow future comparisons with previous studies that did not use the sock. The roller-frame trawl samples a relatively large area rapidly. Initially (August, October, and December 2002), a 5-minute tow at 3.218 km per hour with a 4.267-m (14-ft) frame swept an area of $\approx$ 1,144 m^2. Beginning in February 2003 the fishing vessel switched to a 4.572-m (15-ft) trawl, which swept an area of $\approx$ 1,226 m^2. (The actual area swept with each sample differed somewhat from these figures and was recorded for each sample at the time of sampling.) Because of the large area swept, the habitat sampled may be heterogeneous, and because sampling takes place at night the habitat sampled cannot be adequately noted. Use of the roller-frame trawl was limited to DEPTHZONE O, outside the 3-ft contour. Therefore, the trawl sampled primarily zones 2N, 2S, 3N, and 3S and, to a lesser extent, 1S.

Pull-net. The pull-net is a 1.5-m aluminum-frame hand-pulled trawl designed by Diaz (2001). The frame is 1.5-m wide and 0.5-m high. A 1-mm mesh net 3m in length is attached. A PVC roller on the lower part of the frame minimizes habitat damage and facilitates pulling the trawl over the bottom. The pull-net is pulled by two operators walking adjacent to the frame. The net is pulled for a distance of 20-meters, sampling 30-m^2. Distance is delimited by a marked non-stretchable thin line anchored to the starting point with the loose end wound around a roller carried by one of the pullers. The pull-net sampled inshore areas within the 3-ft contour line (i.e. DEPTHZONE I) primarily in areas corresponding to zones 1S, 2N, and 3N and, to a lesser extent, 2S.

Sampling Summary. This report covers throw-trap sampling from October 2002 through September 2004 (throw-trap sampling continues beyond October 2004). Sampling occurred approximately every eight weeks, resulting in 13 collections as of September 2004. Roller-frame trawl sampling was conducted every other month from August 2002 through February 2004, resulting in 10 collections. Pull-net sampling was conducted every month from July 2003 through October 2004 with the exceptions that no samples were collected in December 2003 and September 2004 and two collections were made in June 2004, corresponding to the timing of the full moon. There were 15 pull-net collections. Trawl sampling was conducted in the outer depth zone, pull-net sampling in the inner depth zone, and throw-trap sampling in both depth zones. Table 1 summarizes sampling effort among gear as distributed between DEPTHZONE and ZONE.

Table 1. Number of samples, by DEPTHZONE and ZONE, collected with each gear: pull-net, trawl, and throw-trap.

Gear	DEPTHZONE	1S	2N	2S	3N	3S	Total
Pull-net	Inner	153	51	10	67	0	281
Trawl	Outer	17	37	92	51	39	236
	Total	170	88	102	118	39	517
Throw-trap	Inner	117	49	50	76	1	293
Throw-trap	Outer	25	51	170	93	64	403
	Total	142	100	220	169	65	696

1.2.4 Target Species and Associated Measurements

Epibenthic fish and invertebrates are the target species in this study. Animals in trawl and pull-net samples were weighed for total biomass, then sorted and identified to a practical taxonomic level. Fish and penaeid shrimp were identified to species. Crabs were identified to genus or species. Fish were measured (standard length) and weighed. Penaeid shrimp were measured (carapace length) and sex was determined. In analysis, weight of penaeid shrimp was determined from carapace length and sex using equations in Diaz (2002). Caridean shrimp were weighed as a group to determine biomass and then counted. Processing of throw-trap samples conformed to protocols previously established in long-term throw-trap sampling in western Florida Bay (Robblee et at, 1991). In throw-trap collections all fish, caridean and penaeid shrimp and most crabs were identified to species and counted. Fish were measured for standard length, while

the carapace length of penaeid shrimp and crabs was measured. Additionally the sex of penaeid shrimp and crabs was determined and gravid caridean shrimp were counted.

Salinity, temperature and water depth were measured at each station sampled. Both trawl and throw-trap sampling teams collected surface and bottom salinity, and temperature; however bottom salinity and temperature were not collected at throw-trap sites until the third collection period, February 2003. Surface salinity and temperature were collected at pull-net sites. Sediment depth was collected at each throw-trap site.

Benthic habitat (seagrass and macroalgae) was quantified at all throw-trap sites using two techniques (Table 2). Structural characteristics of the grass canopy (e.g. seagrass standing crop, algal biomass, blade density, length, width, etc.) were estimated, by species, using a harvest method (Robblee et al, 1991). This involved dropping a 100-cm^2 quadrat outside the throw-trap in close proximity to one corner of the throw-trap. Seagrass and algae within the quadrat were harvested, held on ice and processed in the laboratory. Benthic vegetative cover (seagrass and macroalgae) was estimated according to the Braun- Blanquet cover-abundance methodology (Braun-Blanquet 1932; Mueller-Dombois and Ellenberg 1974). A 0.25 m^2 quadrat was used to estimate %-cover of seagrass and algae, by species, in the vicinity of the throw-trap. At each throw-trap site one quadrat sample was collected to the right, left and astern of the boat and estimates of cover scored as indicated in Table 2 in each quadrat. Estimates of canopy height and sediment texture were made within each quadrat. In addition a single measurement of sediment depth and turbidity were made in the vicinity of each throw-trap sample.

Table 2. Methods and parameters measured in conjunction with throw-trap sampling and used to describe benthic habitat.

Habitat Parameter	N	Method
		Harvest Method
Standing Crop of Seagrass	1	Harvest (10x10 cm quadrat), acid washed (10% HCL), rinsing in freshwater, oven dried at 100 oC for 24 h, by species (g dry wt/m2)..
Seagrass Blade Density	1	Count of blades (#/100 cm2).
Seagrass Blade Length	1	Measure blade length (mm) and width (mm) of Thalassia and blade length of Halodule and Syringodium.
Seagrass Short Shoot Density	1	Count of short shoots (#/100 cm2).
Biomass Macroalgae	1	Harvest (10x10 cm quadrat), rinsing in freshwater, oven dried at 100 oC for 24 h, by species (g dry wt/m2).
Sediment Depth	1	Probe, sediment surface to bedrock (cm).
Water Depth	1	Depth when sampled (cm).
Water Turbidity	1	Turbidimeter (ntu)
		Braun Blanquet Method
Cover Estimate	3	% cover-abundance of seagrass and algae by species (50x50 cm quadrat), Scores by species: .1 = individual, .5 = sparse, 1 = 0-5%, 2 = 5-25%, 3 = 25-50%, 4 = 50-75%, 5 = 75-100%.
Canopy Height	3	Maximum height (cm)
Sediment Texture	3	Estimate: M = mud, SM = sand/mud, MS = mud/sand, S = sand, CS = coarse shell, R = rubble, HH = hard bottom, etc.

1.2.5 Statistical Procedures

1.2.5.1 Raw Data Processing

For analysis, the number of animals of each taxa in each trawl sample was divided by the area swept, then multiplied by 1000 to be expressed as number per 1000 m^2. In pull-net samples, which each covered 30 m^2, the number of animals was analyzed as number per 30 m^2. Each throw-trap sampled 1 m^2, and number of animals was analyzed as number per 1 m^2. Raw mean density and mean density in each ZONE (1S, 2S, 3S, 2N and 3N) were calculated for each taxa, by collection, and reported on a 1-m^2 basis for all gear.

Cochran's (1977) equation for estimating the study area mean from non-proportional sampling within strata was used to calculate the means used to describe the community sampled with the roller-frame trawl. Study-area means from throw-trap and pull-net sampling were computed directly from the samples.

1.2.5.2 Generalized Linear Modeling

Generalized linear modeling (specific techniques include multiple linear regression, MLR, and analysis of variance, ANOVA) was used to determine the relationship of faunal and plant density to salinity and to test the null hypotheses that distributions were not related to salinity, geographic location or habitat. Both continuous and categorical variables were used. Data from each g ear were examined separately, by species. Species analyses were limited to community dominants as defined as taxa comprising about 90% of the individuals captured. As appropriate to each gear type, three analytical approaches were used: 1) examining species densities only in relation to sampling strata including COLLECTION (a proxy for season), 2) examining species densities in relation to field-measured data such as salinity, temperature, habitat, etc., and 3) combinations of field data and sampling strata. Similar approaches were taken with seagrass and algae but with turbidity and sediment depth used as additional field variables.

Throw-trap. Stepwise regression accessing the suite of habitat variables collected with each throw-trap sample (Table 2) was used to identify habitat measures significant ($p \leq 0.05$ include, remove $p \leq 0.1$) in explaining variance in the density of the dominant species of fish, shrimp and crab. The resulting regression models were defined as HABITAT and used in a subsequent regression analysis to evaluate the relative importance of salinity and other factors in the distribution of these species. The basic equation (full model) used was as follows:

$$Y` \sim \text{HABITAT} + \text{COLLECTION} + \text{DEPTHZONE} + \text{LAT} + \text{SAL} + \text{SAL}^2 + \text{TMP} + \text{TMP}^2 \quad (1)$$

COLLECTION and DEPTHZONE are categorical variables relating to season and depth, respectively. DEPTHZONE was substituted for water depth measured at the

time of collection because field measurements of water depth were biased because sampling in shallow water took place on high tide. LAT, latitude of sample site, is a measure of north-south location in the study area. SAL and TMP are the surface salinity and temperature observed at the time of each collection and SAL^2 and TMP^2 are the square of these variables. Using $SAL+SAL^2$ and $TMP+TMP^2$ in the model enabled an optimum salinity or temperature for a species to be predicted from the model. All variables were included in the full model with the exception that LAT, SAL^2 and TMP^2 were included in the model for further analyses only if they were significant ($p \leq 0.1$) in the full model initially. The null hypotheses were evaluated by determining the unique variance explained by each variable by comparing the R^2 of the full model with and without each variable one at a time. Salinity was always represented by $SAL+SAL^2$ when the latter term was significant. Temperature was treated similarly. The relationships of dominant seagrass and algae to salinity were examined similarly but with two exceptions; field measured turbidity, TURB, and sediment depth, SED, were included in the analysis as was LAT. The basic equation (full model) used was as follows:

$$Y` \sim COLLECTION + DEPTHZONE + LAT + SAL + SAL^2 + TMP + TMP^2 + TURB + SED \quad 2)$$

Analysis of variance, ANOVA, was used to compare throw-trap-based species regression models that included HABITAT with models developed using only sampling strata. This approach facilitated comparison of throw-trap based models to roller-trawl and pull-net based models where habitat data were absent. The distribution of dominant seagrasses and algae was examined similarly. The basic equations used were as follows:

$$Y` \sim COLLECTION + DEPTHZONE + SALZONE + GEOZONE \quad (3)$$
$$Y` \sim COLLECTION + ZONE \quad (4)$$

Commercial roller-trawl and Pull-net.

Multiple regression and analysis of variance were used to analyze data from sampling with the roller-frame trawl and pull-net. Three alternative basic equations were used to test the null hypotheses that animal distributions were not related to salinity or geographic location. They were as follows:

$$Y` \sim COLLECTION + SALZONE + GEOZONE \quad (5)$$
$$Y` \sim COLLECTION + LAT + LAT^2 + SAL + SAL^2 \quad (6)$$
$$Y` \sim COLLECTION + ZONE \quad (7)$$

SALZONE and GEOZONE are categorical variables relating to our sampling strata (i.e., SALZONES 1, 2, and 3 and GEOZONES N and S). SAL is a continuous variable, bottom salinity in psu, and SAL^2 is the square of that variable. When SAL^2 was a significant variable in the model with a negative relationship to density, using it with SAL enabled a hypothetical optimum salinity for the species to be predicted from the model. LAT also is a continuous variable and is the starting latitude (in decimal degrees)

of the trawl sweep. A positive relationship with faunal density indicates density is significantly higher in the northern part of the study area, whereas a negative relationship indicates density is significantly higher in the southern part of the study area. A hypothetical distribution maximum at a central location in the study area is suggested when its square term is significant in the model as a negative explaining variable and a distribution minimum at a central latitude in the study area is indicated if the square term is positive and the first-order term is negative. The square terms were tested in the model and, if not significant ($p \leq 0.1$), were dropped from the model to retest the first order term. DEPTH (depth at the time of sampling) was tested for inclusion in models for several species but was dropped because it was not significant ($p \leq 0.1$), possibly because the trawl data pertained to only the deeper depth zone, restricting the depth range. TEMB (bottom temperature) was omitted in preference to collection (COLL), which accounted for seasonal variation. The five areas defined by our two-way stratified sampling design were viewed as separate regions in the third phase of analysis (equation 5). The latter analysis was conducted to determine whether faunal densities might differ among the regions in a manner independent of salinity or position relative to the Black Creek Jetty. This analysis tested the null hypothesis that faunal density in each region did not differ from that in any of the other regions.

Analysis of pull-net data employed the same set of equations used to analyze the trawl data, except that an additional variable, TIME, was added. Sampling was conducted at night, but, for logistic reasons and due to seasonal variation in nightfall, sometimes started at twilight, before it was completely dark.

1.2.5.3 Gear Comparison

One of the purposes of this study is to use the 1-m^2 throw-trap to develop a dataset characterizing the spatial and temporal patterns of fish and macroinvertebrates (shrimp and crabs, an emphasis on the pink shrimp) in nearshore seagrass habitats of southern Biscayne Bay to provide a baseline from which to evaluate the effect of future water management changes. Gear comparisons between the throw-trap and the commercial roller-frame trawl and pull-net have the potential to extend the baseline dataset in time as well as to facilitate comparisons of trawled and untrawled seagrass habitats in southern Biscayne Bay. Since the throw-trap is to be used in future monitoring work in the Bay, it would be advantageous to generate simple models that can be used to convert past trawl and pull-net data to throw-trap data so that past faunal densities, as estimated from these gear, can be compared to present and future densities determined with the throw-trap.

Comparison of faunal density estimates. Underlying sample distributions and the large differences in variances of faunal densities among the three datasets precluded the use of parametric methods on paired individual records to determine the relationship between throw-trap faunal density and density estimated from sampling with the other gear. Therefore, we sought a nonparametric approach. A modification of a nonparametric regression approach, Kendall's robust line-fit method (Sokal and Rohlf 1998), was developed to compare pink shrimp density based on throw-trap sampling to density based

on the roller-frame trawl and pull-net, respectively. This method provides the slope (b) and intercept (a) for a linear relationship. In addition, a graphic approach of comparing corresponding densities from each pair of data sets was conducted.

In preparation for applying these methods, corresponding (same site, same collection period) records from the throw-trap and roller-frame trawl databases and the throw-trap and pull-net databases were merged into single records for a total of 212 throw-trap/trawl (TT-TR) records and a total of 76 throw-trap/pull-net (TT-PN) records. Each throw-trap data element was an integer representing the number of pink shrimp in the 1-m^2 area that was sampled. This value ranged from 0 to 4 in the throw-trap pink shrimp data corresponding to the trawl data and from 0 to 8 in the throw-trap pink shrimp data corresponding to the pull-net data. Each trawl or pull-net data element was the 1-m^2 average of the number of pink shrimp caught in the area swept by the trawl or pull-net, 1,101-m^2, on average, and 30 m^2, respectively.

It was necessary to modify the input data to apply Kendall's robust line-fit method because the many repeated integers in the TT dataset did not allow application of the method to ordered individual records. The method calls for differences between each pair of adjacent TR densities to be divided by the differences in corresponding adjacent TT densities, i.e. $s_i = (y_{i+1} - y_i)/(x_{i+1} - x_i)$, and data sets in which the records consist of a few integer values, repeated many times, result in most of the divisors being zero, leading to an impossible quotient (or, had we reversed the y and the x, almost all of the quotients would have been zero). Therefore, we created a modified (compressed) data set for which there was one median value of TR pink shrimp density for each corresponding integer value of TT.

The steps in preparing the modified, or compressed, dataset and applying the modified Kendall's robust line-fit method were as follows for each dataset (TT-TR and TT-PN). For simplicity, the description is for TT-TR only.

1. The records were ordered by TT density (the integers) and, within each value of TT, ordered by TR.
2. Then a median was obtained for each set of TR densities within each TT-density group.
3. The TT integers and the corresponding TR medians were the input values for application of Kendall's robust line-fit method, as described by Sokal and Rohlf (1998). (There were five paired values for the TT-TR analysis and eight paired values for the TT-PN analysis.)

We used Kendall's rank correlation coefficient, equivalent to the ordering test (Sokal and Rohlf 1998), to determine the significance of the slope obtained from the robust line-fit method.

The graphic method was applied to the dataset of paired density records, as follows:

1. The data were sorted from lowest to highest TR density, and a TR-ordering column was created, numbered from 1 to 212.
2. Then the TR density values were assigned to bins (columns) on the basis of TT density value, retaining the sorted order. The easiest way to do this was to (a) sort again, this time by TT density and TR-density within each TT density, (b) assign a series of adjacent columns to each throw-trap value, (c) copy the TR density values into the appropriate columns, and then (c) re-sort all of the columns using column for the TR-density order. The result is a matrix with a first column numbered from 1 to 212 (the ordering index) and a series of columns, one for each TT value, with only those TR values paired with the TT designation of that column, present in the row corresponding to their respective order with respect to the other TR values.
3. The TR density values in all of the TT columns were then plotted on the TR-ordering axis in a scatter plot, with a different color for each TT value (i.e., each column).

The result was a striking visualization of the correspondence of TR values with the TT values. The method yielded a qualitative perspective on the relationship between faunal density estimates from throw-trap sampling and density estimated from roller-frame trawl (or pull-net) sampling.

Only the data from sampling at approximately the same locations and collection periods were used in these analyses. The number of corresponding data points and their distribution among strata are shown in Table 3.

Table 3. The number of sample pairs available in each stratum for the throw-trap vs pull-net (TT-PN) and throw-trap vs. trawl (TT-TR) comparisons.

Comparison	1S	2N	2S	3N	3S	TOTAL
TT-PN	36	16	4	20		76
TT-TR	16	34	80	46	36	212
TOTAL	52	50	84	66	36	288

Comparison of Estimates of Faunal Community. A tabular format based on raw data was used to summarize the fish fauna obtained from the three sampling gear. The table indicates, for each gear, the percent of total fish represented by each species, the cumulative percent composition in descending order of abundance by gear, and the rank abundance of each species for the gear, in ascending order. Pie diagrams were prepared to show the proportion of species distinct to, and shared between and among, gear types. Species-area curves (power curves, $y = ax^b$) were fitted to the data for each gear type. Sigma Plot, version 9, was used to fit and plot the curves.

1.3.0 RESULTS

In this section, results of environmental conditions, habitat, and density, are presented separately for the sampling program with each gear. Figure 3 shows the sites where samples were collected with each gear during the period covered by this report, August 2002 through October 2004. Mean densities of all species collected, as estimated from collections with the throw-trap, roller-frame trawl and pull-net and corresponding methodologies, are presented in Appendices A, B, and C, respectively. Appendix D contains information on habitat, detailed results of statistical analyses, and information on the Elliott Key control site from the throw-trap sampling program. Appendices E and F contain detailed tabular results of statistical analyses based on data from the roller-frame trawl and pull-net sampling programs, respectively. Appendix G contains results of gear comparison analyses. Appendix H contains our comparison of community composition as reflected in samples from the three gear types. Nomenclature in these sections follows Nelson et al. (2004).

1.3.1.0 Throw-trap

1.3.1.1 Environmental and Physical Conditions in the Study Area

Salinity in the study area has been observed as low as 5.4 psu and as high as 40 psu during throw-trap sampling between October 2002 and September 2004. Both extremes were observed south of Black Creek Jetty. Similarly, during preliminary sampling in July and August 2002 salinities of 0 psu were observed in shallow waters south of Black Creek Jetty. On average, salinities were higher south of the Jetty (Appendix D, Table 1) and increased from nearshore to offshore; salinity was most variable in nearshore shallow waters (Figure 4). Surface to bottom salinity differences have proven to be small during this study. Occasionally bottom salinities in the study area were higher than surface salinities, particularly nearshore, and may average as much as about 2 psu higher than surface salinities. Seasonally salinities differed (Appendix D, Table 1). Salinities observed in the study were more moderate in year 1 compared with year 2; fall/winter salinities were higher in 2002 compared with 2003, and summer salinities were lower in 2003 compared with 2004. This pattern is most obvious in nearshore waters. In contrast, salinities in nearshore waters of Elliott Key were high and relatively constant compared to the western shoreline of southern Biscayne Bay in the study area (Figure 4; Appendix D Table 2).

Surface water temperatures observed in the study area between October 2002 and September 2004 exhibited a seasonal pattern typical of south Florida shallow waters (Figure 5). On average nearshore waters were slightly warmer than offshore waters in the study area (Appendix D, Table 1). Little difference in bottom temperature compared to surface temperature was observed. Year-to-year differences in water temperature were apparent. The pattern was similar to salinity; fall/winter temperatures were higher in 2002 compared with 2003 while summer temperatures were lower in 2003 compared with 2004. Surface water temperature at Elliott Key is not different from that observed in western nearshore waters of the study area.

Water clarity was generally excellent in the study area with differences in turbidity most likely due to wind conditions on the day samples were taken (Figure 6). However, on average turbidity was higher in nearshore waters south of Black Creek Jetty (Appendix D, Table 1). Algal blooms similar to those often observed in Florida Bay have not been evident in the study area. Water clarity adjacent to Elliot Key was lower than that observed south of Black Creek Jetty (Appendix D, Table 2).

Sediment depth varied among zones (Figure 7). The temporal variation in mean sediment depth apparent in Figure 7 arises due to the random stratified sampling scheme whereby a different set of locations was sampled during each collection. In the study area sediments were thickest nearshore in zones 1S, 2N and 3N compared to 2S and 3S (Appendix D, Table 1). Sediments adjacent to Elliott Key were also thicker than those in zones 2S and 3S but not as thick as those in zone 2N (Appendix D, Table 2).

1.3.1.2 Benthic Vegetation

Seagrasses and algae typical of south Florida waters characterize benthic vegetation in the study area (Appendix D, Table 3). By weight, density and cover, turtle grass, *Thalassia testudinum*, is the dominant seagrass in southern Biscayne Bay. *Thalassia* was present at 90.8% of the sites sampled in conjunction with throw-trap sampling between October 2002 and September 2004 (Table 4). By comparison shoal grass, *Halodule wrightii*, is relatively uncommon, being present at only 16.2% of sites. *Syringodium filiforme*, manatee grass, is rare in the study area (Appendix D, Table 3). Generally, seagrass cover over much of the study area is patchy; the exception being in zones 2N and 3N south of Chicken Key where extensive dense *Thalassia*-dominated grass flats occur. The most common or representative algae, *Penicillus*, calcareous algae, *Laurencia*, red algae, and *Batophora*, green algae, were all present at more than 72% of the sites sampled with the throw-trap. These species with several others such as *Halimeda* sp., *Udotea* sp., and *Acetabularia* sp. characterize the benthic alga community (Appendix D, Table 3).

Distinct patterns in grass canopy structure and composition, based on estimates of either standing crop or cover, are evident in the study area (Appendix D, Table 4). Both *Thalassia* and *Halodule* occur in all five zones and Elliott Key (Figures 8 and 9). *Thalassia* is most abundant north of the Black Creek Jetty (2N and 3N) and intermediate south of the Jetty in zone 1S. On average turtle grass is most abundant inshore when compared with deeper water (Appendix D, Table 4). Turtle grass is least abundant in zones 2S and 3S (Table 4). The distribution of *Halodule* differs from *Thalassia* in being most abundant in zone 1S south of Black Creek Jetty, where it commonly occurs in dense but small patches, and at intermediate levels in zones 2N and 3N north of the Jetty (Table 4). Among the five zones the largest proportion of sample sites with *Halodule* present were in zone 1S (69.6% and 48.7%, standing crop and cover, respectively). As with *Thalassia*, shoal grass on average is more abundant inshore than offshore.

Table 4. A comparison of the distribution of abundance of dominant and representative habitat elements among the five zones of the study area; - = low, -- = lowest, i = intermediate, + = high, ++ = highest.

Variable	Zone				
	1S	2S	3S	2N	3N
Thalassia testudinum Standing crop	i	-	-	+	+
Thalassia, cover	i	--	-	+	++
Halodule wrightii Standing crop	+	-	-	i	i
Halodule, cover	+	-	--	i	i
Canopy Height		-	-	+	++
Penicillus sp. biomass	+	-	-	+	-
Penicillus, cover	i	i	I	+	-
Batophora sp. Biomass	-	+	-	-	-
Batophora, cover	+	+	-	-	i
Laurencia sp. biomass	+	i	-	+	-
Laurencia, cover	+	-	I	+	-

Canopy height (maximum vegetation height) is a general measure, without regard to species, measured in Braun-Blanquet cover-abundance quadrats (Figure 10). As such it may serve as an overall measure of benthic vegetation stature or development within the study area. In the presence of *Thalassia*, found at 90.8% of sampling sites, canopy height measurements probably reflect turtle grass height. Canopy height exhibits a distribution among the five zones similar to *Thalassia*; canopy height is greatest north of the Black Creek Jetty, intermediate in zone 1S (generally greater inshore than offshore), and shortest in zones 2S and 3S (Table 5). Sediment depth exhibits a nearly identical pattern with canopy height, suggesting that sediment depth influences grass canopy development (Appendix D, Table 1; Figure 7).

Table 5. Results from ANOVA relating surface salinity and temperature, turbidity, and sediment depth to zone, from throw-trap data, October 2002 thru September 2004.

	Mean/Standard Error Values by Zone					Significance Differences of Factor
	1S	2S	3S	2N	3N	95%ci
Surface salinity	24.910 ± 0.351	29.244 ± 0.256	32.178 ± 0.429	26.054 ± 0.327	28.159 ± 0.244	1S<all; 2n & 3N<2S, 3S; 3S>all
Surface temperature	27.573 ± 0.154	27.389 ± 0.112	27.480 ± 0.188	27.788 ± 0.143	27.043 ± 0.107	3N<all; 2N>2S;
Turbidity	1.261 ± 0.112	1.387 ± 0.082	1.474 ± 0.136	1.000 ± 0.104	1.103 ± 0.078	2N & 3N<2S, 3S
Sediment depth	17.786 ± 02.494	11.453 ± 1.971	7.043 ± 3.100	26.893 ± 2.366	22.446 ± 1.769	1S>2S, 3S; 2N>1S, 2S, 3S; 3N>2S, 3S

Table 6 summarizes regression analyses to examine the response of dominant elements of the vegetation to sampling strata and independent variables available to this study and thought to be important to benthic vegetation in the study area (Appendix D,

Table 4). The full model includes: DEPTHZONE, a proxy for water depth; COLLECTION, a proxy for season; latitude, north/south orientation; and surface salinity and temperature; turbidity; and sediment depth. The measures used for comparison are (1) the variance explained uniquely by each variable expressed as a percentage of the explained variance of the full model and (2) the direction of the relationship with the independent variables. The predictive value for these dependent variables differs markedly for seagrass and algae (model explained variance averaging 18.5% and 2.8%, respectively), suggesting factors not present in the model are important.

The dominant alga species occurred throughout the study area, but patterns of abundance among the five zones differed somewhat among the species (Appendix D, Table 4; Figures 11-16)). *Laurencia*, which occurs attached or drifting and closely rivals Thalassia as the grass canopy dominant (25.2 vs. 23.3 g dry wt/m^2, respectively; Appendix D, Table 1), is most abundant in shallow nearshore waters, zones 1S and 2N. The calcareous alga, *Penicillus*, often found as a common grass canopy associate, is also most abundant in zones 1S and 2N, similar to both *Thalassia* and *Laurencia*. In contrast, *Batophora*, a species that requires shell or other structure as a holdfast, is most abundant in zones 1S and 2S.

Seagrasses, supported by extensive root and rhizome systems, differ from algae in the predictive power of sediment depth, 43.5% vs. 10.9% and 1st vs. 5th ranked in importance, respectively (Table 6)). A relationship between seagrass and sediment depth is to be expected. Sediment depth is the 1st ranked predictor variable for canopy height, explaining 30.1% of the explained variance in height. Temperature is only the 5th ranked predictor variable for canopy height, suggesting it has a lesser role in determining *Thalassia* height. In contrast, the predictive importance of temperature for algae (34.2%, vs. 2.9% for seagrass) suggests that seasonal growth is more critical to algae, as does the relative importance of COLLECTION, 13.7% vs. 0.8% for seagrass (Table 6). A quantitative measure of the structure of benthic vegetative cover is needed that is independent, if possible, of type of vegetation, i.e. seagrass or algae.

Latitude is an important predictor for both seagrasses and algae; seagrass, principally *Thalassia*, is related positively to latitude (increasing turtle grass with distance north in the study area), while algae responds generally negatively (increasing algae with distance south in the study area). Both seagrasses and algae respond negatively to DEPTHZONE being most abundant in the shallower waters.

Salinity as a predictor is difficult to value. It is the 3rd ranked predictor for both average seagrass and average algae (Table 6)). Its effect is both positive and negative among these measures of dominant seagrass and algae. It explains only 3.3% of the variance explained in canopy height, a potential integrative measure and the strongest model among this suite of habitat measures (Table 6). However, a highly interesting pattern emerges from this analysis. The predictive power of salinity differs dramatically between standing crop and biomass measures and the cover measures (i.e., the Braun-Blanquet estimates) (0% vs. 15.7%, 0% vs. 39.5% of explained variance, for seagrass and

algae, respectively). This pattern suggests that salinity influences the spatial coverage of benthic vegetation in the study area rather than it's quantity at a point.

Table 6. Variance (%) uniquely explained by each independent variable in each habitat model relative to full-model R^2 (multiply R^2 by 100 to obtain percent variance explained by full model); + or - = the direction of the relationship with the independent variable.

	Independent Variables							
Dependent Variables	DEPTHZONE	COLLECTION	latitude	salinity	temperature	turbidity	sediment depth	Full model R^2
Thalassia standing crop	2.7-	0-	22.7+	0+	7.6+	0.9-	43.1+	0.225
Thalassia, cover	6.1-	1.5+	27.7+	3.0+	4.2+	0-	30.7+	0.264
Halodule standing crop	3.3-	0+	1.1-	0+	0+	4.3+	82.6+	0.092
Halodule, cover	11.9-	0-	0+	31.4-	0+	1.9+	17.6+	0.159
Seagrass Average	**6.0**	**0.8**	**12.9**	**11.5**	**2.9**	**2.4**	**43.5**	**0.185±0.038**
Penicillus sp. Biomass	6.8-	0-	40.0-	0-	0-	0-	0+	0.005
Penicillus, cover	7.0+	0+	21.4-	57.1-	28.6-	7.1 +	7.1+	0.042
Batophora sp. Biomass	7.9-	0-	61.5-	0+	15.4-	0-	23.1+	0.013
Batophora cover	6.9+	68.0+	0+	56.0+	92.0+	0+	16.0+	0.025
Laurencia sp. Biomass	7.2-	0-	38.5-	0+	11.5-	15.4-	0+	0.026
Laurencia, cover	7.3-	12.7+	5.5-	5.5+	23.6+	34.5-	16.4-	0.055
Algae Average	**7.2**	**13.5**	**27.8**	**23.7**	**34.2**	**9.5**	**10.4**	**0.028±0.008**
Canopy Height	7.8-	14.8+	14.3+	3.3-	5.1+	0+	30.1+	0.335

Data collected during this study allows a comparison of the harvest-based habitat estimation technique used extensively in Florida Bay with the visually-based cover-abundance Braun-Blanquet method currently used in seagrass monitoring in south Florida. Braun-Blanquet visual cover-abundance estimation, as applied in this study, samples 0.75 m^2 of bottom in three 0.25-m^2 quadrats at each throw-trap sampling site as compared to a single 0.01-m^2 harvested sample. Visual estimation used in the Braun-Blanquet method has a tendency to identify groups of species, compared with the harvest technique, where laboratory processing allows more discrimination (Appendix D, Table 3). Table 6 presents results of our comparison of the methods for the relationship of their metrics (i.e., *Thalassia* standing crop vs. *Thalassia* cover) to environmental and physical factors. For those species that can be identified visually, the frequency of observing a species at a site increases with the Braun-Blanquet technique, reflecting the greater bottom area sampled (Table 7). The harvest method allows detailed measures of the structure of grass canopy, blade length and width, leaf area and density. The two

Table 7. A comparison of the frequency of observing a vegetation species with the two benthic measurement methods, Harvest and Braun Blanquet.

Braun-Blanquet	Freq. of Occurrence	% freq.	Harvest Method	Freq. of Occurrence.	% freq.	Difference
Thalassia cover	633	90.8	Thalassia testudinum standing crop	478	68.6	22.2
Halodule cover	113	16.2	Halodule wrightii standing crop	56	8.0	8.2
Penicillus cover	521	74.8	Penicillus sp. biomass	246	35.3	39.5
Batophora cover	546	78.3	Batophora sp. Biomass	309	44.3	34.0
Laurencia cover	505	72.5	Laurencia sp. biomass	338	48.5	24.4

techniques (Braun-Blanquet and harvest) provide measures of habitat that are different rather than redundant and both are useful. In the stepwise regression analysis for dominant faunal species, discussed below, habitat variables derived from the two methods were incorporated into species models about equally, 72.7% vs. 74.3%, harvest and Braun-Blanquet, respectively).

1.3.1.3 Nearshore Fish and Invertebrate Community

Appendix A Tables 1-13 summarize the catch of fish, caridean shrimp, crabs and pink shrimp by strata taken in bi-monthly collections with the throw-trap, October 2002-September 2004. Dominant species in each taxonomic group, ranked by percent of total throw-trap catch, are shown in Figure 17.

Fish. Fifty-six species of fish have been collected with the throw-trap in nearshore waters of southern Biscayne Bay in this study through September 2004. *Lucania parva*, the rainwater killifish, is the dominant fish accounting for 58.4 % of the individuals collected. With five additional species about 90% of the fish collected in the nearshore are accounted for: *Gobiosoma robustum*, *Diplogrammus pauciradiatus*, *Opsanus beta*, *Anarchopterus criniger* and *Microgobius gulosus*. Seasonally highest fish numbers occur during the summer (Figure 18). Overall, fish density averaged 6.40 per m^2 over the course of the study to date.

Caridean Shrimp. Seventeen species of caridean shrimp have been collected with the throw-trap in nearshore waters of southern Biscayne Bay in this study through September 2004. *Thor manningi*, *Thor floridanus* and *Hippolyte zostericola* dominate the caridean shrimp community accounting for >95% of the individuals collected; *Thor manningi*, the numerical dominant accounts for 64% of individuals. The seasonal pattern and interannual variation in caridean abundance in the study area through September 2004 is shown in Figure 18. Overall, caridean shrimp density averaged 59.65 per m^2 over the course of the study to date.

Crabs. As many as thirteen species of crab have been observed in the study area; not all crabs could be identified to species. The mud crab *Eurypanopeus* sp. accounted for 56.4% of the crabs collected between October 2002 and September 2004. Swimming crabs, *Callinectes* sp. accounted for a further 16.9% of individuals. Six species: *Eurypanopeus* sp., *Callinectes similis*, Libinia sp., *Callinectes sapidus*, *Panopeus* sp. and *Rithropanopeus* sp. account for almost 90% of individuals. The pattern of crab abundance observed in the study area through September 2004 is shown in Figure 18. The overall estimated crab density for the period October 2002 to September 2004 is 0.69 per m^2.

Pink Shrimp. The pink shrimp, *Farfantepenaeus duorarum*, a species of special interest in this study. Pink shrimp averaged 0.64 per m^2 through September 2004 with a peak abundance of 1.85 per m^2 in September 2004. Seasonally, abundance was greatest in late summer/early fall and lowest in spring/early summer (Figure 18). This is the typical south Florida seasonal pattern of pink shrimp abundance in inshore waters. Looking at data for three fall periods, peak abundance appears to be highly variable from year to year. *Farfantepenaeus brasiliensis*, the spotted pink shrimp, known to be present in Biscayne Bay, was not found with the throw-trap. This may be explained because the spotted pink shrimp is relatively uncommon in Biscayne Bay, can be separated from *F. duorarum* only as relatively large individuals and the throw-trap sampled a relatively small area, < 700-m^2 thru September 2004.

1.3.1.4 Habitat Differences Among the Dominant Species

Habitat associations for the dominant species (Figure 17) observed in western nearshore waters of southern Biscayne Bay were determined using stepwise regression analysis. The density of each species (the dependent variable) was predicted using raw habitat data as independent variables (Appendix D, Table3). This approach has the advantage that the variability represented in the raw habitat data is available to the analysis but the disadvantage that summarization for explanatory purposes is difficult. Appendix D, Tables 6-8, summarize faunal habitat models developed for dominant species grouped as shrimp, fish and crabs, respectively; intercept, coefficients, their significance and the rank order that each variable entered the model are provided in the tables. Models of all shrimp, all fish and all crabs are included in Appendix D, Tables 6-8, respectively. The variability explained in the abundance of the individual species ranged from an R^2 of 0.078 for the caridean shrimp, *Thor floridanus*, to an R^2 of 0.47 for the dominant fish, *Lucania parva*. Habitat models included from 3, *Rithropanopeus* sp., to 14, *Lucania parva* and *Gobiosoma robustum*, variables. Table 3 in Appendix D indicates how often each habitat variable was included in a step-wise faunal habitat model and groups them into six habitat categories: seagrass, green algae, red algae, calcareous algae, brown algae and other (e.g. sponge, coral, etc.) to aid in summarization. Seagrass variables dominate the habitat models, followed by several algae (Table 8).

Species-specific habitat patterns are difficult to discern from the broad survey approach used here. A simple habitat importance value (1/rank order of each variable, summed by habitat category for each species) was used to compare habitat differences.

Table 8. A comparison of the number of times variables of the indicated habitat category were present in faunal models.

Habitat Categories	Shrimp	Fish	Crabs	Total	% Composition
Seagrass	23	31	10	64	39.8
Green Algae	16	8	8	32	19.9
Red Algae	4	18	7	29	18.0
Calcareous Algae	4	13	6	23	14.3
Brown Algae	0	1	5	6	3.7
Other	3	1	3	7	4.3

Seagrass parameters are the strongest or strong variables in 8 of 10 fish and shrimp models (Figure 19). The exceptions to this generalization are *Diplogrammus pauciradiatus*, the spotted dragonet, which tends to be negatively associated with seagrass, and the fringed pipefish, *Anarchopterus criniger*, which associates with red algae strongly (Appendix D, Table 7).

Table 9. A comparison of the distribution of the density (#/m^2) of the dominant fauna among the five zones of the study area. - = low, i = intermediate, + = high.

	Zone				
Species	1S	2S	3S	2N	3N
SHRIMP					
Farfantepenaeus duorarum	+	i	-	i	+
Thor manningi	+	+	-	+	+
Hippolyte zostericola	i	i	-	+	i
Thor floridanus	+	i	-	+	i
All Carideans	+	i	-	+	+
FISH					
Lucania parva	+	i	-	+	i
Gobiosoma robustum	+	i	-	+	i
Diplogrammus pauciradiatus	-	+	+	-	i
Opsanus beta	i	i	-	+	i
Anarchopterus criniger	i	i	-	+	i
Microgobius gulosus	+	-	-	-	-
All Fish	+	-	-	+	i
CRABS					
Eurypanopeus sp.*					
Libinia sp.*					
Callinectes similis	+	-	-	-	-
Callinectes sapidus*					
Rithropanopeus sp.*					
Panopeus sp.*					

* = non-significant full model

Algae are the important parameters in crab models. Seagrass is present in 3 of 6 crab models and of primary importance in only one, the model for *Eurypanopeus* sp., the most numerous crab collected in the study.

Appendix D, Table 9 summarizes details of ANOVA with the dominant species and sampling strata, including ZONE. With one clear exception the dominant fish and shrimp species observed in the study area were found in greatest numbers in zones 1S, 2N or 3N or in two or all three of these zones, showing a preference for benthic vegetation and shallow water (Table 9). The spotted dragonet was most abundant in zones 2S and 3S, which were characterized by relatively more algae than seagrass and relatively thin sediments, or "hardbottom". This result is consistent with observations in the field and regression analysis (Appendix D, Table 7). With the exception of the lesser blue crab, *Callinectes similis*, patterns of crab abundance among the five zones were not discernable statistically (Table 9). Prediction of crab densities was poor compared to fish and shrimp models (R^2 range for crabs 0.000 to 0.083, 1 significant model; Appendix D, Table 10). However, an examination of the mean density and standard error across zones without regard to statistical significance suggested that crab abundance followed a pattern similar to fish and shrimp; least abundant in zones 2S and 3S and most abundant in zones 1S, 2N and 3N.

1.3.1.5 Salinity and Habitat Relationships among the Dominant Species.

Table 10a summarizes regression analyses to examine the response of dominant species to sampling strata and habitat factors available to this study (Appendix D, Table 10). The full model includes: DEPTHZONE, a proxy for water depth; COLLECTION, a proxy for season; latitude, north/south orientation (included when significant in the full model); surface salinity and temperature; and HABITAT, the habitat variables identified in stepwise regression, appropriate to each species model (Appendix D, Tables 6-8). The relative explanatory importance of each variable was determined using the variance explained uniquely by each variable expressed as a percentage of the explained variance of the full model. Table 10b summarizes regression analyses to examine the response of dominant species to sampling strata only, COLLECTION, DEPTHZONE, GEOZONE and SALZONE (our experimental design) (Appendix D, Table 10b) and compares differences in variance explained with HABITAT in the model to the model with sampling strata only.

Habitat is the overridingly important factor governing the distribution of the dominant species in the study area. On average HABITAT accounted for 77% of the variance explained in the distribution of these species. With HABITAT in the model, R^2 was improved an average of 0.222 over regression models with sampling strata only (Appendix D, Table 10b) and 0.104 for models developed with ANOVA (Appendix D, Table 9). It is likely that fauna are distributed within the study area based largely on response to conditions of benthic vegetation. Other variables are only relatively important such as depth for *D. pauciradiatus* and *O. beta* (25% and 9.2%, respectively) and temperature for *Thor floridanus*, 11.8% (Table 10a). Salinity over the range and

pattern observed in the study area (Figure 4) has little (Table 10b) or the least (Table 10b) influence on the distribution and abundance of the dominant fauna

Table 10a. Variance (%) uniquely explained by each independent variable in each faunal model relative to full-model R^2 (multiply R^2 by 100 to obtain percent variance explained by full model).

Species	DEPTHZONE	COLLECTION	latitude	salinity	temperature	HABITAT	Full model R^2
SHRIMP							
Farfantepenaeus duorarum	5.6	3.0	ns		3.0	46.6	0.232
Thor manningi			ns	2.6	1.6	86.3	0.306
Hippolyte zostericola	0.7		1.2		6.9	79.7	0.433
Thor floridanus	1.5	2.9	ns	2.9	11.8	51.5	0.068
All Carideans	0-	0.3	ns	0.6	2.8	95.3	0.327
FISH							
Lucania parva	1.3	0	ns	1.3	0	64.5	0.471
Gobiosoma robustum	2.3	1.1	ns	1.7	5.7	72.0	0.175
Diplogrammus pauciradiatus	25.0	2.6	6.0	0		40.5	0.116
Opsanus beta	9.2		ns	0.8	1.5	63.1	0.260
Anarchopterus criniger	1.5	0.7	ns	4.8	1.8	96.7	0.273
Microgobius gulosus	2.0	1.6	ns		1.6	77.9	0.244
All Fish	0.2		ns	0	0	65.8	0.511
CRABS							
Eurypanopeus sp.		8.4	ns			88.4	0.095
Libinia sp.	0		ns	0	0.9	93.2	0.438
Callinectes similes	0		ns			95.5	0.134
Callinectes sapidus	0		ns	3.2	7.1	89.0	0.154
Rithropanopeus sp.	1.2	0.4	ns	1.6	2.7	91.4	0.256
Panopeus sp.	0.8	7.5	ns	0.8	2.5	95.0	0.120
All Crabs	1.0	0	ns	1.0		98.0	0.102
Avg. of Indiv. Species Models	**3.7**	**2.8**	**3.6**	**1.8**	**3.6**	**77.0**	**0.222**

Table 10b. Variance (%) uniquely explained by sampling strata in each faunal model relative to full-model R^2 (multiply R^2 by 100 to obtain percent variance explained by full model).

Species	COLLECTION	DEPTHZONE	GEOZONE	SALZONE	Full model R^2	R^2 Diff. w Table 10a
SHRIMP						
Farfantepenaeus duorarum	35.2	31.2	7.2	5.6	0.125	0.107
Thor manningi	48.4	0	48.8	12.2	0.041	0.265
Hippolyte zostericola	4.7	1.2	64.7	17.6	0.085	0.348
Thor floridanus	108.7	0	4.3	4.3	0.023	0.045
All Carideans	10	0	82.5	25	0.040	0.287
FISH						
Lucania parva	1.1	44.6	16.8	9.8	0.184	0.287
Gobiosoma robustum	17.1	7.2	28	42.7	0.082	0.093
Diplogrammus pauciradiatus	4	44	41.3	13.3	0.075	0.041
Opsanus beta	0	48.6	21.1	1.8	0.109	0.151
Anarchopterus criniger	12.9	48.4	71	41.9	0.031	0.242
Microgobius gulosus	2.7	25.7	0	1.8	0.074	0.170
All Fish	1.4	38.1	20.5	13.5	0.215	0.296
CRABS						
Eurypanopeus sp.	64.7	0	23.5	23.5	0.017	0.078
Libinia sp.					ns	0.438
Callinectes similis	28.6	42.9	0	0	0.008	0.126
Callinectes sapidus	28.6	42.9	0	0	0.007	0.147
Rithropanopeus sp.	100	21.4	0	0.1	0.009	0.247
Panopeus sp.	100	25	0	0	0.044	0.076
All Crabs	0	14.3	28.6	42.9	0.067	0.035
Avg. of Indiv. Species Models	**37.1**	**25.5**	**21.8**	**11.6**	**0.061**	**0.161**

1.3.1.6 Comparison of western and eastern South Biscayne Bay communities

A sampling stratum was established as a "control" on the eastern shore of Biscayne Bay adjacent to Elliott Key in waters < 3 feet deep on about the same latitude as the western nearshore study area. The Elliott Key site will be used to help evaluate the null hypothesis that an observed change in the western bay is regional in scope rather than the result of an alteration to upstream hydrology associated with restoration activities. Ideally such a control site should be outside the direct influence of upstream mainland hydrology, be characterized by similar fish and invertebrate communities, and have similar benthic vegetation.

Salinity at Elliott Key is higher and less variable than in the study area (Appendix D, Table 2; Figure 4), indicating a reduced mainland influence. The depth of sediment is generally similar to inshore zones of the study area (i.e. =1S, 3N, <2N); sediment depth is greater than in 2S and 3S where hardbottom habitat is common. Water clarity at Elliott Key is high and more similar to 2N and 3N, *Thalassia*-dominated study zones, than south of the Black Creek Jetty, where on average water clarity is significantly poorer though only slightly so.

The dominant seagrass in the Elliott Key control site is *Thalassia* (Figures 8 and 9). Benthic vegetative development at Elliott Key follows a common pattern: measures of biomass and cover are less than those observed inshore and north of Black Point Jetty (1S, 2N, 3N) and greater than those observed offshore south of the Jetty (2S, 3S) (Appendix D, Table 11; Figures 8-16). Canopy height, an integrative measure, follows a similar pattern. In line with the importance of habitat in the distribution of fish and shrimp, the dominant organisms follow the same pattern (Appendix D, Table 12).

Figure 20 compares the fish, caridean shrimp, pink shrimp and crab densities observed in the study area (western nearshore of southern Biscayne Bay) and the Elliot Key control site between October 2002 and September 2004. In the Elliott Key stratum only caridean shrimp density differed over this time period (with COLLECTION, ANOVA, p=0.000) whereas densities of fish, pink shrimp and caridean shrimp differed in the study area (Appendix D, Table 9). Differences in sample size (54 [48 in October 2002] vs. 10; study area and Elliot Key, respectively) may account for these differences and points to the need for adequate sampling effort not only in the study area but in the control area as well. Ultimately rejecting the null hypothesis is critical to evaluations of the success of restoration.

The fauna observed at Elliott Key, with some exceptions, is broadly similar in species composition and abundance to that found in the western shoreline of southern Biscayne Bay (Figure 21; Appendix D, Table 13). Dominance is reduced in the Elliot Key fish community, where 13 species, compared with 6 species in the study area, exceeded 90% of individuals captured. *Lucania parva* is the most abundant species in both communities but accounts for only 36.5% of individuals in Elliott Key waters compared with 60.6% in the study area. The grass shrimp, *Periclimenes americanus*, in the western nearshore of southern Biscayne Bay, is a community dominant only in the Elliott Key stratum. Pink shrimp are less abundant on average, 0.29 vs 0.70 per m^2, near Elliott Key compared to the western shore of southern Biscayne Bay.

1.3.2.0 Roller-frame Trawl

1.3.2.1 Description of Salinity during Trawl Collections

The range in surface and bottom salinities measured during trawl sampling is shown in Figure 22. Salinity varied from 21.4 psu to 40 psu at the trawl locations at the time of sampling. Salinity measurements in conjunction with trawl sampling confirmed differences in salinity among the salinity strata designated in the sampling design. Mean

salinities also differed between geographic strata. All differences in means were significant ($p \leq 0.05$) (Table 11). Trawl sampling took place only in the depth zone outside the 3-ft contour because the trawl could not operate in shallower water, so the salinity presented relates specifically to DEPTHZONE O.

Table 11. Mean and standard error of surface salinity at trawl stations by strata.

	SALZONE			GEOZONE	
Strata	1	2	3	N	S
Number	17	129	90	88	148
Mean	27.891	30.53	33.027	28.577	32.388
se	0.652	0.239	0.273	0.357	0.261
	a	b	c	d	e

Mean and standard error of salinity within each stratum are shown in Table 12. As expected, salinities were significantly lower in strata 1S than 2S, and significantly lower in 2S than in 3S. Salinities also were significantly lower in 2N than 3N. We did not anticipate from the hydrologic modeling output used in preparing the sampling design that the salinity in 2N would be lower than 2S or that in 3N would be lower than in 3S. Salinities also were lower in 2N and 3N than in 1S, although not significantly.

Table 12. Mean and standard error of bottom salinity at trawl stations, by strata. Number of samples and statistical group are also shown. Those in the same statistical group (a, b, or c) were not significantly different ($p < 0.05$).

Zone	1S	2N	2S	3N	3S
Number	17	37	92	51	39
Mean	29.792	28.334	32.552	31.335	34.659
Se	0.624	0.422	0.267	0.362	0.41
Statgroup	a	a	b	a,b	c

The sampling coverage of 1S by the trawl was very limited, and the area itself was very limited because most of 1S lay inside the 3-ft depth contour, inaccessible to the trawl.

In addition to the expected pattern of salinity, a gradient of low salinity at the shoreline to higher salinity seaward, there was also a significant latitudinal gradient in salinity ($r^2 = 0.4741$, $p < 0.0$), with salinities decreasing with latitude. The negative relationship of salinity with latitude was unexpected since canal discharges are all in the southern part of the study area (i.e., from the Black Creek Jetty south). Discharges from the Snapper Creek Canal, which enters the Bay a short distance north of the study area, may affect the study area.

1.3.2.2 Nearshore Fish and Invertebrate Community from Trawl Sampling

Appendix B Tables 0-10 show mean number per square meter, by species, in trawl collections from August 2002 through February 2004. Mean densities are shown by square meter rather than by 1000 m^2, used in statistical analyses, to facilitate

comparisons with the throw-trap collections. Table numbering in Appendix B starts with Table 0 for August 2002 so that the other tables will have the same numbers as tables in Appendix A for corresponding throw-trap collections. Data from the sock collections were combined with collections in the rest of the trawl for presentation and analyses.

A mean density for each collection was determined by first by weighting the zonal means on the basis of the area covered by each zone and then adjusting for any departure from proportionality in the distribution of samples among zones. Then an overall mean was determined from the weighted and adjusted means for each collection.

The weighted values suggested that caridean shrimp (78.8% of total individuals) were the predominant fauna susceptible to the roller-frame trawl in the study area, followed by penaeid shrimp (10.2%), fish (7.1%), and crabs (3.5%) (Figure 23). The mean for caridean shrimp was based on 4 collections, whereas the other means were based on 10 collections. Other groups occurring in trawl samples were mollusks, echinoderms, and spiny lobsters. The sampling method under-sampled mollusks.

Fish. The dominant fish were pinfish, *Lagodon rhomboides* (41.9% of individual fish), silver jenny, *Eucinostomus gula* (18.9%), yellowfin mojarra, *Gerres cinereus* (7.4%), and rainwater killifish, *Lucania parva* (4.2%) (Figure 24 and Appendix B, Tables 0-10). Eighty-nine species of fish were collected by the trawl (Figure 24 and Appendix B, Table 11). There were no apparent seasonal patterns in the three most abundance fish species over the 20-month period covered by the bimonthly sampling (Figures 23-25).

Pink Shrimp. Penaeid shrimp were primarily *Farfantepenaeus duorarum*, the pink shrimp, however a small proportion of *F. brasiliensis*, the spotted pink shrimp, was included in the samples. The trawl sampling suggested that the density of pink shrimp was twice as great in February 2004 as in February 2003. Density increased from August to December in both years, suggesting recruitment of postlarvae to Biscayne Bay nursery areas in about June or July (Figure26).

Spotted Pink Shrimp. Spotted pink shrimp, *Farfantepenaeus brasiliensis*, made up only 1.1% of the identified penaeids and were consistently represented only within the larger individuals collected. It is possible that some of the smallest individuals identified as *F. duorarum* were actually *F. brasiliensis* because smaller individuals were more difficult to identify to species, but the seasonal pattern of individuals identified as F. brasiliensis was very different from that of *F. duorarum* (Figure 26).

Caridean Shrimp. The relative density of caridean shrimp, as a group, was more than three times greater in February 2003 than in October, December 2002, or April 2003 (Figure 26). Pink shrimp and caridean shrimp relative densities were roughly correlated among sites in October, December, and February, but less so in April. Some of the most abundant caridean species in Biscayne Bay are a major food source of pink shrimp. (Due to the overwhelming effort required at the scale of trawl sampling, caridean shrimp were no longer sorted from the samples after April 2003.)

Crabs. Hermit crabs (*Clibanarius* spp.) were the most numerous crabs, making up 49% of the weighted-mean crab individuals (Figure 27). Callinectid crabs, represented by *Callenectes sapidus*, the blue crab, and *Callinectes similis*, the lesser blue crab, made up 45% of weighted-mean individuals. The lesser blue crab made up 85% of those identified to species.

1.3.2.3 Salinity Relationships of the Dominant Species in Trawl Collections

Generalized linear modeling approaches (i.e., multiple linear regression,[MLR] and analysis of variance [ANOVA] were used to determine the relationship of faunal densities to SALZONE and GEOZONE. Both continuous and categorical variables were used. Trawl catches of each taxa were standardized by dividing the number caught at each site by the area swept by the trawl and then were multiplied by 1000 to approximate the magnitude of the original catch. Models were developed for the 12 most abundant taxa in trawl catches for the period August 2002 through February 2004. This included penaeid shrimp (primarily pink shrimp, *Farfantepenaeus duorarum*, with a small amount of spotted pink shrimp, *F, brasiliensis*), hermit crabs, and 10 fish taxa. Variables significant at $p \leq 0.1$ were retained in each model. Summary tables of results of the MLR and ANOVA analyses are presented in Appendix E.

In the first approach, MLR and ANOVA were conducted to determine whether there was a significant difference in faunal densities among the strata defined by the study design: salinity zones (SALZONE 1, 2, and 3) and geographic zones (GEOZONE N and S). Collection (COLL) was included as a categorical variable in the models to capture seasonality and interannual variation. The variance in the faunal densities explained by the MLR models and the variance uniquely explained by the significant independent variables (or variable sets, in the case of SAL, SAL^2 or LAT, LAT^2) are shown in Table 13. COLL was a major and significant explaining variable in all models. GEOZONE and SALZONE were highly significant in describing density of pink shrimp and eight fish species: *Syngnathus floridae* (dusky pipefish), *Lutjanus griseus* (gray snapper), *Opsanus beta* (toad fish), *Lagodon rhomboides* (pinfish), *Lucania parva* (rainwater killifish), *Eucinostomus gula* (silver jenny), and *Gerres cinereus* (Yellowfin mojarra). GEOZONE was an important describing variable for all taxa except hermit crabs and the other three fish species, *Hippocampus zosterae* (dwarf seahorse), *Atherinomorus stipes* (hardhead silverside), and *Haemulon aurolineatum* (tomtate).

The relationships suggested by the MLRs were examined more closely and, in some cases, refined, with ANOVAs (Table 14) (i.e., probability of F for Type III Sums of Squares). Densities were higher in the northern zone than in the southern zone, except for one species, the hardhead silverside. Densities were higher in SALZONE 1 than in SAZONE 2 or 3 (Table 14), even though the only SALZONE 1 area was in the south. ANOVA results with SALZONE and GEOZONE are given in Appendix E Tables 1 and 2.

Table 13. Model R^2 and percent of explained variance in faunal density ($100xR^2$) explained uniquely by COLL, GEOZONE, SALZONE, and SALZONE and GEOZONE jointly in MLR models based on trawl data.

		Factors				
Taxa	Model	GEOZONE	SALZONE	COLL	Joint GEO-SAL	Full model R^2
SHRIMP						
Farfantepenaeus duorarum	Y~COLL+SALZONE+GEOZONE	17.42	34.82	57.37	39.94	0.390
FISH						
Syngnathus floridae	Y~COLL+GEOZONE	47.17		51.73		0.226
Hippocampus zosterae	Y~COLL+SALZONE+GEOZONE	9.31	4.59	79.65	20.59	0.290
Lutjanus griseus	Y~COLL+SALZONE+GEOZONE	52.57	24.09	41.38	59.45	0.255
Opsanus beta	Y~COLL+SALZONE+GEOZONE	60.50	38.08	23.68	74.10	0.250
Atherinomorus stipes	Y~COLL+GEOZONE	8.33		91.83		0.192
Lagodon rhomboidess	Y~COLL+SALZONE+GEOZONE	35.36	44.35	36.40	59.56	0.366
Lucania parva	Y~COLL+SALZONE+GEOZONE	21.72	25.96	59.40	39.06	0.203
Eucinostomus gula	Y~COLL+SALZONE+GEOZONE	13.81	21.25	71.67	26.37	0.330
Haemulon aurolineatum	Y~COLL+SALZONE+GEOZONE	14.92		84.58		0.184
Gerres cinereus	Y~COLL+SALZONE+GEOZONE	14.82	63.99	32.01	67.78	0.254
CRABS						
Clibanarius spp.	Y~COLL+SALZONE		13.34	20.69		0.239
Average		26.9	30.1	54.2	48.4	.2649

Table 14. Summary of results of ANOVA of species densities as a function of COLLECTION, SALZONE, and GEOZONE, and direction of significant relationships (trawl data August 2002 through February 2004).

		Type III Sums of Squares Pr(F)			SigDif of Salzone	SigDif of Geozone
Taxa	Model	COLL	SALZONE	GEOZONE	95%	95%
SHRIMP						
Farfantepenaeus duorarum	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.0000	1>2,3; 2>3	N>S
FISH						
Syngnathus floridae	Y~COLL+GEOZONE	0.0002		0.0000		N>S
Hippocampus zosterae	Y~COLL+GEOZONE	0.0000		0.0002		N>S
Lutjanus griseus	Y~COLL+SALZONE+GEOZONE	0.0005	0.0001	0.0000	1>2,3: 2>3	N>S
Opsanus beta	Y~COLL+SALZONE+GEOZONE	0.0460	0.0000	0.0000		N>S
Atherinomorus stipes	Y~COLL+SALZONE+GEOZONE	0.0000		0.0364		S>N
Lagodon rhomboides	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.0000	1>2,3; 2>3	N>S
Lucania parva	Y~COLL+SALZONE+GEOZONE	0.0002	0.0008	0.0005	1>2,3	N>S
Eucinostomus gula	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.0001	1>2,3; 2>3	N>S
Haemulon aurolineatum	Y~COLL+GEOZONE	0.0000		0.0064		N>S
Gerres cinereus	Y~COLL+SALZONE+GEOZONE	0.0054	0.0000	0.0009	1>2,3	N>S
CRAB						
Clibanarius spp.	Y~COLL+SALZONE	0.0000	0.0100		2>3	

Results of the MLR analysis validated our study design by demonstrating significant differences in faunal densities among strata. It did not necessarily demonstrate a dependence of distribution upon either geography or salinity, however. The higher densities in the north, where salinities are moderate to higher, and in the southern zone of lowest, most variable salinities may reflect an influence of spatial patterns in features other than salinity, such as bottom habitat. Vegetation maps of the area (Figure 3) and the vegetation sampling associated with our throw-trap sampling indicated that the vegetation cover is very sparse in strata 2S and 3S.

To better clarify spatial relationships, we conducted ANOVAs examining the variation in faunal density among the five zones defined by the study design: i.e., 1S, 2S, 3S, 2N, and 3N. Results are shown in Appendix E, Table 3, and are summarized in Table 15. Results from the ANOVAs with ZONES suggest that variation in faunal density is not so much among salinity zones and between north and south but, rather, in an inshore to offshore direction, with zones 2N and 1S being the areas of maximum abundance of most of the species examined. In general, Zones 2N and 3N have significantly higher faunal abundances than 2S and 3S, but not 1S. *Hippocampus zosterae* (dwarf seahorse) is the only species occurring at higher densities in 3N than 2N.

Table 15. Distribution of dominant fauna in trawl samples among the five ZONE of the study area from ANOVAs; +++ = extremely high, ++ = very high, + = high, i = intermediate, - = low, and -- = very low.

	ZONE				
Variable	1S	2S	3S	2N	3N
SHRIMP					
Farfantepenaeus duorarum	++	-	--	++	-
FISH					
Syngnathus floridae	i	-	-	+	+
Hippocampus zosterae	-	-	-	-	+
Lutjanus griseus	++	-	--	+++	+
Opsanus beta	++	-	-	+++	+
*Atherinomorus stipes**					
Lagodon rhomboides	+	-	-	++	--
Lucania parva	++	-	--	+	-
Eucinostomus gula	++	-	--	+	-
Haemulon aurolineatum	i	-	-	+	I
Gerres cinereus	+++	-	--	+	-
CRAB					
Clibanarius spp.	i	i	i	+	-

* No between-ZONE significant differences at $p \leq 0.05$.

To further clarify relationships of faunal densities to salinity and geography, we examined faunal density in relation to the continuous variables SAL and LAT. In the trawl models, SAL is bottom salinity at the time and site of sampling and LAT is the latitude of the starting point for the trawl. Square terms (2^{nd}-order terms) of each of these variables were added initially to test whether there was a midrange maximum in density in relation to either of these variables. (A positive 1^{st}-order term and negative 2^{nd}-order term indicated a mid-range maximum, however a negative 1^{st}-order term and positive 2^{nd}-order term indicated a midrange minimum.) If the square term of the parabolic factor was significant, but the other term was not, then both terms were retained because the square term and its significance were dependent upon the presence of the first-order term. If the 1^{st}-order term was significant ($p < 0.1$) but the 2^{nd}-order term was not, then the 2^{nd}-order term was dropped from the equation, suggesting that the relationship with faunal density was a linear one. The categorical variable COLL was included in the model to account for seasonal and inter-annual variability in recruitment. Because salinity and latitude were correlated ($R = 0.31$), the models were run first with SAL and SAL^2 and then later with LAT and LAT^2. The addition of LAT caused SAL to drop out of the equation in one case and, in other cases, caused SAL to explain a lower percent of the explained variance. Therefore, the importance of SAL may have been somewhat underestimated in the models.

The analysis was conducted with the 12 taxa examined in the previous analysis. LAT was a significant factor explaining variation in the density of six species. Three species (dusky pipefish, dwarf seahorse, and rainwater killifish) were denser in the north, the hardhead silverside) was denser in the south, and two species (hermit crab and tomtate) were densest in the center (LAT-LAT^2). SAL was a significant factor explaining variation in the density of ten species (all but dwarf seahorse and hardhead silverside). Eight were denser at salinities in the lower part of the range occurring in the area sampled by the trawl and two (dusty pipefish and tomtate) were densest in the middle of the area's salinity range (SAL-SAL^2) (Table 16).

Table 16. Number of faunal models (out of 12) in which the indicated variable is included as a significant explaining variable (trawl data August 2002 through February 2004)

		Continuous variable		
Variable	Categorical	Positive	Negative	+,-
COLL	12			
SAL		1	7	
SAL - SAL^2				2
LAT		3	1	
LAT - LAT^2				2

Note: +,- means the binomial with positive 1^{st} order term and negative 2^{nd} order term.

The faunal models with continuous variables explained from 15.57% (gray snapper) to 33.32% (penaeid shrimp) of density variance (Table 17). The percent of explained variance explained uniquely by the dependent variables is shown for each faunal model in Table 17. COLL was the major explaining variable in the models,

uniquely describing 8% to 26% of total variation in faunal density (8.23% to 46.51% of variance explained by the model). SAL uniquely described from 1.41% to 11.76% of total variation in animal density (1.41% to 12.27% of explained variance), and LAT uniquely explained from 1.26% to 6.61% of density variance (1.07% to 22.93% of explained variance). Details of this set of models are provided in Appendix E Table 4.

The faunal models with continuous variables suggest that faunal distributions are influenced by the collection date, salinity, and factors in addition to salinity that vary latitudinally. Although other potential explanatory variables such as temperature and bottom depth were considered, they were not significant in any equation with trawl data in which they were tested. Patchy animal distributions over a heterogeneous habitat and the low, possibly variable, catch efficiency of the trawl probably explained the balance of density variation not explained by the model.

Table 17. Model R^2 and percent of explained variance in faunal density ($100xR^2$) explained uniquely by COLL, SAL, and LAT in models with trawl data, August 2002 through February 2004. (All models were significant at $p < 0.0001$.).

Taxa	Model	Model R^2	Collection	Salinity*	Latitude*
SHRIMP					
Farfantepenaeus duorarum	$Y \sim COLL - SAL + LAT - LAT^2$	0.3332	19.33	3.20	2.01
FISH					
Syngnathus floridae	$Y \sim COLL + SAL - SAL^2 + LAT$	0.2625	46.51	12.27	22.93
Hippocampus zosterae	$Y \sim COLL + LAT$	0.2964	21.80		6.61
Lutjanus griseus	$Y \sim COLL - SAL$	0.1557	11.77	5.25	
Opsanus beta	$Y \sim COLL - SAL$	0.1637	11.66	9.89	
Atherinomorus stipes	$Y \sim COLL + SAL - LAT$	0.2235	18.19	1.72	1.07
Lagodon rhomboides	$Y \sim COLL - SAL$	0.2657	24.47	11.76	
Lucania parva	$Y \sim COLL - SAL + LAT$	0.1914	13.59	2.79	1.26
Eucinostomus gula	$Y \sim COLL - SAL$	0.2969	26.00	5.37	
Haemulon aurolineatum	$Y \sim COLL + SAL - SAL^2 + LAT - LAT^2$	0.2180	13.79	1.67	2.72
Gerres cinereus	$Y \sim COLL - SAL$	0.1588	8.23	7.71	
CRAB					
Clibanarius spp.	$Y \sim COLL - SAL + LAT - LAT^2$	0.2440	21.89	1.41	2.69
Average		0.2342	19.8	5.7	5.6

*The form of this variable and direction of its relationship are indicated in the equation.

1.3.3.0 Pull-Net

1.3.3.1 Description of Salinity during Pull-Net Collections

Salinity measurements obtained at pull-net sampling sites during collections (from water taken just below the surface) varied from 1 psu to 45 psu (Figure 28). The pull-net was operated only in the very shallow water inside the 3 ft depth contour, so the salinities reported here refer to DEPTHZONE I only. Median salinities were highest in

June 2004 and lowest in October 2004. Mean salinities for salinity zones and geographic zones corresponding to our study design are shown in Table 18. Salinities were highest in SALZONE 3 and in the GEOZONE south. As was the case with the salinity data collected during trawl sampling, there were significant differences in salinity among the three salinity strata but there was no significant difference in salinity between the two geographical strata (N and S).

Table 18. Mean and standard error of measured (at time of pull-net sampling) salinity among salinity zones and between geographic zones.

	SALZONE			GEOZONE	
Strata	1	2	3	N	S
Number	153	61	67	118	163
Mean	22.914	28.11	31.479	26.085	28.917
se	1.087	1	1.224	0.856	1.27
Statgroup	a	b	c	d	d

Differences among the four zones sampled with the pull-net (1S, 2N, 2S, 3N) were also examined (Table 19). The ANOVA comparing salinity among zones indicated significant differences among 1S, 2N, and 3N, but no significant differences among 2N, 2S, and 3N. This result differs to that from trawl sampling, in which 2N had a lower salinity than 1S, however those differences were not significant. 1S was sampled much more extensively by the pull-net than the trawl because only a very small part of 1S lay outside the 3-ft depth contour. 3S was not sampled with the pull-net as very little of 3S is within the 3-ft contour.

Table 19. Mean and standard error of salinity at pull-net stations, by zone, number of samples, and statistical groups (those in the same statistical group (a, b, or c) were not significantly different ($p<0.05$).

Zone	1SI	2NI	2SI	3NI
Number	153	51	10	67
Mean	24.33	26.694	29.526	30.063
SE	0.458	0.815	1.811	0.718
Statgroup	a,d	d,e	b,e,f	d,f

1.3.3.2 Nearshore Fish and Invertebrate Community from Pull-net Sampling

Appendix C shows the mean density, by fauna, estimated from pull-net sampling. The most abundant taxa in pull-net samples were *Farfantepenaeus duorarum* (pink shrimp), hermit crabs (*Clibanarius* sp.), and three fish species, *Lucania parva* (rainwater killifish), *Eucinostomus gula* (silver jenny), and pinfish (*Lagodon rhomboides*). The three fish species accounted for 60.4%, 16.7%, and 11.9% of fish identified in pull-net samples (Figure 29). Gulf pipefish, representing 2% of fish collected, completed the group representing 90% of the fish collected. Three other species each made up more than 1% of fish taxa. These were goldspotted killifish (*Floridichthyes carpio*) (1.8%),

yellowfin mojarra (*Gerres cinereus*) (1.4)%, and dusky pipefish (*Syngnathus floridae*) (1.2%).

1.3.3.3 Salinity Relationships of the Dominant Species in Pull-Net Collections

MLR and ANOVA were conducted to develop models for the four most abundant species caught in the pull-net. The first series of analyses examined faunal densities as a function of COLL, SALZONE, GEOZONE, and TIME (of day of sampling). TIME was a significant variable in all models except the *Lagodon rhomboides* model. SALZONE was a significant variable explaining density of *Lucania parva* and (with GEOZONE removed) *Farfantepenaeus duorarum*. GEOZONE was not a significant factor explaining density of any of the four species. Table 20 shows the P-values for the type III sums of squares F statistic. Significant differences in SALZONE, and the direction of the differences are also shown. Standard errors were not computed, and means and significant differences among means were only computed (by the software) for ANOVAs without continuous variables.

Table 20. Summary of results of ANOVA of faunal density in relation to SALZONE, GEOZONE, and TIME.

Taxa	Model	Type III Sum of Squares Pr(F)				SALZONE mean			Sig. Diff.
		COLL	SALZONE	GEOZONE	TIME	1	2	3	95%
Farfantepenaeus duorarum	Y~COLL+SALZONE+GEOZONE+TIME	0.0000	0.5789	0.6190	0.0000				
	Y~COLL+SALZONE+TIME	0.0000	0.0025		0.0000				
	Y~COLL+SALZONE	0.0000	0.0019			6.72	4.89	10.49	1<3,2<3
Lucania parva	Y~COLL+SALZONE+TIME	0.7546	0.0007		0.0001				
	Y~COLL+SALZONE	0.0894	0.0024			10.81	9.77	22.30	1<3, 2<3
Eucinostomus gula	Y~COLL+SALZONE+GEOZONE+TIME	0.0000	0.4610	0.2742	0.0061				
	Y~COLL+SALZONE+GEOZONE	0.0000	0.0471	0.2044		5.29	1.19	2.15	ns
	Y~COLL+SALZONE+TIME	0.0000	0.8285		0.0048				
	Y~COLL+SALZONE	0.0000	0.0469			4.26	2.28	3.62	1>2
Lagodon rhomboides	Y~COLL+SALZONE+GEOZONE+TIME	0.0018	0.8010	na	0.2867				
	Y~COLL+SALZONE+GEOZONE	0.0014	0.2962	0.2901		3.43	1.57	1.64	ns

A second set of analyses was conducted substituting latitude (LAT and LAT^2) for GEOZONE (Table 21). LAT is a continuous variable, the latitudinal coordinate of the sampling site, that reflects spatial distributions in a continuous manner. LAT was significant in two of these models. SALZONE was significant in three, and COLL was significant in all four. These regression models explained 24%, 28%, and 40% of the variation in density of *E. gula*, *L. parva*, and *F. duorarum*, respectively. The latitudinal factor added considerably to the explanatory power of the models for *F. duorarum* and *L. parva*. Note that the regression coefficient is positive for the 2nd order term (LAT2) and negative for the 1st order term (LAT), a combination that indicates a concave distribution curve, with densities lowest in the middle latitudes of the sampling area and higher both north and south of it. SALZONE contributed substantially to the models for F. duorarum and L. parva, but very little to the *E. gula* model and not at all to the L. rhomboides model.

Table 21. Model R^2 and percent of explained variance in faunal density ($100xR^2$) explained uniquely by COLL, SALZONE, and LAT in faunal models based on pull-net data, July 2003 through October 2004.

		Factors				
		COLL	SALZONE	TIME	LAT^2-LAT	Full model R^2
SHRIMP						
Farfantepenaeus duorarum	Y~COLL+SALZONE+LAT^2-LAT+TIME	39.17	6.68	6.27	25.36	0.3955
FISH						
Lucania parva	Y~COLL+SALZONE+LAT^2-LAT+TIME	12.08	13.28	3.23	39.83	0.2847
Eucinostomus gula	Y~COLL+SALZONE+TIME	86.29	0.45	9.60		0.2428
Lagodon rhomboides	Y~COLL	100.00				0.1178

Another set of models was prepared with ZONE as a categorical variable in place of SALZONE and GEOZONE to allow relationships of density with area to be examined independently of the two-way sampling design (Table 22). Four zones were sampled by the pull-net, 1S, 2S, 2N, and 3N (although there were only a few samples for 2S). ZONE was a significant factor explaining shrimp (*F. duorarum*) and killifish (*L. parva*) densities, but not silver jenny (*E. gula*) or pinfish (*L. rhomboides*) densities. COLL was the only factor contributing significantly to the explanation of variation in pinfish densities.

Table 22. Results of ANOVA of faunal density in relation to COLL, ZONE, and TIME (pull-net data, July 2003-October 2004).

		Type III Sum of Squares Pr[F]			Means				Zone Sig. diff.
Taxa	Model	COLL	ZONE	TIME	1S	2N	2S	3N	95%
SHRIMP									
	Y~COLL+ZONE+TIME	0.0000	0.0067	0.0000					
Farfantepenaeus duorarum	Y~COLL+ZONE	0.0000	0.0044		6.72	5.31	2.76	10.48	3N>1S, 2N
FISH									
	Y~COLL+ZONE+TIME	0.7336	0.0018	0.0001					
Lucania parva	Y~COLL+ZONE	0.0992	0.0057		10.81	10.73	4.90	22.28	3N>1S
Eucinostomus gula	Y~COLL+ZONE+TIME	0.0000	0.6650	0.0061					ns
Lagodon rhomboides	Y~COLL+ZONE	0.0014	0.3825						ns

In another series of analyses, multiple regression models were developed with continuous variables to represent salinity and spatial relationships (Table 23). This approach suggested parabolic relationships with salinity (SAL - SAL^2) for three species, *Farfantepenaeus duorarum* (pink shrimp), *Lucania parva* (rainwater killifish), and *Lagodon rhomboides* (pinfish), with a density maximum near the middle of the salinity range These models explained 15%, 24%, 26%, and 39% of the variance in density of pinfish, silver jenny, rainwater killifish, and pink shrimp, respectively. The percent of the explained variance explained uniquely by SAL-SAL^2 varied from 0.6% for silver jenny to 14% for pinfish. COLL uniquely explained the greater part of the explained variance

for pink shrimp, silver jenny, and pinfish, but not rainwater killifish. LAT^2-LAT (suggesting a central minimum, not maximum) explained the greatest part of the explained variance for the killifish. TIME was an important explaining variable for pink shrimp, rainwater killifish, and silver jenny, but not pinfish.

Table 23. Model R^2 and percent of explained variance ($100xR^2$) explained uniquely by collection (COLL), salinity (SAL), latitude (LAT), and TIME in MLR models with pull-net data, July 2003-October 2004).

		Factors				
Taxa	Model	COLL	SAL-SAL^2	LAT^2-LAT	TIME	Full model R^2
SHRIMP						
Farfantepenaeus duorarum	Y~COLL+ LAT^2-LAT+SAL-SAL^2+TIME	42.84	4.87	24.41	17.47	0.3880
FISH						
Lucania parva	Y~COLL+ LAT^2-LAT+SAL-SAL^2+TIME	15.59	5.18	41.44	14.21	0.2604
Eucinostomus gula	Y ~ COLL+SAL+TIME	96.09	0.58		14.23	0.2431
Lagodon rhomboides	Y ~ COLL+SAL -SAL^2+TIME	74.02	14.02			0.1455

In this section we have summarized results of four sets of models for the four major species in the pull-net data. The first examined the relationships of faunal density to SALZONE and GEOZONE and found that GEOZONE was not a significant variable ($p \leq 0.1$) in the model for any of the four species. It is not surprising that SALZONE and GEOZONE were not both significant variables explaining faunal density in this dataset, because the main zones are 1S, 2N, and 3N, making the two categorical variables almost redundant SALZONE, with the comparisons of 1, 2, and 3, apparently reflected the differences among zones better than GEOZONE, with only N and S.

A second set of models was prepared replacing latitude (LAT and LAT^2) for GEOZONE. The form that was significant in two of the models, LAT^2 – LAT, suggested that the density of *F. duorarum* and *L. parva* was lowest at the middle latitudes of the study area. The same construct of latitude appeared in subsequent sets of models.

The third set of models was prepared with ANOVA, and ZONE was substituted for both of SALZONE and LAT. These models indicated that the density of both pink shrimp and killifish was significantly higher in 3N. Only the inshore parts of 2N and 3N were sampled with the pull-net. The inshore part of 3N is the area near Chicken Key and the inshore area of 2N includes the area immediately north of Black Point.

In a fourth set of models, using MLR, SALZONE was replaced by SAL – SAL^2, SAL being surface salinity at the sampling site. Density of all four species was significantly related to SAL, compared to only three related to SALZONE. This confirmed our observation that there was much more salinity variation in the pull-net sampling area than could adequately be described by the zones we had defined. The salinity measured in conjunction with sampling was a more effective variable.

The various sets of models had three variables in common, COLL, TIME, and after the first set, LAT. COLL was a consistently strong explaining variable in all sets of models described above and uniquely explained the greatest part of the explained variance in most models. This variable accounted for seasonal variation and also variation between years. TIME was an important explaining variable in all models except those for pinfish. Since the relationship was negative, it suggested that that sampling before full darkness—which came later in the summer—decreased the catch of the other three species, pink shrimp, rainwater killifish, and silver jenny, which may be more susceptible to capture with the pull-net after dark. The relationship between densities and latitude was negatively parabolic ($LAT^2 - LAT$), suggesting that densities were highest in the northernmost and southernmost parts of the sampling region and lowest in the center. Model statistics are summarized more fully in Appendix F.

1.3.4.0 Comparison of Gear and Sampling Results

Analyses were conducted to compare throw trap samples to trawl and pull-net samples. These analyses focused on comparing estimates of density and estimates of species composition based on each of the three gear.

1.3.4.1 Influence of Sampling Gear on Density Estimates of the Pink Shrimp

Pink shrimp density, estimated by sampling with roller-frame trawl or pull-net, was compared graphically and by means of a nonparametric approach, to pink shrimp density estimated with the 1-m^2 throw-trap. The comparison was made on the basis of average catch per m^2 sampled. Records for samples collected at the same assigned site and within a few days of each other were paired, creating two data sets of paired pink shrimp density records, one for throw-trap with the roller-frame trawl and one for throw-trap with the pull-net.

In 212 paired records of pink shrimp density for throw-trap and roller-frame trawl, throw-trap densities ranged from 0 to 4 per m^2 and trawl densities from 0 to 0.39. Figure 34 shows the average shrimp density (for each site and collection; no./m^2) from trawl data, plotted in order from lowest to highest density and color-coded by the corresponding throw-trap catch (0/m^2 through 4/m^2). A perfect correlation between the catches of the two gear types would be indicated if all points color-coded for TT = 0 were at the lower end of the scale and all those color-coded for TT = 4 were at the high end, with the other colors sorted in their appropriate intermediate positions. The scatter of color in Figure 34 is far greater than a perfect correlation would provide, but more points color-coded for TT = 0 are plotted at the lower end of the curve, and the few points color-coded for TT = 4 are plotted toward, although not at, the upper end of the curve.

A quantitative comparison method was applied as described in the Methods section. Figure 35 shows the median and 25th and 75th quartiles of the set of trawl catches (no./m^2) corresponding to throw-trap catches of 0, 1, 2, 3, and 4 shrimp/m2, respectively. These median values of the trawl catches, along with the corresponding values of the throw-trap catches, were input to a Kendall's robust line-fit method (Sokal and Rohlf

1998). The line-fit, with intercept, and slope, of the relationship developed by this method is shown in Figure 36. Interestingly, the intercept is greater than zero, probably reflecting the large difference in area sampled. Apparently, on average, the trawl catch exceeds the throw-trap catch where the throw-trap catch is zero (i.e., 0.047 vs. 0). The throw- trap catch becomes larger than the trawl catch when the throw-trap catch reaches 1. By TT = 4, the throw-trap catch is over 31 times as great as the trawl catch. The Kendall correlation test indicated that the slope of the fit was significant at $p \leq 0.1$. See tables in Appendix G for further details of this analysis.

Figure 37 shows the average shrimp density (for each site and collection; no./m^2) from pull-net data, plotted in order from lowest to highest density and color-coded by the corresponding throw-trap catch (0/m^2 through 8/m^2). Conformity to perfect correlation is much greater in this plot for the pull-net than in the corresponding plot comparing the throw-trap to the roller-frame trawl (Figure 34); points color-coded for TT = 0 are almost all at the lower end and are followed in proper order by points for subsequent TT values.

Figure 38 shows the median and 25th and 75th quartiles of the set of pull-net catches (no./m^2) corresponding to throw-trap catches of 0 to 8 shrimp/m^2, respectively. These median values of the pull-net catches, along with the corresponding values of the throw-trap catches, were input to Kendall's robust line-fit method (Sokal and Rohlf 1998). The line fit, with intercept and slope, of the relationship developed by this method is shown in Figure 39. As was the case with the throw-trap/roller-frame trawl comparison, the intercept is greater than zero, again probably reflecting the differences in area sampled. The Kendall robust line-fit analysis indicated that, on average, the pull-net catch exceeds the throw-trap catch when the throw-trap catch is zero (i.e., 0.085 vs. 0). The throw-trap catch becomes larger than the pull-net catch when the throw-trap catch reaches 1. By TT = 8, the throw-trap catch is about 10 times as great as the pull-net catch. The Kendall correlation test indicated that the slope of the fit was not significant. See tables in Appendix G for further details of this analysis.

1.3.4.2 Influence of Sampling Gear and Scale on Community Metrics

In this section we report and compare community-level results in the context of the sampling gear and scale. The focus of this comparison is the fish, as other groups were not necessarily handled consistently in the different sampling programs. Our results suggest that scale and other aspects of method affect estimates of community metrics.

In total, the throw-trap sampled 696 m^2 and caught 4,545 fish (6.53/m^2) during the period covered by this report, the pull-net sampled 8,550 m^2 and caught 6,197 fish (0.725/m^2), and the roller-frame trawl sampled 259,952 m^2 and caught 13,431 fish (0.052/m^2). Over the sampling periods, the throw-trap caught 45 species, the pull-net caught 34 species, and the trawl caught 88 species. Figure 40 shows the distribution of species according to the $\log_{10}$ of individuals caught. The throw-trap collected more species per total area swept or total individuals caught; the trawl caught the least species per unit area swept, and the pull-net caught the fewest species per individuals caught (Table 24).

Table 24. Comparison of the sampling characteristics of the three gear types.

Gear	Area swept	Individuals caught	Species caught	Individuals per species	Area per species
Throw-trap	696	4,545	45	101	15.5
Pull-net	8,550	6,197	34	182	251
Trawl	259,952	13,431	88	153	2,954

The throw-trap exhibited greater efficiency in sampling the species richness of the community. The roller-frame trawl and pull-net were restricted to largely separate parts of the study area operationally; the trawl sampling outside the 3-ft contour, the pull-net sampling inside the 3-ft contour. In contrast the throw-trap sampled all depths (< 1 ft to > 10 ft) present in the study area. However, this only partly explains its greater efficiency in terms of sampling species richness. The pull-net, operating in DEPTHZONE I, captured only 2 species unique to it. In contrast the roller-frame trawl, operating only in DEPTHZONE O, captured 47 species not captured by the throw-trap or pull-net, and the throw-trap captured 14 species not caught by either the trawl or the pull-net (Figure 41). There was considerable overlap of species caught by the three gear types. Twenty-one species were caught by all three gears, 31 were caught by both the throw-trap and trawl, 22 were caught by both the throw-trap and pull-net, and 31 were caught by both the trawl and pull-net (Figure 41). Comparisons of species unique, and species common, to pairs of gear appear in Figure 42.

The top 10 species in abundance in samples of each gear type appear in the bar graph in Figure 43, which also includes the percent of the catch made up of the same species in the other gear (where it was not necessarily among the top 10). Seventeen species, rather than 30, appear because all but seven are among the top 10 in samples of two or more gear types. Bars are scaled by percent of the catch by the particular gear type (i.e., *Eucinostomus gula* represented 16.7% of the pull-net fish catch and 18.5% of the roller-frame trawl fish catch. Several species were present and within the top 10 species in the catches of at least two gear types. We might have expected those species most abundant in DEPTHZONE I to occur in high percentages in both pull-net and the throw-trap samples and those species most abundant in DEPTHZONE O to occur in high percentages in both the trawl and the throw-trap because the throw-trap sampled both depth zones. Instead, there were more of the top 10 species in common between the pull-net and the trawl than between the throw-trap and either the pull-net or the trawl. The split suggested that the trawl and the pull-net sampled water-column species (i.e., hardhead silversides, silver jenny, yellowfin mojarra) more effectively, whereas the throw-trap more effectively sampled those species strongly associated with the bottom (e.g., spotted dragonet, clown and code gobies). Seahorses and pipefishes seemed equally vulnerable to all three gear.

Another view of species richness in relation to gear is provided by the species-area curves in Figures 44-46. The data from all three gear fit well to a power curve, however the three curves differ, and, in further analysis, might lead one to different

estimations of the total species richness of the area. The trawl data fit their curve more tightly, possibly because of the larger area each point represents.

1.3.5.0 Comparison of Faunal Density in Fished and Unfished Areas

Commercial fishing is conducted in Biscayne Bay with the roller-frame trawl to supply a baitfish industry serving the recreational fishing community. In the study area commercial trawls are limited to the area outside the 3-ft contour line. It is possible that trawling activities affect the density of the target species, pink shrimp, and also the many other species that are collected as bycatch in trawls. In this study the throw-trap was the only gear used that sampled both fished and unfished areas. Analyses of faunal densities in relation to DEPTHZONE are presented in Appendix D, Table 9 and summarized in Table 25).

Table 25. Relationship of the density of dominant fauna to DEPTHZONE in the nearshore waters of southern Biscayne Bay.

Species	Model R^2	Full model P-value	DETHZONE I mean ± se	DEPTHZONE O mean ± se	Sig Dif 95%
SHRIMP					
Farfantepenaeus duorarum	0.217	0.000	1.053 ± 0.086	0.430 ± 0.080	I>O
Thor manningi	0.148	0.000	43.926 ± 6.368	40.989 ± 5.911	ns
Hippolyte zostericola	0.251	0.000	19.864 ± 1.552	13.652 ± 1.440	I>O
Thor floridanus	0.215	0.000	6.743 ± 1.356	6.499 ± 1.259	ns
All carideans	0.133	0.000	51.023 ± 7.243	87.202 ± 7.624	ns
FISH					
Lucania parva	0.275	0.000	8.370 ± 0.560	1.647 ± 0.520	I>O
Gobiosoma robustum	0.162	0.000	0.912 ± 0.077	0.575 ± 0.072	I>O
Diplogrammus pauciradiatus	0.148	0.000	0.212 ± 0.062	0.634 ± 0.058	O>I
Opsanus beta	0.214	0.000	0.844 ± 0.062	0.219 ± 0.058	I>O
Anarchopterus cringer	0.096	0.000	0.227 ± 0.057	0.412 ± 0.053	I>O
Microgobius gulosus	0.077	0.002	0.229 ± 0.043	0.027 ± 0.040	I>O
All fish	0.307	0.000	11.699 ± 0.602	4.106 ± 0.559	I>O
CRABS					
Eurypanopeus sp.	0.001	0.474	0.486 ± 0.125	0.371 ± 0.116	ns
Libinia sp.	0.073	0.002	0.049 ± 0.018	0.046 ± 0.017	ns
Callinectes similis	0.083	0.001	0.067 ± 0.016	0.052 ± 0.015	ns
Callinectes sapidus	0.000	0.495	0.056 ± 0.017	0.032 ± 0.015	ns
Rithropanopeus sp.	0.108	0.000	0.090 ± 0.012	0.012 ± 0.027	ns
Panopeus sp.	0.052	0.019	0.061 ± 0.022	0.041 ± 0.021	ns
All crabs	0.014	0.268	0.844 ± 0.141	0.606 ± 0.131	ns

Results summarized in Table 25 suggest that pink shrimp and most fish are more abundant in the inshore area, the unfished zone, but that DEPTHZONE is not a significant factor explaining the distributions of crabs or most caridean shrimp. One fish species, *Diplogrammus pauciradiatus*, is significantly more abundant in DEPTHZONE O. Unless fish are more susceptible to fishing gear than crabs, there is no clear suggestion in these data that fishing pressure is the cause of the lower density of most fish species in the deeper waters of the study area. The differences more likely are due to the

habitat differences described in the above sections 1.3.1.2 and 1.3.1.3 than to fishing pressure. HABITAT accounted for an average of 77.0% of the variance explained in dominant fauna models while DEPTHZONE explained only 3.7% (Table 10).

Table 26. Distribution of samples between DEPTHZONE I and O, inside and outside the 3-ft contour line, respectively, by number of pink shrimp caught, or density (no./m^2).

	Number of Samples		
Density (no./m^2)	DEPTHZONE I	DEPTHZONE O	sum
0	149	307	456
1	70	66	136
2	34	16	50
3	16	8	24
4	9	6	15
5	3	0	3
6	3	0	3
7	5	0	5
8	2	0	2
9	1	0	1
18	1	0	1
sum	293	403	696

In a separate analysis, the throw-trap pink shrimp data were compiled into a frequency distribution according to the number of pink shrimp caught in each sample (Table 26) and then the distribution was collapsed into three categories, 0/m^2, 1-3/m^2, and 4-18/m^2, (3 x 2 cell table) so that no category would have an empty cell. A Chi-square was calculated for the contingency table thus created. The Chi-square test indicated that the distributions differed significantly (P=0.0005). There was a higher proportion of 1-3 and 4-18 density values and a lower proportion of '0' values in DEPTHZONE I, the unfished zone, than in DEPTHZONE O, the fished zone, thus confirming results of the ANOVA for pink shrimp summarized in Table 25 above. The shallow nearshore region of southern Biscayne Bay may be a nursery area for species such as pink shrimp (*F. duorarum*), and nursery grounds are characterized by higher densities and smaller individuals.

1.4.0 DISCUSSION

The epibenthic fauna of western nearshore waters of southern Biscayne Bay were sampled with three types of gear: throw-trap, pull-net, and roller-frame trawl. Data from these sampling programs were needed to develop a dataset characterizing the spatial and temporal patterns of fish and macroinvertebrates (shrimp and crabs, with emphasis on pink shrimp) and to test the null hypotheses that distributions were not related to salinity, geographic location, or habitat. This community description is needed to provide baseline conditions for planning mitigation and restoration projects and for evaluating the effects of future upstream water management changes. The role of salinity in structuring the nearshore community is critical since it is salinity that will be most immediately affected through restoration activities.

1.4.1 Spatial Patterns

Seagrasses typical of South Florida waters dominate benthic vegetation in southern Biscayne Bay (Appendix D, Table 3). *Thalassia testudinum*, turtle grass, is the principal seagrass present. Shoal grass, *Halodule wrightii*, is relatively uncommon but locally important. *Syringodium filiforme*, manatee grass, is rare in the study area, being observed at only 5 of 696 sites sampled. The grass canopy is best developed inshore in waters less than about 3-ft deep where sediments are deepest. *Thalassia* is most abundant north of the Black Creek Jetty (2N and 3N) and in 3N occurs in extensive, dense *Thalassia*-dominated grass flats in the vicinity of Chicken Key. In contrast with *Thalassia*, shoal grass is most abundant (but patchy) south of Gould's Canal and Black Creek Jetty (zone 1S). While both *Thalassia* and *Halodule* are present in waters deeper than about 3-ft, the grass canopy is least well developed.

Algae typical of South Florida waters are found throughout the study area: *Laurencia* sp., *Penicillus* sp., *Udotea* sp., *Halimeda* sp., *Dictyota* sp., *Batophora* sp., and other species (Appendix D, Table 3). The red alga, *Laurencia* sp., rivals *Thalassia* as the most important element of benthic vegetation in the study area (23.3 vs 25.2 g dry wt/m^2, respectively; Appendix D, Table 3). As with seagrasses in the study area, algae are most abundant inshore in waters less than about 3-ft deep and most abundant in zones 1S and 2N. However, unlike seagrass abundance, algal abundance in the study area may be relatively independent of sediment depth and more dependent on substrate and environmental conditions. *Batophora*, a species that requires shell or other structure as a holdfast, is most abundant in zones 1S and 2S, where the grass canopy is patchy or absent. *Laurencia*, which occurs attached or drifting, and *Penicillus*, a representative of a large group of anchored calcareous algae, both are commonly associated with the grass canopy and are most abundant in zones 1S and 2N. Discharge from the Goulds Canal may be responsible for the higher abundance of algae in seagrass beds in zones 1S and 2N because there is significantly less algae in the extensive *Thalassia* beds of zone 3N, an area that may be less affected by canal discharge (Table 4). Among the five zones, salinity is lowest in 1S and 2N (Appendix D, Table 1) but higher in 2N, though not significantly, possibly because of the presence of the Black Creek Jetty (Table 5). Nutrient enrichment accompanying freshwater discharge, not a focus of this study, may be reflected in the distribution of algae.

Sampling with three gears – throw-trap, roller-frame trawl, pull-net – indicates that the fish community in shallow, nearshore waters of southern Biscayne Bay is dominated by the fishes: *Lucania parva*, rainwater killifish, *Lagodon rhomboides*, pinfish and the silver jenny, *Eucinostomus gula*, a mojara. A number of other fishes are important as well, having accounted for up to 90% of the individuals collected with one or more of the three gear (Figure 43). The commercially important pink shrimp, *Farfantepenaeus duorarum*, a penaeid shrimp, clearly dominates the shrimp community based on biomass. However, small grass shrimp (caridean shrimp) of several species are extremely numerous: *Thor manningi*, *Hippocampus zostericola*, and *Thor floridanus* (Figure 17). While crabs were treated unevenly among the sampling programs, mud crabs

of the genus *Eurypanopeus*, hermit crabs of the genera *Clibanarius*, and the callinectid crabs, *Callinectes similis* and *C. sapidus*, the lesser blue crab and the blue crab, respectively, were abundant. All of these species are important constituents of other similar shallow water systems in south Florida. See Appendix D, Table 14, for a comparison of the abundant fauna observed in this study with that observed in the dense grass beds of Johnson Key Basin in western Florida Bay during the same time frame, October 2002 through September 2004.

The abundance of most of the dominant fish and shrimp species observed in the study followed the same pattern as benthic vegetation; greatest numbers occurred in shallow inshore waters less than about 3-ft deep (Appendix D, Table 9), generally zones 1S, 2N, and the inner part of 3N; *Thor manningi* and caridean shrimp in general were also abundant in zone 3N, the pink shrimp was most abundant in zones 1S and 3N (Table 9). Of the dominant fish and shrimp, only the spotted dragonet, *Diplogrammus pauciradiatus*, was most abundant in zone 3S. Zone 3S was characterized by very shallow sediments or "hardbottom" and relatively more algae than seagrass; intermediate levels of *Penicillus* and *Laurencia* cover were common in 3S (Table 4). With the exception of the lesser blue crab, *Callinectes similis* (most abundant in 1S), patterns of crab abundance among the five zones were not discernable statistically (Table 9). However, an examination of the mean density and standard error across zones without regard to statistical significance suggested that crab abundance followed a pattern similar to fish and shrimp; least abundant in zones 2S and 3S and most abundant in zones 1S, 2N and 3N.

1.4.2 The Importance of Habitat

Data from the three sampling programs were analyzed to examine the relationship of faunal densities to salinity in relation to other potential influencing factors. Of these, benthic vegetation, or habitat, has been considered to be of primary importance. For roller-frame trawl and pull-net collections that were not coupled with field measurements of habitat, habitat is implicit in the sampling strata: SALZONE, GEOZONE, DEPTHZONE and ZONE. Clear habitat differences among strata are evident (Table 4) just as differences in salinity were present among strata (Appendix D, Table 1, also Tables 5, 12, 19 in above text). For throw-trap collections habitat can be incorporated into statistical models either explicitly using field measurements of habitat associated with each sample or implicitly using sampling strata of our experimental design. Habitat estimators were developed using two techniques; a harvest method from which a suite of measured variables could be derived (e.g., standing crop, biomass, short shoot density, blade length, blade width, leaf area) and the Braun-Blanquet visual estimation method providing cover-abundance estimates. Both methods produced species-specific estimates and both methods contributed habitat variables in about equal percentages to faunal models.

In general, no matter the gear type used to estimate density or whether habitat was incorporated implicitly or explicitly in the model, the variance explained in faunal density in this study was relatively low (see Tables 10a and b, 13 and 17, 21 and 23; throw-trap,

roller-frame trawl, pull-net, respectively). The R^2 of single species models, all gear types, ranged from 0.471 for *Lucania parva* to 0.007 for the blue crab, *Callinectes sapidus*. The mean and standard error of R^2 for 63 species models, all gear types, was $0.213 \pm .014$.

The importance of habitat in explaining the variance in the density of the dominant fish, shrimp and crabs of nearshore waters in southern Biscayne Bay can be evaluated directly using the throw-trap dataset. Models with habitat explicit as dependent variables and implicit in categorical sampling strata can be compared directly in Tables 10a and b. On average HABITAT accounted for 77% of the variance explained in the distribution of these species Table 10a. With HABITAT in the model, R^2 was improved an average of 0.161 over multiple regression models with sampling strata only (Appendix D, Table 10b) and 0.104 over models developed with ANOVA (Appendix D, Table 9). It is likely that fauna are distributed within the study area based largely on response to conditions of benthic vegetation. Other variables are only relatively important such as depth for *D. pauciradiatus* and *O. beta* (25% and 9.2%, respectively) and temperature for *Thor floridanus*, 11.8% (Table 10a).

