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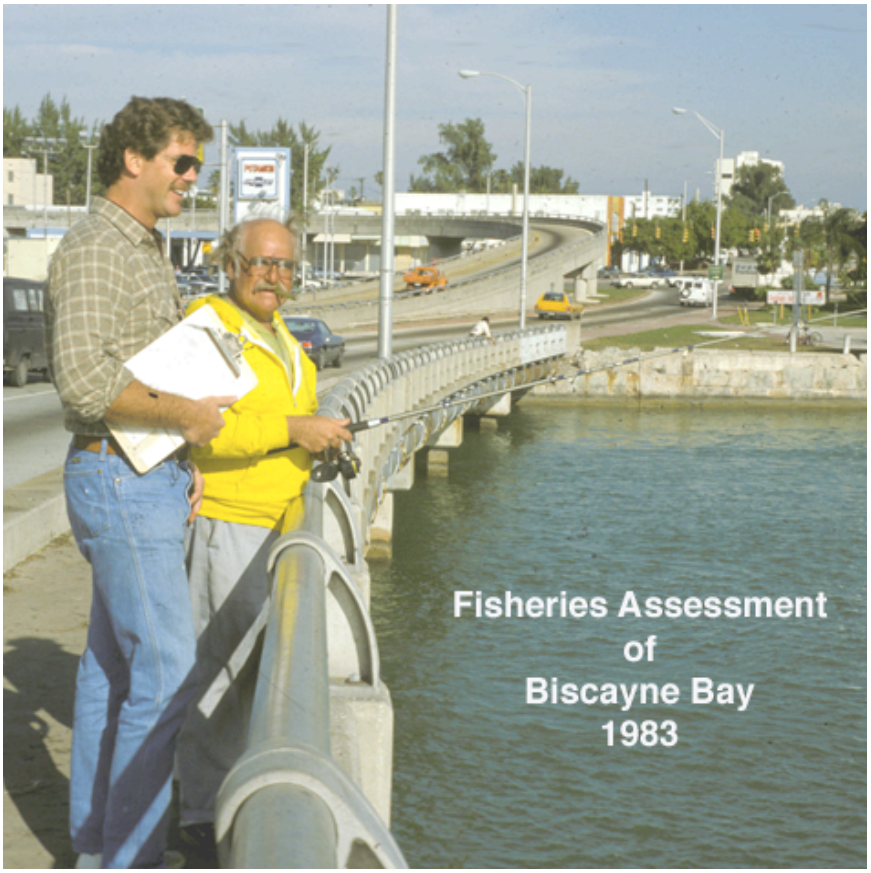

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Fisheries Assessment of Biscayne Bay 1983

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COVER PHOTO: Pat Cope (Rosenstiel School of Marine and Atmospheric Science) interviewing a fisherman on the causeway leading to Miami Beach during the fisheries assessment. Photograph taken by Stephen Carney while at the Rosenstiel School of Marine and Atmospheric Science, University of Miami.

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ACKNOWLEDGMENT

This study constitutes an Integral part of the Biscayne Bay Restoration and Enhancement Program. It is the primary goal of the program to maintain, restore or enhance those qualities of Biscayne Bay that provide the basic character and value of the resource. One of the objectives set forth to effect the realization of this goal includes the completion of specific baseline studies.

Funding for this project has been provided by the State of Florida through the Department of Environmental Regulation. Local administration of the funds has been conducted by the Dade County Department of Environmental Resources Management.

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Fisheries Assessment of Biscayne Bay 1983

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ABSTRACT

Creel and trawl surveys of Biscayne Bay were carried out in 1982 - 1983 to assess commercial fish and macro-invertebrate habitats and fisheries. Dredged and/or barren bottom was dramatically less productive than seagrass, algae or hard bottom areas. Low fish abundance and diversity in north Biscayne Bay appeared to be correlated with high turbidity and low seagrass abundance. Substantive increases in fish and crustacean productivity in north Biscayne Bay will occur only if seagrass communities can be re-established. Deeper dredged areas in North Bay will not likely become recolonized with seagrass even if turbidity levels are reduced. Hard bottom areas in South Bay are associated with high diversity of fish fauna and serve as nursery areas for several highly desirable species (e.g. hogfish, yellowtail snapper, lane snapper). The area between Julia Tuttle and 79th Street Causeways, which had very dense seagrass abundance, was the richest area on either North or South Biscayne Bay for juvenile fish and shrimp. This basin can serve as a model for the potential of the remainder of North Bay.

1. INTRODUCTION

A comprehensive study of the fisheries resources of Biscayne Bay was initiated in December, 1981. The overall goal of the project was to obtain baseline fishery resource data for the Bay and to develop recommendations for cost effective management procedures if needed. Specific objectives were:

1. To describe and quantify the commercial and recreational fishing activities in Biscayne Bay.

2. To determine yields (harvest) by area, habitat type and season for the important commercial and recreational species, both vertebrate and invertebrate.

3. To determine baseline biological data including mean lengths and weights, size frequency distributions, sex ratios and spawning seasons for important recreational and commercial species in Biscayne Bay.

4. To define and identify major habitat types and their associated biota, and determine the areas, habitats and environmental parameters with which the important recreational and commercial species are associated.

5. To isolate the environmental parameters critical for particular species and determine the types of human activity associated with changes in these parameters.

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6. To determine areas of particular concern and make recommendations on how to maintain or improve the ability of the Bay to support its fisheries resources.

7. To assess populations of macro-invertebrates of recreational and commercial importance in north Biscayne Bay.

To accomplish these objectives four relatively distinct monitoring and sampling programs were begun:

1. Creel census sampling program

2. Juvenile fish and habitat survey

3. Commercial fishing harvest monitoring

4. North Biscayne Bay recreational and commercial macro-invertebrate assessment

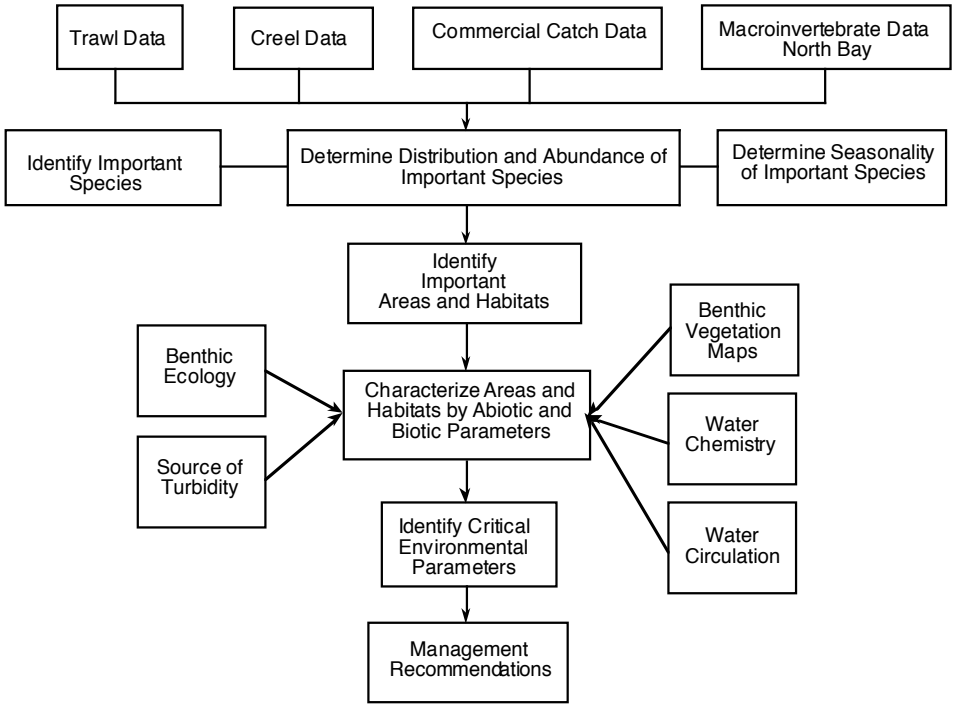
Management of Biscayne Bay fisheries involves primarily:

1. Habitat and water quality protection and management, and

2. Resource allocation among user groups.

This study was designed to provide information necessary to maximize the ability of the Bay to support its diverse fisheries resources through habitat and water quality management. Resource allocation among user groups is not primarily a biological question and this study was not designed to address this issue. Nonetheless, some guidelines can be gleaned from the data.

The flow diagram below summarizes the rationale of the research design as well as indicating how the fisheries project interacts with other components of the overall program.



Specific tasks as described in the contract were:

1. Design creel census sampling program
2. Build and test sampling gear
3. Monitor commercial and recreational fisheries in Biscayne Bay
4. Survey for and establish macro-invertebrate and juvenile fish sampling stations in south Biscayne Bay
5. Macro-invertebrate and juvenile fish assessment in south Biscayne Bay
6. Survey for and establish macro-invertebrate and juvenile fish sampling stations in north Biscayne Bay
7. Macro-invertebrate and juvenile fish assessment in north Biscayne Bay
8. Determine yields
9. Literature search (Appendix IX)
10. Prepare reference collection (Appendix IX)
11. Data analysis, final report, recommendations
12. Conduct tri-monthly aerial surveillance of Biscayne Bay.

2. Methods and Materials

2.1. Creel Survey

The creel survey was designed to 1) determine the recreational species and estimate their levels of harvest from Biscayne Bay and 2) determine abundance and distribution of important recreational species by area, habitat and season using catch and effort data as a measure of relative abundance. A consultant was retained to assist us in the design of the sampling program and to provide statistical advice. A brief description of the sampling design and rationale is given below. A complete description appears in Appendix I.

The survey was divided into four components: 1. Daytime launching ramp intercept survey, 2. Nighttime launching ramp intercept survey, 3. Daytime shore access "roving clerk" survey, 4. Nighttime shore access "roving clerk" survey. Figures 1a and 1b show the locations of the creel survey access points. The following launching ramps (access point numbers) were included in the survey:

Haulover Park (41)	Dinner Key (45)
Pelican Harbor (42)	Black Point (46)
Watson Island Park (43)	Homestead Bayfront Park (47)
Crandon Park (44)	Matheson Hammock (48)

The following shoreline locations (access point numbers) were used in the roving clerk surveys:

1. Pelican Harbor Park and Causeway Haulover Park (51)

2. MacArthur Causeway (two bridges and fishing pier) (52)

3. Rickenbacker Causeway, Bear Cut Bridge, Cape Florida Park (53)

4. Black Point and Canal C102, Military Canal, Mowry Canal, Homestead Bayfront Park (54)

5. Matheson Hammock, Chapman Field Park, Cutler Power Plant (59)

These launching ramps and shoreline areas are believed to account for a high percentage of the total fishing effort in Biscayne Bay. However, to test this assumption and estimate the actual percentage of total fishing effort represented by these areas, aerial over flights were made in which all fishermen on the Bay were counted. Three flights per month were scheduled randomly (one on a weekday, two on weekend days) with flight times selected with non-uniform probability based on variation in fishing pressure as reported by Austin *et al.* (1977).

In each survey component, catch and effort was recorded by sub-area within the Bay. Thirty-three such areas were delineated based on preliminary bottom community and habitat data provided by Gary Milano, DERM (Figures 1a and 1b).