1.4.3 The Influence of Salinity

Analysis of all three gear type datasets supported our choice of sampling design; during the study, on average, salinity has been lowest inshore south of Black Point Jetty (1S) and higher inshore north of the Jetty (2N) and highest offshore in DEPHZONE O, 3S and 3N (Figure 4; Tables 5, 11 and 18; throw-trap, roller-frame trawl, and pull-net sampling, respectively). Analysis of the three datasets indicated significant relationships of the density of the dominant fauna with both SALZONE and salinity measured in conjunction with sampling. Of the 10 abundant fish species and the 2 abundant invertebrates collected with the roller-frame trawl, relationships with SALZONE as an independent variable were highly significant in 9 models and measured salinity was significant in 11 models (Tables 13 and 17). Evidence in the pull-net data was somewhat weaker where the densities of 2 out of the 4 dominant fish species were significantly related to SALZONE (Table 21) and 3 out of the 4 with salinity represented as a continuous, field-measured, variable (Table 23). Relationships with salinity were weakest among the dominant species in the throw-trap dataset; SALZONE was significant in 8 of 16 species models (Appendix D, Table 10b) and measured salinity was significant in only 4 of 16 models (Appendix D, Table 10a).

Our analyses suggest that the influence of salinity in the distribution and abundance of dominant fauna in the study area is small compared to that of habitat and other unknown factors. Whether represented in models by the categorical variable SALZONE or by field measurements, as summarized in Figures 4, 22, and 29, salinity explains only a relatively small proportion of the variance explained in density (full model R^2) for the dominant species observed during the study. SALZONE uniquely explained an average of only 30.1%, 6.8% and 11.6% of explained variance for the three gear types, roller-frame trawl, pull-net, and throw-trap, respectively. Similarly, salinity as a continuous variable averaged only 5.7%, 6.2% and 1.8%, respectively (see Tables 10a, 10b – TT; 13, 17 – RT and 21, 23 – PN).

The throw-trap dataset encompasses the entire study area and, with coupled habitat estimates, allows a relatively unambiguous examination of the influence of salinity on the density of the dominant species collected with the throw-trap in relation to habitat (Table 10a). The range of variance explained uniquely by salinity among the dominant species is about 0.6% to 4.8%, averaging 1.8% (Table 10a). In contrast, habitat explains an average of 77% (40.5% to 96.7%) of the variance explained with the full model for the dominant species collected with the throw-trap. The throw trap analysis suggested a minimal effect of salinity within the salinity range encompassed (Figure 4).

Faunal relationships with SALZONE as a proxy for field estimates of salinity or salinity measurements within SALZONE (i.e. 1, 2 and 3) are confounded with gradients of other factors influencing faunal density at the scale of SALZONE. This is true for GEOZONE as well. Without habitat measurements linked to faunal sampling, a more precise understanding of the role of salinity will not be possible; field observations and the scientific literature attest to the strong link between faunal abundance and benthic vegetation and thus the emphasis on seagrass and algae in our study. Further, the explained variance in faunal density is relatively low for the dominant species observed to date in southern Biscayne Bay, implying that other, as yet unaccounted for, factors vary within and among sampling strata and further obscure the relationship of salinity to faunal density.

1.4.4 Sampling with Different Gears

The three sampling gears used in this study differ importantly. The roller-frame trawl and pull-net were used at night and subject to some logistic disadvantages compared to the throw-trap. The throw-trap was used during the day. The pull-net and throw-trap required people to work the gear in the water and were more susceptible to bad weather than the roller-frame trawl used from a commercial fishing vessel. The pull-net sampling was especially vulnerable to the thunderstorms that occurred around nightfall. The roller-frame trawl was restricted operationally for use in depths of at least 3-ft, while the pull-net was usable only in waters shallower than about 3-ft. In contrast, the throw-trap operated effectively at all depths found in the study area.

The three gears used in this study sampled on different spatial scales. The area swept for a roller-frame trawl sample ranged from 647 m^2 to 1,537 m^2 with a median of 1,122 m^2 per sample. The pull-net swept 30-m^2 per sample. Setting aside the critical issue of sampling efficiency, the advantage of these over the throw-trap, which samples only 1 m^2, is that each sample, expressed on a 1-m^2 basis, represented an average of the larger area swept. But, since the throw-trap samples only 1 m^2, it is considerably more habitat-specific than either the roller-frame trawl or the pull-net, and this is an important advantage of the throw-trap. Further, it is a great advantage of the throw-trap that it can relatively easily be associated with habitat measurements compared to the roller-frame trawl and pull-net. Perhaps most important in seagrass habitats that characterize the study area, the throw-trap is an enclosure net; an area of bottom is enclosed and sampled repeatedly (4 replicate sweeps in this study), resulting in high capture efficiency

(estimated at > 95%). The throw-trap targets organisms that live in the seagrass or algal canopy or that hide in benthic vegetation when threatened. Both the roller-frame trawl and the pull-net pass across the area being sampled a single time and as such are extremely inefficient in a habitat where fish and invertebrates shelter in the seagrass. On the other hand, fishes and macroinvertebrates in the water column (e.g., pinfish) are more susceptible to the pull-net and roller-frame trawl than the throw-trap. These differences among the three gears affect their respective characterizations of the fish and shrimp community of nearshore southern Biscayne Bay.

Because of their coverage of a relatively large area with each sample and their greater effectiveness in capturing free-swimming species, the roller-frame trawl and pull-net complemented the throw-trap in characterizing the fauna of the study area and allowed us to provide a more complete characterization than would have been possible with the throw-trap alone (Figure 43). Conversion of the raw catch of the roller-frame trawl and pull-net to no./m^2 made it possible to compare density estimates from the three gear. An estimate of relative efficiency, or conversion factor, based on these data could potentially make it possible to combine data sets or reach back in time to evaluate trends based on historical data from the trawl and pull-net. We present in Figures 37 and 38, for roller-frame trawl and pull-net respectively, an initial effort at developing a conversion factor for the pink shrimp. At pink shrimp field densities where throw-trap catches of pink shrimp are 0, both pull-net and trawl catches, expressed on a 1-m^2 basis, are higher because they sample so much more area of bottom. However, as soon as the throw-trap collects 1 shrimp, the catch efficiency of the throw-trap exceeds that of the other gear. At highest densities observed, the throw-trap density estimate exceeds that from the roller-frame trawl sample by 31 times and that from the pull-net sample by 10 times. Despite sampling a much smaller area, the throw-trap samples species richness much better than either the pull-net or the roller-frame trawl; 1 species/15 m^2 sampled vs. 1 species in about 250 m^2 and about 3,000 m^2 sampled by the pull-net or roller-frame trawl, respectively (Table 24).

Results are mixed in comparing models developed using pull-net and roller-frame trawl data to those using throw-trap data. For example, models based on both trawl and pull-net data, with habitat represented implicitly, were able to explain about 40% (39.0% and 39.6%, respectively) of the total variance in pink shrimp density. In contrast, the throw-trap pink shrimp model with habitat represented explicitly explained just 23.2%. The pattern apparent with the pink shrimp was reversed among models for the rainwater killifish, *Lucania parva*; the variance explained was 20.3%, 28.5% and 47.1% (roller-frame trawl, pull-net and throw-trap; respectively; Tables 21, 13, 10a, respectively).

The sampling area, efficiency, limitations, and other aspects of the device to some extent control the data, possible analyses, and outcomes. Specificity, with respect to habitat experienced by the fauna sampled, sampling efficiency, and flexibility with regard to where it can be used are strong advantages of the throw-trap. For a fauna oriented to benthic vegetation it seems prudent to use a gear and sampling strategy that can include characteristics of bottom habitat as measured variables. In doing so, one gives up some of the larger-scale capability provided by alternative gear.

1.5.0 ACKNOWLEDGMENTS—Part I

Throw-trap collections were only possible because of the hard work of numerous individuals: André Daniels has directed field and laboratory operations, first David Moore, than David Kickbusch and more recently David Reed have served as project leader. Leslie James, Marta Viciedo, Brian Shepard, Andy Davis, Ellis Langois, Johns Carroll and Travis Thyberg have worked full time on the project. Numerous undergraduate students have volunteered or worked part time sorting and identifying fish and shrimp. This work could not be done without their critical contributions. We wish to thank Rudolph Jaffé and his staff at the Southeastern Environmental Research Center at FIU for support of all kinds. Especially we wish to thank Oria, Doris and Nelsie who provide daily support. Special thanks also go to Jim Fourqurean for use of his laboratory at FIU. We would be homeless without him. And last but not least we all want to thank staff at Biscayne National Park for life saving help on many occasions

Trawl collections were made possible by the generous assistance of many persons in addition to biologists working on full-time on this project. To date, these include Pamela Brown-Eyo, Thomas Jackson, David Kieckbusch, Peter Schroeder, Mindy Nelson, Hernando Cardenas, Michael Judge, Todd Kellison, David Moore, Neil Baertlein, Joe Contillo, Michael Robblee, and Jesse Wicker. We also appreciate the involvement of Samuel Quinland and John Frow, owner and captain of the Biscayne Bay shrimp boat, "The Seven". Pull-net collections were made possible by many of the same persons above, especially Neil Baertlein, as well as Corey Gable, Lisa Belskis, Charles Fasano, Amy Paine, and Chris Rokicki. We also appreciate the assistance of Sarah Frias-Torres in helping organize our identification system for pipefish and Joe Serafy and Guillermo Diaz in providing valuable assistance with respect to sampling design. Liz Uzgiden provided full-time assistance the first year of the project.

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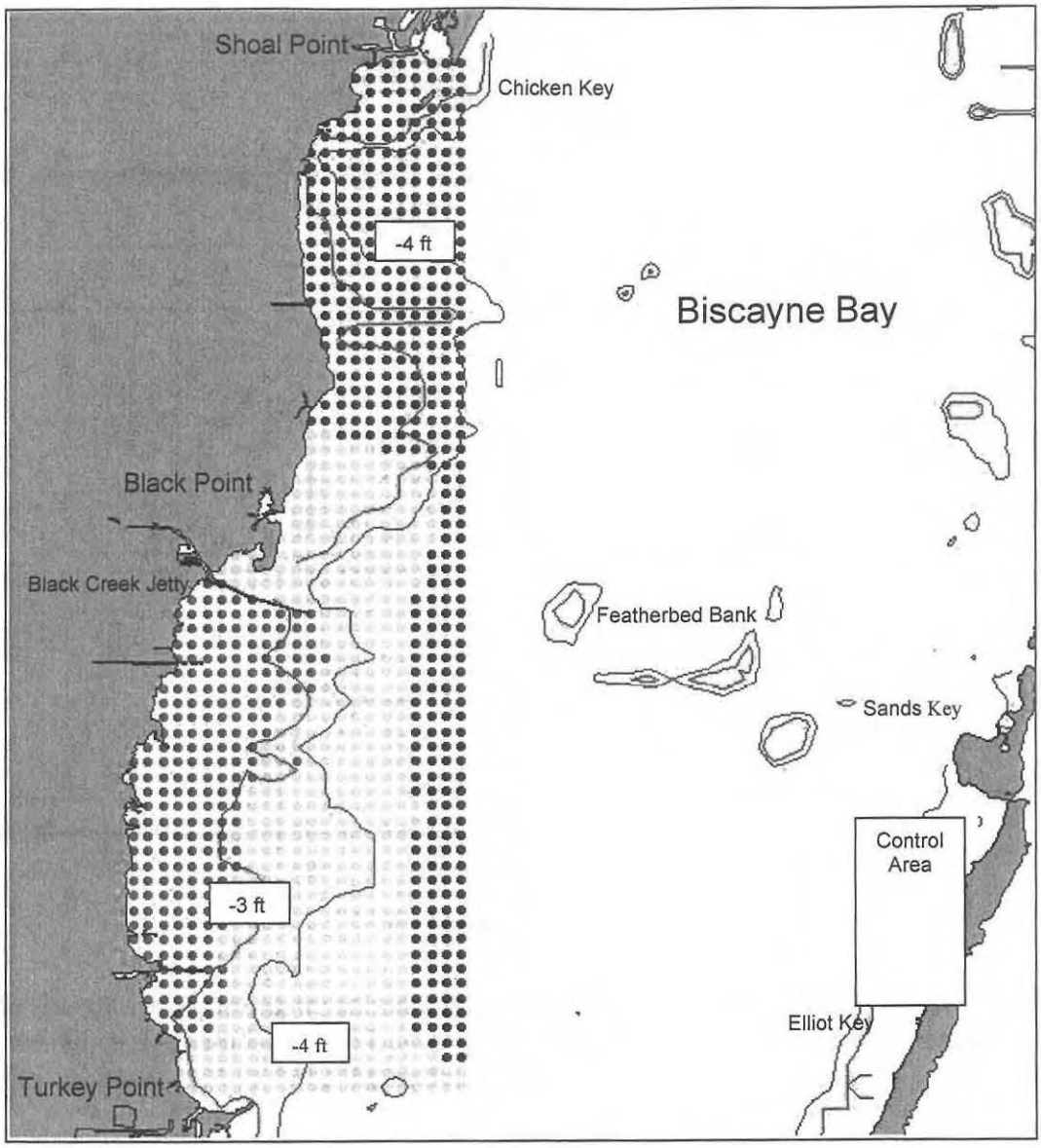


Figure 1. Study area in southern Biscayne Bay. Salinity strata 1, 2 and 3 (SALZONE) are depicted in red, yellow and blue, respectively. The Black Creek Jetty divides the study area north and south (GEOZONE). The Elliott key control area is approximated.

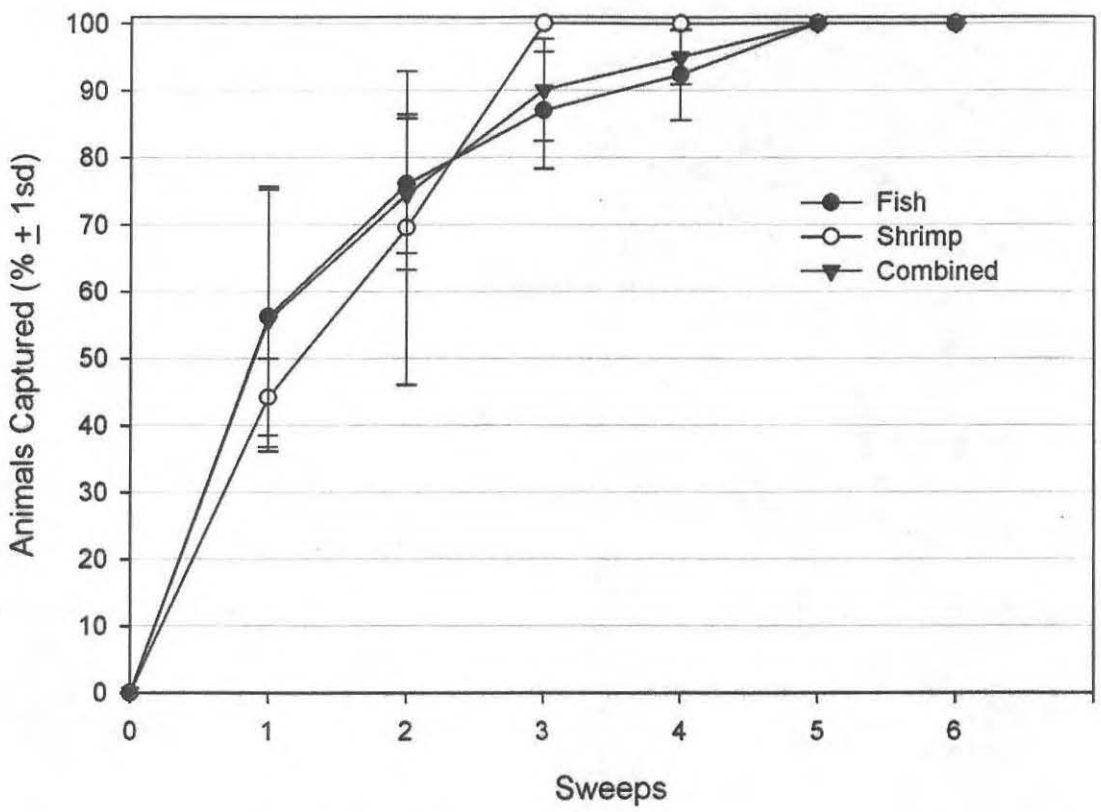


Figure 2. Results of sampling to estimate the number of sweeps required for sampling the throw-trap in southern Biscayne Bay. Four sweeps were established as the standard in order to collect at least 95 % of the individuals present.

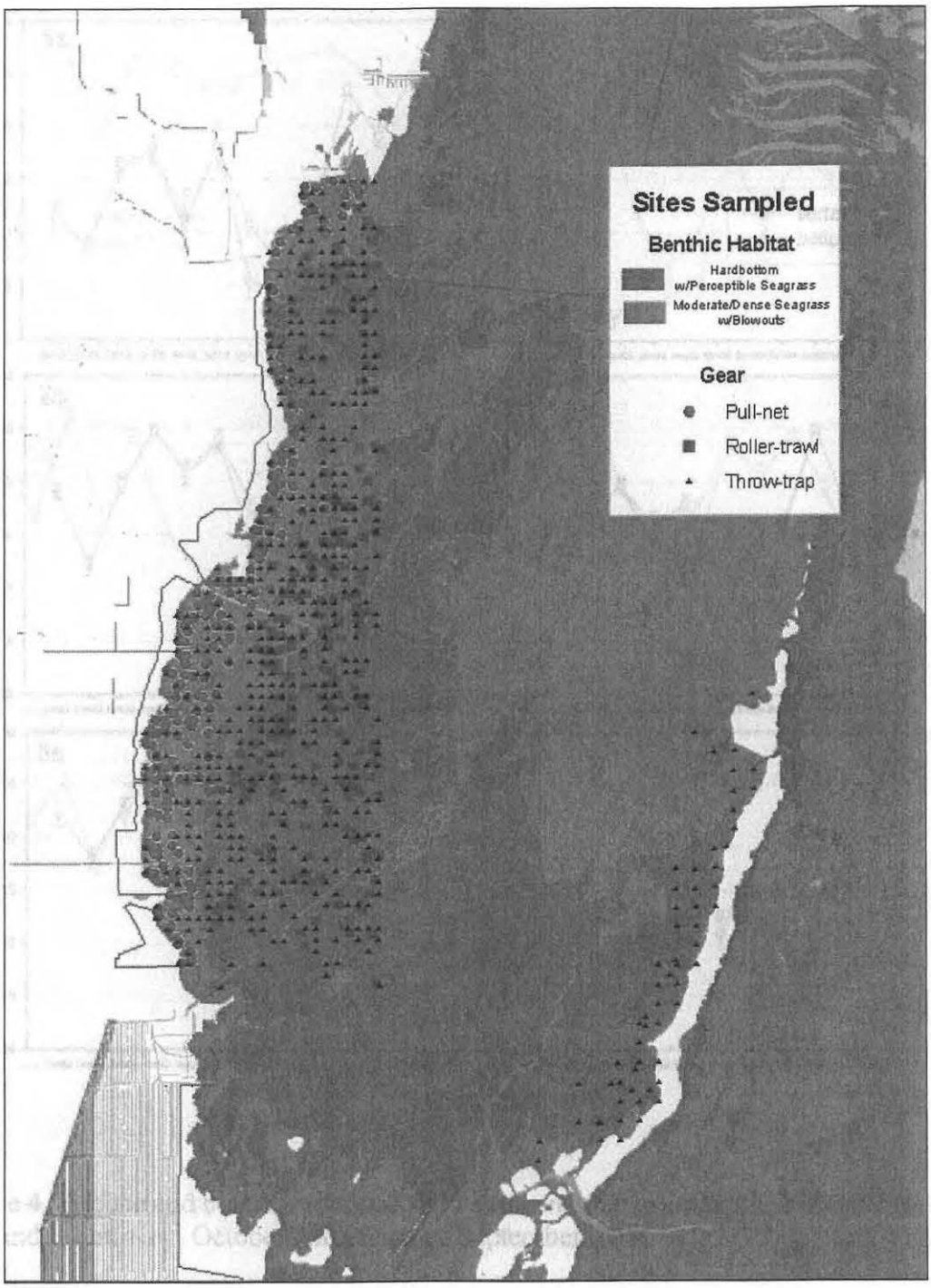


Figure 3. Map of study area showing locations sampled by the three gear types for all collections through October 2004.

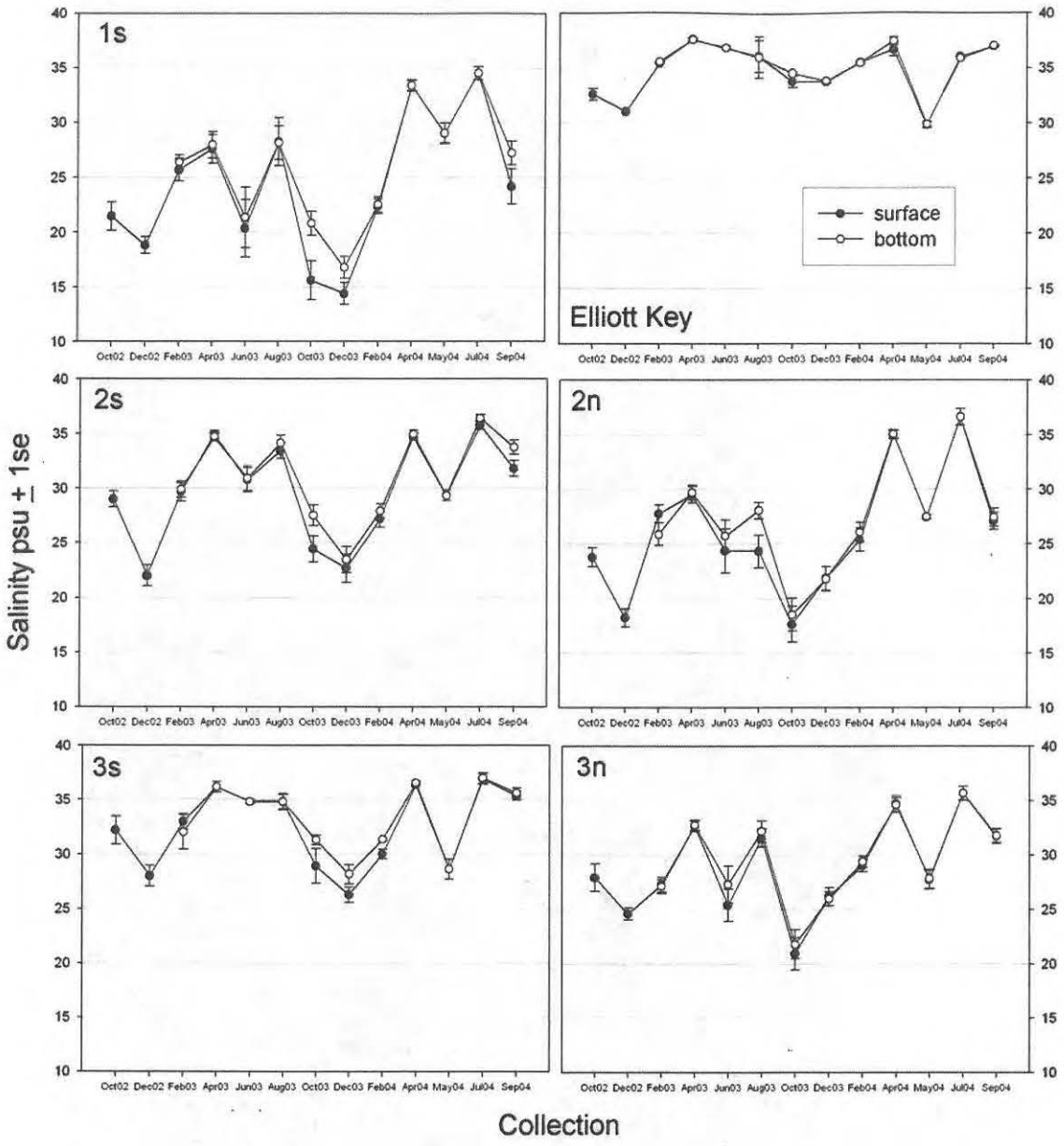


Figure 4. Surface and bottom salinity observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

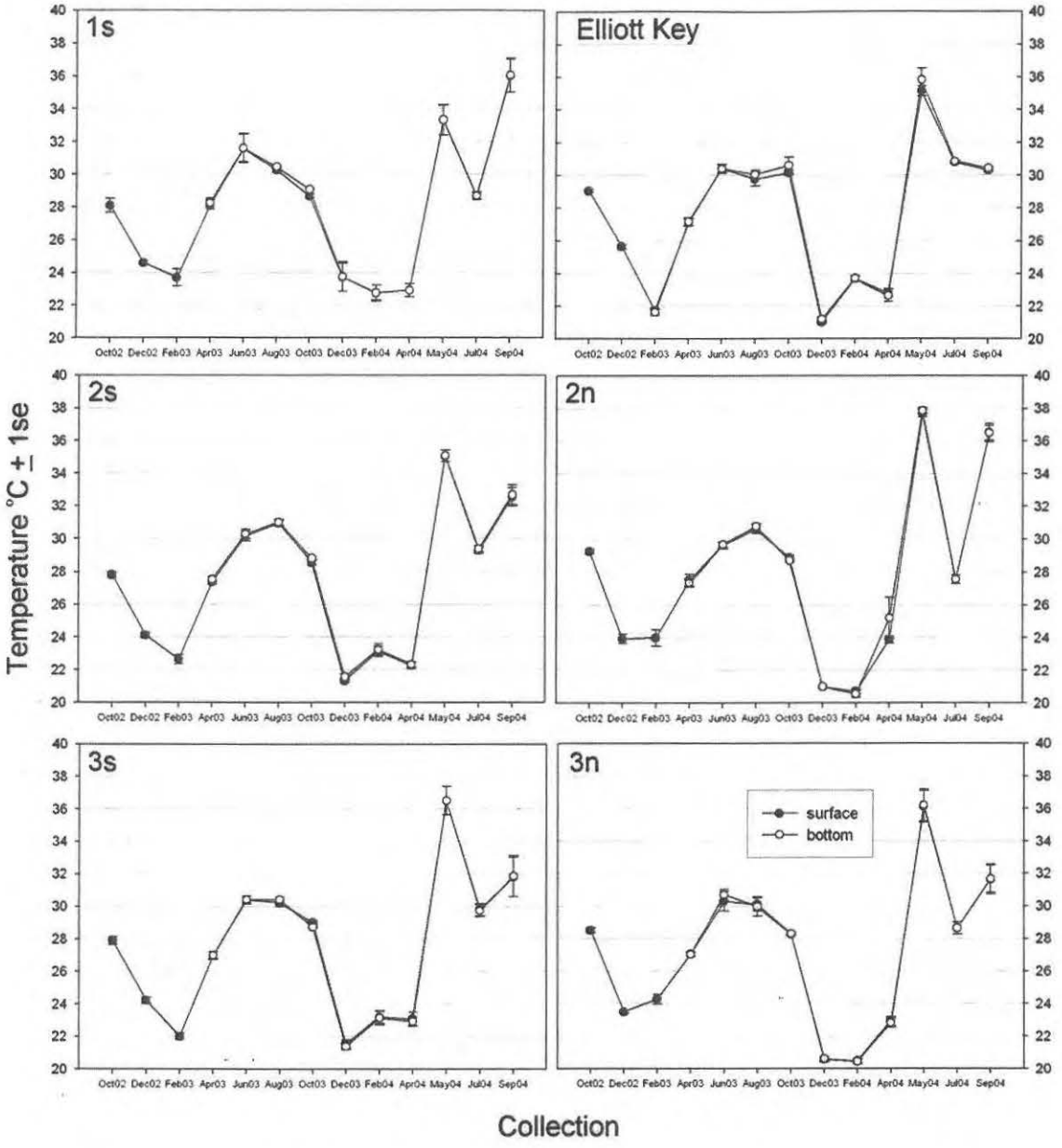


Figure 5. Surface and bottom temperature observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

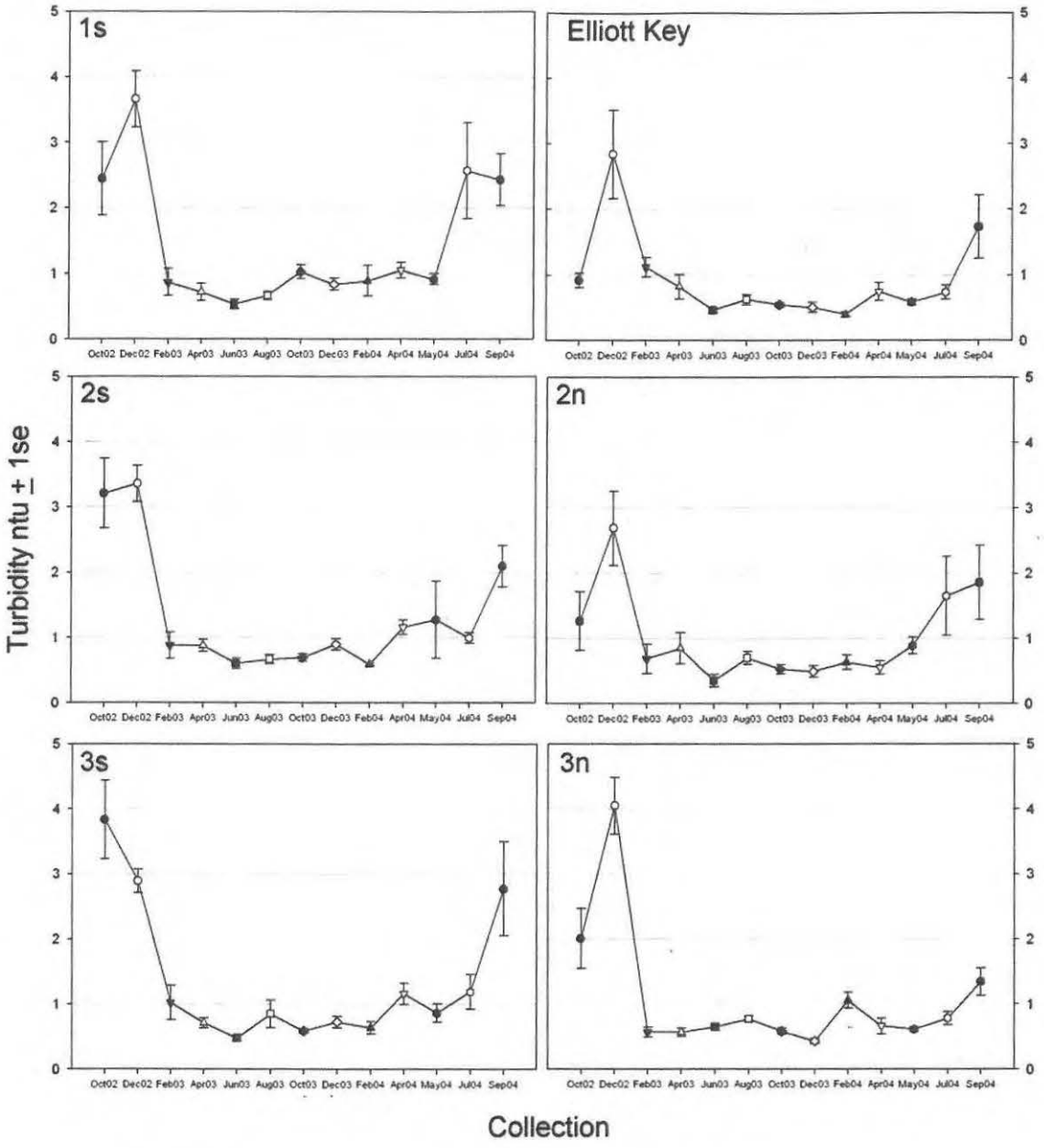


Figure 6. Turbidity observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

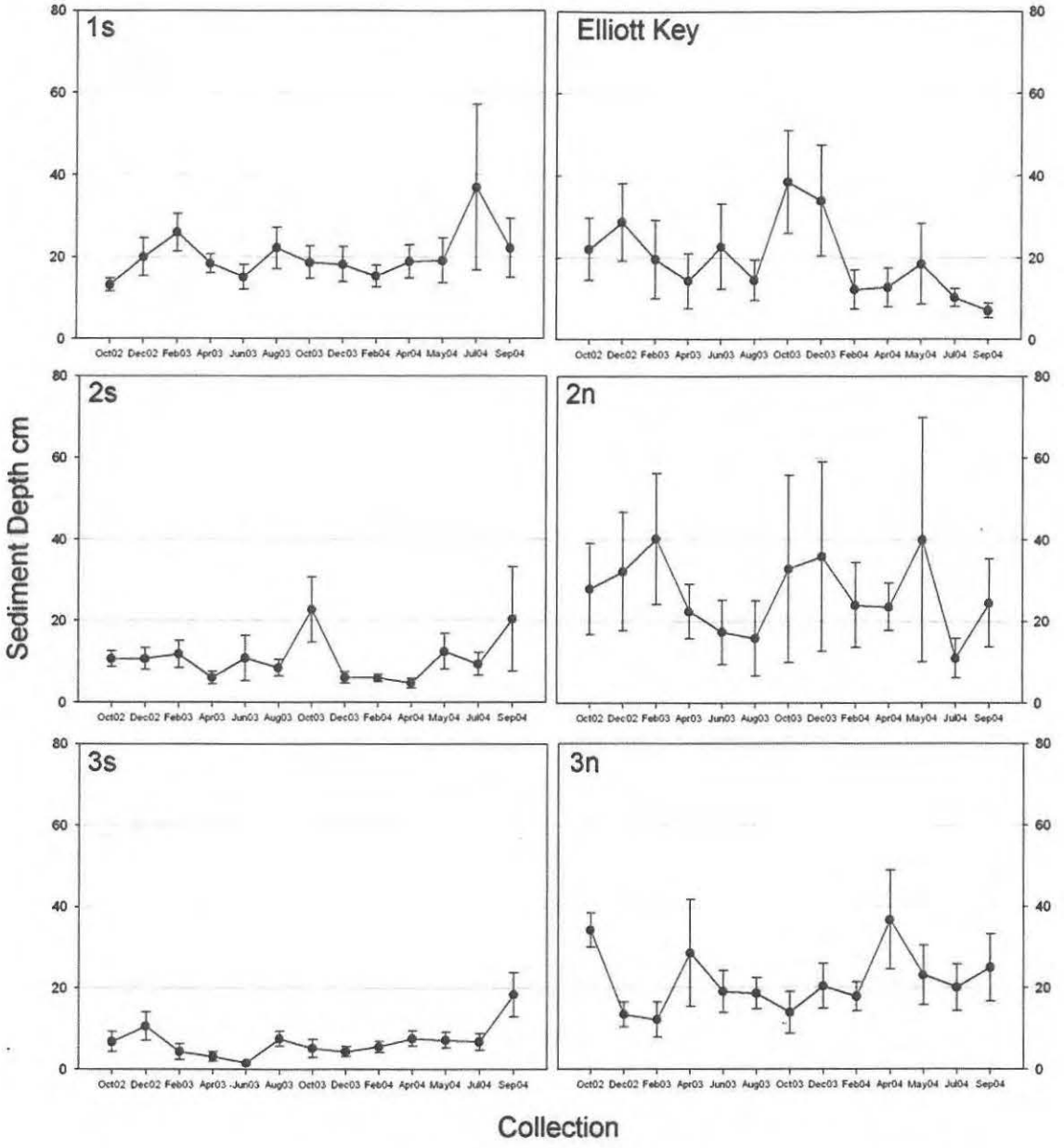


Figure 7. Sediment depth by zone and collection observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

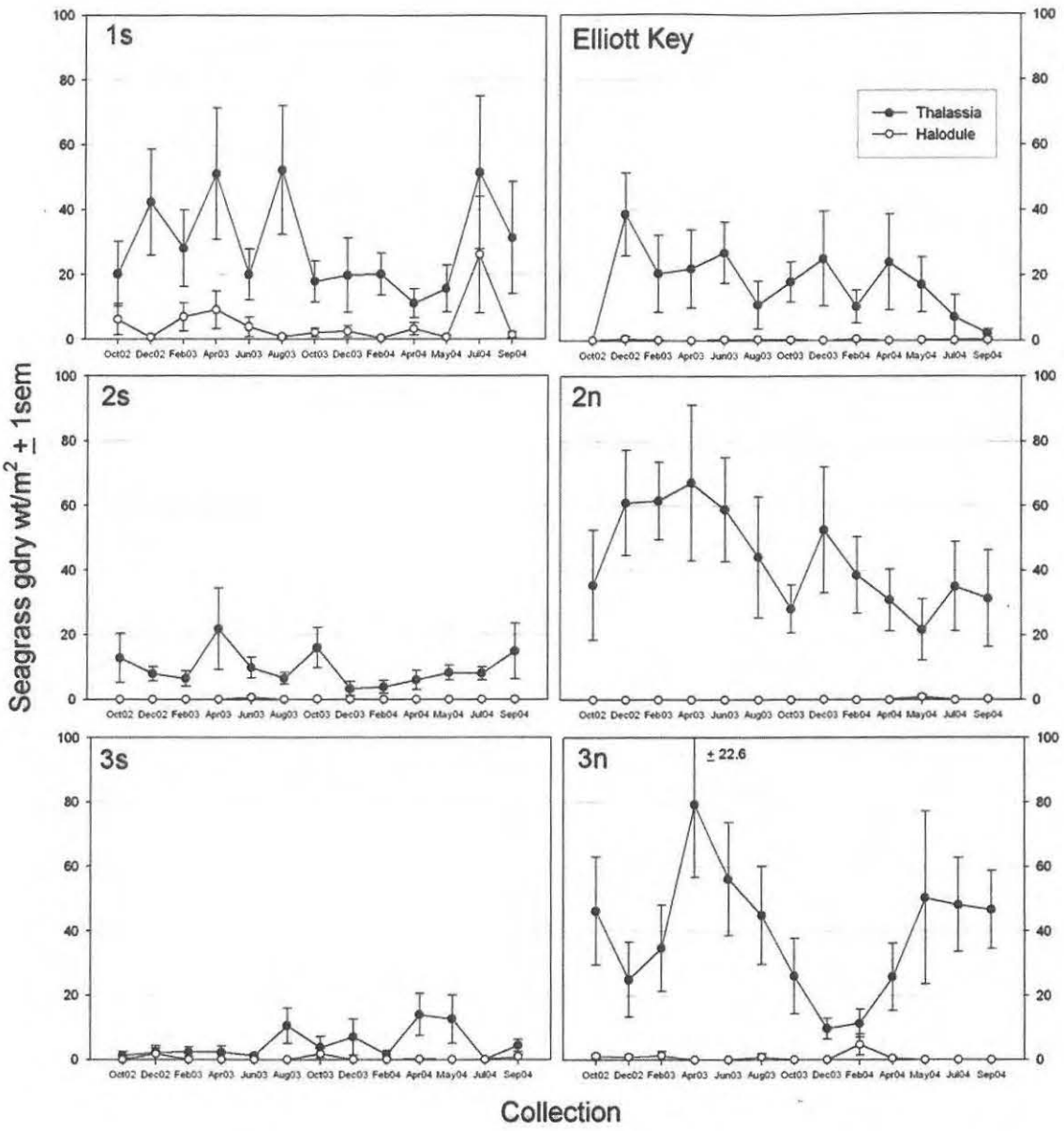


Figure 8. *Thalassia* and *Halodule* standing crop observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

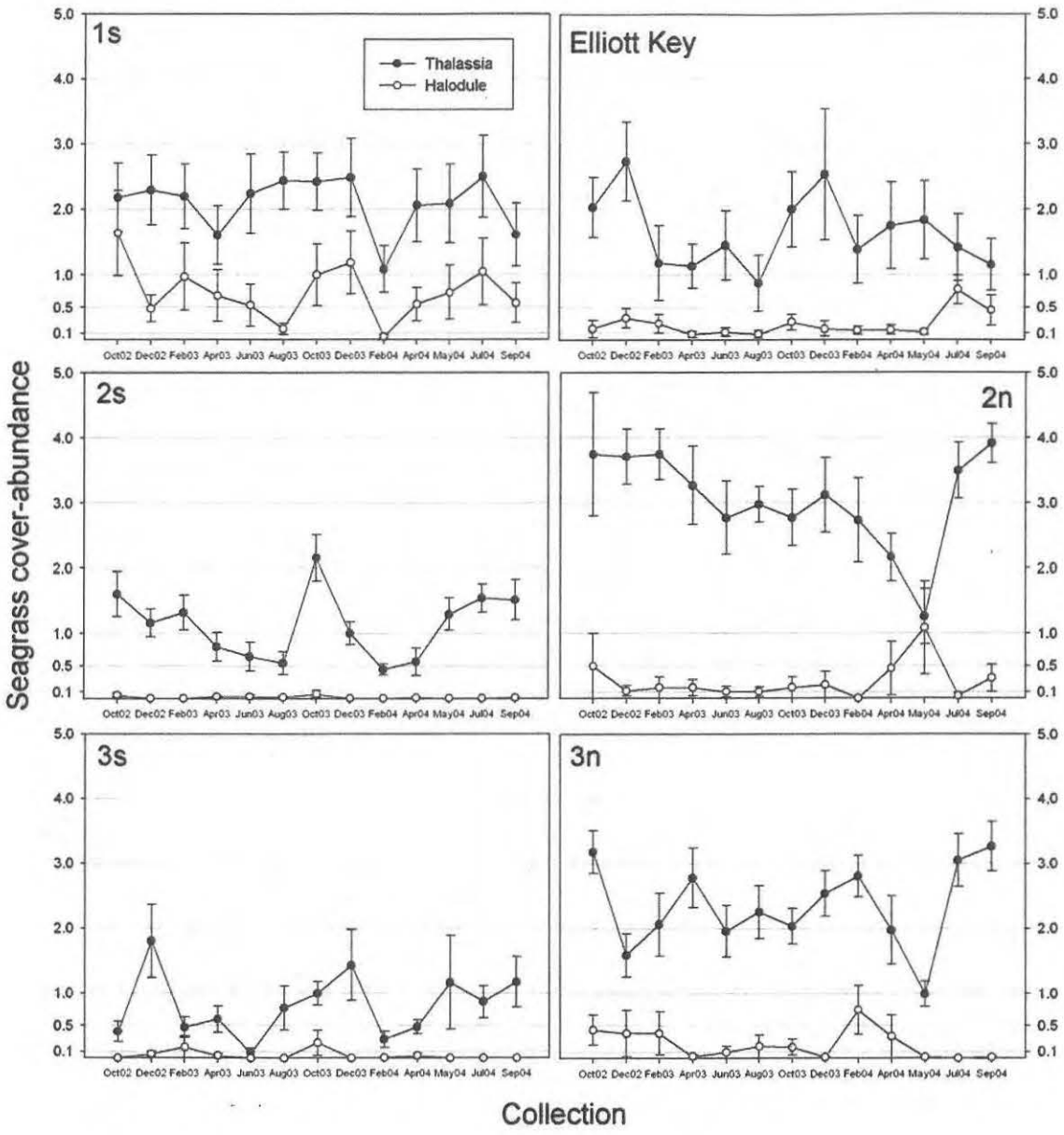


Figure 9. *Thalassia* and *Halodule* cover-abundance observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

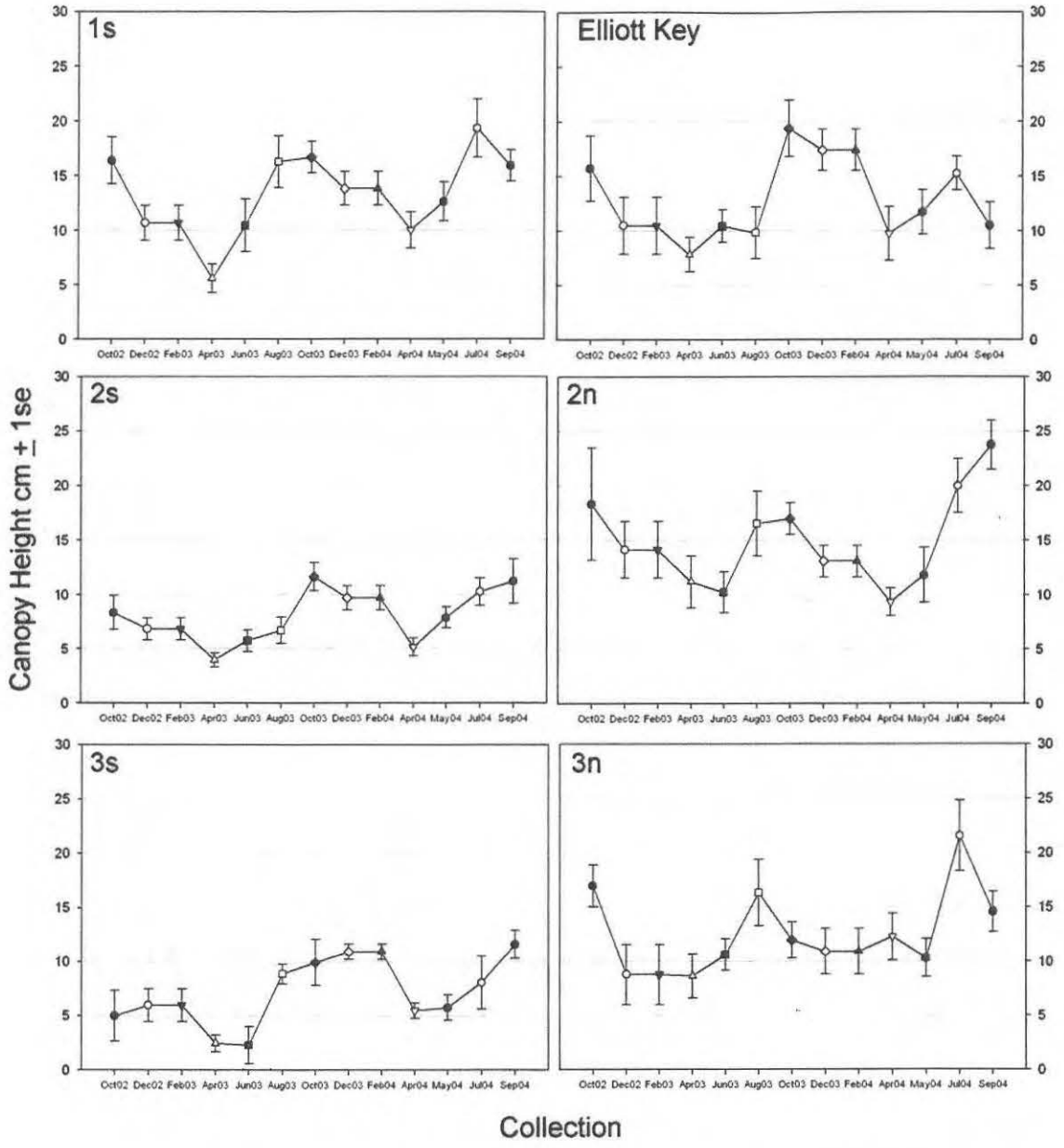


Figure 10. Maximum canopy height measured in Braun-Blanquet cover-abundance quadrats in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

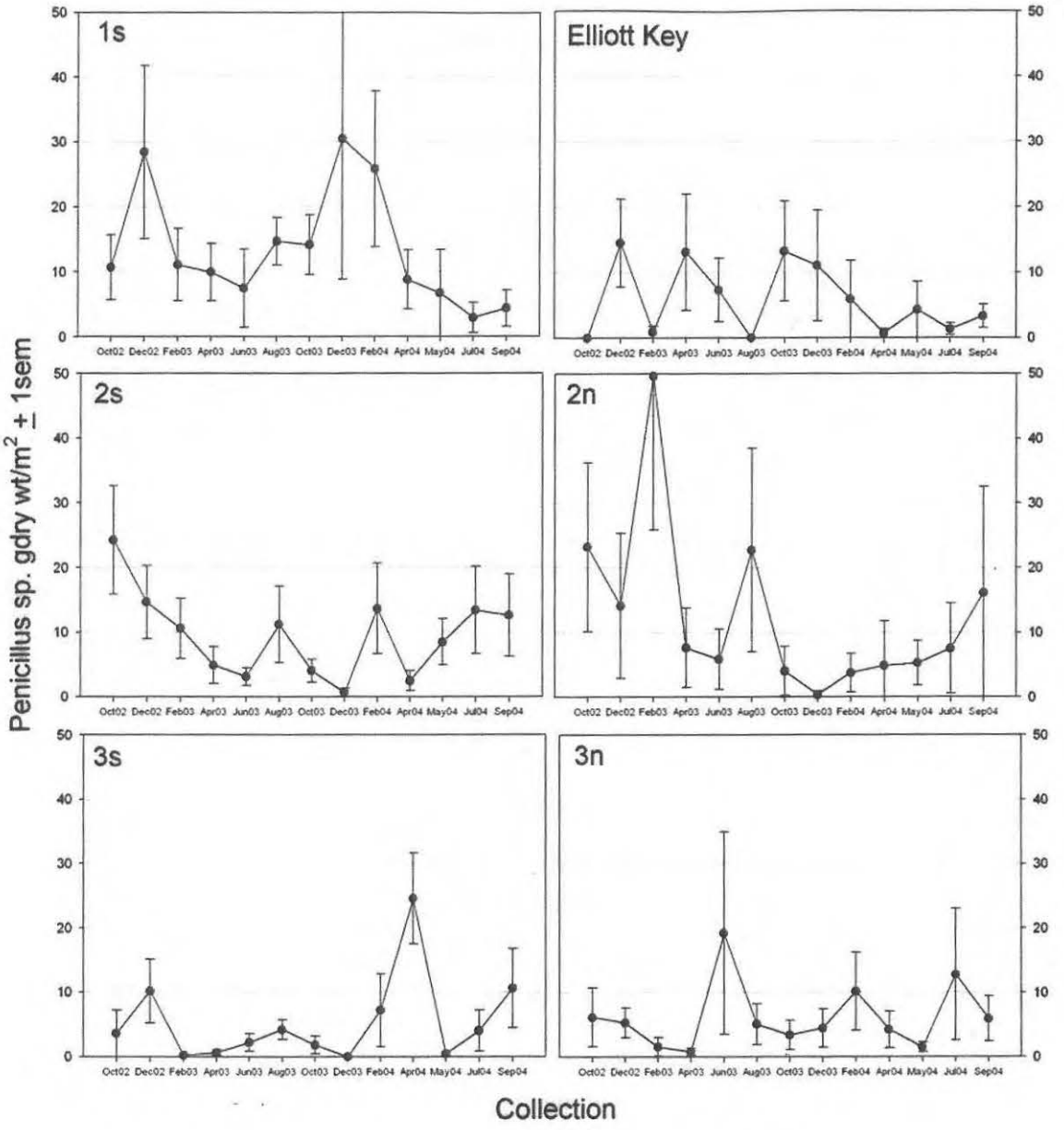


Figure 11. *Penicillus* sp. biomass observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

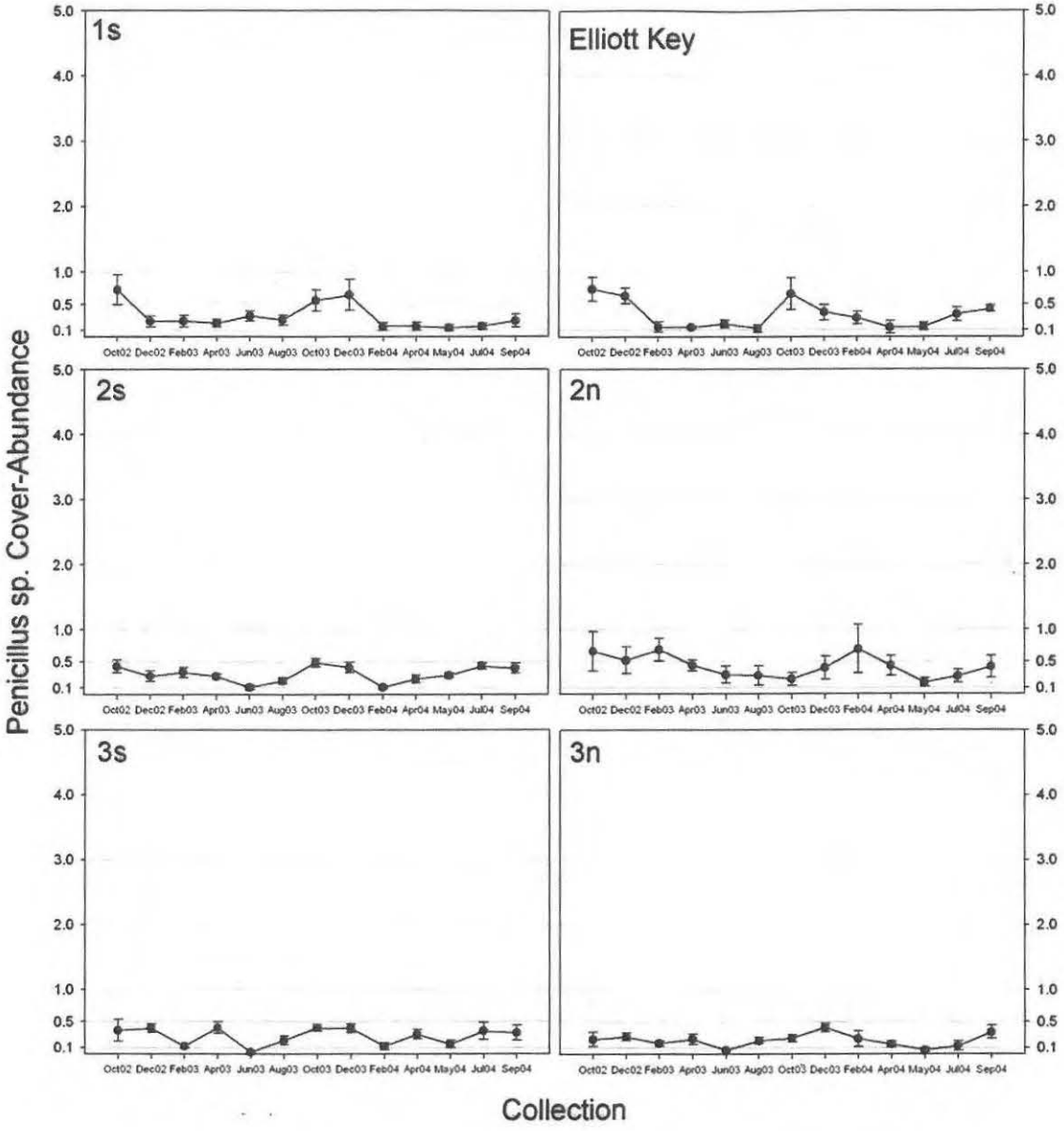


Figure 12. *Penicillus* sp. cover-abundance observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

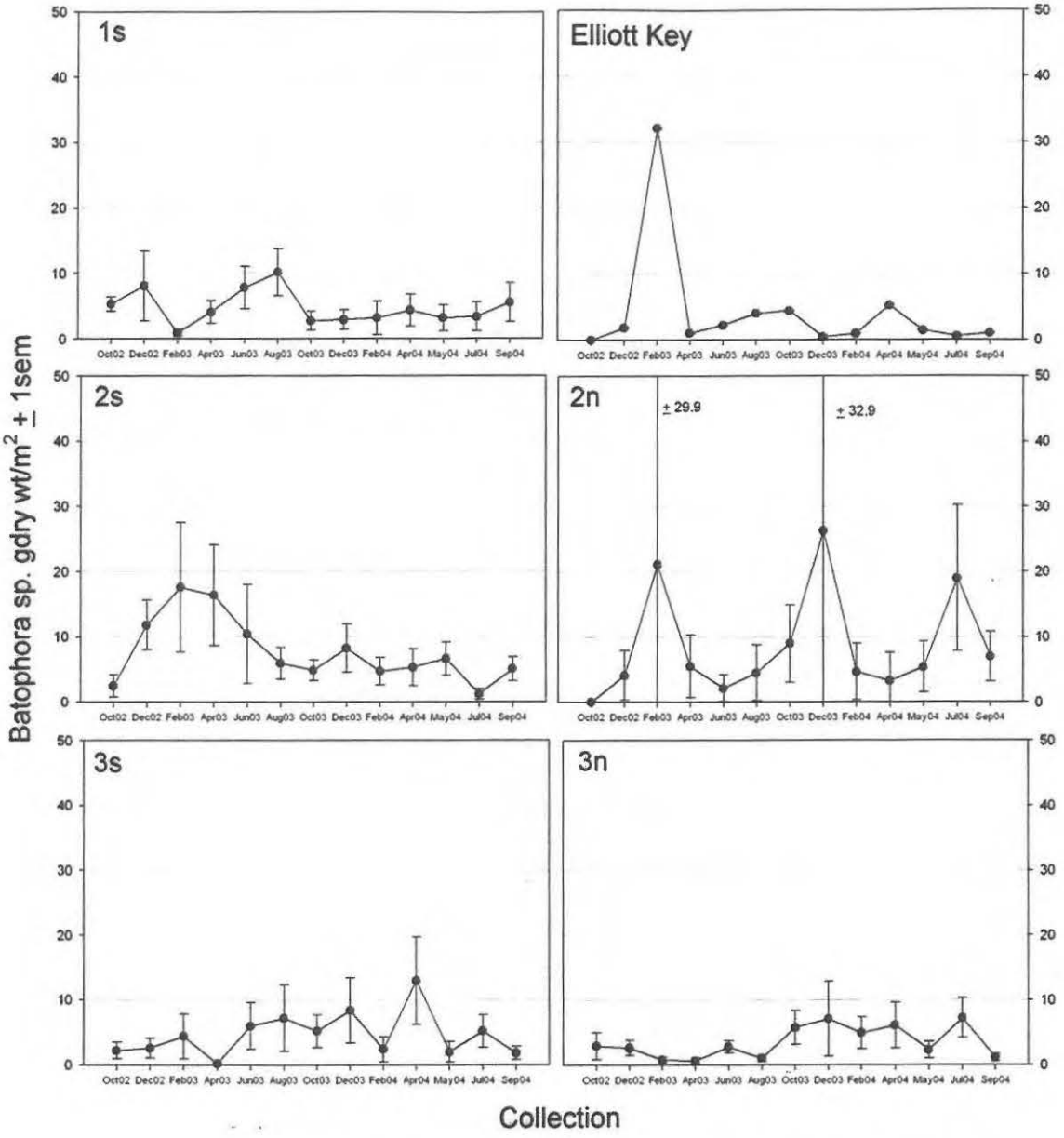


Figure 13. *Batophora* sp. biomass observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

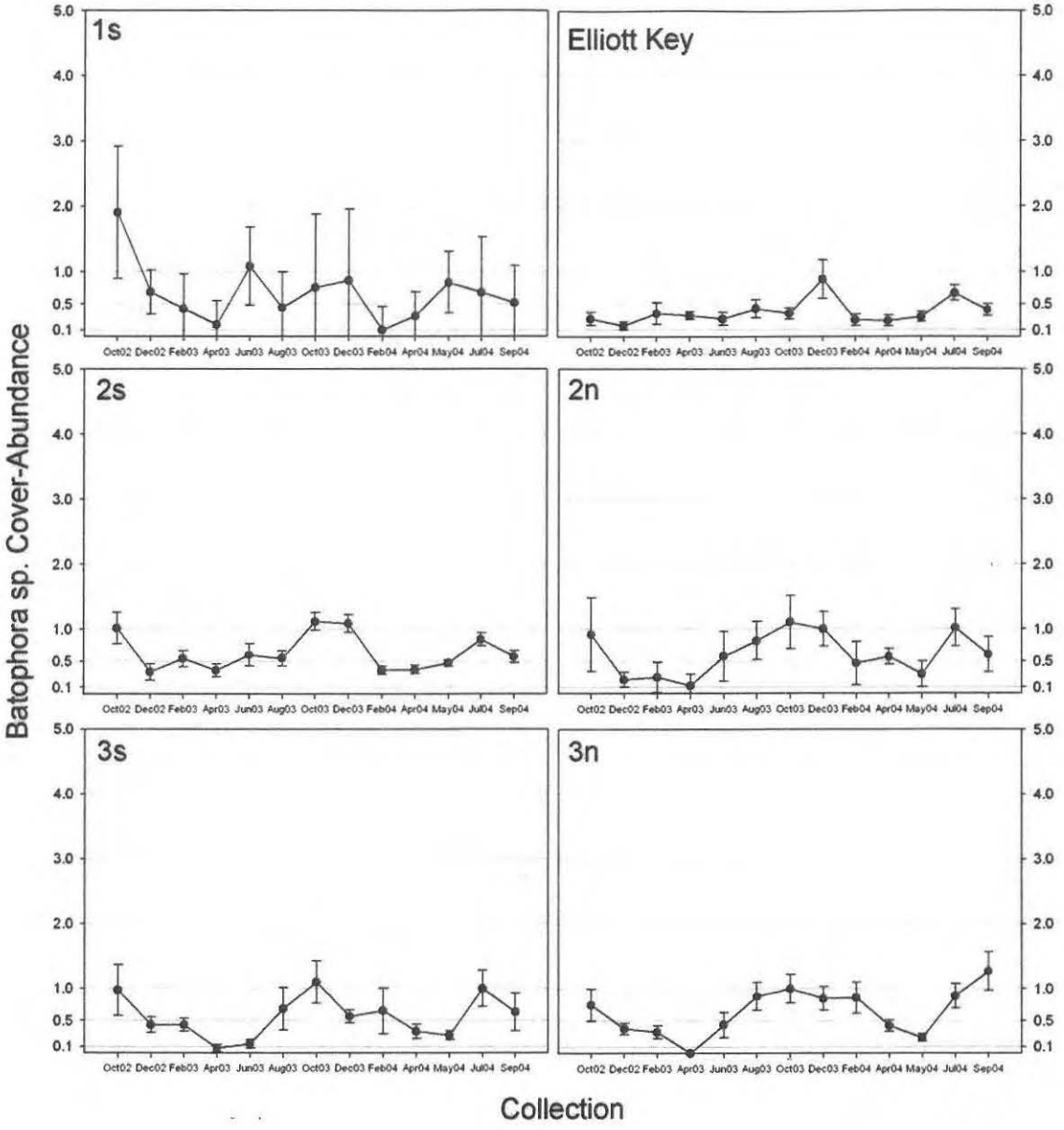


Figure 14. *Batophora* sp. cover-abundance observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

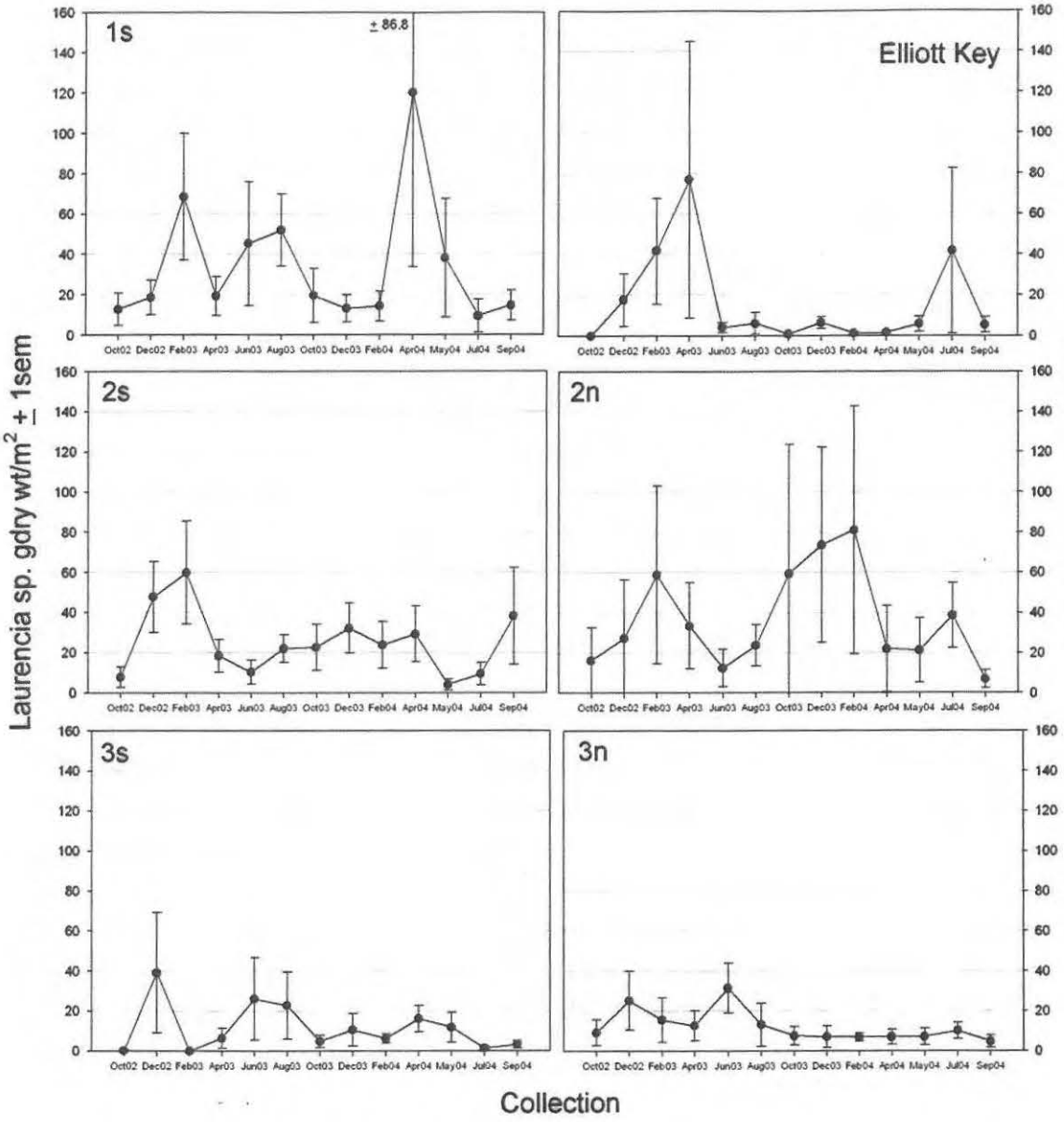


Figure 15. *Laurencia* sp. biomass observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

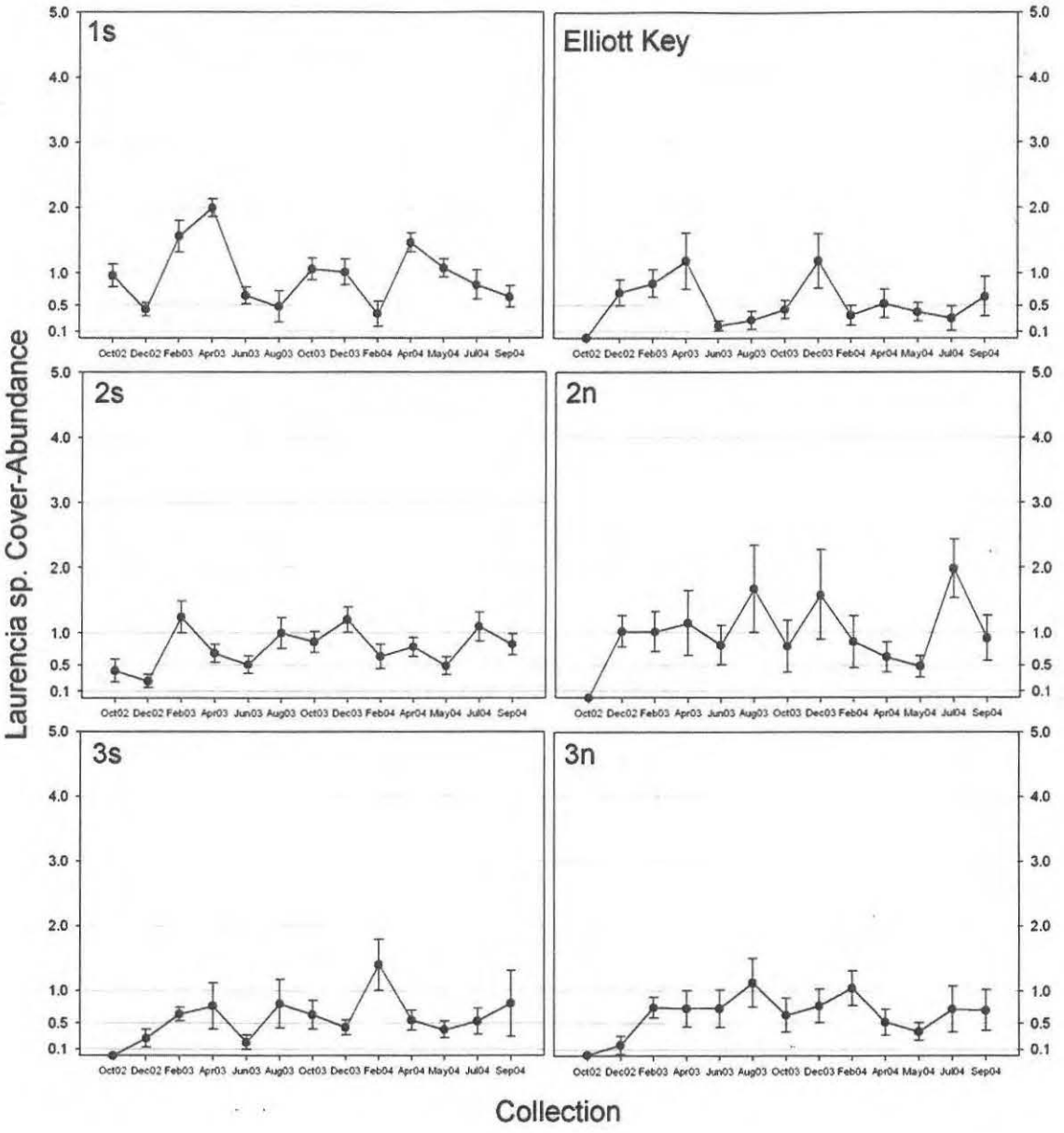


Figure 16. *Laurencia* sp. cover-abundance observed in nearshore waters of southern Biscayne Bay and Elliott Key, October 2002 through September 2004.

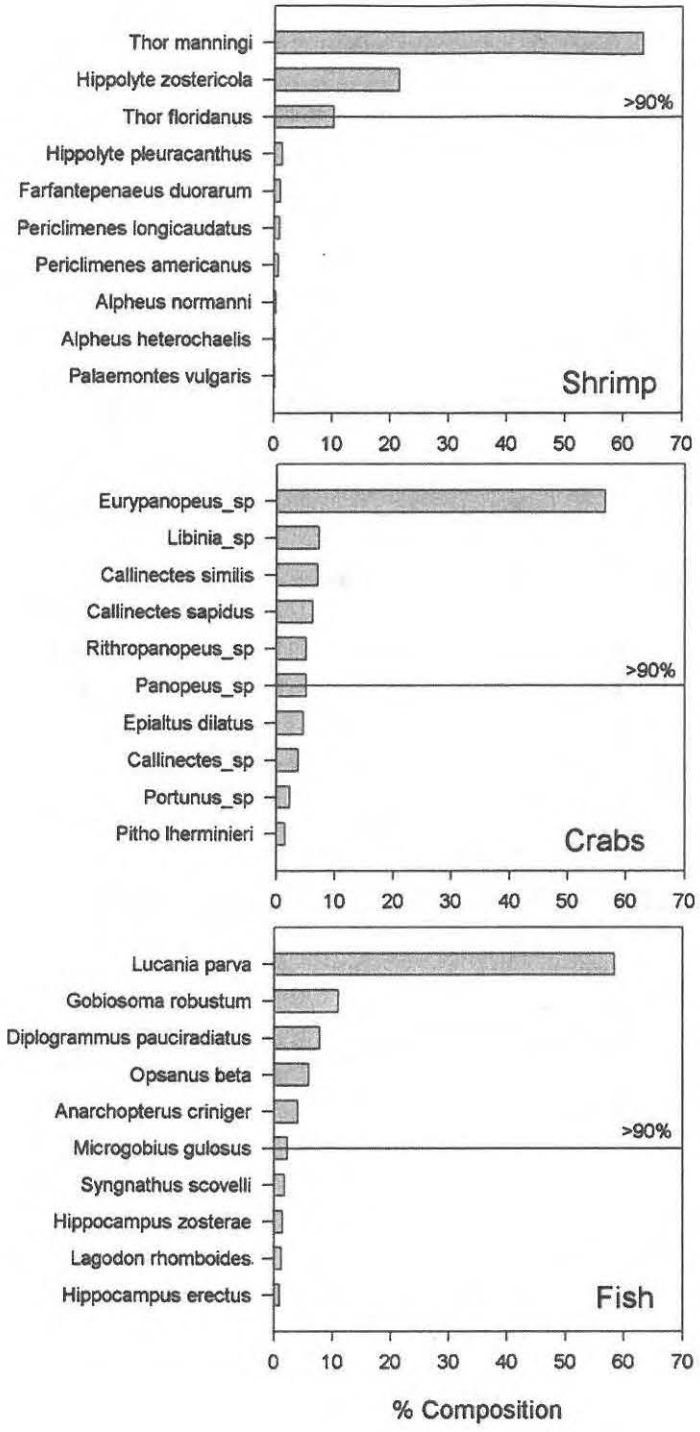


Figure 17. Abundant species of fish, shrimp, and crabs, captured in throw-trap samples taken in the western nearshore of southern Biscayne Bay, October 2002 through September 2004, ranked by percent of total throw trap catch. Species at or above the 90% line are considered dominant species.

Figure 2. Average abundance of fish, shrimp and crabs observed in the western nearshore of southern Biscayne Bay, October 2002 - September 2004

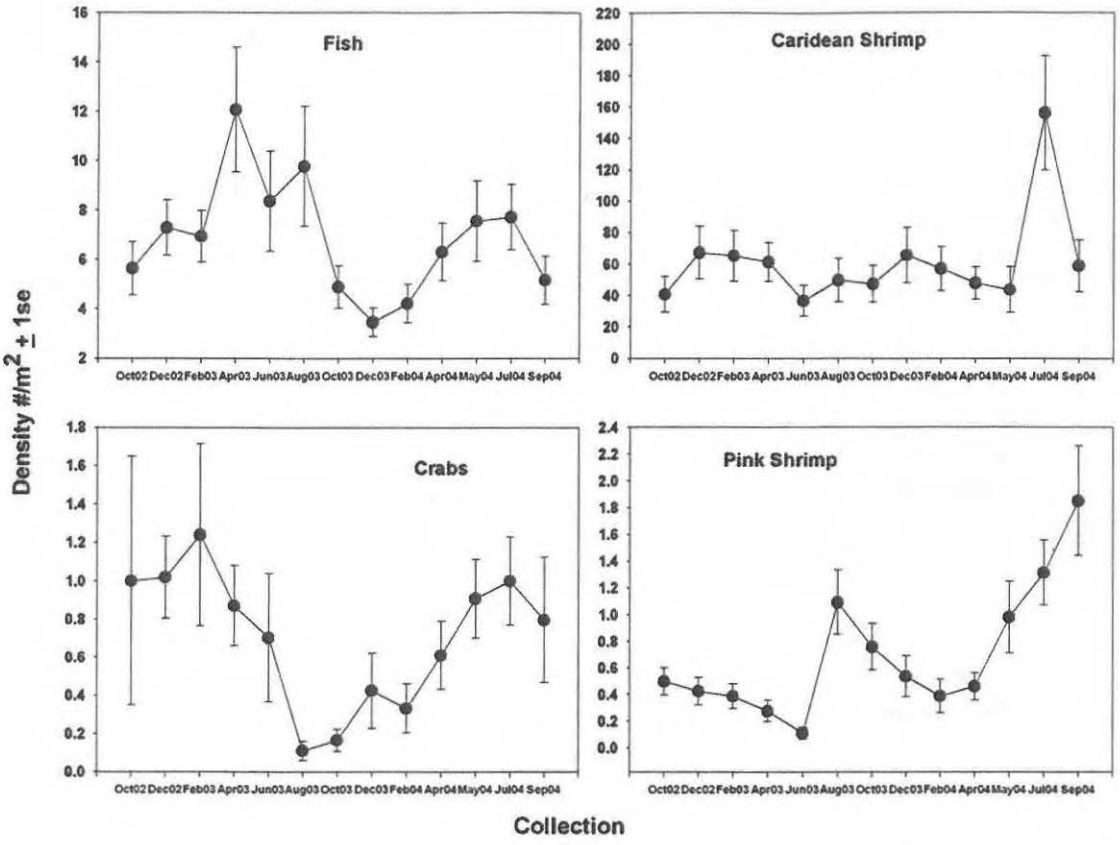


Figure 18. Density (no./m^2) of fish, shrimp and crabs observed in the southern Biscayne Bay study area, October 2002 through September 2004.

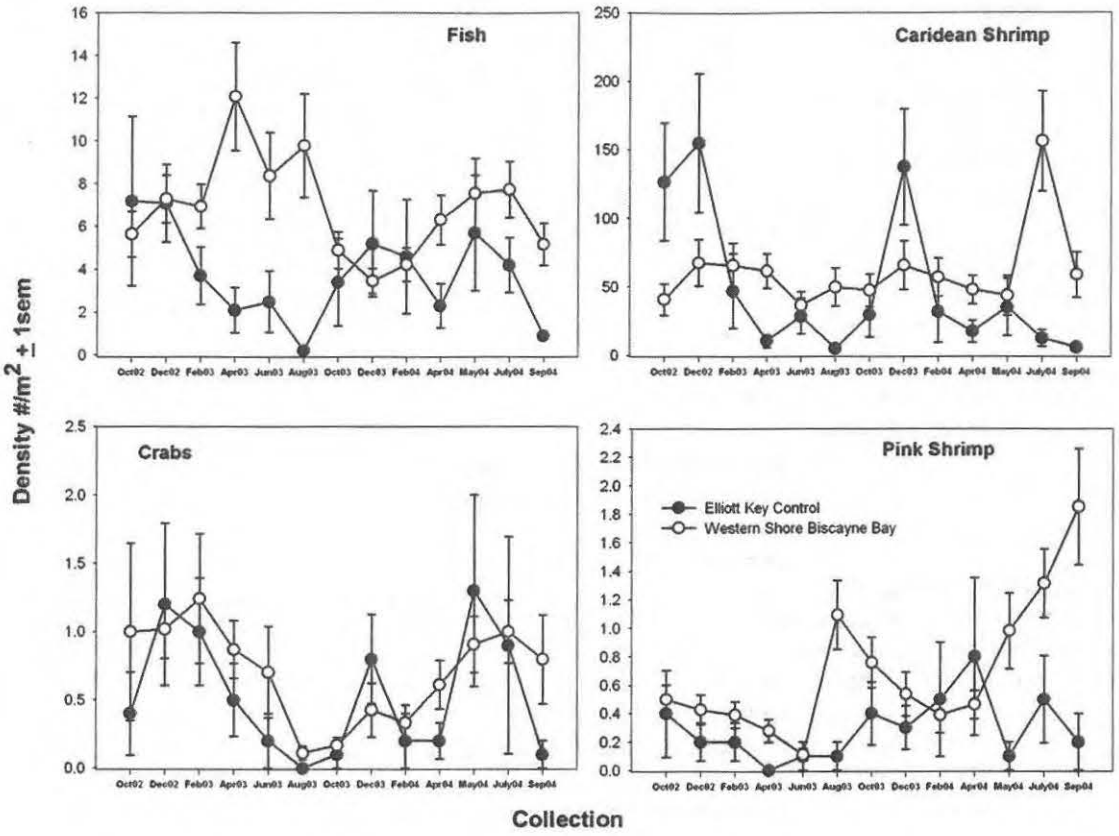


Figure 19. Habitat associations for the dominant fish, shrimp, and crabs observed in nearshore waters of southern Biscayne Bay, October 2002 through September 2004. Habitat Importance Value = 1/rank order of each habitat variable, summed by habitat category for each species (see Appendix D, Table 1- 4).

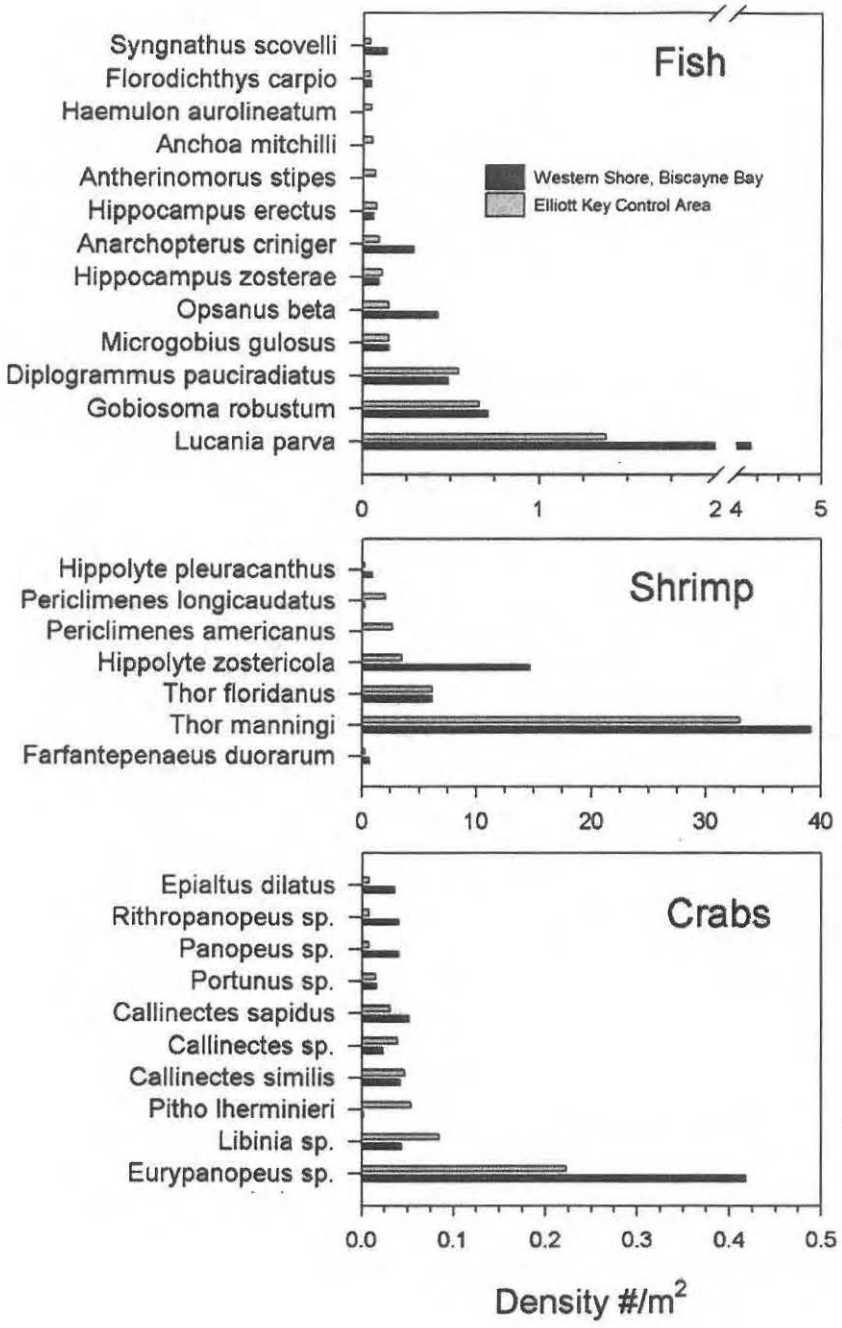


Figure 20. Comparison of fish, caridean shrimp, pink shrimp, and crab densities observed in the study area (western nearshore of southern Biscayne Bay) and the Elliott Key control site between October 2002 and September 2004.

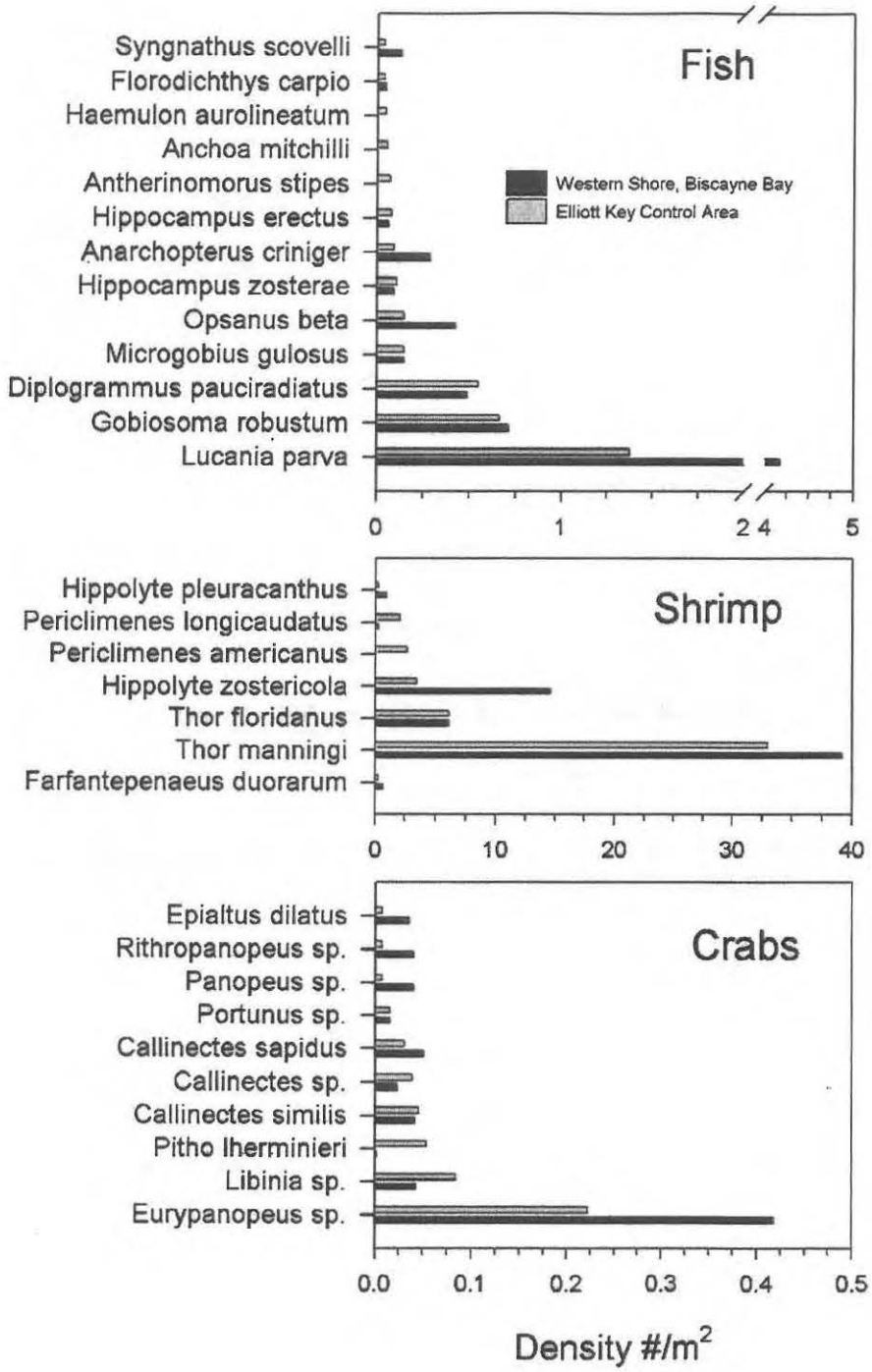


Figure 21. Density (no./m^2) of fish, shrimp and crabs observed in the western nearshore of southern Biscayne Bay compared to densities observed in the Elliott Key control site, October 2002 through September 2004.

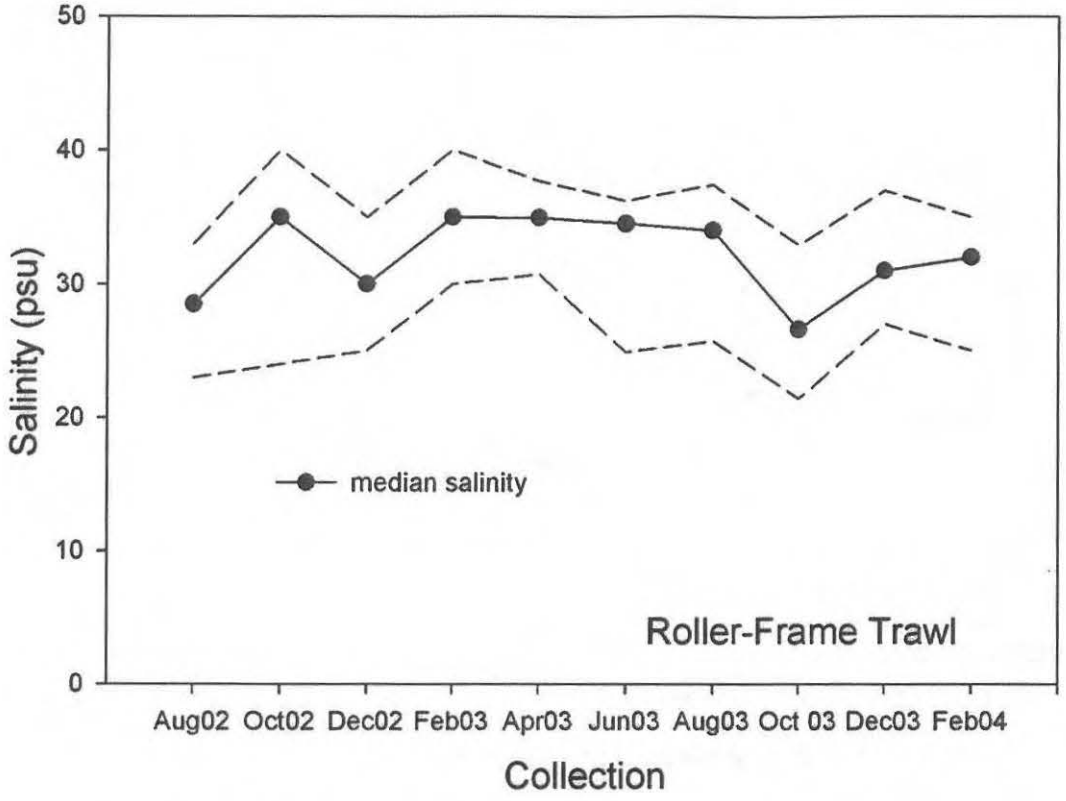


Figure 22. Maximum, median, and minimum bottom salinity (psu) measured during bi-monthly trawl collections, August 2002 through February 2004.

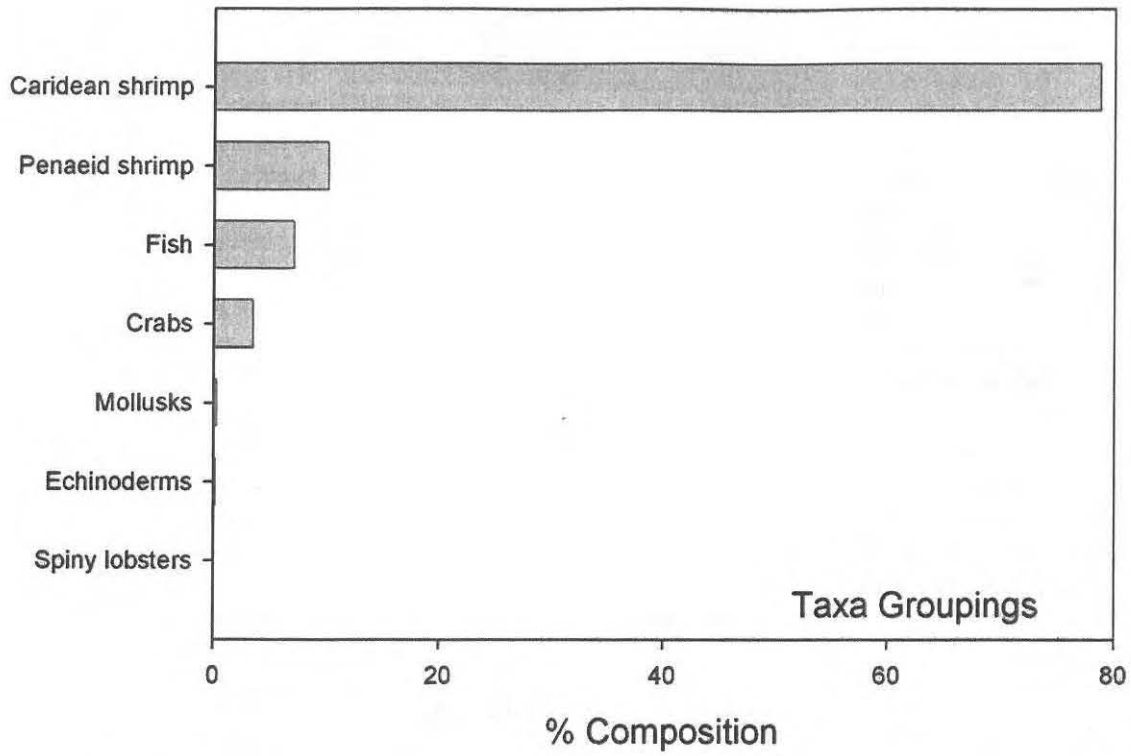


Figure 23. Distribution of animals among major taxa, as percent of total animals, based on area-weighted means of data from trawl collections.

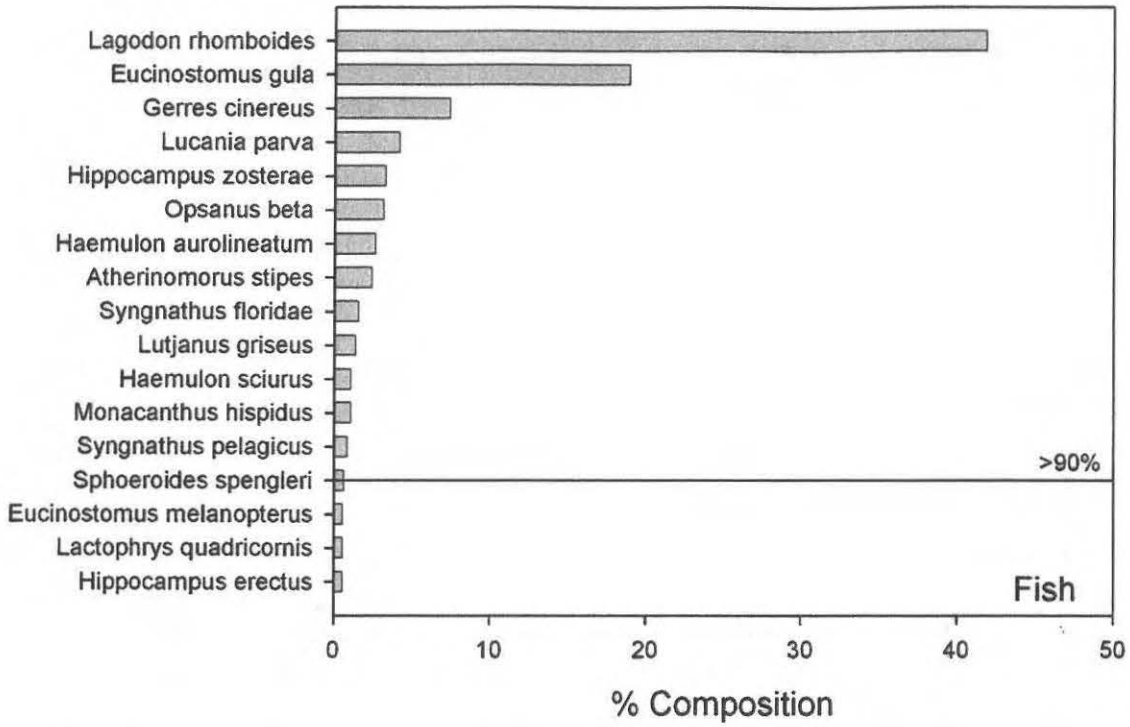


Figure 24. Distribution of most abundant fish among taxa (percent of total fish), from area-weighted means of trawl collections, August 2002 through February 2004.

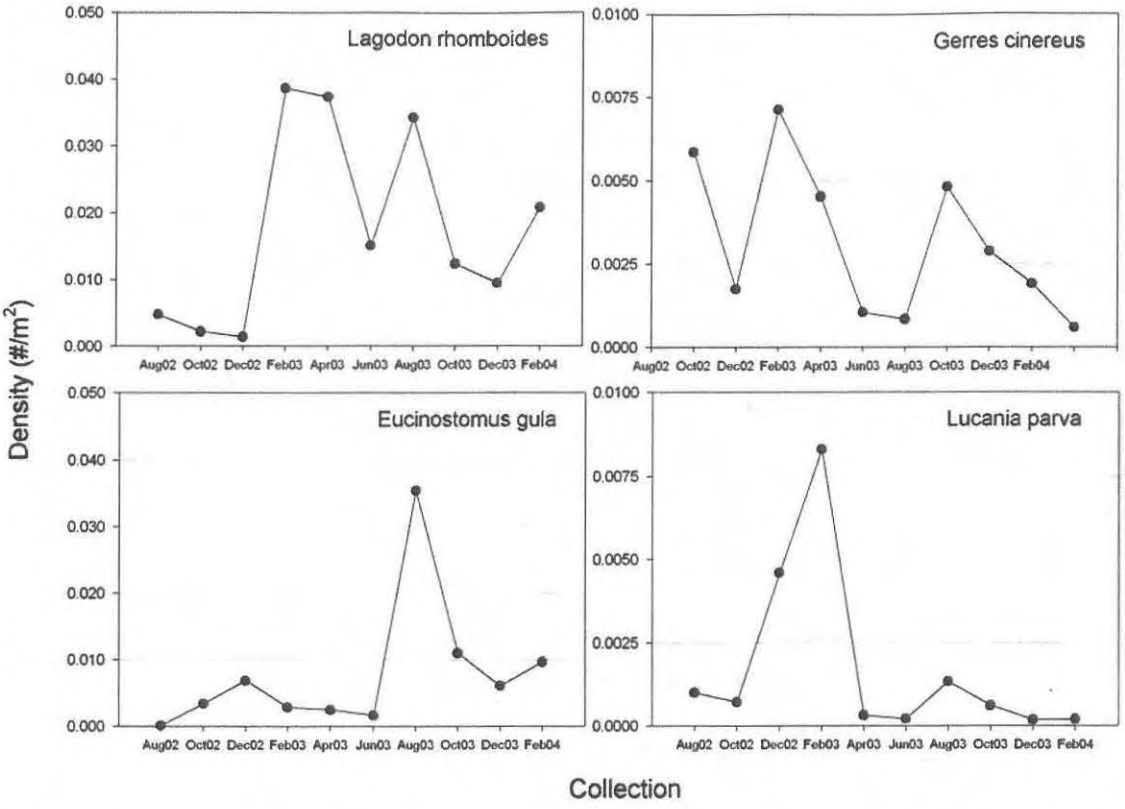


Figure 25. Area-weighted mean density of *Lagodon rhomboides* (pinfish), *Eucinostomus gula* (silver jenny), *Gerres cinereus* (yellowfin mojarra), and *Lucania parva* (rainwater killifish) in trawl collections, by collection month, August 2002 through February 2004.