In the creel survey, four creel clerks were utilized, each devoting approximately 140 hours per month to field interviews. Thus, a total of 560 hours per month were available for all survey components. Tables 1a and 1b show the monthly allocation of effort by type of survey, kind of day and time of day and by access point within a survey component. It can be seen that a stratified sampling design was used among survey components with sampling effort roughly proportional to our *a priori* assumptions concerning actual fishing effort (or catch). Within each component, sampling was stratified by kind of day (weekend vs. weekday). Within each day, sampling was stratified by time period (two approximately 6-hour periods for each day or night survey). And within each time period sampling sites were selected using non-uniform probabilities to account for previously determined differences between North and South Bay catches and effort.

Interviews were conducted to determine catch and effort by species and area. Lengths and weights of fish kept were recorded whenever possible. An interview form is attached as Appendix II.

Statistical methodology and logic used to expand recorded data to total catch and effort are explained in Appendix 1. These data yield estimates of total recreational effort and harvest of each species, by month, by area within the Bay, and by habitat type. In addition, mean size by month and size frequency distributions of the frequently-caught species were derived.

Catch-per-unit-effort (CPUE) is considered a measure of relative abundance. CPUE was calculated for selected species and for a fish combined, CPUE was expressed as catch in numbers of fish per man-hour fishing. This information was then used to identify areas and habitats utilized by "important species."

Plate 1. Trawl being deployed. [Photograph courtesy of S. A. Berkeley.]

2.2. Trawl Sampling

A trawl survey was initiated to provide information on abundance and distribution of juvenile fish and crustaceans in Biscayne Bay. Sampling stations were established after a preliminary survey and were located so that at least one station was in each sub-area (Figure 1a, 1b and 2) as close to a benthic sampling station as possible. Trawling in South Bay began in April, 1982 and continued through March, 1983. Twenty-two stations were sampled monthly. Twelve stations were sampled monthly for one year in North Bay beginning in October, 1982. Four stations in South Bay (5, 6, 8 and 10) were sampled monthly for the entire study period (April 1982 - September, 1983). Trawling gear consisted of a pair of 8-foot roller frame trawls fitted with 3/8", stretch mesh nets (Tabb and Kenny, 1969) (Plate 1). The sampling vessel, R/V Gale, is 28 feet long with twin diesel engines and was specially modified to handle the sampling gear. Sampling was done at night to reduce net avoidance and to enable the nocturnal species (primarily penaeid shrimp) to be sampled. Three 5-minute tows were made at each station each month giving 6 replicate samples per station per month. Nets were emptied into containers for rough sorting. Fish and crustacea were removed and placed in jars containing 10% formalin to preserve them until they could be processed in the lab. Once in the lab samples were washed under running water to remove formalin and all fish and crustacea identified, weighed, measured, and sexed (crustacea only). Data was recorded, and later key punched and stored on tape for statistical analysis. A list of references used for identification of this material is given in Appendix III.

Mean numbers and weight per 3-minute tow per station were calculated for 16 fish and 4 crustacean species. Analysis of variance (ANOVA) was used to test for differences in mean number (density) among stations. Duncan's multiple range test was used to determine which stations had significantly greater abundances. These data were summed across all months and across all stations and again tested statistically using ANOVA and multiple range tests. Analysis of variance and multiple range tests were also calculated for monthly mean weights of

all fish combined, all crustaceans combined and total fish and crustacean biomass. Those data were also summed by month and by station and tested as above.

Catches of selected species and combined fish and crustacea were summed over all South Bay stations and means tested against means for all North Bay stations (monthly and annual) using a Student's t-test. A t-test was also used to compare mean catches of selected species in those months sampled in both 1982 and 1983 at the four South Bay stations sampled for 18 months.

Monthly and annual diversity indices were calculated for each station using the Shannon-Weaver diversity index:

$$H = \sum P_i \ln P_i$$

$$i = 1 \text{ to } K$$

where $$P_i = \frac{f_i}{N}$$

f_i = number of individuals of species i
N = total number of individuals
K = number of different species

Species richness was calculated by station, monthly and annually, for fish and is expressed as mean number of species per tow. Evenness is calculated as

$$J = \frac{\text{Diversity}}{\ln \text{ total no. species}}$$

Size-frequency distributions were calculated for "important" and/or numerically abundant species.

Stations were characterized as to their general habitat type by diver observation, bottom community maps and reported observations of other working team members. These characterizations were used to identify important fish habitats. Habitat types were quantitatively defined by various abiotic factors including:

Salinity

Standard deviation of salinity

Water depth

Bottom type

Median sediment size

Turbidity

Standard deviation of turbidity

Color

Fecal coliform count

Stepwise multiple regression was used to determine how these factors are associated with species abundance. Regressions were run using selected species as the dependent variable and also using combined fish and combined crustacean biomass as the dependent variable.

2.3. Macro-crustacean Survey

North Bay was surveyed for macro-crustaceans by trawling and trapping. Penaeid shrimp were sampled as part of the trawl survey. Blue crabs were originally proposed to be surveyed by trapping, but because we felt that we could adequately sample blue crabs in our routine trawling we did not deploy blue crab traps. Stone crabs were sampled with standard wood lath stone crab traps. Five traps were deployed in each North Bay basin (see Figure 2) and allowed to soak 3 - 5 days. Traps were connected to one another with 100-foot sections of line and set unbuoyed. They were relocated using shore ranges and retrieved by towing a grappling hook along the bottom. All stone crabs were removed, sexed, measured, and by-catch recorded. After the five traps were recovered they were re-baited and moved to another location within the cell. After the traps were checked three times, they were removed from the water. This procedure was repeated every two months for one year. Mean catch per cell was tested using analysis of variance.