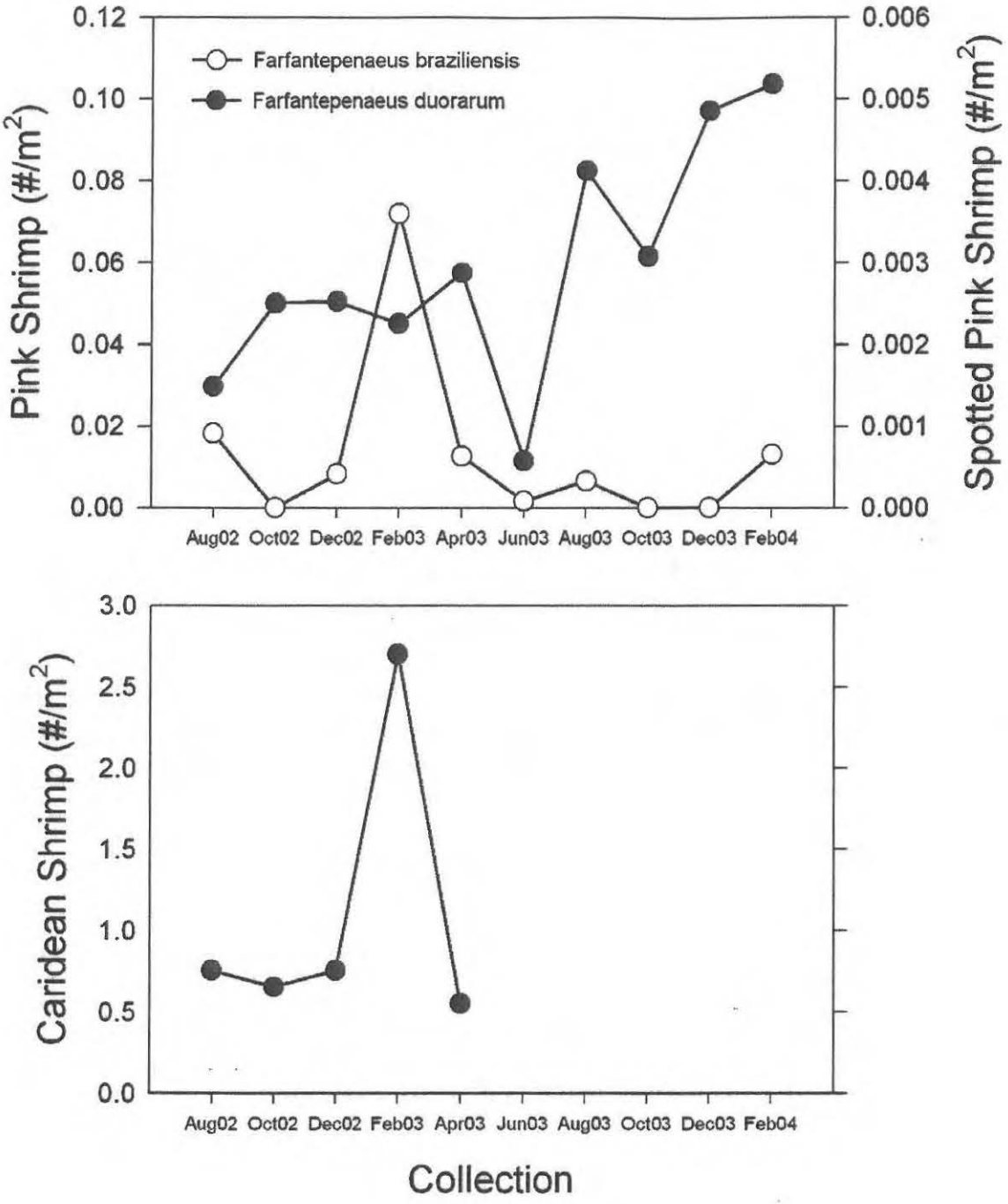


Figure 26. Area-weighted mean density of pink shrimp (*Farfantepenaeus duorarum*) and spotted pink shrimp (*F. brasiliensis*), and zonal-weighted mean density of caridean shrimp in trawl collections, by collection month (carideans were only counted in trawl samples from October 2002 through April 2003).

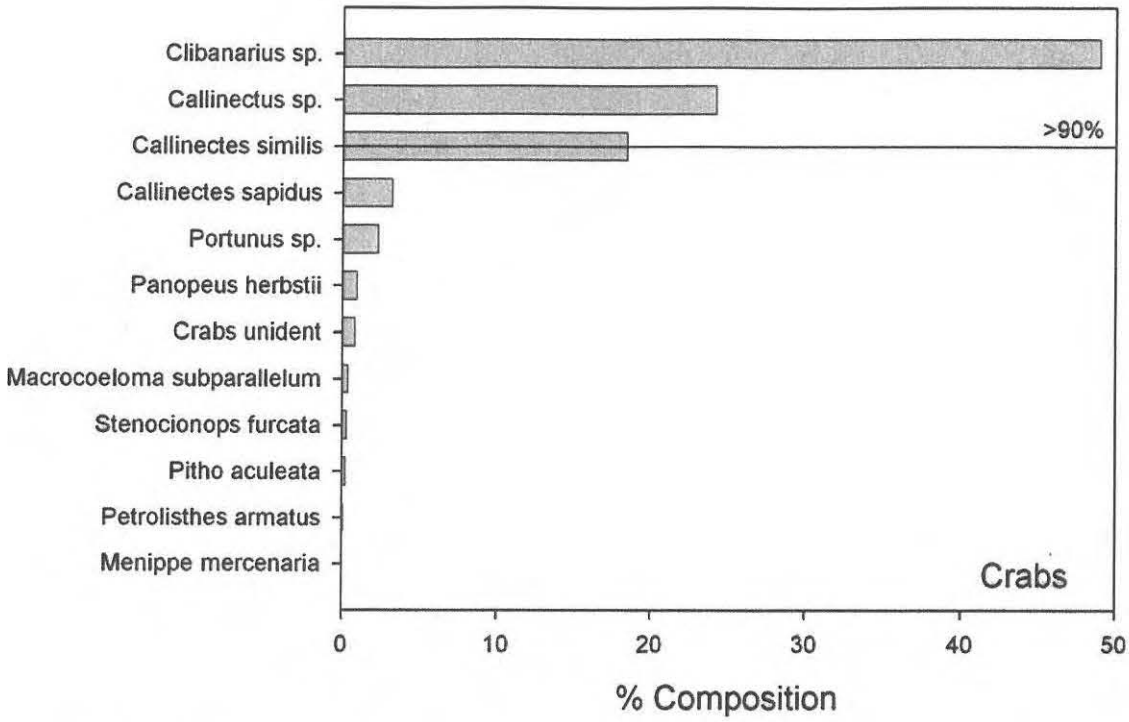


Figure 27. Distribution of crabs among taxa, as percent of total crabs, based on area-weighted means from trawl collections.

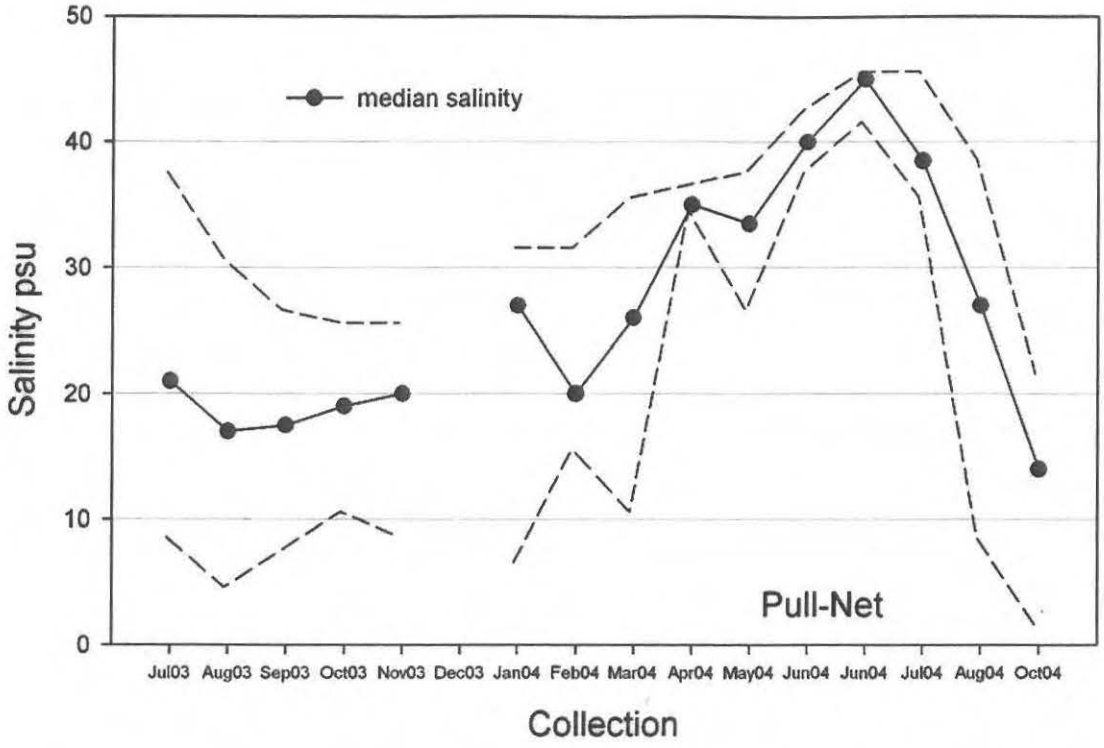


Figure 28. Maximum, median, and minimum salinity in surface water, measured during pull-net collections, July 2003 through October 2004.

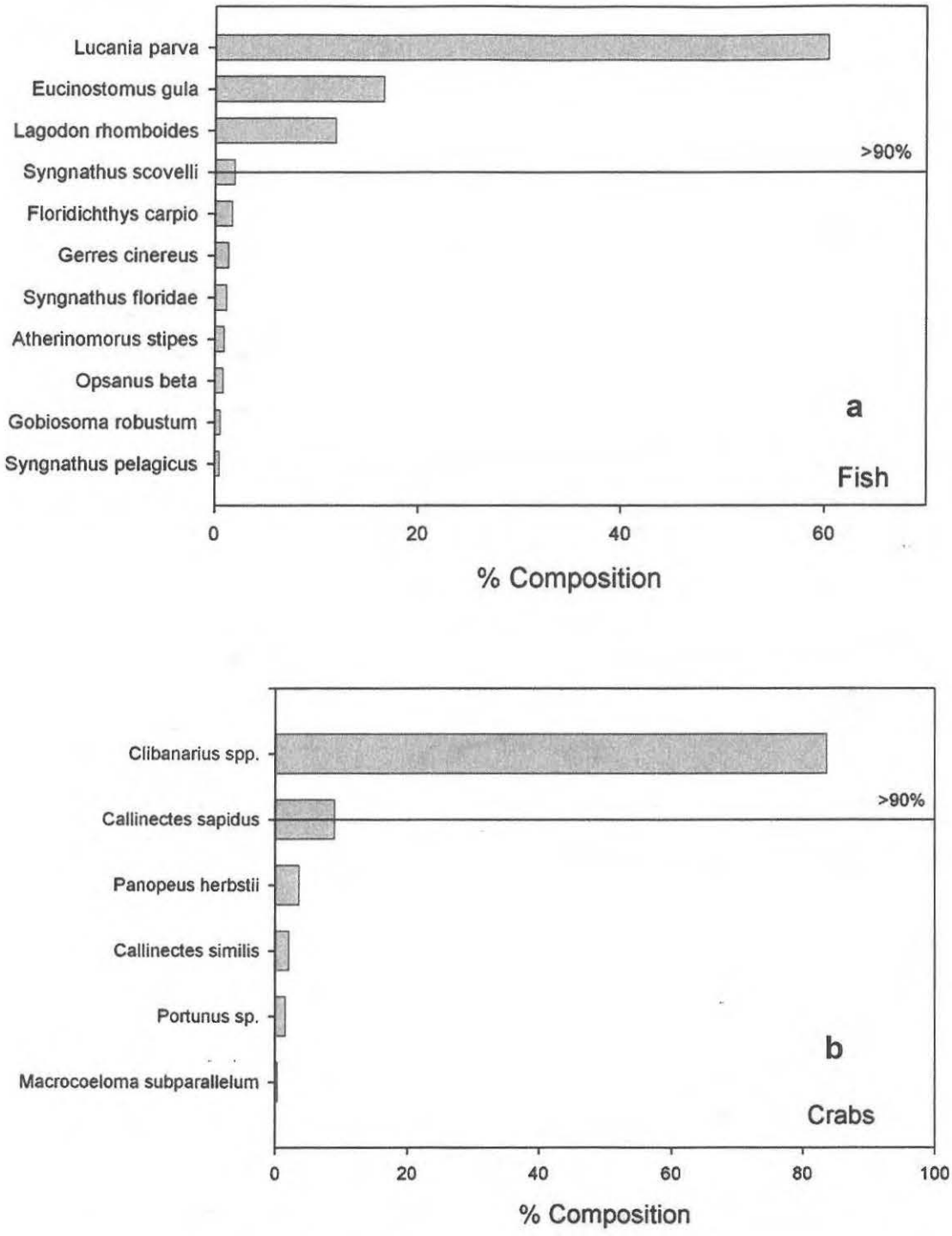


Figure 29. Distributions of (a) fish of the most abundant species as percent of total fish and (b) crabs as percent of total crabs, from pull-net collections, July 2003 through October 2004.

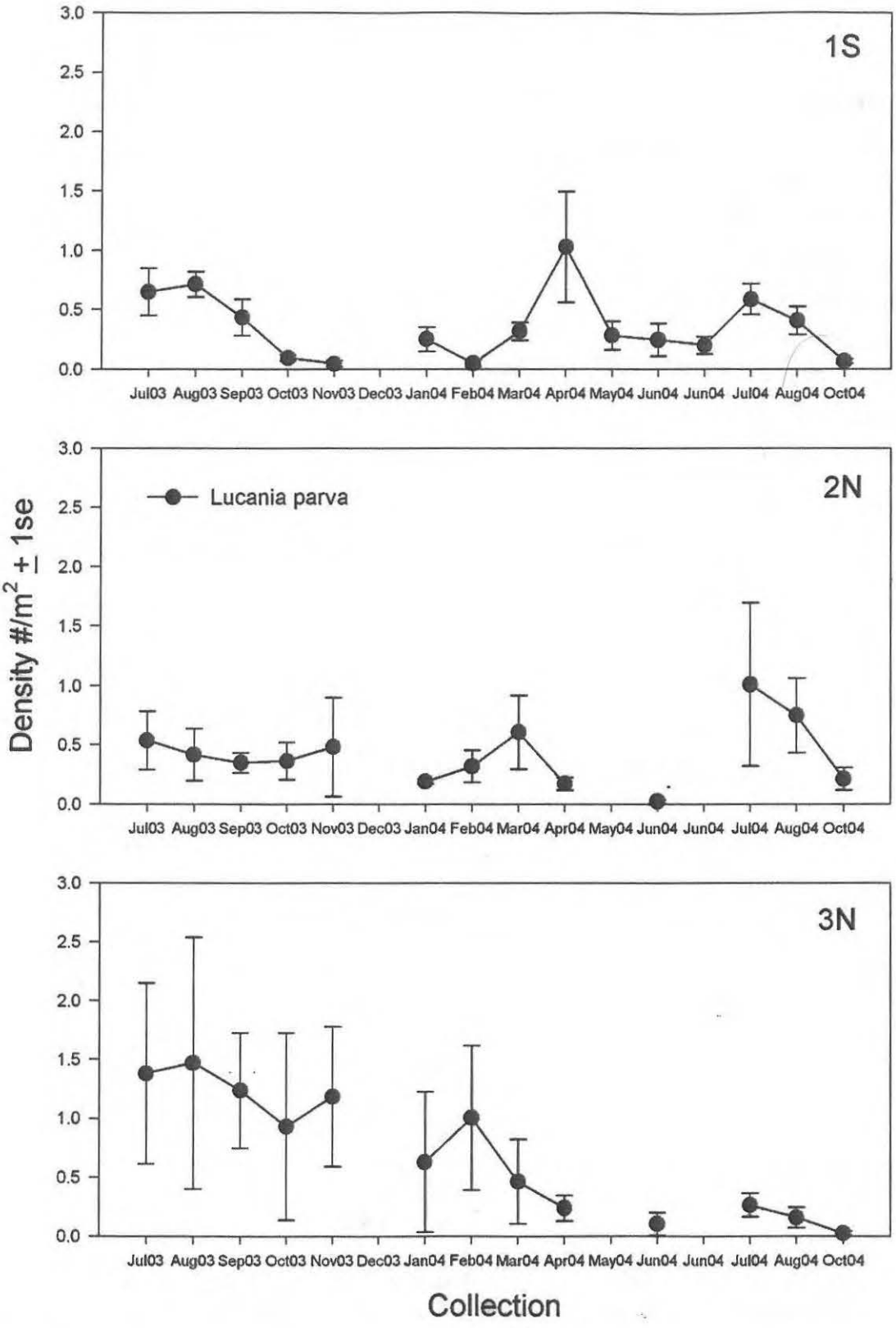


Figure 30. Mean density (no./m^2) of *Lucania parva* (rainwater killifish), by pull-net collection, in zones 1S, 2N, and 3N, July 2003 through October 2004.

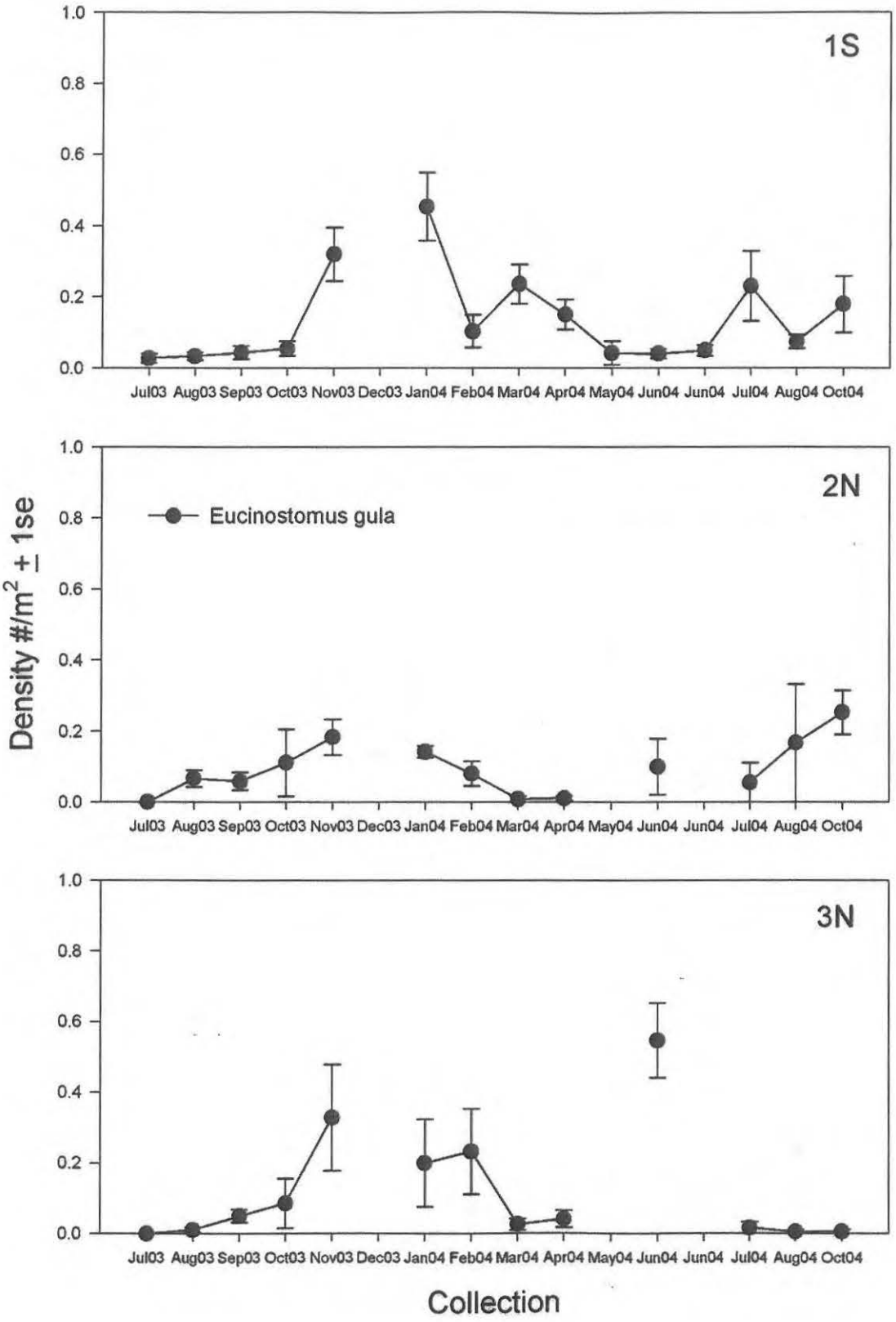


Figure 31. Mean density (no./m^2) of *Eucinostomus gula* (silver jenny), by pull-net collection, in zones 1S, 2N, and 3N, July 2003 through October 2004.

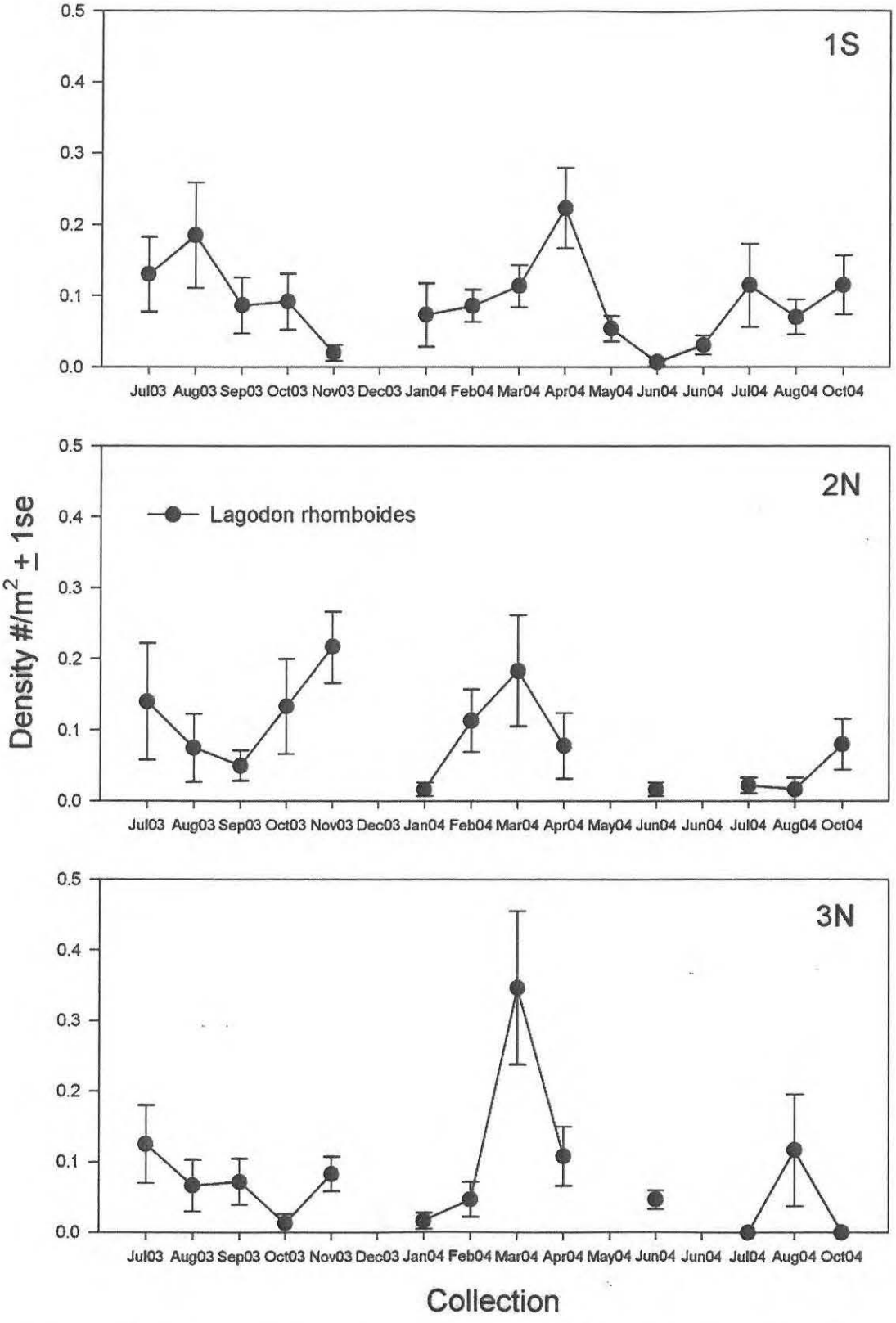


Figure 32. Mean density (no./m^2) of *Lagodon rhomboides* (pinfish), by pull-net collection, in zones 1S, 2N, and 3N, July 2003 through October 2004.

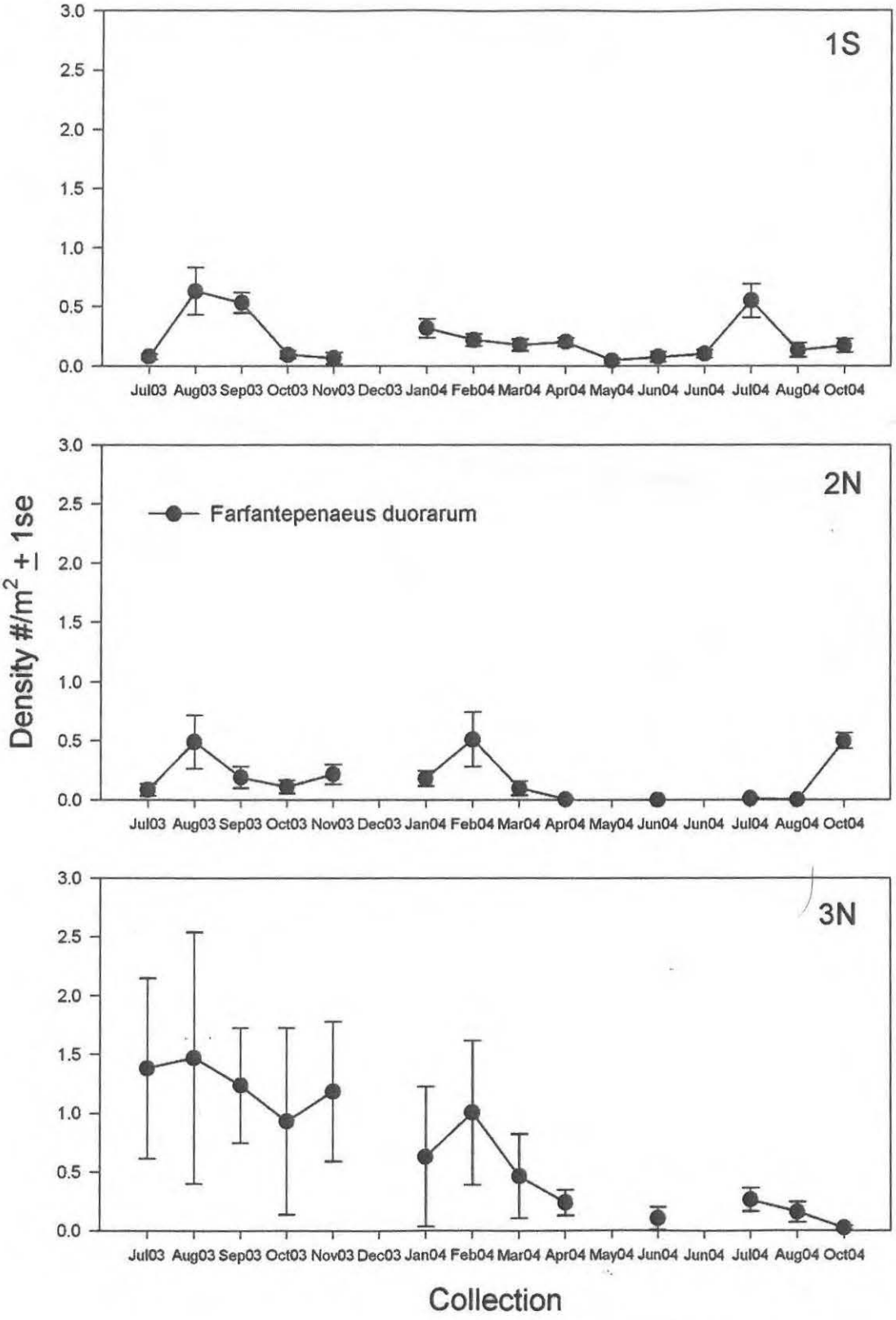


Figure 33. Mean density (no./m^2) of *Farfantepenaeus duorarum* (pink shrimp), by pull-net collection, in zones 1S, 2N, and 3N, July 2003 through October 2004

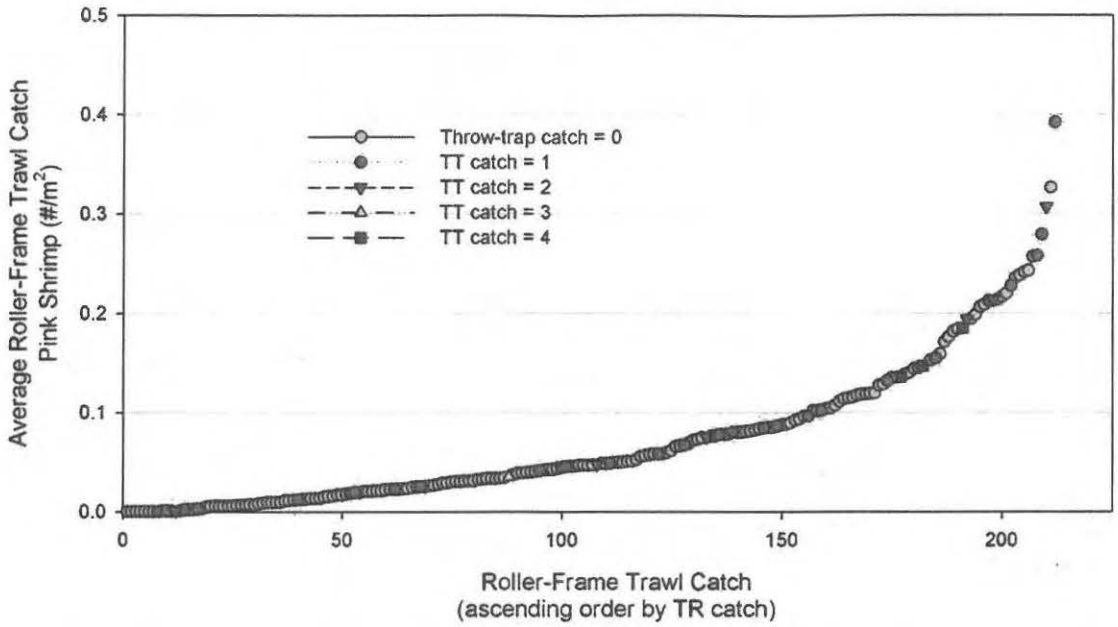


Figure 34. Average trawl catch per m^2 for each site and collection, ordered from smallest to largest and color-coded by corresponding throw trap catch per m^2 for corresponding site and collection.

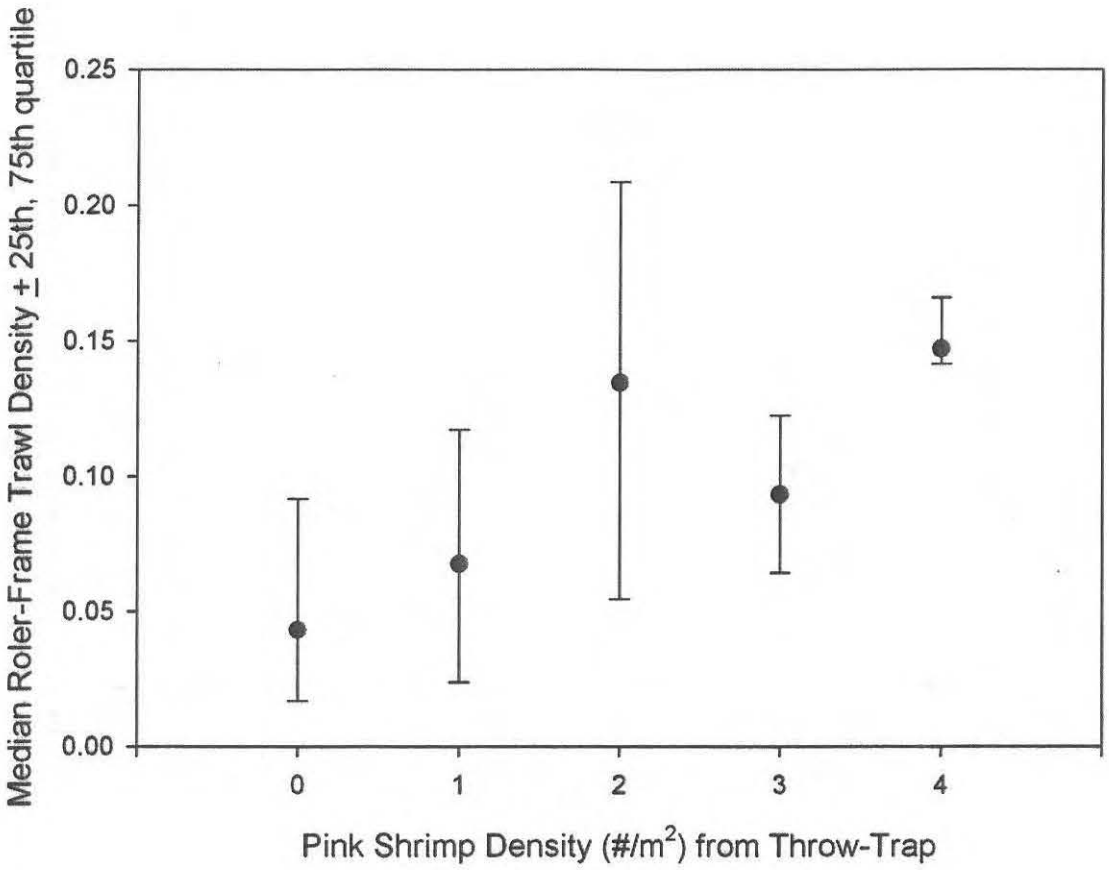


Figure 35. Median pink shrimp density (no./m^2) from trawl sampling, grouped into categories based on corresponding pink shrimp density (no./m^2) from throw-trap sampling (input data for Kendall's robust line-fit method).

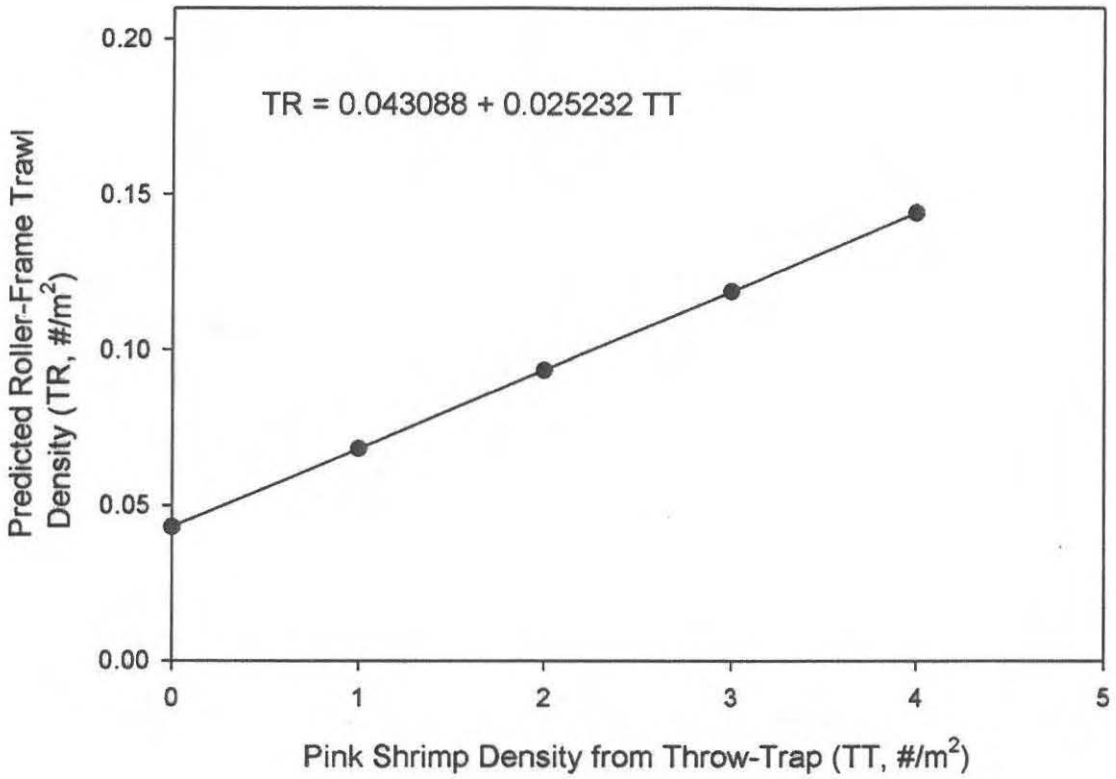


Figure 36. Predicted trawl-based pink shrimp density (no./m^2, based on Kendall's robust line-fit method) vs. throw-trap-based pink shrimp density (no./m^2).

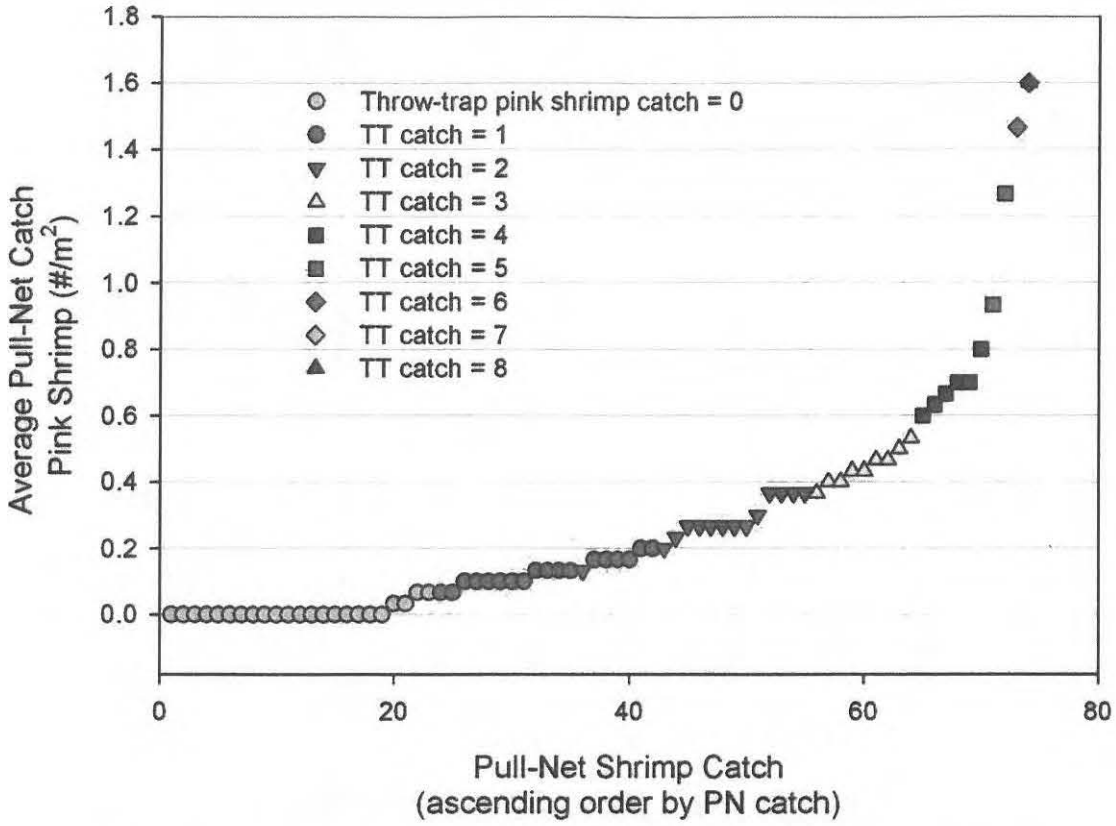


Figure 37. Average pull-net catch per m^2 for each site and collection, ordered from smallest to largest and color-coded by corresponding throw trap catch per m^2 for corresponding site and collection.

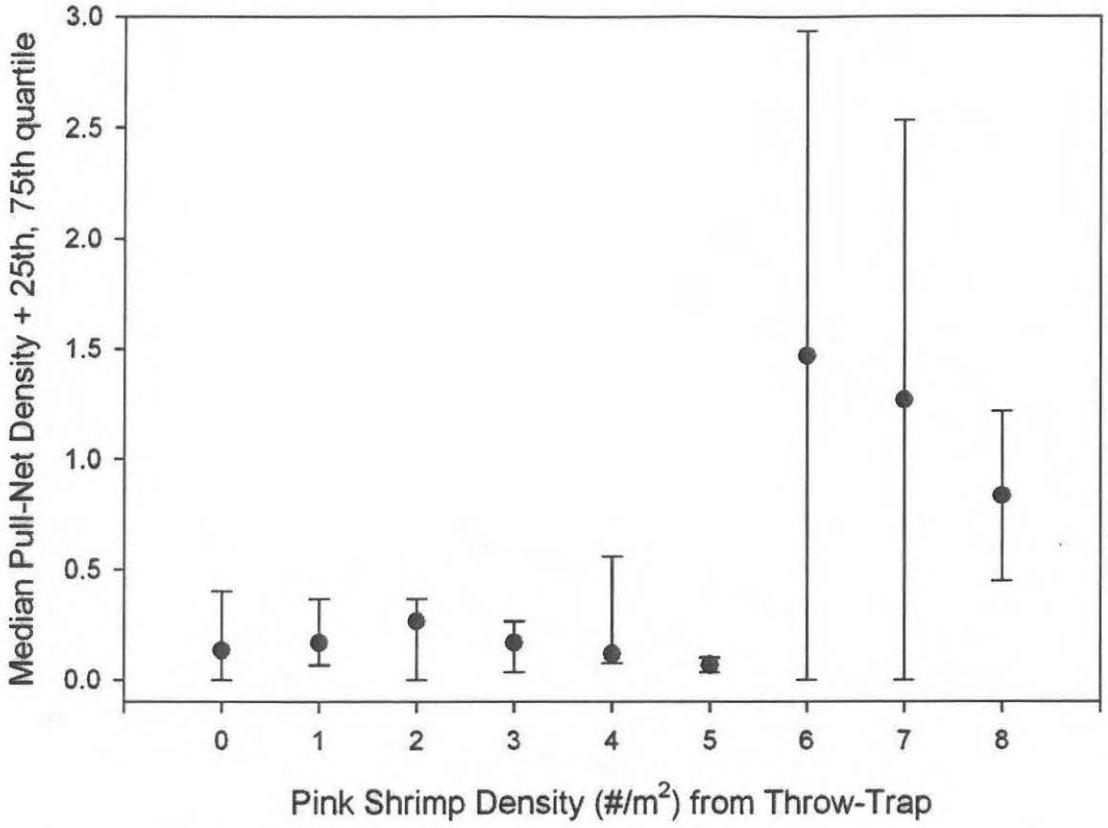


Figure 38. Median of pink shrimp density (no./m^2) from pull-net sampling, grouped into categories based on corresponding pink shrimp density (no./m^2) from throw-trap sampling (input data for Kendall's robust line-fit method).

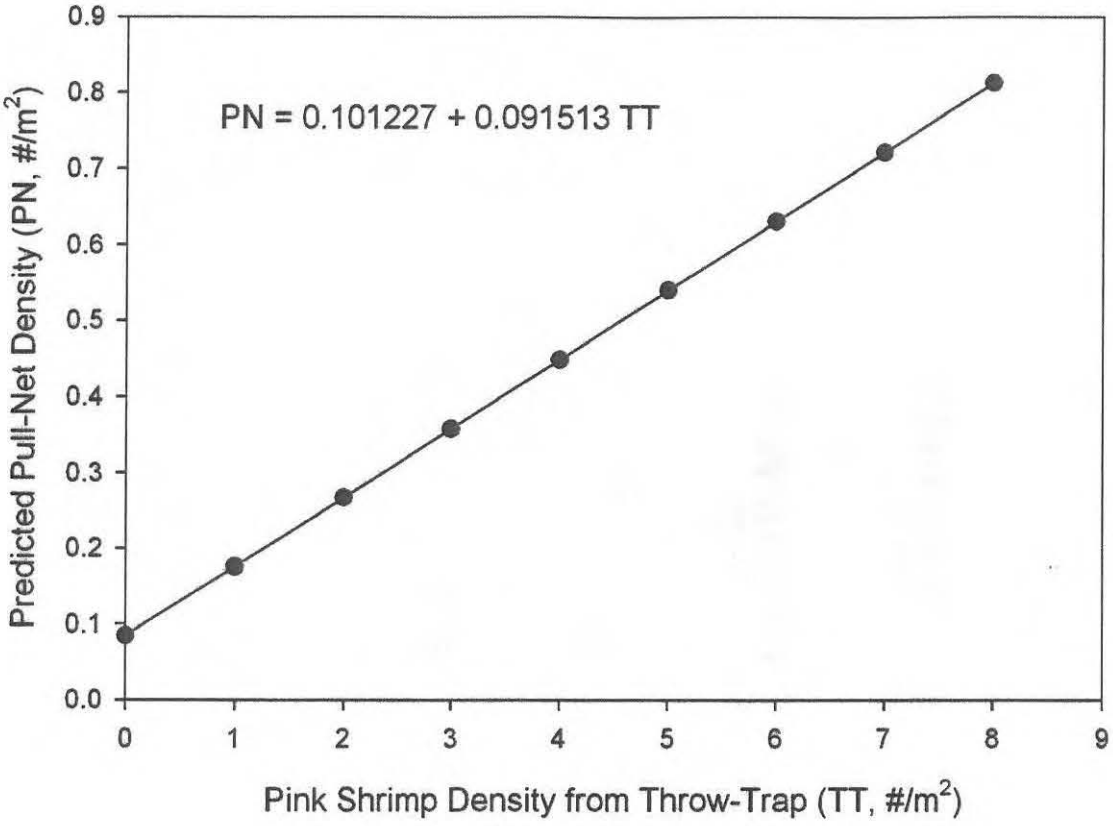


Figure 39. Predicted trawl-based pink shrimp density (no./m^2, based on Kendall's robust line-fit method) vs. throw-trap-based pink shrimp density (no./m^2).

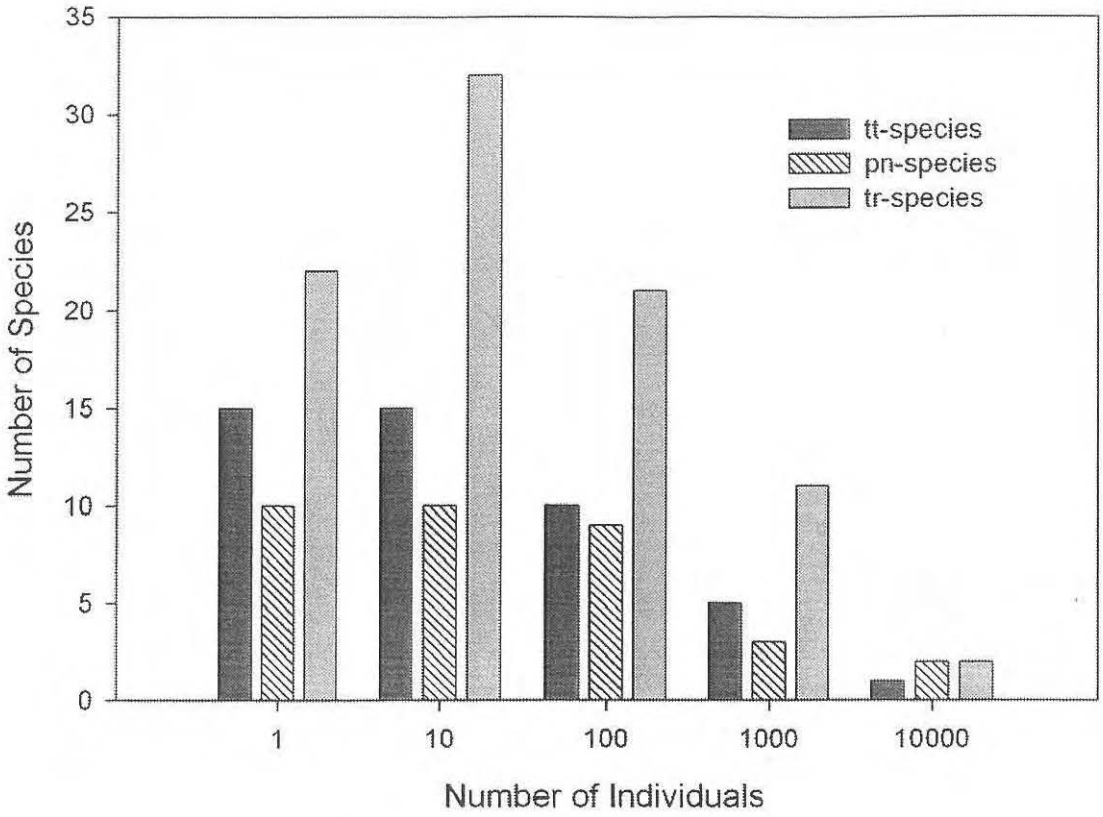


Figure 40. Number of species by number of individuals caught in throw-trap, pull-net, and trawl.

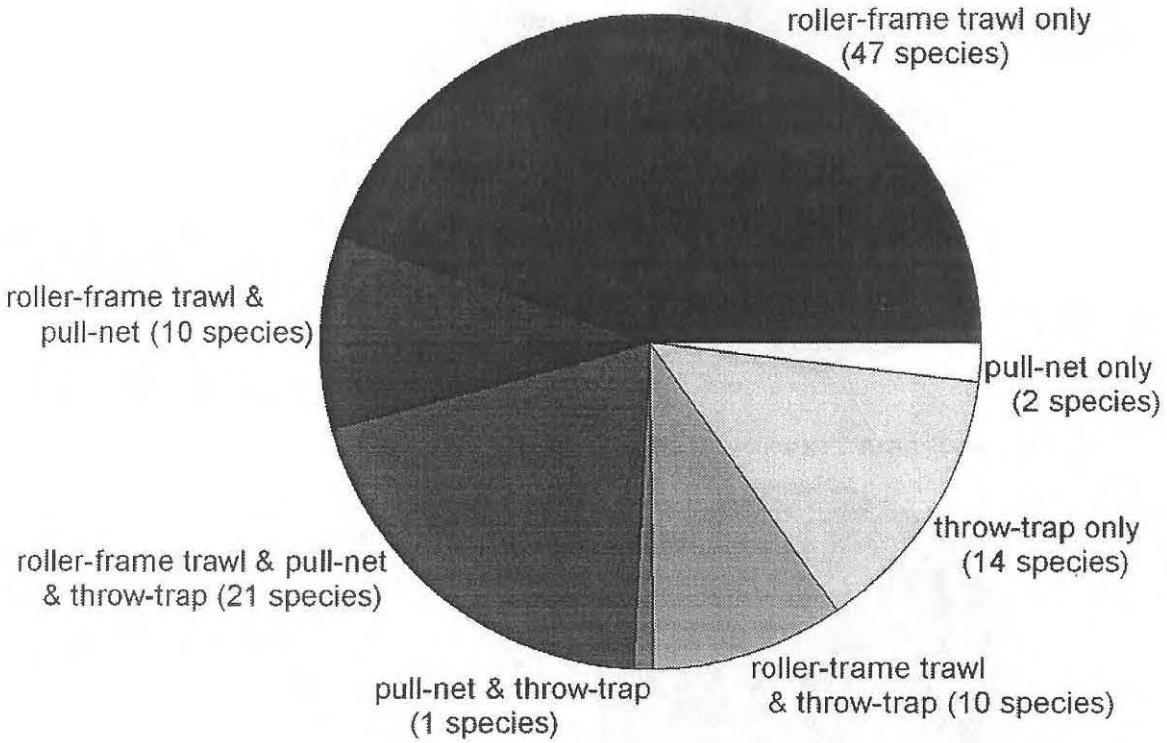


Figure 41. Number of species caught in throw-trap, pull-net, and trawl, uniquely or in combination.

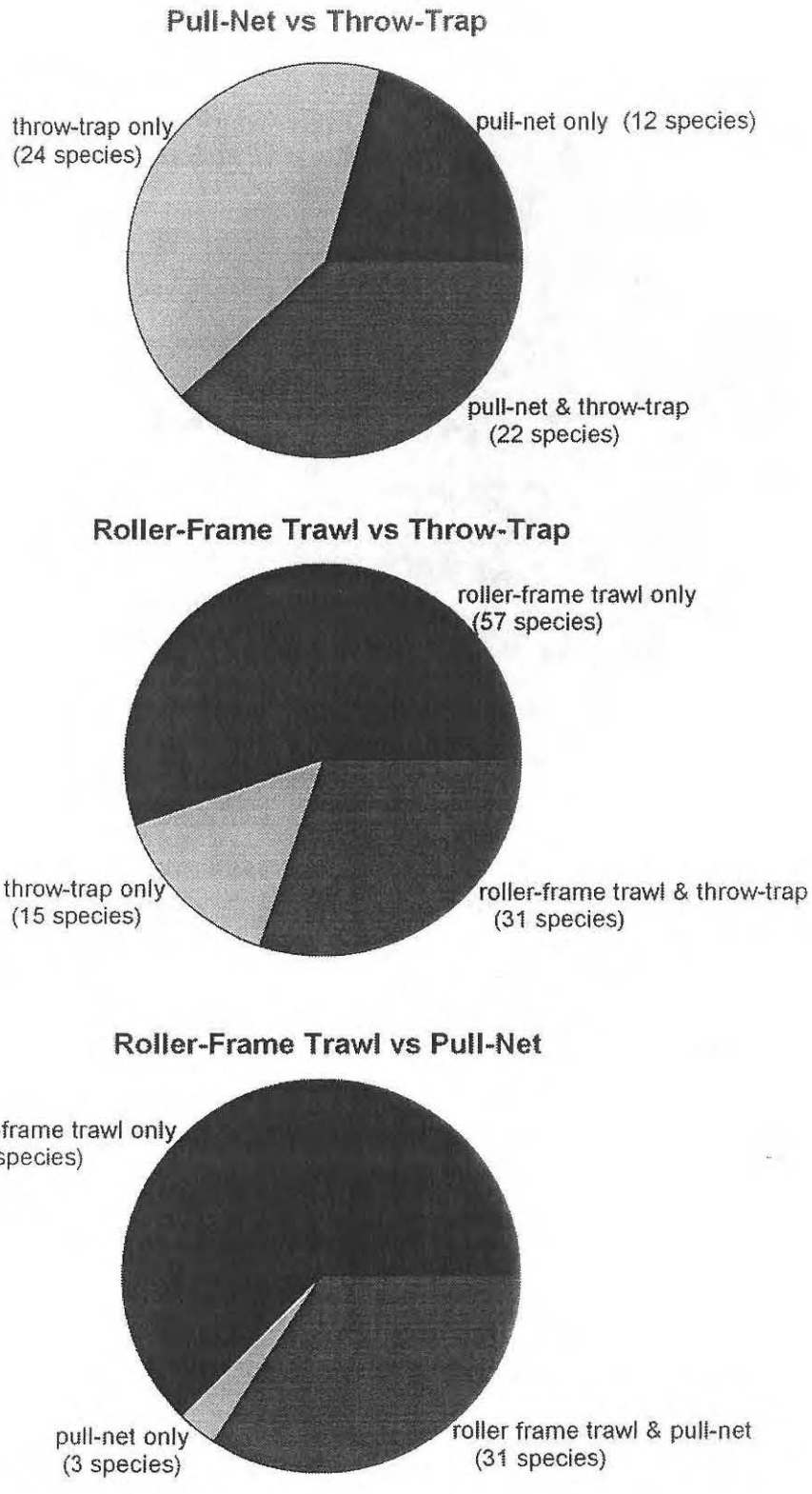


Figure 42. Number of species caught by throw-trap/trawl, throw-trap/pull-net, and trawl/pull-net, each uniquely and in combination.

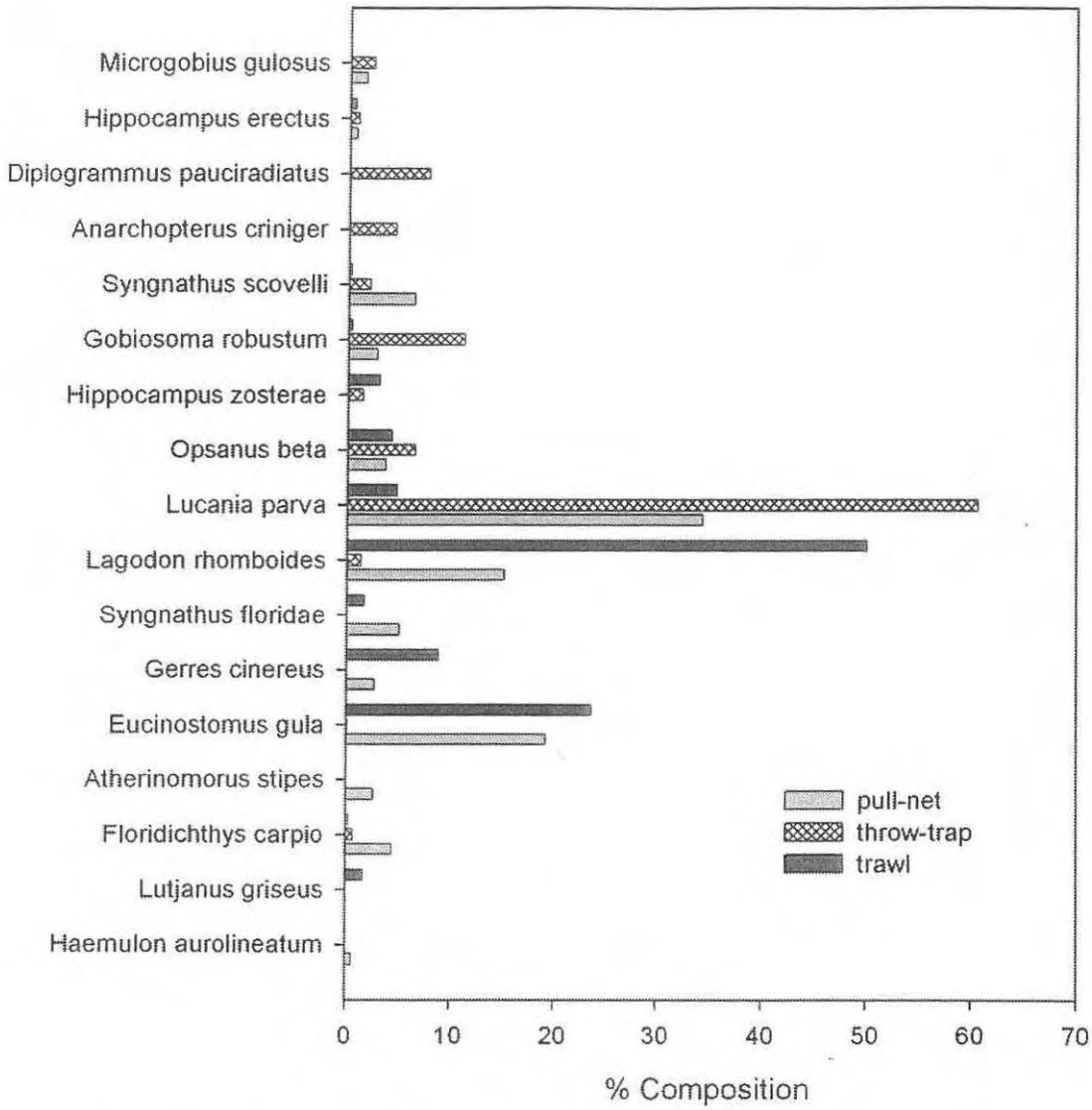


Figure 43. Fish species within the top 10 in collections of any of the three gear, represented as percent composition of the total fish catch of the particular gear.

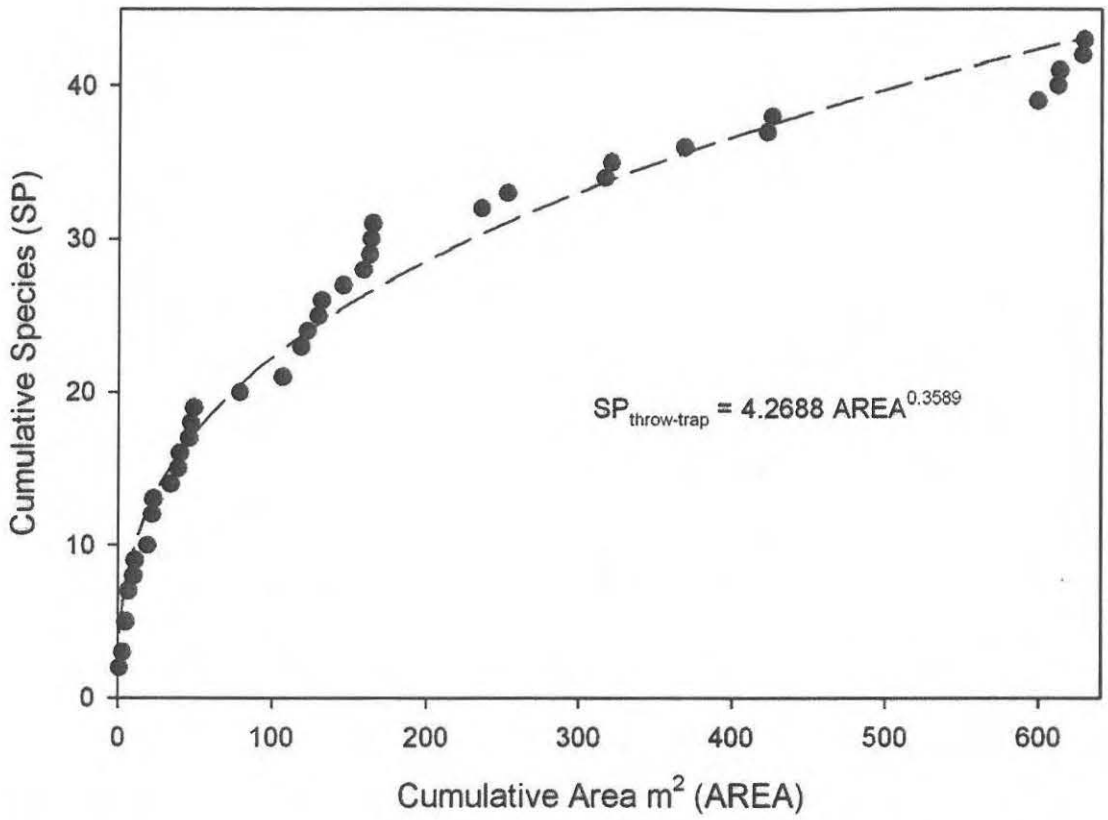


Figure 44. Species-area "power" curve (cumulative species vs. cumulative area) for throw-trap collections.

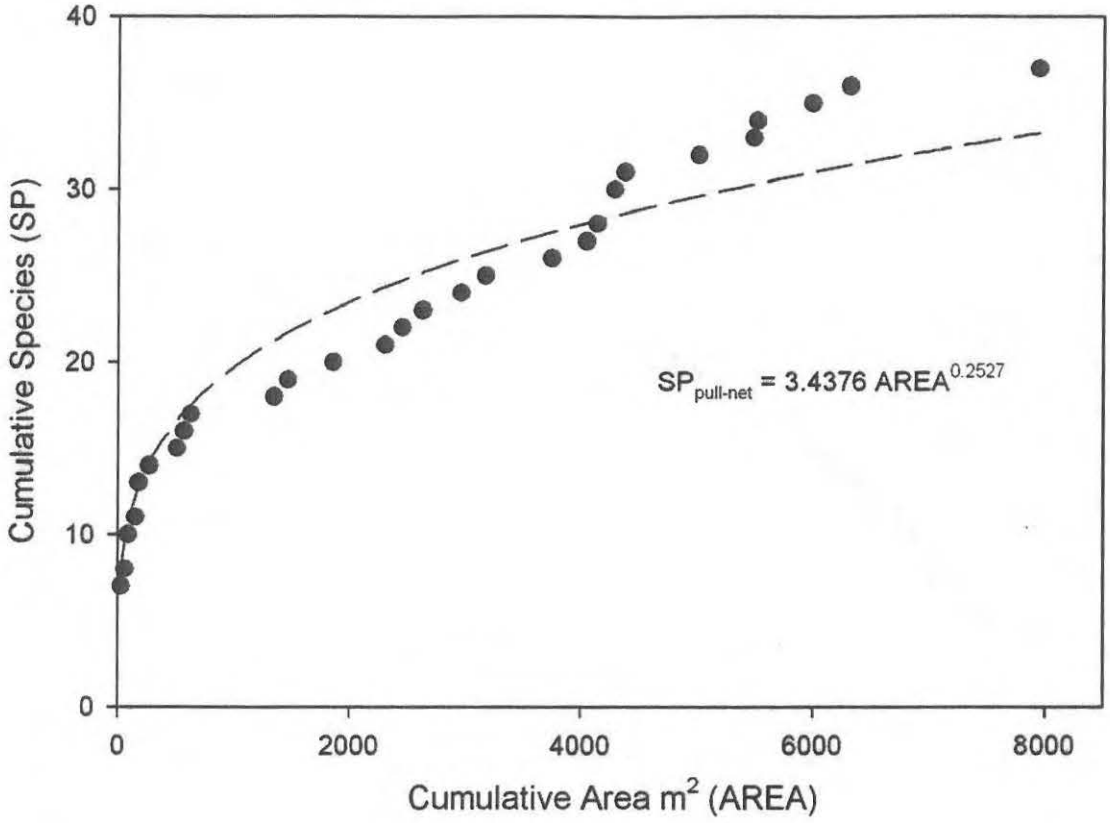


Figure 45. Species-area "power" curve (cumulative species vs. cumulative area) for pull-net collections.

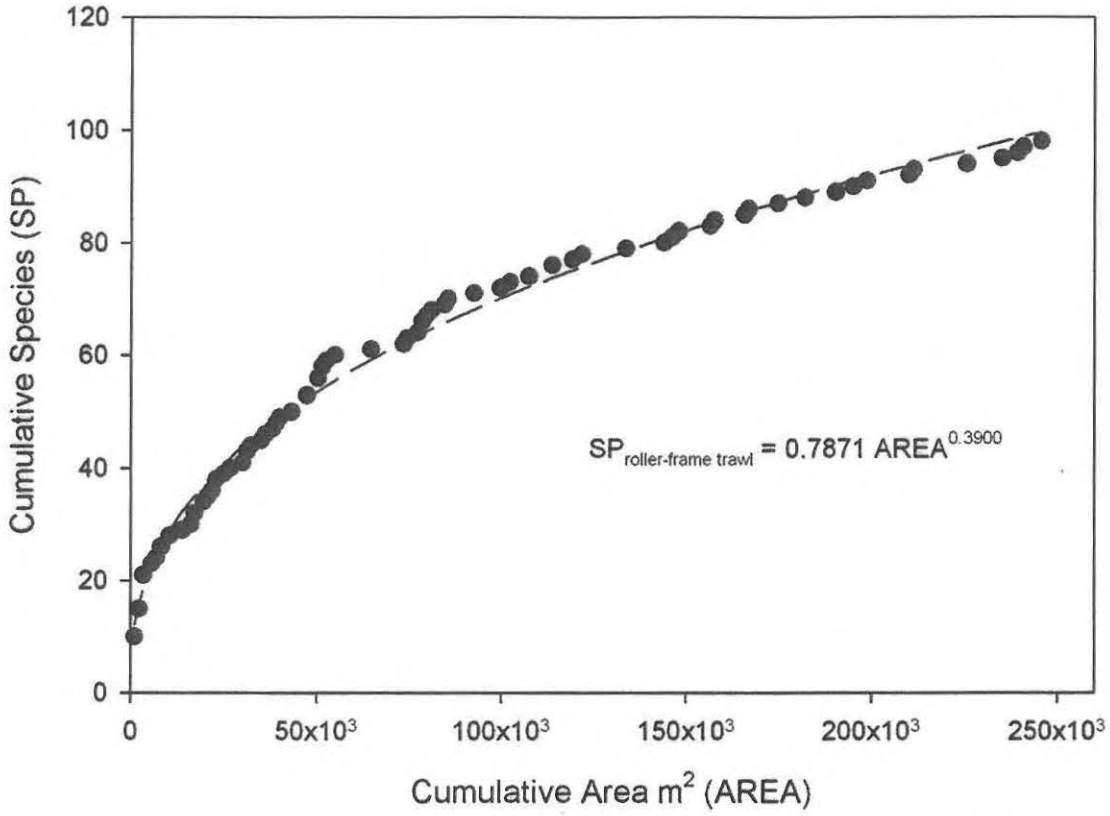


Figure 46. Species-area "power" curve (cumulative species vs. cumulative area) for trawl collections.

PART II

Spatial and Temporal Patterns in the Coastal Creek/Open Wetland Flats Community

Annual Report: 1 October 2003 – 30 September 2004

Biscayne Coastal Wetlands Fish Sampling
Audubon Tavernier Science Center
Jerry Lorenz, Peter Frezza, and David Green

January 2005

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2.1.0 INTRODUCTION

Loss and degradation of coastal wetlands and nearshore estuarine habitat is a long-term threat to ecological function and productivity of Biscayne Bay. The ecology is dependent upon the quantity, quality, timing, and distribution of freshwater inflow. The Comprehensive Everglades Restoration Plan (CERP) and the Lower East Coast Regional Water Supply Plan (LECRWSP) could affect freshwater flow to Biscayne Bay. Special projects in CERP will be designed to restore estuarine habitat in Biscayne Bay that has been diminished by past and current water management practices. Both CERP and LECRWSP require periodic assessments to evaluate the effect of new CERP projects as they are implemented. Scientifically based performance measures based on biological communities are needed to quantify change, and benchmarks are needed to indicate whether restoration is succeeding. Scientific workshops have revealed a lack of essential information about coastal wetlands and nearshore biological communities with which to develop performance measures, and guide the design of the Biscayne Bay projects. In an effort to acquire some of this essential information, the National Marine Fisheries Service in collaboration with the U.S. Geological Service and National Audubon Society developed the "Biscayne Bay Coastal and Nearshore Community Baseline Study" so as to develop biological performance measures. As part of this effort, the National Audubon Society was contracted to implement a study of the spatial and temporal patterns in the coastal creek/open wetland flats fish community. This is the second annual report for that study.

2.1.1 REPORT OBJECTIVES

Task 8 of the contract calls for a summary of work completed in the last quarter (July 1 – September 30, 2004), a summary of work completed in the last 12 months (October 1, 2003 – September 30, 2004), percentage of work completed overall, an explanation of significant variances from the expected work schedule for the report period, and data collected to date. Most of these objectives can be met in a single annual report. This report will be divided into two parts: a progress report (details the status of meeting contractual goals) and a data report. This project samples fish at fixed locations using a unique protocol developed specifically for coastal wetlands that periodically wet and dry and contain deeper areas (i.e., ponds or tidal creeks) where fish concentrate during the dry down. This report summarizes our activities at these locations for the report period.

2.1.2 ANNUAL PROGRESS REPORT

As per the Scope of Work for this project, a new site was established for sampling demersal fishes in the coastal creek/wetland flat habitat associated with southern Biscayne Bay (Figure 1). The site, designated TP (Turkey Point) was identified during extensive field reconnaissance exercises and complement the existing sites MB (Manatee Bay), BS (Barnes Sound), and CS (Card Sound). The sites were chosen primarily for the potential impact of CERP related projects on their hydrology and on a physical similarity to the existing sites described in Lorenz *et al.* (1997). This design was developed specifically for sampling in the coastal creek/open wetland flats type of habitat and collects small demersal fish effectively and with very limited bias (Lorenz *et al.* 1997). Each net surrounds an individual dwarf mangrove tree, thereby sampling both prop-root habitat and the open area between trees. Individual trees were

selected so that each site has a similar array of tree sizes with roughly equivalent prop-root density sampled between sites. Each site has six nets, three in each habitat type (creek and flats). These sites were sampled on the dates specified in Table 1.

The protocol calls for nets to be set-up, left in place overnight, and deployed the following day within 2 hours after sunrise. Fish are cleared from the net using rotenone (a fish toxicant) with strong measures implemented to avoid or minimize bi-kill (as described by Lorenz *et al.* 1997). Fish missed in the initial collection day are collected the following day when they float to the surface. Net clearing efficiencies will be estimated using mark an recapture techniques. Previous studies indicate that efficiency ranged from 78% to 90% for the most common fish species and averaged 86% for all marked and recaptured fish (Lorenz *et al.* 1997). All fish collected are identified, weighed, and measured. Weights for specimens collected during the second collection day are calculated from length-weight regressions generated from the first day's collection. Although effective, the method is labor- and cost-intensive, however, these expenses are justified based on the intractable nature of the habitat being sampled.

The Turkey Point site (TP: N25°22.8' W80°18.9') is located east of the cooling canals and just north of the cooling canal outfall. This area is a critical addition to our existing sites since this wetland will remain isolated from restoration efforts, thereby providing a "control" site for restoration efforts. We have secured access to the site from the cooling canal perimeter road and national security issues have been addressed through several meetings with Florida Power and Light's land use personnel at their Turkey Point facility. Site preparation and construction began in November 2003. TP was first sampled for fishes on 3 December 2003 with no problems encountered.

In addition to setting up the fish collection method, the TP site required instrumentation for the continuous collection of physical data. The hydrostation monitors water level, conductivity, salinity, temperature, and dissolved oxygen using a Hydrolab Quanta sensor. Data are collected hourly and stored on a Campbell Scientific CR510 datalogger. Data are downloaded daily to a base computer at Audubon's Tavernier Science Center using GSM cellular phone technology. The hydrostation was installed at TP on 21 January 2004, and has functioned to specifications since that date, as there have been no data gaps since the installation date.

All eight samples scheduled in the contract have been collected to date and all hydrostations have been installed indicating that 100% of the project is completed, up to contract renewal for an additional year.

2.2.0 Annual Data Report

In addition to the three sites added under this contract (MB, CS, and TP), a fourth site in southern Biscayne Bay (BS: Figure 1) was established in 1992. This site is sampled under contract with Everglades National Park, however these data are also pertinent to this study and will be reported here. Sites were sampled on the dates specified in Table 1.

We used standard measurements of salinity, temperature, dissolved oxygen and rainfall, however our use of relative depth for measuring water level requires some explanation. Water

levels recorded at the sites are relative to the depth on the surrounding flats habitat. When depth is recorded as zero, the surrounding flats are completely dry while the creek habitat is filled to the "bank", i.e., this is analogous to flood stage in rivers. At this stage, fish are trapped in the creek habitat and are susceptible to high mortality (via predation, low oxygen, disease etc.). If water levels increase even slightly from this point, the flats begin to flood. At approximately 5 to 8 cm depth, the flats are completely inundated and fish can begin to leave the creek and move out on the flats. Above 12.5 cm, fish are widely dispersed across the flats. However, Lorenz (2000) indicated that when relative depth drops below 12.5 cm, the fish stay in close proximity to the creek presumably to have ready access to deep-water refugia should a drying event occur. Unfortunately, these sites are tidal so depth can range across these thresholds in the course of a day. This makes interpreting fish concentrations by using daily depth averages less exact. Although we use mean depth in this report, further hydrologic analysis will be used to determine a more appropriate statistic in future reports (e.g. use daily minimum).

2.2.1 MB Data

Physical data from the MB hydrostation is presented in Figure 2. Dissolved oxygen and temperature appear within expected parameters. In comparison to the other sites, salinity appears relatively low. This was expected, as this site is immediately downstream from the C-111 outfall. The release schedule from S-197 would explain the low salinity while pulse releases of fresh water from the canal during storm events and salt water mixing during spring tides would explain the high variability in salinity at MB. Water depth appears to follow the traditional cycle of peak water late in the wet season followed by a decline to the low point in late spring.

Abundance of fish in both number and biomass were typically higher on the flats than in the creeks (Figure 3). The number of fish/m^2 was slightly higher in the creek habitat in both the September and the April samples, while biomass was slightly higher in the creeks during the January and April samples. Fish abundance and biomass peaked in February and March, before dropping off dramatically in April. Water depths at the site were measured at the time of the sample collection and are reported in Table 1B. Interestingly, only one sample was collected below the fish concentration water level mark at 12.5-cm (February), and creek fish abundance was highest at this time.

A summary of the number and biomass of each species collected at MB is presented in Tables 2 and 3, respectively. In total, 13 species were collected, and the most common species by number was the clown goby (*Microgobius gulosus*), followed by the goldspotted killifish (*Floridichthys carpio*) and the sailfin molly (*Poecilia latipinna*). By weight, the latter two greatly outweigh the former.

2.2.2 BS Data

Physical data from the BS hydrostation is presented in Figure 4. Dissolved oxygen and temperature appear within expected parameters. Salinity is highly variable due to the tidal influences at this site, and peaked near 50 psu late in the dry season. Water levels followed the

wet/dry season paradigm with the highest depths occurring in the fall (October and November) and declining to low levels in April.

Abundance of fish was highest in the flats habitat during most of the wet season (Figure 5). Abundance and biomass became more available in the creek system as water levels dropped in January. This also represents the sample month in which fish abundance and biomass peaked overall. Two samples were collected below the fish concentration water level mark at 12.5-cm (Table 1B: January and February), and fish were clearly concentrated into the creek habitat as creek abundance and biomass greatly outnumbered flats abundance and biomass in January. A peak in water level occurred in late March and samples were collected during the initial rise in water level associated with this peak and immediately following the dry-down associated with this peak. Both samples (March and April) were relatively similar in terms of both fish abundance and biomass. In addition, fewer fish were caught and less biomass of fish was available during these two samples than any other sample month during the hydrologic year.

A summary of the number and biomass of each species collected at BS is presented in Tables 4 and 5, respectively. In total, 14 species were collected, and the most common species by number was the sheepshead minnow (*Cyprinodon variegatus*), followed by the goldspotted killifish (*Floridichthys carpio*) and the clown goby (*Microgobius gulosus*). By weight, the sailfin molly (*Poecilia latipinna*), sheepshead minnow, and goldspotted killifish were the most common species.

2.2.3 CS Data

Physical data from the CS hydrostation are presented in Figure 6. Dissolved oxygen and temperature appear within expected parameters. The salt content rarely dropped below 20 psu, and only for short periods, indicating that hydrography at this site was dominated by Biscayne Bay influences rather than overland runoff. This is to be expected since the site is entirely isolated from its historic freshwater source by Card Sound Road and only runoff from localized rainfall affects this site. As at the other sites, water levels followed the wet/dry season paradigm with the highest depths occurring in the late fall (October and November) and declining to lows by January. This site remained relatively flooded throughout the entire hydrologic year and never reached the fish concentration threshold. Indeed, all samples were collected at relatively high water levels compared to the other sites.

As the hydrologic year progressed, fish abundance on the flats increased each month until numbers peaked in January following the paradigm that fish numbers increase through time during high water periods (Browder 1978, Loftus and Kushlan 1987, Lorenz 2000). Fish abundance peaked in the creek habitat in June and again in December (Figure 7). The June and December samples were collected at lower water levels than the other samples, so these peaks may suggest that the concentration threshold occurs at higher water levels at this site (perhaps as a response to greater tidal amplitude in Card Sound verses Barnes Sound). It is interesting that this site appears to be dominated by more marine inputs yet follows the wetland production and concentration paradigms in almost text book fashion (i.e., fish abundance increased steadily during the wet season and low water levels during the dry season resulted in fish moving from the flats to the creeks).

A summary of the number and biomass of each species collected at CS is presented in Tables 6 and 7, respectively. In total, 10 species were collected, and the most common species by number was the clown goby, followed by the sailfin molly and the rainwater killifish (*Lucania parva*). By weight, the sailfin molly, goldspotted killifish and mojarras (*Gerreidae* spp.) were the most common species.

2.2.4 TP Data

Physical data from the TP hydrostation is presented in Figure 8. Data at this site was collected beginning 21 January 2004, after the hydrostation was installed. Therefore, it is difficult to determine trends throughout the entire hydrologic year since the data only represents the latter half of the dry season. However, based on this partial data set, it appears that TP is similar to CS in that it is dominated by marine influences. In contrast to CS, however, there is no wetland runoff at all. The cooling canals intercept overland flow so the only freshwater input is from rainfall directly on the site (Figure 1). Like CS, TP salinity peaked in April at above 50 psu and this event coincided with the lowest water level.

Fish collections began at TP in November. The hydrostation and staff gage was not installed until late January, so the date of sample water depths were not collected until the February sample. Efforts were being made to calibrate the staff gage in March and April, so depths were also not taken in these months. As a result, depths at the time of sampling were not collected. However, the depths at the time of sampling were retroactively estimated from the hydrolab data (Table 1B). Fish abundance patterns were very similar to those at CS. Both density and biomass on the flats peaked in January, while relatively low water level in January coincided with peak density and biomass in the creeks. This supports the idea that fish leave the flats at higher water depths in these more tidally influenced systems.

A summary of the number and biomass of each species collected at TP is presented in Tables 8 and 9, respectively. In total, 9 species were collected, and the most common species by number was the sheepshead minnow, followed by the goldspotted killifish and the rainwater killifish. By weight, the sailfin molly, goldspotted killifish, and sheepshead minnow dominated the catch.

2.3.0 Site Contrasts and Comparisons

Based on Tables 2 through 9, it is clear that species composition at all four sites differs very little from other mangrove sites in south Florida. For the sites combined, the most common species appear to be the sheepshead minnow, goldspotted killifish, sailfin molly, rainwater killifish, and clown goby, which have been shown to be ubiquitous in other estuarine systems in Florida.

In terms of overall fish availability during the dry season, the numbers of fish in the creek habitat peaked at CS in December (excepting June), BS peaked in January and MB peaked in January and February (Figures 10A and 11A). This is an interesting temporal shift since CS is the northernmost of these three sites and MB lies at the southern extreme. The wetlands surface

elevations are higher toward the north and slowly grade southwestward toward Taylor Slough in Florida Bay. The staggering of fish abundance peaks suggests a clear and consistent drawdown in water levels through time with the "drying front" moving from northeast to southwest. TP was not consistent with this pattern in that, being the northern most site it should have peaked earliest. Fish numbers in the creek habitat were consistently high at TP from January through March, however. This suggests a different hydrologic relationship distinctive from the other sites. Perhaps the location of this site near Biscayne Bay proper instead of in the southern basins results in different drying patterns. Another alternative is that wetland elevations down grade northward toward Biscayne Bay in Card Sound. On the other hand, the cooling canals adjacent to this site may alter drying patterns. We expect to assess these possibilities as the study progresses.

Fish abundance on the flats is also consistent with the drying pattern explained in the previous paragraph. Fish density and biomass peaked in January at the CS site and declined thereafter (Figures 10B and 11B). At BS flats density peaked in January while biomass peaked in February. Flats density at MB peaked in February and March with biomass highest in March. As drying occurs and fish evacuate the flats, there is a concurrent increase in mortality associated with the concentration effect (e.g. predation, low oxygen, disease). Through time, this mortality would be expressed through reduced fish numbers on the flats when they are flooded. TP peaked in January constant with when the concentration effect was first observed.

2.4.0 Two-year Contrast and Comparison

A comparison between the current hydrologic year and the previous hydrologic year was possible at MB, BS, and CS. Means were taken for both fish numbers and fish biomass and are presented in Figure 12, with standard error bars shown. Fish abundance measured in terms of numbers appears to be substantially higher in 2002-03 than in 2003-04. Although temporal trends and peaks are similar, fewer fish each month were observed during the current hydrologic year. When measured in terms of biomass, fish abundance is also higher in the previous hydrologic year than in the current year. A June 2002 sample was not collected so this month should not be compared.

Water levels at these three sites were substantially higher during the current hydrologic year than they were during the previous year, thereby allowing the fish to disperse across the entire landscape (as reported in last years report; Lorenz et al. 2004). At the BS site from mid-December 2002 to mid-April 2003, water levels remained well below 10-cm, whereas during this same time period of the current hydrologic year, water levels rarely dropped below 10-cm, and when they did, it was of very short duration. CS shows a similar difference in water level during this critical time period: during the current hydrologic year, water depths oscillated between 20- and 40-cm during the dry season. However, during the previous hydrologic year, water levels oscillated between 0- and 20-cm, and were below the 12.5-cm concentration threshold for a good majority of January and February 2003. Incomplete hydrolab data from the MB site from hydrologic year 2002-03 makes comparisons difficult, but water depths appear to have been substantially lower at this site, as well. With the higher water levels, salinities were generally lower during the 2003-04 hydrologic year than they were in the previous comparison year.

2.5.0 Literature Cited

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Loftus, W. F. and J. A. Kushlan. 1987. Freshwater fishes of southern Florida. Bull. Fla. State Mus. Biol. Sci. 31: 137-344.

Lorenz, J. J., C. C. McIvor, G. V. N. Powell and P. C. Frederick. 1997. A drop net and removable walkway used to quantitatively sample fishes over wetland surfaces in the dwarf mangroves of the southern Everglades. Wetlands 17 : 346-359.

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Table 1. A. Dates of fish collections at each of the sampling sites.

	Site			
Sample	**MB (Manatee Bay)**	**BS (Barnes Sound)**	**CS (Card Sound)**	**TP (Turkey Point)**
June-03	10-Jun	26-Jun	1-Jul	
September-03	4-Sep	1-Sep	30-Aug	
November-03	17-Nov	11-Nov	8-Nov	4-Dec
December-03	15-Dec	17-Dec	11-Dec	16-Dec
January-04	16-Jan	4-Jan	18-Jan	22-Jan
February-04	13-Feb	15-Feb	21-Feb	18-Feb
March-04	4-Mar	15-Mar	19-Mar	8-Mar
April-04	22-Apr	31-Mar	19-Apr	8-Apr

B. Water Depths (cm) at time of Sample. Bold font indicates water levels below the concentration threshold of 12.5 (as defined by Lorenz 2000). Asterisks indicate the depth was estimated from hydrolab data rather than measured directly.

	Site			
Sample	**MB (Manatee Bay)**	**BS (Barnes Sound)**	**CS (Card Sound)**	**TP (Turkey Point)**
June-03	21	**12**	24	-
September-03	29	24	40	-
November-03	39	55	48	55*
December-03	27	20	30	31*
January-04	24	**4**	35	30*
February-04	**12**	**5**	35	24
March-04	24	24	40	20*
April-04	15	20	37	35*

Table 2. Number of fish collected by species at Manatee Bay (MB) in 2003-2004.

Common Name	Species	June	Sep	Nov	Dec	Jan	Feb	Mar	Apr	Total
Clown Goby	*Microgobius gulosus*	32	20	35	45	29	62	7	19	249
Goldspotted killifish	*Floridichthys carpio*	39	28	35	25	15	15	5	53	215
Sailfin Molly	*Poecilia latipinna*	0	0	0	2	12	51	109	14	188
Rainwater killifish	*Lucania parva*	7	13	15	7	13	38	2	5	100
Silversides	*Menidia peninsulae*	0	0	0	0	0	1	2	16	19
Sheepshead Minnow	*Cyprinodon variegatus*	1	0	0	0	13	1	0	1	16
Eastern mosquitofish	*Gambusia holbrooki*	0	0	0	0	6	4	3	2	15
Gulf Toadfish	*Opsanus beta*	1	0	0	0	2	4	0	7	14
Marsh killifish	*Fundulus confluentus*	0	0	0	0	0	2	2	0	4
Mojarras	*Gerreidae spp.*	0	0	0	0	3	0	0	0	3
Gulf killifish	*Fundulus grandis*	0	0	0	0	0	1	1	0	2
Redfin needlefish	*Strongylura notata*	0	0	0	0	0	0	0	1	1
Bluefin killifish	*Lucania goodei*	0	0	0	0	1	0	0	0	1
Total	**13**	**80**	**61**	**85**	**79**	**94**	**179**	**131**	**118**	**827**

Table 3. Biomass (g) of fish collected by species at Manatee Bay (MB) in 2003-2004.

Common Name	Species	June	Sep	Nov	Dec	Jan	Feb	Mar	Apr	Total
Sailfin Molly	*Poecilia latipinna*	0	0	0	2.88	19.26	39.79	125.33	14.69	201.95
Goldspotted killifish	*Floridichthys carpio*	16.46	6.76	4.68	32.09	24.12	15.37	5.63	43.65	148.76
Clown Goby	*Microgobius gulosus*	10.88	3.77	7.87	10.18	7.02	25.13	2.99	11.43	79.27
Rainwater killifish	*Lucania parva*	2.1	1.92	3.16	0.98	1.53	11.05	0.46	1.27	22.47
Gulf Toadfish	*Opsanus beta*	0.59	0	0	0	1.05	11.49	0	6.24	19.37
Sheepshead Minnow	*Cyprinodon variegatus*	0.39	0	0	0	14.8	0.89	0	1.55	17.63
Mojarras	*Gerreidae spp.*	0	0	0	0	7.59	0	0	0	7.59
Marsh killifish	*Fundulus confluentus*	0	0	0	0	0	3.37	2.98	0	6.35
Silversides	*Menidia peninsulae*	0	0	0	0	0	0.35	0.97	3.37	4.69
Eastern mosquitofish	*Gambusia holbrooki*	0	0	0	0	1.47	1.42	0.89	0.41	4.19
Gulf killifish	*Fundulus grandis*	0	0	0	0	0	1.83	1.1	0	2.93
Bluefin killifish	*Lucania goodei*	0	0	0	0	0.07	0	0	0	0.07
Redfin needlefish	*Strongylura notata*	0	0	0	0	0	0	0	0.03	0.03
Total	**13**	**30.42**	**12.45**	**15.71**	**46.13**	**76.91**	**110.69**	**140.35**	**82.64**	**515.3**

Table 4. Number of fish collected by species at Barnes Sound (BS) in 2003-2004.

Common Name	Species	Jun-03	Sep-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04	Total
Sheepshead Minnow	*Cyprinodon variegatus*	14	5	0	0	84	33	0	1	137
Goldspotted killifish	*Floridichthys carpio*	40	19	4	11	21	20	4	4	123
Clown Goby	*Microgobius gulosus*	10	7	53	15	14	8	4	5	116
Rainwater killifish	*Lucania parva*	19	13	5	5	15	8	7	5	77
Sailfin Molly	*Poecilia latipinna*	8	2	2	1	43	2	0	0	58
Marsh killifish	*Fundulus confluentus*	0	0	0	0	27	0	0	0	27
Silversides	*Menidia peninsulae*	0	6	2	7	0	0	0	0	15
Gulf killifish	*Fundulus grandis*	1	0	0	0	2	11	0	0	14
Mojarras	*Gerreidae* spp.	1	4	0	4	0	0	0	0	9
Diamond killifish	*Adinia xenica*	0	0	0	0	8	1	0	0	9
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	3	0	0	0	3
Eastern mosquitofish	*Gambusia holbrooki*	0	0	0	0	1	0	0	0	1
Mayan Cichlid	*Cichlasoma urophthalmus*	0	0	0	0	1	0	0	0	1
Gulf Toadfish	*Opsanus beta*	0	0	0	0	0	1	0	0	1
Total	**14**	**93**	**56**	**66**	**43**	**219**	**84**	**15**	**15**	**591**

Table 5. Biomass (g) of fish collected by species at Barnes Sound (BS) in 2003-2004.

Common Name	Species	June	Sep	Nov	Dec	Jan	Feb	Mar	Apr	Total
Sailfin Molly	*Poecilia latipinna*	13.91	0.34	0.14	1.46	71.24	2.38	0	0	89.47
Sheepshead Minnow	*Cyprinodon variegatus*	8.98	0.17	0	0	50.94	23.45	0	0.24	83.78
Goldspotted killifish	*Floridichthys carpio*	34.17	2.89	0.34	2	19.65	19.61	3.58	0.98	83.22
Marsh killifish	*Fundulus confluentus*	0	0	0	0	68.36	0	0	0	68.36
Gulf killifish	*Fundulus grandis*	1.38	0	0	0	9.81	41.87	0	0	53.06
Clown Goby	*Microgobius gulosus*	2.14	1.89	4.17	2.81	5.27	2.36	1.75	2.4	22.79
Rainwater killifish	*Lucania parva*	7.21	3.1	0.39	0.81	2.98	1.91	1.3	0.84	18.54
Gulf Toadfish	*Opsanus beta*	0	0	0	0	0	16.92	0	0	16.92
Mojarras	*Gerreidae spp.*	6.96	4.93	0	3.06	0	0	0	0	14.95
Silversides	*Menidia peninsulae*	0	1.77	2.47	2.33	0	0	0	0	6.57
Mayan Cichlid	*Cichlasoma urophthalmus*	0	0	0	0	4.46	0	0	0	4.46
Diamond killifish	*Adinia xenica*	0	0	0	0	2.48	0.23	0	0	2.71
Eastern mosquitofish	*Gambusia holbrooki*	0	0	0	0	0.37	0	0	0	0.37
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0.12	0	0	0	0.12
Total	**14**	**74.75**	**15.09**	**7.51**	**12.47**	**235.68**	**108.73**	**6.63**	**4.46**	**465.32**

Table 6. Number of fish collected by species at Card Sound (CS) in 2003-2004.

Common Name	Species	June	Sep	Nov	Dec	Jan	Feb	Mar	Apr	Total
Clown Goby	*Microgobius gulosus*	23	52	46	80	46	12	17	17	293
Sailfin Molly	*Poecilia latipinna*	60	0	0	5	100	2	11	7	185
Rainwater killifish	*Lucania parva*	15	20	19	6	22	6	3	15	106
Goldspotted killifish	*Floridichthys carpio*	17	0	2	37	19	1	4	16	96
Mojarras	*Gerreidae spp.*	4	8	2	31	0	1	10	1	57
Eastern mosquitofish	*Gambusia holbrooki*	4	1	5	14	1	11	9	9	54
Silversides	*Menidia peninsulae*	1	0	0	18	0	1	17	5	42
Sheepshead Minnow	*Cyprinodon variegatus*	0	0	0	11	6	0	0	0	17
Gulf Toadfish	*Opsanus beta*	6	1	0	0	0	0	1	1	9
Mojarras (> 6.5cmSL)	*Gerreidae spp.*	2	3	0	0	0	0	0	0	5
Marsh killifish	*Fundulus confluentus*	0	0	0	0	1	0	0	0	1
Total	**11**	**132**	**85**	**74**	**202**	**195**	**34**	**72**	**71**	**865**

Table 7. Biomass (g) of fish collected by species at Card Sound (CS) in 2003-2004.

Common Name	Species	June	Sep	Nov	Dec	Jan	Feb	Mar	Apr	Total
Sailfin Molly	*Poecilia latipinna*	159.3	0	0	8.05	84.04	3.97	11.61	9.44	276.41
Goldspotted killifish	*Floridichthys carpio*	25.11	0	0.25	51.32	55.08	0.56	5.62	8.57	146.51
Mojarras	*Gerreidae spp.*	18.94	7.36	0.16	75.16	0	1.32	28.93	0.05	131.92
Clown Goby	*Microgobius gulosus*	8.93	15.77	11.4	17.3	11.51	2.09	9.38	7.73	84.11
Mojarras (> 6.5cmSL)	*Gerreidae spp.*	22.26	41.02	0	0	0	0	0	0	63.28
Rainwater killifish	*Lucania parva*	3.32	1.86	1.48	0.85	4.67	1.23	0.95	3.74	18.1
Silversides	*Menidia peninsulae*	0.98	0	0	10.22	0	0.23	3.56	1.02	16.01
Sheepshead Minnow	*Cyprinodon variegatus*	0	0	0	10.37	4.64	0	0	0	15.01
Eastern mosquitofish	*Gambusia holbrooki*	0.42	0.05	0.71	3.39	0.38	2.11	1.72	2.3	11.08
Gulf Toadfish	*Opsanus beta*	4.33	1.03	0	0	0	0	0.29	0.02	5.67
Marsh killifish	*Fundulus confluentus*	0	0	0	0	1.7	0	0	0	1.7
Total	**11**	**243.59**	**67.09**	**14**	**176.66**	**162.02**	**11.51**	**62.06**	**32.87**	**769.8**

Table 8. Number of fish collected by species at Turkey Point (TP) in 2003-2004.

Common Name	Species	June	Sep	Nov	Dec	Jan	Feb	Mar	Apr	Total
Sheepshead Minnow	*Cyprinodon variegatus*			0	0	22	114	87	7	230
Goldspotted killifish	*Floridichthys carpio*			23	30	60	74	10	26	223
Rainwater killifish	*Lucania parva*			13	7	34	31	53	61	199
Sailfin Molly	*Poecilia latipinna*			0	46	28	20	12	11	117
Clown Goby	*Microgobius gulosus*			7	0	17	8	3	5	40
Mojarras	*Gerreidae spp.*			8	13	4	1	2	5	33
Silversides	*Menidia peninsulae*			0	0	8	2	9	12	31
Eastern mosquitofish	*Gambusia holbrooki*			7	0	3	0	2	3	15
Gulf Toadfish	*Opsanus beta*			4	3	2	0	2	2	13
Total	**9**			**62**	**99**	**178**	**250**	**180**	**132**	**901**

Table 9. Biomass (g) of fish collected by species at Turkey Point (TP) in 2003-2004.

Common Name	Species	June	Sep	Nov	Dec	Jan	Feb	Mar	Apr	Total
Sailfin Molly	*Poecilia latipinna*			0	70.96	43.7	20.38	7.46	13.44	155.94
Goldspotted killifish	*Floridichthys carpio*			6.94	17.05	55.19	55.07	4.01	14.73	152.99
Sheepshead Minnow	*Cyprinodon variegatus*			0	0	17.89	64.36	45.48	3.27	131
Rainwater killifish	*Lucania parva*			1.82	1.38	5.19	3.96	8.79	8.46	29.6
Mojarras	*Gerreidae spp.*			5.81	8.7	2.32	0.53	0.62	2.81	20.79
Clown Goby	*Microgobius gulosus*			1.63	0	6.08	3.54	1.3	3.94	16.49
Gulf Toadfish	*Opsanus beta*			1.02	1.23	0.59	0	1.05	9.18	13.07
Eastern mosquitofish	*Gambusia holbrooki*			2.32	0	0.86	0	0.52	0.84	4.54
Silversides	*Menidia peninsulae*			0	0	0.73	0.16	1.12	1.59	3.6
Total	**9**			**19.54**	**99.32**	**132.55**	**148**	**70.35**	**58.26**	**528.02**

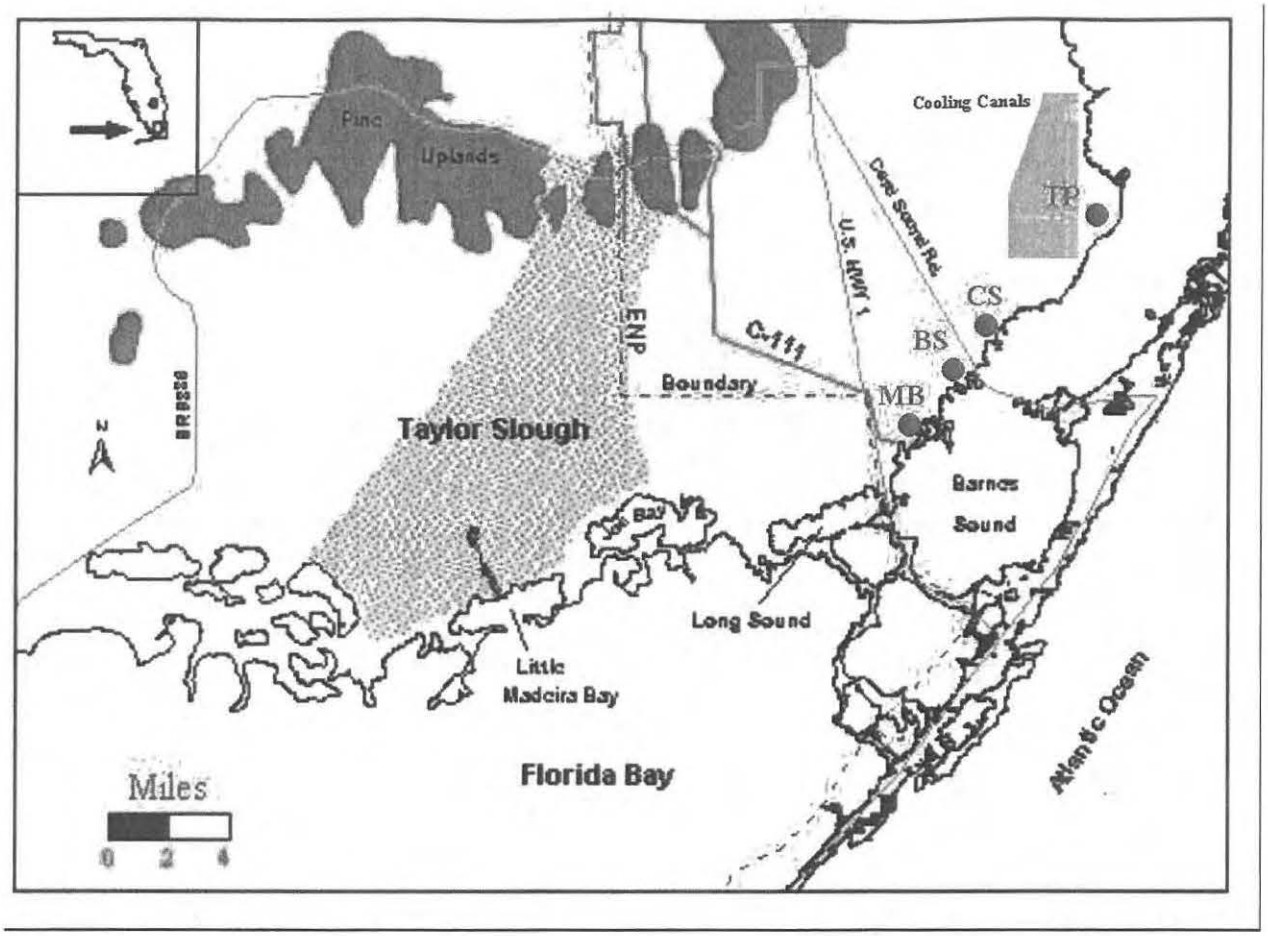


Figure 1. Map of southeastern Florida indicating the location of southern Biscayne Bay fish sampling sites in relation to Taylor Slough, US-1, Card Sound Road, C-111 canal, and Turkey Point Nuclear Power Plant cooling canals.