2.4. Commercial Fisheries

Biscayne Bay is fished commercially for bait shrimp, blue crabs, stone crabs, mullet, lobster, sponges, and clupeids (Spanish sardines, thread herring, and pilchards). Sponge and lobster harvests are monitored by Biscayne National Park and were not included in this study. Estimates of total catch for each of the other species were derived from interviews, sampling aboard commercial boats, and from wholesale and retail fish and bait dealers.

Bait shrimp catches were estimated by multiplying mean catch per boat night by estimated total number of boat-nights for the fleet and summed over the year.

A technician was placed aboard commercial shrimp boats at least once per month for the duration of the project. Total catch, catch per tow, and by-catch were recorded (by-catch was saved and returned to the lab for processing).

Stone crab landings were derived from estimates of mean catch per trap (from observation and interviews) multiplied by estimated total number of traps (from interviews).

Mullet landings were estimated primarily by data supplied by retail bait and tackle stores and by the major bait wholesaler in Dade County. Blue crab landings were estimated from interviews with a sub-sample of commercial blue crab fishermen.

Clupeid landings were estimated from interviews with commercial king mackerel and yellowtail snapper fishermen.

3. Results and Discussion

The following are the results specified by the contract to be included in the final report.

3.1. "List of important recreational and commercial species from Biscayne Bay."

Table 2 lists all species harvested from Biscayne Bay recorded in the creel survey. A total of approximately 139 species (including unidentified species) were recorded during the 21 months of sampling. Certain species recorded in the survey are not of recreational or commercial

importance. Characterizing species as to their importance is somewhat subjective but we have assigned each species to one of four categories:

G Highly desirable gamefish
R Recreational species
B Baitfish species
U Caught recreationally but not generally considered desirable.

Using this classification (Table 2), 36 species (26%) were in group G; 33 species (24%) in group R; 10 species (7%) were in group B and 59 species (43%) were in group U.

3.2. "A complete species list from Biscayne Bay."

All species recorded in the trawl survey are listed in Table 3. A total of 193 species of fish were identified from trawl catches during the survey. In addition approximately 82 species of crustaceans, two species of octopus and four species of squid were identified.

3.3. "Mean lengths, weights and size frequency distributions of important commercial and recreational fish species in the Bay."

Mean weights of important commercial and recreational species caught in the trawl survey are presented in Table 4. Total numbers and total weight are also presented. Mean weight of each species recorded (caught and kept) in the creel survey is given in Table 3. Species recorded in both trawl and creel sampling are marked (*). Length frequency distributions of recreationally-caught fish are presented in tables as follows:

Table Number	Species
6	Sand perch (*Diplectrum formosum*)
7	Blue runner (*Caranx crysos*)
8	Pinfish (*Lagodon rhomboides*)
9	White grunt (*Haemulon plumieri*)
10	Bluestriped grunt (*Haemulon sciurus*)
11	Lane snapper (*Lutjanus synagris*)
12	Pigfish (*Orthopristis chrysoptera*)
13	Spotted seatrout (*Cynoscion nebulosus*)
14	Mutton snapper (*Lutjanus analis*)
15	Gray snapper (*Lutjanus griseus*)
16	Spanish mackerel (*Scomberomorus maculatus*)
17	Great barracuda (*Sphyraena barracuda*)

Annual length frequency distributions for species caught in the trawl survey are presented in Tables 18 - 25, and by month in the following figures:

Figure No.	Species
16	White grunt (*Haemulon plumieri*)
17	Bluestriped grunt (*Haemulon sciurus*)
18	Sailor's choice (*Haemulon parrai*)
19a and b	Pinfish (*Lagodon rhomboides*)
20	Pigfish (*Orthopristis chrysoptera*)
21	Gray snapper (*Lutjanus griseus*)
22a and b	Pink shrimp (*Penaeus duorarum*)

Length frequency distributions clearly show the smaller sizes vulnerable to the trawls. Larger fish are generally better able to avoid the nets, whereas smaller individuals are less likely to be caught on hook and line, and if caught will often be released. Many species recorded commonly in the creel survey do not appear in the trawl catches (e.g. Spanish mackerel, blue runner, bonefish, crevalle jack). In most cases the reason is that the juveniles are either pelagic or do not occur in Biscayne Bay.

Size frequency distributions of recreationally caught gray snapper recorded in this study are very similar to those recorded in Everglades National Park (Rutherford *et al.*, 1983). The mean length of 1026 gray snapper collected from sport fishermen catches in Everglades National Park in 1978 - 1980 was 257 mm (Rutherford *et al.*, 1983). In Biscayne Bay, the mean length of gray snapper recorded in our creel survey was 248 mm (n = 2703). A few gray snapper were recorded larger than the largest size in the Everglades National Park study (>460 mm) (Table 10). The larger sample size in our study or the proximity of Biscayne Bay to the adult habitat in the reef may account for the minor differences in length-frequency distributions.

A similar comparison with Everglades National Park can be made for spotted sea trout. In the Everglades, the modal size recorded was 300 - 320 mm (Rutherford *et al.*, 1982). In Biscayne Bay, the modal size was 300 - 340 mm (Table 13). Interestingly, in both studies a second mode occurred between 360 - 390 mm. The mean length in Biscayne Bay was 370 mm (N = 936) while in Everglades National Park it was 330 mm (N = 748). The larger mean size in Biscayne Bay may reflect faster growth or lower mortality rates but specific age structure data for the population is needed to determine these rates.

3.4. "Yields from Biscayne Bay by species, size, seasons effort and habitat type, both invertebrate and vertebrate."

3.4.1. Yields by species

Total number, total weight, and mean weight of each species recorded in the creel survey is presented in Table 5. Of the total weight of all fish and crustaceans recorded as caught and kept in the creel survey, 377,249 lbs. (53%) were classified as desirable gamefish; 160,955 lbs. (23%) were classified as recreational species; 135,996 lbs. (19%) were classified as bait species; and 33,264 lbs. (5%) were classified as undesirable species.

Pink shrimp was the single most important species harvested (by weight) accounting for 29% of the total recreational harvest from Biscayne Bay. The five most abundant finfish species (by weight) harvested recreationally from Biscayne Bay were:

	Species	Total Wt (lbs.)	Percent of Total Harvest	Percent of Finfish Harvest
1.	Gray snapper	79,912	11.3	16.4
2.	White mullet	57,985	8.2	11.9
3.	Pilchard	44,862	6.3	9.2
4.	White grunt	43,442	6.1	8.9
5.	Spotted seatrout	25,048	3.5	5.2

These five species accounted for 35.3% of the total recreational harvest and 51.7% of the total recreational finfish harvest (by weight) from Biscayne Bay.

Tables 26 - 45 summarize recreational harvest by area for 20 abundant and/or important species recorded in the creel survey. Recreational harvest for all other species recorded in the creel survey is presented in Appendix IV. Area locations are shown in Figure 1. Because

sub-areas vary in size, catches are also presented on a per unit area basis (numbers and weights per km^2). Shrimp are not included in these tables because they are not caught in their normal habitat; rather they are caught in ocean cuts and passes when they are migrating out of the Bay. Thus, catch or catch per unit effort is not a reflection of their preferred habitat. Table 46 summarizes the recreational harvest for all species combined, excluding shrimp and baitfish, for the thirty-three sub-areas in the Bay.

The CPUE column in Tables 26 - 34 reflect effort directed at that particular species ("fished for"). In Tables 35 - 45, the CPUE column is derived by taking the total catch of that species and dividing by the total man-hours effort recorded for that area over all months. The result is multiplied by 100 so that CPUE is expressed as catch per 100 man-hours of fishing effort. This is done because in some instances an insufficient amount of effort was specifically directed at a particular species to derive species specific effort estimates. In other instances certain species are rarely specifically fished for. For example, few people could actually specify the species of grunt or snapper they were fishing for. If an interviewee could not specify a single species being fished for, then effort was not recorded as being directed at any particular species.

3.4.1.1. Spotted seatrout (*Cynoscion nebulosus*)

Spotted seatrout were the fifth most important species, by weight, recorded in the creel survey (25,048 lbs.). Effort values are from "fished for" data thus CPUE reflects only those hours of effort directed specifically at seatrout. The highest mean CPUE value for spotted seatrout was 0.7 fish per hour, and was recorded in areas 13 and 27 (Table 26). Next highest were areas 22 and 24, near Black Point with 0.5 fish per hour. In North Bay, the area north of Julia Tuttle Causeway (areas 4 and 5) had high CPUE values (0.4 fish/hour) and area 5 had the highest catch per unit area of any location in the Bay. All areas of high seatrout abundance, as determined from CPUE, are in seagrass areas, generally with rivers or canals entering the Bay.

3.4.1.2. Gray snapper (*Lutjanus griseus*)

Gray snapper were the most important finfish species, by weight, harvested recreationally from Biscayne Bay (79,912 lbs.). Highest CPUE, 2.7 fish/hour (from "fished for" data) was in the western half of the Julia Tuttle Basin (Area 4) (Table 27). Areas 21, 13, 24, 27 and 31 all had approximately the same CPUEs (0.9 - 1.1 fish/hour). Area 24 (near Black Point) had the highest total catch (26,204). These areas are fairly diverse in their habitat types. High CPUE in area 4 is probably due to the artificial reef located there. Areas 13, 24 and 27 are dominated by seagrass but also have some hard bottom and deeper channels and/or canals associated with them. Areas 21 and 31 are on the eastern side of the Bay and have deep channels and passages to connecting outside waters, as well as considerable seagrass. It is apparently the combination of deep channels combined with seagrass beds in close proximity that makes these areas favored gray snapper habitat.

3.4.1.3. Spanish mackerel (*Scomberomorus maculatus*)

Spanish mackerel are seasonal in their occurrence in Biscayne Bay, being found only from fall-spring. They were the tenth most abundant finfish species, by weight, caught recreationally in Biscayne Bay (15,050 lbs.). Only areas 12, 15, 16, 17, 19 and 20 of 33 areas had any recorded effort directed specifically at this species (Table 29). The small amount of effort and low CPUE values reflects the relatively low catches recorded in 1982 and 1983 from the Bay.

3.4.1.4. Bonefish (*Albula vulpes*)

Bonefish (Table 29) are one of the most highly valued gamefish in Biscayne Bay. While only occasionally caught, they are most often caught by fishing guides and others fishing specifically for this species. Only areas 15, 18, 21 and 26 had effort recorded specifically for bonefish. These areas are all near the ocean and have the most stable salinity regimes. Bonefish are not generally found in estuarine waters.

3.4.1.5. White mullet (*Mugil curema*)

White mullet ("silver" mullet) were the second most abundant species by weight recorded in the creel survey (Table 5). This species is caught with cast nets and is used almost exclusively for bait. The highest catch and CPUE (24 fish/hour) was recorded in area 2, south of Baker's Haulover (Table 30). This area accounted for over 72% of the total bay-wide recreational catch of white mullet. High CPUEs were also recorded in areas 4 (11.5 fish/hour) and 24 (6.2 fish/hour).

3.4.1.6. Pilchard (*Harengula jaguana*)

Pilchards were the third most abundant species, by weight, recorded in the creel survey. Like white mullet they are caught primarily with cast nets and used almost exclusively for bait. The highest recorded CPUEs (68.7 and 47.6) were recorded in areas 2 and 1 in North Biscayne Bay (Table 31). In South Bay, areas 15 and 12, near the Rickenbacker and Bear Cut bridges had the highest CPUEs (32.9 and 22.0).