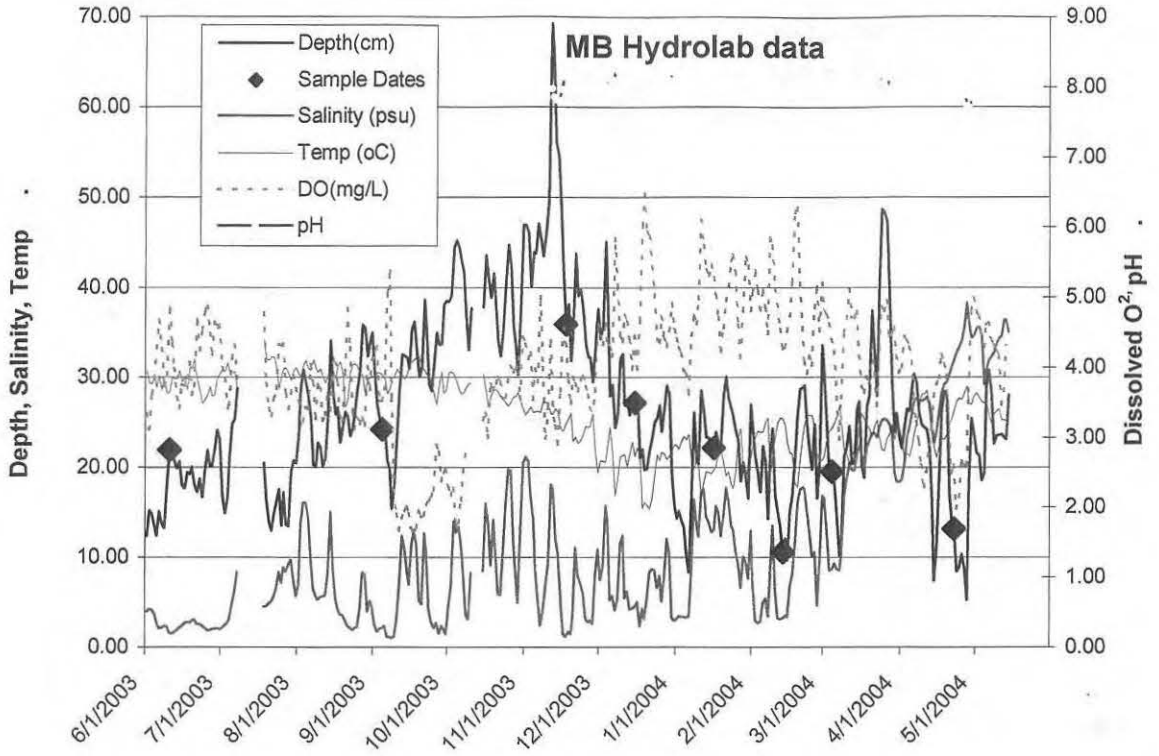


Figure 2. Physical data collected at MB (Manatee Bay) by hydrolab from June 2003 to May 2004.

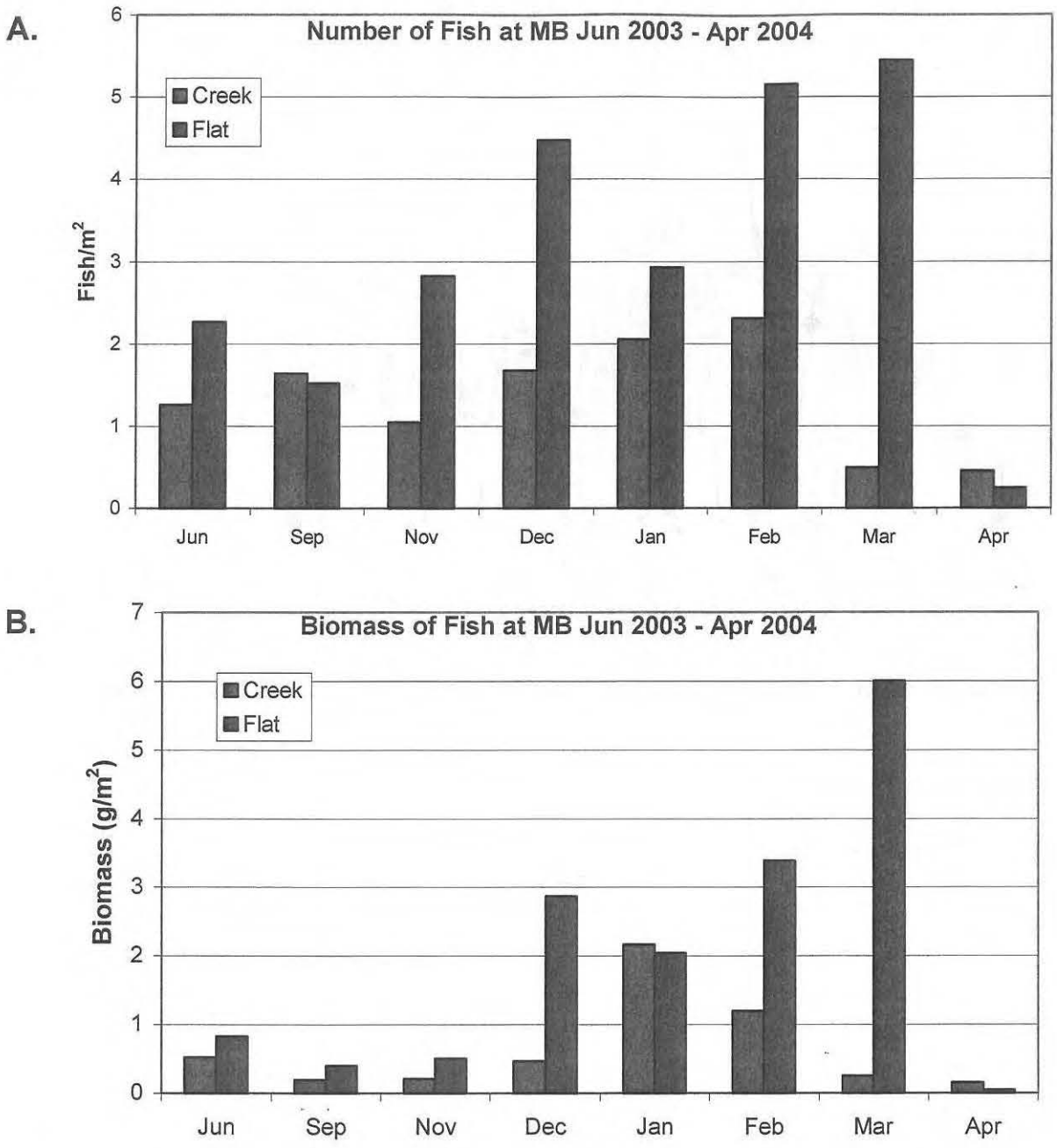


Figure 3. Numbers (A) and biomass (B) of fish collected at MB (Manatee Bay) in both creeks and flats habitats.

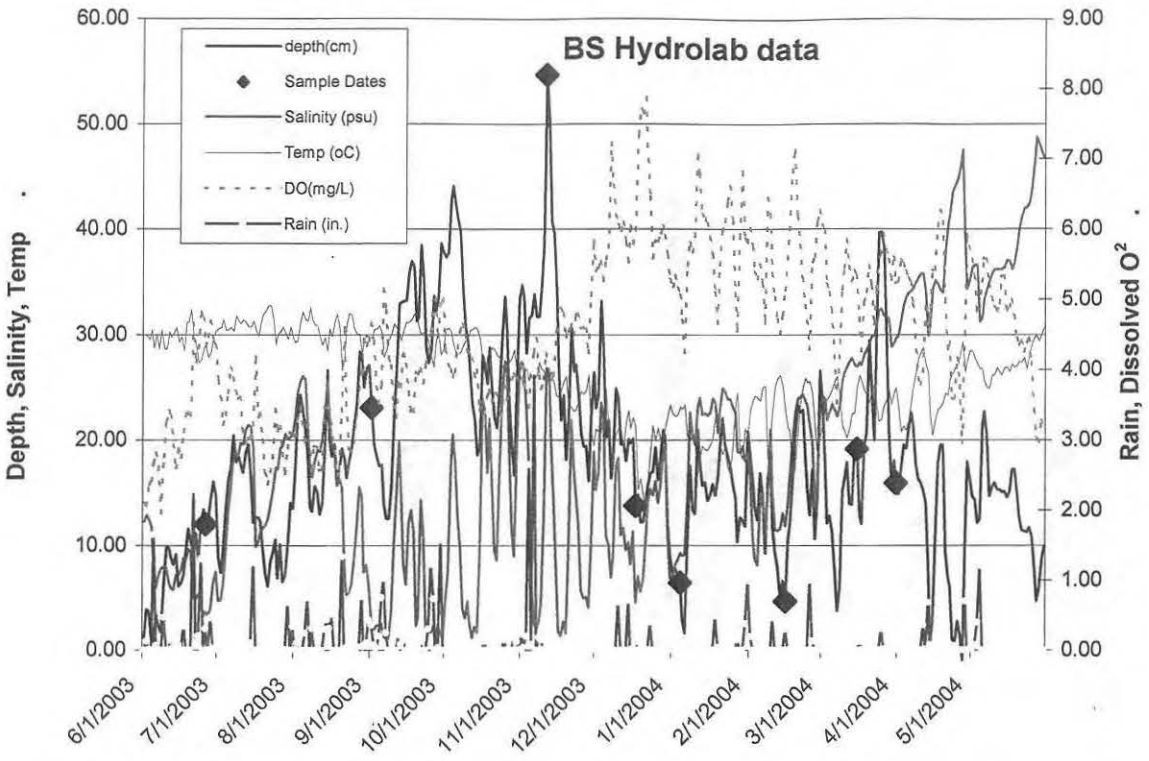


Figure 4. Physical data collected at BS (Barnes Sound) by Hydrolab from June 2003 to May 2004.

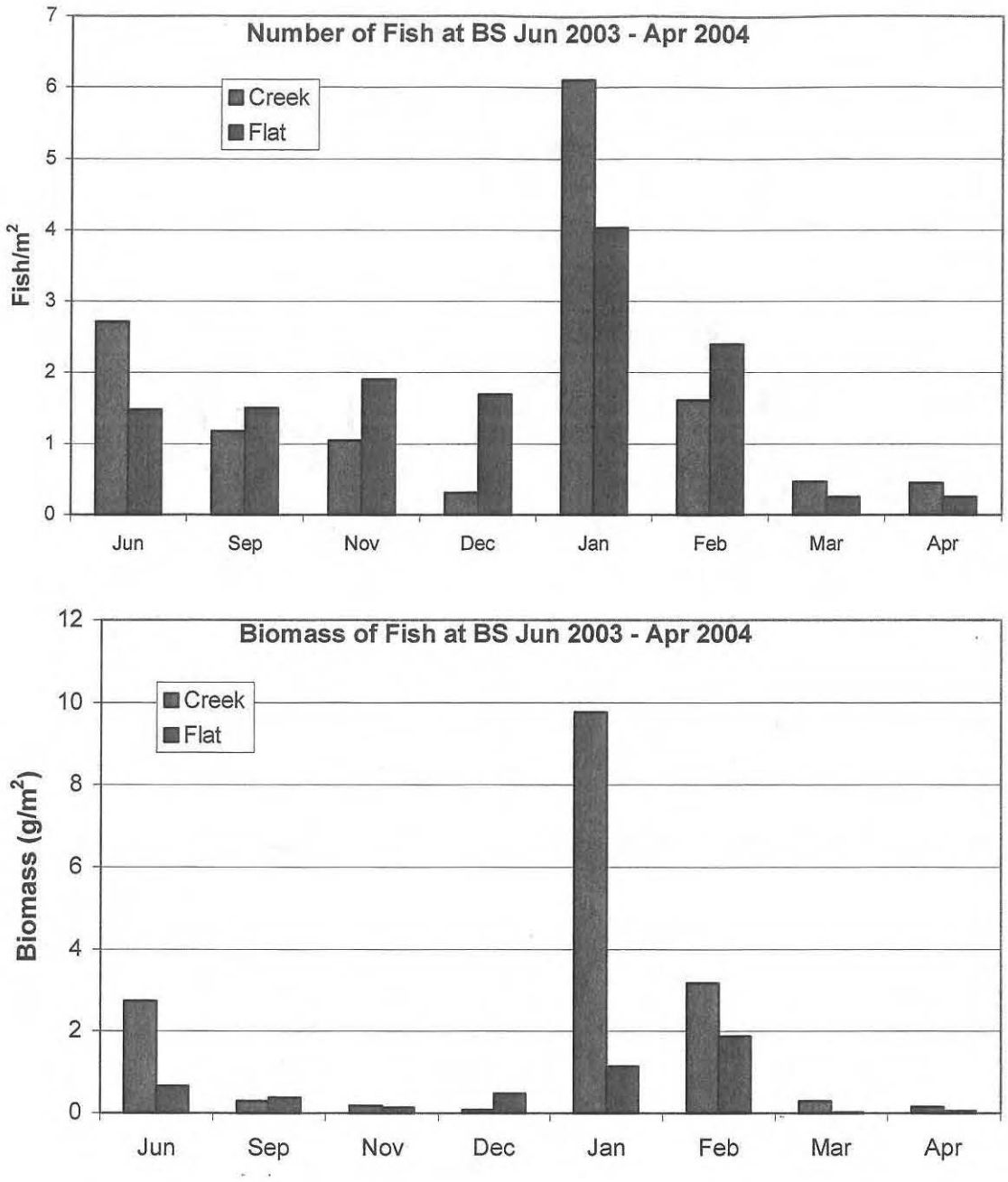


Figure 5. Numbers (A) and biomass (B) of fish collected at BS (Barnes Sound) in both creeks and flats habitats.

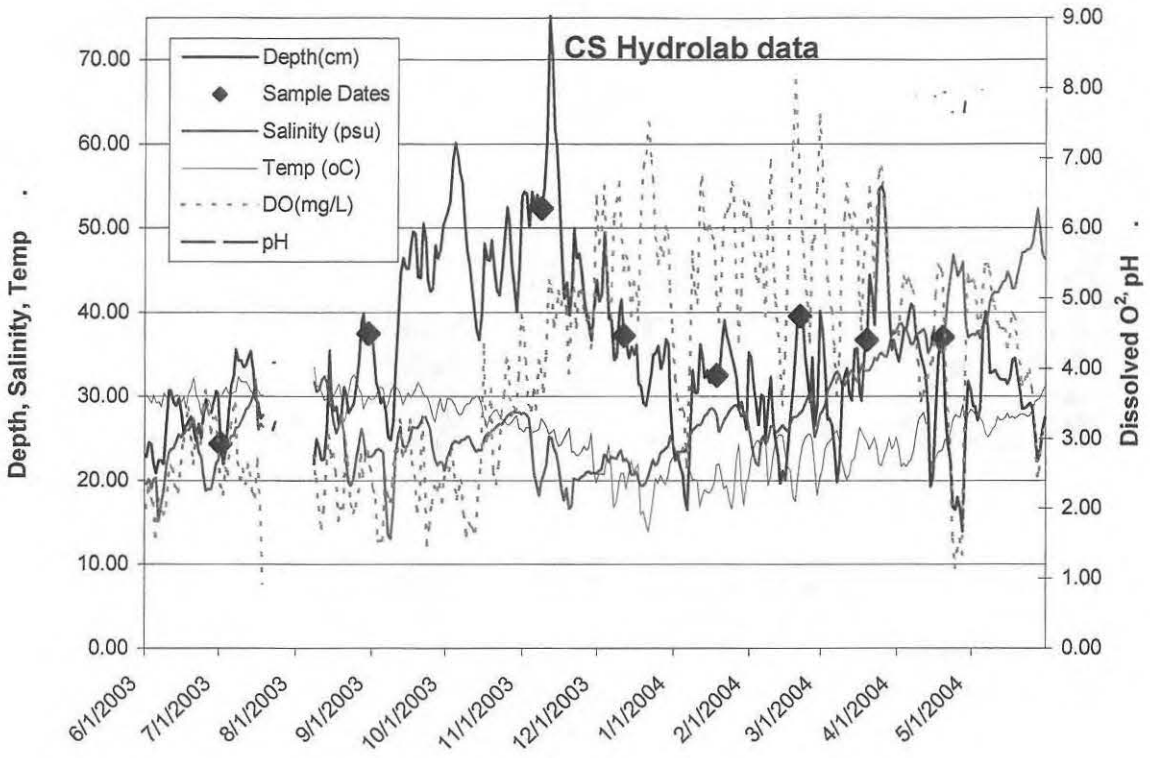
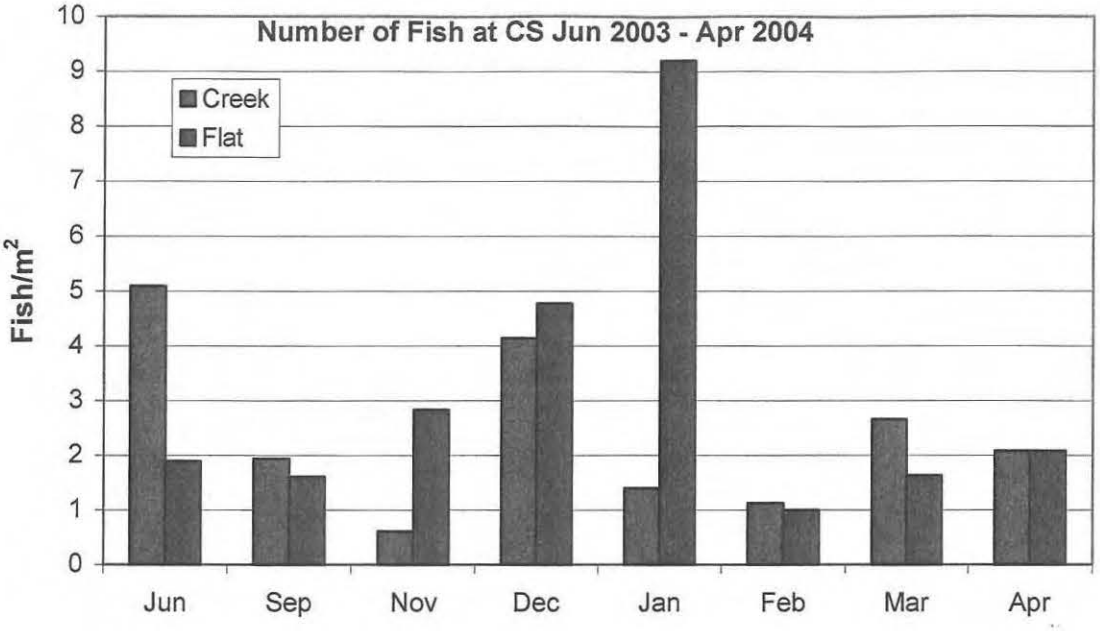


Figure 6. Physical data collected at CS (Card Sound) by Hydrolab from June 2003 to May 2004.

A.



B.

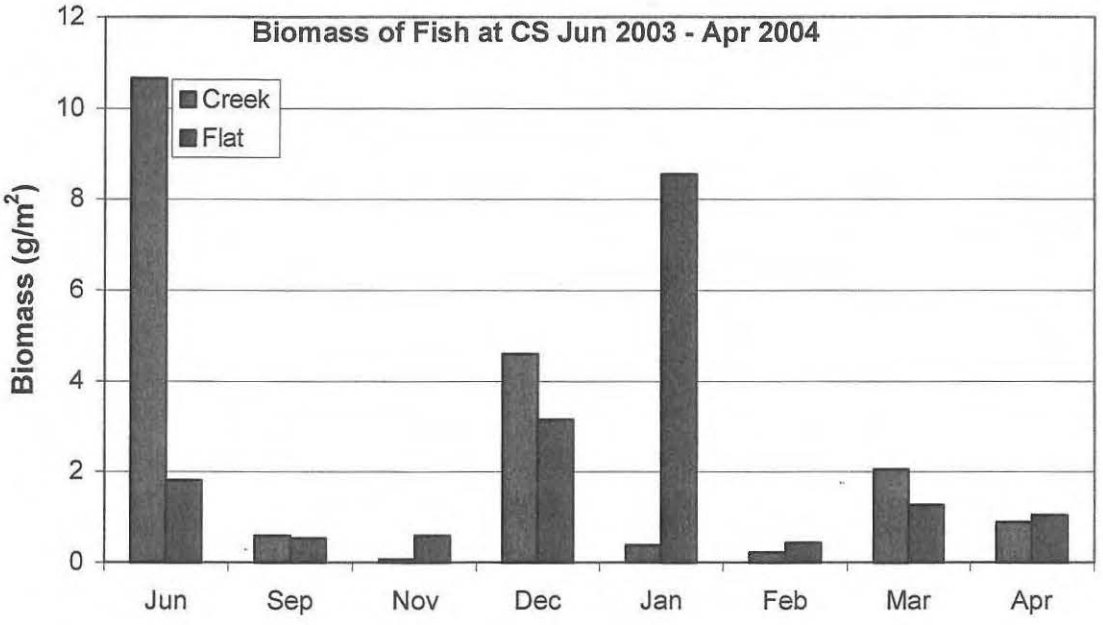


Figure 7. Numbers (A) and biomass (B) of fish collected at CS (Card Sound) in both creek and flats habitats.

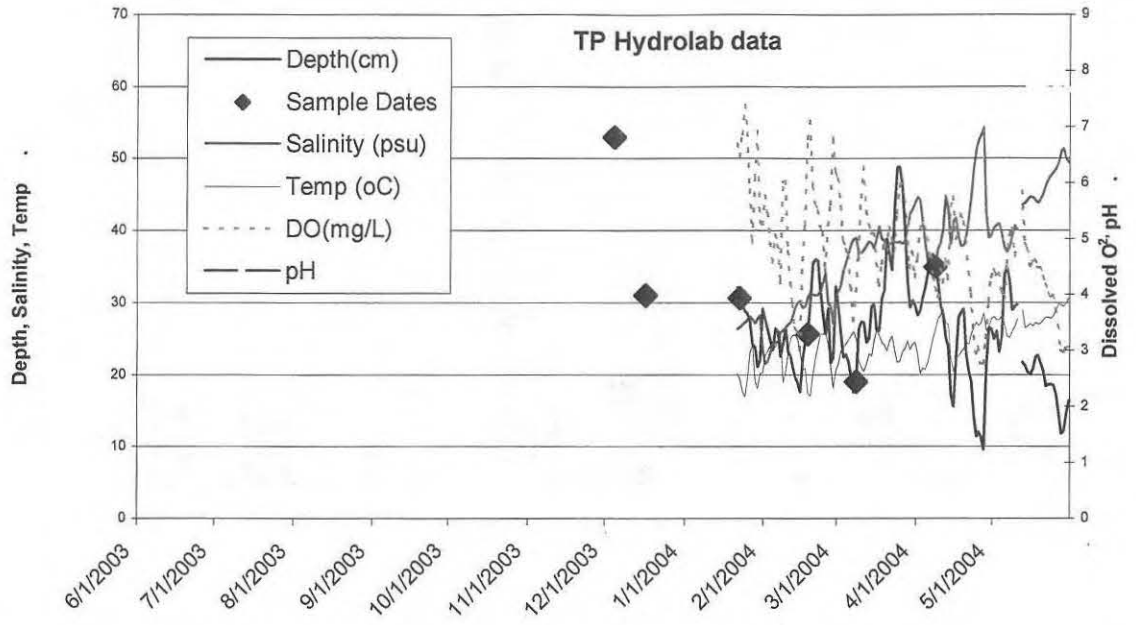


Figure 8. Physical data collected at TP (Turkey Point) by Hydrolab from June 2003 to May 2004.

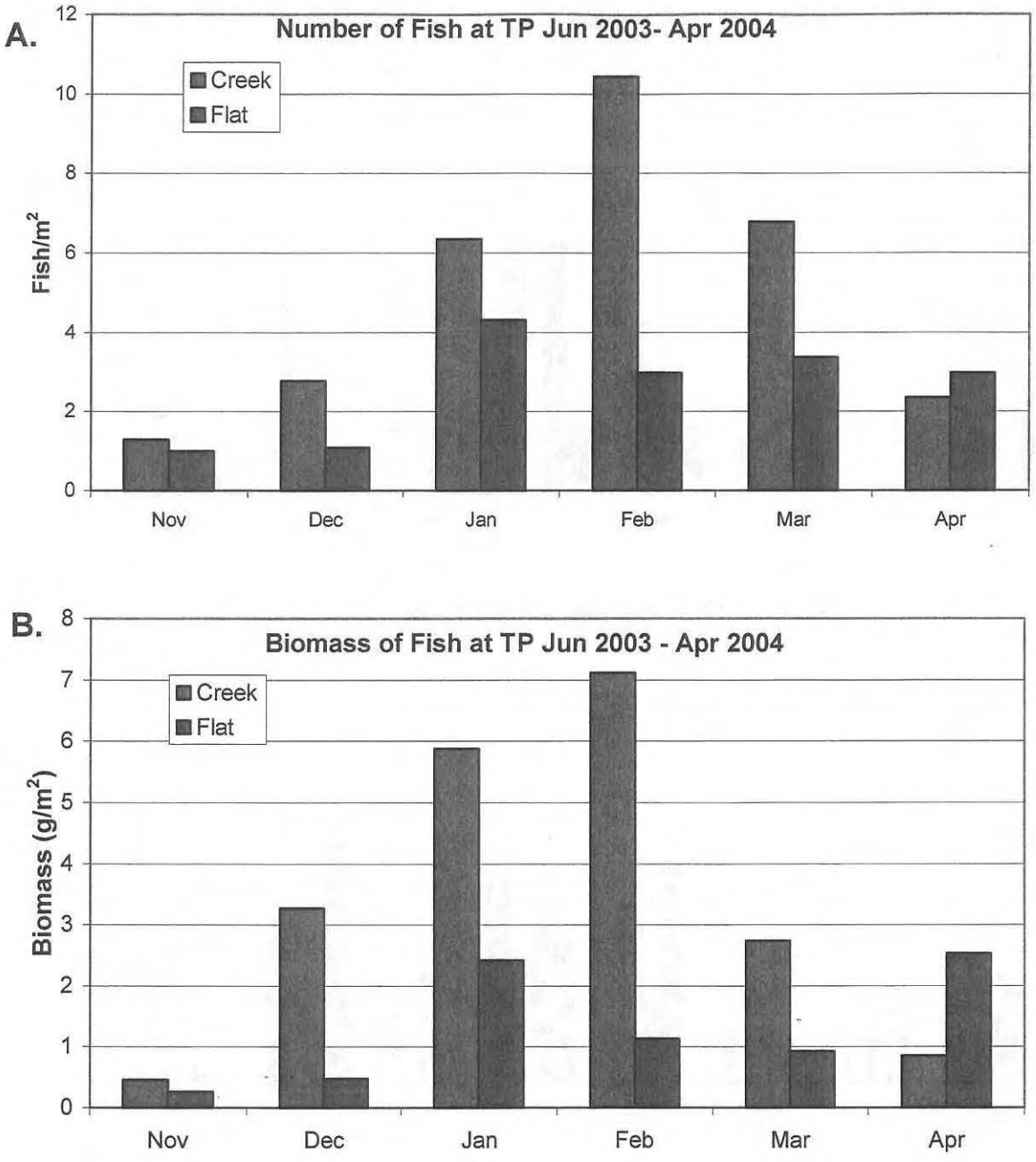


Figure 9. Numbers (A) and biomass (B) of fish collected at TP (Turkey Point) in both creeks and flats habitats.

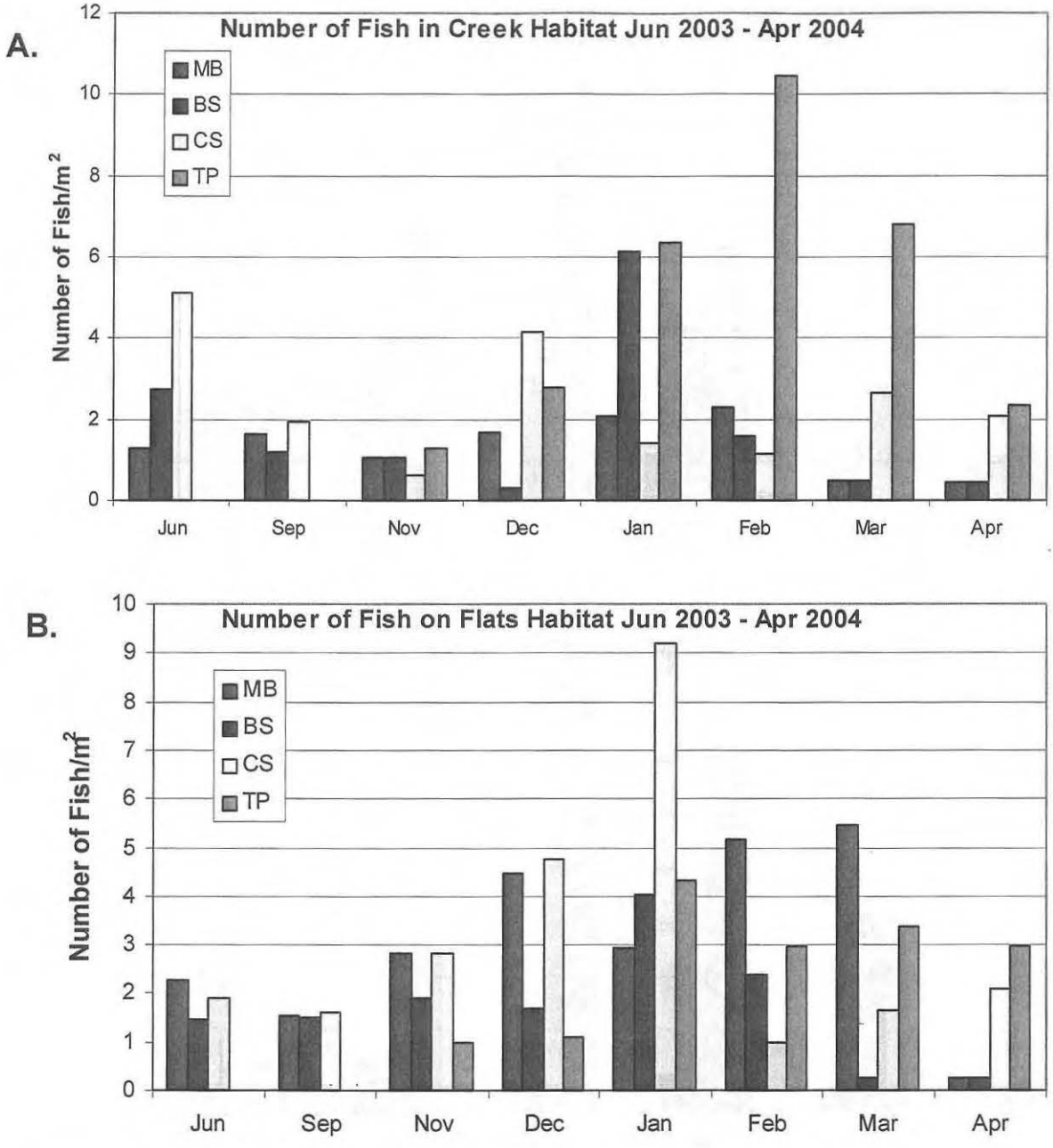


Figure 10. A comparison of fish numbers collected at the four sites in both creek (A) and flats (B) habitats.

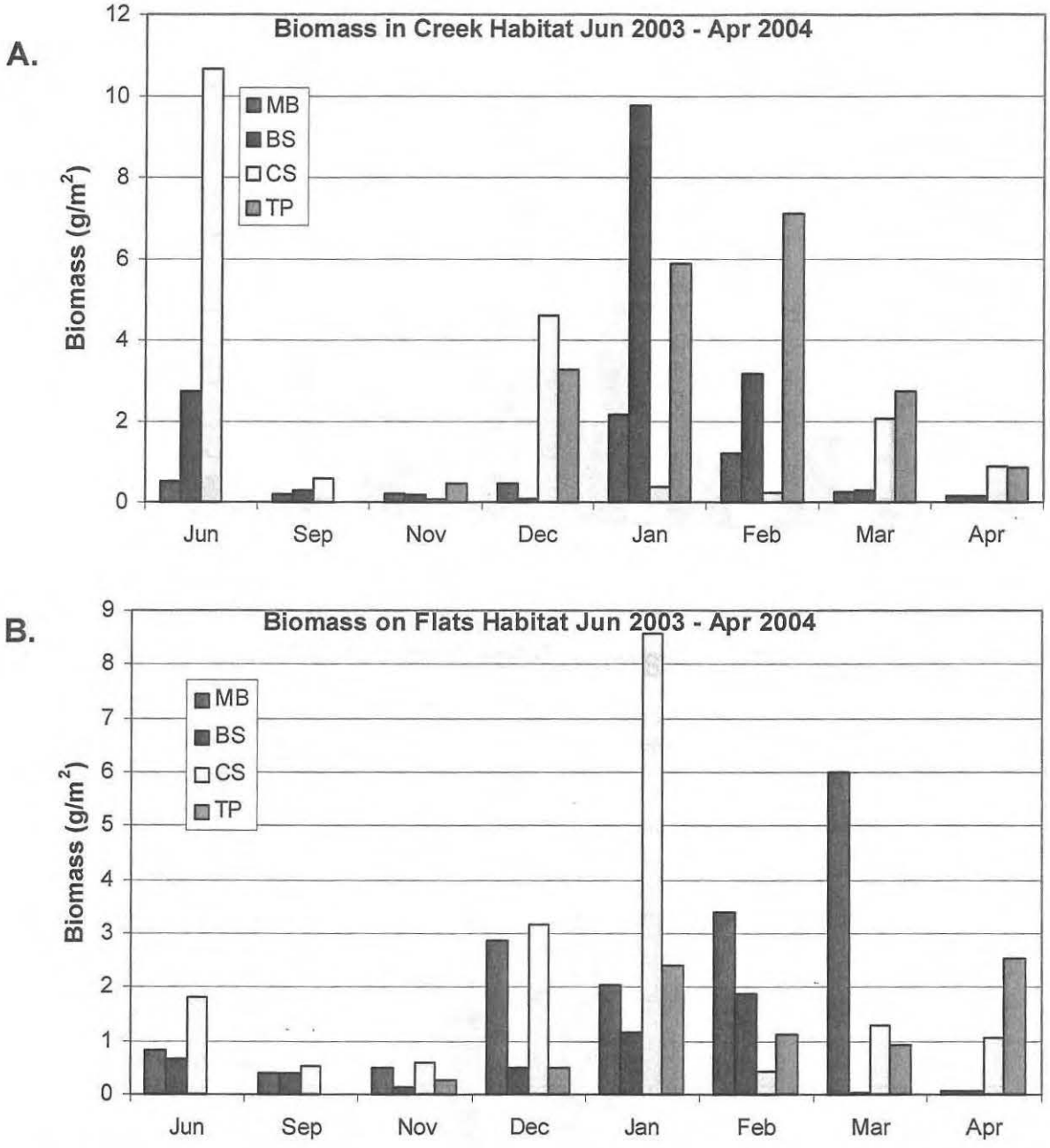


Figure 11. A comparison of fish biomass collected at the four sites in both creek (A) and flats (B) habitats.

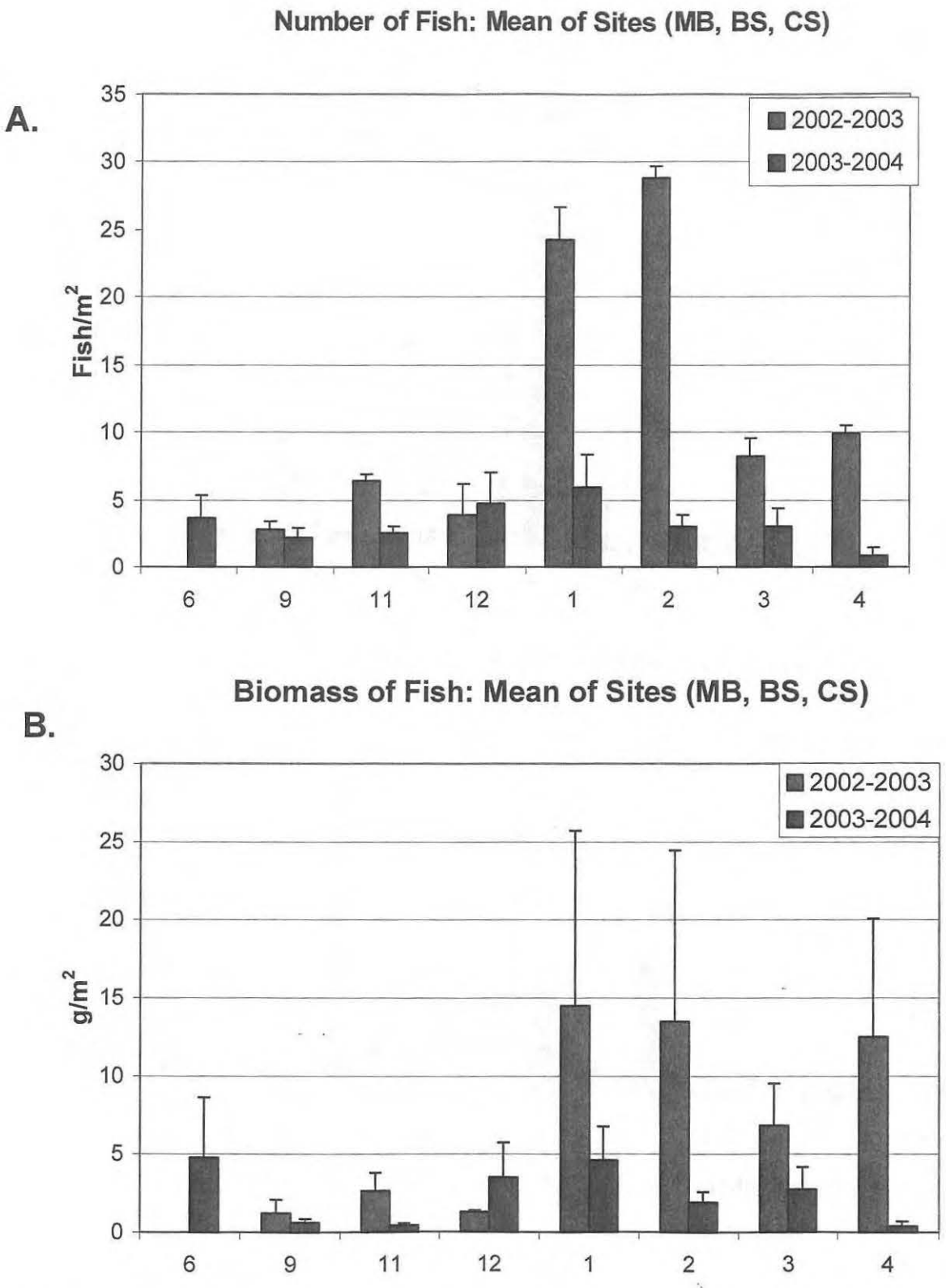


Figure 12. Site means comparing numbers of fish (A) and fish biomass (B) for each hydrologic year.

Appendix A, Table 1. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in October 2002. Sample size: overall=48, 1s=10, 2n=4, 2s=16, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	*Paraclinus fasciatus*	0.0417	0	0	0.4	0	0	0.08	0	0.2887	0	0	0.4	0	0	0.08	0
Bank cusk-eel	*Ophdion holbrooki*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	*Microgobius microlepis*	0.0208	0	0	0.2	0	0	0.04	0	0.1443	0	0	0.2	0	0	0.04	0
Barbfish	*Scorpaena brasiliensis*	0.0208	0	0.0625	0	0	0	0.0125	0	0.1443	0	0.0625	0	0	0	0.0125	0
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	*Barbulifer ceuthoeus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	*Holacanthus bermudensis*	0.0208	0	0	0	0	0.0769	0.0154	0	0.1443	0	0	0	0	0.0769	0.0154	0
Bluelip parrotfish	*Cryptotomus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	*Haemulon sciurus*	0.0208	0	0.0625	0	0	0	0.0125	0.1	0.1443	0	0.0625	0	0	0	0.0125	0.1
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	*Microgobius gulosus*	0.25	1	0.0625	0	0	0.0769	0.2279	0	1.0417	0.6831	0.0625	0	0	0.0769	0.1306	0
Code goby	*Gobiosoma robustum*	1	1.3	0.375	0.2	0.75	1.9231	0.9096	0.9	1.5437	0.4485	0.1797	0.2	0.4787	0.6249	0.0857	0.4069
Crested goby	*Lophogobius cyprinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	*Parophidion schmidti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	*Syngnathus floridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	*Cosmocampus hildebrandi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	*Hippocampus zosterae*	0.1667	0.2	0.0625	0	0.25	0.3077	0.164	0.3	0.5586	0.2	0.0625	0	0.25	0.2371	0.0501	0.2134
Frillfin goby	*Bathygobius soporator*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	*Anarchopterus criniger*	0.1042	0.2	0.125	0	0	0.0769	0.0804	0.4	0.3087	0.1333	0.0854	0	0	0.0769	0.026	0.2667
Gold brotula	*Gunterichthys longipenis*	0.0208	0	0	0	0	0.0769	0.0154	0	0.1443	0	0	0	0	0.0769	0.0154	0
Goldspot goby	*Gnatholepis thompsoni*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Goldspotted killifish	*Floridichthys carpio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	*Syngnathus scovelli*	0.0833	0	0	0	0.75	0.0769	0.1654	0	0.3472	0	0	0	0.4787	0.0769	0.0931	0
Gulf toadfish	*Opsanus beta*	0.1875	0.7	0	0	0.5	0	0.24	0.3	0.5322	0.2603	0	0	0.5	0	0.1005	0.2134
Hardhead silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 1. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	*Ogilbia cayorum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined seahorse	*Hippocampus erectus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	*Paraclinus marmoratus*	0.0208	0	0.0625	0	0	0	0.0125	0.1	0.1443	0	0.0625	0	0	0	0.0125	0.1
Mummichog	*Fundulus heteroclitus*	0.0417	0	0	0	0	0.1538	0.0308	0	0.2019	0	0	0	0	0.1042	0.0208	0
Northern pipefish	*Syngnathus fuscus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Planehead filefish	*Monocanthus hispidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	*Bryx dunckeri*	0.125	0	0	0	0.5	0.3077	0.1615	0	0.4436	0	0	0	0.5	0.1748	0.0973	0
Rainwater killifish	*Lucania parva*	3.0833	7.8	0	0	7	3.2308	3.6062	4.2	6.5488	3.2311	0	0	3.8079	1.6375	0.7926	3.9827
Redfin brotula	*Petrotyx sanguineus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	*Syngnathus pelagicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	*Eucinostomus gula*	0.0208	0	0	0	0.25	0	0.05	0.1	0.1443	0	0	0	0.25	0	0.05	0.1
Spotfin jawfish	*Opistognathus robinsi*	0.4167	0.1	0.625	1	0	0.3077	0.4065	0.7	1.1639	0.1	0.4366	0.6325	0	0.1748	0.1162	0.423
Spotted dragonet	*Diplogrammus pauciradiatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	*Ophidion marginatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Fish		5.6458	11.3	1.4375	1.8	10	6.6154	6.2306	7.2	7.8915	3.8182	0.6322	1.1136	4.4535	1.7742	0.7547	3.9519

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	*Farfantepenaeus duorarum*	0.5	0.9	0.3125	0.2	0.75	0.4615	0.5248	0.4	0.7438	0.2769	0.1983	0.2	0.25	0.1831	0.0178	0.3055
	Alpheus heterochaelis	0.0208	0	0	0	0	0.0769	0.0154	1.5	0.1443	0	0	0	0	0.0769	0.0154	1.3924
	Alpheus normanni	0.0208	0	0.0625	0	0	0	0.0125	0	0.1443	0	0.0625	0	0	0	0.0125	0
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.1667	0	0.0625	0.2	0	0.4615	0.1448	0	0.6631	0	0.0625	0.2	0	0.3323	0.0646	0
	Hippolyte zostericola	8.6042	6.5	2.5625	0.6	20	17.231	9.3787	1.2	13.155	2.9972	1.3601	0.4	11.083	4.3621	1.8872	0.786
	Latreutes fucorum	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0.2
	Leander tenuicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0.0625	0	0	0.6	0	0	0.12	0	0.433	0	0	0.6	0	0	0.12	0
	Palaemonetes intermedius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 1. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Palaemonetes pugio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes vulgaris	0.8958	3.9	0	0	0	0.3077	0.8415	0.1	5.6465	3.9	0	0	0	0.3077	0.7669	0.1
	Periclimenes americanus	0	0	0	0	0	0	0	3.5	0	0	0	0	0	0	0	2.8607
	Periclimenes longicaudatus	0.1458	0	0.3125	0.4	0	0	0.1425	3.3	0.5049	0	0.1983	0.2449	0	0	0.0548	1.9553
	Processa bermudensis	0.0417	0	0.0625	0.2	0	0	0.0525	0.1	0.2019	0	0.0625	0.2	0	0	0.0388	0.1
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	9.7917	9	13.313	2.4	0	11.923	7.3271	24.3	30.03	8.4591	9.7599	1.5033	0	8.8139	2.0481	16.169
	Thor manningi	21.021	28.7	5.6875	4	0.25	46.923	17.112	92.5	57.474	26.747	4.0111	4	0.25	21.249	5.3202	36.051
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		40.771	48.1	22.063	8.4	20.25	76.923	35.147	126.7	82.955	37.168	11.934	6.0795	10.942	29.165	5.9799	43.057

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	*Callinectes sapidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Callinectes similis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Callinectes sp.	0.125	0.1	0.0625	0	0	0.3077	0.094	0	0.3928	0.1	0.0625	0	0	0.1748	0.033	0
	Epialtus dilatatus	0.0208	0	0	0.2	0	0	0.04	0	0.1443	0	0	0.2	0	0	0.04	0
	Eurypanopeus sp	0.8542	3.7	0	0	0.25	0.2308	0.8362	0.4	4.7713	3.2696	0	0	0.25	0.1662	0.6349	0.3055
	Libinia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crabs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		1	3.8	0.0625	0.2	0.25	0.5385	0.9702	0.7	4.7714	3.2585	0.0625	0.2	0.25	0.2683	0.6137	0.4726

APPENDIX A, Table 2. Abundance and variability of fish and shrimp collected in southern Biscayne Bay with the throw-trap in December 2002. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	*Paraclinus fasciatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank cusk-eel	*Ophidion holbrooki*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	*Microgobius microlepis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	*Scorpaena brasiliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	*Barbulifer ceuthoeus*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	*Holacanthus bermudensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	*Cryptotomus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	*Haemulon sciurus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	*Microgobius gulosus*	0.2407	1	0	0	0	0.1333	0.2267	0	0.1266	0.556	0	0	0	0.1538	0.1077	0
Code goby	*Gobiosoma robustum*	1.2222	2.3636	0.8824	0	1.375	0.9333	1.1109	1.4	0.1825	0.5094	0.2319	0	0.3239	0.3662	0.0844	0.4761
Crested goby	*Lophogobius cyprinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	*Parophidion schmidti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	*Syngnathus floridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	*Cosmocampus hildebrandi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	*Hippocampus zosterae*	0.1296	0.1818	0.1765	0	0.25	0	0.1217	0.1	0.0594	0.122	0.1307	0	0.25	0	0.0469	0.1
Frillfin goby	*Bathygobius soporator*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	*Anarchopterus criniger*	0.2778	0.0909	0.5294	0	0.125	0.2667	0.2024	0.1	0.1134	0.0909	0.3026	0	0.125	0.1332	0.0491	0.1
Gold brotula	*Gunterichthys longipenis*	0.0556	0.0909	0	0	0.25	0	0.0682	0.4	0.0411	0.0909	0	0	0.25	0	0.0487	0.2667
Goldspot goby	*Gnatholepis thompsoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	*Floridichthys carpio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0.1	0	0	0.073	0	0	0	0.0146	0.1
Gulf pipefish	*Syngnathus scovelli*	0.2037	0.9091	0.0588	0	0	0	0.1936	0.2	0.0852	0.3426	0.1516	0	0	0	0.0876	0.2
Gulf toadfish	*Opsanus beta*	0.4074	0.6364	0.0588	0	1.25	0.2667	0.4424	0.3	0.1361	0.3878	0.0529	0	0.559	0.2371	0.1039	0.2134
Hardhead silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 2. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	*Ogilbia cayorum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined seahorse	*Hippocampus erectus*	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0.1333
Lined sole	*Achirus lineatus*	0.0185	0	0	0	0	0.0667	0.0133	0	0.0185	0	0	0	0	0.0769	0.0154	0
Marbled blenny	*Paraclinus marmoratus*	0.0741	0.0909	0.0588	0	0.125	0.0667	0.0683	0	0.036	0.0909	0.0529	0	0.125	0.0769	0.0209	0
Mummichog	*Fundulus heteroclitus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	*Syngnathus fuscus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Planehead filefish	*Monocanthus hispidus*	0.0185	0	0	0.2	0	0	0.04	0	0.0185	0	0	0.2	0	0	0.04	0
Pugnose pipefish	*Bryx dunckeri*	0.037	0	0.1176	0	0	0	0.0235	0.1	0.0259	0	0.073	0	0	0	0.0146	0.1
Rainwater killifish	*Lucania parva*	3.8889	3.2727	0.3529	0	10	5.8667	3.8985	3.1	1.102	1.4148	0.2928	0	3.6105	3.4065	0.7584	1.4716
Redfin brotula	*Petrotyx sanguineus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Sargassum pipefish	*Syngnathus pelagicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	*Eucinostomus gula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin jawfish	*Opistognathus robinsi*	0.7222	0	1.2353	0.2	0.125	1.0667	0.5254	0.6	0.166	0	0.2533	0.2	0.125	0.5083	0.0843	0.4
Spotted dragonet	*Diplogrammus pauciradiatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	*Ophidion marginatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0.3
unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Fish		7.2963	8.6364	3.4706	0.4	13.5	8.6667	6.9347	7.1	1.1242	1.5152	0.8316	0.2449	3.6499	3.1112	0.654	1.8163

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	*Farfantepenaeus duorarum*	0.4259	0.5455	0.4706	0	0.5	0.3333	0.3699	0.2	0.1044	0.3123	0.1952	0	0.189	0.1804	0.0501	0.1333
	Alpheus heterochaelis	0.0185	0	0.0588	0	0	0	0.0118	1.1	0.0185	0	0.0529	0	0	0	0.0106	0.6904
	Alpheus normanni	0.2222	0	0.5882	0.4	0	0	0.1976	2.2	0.0778	0	0.1973	0.2449	0	0	0.0547	1.2543
	Brachycarpus biunguiculatus	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0529	0	0	0	0.0106	0
	Hippolyte pleuracanthus	2.1296	1	0.9412	0.2	3.5	4.0667	1.9416	1.5	0.7833	0.3568	0.6014	0.2	3.3594	2.3332	0.6274	0.5217
	Hippolyte zostericola	19.315	10.909	20.059	6.2	37	17.133	18.26	6.9	3.4473	3.0938	5.5088	3.7736	14.9	6.7354	2.1233	2.3402
	Latreutes fucorum	0.0926	0.0909	0.0588	0.4	0	0.0667	0.1233	0.5	0.0478	0.0909	0.0529	0.4	0	0.0769	0.0707	0.2236
	Leander tenuicorris	0.037	0	0	0	0	0.1333	0.0267	0	0.037	0	0	0	0	0.1538	0.0308	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 2. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Palaemonetes pugio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes vulgaris	0.1111	0.1818	0	0	0	0.2667	0.0897	0	0.0778	0.122	0	0	0	0.3077	0.0603	0
	Periclimenes americanus	0.037	0	0.1176	0	0	0	0.0235	4.8	0.037	0	0.1059	0	0	0	0.0212	3.3724
	Periclimenes longicaudatus	0.2593	0.2727	0.5882	0.2	0	0	0.2122	6.9	0.0996	0.2727	0.2252	0.2	0	0	0.0582	3.9227
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	26.815	14.818	48.529	0.4	39.25	9.6	22.52	37.4	8.1515	10.107	18.995	0.2449	25.521	6.5167	4.4899	10.448
	Thor manningi	18.296	10	45.647	3	0.875	5.6	13.024	93.5	7.4119	5.6084	21.09	0.5477	0.875	3.2142	3.8162	46.8
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		67.352	37.273	116.65	10.8	80.625	36.867	56.442	154.8	16.834	16.901	43.182	4.3749	38.405	11.882	7.5906	50.882

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	*Callinectes sapidus*	0.037	0.1818	0	0	0	0	0.0364	0.1	0.0259	0.122	0	0	0	0	0.0244	0.1
	Callinectes similis	0.2593	0.6364	0.1176	0	0.25	0.2	0.2408	0.1	0.0709	0.2439	0.073	0	0.1637	0.1216	0.0412	0.1
	Callinectes sp.	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0	0.2134
	Epialtus dilatatus	0.0926	0.0909	0.2353	0	0	0	0.0652	0	0.0398	0.0909	0.0976	0	0	0	0.0231	0
	Eurypanopeus sp	0.5	0.4545	0.4118	0	0.5	0.7333	0.4199	0.7	0.1442	0.3123	0.1597	0	0.2673	0.4647	0.0776	0.5175
	Libinia sp.	0.0185	0	0	0	0.125	0	0.025	0	0.0185	0	0	0	0.125	0	0.025	0
	Panopeus sp.	0.1111	0.3636	0	0	0	0.1333	0.0994	0	0.0822	0.3636	0	0	0	0.1538	0.0715	0
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crabs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		1.0185	1.7273	0.7647	0	0.875	1.0667	0.8867	1.3	0.2139	0.5892	0.2482	0	0.2266	0.6114	0.1167	0.5783

APPENDIX A, Table 3. Abundance and variability of fish and shrimp collected in southern Biscayne Bay with the throw-trap in February 2003. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	*Paraclinus fasciatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank cusk-eel	*Ophidion holbrooki*	0.0185	0	0	0	0.125	0	0.025	0	0.0185	0	0	0	0.125	0	0.025	0
Banner goby	*Microgobius microlepis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	*Scorpaena brasiliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Bearded goby	*Barbulifer ceuthoeus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0.2	0	0	0.073	0	0	0	0.0146	0.1333
Blue angelfish	*Holacanthus bermudensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	*Cryptotomus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	*Haemulon sciurus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	*Microgobius gulosus*	0.1667	0.8182	0	0	0	0	0.1636	0.2	0.1145	0.5363	0	0	0	0	0.1073	0.1333
Code goby	*Gobiosoma robustum*	1.2222	2.3636	0.5882	0	1.875	1	1.1654	0.8	0.2692	0.6364	0.286	0	0.9717	0.6289	0.1663	0.611
Crested goby	*Lophogobius cyprinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	*Parophidion schmidti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	*Syngnathus floridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	*Cosmocampus hildebrandi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	*Hippocampus zosterae*	0.1296	0.0909	0	0	0.375	0.2	0.1332	0.2	0.0594	0.0909	0	0	0.2631	0.1662	0.0505	0.1333
Frillfin goby	*Bathygobius soporator*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	*Anarchopterus criniger*	0.2407	0.1818	0.2353	0	0.625	0.1333	0.2351	0	0.1022	0.122	0.2117	0	0.4199	0.1042	0.0706	0
Gold brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspot goby	*Gnatholepis thompsoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	*Floridichthys carpio*	0.037	0.1818	0	0	0	0	0.0364	0	0.0259	0.122	0	0	0	0	0.0244	0
Great barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	*Syngnathus scovelli*	0.2963	0.9091	0	0	0.125	0.3333	0.2735	0	0.16	0.7193	0	0	0.125	0.2412	0.1333	0
Gulf toadfish	*Opsanus beta*	0.6111	1.0909	0.2353	0	1.25	0.4667	0.6086	0.1	0.1482	0.3426	0.1739	0	0.491	0.3323	0.0837	0.1
Hardhead silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX A, Table 3. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	*Ogilbia cayorum*	0.0185	0	0	0	0	0.0667	0.0133	0	0.0185	0	0	0	0	0.0769	0.0154	0
Lined seahorse	*Hippocampus erectus*	0.037	0	0	0	0.25	0	0.05	0	0.0259	0	0	0	0.1637	0	0.0327	0
Lined sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	*Paraclinus marmoratus*	0.0556	0	0.1176	0.2	0	0	0.0635	0.2	0.0315	0	0.0976	0.2	0	0	0.0399	0.1333
Mummichog	*Fundulus heteroclitus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	*Syngnathus fuscus*	0.0185	0	0	0	0.125	0	0.025	0.1	0.0185	0	0	0	0.125	0	0.025	0.1
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0.2
Pinfish	*Lagodon rhomboidalis*	0.0741	0.0909	0.1765	0	0	0	0.0535	0	0.0446	0.0909	0.116	0	0	0	0.0256	0
Planehead filefish	*Monocanthus hispidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	*Bryx dunckeri*	0.0185	0	0.0588	0	0	0	0.0118	0.2	0.0185	0	0.0529	0	0	0	0.0106	0.2
Rainwater killifish	*Lucania parva*	3.3889	6.0909	1.7647	0	7.25	1.8667	3.3945	0.6	0.709	1.3847	1.1978	0	2.21	1.0491	0.3544	0.6
Redfin brotula	*Petrotyx sanguineus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	*Syngnathus pelagicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	*Archosargus probatocephalus*	0.037	0	0.1176	0	0	0	0.0235	0	0.037	0	0.1059	0	0	0	0.0212	0
Silver jenny	*Eucinostomus gula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin jawfish	*Opistognathus robinsi*	0.4815	0	0.4118	0.6	0.375	0.8667	0.4507	0.4	0.1204	0	0.164	0.4	0.2631	0.3581	0.0719	0.1633
Spotted dragonet	*Diplogrammus pauciradiatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Striped cusk-eel	*Ophidion marginatum*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Tomtate	*Haemulon aurolineatum*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
unidentified fish		0.0926	0.1818	0.0588	0	0	0.1333	0.0748	0.1	0.0478	0.1818	0.0529	0	0	0.1042	0.0345	0.1
Total Fish		6.9444	12	3.7647	0.8	12.375	5.0667	6.8013	3.7	1.0409	2.2442	1.5897	0.3742	3.0876	1.5477	0.4467	1.3337

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	*Farfantepenaeus duorarum*	0.3889	0.1818	0.4706	0	0.375	0.5333	0.3121	0.2	0.0931	0.122	0.1973	0	0.183	0.213	0.0389	0.1333
	Alpheus heterochaelis	0.0741	0	0.1176	0	0.125	0.0667	0.0619	0.1	0.0446	0	0.1059	0	0.125	0.0769	0.0263	0.1
	Alpheus normanni	0.0926	0	0.1176	0	0.375	0	0.0985	0.2	0.0546	0	0.1059	0	0.2631	0	0.0516	0.2
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	2.0926	1.0909	3.1176	0	3	1.6	1.7617	1.2	0.5708	0.6935	1.3669	0	0.8864	1.0552	0.2286	0.6289
	Hippolyte zostericola	22.148	17.909	24.882	1	40.25	16.6	20.128	5.8	4.3575	6.0143	11.02	0.6325	10.198	7.8396	1.8508	2.021
	Latreutes fucorum	0.1111	0	0.2353	0	0.25	0	0.0971	0.1	0.0506	0	0.1241	0	0.1637	0	0.0358	0.1
	Leander tenuicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX A, Table 3. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Palaemonetes pugio	0.0185	0	0	0	0.125	0	0.025	0	0.0185	0	0	0	0.125	0	0.025	0
	Palaemonetes vulgaris	0	0	0	0	0	0	0	0.7	0	0	0	0	0	0	0	0.3
	Periclimenes americanus	0.037	0	0.1176	0	0	0	0.0235	1.3	0.0259	0	0.073	0	0	0	0.0146	0.5588
	Periclimenes longicaudatus	0.1852	0.0909	0.3529	0	0.125	0.1333	0.1404	2.5	0.0751	0.0909	0.3193	0	0.125	0.1538	0.0522	0.6368
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	10.759	13.909	15.588	0.2	11.25	4.8	9.1495	5.3	3.3589	8.0909	10.643	0.2	8.0017	3.1958	1.89	3.9017
	Thor manningi	29.852	28.273	40.765	1	36	21.133	25.434	29.6	9.1638	14.551	31.515	0.4472	24.116	12.729	5.2869	21.264
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		65.37	61.273	85.294	2.2	91.5	44.333	56.92	46.8	16.165	27.383	52.378	1.2	36.087	22.361	8.3965	26.977

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	*Callinectes sapidus*	0.0185	0	0	0	0	0.0667	0.0133	0.1	0.0185	0	0	0	0	0.0769	0.0154	0.1
	Callinectes similis	0.037	0.0909	0.0588	0	0	0	0.0299	0	0.0259	0.0909	0.0529	0	0	0	0.0186	0
	Callinectes sp.	0.0556	0.0909	0	0.2	0	0.2	0.0982	0.1	0.0315	0.0909	0.073	0.2	0	0.0769	0.0321	0.1
	Epialtus dilatatus	0.037	0	0.1176	0	0	0	0.0235	0.1	0.037	0	0.1059	0	0	0	0.0212	0.1
	Eurypanopeus sp	1.2037	0.2727	1.6471	0	3.25	0.5333	1.1406	0.7	0.4732	0.1408	1.2187	0	1.1456	0.2665	0.26	0.423
	Libinia sp.	0.037	0	0.1176	0	0	0	0.0235	0	0.0259	0	0.073	0	0	0	0.0146	0
	Panopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crabs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Crabs		1.2407	0.2727	1.7647	0	3.25	0.5333	1.1642	0.7	0.4736	0.1408	1.2179	0	1.1456	0.2665	0.2599	0.423

APPENDIX A, Table 4. Abundance and variability of fish and shrimp collected in southern Biscayne Bay with the throw-trap in April 2003. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	*Paraclinus fasciatus*	0.0625	0	0.125	0.0588	0.0769	0	0.0521	0.1	0.0315	0	0.125	0.0588	0.0769	0	0.0239	0.1
Bank cusk-eel	*Ophidion holbrooki*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	*Microgobius microlepis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	*Scorpaena brasiliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	*Barbulifer ceuthoeus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	*Holacanthus bermudensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	*Cryptotomus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	*Haemulon sciurus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	*Microgobius gulosus*	0.1719	0.6364	0.125	0.1176	0.0769	0	0.1912	0	0.0718	0.2787	0.125	0.0805	0.0769	0	0.1135	0
Code goby	*Gobiosoma robustum*	0.9219	1.4545	1	0.2941	1.3846	0	0.8267	1.2	0.1673	0.4929	0.378	0.2059	0.3309	0	0.2918	0.9978
Crested goby	*Lophogobius cyprinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	*Parophidion schmidti*	0.0313	0	0	0	0.1538	0	0.0308	0	0.037	0	0	0	0.1538	0	0.0308	0
Dusky pipefish	*Syngnathus floridae*	0.0156	0	0	0	0.0769	0	0.0154	0	0.0185	0	0	0	0.0769	0	0.0154	0
Dwarf pipefish	*Cosmocampus hildebrandi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	*Hippocampus zosterae*	0.1094	0.1818	0.125	0.1176	0.1538	0	0.1157	0	0.0532	0.1818	0.125	0.0805	0.1042	0	0.0311	0
Frillfin goby	*Bathygobius soporator*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	*Anarchopterus criniger*	0.2969	0.4545	0.125	0.2941	0.5385	0	0.2824	0.1	0.1211	0.3123	0.125	0.2941	0.1831	0	0.1	0.1
Gold brotula	*Gunterichthys longipenis*	0.0156	0	0	0.0588	0	0	0.0118	0	0.0185	0	0	0.0588	0	0	0.0118	0
Goldspot goby	*Gnatholepis thompsoni*	0.0156	0	0	0	0.0769	0	0.0154	0	0.0185	0	0	0	0.0769	0	0.0154	0
Goldspotted killifish	*Floridichthys carpio*	0.0938	0.4545	0.125	0	0	0	0.1159	0	0.0941	0.4545	0.125	0	0	0	0.0881	0
Great barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	*Syngnathus scovelli*	0.25	0.8182	0	0.3529	0.0769	0	0.2496	0	0.0862	0.1818	0	0.209	0.0769	0	0.1563	0
Gulf toadfish	*Opsanus beta*	0.7031	0.9091	2.25	0.2353	0.8462	0	0.8481	0.2	0.2233	0.3921	1.114	0.1364	0.4058	0	0.3914	0.2
Hardhead silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 4. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	*Ogilbia cayorum*	0.0156	0.0909	0	0	0	0	0.018	0.000	0.0185	0.0909	0	0	0	0	0.0182	0.000
Lined seahorse	*Hippocampus erectus*	0.0625	0.0909	0.25	0	0.0769	0	0.0836	0	0.036	0.0909	0.1637	0	0.0769	0	0.0457	0
Lined sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	*Paraclinus marmoratus*	0.0313	0	0	0.1176	0	0	0.0235	0	0.037	0	0	0.1176	0	0	0.0235	0
Mummichog	*Fundulus heteroclitus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	*Syngnathus fuscus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.3281	0.5455	0.875	0.2353	0.3077	0	0.3927	0	0.1134	0.3123	0.3981	0.1825	0.1748	0	0.1487	0
Planehead filefish	*Monocanthus hispidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	*Bryx dunckeri*	0.0156	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Rainwater killifish	*Lucania parva*	6.5781	16.364	19.625	0.1176	6.3077	0	8.4828	0	2.3245	5.9288	11.014	0.1176	3.1407	0	4.08	0
Redfin brotula	*Petrotyx sanguineus*	0.0469	0.0909	0	0	0.1538	0	0.049	0	0.0411	0.0909	0	0	0.1538	0	0.0316	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	*Syngnathus pelagicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	*Eucinostomus gula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin jawfish	*Opistognathus robinsi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted dragonet	*Diplogrammus pauciradiatus*	0.7344	0.2727	0.25	1.1765	1	1	0.7398	0.4	0.1781	0.195	0.25	0.4043	0.4082	0.4472	0.198	0.2667
Spotted whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	*Ophidion marginatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Fish		10.516	22.455	24.875	3.1765	11.308	1	12.563	2.100	2.5156	6.1087	12.081	0.8235	2.7535	0.4472	4.8622	1.048

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	*Farfantepenaeus duorarum*	0.2778	0.0909	0.25	0.1765	0.4615	0.6	0.3158	0	0.0804	0.0909	0.1637	0.1282	0.2153	0.4	0.1073	0
	Alpheus heterochaelis	0.0741	0.0909	0.125	0.1176	0	0	0.0667	0.3	0.0356	0.0909	0.125	0.0805	0	0	0.081	0.2134
	Alpheus normanni	0.1852	0.1818	0.125	0.0588	0.4615	0	0.1654	1	0.0645	0.1818	0.125	0.0588	0.1831	0	0.1208	1
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	1.2222	0.9091	1.625	1.4118	0	3.8	1.5492	0	0.4179	0.4946	1.0846	0.9551	0	2.3749	0.918	0
	Hippolyte zostericola	29.759	31.545	26	20	23.692	80.8	36.408	2.6	5.8976	11.908	16.04	7.525	9.9521	35.56	8.6378	1.0349
	Latreutes fucorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Leander tenuicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 4. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Palaemonetes pugio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes vulgaris	0.2407	0	0	0.6471	0.1538	0	0.1602	0.6	0.2044	0	0	0.6471	0.1538	0	0.5171	0.4989
	Periclimenes americanus	0.1296	0.0909	0	0	0.4615	0	0.1105	3.4	0.0788	0.0909	0	0	0.3125	0	0.2182	2.4184
	Periclimenes longicaudatus	0.4259	0.4545	0.5	0.7647	0.0769	0	0.3592	0.7	0.1272	0.2073	0.378	0.3269	0.0769	0	0.2471	0.4955
	Processa bermudensis	0.0926	0	0	0.2941	0	0	0.0588	0	0.0541	0	0	0.1664	0	0	0.1372	0
	Processa fimbriata	0.0185	0	0.125	0	0	0	0.025	0	0.0183	0	0.125	0	0	0	0.0707	0
	Thor floridanus	3.5926	5.7273	5	3.4118	1.6154	2.4	3.6309	0.2	1.0451	3.8021	3.5305	1.5341	0.675	1.7493	1.8871	0.2
	Thor manningi	25.722	22.545	43.625	34.294	13.615	6.4	24.096	1.7	7.566	10.727	32.992	16.857	7.1652	3.9699	15.301	1.0116
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		61.5	61.545	77.125	61	40.154	93.6	66.685	10.500	12.21	24.373	46	24.873	14.444	43.032	12.844	4.911

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	*Callinectes sapidus*	0.1111	0.0909	0	0.1176	0.2308	0	0.0879	0.3	0.0623	0.0909	0	0.0805	0.2308	0.000	0.1311	0.2134
	Callinectes similis	0.0556	0	0	0.0588	0.1538	0	0.0425	0.2	0.0407	0	0	0.0588	0.1538	0	0.0713	0.2
	Callinectes sp.	0.037	0	0.125	0	0.0769	0	0.0404	0	0.0257	0	0.125	0	0.0769	0.000	0.0564	0
	Epialtus dilatatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurypanopeus sp	0.6481	0.8182	0.875	0.1176	0.8462	1.2	0.7714	0	0.1798	0.4004	0.6105	0.0805	0.4647	0.8	0.6128	0
	Libinia sp.	0.0185	0	0	0.0588	0	0	0.0118	0	0.0183	0	0	0.0588	0	0	0.0217	0
	Panopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crabs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Crabs		0.8704	0.9091	1	0.3529	1.3077	1.2	0.9539	0.5	0.2079	0.4759	0.6268	0.1471	0.5816	0.8	0.7015	0.2687

Appendix A, Table 5. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in June 2003. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	*Paraclinus fasciatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank cusk-eel	*Ophdion holbrooki*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	*Microgobius microlepis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	*Scorpaena brasiliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	*Barbulifer ceuthoeus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	Dactyloscopus crossotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	*Holacanthus bermudensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	Cryptotomus roseus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	Chaenopsis ocellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	*Haemulon sciurus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	*Microgobius gulosus*	0.3333	0.9091	0	0	0	0.6154	0.3049	0.1	0.1374	0.4759	0	0	0	0.5927	0.3579	0.1
Code goby	*Gobiosoma robustum*	0.5556	0.6364	0.0588	0	0.75	1.2308	0.5352	0.5	0.1534	0.2439	0.0588	0	0.491	0.7562	0.3231	0.3073
Crested goby	*Lophogobius cyprinoides*	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0603	0
Dusky cusk	*Parophidion schmidti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	*Syngnathus floridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	Cosmocampus hildebrandi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	*Hippocampus zosterae*	0.0556	0	0	0	0	0.2308	0.0462	0.2	0.0411	0	0	0	0	0.2679	0.1198	0.1333
Frillfin goby	*Bathygobius soporator*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Fringed pipefish	*Anarchopterus criniger*	0.1296	0.1818	0.0588	0	0.25	0.1538	0.1289	0	0.0532	0.1818	0.0588	0	0.1637	0.1679	0.1026	0
Gold brotula	*Gunterichthys longipenis*	0.037	0	0	0	0.125	0.0769	0.0404	0	0.0259	0	0	0	0.125	0.124	0.0782	0
Goldspot goby	*Gnatholepis thompsoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	*Floridichthys carpio*	0.1111	0.0909	0.0588	0	0	0.3077	0.0915	0.3	0.0778	0.0909	0.0588	0	0	0.4961	0.2042	0.3
Great barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	*Syngnathus scovelli*	0.1296	0.5455	0	0	0	0.0769	0.1245	0	0.0532	0.2073	0	0	0	0.124	0.1348	0
Gulf toadfish	*Opsanus beta*	0.5741	0.8182	0	0	1.375	0.8462	0.6079	0.1	0.1705	0.553	0	0	0.5324	0.5729	0.3874	0.1
Hardhead silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0.9

Appendix A, Table 5. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	*Ogilbia cayorum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined seahorse	*Hippocampus erectus*	0.037	0	0	0	0	0.1538	0.0308	0	0.0259	0	0	0	0	0.1679	0.0751	0
Lined sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	*Paraclinus marmoratus*	0.0185	0	0	0.2	0	0	0.04	0.1	0.0185	0	0	0.124	0	0	0.0894	0.1
Mummichog	*Fundulus heteroclitus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	*Syngnathus fuscus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.1296	0.0909	0	0	0.25	0.3077	0.1297	0	0.065	0.0909	0	0	0.25	0.3359	0.1637	0
Planehead filefish	*Monocanthus hispidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	*Bryx dunckeri*	0.037	0	0.1176	0	0	0	0.0235	0	0.037	0	0.1176	0	0	0	0.097	0
Rainwater killifish	*Lucania parva*	5.3519	9.7273	0.2353	0	7.375	9.1538	5.2983	0	1.9444	5.9484	0.2353	0	5.3283	8.4693	4.3437	0
Redfin brotula	*Petrotyx sanguineus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	Syngnathus pelagicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	*Eucinostomus gula*	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0603	0
Spotfin jawfish	*Opistognathus robinsi*	0.8148	0.1818	1	0.6	0.5	1.3846	0.7333	0.2	0.1962	0.1818	0.2844	0.2481	0.378	1.0253	0.2882	0.1333
Spotted dragonet	*Diplogrammus pauciradiatus*	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0588	0	0	0	0.0485	0
Spotted whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	*Ophidion marginatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Fish		8.3704	13.364	1.5882	0.8	10.625	14.538	8.1831	2.5	2.0206	6.0906	0.4118	0.232	5.3115	8.2636	4.161	1.424

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	*Farfantepenaeus duorarum*	0.1111	0.0909	0.0588	0	0.25	0.1538	0.1107	0.1	0.0432	0.0909	0.0588	0	0.1637	0.1679	0.0784	0.1
	Alpheus heterochaelis	0.0185	0.0909	0	0	0	0	0.0182	0.4	0.0185	0.0909	0	0	0	0	0.0603	0.3055
	Alpheus normanni	0.0741	0.1818	0.0588	0	0.125	0	0.0731	1.7	0.0446	0.1818	0.0588	0	0.125	0	0.114	1.193
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.6111	1.0909	0	0.2	0.75	1.0769	0.6236	0	0.2622	1.0909	0	0.124	0.491	0.8054	0.6299	0
	Hippolyte zostericola	10.593	6.5455	0.8824	0.4	26.5	20.846	11.035	1.8	2.4875	4.4972	0.4362	0.2481	7.9462	10.165	4.7915	1.2893
	Latreutes fucorum	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0.2
	Leander tenuicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0.2407	1.0909	0	0	0	0.0769	0.2336	0.4	0.2226	1.0909	0	0	0	0.124	0.7118	0.4

Appendix A, Table 5. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Palaemonetes pugio	0.1296	0.5455	0	0	0	0.0769	0.1245	0.6	0.0795	0.3659	0	0	0	0.124	0.2351	0.4269
	Palaemonetes vulgaris	0.037	0.1818	0	0	0	0	0.0364	1.5	0.037	0.1818	0	0	0	0	0.1206	1.2042
	Periclimenes americanus	0	0	0	0	0	0	0	2.2	0	0	0	0	0	0	0	2.2
	Periclimenes longicaudatus	0.1852	0	0.4706	0	0	0.1538	0.1249	0.7	0.0839	0	0.2288	0	0	0.2481	0.1935	0.423
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	2.0741	2.1818	0.2353	0.8	2.75	4.4615	2.0857	0.2	0.7038	1.8114	0.1611	0.4961	1.7398	3.6497	1.3385	0.2
	Thor manningi	22.722	32.273	3.4118	1	49.25	31.923	23.572	19	8.1516	27.979	1.3587	0.4804	30.24	24.464	19.233	10.492
unidentified shrimp		0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0603	0
Total Carideans		36.685	44.182	5.0588	2.4	79.375	58.615	37.926	28.7	9.7514	29.556	1.852	0.9923	34.92	32.263	21.146	13.112

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	*Callinectes sapidus*	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0603	0
	Callinectes similis	0.037	0.0909	0	0.2	0	0	0.0582	0	0.0259	0.0909	0	0.124	0	0	0.0945	0
	Callinectes sp.	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0603	0
	Epialtus dilatatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurypanopeus sp	0.6296	2.4545	0	0	0.375	0.3077	0.6274	0	0.3186	1.4545	0	0	0.2631	0.3359	0.9056	0
	Libinia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho lherminieri	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0.2
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crabs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		0.7037	2.7273	0	0.2	0.375	0.3077	0.722	0.2	0.335	1.5141	0	0.124	0.2631	0.3359	0.9175	0.2

Appendix A, Table 6. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in August 2003. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	*Paraclinus fasciatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank cusk-eel	*Ophdion holbrooki*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	*Microgobius microlepis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	*Scorpaena brasiliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	*Barbulifer ceuthoeus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	*Holacanthus bermudensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	*Cryptotomus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	*Haemulon sciurus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	*Microgobius gulosus*	0.037	0.0909	0	0	0.125	0	0.0432	0	0.0259	0.0909	0	0	0.125	0	0.0806	0
Code goby	*Gobiosoma robustum*	0.5926	1.3636	0.4118	0	0.25	0.6154	0.5282	0.1	0.2073	0.845	0.1728	0	0.1637	0.6465	0.489	0.1
Crested goby	*Lophogobius cyprinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	*Parophidion schmidti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	*Syngnathus floridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	*Cosmocampus hildebrandi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	*Hippocampus zosterae*	0.1296	0.0909	0.1765	0.2	0.125	0.0769	0.1339	0	0.0532	0.0909	0.1282	0.124	0.125	0.124	0.0469	0
Frillfin goby	*Bathygobius soporator*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	*Anarchopterus criniger*	0.2037	0.3636	0.1765	0	0.375	0.0769	0.1984	0	0.1002	0.3636	0.1282	0	0.375	0.124	0.2289	0
Gold brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspot goby	*Gnatholepis thompsoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	*Floridichthys carpio*	0.037	0	0	0	0	0.1538	0.0308	0	0.037	0	0	0	0	0.2481	0.1109	0
Great barracuda	*Sphyraena barracuda*	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0803	0
Gulf pipefish	*Syngnathus scovelli*	0.0556	0.0909	0	0	0.25	0	0.0682	0	0.0411	0.0909	0	0	0.25	0	0.1392	0
Gulf toadfish	*Opsanus beta*	0.3148	0.4545	0.1765	0	0.25	0.5385	0.2839	0	0.0947	0.2817	0.0953	0	0.1637	0.4326	0.1812	0
Hardhead silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 6. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Palaemonetes pugio	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0603	0
	Palaemonetes vulgaris	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
	Periclimenes americanus	0.0556	0	0.1765	0	0	0	0.0353	0.5	0.0411	0	0.1282	0	0	0	0.1057	0.5
	Periclimenes longicaudatus	0.2037	0	0.5882	0	0.125	0	0.1426	0.2	0.093	0	0.272	0	0.125	0	0.2176	0.1333
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	2.4815	2	5.0588	0	2.125	0.6923	1.9752	0.1	0.969	1.2136	2.8652	0	1.109	0.7612	2.037	0.1
	Thor manningi	41.963	69	42.294	4.6	41.25	33.462	38.121	3.7	12.062	45.413	18.728	1.8355	23.412	28.084	23.02	1.82
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		49.704	77.455	51.176	5	52.625	39.692	45.19	4.9	13.763	50.993	22.595	2.0755	26.455	31.073	25.955	2.1677

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	*Callinectes sapidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Callinectes similis	0.0185	0	0.0588	0	0	0	0.0118	0	0.0025	0	0.0208	0	0	0.000	0.0053	0
	Callinectes sp.	0.037	0	0.1176	0	0	0	0.0235	0	0.005	0	0.0416	0	0	0.000	0.0105	0
	Epialtus diltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurypanopeus sp	0.0185	0	0.0588	0	0	0	0.0118	0	0.0025	0	0.0208	0	0	0.000	0.0053	0
	Libinia sp.	0.0185	0	0	0	0.125	0	0.025	0	0.0025	0	0	0	0.0347	0	0.0112	0
	Panopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0.0185	0	0	0	0.125	0	0.025	0	0.0025	0	0	0	0.0347	0	0.0112	0
unidentified crabs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		0.111	0.182	0.059	0	0	0.231	0.094	0	0.0506	0	0.1364	0	0.1637	0	0.1265	0

Appendix A, Table 6. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	*Ogilbia cayorum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined seahorse	*Hippocampus erectus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	*Paraclinus marmoratus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mummichog	*Fundulus heteroclitus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	*Syngnathus fuscus*	0.0185	0	0	0	0	0.0769	0.0154	0	0.0185	0	0	0	0	0.124	0.0555	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.0741	0.2727	0	0	0.125	0	0.0795	0	0.036	0.1408	0	0	0.125	0	0.1021	0
Planehead filefish	*Monacanthus hispidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	*Bryx dunckeri*	0.037	0	0.1176	0	0	0	0.0235	0	0.0259	0	0.0805	0	0	0	0.0664	0
Rainwater killifish	*Lucania parva*	8.1111	20.909	0.5294	0	12.125	7.8462	8.2819	0	2.3243	7.3255	0.3222	0	7.6566	7.0825	5.0749	0
Redfin brotula	*Petrotyx sanguineus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	*Syngnathus pelagicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	*Eucinostomus gula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin jawfish	*Opistognathus robinsi*	0.1296	0	0.1765	0	0	0.3077	0.0968	0.1	0.065	0	0.0953	0	0	0.3823	0.1694	0.1
Spotted dragonet	*Diplogrammus pauciradiatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	*Ophidion marginatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified fish		0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0588	0	0	0	0.0485	0
Total Fish		9.778	23.727	1.824	0.200	13.625	9.692	9.814	0.200	2.420	7.768	0.516	0.124	7.521	7.168	5.081	0.133

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	*Farfantepenaeus duorarum*	1.0926	2.0909	0.7647	0.2	1	1.0769	1.0265	0.1	0.2412	0.7441	0.2647	0.124	0.3273	1.0241	0.3969	0.1
	Alpheus heterochaelis	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0603	0
	Alpheus normanni	0.0556	0	0.1765	0	0	0	0.0353	0.1	0.0411	0	0.1282	0	0	0	0.1057	0.1
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.0741	0	0	0	0	0.3077	0.0615	0	0.0741	0	0	0	0	0.4961	0.2219	0
	Hippolyte zostericola	4.7593	5.9091	2.8824	0.4	9.125	5.2308	4.7094	0.2	1.3723	4.8382	1.0775	0.2481	4.1552	4.4802	2.6838	0.1333
	Latreutes fucorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Leander tenuicornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0.0741	0.3636	0	0	0	0	0.0727	0	0.0741	0.3636	0	0	0	0	0.2412	0

Appendix A, Table 7. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in October 2003. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	*Paraclinus fasciatus*	0.037	0.0909	0.0588	0	0	0	0.0299	0	0.0259	0.0909	0.0588	0	0	0	0.0673	0
Bank cusk-eel	*Ophdion holbrooki*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	*Microgobius microlepis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	*Scorpaena brasiliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	*Barbulifer ceuthoeus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	*Holacanthus bermudensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	*Cryptotomus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0588	0	0	0	0.0485	0
Bluestriped grunt	*Haemulon sciurus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	*Microgobius gulosus*	0.037	0.0909	0	0	0.125	0	0.0432	0.3	0.0259	0.0909	0	0	0.125	0	0.0806	0.2134
Code goby	*Gobiosoma robustum*	0.4074	0.7273	0.2353	0	0.375	0.5385	0.3752	0.1	0.1074	0.3042	0.1364	0	0.2631	0.4326	0.1828	0.1
Crested goby	*Lophogobius cyprinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	*Parophidion schmidti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	*Syngnathus floridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	*Cosmocampus hildebrandi*	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0588	0	0	0	0.0485	0
Dwarf seahorse	*Hippocampus zosterae*	0.0556	0	0.1176	0	0.125	0	0.0485	0	0.0315	0	0.0805	0	0.125	0	0.084	0
Frillfin goby	*Bathygobius soporator*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	*Anarchopterus criniger*	0.3889	0.0909	0.2941	0	1.25	0.3846	0.4039	0	0.1384	0.0909	0.1664	0	0.7008	0.4297	0.3409	0
Gold brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspot goby	*Gnatholepis thompsoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	*Floridichthys carpio*	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0.2
Great barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	*Syngnathus scovelli*	0.0556	0	0.0588	0.2	0	0.0769	0.0671	0	0.0315	0	0.0588	0.124	0	0.124	0.0862	0
Gulf toadfish	*Opsanus beta*	0.2778	0.6364	0.1176	0	0.375	0.2308	0.272	0.3	0.1038	0.3636	0.0805	0	0.375	0.2679	0.224	0.2134
Hardhead silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 7. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	*Ogilbia cayorum*	0.0556	0.1818	0	0	0	0.0769	0.0517	0	0.0411	0.1818	0	0	0	0.124	0.1195	0
Lined seahorse	*Hippocampus erectus*	0.0556	0	0.0588	0	0.125	0.0769	0.0521	0.2	0.0315	0	0.0588	0	0.125	0.124	0.0735	0.1333
Lined sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	*Paraclinus marmoratus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mummichog	*Fundulus heteroclitus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	*Syngnathus fuscus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.0185	0	0.0588	0	0	0	0.0118	0.1	0.0185	0	0.0588	0	0	0	0.0485	0.1
Planehead filefish	*Monocanthus hispidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	*Bryx dunckeri*	0.0741	0	0.1765	0	0	0.0769	0.0507	0	0.0446	0	0.1282	0	0	0.124	0.1064	0
Rainwater killifish	*Lucania parva*	3.0185	8.5455	1	0.2	3	2.0769	2.9645	2	0.8163	2.9553	0.7859	0.124	1.6583	1.6679	1.5277	1.8915
Redfin brotula	*Petrotyx sanguineus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	*Syngnathus pelagicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	*Eucinostomus gula*	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0603	0
Spotfin jawfish	*Opistognathus robinsi*	0.3519	0.0909	0.6471	0.4	0.125	0.3077	0.3141	0.2	0.1095	0.0909	0.2963	0.1519	0.125	0.2819	0.1642	0.1333
Spotted dragonet	*Diplogrammus pauciradiatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	*Ophidion marginatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Fish		4.8889	10.545	2.9412	0.8	5.5	3.8462	4.727	3.400	0.8585	2.9522	0.8889	0.3616	1.5924	2.1201	1.3877	2.034

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	*Farfantepenaeus duorarum*	0.7593	1.2727	0.7059	0	1.125	0.4615	0.713	0.4	0.1772	0.4491	0.3614	0	0.5489	0.3471	0.3013	0.2211
	Alpheus heterochaelis	0	0	0	0	0	0	0	1.6	0	0	0	0	0	0	0	1.6
	Alpheus normanni	0.0185	0	0.0588	0	0	0	0.0118	0.6	0.0185	0	0.0588	0	0	0	0.0485	0.6
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.2037	0.3636	0	0	0	0.5385	0.1804	0	0.093	0.2439	0	0	0	0.5038	0.2423	0
	Hippolyte zostericola	5.2222	4.2727	2.5882	0.6	9.625	8.5385	5.1249	1.6	1.2914	1.9216	1.0075	0.2481	4.7432	6.185	2.5582	1.6
	Latreutes fucorum	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0.2
	Leander tenuicorris	0.0185	0.0909	0	0	0	0	0.0182	0.1	0.0185	0.0909	0	0	0	0	0.0603	0.1
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 7. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Palaemonetes pugio	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0.2
	Palaemonetes vulgaris	0.0185	0.0909	0	0	0	0	0.0182	0.3	0.0185	0.0909	0	0	0	0	0.0603	0.3
	Periclimenes americanus	0.0185	0	0.0588	0	0	0	0.0118	9.7	0.0185	0	0.0588	0	0	0	0.0485	9.7
	Periclimenes longicaudatus	0.1111	0	0.2353	0	0.125	0.0769	0.0874	0.9	0.0432	0	0.106	0	0.125	0.124	0.0908	0.6904
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	0.8148	1	0.6471	0	0.5	1.3846	0.7063	0.8	0.2872	0.8202	0.2416	0	0.5	1.4322	0.5814	0.4163
	Thor manningi	40.907	47.273	42	1	42.375	48.538	36.237	13.8	11.066	27.794	18.381	0.3922	21.297	48.133	18.314	4.3123
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		47.333	53.091	45.588	1.6	52.625	59.077	42.396	29.800	11.806	29.493	19.012	0.5038	22.35	52.291	19.657	16.574

CRABS	*Scientific Name*	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	*Callinectes sapidus*	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0588	0	0	0.000	0.0485	0
	Callinectes similis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Callinectes sp.	0.0185	0.0909	0	0	0	0	0.0182	0.1	0.0185	0.0909	0	0	0	0.000	0.0603	0.1
	Epialtus diltatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurypanopeus sp	0.1111	0	0.2353	0	0.125	0.0769	0.0874	0	0.0432	0	0.106	0	0.125	0.124	0.0908	0
	Libinia sp.	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0588	0	0	0	0.0485	0
	Panopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crabs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		0.1667	0.0909	0.3529	0	0.125	0.0769	0.1292	0.1	0.0576	0.0909	0.1471	0	0.125	0.124	0.0967	0.1

Appendix A, Table 8. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in December 2003. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	*Paraclinus fasciatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank cusk-eel	*Ophdion holbrooki*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	*Microgobius microlepis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	*Scorpaena brasiliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay anchovy	*Anchoa mitchilli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	*Barbulifer ceuthoeus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	*Dactyloscopus crossotus*	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0529	0	0	0	0.0106	0
Blackcheek tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	*Holacanthus bermudensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	*Cryptotomus roseus*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	*Haemulon sciurus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	*Microgobius gulosus*	0.0556	0.2727	0	0	0	0	0.0545	0.1	0.0411	0.195	0	0	0	0	0.039	0.1
Code goby	*Gobiosoma robustum*	0.2407	0.6364	0.0588	0	0.25	0.2	0.229	0.6	0.0913	0.3636	0.0529	0	0.25	0.1216	0.0664	0.4989
Crested goby	*Lophogobius cyprinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	*Parophidion schmidti*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	*Syngnathus floridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	*Cosmocampus hildebrandi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	*Hippocampus zosterae*	0.037	0	0.0588	0	0	0.0667	0.0251	0.6	0.0259	0	0.1516	0	0	0.0769	0.0304	0.4269
Frillfin goby	*Bathygobius soporator*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	*Anarchopterus criniger*	0.3333	0.0909	0.2353	0	1.375	0.1333	0.3669	0.3	0.1754	0.0909	0.136	0	1.1009	0.1538	0.2029	0.3
Gold brotula	*Gunterichthys longipenis*	0.0185	0	0	0	0	0.0667	0.0133	0	0.0185	0	0	0	0	0.0769	0.0154	0
Goldspot goby	*Gnatholepis thompsoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	*Floridichthys carpio*	0.037	0.1818	0	0	0	0	0.0364	0	0.037	0.1818	0	0	0	0	0.0364	0
Great barracuda	*Sphyraena barracuda*	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0529	0	0	0	0.0106	0
Gulf pipefish	*Syngnathus scovelli*	0.0926	0.4545	0	0	0	0	0.0909	0.1	0.0478	0.2073	0	0	0	0	0.0415	0.1
Gulf toadfish	*Opsanus beta*	0.1481	0	0	0	0.25	0.4	0.13	0	0.0766	0	0	0	0.25	0.2683	0.0635	0
Hardhead silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 8. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	*Ogilbia cayorum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined seahorse	*Hippocampus erectus*	0.1296	0	0.2353	0.6	0	0	0.1671	0.3	0.0594	0	0.1241	0.4	0	0	0.0776	0.2134
Lined sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	*Paraclinus marmoratus*	0.037	0	0.1176	0	0	0	0.0235	0	0.037	0	0.1059	0	0	0	0.0212	0
Mummichog	*Fundulus heteroclitus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	*Syngnathus fuscus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.0185	0	0	0	0.125	0	0.025	0.1	0.0185	0	0	0	0.125	0	0.025	0.1
Planehead filefish	*Monocanthus hispidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	*Bryx dunckeri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater killifish	*Lucania parva*	1.6852	4.1818	0	0	3	1.4	1.7164	2.6	0.5138	1.6778	0	0	1.476	1.0714	0.3585	2.4909
Redfin brotula	*Petrotyx sanguineus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	*Syngnathus pelagicus*	0.0185	0	0.0588	0	0	0	0.0118	0.1	0.0185	0	0.1059	0	0	0	0.0212	0.1
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	*Eucinostomus gula*	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0529	0	0	0	0.0106	0
Spotfin jawfish	*Opistognathus robinsi*	0.537	0.2727	0.5294	1	0.875	0.3333	0.6021	0.1	0.1557	0.195	0.1966	0.7746	0.7425	0.213	0.1366	0.1
Spotted dragonet	*Diplogrammus pauciradiatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	*Ophidion marginatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
unidentified fish		0.0185	0	0	0	0.125	0	0.025	0.1	0.0185	0	0	0	0.125	0	0.025	0.1
Total Fish		3.463	6.0909	1.4706	1.6	6	2.6	3.5523	5.2	0.5826	1.6539	0.4361	0.7483	1.4639	1.3009	0.2282	2.4801

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	*Farfantepenaeus duorarum*	0.537	0.7273	0.0588	0.2	0.625	0.9333	0.5089	0.3	0.1535	0.3328	0.0529	0.2	0.2631	0.5122	0.0757	0.1528
	Alpheus heterochaelis	0.037	0.0909	0	0.2	0	0	0.0582	1.3	0.0259	0.0909	0.2189	0.2	0	0	0.047	0.7
	Alpheus normanni	0.0926	0.0909	0.1765	0	0.125	0	0.0785	0.3	0.0607	0.0909	0.1588	0	0.125	0	0.0324	0.3
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.0185	0	0	0	0.125	0	0.025	0	0.0185	0	0	0	0.125	0	0.025	0
	Hippolyte zostericola	17.741	10.091	9.3529	6.2	35.5	25	17.229	11.8	3.4057	5.3775	3.1739	1.3928	10.554	9.5698	1.776	2.444
	Latreutes fucorum	0.0185	0	0	0.2	0	0	0.04	2.6	0.0185	0	0.8025	0.2	0	0	0.1554	1.668
	Leander tenuicorris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 8. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Palaemonetes pugio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes vulgaris	0	0	0	0	0	0	0	0.6	0	0	0.2918	0	0	0	0.0584	0.4
	Periclimenes americanus	0	0	0	0	0	0	0	6.3	0	0	1.605	0	0	0	0.321	2.9629
	Periclimenes longicaudatus	0.8704	0	1.7647	2.2	0.5	0.2667	0.9463	5.6	0.4222	0	1.1545	0.9695	0.378	0.1042	0.2311	2.0987
	Processa bermudensis	0	0	0	0	0	0	0	0.1	0	0	0.073	0	0	0	0.0146	0.1
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	4.4444	3.6364	2.8824	5	9.625	3.2667	4.8821	6.1	1.3054	3.6364	1.3985	3.1937	5.3717	2.0914	0.6842	4.3829
	Thor manningi	42.407	18.545	25.647	6.6	120.88	44.8	43.294	102.7	15.291	13.317	10.941	2.3152	82.881	31.788	14.478	42.326
unidentified shrimp		0.0185	0	0	0.2	0	0	0.04	0	0.0185	0	0	0.2	0	0	0.04	0
Total Carideans		65.648	32.455	39.824	20.6	166.75	73.333	66.592	137.4	17.64	19.219	14.598	3.4728	88.545	37.945	15.016	42.385

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	*Callinectes sapidus*	0.0185	0	0.0588	0	0	0	0.0118	0.1	0.0185	0	0.0529	0	0	0	0.0106	0.1
	Callinectes similis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Callinectes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Epialtus dilatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurypanopeus sp	0.2222	0.0909	0.1176	0	0.75	0.2	0.2317	0.1	0.1111	0.0909	0.073	0	0.6196	0.2308	0.1107	0.1
	Libinia sp.	0.1852	0	0.2353	0	0.625	0.0667	0.1854	0.6	0.088	0	0.136	0	0.4978	0.0769	0.0925	0.3399
	Panopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crabs		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		0.4259	0.0909	0.4118	0	1.375	0.2667	0.4289	0.8	0.1971	0.0909	0.2245	0	1.117	0.3077	0.1994	0.3266