3.4.1.7. Pinfish (*Lagodon rhomboides*)

Pinfish are targeted specifically for use as bait as well as comprising an incidental catch when bottom fishing. We include pinfish in this section primarily to allow a comparison with trawl catches. Table 32 shows the mean CPUE for pinfish derived from effort directed specifically at pinfish (presumably by fishermen using them for bait). The highest CPUE in North Bay was in area 4 (3.5 fish/hr). The equivalent trawl station (29) also had the highest CPUE (mean number per 3 minute tow) in North Bay (Table 70). Both sampling methods indicate very low numbers of pinfish elsewhere in North Bay. In South Bay, the highest CPUEs from the creel survey were in areas 13 (4.2 fish/man-hour), 16 (3.9 fish/man-hour), and area 26 (3.4 fish/man-hour). Station equivalents are: area 13 = station 2; area 16 = station 5; area 26 = station 15. These stations were not among the South Bay trawl stations with greatest catches. The discrepancy may be a result of not having recorded any directed effort in certain areas, thus CPUE could not be calculated. It is also possible that adult pinfish, preferred as bait, have a different distribution than juveniles, which predominate in our trawl samples.

3.4.1.8. Blue crab (*Callinectes sapidus*)

Highest CPUE recorded for blue crab was north of Julia Tuttle Causeway (area 4) in North Bay (Table 33). Blue crabs were also abundant south of Venetian Causeway (area 7), in the areas just to the north and south of the Rickenbacker bridge (areas 10 and 12), near Key Biscayne (area 15) and near Snapper Creek (area 16). Catch per unit effort data are not complete enough to accurately reflect abundance. Highest catches of blue crab in our trawl samples were at station 21 (area 32) south of the Arsenicker Keys, station 16 and station 18 just north and just south of Turkey Point (Table 68). Surprisingly, station 29 (area 4) produced few blue crabs in our trawl samples although they were very abundant based on the creel survey.

3.4.1.9. Spiny lobster (*Panulirus argus*)

During our creel survey, we recorded little effort directed specifically for lobster. The highest recorded CPUE and the greatest catch per unit area, was in area 18, in the Safety Valve area south of Key Biscayne (Table 34). The next highest CPUEs were in areas 13 (adjacent to Key Biscayne) and 21 (near Soldier Key). All of southern Biscayne Bay is in the Biscayne National Park lobster sanctuary and thus catch and CPUE in these areas do not reflect the actual abundance of lobsters.

Juvenile lobsters (Table 68) were most abundant in our trawl samples south of the Arsenicker Keys (station 21) and at stations near the safety valves (station 7) and near Soldier Key (station 10).

Catch per unit effort for species discussed below (Tables 35 - 45) is calculated using total effort rather than effort directed specifically for the particular species and is expressed as catch per 100 man hours fishing effort.

3.4.1.10. Mutton snapper (*Lutjanus analis*)

Mutton snapper were infrequently caught in our trawls, and only as small juveniles. In the creel survey they were recorded relatively often (Table 35). The highest CPUE and catch per unit area was recorded in the area just north and south of Broad Causeway (Area 2). Area 1, near Baker's Haulover had the next highest CPUE. In contrast, virtually no mutton snapper were caught in our trawls in North Bay. Thus it appears that sub-adults utilize North Bay to a much greater extent than juveniles. In South Bay, highest CPUEs were near Soldier Key (area 21), north of Turkey Point (area 27) and in the area near Shoal Point and Chicken Key (area 19). In the trawl samples, highest catches were at mid-bay stations (Table 69).

3.4.1.11. Lane snapper (*Lutjanus synagris*)

Lane snapper are the second most abundant snapper in Biscayne Bay (after gray snapper). Like mutton snapper, they are virtually absent as juveniles in North Biscayne Bay (Table 69) but are relatively abundant there as sub-adults (Table 36). Areas 17 and 20, both mid-bay areas, had the highest CPUEs. The third highest CPUE was recorded in the area just north and south of Broad Causeway (area 2).

3.4.1.12. Yellowtail snapper (*Ocyurus chrysurus*)

Like the other snappers, yellowtail snapper were caught only as juveniles (or sub-adults) in Biscayne Bay. They were most abundant on the eastern side of South Bay, particularly near Soldier Key and Elliott Key (Table 37). In trawl samples, they were most abundant at our station (number 10) south of Soldier Key (Table 69). Yellowtail are not an estuarine species. They are most closely associated with reefs and relatively stable, oceanic environments, thus their observed distribution in Biscayne Bay.

3.4.1.13. Great barracuda (*Sphyraena barracuda*)

Barracuda are widespread in the Bay, but were most abundant over seagrass beds in South Bay (Table 38). They were particularly abundant in the area south of the Arsenicker Keys (area 32).

3.4.1.14. Blue runner (*Caranx ruber*)

Blue runner are widely distributed in Biscayne Bay, having been recorded in all areas in our creel survey (Table 39). However, they were generally more abundant in South Bay. Many blue runner were caught from the Rickenbacker and Bear Cut bridges and off Cape Florida (areas 15, 12 and 19). High catches in those areas are due largely to the great amount of fishing effort associated with these areas. The areas of greatest abundance indicated by high CPUEs are all in mid-bay (areas 20, 14, 33, 17 and 25).

3.4.1.15. Crevalle jack (*Caranx crysos*)

Crevalle jacks, were caught in all areas of Biscayne Bay except areas 30 and 33, areas which are fished very little (Table 40). They were most abundant in areas 28, 27 and 24, in the area between Turkey Point and Black Point.