Appendix A, Table 9. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in February 2003. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	Paraclinus fasciatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank cusk-eel	Ophidion holbooki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	Microgobius microlepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	Scorpaena brasiliensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay Anchovy	Anchoa mitchilli	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0	0.6
Bearded goby	Barbulifer ceuthoeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0.037	0.0909	0	0	0	0.0667	0.0315	0	0.0259	0.0909	0	0	0	0.0769	0.0207	0
Bigeye stargazer	Dactyloscopus crossotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	Symphurus plagiusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	Holacanthus bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	Cryptotomus roseus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	Chaenopsis ocellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	Haemulon sciurus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0.1	0	0	0.073	0	0	0	0.0146	0.1
Clown goby	Microgobius gulosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Code goby	Gobiosoma robustum	0.6296	1.8182	0.1176	0	0.625	0.4667	0.6055	1.2	0.1678	0.553	0.073	0	0.3239	0.3323	0.0994	0.786
Crested goby	Lophogobius cyprinoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	Parophidion schmidti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	Syngnathus floridae	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Dwarf pipefish	Cosmocampus hildebrandi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	Hippocampus zosterae	0.0741	0	0	0	0.375	0.0667	0.0883	0	0.0446	0	0	0	0.2631	0.0769	0.051	0
Frillfin goby	Bathygobius soporator	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	Anarchopterus criniger	0.1667	0	0.0588	0	0.25	0.4	0.1418	0	0.0736	0	0.087	0	0.1637	0.2683	0.0512	0
Gold brotula	Gunterichthys longipenis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspot goby	Gnatholepis thompsoni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	Floridichthys carpio	0.0926	0.1818	0	0	0	0.2	0.0764	0	0.0478	0.122	0	0	0	0.1662	0.036	0
Great barracuda	Sphyraena barracuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	Syngnathus scovelli	0.1111	0.1818	0	0	0	0.2667	0.0897	0.1	0.0629	0.122	0	0	0	0.2371	0.0476	0.1
Gulf toadfish	Opsanus beta	0.1111	0.2727	0	0	0.25	0.0667	0.1179	0.1	0.0432	0.1408	0	0	0.1637	0.0769	0.0342	0.1
Hardhead silverside	Atherinomorus stipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 9. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	Ogilbia cayorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined seahorse	Hippocampus erectus	0.037	0	0.0588	0	0.125	0	0.0368	0	0.0259	0	0.0529	0	0.125	0	0.0246	0
Lined sole	Achirus lineatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	Paraclinus marmoratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mummichog	Fundulus heteroclitus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	Syngnathus fuscus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	Orthopristis chrysoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	Lagodon rhomboides	0.0926	0.1818	0.0588	0	0.25	0	0.0981	0	0.0398	0.122	0.087	0	0.1637	0	0.0328	0
Planehead filefish	Monocanthus hispidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	Bryx dunckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater killifish	Lucania parva	2.4444	4.1818	0	0	3.625	3.8	2.3214	1.5	0.7276	1.7206	0	0	2.3975	2.0303	0.5133	1.2042
Redfin brotula	Petrotyx sanguineus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	Histrio histrio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	Syngnathus pelagicus	0.0185	0	0	0	0	0.0667	0.0133	0	0.0185	0	0	0	0	0.0769	0.0154	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Sheepshead porgy	Archosargus probatocephalus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	Eucinostomus gula	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Spotfin jawfish	Opistognathus robinsi	0.2778	0.0909	0.2353	0.2	0.125	0.5333	0.2369	0.9	0.0853	0.0909	0.1123	0.2	0.125	0.2895	0.0365	0.526
Spotted dragonet	Diplogrammus pauciradiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted whiff	Citharichthys macrops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	Ophidion marginatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	Haemulon aurolineatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified fish		0.0926	0	0.2941	0	0	0	0.0588	0	0.076	0	0.2214	0	0	0	0.0443	0
Total Fish		4.2222	7.1818	0.8235	0.2	5.625	5.9333	3.9527	4.6	0.7823	1.9345	0.4006	0.2	2.2908	1.8427	0.4296	2.6675

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	Farfantepenaeus duorarum	0.3889	0.8182	0.0588	0	0.125	0.6667	0.3337	0.5	0.1252	0.3521	0.0529	0	0.125	0.3782	0.0776	0.4014
	Alpheus heterochaelis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Alpheus normanni	0.0556	0	0	0	0.125	0.1333	0.0517	0	0.0315	0	0	0	0.125	0.1042	0.0283	0
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	2.537	3.5455	2.7059	0.6	3.375	1.4667	2.3386	0	0.7214	1.7703	2.4366	0.6	1.7722	0.7794	0.3428	0
	Hippolyte zostericola	17.556	25.182	6	2.4	37.625	17.2	17.681	6.3	3.0679	7.9233	3.6368	0.5099	7.6717	6.9433	1.4302	3.0806
	Latreutes fucorum	0.0185	0.0909	0	0	0	0	0.0182	0.6	0.0185	0.0909	0	0	0	0	0.0182	0.4

Appendix A, Table 9. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Leander tenuicorris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0.0185	0	0	0	0	0.0667	0.0133	0	0.0185	0	0	0	0	0.0769	0.0154	0
	Palaemonetes pugio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes vulgaris	0.0741	0	0	0.2	0.125	0.1333	0.0917	0.1	0.0446	0	0	0.2	0.125	0.1538	0.0409	0.1
	Periclimenes americanus	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0529	0	0	0	0.0106	0
	Periclimenes longicaudatus	0.2037	0.0909	0.5294	0	0	0.0667	0.1374	3	0.0892	0.0909	0.2379	0	0	0.0769	0.0435	1.5275
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	9.6481	4.8182	2.4118	0.6	22.375	16.333	9.3077	3.3	4.4526	4.0448	1.8653	0.2449	13.754	16	3.2185	3.0806
	Thor manningi	26.815	14.636	4	1.8	57.125	50.467	25.606	18.7	9.2589	10.185	1.5422	0.4899	27.064	31.909	6.4938	16.743
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		56.944	48.364	15.706	5.6	120.75	85.867	55.257	32	14.028	19.248	9.2707	1.077	41.384	45.008	8.6756	22.895

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	Callinectes sapidus	0.037	0	0.0588	0	0	0.0667	0.0251	0	0.0259	0	0.0529	0	0	0.0769	0.0163	0
	Callinectes similis	0.0556	0.0909	0	0	0	0.1333	0.0448	0	0.0411	0.0909	0	0	0	0.1538	0.0316	0
	Callinectes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Epialtus dilatatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurypanopeus sp	0.1481	0	0	0	0.25	0.4	0.13	0.2	0.1003	0	0	0	0.25	0.3859	0.0808	0.2
	Libinia sp.	0.0556	0	0	0	0	0.2	0.04	0	0.0556	0	0	0	0	0.2308	0.0462	0
	Panopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crab		0.037	0	0.0588	0	0.125	0	0.0368	0	0.0259	0	0.0529	0	0.125	0	0.0246	0
Total Crabs		0.3333	0.0909	0.1176	0	0.375	0.8	0.2767	0.2	0.1295	0.0909	0.073	0	0.2631	0.4731	0.085	0.2

Appendix A, Table 10. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in February 2003. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	Paraclinus fasciatus	0.037	0.0909	0.0588	0	0	0	0.0299	0.1	0.0259	0.0909	0.0529	0	0	0	0.0186	0.1
Bank cusk-eel	Ophidion holbooki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	Microgobius microlepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	Scorpaena brasiliensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay Anchovy	Anchoa mitchilli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	Barbulifer ceuthoeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye stargazer	Dactyloscopus crossotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	Symphurus plagiusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	Holacanthus bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	Cryptotomus roseus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	Chaenopsis ocellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	Haemulon sciurus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	Microgobius gulosus	0.0741	0.2727	0	0	0	0.0667	0.0679	0	0.0446	0.195	0	0	0	0.0769	0.0382	0
Code goby	Gobiosoma robustum	0.4444	1.3636	0.1765	0	0.25	0.2667	0.4114	0.3	0.1286	0.4724	0.1771	0	0.1637	0.1748	0.0764	0.2134
Crested goby	Lophogobius cyprinoides	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Dusky cusk	Parophidion schmidti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	Syngnathus floridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	Cosmocampus hildebrandi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	Hippocampus zosterae	0.1111	0.1818	0.1765	0	0	0.0667	0.085	0	0.0432	0.122	0.087	0	0	0.0769	0.0245	0
Frillfin goby	Bathygobius soporator	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	Anarchopterus criniger	0.2407	0.5455	0.4118	0	0	0	0.1914	0	0.1088	0.3659	0.2918	0	0	0	0.0814	0
Gold brotula	Gunterichthys longipenis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspot goby	Gnatholepis thompsoni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	Floridichthys carpio	0.0185	0	0	0	0	0.0667	0.0133	0	0.0185	0	0	0	0	0.0769	0.0154	0
Great barracuda	Sphyraena barracuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	Syngnathus scovelli	0.1296	0.3636	0	0	0.25	0.0667	0.1361	0.1	0.0594	0.2033	0	0	0.25	0.0769	0.0517	0.1
Gulf toadfish	Opsanus beta	0.2407	0	0.1765	0	0.25	0.5333	0.192	0	0.0833	0	0.1588	0	0.1637	0.213	0.0447	0
Hardhead silverside	Atherinomorus stipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix A, Table 10. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Key brotula	Ogilbia cayorum	0.0185	0	0	0	0.125	0	0.025	0	0.0185	0	0	0	0.125	0	0.025	0
Lined seahorse	Hippocampus erectus	0.1111	0.0909	0.2353	0	0	0.0667	0.0786	0	0.0629	0.0909	0.1648	0	0	0.0769	0.031	0
Lined sole	Achirus lineatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	Paraclinus marmoratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mummichog	Fundulus heteroclitus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	Syngnathus fuscus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	Orthopristis chrysoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	Lagodon rhomboides	0.1852	0.1818	0.4118	0	0.125	0	0.1437	0.1	0.0839	0.1818	0.2816	0	0.125	0	0.0542	0.1
Planehead filefish	Monocanthus hispidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	Bryx dunckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater killifish	Lucania parva	4.2963	8	0.4706	0	9.625	3.9333	4.4058	1.1	1.0665	2.6251	0.3716	0	4.6366	1.8384	0.8356	1.1
Redfin brotula	Petrotyx sanguineus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	Histrio histrio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	Syngnathus pelagicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	Archosargus probatocephalus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	Eucinostomus gula	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Speckled worm eel	Myrophis punctatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin jawfish	Opistognathus robinsi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted dragonet	Diplogrammus pauciradiatus	0.3889	0.0909	0.4118	0.2	0.875	0.3333	0.3822	0.4	0.1038	0.0909	0.1966	0.2	0.3981	0.1804	0.0503	0.4
Spotted whiff	Citharichthys macrops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	Ophidion marginatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	Haemulon aurolineatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified fish		0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Total Fish		6.3148	11.273	2.5294	0.2	11.5	5.4	6.1804	2.3	1.1607	2.8447	0.8293	0.2	4.6059	2.0636	0.7765	1.044

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	Farfantepenaeus duorarum	0.463	1	0.1765	0	0.625	0.4	0.4403	0.8	0.1014	0.3303	0.087	0	0.2631	0.1831	0.0593	0.5538
	Alpheus heterochaelis	0.0185	0	0.0588	0	0	0	0.0118	1.3	0.0185	0	0.0529	0	0	0	0.0106	1.193
	Alpheus normanni	0.1481	0.0909	0.2353	0	0.25	0.0667	0.1286	0.3	0.0615	0.0909	0.1459	0	0.1637	0.0769	0.0289	0.2134
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.4074	0.0909	0.4706	0.8	0.5	0.3333	0.439	0.1	0.1484	0.0909	0.3003	0.8	0.5	0.3109	0.119	0.1
	Hippolyte zostericola	26.704	63.364	18.294	1.8	28.25	13.4	25.022	4	5.5717	19.513	8.6309	0.8602	8.8857	5.4448	3.0742	2.9059
	Latreutes fucorum	0.0185	0.0909	0	0	0	0	0.0182	0.1	0.0185	0.0909	0.073	0	0	0	0.0203	0.1

Appendix A, Table 10. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
	Leander tenuicorris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0.1667	0.4545	0	0	0	0.2667	0.1442	0	0.1175	0.4545	0	0	0	0.3077	0.0962	0
	Palaemonetes pugio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes vulgaris	0.037	0	0	0.2	0	0.0667	0.0533	0.2	0.0259	0	0.073	0.2	0	0.0769	0.0366	0.1333
	Periclimenes americanus	0	0	0	0	0	0	0	1.2	0	0	0	0	0	0	0	1.2
	Periclimenes longicaudatus	0.1481	0	0.2353	0.2	0.125	0.1333	0.1387	1.2	0.0669	0	0.1739	0.2	0.125	0.1042	0.0346	0.6633
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	0.6667	0.3636	1.0588	0	0.5	0.6667	0.5178	0	0.2683	0.3636	0.6941	0	0.5	0.4107	0.1135	0
	Thor manningi	19.611	19.818	22.412	1.8	22.375	18.133	16.908	9.1	6.2314	13.802	13.564	1.3565	12.173	11.672	2.3245	4.8384
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		47.926	84.273	42.765	4.8	52	33.067	43.381	17.5	10.161	27.084	21.717	3.1209	15.354	16.188	3.9966	8.1175

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	Callinectes sapidus	0.037	0	0.0588	0	0	0.0667	0.0251	0	0.0259	0	0.0529	0	0	0.0769	0.0163	0
	Callinectes similis	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0529	0	0	0	0.0106	0
	Callinectes sp.	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
	Epialtus dilatatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Eurypanopeus sp.	0.3148	0.7273	0.0588	0	0.875	0.0667	0.3456	0.1	0.1369	0.5574	0.0529	0	0.4407	0.0769	0.1138	0.1
	Libinia sp.	0.1667	0.2727	0.2941	0	0	0.0667	0.1267	0	0.0736	0.1408	0.1864	0	0	0.0769	0.0373	0
	Macrocoeloma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panopeus sp.	0.0185	0	0	0	0	0.0667	0.0133	0	0.0185	0	0	0	0	0.0769	0.0154	0
	Pitho lherminieri	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.087	0	0	0	0.0174	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portunus sp.	0.0185	0	0	0.2	0	0	0.04	0	0.0185	0	0	0.2	0	0	0.04	0
	Rithropanopeus sp.	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
unidentified crab		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		0.6111	1.0909	0.5294	0.2	0.875	0.2667	0.5924	0.2	0.1782	0.6246	0.283	0.2	0.4407	0.1748	0.084	0.1333

Appendix A, Table 11. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in May 2004. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	Paraclinus fasciatus	0.0926	0	0.2353	0.2	0	0	0.0871	0	0.0478	0	0.1241	0.2	0	0	0.0415	0
Bank cusk-eel	Ophidion holbooki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	Microgobius microlepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	Scorpaena brasiliensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay Anchovy	Anchoa mitchilli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	Barbulifer ceuthoeus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigeye mojarra	Eucinostomus havana	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Bigeye stargazer	Dactyloscopus crossotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	Symphurus plagiusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	Holacanthus bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	Cryptotomus roseus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	Chaenopsis ocellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	Haemulon sciurus	0.0185	0.0909	0	0	0	0	0.0182	0.1	0.0185	0.0909	0	0	0	0	0.0182	0.1
Caesar grunt	Haemulon carbonarium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	Microgobius gulosus	0.2963	1.1818	0	0	0.25	0.0667	0.2997	0.3	0.139	0.6152	0	0	0.1637	0.0769	0.115	0.2134
Code goby	Gobiosoma robustum	0.2593	0.1818	0.2941	0	0.5	0.2	0.2352	0.4	0.0709	0.122	0.1648	0	0.3273	0.1216	0.0528	0.2667
Crested goby	Lophogobius cyprinoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	Parophidion schmidti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	Syngnathus floridae	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Dwarf pipefish	Cosmocampus hildebrandi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	Hippocampus zosterae	0.0741	0.0909	0.0588	0.2	0.125	0	0.0949	0	0.036	0.0909	0.0529	0.2	0.125	0	0.0337	0
Frillfin goby	Bathygobius soporator	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	Anarchopterus criniger	0.2778	0.1818	0.0588	0	1	0.2667	0.3015	0	0.1103	0.1818	0.0529	0	0.6268	0.1332	0.1115	0
Gold brotula	Gunterichthys longipenis	0.0556	0	0	0	0	0.2	0.04	0	0.0556	0	0	0	0	0.2308	0.0462	0
Goldspot goby	Gnatholepis thompsoni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	Floridichthys carpio	0.0926	0.3636	0	0	0	0.0667	0.0861	0	0.0478	0.2033	0	0	0	0.0769	0.0397	0
Great barracuda	Sphyraena barracuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	Syngnathus scovelli	0.1296	0.3636	0	0	0.25	0.0667	0.1361	0	0.0532	0.2033	0	0	0.1637	0.0769	0.0416	0
Gulf toadfish	Opsanus beta	0.7963	0.6364	0.2353	0.4	1.625	1.2667	0.8327	0.5	0.2399	0.2787	0.136	0.2449	1.2527	0.5475	0.2019	0.4014
Hardhead silverside	Atherinomorus stipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore lizardfish	Synodus foetens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Key brotula	Ogilbia cayorum	0.0556	0	0	0	0.375	0	0.075	0	0.0411	0	0	0	0.2631	0	0.0526	0

Appendix A, Table 11. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Leopard toadfish	Opsanus pardus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined seahorse	Hippocampus erectus	0.0926	0.0909	0.1176	0	0	0.1333	0.0684	0	0.0478	0.0909	0.073	0	0	0.1538	0.0292	0
Lined sole	Achirus lineatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	Paraclinus marmoratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mummichog	Fundulus heteroclitus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	Syngnathus fuscus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	Orthopristis chrysoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	Lagodon rhomboides	0.0926	0	0.1765	0	0.25	0	0.0853	0	0.0398	0	0.087	0	0.1637	0	0.033	0
Planehead filefish	Monocanthus hispidus	0.0185	0	0	0	0.125	0	0.025	0	0.0185	0	0	0	0.125	0	0.025	0
Pugnose pipefish	Bryx dunckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater killifish	Lucania parva	4.3889	11.545	0	0	7.125	3.5333	4.4408	2.8	1.4446	5.4878	0.3648	0	3.5428	2.4138	1.0182	2.2988
Redfin brotula	Petrotyx sanguineus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	Histrio histrio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	Syngnathus pelagicus	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	Archosargus probatocephalus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	Eucinostomus gula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled worm eel	Myrophis punctatus	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Spotfin jawfish	Opistognathus robinsi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted dragonet	Diplogrammus pauciradiatus	0.7778	0.0909	1.1765	2.6	0.375	0.4667	0.9418	1.3	0.1686	0.0909	0.3385	0.6782	0.2631	0.1804	0.1008	0.3958
Spotted whiff	Citharichthys macrops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	Ophidion marginatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	Haemulon aurolineatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified fish		0.0185	0	0	0.2	0	0	0.04	0	0.0185	0	0	0.2	0	0	0.04	0
Total Fish		7.5556	14.909	2.3529	3.6	12	6.2667	7.8257	5.7	1.6319	5.7215	0.6856	0.6782	5.3818	2.528	1.0986	2.6835

Appendix A, Table 11. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	Farfantepenaeus duorarum	0.9815	2.0909	0.1765	0	1.375	1.0667	0.9418	0.1	0.2676	0.9289	0.116	0	0.625	0.5791	0.1719	0.1
	Alpheus heterochaelis	0.0741	0	0	0.2	0	0.2	0.08	0.3	0.0446	0	0.1459	0.2	0	0.1662	0.0427	0.2134
	Alpheus normanni	0.2963	0	0.5882	1.2	0	0	0.3576	1	0.1533	0	0.3031	1.2	0	0	0.2324	1
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.9259	0.4545	0.1176	1	2.875	1	1.0894	0.2	0.4051	0.3659	0.073	1	2.3333	0.7325	0.3913	0.2
	Hippolyte zostericola	14.574	17.727	6.2353	1.8	46.5	7	15.853	1.9	5.3155	9.5461	1.8524	1.1136	31.976	3.2571	5.8007	1.0483
	Latreutes fucorum	0.037	0	0.1176	0	0	0	0.0235	0	0.0259	0	0.073	0	0	0	0.0146	0
	Leander tenuicorris	0.0185	0	0	0	0	0.0667	0.0133	0	0.0185	0	0	0	0	0.0769	0.0154	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0.1111	0.2727	0	0	0.375	0	0.1295	0.1	0.0778	0.2727	0	0	0.375	0	0.081	0.1
	Palaemonetes pugio	0.2222	0.2727	0	0.2	0.75	0.1333	0.2712	0	0.1286	0.2727	0	0.2	0.75	0.1538	0.1268	0
	Palaemonetes vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Periclimenes americanus	0	0	0	0	0	0	0	0.8	0	0	0	0	0	0	0	0.8
	Periclimenes longicaudatus	0.2407	0	0.4118	1.2	0	0	0.3224	0.4	0.0833	0	0.1597	0.4899	0	0	0.0952	0.2211
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	0.6296	0.8182	0.5294	0	1	0.5333	0.5762	1.3	0.2232	0.8182	0.8067	0	0.6547	0.3676	0.1553	1.0858
	Thor manningi	26.519	30.636	6.8824	1.2	70.5	27.2	27.284	29.2	9.4645	23.102	13.992	0.9695	46.154	18.128	7.3971	19.552
unidentified shrimp		0.037	0	0	0	0.125	0.0667	0.0383	0	0.0259	0	0	0	0.125	0.0769	0.0259	0
Total Carideans		43.685	50.182	14.882	6.8	122.13	36.2	46.038	35.2	14.396	33.459	14.991	2.5768	76.198	20.958	12.658	20.938

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	Callinectes sapidus	0.1481	0.2727	0	0	0	0.3333	0.1212	0	0.0766	0.195	0	0	0	0.2665	0.0576	0
	Callinectes similis	0.1111	0.1818	0.1176	0	0	0.1333	0.0866	0.1	0.0506	0.1818	0.073	0	0	0.1042	0.0343	0.1
	Callinectes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Epialtus dilatatus	0.037	0	0.1176	0	0	0	0.0235	0	0.0259	0	0.073	0	0	0	0.0146	0
	Eurypanopeus sp.	0.5741	0.0909	0.4706	0.4	0.875	0.8667	0.5406	0.7	0.1935	0.0909	0.3828	0.4	0.3981	0.6304	0.0857	0.4726
	Libinia sp.	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
	Macrocoeloma sp.	0	0	0	0	0	0	0	0.1	0	0	0.073	0	0	0	0.0146	0.1
	Nibilia antilocapra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panopeus sp.	0	0	0	0	0	0	0	0.1	0	0	0.073	0	0	0	0.0146	0.1
	Pitho lherminieri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portunus sp.	0.037	0	0.0588	0	0	0.0667	0.0251	0.2	0.0259	0	0.087	0	0	0.0769	0.0201	0.1333
	Rithropanopeus sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
unidentified crab		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		0.9074	0.5455	0.7647	0.4	0.875	1.4	0.797	1.3	0.2052	0.2473	0.5643	0.4	0.3981	0.6049	0.0645	0.7

Appendix A, Table12. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in July 2004. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	Paraclinus fasciatus	0.0741	0	0.1176	0	0.25	0	0.0735	0	0.036	0	0.073	0	0.1637	0	0.0323	0
Bank cusk-eel	Ophidion holbooki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	Microgobius microlepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	Scorpaena brasiliensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bay Anchovy	Anchoa mitchilli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	Barbulifer ceuthoeus	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Bigeye mojarra	Eucinostomus havana	0.0556	0	0	0	0	0.2	0.04	0	0.0556	0	0	0	0	0.2308	0.0462	0
Bigeye stargazer	Dactyloscopus crossotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	Symphurus plagiusa	0.0185	0	0.0588	0	0	0	0.0118	0	0.0185	0	0.0529	0	0	0	0.0106	0
Blue angelfish	Holacanthus bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	Cryptotomus roseus	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Bluethroat pikeblenny	Chaenopsis ocellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	Haemulon sciurus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caesar grunt	Haemulon carbonarium	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Chain pipefish	Syngnathus louisianae	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Clown goby	Microgobius gulosus	0.1852	0.7273	0.0588	0.2	0	0	0.1972	0.7	0.0956	0.4283	0.2214	0.2	0	0	0.08	0.3958
Code goby	Gobiosoma robustum	1.037	1.8182	0.9412	0	1.625	0.4667	0.9702	1	0.185	0.5012	0.2755	0	0.625	0.2153	0.1098	0.4944
Crested goby	Lophogobius cyprinoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	Parophidion schmidti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	Syngnathus floridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	Cosmocampus hildebrandi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	Hippocampus zosterae	0.1111	0.0909	0	0	0.625	0	0.1432	0	0.0571	0.0909	0	0	0.3239	0	0.0628	0
Frillfin goby	Bathygobius soporator	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	Anarchopterus criniger	0.7593	0.2727	1.1176	0	1.375	0.5333	0.6597	0.3	0.2195	0.195	0.5314	0	0.5324	0.2895	0.102	0.1528
Gold brotula	Gunterichthys longipenis	0.037	0	0.0588	0	0.125	0	0.0368	0	0.0259	0	0.0529	0	0.125	0	0.0246	0
Goldspot goby	Gnatholepis thompsoni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	Floridichthys carpio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Great barracuda	Sphyraena barracuda	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Gulf pipefish	Syngnathus scovelli	0.0556	0.1818	0	0	0.125	0	0.0614	0	0.0315	0.122	0	0	0.125	0	0.0303	0
Gulf toadfish	Opsanus beta	0.5741	1	0.2941	0	1.25	0.3333	0.5755	0	0.1462	0.5045	0.1699	0	0.4119	0.1804	0.0907	0
Hardhead silverside	Atherinomorus stipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore lizardfish	Synodus foetens	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Key brotula	Ogilbia cayorum	0.1852	0.4545	0.1765	0	0.125	0.0667	0.1645	0	0.0703	0.2473	0.116	0	0.125	0.0769	0.0402	0

Appendix A, Table12. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Leopard toadfish	Opsanus pardus	0.037	0	0	0	0	0.1333	0.0267	0	0.037	0	0	0	0	0.1538	0.0308	0
Lined seahorse	Hippocampus erectus	0.0926	0.0909	0.0588	0	0.25	0.0667	0.0933	0	0.0398	0.0909	0.0529	0	0.1637	0.0769	0.0267	0
Lined sole	Achirus lineatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	Paraclinus marmoratus	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Mummichog	Fundulus heteroclitus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	Syngnathus fuscus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	Orthopristis chrysoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	Lagodon rhomboides	0.0556	0.0909	0	0	0.125	0.0667	0.0565	0	0.0315	0.0909	0	0	0.125	0.0769	0.0252	0
Planehead filefish	Monocanthus hispidus	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Pugnose pipefish	Bryx dunckeri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater killifish	Lucania parva	3.7963	3.5455	0	0	13.5	3.8667	4.1824	0	1.0605	1.1706	0	0	5.2881	1.651	0.9723	0
Redfin brotula	Petrotyx sanguineus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	Histrio histrio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	Syngnathus pelagicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	Archosargus probatocephalus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	Eucinostomus gula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled worm eel	Myrophis punctatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin jawfish	Opistognathus robinsi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted dragonet	Diplogrammus pauciradiatus	0.537	0.0909	0.9412	1	0.125	0.5333	0.5381	1.8	0.1314	0.0909	0.246	0.5477	0.125	0.3125	0.0814	0.8794
Spotted whiff	Citharichthys macrops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	Ophidion marginatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	Haemulon aurolineatum	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
unidentified fish		0.0185	0	0	0	0.125	0	0.025	0	0.0185	0	0	0	0.125	0	0.025	0
Total Fish		7.7222	8.8182	3.8235	1.2	19.625	6.2667	7.9467	4.2	1.3282	1.8082	0.9658	0.5831	6.1613	1.9983	0.9993	1.2806

Appendix A, Table12. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	Farfantepenaeus duorarum	1.3148	2.5455	1.1176	0.4	0.5	1.2	1.1526	0.5	0.242	0.7181	0.286	0.2449	0.2673	0.5942	0.0978	0.3073
	Alpheus heterochaelis	0.2778	0.5455	0.4706	0	0.125	0	0.2282	0	0.1252	0.2473	0.3219	0	0.125	0	0.0648	0
	Alpheus normanni	0.2593	0.1818	0.7059	0	0	0	0.1775	0.2	0.1891	0.1818	0.529	0	0	0	0.1029	0.2
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.6852	0.9091	0	0	1.875	0.8	0.7168	0	0.2449	0.4759	0	0	1.0426	0.6351	0.1987	0
	Hippolyte zostericola	7.1852	6.1818	3.7647	0.2	17.75	7.5333	7.086	0.8	1.6036	2.3231	1.9531	0.2	6.8237	3.1325	1.0947	0.611
	Latreutes fucorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Leander tenuicorris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes pugio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Periclimenes americanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Periclimenes longicaudatus	0.2963	0	0.5882	0.2	0	0.3333	0.2243	0	0.1622	0	0.4244	0.2	0	0.2665	0.0814	0
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	5.3889	6.2727	2.1765	0.6	7.125	8.3333	4.9015	0.8	1.3134	3.3739	1.1588	0.6	3.0322	3.722	0.6274	0.5538
	Thor manningi	142.13	163.45	75.118	3	231.63	182.13	131.07	10.8	34.153	74.971	33.624	2.5298	92.82	100.16	18.586	5.4259
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		156.22	177.55	82.824	4	258.5	199.13	144.4	12.6	36.427	79.673	36.452	3.0984	100.75	105.3	19.703	6.4588

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	Callinectes sapidus	0.037	0.0909	0	0	0.125	0	0.0432	0	0.0259	0.0909	0	0	0.125	0	0.027	0
	Callinectes similis	0.0556	0.0909	0.0588	0	0.125	0	0.0549	0	0.0315	0.0909	0.0529	0	0.125	0	0.0247	0
	Callinectes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Epialtus dilatatus	0.2037	0	0.6471	0	0	0	0.1294	0	0.1102	0	0.3017	0	0	0	0.0603	0
	Eurypanopeus sp.	0.2037	0.2727	0.2353	0	0	0.2667	0.1549	0	0.1037	0.2727	0.2117	0	0	0.2083	0.0577	0
	Libinia sp.	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0.4
	Macrocoeloma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Nibilia antilocapra	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
	Panopeus sp.	0.1481	0.1818	0.0588	0	0	0.3333	0.1148	0	0.0811	0.122	0.0529	0	0	0.3109	0.0579	0
	Pitho lherminieri	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0.3055
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portunus sp.	0.0741	0	0.0588	0.4	0.125	0	0.1168	0	0.0446	0	0.0529	0.4	0.125	0	0.0747	0
	Rithropanopeus sp.	0.2778	0.0909	0.2941	0	0.75	0.2	0.267	0	0.0968	0.0909	0.2156	0	0.3134	0.1216	0.0538	0
unidentified crab		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		1	0.7273	1.3529	0.4	1.125	0.8	0.881	0.9	0.2305	0.4491	0.4447	0.4	0.4407	0.5484	0.0246	0.7951

Appendix A, Table 13. Abundance and variability of fish, shrimp and crabs collected in southern Biscayne Bay with the throw-trap in September 2004. Sample size: overall=54, 1s=11, 2n=8, 2s=17, 3n=13, 3s=5, zones=5, Elliot=10.

		Mean								Standard Error of Mean							
FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Banded blenny	Paraclinus fasciatus	0.0556	0	0	0.1765	0	0	0.0353	0.1	0.0411	0	0	0.116	0	0	0.0232	0.1
Bank cusk-eel	Ophidion holbrooki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Banner goby	Microgobius microlepis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbfish	Scorpaena brasiliensis	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Bay Anchovy	Anchoa mitchilli	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bearded goby	Barbulifer ceuthoeus	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
Bigeye mojarra	Eucinostomus havana	0.0741	0.2727	0.125	0	0	0	0.0795	0	0.0446	0.195	0.125	0	0	0	0.0407	0
Bigeye stargazer	Dactyloscopus crossotus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek tonguefish	Symphurus plagiusa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue angelfish	Holacanthus bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluelip parrotfish	Cryptotomus roseus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	Chaenopsis ocellata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped grunt	Haemulon sciurus	0.0185	0	0	0.0588	0	0	0.0118	0	0.0185	0	0	0.087	0	0	0.0174	0
Caesar grunt	Haemulon carbonarium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain pipefish	Syngnathus louisianae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown goby	Microgobius gulosus	0.0926	0.3636	0.125	0	0	0	0.0977	0.2	0.0607	0.2787	0.125	0	0	0	0.0551	0.1333
Code goby	Gobiosoma robustum	0.7963	1.0909	0.625	0.7647	0.8667	0	0.6695	0.1	0.1761	0.3921	0.375	0.4596	0.3755	0	0.0816	0.1
Crested goby	Lophogobius cyprinoides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky cusk	Parophidion schmidti	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	Syngnathus floridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf pipefish	Cosmocampus hildebrandi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	Hippocampus zosterae	0.0185	0	0	0.0588	0	0	0.0118	0	0.0185	0	0	0.087	0	0	0.0174	0
Frillfin goby	Bathygobius soporator	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed pipefish	Anarchopterus criniger	0.2593	0	0.25	0.1176	0.6667	0	0.2069	0	0.1158	0	0.25	0.0976	0.426	0	0.0818	0
Gold brotula	Gunterichthys longipenis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspot goby	Gnatholepis thompsoni	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted killifish	Floridichthys carpio	0.037	0.1818	0	0	0	0	0.0364	0	0.0259	0.122	0	0	0	0	0.0244	0
Great barracuda	Sphyraena barracuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf pipefish	Syngnathus scovelli	0.0556	0.0909	0.125	0	0.0667	0	0.0565	0	0.0315	0.0909	0.125	0	0.0769	0	0.0252	0
Gulf toadfish	Opsanus beta	0.463	0.0909	0.375	0.7647	0.5333	0	0.3528	0	0.1557	0.0909	0.2631	0.4332	0.213	0	0.0743	0
Hardhead silverside	Atherinomorus stipes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore lizardfish	Synodus foetens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Key brotula	Ogilbia cayorum	0.0556	0	0	0.1765	0	0	0.0353	0	0.0556	0	0	0.1588	0	0	0.0318	0

Appendix A, Table 13. Cont.

FISH	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Leopard toadfish	Opsanus pardus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined seahorse	Hippocampus erectus	0.0926	0.0909	0.375	0.0588	0	0	0.1049	0.3	0.0398	0.0909	0.183	0.087	0	0	0.0341	0.1528
Lined sole	Achirus lineatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	Paraclinus marmoratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mummichog	Fundulus heteroclitus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern pipefish	Syngnathus fuscus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	Orthopristis chrysoptera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	Lagodon rhomboides	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Planehead filefish	Monocanthus hispidus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pugnose pipefish	Bryx dunckeri	0.0185	0	0.125	0	0	0	0.025	0	0.0185	0	0.125	0	0	0	0.025	0
Rainwater killifish	Lucania parva	2.9444	4.2727	7	1.2941	2.2667	0	2.9667	0	0.7604	1.9121	2.4349	1.9132	1.1958	0	0.4217	0
Redfin brotula	Petrotyx sanguineus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	Histrio histrio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum pipefish	Syngnathus pelagicus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scrawled cowfish	Lactophrys quadricornis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead porgy	Archosargus probatocephalus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Silver jenny	Eucinostomus gula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled worm eel	Myrophis punctatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin jawfish	Opistognathus robinsi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted dragonet	Diplogrammus pauciradiatus	0.1111	0	0	0.1765	0.1333	0.2	0.102	0	0.0508	0	0	0.116	0.1042	0.2	0.0381	0
Spotted whiff	Citharichthys macrops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped cusk-eel	Ophidion marginatum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	Haemulon aurolineatum	0.037	0	0	0.1176	0	0	0.0235	0	0.037	0	0	0.1059	0	0	0.0212	0
unidentified fish		0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
Total Fish		5.1667	6.6364	9.125	3.7647	4.5333	0.2	4.8519	0.9	0.9751	2.0148	2.5735	2.8913	1.751	0.2	0.4669	0.1795

Appendix A, Table 13. Cont.

SHRIMP	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Pink Shrimp	Farfantepenaeus duorarum	1.8519	3.2727	2.875	0.2353	2.4667	0	1.7699	0.2	0.409	0.8538	0.6928	0.1648	1.3001	0	0.2359	0.2
	Alpheus heterochaelis	0.2037	0	0.125	0.2941	0.3333	0	0.1505	0	0.107	0	0.125	0.2214	0.3109	0	0.0612	0
	Alpheus normanni	0.3704	0	0	0.8824	0.3333	0	0.2431	0	0.1759	0	0	0.4611	0.2665	0	0.0943	0
	Brachycarpus biunguiculatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hippolyte pleuracanthus	0.5	0.3636	0.875	0.2353	0.8	0	0.4548	0	0.1466	0.2787	0.4407	0.2614	0.4154	0	0.0784	0
	Hippolyte zostericola	5.463	4.1818	13.5	1.7647	7.4	0	5.3693	0	1.4646	2.1312	7.0887	2.2464	2.7213	0	1.1616	0
	Latreutes fucorum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Leander tenuicorris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lysmata rathbunae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palaemonetes intermedius	0.0185	0.0909	0	0	0	0	0.0182	0	0.0185	0.0909	0	0	0	0	0.0182	0
	Palaemonetes pugio	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
	Palaemonetes vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Periclimenes americanus	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0	0	0.3055
	Periclimenes longicaudatus	0.3889	0	0.125	1	0.2	0	0.265	1.5	0.1252	0	0.125	0.2932	0.2308	0	0.0594	1.0028
	Processa bermudensis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Processa fimbriata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Thor floridanus	3	0.3636	4.5	3.4706	4.2	0	2.5068	0.1	0.9435	0.3636	3.7177	1.9636	1.3814	0	0.6591	0.1
	Thor manningi	48.944	7.1818	94	45.529	69.133	0.2	43.209	3.8	14.688	3.4054	54.848	28.578	31.914	0.2	10.064	1.4048
unidentified shrimp		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Carideans		58.889	12.182	113.13	53.176	82.4	0.2	52.217	5.9	16.496	5.3832	62.68	32.051	35.107	0.2	11.291	2.0025

CRABS	Scientific Name	overall	1s	2n	2s	3n	3s	zones	Elliot	overall	1s	2n	2s	3n	3s	zones	Elliot
Blue Crab	Callinectes sapidus	0.0556	0.0909	0.125	0	0.0667	0	0.0565	0	0.0315	0.0909	0.125	0	0.0769	0	0.0252	0
	Callinectes similis	0.0185	0	0	0	0.0667	0	0.0133	0	0.0185	0	0	0	0.0769	0	0.0154	0
	Callinectes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Epialtus dilatatus	0.0741	0	0	0.2353	0	0	0.0471	0	0.036	0	0	0.0976	0	0	0.0195	0
	Eurypanopeus sp.	0.0556	0	0	0	0.2	0	0.04	0	0.0556	0	0	0	0.2308	0	0.0462	0
	Libinia sp.	0.037	0.0909	0	0	0.0667	0	0.0315	0	0.0259	0.0909	0	0	0.0769	0	0.0207	0
	Macrocoeloma sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Nibilia antilocapra	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panopeus sp.	0.2407	0.2727	0	0.2353	0.4	0	0.1816	0	0.121	0.2727	0	0.2117	0.3323	0	0.0694	0
	Pitho lherminieri	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.1
	Pitho sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Portunus sp.	0.0741	0	0	0.0588	0.2	0	0.0518	0	0.036	0	0	0.0529	0.1216	0	0.024	0
	Rithropanopeus sp.	0.2407	0	0	0.6471	0.1333	0	0.1561	0	0.2047	0	0	0.5822	0.1042	0	0.113	0
unidentified crab		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Crabs		0.7963	0.4545	0.125	1.1765	1.1333	0	0.5779	0.1	0.3274	0.2817	0.125	0.8418	0.5475	0	0.1514	0.1

Appendix B

Table	Trip	Number of samples					
		Total	1S	2N	2S	3N	3S
1	August 2002 trawl (with sock) mean catch (number) per square meter.	21	1	2	10	5	3
2	October 2002 trawl (with sock) mean catch (number) per square meter.	23	0	3	10	6	4 *
3	December 2002 trawl (with sock) mean catch (number) per square meter.	24	2	4	9	5	4
4	February 2003 trawl (with sock) mean catch (number) per square meter.	24	2	4	9	5	4
5	April 2003 trawl (with sock) mean catch (number) per square meter.	24	2	4	9	5	4
6	June 2003 trawl (with sock) mean catch (number) per square meter.	24	2	2	9	5	4
7	August 2003 trawl (with sock) mean catch (number) per square meter.	24	2	4	9	5	4
8	October 2003 trawl (with sock) mean catch (number) per square meter.	24	2	4	9	5	4
9	December 2003 trawl (with sock) mean catch (number) per square meter.	24	2	4	9	5	4
10	February 2004 trawl (with sock) mean catch (number) per square meter.	24	2	4	9	5	4

*For Carideans, Total=22, 3S=3

Appendix Table B 1. August 2002 trawl mean and standard deviation of number per square meter.

Sample size: raw=21, 1S=1, 2N=2, 2S=10, 3N=5, 3S=3, zones=5.

		Mean							Standard deviation						
Common name	Scientific name	raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Alewife	*Alosa pseudoharengus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bandtail Puffer	*Sphoeroides spengleri*	0.00687	0	0.00044	0.00017	0.00017	0.00115	0.00039	0.00064	0.00062	0.00035	0.00039	0.00134	0.00046	
Bigeye Mojarra	*Eucinostomus havana*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Blackcheek Tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Blackfin Cardinalfish	*Astrapogon puncticulatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Blenny?		0	0	0	0	0	0	0	0	0	0	0	0	0	
Blenny		0	0	0	0	0	0	0	0	0	0	0	0	0	
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	
BlueStriped Grunt	*Haemulon sciurus*	0.02132	0.00276	0	0.00053	0.0016	0.00175	0.00133	0.00134	0	0.00075	0.00188	0.00175	0.00108	
Bridled Cardinalfish	*Apogon aurolineatus*	0.00175	0	0	8.7E-05	0	0.00029	7.6E-05	0.00026	0	0.00028	0	0.0005	0.00013	
Bucktooth parrotfish	*Sparisoma radians*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Chain Pipefish	*Syngnathus louisianae*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clown Goby	*Microbius gulosus*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Code Goby	*Gobiosoma robustum*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Colon Goby	*Coryphopterus dicrus*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dusky Pipefish	*Syngnathus floridae*	0.00166	0	0	8.3E-05	0	0.00028	7.2E-05	0.00025	0	0.00026	0	0.00048	0.00012	
Dwarf Goatfish	*Upeneus parvus*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dwarf Seahorse	*Hippocampus zosterae*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Emerald Parrotfish	*Nicholsina usta*	0.00083	0	0	8.3E-05	0	0	1.7E-05	0.00018	0	0.00026	0	0	3.7E-05	
Flagfin Mojarra	*Eucinostomus melanopterus*	0.02947	0	0.00437	0.00051	0.00245	0.00112	0.00169	0.00316	0.00618	0.00081	0.00547	0.00127	0.00175	
Freckled cardinalfish	*Phaeoptyx conklini*	0	0	0	0	0	0	0	0	0	0	0	0	0	
French Angelfish (juvenile)	*Pomacanthus paru*	0	0	0	0	0	0	0	0	0	0	0	0	0	
French Grunt	*Haemulon flavolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fringed Filefish	*Monacanthus ciliatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fringed Pipefish	*Microgmathus criniger*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gobionellus sp.	*Gobionellus sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gold Brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Goldspotted Killifish	*Floridichthys carpio*	0.00087	0	0.00044	0	0	0	8.7E-05	0.00019	0.00062	0	0	0	0.0002	
Grass Porgy	*Calamus arctifrons*	0.00171	0	0	0	0	0.00057	0.00011	0.00026	0	0	0	0.00049	0.00025	
Gray Snapper	*Lutjanus griseus*	0.00536	0.00092	0	0.00017	0.00056	0	0.00033	0.00049	0	0.00053	0.00051	0	0.0004	
Great Barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gulf Flounder	*Paralichthys albigutta*	0.00195	0	0	9.2E-05	0.00021	0	6E-05	0.00029	0	0.00029	0.00046	0	9.1E-05	
Gulf Pipefish	*Syngnathus scovelli*	0.00179	0.00092	0	0	0.00017	0	0.00022	0.00027	0	0	0.00039	0	0.0004	
Gulf Toadfish	*Opsanus beta*	0.01732	0.00184	0.00044	0.00068	0.00122	0.00055	0.00095	0.00142	0.00062	0.00129	0.00228	0.00096	0.00058	
Haemulidae	Haemulidae	0.00262	0	0	0	0.00035	0.00029	0.00013	0.00031	0	0	0.00048	0.0005	0.00018	

Appendix B Table 1. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	0.0104	0	0.00044	0.00034	0.00087	0.00058	0.00045	0.00093		0.00062	0.00072	0.00151	0.00101	0.00032
Scrawled Filefish	*Aluterus scriptus*	0.00087	0	0	0	0.00017	0	3.5E-05	0.00019		0	0	0.00039	0	7.8E-05
Sea Bream	*Archosargus rhomboidalis*	0	0	0	0	0	0	0	0		0	0	0	0	0
Seahorses unident	*Hippocampus spp.*	0.00345	0	0	0.00035	0	0	6.9E-05	0.00035		0	0.00045	0	0	0.00015
Sharksucker	*Echeneis naucrates*	0	0	0	0	0	0	0	0		0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0.00087	0	0.00044	0	0	0	8.7E-05	0.00019		0.00062	0	0	0	0.0002
Shrimp eel	*Ophichthus gomesi*	0.00087	0	0	0	0.00017	0	3.5E-05	0.00019		0	0	0.00039	0	7.8E-05
Silver Jenny	*Eucinostomus gula*	0.00293	0	0	0	0.00059	0	0.00012	0.00048		0	0	0.0009	0	0.00026
Silverside	Atherinidae	0	0	0	0	0	0	0	0		0	0	0	0	0
Slender Filefish	*Monacanthus tuckeri*	0.00822	0	0.00044	0.00044	0.00041	0.00029	0.00032	0.00063		0.00062	0.00062	0.00092	0.0005	0.00019
Southern Puffer	*Sphoeroides nephelus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Speckled Stargazer	*Dactyloscopus moorei*	0.00087	0	0	0	0	0.00029	5.8E-05	0.00019		0	0	0	0.0005	0.00013
Speckled Worm Eel	*Myrophis punctatus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Spotted Scorpionfish	*Scorpaena plumieri*	0.00087	0	0.00044	0	0	0	8.7E-05	0.00019		0.00062	0	0	0	0.0002
Spotted Whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0		0	0	0	0	0
Striped Burrfish	*Chilomycterus schoepfi*	0.00087	0	0.00044	0	0	0	8.7E-05	0.00019		0.00062	0	0	0	0.0002
Striped Grunt	*Haemulon striatum*	0	0	0	0	0	0	0	0		0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0.01054	0.00092	0.00087	0.00027	0.00052	0.00085	0.00069	0.00059		0.00124	0.00044	0.00048	0.00083	0.00028
Trunkfish	*Lactophrys trigonus*	0.00179	0	0.00044	9.2E-05	0	0	0.00011	0.00027		0.00062	0.00029	0	0	0.00019
White Grunt	*Haemulon plumieri*	0.00087	0	0	8.7E-05	0	0	1.7E-05	0.00019		0	0.00028	0	0	3.9E-05
Whitenose Pipefish	*Cosmocampus albirostris*	0	0	0	0	0	0	0	0		0	0	0	0	0
Yellowfin Mojarra	*Gerres cinereus*	0.12396	0.01932	0.00961	0.00481	0.00527	0.00363	0.00853	0.00724		0.00371	0.00762	0.00755	0.00486	0.00644
Unidentified fish		0	0	0	0	0	0	0	0		0	0	0	0	0
Total fish		0.40115	0.06163	0.03408	0.013	0.02009	0.01364	0.02849	0.01676		0.00865	0.01177	0.01859	0.00968	0.02038

Appendix B Table 1. Cont.

Common name	Scientific name	Mean raw	1S	2N	2S	3N	3S	zone	Standard deviation raw	1S	2N	2S	3N	3S	zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.03003	0.07175	0.06336	0.01762	0.0326	0.03102	0.04327	0.02527		0.03893	0.01293	0.02546	0.02848	0.02311
Spotted Pink Shrimp	*F arfantepenaeus brasiliensis*	0.00092	0.00552	0.00262	0.00026	0.00087	0.00055	0.00197	0.00166		0.00371	0.00042	0.00124	0.00096	0.00219
Penaeid shrimp	*Farfantepenaeus spp.*	0.00798	0.03128	0.0166	0.00432	0.01049	0.0025	0.01304	0.01041		0.01607	0.00644	0.01176	0.00432	0.01161
Caridean Shrimp	*Palaemonetes, etc.*	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA
CRAB															
Blue crab	*Callinectes sapidus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Lesser blue crab	*Callinectes similis*	0	0	0	0	0	0	0	0		0	0	0	0	0
Callinectes sp.	*Callinectes spp.*	0.0531	0	0.00175	0.00182	0.00492	0.00225	0.00215	0.00335		0	0.00157	0.00608	0.00253	0.00177
Crabs unident		0	0	0	0	0	0	0	0		0	0	0	0	0
Decorator Crab	*Stenocionops furcata*	0.00524	0	0.00044	0.00017	0.00035	0.00029	0.00025	0.0004		0.00062	0.00037	0.00048	0.0005	0.00017
Gray Pitho Crab	*Pitho aculeata*	0.00083	0	0	8.3E-05	0	0	1.7E-05	0.00018		0	0.00026	0	0	3.7E-05
Green porcelain crab	*Petrolisthes armatus*	0.00429	0	0.00044	8.7E-05	0	0.00085	0.00027	0.00046		0.00062	0.00028	0	0.00083	0.00037
Hermit Crab	*Clibanarius* sp.	0.00087	0	0	8.7E-05	0	0	1.7E-05	0.00019		0	0.00028	0	0	3.9E-05
Mud Crab	*Panopeus herbstii*	0	0	0	0	0	0	0	0		0	0	0	0	0
Portunus Crab	*Portunus* sp.	0	0	0	0	0	0	0	0		0	0	0	0	0
Sponge Spider Crab	*Macrocoeloma subparallelum*	0	0	0	0	0	0	0	0		0	0	0	0	0
Stone Crab	*Menippe mercenaria*	0	0	0	0	0	0	0	0		0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Spotted spiny lobster	*Panulirus guttatus*	0	0	0	0	0	0	0	0		0	0	0	0	0
Starfish		0.00092	0	0	9.2E-05	0	0	1.8E-05	0.0002		0	0.00029	0	0	4.1E-05
Red Sea Star		0	0	0	0	0	0	0	0		0	0	0	0	0
Ruby Brittlestar		0	0	0	0	0	0	0	0		0	0	0	0	0
Brittlestar		0	0	0	0	0	0	0	0		0	0	0	0	0
Other molluskks	Mollusca (other than cephalopoda)	0.01517	0.00092	0.00044	0.00052	0.00146	0.00029	0.00073	0.001		0.00062	0.00084	0.00149	0.0005	0.00047
Nudibranch		0.00087	0	0	0	0.00017	0	3.5E-05	0.00019		0	0	0.00039	0	7.8E-05
Octopus	Cephalopoda: Octopodiformes	0.00179	0	0	9.2E-05	0.00017	0	5.3E-05	0.00027		0	0.00029	0.00039	0	7.9E-05
Squid	Cephalopoda: Decapodiformes	0	0	0	0	0	0	0	0		0	0	0	0	0

Appendix Table B 2. October 2002 trawl mean and standard deviation of number per square meter.

Sample size: raw=23, 2N=3, 2S=10, 3N=6, 3S=4, zones=4 (except Carideans, raw=22, 3S=3).

		Mean							Standard deviation						
Common name	Scientific name	raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Alewife	*Alosa pseudoharengus*	0.00012		0	8.6E-05	0.00032	0	0.0001	0.000433		0	0.00027	0.00079	0	0.0001
Bandtail Puffer	*Sphoeroides spengleri*	0.00036		0	0.00027	0.00078	0.00025	0.00032	0.000815		0	0.00084	0.00109	0.00049	0.00032
Bigeye Mojarra	*Eucinostomus havana*	0		0	0	0	0	0			0	0	0	0	0
Blackcheek Tonguefish	*Symphurus plagiusa*	0		0	0	0	0	0			0	0	0	0	0
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0		0	0	0	0	0			0	0	0	0	0
Blackfin Cardinalfish	*Astrapogon puncticulatus*	0		0	0	0	0	0			0	0	0	0	0
Blenny?		0		0	0	0	0	0			0	0	0	0	0
Blenny		0		0	0	0	0	0			0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0		0	0	0	0	0			0	0	0	0	0
BlueStriped Grunt	*Haemulon sciurus*	0.00059		0.00077	0.00056	0.00095	0	0.00057	0.000747		0.00068	0.00079	0.00084	0	0.00057
Bridled Cardinalfish	*Apogon aurolineatus*	0		0	0	0	0	0			0	0	0	0	0
Bucktooth Parrotfish	*Sparisoma radians*	0		0	0	0	0	0			0	0	0	0	0
Chain Pipefish	*Syngnathus louisianae*	0		0	0	0	0	0			0	0	0	0	0
Clown Goby	*Microbius gulosus*	0		0	0	0	0	0			0	0	0	0	0
Code Goby	*Gobiosoma robustum*	5.1E-05		0.00039	0	0	0	9.8E-05	0.000245		0.00068	0	0	0	9.8E-05
Colon Goby	*Coryphopterus dicrus*	8.2E-05		0	0.00019	0	0	4.7E-05	0.000272		0	0.0004	0	0	4.7E-05
Crested Pipefish	*Cosmocampus brachycephalus*	4E-05		0	0	0.00015	0	3.9E-05	0.000194		0	0	0.00038	0	3.9E-05
Dusky Pipefish	*Syngnathus floridae*	0.00087		0.00034	8.9E-05	0.003	0	0.00086	0.001861		0.00059	0.00028	0.00274	0	0.00086
Dwarf Goatfish	*Upeneus parvus*	0		0	0	0	0	0			0	0	0	0	0
Dwarf Seahorse	*Hippocampus zosterae*	0.00022		0	0	0.00083	0	0.00021	0.001041		0	0	0.00204	0	0.00021
Emerald Parrotfish	*Nicholsina usta*	0		0	0	0	0	0			0	0	0	0	0
Flagfin Mojarra	*Eucinostomus melanopterus*	0.00054		0.00043	0.00037	0.00111	0.00022	0.00053	0.000949		0.00075	0.00064	0.00153	0.00044	0.00053
Freckled cardinalfish	*Phaeoptyx conklini*	0		0	0	0	0	0			0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	0		0	0	0	0	0			0	0	0	0	0
French Grunt	*Haemulon flavolineatum*	0		0	0	0	0	0			0	0	0	0	0
Fringed Filefish	*Monacanthus ciliatus*	0		0	0	0	0	0			0	0	0	0	0
Fringed Pipefish	*Microgmathus criniger*	0		0	0	0	0	0			0	0	0	0	0
Gobionellus sp.	*Gobionellus* sp.	0		0	0	0	0	0			0	0	0	0	0
Gold Brotula	*Gunterichthys longipenis*	0		0	0	0	0	0	0.000245		0	0	0	0	0
Goldspotted Killifish	*Floridichthys carpio*	5.1E-05		0.00039	0	0	0	9.8E-05			0.00068	0	0	0	9.8E-05
Grass Porgy	*Calamus arctifrons*	0		0	0	0	0	0			0	0	0	0	0
Gray Snapper	*Lutjanus griseus*	0.00128		0.00154	0.00028	0.00369	0	0.00138	0.002137		0.00136	0.00045	0.00295	0	0.00138
Great Barracuda	*Sphyraena barracuda*	0		0	0	0	0	0			0	0	0	0	0
Gulf Flounder	*Paralichthys albigutta*	0		0	0	0	0	0			0	0	0	0	0
Gulf Pipefish	*Syngnathus scovelli*	0		0	0	0	0	0			0	0	0	0	0
Gulf Toadfish	*Opsanus beta*	0.0008		0.00073	0.00035	0.00211	0	0.0008	0.001332		0.00064	0.00084	0.00184	0	0.0008
Haemulidae	Haemulidae	0		0	0	0	0	0			0	0	0	0	0

Appendix Table B 2. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Hardhead halfbeak	*Chriodorus atherinoides*	0		0	0	0	0	0			0	0	0	0	0
Hardhead Silverside	*Atherinomorus stipes*	0		0	0	0	0	0			0	0	0	0	0
High-hat (juvenile)	*Equetus acuminatus*	0		0	0	0	0	0			0	0	0	0	0
Hogfish	*Lachnolaimus maximus*	4.3E-05		0	0	0	0.00025	6.2E-05	0.000206		0	0	0	0.00049	6.2E-05
Honeycomb Cowfish	*Lactophrys polygonia*	0		0	0	0	0	0			0	0	0	0	0
Inshore Lizardfish	*Synodus foetens*	7.8E-05		0	8.6E-05	0.00016	0	6.1E-05	0.000259		0	0.00027	0.00038	0	6.1E-05
Key Brotula	*Ogilbia cayorum*	0		0	0	0	0	0			0	0	0	0	0
Lane Snapper	*Lutjanus synagris*	0		0	0	0	0	0			0	0	0	0	0
Leopard Searobin	*Prionutus roseus*	0		0	0	0	0	0			0	0	0	0	0
Lined Seahorse	*Hippocampus erectus*	0		0	0	0	0	0			0	0	0	0	0
Lined Sole	*Achirus lineatus*	0		0	0	0	0	0			0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0		0	0	0	0	0			0	0	0	0	0
Mahogany Snapper	*Lutjanus mahogoni*	0		0	0	0	0	0			0	0	0	0	0
Marbled Blenny	*Paraclinus marmoratus*	4E-05		0	9.3E-05	0	0	2.3E-05	0.000193		0	0.00029	0	0	2.3E-05
Mojarra sp.		4.4E-05		0.00034	0	0	0	8.5E-05	0.000212		0.00059	0	0	0	8.5E-05
Mutton Snapper	*Lutjanus analis*	0		0	0	0	0	0			0	0	0	0	0
Orange Filefish	*Aluterus schoepfi*	4E-05		0	9.3E-05	0	0	2.3E-05	0.000194		0	0.00029	0	0	2.3E-05
Parrotfish sp.	Scaridae	0		0	0	0	0	0			0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0		0	0	0	0	0			0	0	0	0	0
Pikeblenny	*Chaenopsis sp?*	4.2E-05		0	0	0.00016	0	4E-05	0.0002		0	0	0.00039	0	4E-05
Pinfish	*Lagodon rhomboidalis*	0.00236		0.00293	0.00151	0.00504	0	0.00237	0.003004		0.00423	0.00264	0.0023	0	0.00237
Planehead Filefish	*Monacanthus hispidus*	0.00051		0.00034	0.00052	0.00063	0.00044	0.00048	0.00071		0.00059	0.00057	0.00114	0.00051	0.00048
Porkfish	*Anisotremus virginicus*	0		0	0	0	0	0			0	0	0	0	0
Queen Parrotfish	*Scarus vetula*	0		0	0	0	0	0			0	0	0	0	0
Rainwater Killifish	*Lucania parva*	0.00088		0.00295	9.6E-05	0.00174	0	0.0012	0.001519		0.00198	0.0003	0.00176	0	0.0012
Redfin Parrotfish	*Sparisoma rubripinne*	0.00013		0.00039	9.3E-05	0.00015	0	0.00016	0.000351		0.00068	0.00029	0.00038	0	0.00016
Redtail Parrotfish	*Sparisoma chrysopterum*	0		0	0	0	0	0			0	0	0	0	0
Sailors Choice	*Haemulon parrai*	7.9E-05		0	8.6E-05	0.00016	0	6.1E-05	0.00026		0	0.00027	0.00038	0	6.1E-05
Sand Perch	*Diplectrum formosum*	0		0	0	0	0	0			0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	0		0	0	0	0	0			0	0	0	0	0
Sand Whiff	*Citharichthys arenaceus*	0		0	0	0	0	0			0	0	0	0	0
Sargassumfish	*Histrio histrio*	0		0	0	0	0	0			0	0	0	0	0
Sargassum Pipefish	*Syngnathus pelagicus*	0.00018		0.00043	0.00019	0.00016	0	0.0002	0.000406		0.00075	0.0004	0.00039	0	0.0002
Schoolmaster	*Lutjanus apodus*	5.1E-05		0.00039	0	0	0	9.8E-05	0.000245		0.00068	0	0	0	9.8E-05

Appendix Table B 2. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	0.00033		0	0.00036	0.00021	0.00066	0.00031	0.000808		0	0.00088	0.00051	0.00132	0.00031
Scrawled Filefish	*Aluterus scriptus*	0		0	0	0	0	0			0	0	0	0	0
Sea Bream	*Archosargus rhomboidalis*	0		0	0	0	0	0			0	0	0	0	0
Seahorses unident		0.00077		0.00082	0.0006	0.00126	0.00044	0.00078	0.000716		0.00072	0.00055	0.00096	0.00051	0.00078
Sharksucker	*Echeneis naucrates*	0		0	0	0	0	0			0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0.00012		0	9.3E-05	0	0.00044	0.00013	0.000406		0	0.00029	0	0.00088	0.00013
Sheepshead Porgy	*Archosargus probatocephalus*	0		0	0	0	0	0			0	0	0	0	0
Shrimp eel	*Ophichthus gomesi*	0.00016		0	9E-05	0.00048	0	0.00014	0.000466		0	0.00029	0.0008	0	0.00014
Silver Jenny	*Eucinostomus gula*	0.00385		0.00828	0.00141	0.00827	0	0.00449	0.005781		0.0102	0.00253	0.00591	0	0.00449
Silverside		0		0	0	0	0	0			0	0	0	0	0
Slender Filefish	*Monacanthus tuckeri*	0.00016		0	0.00018	0.00016	0.00022	0.00014	0.000355		0	0.00039	0.00038	0.00044	0.00014
Southern Puffer	*Sphoeroides nephelus*	0		0	0	0	0	0			0	0	0	0	0
Speckled Stargazer	*Dactyloscopus moorei*	0		0	0	0	0	0			0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	0		0	0	0	0	0			0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0		0	0	0	0	0			0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	8.4E-05		0	0	0.00032	0	8E-05	0.000402		0	0	0.00079	0	8E-05
Spotted Dragonet	*Diplogrammus pauciradiatus*	0		0	0	0	0	0			0	0	0	0	0
Spotted Scorpionfish	*Scorpaena plumieri*	4.1E-05		0	0	0.00016	0	3.9E-05	0.000195		0	0	0.00038	0	3.9E-05
Spotted Whiff	*Citharichthys macrops*	0		0	0	0	0	0			0	0	0	0	0
Striped Burrfish	*Chilomycterus schoepfi*	0.00014		0.00043	9E-05	0.00016	0	0.00017	0.000366		0.00075	0.00029	0.00038	0	0.00017
Striped Grunt	*Haemulon striatum*	0.0001		0.00078	0	0	0	0.0002	0.000489		0.00135	0	0	0	0.0002
Tomtate	*Haemulon aurolineatum*	0.00115		0.00039	0.00147	0.00101	0.00115	0.001	0.001571		0.00068	0.00217	0.00106	0.0009	0.001
Trunkfish	*Lactophrys trigonus*	8E-05		0	8.9E-05	0.00016	0	6.2E-05	0.000266		0	0.00028	0.00039	0	6.2E-05
White Grunt	*Haemulon plumieri*	5.4E-05		0	0	0.00021	0	5.2E-05	0.00026		0	0	0.00051	0	5.2E-05
Whitenose Pipefish	*Cosmocampus albirostris*	4.1E-05		0	0	0.00016	0	3.9E-05	0.000195		0	0	0.00038	0	3.9E-05
Yellowfin Mojarra	*Gerres cinereus*	0.00195		0.00376	0.00038	0.00482	0.00022	0.00229	0.00423		0.00389	0.00067	0.00725	0.00044	0.00229
Unidentified fish		0		0	0	0	0	0			0	0	0	0	0
Total fish		0.01851		0.02685	0.00971	0.0385	0.00428	0.01983			0.03245	0.01817	0.04104	0.00641	0.01983

Appendix Table B 2. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.05224		0.04815	0.02641	0.12171	0.01565	0.05298	0.055298		0.04378	0.01096	0.06489	0.00957	0.04777
Spotted Pink Shrimp	*Farfantepenaeus braziliensis*	0		0	0	0	0	0			0	0	0	0	0
Caridean Shrimp	*Palaemonetes, etc.*	0.69186		0.28825	0.21813	1.97313	0.11202	0.64788	1.17946		0.24893	0.22116	1.73509	0.0704	0.88646
CRAB															
Blue crab	*Callinectes sapidus*	0		0	0	0	0	0			0	0	0	0	0
Lesser blue crab	*Callinectes similis*	0		0	0	0	0	0			0	0	0	0	0
Callinectes sp.	*Callinectes* spp.	0.0148		0.00446	0.00934	0.03607	0.00428	0.01354	0.021345		0.00415	0.01262	0.03084	0.00259	0.01354
Crabs unident		0.00056		0	0.00043	0.00142	0	0.00046	0.002348		0	0.00111	0.00347	0	0.00046
Decorator Crab	*Stenocionops furcata*	0.00013		0.00039	8.6E-05	0.00016	0	0.00016	0.000348		0.00068	0.00027	0.00039	0	0.00016
Gray Pitho Crab	*Pitho aculeata*	4.2E-05		0	9.6E-05	0	0	2.4E-05	0.0002		0	0.0003	0	0	2.4E-05
Green porcelain crab	*Petrolisthes armatus*	0		0	0	0	0	0			0	0	0	0	0
Hermit Crab	*Clibanarius* sp.	0.00879		0.00586	0.01156	0.00977	0.00258	0.00744	0.008098		0.00845	0.0087	0.0081	0.00304	0.00744
Mud Crab	*Panopeus herbstii*	4.4E-05		0.00034	0	0	0	8.5E-05	0.000212		0.00059	0	0	0	8.5E-05
Portunus Crab	*Portunus* sp.	0		0	0	0	0	0			0	0	0	0	0
Sponge Spider Crab	*Macrocoeloma subparallelum*	3.8E-05		0	8.8E-05	0	0	2.2E-05	0.000183		0	0.00028	0	0	2.2E-05
Stone Crab	*Menippe mercenaria*	0		0	0	0	0	0			0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0		0	0	0	0	0			0	0	0	0	0
Spotted spiny lobster	*Panulirus guttatus*	0		0	0	0	0	0			0	0	0	0	0
Starfish		0		0	0	0	0	0			0	0	0	0	0
Red Sea Star		4.1E-05		0	0	0.00016	0	3.9E-05	0.000196		0	0	0.00038	0	3.9E-05
Ruby Brittlestar		4E-05		0	0	0.00015	0	3.9E-05	0.000194		0	0	0.00038	0	3.9E-05
Brittlestar		0.00195		0	0.00105	0.00571	0	0.00169	0.005141		0	0.00192	0.00926	0	0.00169
Other molluskks	Mollusca (non- cephalopoda)	0.00041		0	0.00019	0.00127	0	0.00037	0.000989		0	0.0004	0.00167	0	0.00037
Nudibranch		0		0	0	0	0	0			0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0		0	0	0	0	0			0	0	0	0	0
Squid	Cephalopoda: Decapodiformes	0		0	0	0	0	0			0	0	0	0	0

Appendix Table B 3. December 2002 trawl mean and standard deviation of number per square meter.

Sample size: raw=24, 1S=2, 2N=4, 2S=9, 3N=5, 3S=4, zone=5.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Alewife	*Alosa pseudoharengus*	3.83E-05	0	0.00023	0	0	0	4.6E-05	0.000188	0	0.00046	0	0	0	0.000103
Bandtail Puffer	*Sphoeroides spengleri*	0.000196	0	0	0.000236	0.000519	0	0.000151	0.000456	0	0	0.000468	0.000728	0	0.00023
Bigeye Mojarra	*Eucinostomus havana*	0	0	0	0	0	0	0		0	0	0	0	0	0
Blackcheek Tonguefish	*Symphurus plagiusa*	4.28E-05	0	0	0.000114	0	0	2.28E-05	0.00021	0	0	0.000343	0	0	5.11E-05
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0	0	0	0	0	0	0		0	0	0	0	0	0
Blackfin Cardinalfish	*Astrapogon puncticulatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Blenny?	Blenniidae	0	0	0	0	0	0	0		0	0	0	0	0	0
Blenny	Blenniidae	0	0	0	0	0	0	0		0	0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0		0	0	0	0	0	0
BlueStriped Grunt	*Haemulon sciurus*	0.000217	0	0.00092	0	0.000305	0	0.000245	0.000588	0	0.001062	0	0.000682	0	0.0004
Bridled Cardinalfish	*Apogon aurolineatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Bucktooth Parrotfish	*Sparisoma radians*	0	0	0	0	0	0	0		0	0	0	0	0	0
Chain Pipefish	*Syngnathus louisianae*	0	0	0	0	0	0	0		0	0	0	0	0	0
Clown Goby	*Microblus gulosus*	0.000164	0	0.000448	0	0.000428	0	0.000175	0.000491	0	0.000518	0	0.000956	0	0.00024
Code Goby	*Gobiosoma robustum*	0.000409	0.001639	0.00023	0.000248	0.000677	0	0.000559	0.00084	0.002317	0.00046	0.000497	0.000979	0	0.000651
Colon Goby	*Coryphopterus dicrus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Dusky Pipefish	*Syngnathus floridae*	0.000206	0	0.000521	9.68E-05	0.000214	0.00023	0.000212	0.000413	0	0.00061	0.00029	0.000478	0.00046	0.000196
Dwarf Goatfish	*Upeneus parvus*	4.85E-05	0	0.000291	0	0	0	5.83E-05	0.000238	0	0.000583	0	0	0	0.00013
Dwarf Seahorse	*Hippocampus zosterae*	0.000392	0.001092	0.00115	0.000293	0	0	0.000507	0.001064	0.001545	0.0023	0.000614	0	0	0.000574
Emerald Parrotfish	*Nicholsina usta*	0	0	0	0	0	0	0		0	0	0	0	0	0
Flagfin Mojarra	*Eucinostomus melanopterus*	0.000275	0.000546	0.00138	0	0	0	0.000385	0.000964	0.000772	0.00219	0	0	0	0.000604
Freckled cardinalfish	*Phaeoptyx conklini*	0	0	0	0	0	0	0		0	0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	0	0	0	0	0	0	0		0	0	0	0	0	0
French Grunt	*Haemulon flavolineatum*	7.67E-05	0	0.00046	0	0	0	9.2E-05	0.00026	0	0.000531	0	0	0	0.000206
Fringed Filefish	*Monacanthus ciliatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Fringed Pipefish	*Micrognathus criniger*	0	0	0	0	0	0	0		0	0	0	0	0	0
Gobionellus sp.	*Gobionellus* sp.	0.000359	0	0.000448	0.000219	0.00061	0.000448	0.000345	0.000761	0	0.000518	0.000658	0.001364	0.000518	0.000238
Gold Brotula	*Gunterichthys longipenis*	3.83E-05	0	0.00023	0	0	0	4.6E-05	0.000188	0	0.00046	0	0	0	0.000103
Goldspotted Killifish	*Floridichthys carpio*	0.000562	0.001639	0.00046	0.000139	0.001426	0	0.000733	0.001279	0.002317	0.00092	0.000416	0.002199	0	0.000753
Grass Porgy	*Calamus arctifrons*	0	0	0	0	0	0	0		0	0	0	0	0	0
Gray Snapper	*Lutjanus griseus*	0.001043	0.002419	0.002012	0.000399	0.00171	0	0.001308	0.001362	0.001876	0.001323	0.000476	0.001887	0	0.001052
Great Barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0		0	0	0	0	0	0
Gulf Flounder	*Paralichthys albigutta*	6.35E-05	0	0	0	0.000305	0	6.1E-05	0.000311	0	0	0	0.000682	0	0.000136
Gulf Pipefish	*Syngnathus scovelli*	0	0	0	0	0	0	0		0	0	0	0	0	0
Gulf Toadfish	*Opsanus beta*	0.002852	0.013966	0.005354	0.000834	0.00197	0.000437	0.004512	0.004959	0.01269	0.003811	0.001297	0.001527	0.000874	0.005628

Appendix Table B 3. cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Haemulidae	Haemulidae	0	0	0	0	0	0	0		0	0	0	0	0	0
Hardhead halfbeak	*Chriodorus atherinoides*	0	0	0	0	0	0	0		0	0	0	0	0	0
Hardhead Silverside	*Atherinomorus stipes*	0	0	0	0	0	0	0		0	0	0	0	0	0
High-hat (juvenile)	*Equetus acuminatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Hogfish	*Lachnolaimus maximus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Honeycomb Cowfish	*Lactophrys polygonia*	0	0	0	0	0	0	0		0	0	0	0	0	0
Inshore Lizardfish	*Synodus foetens*	3.83E-05	0	0.00023	0	0	0	4.6E-05	0.000188	0	0.00046	0	0	0	0.000103
Key Brotula	*Oglibia cayorum*	3.83E-05	0	0.00023	0	0	0	4.6E-05	0.000188	0	0.00046	0	0	0	0.000103
Lane Snapper	*Lutjanus synagris*	0	0	0	0	0	0	0		0	0	0	0	0	0
Leopard Searobin	*Prionutus roseus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Lined Seahorse	*Hippocampus erectus*	7.4E-05	0	0	9.52E-05	0	0.00023	6.5E-05	0.000251	0	0	0.000286	0	0.00046	0.000101
Lined Sole	*Achirus lineatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0	0	0	0	0	0	0		0	0	0	0	0	0
Mahogany Snapper	*Lutjanus mahogoni*	0	0	0	0	0	0	0		0	0	0	0	0	0
Marbled Blenny	*Paraclinus marmoratus*	3.83E-05	0	0	0	0	0.00023	4.6E-05	0.000188	0	0	0	0	0.00046	0.000103
Mojarra sp.	Gerrilidae	0.000268	0	0	0	0.001288	0	0.000258	0.001314	0	0	0	0.00288	0	0.000576
Mutton Snapper	*Lutjanus analis*	0	0	0	0	0	0	0		0	0	0	0	0	0
Orange Filefish	*Aluterus schoepfi*	0	0	0	0	0	0	0		0	0	0	0	0	0
Parrotfish sp.	Scaridae	0	0	0	0	0	0	0		0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0		0	0	0	0	0	0
Pikeblenny	*Chaenopsis sp?*	0	0	0	0	0	0	0		0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.002598	0.013732	0.006029	0.000672	0.000946	0	0.004276	0.005444	0.005297	0.009481	0.000917	0.001426	0	0.005806
Planehead Filefish	*Monacanthus hispidus*	0.000369	0.000624	0	0.00063	0	0.000487	0.000348	0.000852	0.000883	0	0.000958	0	0.000974	0.000496
Porkfish	*Anisotremus virginicus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Queen Parrotfish	*Scarus vetula*	0	0	0	0	0	0	0		0	0	0	0	0	0
Rainwater Killifish	*Lucania parva*	0.007385	0.04229	0.011042	0.001178	0.00758	0	0.012418	0.014144	0.017434	0.0132	0.002864	0.012786	0	0.017307
Redfin Parrotfish	*Sparisoma rubripinne*	3.47E-05	0	0	9.25E-05	0	0	1.85E-05	0.00017	0	0	0.000277	0	0	4.14E-05
Redtail Parrotfish	*Sparisoma chrysopterum*	0	0	0	0	0	0	0		0	0	0	0	0	0
Sailors Choice	*Haemulon parral*	0	0	0	0	0	0	0		0	0	0	0	0	0
Sand Perch	*Diplectrum formosum*	0	0	0	0	0	0	0		0	0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Sand Whiff	*Citharichthys arenaceus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0.001051	0	0	0	0	0	0
Sargassum Pipefish	*Syngnathus pelagicus*	0.000468	0	0.00023	0.000324	0.000915	0.000704	0.000434		0	0.00046	0.000651	0.002046	0.000922	0.00037
Schoolmaster	*Lutjanus apodus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Scrawled Cowfish	*Lactophrys quadricornis*	0.000179	0	0	0.000121	0.000447	0.000243	0.000162	0.00041	0	0	0.000364	0.000613	0.000485	0.000188
Scrawled Filefish	*Aluterus scriptus*	3.83E-05	0	0	0.000102	0	0	2.04E-05	0.000188	0	0	0.000307	0	0	4.57E-05

Appendix Table B 3.cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Sea Bream	*Archosargus rhomboidalis*	0	0	0	0	0	0	0		0	0	0	0	0	0
Seahorses unident		0.000815	0	0	0.001855	0.000184	0.000485	0.000505	0.001688	0	0	0.002395	0.000411	0.000971	0.00078
Sharksucker	*Echeneis naucrates*	0	0	0	0	0	0	0		0	0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Shrimp eel	*Ophichthus gomesi*	9.71E-05	0	0.000583	0	0	0	0.000117	0.000476	0	0.001165	0	0	0	0.000261
Silver Jenny	*Eucinostomus gula*	0.007658	0.014435	0.010617	0.008712	0.005493	0.001642	0.00818	0.008402	0.0096	0.004686	0.011738	0.003744	0.000837	0.004881
Silverside		0	0	0	0	0	0	0		0	0	0	0	0	0
Slender Filefish	*Monacanthus tuckeri*	0.000198	0	0.00046	0.000204	0.000214	0	0.000176	0.000395	0	0.000531	0.000406	0.000478	0	0.00019
Southern Puffer	*Sphoeroides nephelus*	6.35E-05	0	0	0	0.000305	0	6.1E-05	0.000311	0	0	0	0.000682	0	0.000136
Speckled Stargazer	*Dactyloscopus moorei*	0	0	0	0	0	0	0		0	0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	4.85E-05	0	0.000291	0	0	0	5.83E-05	0.000238	0	0.000583	0	0	0	0.00013
Spotted Scorpionfish	*Scorpaena plumieri*	0	0	0	0	0	0	0		0	0	0	0	0	0
Spotted Whiff	*Citharichthys macrops*	0	0	0	0	0	0	0		0	0	0	0	0	0
Striped Burrfish	*Chilomycterus schoepfi*	0.00023	0	0.00046	0.000408	0	0	0.000174	0.000408	0	0.000531	0.000487	0	0	0.000239
Striped Grunt	*Haemulon striatum*	3.47E-05	0	0	9.25E-05	0	0	1.85E-05	0.00017	0	0	0.000277	0	0	4.14E-05
Tomtate	*Haemulon aurolineatum*	0.002136	0.001795	0.001748	0.002553	0.002976	0.000704	0.001955	0.002848	0.000993	0.003496	0.003099	0.003722	0.000922	0.000871
Trunkfish	*Lactophrys trigonus*	0.000184	0.000624	0.000291	0	0	0.0005	0.000283	0.000422	0.000883	0.000583	0	0	0.000578	0.000284
White Grunt	*Haemulon plumieri*	0	0	0	0	0	0	0		0	0	0	0	0	0
Whitenose Pipefish	*Cosmocampus albirostris*	0	0	0	0	0	0	0		0	0	0	0	0	0
Yellowfin Mojarra	*Gerres cinereus*	0.010334	0.064059	0.007347	0.002215	0.014115	0	0.017547	0.022083	0.049986	0.008409	0.00408	0.019182	0	0.026562
Unidentified fish		0	0	0	0	0	0	0		0	0	0	0	0	0
Total fish		0.040312	0.158859	0.053694	0.021833	0.042628	0.00634	0.056671		0.106592	0.059789	0.034165	0.05945	0.008462	0.070911

Appendix Table B 3. cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.064964	0.165761	0.128597	0.039182	0.051124	0.026243	0.082181	0.081641	0.071289	0.178839	0.026001	0.035718	0.011572	0.061406
Spotted Pink Shrimp	*Farfantepenaeus brasiliensis*	0.000664	0	0.003121	0	0.000691	0	0.000762	0.002551	0	0.006242	0	0.000705	0	0.001352
Caridean Shrimp	*Palaemonetes, etc.*	0.826252	0.957681	1.39403	0.598903	1.201871	0.234769	0.877451	0.869347	0.074021	1.517674	0.639107	0.903428	0.116355	0.466146
CRAB															
Blue crab	*Callinectes sapidus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Lesser blue crab	*Callinectes similis*	0	0	0	0	0	0	0		0	0	0	0	0	0
Callinectes sp.	*Callinectes* spp.	0.015548	0.016229	0.021931	0.014664	0.021191	0.003758	0.015555	0.010491	0.010593	0.009805	0.008717	0.012478	0.002142	0.007294
Crabs unident		0.001072	0	0.001564	0.00108	0.001202	0.000935	0.000956	0.001321	0	0.001831	0.001644	0.000911	0.000754	0.000583
Decorator Crab	*Stenocionops furcata*	8.67E-05	0.000624	0	9.25E-05	0	0	0.000143	0.0003	0.000883	0	0.000277	0	0	0.000272
Gray Pitho Crab	*Pitho aculeata*	0	0	0	0	0	0	0		0	0	0	0	0	0
Green porcelain crab	*Petrolisthes armatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Hermit Crab	*Clibanarius* sp.	0.008615	0.004291	0.018087	0.007499	0.006476	0.006492	0.008569	0.011386	0.004524	0.024837	0.00815	0.004888	0.003426	0.005448
Mud Crab	*Panopeus herbstii*	3.83E-05	0	0.00023	0	0	0	4.6E-05	0.000188	0	0.00046	0	0	0	0.000103
Portunus Crab	*Portunus* sp.	0.000275	0	0.000448	0.000189	0.000233	0.000485	0.000271	0.000526	0	0.000518	0.000376	0.000521	0.000971	0.000199
Sponge Spider Crab	*Macrocoeloma subparallelum*	0.000163	0	0.000521	0.000202	0	0	0.000145	0.000375	0	0.00061	0.000403	0	0	0.000228
Stone Crab	*Menippe mercenaria*	0	0	0	0	0	0	0		0	0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Spotted spiny lobster	*Panulirus guttatus*	0	0	0	0	0	0	0		0	0	0	0	0	0
Starfish		0	0	0	0	0	0	0		0	0	0	0	0	0
Red Sea Star		0.000679	0.001717	0.00207	0.000114	0.000519	0.000243	0.000932	0.001735	0.000662	0.004139	0.000343	0.000728	0.000485	0.000898
Ruby Brittlestar		0	0	0	0	0	0	0		0	0	0	0	0	0
Brittlestar		0.000759	0	0	0.000216	0	0.004066	0.000856	0.002023	0	0	0.00043	0	0.003647	0.001797
Other molluskks	Mollusca (other than cephalopoda)	0.001082	0	0.003507	0.000102	0.001997	0.000257	0.001173	0.002643	0	0.004627	0.000307	0.004466	0.000514	0.001557
Nudibranch		0	0	0	0	0	0	0		0	0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0.000234	0	0	0	0	0.001405	0.000281	0.000834	0	0	0	0	0.001771	0.000628
Squid	Cephalopoda: Decapodiformes	0	0	0	0	0	0	0		0	0	0	0	0	0

Appendix Table B 4. February 2003 trawl mean and standard deviation of number per square meter.

Sample size: raw=24, 1S=2, 2N=4, 2S=9, 3N=5, 3S=4, zone=5

		Mean							Standard deviation						
Common name	Scientific name	raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Alewife	*Alosa pseudoharengus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bandtail Puffer	*Sphoeroides spengleri*	0.00014	0	0.00062	0	0.0002	0	0.00016	0.31998	0	0.00125	0	0.00044	0	0.00027
Bigeye Mojarra	*Eucinostomus havana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek Tonguefish	*Symphurus plagiusa*	3.5E-05	0	0	9.3E-05	0	0	1.9E-05	0.14433	0	0	0.00028	0	0	4.2E-05
Blackedge Cusk Eel	*Lepophidium brevibarbe*	4.3E-05	0	0	0.00012	0	0	2.3E-05	0.14433	0	0	0.00035	0	0	5.2E-05
Blackfin Cardinalfish	*Astrapogon puncticulatus*	3.5E-05	0	0	9.4E-05	0	0	1.9E-05	0.14433	0	0	0.00028	0	0	4.2E-05
Blenny?	Blennildae	5.2E-05	0	0.00031	0	0	0	6.2E-05	0.14433	0	0.00062	0	0	0	0.00014
Blenny	Blennildae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BlueStriped Grunt	*Haemulon sciurus*	0.00028	0	0.00031	0.00035	0.00049	0	0.00023	0.54533	0	0.00062	0.00104	0.00073	0	0.00022
Bridled Cardinalfish	*Apogon aurolineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bucktooth Parrotfish	*Sparisoma radians*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain Pipefish	*Syngnathus louisianae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown Goby	*Microbius gulosus*	4.1E-05	0	0	0	0.0002	0	3.9E-05	0.14433	0	0	0	0.00044	0	8.8E-05
Code Goby	*Gobiosoma robustum*	0.0006	0.00041	0.00022	8.4E-05	0.00214	0.00032	0.00064	0.90691	0.00058	0.00043	0.00025	0.00155	0.00065	0.00085
Colon Goby	*Coryphopterus dicrus*	6.9E-05	0	0	0	0.00033	0	6.7E-05	0.28867	0	0	0	0.00075	0	0.00015
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky Pipefish	*Syngnathus floridae*	0.00066	0.00124	0.00084	0.0002	0.00146	0.00021	0.00079	1.04411	0.00175	0.00117	0.00039	0.002	0.00043	0.00058
Dwarf Goatfish	*Upeneus parvus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf Seahorse	*Hippocampus zosterae*	0.00385	0.00211	0.00312	0.00343	0.00716	0.00228	0.00362	3.75745	0.00052	0.00312	0.00298	0.00534	0.00179	0.00205
Emerald Parrotfish	*Nicholsina usta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flagfin Mojarra	*Eucinostomus melanopterus*	0.00015	0	0	0	0.00049	0.00028	0.00015	0.34721	0	0	0	0.00072	0.00055	0.00022
Freckled cardinalfish	*Phaeoptyx conklini*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	3.5E-05	0	0	9.3E-05	0	0	1.9E-05	0.14433	0	0	0.00028	0	0	4.2E-05
French Grunt	*Haemulon flavolineatum*	4.5E-05	0	0.00027	0	0	0	5.4E-05	0.14433	0	0.00054	0	0	0	0.00012
Fringed Filefish	*Monacanthus ciliatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed Pipefish	*Micrognathus criniger*	7.6E-05	0.00041	0	0	0.0002	0	0.00012	0.20193	0.00058	0	0	0.00044	0	0.00018
Gobionellus sp.	*Gobionellus sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gold Brotula	*Gunterichthys longipenis*	3.5E-05	0	0	9.4E-05	0	0	1.9E-05	0.14433	0	0	0.00028	0	0	4.2E-05
Goldspotted Killifish	*Floridichthys carpio*	0.00018	0	0	0.00012	0.00067	0	0.00016	0.59212	0	0	0.00035	0.00149	0	0.00029
Grass Porgy	*Calamus arctifrons*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Snapper	*Lutjanus griseus*	0.00069	0.00165	0.00096	0.00077	0.00052	0	0.00078	1.06657	0.00234	0.00071	0.00157	0.00074	0	0.00061
Great Barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Flounder	*Paralichthys albigutta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Pipefish	*Syngnathus scovelli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Toadfish	*Opsanus beta*	0.00258	0.00083	0.00451	0.001	0.00636	0.00032	0.0026	3.10968	0.00117	0.00404	0.00238	0.00542	0.00065	0.00268
Haemulidae	Haemulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table B 4. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Hardhead halfbeak	*Chriodorus atherinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hardhead Silverside	*Atherinomorus stipes*	0.00014	0	0	9.9E-05	0.0005	0	0.00012	0.4535	0	0	0.0003	0.00112	0	0.00022
High-hat (juvenile)	*Equetus acuminatus*	3.7E-05	0	0	9.9E-05	0	0	2E-05	0.14433	0	0	0.0003	0	0	4.4E-05
FISH															
Hogfish	*Lachnolaimus maximus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honeycomb Cowfish	*Lactophrys polygonia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore Lizardfish	*Synodus foetens*	0.0003	0	0.00025	0.00037	0.00033	0.00028	0.00025	0.42935	0	0.00051	0.00045	0.00075	0.00055	0.00015
Key Brotula	*Ogilbia cayorum*	6.7E-05	0	0	0.00018	0	0	3.6E-05	0.20193	0	0	0.00036	0	0	8E-05
Lane Snapper	*Lutjanus synagris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leopard Searobin	*Prionutus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined Seahorse	*Hippocampus erectus*	0.00025	0	0.00027	0.00018	0.0002	0.0006	0.00025	0.33417	0	0.00054	0.00035	0.00044	0.0007	0.00022
Lined Sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahogany Snapper	*Lutjanus mahogoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled Blenny	*Paraclinus marmoratus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mojarra sp.	Gerridae	0.00021	0	0.00125	0	0	0	0.00025	0.57733	0	0.00249	0	0	0	0.00056
Mutton Snapper	*Lutjanus analis*	3.4E-05	0	0	0	0.00016	0	3.2E-05	0.14434	0	0	0	0.00036	0	7.2E-05
Orange Filefish	*Aluterus schoepfi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parrotfish sp.	Scaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pikeblenny	*Chaenopsis sp?*	0.00012	0	0.00031	0.00019	0	0	0.0001	0.24461	0	0.00062	0.00038	0	0	0.00014
Pinfish	*Lagodon rhomboidalis*	0.03922	0.06461	0.03392	0.02408	0.08274	0.01149	0.04337	41.1418	0.03643	0.03621	0.04047	0.07531	0.01667	0.02949
Planehead Filefish	*Monacanthus hispidus*	0.00071	0	0.0009	0.00069	0.00034	0.00135	0.00066	0.81821	0	0.00123	0.00088	0.00047	0.00109	0.00052
Porkfish	*Anisotremus virginicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queen Parrotfish	*Scarus vetula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater Killifish	*Lucania parva*	0.00777	0.00537	0.00606	0.00318	0.02459	0	0.00784	15.2152	0.0076	0.00595	0.00855	0.0329	0	0.00966
Redfin Parrotfish	*Sparisoma rubripinne*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redtail Parrotfish	*Sparisoma chrysopterum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sailors Choice	*Haemulon parrai*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Perch	*Diplectrum formosum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	0.00012	0	0	0.00016	0	0.00032	9.8E-05	0.24461	0	0	0.00033	0	0.00065	0.00015
Sand Whiff	*Citharichthys arenaceus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	4.5E-05	0	0.00027	0	0	0	5.4E-05	0.14433	0	0.00054	0	0	0	0.00012
Sargassum Pipefish	*Syngnathus pelagicus*	0.0006	0	0.00141	0.0001	0.00157	0	0.00062	0.77601	0	0.00113	0.00031	0.00119	0	0.0008
Schoolmaster	*Lutjanus apodus*	3.5E-05	0	0	0	0.00017	0	3.3E-05	0.14433	0	0	0	0.00037	0	7.5E-05

Appendix Table B 4. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	0.00027	0	0.00031	0.00029	0.00033	0.00022	0.00023	0.35662	0	0.00062	0.00044	0.00045	0.00044	0.00013
Scrawled Filefish	*Aluterus scriptus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sea Bream	*Archosargus rhomboidalis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seahorses unident	*Hippocampus spp.*	0.00011	0	0.00043	9.9E-05	0	0	0.00011	0.31998	0	0.00087	0.0003	0	0	0.00019
Sharksucker	*Echeneis naucrates*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrimp eel	*Ophichthus gomesi*	0.00011	0	0	0.0001	0.00032	0	8.5E-05	0.31998	0	0	0.00031	0.00072	0	0.00014
Silver Jenny	*Eucinostomus gula*	0.00307	0.00413	0.00448	0.0015	0.00682	0	0.00339	4.32952	0.00585	0.00421	0.0045	0.00913	0	0.00267
Silverside		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slender Filefish	*Monacanthus tuckeri*	0.00017	0	0	0.0002	0	0.00054	0.00015	0.34721	0	0	0.0006	0	0.00065	0.00024
Southern Puffer	*Sphoeroides nephelus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Stargazer	*Dactyloscopus moorei*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	0.00031	0.00043	0	0.00019	0.00072	0.00032	0.00033	0.41197	0.00061	0	0.00038	0.00081	0.00065	0.00027
Spotted Scorpionfish	*Scorpaena plumieri*	0.00024	0	0.00022	0.00029	0	0.00055	0.00021	0.39271	0	0.00043	0.00044	0	0.00111	0.00023
Spotted Whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped Burrfish	*Chilomycterus schoepfi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped Grunt	*Haemulon striatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0.0026	0.00207	0.00601	0.00189	0.00262	0.00103	0.00272	2.35787	0.00292	0.00265	0.00171	0.00255	0.00073	0.00192
Trunkfish	*Lactophrys trigonus*	9.7E-05	0	0.00058	0	0	0	0.00012	0.20193	0	0.00067	0	0	0	0.00026
White Grunt	*Haemulon plumieri*	7.2E-05	0	0	0.00019	0	0	3.8E-05	0.20193	0	0	0.00038	0	0	8.6E-05
Whitenose Pipefish	*Cosmocampus albirostris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellowfin Mojarra	*Gerres cinereus*	0.00472	0.00087	0.00921	0.00264	0.01017	0	0.00458	6.83738	0.00123	0.01634	0.00376	0.01141	0	0.00478
Unidentified fish		0.00011	0	0.00022	0	0.00036	0	0.00012	0.00026	0	0.00043	0	0.00081	0	0.00026
Total fish		0.07114	0.08414	0.07726	0.04318	0.15216	0.02013	0.07538	90.4261	0.06159	0.08795	0.0759	0.15886	0.0273	0.06213

Appendix Table B 4. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.04707	0.05838	0.06147	0.02882	0.09102	0.01315	0.05057		0.0285	0.03114	0.03069	0.06436	0.0083	0.03037
Spotted Pink Shrimp	*Farfantepenaeus brasiliensis*	0.00373	0.003	0.00524	0.00193	0.0066	0.00304	0.00396		0.0019	0.00368	0.00145	0.0059	0.00412	0.0019
Caridean Shrimp	*Palaemonetes, etc.*	2.79672	3.38476	3.6008	1.07989	7.0499	0.245	3.07207		2.18779	1.76385	1.1783	7.52172	0.1852	2.65337
CRAB															
Blue crab	*Callinectes sapidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lesser blue crab	*Callinectes similis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callinectes sp.	*Callinectes spp.*	0.01653	0.00711	0.01135	0.00837	0.04733	0.00624	0.01608	20.8554	0.00514	0.00465	0.00712	0.04402	0.00408	0.01758
Crabs unident		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decorator Crab	*Stenocionops furcata*	4.3E-05	0	0	0.00012	0	0	2.3E-05	0.14433	0	0	0.00035	0	0	5.2E-05
Gray Pitho Crab	*Pitho aculeata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green porcelain crab	*Petrolisthes armatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Crab	*Clibanarius* sp.	0.01271	0.01379	0.01065	0.01415	0.01109	0.01304	0.01254	10.6052	0.0109	0.00572	0.01348	0.0099	0.01431	0.00159
Mud Crab	*Panopeus herbstii*	0.0008	0.0017	0.00025	0.00061	0.00159	0.00032	0.00089	0.96164	6E-05	0.00051	0.00084	0.00188	0.00065	0.0007
Portunus Crab	*Portunus* sp.	0.00049	0	0	0.00037	0.00127	0.0005	0.00043	0.64367	0	0	0.00061	0.00111	0.00058	0.00052
Sponge Spider Crab	*Macrocoeloma subparallelum*	0.00022	0	0.00022	0.0002	0	0.00066	0.00022	0.48922	0	0.00043	0.0004	0	0.00132	0.00027
Stone Crab	*Menippe mercenaria*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted spiny lobster	*Panulirus guttatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Starfish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Sea Star		0.00201	0.00294	0.00478	0.00053	0.00293	0.00097	0.00243	2.18262	0.00169	0.00426	0.00072	0.00265	0.00194	0.00172
Ruby Brittlestar		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brittlestar		0.0003	0	0.00027	0.0003	0.00016	0.00065	0.00027	0.46074	0	0.00054	0.00063	0.00036	0.00129	0.00024
Other molluskks	Mollusca (other than cephalopoda)	0.00026	0	0.00025	0.0002	0.00049	0.00022	0.00023	0.41198	0	0.00051	0.0004	0.00074	0.00044	0.00018
Nudibranch		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0.00069	0	0.00022	0.00093	0	0.0018	0.00059	1.0441	0	0.00043	0.00174	0	0.00107	0.00078
Squid	Cephalopoda: Decapodiformes	0.00021	0	0	0.00057	0	0	0.00011	0.53093	0	0	0.00094	0	0	0.00025

Appendix Table B 5. April 2003 trawl mean and standard deviation of number per square meter.