3.4.1.16. White grunt (*Haemulon plumieri*)

White grunt is the most abundant species of grunt in Biscayne Bay and was the fourth most abundant species (by weight) recorded in the creel survey. High CPUEs were recorded in all areas along the eastern side of south Biscayne Bay (Table 41). This species was also abundant in North Bay near Government Cut (areas 9, 11, and 7). In trawl samples white grunts were very abundant at station 10 near Soldier Key (Table 70). This was the area (21) of greatest abundance (highest CPUE) determined from the creel survey. Although widely distributed as both juveniles and sub-adults, they are apparently most abundant near ocean accesses.

3.4.1.17. Bluestriped grunt (*Haemulon sciurus*)

Bluestriped grunts are the second most abundant species of grunt in Biscayne Bay. They are proportionately more abundant in North Bay than are white grunts (Table 42). In North Bay, bluestriped grunts were most abundant in area 9 near Government Cut, area 6 between Venetian and Julia Tuttle Causeways, and area 2 near Broad Causeway. In South Bay, only area 31 near Caesar's Creek, and area 28 in mid-bay, west of Elliott Key, had CPUEs as high as the highest ranked North Bay stations. The greatest number harvested was in area 15, the Key Biscayne - Bear Cut area. In trawl samples, station 29 (area 4) near Julia Tuttle Causeway, had the highest catch of bluestriped grunts (Table 70). In South Bay, station 10 (area 21) had the highest catch in trawl samples. Juveniles appear to occupy a somewhat different habitat than sub-adults.

3.4.1.18. Pigfish (*Orthopristis chrysoptera*)

Pigfish were most abundant (highest CPUE) in area 8 near the Miami River (Table 43). This was the second most abundant trawl station (station 24) for this species (Table 70). The second and third most abundant areas for pigfish recorded in the creel survey were areas 9 and 11 near Government Cut. Adult and sub-adult pigfish are apparently more abundant in North Bay than in South Bay where only areas 12 and 15 had relatively high total catches recorded in the creel survey. In South Bay, area 28 had the highest CPUE but this was based an a small and possibly unrepresentative sample.

3.4.1.19. Gag grouper (*Mycteroperca microlepis*)

Gag grouper (Table 44) is the most commonly caught grouper species in Biscayne Bay. The highest CPUE recorded in the creel survey was in area 28, in mid-bay. Area 19, south of Key

Biscayne produced the greatest total number of gag grouper. The next highest CPUEs were recorded in areas 23, 30 and 25, all in mid-bay between Black Point and Turkey Point.

3.4.1.20. Sand parch (*Diplectrum formosum*)

Sand perch were most abundant in mid-bay north of Black Point (areas 14, 20 and 23; Table 45). Sand perch were not abundant in our trawl samples (table 72). The trawl stations with the highest catches of sand perch were not in the areas that had high CPUEs recorded in the creel survey.

3.4.2. Yields by Season

Recreational catches of 20 important and/or abundant species of fish and crustaceans are summarized by season in Table 79. For all species combined, catches were highest in spring, but for individual species, seasonality varied. Variability in catches may be due either to changes in availability or to changes in fishing patterns. For most species listed, variation in catch probably reflects availability.

3.4.3. Commercial Yields

3.4.3.1. Bait shrimp

Commercial bait shrimp boats work out of Black Point, Virginia Key and Dinner Key. From March through November 1983, bait shrimp boats were counted from routine tri-monthly aerial over flights. Mean number and standard error (SE) of boats recorded at each location were:

	x	SE	Max	Min
Black Point	7.88	0.60	12	0
Dinner Key	11.29	0.30	13	8
Virginia Key	3.33	0.12	4	2

Each commercial dock was visited on a random schedule after dark to count the number of boats actually out fishing an a particular night. Mean number, standard error (SE) and number of times sampled are given below.

	N	x	SE
Black Point	4	10.00	1.35
Dinner Key	28	9.07	0.31
Virginia Key	27	2.11	0.21

From above, the mean number of boats fishing per night was 21, or 7665 boat nights per year. However, the mean number of boats fishing at Black Point appears too high [in fact the estimate of mean number of boats fishing at Black Point (10.0) is larger than the mean number of boats recorded moored there (7.88)]. Assuming the ratio of mean number of boats moored to boats fishing per night at Black Point is the same as at Dinner Key, then a better estimate of mean boatnight fishing from Black Point is 6.30. Thus the total number of boat-nights for the fleet was 6380 per year.

Table 47 is a summary of catch per boat night summarized from log books of cooperating fishermen. In 1982 the mean catch per boat night was 5865 shrimp. Assuming an average of

130 shrimp per pound then a total of 287,836 lbs. of shrimp were caught in 1982. Using the same approach for 1983 the total catch was 272,573 lbs.

3.4.3.2. Mullet

During the one year period from April, 1982 - March, 1983, Better Bait Supply handled 39,000 lbs. of silver mullet caught in Biscayne Bay. An additional 6,000 - 7,000 lbs. were reported purchased by retail bait shops directly from fishermen. Thus, a total of 45,000 - 46,000 lbs. of silver mullet were landed in the one year period, 1982 - 1983. From April 1983 to November 1983, Better Bait reported handling 44,161 lbs. of mullet, from Biscayne Bay. During the same time period of the previous year, 26,310 lbs. were reported by the same dealer. Thus, there appears to have been 68% increase in silver mullet landings between 1982 and 1983.

3.4.3.3. Stone Crabs

The legal season for harvesting stone crabs in Florida is October 15 through May 15. Data for 1982, therefore, includes landings from January - May 15 and again from October 15 - December 31. During these time periods an estimated 5862 traps were being fished in Biscayne Bay. We monitored the catch from 3755 trap hauls. Assuming the average soak time per trap is 5 days then a total of 1172 traps were pulled daily. The overall mean catch per trap based on our sample of 3755 traps was 0.175 lbs. of claws/trap. Therefore, the total catch of stone crabs from Biscayne Bay during the 213 days of open season Was:

$$213 \text{ days} \frac{1172 \text{ traps}}{\text{day}} \frac{0.175 \text{ lbs.}}{\text{trap}} = 43{,}686 \text{ lbs.}$$

This is approximately 87,000 crabs.