Sample size: raw=24, 1S=2, 2N=4, 2S=9, 3N=5, 3S=4, zone=5

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Alewife	*Alosa pseudoharengus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bandtail Puffer	*Sphoeroides spengleri*	0.00033	0	0.00063	0.00031	0.00021	0.00038	0.00031	0.00044	0	0.00042	0.00046	0.00047	0.00044	0.00023
Bigeye Mojarra	*Eucinostomus havana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek Tonguefish	*Symphurus plagiusa*	4.6E-05	0	0	0.00012	0	0	2.5E-05	0.00023	0	0	0.00037	0	0	5.5E-05
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackfin Cardinalfish	*Astrapogon puncticulatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny?	Blenneildae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny	Blenneildae	3.2E-05	0	0.00019	0	0	0	3.9E-05	0.00016	0	0.00039	0	0	0	8.7E-05
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BlueStriped Grunt	*Haemulon sciurus*	0.00086	0.00166	0.00203	0.00053	0.00074	0.00022	0.00103	0.00121	0.00235	0.00187	0.00084	0.00075	0.00044	0.00077
Bridled Cardinalfish	*Apogon aurolineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bucktooth parrotfish	*Sparisoma radians*	7.1E-05	0	0.00021	9.7E-05	0	0	6.1E-05	0.00024	0	0.00042	0.00029	0	0	9.3E-05
Chain Pipefish	*Syngnathus louisianae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown Goby	*Microbius gulosus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Code Goby	*Gobiosoma robustum*	7.3E-05	0	0	9.7E-05	0.00017	0	5.4E-05	0.00025	0	0	0.00029	0.00039	0	7.9E-05
Colon Goby	*Coryphopterus dicrus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky Pipefish	*Syngnathus floridae*	0.00077	0.00092	0.00184	0.00011	0.00113	0.00063	0.00093	0.00106	0.0013	0.0017	0.00034	0.00089	0.00083	0.00084
Dwarf Goatfish	*Upeneus parvus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf Seahorse	*Hippocampus zosterae*	0.00198	0.00046	0.00223	0.00165	0.00324	0.00164	0.00184	0.00173	0.00065	0.00237	0.00163	0.00185	0.00094	0.00101
Emerald Parrotfish	*Nicholsina usta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flagfin Mojarra	*Eucinostomus melanopterus*	7.4E-05	0	0	0.0002	0	0	4E-05	0.00036	0	0	0.00059	0	0	8.9E-05
Freckled cardinalfish	*Phaeoptyx conklini*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Grunt	*Haemulon flavolineatum*	8.3E-05	0.00055	0	9.7E-05	0	0	0.00013	0.00028	0.00078	0	0.00029	0	0	0.00024
Fringed Filefish	*Monacanthus ciliatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed Pipefish	*Micrognathus criniger*	0.00012	0	0.00023	0	0.0004	0	0.00013	0.00033	0	0.00045	0	0.00056	0	0.00018
Gobionellus sp.	*Gobionellus sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gold Brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted Killifish	*Floridichthys carpio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grass Porgy	*Calamus arctifrons*	0.00022	0	0.00045	0	0.00034	0.00042	0.00024	0.00047	0	0.00091	0	0.00046	0.00049	0.00023
Gray Snapper	*Lutjanus griseus*	0.00058	0.00092	0.00019	0.00115	0.00017	0	0.00049	0.00097	0.0013	0.00039	0.00126	0.00039	0	0.00051
Great Barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Flounder	*Paralichthys albigutta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Pipefish	*Syngnathus scovelli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Toadfish	*Opsanus beta*	0.00151	0.0024	0.00451	0.00101	0.00087	0	0.00176	0.00245	0.00183	0.00384	0.00173	0.00194	0	0.00176
Haemulidae	Haemulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table B 5. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Hardhead halfbeak	*Chriodorus atherinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hardhead Silverside	*Atherinomorus stipes*	0.0011	0.00046	0.00073	0.00097	0.00068	0.00259	0.00109	0.00158	0.00065	0.00146	0.00105	0.00153	0.00265	0.00086
High-hat (juvenile)	*Equetus acuminatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogfish	*Lachnolaimus maximus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honeycomb Cowfish	*Lactophrys polygonia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore Lizardfish	*Synodus foetens*	0.0003	0	0.00021	0.00045	0	0.00057	0.00025	0.00049	0	0.00042	0.00054	0	0.00072	0.00026
Key Brotula	*Ogilbia cayorum*	0.00015	0	0	0.00041	0	0	8.2E-05	0.00044	0	0	0.00066	0	0	0.00018
Lane Snapper	*Lutjanus synagris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leopard Searobin	*Prionutus roseus*	4.2E-05	0	0	0.00011	0	0	2.2E-05	0.00021	0	0	0.00034	0	0	5E-05
Lined Seahorse	*Hippocampus erectus*	0.00015	0	0	0.00011	0.00016	0.00045	0.00015	0.00044	0	0	0.00034	0.00036	0.00091	0.00019
Lined Sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0.00011	0	0	0.00011	0.00017	0.00022	0.0001	0.00044	0	0	0.00032	0.00039	0.00044	0.00016
Mahogany Snapper	*Lutjanus mahogoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled Blenny	*Paraclinus marmoratus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mojarra sp.	Gerridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mutton Snapper	*Lutjanus analis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange Filefish	*Aluterus schoepfi*	3.4E-05	0	0	0	0.00016	0	3.3E-05	0.00017	0	0	0	0.00036	0	7.3E-05
Parrotfish sp.	Scaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0.00019	0.00185	0	0	0	0.00023	0.00041	0.00077	0.00261	0	0	0	0.00045	0.00081
Pikeblenny	*Chaenopsis sp.*	4.8E-05	0	0	0	0.00023	0	4.6E-05	0.00023	0	0	0	0.00051	0	0.0001
Pinfish	*Lagodon rhomboidalis*	0.05633	0.12164	0.17795	0.03442	0.01633	0.00136	0.07034	0.08418	0.03283	0.1413	0.03357	0.01462	0.00272	0.07612
Planehead Filefish	*Monacanthus hispidus*	0.00041	0.00055	0.00063	0	0.00039	0.00105	0.00052	0.00062	0.00078	0.00077	0	0.00055	0.0008	0.00038
Porkfish	*Anisotremus virginicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queen Parrotfish	*Scarus vetula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater Killifish	*Lucania parva*	0.00059	0.00055	0.00283	9.7E-05	0.00016	0	0.00073	0.00162	0.00078	0.00337	0.00029	0.00036	0	0.00119
Redfin Parrotfish	*Sparisoma rubripinne*	8.5E-05	0	0.00023	0	0.00023	0	9.1E-05	0.00029	0	0.00045	0	0.00051	0	0.00012
Redtail Parrotfish	*Sparisoma chrysopterum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sailors Choice	*Haemulon parrai*	8.1E-05	0	0.00049	0	0	0	9.8E-05	0.0004	0	0.00098	0	0	0	0.00022
Sand Perch	*Diplectrum formosum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Whiff	*Citharichthys arenaceus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum Pipefish	*Syngnathus pelagicus*	0.00038	0.00055	0.00085	0.00022	0.00051	0	0.00043	0.00058	0.00078	0.00069	0.00044	0.00077	0	0.00033
Schoolmaster	*Lutjanus apodus*	3.7E-05	0	0	9.7E-05	0	0	1.9E-05	0.00018	0	0	0.00029	0	0	4.4E-05

Appendix Table B 5. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	0.00026	0	0	0.00053	0	0.00039	0.00018	0.00056	0	0	0.0007	0	0.00078	0.00026
Scrawled Filefish	*Aluterus scriptus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sea Bream	*Archosargus rhomboidalis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seahorses unident	*Hippocampus spp.*	8.9E-05	0	0	0.00024	0	0	4.7E-05	0.00043	0	0	0.00071	0	0	0.00011
Sharksucker	*Echeneis naucrates*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrimp eel	*Ophichthus gomesi*	0.00018	0	0.00064	0.0002	0	0	0.00017	0.00044	0	0.00081	0.00039	0	0	0.00028
Silver Jenny	*Eucinostomus gula*	0.00279	0.00932	0.00171	0.00404	0.00067	0.00044	0.00323	0.00353	0.00379	0.00165	0.00374	0.00072	0.00088	0.00368
Silverside	Atherinidae	4E-05	0	0	0.00011	0	0	2.1E-05	0.0002	0	0	0.00032	0	0	4.8E-05
Slender Filefish	*Monacanthus tuckeri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Puffer	*Sphoeroides nephelus*	0.00023	0.00101	0.00044	0.00021	0	0	0.00033	0.00042	0.00013	0.00051	0.00041	0	0	0.00042
Speckled Stargazer	*Dactyloscopus moorei*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	0.00014	0	0.00021	0.00011	0.00033	0	0.00013	0.00033	0	0.00042	0.00032	0.00045	0	0.00014
Spotted Scorpionfish	*Scorpaena plumieri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Whiff	*Citharichthys macrops*	3.2E-05	0	0	0	0	0.00019	3.9E-05	0.00016	0	0	0	0	0.00039	8.7E-05
Striped Burrfish	*Chilomycterus schoepfi*	0.00011	0.00046	0	9.7E-05	0.00017	0	0.00015	0.0003	0.00065	0	0.00029	0.00039	0	0.00019
Striped Grunt	*Haemulon striatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0.00202	0.00138	0.00591	0.00051	0.00207	0.00179	0.00233	0.00302	0.00196	0.00553	0.00102	0.00197	0.0017	0.00209
Trunkfish	*Lactophrys trigonus*	0.00039	0.00055	0.00019	0.00045	0.00039	0.00037	0.00039	0.00053	0.00078	0.00039	0.00053	0.00055	0.00075	0.00013
White Grunt	*Haemulon plumieri*	0.00016	0.00046	0.00021	0.00023	0	0	0.00018	0.00037	0.00065	0.00042	0.00046	0	0	0.00019
Whitenose Pipefish	*Cosmocampus albirostris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellowfin Mojarra	*Gerres cinereus*	0.00133	0.0071	0.0006	0.00152	0.00035	0	0.00191	0.00305	0.00692	0.00075	0.00317	0.00078	0	0.00296
Unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total fish		0.07456	0.15282	0.20634	0.05058	0.03031	0.01293	0.09059	0.09427	0.04876	0.15729	0.04163	0.02277	0.00102	0.08446

Appendix Table B 5. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1S	2N	2S	3N	3S	zone	raw	1S	2N	2S	3N	3S	zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.06377	0.13499	0.07372	0.06025	0.03483	0.06233	0.07322	0.04023	0.0265	0.04518	0.02106	0.05026	0.02518	0.03734
Spotted Pink Shrimp	*Farfantepenaeus braziliensis*	0.00074	0.00194	0.00087	0.00059	0.00035	0.00083	0.00091	0.00099	0.00118	0.00118	0.00116	0.00078	7.8E-05	0.00061
Caridean Shrimp	*Palaemonetes, etc.*	0.74381	1.95038	1.63227	0.55267	0.30202	0.23437	0.93434	0.94566	0.95629	1.79977	0.3331	0.39292	0.07981	0.7992
CRAB															
Blue crab	*Callinectes sapidus*	3.8E-05	0	0	0	0	0.00023	4.5E-05	0.00018	0	0	0	0	0.00045	0.0001
Lesser blue crab	*Callinectes similis*	0.01739	0.04299	0.01668	0.02137	0.00882	0.00709	0.01939	0.01895	0.03577	0.01839	0.02015	0.01074	0.00163	0.01441
Callinectes sp.	*Callinectes spp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crabs unident		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decorator Crab	*Stenocionops furcata*	0.00012	0.00046	0	0.00022	0	0	0.00014	0.00033	0.00065	0	0.00044	0	0	0.00021
Gray Pitho Crab	*Pitho aculeata*	4.8E-05	0	0	0	0.00023	0	4.6E-05	0.00023	0	0	0	0.00051	0	0.0001
Green porcelain crab	*Petrolisthes armatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Crab	*Clibanarius* sp.	0.01316	0.01595	0.01606	0.01529	0.00397	0.01556	0.01337	0.0122	0.00223	0.01101	0.01742	0.00395	0.00315	0.00526
Mud Crab	*Panopeus herbstii*	0.00042	0.00055	0.00087	0.00053	0	0.00019	0.00043	0.0006	0.00078	0.00101	0.00051	0	0.00037	0.00034
Portunus Crab	*Portunus* sp.	0.00012	0	0	0.00012	0.00017	0.00022	0.0001	0.00032	0	0	0.00035	0.00039	0.00044	0.0001
Sponge Spider Crab	*Macrocoeloma subparallelum*	3.5E-05	0	0.00021	0	0	0	4.2E-05	0.00017	0	0.00042	0	0	0	9.3E-05
Stone Crab	*Menippe mercenaria*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted spiny lobster	*Panulirus guttatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Starfish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Sea Star		0.00054	0.00111	0.00023	0.001	0	0.00019	0.0005	0.00103	0.00156	0.00045	0.00142	0	0.00037	0.00051
Ruby Brittlestar		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brittlestar		0.00095	0	0.00042	0.00136	0	0.00223	0.0008	0.00185	0	0.00049	0.00189	0	0.00337	0.00097
Other molluskks	Mollusca (other than cephalopoda)	0.00034	0	0	0.00032	0.00055	0.00061	0.0003	0.00056	0	0	0.00048	0.00078	0.00075	0.00029
Nudibranch		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0.0014	0	0	0.00181	0.00103	0.00305	0.00118	0.00239	0	0	0.00347	0.00153	0.0005	0.00129
Squid	Cephalopoda: Decapodiformes	0.00011	0	0	0	0	0.00063	0.00013	0.00039	0	0	0	0	0.00083	0.00028

AppendixTable B 6. June 2003 trawl mean and standard deviaiton of number per square meter.

Sample size: raw=24, 1s=2, 2n=2, 2s=9, 3n=5, 3s=4, zones=5

Common name	Scientific name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zonal	raw	1s	2n	2s	3n	3s	zonal
FISH															
Alewife	*Alosa pseudoharengus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bandtail Puffer	*Sphoeroides spengleri*	0.00022	0	0	0.00028	0.00053	0	0.00016	0.00039	0	0	0.00043	0.00049	0	0.00024
Bigeye Mojarra	*Eucinostomus havana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek Tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackfin Cardinalfish	*Astrapogon puncticulatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny?	Blenneidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny	Blennelidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BlueStriped Grunt	*Haemulon sciurus*	0.00077	0.0005	0.00161	0.00099	0.00021	0.00027	0.00072	0.00122	0.00071	0.0013	0.00161	0.00047	0.00053	0.00059
Bluethroat pikeblenny	*Chaenopsis ocellata*	8.4E-05	0	0	0	0	0.00051	0.0001	0.00029	0	0	0	0	0.00059	0.00023
Bridled Cardinalfish	*Apogon aurolineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bucktooth parrotfish	*Sparisoma radians*	0.00021	0	0.00068	8.6E-05	0.00033	0	0.00022	0.00065	0	0.00136	0.00026	0.00074	0	0.00029
Chain Pipefish	*Syngnathus louisianae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clown Goby	*Microbius gulosus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Code Goby	*Gobiosoma robustum*	4.4E-05	0	0	0	0.00021	0	4.2E-05	0.00021	0	0	0	0.00047	0	9.4E-05
Colon Goby	*Coryphopterus dicrus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky Pipefish	*Syngnathus floridae*	0.00101	0	0.003	0.00019	0.00149	0.00074	0.00108	0.00225	0	0.00528	0.00058	0.00096	0.0005	0.00121
Dwarf Goatfish	*Upeneus parvus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf Seahorse	*Hippocampus zosterae*	0.00455	0.0005	0.00242	0.00176	0.01632	0.00028	0.00426	0.00794	0.00071	0.0018	0.00307	0.01093	0.00055	0.0068
Emerald Parrotfish	*Nicholsina usta*	1E-04	0	0.00023	0.00017	0	0	7.8E-05	0.00035	0	0.00045	0.0005	0	0	0.00011
Flagfin Mojarra	*Eucinostomus melanopterus*	7E-05	0	0	0.00019	0	0	3.7E-05	0.00024	0	0	0.00037	0	0	8.3E-05
Freckled cardinalfish	*Phaeoptyx conklini*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Grunt	*Haemulon flavolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed Filefish	*Monacanthus ciliatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed Pipefish	*Micrognathus criniger*	3.1E-05	0	0	8.3E-05	0	0	1.7E-05	0.00015	0	0	0.00025	0	0	3.7E-05
Gobionellus sp.	*Gobionellus sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gold Brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted Killifish	*Floridichthys carpio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grass Porgy	*Calamus arctifrons*	0.0002	0	0	0.00032	0.00021	0.00024	0.00015	0.00041	0	0	0.00048	0.00047	0.00048	0.00015
Gray Snapper	*Lutjanus griseus*	7.4E-05	0.0005	0	8.6E-05	0	0	0.00012	0.00025	0.00071	0	0.00026	0	0	0.00022
Great Barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Flounder	*Paralichthys albigutta*	3.2E-05	0	0	0	0.00015	0	3.1E-05	0.00016	0	0	0	0.00035	0	6.9E-05
Gulf Pipefish	*Syngnathus scovelli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Toadfish	*Opsanus beta*	0.00043	0.00151	0.00111	9.7E-05	0.00042	0	0.00063	0.00093	0.00214	0.00132	0.00029	0.00094	0	0.00066
Haemulidae	Haemulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AppendixTable B 6. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zonal	raw	1s	2n	2s	3n	3s	zonal
FISH															
Hardhead halfbeak	*Chriodorus atherinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hardhead Silverside	*Atherinomorus stipes*	0.00699	0.00114	0	0.00773	0	0.02397	0.00657	0.01436	0.00161	0	0.01182	0	0.02458	0.01037
High-hat (juvenile)	*Equetus acuminatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogfish	*Lachnolaimus maximus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honeycomb Cowfish	*Lactophrys polygonia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore Lizardfish	*Synodus foetens*	0.00021	0	0.00045	0	0.00021	0.00052	0.00024	0.00049	0	0.00091	0	0.00047	0.0006	0.00024
Key Brotula	*Ogilbia cayorum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lane Snapper	*Lutjanus synagris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leopard Searobin	*Prionutus roseus*	7.5E-05	0	0	0	0.00017	0.00024	8.1E-05	0.00025	0	0	0	0.00037	0.00048	0.00011
Lined Seahorse	*Hippocampus erectus*	0.00087	0	0.00069	0.00082	0.00198	0.00022	0.00074	0.00099	0	0.00046	0.00106	0.00081	0.00044	0.00077
Lined Sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0.00015	0	0	0.00017	0.00016	0.00028	0.00012	0.00055	0	0	0.00052	0.00037	0.00055	0.0002
Mahogany Snapper	*Lutjanus mahogoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled Blenny	*Paraclinus marmoratus*	7.6E-05	0	0	0.0002	0	0	4E-05	0.00037	0	0	0.0006	0	0	9E-05
Mojarra sp.	Gerridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mutton Snapper	*Lutjanus analis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange Filefish	*Aluterus schoepfi*	0.00015	0	0.00028	9.7E-05	0.00015	0.00024	0.00015	0.00036	0	0.00055	0.00029	0.00035	0.00048	0.00011
Parrotfish sp.	Scaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	3.2E-05	0	0	8.6E-05	0	0	1.7E-05	0.00016	0	0	0.00026	0	0	3.9E-05
Pikeblenny	*Chaenopsis sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.02743	0.10137	0.08785	0.00884	0.00491	0	0.04059	0.04449	0.07077	0.04449	0.00582	0.00544	0	0.04964
Planehead Filefish	*Monacanthus hispidus*	0.00013	0	0.00055	0	0	0.00022	0.00015	0.00048	0	0.00111	0	0	0.00044	0.00024
Porkfish	*Anisotremus virginicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queen Parrotfish	*Scarus vetula*	4.4E-05	0	0	0	0.00021	0	4.2E-05	0.00021	0	0	0	0.00047	0	9.4E-05
Rainwater Killifish	*Lucania parva*	0.00052	0.00303	0.00159	0	0	0	0.00092	0.00149	0.00428	0.0019	0	0	0	0.00136
Redfin Parrotfish	*Sparisoma rubripinne*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redtail Parrotfish	*Sparisoma chrysopterum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sailors Choice	*Haemulon parrai*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Perch	*Diplectrum formosum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	4.4E-05	0	0	0	0	0.00027	5.3E-05	0.00022	0	0	0	0	0.00053	0.00012
Sand Whiff	*Citharichthys arenaceus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum Pipefish	*Syngnathus pelagicus*	0.00054	0.00151	0.00139	9.7E-05	0.00049	0.00028	0.00075	0.00091	0.00214	0.00114	0.00029	0.00073	0.00055	0.00065
Schoolmaster	*Lutjanus apodus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AppendixTable B 6. Cont.

Common name	Scientific name	Mean raw	Mean 1s	Mean 2n	Mean 2s	Mean 3n	Mean 3s	Mean zonal	Standard deviation raw	Standard deviation 1s	Standard deviation 2n	Standard deviation 2s	Standard deviation 3n	Standard deviation 3s	Standard deviation zonal
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	0.00014	0	0	9.7E-05	0.00033	0.00022	0.00013	0.00032	0	0	0.00029	0.00045	0.00044	0.00014
Scrawled Filefish	*Aluterus scriptus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sea Bream	*Archosargus rhomboidalis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seahorses unident	*Hippocampus spp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharksucker	*Echeneis naucrates*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrimp eel	*Ophichthus gomesi*	0.00011	0	0	0.0002	0	0.00022	8.4E-05	0.0003	0	0	0.0004	0	0.00044	0.00012
Silver Jenny	*Eucinostomus gula*	0.00181	0.00555	0.00122	0.00195	0.00177	0.00028	0.00216	0.00257	0.00785	0.00099	0.0022	0.00146	0.00055	0.00201
Silverside	Atherinidae	0.00123	0	0	0.00081	0	0.00557	0.00128	0.00338	0	0	0.00207	0	0.0067	0.00243
Slender Filefish	*Monacanthus tuckeri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Puffer	*Sphoeroides nephelus*	0.00011	0	0.00022	9.9E-05	0	0.00024	0.00011	0.00031	0	0.00043	0.0003	0	0.00048	0.00011
Speckled Stargazer	*Dactyloscopus moorei*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	0.00028	0	0.00045	0	0.00097	0	0.00028	0.00068	0	0.00091	0	0.00106	0	0.00043
Spotted Scorpionfish	*Scorpaena plumieri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Whiff	*Citharichthys macrops*	3.5E-05	0	0	0	0.00017	0	3.3E-05	0.00017	0	0	0	0.00037	0	7.5E-05
Striped Burrfish	*Chilomycterus schoepfi*	0.00011	0	0	0.00018	0	0.00022	8.1E-05	0.00029	0	0	0.00037	0	0.00044	0.00011
Striped Grunt	*Haemulon striatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0.00027	0.0005	0.00071	0.00018	0.00021	0	0.00032	0.00052	0.00071	0.00093	0.00037	0.00047	0	0.00028
Trunkfish	*Lactophrys trigonus*	0.0004	0.0005	0.00028	0.00052	0.00021	0.00044	0.00039	0.00062	0.00071	0.00055	0.00068	0.00047	0.00088	0.00014
White Grunt	*Haemulon plumieri*	3.4E-05	0	0	0	0.00016	0	3.3E-05	0.00017	0	0	0	0.00037	0	7.4E-05
Whitenose Pipefish	*Cosmocampus albirostris*	0.00023	0	0.00023	0.00032	0.00033	0	0.00017	0.0004	0	0.00045	0.00048	0.00045	0	0.00016
Yellowfin Mojarra	*Gerres cinereus*	0.00144	0.00891	0.00223	0.00039	0.00087	0	0.00248	0.00292	0.00453	0.00328	0.00046	0.00143	0	0.00369
Unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total fish		0.05128	0.12556	0.10718	0.02704	0.03319	0.03543	0.06568	0.04782	0.09367	0.0537	0.01251	0.00796	0.02703	0.04683

AppendixTable B 6. Cont.

Common name	Scientific name	Mean raw	Mean 1s	Mean 2n	Mean 2s	Mean 3n	Mean 3s	Mean zonal	Standard deviation raw	Standard deviation 1s	Standard deviation 2n	Standard deviation 2s	Standard deviation 3n	Standard deviation 3s	Standard deviation zonal
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.01238	0.03392	0.00769	0.01809	0.00016	0.00871	0.01371	0.01247	0.02055	0.01198	0.00853	0.00036	0.00328	0.01297
Spotted Pink Shrimp	*Farfantepenaeus braziliensis*	6.2E-05	0	0	0.00017	0	0	3.3E-05	0.0003	0	0	0.0005	0	0	7.4E-05
Caridean Shrimp	*Palaemonetes, etc.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRAB															
Blue crab	*Callinectes sapidus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lesser blue crab	*Callinectes similis*	0.00532	0.00487	0.00256	0.01092	0.00054	0.00168	0.00411	0.00601	0.00118	0.00295	0.0063	0.00076	0.00075	0.00413
Callinectes sp.	*Callinectes spp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crabs unident		3.2E-05	0	0	8.6E-05	0	0	1.7E-05	0.00016	0	0	0.00026	0	0	3.9E-05
Decorator Crab	*Stenocionops furcata*	3.4E-05	0	0	0	0.00016	0	3.3E-05	0.00017	0	0	0	0.00037	0	7.4E-05
Gray Pitho Crab	*Pitho aculeata*	3.7E-05	0	0	9.9E-05	0	0	2E-05	0.00018	0	0	0.0003	0	0	4.4E-05
Green porcelain crab	*Petrolisthes armatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Crab	*Clibanarius* sp.	0.0132	0.03208	0.0117	0.00822	0.00398	0.02799	0.01679	0.01208	0.0111	0.01125	0.00515	0.00281	0.01099	0.01248
Mud Crab	*Panopeus herbstii*	0.00016	0.0005	0.00022	0.00021	0	0	0.00019	0.00036	0.00071	0.00043	0.00041	0	0	0.00021
Portunus Crab	*Portunus* sp.	0.00115	0	0	0.00203	0.00016	0.00213	0.00087	0.002	0	0	0.00263	0.00037	0.00208	0.00111
Sponge Spider Crab	*Macrocoeloma subparallelum*	0.0001	0	0	0.00018	0	0.00022	8E-05	0.00028	0	0	0.00036	0	0.00044	0.00011
Stone Crab	*Menippe mercenaria*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted spiny lobster	*Panulirus guttatus*	4.2E-05	0.0005	0	0	0	0	0.0001	0.00021	0.00071	0	0	0	0	0.00023
Starfish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Sea Star		3.6E-05	0	0.00022	0	0	0	4.3E-05	0.00018	0	0.00043	0	0	0	9.7E-05
Ruby Brittlestar		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brittlestar		0.00029	0	0	0.00057	0.00016	0.00024	0.00019	0.00048	0	0	0.00058	0.00036	0.00048	0.00023
Other molluskks	Mollusca (other than cephalopoda)	0.00058	0.0005	0.00024	0.00042	0.00021	0.00176	0.00063	0.00117	0.00071	0.00049	0.00101	0.00047	0.00216	0.00065
Nudibranch		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0.00188	0	0	0.00314	0	0.00423	0.00147	0.00338	0	0	0.00443	0	0.00315	0.00206
Squid	Cephalopoda: Decapodiformes	3.8E-05	0	0	0.0001	0	0	2E-05	0.00018	0	0	0.0003	0	0	4.5E-05

Appendix Table B 7. August 2003 trawl mean and standard deviation of number per square meter.

Sample size: raw=24, 1s=2, 2n=4, 2s=9, 3n=5, 3s=4, zone=5)

Common name	Scientific name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Alewife	*Alosa pseudoharengus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bandtail Puffer	*Sphoeroides spengleri*	0.00033	0	0.000697	0.00035	0.000383	0	0.000285	0.00069	0	0.000697	0.000738	0.000855	0	0.000422
Bigeye Mojarra	*Eucinostomus havana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek Tonguefish	*Symphurus plagiusa*	7.6E-05	0	0	0	0.000168	0.00024	8.24E-05	0.000257	0	0	0	0.000376	0.0004872	0.00024
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackfin Cardinalfish	*Astrapogon puncticulatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny?	Blenneiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny	Blenneiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BlueStriped Grunt	*Haemulon sciurus*	0.00063	0.00051	0.00212	0.00043	0.00035	0	0.000683	0.001069	0.000721	0.00212	0.000864	0.00048	0	0.000789
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridled Cardinalfish	*Apogon aurolineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bucktooth parrotfish	*Sparisoma radians*	0.00016	0	0.000489	0.0001	0.000182	0	0.000154	0.000359	0	0.000489	0.000301	0.000406	0	0.000228
Chain Pipefish	*Syngnathus louisianae*	7.6E-05	0	0	9.7E-05	0.00019	0	5.75E-05	0.000258	0	0	0.000292	0.000425	0	0.000202
Clown Goby	*Microbius gulosus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Code Goby	*Gobiosoma robustum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colon Goby	*Coryphopterus dicrus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky Pipefish	*Syngnathus floridae*	0.0017	0	0.002775	0.00148	0.003283	0	0.001507	0.001744	0	0.002775	0.001553	0.001653	0	0.001193
Dwarf Goatfish	*Upeneus parvus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf Seahorse	*Hippocampus zosterae*	0.00082	0.00051	0	0.00064	0.001862	0.00087	0.000776	0.001186	0.000721	0	0.000831	0.001909	0.0010186	0.000685
Emerald Parrotfish	*Nicholsina usta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flagfin Mojarra	*Eucinostomus melanopterus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Grunt	*Haemulon flavolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freckled cardinalfish	*Phaeoptyx conklini*	3.7E-05	0	0	0	0	0.00022	4.43E-05	0.000181	0	0	0	0	0.0004428	0.000198
Fringed Filefish	*Monacanthus ciliatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed Pipefish	*Micrognathus criniger*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gobionellus sp.	*Gobionellus sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gold Brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted Killifish	*Floridichthys carpio*	0.00011	0	0	0.00029	0	0	5.85E-05	0.000537	0	0	0.000877	0	0	0.000392
Grass Porgy		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Snapper	*Lutjanus griseus*	0.00011	0.00045	0.000238	0	0.000168	0	0.00017	0.000303	0.00063	0.000238	0	0.000376	0	0.000267
Great Barracuda	*Sphyraena barracuda*	0.00012	0	0.000228	0	0.000383	0	0.000122	0.000425	0	0.000228	0	0.000855	0	0.00037
Gulf Flounder	*Paralichthys albigutta*	3.7E-05	0	0	0	0	0.00022	4.43E-05	0.000181	0	0	0	0	0.0004428	0.000198
Gulf Pipefish	*Syngnathus scovelli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Toadfish	*Opsanus beta*	0.00227	0.00089	0.008755	0.00156	0.00071	0	0.002383	0.00379	0.001261	0.008755	0.00238	0.000717	0	0.003536
Haemulidae	Haemulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table B 7. Cont.

Common name	Scientific name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Hardhead halfbeak	*Chriodorus atherinoides*	4.4E-05	0	0	0.00012	0	0	2.33E-05	0.000214	0	0	0.00035	0	0	0.000157
Hardhead Silverside	*Atherinomorus stipes*	0.00058	0.00153	0	0.00085	0.000158	0.00061	0.000631	0.001016	0.002163	0	0.001221	0.000354	0.0008048	0.000839
High-hat (juvenile)	*Equetus acuminatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogfish	*Lachnolaimus maximus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honeycomb Cowfish	*Lactophrys polygonia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore Lizardfish	*Synodus foetens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Key Brotula	*Ogilbia cayorum*	3.7E-05	0	0	9.7E-05	0	0	1.95E-05	0.000179	0	0	0.000292	0	0	0.000131
Lane Snapper	*Lutjanus synagris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leopard Searobin	*Prionutus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined Seahorse	*Hippocampus erectus*	0.00019	0	0.000252	0.00022	0	0.00041	0.000176	0.000385	0	0.000252	0.000432	0	0.0004789	0.000229
Lined Sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahogany Snapper	*Lutjanus mahogoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled Blenny	*Paraclinus marmoratus*	8.4E-05	0	0	0.00012	0.000191	0	6.16E-05	0.000284	0	0	0.00035	0.000428	0	0.000215
Mojarra sp.	Gerridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mutton Snapper	*Lutjanus analis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange Filefish	*Aluterus schoepfi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parrotfish sp.	Scaridae	7E-05	0	0	0	0.000337	0	6.73E-05	0.000344	0	0	0	0.000753	0	0.000337
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pikeblenny	*Chaenopsis sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.04333	0.05056	0.11708	0.03346	0.032653	0.00153	0.047057	0.050252	0.057082	0.11708	0.045211	0.028644	0.0030586	0.042521
Planehead Filefish	*Monacanthus hispidus*	0.0005	0.00051	0.000933	9.7E-05	0.000925	0.00046	0.000584	0.000766	0.000721	0.000933	0.000292	0.0013	0.0005284	0.000386
Porkfish	*Anisotremus virginicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queen Parrotfish	*Scarus vetula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater Killifish	*Lucania parva*	0.0021	0.00089	0.009161	0.0005	0.001519	0	0.002414	0.00473	0.001261	0.009161	0.001494	0.002404	0	0.003623
Redfin Parrotfish	*Sparisoma rubripinne*	3.7E-05	0	0.000222	0	0	0	4.44E-05	0.000181	0	0.000222	0	0	0	9.93E-05
Redtail Parrotfish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sailors Choice	*Haemulon parrai*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Perch	*Diplectrum formosum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	7.4E-05	0	0	0.00011	0	0.00019	6.08E-05	0.000254	0	0	0.000339	0	0.0003823	0.000198
Sand Whiff	*Citharichthys arenaceus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum Pipefish	*Syngnathus pelagicus*	0.00076	0	0.001407	0.00037	0.001831	0	0.000722	0.001301	0	0.001407	0.00112	0.001304	0	0.000707
Schoolmaster	*Lutjanus apodus*	0.00012	0.00045	0.000222	0.00012	0	0	0.000158	0.000329	0.00063	0.000222	0.000373	0	0	0.000267

Appendix Table B 7. Cont.

Common name	Scientific name	Mean raw	Mean 1s	Mean 2n	Mean 2s	Mean 3n	Mean 3s	Mean zone	Standard deviation raw	Standard deviation 1s	Standard deviation 2n	Standard deviation 2s	Standard deviation 3n	Standard deviation 3s	Standard deviation zone
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	7.2E-05	0.00045	0	0	0	0.00021	0.000131	0.000245	0.00063	0	0	0	0.0004235	0.000298
Scrawled Filefish	*Aluterus scriptus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sea Bream	*Archosargus rhomboidalis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seahorses unident	*Hippocampus spp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharksucker	*Echeneis naucrates*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrimp eel	*Ophichthus gomesi*	4.4E-05	0	0	0.00012	0	0	2.33E-05	0.000214	0	0	0.00035	0	0	0.000157
Silver Jenny	*Eucinostomus gula*	0.04075	0.0302	0.09397	0.04146	0.031348	0.00296	0.039987	0.052193	0.01497	0.09397	0.056596	0.035328	0.0008722	0.036629
Silverside	Atherinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slender Filefish	*Monacanthus tuckeri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Puffer	*Sphoeroides nephelus*	0.00015	0	0	0.0002	0.000373	0	0.000115	0.000439	0	0	0.000602	0.000511	0	0.000306
Speckled Stargazer	*Dactyloscopus moorei*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	0.00027	0	0.000713	0	0.000719	0	0.000286	0.000749	0	0.000713	0	0.000988	0	0.000476
Spotted Scorpionfish	*Scorpaena plumieri*	3.3E-05	0	0	0	0.000158	0	3.17E-05	0.000162	0	0	0	0.000354	0	0.000158
Spotted Whiff	*Citharichthys macrops*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Striped Burrfish	*Chilomycterus schoepfi*	0.00016	0.00045	0	0.00033	0	0	0.000155	0.000474	0.00063	0	0.000708	0	0	0.000368
Striped Grunt	*Haemulon striatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0.00015	0.00045	0.000238	9.7E-05	0.000182	0	0.000192	0.000345	0.00063	0.000238	0.000292	0.000406	0	0.000231
Trunkfish	*Lactophrys trigonus*	0.00019	0	0.000444	0.00021	0	0.00024	0.00018	0.000469	0	0.000444	0.000427	0	0.0004872	0.000249
White Grunt	*Haemulon plumieri*	7E-05	0	0	0	0.000337	0	6.73E-05	0.000344	0	0	0	0.000753	0	0.000337
Whitenose Pipefish	*Cosmocampus albirostris*	7.7E-05	0	0	0	0.000372	0	7.43E-05	0.000262	0	0	0	0.000509	0	0.000228
Yellowfin Mojarra	*Gerres cinereus*	0.00496	0.00267	0.008173	0.00527	0.006728	0	0.004569	0.006286	0.003782	0.008173	0.008164	0.006517	0	0.003476
Unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total fish		0.10178	0.0905	0.250259	0.08882	0.085698	0.00818	0.104691	0.109244	0.047242	0.250259	0.109443	0.052322	0.0037423	0.095806

Appendix Table B 7. Cont.

		Mean							Standard deviation						
Common name	Scientific name	raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.09573	0.14445	0.18182	0.11767	0.018366	0.03261	0.098982	0.084764	0.052887	0.18182	0.095822	0.017848	0.0099748	0.070307
Spotted Pink Shrimp	*Farfantepenaeus braziliensis*	0.00049	0	0.002109	0.00037	0	0	0.000496	0.001128	0	0.002109	0.00112	0	0	0.000951
Caridean Shrimp	*Palaemonetes, etc.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRAB															
Blue crab	*Callinectes sapidus*	6.7E-05	0	0	0	0.000168	0.00019	7.19E-05	0.000227	0	0	0	0.000376	0.0003823	0.000208
Lesser blue crab	*Callinectes similis*	0.00851	0.00917	0.012108	0.01234	0.001342	0.00494	0.007981	0.007882	0.002888	0.012108	0.009975	0.001182	0.005179	0.004645
Callinectes sp.	*Callinectes spp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crabs unident		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decorator crab	*Stenocionops furcata*	3.8E-05	0	0	0.0001	0	0	2.05E-05	0.000188	0	0	0.000308	0	0	0.000138
Gray Pitho Crab	*Pitho aculeata*	0.00023	0.00045	0.000489	0.00021	0.000158	0	0.000261	0.00041	0.00063	0.000489	0.000419	0.000354	0	0.000235
Green porcelain crab	*Petrolisthes armatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Crab	*Clibanarius* sp.	0.03119	0.01866	0.057887	0.04289	0.010487	0.01031	0.028046	0.041423	0.017735	0.057887	0.046623	0.008025	0.0019252	0.024557
Mud crab	*Panopeus herbstii*	0.00029	0.00045	0.000694	0.00037	0	0	0.000303	0.000788	0.00063	0.000694	0.00112	0	0	0.000484
Portunus Crab	*Portunus* sp.	0.00037	0.00051	0.000703	0.00044	0	0.00024	0.00038	0.000559	0.000721	0.000703	0.000526	0	0.0004872	0.000292
Sponge spider crab	*Macrocoeloma subparallelum*	7.7E-05	0	0.000238	0	0	0.00022	9.18E-05	0.000259	0	0.000238	0	0	0.0004428	0.0002
Stone crab	*Menippe mercenaria*	3.3E-05	0	0	0	0.000158	0	3.17E-05	0.000162	0	0	0	0.000354	0	0.000158
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted spiny lobster	*Panulirus guttatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Starfish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red sea star		0.00044	0	0.002143	0.00012	0.00019	0	0.000491	0.001011	0	0.002143	0.000373	0.000425	0	0.000892
Ruby Brittlestar		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brittlestar		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other molluskks	Mollusca (other than cephalopoda)	0.00056	0.00045	0.000238	0.00052	0.000363	0.00129	0.000572	0.000866	0.00063	0.000238	0.000665	0.000812	0.0015502	0.000481
Nudibranch		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0.00044	0	0	0.00098	0	0.00043	0.000283	0.000921	0	0	0.001321	0	0.0005004	0.000577
Squid	Cephalopoda: Decapodiformes	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table B 8. October 2003 trawl mean and standard deviation of number per square meter.

Sample size: raw=24, 1s=2, 2n=4, 2s=9, 3n=5, 3s=4, zone=5

		Mean							Standard deviation						
Common Name	Scientific Name	raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Alewife	*Alosa pseudoharengus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bandtail Puffer	*Sphoeroides spengleri*	0.0001289	0	0	8.604E-05	0.0003198	0.0001804	0.0001172	0.0002952	0	0	0.0002581	0.0004395	0.0003607	0.0001355
Bigeye Mojarra	*Eucinostomus havana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek Tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackfin Cardinalfish	*Astrapogon puncticulatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny?		3.631E-05	0	0	0	0.0001743	0	3.486E-05	0.0001779	0	0	0	0.0003897	0	7.794E-05
Blenny		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped Grunt	*Haemulon sciurus*	0.0004493	0.0003776	0.0010033	0.000396	0.0004903	0	0.0004535	0.000692	0.000534	0.0009357	0.0006853	0.0007523	0	0.00036
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridled Cardinalfish	*Apogon aurolineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bucktooth Parrotfish	*Sparisoma radians*	0.0005151	0.0004599	0.0009981	0.000264	0.0006395	0.0004691	0.0005661	0.00077	0.0006504	0.000937	0.0007919	0.000879	0.0005418	0.0002757
Chain Pipefish	*Syngnathus louisianae*	6.541E-05	0	0.000206	0	0.0001492	0	7.103E-05	0.0002219	0	0.0004119	0	0.0003336	0	9.931E-05
Clown Goby	*Microbius gulosus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Code Goby	*Gobiosoma robustum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colon Goby	*Coryphopterus dicrus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky pipefish	*Syngnathus floridae*	0.0004259	0.0012151	0.000206	0.000308	0.000672	0.0002088	0.000522	0.0007248	0.0004176	0.0004119	0.0006789	0.0011327	0.0004176	0.0004321
Dwarf Goatfish	*Upeneus parvus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf Seahorse	*Hippocampus zosterae*	0.0007112	0.0004599	0	0.0007653	0.0014815	0.0004632	0.000634	0.0011114	0.0006504	0	0.0011862	0.0014801	0.0009265	0.000547
Emerald Parrotfish	*Nicholsina usta*	3.631E-05	0	0	0	0.0001743	0	3.486E-05	0.0001779	0	0	0	0.0003897	0	7.794E-05
Flagfin Mojarra	*Eucinostomus melanopterus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freckled cardinalfish	*Phaeoptyx conklini*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Grunt	*Haemulon flavolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed Filefish	*Monacanthus ciliatus*	9.847E-05	0	0	0	0.0004727	0	9.454E-05	0.0003459	0	0	0	0.0006834	0	0.0002114
Fringed Pipefish	*Micrognathus criniger*	0.0001139	0.0003776	0	0.0002197	0	0	0.0001195	0.0004257	0.000534	0	0.0006591	0	0	0.0001728
Gobionellus sp.	*Gobionellus* sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gold Brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted Killifish	*Floridichthys carpio*	4.119E-05	0	0	0.0001098	0	0	2.197E-05	0.0002018	0	0	0.0003295	0	0	4.913E-05
Grass Porgy	*Calamus arctifrons*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Snapper	*Lutjanus griseus*	0.0009559	0.0012151	0.0038147	0.0004179	0.0002984	0	0.0011492	0.0016365	0.0004176	0.0018744	0.000991	0.0006672	0	0.0015563
Great Barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Flounder	*Paralichthys albigutta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Pipefish	*Syngnathus scovelli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf toadfish	*Opsanus beta*	0.0010037	0.0057804	0.0018941	0.0003705	0.0003235	0	0.0016737	0.0017669	0.0003694	0.0015013	0.0008181	0.0004452	0	0.0024102
Haemulidae	Haemulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table B 8. Cont.

		Mean							Standard deviation						
Common Name	Scientific Name	raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Hardhead halfbeak	*Chriodorus atherinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hardhead Silverside	*Atherinomorus stipes*	3.48E-05	0	0	0	0	0.0002088	4.176E-05	0.0001705	0	0	0	0	0.0004176	9.337E-05
High-hat (juvenile)	*Equetus acuminatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogfish	*Lachnolaimus maximus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honeycomb Cowfish	*Lactophrys polygonia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore Lizardfish	*Synodus foetens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Key Brotula	*Ogilbia cayorum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lane Snapper	*Lutjanus synagris*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leopard Searobin	*Prionutus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined Seahorse	*Hippocampus erectus*	6.251E-05	0	0.0001885	0	0.0001492	0	6.755E-05	0.0002118	0	0.0003771	0	0.0003336	0	9.353E-05
Lined Sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahogany Snapper	*Lutjanus mahogoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled blenny	*Paraclinus marmoratus*	0.0001423	0	0.000206	0.0001823	0	0.0002375	0.0001252	0.0004059	0	0.0004119	0.000547	0	0.000475	0.0001159
Mojarra sp.	*Gerridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mutton Snapper	*Lutjanus analis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange Filefish	*Aluterus schoepfi*	3.554E-05	0	0	0	0.0001706	0	3.411E-05	0.0001741	0	0	0	0.0003814	0	7.628E-05
Parrotfish sp.	Scaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pikeblenny	*Chaenopsis sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.0208881	0.0691439	0.0642417	0.0084812	0.0088232	0.0009036	0.0299187	0.0314908	0.0401111	0.0345211	0.0105822	0.0094164	0.0013111	0.0337376
Planehead Filefish	*Monacanthus hispidus*	0.0002681	0	0.0003771	0	0.0005066	0.0005982	0.0002964	0.0004968	0	0.0007542	0	0.000463	0.0007195	0.0002817
Porkfish	*Anisotremus virginicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queen Parrotfish	*Scarus vetula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater Killifish	*Lucania parva*	0.000932	0.0074555	0	0.0005492	0.0005029	0	0.0017015	0.0022683	0.0001365	0	0.0016477	0.0007581	0	0.0032274
Redfin Parrotfish	*Sparisoma rubripinne*	3.108E-05	0	0	0	0.0001492	0	2.984E-05	0.0001523	0	0	0	0.0003336	0	6.672E-05
Redtail Parrotfish	*Sparisoma chrysopterum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sailors Choice	*Haemulon parrai*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Perch	*Diplectrum formosum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	3.86E-05	0	0	0	0	0.0002316	4.632E-05	0.0001891	0	0	0	0	0.0004632	0.0001036
Sand Whiff	*Citharichthys arenaceus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum Pipefish	*Syngnathus pelagicus*	0.0005825	0.0015104	0.0004171	8.833E-05	0.0016992	0	0.000743	0.001214	0.002136	0.0004817	0.000265	0.0020282	0	0.0008047
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoolmaster	*Lutjanus apodus*	0.0001093	0.0004599	0	9.232E-05	0.0001743	0	0.0001453	0.0002956	0.0006504	0	0.000277	0.0003897	0	0.0001903

Appendix Table B 8. Cont.

Common Name	Scientific Name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	3.48E-05	0	0	0	0	0.0002088	4.176E-05	0.0001705	0	0	0	0	0.0004176	9.337E-05
Scrawled Filefish	*Aluterus scriptus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sea Bream	*Archosargus rhomboidalis*	3.433E-05	0	0.000206	0	0	0	4.119E-05	0.0001682	0	0.0004119	0	0	0	9.211E-05
Seahorses unident	*Hippocampus spp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharksucker	*Echeneis naucrates*	4.119E-05	0	0	0.0001098	0	0	2.197E-05	0.0002018	0	0	0.0003295	0	0	4.913E-05
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrimp eel	*Ophichthus gomesi*	0.0001895	0	0.0004377	0.0003109	0	0	0.0001497	0.000478	0	0.000506	0.0006813	0	0	0.0002098
Silver Jenny	*Eucinostomus gula*	0.0136035	0.0465246	0.0177637	0.0112014	0.011469	0.0010556	0.0176029	0.0189479	0.0070546	0.0167257	0.0207584	0.015609	0.0013355	0.0172403
Silverside	*Atherinidae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slender Filefish	*Monacanthus tuckeri*	3.226E-05	0	0	8.604E-05	0	0	1.721E-05	0.0001581	0	0	0.0002581	0	0	3.848E-05
Southern Puffer	*Sphoeroides nephelus*	3.312E-05	0	0	8.833E-05	0	0	1.767E-05	0.0001623	0	0	0.000265	0	0	3.95E-05
Speckled Stargazer	*Dactyloscopus moorei*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	3.433E-05	0	0.000206	0	0	0	4.119E-05	0.0001682	0	0.0004119	0	0	0	9.211E-05
Spotted Scorpionfish	*Scorpaena plumieri*	4.119E-05	0	0	0.0001098	0	0	2.197E-05	0.0002018	0	0	0.0003295	0	0	4.913E-05
Spotted Whiff	*Citharichthys macrops*	6.661E-05	0	0.0003997	0	0	0	7.993E-05	0.0002261	0	0.000463	0	0	0	0.0001787
Striped Burrfish	*Chilomycterus schoepfi*	7.432E-05	0	0	0.0001982	0	0	3.964E-05	0.0002534	0	0	0.0003962	0	0	8.863E-05
Striped Grunt	*Haemulon striatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0.0006192	0.0008375	0.0006211	0.0003964	0.0012828	0.0001804	0.0006636	0.000871	0.0001164	0.0004187	0.0007924	0.0014126	0.0003607	0.0004244
Trunkfish	*Lactophrys trigonus*	0.0002814	0	0	0.0001806	0.0010258	0	0.0002413	0.0006534	0	0	0.0003586	0.0011332	0	0.0004455
White Grunt	*Haemulon plumieri*	0.0002894	0	0	0	0.0013892	0	0.0002778	0.0010783	0	0	0	0.0021855	0	0.0006213
Whitenose Pipefish	*Cosmocampus albirostris*	3.299E-05	0	0	8.799E-05	0	0	1.76E-05	0.0001616	0	0	0.000264	0	0	3.935E-05
Yellowfin Mojarra	*Gerres cinereus*	0.0040355	0.0240559	0.0026653	0.0010985	0.0056387	0	0.0066917	0.008201	0.0119048	0.0042816	0.0032954	0.008639	0	0.009936
Unidentified fish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total fish		0.0471503	0.1598736	0.0958519	0.0241986	0.0381762	0.0049461	0.0646093	0.0545106	0.0327835	0.0271289	0.0388126	0.0381227	0.0029442	0.0631325

Appendix Table B 8. Cont.

Common Name	Scientific Name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.0789072	0.1585279	0.1768021	0.0772914	0.007256	0.0344017	0.0908558	0.0744398	0.0372884	0.0457794	0.0649673	0.0143056	0.0136481	0.0668225
Spotted Pink Shrimp	*Farfantepenaeus braziliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caridean Shrimp	*Pallaemonetes* etc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRAB															
Callinectes sapidus	*Callinectes sapidus*	7.075E-05	0	0.0002266	8.799E-05	0	0	6.291E-05	0.0002403	0	0.0004531	0.000264	0	0	9.91E-05
Callinectes similis	*Callinectes similis*	0.0038857	0.0026773	0.0100258	0.0051253	0	0.0004176	0.0036492	0.0047552	0.0027182	0.0053865	0.0040679	0	0.0008351	0.0041093
Callinectes sp.	*Callinectes sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crabs unident		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decorator Crab	*Stenocionops furcata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Pitho Crab	*Pitho aculeata*	7.145E-05	0.0004599	0	8.833E-05	0	0	0.0001097	0.0002428	0.0006504	0	0.000265	0	0	0.0001995
Green porcelain crab	*Petrolisthes armatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Crab	*Clibanarius sp.*	0.0142345	0.0201691	0.0248933	0.0169954	0.0033185	0.0080414	0.0146835	0.0167114	0.0157072	0.0282884	0.0166606	0.0019585	0.0081074	0.0088453
Mud Crab	*Panopeus herbstii*	0.0002176	0	0.0006036	0.000312	0	0	0.0001831	0.000534	0	0.0007391	0.0006823	0	0	0.0002711
Portunus Crab	*Portunus* sp.	0.000215	0	0.0001885	0.0004067	0.0001492	0	0.0001489	0.0004822	0	0.0003771	0.000693	0.0003336	0	0.0001676
Sponge spider crab	*Macrocoeloma subparallelum*	3.299E-05	0	0	8.799E-05	0	0	1.76E-05	0.0001616	0	0	0.000264	0	0	3.935E-05
Stone Crab	*Menippe mercenaria*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted spiny lobster	*Panulirus guttatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Starfish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Sea Star	*Formia milleporella*	7.141E-05	0	0.0002266	8.973E-05	0	0	6.326E-05	0.0002424	0	0.0004531	0.0002692	0	0	9.921E-05
Ruby Brittlestar	*Ophioderma rubicundum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brittlestar	*Ophioderma sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other molluskks	Mollusca (other than cephalopoda)	0.0001288	0	0	0.0001777	0.0002984	0	9.522E-05	0.0003675	0	0	0.0003527	0.0006672	0	0.0001372
Nudibranch		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0.0001444	0	0	0.0003851	0	0	7.703E-05	0.0004342	0	0	0.0006616	0	0	0.0001722
Squid	Cephalopoda: Decapodiformes	0.0002732	0	0	0.0005629	0.0002984	0	0.0001723	0.0005825	0	0	0.0007516	0.0006672	0	0.0002537

Appendix Table B 9. December 2003 trawl mean and standard deviation of number per square meter.

Sample size: raw=24, 1s=2, 2n=4, 2s=9, 3n=5, 3s=4, zone=5

Common Name	Scientific Name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Alewife	*Alosa pseudoharengus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bandtail Puffer	*Sphoeroides spengleri*	0.000253	0	0.000201	0.000203	0.000353	0.000421	0.000236	0.000481	0	0.0004	0.0004	0.00079	0.000488	0.000163
Bigeye Mojarra	*Eucinostomus havana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackcheek Tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackfin Cardinalfish	*Astrapogon puncticulatus*	7.38E-05	0	0	0.000197	0	0	3.94E-05	0.000252	0	0	0.00039	0	0	8.8E-05
Blenny?		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped Grunt	*Haemulon sciurus*	0.000289	0.000541	0.001276	8.47E-05	0	0	0.00038	0.000639	0.00077	0.00102	0.00025	0	0	0.000549
Bluethroat pikeblenny	*Chaenopsis ocellata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridled Cardinalfish	*Apogon aurolineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bucktooth Parrotfish	*Sparisoma radians*	0.000162	0.000541	0.00044	0	0.000208	0	0.000238	0.000372	0.00077	0.00051	0	0.000466	0	0.000248
Chain Pipefish	*Syngnathus louisianae*	3.18E-05	0	0	8.47E-05	0	0	1.69E-05	0.000156	0	0	0.00025	0	0	3.79E-05
Clown Goby	*Microbius gulosus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Code Goby	*Gobiosoma robustum*	7.67E-05	0	0	9.31E-05	0.000201	0	5.88E-05	0.000261	0	0	0.00028	0.000449	0	8.9E-05
Colon Goby	*Coryphopterus dicrus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky Pipefish	*Syngnathus floridae*	0.000289	0	0.000201	0.000449	0.000417	0	0.000213	0.000583	0	0.0004	0.00061	0.000932	0	0.000217
Dwarf Goatfish	*Upeneus parvus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf seahorse	*Hippocampus zosterae*	0.000131	0	0.000201	0.000259	0	0	9.21E-05	0.000299	0	0.0004	0.00039	0	0	0.000128
Emerald Parrotfish	*Nicholsina usta*	7.04E-05	0	0	8.97E-05	0.000177	0	5.33E-05	0.000239	0	0	0.00027	0.000395	0	7.91E-05
Flagfin Mojarra	*Eucinostomus melanopterus*	0.000122	0.000541	0	8.97E-05	0.000208	0	0.000168	0.000333	0.00077	0	0.00027	0.000466	0	0.000226
Freckled cardinalfish	*Phaeoptyx conklini*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Grunt	*Haemulon flavolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed Filefish	*Monacanthus ciliatus*	0.000282	0	0	0.000275	0.000364	0.000621	0.000252	0.00048	0	0	0.00041	0.000507	0.000805	0.000263
Fringed Pipefish	*Micrognathus criniger*	8.62E-05	0	0.000257	0	0.000208	0	9.3E-05	0.000292	0	0.00051	0	0.000466	0	0.000128
Gobionellus sp.	*Gobionellus* sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gold Brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted Killifish	*Floridichthys carpio*	4.51E-05	0.000541	0	0	0	0	0.000108	0.000221	0.00077	0	0	0	0	0.000242
Grass Porgy	*Calamus arctifrons*	0.000104	0	0	0.000167	0.000201	0	7.35E-05	0.000285	0	0	0.00033	0.000449	0	0.000101
Gray Snapper	*Floridichthys carpio*	0.000759	0.001624	0.002027	0.000191	0.001026	0	0.000974	0.001161	0.0023	0.00092	0.00038	0.00146	0	0.00088
Great Barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Flounder	*Paralichthys albigutta*	6.58E-05	0	0	0.000175	0	0	3.51E-05	0.000223	0	0	0.00035	0	0	7.84E-05
Gulf Pipefish	*Syngnathus scovelli*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Toadfish	*Opsanus beta*	0.002788	0.000424	0.01348	0.00073	0.001114	0	0.00315	0.007684	0.0006	0.01605	0.00191	0.001026	0	0.005789
Haemulidae	Haemulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table B 9. Cont.

Common Name	Scientific Name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Hardhead halfbeak	*Chriodorus atherinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hardhead Silverside	*Atherinomorus stipes*	0.000156	0	0	0.000322	0	0.000211	0.000107	0.000608	0	0	0.00096	0	0.000422	0.000151
High-hat (juvenile)	*Equetus acuminatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogfish	*Lachnolaimus maximus*	3.68E-05	0	0	0	0.000177	0	3.53E-05	0.00018	0	0	0	0.000395	0	7.9E-05
Honeycomb Cowfish	*Lactophrys polygonia*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inshore Lizardfish	*Synodus foetens*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Key Brotula	*Ogilbia cayorum*	3.52E-05	0	0	0	0	0.000211	4.22E-05	0.000172	0	0	0	0	0.000422	9.44E-05
Lane Snapper	*Lutjanus synagris*	6.71E-05	0	0.000402	0	0	0	8.05E-05	0.000329	0	0.0008	0	0	0	0.00018
Leopard Searobin	*Prionutus roseus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lined Seahorse	*Hippocampus erectus*	7.14E-05	0	0.000208	0	0.000177	0	7.69E-05	0.000242	0	0.00042	0	0.000395	0	0.000106
Lined Sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahogany Snapper	*Lutjanus mahogoni*	4.28E-05	0	0.000257	0	0	0	5.13E-05	0.000209	0	0.00051	0	0	0	0.000115
Marbled Blenny	*Paraclinus marmoratus*	0.00011	0	0.000458	8.97E-05	0	0	0.000109	0.000299	0	0.00054	0.00027	0	0	0.000199
Mojarra sp.	*Gerridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mutton Snapper	*Lutjanus analis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange Filefish	*Aluterus schoepfi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parrotfish sp.	Scaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pikeblenny	*Chaenopsis sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.018361	0.070257	0.062477	0.002946	0.004576	0.000214	0.028094	0.042322	0.09816	0.0672	0.00274	0.00968	0.000428	0.035081
Planehead Filefish	*Monacanthus hispidus*	0.000841	0.000541	0.000402	0.00101	0.001161	0.000651	0.000753	0.001035	0.00077	0.0008	0.00088	0.00173	0.000823	0.00032
Porkfish	*Anisotremus virginicus*	3.58E-05	0	0	0	0.000172	0	3.44E-05	0.000176	0	0	0	0.000385	0	7.7E-05
Queen Parrotfish	*Scarus vetula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater Killifish	*Lucania parva*	0.000305	0.002165	0.000257	0.000217	0	0	0.000528	0.00092	0.00306	0.00051	0.00043	0	0	0.000923
Redfin Parrotfish	*Sparisoma rubripinne*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redtail Parrotfish	*Sparisoma chrysopterum*	8.45E-05	0	0	0.00011	0.000208	0	6.36E-05	0.000286	0	0	0.00033	0.000466	0	9.38E-05
Sailors Choice	*Haemulon parrai*	7.86E-05	0.000541	0.000201	0	0	0	0.000149	0.00027	0.00077	0.0004	0	0	0	0.000236
Sand Perch	*Diplectrum formosum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Whiff	*Citharichthys arenaceus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum Pipefish	*Syngnathus pelagicus*	0.000302	0.000541	0.000873	0	0	0.000667	0.000416	0.000678	0.00077	0.00069	0	0	0.001335	0.000398
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoolmaster	*Lutjanus apodus*	3.46E-05	0	0.000208	0	0	0	4.15E-05	0.00017	0	0.00042	0	0	0	9.29E-05

Appendix Table B 9. Cont.

Common Name	Scientific Name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	0.000366	0.000424	0.000238	0.000363	0.000745	0	0.000354	0.000592	0.0006	0.00048	0.00043	0.001026	0	0.000272
Scrawled Filefish	*Aluterus scriptus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sea Bream	*Archosargus rhomboidalis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seahorses unident	*Hippocampus spp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharksucker	*Echeneis naucrates*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrimp eel	*Ophichthus gomesi*	0.000502	0.000541	0.001247	0.000384	0.000327	0.000222	0.000544	0.000845	0.00077	0.00152	0.00077	0.000449	0.000445	0.000409
Silver Jenny	*Eucinostomus gula*	0.01034	0.037541	0.03038	0.004112	0.002741	0.000211	0.014997	0.02209	0.0495	0.03872	0.00348	0.003273	0.000422	0.017551
Silverside	*Atherinidae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slender Filefish	*Monacanthus tuckeri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Puffer	*Sphoeroides nephelus*	4.18E-05	0	0	0	0.000201	0	4.01E-05	0.000205	0	0	0	0.000449	0	8.97E-05
Speckled Stargazer	*Dactyloscopus moorei*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotfin Mojarra	*Eucinostomus argenteus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	3.49E-05	0	0	9.31E-05	0	0	1.86E-05	0.000171	0	0	0.00028	0	0	4.16E-05
Spotted Scorpionfish	*Scorpaena plumieri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Whiff	*Citharichthys macrops*	3.97E-05	0	0.000238	0	0	0	4.77E-05	0.000195	0	0.00048	0	0	0	0.000107
Striped Burrfish	*Chilomycterus schoepfi*	8.79E-05	0.000541	0.000257	0	0	0	0.00016	0.000298	0.00077	0.00051	0	0	0	0.000241
Striped Grunt	*Haemulon striatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0.001484	0.001624	0.001375	0.00124	0.002811	0.000413	0.001492	0.002645	0.0023	0.00112	0.0015	0.005458	0.000477	0.000866
Trunkfish	*Lactophrys trigonus*	0.00021	0	0.000409	0.000379	0	0	0.000158	0.000439	0	0.00047	0.0006	0	0	0.000216
White Grunt	*Haemulon plumieri*	0.000614	0.002707	0.001026	0	0.001042	0	0.000955	0.001671	0.00383	0.00205	0	0.002329	0	0.001107
Whitenose Pipefish	*Cosmocampus albirostris*	3.08E-05	0	0	8.22E-05	0	0	1.64E-05	0.000151	0	0	0.00025	0	0	3.68E-05
Yellowfin Mojarra	*Gerres cinereus*	0.004003	0.022619	0.010812	0.000728	0.000208	0	0.006873	0.011183	0.03079	0.0162	0.00191	0.000466	0	0.00991
Unidentified fish	Unidentified fish	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total fish		0.043945	0.144256	0.129807	0.015162	0.019022	0.003843	0.062418	0.082724	0.19562	0.12773	0.01024	0.026134	0.00125	0.068531

Appendix Table B 9. Cont.

Common Name	Scientific Name	Mean raw	Mean 1s	Mean 2n	Mean 2s	Mean 3n	Mean 3s	Mean zone	Standard deviation raw	Standard deviation 1s	Standard deviation 2n	Standard deviation 2s	Standard deviation 3n	Standard deviation 3s	Standard deviation zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.107915	0.103255	0.20506	0.098096	0.105412	0.038319	0.110029	0.080837	0.12605	0.1172	0.05939	0.034409	0.023632	0.047684
Spotted Pink Shrimp	*Farfantepenaeus braziliensis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caridean Shrimp	*Palaemonetes, etc.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRAB															
Callinectes sapidus	*Callinectes sapidus*	7.29E-05	0	0	0.000194	0	0	3.89E-05	0.000248	0	0	0.00039	0	0	8.69E-05
Callinectes similis	*Callinectes similis*	0.005478	0.002777	0.010436	0.006253	0.004595	0.001229	0.005058	0.005818	0.00087	0.00655	0.00685	0.004286	0.001421	0.003551
Callinectes sp.		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crabs unident		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decorator Crab	*Stenocionops furcata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Pitho Crab	*Pitho aculeata*	3.18E-05	0	0	8.47E-05	0	0	1.69E-05	0.000156	0	0	0.00025	0	0	3.79E-05
Green porcelain crab	*Petrolisthes armatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Crab	*Clibanarius sp.*	0.005219	0.002118	0.006231	0.007538	0.001375	0.005344	0.004521	0.006454	0.003	0.00468	0.00891	0.001703	0.00549	0.002663
Mud crab	*Panopeus herbstii*	0.000109	0	0.000458	8.71E-05	0	0	0.000109	0.000297	0	0.00054	0.00026	0	0	0.000199
Portunus crab	*Portunus* sp.	0.000386	0	0.000495	0.000284	0.000946	0	0.000345	0.00078	0	0.00057	0.0006	0.001373	0	0.000395
Sponge spider crab	*Macrocoeloma subparallelum*	0.000108	0	0.000238	8.47E-05	0.000177	0	9.99E-05	0.000294	0	0.00048	0.00025	0.000395	0	0.000106
Stone Crab	*Menippe Mercenaria*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	3.35E-05	0	0.000201	0	0	0	4.02E-05	0.000164	0	0.0004	0	0	0	9E-05
Spotted spiny lobster	*Panulirus guttatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Starfish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red sea star	*Formia milleporella*	0.000265	0.000541	0.000672	0.000287	0	0	0.0003	0.000491	0.00077	0.00082	0.00043	0	0	0.000307
Ruby Brittlestar	*Ophioderma rubicundum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brittlestar	*Ophioderma sp.*	0.000236	0.000541	0	0.000399	0.000201	0	0.000228	0.000494	0.00077	0	0.00065	0.000449	0	0.000241
Other molluskks	Mollusca (other than cephalopoda	0.000343	0	0.001179	0	0.000545	0.000199	0.000384	0.00074	0	0.00132	0	0.000788	0.000397	0.000497
Nudibranch		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0.000583	0	0	0.000711	0.00118	0.000422	0.000463	0.001311	0	0	0.00134	0.002178	0.000844	0.000501
Squid	Cephalopoda: Decapodiformes	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table B10 February 2004 trawl mean and standard deviation of number per square meter.

Sample size: raw=24, 1s=2, 2n=4, 2s=9, 3n=5, 3s=4, zone=5

		Mean							Standard deviation						
Common Name	Scientific Name	raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Alewife	*Alosa pseudoharengus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bandtail Puffer	*Sphoeroides spengleri*	0.000474	0.000496	0.000722	0.000341	0.000711	0.000216	0.000497	0.000641	0.000702	0.000929	0.000582	0.000734	0.000432	0.000224
Bigeye Mojarra	*Eucinostomus havana*	0.000139	0	0	0.000282	0	0.000199	9.63E-05	0.000318	0	0	0.000423	0	0.000399	0.000135
Blackcheek Tonguefish	*Symphurus plagiusa*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackedge Cusk Eel	*Lepophidium brevibarbe*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackfin Cardinalfish	*Astrapogon puncticulatus*	0.000114	0	0.000254	9.38E-05	0.000174	0	0.000104	0.000309	0	0.000509	0.000281	0.00039	0	0.000111
Blenny?	Blenneilidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blenny	Blenneilidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bluestriped Grunt	*Haemulon sciurus*	0.00024	0	0.000759	0	0.000547	0	0.000261	0.000588	0	0.000973	0	0.00082	0	0.000365
Bluethroat Pikeblenny	*Chaenopsis ocellata*	0.000102	0	0	9.6E-05	0	0.000399	9.89E-05	0.000363	0	0	0.000288	0	0.000797	0.000173
Bridled Cardinalfish	*Apogon aurolineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bucktooth Parrotfish	*Sparisoma radians*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chain Pipefish	*Syngnathus louisianae*	0.000146	0	0.000254	0.00018	0	0.000216	0.00013	0.000336	0	0.000509	0.000359	0	0.000432	0.000122
Clown Goby	*Microbius gulosus*	3.93E-05	0	0.000236	0	0	0	4.72E-05	0.000193	0	0.000472	0	0	0	0.000106
Code Goby	*Gobiosoma robustum*	0.000178	0	0.000251	0.000185	0.000174	0.000187	0.000159	0.000434	0	0.000501	0.000554	0.00039	0.000373	9.4E-05
Colon Goby	*Coryphopterus dicrus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crested Pipefish	*Cosmocampus brachycephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dusky Pipefish	*Syngnathus floridae*	0.001103	0.001882	0.001486	0.000635	0.001602	0.000762	0.001273	0.001117	0.002662	0.001016	0.000567	0.001334	0.001057	0.000546
Dwarf Goatfish	*Upeneus parvus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dwarf Seahorse	*Hippocampus zosterae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emerald Parrotfish	*Nicholsina usta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flagfin Mojarra	*Eucinostomus melanopterus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freckled cardinalfish	*Phaeoptyx conklini*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Angelfish (juvenile)	*Pomacanthus paru*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
French Grunt	*Haemulon flavolineatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringed Filefish	*Hippocampus zosterae*	0.000271	0.000627	0.000472	0.000186	0.000339	0	0.000325	0.000577	0.000887	0.000944	0.00037	0.000758	0	0.000244
Fringed Pipefish	*Microgmathus criniger*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gobionellus sp.	*Gobionellus* sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gold Brotula	*Gunterichthys longipenis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goldspotted Killifish	*Floridichthys carpio*	0.000242	0.001124	0.000501	8.42E-05	0	0.000202	0.000382	0.000527	0.000186	0.001003	0.000253	0	0.000404	0.000456
Grass Porgy	*Calamus arctifrons*	0.000898	0	0.000965	0.001199	0.001221	0.000199	0.000717	0.001326	0	0.001375	0.001837	0.000767	0.000399	0.000576
Gray Snapper	*Lutjanus griseus*	0.001305	0.001124	0.003926	0.000517	0.001592	0.000187	0.001469	0.001845	0.000186	0.002372	0.000665	0.00217	0.000373	0.001477
Great Barracuda	*Sphyraena barracuda*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Flounder	*Paralichthys albigutta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf Pipefish	*Syngnathus scovelli*	0.000965	0.001751	0.000748	0.000816	0.001059	0.001007	0.001076	0.000848	0.001073	0.000499	0.000559	0.001472	0.000776	0.000399
Gulf Toadfish	*Opsanus beta*	0.003565	0.005851	0.013234	0.001171	0.001757	0.000401	0.004483	0.005278	0.002951	0.005026	0.001884	0.00295	0.000463	0.005327
Haemulidae	Haemulidae	0.001152	0.000496	0.002507	0.000647	0.001998	0.000202	0.00117	0.001926	0.000702	0.003121	0.000929	0.002761	0.000404	0.001017

Appendix Table B10 Cont.

Common Name	Scientific Name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Hardhead halfbeak	*Chriodorus atherinoides*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hardhead Silverside	*Atherinomorus stipes*	3.63E-05	0	0	0	0.000174	0	3.49E-05	0.000178	0	0	0	0.00039	0	7.79E-05
High-hat (juvenile)	*Equetus acuminatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hogfish	*Lachnolaimus maximus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honeycomb Cowfish	*Lactophrys polygonia*	3.93E-05	0	0.000236	0	0	0	4.72E-05	0.000193	0	0.000472	0	0	0	0.000106
Inshore Lizardfish	*Synodus foetens*	0.000278	0	0.000236	0.000353	0.000353	0.000199	0.000228	0.000404	0	0.000472	0.000419	0.000484	0.000399	0.000145
Key Brotula	*Ogilbia cayorum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lane Snapper	*Lutjanus synagris*	4.24E-05	0	0.000254	0	0	0	5.09E-05	0.000208	0	0.000509	0	0	0	0.000114
Leopard Searobin	*Prionutus roseus*	0.0001	0	0.000251	0.000156	0	0	8.14E-05	0.000277	0	0.000501	0.000312	0	0	0.000116
Lined Seahorse	*Hippocampus erectus*	0.000599	0.000627	0.000737	0.000257	0.001573	0	0.000639	0.000891	0.000887	0.000934	0.000389	0.001258	0	0.000599
Lined Sole	*Achirus lineatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Longsnout Seahorse	*Hippocampus reidi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mahogany Snapper	*Lutjanus mahogoni*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marbled Blenny	*Paraclinus marmoratus*	0.00032	0.000496	0.000254	0.000274	0.000174	0.000585	0.000357	0.000487	0.000702	0.000509	0.000412	0.00039	0.000759	0.000175
Mojarra sp.	*Gerridae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mutton Snapper	*Lutjanus analis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Orange Filefish	*Aluterus schoepfi*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parrotfish sp.	Scaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pigfish	*Orthopristis chrysoptera*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pikeblenny	*Chaenopsis sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinfish	*Lagodon rhomboidalis*	0.026463	0.051711	0.060254	0.019169	0.019891	0.004676	0.03114	0.024855	0.015598	0.009909	0.02292	0.015535	0.004754	0.02367
Planehead Filefish	*Monacanthus hispidus*	0.000724	0.000496	0.000995	0.000979	0.000716	0	0.000637	0.000975	0.000702	0.001418	0.001119	0.000749	0	0.000412
Porkfish	*Anisotremus virginicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Queen Parrotfish	*Scarus vetula*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainwater Killifish	*Lucania parva*	0.000412	0.00251	0.000995	0	0.000179	0	0.000737	0.001102	0.003549	0.000831	0	0.0004	0	0.001073
Redfin Parrotfish	*Sparisoma rubripinne*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redtail Parrotfish	*Sparisoma chrysopterum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sailors Choice	*Haemulon parrai*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Perch	*Diplectrum formosum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Stargazer	*Dactyloscopus crossotus*	9.95E-05	0	0	9.38E-05	0	0.000386	9.6E-05	0.000269	0	0	0.000281	0	0.000446	0.000167
Sand Whiff	*Citharichthys arenaceus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassum Pipefish	*Syngnathus pelagicus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sargassumfish	*Histrio histrio*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schoolmaster	*Lutjanus apodus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix Table B10 Cont.

Common Name	Scientific Name	Mean							Standard deviation						
		raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
FISH															
Scrawled Cowfish	*Lactophrys quadricornis*	0.000173	0	0.000243	0.000257	0	0.000216	0.000143	0.000425	0	0.000486	0.000569	0	0.000432	0.000132
Scrawled Filefish	*Aluterus scriptus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sea Bream	*Archosargus rhomboidalis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seahorses unident	*Hippocampus spp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharksucker	*Echeneis naucrates*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sharptail Goby	*Gobionellus hastatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheepshead Porgy	*Archosargus probatocephalus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shrimp Eel	*Ophichthus gomesi*	0.000232	0	0.000479	0.000323	0	0.000187	0.000198	0.000422	0	0.000553	0.000506	0	0.000373	0.000208
Silver Jenny	*Eucinostomus gula*	0.014819	0.053389	0.036104	0.003034	0.014002	0.001786	0.021663	0.020139	0.029196	0.022226	0.003717	0.005947	0.002671	0.022449
Silverside	*Atherinidae*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slender Filefish	*Monacanthus tuckeri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southern Puffer	*Sphoeroides nephelus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Stargazer	*Dactyloscopus moorei*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Speckled Worm Eel	*Myrophis punctatus*	3.16E-05	0	0	8.42E-05	0	0	1.68E-05	0.000155	0	0	0.000253	0	0	3.76E-05
Spotfin Mojarra	*Eucinostomus argenteus*	0.000144	0	0	0.000385	0	0	7.71E-05	0.000494	0	0	0.000772	0	0	0.000172
Spottail Goby	*Gobionellus stigmaturus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Dragonet	*Diplogrammus pauciradiatus*	0.000164	0.000627	0.000251	9.24E-05	0.000169	0	0.000228	0.000381	0.000887	0.000501	0.000277	0.000379	0	0.000242
Spotted Scorpionfish	*Scorpaena plumieri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted Whiff	*Citharichthys macrops*	0.000149	0	0.000236	0.000292	0	0	0.000106	0.000425	0	0.000472	0.000616	0	0	0.000146
Striped Burrfish	*Chilomycterus schoepfi*	3.52E-05	0	0	9.38E-05	0	0	1.88E-05	0.000172	0	0	0.000281	0	0	4.2E-05
Striped Grunt	*Haemulon striatum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tomtate	*Haemulon aurolineatum*	0.001192	0.003998	0.001714	0.000568	0.00107	0.00082	0.001634	0.001229	0.001444	0.000467	0.000952	0.000752	0.000707	0.001388
Trunkfish	*Lactophrys trigonus*	3.93E-05	0	0.000236	0	0	0	4.72E-05	0.000193	0	0.000472	0	0	0	0.000106
White Grunt	*Haemulon plumieri*	4.24E-05	0	0.000254	0	0	0	5.09E-05	0.000208	0	0.000509	0	0	0	0.000114
Whitenose Pipefish	*Cosmocampus albirostris*	0.000101	0	0	0	0.000174	0.000389	0.000113	0.000274	0	0	0	0.00039	0.000449	0.000172
Yellowfin Mojarra	*Gerres cinereus*	0.00058	0.000992	0.000251	0.000929	0.000353	0.000202	0.000545	0.00158	0.001403	0.000501	0.002514	0.000484	0.000404	0.000384
Total fish		0.058001	0.128198	0.130297	0.03386	0.051041	0.013622	0.071404	0.049785	0.049394	0.032572	0.025539	0.022098	0.005339	0.054445

Appendix Table B10 Cont.

		Mean							Standard deviation						
Common Name	Scientific Name	raw	1s	2n	2s	3n	3s	zone	raw	1s	2n	2s	3n	3s	zone
SHRIMP															
Pink Shrimp	*Farfantepenaeus duorarum*	0.120862	0.217701	0.210914	0.121772	0.056603	0.060668	0.133531	0.082511	0.03284	0.063976	0.050257	0.095341	0.010402	0.078163
Spotted pink shrimp	*Farfantepenaeus brasiliensis*	0.000639	0	0.001003	0	0.002266	0	0.000654	0.002419	0	0.002006	0	0.005066	0	0.001
Caridean Shrimp	*Palaemonetes, etc.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRAB															
Callinectes sapidus	*Callinectes sapidus*	0.006445	0.008726	0.006303	0.007932	0.005892	0.002795	0.006329	0.004591	0.001693	0.003593	0.004308	0.007187	0.000982	0.002291
Callinectes similis	*Callinectes similis*	0.000283	0.000496	0.000479	0.000349	0	0.000187	0.000302	0.000593	0.000702	0.000553	0.000833	0	0.000373	0.00021
Callinectes sp.	*Callinectus* sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crabs unident		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Decorator Crab	*Stenocionops furcata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Pitho Crab	*Pitho aculeata*	3.76E-05	0	0	0.0001	0	0	2.01E-05	0.000184	0	0	0.000301	0	0	4.49E-05
Green porcelain crab	*Petrolisthes armatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hermit Crab	*Clibanarius* sp.	0.001245	0.001124	0.001471	0.001211	0.001221	0.00119	0.001243	0.000565	0.000186	0.000552	0.00064	0.000767	0.000412	0.000133
Mud Crab	*Panopeus herbstii*	7.16E-05	0	0	9.41E-05	0.000174	0	5.37E-05	0.000243	0	0	0.000282	0.00039	0	7.88E-05
Portunus Crab	*Portunus* sp.	0.001364	0.001124	0.000254	0.002533	0.000519	0.001021	0.00109	0.002004	0.000186	0.000509	0.002842	0.000778	0.001013	0.000882
Sponge Spider Crab	*Macrocoeloma subparallelum*	0.000101	0	0.000254	0.000156	0	0	8.22E-05	0.000279	0	0.000509	0.000312	0	0	0.000118
Stone Crab	*Menippe mercenaria*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER INVERTEBRATES															
Caribbean spiny lobster	*Panulirus argus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotted spiny lobster	*Panulirus gutattus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Starfish		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Sea Star	*Formia milleporella*	0.001603	0.002116	0.005931	0.00117	0	0	0.001843	0.002557	0.001218	0.003904	0.000604	0	0	0.002451
Ruby Brittle Star	*Ophioderma rubicundum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brittlestar	*Ophioderma sp.*	0.000173	0	0	0.00019	0.000179	0.000386	0.000151	0.000345	0	0	0.000377	0.0004	0.000446	0.000161
Other molluskks	Mollusca (other than cephalopoda)	0.000861	0.001255	0.000745	0.000544	0.001894	0.000199	0.000927	0.001264	0.001775	0.000958	0.000922	0.00195	0.000399	0.000662
Nudibranch		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Octopus	Cephalopoda: Octopodiformes	0.002299	0	0	0.003346	0	0.006264	0.001922	0.003346	0	0	0.003789	0	0.001983	0.002827
Squid	Cephalopoda: Decapodiformes	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix C

Pull-net collection dates and sample sizes

Collection	Date	Number of samples 1S	2N	2S	3N	Total
1	2003 July14,15	11	5	1	4	21
2	2003 August14,15,18	9	4	0	6	19
3	2003 September 9, 10	10	4	0	6	20
4	2003 October 8, 9	8	3	1	5	17
5	2003 November 12, 13	10	2	1	8	21
6	2004 January 8, 12	10	4	1	6	21
7	2004 February 11, 12	13	5	1	5	24
8	2004 March 8, 9	12	4	1	5	22
9	2004 April 5, 8	10	6	1	4	21
10	2004 May 4	8	0	0	0	8
11	2004 June 2, 3	9	4	0	5	18
12	2004 June 21	13	0	0	0	13
13	2004 July 26, 27	9	3	0	2	14
14	2004 August 30, 31	10	2	2	6	20
15	2004 October 4, 5	11	5	1	5	22

Appendix Table C 1a. 2003 July 14,15 pull-net mean and standard deviation of number per square meter. Sample size: raw=21, 1S=11, 2N=5, 2S=1, 3N=4, zones=4

		Mean						Standard deviation					
Common name	**Scientific name**	raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Clown Goby	*Microbius gulosus*	0.00952	0.01515	0	0	0.00833	0.00587	0.01869	0.02292	0		0.01667	0.00733
Code Goby	*Gobiosoma robustum*	0.00635	0.00606	0	0	0.01667	0.00568	0.01706	0.01348	0		0.03333	0.00786
Dusky Pipefish	*Syngnathus floridae*	0.00952	0.01212	0.01333	0	0	0.00636	0.0239	0.03081	0.01826		0	0.00736
Dwarf Seahorse	*Hippocampus zosterae*	0.00159	0	0	0	0.00833	0.00208	0.00727	0	0		0.01667	0.00417
Flagfin Mojarra	*Eucinostomus melanopterus*	0.00476	0.00606	0	0	0.00833	0.0036	0.01594	0.0201	0		0.01667	0.00426
Flat Needlefish	*Ablennes hians*	0.00159	0	0	0	0.00833	0.00208	0.00727	0	0		0.01667	0.00417
Fringed Pipefish	*Micrognathus criniger*	0.00159	0	0	0.03333	0	0.00833	0.00727	0	0		0	0.01667
Goldspotted Killifish	*Floridichthys carpio*	0.02381	0.00606	0	0	0.10833	0.0286	0.07082	0.0201	0		0.1424	0.05323
Great Barracuda	*Sphyraena barracuda*	0.00159	0.00303	0	0	0	0.00076	0.00727	0.01005	0		0	0.00152
Gulf Toadfish	*Opsanus beta*	0.0254	0.00303	0.04667	0.13333	0.03333	0.05409	0.0446	0.01005	0.03801		0.06667	0.05589
Hardhead silverside	*Atherinomorus stipes*	0.00476	0.00606	0	0	0.00833	0.0036	0.01594	0.0201	0		0.01667	0.00426
Pinfish	*Lagodon rhomboidalis*	0.12698	0.1303	0.14	0.03333	0.125	0.10716	0.1555	0.17414	0.18318		0.11013	0.04961
Rainwater Killifish	*Lucania parva*	0.75873	0.65152	0.54	0.53333	1.38333	0.77705	0.85556	0.66204	0.55045		1.5349	0.40781
Sargassum Pipefish	*Syngnathus pelagicus*	0.01587	0.00303	0.01333	0	0.05833	0.01867	0.0403	0.01005	0.02981		0.07876	0.02705
Silver Jenny	*Eucinostomus gula*	0.01429	0.02727	0	0	0	0.00682	0.03261	0.04168	0		0	0.01364
Tomtate	*Haemulon aurolineatum*	0.00159	0.00303	0	0	0	0.00076	0.00727	0.01005	0		0	0.00152
Yellowfin Mojarra	*Gerres cinereus*	0.02063	0.02424	0.02	0	0.01667	0.01523	0.06099	0.0804	0.04472		0.01925	0.01061
Total fish		1.02857	0.89697	0.77333	0.73333	1.78333	1.04674	0.9768	0.75945	0.70608		1.67719	0.49598
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.13492	0.07879	0.08667	0.1	0.35833	0.15595	0.1815	0.07035	0.1145		0.32131	0.13521
Spotted pink shrimp	*Farfantepenaeus brasiliensis*	0.00159	0	0	0	0.00833	0.00208	0.00727	0	0		0.01667	0.00417
Total shrimp		0.13651	0.07879	0.08667	0.1	0.36667	0.15803	0.18586	0.07035	0.1145		0.32998	0.13937
CRAB													
Blue crab	*Callinectes sapidus*	0.00159	0	0	0	0.00833	0.00208	0.00727	0	0		0.01667	0.00417
Lesser blue crab	*Callinectes similis*	0.00159	0	0	0.03333	0	0.00833	0.00727	0	0		0	0.01667
Hermit crab	*Clibanarius sp.*	0.06667	0.03939	0.16667	0.1	0.00833	0.0786	0.17701	0.07121	0.35434		0.01667	0.06997
Total crabs		0.06984	0.03939	0.16667	0.13333	0.01667	0.08902	0.17698	0.07121	0.35434		0.01925	0.07232
OTHER INVERTEBRATES													
Red Sea Star	*Formia milleporella*	0.00317	0	0	0.06667	0	0.01667	0.01455	0	0		0	0.03333
Grand total, all taxa		1.2381	1.01515	1.02667	1.03333	2.16667	1.31045	1.14256	0.84501	0.74229	#DIV/0!	1.99509	0.57109

Appendix Table C 1b. 2003 July 14,15 pull-net mean and standard deviation of number per square meter.

Sample size: raw=21, S=12, N=9, S&N=2

		Mean				Standard deviation			
Common Name	**Scientific Name**	raw	s	n	s%n	raw	s	n	s&n
FISH									
Clown Goby	*Microbius gulosus*	0.00952	0.01389	0.0037	0.0088	0.01869	0.02229	0.01111	0.0079
Code Goby	*Gobiosoma robustum*	0.00635	0.00556	0.00741	0.00648	0.01706	0.01297	0.02222	0.00654
Dusky Pipefish	*Syngnathus floridae*	0.00952	0.01111	0.00741	0.00926	0.0239	0.02959	0.0147	0.01053
Dwarf Seahorse	*Hippocampus zosterae*	0.00159	0	0.0037	0.00185	0.00727	0	0.01111	0.00786
Flagfin Mojarra	*Eucinostomus melanopterus*	0.00476	0.00556	0.0037	0.00463	0.01594	0.01925	0.01111	0.00575
Flat Needlefish	*Ablennes hians*	0.00159	0	0.0037	0.00185	0.00727	0	0.01111	0.00786
Fringed Pipefish	*Micrognathus criniger*	0.00159	0.00278	0	0.00139	0.00727	0.00962	0	0.0068
Goldspotted Killifish	*Floridichthys carpio*	0.02381	0.00556	0.04815	0.02685	0.07082	0.01925	0.10423	0.06009
Great Barracuda	*Sphyraena barracuda*	0.00159	0.00278	0	0.00139	0.00727	0.00962	0	0.0068
Gulf Toadfish	*Opsanus beta*	0.0254	0.01389	0.04074	0.02731	0.0446	0.03882	0.04938	0.00747
Hardhead silverside	*Atherinomorus stipes*	0.00476	0.00556	0.0037	0.00463	0.01594	0.01925	0.01111	0.00575
Pinfish	*Lagodon rhomboidalis*	0.12698	0.12222	0.13333	0.12778	0.1555	0.16838	0.14625	0.01565
Rainwater Killifish	*Lucania parva*	0.75873	0.64167	0.91481	0.77824	0.85556	0.63216	1.11019	0.33802
Sargassum Pipefish	*Syngnathus pelagicus*	0.01587	0.00278	0.03333	0.01806	0.0403	0.00962	0.05774	0.03402
Silver Jenny	*Eucinostomus gula*	0.01429	0.025	0	0.0125	0.03261	0.04051	0	0.02865
Tomtate	*Haemulon aurolineatum*	0.00159	0.00278	0	0.00139	0.00727	0.00962	0	0.0068
Yellowfin Mojarra	*Gerres cinereus*	0.02063	0.02222	0.01852	0.02037	0.06099	0.07698	0.03379	0.03054
Total fish		1.02857	0.88333	1.22222	1.05278	0.9768	0.72565	1.25996	0.37782
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.13492	0.08056	0.20741	0.14398	0.1815	0.06736	0.25646	0.13372
Spotted pink shrimp	*Farfantepenaeus brasiliensis*	0.00159	0	0.0037	0.00185	0.00727	0	0.01111	0.00786
Total shrimp		0.13651	0.08056	0.21111	0.14583	0.18586	0.06736	0.263	0.13834
CRAB									
Blue crab	*Callinectes sapidus*	0.00159	0	0.0037	0.00185	0.00727	0	0.01111	0.00786
Lesser blue crab	*Callinectes similis*	0.00159	0.00278	0	0.00139	0.00727	0.00962	0	0.0068
Hermit crab	*Clibanarius sp.*	0.06667	0.04444	0.0963	0.07037	0.17701	0.07011	0.26428	0.1373
Total crabs		0.06984	0.04722	0.1	0.07361	0.17698	0.07311	0.263	0.13427
OTHER INVERTEBRATES									
Red Sea Star	*Formia milleporella*	0.00317	0.00556	0	0.00278	0.01455	0.01925	0	0.01361
Grand total, all taxa		1.2381	1.01667	1.53333	1.275	1.14256	0.80597	1.46392	0.46524

Appendix Table C 2a. 2003 August 14,15,18 pull-net mean and standard deviation of number per square. meter. Sample size: raw=19, 1S=9, 2N=4, 2S=0, 3N=6, zones=3

		Mean						Standard deviation					
Common name	**Scientific name**	raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Clown Goby	*Microbius gulosus*	0.0123	0.0259	0.0000		0.0000	0.0086	0.0228	0.0278	0.0000		0.0000	0.0150
Code Goby	*Gobiosoma robustum*	0.0070	0.0074	0.0000		0.0111	0.0062	0.0178	0.0222	0.0000		0.0172	0.0057
Dusky Pipefish	*Syngnathus floridae*	0.0088	0.0185	0.0000		0.0000	0.0062	0.0187	0.0242	0.0000		0.0000	0.0107
Fringed Pipefish	*Microgнathus criniger*	0.0070	0.0000	0.0167		0.0111	0.0093	0.0178	0.0000	0.0333		0.0172	0.0085
Goldspotted Killifish	*Floridichthys carpio*	0.0175	0.0185	0.0083		0.0222	0.0164	0.0321	0.0176	0.0167		0.0544	0.0072
Great Barracuda	*Sphyraena barracuda*	0.0018	0.0000	0.0083		0.0000	0.0028	0.0076	0.0000	0.0167		0.0000	0.0048
Gulf toadfish	*Opsanus beta*	0.0123	0.0074	0.0167		0.0167	0.0136	0.0228	0.0222	0.0192		0.0279	0.0053
Hardhead Silverside	*Atherinomorus stipes*	0.0035	0.0000	0.0000		0.0111	0.0037	0.0105	0.0000	0.0000		0.0172	0.0064
Pinfish	*Lagodon rhomboidalis*	0.1246	0.1852	0.0750		0.0667	0.1090	0.1710	0.2224	0.0957		0.0894	0.0662
Rainwater Killifish	*Lucania parva*	0.8912	0.7148	0.4167		1.4722	0.8679	1.4703	0.3198	0.4393		2.6195	0.5442
Sargassum Pipefish	*Syngnathus pelagicus*	0.0070	0.0111	0.0000		0.0056	0.0056	0.0238	0.0333	0.0000		0.0136	0.0056
Silver Jenny	*Eucinostomus gula*	0.0333	0.0333	0.0667		0.0111	0.0370	0.0369	0.0333	0.0471		0.0172	0.0280
Yellowfin Mojarra	*Gerres cinereus*	0.0053	0.0000	0.0250		0.0000	0.0083	0.0229	0.0000	0.0500		0.0000	0.0144
Total fish		1.1316	1.0222	0.6333		1.6278	1.0944	1.4553	0.2853	0.4922		2.6141	0.5011
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.5965	0.6333	0.4917		0.6111	0.5787	0.5333	0.5998	0.4533		0.5600	0.0762
CRAB													
Mud crab	*Panopeus herbstii*	0.0088	0.0037	0.0250		0.0056	0.0114	0.0244	0.0111	0.0500		0.0136	0.0118
Hermit crab	*Clibanarius sp.*	0.0579	0.0037	0.1500		0.0778	0.0772	0.1502	0.0111	0.3000		0.1205	0.0732
Total crabs		0.0667	0.0074	0.1750		0.0833	0.0886	0.1728	0.0147	0.3500		0.1329	0.0839
Grand total with shrimp		1.7947	1.6630	1.3000		2.3222	1.7617	1.9740	0.8891	1.0572		3.1350	0.5467

Appendix Table C 2b. 2003 August 14,15,18 pull-net mean and standard deviation of number per square meter.
Sample size: raw=19, S=9, N=10, S&N=2

		Mean				Standard deviation			
Common Name	**Scientific Name**	raw	s	n	s%n	raw	s	n	s&n
FISH									
Clown Goby	*Microbius gulosus*	0.0123	0.0259	0.0000	0.0130	0.0228	0.0278	0.0000	0.0183
Code Goby	*Gobiosoma robustum*	0.0070	0.0074	0.0067	0.0070	0.0178	0.0222	0.0141	0.0005
Dusky Pipefish	*Syngnathus floridae*	0.0088	0.0185	0.0000	0.0093	0.0187	0.0242	0.0000	0.0131
Fringed Pipefish	*Micrognathus criniger*	0.0070	0.0000	0.0133	0.0067	0.0178	0.0000	0.0233	0.0094
Goldspotted Killifish	*Floridichthys carpio*	0.0175	0.0185	0.0167	0.0176	0.0321	0.0176	0.0423	0.0013
Great Barracuda	*Sphyraena barracuda*	0.0018	0.0000	0.0033	0.0017	0.0076	0.0000	0.0105	0.0024
Gulf toadfish	*Opsanus beta*	0.0123	0.0074	0.0167	0.0120	0.0228	0.0222	0.0236	0.0065
Hardhead Silverside	*Atherinomorus stipes*	0.0035	0.0000	0.0067	0.0033	0.0105	0.0000	0.0141	0.0047
Pinfish	*Lagodon rhomboidalis*	0.1246	0.1852	0.0700	0.1276	0.1710	0.2224	0.0867	0.0814
Rainwater Killifish	*Lucania parva*	0.8912	0.7148	1.0500	0.8824	1.4703	0.3198	2.0429	0.2370
Sargassum Pipefish	*Syngnathus pelagicus*	0.0070	0.0111	0.0033	0.0072	0.0238	0.0333	0.0105	0.0055
Silver Jenny	*Eucinostomus gula*	0.0333	0.0333	0.0333	0.0333	0.0369	0.0333	0.0416	0.0000
Yellowfin Mojarra	*Gerres cinereus*	0.0053	0.0000	0.0100	0.0050	0.0229	0.0000	0.0316	0.0071
Total fish		1.1316	1.0222	1.2300	1.1261	1.4553	0.2853	2.0349	0.1469
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.5965	0.6333	0.5633	0.5983	0.5333	0.5998	0.4965	0.0495
CRAB									
Mud crab	*Panopeus herbstii*	0.00877	0.0037	0.01333	0.00852	0.02445	0.01111	0.0322	0.00681
Hermit crab	*Clibanarius sp.*	0.05789	0.0037	0.10667	0.05519	0.15024	0.01111	0.19864	0.07281
Total crabs		0.06667	0.00741	0.12	0.0637	0.17285	0.0147	0.22998	0.07961
Grand total with shrimp		1.79474	1.66296	1.91333	1.78815	1.97398	0.88914	2.50214	0.27603

Appendix Table C 3a. 2003 Sept 9, 10 pull-net mean and standard deviation of number per square meter. Sample size: raw=20, 1S=10, 2N=4, 2S=0, 3N=6, zones=3

		Mean						Standard deviation					
Common name	Scientific name	raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Chain Pipefish	*Syngnathus louisianae*	0.0017	0.0033	0.0000		0.0000	0.0011	0.0075	0.0105	0.0000		0.0000	0.0019
Code Goby	*Gobiosoma robustum*	0.0050	0.0067	0.0000		0.0056	0.0041	0.0122	0.0141	0.0000		0.0136	0.0036
Dusky Pipefish	*Syngnathus floridae*	0.0100	0.0100	0.0083		0.0111	0.0098	0.0190	0.0225	0.0167		0.0172	0.0014
Goldspotted Killifish	*Floridichthys carpio*	0.0067	0.0133	0.0000		0.0000	0.0044	0.0174	0.0233	0.0000		0.0000	0.0077
Graysnapper	*Lutjanus griseus*	0.0017	0.0033	0.0000		0.0000	0.0011	0.0075	0.0105	0.0000		0.0000	0.0019
Great Barracuda	*Sphyraena barracuda*	0.0033	0.0033	0.0000		0.0056	0.0030	0.0103	0.0105	0.0000		0.0136	0.0028
Gulf toadfish	*Opsanus beta*	0.0017	0.0000	0.0000		0.0056	0.0019	0.0075	0.0000	0.0000		0.0136	0.0032
Hardhead Silverside	*Atherinomorus stipes*	0.0033	0.0067	0.0000		0.0000	0.0022	0.0149	0.0211	0.0000		0.0000	0.0038
Pinfish	*Lagodon rhomboidales*	0.0750	0.0867	0.0500		0.0722	0.0696	0.0973	0.1239	0.0430		0.0800	0.0185
Rainwater Killifish	*Lucania parva*	0.6600	0.4367	0.3500		1.2389	0.6752	0.8048	0.4857	0.1644		1.2006	0.4901
Sargassum Pipefish	*Syngnathus pelagicus*	0.0100	0.0133	0.0000		0.0111	0.0081	0.0219	0.0233	0.0000		0.0272	0.0071
Silver Jenny	*Eucinostomus gula*	0.0483	0.0433	0.0583		0.0500	0.0506	0.0524	0.0610	0.0500		0.0459	0.0075
Tomtate	*Haemulon aurolineatum*	0.0017	0.0000	0.0000		0.0056	0.0019	0.0075	0.0000	0.0000		0.0136	0.0032
Yellowfin Mojarra	*Gerres cinereus*	0.0117	0.0033	0.0417		0.0056	0.0169	0.0379	0.0105	0.0833		0.0136	0.0215
Total fish		0.8400	0.6300	0.5083		1.4111	0.8498	0.8073	0.5673	0.2299		1.1393	0.4899
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.4633	0.5333	0.1917		0.5278	0.4176	0.3219	0.2726	0.1833		0.4074	0.1957
CRAB													
Lesser Blue Crab	*Callinectes similis*	0.0017	0.0033	0.0000		0.0000	0.0011	0.0075	0.0105	0.0000		0.0000	0.0019
Mud Crab	*Panopeus herbstii*	0.0017	0.0033	0.0000		0.0000	0.0011	0.0075	0.0105	0.0000		0.0000	0.0019
Hermit crab	*Clibanarius sp.*	0.0033	0.0000	0.0000		0.0111	0.0037	0.0149	0.0000	0.0000		0.0272	0.0064
Total crabs		0.0067	0.0067	0.0000		0.0111	0.0059	0.0174	0.0141	0.0000		0.0272	0.0056
Grand total with shrimp		1.3100	1.1700	0.7000		1.9500	1.2733	1.1391	0.8399	0.4133		1.5689	0.6904

Appendix Table C 3b. 2003 Sept 9, 10 pull-net mean and standard deviation of number per square meter.

Sample size: raw=20, S=10, N=10, S&N=2

		Mean				Standard deviation			
Common Name	**Scientific Name**	raw	s	n	s%n	raw	s	n	s&n
FISH									
Chain Pipefish	*Syngnathus louisianae*	0.0017	0.0033	0.0000	0.0017	0.0075	0.0105	0.0000	0.0024
Code Goby	*Gobiosoma robustum*	0.0050	0.0067	0.0033	0.0050	0.0122	0.0141	0.0105	0.0024
Dusky Pipefish	*Syngnathus floridae*	0.0100	0.0100	0.0100	0.0100	0.0190	0.0225	0.0161	0.0000
Goldspotted Killifish	*Floridichthys carpio*	0.0067	0.0133	0.0000	0.0067	0.0174	0.0233	0.0000	0.0094
Graysnapper	*Lutjanus griseus*	0.0017	0.0033	0.0000	0.0017	0.0075	0.0105	0.0000	0.0024
Great Barracuda	*Sphyraena barracuda*	0.0033	0.0033	0.0033	0.0033	0.0103	0.0105	0.0105	0.0000
Gulf toadfish	*Opsanus beta*	0.0017	0.0000	0.0033	0.0017	0.0075	0.0000	0.0105	0.0024
Hardhead Silverside	*Atherinomorus stipes*	0.0033	0.0067	0.0000	0.0033	0.0149	0.0211	0.0000	0.0047
Pinfish	*Lagodon rhomboidales*	0.0750	0.0867	0.0633	0.0750	0.0973	0.1239	0.0656	0.0165
Rainwater Killifish	*Lucania parva*	0.6600	0.4367	0.8833	0.6600	0.8048	0.4857	1.0102	0.3158
Sargassum Pipefish	*Syngnathus pelagicus*	0.0100	0.0133	0.0067	0.0100	0.0219	0.0233	0.0211	0.0047
Silver Jenny	*Eucinostomus gula*	0.0483	0.0433	0.0533	0.0483	0.0524	0.0610	0.0450	0.0071
Tomtate	*Haemulon aurolineatum*	0.0017	0.0000	0.0033	0.0017	0.0075	0.0000	0.0105	0.0024
Yellowfin Mojarra	*Gerres cinereus*	0.0117	0.0033	0.0200	0.0117	0.0379	0.0105	0.0526	0.0118
Total fish		0.8400	0.6300	1.0500	0.8400	0.8073	0.5673	0.9778	0.2970
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.4633	0.5333	0.3933	0.4633	0.3219	0.2726	0.3654	0.0990
CRAB									
Lesser Blue Crab	*Callinectes similis*	0.0017	0.0033	0.0000	0.0017	0.0075	0.0105	0.0000	0.0024
Mud Crab	*Panopeus herbstii*	0.0017	0.0033	0.0000	0.0017	0.0075	0.0105	0.0000	0.0024
Hermit crab	*Clibanarius sp.*	0.0033	0.0000	0.0067	0.0033	0.0149	0.0000	0.0211	0.0047
Total crabs		0.0067	0.0067	0.0067	0.0067	0.0174	0.0141	0.0211	0.0000
Grand total with shrimp		1.3100	1.1700	1.4500	1.3100	1.1391	0.8399	1.3604	0.3960

Appendix Table C 4a. 2003 October 8, 9 pull-net mean and standard deviation of number per square meter. Sample size: raw=17, 1S=8, 2N=3, 2S=1, 3N=5, zones=4

		Mean						Standard deviation					
Common name	Scientific name	raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Dusky Pipefish	*Syngnathus floridae*	0.0098	0.0125	0.0000	0.0000	0.0133	0.0065	0.0229	0.0248	0.0000		0.0298	0.0075
Goldspotted Killifish	*Floridichthys carpio*	0.0451	0.0000	0.0111	0.0000	0.1467	0.0394	0.1073	0.0000	0.0192		0.1660	0.0717
Hardhead silverside	*Atherinomorus stipes*	0.0373	0.0000	0.0000	0.0667	0.1133	0.0450	0.1290	0.0000	0.0000		0.2352	0.0553
Pinfish	*Lagodon rhomboidalis*	0.0745	0.0917	0.1333	0.0667	0.0133	0.0763	0.0961	0.1109	0.1155		0.0298	0.0502
Rainwater Killifish	*Lucania parva*	0.3863	0.0958	0.3667	0.0333	0.9333	0.3573	0.9714	0.0765	0.2728		1.7756	0.4104
Sand Stargazer	*Dactyloscopus crossotus*	0.0020	0.0042	0.0000	0.0000	0.0000	0.0010	0.0081	0.0118	0.0000		0.0000	0.0021
Sargassum Pipefish	*Syngnathus pelagicus*	0.0020	0.0000	0.0000	0.0000	0.0067	0.0017	0.0081	0.0000	0.0000		0.0149	0.0033
Schoolmaster	*Lutjanus apodus*	0.0020	0.0000	0.0000	0.0000	0.0067	0.0017	0.0081	0.0000	0.0000		0.0149	0.0033
Silver Jenny	*Eucinostomus gula*	0.0706	0.0542	0.1111	0.0000	0.0867	0.0630	0.1092	0.0589	0.1644		0.1574	0.0480
Tomtate	*Haemulon aurolineatum*	0.0020	0.0000	0.0000	0.0000	0.0067	0.0017	0.0081	0.0000	0.0000		0.0149	0.0033
Yellowfin Mojarra	*Gerres cinereus*	0.0431	0.0083	0.1778	0.0667	0.0133	0.0665	0.0888	0.0236	0.1575		0.0298	0.0787
Total fish		0.6745	0.2667	0.8000	0.2333	1.3400	0.6600	1.0682	0.1834	0.5044		1.8524	0.5224
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.1667	0.0958	0.1111	0.1333	0.3200	0.1651	0.1443	0.0881	0.0962		0.1520	0.1044
CRAB													
Lesser Blue Crab	*Callinectes similis*	0.0059	0.0042	0.0000	0.0000	0.0133	0.0044	0.0176	0.0118	0.0000		0.0298	0.0063
Hermit crab	*Clibanarius sp.*	0.0078	0.0083	0.0000	0.0000	0.0133	0.0054	0.0221	0.0236	0.0000		0.0298	0.0066
Total crabs		0.0137	0.0125	0.0000	0.0000	0.0267	0.0098	0.0355	0.0248	0.0000		0.0596	0.0127
Grand total with shrimp		0.8549	0.3750	0.9111	0.3667	1.6867	0.8349	1.2098	0.2617	0.6006		1.9932	0.6354

Appendix Table C 4b. 2003 October 8, 9 pull-net mean and standard deviation of number per square meter.
Sample size: raw=17, S=9, N=8, S&N=2

		Mean				Standard deviation			
Common Name	**Scientific Name**	raw	s	n	s%n	raw	s	n	s&n
FISH									
Dusky Pipefish	*Syngnathus floridae*	0.0098	0.0111	0.0083	0.0097	0.0229	0.0236	0.0236	0.0020
Goldspotted Killifish	*Floridichthys carpio*	0.0451	0.0000	0.0958	0.0479	0.1073	0.0000	0.1441	0.0678
Hardhead silverside	*Atherinomorus stipes*	0.0373	0.0074	0.0708	0.0391	0.1290	0.0222	0.1872	0.0448
Pinfish	*Lagodon rhomboidalis*	0.0745	0.0889	0.0583	0.0736	0.0961	0.1041	0.0904	0.0216
Rainwater Killifish	*Lucania parva*	0.3863	0.0889	0.7208	0.4049	0.9714	0.0745	1.3816	0.4469
Sand Stargazer	*Dactyloscopus crossotus*	0.0020	0.0037	0.0000	0.0019	0.0081	0.0111	0.0000	0.0026
Sargassum Pipefish	*Syngnathus pelagicus*	0.0020	0.0000	0.0042	0.0021	0.0081	0.0000	0.0118	0.0029
Schoolmaster	*Lutjanus apodus*	0.0020	0.0000	0.0042	0.0021	0.0081	0.0000	0.0118	0.0029
Silver Jenny	*Eucinostomus gula*	0.0706	0.0481	0.0958	0.0720	0.1092	0.0580	0.1485	0.0337
Tomtate	*Haemulon aurolineatum*	0.0020	0.0000	0.0042	0.0021	0.0081	0.0000	0.0118	0.0029
Yellowfin Mojarra	*Gerres cinereus*	0.0431	0.0148	0.0750	0.0449	0.0888	0.0294	0.1218	0.0426
Total fish		0.6745	0.2630	1.1375	0.7002	1.0682	0.1720	1.4531	0.6184
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.1667	0.1000	0.2417	0.1708	0.1443	0.0833	0.1660	0.1002
CRAB									
Lesser Blue Crab	*Callinectes similis*	0.0059	0.0037	0.0083	0.0060	0.0176	0.0111	0.0236	0.0033
Hermit crab	*Clibanarius sp.*	0.0078	0.0074	0.0083	0.0079	0.0221	0.0222	0.0236	0.0007
Total crabs		0.0137	0.0111	0.0167	0.0139	0.0355	0.0236	0.0471	0.0039
Grand total with shrimp		0.8549	0.3741	1.3958	0.8850	1.2098	0.2464	1.6137	0.7225

Appendix Table C 5a. 2003 November 12, 13 pull-net mean and standard deviation of number per square meter. Sample size: raw=21, 1s=10, 2n=2, 2s=1, 3n=8, zones=4

Common name	Scientific name	Mean						Standard deviation					
		raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Bluestriped Grunt		0.0032	0.0000	0.0333	0.0000	0.0000	0.0083	0.0145	0.0000	0.0471		0.0000	0.0167
Clown Goby	*Microbius gulosus*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Code Goby	*Gobiosoma robustum*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Dusky Pipefish	*Syngnathus floridae*	0.0270	0.0167	0.0333	0.0333	0.0375	0.0302	0.0309	0.0283	0.0471		0.0330	0.0092
Goldspotted Killifish	*Floridichthys carpio*	0.0032	0.0033	0.0000	0.0000	0.0042	0.0019	0.0100	0.0105	0.0000		0.0118	0.0022
Great Barracuda	*Sphyraena barracuda*	0.0016	0.0000	0.0000	0.0000	0.0042	0.0010	0.0073	0.0000	0.0000		0.0118	0.0021
Gulf toadfish	*Opsanus beta*	0.0048	0.0000	0.0000	0.0000	0.0125	0.0031	0.0159	0.0000	0.0000		0.0248	0.0063
Hardhead Silverside	*Atherinomorus stipes*	0.0032	0.0000	0.0000	0.0000	0.0083	0.0021	0.0100	0.0000	0.0000		0.0154	0.0042
Pinfish	*Lagodon rhomboidalis*	0.0651	0.0200	0.2167	0.0667	0.0833	0.0967	0.0771	0.0358	0.0707		0.0690	0.0844
Rainwater Killifish	*Lucania parva*	0.5381	0.0467	0.4833	0.3667	1.1875	0.5210	1.1389	0.0820	0.5893		1.6781	0.4811
Redfin Needlefish	*Strongylura notata*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Sargassum Pipefish	*Syngnathus pelagicus*	0.0127	0.0233	0.0000	0.0000	0.0042	0.0069	0.0387	0.0545	0.0000		0.0118	0.0111
Silver jenny	*Eucinostomus gula*	0.2968	0.3200	0.1833	0.0333	0.3292	0.2165	0.3075	0.2394	0.0707		0.4244	0.1391
Tomtate	*Haemulon aurolineatum*	0.0016	0.0000	0.0000	0.0000	0.0042	0.0010	0.0073	0.0000	0.0000		0.0118	0.0021
Yellowfin mojarra	*Gerres cinereus*	0.0429	0.0067	0.0833	0.0000	0.0833	0.0433	0.0659	0.0141	0.0707		0.0836	0.0463
Total fish		1.0048	0.4467	1.0333	0.5000	1.7583	0.9346	1.4371	0.2635	0.6600		2.1492	0.6097
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.3254	0.0667	0.2167	0.2333	0.6875	0.3010	0.4706	0.1548	0.1179		0.5915	0.2683
CRAB													
Blue Crab	*Callinectes sapidus*	0.0016	0.0000	0.0000	0.0333	0.0000	0.0083	0.0073	0.0000	0.0000		0.0000	0.0167
Hermit crab	*Clibanarius sp.*	0.0063	0.0067	0.0000	0.0000	0.0083	0.0038	0.0201	0.0211	0.0000		0.0236	0.0044
Total crabs		0.0079	0.0067	0.0000	0.0333	0.0083	0.0121	0.0208	0.0211	0.0000		0.0236	0.0146
OTHER INVERTEBRATES													
Red Sea Star	*Formia milleporella*	0.0016	0.0000	0.0000	0.0000	0.0042	0.0010	0.0073	0.0000	0.0000		0.0118	0.0021
Grand total, all taxa		1.3397	0.5200	1.2500	0.7667	2.4583	1.2488	1.9105	0.4252	0.7778		2.7434	0.8741

Appendix Table C 5b. 2003 November 12, 13 pull-net mean and standard deviation of number per square meter.
Sample size: raw=21, s=11, n=11, s&n=2

Common Name	Scientific Name	Mean				Standard deviation			
		raw	s	n	s%n	raw	s	n	s&n
FISH									
Bluestriped Grunt		0.0032	0.0000	0.0067	0.0033	0.0145	0.0000	0.0201	0.0047
Clown Goby	*Microbius gulosus*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Code Goby	*Gobiosoma robustum*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0101	0.0021
Dusky Pipefish	*Syngnathus floridae*	0.0270	0.0182	0.0367	0.0274	0.0309	0.0273	0.0333	0.0131
Goldspotted Killifish	*Floridichthys carpio*	0.0032	0.0030	0.0033	0.0032	0.0100	0.0101	0.0101	0.0002
Great Barracuda	*Sphyraena barracuda*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0101	0.0024
Gulf toadfish	*Opsanus beta*	0.0048	0.0000	0.0100	0.0050	0.0159	0.0000	0.0216	0.0071
Hardhead Silverside	*Atherinomorus stipes*	0.0032	0.0000	0.0067	0.0033	0.0100	0.0000	0.0135	0.0047
Pinfish	*Lagodon rhomboidalis*	0.0651	0.0242	0.1100	0.0671	0.0771	0.0368	0.0882	0.0606
Rainwater Killifish	*Lucania parva*	0.5381	0.0758	1.0467	0.5612	1.1389	0.1239	1.4781	0.6865
Redfin Needlefish	*Strongylura notata*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Sargassum Pipefish	*Syngnathus pelagicus*	0.0127	0.0212	0.0033	0.0123	0.0387	0.0522	0.0216	0.0126
Silver jenny	*Eucinostomus gula*	0.2968	0.2939	0.3000	0.2970	0.3075	0.2430	0.3606	0.0043
Tomtate	*Haemulon aurolineatum*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0101	0.0024
Yellowfin mojarra	*Gerres cinereus*	0.0429	0.0061	0.0833	0.0447	0.0659	0.0135	0.0776	0.0546
Total fish		1.0048	0.4515	1.6133	1.0324	1.4371	0.2505	1.8694	0.8215
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.3254	0.0818	0.5933	0.3376	0.4706	0.1552	0.5601	0.3617
CRAB									
Blue Crab	*Callinectes sapidus*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Hermit crab	*Clibanarius sp.*	0.0063	0.0061	0.0067	0.0064	0.0201	0.0201	0.0201	0.0004
Total crabs		0.0079	0.0091	0.0067	0.0079	0.0208	0.0216	0.0201	0.0017
OTHER INVERTEBRATES									
Red Sea Star	*Formia milleporella*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0101	0.0024
Grand total, all taxa		1.3397	0.5424	2.2167	1.3795	1.9105	0.4129	2.4332	1.1839

Appendix Table C 6a. 2004 January 8, 12 pull-net mean and standard deviation of number per square meter. Sample size: raw=21, 1s=10, 2n=4, 2s=1, 3n=6, zones=4

		Mean						Standard deviation					
Common name	Scientific name	raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Chain Pipefish	*Syngnathus louisianae*	0.0048	0.0100	0.0000	0.0000	0.0000	0.0025	0.0120	0.0161	0.0000		0.0000	0.0050
Clown Goby	*Microbius gulosus*	0.0095	0.0167	0.0000	0.0000	0.0056	0.0056	0.0301	0.0423	0.0000		0.0136	0.0079
Code Goby	*Gobiosoma robustum*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Dusky Pipefish	*Syngnathus floridae*	0.0063	0.0133	0.0000	0.0000	0.0000	0.0033	0.0201	0.0281	0.0000		0.0000	0.0067
Fringed Filefish	*Monacanthus ciliatus*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Goldspotted Killifish	*Floridichthys carpio*	0.0238	0.0500	0.0000	0.0000	0.0000	0.0125	0.0559	0.0741	0.0000		0.0000	0.0250
Gulf Pipefish	*Syngnathus scovelli*	0.0175	0.0300	0.0000	0.0000	0.0111	0.0103	0.0250	0.0246	0.0000		0.0272	0.0142
Gulf Toadfish	*Opsanus beta*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Hardhead Silverside	*Atherinomorus stipes*	0.0016	0.0000	0.0083	0.0000	0.0000	0.0021	0.0073	0.0000	0.0167		0.0000	0.0042
Pinfish	*Lagodon rhomboidalis*	0.0524	0.0733	0.0167	0.2000	0.0167	0.0767	0.1057	0.1412	0.0192		0.0279	0.0865
Rainwater Killifish	*Lucania parva*	0.3397	0.2533	0.1917	0.0333	0.6333	0.2779	0.7849	0.3248	0.0419		1.4556	0.2544
Sargassum Pipefish	*Syngnathus pelagicus*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Silver Jenny	*Eucinostomus gula*	0.3000	0.4533	0.1417	0.0000	0.2000	0.1988	0.2974	0.3015	0.0319		0.3040	0.1894
Yellowfin Mojarra	*Gerres cinereus*	0.0206	0.0300	0.0000	0.0000	0.0222	0.0131	0.0387	0.0367	0.0000		0.0544	0.0154
Total fish		0.7825	0.9433	0.3583	0.2333	0.8889	0.6060	0.9604	0.5384	0.0833		1.7011	0.3624
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.2825	0.3200	0.1833	0.0000	0.3333	0.2092	0.3807	0.2554	0.1291		0.6501	0.1550
CRAB													
Blue Crab	*Callinectes sapidus*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Hermit crab	*Clibanarius sp.*	0.0032	0.0000	0.0083	0.0000	0.0056	0.0035	0.0100	0.0000	0.0167		0.0136	0.0042
Total crabs		0.0048	0.0033	0.0083	0.0000	0.0056	0.0043	0.0120	0.0105	0.0167		0.0136	0.0035
OTHER INVERTEBRATES													
Red Sea Star	*Formia milleporella*	0.0127	0.0000	0.0000	0.0000	0.0444	0.0111	0.0511	0.0000	0.0000		0.0935	0.0222
Grand total, all taxa		1.0825	1.2667	0.5500	0.2333	1.2722	0.8306	1.3906	0.7977	0.1958		2.4576	0.5301

Appendix Table C 6b. 2004 January 8, 12 pull-net mean and standard deviation of number per square meter.
Sample size: raw=21, s=11, n=10, s&n=2

		Mean				Standard deviation			
Common Name	**Scientific Name**	raw	s	n	s%n	raw	s	n	s&n
FISH									
Chain Pipefish	*Syngnathus louisianae*	0.0048	0.0091	0.0000	0.0045	0.0120	0.0156	0.0000	0.0064
Clown Goby	*Microbius gulosus*	0.0095	0.0152	0.0033	0.0092	0.0301	0.0405	0.0105	0.0084
Code Goby	*Gobiosoma robustum*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Dusky Pipefish	*Syngnathus floridae*	0.0063	0.0121	0.0000	0.0061	0.0201	0.0270	0.0000	0.0086
Fringed Filefish	*Monacanthus ciliatus*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Goldspotted Killifish	*Floridichthys carpio*	0.0238	0.0455	0.0000	0.0227	0.0559	0.0719	0.0000	0.0321
Gulf Pipefish	*Syngnathus scovelli*	0.0175	0.0273	0.0067	0.0170	0.0250	0.0250	0.0211	0.0146
Gulf Toadfish	*Opsanus beta*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Hardhead Silverside	*Atherinomorus stipes*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0105	0.0024
Pinfish	*Lagodon rhomboidalis*	0.0524	0.0848	0.0167	0.0508	0.1057	0.1393	0.0236	0.0482
Rainwater Killifish	*Lucania parva*	0.3397	0.2333	0.4567	0.3450	0.7849	0.3152	1.1089	0.1579
Sargassum Pipefish	*Syngnathus pelagicus*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Silver Jenny	*Eucinostomus gula*	0.3000	0.4121	0.1767	0.2944	0.2974	0.3170	0.2294	0.1665
Yellowfin Mojarra	*Gerres cinereus*	0.0206	0.0273	0.0133	0.0203	0.0387	0.0360	0.0422	0.0099
Total fish		0.7825	0.8788	0.6767	0.7777	0.9604	0.5538	1.2981	0.1429
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.2825	0.2909	0.2733	0.2821	0.3807	0.2608	0.4964	0.0124
CRAB									
Blue Crab	*Callinectes sapidus*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Hermit crab	*Clibanarius sp.*	0.0032	0.0000	0.0067	0.0033	0.0100	0.0000	0.0141	0.0047
Total crabs		0.0048	0.0030	0.0067	0.0048	0.0120	0.0101	0.0141	0.0026
OTHER INVERTEBRATES									
Red Sea Star	*Formia milleporella*	0.0127	0.0000	0.0267	0.0133	0.0511	0.0000	0.0734	0.0189
Grand total, all taxa		1.0825	1.1727	0.9833	1.0780	1.3906	0.8185	1.8761	0.1339

Appendix Table C 7a. 2004 February 11, 12 pull-net mean number per square meter.
Sample size: raw=23, 1S=13, 2N=5, 2S=1, 3N=5, zones=4

		Mean						Standard deviation					
Common name	**Scientific name**	raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Clown Goby	*Microbius gulosus*	0.0014	0.0026	0.0000	0.0000	0.0000	0.0006	0.0070	0.0092	0.0000		0.0000	0.0013
Code Goby	*Gobiosoma robustum*	0.0043	0.0077	0.0000	0.0000	0.0000	0.0019	0.0153	0.0200	0.0000		0.0000	0.0038
Dusky Pipefish	*Syngnathus floridae*	0.0072	0.0026	0.0000	0.0000	0.0267	0.0073	0.0283	0.0092	0.0000		0.0596	0.0130
Goldspotted Killifish	*Floridichthys carpio*	0.0116	0.0128	0.0067	0.0000	0.0133	0.0082	0.0191	0.0169	0.0149		0.0298	0.0063
Gulf Pipefish	*Syngnathus scovelli*	0.0159	0.0103	0.0200	0.0333	0.0267	0.0226	0.0316	0.0160	0.0298		0.0596	0.0098
Gulf Toadfish	*Opsanus beta*	0.0058	0.0000	0.0200	0.0000	0.0067	0.0067	0.0164	0.0000	0.0298		0.0149	0.0094
Haemulon species	*Haemulon sp.*	0.0029	0.0051	0.0000	0.0000	0.0000	0.0013	0.0096	0.0125	0.0000		0.0000	0.0026
Lined Seahorse	*Hippocampus erectus*	0.0014	0.0000	0.0067	0.0000	0.0000	0.0017	0.0070	0.0000	0.0149		0.0000	0.0033
Pinfish	*Lagodon rhomboidalis*	0.0797	0.0795	0.1133	0.0000	0.0467	0.0599	0.0790	0.0788	0.0989		0.0558	0.0483
Rainwater Killifish	*Lucania parva*	0.3145	0.0462	0.3200	0.0000	1.0067	0.3432	0.7182	0.1023	0.3033		1.3714	0.4643
Silver Jenny	*Eucinostomus gula*	0.1246	0.1000	0.0800	0.0667	0.2333	0.1200	0.1744	0.1521	0.0767		0.2698	0.0768
Southern Puffer	*Sphoeroides nephelus*	0.0014	0.0000	0.0000	0.0000	0.0067	0.0017	0.0070	0.0000	0.0000		0.0149	0.0033
Tomtate	*Haemulon aurolineatum*	0.0014	0.0000	0.0000	0.0000	0.0067	0.0017	0.0070	0.0000	0.0000		0.0149	0.0033
Total fish		0.5725	0.2667	0.5667	0.1000	1.3733	0.5767	0.8482	0.2415	0.3283		1.6025	0.5651
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.1855	0.0308	0.1467	0.0000	0.6267	0.2010	0.4017	0.0346	0.2022		0.7213	0.2907
CRAB													
Blue Crab	*Callinectes sapidus*	0.0203	0.0077	0.0333	0.0000	0.0400	0.0203	0.0359	0.0200	0.0408		0.0548	0.0194
Lesser Blue Crab	*Callinectes similis*	0.0014	0.0026	0.0000	0.0000	0.0000	0.0006	0.0070	0.0092	0.0000		0.0000	0.0013
Hermit Crab	*Clibanarius sp.*	0.1623	0.0205	0.1133	0.0000	0.5800	0.1785	0.3944	0.0290	0.1994		0.7259	0.2722
Mud Crab	*Panopeus herbstii*	0.0014	0.0000	0.0000	0.0000	0.0067	0.0017	0.0070	0.0000	0.0000		0.0149	0.0033
Total crabs		0.1855	0.0308	0.1467	0.0000	0.6267	0.2010	0.4017	0.0346	0.2022		0.7213	0.2907
OTHER INVERTEBRATES													
Red Sea Star	*Formia milleporella*	0.0087	0.0051	0.0133	0.0000	0.0133	0.0079	0.0206	0.0185	0.0298		0.0183	0.0066
Grand total, all taxa		0.9522	0.3333	0.8733	0.1000	2.6400	0.9867	1.6723	0.3292	0.7625		3.0633	1.1531

Appendix Table C 7b. 2004 February 11, 12 pull-net mean and standard deviation of number per square meter.
Sample size: raw=23, s=13, n=10, s&n=2

		Mean				Standard deviation			
Common Name	**Scientific Name**	raw	s	n	s%n	raw	s	n	s&n
FISH									
Clown Goby	*Microbius gulosus*	0.0014	0.0026	0.0000	0.0013	0.0070	0.0092	0.0000	0.0018
Code Goby	*Gobiosoma robustum*	0.0043	0.0077	0.0000	0.0038	0.0153	0.0200	0.0000	0.0054
Dusky Pipefish	*Syngnathus floridae*	0.0072	0.0026	0.0133	0.0079	0.0283	0.0092	0.0422	0.0076
Goldspotted Killifish	*Floridichthys carpio*	0.0116	0.0128	0.0100	0.0114	0.0191	0.0169	0.0225	0.0020
Gulf Pipefish	*Syngnathus scovelli*	0.0159	0.0103	0.0233	0.0168	0.0316	0.0160	0.0446	0.0092
Gulf Toadfish	*Opsanus beta*	0.0058	0.0000	0.0133	0.0067	0.0164	0.0000	0.0233	0.0094
Haemulon species	*Haemulon sp.*	0.0029	0.0051	0.0000	0.0026	0.0096	0.0125	0.0000	0.0036
Lined Seahorse	*Hippocampus erectus*	0.0014	0.0000	0.0033	0.0017	0.0070	0.0000	0.0105	0.0024
Pinfish	*Lagodon rhomboidalis*	0.0797	0.0795	0.0800	0.0797	0.0790	0.0788	0.0834	0.0004
Rainwater Killifish	*Lucania parva*	0.3145	0.0462	0.6633	0.3547	0.7182	0.1023	1.0039	0.4364
Silver Jenny	*Eucinostomus gula*	0.1246	0.1000	0.1567	0.1283	0.1744	0.1521	0.2037	0.0401
Southern Puffer	*Sphoeroides nephelus*	0.0014	0.0000	0.0033	0.0017	0.0070	0.0000	0.0105	0.0024
Tomtate	*Haemulon aurolineatum*	0.0014	0.0000	0.0033	0.0017	0.0070	0.0000	0.0105	0.0024
Total fish		0.5725	0.2667	0.9700	0.6183	0.8482	0.2415	1.1705	0.4973
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.1855	0.0308	0.3867	0.2087	0.4017	0.0346	0.5598	0.2517
CRAB									
Blue Crab	*Callinectes sapidus*	0.0203	0.0077	0.0367	0.0222	0.0359	0.0200	0.0457	0.0205
Lesser Blue Crab	*Callinectes similis*	0.0014	0.0026	0.0000	0.0013	0.0070	0.0092	0.0000	0.0018
Hermit Crab	*Clibanarius sp.*	0.1623	0.0205	0.3467	0.1836	0.3944	0.0290	0.5589	0.2306
Mud Crab	*Panopeus herbstii*	0.0014	0.0000	0.0033	0.0017	0.0070	0.0000	0.0105	0.0024
Total crabs		0.1855	0.0308	0.3867	0.2087	0.4017	0.0346	0.5598	0.2517
OTHER INVERTEBRATES									
Red Sea Star	*Formia milleporella*	0.0087	0.0051	0.0133	0.0092	0.0206	0.0185	0.0233	0.0058
Grand total, all taxa		0.9522	0.3333	1.7567	1.0450	1.6723	0.3292	2.3134	1.0064

Appendix Table C 8a. 2004 March 8, 9 pull-net mean and standard deviation of number per square meter. Sample size: raw=22, 1s=12, 2n=4, 2s=1, 3n=5, zones=4

		Mean						Standard deviation					
Common name	Scientific name	raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Bandtail Puffer	*Sphoeroides spengleri*	0.0015	0.0028	0.0000	0.0000	0.0000	0.0007	0.0071	0.0096	0.0000		0.0000	0.0014
Bluethroat Pikeblenny	*Chaenopsis ocellata*	0.0015	0.0028	0.0000	0.0000	0.0000	0.0007	0.0071	0.0096	0.0000		0.0000	0.0014
Code Goby	*Gobiosoma robustum*	0.0106	0.0167	0.0083	0.0000	0.0000	0.0063	0.0298	0.0389	0.0167		0.0000	0.0080
Dusky Pipefish	*Syngnathus floridae*	0.0076	0.0139	0.0000	0.0000	0.0000	0.0035	0.0228	0.0300	0.0000		0.0000	0.0069
Goldspotted Killifish	*Floridichthys carpio*	0.0167	0.0306	0.0000	0.0000	0.0000	0.0076	0.0457	0.0594	0.0000		0.0000	0.0153
Gulf Pipefish	*Syngnathus scovelli*	0.0227	0.0389	0.0000	0.0333	0.0000	0.0181	0.0464	0.0583	0.0000		0.0000	0.0210
Gulf Toadfish	*Opsanus beta*	0.0030	0.0000	0.0083	0.0000	0.0067	0.0038	0.0098	0.0000	0.0167		0.0149	0.0044
Haemulon species	*Haemulon sp.*	0.0045	0.0028	0.0083	0.0000	0.0067	0.0044	0.0117	0.0096	0.0167		0.0149	0.0038
Hardhead Silverside	*Atherinomorus stipes*	0.0061	0.0000	0.0333	0.0000	0.0000	0.0083	0.0221	0.0000	0.0471		0.0000	0.0167
Marbled Blenny	*Paraclinus marmoratus*	0.0091	0.0167	0.0000	0.0000	0.0000	0.0042	0.0183	0.0225	0.0000		0.0000	0.0083
Pinfish	*Lagodon rhomboidalis*	0.1773	0.1139	0.1833	0.0667	0.3467	0.1776	0.1732	0.1029	0.1552		0.2434	0.1224
Rainwater Killifish	*Lucania parva*	0.3924	0.3194	0.6083	0.0333	0.4667	0.3569	0.4829	0.2615	0.6209		0.8035	0.2459
Silver Jenny	*Eucinostomus gula*	0.1364	0.2361	0.0083	0.0000	0.0267	0.0678	0.1811	0.1951	0.0167		0.0365	0.1128
Tomtate	*Haemulon aurolineatum*	0.0015	0.0000	0.0000	0.0000	0.0067	0.0017	0.0071	0.0000	0.0000		0.0149	0.0033
Total fish		0.7909	0.7944	0.8583	0.1333	0.8600	0.6615	0.5837	0.5259	0.7310		0.7135	0.3534
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.1864	0.1778	0.1000	0.0000	0.3133	0.1478	0.1975	0.1737	0.1186		0.2735	0.1322
CRAB													
Blue Crab	*Callinectes sapidus*	0.0061	0.0083	0.0000	0.0000	0.0067	0.0038	0.0132	0.0151	0.0000		0.0149	0.0044
Hermit Crab	*Clibanarius sp.*	0.0076	0.0000	0.0083	0.0000	0.0267	0.0088	0.0176	0.0000	0.0167		0.0279	0.0126
Mud Crab	*Panopeus herbstii*	0.0015	0.0000	0.0083	0.0000	0.0000	0.0021	0.0071	0.0000	0.0167		0.0000	0.0042
Portunus species	*Portunus sp.*	0.0015	0.0028	0.0000	0.0000	0.0000	0.0007	0.0071	0.0096	0.0000		0.0000	0.0014
Total crabs		0.0167	0.0111	0.0167	0.0000	0.0333	0.0153	0.0224	0.0217	0.0192		0.0236	0.0139
OTHER INVERTEBRATES													
Mollusk	*Mollusca (non- cephalopoda)*	0.0045	0.0000	0.0250	0.0000	0.0000	0.0063	0.0213	0.0000	0.0500		0.0000	0.0125
Grand total, all taxa		0.9985	0.9833	1.0000	0.1333	1.2067	0.8308	0.7824	0.7017	0.8392		0.9866	0.5012

Appendix Table C 8b. 2004 March 8, 9 pull-net mean and standard deviation of number per square meter.

Sample size: raw=22, s=13, n=9, s&n=2

		Mean				Standard deviation			
Common Name	Scientific Name	raw	s	n	s%n	raw	s	n	s&n
FISH									
Bandtail Puffer	*Sphoeroides spengleri*	0.00152	0.00256	0	0.00128	0.00711	0.00925	0	0.00181
Bluethroat Pikeblenny	*Chaenopsis ocellata*	0.00152	0.00256	0	0.00128	0.00711	0.00925	0	0.00181
Code Goby	*Gobiosoma robustum*	0.01061	0.01538	0.0037	0.00954	0.02979	0.03755	0.01111	0.00826
Dusky Pipefish	*Syngnathus floridae*	0.00758	0.01282	0	0.00641	0.02284	0.02899	0	0.00907
Goldspotted Killifish	*Floridichthys carpio*	0.01667	0.02821	0	0.0141	0.04572	0.05749	0	0.01994
Gulf Pipefish	*Syngnathus scovelli*	0.02273	0.03846	0	0.01923	0.04645	0.05585	0	0.0272
Gulf Toadfish	*Opsanus beta*	0.00303	0	0.00741	0.0037	0.00981	0	0.0147	0.00524
Haemulon species	*Haemulon sp.*	0.00455	0.00256	0.00741	0.00499	0.01171	0.00925	0.0147	0.00342
Hardhead Silverside	*Atherinomorus stipes*	0.00606	0	0.01481	0.00741	0.02215	0	0.03379	0.01048
Marbled Blenny	*Paraclinus marmoratus*	0.00909	0.01538	0	0.00769	0.01835	0.02201	0	0.01088
Pinfish	*Lagodon rhomboidalis*	0.17727	0.11026	0.27407	0.19217	0.17317	0.09943	0.21459	0.11584
Rainwater Killifish	*Lucania parva*	0.39242	0.29744	0.52963	0.41353	0.48293	0.26263	0.68768	0.16419
Silver Jenny	*Eucinostomus gula*	0.13636	0.21795	0.01852	0.11823	0.18109	0.19796	0.0294	0.14102
Tomtate	*Haemulon aurolineatum*	0.00152	0	0.0037	0.00185	0.00711	0	0.01111	0.00262
Total fish		0.79091	0.74359	0.85926	0.80142	0.58375	0.53582	0.67449	0.08179
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.18636	0.1641	0.21852	0.19131	0.19751	0.17345	0.23518	0.03848
CRAB									
Blue Crab	*Callinectes sapidus*	0.00606	0.00769	0.0037	0.0057	0.01316	0.01462	0.01111	0.00282
Hermit Crab	*Clibanarius sp.*	0.00758	0	0.01852	0.00926	0.01761	0	0.02422	0.01309
Mud Crab	*Panopeus herbstii*	0.00152	0	0.0037	0.00185	0.00711	0	0.01111	0.00262
Portunus species	*Portunus sp.*	0.00152	0.00256	0	0.00128	0.00711	0.00925	0	0.00181
Total crabs		0.01667	0.01026	0.02593	0.01809	0.02242	0.02101	0.02222	0.01108
OTHER INVERTEBRATES									
Mollusk	*Mollusca (non- cephalopoda)*	0.00455	0	0.01111	0.00556	0.02132	0	0.03333	0.00786
Grand total, all taxa		0.99848	0.91795	1.11481	1.01638	0.78238	0.71223	0.90526	0.13921

Appendix Table C 9a. 2004 April 5, 8 pull-net mean and standard deviation of number per square meter. Sample size: raw=21, 1s=10, 2n=6, 2s=1, 3n=4, zones=4

		Mean						Standard deviation					
Common name	Scientific name	raw	1s	2n	2s	3n	zone	raw	1s	2n	2s	3n	zone
FISH													
Bandtail Puffer	*Sphoeroides spengleri*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Bucktooth Parrotfish	*Sparisoma radians*	0.0016	0.0000	0.0000	0.0000	0.0083	0.0021	0.0073	0.0000	0.0000		0.0167	0.0042
Crested Goby	*Logophogobius cyprinoides*	0.0048	0.0100	0.0000	0.0000	0.0000	0.0025	0.0218	0.0316	0.0000		0.0000	0.0050
Dusky Pipefish	*Syngnathus floridae*	0.0048	0.0100	0.0000	0.0000	0.0000	0.0025	0.0120	0.0161	0.0000		0.0000	0.0050
Goldspotted Killifish	*Floridichthys carpio*	0.0143	0.0067	0.0000	0.0000	0.0583	0.0163	0.0326	0.0211	0.0000		0.0500	0.0282
Grass Porgy	*Calamus arctifrons*	0.0016	0.0000	0.0000	0.0000	0.0083	0.0021	0.0073	0.0000	0.0000		0.0167	0.0042
Gulf Pipefish	*Syngnathus scovelli*	0.0095	0.0167	0.0000	0.0000	0.0083	0.0063	0.0154	0.0176	0.0000		0.0167	0.0080
Gulf Toadfish	*Opsanus beta*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Haemulon species	*Haemulon sp.*	0.0016	0.0033	0.0000	0.0000	0.0000	0.0008	0.0073	0.0105	0.0000		0.0000	0.0017
Hardhead Silverside	*Atherinomorus stipes*	0.0317	0.0000	0.1000	0.0000	0.0167	0.0292	0.1167	0.0000	0.2140		0.0333	0.0479
Lined Seahorse	*Hippocampus erectus*	0.0063	0.0033	0.0056	0.0000	0.0167	0.0064	0.0171	0.0105	0.0136		0.0333	0.0072
Marbled Blenny	*Paraclinus marmoratus*	0.0095	0.0200	0.0000	0.0000	0.0000	0.0050	0.0215	0.0281	0.0000		0.0000	0.0100
Pinfish	*Lagodon rhomboidalis*	0.1492	0.2233	0.0778	0.0000	0.1083	0.1024	0.1555	0.1778	0.1129		0.0833	0.0927
Rainwater Killifish	*Lucania parva*	0.5857	1.0300	0.1722	0.0000	0.2417	0.3610	1.0873	1.4754	0.1357		0.2184	0.4574
Silver Jenny	*Eucinostomus gula*	0.0825	0.1500	0.0111	0.0000	0.0417	0.0507	0.1148	0.1354	0.0172		0.0500	0.0685
Total fish		0.9063	1.4800	0.3667	0.0000	0.5083	0.5888	1.3152	1.7470	0.3148		0.2132	0.6316
SHRIMP													
Pink shrimp	*Farfantepenaeus duorarum*	0.1571	0.2033	0.0056	0.0000	0.3083	0.1293	0.1599	0.1094	0.0136		0.2062	0.1523
CRAB													
Blue Crab	*Callinectes sapidus*	0.0048	0.0067	0.0000	0.0000	0.0083	0.0038	0.0120	0.0141	0.0000		0.0167	0.0044
Hermit Crab	*Clibanarius sp.*	0.0190	0.0033	0.0222	0.0000	0.0583	0.0210	0.0374	0.0105	0.0404		0.0569	0.0268
Mud Crab	*Panopeus herbstii*	0.0016	0.0000	0.0000	0.0000	0.0083	0.0021	0.0073	0.0000	0.0000		0.0167	0.0042
Portunus Crab	*Portunus sp.*	0.0016	0.0000	0.0000	0.0000	0.0083	0.0021	0.0073	0.0000	0.0000		0.0167	0.0042
Total crabs		0.0270	0.0100	0.0222	0.0000	0.0833	0.0289	0.0417	0.0225	0.0404		0.0430	0.0374
OTHER INVERTEBRATES													
Red Sea Star	*Formia milleporella*	0.0048	0.0000	0.0000	0.0000	0.0250	0.0063	0.0218	0.0000	0.0000		0.0500	0.0125
Mollusk	*Mollusca (non-cephalopoda)*	0.0016	0.0000	0.0000	0.0000	0.0083	0.0021	0.0073	0.0000	0.0000		0.0167	0.0042
Grand total with shrimp		2.0302	3.1833	0.7833		1.5250	1.3729	2.7782	3.6065	0.6153		0.6326	1.4145

Appendix Table C 9b. 2004 April 5, 8 pull-net mean and standard deviation of number per square meter.

Sample size: raw=21, s=11, n=11, s&n=2

		Mean				Standard deviation			
Common Name	**Scientific Name**	raw	s	n	s%n	raw	s	n	s&n
FISH									
Bandtail Puffer	*Sphoeroides spengleri*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Bucktooth Parrotfish	*Sparisoma radians*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0096	0.0024
Crested Goby	*Logophogobius cyprinoides*	0.0048	0.0091	0.0000	0.0045	0.0218	0.0302	0.0000	0.0064
Dusky Pipefish	*Syngnathus floridae*	0.0048	0.0091	0.0000	0.0045	0.0120	0.0156	0.0000	0.0064
Goldspotted Killifish	*Floridichthys carpio*	0.0143	0.0061	0.0233	0.0147	0.0326	0.0201	0.0388	0.0122
Grass Porgy	*Calamus arctifrons*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0096	0.0024
Gulf Pipefish	*Syngnathus scovelli*	0.0095	0.0152	0.0033	0.0092	0.0154	0.0174	0.0096	0.0084
Gulf Toadfish	*Opsanus beta*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Haemulon species	*Haemulon sp.*	0.0016	0.0030	0.0000	0.0015	0.0073	0.0101	0.0000	0.0021
Hardhead Silverside	*Atherinomorus stipes*	0.0317	0.0000	0.0667	0.0333	0.1167	0.0000	0.1526	0.0471
Lined Seahorse	*Hippocampus erectus*	0.0063	0.0030	0.0100	0.0065	0.0171	0.0101	0.0207	0.0049
Marbled Blenny	*Paraclinus marmoratus*	0.0095	0.0182	0.0000	0.0091	0.0215	0.0273	0.0000	0.0129
Pinfish	*Lagodon rhomboidalis*	0.1492	0.2030	0.0900	0.1465	0.1555	0.1816	0.0955	0.0799
Rainwater Killifish	*Lucania parva*	0.5857	0.9364	0.2000	0.5682	1.0873	1.4338	0.1688	0.5207
Silver Jenny	*Eucinostomus gula*	0.0825	0.1364	0.0233	0.0798	0.1148	0.1362	0.0332	0.0799
Total fish		0.9063	1.3455	0.4233	0.8844	1.3152	1.7163	0.2983	0.6520
SHRIMP									
Pink shrimp	*Farfantepenaeus duorarum*	0.1571	0.1848	0.1267	0.1558	0.1599	0.1205	0.1823	0.0411
CRAB									
Blue Crab	*Callinectes sapidus*	0.0048	0.0061	0.0033	0.0047	0.0120	0.0135	0.0096	0.0019
Hermit Crab	*Clibanarius sp.*	0.0190	0.0030	0.0367	0.0198	0.0374	0.0101	0.0460	0.0238
Mud Crab	*Panopeus herbstii*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0096	0.0024
Portunus Crab	*Portunus sp.*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0096	0.0024
Total crabs		0.0270	0.0091	0.0467	0.0279	0.0417	0.0216	0.0489	0.0266
OTHER INVERTEBRATES									
Red Sea Star	*Formia milleporella*	0.0048	0.0000	0.0100	0.0050	0.0218	0.0000	0.0289	0.0071
Mollusk	*Mollusca (non-cephalopoda)*	0.0016	0.0000	0.0033	0.0017	0.0073	0.0000	0.0096	0.0024
Grand total with shrimp		2.0302	2.8939	1.0800	1.9870	2.7782	3.5577	0.8099	1.2826

Appendix Table C 10. 2004 May 4 pull-net mean and standard deviation of number per square meter.
Sample size: 1s=8

Common Name	Scientific Name	Mean 1S	Standard deviation 1S
FISH			
Code Goby	*Gobiosoma robustum*	0.0042	0.0118
Dusky Pipefish	*Syngnathus floridae*	0.0125	0.0248
Goldspotted Killifish	*Floridichthys carpio*	0.0042	0.0118
Gulf Pipefish	*Syngnathus scovelli*	0.0208	0.0354
Gulf Toadfish	*Opsanus beta*	0.0167	0.0309
Hardhead Silverside	*Atherinomorus stipes*	0.0083	0.0236
Lined Seahorse	*Hippocampus erectus*	0.0042	0.0118
Marbled Blenny	*Paraclinus marmoratus*	0.0333	0.0690
Pinfish	*Lagodon rhomboidalis*	0.0542	0.0502
Rainwater Killifish	*Lucania parva*	0.2833	0.3357
Silver Jenny	*Eucinostomus gula*	0.0417	0.0939
Total fish		0.4833	0.4983
SHRIMP			
Pink shrimp	*Farfantepenaeus duorarum*	0.0458	0.0562
CRAB			
Blue Crab	*Callinectes sapidus*	0.0042	0.0118
Hermit Crab	*Clibanarius sp.*	0.0083	0.0154
Mud Crab	*Panopeus herbstii*	0.0125	0.0354
Total crabs		0.0250	0.0463
OTHER INVERTEBRATES			
Red Sea Star	*Formia milleporella*	0.0042	0.0118
Grand total with shrimp		0.5583	0.5496

Appendix D, Table 1. Results from ANOVA relating surface salinity and temperature, turbidity, and sediment depth to collection, salzone, depthzone, geozone and zone, from throw-trap data, October 2002 thru September 2004.

Surface Salinity

	Model Statistics			Mean/Standard Error Values by Salzone			Mean/Standard Error Values by Geozone		Mean/Standard Error Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	0.753	694	.000								
Main Effects											
Collection			.000								
Salzone			.000	24.910/.351	27.649/.208	29.565/.218					1>2;1>3;2>3
Geozone			.000				28.159/.194	27.106/.204			S>N
Depthzone			.000						26.047/.207	29.039/.192	O>I

		Mean/Standard Error Values by Zone					Significance Differences of Factor 95%ci
		1S	2S	3S	2N	3N	
Zones	.000	24.910/.351	29.244/.256	32.178/.429	26.054/.327	28.159/.244	1S<all; 2n & 3N<2S, 3S; 3S>all

Surface Temperature

	Model Statistics			Mean/Standard Error Values by Salzone			Mean/Standard Error Values by Geozone		Mean/Standard Error Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.910	694	.000								
Main Effects											
Collection			.000								
Salzone			.007	27.573/.154	27.589/.091	27.196/.096					1>3; 2>3
Geozone			.597				27.481/.085	27.416/.089			
Depthzone			.000						27.703/.091	27.248/.084	O>I

		Mean/Standard Error Values by Zone					Significance Differences of Factor 95%ci
		1S	2S	3S	2N	3N	
Zones	.001	27.573/.154	27.389/.112	27.480/.188	27.788/.143	27.043/.107	3N<all; 2N>2S;

Turbidity

	Model Statistics			Mean/Standard Error Values by Salzone			Mean/Standard Error Values by Geozone		Mean/Standard Error Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.432	689	.000								
Main Effects											
Collection			.000								
Salzone			.848	1.261/.112	1.194/.066	1.233/.069					
Geozone			.001				1.356/.062	1.052/.065			S>N
Depthzone			.080						1.309/.066	1.151/.061	

		Mean/Standard Error Values by Zone					Significance Differences of Factor 95%ci
		1S	2S	3S	2N	3N	
Zones	.006	1.261/.112	1.387/.082	1.474/.136	1.000/.104	1.103/.078	2N & 3N<2S, 3S

Appendix D, Table 1. Con't.

Sediment Depth

	Model Statistics			Mean/Standard Error Values by Salzone			Mean/Standard Error Values by Geozone		Mean/Standard Error Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.112	685	.000								
Main Effects											
Collection			.882								
Salzone			.626	17.786/2.494	19.173/1.540	17.055/1.591					
Geozone			.000				12.939/1.410	24.669.1.477			N>S
Depthzone			.000						23.872/1.537	13.416/1.267	I>O

			Mean/Standard Error Values by Zone					Significance Differences of Factor 95%ci
			1S	2S	3S	2N	3N	
Zones		.000	17.786/2.494	11.453/1.971	7.043/3.100	26.893/2.366	22.446/1.769	1S>2S, 3S; 2N>1S, 2S, 3S; 3N>2S, 3S

Appendix D, Table 2. Results from ANOVA comparing environmental conditions by ZONE between the western shoreline of Biscayne Bay and the Elliott Key Control site, October 2002 thru September 2004.

ZONE	Model Statistics			Mean/Standard Error Values by Zone						Significance Differences of Factor
	R2	df	p-value	1S	2S	3S	2N	3N	Elliott	95%ci
salinity	0.267	825	0	24.304/.459	29.632/.369	32.418/.679	26.166/.547	32.418/.679	34.769/.480	E>all
temperature	0.002	825	0.671	27.859/.382	27.320/.306	27.442/.562	27.723/.453	27.027/349	27.513/.398	ns
turbidity	0.017	825	0.002	1.428/.107	1.375/.086	1.365/.158	1.005/.128	1.086/.098	.927/.112	E<1S,2S,3S
sediment depth	0.056	825	0	20.599/2.036	10.875/1.622	6.877/2.956	26.715/2.383	21.821/1.839	19.597/2.098	E<2N; E>2S, 3S

Appendix D, Table 3. Con't

General Catagories	Measurement Name	Units	Variable Name	freq. occur.	g dry wt/m2	no./m2	no. of habitat models
		Braun-Blanquet Cover-Abundance					
other	Sediment Texture	category	SedTex	0			1
seagrass	Canopy Height	cm	Canopy	662	10.9		6
seagrass	Thalassia Cover	BB-scale	dThalassia	633	1.827		3
seagrass	Halodule Cover	BB-scale	dHalodule	113	0.244		5
seagrass	Syringodium Cover	BB-scale	dSyringodium	5	0.020		4
calcareous algae	Halimeda Cover	BB-scale	dCGHalimeda	316	0.163		2
calcareous algae	Udotea Cover	BB-scale	dCGUdotea	175	0.043		4
calcareous algae	Penicillus Cover	BB-scale	dCGPenicillus	521	0.310		4
calcareous algae	Rhipocephalus Cover	BB-scale	dCGRhipocephalus	31	0.008		2
calcareous algae	Acetabularia Cover	BB-scale	dCGAcetabularia	317	0.126		2
calcareous algae	Other Calcareous Algae Cover	BB-scale	dCGOther	87	0.036		4
calcareous algae	Total Calcareous Algae Cover	BB-scale	dCGTotal	40	0.042		1
green algae	Anadyomene Cover	BB-scale	dANAdyomene	108	0.043		2
green algae	Avrainvillea Cover	BB-scale	dAVRainvillea	14	0.004		0
green algae	Batophora Cover	BB-scale	dBATophora	546	0.361		5
green algae	Caulerpa Cover	BB-scale	dCAUlerpa	86	0.041		1
green algae	Cladophora Cover	BB-scale	dCLAdophora	11	0.012		0
green algae	Dictyosphaeria Cover	BB-scale	dDictyoSPhaeria	8	0.008		0
green algae	Neomeris Cover	BB-scale	dNEOmeris	1	0.000		1
green algae	Ulva Cover	BB-scale	dULVa	2	0.001		0
green algae	Valonia Cover	BB-scale	dVALonia	1	0.000		1
green algae	Other Green Algae Cover	BB-scale	dGreenOther	215	0.209		3
green algae	Total Green Algae Cover	BB-scale	dGreenTotal	3	0.003		2
red algae	Laurencia Cover	BB-scale	dLAUrencia	505	0.424		5
red algae	Red Algae Cover	BB-scale	dRedOther	258	0.354		4
red algae	Drift Red Algae Cover	BB-scale	dDriftRed	2	0.001		1
red algae	Coraline Algae Cover	BB-scale	dCorallineRed	1	0.001		1
red algae	Total Red Algae Cover	BB-scale	dRedTotal	1	0.001		0
brown algae	Brown Algae Cover	BB-scale	dBrownOther	45	0.041		1
brown algae	Sargassum Cover	BB-scale	dSARgassum	22	0.007		1
brown algae	Dictyota Cover	BB-scale	dDICtyota	3	0.001		0
other	Sponge	BB-scale	dSPOnge	111	0.048		1
other	Stony Coral	BB-scale	dSTOnycoral	29	0.007		0
other	Soft Coral	BB-scale	dOCTocoral	8	0.003		0
other	Other	BB-scale	dOther	1	0.000		0

Appendix D, Table 3. Habitat measurements associated with individual throw-trap collections in western nearshore waters of southern Biscayne Bay.

General Catagories	Measurement Name	Units	Variable Name	freq. occur.	g dry wt/m2	no./m^2	no. of habitat models
			Station Measurements				
other	Water Turbidity	ntu	turbidity	818			2
other	Sediment Depth	cm	seddepth	810			2
			Harvest-Based Habitat Measurements				
seagrass	Dead Seagrass	g dry wt	Litter	375	10.98		3
seagrass	Thalassia Standing Crop	count	ThalSC	478	25.23		4
seagrass	Thalassia Short Shoot Density	count	ThalSS	473		453	2
seagrass	Thalassia Blade Density	count	ThalDen	472		1291	7
seagrass	Halodule Standing Crop	g dry wt	HaloSC	56	1.23		5
seagrass	Halodule Short Shoot Density	count	HaloSS	55		128	3
seagrass	Halodule Blade Density	count	HaloDen	54		401	0
seagrass	Syringodium Standing Crop	g dry wt	SyrSC	3	0.01		1
seagrass	Syringodium Short Shoot Density	count	SyrSS	2		1	0
seagrass	Syringodium Blade Density	count	SyrDen	3		1	0
seagrass	Chara Standing Crop	g dry wt	Chara	2	0.06		1
calcareous algae	Udotea sp.	g dry wt	cgUdotea	47	2.75		0
green algae	Batophora sp.	g dry wt	gBatophora	309	5.36		2
calcareous algae	Penicillus sp.	g dry wt	cgPenicillus	246	10.51		2
calcareous algae	Halimeda sp.	g dry wt	cgHalimeda	112	9.25		0
calcareous algae	Acetabularia sp.	g dry wt	cgAcetabularia	71	0.43		2
red algae	Laurencia sp.	g dry wt	rLaurencia	338	23.33		7
green algae	Anadyomene sp.	g dry wt	gAnadyomene	77	0.95		5
red algae	Hypnea sp.	g dry wt	rHypnea	47	0.74		2
green algae	Cladophora sp.	g dry wt	gCladophora	22	0.46		1
red algae	Diginia sp.	g dry wt	rDiginia	9	0.93		1
green algae	Codium sp.	g dry wt	gCodium	1	0.01		0
green algae	Dictyosphaeria sp.	g dry wt	gDictyosphaeria	7	0.27		0
red algae	Spyridia sp.	g dry wt	rSpyridia	30	2.05		3
calcareous algae	Rhipocepalus sp.	g dry wt	cgRhipocepalus	5	0.45		0
green algae	Ernadesmis sp.	g dry wt	gErnadesmis	2	0.26		3
red algae	Chondria sp.	g dry wt	rChondria	1	0.00		0
brown algae	Sargassum sp.	g dry wt	bSargassum	3	0.08		4
green algae	Caulerpa sp.	g dry wt	gCaulerpa	9	0.27		1
red algae	Polysiphonia sp.	g dry wt	rPolysiphonia	3	0.07		0
green algae	Valonia sp.	g dry wt	gValonia	1	0.02		0
green algae	Derbesia sp.	g dry wt	gDerbesia	8	0.03		4
red algae	Dasya sp.	g dry wt	rDasya	3	0.35		6
brown algae	Dictyota sp.	g dry wt	bDictyota	10	0.05		0
green algae	Dasycladus sp.	g dry wt	gDasycladus	2	0.03		0
green algae	Microdictyon sp.	g dry wt	gMicrodictyon	1	0.18		1
seagrass	Thalassia Blade Length	mm	thal_len	484			2
seagrass	Thalassia Blade Width	mm	thal_wid	464			0
seagrass	Thalassia Leaf Area	mm2	thal_la	457			4
seagrass	Halodule Blade Length	mm	hal_len	50			5
seagrass	Halodule Leaf Area	mm2	hal_la	48			3
seagrass	Syringodium Blade Length	mm	syr_len	2			1
seagrass	Syringodium Leaf Area	mm2	syr_la	2			1
seagrass	Total Seagrass Leaf Area	mm2	tot_la	488			4

Appendix D, Table 4. Results from ANOVA relating seagrass and dominant algae to collection, salzone, depthzone, geozone, and zone from throw-trap data, October 2002 thru September 2004.

SEAGRASS

Thalassia testudium, standing crop

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.164	695	.000								
Main Effects											
Collection			.012								
Salzone			.966	.260/.044	.273/.026	.272/.027					ns
Geozone			.000				.156/.024	.414/.026			N>S
Depthzone			.001						.337/.026	.215/.024	I>O

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone	.000	.260/.044	.112/.032	.045/.054	.435/.041	.393/.031	1S>2S & 3S; 2N & 3N>1S

Thalassia testudinum, cover

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.323	695	.000								
Main Effects											
Collection			.001								
Salzone			.012	2.113/.142	2.147/.084	1.799/.088					3<2
Geozone			.000				1.458/.079	2.736/.083			N>S
Depthzone			.000						2.391/.084	1.719/.078	I>O

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone	.000	2.113/.142	1.201/.104	.721/.174	3.093/.133	2.379/.099	1S>2S & 3S; 2N & 3N>1S; 2N>3N

Appendix D, Table 4. Con't.

SEAGRASS

Halodule wrightii, standing crop

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.045	695	.035								
Main Effects											
Collection			.801								
Salzone			.011	.035/.010	.001/.006	.007/.006					1>2,3
Geozone			.195				.015/.005	.005/.006			ns
Depthzone			.073						.018/.006	.004/.005	ns

			Mean/Standard Error Values by Zone					Significance Differences of Factor
			1S	2S	3S	2N	3N	95%ci
Zone		.056	.035/.010	.001/.009	.003/.012	.001/.009	.008/.007	1s>2S, 3S, 2n, 3N; 3S<1S

Halodule wrightii, cover

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.138	695	.000								
Main Effects											
Collection											
Salzone			.000	.699/.084	.135/.049	.169/.052					1>2, 3
Geozone			.493				.291/.046	.245/.049			ns
Depthzone			.001						.396/.049	.169/.046	I>O

			Mean/Standard Error Values by Zone					Significance Differences of Factor
			1S	2S	3S	2N	3N	95%ci
Zone		.000	.699/.084	.021/.061	.036/.102	.250/.078	.241/.058	1S>2S, 3S, 2N & 3N; 2N> 2S & 3S; 2N>3N

Appendix D, Table 4. Con't.

ALGAE

Penicillus sp., biomass

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.105	695	.000								
Main Effects											
Collection											
Salzone			.018	.158/.026	.134/.015	.083/.016					1>3; 2>3
Geozone			.688				.118/.014	.127/.015			ns
Depthzone			.055						.144/.015	.104/.014	ns

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone	.000	.158/.026	.077/.019	.122/.032	.191/.024	.062/.018	1S>2S, 3N; 2N>2S, 3N

Penicillus sp., cover

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.260	.681	.000								
Main Effects											
Collection											
Salzone				.309/.033	.376/.020	.238/.020					2>3
Geozone							.288/.019	.348/.019			N>S
Depthzone									.296/.020	.329/.018	ns

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone		.309/.033	.253/.026	.312/.040	.498/.030	.198/.023	2N>1S, 2S, 3S, 3N; 1S>3S; 3S>3N

Appendix D, Table 4. Con't.

ALGAE

Batophora sp., biomass

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.088	695	.000								
Main Effects											
Collection											
Salzone			.000	.043/.016	.083/.009	.030/.010					2>1,3
Geozone			.130				.065/.009	.046/.009			ns
Depthzone			.293						.064/.009	.050/.009	ns

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone	.000	.043/.016	.108/.012	.025/.019	.058/.015	.033/.011	2S>1S, 3S, 2N, 3N

Batophora sp., cover

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.256	688	.000								
Main Effects											
Collection			.000								
Salzone			.088	.713/.064	.569/.038	.552/.040					1>3
Geozone			.035				.643/.035	.534/.037			S>N
Depthzone			.263						.563/.038	.621/.035	ns

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone	.000	.713/.064	.705/.047	.396/.078	.432/.060	.637/.045	1S>2N, 3S; 2N<1S, 2S, 3N; 3N>2N, 3S<1S, 2S,3N

Appendix D, Table 4. Con't.

ALGAE

Laurencia sp., biomass

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.075	695	.002								
Main Effects											
Collection			.462								
Salzone			.000	.427/.067	.337/.040	.119/.042					1, 2>3
Geozone			.134				.318/.037	.237/.039			ns
Depthzone			.060						.339/.040	.237/.037	ns

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone	.000	.427/.067	.325/.049	.105/.082	.349/.063	.126/.047	1S, 2S &2N>3S, 3N; 1S>2S & 2N

Laurencia sp., cover

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.177	690	.000								
Main Effects											
Collection			.000								
Salzone			.000	1.242/.092	.940/.005	.558/.057					1>2,3; 2>3
Geozone			.231				.916/.051	.827/.054			ns
Depthzone			.237						.925/.055	.837/.051	ns

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone	.000	1.242/.092	.869/.068	.399/.113	1.011/.086	.644/.054	1S>2S, 3N, 3S; 2N>3N, 3S

SEAGRASS and ALGAE

Canopy Height

	Model Statistics			Mean/Standard Error Values by Salzone			Values by Geozone		Values by Depthzone		Sig. Diff. of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
Full Model	.401	695	.000								
Main Effects											
Collection			.000								
Salzone			.357	11.429/.642	11.412/.380	10.675/.399					
Geozone			.000				8.932/.355	14.001/.373			N>S
Depthzone			.000						13.549/.379	9.223/.351	I>O

		Mean/Standard Error Values by Zone					Significance Differences of Factor
		1S	2S	3S	2N	3N	95%ci
Zone	.000	11.429/.642	7.795/.469	6.408/.784	15.028/.599	12.973/.446	2S &3S<1S, 2N, 3N; 2N>3N; 1S<2N, 3N

Appendix D, Table 5. Results of regression analysis relating important habitat measures to depthzone (depth), collection (Coll), latitude (Lat) salinity (Sal+Sal^2), temperature (Tmp+Tmp^2), turbidity (Turb) and sediment depth (Sed) in western nearshore waters of southern Biscayne Bay. - = for selected variables, Lat, Sal^2 and Tmp^2, not signicant at P-value < .1 in full model, excluded from further analysis.

	Regression coefficients, P-value										Model statistics					
Model	Intercept	Depth	Coll	Lat	Sal	Sal^2	Tmp	Tmp^2	Turb	Sed	R2	P-value	df	Variable	unique R2	%
SEAGRASS																
						Thalassia testudinum, standing crop										
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-55.700	-.083	-.004	2.122	.001	-	.127	-.002	-.008	.006	.225	.000	677	Full Model	22.5	100.0
Y=Coll+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-57.069		-.003	2.171	-.001	-	.130	-.002	-.007	.006	.219	.000	677	Depth	0.6	2.7
Y=Depth+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-56.410	-.080		2.143	.000	-	.139	-.002	-.006	.006	.225	.000	677	Coll	0.0	0.0
Y=Depth+Coll+Sal+Tmp+Tmp^2+Turb+Sed	-1.201	-.097	-.007		.000	-	.109	-.002	-.018	.007	.174	.000	677	Lat	5.1	22.7
Y=Depth+Coll+Lat+Tmp+Tmp^2+Turb+Sed	-55.531	-.078	-.004	2.114		-	.131	-.002	-.009	.006	.226	.000	678	Sal	-0.1	0.0
Y=Depth+Coll+Lat+Sal+Turb+Sed	-50.807	-.090	-.009	2.002	.003	-			-.008	.006	.208	.000	678	Tmp+Tmp^2	1.7	7.6
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Sed	-56.190	-.080	-.003	2.142	.001	-	.125	-.002		.006	.223	.000	683	Turb	0.2	0.9
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Turb	-67.092	-.146	-.003	2.572	.000	-	.134	-.002	-.008		.128	.000	687	Sed	9.7	43.1
						Thalassia testudinum, cover										
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Tmp^2+Turb+Sed	-236.269	-.444	.038	9.057	.127	-.003	.435	,129	-.024	.019	.264	.000	677	Full Model	26.4	100.0
Y=Coll+Lat+Sal+Sal^2+Tmp+Tmp^2+Turb+Sed	-243.792		.044	9.338	.102	-.003	.437	-.008	-.020	.021	.248	.000	677	Depth	1.6	6.1
Y=Depth+Lat+Sal+Sal^2+Tmp+Tmp^2+Turb+Sed	-231.616	-.465		8.960	.097	-.002	.310	-.006	-.037	.019	.260	.000	677	Coll	0.4	1.5
Y=Depth+Coll+Sal+Sal^2+Tmp+Tmp^2+Turb+Sed	-4.634	-.504	.032		.161	-.004	.391	-.007	-.065	.022	.191	.000	677	Lat	7.3	27.7
Y=Depth+Coll+Lat+Tmp+Tmp^2+Turb+Sed	-241.216	-.476	.015	9.393			.276	-.005	-.023	.019	.256	.000	.678	Sal+Sal^2	0.8	3.0
Y=Depth+Coll+Lat+Sal+Sal^2+Turb+Sed	-226.149	-.450	.006	8.926	.060	-.001			-.031	.019	.253	.000	.678	Tmp+Tmp^2	1.1	4.2
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Tmp^2+Sed	-238.256	-447	.040	9.129	.128	-.003	.442	-.008		.019	.267	.000	683	Turb	-0.3	0.0
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Tmp^2+Turb	-266.572	-.670	.042	10.242	.139	-.003	.477	-.009	-.028		.183	.000	687	Sed	8.1	30.7
						Halodule wrightii, standing crop										
Y=Depth+Coll+Lat+Sal+Tmp+Turb+Sed	2.374	-.013	-.001	-.092	.000	-	.000	-	.005	.001	.092	.000	677	Full Model	9.2	100.0
Y=Coll+Lat+Sal+Tmp+Turb+Sed	2.165		.001	-.085	.000	-	.000	-	.005	.001	.089	.000	677	Depth	0.3	3.3
Y=Depth+Lat+Sal+Tmp+Turb+Sed	2.416	-.014		.194	.000	-	.000	-	.005	.001	.093	.000	677	Coll	-0.1	0.0
Y=Depth+Coll+Sal+Tmp+Turb+Sed	.013	-.013	.001		.000	-	.000	-	.005	.001	.091	.000	677	Lat	0.1	1.1
Y=Depth+Coll+Lat+Tmp+Turb+Sed	2.365	-.014	.001	-.092		-	.000	-	.005	.001	.093	.000	678	Sal	0.0	0.0
Y=Depth+Coll+Lat+Sal+Turb+Sed	2.308	-.013	.000	-.090	.000	-		-	.005	.001	.093	.000	678	Tmp	0.0	0.0
Y=Depth+Coll+Lat+Sal+Tmp+Sed	2.812	-.014	.000	-.109	.000	-	.000	-		.001	.088	.000	683	Turb	0.4	4.3
Y=Depth+Coll+Lat+Sal+Tmp+Turb	.032	-.024	.001	.001	.000	-	.000	-	.005		.016	.000	687	Sed	7.6	82.6

Appendix D, Table 5. Results of regression analysis relating important habitat measures to depthzone (depth), collection (Coll), latitude (Lat) salinity (Sal+Sal^2), temperature (Tmp+Tmp^2), turbidity (Turb) and sediment depth (Sed) in western nearshore waters of southern Biscayne Bay. - = for selected variables, Lat, Sal^2 and Tmp^2, not signicant at P-value < .1 in full model, excluded from further analysis.

	Regression coefficients, P-value										Model statistics					
Model	Intercept	Depth	Coll	Lat	Sal	Sal^2	Tmp	Tmp^2	Turb	Sed	R2	P-value	df	Variable	unique R2	%
SEAGRASS																
						Thalassia testudinum, standing crop										
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-55.700	-.083	-.004	2.122	.001	-	.127	-.002	-.008	.006	.225	.000	677	Full Model	22.5	100.0
Y=Coll+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-57.069		-.003	2.171	-.001	-	.130	-.002	-.007	.006	.219	.000	677	Depth	0.6	2.7
Y=Depth+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-56.410	-.080		2.143	.000	-	.139	-.002	-.006	.006	.225	.000	677	Coll	0.0	0.0
Y=Depth+Coll+Sal+Tmp+Tmp^2+Turb+Sed	-1.201	-.097	-.007		.000	-	.109	-.002	-.018	.007	.174	.000	677	Lat	5.1	22.7
Y=Depth+Coll+Lat+Tmp+Tmp^2+Turb+Sed	-55.531	-.078	-.004	2.114		-	.131	-.002	-.009	.006	.226	.000	678	Sal	-0.1	0.0
Y=Depth+Coll+Lat+Sal+Turb+Sed	-50.807	-.090	-.009	2.002	.003	-			-.008	.006	.208	.000	678	Tmp+Tmp^2	1.7	7.6
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Sed	-56.190	-.080	-.003	2.142	.001	-	.125	-.002		.006	.223	.000	683	Turb	0.2	0.9
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Turb	-67.092	-.146	-.003	2.572	.000	-	.134	-.002	-.008		.128	.000	687	Sed	9.7	43.1
						Thalassia testudinum, cover										
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Tmp^2+Turb+Sed	-236.269	-.444	.038	9.057	.127	-.003	.435	,129	-.024	.019	.264	.000	677	Full Model	26.4	100.0
Y=Coll+Lat+Sal+Sal^2+Tmp+Tmp^2+Turb+Sed	-243.792		.044	9.338	.102	-.003	.437	-.008	-.020	.021	.248	.000	677	Depth	1.6	6.1
Y=Depth+Lat+Sal+Sal^2+Tmp+Tmp^2+Turb+Sed	-231.616	-.465		8.960	.097	-.002	.310	-.006	-.037	.019	.260	.000	677	Coll	0.4	1.5
Y=Depth+Coll+Sal+Sal^2+Tmp+Tmp^2+Turb+Sed	-4.634	-.504	.032		.161	-.004	.391	-.007	-.065	.022	.191	.000	677	Lat	7.3	27.7
Y=Depth+Coll+Lat+Tmp+Tmp^2+Turb+Sed	-241.216	-.476	.015	9.393			.276	-.005	-.023	.019	.256	.000	.678	Sal+Sal^2	0.8	3.0
Y=Depth+Coll+Lat+Sal+Sal^2+Turb+Sed	-226.149	-.450	.006	8.926	.060	-.001			-.031	.019	.253	.000	.678	Tmp+Tmp^2	1.1	4.2
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Tmp^2+Sed	-238.256	-447	.040	9.129	.128	-.003	.442	-.008		.019	.267	.000	683	Turb	-0.3	0.0
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Tmp^2+Turb	-266.572	-.670	.042	10.242	.139	-.003	.477	-.009	-.028		.183	.000	687	Sed	8.1	30.7
						Halodule wrightii, standing crop										
Y=Depth+Coll+Lat+Sal+Tmp+Turb+Sed	2.374	-.013	-.001	-.092	.000	-	.000	-	.005	.001	.092	.000	677	Full Model	9.2	100.0
Y=Coll+Lat+Sal+Tmp+Turb+Sed	2.165		.001	-.085	.000	-	.000	-	.005	.001	.089	.000	677	Depth	0.3	3.3
Y=Depth+Lat+Sal+Tmp+Turb+Sed	2.416	-.014		.194	.000	-	.000	-	.005	.001	.093	.000	677	Coll	-0.1	0.0
Y=Depth+Coll+Sal+Tmp+Turb+Sed	.013	-.013	.001		.000	-	.000	-	.005	.001	.091	.000	677	Lat	0.1	1.1
Y=Depth+Coll+Lat+Tmp+Turb+Sed	2.365	-.014	.001	-.092		-	.000	-	.005	.001	.093	.000	678	Sal	0.0	0.0
Y=Depth+Coll+Lat+Sal+Turb+Sed	2.308	-.013	.000	-.090	.000	-		-	.005	.001	.093	.000	678	Tmp	0.0	0.0
Y=Depth+Coll+Lat+Sal+Tmp+Sed	2.812	-.014	.000	-.109	.000	-	.000	-		.001	.088	.000	683	Turb	0.4	4.3
Y=Depth+Coll+Lat+Sal+Tmp+Turb	.032	-.024	.001	.001	.000	-	.000	-	.005		.016	.000	687	Sed	7.6	82.6

Appendix D, Table 5. Con't

Model	Regression coefficients, P-value										Model statistics					
	Intercept	Depth	Coll	Lat	Sal	Sal^2	Tmp	Tmp^2	Turb	Sed	R2	P-value	df	Variable	unique R2	%
SEAGRASS																
							Halodule wrightii, cover									
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Turb+Sed	-13.979	-.251	-.001	.647	-.149	.002	.005	-	.041	.006	.159	.000	677	Full Model	15.9	100.0
Y=Coll+Lat+Sal+Sal^2+Tmp+Turb+Sed	-18.238		.003	.805	-.162	.003	.006	-	.043	.007	.140	.000	677	Depth	1.9	11.9
Y=Depth+Lat+Sal+Sal^2+Tmp+Turb+Sed	-14.027	-.250		.648	-.148	.002	.005	-	.041	.006	.160	.000	677	Coll	-0.1	0.0
Y=Depth+Coll+Sal+Sal^2+Tmp+Turb+Sed	2.518	-.255	-.001		-.146	.002	.004	-	.038	.006	.159	.000	677	Lat	0.0	0.0
Y=Depth+Coll+Lat+Tmp+Turb+Sed	-13.825	-.368	-.007	.566			.003	-	.045	.006	.109	.000	678	Sal	5.0	31.4
Y=Depth+Coll+Lat+Sal+Sal^2+Turb+Sed	-13.359	-.251	.001	.626	-.147	.002		-	.042	.006	.159	.000	678	Tmp	0.0	0.0
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Sed	-10.403	-.253	-.003	.509	-.149	.001	.005	-		.006	.156	.000	683	Turb	0.3	1.9
Y=Depth+Coll+Lat+Sal+Sal^2+Tmp+Turb	-22.477	-.293	-.001	.990	-.156	.003	.006	-	.042		.131	.000	687	Sed	2.8	17.6
							Canopy height									
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-919.810	-2.691	.547	35.296	-.149	-	2.254	.229	.098	-.038	.335	.000	678	Full Model	33.5	100.0
Y=Coll+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-964.037		.592	36.871	-.219	-	2.331	-.039	.257	.109	.309	.000	678	Depth	2.6	7.8
Y=Depth+Lat+Sal+Tmp+Tmp^2+Turb+Sed	-833.431	-3.104		32.725	-.046	-	.769	-.010	.017	.101	.286	.000	678	Coll	4.9	14.6
Y=Depth+Coll+Sal+Tmp+Tmp^2+Turb+Sed	-13.450	-2.909	.509		-.165	-	1.946	-.033	.069	.110	.287	.000	678	Lat	4.8	14.3
Y=Depth+Coll+Lat+Tmp+Tmp^2+Turb+Sed	-924.044	-3.278	.454	36.279		-	1.852	-.031	.254	.099	.324	.000	678	Sal	1.1	3.3
Y=Depth+Coll+Lat+Sal+Turb+Sed	-833.137	-2.815	.482	33.154	-.112	-			.221	.100	.318	.000	679	Tmp+Tmp2	1.7	5.1
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Sed	-893.313	-2730	.536	34.285	-.153	-	2.237	-.038		.098	.335	.000	684	Turb	0.0	0.0
Y=Depth+Coll+Lat+Sal+Tmp+Tmp^2+Turb	-1074.549	-3.834	.548	41.420	-.160	-	2.408	-.041	.212		.234	.000	688	Sed	10.1	30.1
ALGAE																
							Penicillus sp., biomass									
Y=Depth+Coll+Lat+Sal+Tmp+Turb+Sed	8.184	-.039	-.003	-.310	-.001	-	-.002	-	-.001	.000	.005	.173	677	Full Model	0.5	100.0
Y=Coll+Lat+Sal+Tmp+Turb+Sed	7.578		-.002	-.288	-.002	-	-.002	-	.002	.000	.001	.327	677	Depth	0.4	80.0
Y=Depth+Lat+Sal+Tmp+Turb+Sed	7.977	-.037		-.302	-.002	-	-.002	-	.002	.000	.005	.148	677	Coll	0.0	0.0
Y=Depth+Coll+Sal+Tmp+Turb+Sed	.257	-.037	-.002		-.001	-	-.002	-	.007	.000	.003	.238	677	Lat	0.2	40.0
Y=Depth+Coll+Lat+Tmp+Turb+Sed	7.813	-.045	-.003	-.297		-	-.002	-	.002	.000	.005	.145	678	Sal	0.0	0.0
Y=Depth+Coll+Lat+Sal+Turb+Sed	8.008	-.039	-.003	-.305	-.001	-		-	.001	.000	.006	.134	678	Tmp	-0.1	0.0
Y=Depth+Coll+Lat+Sal+Tmp+Sed	8.335	-.038	-.002	-.315	-.002	-	-.002	-		.000	.007	.105	683	Turb	-0.2	0.0
Y=Depth+Coll+Lat+Sal+Tmp+Turb	7.331	-.039	-.002	-.277	-.002	-	-.002	-	.001		.006	.128	687	Sed	-0.1	0.0
							Penicillus sp., cover									
Y=Depth+Coll+Lat+Sal+Tmp+Turb+Sed	19.020	.067	.004	-.718	-.009	-	-.009	-	-.012	.001	.042	.000	663	Full Model	4.2	100.0
Y=Coll+Lat+Sal+Tmp+Turb+Sed	20.132		.003	-.759	-.008	-	-.009	-	-.013	.000	.035	.000	663	Depth	0.7	16.7
Y=Depth+Lat+Sal+Tmp+Turb+Sed	19.381	.064		-.733	-.009	-	-.008	-	-.014	.001	.042	.000	663	Coll	0.0	0.0
Y=Depth+Coll+Sal+Tmp+Turb+Sed	.647	.072	.004		-.009	-	-.009	-	-.010	.000	.033	.000	663	Lat	0.9	21.4
Y=Depth+Coll+Lat+Tmp+Turb+Sed	16.470	.029	-.001	-.626		-	-.009	-	-.012	.001	.018	.000	664	Sal	2.4	57.1
Y=Depth+Coll+Lat+Sal+Turb+Sed	17.428	.072	.000	-.665	-.009	-		-	-.015	.001	.030	.000	664	Tmp	1.2	28.6
Y=Depth+Coll+Lat+Sal+Tmp+Sed	17.663	.067	.004	-.666	-.009	-	-.009	-		.001	.039	.000	669	Turb	0.3	7.1
Y=Depth+Coll+Lat+Sal+Tmp+Turb	21.030	.045	.001	-.795	-.009	-	-.009	-	-.013		.039	.000	673	Sed	0.3	7.1

Appendix D, Table 5. Con't

Model	Regression coefficients, P-value										Model statistics					
	Intercept	Depth	Coll	Lat	Sal	Sal^2	Tmp	Tmp^2	Turb	Sed	R2	P-value	df	Variable	unique R2	%
ALGAE																
						Batophora sp., biomass										
Y=Depth+Coll+Lat+Sal+Tmp+Turb+Sed	8.081	-.018	-.001	-311	.001	-	-.002	-	-.006	.000	.013	.027	678	Full Model	1.3	100.0
Y=Coll+Lat+Sal+Tmp+Turb+Sed	7.795		-.001	-.301	.000	-	-.002	-	-.006	.000	.011	.033	677	Depth	0.2	15.4
Y=Depth+Lat+Sal+Tmp+Turb+Sed	7.992	-.017		-.307	.000	-	-.002	-	-.006	.000	.014	.000	.018	Coll	0.0	0.0
Y=Depth+Coll+Sal+Tmp+Turb+Sed	.132	-.016	-.001		.001	-	-.002	-	-.005	-.001	.005	.152	677	Lat	0.8	61.5
Y=Depth+Coll+Lat+Tmp+Turb+Sed	8.212	-.016	-.001	-.316		-	-.002	-	-.006	.000	.014	.017	678	Sal	-0.1	0.0
Y=Depth+Coll+Lat+Sal+Turb+Sed	7.758	-.017	-.002	-.300	.001	-		-	-.006	.000	.011	.039	678	Tmp	0.2	15.4
Y=Depth+Coll+Lat+Sal+Tmp+Sed	7.784	-.019	-.001	-300	.001	-	-.002	-		.000	.013	.024	683	Turb	0.0	0.0
Y=Depth+Coll+Lat+Sal+Tmp+Turb	8.733	-.014	-.001	-.337	.001	-	-.002	-	-.006		.010	.043	687	Sed	0.3	23.1
						Batophora sp., cover										
Y=Depth+Coll+Lat+Sal+Sal2+Tmp+Tmp2+Turb+Sed	-4.652	.068	.031	.049	.038	-.001	.256	-.005	.001	-.002	.025	.002	671	Full Model	2.5	100.0
Y=Coll+Lat+Sal+Sal2+Tmp+Tmp2+Turb+Sed	-3.474		.030	.005	.042	-.001	.256	-.005	.000	-.002	.024	.002	671	Depth	0.1	4.0
Y=Depth+Lat+Sal+Sal2+Tmp+Tmp2+Turb+Sed	-.924	.051		-.028	.014	.000	.155	-.003	-.009	-.002	.008	.111	671	Coll	1.7	68.0
Y=Depth+Coll+Sal+Sal2+Tmp+Tmp2+Turb+Sed	-3.94	.067	.031		.038	-.001	.256	-.005	.001	-.002	.026	.001	671	Lat	-0.1	0.0
Y=Depth+Coll+Lat+Tmp+Tmp2+Turb+Sed	-7.601	.024	.018	.221			.179	-.003	.002	-.002	.011	.046	671	Sal+Sal2	1.4	56.0
Y=Depth+Coll+Lat+Sal+Sal2+Turb+Sed	1.155	.068	.013	-.023	-.001	.000			-.003	-.002	.002	.301	672	Tmp+Tmp2	2.3	92.0
Y=Depth+Coll+Lat+Sal+Sal2+Tmp+Tmp2+Sed	-4.853	.069	.031	.058	.037	-.001	.255	-.005		-.002	.026	.001	677	Turb	-0.1	0.0
Y=Depth+Coll+Lat+Sal+Sal2+Tmp+Tmp2+Turb	4.314	.073	.026	-.306	.039	-.001	.263	-.005	-.002		.021	.004	681	Sed	0.4	16.0
						Laurencia sp., biomass										
Y=Depth+Coll+Lat+Sal+Tmp+Turb+Sed	38.230	-.188	-.008	-1.467	.004	-	-.009	-	-.037	.000	.026	.001	677	Full Model	2.6	100.0
Y=Coll+Lat+Sal+Tmp+Turb+Sed	35.291		-.005	-1.361	-.001	-	-.008	-	-.035	.000	.009	.057	677	Depth	1.7	65.4
Y=Depth+Lat+Sal+Tmp+Turb+Sed	37.627	-.182		-1.443	.002	-	-.011	-	-.034	.000	.026	.001	677	Coll	0.0	0.0
Y=Depth+Coll+Sal+Tmp+Turb+Sed	.718	-.179	-.007		.005	-	-.008	-	-.031	-.001	.016	.011	677	Lat	1.0	38.5
Y=Depth+Coll+Lat+Tmp+Turb+Sed	39.147	-.173	-.006	-1.500		-	-.009	-	-.038	.000	.026	.001	678	Sal	0.0	0.0
Y=Depth+Coll+Lat+Sal+Turb+Sed	36.654	-.182	-.011	-1.414	.004	-		-	-.039	.000	.023	.001	678	Tmp	0.3	11.5
Y=Depth+Coll+Lat+Sal+Tmp+Sed	35.038	-.190	-.005	-1.344	.004	-	-.010	-		.000	.022	.002	683	Turb	0.4	15.4
Y=Depth+Coll+Lat+Sal+Tmp+Turb	37.847	-.180	-.006	-1.453	.004	-	-.010	-	-.038		.027	.000	687	Sed	-0.1	0.0
						Laurencia sp., cover										
Y=Depth+Coll+Lat+Sal+Sal2+Tmp+Tmp2+Turb+Sed	30.355	-291	.027	-1.227	.063	-.001	.133	-.003	-.098	-.004	.055	.000	673	Full Model	5.5	100.0
Y=Coll+Lat+Sal+Sal2+Tmp+Tmp2+Turb+Sed	25.335		.031	-1.039	.047	-.001	.132	-.003	-.093	-.003	.035	.000	673	Depth	2.0	36.4
Y=Depth+Lat+Sal+Sal2+Tmp+Tmp2+Turb+Sed	33.775	-.307		-1.300	.042	-.001	.043	-.001	-.107	-.004	.048	.000	673	Coll	0.7	12.7
Y=Depth+Coll+Sal+Sal2+Tmp+Tmp2+Turb+Sed	-1.022	-.283	.028		.059	-.001	.138	-.003	-.092	-.004	.052	.000	673	Lat	0.3	5.5
Y=Depth+Coll+Lat+Tmp+Tmp2+Turb+Sed	28.424	-.297	.018	-1.085			.064	-.001	-.097	-.004	.052	.000	673	Sal+Sal2	0.3	5.5
Y=Depth+Coll+Lat+Sal+Sal2+Turb+Sed	30.183	-.278	.009	-1.145	.036	-.001			-.104	-.004	.042	.000	674	Tmp+Tmp2	1.3	23.6
Y=Depth+Coll+Lat+Sal+Sal2+Tmp+Tmp2+Sed	20.031	-.284	.033	-.837	.064	-.001	.146	-.002		-.004	.036	.000	679	Turb	1.9	34.5
Y=Depth+Coll+Lat+Sal+Sal2+Tmp+Tmp2+Turb	39.154	-.246	.025	-1.572	.058	-.001	.129	-.003	-.099		.046	.000	683	Sed	0.9	16.4

Appendix D, Table 6. Habitat relationships for the dominant shrimp in nearshore waters of southern Biscayne Bay. Original = regression coefficient and significance, rank = order variable entered in stepwise regression.

SHRIMP

Species	Farfanepenaeus duorarum pink shrimp		Thor manningi grass shrimp		Hippolyte zostericola grass shrimp		Thor floridanus grass shrimp		All Carideans	
Model	original	rank	original	rank	original	rank	original	rank	original	rank
R square	0.196		0.29		0.401		0.078		0.315	
No. Variables	6		11		13		6		14	
Intercept	-0.2		-15.991		7.447		-1.526		-7.08	
turbidity	_	-	-	-	-	-	-	-	-	-
seddepth	0.011	2	-	-	-	-	-	-	-	-
Litter	-	-	54.682	7	-	-	10.895	1	71.079	7
ThalSC	-	-	-	-	31.734	2	-	-	103.988	10
ThalSS	-	-	-	-	-1.004	13	-	-	-	-
ThalDen	-	-	2.28	2	0.684	8	-	-	2.633	1
HaloSC	-	-	-	-	-	-	-	-	-	-
HaloSS	-	-	-	-	-	-	-	-	-	-
SyrSC	-	-	-	-	-	-	-	-	-	-
Chara	-	-	-	-	-	-	-	-	-	-
gBatophora	-	-	52.64	6	-	-	-	-	-	-
cgPenicillus	-	-	-	-	-	-	-	-	-	-
cgAcetabularia	-	-	-	-	-	-	-	-	-	-
rLaurencia	-	-	-	-	13.396	3	-	-	20.587	5
gAnadyomene	-	-	301.536	4	-40.683	10	-	-	237.265	6
rHypnea	-	-	-	-	-	-	-	-	-	-
gCladophora	-	-	-	-	-	-	-	-	-	-
rDiginia	-	-	-	-	-	-	-	-	-	-
rSpyridia	-	-	-	-	-	-	-	-	-	-
gErnadesmis	-	-	-	-	-34.869	11	-	-	-176.092	11
bSargassum	-	-	-	-	-	-	-	-	-	-
gCaulerpa	-	-	-	-	-	-	-	-	-	-
gDerbesia	26.491	5	-	-	575.091	6	-	-	-	-
rDasya	-	-	246.412	3	-	-	-	-	292.915	3
gMicrodictyon	-	-	-	-	-	-	-	-	-	-
thal_len	-	-	-	-	-	-	-	-	-	-
thal_la	-	-	-	-	-0.001	9	-	-	-0.004	9
hal_len	0.007	3	-	-	-	-	-	-	-	-
hal_la	-	-	-	-	-	-	-	-	-	-
syr_len	-	-	-	-	-	-	-	-	-1.996	14
syr_la	-	-	-	-	-0.399	12	-	-	-	-
tot_la	-	-	-0.002	8	-	-	-	-	-	-

Appendix D, Table 6. Con't

Species	Farfanepenaeus duorarum		Thor manningi		Hippolyte zostericola		Thor floridanus		All Carideans	
SedTex	-	-	-	-	-1.072	7	-	-	-	-
Canopy	0.055	1	1.271	11	-	-	-	-	-	-
dThalassia	-	-	-	-	-	-	1.349	5	-	-
dHalodule	-	-	-12.857	10	-	-	-	-	-15.401	8
dSyringodium	-	-	42.173	5	47.422	1	-	-	87.078	4
dCGHalimeda	-	-	-	-	-	-	-	-	-	-
dCGUdotea	-	-	-	-	-	-	-	-	-	-
dCGPenicillus	-	-	-32.558	9	-	-	-	-	-29.868	12
dCGRhipocephalus	-	-	-	-	-	-	-	-	-	-
dCGAcetabularia	-	-	-	-	-	-	6.947	3	-	-
dCGOther	-	-	-	-	-	-	-	-	-	-
dCGTotal	-	-	-	-	-	-	2.082	6	-	-
dANAdyomene	-0.819	6	-	-	-	-	14.953	4	-	-
dBATophora	0.289	4	54.199	1	-	-	-	-	64.235	2
dCAUlerpa	-	-	-	-	-	-	-	-	-	-
dNEOmeris	-	-	-	-	2608.517	5	-	-	-	-
dVALonia	-	-	-	-	-	-	-	-	-	-
dGreenOther	-	-	-	-	-	-	5.347	2	19.656	13
dGreenTotal	-	-	-	-	-	-	-	-	-	-
dLAUrencia	-	-	-	-	-	-	-	-	-	-
dRedOther	-	-	-	-	-	-	-	-	-	-
dDriftRed	-	-	-	-	-	-	-	-	-	-
dCorallineRed	-	-	-	-	465.823	4	-	-	-	-
dBrownOther	-	-	-	-	-	-	-	-	-	-
dSARgassum	-	-	-	-	-	-	-	-	-	-
dSPOnge	-	-	-	-	-	-	-	-	-	-
P-value	p = .1	p = .05	p = .01	p = .001						

Appendix D, Table 7. Habitat relationships for the dominant shrimp in nearshore waters of southern Biscayne Bay. Original = regression coefficient and significance, rank = order variable entered in stepwise regression.

FISH

Species	Lucania parva rainwater killifish		Gobiosoma robustum code goby		Diplogrammus pauciradiatus spotted dragonet		Opsanus beta Gulf toadfish		Anarchopterus criniger fringed pipefish		Microgobius gulosus clown goby		All Fish	
Model	original	rank	original	rank	original	rank	original	rank	orginal	rank	original	rank	original	rank
R square	0.47		0.171		0.079		0.24		0.263		0.269		0.504	
No. Variables	14		14		6		8		7		6		17	
Intercept	-4.842		-0.105		0.448		-0.156		0.003		0.011		-3.193	
turbidity	-	-	0.132	3	-	-	-	-	-	-	-	-	-	-
seddepth	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Litter	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ThalSC	-	-	0.876	12	-0.404	5	-	-	-	-	-	-	-	-
ThalSS	-	-	-	-	-	-	-	-	0.017	5	-	-	-	-
ThalDen	-	-	0.022	9	-	-	0.025	1	-	-	-	-	0.093	10
HaloSC	-47.671	11	-	-	-	-	-	-	-	-	2.231	5	-40.575	14
HaloSS	-	-	0.021	13	-	-	-	-	-	-	-	-	-	-
SyrSC	-	-	-	-	-	-	-	-	-	-	-91.748	2	-	-
Chara	-	-	-	-	-	-	-	-	-	-	3.559	4	-	-
gBatophora	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cgPenicillus	4.73	9	-	-	-	-	-	-	-	-	-	-	4.057	12
cgAcetabularia	72.431	5	-	-	-	-	-	-	-	-	-	-	80.978	5
rLaurencia	1.174	15	0.254	6	-	-	0.198	2	0.144	4	-	-	1.948	9
gAnadyomene	-13.367	14	-	-	-	-	-	-	-	-	-	-	-12.872	16
rHypnea	12.923	10	-	-	-	-	-	-	-	-	-	-	11.793	13
gCladophora	-	-	-	-	-	-	-	-	-	-	-	-	-	-
rDiginia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
rSpyridia	5.87	6	-	-	-	-	-	-	-	-	-	-	5.121	8
gErnadesmis	-	-	-1.551	14	-	-	-	-	-	-	-	-	-	-
bSargassum	-	-	-	-	-	-	9.317	3	-	-	-	-	-	-
gCaulerpa	-	-	-	-	-	-	-	-	-	-	-	-	-	-
gDerbesia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
rDasya	-	-	-	-	-	-	-	-	3.691	1	-	-	-	-
gMicrodictyon	-	-	-	-	-	-	-	-	-	-	-	-	-	-
thal_len	-	-	0.004	11	0.005	6	-	-	-	-	-	-	-	-
thal_la	-	-	-	-	-	-	-	-	-	-	-	-	0.001	15
hal_len	0.088	4	0.007	10	-	-	-0.007	6	-	-	-	-	0.069	4
hal_la	-	-	-	-	-	-	-	-	-	-	-0.00006	6	-	-
syr_len	-	-	-	-	-	-	-	-	-	-	-	-	-	-
syr_la	-	-	-	-	-	-	-	-	-	-	-	-	-	-
tot_la	0.002	1	0.00006	8	-	-	-	-	-	-	-	-	0.001	1

Appendix D, Table 7. Con't

Species	Lucania parva		Gobiosoma robustum		Diplogrammus pauciradiatus		Opsanus beta		Anarchopterus criniger		Microgobius gulosus		All Fish	
SedTex	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canopy	0.338	3	-	-	-0.022	3	-	-	-	-	-	-	0.335	3
dThalassia	-	-	0.077	1	-	-	-	-	-	-	-	-	-	-
dHalodule	-	-	-	-	-	-	0.304	5	-	-	0.408	1	1.808	11
dSyringodium	-	-	-	-	-	-	-	-	0.558	3	-	-	-	-
dCGHalimeda	-	-	-	-	0.594	2	-	-	-	-	-	-	-	-
dCGUdotea	-	-	-0.937	4	0.431	4	-	-	-	-	-	-	-	-
dCGPenicillus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dCGRhipocephalus	-18.302	13	-	-	-	-	-	-	-	-	-	-	-17.696	17
dCGAcetabularia	-	-	5.569	7	-	-	-	-	-	-	-	-	-	-
dCGOther	8.678	7	0.727	5	-	-	-	-	-	-	-	-	11.09	7
dCGTotal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dANAdyomene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dBATophora	-	-	-	-	-	-	-	-	0.324	2	-	-	-	-
dCAUlerpa	-	-	-	-	-	-	-	-	-0.49	6	-	-	-	-
dNEOmeris	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dVALonia	-	-	-	-	24.983	1	-	-	-	-	-	-	-	-
dGreenOther	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dGreenTotal	-	-	-	-	-	-	1.793	4	-	-	0.188	3	-	-
dLAUrencia	1.601	8	-	-	-	-	0.145	8	0.091	7	-	-	2.083	6
dRedOther	3.39	2	0.161	2	-	-	0.22	7	-	-	-	-	3.949	2
dDriftRed	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dCorallineRed	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dBrownOther	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dSARgassum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dSPOnge	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P-value	p = .1		p = .05		p = .01		p = .001							

Appendix D, Table 8. Habitat relationships for the dominant shrimp in nearshore waters of southern Biscayne Bay. Original = regression coefficient and significance, rank = order variable entered in stepwise regression.

CRABS

Species	Eurypanopeus sp.		Libinia sp.		Callinectes similis lesser blue crab		Callinectes sapidus blue crab		Rithropanopeus sp. mud crab		Panopeus sp. mud crab		All Crabs	
Model	original	rank	original	rank	original	rank	original	rank	original	rank	original	rank	original	rank
R square	0.104		0.45		0.149		0.144		0.238		0.105		0.116	
No. Variables	4		4		7		7		3		8		6	
Intercept	0.336		0.018		0.044		0.022		0.015		-0.039		0.66	
turbidity	-	-	-	-	0.028	3	-	-	-	-	-	-	-	-
seddepth	-	-	-	-	-	-	0.001	7	-	-	-	-	-	-
Litter	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ThalSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ThalSS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ThalDen	-	-	-	-	-	-	-	-	-	-	0.006	3	-	-
HaloSC	-13.974	2	-	-	-	-	-	-	-	-	-	-	-13.966	2
HaloSS	-0.042	4	-	-	-	-	-	-	-	-	-	-	-0.05	5
SyrSC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chara	-	-	-	-	-	-	-	-	-	-	-	-	-	-
gBatophora	-	-	0.189	3	-	-	-	-	-	-	-	-	-	-
cgPenicillus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cgAcetabularia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
rLaurencia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
gAnadyomene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
rHypnea	-	-	-	-	-	-	-	-	-	-	-	-	-	-
gCladophora	-	-	-	-	-	-	0.612	3	-	-	-	-	-	-
rDiginia	-	-	-	-	0.224	2	-	-	-	-	-	-	-	-
rSpyridia	-	-	-	-	-	-	0.288	1	-	-	-	-	-	-
gErnadesmis	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bSargassum	-	-	-	-	-	-	-	-	15.845	1	5.747	1	21.634	4
gCaulerpa	-	-	-	-	1.679	1	-	-	-	-	-	-	-	-
gDerbesia	-	-	26.958	2	-	-	7.887	4	-	-	-	-	-	-
rDasya	2.043	3	1.553	1	-	-	-	-	-	-	-	-	3.683	3
gMicrodictyon	-	-	-	-	-	-	0.479	5	-	-	-	-	-	-
thal_len	-	-	-	-	-	-	-	-	-	-	-	-	-	-
thal_la	-	-	-	-	-	-	-	-	-	-	0.00006	8	-	-
hal_len	-	-	-	-	-	-	-	-	-	-	-	-	-	-
hal_la	0.001	1	-	-	-	-	-	-	-	-	-	-	0.001	1
syr_len	-	-	-	-	-	-	-	-	-	-	-	-	-	-
syr_la	-	-	-	-	-	-	-	-	-	-	-	-	-	-
tot_la	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix D, Table 8. Con't

Species	Eurypanopeus sp.		Libinia sp.		Callinectes similis		Callinectes sapidus		Rithropanopeus sp.		Panopeus sp.		All Crabs	
SedTex	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Canopy	-	-	-	-	-0.005	6	-	-	-	-	-	-	-	-
dThalassia	-	-	-	-	0.017	7	-	-	-	-	-	-	-	-
dHalodule	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dSyringodium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dCGHalimeda	-	-	-	-	-0.113	5	-	-	-	-	-	-	-	-
dCGUdotea	-	-	-	-	-	-	-	-	-0.407	3	-	-	-1.64	6
dCGPenicillus	-	-	-	-	-	-	-0.056	6	-	-	-0.118	5	-	-
dCGRhipocephalus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dCGAcetabularia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dCGOther	-	-	-	-	-	-	0.2	2	-	-	-	-	-	-
dCGTotal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dANAdyomene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dBATophora	-	-	-	-	-	-	-	-	-	-	0.101	2	-	-
dCAUlerpa	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dNEOmeris	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dVALonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dGreenOther	-	-	-	-	-	-	-	-	-	-	0.057	7	-	-
dGreenTotal	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dLAUrencia	-	-	-	-	-	-	-	-	0.064	2	-	-	-	-
dRedOther	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dDriftRed	-	-	-	-	2.25	4	-	-	-	-	-	-	-	-
dCorallineRed	-	-	-	-	-	-	-	-	-	-	-	-	-	-
dBrownOther	-	-	-	-	-	-	-	-	-	-	0.132	4	-	-
dSARgassum	-	-	-	-	-	-	-	-	-	-	0.803	6	-	-
dSPOnge	-	-	0.113	4	-	-	-	-	-	-	-	-	-	-

P-value	p = .1	p = .05	p = .01	p = .001

Appendix D, Table 9. Results from ANOVA relating the density of dominat species to collection, salzone, depthzone, geozone and zone, from throw-trap data, October 2002 thru September 2004.

	Model Statistics		Type III Sums of Squares	Mean/Standard Error Values by Salzone			Mean/Standard Error Values by Geozone		Mean/Standard Error Values by Depthzone		Significance Differences of Factor
Model	R2	df	P-value	1	2	3	S	N	I	O	95%ci
SHRIMP											
				Farfantepenaeus duorarum, pink shrimp							
Full Model	.217	695	.000								
Main Effects											
Collection			.000								
Salzone			.048	1.015/.146	.627/.086	.620/.091					1>2,3
Geozone			.019				.589/.080	.864/.085			N>S
Depthzone			.000						1.053/.086	.430/.080	I>0
				Mean/Standard Error Values by Zone					Significance Differences of Factor		
				1S	2S	3S	2N	3N	95%ci		
Zones			.000	1.015/.146	.439/.106	.075/.178	.814/.136	.913/.101	1S>2S, 3S; 2N, 3N>2S, 3S; 3S<2N		
				Thor mannigi, grass shrimp							
Full Model	.146	695	.000								
Main Effects											
Collection			.000								
Salzone			.747	40.194/10.802	49.764/6.392	33.988/6.716					ns
Geozone			.283				31.797/5.964	55.648/6.278			N>S
Depthzone			.716						43.926/6.368	40.989/5.911	ns
				Mean/Standard Error Values by Zone					Significance Differences of Factor		
				1S	2S	3S	2N	3N	95%ci		
Zones			.008	40.194/10.802	39.352/7.881	2.171/13.189	60.176/10.066	51.120	1S>3S; 3S<all;		
				Hippolyte zostericola, grass shrimp							
Full Model	.251	695	.000								
Main Effects											
Collection			.000								
Salzone			.019	17.098/2.632	19.001/1.558	12.689/1.636					2>3
Geozone			.000				11.313/1.453	22.952/1.530			N>S
Depthzone			.003						19.864/1.552	13.652/1.440	I>O
				Mean/Standard Error Values by Zone					Significance Differences of Factor		
				1S	2S	3S	2N	3N	95%ci		
Zones			.000	17.098/2.632	10.737/1.920	1.639/3.214	27.266/2.453	18.638/1.829	2N>all; 1S>3S; 2S<1S, 3N; 3N>3S		
				Thor floridanus, grass shrimp							
Full Model	.215	695	.000								
Main Effects											
Collection			.000								
Salzone			.011	4.714/2.300	9.622/1.361	3.923/1.430					2>3
Geozone			.767				6.367/1.270	6.915/1.337			ns
Depthzone			.895						6.743/1.356	6.499/1.259	ns
				Mean/Standard Error Values by Zone					Significance Differences of Factor		
				1S	2S	3S	2N	3N	95%ci		
Zones			.013	4.714/2.300	11.042/1.678	.757/2.808	8.202/2.143	5.627/2.808	2S>1S, 3N, 3S; 2N>3S		

Appendix D, Table 9. Con't

Model	Model Statistics R2	df	Type III Sums of Squares P-value	Mean/Standard Error Values by Salzone 1	2	3	Mean/Standard Error Values by Geozone S	N	Mean/Standard Error Values by Depthzone I	O	Significance Differences of Factor 95%ci
SHRIMP											
				All Caridean Shrimp							
Full Model	.133	695	.000								
Main Effects											
Collection			.000								
Salzone			.043	63.521/13.118	80.189/7.763	52.016/8.156					2>3
Geozone			.001				51.023/7.243	87.202/7.624			N>S
Depthzone			.344						72.474/7.733	62.475/7.178	ns
				Mean/Standard Error Values by Zone							Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.000	63.521/13.118	63.041/9.570	5.493/16.017	97.337/12.225	77.067/9.113			3S<all; 2N>2S
FISH											
				Lucania parva, rainwater killifish							
Full Model	.275	695	.000								
Main Effects											
Collection			.023								
Salzone			.004	6.812/0.950	4.732/0.562	3.186/0.591					1>3
Geozone			.000				3.024/0.525	6.752/0.522			N>S
Depthzone			.000						8.370/0.560	1.647/0.520	I>O
				Mean/Standard Error Values by Zone							Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.000	6.812/.950	.856/.693	.014/1.160	8.609/.886	4.894/.660			1S>2S, 3s; 2N>2S, 3S, 3N; 3N>3S
				Gobiosoma robustum, code goby							
Full Model	.162	695	.000								
Main Effects											
Collection			.000								
Salzone			.001	1.128/0.131	0.681/0.078	0.524/0.082					1>2, 1>3
Geozone			.164				0.662/0.073	0.808/0.076			ns
Depthzone			.001						0.912/0.077	0.575/0.072	I>O
				Mean/Standard Error Values by Zone							Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.000	1.128/.131	.542/.096	.018/.160	.821/.122	.796/.091			1S>2S, 3N; 3S<1S, 2S, 2N, 3N; 3N>3S
				Diplogrammus pauciradiatus, spotted dragonet							
Full Model	.148	695	.000								
Main Effects											
Collection			.003								
Salzone			.001	0.150/0.106	0.469/0.062	0.604/0.066					2>1, 3>1
Geozone			.781				0.455/0.058	0.431/0.061			ns
Depthzone			.000						0.212/0.062	0.634/0.058	O>I
				Mean/Standard Error Values by Zone							Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.000	.150/.106	.649/.077	.661/.129	.288/.098	.574/.073			1S<2S, 3N, 3S; 2N<2S, 3N,3S

Appendix D, Table 9. Con't

Model	Model Statistics R2	df	Type III Sums of Squares P-value	Mean/Standard Error Values by Salzone 1	2	3	Mean/Standard Error Values by Geozone S	N	Mean/Standard Error Values by Depthzone I	O	Significance Differences of Factor 95%ci
FISH											
					Opsanus beta, Gulf toadfish						
Full Model	.214	695	.000								
Main Effects											
Collection			.000								
Salzone			.039	0.521/0.105	0.593/0.062	0.364/0.065					2>3
Geozone			.000				0.322/0.058	0.724/0.061			N>S
Depthzone			.000						0.844/0.062	0.219/0.058	I>O
				Mean/Standard Error Values by Zone					Significance Differences of Factor		
				1S	2S	3S	2N	3N	95%ci		
Zones			.000	.521/.105	.282/.077	.029/.129	.904/.098	.545/.073	2N>all; 1S>3S; 3N>2S, 3S		
					Anarchopterus criniger, fringed pipefish						
Full Model	.096	695	.000								
Main Effects											
Collection			.073								
Salzone			.013	0.318/0.096	0.439/0.057	0.194/0.060					2>3
Geozone			.039				0.259/0.053	0.418/0.056			N>S
Depthzone			.017						0.227/0.057	0.412/0.053	I>O
				Mean/Standard Error Values by Zone					Significance Differences of Factor		
				1S	2S	3S	2N	3N	95%ci		
Zones			.010	.318/.096	.339/.070	.000/.114	.538/.090	.298/.118	3S<all; 2N>3N; 2S>3S;		
					Microgobius gulosus, clown goby						
Full Model	.077	695	.002								
Main Effects											
Collection			.652								
Salzone			.001	0.342/0.073	0.050/0.043	0.061/0.045					1>2, 1>3
Geozone			.159				.154/.040	0.072/0.042			ns
Depthzone			.001						0.229/0.043	0.027/0.040	I>O
				Mean/Standard Error Values by Zone					Significance Differences of Factor		
				1S	2S	3S	2N	3N	95%ci		
Zones			.009	.342/.073	.041/.053	.014/.089	.058/.068	.087/.050	1S>all		
					All Fish						
Full Model	.307	695	.000								
Main Effects											
Collection			.001								
Salzone			.000	10.323/1.022	7.754/0.605	5.383/0.635					1>2, 3; 2>3
Geozone			.000				5.618/0.564	9.926/0.594			N>S
Depthzone			.000						11.699/0.602	4.106/0.559	I>O
				Mean/Standard Error Values by Zone					Significance Differences of Factor		
				1S	2S	3S	2N	3N	95%ci		
Zones			.000	10.323/1.022	3.428/.746	.946/1.248	12.080/.952	7.772/.710	1S>2S, 3S, 3N; 2N>2S, 3S, 3N; 2S<3N; 3N>3S		

Appendix D, Table 9. Con't

Model	Model Statistics R2	df	Type III Sums of Squares P-value	Mean/Standard Error Values by Salzone 1	2	3	Mean/Standard Error Values by Geozone S	N	Mean/Standard Error Values by Depthzone I	O	Significance Differences of Factor 95%ci
CRABS											
					Eurypanopeus sp., mud crab						
Full Model	.001	695	.474								
Main Effects											
Collection			.286								
Salzone			.394	0.551/0.212	0.459/0.126	0.292/0.132					ns
Geozone			.358				0.356/0.117	0.507/0.123			ns
Depthzone			.837						0.486/0.125	0.371/0.116	ns
					Mean/Standard Error Values by Zone						Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.464	.551/.212	.337/.155	.029/.259	.580/.198	.434/.147			ns
					Libinia sp., spider crab						
Full Model	.073	695	.002								
Main Effects											
Collection			.001								
Salzone			.185	0/036/0.031	0.071/0.018	0.024/0.019					ns
Geozone			.747				0.044/0.017	0.052/0.018			ns
Depthzone			.899						0.049/0.018	0.046/0.017	ns
					Mean/Standard Error Values by Zone						Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.406	.036/.031	.075/.022	.000/.038	.067/.029	.037/.021			ns
					Callinectes similis, lesser blue crab						
Full Model	.083	695	.001								
Main Effects											
Collection			.000								
Salzone			.018	0.124/0.027	0.040/0.016	0.042/0.017					1>2, 3
Geozone			.096				0.075/0.015	0.039/0.016			ns
Depthzone			.490						0.067/0.016	0.052/0.015	ns
					Mean/Standard Error Values by Zone						Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.078	.124/.027	.050/.020	.029/.033	.029/.025	.049/.019			1S>all
					Callinectes sapidus, blue crab						
Full Model	.000	695	.495								
Main Effects											
Collection			.352								
Salzone			.193	0.085/0.028	0.027/0.017	0.036/0.017					ns
Geozone			.648				0.047/0.015	0.037/0.016			ns
Depthzone			.287						0.056/0.017	0.032/0.015	ns
					Mean/Standard Error Values by Zone						Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.266	.085/.028	.035/.020	.000/.034	.019/.026	.055/.019			ns

Appendix D, Table 9. Con't

Model	Model Statistics R2	df	Type III Sums of Squares P-value	Mean/Standard Error Values by Salzone 1	2	3	Mean/Standard Error Values by Geozone S	N	Mean/Standard Error Values by Depthzone I	O	Significance Differences of Factor 95%ci
CRABS con't											
				Rithropanopeus sp., mud crab							
Full Model	.108	696	.000								
Main Effects											
Collection			.001								
Salzone			.169	0.004/0.050	0.089/0.029	0.020/0.031					ns
Geozone			.904				0.049/0.027	0.044/0.029			ns
Depthzone			.050						0.090/0.029	0.012/0.027	ns
				Mean/Standard Error Values by Zone							Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.228	.004/.050	.121/.036	.000/.060	.058/.046	.031/.034			ns
				Panopeus sp., mud crab							
Full Model	.052	696	.019								
Main Effects											
Collection			.000								
Salzone			.190	0.098/0.038	0.021/0.022	0.056/0.024					ns
Geozone			.694				0.055/0.021	0.043/0.022			ns
Depthzone			.512						0.061/0.022	0.041/0.021	ns
				Mean/Standard Error Values by Zone							Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
Zones			.154	.098/.038	.041/.028	.000/.046	.000/.035	.086/.026			ns
				All Crabs							
Full Model	.014	695	.268								
Main Effects											
Collection			.244								
Salzone			.294	0.917/0.239	0.760/0.141	0.520/0.148					ns
Geozone			.733				0.684/0.132	0.750/0.139			ns
Depthzone			.216						0.844/0.141	0.606/0.131	ns
				Mean/Standard Error Values by Zone							Significance Differences of Factor
				1S	2S	3S	2N	3N			95%ci
			.285	.917/.239	.757/.174	.118/.291	.763/.222	.737/.166			ns

Appendix D, Table 10a. Results of regression analysis relating the abundance of dominant shrimp, fish and crabs to habitat (from Tables 6-8, Appendix D), depthzone (depth), collection (Coll), latitude (Lat) salinity (Sal+Sal^2) and temperature (Tmp+Tmp^2) in nearshore waters of southern Biscayne Bay. - = for selected variables, Lat, Sal^2 and Tmp^2, not signicant at P-value < .1 in full model.

	Regression coefficients, P-value								Model statistics					
Model	Intercept	Depth	Coll	Lat	Sal	Sal^2	Tmp	Tmp^2	R2	P-value	df	Variable	unique R2	%
SHRIMP														
					Farfantepenaeus duorarum, pink shrimp									
Y=Habitat+Depth+Coll+Sal+Tmp	-.705	-.411	.049	-	.007	-	.030	-	.232	.000	683	Full Model	23.2	100.0
Y=Habitat+Coll+Sal+Tmp	-1.216		.056	-	-.002	-	.030	-	.219	.000	684	Depth	1.3	5.6
Y=Habitat+Depth+Sal+Tmp	-.937	-.449		-	.017	-	.040	-	.225	.000	684	Coll	0.7	3.0
Y=Habitat+Depth+Coll+Tmp	-.556	-.386	.054	-		-	.029	-	.233	.000	684	Sal	-0.1	
Y=Habitat+Depth+Coll+Sal	.062	-.410	.063	-	.006	-		-	.225	.000	684	Tmp	0.7	3.0
Y=Depth+Coll+Sal+Tmp	1.502	-761	.088	-	-.008	-	.034	-	.124	.000	693	Habitat	10.8	46.6
					Thor mannigi, grass shrimp									
Y=Habitat+Depth+Coll+Sal+TMP+TMP^2	-299.155	-3.299	.525	-	1.877	-	17.458	-.324	.306	.000	677	Full Model	30.6	100.0
Y=Habitat+Coll+Sal+Tmp+Tmp^2	-303.088		.591	-	1.804	-	17.438	-.324	.307	.000	677	Depth	-0.1	
Y=Habitat+Depth+Sal+Tmp+Tmp^2	-280.520	-3.692		-	1.983	-	16.053	-.298	.307	.000	677	Coll	-0.1	
Y=Habitat+Depth+Coll+Tmp+Tmp^2	-324.574	3.420	2.023	-		-	23.409	-.433	.298	.000	678	Sal	0.8	2.6
Y=Habitat+Depth+Coll+SAL	-73.250	-3.019	-1.092	-	2.250	-			.301	.000	678	Tmp+Tmp^2	0.5	1.6
Y=Depth+Coll+Sal+Tmp+Tmp^2	-414.911	-14.948	5.812	-	.817	-	31.352	-.577	.043	.000	693	Habitat	26.4	86.3
					Hippolyte zostericola, grass shrimp									
Y=Habitat+Depth+Coll+Lat+Sal+Tmp	-1176.648	-3.911	.005	47.596	.133	-	-1.086	-	.433	.000	689	Full Model	43.3	100.0
Y=Habitat+Coll+Lat+Sal+Tmp	-1189.533		.056	47.927	.033	-	-1.069	-	.430	.000	689	Depth	0.3	0.7
Y=Habitat+Depth+Lat+Sal+Tmp	-1176.852	-3.914		47.603	.134	-	-1.085	-	.434	.000	689	Coll	-0.1	
Y=Habitat+Depth+Coll+Sal+Tmp	39.649	-3.954	.018		.102	-	-1.119	-	.428	.000	689	Lat	0.5	1.2
Y=Habitat+Depth+Coll+Tmp	-1120.588	-3.201	.068	45.486		-	-1.089	-	.434	.000	690	Sal	-0.0	
Y=Habitat+Depth+Coll+Sal	-1386.386	-3.347	-.357	54.767	.132	-		-	.403	.000	690	Tmp	3.0	6.9
Y=Depth+Coll+Lat+Sal+Tmp	2443.888	-9.625	-.213	97.875	.178	-	-1.009	-	.088	.000	693	Habitat	34.5	79.7
					Thor floridanus, grass shrimp									
Y=Habitat+Depth+Coll+Sal+Tmp	17.200	2.962	-.395	-	-.224	-	-.467	-	.068	.000	682	Full Model	6.8	100.0
Y=Habitat+Coll+Sal+Tmp	20.570		-.451	-	-.146	-	-.471	-	.065	.000	682	Depth	0.1	1.5
Y=Habitat+Depth+Sal+Tmp	17.713	3.292		-	-.284	-	-.553	-	.066	.000	682	Coll	0.2	2.9
Y=Habitat+Depth+Coll+Tmp	12.919	2.018	-.523	-		-	-.455	-	.066	.000	683	Sal	0.2	2.9
Y=Habitat+Depth+Coll+Sal	5.476	3.045	-.617	-	-.212	-		-	.060	.000	683	Tmp	0.8	11.8
Y=Depth+Coll+Sal+Tmp	30.379	.905	-.684	-	-.296	-	-.459	-	.033	.000	693	Habitat	3.5	51.5
					All Caridean Shrimp									
Y=Habitat+Depth+Coll+Sal+Tmp+Tmp^2	-139.030	-8.509	1.954	-	1.816	-	9.304	.167	.327	.000	676	Full Model	31.8	100.0
Y=Habitat+Coll+Sal+Tmp+Tmp^2	-148.968		2.178	-	1.274	-	9.277	-.213	.327	.000	676	Depth	0.0	0.0
Y=Habitat+Depth+Sal+Tmp+Tmp^2	-79.094	-10.218		-	1.839	-	4.984	-.131	.326	.000	676	Coll	0.1	0.3
Y=Habitat+Depth+Coll+Tmp+Tmp^2	-172.809	-2.761	3.178	-		-	13.831	-.296	.325	.000	677	Sal	0.2	0.6
Y=Habitat+Depth+Coll+Sal	-44.681	-8.774	-.268	-	1.816	-			.318	.000	677	Tmp+Tmp^2	0.9	2.8
Y=Depth+Coll+Sal+Tmp+Tmp^2	-236.387	-25.117	4.528	-	.717	-	23.535	-.466	.024	.001	693	Habitat	30.3	95.3

P-value	p = .1	p = .05	p = .01	p = .001

Appendix D, Table 10a. Con't

Model	Regression coefficients, P-value								Model statistics					
	Intercept	Depth	Coll	Lat	Sal	Sal^2	Tmp	Tmp^2	R2	P-value	df	Variable	unique R2	%
FISH														
					Lucania parva, rainwater killifish									
Y=Habitat+Depth+Coll+Sal+Sal^2+Tmp	8.424	-2.668	-.060	-	-719	.012	.106	-	.471	.000	686	Full Model	47.1	100.0
Y=Habitat+Coll+Sal+Sal^2+Tmp	4.714		-.028	-	-.776	.012	.114	-	.458	.000	686	Depth	1.3	2.8
Y=Habitat+Depth+Sal+Sal^2+Tmp	8.381	-2.636		-	-.708	.012	.093	-	.471	.000	686	Coll	0.0	0.0
Y=Habitat+Depth+Coll+Tmp	-1.123	-3.017	-.093	-			.104	-	.465	.000	687	Sal+Sal^2	0.6	1.3
Y=Habitat+Depth+Coll+Sal+Sal^2	10.243	-2.741	-.012	-	-.663	.011		-	.471	.000	687	Tmp	0.0	0.0
Y=Depth+Coll+Sal+Sal^2+Tmp	27.185	-7.129	-.163	-	-1.069	.018	.157	-	.167	.000	693	Habitat	30.4	64.5
					Gobiosoma robustum, code goby									
Y=Habitat+Depth+Coll+Sal+Tmp+Tmp^2	-2.245	-.162	.015	-	-.008	-	.207	-.004	.175	.000	675	Full Model	17.5	100.0
Y=Habitat+Coll+Sal+Tmp+Tmp^2	-2.407		.017	-	-.011	-	.203	-.004	.171	.000	675	Depth	0.4	2.3
Y=Habitat+Depth+Sal+Tmp+Tmp^2	-1.752	-.172		-	-.005	-	.173	-.003	.173	.000	675	Coll	0.2	1.1
Y=Habitat+Depth+Coll+Tmp+Tmp^2	-2.056	-.194	.009	-		-	.183	-.004	.172	.000	676	Sal	0.3	1.7
Y=Habitat+Depth+Coll+Sal	.406	-.149	-.004	-	-.005	-			.165	.000	676	Tmp+Tmp^2	1.0	5.7
Y=Depth+Coll+Sal+Tmp+Tmp^2	-1.368	-.463	-.024	-	-.008	-	.242	-.004	.049	.000	693	Habitat	12.6	72.0
					Diplogrammus pauciradiatus, spotted dragonet									
Y=Habitat+Depth+Coll+Lat+Sal+Tmp	-53.860	.428	-.021	2.095	.007	-	.004	-	.116	.000	683	Full Model	11.6	100.0
Y=Habitat+Coll+Lat+Sal+Tmp	-59.790		-023	2.347	.015	-	.003	-	.087	.000	683	Depth	2.9	25.0
Y=Habitat+Depth+Lat+Sal+Tmp	-55.356	.433		2.157	.003	-	.000	-	.113	.000	683	Coll	0.3	2.6
Y=Habitat+Depth+Coll+Sal+Tmp	-.355	.441	-.022		.006	-	.002	-	.109	.000	683	Lat	0.7	6.0
Y=Habitat+Depth+Coll+Tmp	-52.550	.450	-.017	.014		-	.004	-	.116	.000	684	Sal	0.0	0.0
Y=Habitat+Depth+Coll+Sal	-52.897	.428	-.020	2.061	.006	-		-	.118	.000	684	Tmp	-0.2	
Y=Depth+Coll+Lat+Sal+Tmp	-39.941	.522	-.024	1.544	.005	-	.008	-	.069	.000	693	Habitat	4.7	40.5
					Opsanus beta, Gulf toadfish									
Y=Habitat+Depth+Coll+Sal+Tmp	-.230	-.386	-.010	-	.012	-	.019	-	.260	.000	687	Full Model	26.0	100.0
Y=Habitat+Coll+Sal+Tmp	-.758		-.003	-	.004	-	.020	-	.236	.000	687	Depth	2.4	9.2
Y=Habitat+Depth+Sal+Tmp	-.201	-.379		-	.010	-	.016	-	.261	.000	687	Coll	-0.1	
Y=Habitat+Depth+Coll+Tmp	.005	-.346	-.003	-		-	.018	-	.258	.000	688	Sal	0.2	0.8
Y=Habitat+Depth+Coll+Sal	.239	-.391	.000	-	.011	-		-	.256	.000	688	Tmp	0.4	1.5
Y=Depth+Coll+Sal+Tmp	.684	-.680	-.013	-	.011	-	.022	-	.096	.000	693	Habitat	16.4	63.1
					Anarchopterus criniger, fringed pipefish									
Y=Habitat+Depth+Coll+Sal+Tmp	-.463	.141	-.017	-	.009	-	.003	-	.273	.000	690	Full Model	27.3	100.0
Y=Habitat+Coll+Sal+Tmp	-.313		-.021	-	.013	-	.002	-	.269	.000	690	Depth	0.4	1.5
Y=Habitat+Depth+Sal+Tmp	-.389	.157		-	.006	-	-.001	-	.271	.000	690	Coll	0.2	0.7
Y=Habitat+Depth+Coll+Tmp	-.310	.197	-.012	-		-	.002	-	.260	.000	691	Sal	1.3	4.8
Y=Habitat+Depth+Coll+Sal	-.395	.141	-.016	-	.009	-		-	.268	.000	691	Tmp	0.5	1.8
Y=Depth+Coll+Sal+Tmp	.213	.136	.025	-	-.003	-	-.009	-	.009	.040	693	Habitat	26.4	96.7

Appendix D, Table 10a. Con't

Model	Regression coefficients, P-value								Model statistics					
	Intercept	Depth	Coll	Lat	Sal	Sal^2	Tmp	Tmp^2	R2	P-value	df	Variable	unique R2	%
FISH														
					Microgobius gulosus, clown goby									
Y=Habitat+Depth+Coll+Sal+Tmp	.043	-.116	-.013	-	.000	-	.011	-	.244	.000	693	Full Model	24.4	100.0
Y=Habitat+Coll+Sal+Tmp	-.092		-.011	-	-.003	-	.011	-	.239	.000	693	Depth	0.5	2.0
Y=Habitat+Depth+Sal+Tmp	.078	-.107		-	-.002	-	.008	-	.241	.000	693	Coll	0.4	1.6
Y=Habitat+Depth+Coll+Tmp	.038	-.117	-.013	-		-	.011	-	.245	.000	694	Sal	-0.1	
Y=Habitat+Depth+Coll+Sal	.315	-.125	-.009	-	.000	-		-	.240	.000	694	Tmp	0.4	1.6
Y=Depth+Coll+Sal+Tmp	.554	-.250	-.010	-	-.009	-	.011	-	.054	.000	693	Habitat	19.0	77.9
					All Fish									
Y=Habitat+Depth+Coll+Sal+Tmp	1.074	-2.825	-.071	-	-.069	-	.117	-	.511	.000	685	Full Model	51.1	100.0
Y=Habitat+Coll+Sal+Tmp	-3.049		-.033	-	-.125	-	.124	-	.500	.000	685	Depth	0.1	0.2
Y=Habitat+Depth+Sal+Tmp	1.294	-2.782		-	-.080	-	.102	-	.512	.000	685	Coll	-0.1	
Y=Habitat+Depth+Coll+Tmp	-.357	-3.062	-.112	-		-	.120	-	.511	.000	686	Sal	0.0	0.0
Y=Habitat+Depth+Coll+Sal	3.791	-2.916	-.020	-	-.059	-		-	.511	.000	686	Tmp	0.0	0.0
Y=Depth+Coll+Sal+Tmp	20.400	-8.423	-.187	-	-.132	-	.174	-	.175	.000	693	Habitat	33.6	65.8
CRABS														
					Eurypanopeus sp., mud crab									
Y=Habitat+Depth+Coll+Sal+Tmp	.591	-.105	-.054	-	.002	-	.010	-	.095	.000	693	Full Model	9.5	100.0
Y=Habitat+Coll+Sal+Tmp	.478		-.053	-	-.001	-	.011	-	.096	.000	693	Depth	-0.1	
Y=Habitat+Depth+Sal+Tmp	.743	-.065		-	-.008	-	-.001	-	.087	.000	693	Coll	0.8	8.4
Y=Habitat+Depth+Coll+Tmp	.621	-.097	-.054	-		-	.010	-	.096	.000	694	Sal	-0.1	
Y=Habitat+Depth+Coll+Sal	.859	-.106	-.050	-	.001	-		-	.096	.000	694	Tmp	-0.1	
Y=Depth+Coll+Sal+Tmp	1.092	-.179	-.057	-	-.007	-	.008	-	.011	.021	693	Habitat	8.4	88.4
					Libinia, spider crab									
Y=Habitat+Depth+Coll+Sal+Tmp+Tmp^2	.693	-.018	.001	-	.001	-	-.045	.001	.438	.000	693	Full Model	43.8	100.0
Y=Habitat+Coll+Sal+Tmp+Tmp^2	.662		.001	-	.001	-	-.044	.001	.438	.000	693	Depth	0.0	0.0
Y=Habitat+Depth+Sal+Tmp+Tmp^2	.725	-.019		-	.001	-	-.047	.001	.439	.000	693	Coll	-0.1	
Y=Habitat+Depth+Coll+Tmp+Tmp^2	.661	-.012	.002	-		-	-.041	.001	.438	.000	693	Sal	0.0	0.0
Y=Habitat+Depth+Coll+Sal	.012	-.013	.001	-	.001	-			.429	.000	693	Tmp+Tmp^2	0.9	2.1
Y=Depth+Coll+Sal+Tmp+Tmp^2	1.194	-.012	.004	-	.001	-	-.076	.001	.030	.000	693	Habitat	40.8	93.2
					Callinectes similis, lesser blue crab									
Y=Habitat+Depth+Coll+Sal+Tmp	.152	-.028	.001	-	-.002	-	-.001	-	.134	.000	681	Full Model	13.4	100.0
Y=Habitat+Coll+Sal+Tmp	.118		.002	-	-.002	-	-.001	-	.134	.000	681	Depth	0.0	0.0
Y=Habitat+Depth+Sal+Tmp	.148	-.028		-	-.001	-	-.001	-	.135	.000	681	Coll	-0.1	
Y=Habitat+Depth+Coll+Tmp	.122	-.033	.001	-		-	-.001	-	.135	.000	682	Sal	-0.1	
Y=Habitat+Depth+Coll+Sal	.124	-.027	.001	-	-.002	-		-	.135	.000	682	Tmp	-0.1	
Y=Depth+Coll+Sal+Tmp	.188	-.033	-.003	-	-.002	-	.000	-	.006	.000	693	Habitat	12.8	95.5

Appendix D, Table 10a. Con't

Model	Regression coefficients, P-value								Model statistics					
	Intercept	Depth	Coll	Lat	Sal	Sal^2	Tmp	Tmp^2	R2	P-value	df	Variable	unique R2	%
CRABS														
					Callinectes sapidus, blue crab									
Y=Habitat+Depth+Coll+Sal+Tmp+Tmp^2	.589	-.016	.001	-	-.001	-	-.042	.001	.154	.000	669	Full Model	15.4	100.0
Y=Habitat+Coll+Sal+Tmp+Tmp^2	.568		.001	-	-.002	-	-.042	.001	.154	.000	669	Depth	0.0	0.0
Y=Habitat+Depth+Sal+Tmp+Tmp^2	.629	-.017		-	-.001	-	-.045	.001	.155	.000	669	Coll	-0.0	0.0
Y=Habitat+Depth+Coll+Tmp+Tmp^2	.592	-.019	.000	-		-	-.044	.001	.149	.000	670	Sal	0.5	3.2
Y=Habitat+Depth+Coll+Sal	.071	-.016	.005	-	-.002	-			.143	.000	670	Tmp+Tmp^2	1.1	7.1
Y=Depth+Coll+Sal+Tmp+Tmp^2	.726	-.049	.000	-	.001	-	-.050	.001	.017	.005	693	Habitat	13.7	89.0
					Rithropanopeus sp., mud crab									
Y=Habitat+Depth+Coll+Sal+Tmp+Tmp^2	-1.480	-.060	.008	-	.006	-	.095	-.002	.256	.000	687	Full Model	25.6	100.0
Y=Habitat+Coll+Sal+Tmp+Tmp^2	-1.560		.008	-	.005	-	.096	-.002	.253	.000	687	Depth	0.3	1.2
Y=Habitat+Depth+Sal+Tmp+Tmp^2	-1.243	-.063		-	.008	-	.077	-.001	.255	.000	687	Coll	0.1	0.4
Y=Habitat+Depth+Coll+Tmp+Tmp^2	-1.608	-.036	.012	-		-	.112	-.002	.252	.000	688	Sal	0.4	1.6
Y=Habitat+Depth+Coll+Sal	-.128	-.064	.005	-	.008	-			.249	.000	688	Tmp+Tmp^2	0.7	2.7
Y=Depth+Coll+Sal+Tmp+Tmp^2	-1.355	-.070	.018	-	.003	-	.093	-.002	.022	.001	693	Habitat	23.4	91.4
					Panopeus sp., mud crab									
Y=Habitat+Depth+Coll+Sal+Tmp+Tmp^2	-.921	-.037	.014	-	.003	-	.057	-.001	.120	.000	675	Full Model	12.0	100.0
Y=Habitat+Coll+Sal+Tmp+Tmp^2	-.963		.016	-	.001	-	.058	-.001	.119	.000	675	Depth	0.1	0.8
Y=Habitat+Depth+Sal+Tmp+Tmp^2	-.481	-.051		-	.018	-	.026	.000	.111	.000	675	Coll	0.9	7.5
Y=Habitat+Depth+Coll+Tmp+Tmp^2	-.981	-.026	.017	-		-	.065	-.001	.119	.000	676	Sal	0.1	0.8
Y=Habitat+Depth+Coll+Sal	-.154	-.037	.010	-	.004	-			.117	.000	676	Tmp	0.3	2.5
Y=Depth+Coll+Sal+Tmp+Tmp^2	-.979	-.050	.003	-	.001	-	.073	-.001	.016	.007	693	Habitat	11.4	95.0
					All Crabs									
Y=Habitat+Depth+Coll+Sal+Tmp	.584	-.224	-.027	-	.013	-	.011	-	.102	.000	687	Full Model	10.2	100.0
Y=Habitat+Coll+Sal+Tmp	.353		-.025	-	.007	-	.012	-	.101	.000	687	Depth	0.1	1.0
Y=Habitat+Depth+Sal+Tmp	.584	-.224	-.027	-	.013	-	.011	-	.102	.000	687	Coll	0.0	0.0
Y=Habitat+Depth+Coll+Tmp	.656	-.209		-	.008	-	.005	-	.101	.000	687	Sal	0.1	1.0
Y=Habitat+Depth+Coll+Sal	.864	-.223	-.022	-	.012	-		-	.103	.000	688	Tmp	-0.1	
Y=Depth+Coll+Sal+Tmp	1.316	-.353	-.021	-	-.001	-	.004	-	.002	.238	693	Habitat	10.0	98.0

Appendix D, Table 10b. Results of regression analysis relating the abundance of dominant shrimp, fish and crabs to experimental design factors, collection, depthzone, geozone, salzone in nearshore waters of southern Biscayne Bay.

Model	Regression coefficients Intercept	Collection	Depthzone	Geozone	Salzone	R2	P-value	Model statistics df	Variable	unique R2	%
SHRIMP											
Farfantepenaeus duorarum, pink shrimp											
Y=Collection+Depthzone+Geozone+Salzone	1.129	.084	-.656	.382	-.242	.125	.000	695	Full Model	12.5	100.0
Y=Depthzone+Geozone+Salzone	1.732		-.664	.390	-.245	.081	.000	695	Collection	4.4	35.2
Y=Collection+Geozone+Salzone	.251	.085		.612	-.468	.086	.000	695	Depth	3.9	31.2
Y=Collection+Depthzone+Salzone	1.471	.085	-.758		-.080	.116	.000	.695	Geozone	0.9	7.2
Y=Collection+Depthzone+Geozone	1.095	.084	-.782	.178		.118	.000	695	Salzone	0.7	5.6
Thor manningi, grass shrimp											
Y=Collection+Depthzone+Geozone+Salzone	-13.655	4.166	.930	39.764	-15.560	0.041	.000	695	Full Model	4.1	100.0
Y=Depthzone+Geozone+Salzone	16.226		.520	40.125	-15.726	.020	.001	695	Collection	2.0	48.8
Y=Collection+Geozone+Salzone	-12.410	4.165		39.439	-15.239	.042	.000	695	Depth	-0.1	
Y=Collection+Depthzone+Salzone	21.941	-9.652	-9.652		1.315	.020	.001	695	Geozone	2.0	48.8
Y=Collection+Depthzone+Geozone	-15.840	4.180	-7.201	26.603		.036	.000	695	Salzone	0.5	12.2
Hippolyte zostericola, grass shrimp											
Y=Collection+Depthzone+Geozone+Salzone	17.322	-.576	-5.103	16.673	-6.418	.085	.000	695	Full Model	8.5	100.0
Y=Depthzone+Geozone+Salzone	13.193		-5.047	16.623	-6.395	.081	.000	695	Collection	0.4	4.7
Y=Collection+Geozone+Salzone	10.487	-.568		18.458	-8.176	.080	.000	695	Depth	0.1	1.2
Y=Collection+Depthzone+Salzone	32.247	-.560	-9.540		.658	.030	.000	695	Geozone	5.5	64.7
Y=Collection+Depthzone+Geozone	16.421	-.570	-8.457	11.245		.070	.000	695	Salzone	1.5	17.6
Thor floridanus, grass shrimp											
Y=Collection+Depthzone+Geozone+Salzone	11.456	-1.001	.982	3.002	-1.865	.023	.001	695	Full Model	2.3	100.0
Y=Depthzone+Geozone+Salzone	4.275		1.080	2.915	-1.825	-.002	.601	695	Collection	2.5	108.7
Y=Collection+Geozone+Salzone	12.771	-1.003		2.658	-1.527	.024	.000	695	Depth	-0.1	
Y=Collection+Depthzone+Salzone	14.143	-.998	.183		-.591	.022	.000	695	Geozone	0.1	4.3
Y=Collection+Depthzone+Geozone	11.194	-1.000	.007	1.424		.022	.000	695	Salzone	0.1	4.3
All Caridean Shrimp											
Y=Collection+Depthzone+Geozone+Salzone	17.959	2.534	-3.726	59.538	-23.889	.040	.000	695	Full Model	4.0	100.0
Y=Depthzone+Geozone+Salzone	36.137		-3.976	59.757	-23.990	.036	.000	695	Collection	0.4	10.0
Y=Collection+Geozone+Salzone	12.969	2.540		60.841	-25.173	.041	.000	695	Depth	-0.1	
Y=Collection+Depthzone+Salzone	71.256	2.591	-19.571		1.377	.007	.000	695	Geozone	3.3	82.5
Y=Collection+Depthzone+Geozone	14.605	2.555	-16.210	39.331		.030	.000	695	Salzone	1.0	25.0
FISH											
Lucania parva, rainwater killifish											
Y=Collection+Depthzone+Geozone+Salzone	14.273	-.138	-6.448	4.590	-2.486	.184	.000	695	Full Model	18.4	100.0
Y=Depthzone+Geozone+Salzone	13.281		-6.435	4.578	-2.481	.182	.000	695	Collection	0.2	1.1
Y=Collection+Geozone+Salzone	5.638	-.129		6.846	-4.709	.102	.000	695	Depth	8.2	44.6
Y=Collection+Depthzone+Salzone	18.382	-.134	-7.670		-.539	.153	.000	695	Geozone	3.1	16.8
Y=Collection+Depthzone+Geozone	13.924	-.136	-7.748	2.487		.166	.000	695	Salzone	1.8	9.8
Gobiosoma robustum, code goby											
Y=Collection+Depthzone+Geozone+Salzone	1.624	-.043	-.239	.512	-.444	.082	.000	695	Full Model	8.2	100.0
Y=Depthzone+Geozone+Salzone	1.319		-.235	.508	-.442	.068	.000	695	Collection	1.4	17.1
Y=Collection+Geozone+Salzone	1.304	-.042		.596	-.526	.076	.000	695	Depth	0.6	7.3
Y=Collection+Depthzone+Salzone	2.083	-.042	-.375		-.226	.059	.000	695	Geozone	2.3	28.0
Y=Collection+Depthzone+Geozone	1.562	-.042	-.471	.137		.047	.000	695	Salzone	3.5	42.7
Diplogrammus pauciradiatus, spotted dragonet											
Y=Collection+Depthzone+Geozone+Salzone	-.306	-.018	.424	-.117	.195	.075	.000	695	Full Model	7.5	100.0
Y=Depthzone+Geozone+Salzone	-.438		.426	-.118	.196	.072	.000	695	Collection	0.3	4.0
Y=Collection+Geozone+Salzone	.263	-.019		-.265	.342	.042	.000	695	Depth	3.3	44.0
Y=Collection+Depthzone+Salzone	-.410	-.019	.456		.146	.074	.000	695	Geozone	3.1	41.3
Y=Collection+Depthzone+Geozone	-.278	-.019	.526	.048		.065	.000	695	Salzone	1.0	13.3
Opsanus beta, Gulf toadfish											
Y=Collection+Depthzone+Geozone+Salzone	.957	.000	-.557	.424	-.112	.109	.000	695	Full Model	10.9	100.0
Y=Depthzone+Geozone+Salzone	.956		-.557	.424	-.112	.111	.000	695	Collection	-0.2	
Y=Collection+Geozone+Salzone	.210	.001		.619	-.304	.056	.000	695	Depth	5.3	48.6
Y=Collection+Depthzone+Salzone	1.337	.000	-.670		.068	.086	.000	695	Geozone	2.3	21.1
Y=Collection+Depthzone+Geozone	.941	.000	-.616	.328		.107	.000	695	Salzone	0.2	1.8

P-value p = .1 p = .05 p = .01 p = .001

Appendix D, Table 10b. Con't

Model	Regression coefficients: Intercept	Collection	Depthzone	Geozone	Salzone	Model statistics: R2	P-value	df	Variable	unique R2	%
FISH											
				Anarchopterus criniger, fringed pipefish							
Y=Collection+Depthzone+Geozone+Salzone	-.328	.018	..258	.360	-.197	.031	.000	695	Full Model	3.1	100.0
Y=Depthzone+Geozone+Salzone	-.196		.256	.362	-.198	.027	.000	695	Collection	0.4	12.9
Y=Collection+Geozone+Salzone	.018	.018		.270	-.108	.016	.000	695	Depth	1.5	48.4
Y=Collection+Depthzone+Salzone	-.005	.019	.162		-.044	.009	.030	695	Geozone	2.2	71.0
Y=Collection+Depthzone+Geozone	-.335	.019	.155	.194		.018	.001	695	Salzone	1.3	41.9
				Microgobius gulosus, clown goby							
Y=Collection+Depthzone+Geozone+Salzone	.928	-.010	-.218	-.003	-.169	.074	.000	695	Full Model	7.4	100.0
Y=Depthzone+Geozone+Salzone	.856		-.215	-.003	-.169	.072	.000	695	Collection	0.2	2.7
Y=Collection+Geozone+Salzone	.638	-.010		.073	-.244	.055	.000	695	Depth	1.9	25.7
Y=Collection+Depthzone+Salzone	.926	-.010	-.216		-.170	.075	.000	695	Geozone	-0.1	
Y=Collection+Depthzone+Geozone	.904	-.010	-.305	-.146		.056	.000	695	Salzone	1.8	24.3
				All Fish							
Y=Collection+Depthzone+Geozone+Salzone	18.610	-.200	-7.085	5.976	-3.474	.215	.000	695	Full Model	21.5	100.0
Y=Depthzone+Geozone+Salzone	17.176		-7.065	5.959	-3.466	.212	.000	695	Collection	0.3	1.4
Y=Collection+Geozone+Salzone	9.122	-.190		8.455	-5.916	.133	.000	695	Depth	8.2	38.1
Y=Collection+Depthzone+Salzone	23.959	-.194	-8.675		-.938	.171	.000	695	Geozone	4.4	20.5
Y=Collection+Depthzone+Geozone	18.122	-.197	-8.900	3.038		.186	.000	695	Salzone	2.9	13.5
CRABS											
				Eurypanopeus sp., mud crab							
Y=Collection+Depthzone+Geozone+Salzone	1.011	-.058	-.060	.355	-.272	.017	.000	695	Full Model	1.7	100.0
Y=Depthzone+Geozone+Salzone	.592		-.054	.350	-.269	.006	.000	695	Collection	1.1	64.7
Y=Collection+Geozone+Salzone	.931	-.058		.376	-.292	.019	.001	695	Depth	-0.2	
Y=Collection+Depthzone+Salzone	1.329	-.058	-.154		-.121	.013	.006	695	Geozone	0.4	23.5
Y=Collection+Depthzone+Geozone	.973	-.058	-.202	.126		.013	.008	695	Salzone	0.4	23.5
				Libinia sp., spider crab							
Y=Collection+Depthzone+Geozone+Salzone	.019	.004	.001	.022	-.016	-.002	.625	695	Full Model		
Y=Depthzone+Geozone+Salzone	.046		.001	.022	-.016	-.003	.813	695	Collection		
Y=Collection+Geozone+Salzone	.021	.004		.021	-.016	-.001	.456	695	Depth		
Y=Collection+Depthzone+Salzone	.038	.004	-.004		-.007	-.001	.570	695	Geozone		
Y=Collection+Depthzone+Geozone	.017	.004	-.007	.008		-.002	.587	695	Salzone		
				Callinectes similis, lesser blue crab							
Y=Collection+Depthzone+Geozone+Salzone	.179	-.004	-.033	-.005	-.018	.008	.056	695	Full Model	0.8	100.0
Y=Depthzone+Geozone+Salzone	.149		-.033	-.006	-.018	.005	.090	695	Collection	0.3	37.5
Y=Collection+Geozone+Salzone	.135	-.004		.006	-.029	.006	.077	695	Depth	0.2	25.0
Y=Collection+Depthzone+Salzone	.174	-.004	-.032		-.020	.009	.027	695	Geozone	-0.1	
Y=Collection+Depthzone+Geozone	.177	-.004	-.042	-.020		.007	.043	695	Salzone	0.1	12.5
				Callinectes sapidus, blue crab							
Y=Collection+Depthzone+Geozone+Salzone	.098	.004	-.037	.010	-.017	.007	.070	695	Full Model	0.7	100.0
Y=Depthzone+Geozone+Salzone	.123		-.037	.010	-.017	.005	.082	695	Collection	0.2	28.6
Y=Collection+Geozone+Salzone	.048	.004		.023	-.030	.004	.129	695	Depth	0.3	42.9
Y=Collection+Depthzone+Salzone	.106	.004	-.040		-.013	.008	.036	695	Geozone	-0.1	
Y=Collection+Depthzone+Geozone	.095	.004	-.046	-.005		.007	.052	695	Salzone	0.0	0.0
				Rithropanopeus sp., mud crab							
Y=Collection+Depthzone+Geozone+Salzone	.015	.016	-.065	-.024	.024	.014	.009	695	Full Model	1.4	100.0
Y=Depthzone+Geozone+Salzone	.127		-.067	-.023	.024	.000	.422	695	Collection	1.4	100.0
Y=Collection+Geozone+Salzone	-.073	.016		-.001	.002	.011	.012	695	Depth	0.3	21.4
Y=Collection+Depthzone+Salzone	-.007	.016	-.059		.014	.015	.004	695	Geozone	-0.1	
Y=Collection+Depthzone+Geozone	.018	.016	-.053	-.004		.014	.004	695	Salzone	0.1	7.1
				Panopeus sp., mud crab							
Y=Collection+Depthzone+Geozone+Salzone	.015	.009	-.046	.006	.012	.008	.044	695	Full Model	0.8	100.0
Y=Depthzone+Geozone+Salzone	.081		-.047	.007	.011	.000	.379	695	Collection	0.8	100.0
Y=Collection+Geozone+Salzone	-.047	.009		.022	-.004	.006	.061	695	Depth	0.2	25.0
Y=Collection+Depthzone+Salzone	.021	.009	-.048		.014	.010	.020	695	Geozone	-0.2	
Y=Collection+Depthzone+Geozone	.017	.009	-.040	.016		.009	.022	695	Salzone	-0.1	
				All Crabs							
Y=Collection+Depthzone+Geozone+Salzone	1.306	-.021	-.208	.308	-.264	.007	.067	695	Full Model	0.7	100.0
Y=Depthzone+Geozone+Salzone	1.156		-.208	.307	-.263	.007	.049	695	Collection	0.0	0.0
Y=Collection+Geozone+Salzone	1.028	-.021		.381	-.336	.006	.058	695	Depth	0.1	14.3
Y=Collection+Depthzone+Salzone	1.583	-.021	-.290		-.133	.005	.085	695	Geozone	0.2	28.6
Y=Collection+Depthzone+Geozone	1.269	-.021	-.346	.085		.004	.132	695	Salzone	0.3	42.9

Appendix D, Table 11. Results from ANOVA comparing dominant and representative habitat measures by ZONE between the western shoreline of Biscayne Bay and the Elliott Key Control site, October 2002 thru September 2004.

ZONE	Model Statistics			Mean/Standard Error Values by Zone						Significance Differences of Factor
	R2	df	p-value	1S	2S	3S	2N	3N	Elliott	95%ci
SEAGRASS										
Thalassia standing crop	.102	815	.000	.294/.033	.098/.027	.049/.049	.439/.040	.388/.030	.185/.036	E>2S, 3S; E<1S, 2N, 3N
Thalassia cover	.184	825	.000	2.106/.121	1.121/.097	.730/.178	3.033/.144	2.351/.111	1.656/.126	E>2S, 3S; E<1S, 2N, 3N
Halodule standing crop	0.038	815	.000	.049/.007	.000/.006	.004/.010	.001/.008	.007/.006	.002/.008	E<1S
Halodule cover	.094	825	.000	.726/.061	.017/.049	.039/.090	.253/.072	.214/.056	.239/.063	E<1S; E>2S
ALGAE										
Penicillus biomass	.023	815	.000	.135/.020	.085/.016	.109/.029	.181/.024	.060/.018	.063/.021	E<1S, 2N
Penicillus cover	.055	811	.000	.312/.029	.297/.023	.312/.042	.501/.034	.193/.026	.334/.030	E<2N; E>3N
Batophora biomass	.003	815	.173	.047/.015	.076/.012	.027/.022	.061/.017	.035/.013	.046/.016	ns
Batophora cover	.032	818	.000	.668/.053	.647/.043	.370/.078	.448/.063	.656/.048	.379/.055	E<1S, 2S, 3N
Laurencia biomass	.012	815	.010	.344/.054	.234/.044	.112/.080	.343/.065	.121/.050	.174/.059	E<1S
Laurencia cover	.041	820	.000	.967/.074	.764/.060	.418/.109	1.051/.088	.637/.067	.540/.077	E<1S, 2N, 2S
Canopy	.137	825	.000	12.636/.584	7.428/.469	6.420/.863	14.719/.696	12.708/.535	12.081/.610	E>2S, 3S; E< 2N

Appendix D, Table 12. Results from ANOVA comparing the density by ZONE of dominat species between the western shoreline of Biscayne Bay and the Elliott Key Control site, October 2002 thru September 2004.

ZONE	Model Statistics			Mean/Standard Error Values by Zone						Significance Differences of Factor
	R2	df	p-value	1S	2S	3S	2N	3N	Elliott	95%ci
SHRIMP										
Farfantepenaeus duorarum	.068	825	.000	1.246/.113	.355/.091	.007/.167	.810/.135	.870/.104	.292/.118	E<1S, 2N, 3N
Thor manningi	.018	825	.001	39.873/8.373	29.045/6.727	2.262/12.376	62.580/9.978	52.012/7.676	32.931/8.751	E<2N; E>3S
Hippolyte zostericola	.096	825	.000	16.838/2.030	8.164/1.164	1.754/3.000	27.690/2.419	18.450/1.860	3.454/2.121	E<1S,2N, 3N
Thor floridanus, grass shrimp	.001	825	.317	4.908/1.911	7.482/1.532	.769/2.824	8.530/2.277	6.041/1.751	6.146/1.997	ns
All Carideans	.033	825	.000	63.303/10.021	46.436/8.051	5.754/14.811	100.560/11.941	78.172/9.185	49.446/10.473	ns
FISH										
Lucania parva	.123	825	.000	8.345/.743	.445/.597	.015/1.098	8.540/.885	4.556/.681	1.377/.776	E<1S, 2N, 3n
Gobiosoma robustum	.069	825	.000	1.317/.107	.400/.086	.015/.159	.790/.128	.828/.098	.662/.112	E<1S; E>3S
Diplogrammus pauciradiatus	.035	825	.000	.099/.087	.673/.070	.692/.129	.300/.104	.609/.080	.546/.091	E>1S
Opsanus beta	.063	825	.000	.556/.081	.177/.065	.031/.120	.880/.097	.521/.075	.146/.085	E<1S, 2N, 3N
Anarchopterus criniger	.024	825	.000	.204/.070	.291/.057	.000/.104	.560/.084	.308/.065	.092/.074	E<2S, 2N, 3N
Microgobius gulosus	.083	825	.000	.563/.052	.018/.042	.015/.077	.060/.062	.083/.040	.146/.055	E<1S
All Fish	.149	825	.000	12.077/.809	2.545/.650	.985/1.196	11/950/.964	7.473/.741	3.777/.845	E<1S, 2N, 3N
CRABS										
Eurypanopeus sp.	.006	825	.084	.662/.148	.273/.119	.031/.219	.600/.177	.444/.136	.223/.155	E<1S
Libinia sp.	.001	825	.540	.035/.027	.055/.022	.000/.028	.070/.032	.036/.025	.085/.028	ns
Callinectes similis	.006	825	.082	.106/.021	.036/.017	.031/.030	.030/.025	.047/.019	.031/.022	ns
Callinectes sapidus	.006	825	.078	.092/.021	.023/.017	.000/.031	.020/.025	.053/.019	.046/.022	ns
Rithropanopeus sp.	.002	825	.612	.007/.036	.073/.029	.000/.054	.060/.043	.030/.033	.008/.038	ns
All Crabs	.006	825	.085	.993/171	.591/.137	.123/.252	.790/.204	.123/.252	.538/.179	ns

Appendix E Table 1. Statistics of MLR models predicting faunal density (no./1000 m2) as a function of COLLECTION, SALZONE, and GEOZONE (trawl data Aug 2002-Feb 2004).

Taxa	Model	P-values		Model statistics			Factor	Unique	
		Intercept	GEOZONE	R2	P-value	df		% tot. var.	% exp. var.
SHRIMP									
Farfantepenaeus duorarum	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.3903	0.0000	12,223	Full	39.03	100.00
	Y~COLL+SALZONE	0.0000		0.3223	0.0000		GEOZONE	6.80	17.42
	Y~COLL+GEOZONE	0.0000	0.0150	0.2544	0.0000		SALZONE	13.59	34.82
	Y~SALZONE+GEOZONE	0.0000	0.0000	0.1664	0.0000		COLL	22.39	57.37
	Y~COLL			0.2344	0.0000	9,225	Zones jointly	15.59	39.94
FISH									
Syngnathus floridae	Y~COLL+GEOZONE	0.0000	0.0000	0.2260	0.0000	10,225	Full	22.60	100.00
	Y~GEOZONE	0.0000	0.0000	0.1091	0.0000		COLL	11.69	51.73
	Y~COLL			0.1194	0.0006		GEOZONE	10.66	47.17
Hippocampus zosterae	Y~COLL+SALZONE+GEOZONE	0.0000	0.004	0.2900	0.0000	12,223	Full	29.00	100.00
	Y~COLL+SALZONE	0.0001		0.2630	0.0000		GEOZONE	2.70	9.31
	Y~COLL+GEOZONE	0.0000	0.0002	0.2767	0.0000		SALZONE	1.33	4.59
	Y~SALZONE+GEOZONE	0.0000	0.0081	0.0590	0.0027		COLL	23.10	79.65
	Y~COLL			0.2303	0.0000		Zones jointly	5.97	20.59
Lutjanus griseus	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.2545	0.0000	12,223	Full	25.45	100.00
	Y~COLL+SALZONE	0.0000		0.1207	0.0020		GEOZONE	13.38	52.57
	Y~COLL+GEOZONE	0.0000	0.0000	0.1932	0.0000		SALZONE	6.13	24.09
	Y~SALZONE+GEOZONE	0.0000	0.0000	0.1492	0.0000		COLL	10.53	41.38
	Y~COLL			0.1032	0.0030		Zones jointly	15.13	59.45
Opsanus beta	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.2500	0.0000	12,223	Full	25.00	100.00
	Y~COLL+SALZONE	0.0000		0.0988	0.0138		GEOZONE	15.13	60.50
	Y~COLL+GEOZONE	0.0000	0.0000	0.1548	0.0000		SALZONE	9.52	38.08
	Y~SALZONE+GEOZONE	0.0000	0.0000	0.1908	0.0000		COLL	5.92	23.68
	Y~COLL			0.0648	0.0814	9,225	Zones jointly	18.52	74.10
Atherinomorus stipes	Y~COLL+GEOZONE	0.0159	0.0364	0.1921	0.0000		Full	19.21	100.00
	Y~GEOZONE	0.0224	0.0546	0.0157	0.0546		COLL	17.64	91.83
	Y~COLL			0.1761	0.0000	9,225	GEOZONE	1.60	8.33

Appendix E, Table 1. Cont.

Taxa	Model	P-values		Model statistics			Factor	Unique	
		Intercept	GEOZONE	R2	P-value	df		% tot. var.	% exp. var.
FISH cont.									
Lagodon rhomboides	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.3662	0.0000	12,223	Full	36.62	100.00
	Y~COLL+SALZONE	0.0000		0.2367	0.0000		GEOZONE	12.95	35.36
	Y~COLL+GEOZONE	0.0000	0.0001	0.2038	0.0000		SALZONE	16.24	44.35
	Y~SALZONE+GEOZONE	0.0000	0.0000	0.2329	0.0000		COLL	13.33	36.40
	Y~COLL			0.1481	0.0000	9,225	Zones jointly	21.81	59.56
Lucania parva	Y~COLL+SALZONE+GEOZONE	0.0000	0.0005	0.2030	0.0000	12,223	Full	20.30	100.00
	Y~COLL+SALZONE	0.0000		0.1589	0.0000		GEOZONE	4.41	21.72
	Y~COLL+GEOZONE	0.0000	0.0084	0.1503	0.0001		SALZONE	5.27	25.96
	Y~SALZONE+GEOZONE	0.0000	0.0009	0.0824	0.0002		COLL	12.06	59.40
	Y~COLL			0.1237	3.92x10-4	9,225	Zones jointly	7.93	39.06
Eucinostomus gula	Y~COLL+SALZONE+GEOZONE	0.0000	0.0001	0.3303	0.0000	12,223	Full	33.03	100.00
	Y~COLL+SALZONE	0.0000		0.2847	0.0000		GEOZONE	4.56	13.81
	Y~COLL+GEOZONE	0.0000	0.0242	0.2601	0.0000		SALZONE	7.02	21.25
	Y~SALZONE+GEOZONE	0.0000	0.0005	0.0936	0.0000		COLL	23.67	71.67
	Y~COLL			0.2432	2.32x10-8	9,225	Zones jointly	8.71	26.37
Haemulon aurolineatum	Y~COLL+GEOZONE	0.0000	0.0064	0.1836	0.0000		Full	18.36	100.00
	Y~GEOZONE	0.0000	0.0096	0.0283	0.0096		COLLection	15.53	84.58
	Y~COLL			0.1562	1.17e10-5	9,225	GEOZONE	2.74	14.92
Gerres cinereus	Y~COLL+SALZONE+GEOZONE	0.0000	0.0009	0.2537	0.0000	12,223	Full	25.37	100.00
	Y~COLL+SALZONE	0.0000		0.2161	0.0000		GEOZONE	3.76	14.82
	Y~COLL+GEOZONE	0.0000	0.1243	0.0914	0.0155		SALZONE	16.24	63.99
	Y~SALZONE+GEOZONE	0.0000	0.0015	0.1725	0.0000		COLL	8.12	32.01
	Y~COLL			0.0818	0.0208	9,225	Zones jointly	17.20	67.78
CRAB									
Clibanarius spp.	Y~COLL+SALZONE	0.0000		0.2391	0.0000	11,224	Full	23.91	100.00
	Y~SALZONE			0.0322	0.0221		COLL	20.69	86.53
	Y~COLL			0.2072	0.0000	9,225	SALZONE	3.19	13.34

Note: Regression coefficients and their p-values appropriate to show here are not readily available for categorical variables in MLR from S-PLUS, except that the p-values provided by S-PLUS are appropriate for categorical variables with only two classes.

Appendix E, Table 2. Results from ANOVA of faunal density (no./1000 m2) as a function of COLLECTION, SALZONE, and GEOZONE (trawl data Aug 2002-Feb 2004). (Value below the mean is standard error of the mean.)

		Type III Sums of Squares Pr(F)			Mean Values by SALZONE			Mean Values by GEOZONE		Significant difference 95%	
Taxa	Model	COLL	SALZONE	GEOZONE	1	2	3	N	S	SALZONE	GEOZONE
SHRIMP											
Farfantepenaeus duorarum	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.0000	138.71	84.48	39.77	108.30	67.00	1>2,3; 2>3	N>S
					14.66	5.37	6.10	8.01	5.86		
FISH											
Syngnathus floridae	Y~COLL+GEOZONE	0.0002		0.0000				1.28	0.37		N>S
								0.13	0.10		
Hippocampus zosterae	Y~COLL+GEOZONE	0.0000		0.0002				2.20	0.75		N>S
								0.30	0.23		
Lutjanus griseus	Y~COLL+SALZONE+GEOZONE	0.0005	0.0001	0.0000	1.78	0.96	0.48	1.60	0.54	1>2,3: 2>3	N>S
					0.03	0.11	0.12	0.16	0.12		
Opsanus beta	Y~COLL+SALZONE+GEOZONE	0.0460	0.0000	0.0000	5.15	2.96	0.77	4.66	1.26		N>S
					0.90	0.33	0.37	0.49	0.36	1>2,3; 2>3	
Atherinomorus stipes	Y~COLL+SALZONE+GEOZONE	0.0000		0.0364				0.10	1.36		S>N
								0.48	0.37		
Lagodon rhomboidalis	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.0000	79.86	36.13	8.57	59.34	23.70	1>2,3; 2>3	N>S
					9.35	3.43	3.89	5.11	3.74		
Lucania parva	Y~COLL+SALZONE+GEOZONE	0.0002	0.0008	0.0005	9.04	2.35	1.75	6.15	2.62	1>2,3	N>S
					1.78	0.65	0.74	0.97	0.71		
Eucinostomus gula	Y~COLL+SALZONE+GEOZONE	0.0000	0.0000	0.0001	27.87	14.03	4.26	20.83	9.94	1>2,3; 2>3	N>S
					4.94	1.81	2.06	2.70	1.98		
Haemulon aurolineatum	Y~COLL+GEOZONE	0.0000		0.0064				1.62	0.95		N>S
								0.20	0.15		
Gerres cinereus	Y~COLL+SALZONE+GEOZONE	0.0054	0.0000	0.0009	17.48	3.87	2.50	9.85	6.05	1>2,3	N>S
					2.01	0.74	0.84	1.10	0.80		
CRAB											
Hermit crab	Y~COLL+SALZONE	0.0000	0.0100		11.83	13.64	6.82			2>3	
					3.96	1.43	1.71				

Appendix E, Table 3. Results from ANOVA of faunal density (no./1000 m2) as a function of COLLECTION and ZONE (trawl data Aug 2002-Feb 2004). (Value below mean is standard error of mean.)

		Type III Sums of Squares Pr(F)		Mean values by ZONE					Significant difference in ZONE
Taxa	Model	COLL	ZONE	1S	2S	3S	2N	3N	95%
SHRIMP									
Farfantepenaeus duorarum	Y~COLL+ZONE	0.0000	0.0000	120.91	60.2	31.52	118.23	53.14	1S>2S,3S,3N; 2N>2S,3S,3N
				13.8	5.9	9.07	9.33	7.93	
FISH									
Syngnathus floridae	Y~COLL+ZONE	0.0002	0.0000	0.5995	0.3668	0.2908	1.1778	1.3455	2N>2S,3S; 3N>2S,3S
				0.2945	0.126	0.1935	0.1991	0.1692	
Hippocampus zosterae	Y~COLL+ZONE	0.0000	0.0000	0.3583	0.9058	0.5323	0.8725	3.1565	3N>1S,2S,2N,3S
				0.6742	0.2884	0.443	0.4558	0.3873	
Lutjanus griseus	Y~COLL+ZONE	0.0005	0.0000	1.2495	0.4003	0.0096	1.5542	0.9616	1S>3S; 2N>2S,3S; 3N>3S
				0.2852	0.122	0.1874	0.1928	0.1638	
Opsanus beta	Y~COLL+ZONE	0.0451	0.0000	3.4694	0.7962	0.1443	5.8018	1.651	1S>2S,3S; 2N>2S,3N,3S
				0.841	0.3597	0.5526	0.5685	0.4831	
Atherinomorus stipes	Y~COLL+ZONE	0.0000	0.0351	0.2027	0.967	2.8061	0.0041	0.1674	
				1.0818	0.4628	0.7109	0.7313	0.6215	ns
Lagodon rhomboidalis	Y~COLL+ZONE	0.0000	0.0000	62.222	13.65	1.738	65.59	17.999	1S>2S,3S,3N; 2N>2S,3S,3N
				8.747	3.742	5.748	5.913	5.026	
Lucania parva	Y~COLL+ZONE	0.0002	0.0003	7.2787	0.594	-0.0213	4.1066	3.5262	1S>2S,3S; 2N>2S,3S,3N
				1.7081	0.7307	1.1224	1.1547	0.9813	
Eucinostomus gula	Y~COLL+ZONE	0.0000	0.0000	22.453	7.813	0.634	21.409	8.309	1S>2S,3S; 2N>2S,3S,3N
				4.737	2.026	3.113	3.202	2.721	
Haemulon aurolineatum	Y~COLL+ZONE	0.0000	0.0159	1.4886	0.9616	0.6736	1.9888	1.3616	2N>2S,3S
				0.4451	0.1904	0.2925	0.3009	0.2557	
Gerres cinereus	Y~COLL+ZONE	0.0057	0.0000	15.581	2.059	0.389	5.546	4.554	1S>2N,2S,3N,3S; 2N>3S
				1.927	0.824	1.266	1.303	1.107	
CRAB									
Clibanarias spp.	Y~COLL+ZONE	0.0000	0.0232	11.865	12.77	9.01	15.809	5.142	2N>3N
				3.962	1.695	2.604	2.678	2.276	

Appendix E, Table 4. 4. Statistics of MLR models predicting faunal density (no./1000 m2) as a function of COLLECTION, SALINITY, and LATITUDE (trawl data, Aug. 2002-Feb. 2004).

Taxa	Model	Regression coefficients					Model statistics			Unique		
		Intercept	SAL	SAL^2	LAT	LAT^2	R^2	P-value	df	Factor	% Tot. var.	% Exp. var.
SHRIMP												
Farfantepenaeus duorarum	Y ~ COLL + SAL + LAT + LAT^2	-2169115.78	-5.3811		169962.40	-3329.00	0.3332	0.0000	12,222	Full	33.32	100.00
	Y ~ COLL + SAL	266.69	-5.9828				0.3131	0.0000	10,224	LAT-LAT^2	2.01	6.03
	Y ~ COLL + LAT + LAT^2	-2926193.95			229132.33	-4485.37	0.2811	0.0000	11,224	(-)SAL	3.20	9.60
	Y ~ SAL + LAT + LAT^2	-3226226.63	-2.6899		252680.55	-4947.28	0.0878	0.0001	3,231	COLLection	19.33	58.01
FISH												
Syngnathus floridae	Y ~ COLL + SAL + SAL^2 + LAT	-215.88	0.9303	-0.0156	7.95		0.2625	0.0000	12,222	Full	26.25	100.00
	Y ~ COLL + SAL + SAL^2	-14.49	1.0876	-0.0189			0.2023	0.0000	11,223	(+)LAT	6.02	22.93
	Y ~ COLL + LAT	-243.81			9.58		0.2303	0.0000	10,225	SAL-SAL^2	3.22	12.27
	Y ~ SAL + SAL^2 + LAT	-265.09	0.7027	-0.011	9.99		0.1404	0.0000	3,231	COLLection	12.21	46.51
Hippocampus zosterae	Y ~ COLL + LAT	-459.69			18.07		0.2964	0.0000	10,225	Full	29.64	100.00
	Y ~ COLL	1.29					0.2303	0.0000	9,226	(+)LAT	6.61	22.30
	Y ~ LAT	-494.79			19.44		0.0784	0.0000	1,234	COLLection	21.80	73.54
Lutjanus griseus	Y ~ COLL + SAL	3.79	-0.0975				0.1557	0.0000	10,224	Full	15.57	100.00
	Y ~ COLL	0.70					0.1032	0.0030	9,225	(-)SAL	5.25	33.72
	Y ~ SAL	2.77	-0.0651				0.0380	0.0027	1,233	COLLection	11.77	75.61
Opsanus beta	Y ~ COLL + SAL	14.35	-0.393				0.1637	0.0000	10,224	Full	16.37	100.00
	Y ~ COLL	1.85					0.0648	0.0814	9,225	(-)SAL	9.89	60.44
	Y ~ SAL	8.84	-0.2192				0.0471	0.0008	1,233	COLLection	11.66	71.21
Atherinomorus stipes	Y ~ COLL + SAL + LAT	300.93	0.221		-12.03		0.2235	0.0000	11,223	Full	22.35	100.00
	Y ~ COLL + SAL	-8.51	0.2958				0.2128	0.0000	10,224	(-)LAT	1.07	4.79
	Y ~ COLL + LAT	463.99			-18.15		0.2063	0.0000	10,225	(+)SAL	1.72	7.70
	Y ~ SAL + LAT	306.36	0.1661		-12.18		0.0416	0.0073	2,232	COLLection	18.19	81.40
Lagodon rhomboides	Y ~ COLL + SAL	179.46	-4.6839				0.2657	0.0000	10,224	Full	26.57	100.00
	Y ~ COLL	24.19					0.1481	0.0000	9,225	(-)SAL	11.76	44.26
	Y ~ SAL	77.19	-1.6541				0.0210	0.0264	1,233	COLLection	24.47	92.10
Lucania parva	Y ~ COLL + SAL + LAT	-508.46	-0.4413		20.56		0.1914	0.0000	11,223	Full	19.14	100.00
	Y ~ COLL + SAL	20.24	-0.569				0.1788	0.0000	10,224	(+)LAT	1.26	6.58
	Y ~ COLL + LAT	-833.20			32.74		0.1635	0.0000	10,225	(-)SAL	2.79	14.58
	Y ~ SAL + LAT	-802.47	-0.1662		31.74		0.0555	0.0013	2,232	COLLection	13.59	71.01
Eucinostomus gula	Y ~ COLL + SAL	64.05	-1.7048				0.2969	0.0000	10,224	Full	29.69	100.00
	Y ~ COLL	9.90					0.2432	0.0000	9,225	(-)SAL	5.37	18.09
	Y ~ SAL	45.86	-1.1274				0.0369	0.0031	1,233	COLLection	26.00	87.58
Haemulon aurolineatum	Y ~ COLL + SAL + SAL^2 + LAT + LAT^2	-59399.28	0.9787	-0.0163	4648.32	-90.96	0.2180	0.0000	13,221	Full	21.80	100.00
	Y ~ COLL + SAL + SAL^2	-14.02	1.0803	-0.0186			0.1908	0.0000	11,223	LAT-LAT^2	2.72	12.48
	Y ~ COLL + LAT + LAT^2	-62577.49			4896.73	-95.79	0.2013	0.0000	11,224	SAL-SAL^2	1.67	7.66
	Y ~ SAL + SAL^2+LAT +LAT^2	-73274.73	1.0149	-0.0156	5732.64	-112.15	0.0801	0.0007	4,230	COLLection	13.79	63.28
Gerres cinereus	Y ~ COLL + SAL	28.00	-0.7603				0.1588	0.0000	10,224	Full	15.88	100.00
	Y ~ COLL	3.83					0.0818	0.0208	9,226	(-)SAL	7.71	48.52
	Y ~ SAL	23.71	-0.6247				0.0765	0.0000	1,233	COLLection	8.23	51.82

Appendix E, Table 4. Cont.

Taxa	Model	Regression coefficients					Model statistics			Unique		
		Intercept	SAL	SAL^2	LAT	LAT^2	R^2	P-value	df	Factor	% Tot. var.	% Exp. var.
CRAB												
Clibanarius spp.	Y ~ COLL + SAL + LAT + LAT^2	-451940.34	-0.7797		35459.81	-695.50	0.2440	0.0000	12,222	Full	24.40	100.00
	Y ~ COLL + SAL	30.04	-0.6018				0.2171	0.0000	10,224	LAT-LAT^2	2.69	11.02
	Y ~ COLL + LAT + LAT^2				41107.62	-805.66	0.2299	0.0000	11,224	(-)SAL	1.41	5.78
	Y ~ SAL + LAT + LAT^2	-585061.65	45855.39		45855.39	-898.48	0.0252	0.1167	3,231	COLLection	21.89	89.69

P-value $p \leq .1$ $p \leq .05$ $p \leq .01$ $p \leq .001$ $p \leq .0001$

Appendix F Table 1. Results of ANOVA of faunal density (no./30 m2) as a function of COLL, SALZONE, GEOZONE, and TIME, from pull-net sampling, July 2003 through October 2004.

		Type III Sum of Squares Pr(F)				SALZONE mean			GEOZONE mean		Salzone Difference
Taxa	Model	COLL	SALZONE	GEOZONE	TIME	1	2	3	N	S	Sig 95%
SHRIMP											
Farfantepenaeus duorarum	Y~COLL+SALZONE+GEOZONE+TIME	0.0000	0.5789	0.6190	0.0000						
	Y~COLL+SALZONE+TIME	0.0000	0.0025		0.0000						
	Y~COLL+SALZONE	0.0000	0.0019			6.72	4.89	10.49			1<3,2<3
FISH											
Lucania parva	Y~COLL+SALZONE+TIME	0.7546	0.0007		0.0001						
	Y~COLL+SALZONE	0.0894	0.0024			10.81	9.77	22.30			1<3, 2<3
Eucinostomus gula	Y~COLL+SALZONE+GEOZONE+TIME	0.0000	0.4610	0.2742	0.0061						
	Y~COLL+SALZONE+GEOZONE	0.0000	0.0471	0.2044		5.29	1.19	2.15	4.08	1.67	ns
	Y~COLL+SALZONE+TIME	0.0000	0.8285		0.0048						
	Y~COLL+SALZONE	0.0000	0.0469			4.26	2.28	3.62			1>2
Lagodon rhomboides	Y~COLL+SALZONE+GEOZONE+TIME	0.0018	0.8010		0.2867						
	Y~COLL+SALZONE+GEOZONE	0.0014	0.2962	0.2901		3.43	1.57	1.64	2.88	1.55	ns

Appendix F Table 2. Statistics of MLR models predicting faunal densities (no./30 m^2) as function of COLL, SALZONE, LAT, and TIME (pull-net data, July 2003-October 2004).

Taxa	Model	Regression Coefficients				Model statistics			unique		
		Intercept	LAT	LAT^2	TIME	R^2	P-val	df	Factor	% tot. var.	% exp. var.
SHRIMP											
Farfantepenaeus duorarum	Y~COLL+SALZONE-LAT+LAT^2+TIME	10377394	-81351	1595	59.7409	0.3955	0.0000	19,261	Full	39.55	100.00
	Y~COLL+SALZONE+TIME	-18.7561			73.4010	0.2952	0.0000	17,263	LAT+LAT^2	10.03	25.36
	Y~COLL-LAT+LAT^2+TIME	729855	-57206	1121	63.8794	0.3691	0.0000	17,263	ALZONE	2.64	6.68
	Y~COLL+SALZONE-LAT+LAT^2	1038076	-81457	1598		0.3707	0.0000	18,262	TIME	2.48	6.27
	Y~SALZONE-LAT+LAT^2+TIME	981156	-76988	1510	31.7096	0.2406	0.0000	5,275	COLL	15.49	39.17
FISH											
Lucania parva	Y~COLL+SALZONE-LAT+LAT^2+TIME	2542835	-199485	3912	88.1374	0.2847	0.0000	19,261	Full	28.47	100.00
	Y~COLL+SALZONE+TIME	-42.6803			160.0722	0.1713	0.0000	17,263	LAT+LAT^2	11.34	39.83
	Y~COLL-LAT+LAT^2+TIME	1644139	-128906	2527	117.7860	0.2469	0.0000	17,263	SALZONE	3.78	13.28
	Y~COLL+SALZONE-LAT+LAT^2	2543841	-199641	651		0.2755	0.0000	18,262	TIME	0.92	3.23
	Y~SALZONE-LAT+LAT^2+TIME	2461107	-193069	641	99.4702	0.2503	0.0000	5,275	COLL	3.44	12.08
Eucinostomus gula	Y~COLL+SALZONE+GEOZONE+TIME	-6.0342			25.1481	0.2462	0.0000	18,262			
	Y~COLL+SALZONE+TIME	-6.0453			25.8321	0.2428	0.0000	17,263	Full	24.28	100.00
	Y~COLL+SALZONE	3.1489				0.2195	0.0000	16,264	TIME	2.33	9.60
	Y~COLL+TIME	-6.6885			27.8889	0.2417	0.0000	15,265	SALZONE	0.11	0.45
	Y~SALXONE+TIME	8.4426			-14.0042	0.0333	0.0246	3,277	COLL	20.95	86.30
Lagodon rhomboides	Y~Coll	2.5509				0.1178	0.0020	14,266	Full	11.78	48.52
SHRIMP											
Farfantepenaeus duorarum (excluding 2S)	Y~COLL+SALZONE-LAT+LAT^2+TIME	1237320	-96929	1898	101.2460	0.4030	0.0000	19,251	Full	40.30	100.00
	Y~COLL+SALZONE+TIME	-18.6131			73.2088	0.2887	0.0000	17,253	LAT+LAT^2	11.43	28.36
	Y~COLL-LAT+LAT^2+TIME	816833	-64012	1254	61.0625	0.3676	0.0000	17,253	SALZONE	3.54	8.78
	Y~COLL+SALZONE-LAT+LAT^2	1013113	-79507	1560		0.3637	0.0000	18,252	TIME	3.93	9.75
	Y~SALZONE-LAT+LAT^2+TIME	1017202	-79802	1565	33.7967	0.2322	0.0000	5,265	COLL	17.08	42.38

P-value $p \leq .1$ $p \leq .05$ $p \leq .01$ $p \leq .001$ $p \leq .0001$

Appendix F, Table 3. Results of ANOVA of faunal density in relation to COLL, ZONE, and TIME (pull-net data, July 2003-October 2004)

		Type III Sum of Squares Pr[F]			Means				Zone Sig. diff.
Taxa	Model	COLL	ZONE	TIME	1S	2N	2S	3N	95%
SHRIMP									
Farfantepenaeus duorarum	Y~COLL+ZONE+TIME	0.0000	0.0067	0.0000					
	Y~COLL+ZONE	0.0000	0.0044		6.72	5.31	2.76	10.48	3N>1S, 2N
FISH									
Lucania parva	Y~COLL+ZONE+TIME	0.7336	0.0018	0.0001					
	Y~COLL+ZONE	0.0992	0.0057		10.81	10.73	4.90	22.28	3N>1S
Eucinostomus gula	Y~COLL+ZONE+TIME	0.0000	0.6650	0.0061					ns
Lagodon rhomboides	Y~COLL+ZONE	0.0014	0.3825						ns

Appendix F Table 4. Statistics of MLR models of faunal density as a function of ZONE, LAT , and TIME (samples from 2S excluded).

Taxa	Model	Regression coefficient				Model			unique		
		Intercept	LAT	LAT^2	TIME	R^2	p-val	df	Factor	% tot. var.	% exp. var.
SHRIMP											
Farfantepenaeus duorarum	Y~COLL+ZONE-LAT+LAT^2+TIME	1237320	-96929	1898.3	101.25	0.403	0.0000	19,251	Full	40.3	100.00
(excludes 2-S-I)	Y~COLL+ZONE+TIME	-18.6131			73.209	0.2887	0.0000	17,253	LAT^2-LAT	11.43	28.36
	Y~COLL-LAT+LAT^2+TIME	816833	-64012.3	1254.1	61.063	0.3676	0.0000	17,253	ZONE	3.54	8.78
	Y~COLL+ZONE-LAT+LAT^2	1013113	-79506.5	1559.9		0.3637	0.0000	18,252	TIME	3.93	9.75
	Y~ZONE-LAT+LAT^2+TIME	1017202				0.2322	0.0000	4,276	COLL	17.08	42.38
FISH											
Lucania parva	Y~COLL+ZONE-LAT+LAT^2+TIME	2665628	-209059	4098.9	111.16	0.2816	0.0000	19,251	Full	28.16	100.00
(excludes 2-S-I)	Y~COLL+ZONE+TIME	-42.3231			159.6	0.1671	0.0001	17,253	LAT^2-LAT	11.45	40.66
	Y~COLL-LAT+LAT^2+TIME	1775289	-139170	2727.4	114.42	0.2445	0.0000	17,253	ZONE	3.71	13.17
	Y~COLL+ZONE-LAT+LAT^2	2419473	-189931	3727.4		0.2736	0.0000	18,252	TIME	0.8	2.84
	Y~ZONE-LAT+LAT^2+TIME	2555301	-200422	3929.9	105.08	0.2466	0.0000	5,265	COLL	3.5	12.43
Eucinostomus gula	Y~COLL+ZONE+TIME	-5.6295				0.2455	0.0000	17,253	Full	24.55	100
(excludes 2-S-I)	Y~COLL+TIME	-5.7521			25.5	0.2445	0.0000	15,255	ZONE	0.1	0.41
	Y~COLL+ZONE	3.2745				0.2237	0.0000	16,254	TIME	2.18	8.88
	Y~ZONE+TIME	8.8663			-14.807	0.0284	0.0525	3,267	COLL	21.71	88.43

P-value $p \leq .1$ $p \leq .05$ $p \leq .01$ $p \leq .001$ $p \leq .0001$

Appendix F Table 5. Results of ANOVA of faunal density (no./30 m^2) as a function of COLL, SAL, and TIME (pull-net data, July 2003-October 2004).

Taxa	Model	Type III Sum of Squares Pr(F) COLL	SAL	SAL^2	TIME
SHRIMP					
Farfantepenaeus duorarum	Y ~ COLL + SAL - SAL^2 + TIME	0.0000	0.0021	0.0104	0.0000
FISH					
Lucania parva	Y ~ COLL + SAL - SAL^2 + TIME	0.9104	0.0056	0.0215	0.0000
	Y ~ COLL + SAL + TIME	0.4872	0.0455		0.0001
	Y ~ COLL + SAL - SAL^2	0.0951	0.0221	0.0344	
Eucinostomus gula	Y ~ COLL + SAL - SAL^2 + TIME	0.0000	0.4391	0.3111	0.0005
	Y ~ COLL + SAL - SAL^2	0.0000	0.6645	0.3681	
	Y ~ COLL + SAL + TIME	0.0000	0.4861		0.0006
	Y ~ COLL+ + TIME	0.0000			0.0002
	Y ~ COLL = SAL	0.0000	0.1191		
	Y ~ COLL	0.0000			
Lagodon rhomboides	Y ~ COLL + SAL - SAL^2 + TIME	0.0067	0.0241	0.0202	0.1252
	Y ~ COLL + SAL - SAL^2	0.0043	0.0494	0.0210	
	Y ~ COLL	0.0020			

Appendix F, Table 6. Statistics of MLR models predicting taxa densities (no./30 m^2) as function of COLL, SAL, LAT, and TIME (pullnet data July 2003-October 2004).

Taxa	Model	Regression coefficients						Model statistics			unique		
		Intercept	LAT	LAT^2	SAL	SAL^2	TIME	R^2	P-value	df	Variable	% tot. var.	% exp. var.
Farfantepenaeus duorarum	Y~COLL+LAT^2-LAT+SAL-SAL^2+TIME	840471.3	-65862	1290	0.7632	-0.0202	65.7	0.3880	0.0000	19,261	Full	38.8	100.00
	Y~COLL+LAT^2-LAT+SAL-SAL^2	786710.8	-61667	1208	0.4236	-0.0151		0.3202	0.0000	18,262	TIME	6.78	17.47
	Y~COLL+LAT^2-LAT+TIME	729854.8	-57206	1121			63.9	0.3691	0.0000	17,263	SAL-SAL^2	1.89	4.87
	Y~COLL+SAL-SAL^2 +TIME	-28.6936			0.9870	-0.0191	69.7	0.2933	0.0000	17,263	LAT^2-LAT	9.47	24.41
	Y~LAT^2-LAT+SAL-SAL^2+TIME	663553.6	-52020	1020	0.2462	-0.0071	42.0	0.2218	0.0000	5,275	COLL	16.62	42.84
Lucania parva	Y~COLL+LAT^2-LAT+SAL-SAL^2+TIME	1917391	-150297	2945	1.3494	-0.0386	117.7	0.2604	0.0000	19,261	Full	26.04	100.00
	Y~COLL+LAT^2-LAT+SAL-SAL^2	1821040	-142778	2799	0.7408	-0.0295		0.2234	0.0000	18,262	TIME	3.7	14.21
	Y~COLL+LAT^2-LAT+TIME	1644139	-128906	2527			117.8	0.2469	0.0000	17,263	SAL-SAL^2	1.35	5.18
	Y~COLL+SAL-SAL^2 +TIME	-62.6459			2.3359	-0.0453	140.3	0.1525	0.0003	17,263	LAT^2-LAT	10.79	41.44
	Y~LAT^2-LAT+SAL-SAL^2+TIME	1517616	-118983	2332	0.9371	-0.0180	119.4	0.2198	0.0000	5,275	COLL	4.06	15.59
Eucinostomus gula	Y~COLL+SAL+TIME	-5.2017			-0.0386		26.6	0.2431	0.0000	16,264	Full	24.31	100.00
	Y~COLL+TIME	-6.6885					27.9	0.2417	0.0000	15,265	SAL	0.14	0.58
	Y~COLL+SAL	5.7429			-0.0856			0.2085	0.0000	15,265	TIME	3.46	14.23
	Y~SAL+TIME	7.7172			-0.3710		-8.5	0.0095	0.2664	2,278	COLL	23.36	96.10
Lagodon rhomboides	Y~COLL+SAL-SAL^2 +TIME	-1.7076			0.2743	.-0.0071	7.7	0.1455	0.0006	17,263			
	Y~COLL+SAL-SAL^2	1.4910			0.2556	-0.0070		0.1382	0.0007	16,264	Full	13.82	100.00
	Y~COLL	2.5099						0.1178	0.0020	14,266	SAL-SAL^2	2.04	14.76
	Y~SAL-SAL^2	0.8081			0.2154	-0.0048		0.0305	0.0135	2,278	COLL	10.77	77.95

P-value $p \leq .1$ $p \leq .05$ $p \leq .01$ $p \leq .001$ $p \leq .0001$

Appendix H, Table H.1. Species caught, by gear type: number, percent of gear-type catch, cumulative percent, and rank by percent (TR=trawl, TT=throw-trap), PN=pull-net).

						Trawl				Throw-trap				Pull-net			
Scientific name	Common name	TR	TT	PN	Found	No. caught	% catch	Cum %	Rank	No. caught	% catch	Cum %	Rank	No. caught	% catch	Cum %	Rank
Ablennes hians	Flat Needlefish			1	PN									1	0.0161	99.73	27
Achirus lineatus	Lined Sole	1	1		TR,TT	1	0.0074	98.79	75	1	0.0210	99.66	42				
Alosa pseudoharengus	Alewife	1			TR	4	0.0298	98.50	55								
Aluterus schoepfi	Orange Filefish	1			TR	7	0.0521	98.06	44								
Aluterus scriptus	Scrawled Filefish	1			TR	2	0.0149	98.71	65								
Anarchopterus criniger	Fringed Pipefish	1	1	1	TR,TT,PN	11	0.0819	97.39	34	201	4.2227	88.78	5	5	0.0807	99.44	18
Anisotremus virginicus	Porkfish	1			TR	1	0.0074	98.82	78								
Apogon aurolineatus	Bridled Cardinalfish	1			TR	2	0.0149	98.67	62								
Archosargus probatocephalus	Sheepshead Porgy	1	1		TR,TT	1	0.0074	98.88	86	2	0.0420	99.33	27				
Archosargus rhomboidalis	Sea Bream	1			TR	1	0.0074	98.86	84								
Astrapogon puncticulatus	Blackfin Cardinalfish	1			TR	6	0.0447	98.10	45								
Atherinomorus stipes	Hardhead silverside	1	1	1	TR,TT,PN	223	1.6603	86.40	8					60	0.9682	96.26	8
Calamus arctifrons	Grass Porgy	1		1	TR,PN	41	0.3053	94.71	20					1	0.0161	99.76	29
Chaenopsis ocellata	Bluethroat Pikeblenny	1	1	1	TR,TT,PN	5	0.0372	98.40	52	3	0.0630	98.93	18	2	0.0323	99.64	23
Chilomycterus schoepfi	Striped Burrfish	1			TR	25	0.1861	96.61	28								
Chriodorus atherinoides	Hardhead halfbeak	1			TR	1	0.0074	98.77	72								
Citharichthys arenaceus	Sand Whiff	1			TR	1	0.0074	98.85	82								
Citharichthys macrops	Spotted Whiff	1			TR	9	0.0670	97.90	41								
Coryphopterus dicrus	Colon goby	1			TR	4	0.0298	98.56	57								
Cosmocampus albirostris	Whitenose Pipefish	1			TR	14	0.1042	97.31	33								
Cosmocampus brachycephalus	Crested Pipefish	1			TR	1	0.0074	98.74	68								
Cosmocampus hildebrandi	Dwarf pipefish		1		TT					1	0.0210	99.60	39				
Cryptotomus roseus	Bluelip parrotfish		1		TT					1	0.0210	99.52	35				
Dactyloscopus crossotus	Bigeye stargazer		1		TT					1	0.0210	99.45	32				
Dactyloscopus crossotus	Sand Stargazer	1		1	TR,PN	10	0.0745	97.62	37					1	0.0161	99.81	32
Dactyloscopus moorei	Speckled Stargazer	1			TR	1	0.0074	98.88	87								
Diplectrum formosum	Sand Perch	1			TR	1	0.0074	98.84	81								
Diplogrammus pauciradiatus	Spotted Dragonet	1	1		TR,TT	34	0.2531	95.76	24	340	7.1429	78.36	3				
Echeneis naucrates	Sharksucker	1			TR	1	0.0074	98.87	85								
Equetus acuminatus	Highhat	1			TR	1	0.0074	98.78	73								
Eucinostomus argenteus	Spotfin Mojarra	1			TR	5	0.0372	98.47	54								
Eucinostomus gula	Silver Jenny	1	1	1	TR,TT,PN	2479	18.4573	65.19	2	5	0.1050	98.87	17	1033	16.6694	77.10	2
Eucinostomus havana	Bigeye Mojarra	1	1		TR,TT	4	0.0298	98.53	56	10	0.2101	98.76	16				
Eucinostomus melanopterus	Flagfin Mojarra	1		1	TR,PN	65	0.4840	92.80	15					3	0.0484	99.58	21
Floridichthys carpio	Goldspotted Killifish	1	1	1	TR,TT,PN	30	0.2234	96.22	26	31	0.6513	97.08	11	109	1.7589	92.74	5
Gerres cinereus	Yellowfin Mojarra	1		1	TR,PN	964	7.1774	72.37	3					85	1.3716	94.11	6

Appendix H, Table H.1. Cont.

						Trawl				Throw-trap				Pull-net			
Scientific name	Common name	TR	TT	PN	Found	No. caught	% catch	Cum %	Rank	No. caught	% catch	Cum %	Rank	No. caught	% catch	Cum %	Rank
Nicholsina usta	Emerald Parrotfish	1			TR	7	0.0521	97.95	42								
Ogilbia cayorum	Key Brotula	1	1		TR,TT	10	0.0745	97.47	35	22	0.4622	97.54	12				
Ophichthus gomesi	Shrimp eel	1			TR	44	0.3276	94.41	19								
Ophidion holbooki	Bank cusk-eel		1		TT					1	0.0210	99.39	29				
Opistognathus robinsi	Spotfin jawfish		1		TT					1	0.0210	99.68	43				
Opsanus beta	Gulf Toadfish	1	1	1	TR,TT,PN	466	3.4696	79.85	5	295	6.1975	84.56	4	53	0.8553	97.11	9
Opsanus pardus	Leopard Toadfish		1		TT					2	0.0420	99.20	24				
Orthopristis chrysoptera	Pigfish	1			TR	6	0.0447	98.28	49								
Paraclinus fasciatus	Banded blenny		1		TT					21	0.4412	97.98	13				
Paraclinus marmoratus	Marbled Blenny	1	1	1	TR,TT,PN	23	0.1712	96.78	29	14	0.2941	98.28	14	20	0.3227	98.85	13
Paralichthys albigutta	Gulf Flounder	1			TR	7	0.0521	98.00	43								
Parophidion schmidti	Dusky cusk		1		TT					2	0.0420	99.08	21				
Petrotyx sanguineus	Redfin brotula		1		TT					3	0.0630	98.99	19				
Phaeoptyx conklini	Freckled cardinalfish	1			TR	1	0.0074	98.76	70								
Pomacanthus paru	French Angelfish	1			TR	1	0.0074	98.76	71								
Prionutus roseus	Leopard seahorse	1	1		TR,TT	6	0.0447	98.19	47								
Scarus vetula	Queen Parrotfish	1			TR	1	0.0074	98.82	79								
Scorpaena brasiliensis	Barbfish		1		TT					1	0.0210	99.43	31				
Scorpaena plumieri	Spotted Scorpionfish	1			TR	10	0.0745	97.77	39								
Sparisoma chrysopterum	Redtail Parrotfish	1			TR	10	0.0745	97.54	36								
Sparisoma radians	Bucktooth parrotfish	1		1	TR,PN	31	0.2308	95.99	25					1	0.0161	99.69	25
Sparisoma rubripinne	Redfin Parrotfish	1			TR	1	0.0074	98.83	80								
Sphoeroides nephelus	Southern Puffer	1		1	TR,PN	16	0.1191	97.21	32					1	0.0161	99.84	34
Sphoeroides spengleri	Bandtail Puffer	1		1	TR,PN	71	0.5286	92.32	14					3	0.0484	99.48	19
Sphyraena barracuda	Great Barracuda	1	1	1	TR,TT,PN	3	0.0223	98.59	58	2	0.0420	99.16	23	8	0.1291	99.16	15
Strongylura notata	Redfin Needlefish			1	PN									1	0.0161	99.79	31
Symphurus plagiusa	Blackcheek Tonguefish	1	1		TR,TT	5	0.0372	98.36	51	1	0.0210	99.47	33				
Syngnathus floridae	Dusky Pipefish	1	1	1	TR,TT,PN	186	1.3849	87.78	9	2	0.0420	99.12	22	73	1.1780	95.29	7
Syngnathus louisianae	Chain Pipefish	1	1	1	TR,TT,PN	9	0.0670	97.83	40	1	0.0210	99.58	38	5	0.0807	99.35	17
Syngnathus pelagicus	Sargassum Pipefish	1	1	1	TR,TT,PN	103	0.7669	91.79	13	2	0.0420	99.29	26	30	0.4841	98.19	11
Syngnathus scovelli	Gulf Pipefish	1	1	1	TR,TT,PN	28	0.2085	96.43	27	91	1.9118	92.90	7	124	2.0010	90.98	4
Synodus foetens	Inshore Lizardfish	1	1	1	TR,TT,PN	36	0.2680	95.25	22	1	0.0210	99.64	41	2	0.0323	99.68	24
Upeneus parvus	Dwarf Goatfish	1			TR	1	0.0074	98.75	69								
Unidentified fish	Unidentified fish					149	1.1094	100.00		15	0.3151	100.00		10	0.1614	100.00	
Total fish	Total fish	**88**	**46**	**34**		13431	100			4760	100			6197	100		

Appendix G, Table 1. Statistics of trawl density (no./m^2) estimates, grouped according to corresponding throw-trap density estimates.

Throw-trap density (no./m2)	number of samples	mean	sd	se	**median**	75th %tile	25th %tile	maximum	minimum
0	170	0.0651	0.0652	0.0050	**0.0431**	0.0916	0.0168	0.3263	0.0000
1	31	0.0915	0.0947	0.0170	**0.0676**	0.1171	0.0237	0.3920	0.0000
2	6	0.1396	0.1169	0.0477	**0.1344**	0.2086	0.0545	0.3070	0.0009
3	2	0.0933	0.0820	0.0580	**0.0933**	0.1223	0.0643	0.1512	0.0353
4	3	0.1560	0.0257	0.0148	**0.1471**	0.1660	0.1415	0.1849	0.1359
	212								

Appendix G, Table 2. S values calculated from throw-trap density and corresponding median trawl density using Kendall's equation.

S			
0.0245	-0.0148	0.0167	0.0260
-0.0541	0.0129	0.0265	
0.0798	0.0668		
0.0538			

SLOPE(B)	INTERCEPT
0.0252	0.0431

Slope is the median S.
Intercept is the median Y-BX

Appendix G, Table 3. Predicted trawl density based on throw trap density using slope and intercept

Trap X	Trawl Y	Y - BX	Predicted trawl YHAT
0	0.0431	0.0431	0.0431
1	0.0676	0.0423	0.0683
2	0.1344	0.0839	0.0936
3	0.0933	0.0176	0.1188
4	0.1471	0.0461	0.1440

Appendix G, Table 4. Kendall's tau test for correlation of median trawl density with throw-trap density

	X	rankX	Y	rankY	Ci
	0	1	0.0431	1	4
	1	2	0.0676	2	3
	2	3	0.1344	4	1
	3	4	0.0933	3	1
	4	5	0.1471	5	0
n=	5				9
N=	16				
tau=	0.8				
p=	0.1				

Appendix G, Table 5. Statistics of pull-net density (no./m^2) estimates, grouped according to corresponding throw-trap density estimates.

Throw-trap (tt) density (no./m2)	number of samples	mean	sd	se	median	75th %tile	25th %tile	maximum	minimum
0	23	0.297101	0.395417	0.08245	**0.133333**	0.4	0	1.6333	0.0000
1	19	0.208772	0.175978	0.040372	**0.166667**	0.366667	0.066667	0.5333	0.0000
2	13	0.251282	0.245559	0.068106	**0.266667**	0.366667	0	0.7000	0.0000
3	9	0.207407	0.206679	0.068893	**0.166667**	0.266667	0.033333	0.6333	0.0000
4	6	0.438889	0.637849	0.260401	**0.116667**	0.558333	0.075	1.6333	0.0000
5	2	0.066667	0.094281	0.066667	**0.066667**	0.1	0.033333	0.1333	0.0000
6	1	1.466667			**1.466667**	1.466667	1.466667	1.4667	1.4667
7	1	1.266667			**1.266667**	1.266667	1.266667	1.2667	1.2667
8	2	0.833333	1.08423	0.766667	**0.833333**	1.216667	0.45	1.6000	0.0667

Appendix G, Table 6. S values calculated from throw-trap density and corresponding median pull-net density using Kendall's equation.

S							
0.0333	0.0667	0.0111	-0.0042	-0.0133	0.2222	0.1619	0.0875
0.1000	0.0000	-0.0167	-0.0250	0.2600	0.1833	0.0952	
-0.1000	-0.0750	-0.0667	0.3000	0.2000	0.0944		
-0.0500	-0.0500	0.4333	0.2750	0.1333			
-0.0500	0.6750	0.3833	0.1792			SLOPE(B)	INTERCEPT
1.4000	0.6000	0.2556				0.0910	0.0847
-0.2000	-0.3167						
-0.4333							

Slope is the median S.
Intercept is the median Y-BX

Appendix G, Table 7. Predicted pull-net density based on throw trap density using slope and intercept

Trap X	Pull-net Y	Y - BX	Predicted pull-net YHAT
0	0.1333	0.1333	0.0847
1	0.1667	0.0757	0.1757
2	0.2667	0.0847	0.2667
3	0.1667	-0.1062	0.3576
4	0.1167	-0.2472	0.4486
5	0.0667	-0.3882	0.5396
6	1.4667	0.9208	0.6306
7	1.2667	0.6299	0.7215
8	0.8333	0.1056	0.8125

Appendix G, Table 8. Kendall's tau test for correlation of median pull-net density with throw-trap density.

X	rankX	Y	rankY		R1	R2	Ci
0	1	0.133333	3		1	3	6
1	2	0.166667	4.5		2	4.5	4.5
2	3	0.266667	6		3	6	3
3	4	0.166667	4.5		4	4.5	3
4	5	0.116667	2		5	2	4
5	6	0.066667	1		6	1	3
6	7	1.466667	9		7	9	0
7	8	1.266667	8		8	8	0
8	9	0.833333	7		9	7	0
				n=	9		23.5
				N=	22		
				tau=	0.30989		
				p>	0.1		