In 1983, we monitored 9490 trap-hauls. The mean catch per trap was 0.198 lbs. From interviews we estimated that a total of 3,200 traps were being fished in Biscayne Bay in 1983. Using the same assumptions as above, the 1983 commercial stone crab harvest was:

$$213 \text{ days} \frac{640 \text{ traps}}{\text{day}} \frac{0.198 \text{ lbs.}}{\text{trap}} = 26{,}991 \text{ lbs.}$$

This is approximately 54,000 crabs.

3.4.3.4. Blue Crab

Based an a total of 17 interviews from six fishermen (all fishing out of Black Point), the mean number of traps pulled by blue crab fishermen is 36. The mean soak time was 4 days and the mean catch was 0.754 lbs./trap. If traps are fished in all months and pulled 5 days per week, then the total catch of these 6 fishermen in 1983 was:

$$6 \text{ fishermen} \frac{36 \text{ traps/fisherman}}{\text{day}} \frac{5 \text{ days}}{\text{week}} \frac{32 \text{ weeks}}{\text{yr}} \frac{0.734 \text{ lbs.}}{\text{trap}} = 42{,}345 \text{ lbs./yr}$$

3.4.3.5. Pilchards

Pilchards (includes Scaled sardine, *Harengula jaguana*, Spanish sardine, *Sardinella aurita*, and thread herring, *Opisthonema oglinum*) are caught commercially in Biscayne Bay using cast nets. The majority of the commercial catch is used for bait by the fishermen who catch them,

although a small amount is caught and sold directly to retail bait and tackle stores. There is a fleet of 30 - 40 boats moored on the Miami River that use pilchards for bait. Based on interviews with 7 of these fishermen they spend 1 - 2 hours per day cast netting for bait, using, on average, 300 lbs. per week from Biscayne Bay during the 6 months November - April. For 30 boats the annual harvest would be:

$$30 \text{ boats} \frac{300 \text{ lbs./boat}}{\text{week}} \frac{26 \text{ weeks}}{\text{year}} = 234{,}000 \text{ lbs./yr.}$$

In addition, 7,000 lbs. were reported bought by retail bait shops from independent cast net fishermen. The total annual commercial catch of pilchards in 1982 - 1983 was 241,000 lbs. For 40 boats the annual harvest would be 319,000 lbs./yr. The table below summarizes the above estimates of the commercial catch.

	Estimated Total Catch (lbs.)	
	1982	1983
Bait shrimp	287,836	272,573
Mullet	45,000*	44,161**
Stone Crab	43,686	26,991
Blue Crab	- ***	42,345
Pilchards	241,000****	241,000
Totals	617,522	627,070

* April 1982 - March 1983
** Nine months only, April 1983 - November 1983
*** No estimate for 1982
**** Assuming 30 boats

The accuracy of these estimates varies by species. We feel that the shrimp estimates are good; mullet estimates represent a minimum catch and almost certainly are an underestimate of actual landings; stone crab and blue crab estimates require assumptions about total effort which are difficult to validate but do not seem unreasonable; pilchard landings seem high but we believe they are reasonable and may actually underestimate actual landings.

Bait shrimp landings are somewhat misleading because a single calendar year encompasses two shrimp year classes. The higher catch per boat night in 1982 was primarily a result of the very strong 1991 year class recruited in summer 1981 and fished until migrating out of the Bay in winter 1982, which supported high catches in January, February and March 1982. Catches in 1981 - 1982 were very high while 1982 - 1983 and 1983 - 1984 were considered average or slightly above average.

Reported silver mullet landings in Dade County were 71,477 lbs. in 1982 and 70,929 lbs. in 1983 (Ernie Snell, NMFS-SEFC, personal communication), Some percentage of these reported landings probably come from outside Biscayne Bay.

Stone crab fishing was poor in both 1982 and 1983 in Biscayne Bay. Mean catch per trap was low in both years (0.173 lbs./trap and 0.198 lbs./trap), but total harvest was fairly high because of the large number of traps being fished. Total catch may be overestimated because some fishermen may not have fished their traps for the entire season.

The estimated catch of pilchards is surprisingly large. While it may be an overestimate because fishermen often do not consider all the days they are weathered out, we have only expanded the reported average weekly catch by 26 weeks. Since some pilchards (or thread herring) are caught during the remainder of the year, these estimates may actually be conservative.

3.5. "Abundance and seasonal distribution of invertebrate and vertebrate catches in Biscayne Bay."

Abundance and seasonal distribution of twenty important and/or abundant species of invertebrates and fishes are summarized in Tables 48 - 67 and 68 - 72.

These species are:

1. *Penaeus* spp., shrimp
2. *Callinectes sapidus* - blue crab
3. *Panulirus argus* - spiny lobster
4. *Callinectes ornatus* - ornate crab
3. *Lutjanus analis* - mutton snapper
6. *Ocyurus chrysurus* - yellowtail snapper
7. *Lutjanus synagris* - lane snapper
S. *Lagodon rhomboides* - pinfish
9. *Eucinostomus gula* - silver jenny
10. *Orthopristis chrysoptera* - pigfish
11. *Lutjanus griseus* - gray snapper
12. *Opsanus beta* - toadfish
13. *Haemulon plumieri* - white grunt
14. *Haemulon sciurus* - bluestriped grunt
15. *Haemulon parrai* - sailor's choice
16. *Lachnolaimus maximus* - hogfish
17. *Cynoscion nebulosus* - spotted seatrout
18. *Haemulon flavolineatum* - French grunt
19. *Haemulon aurolineatum* - tomtate
20. *Diplectrum formosum* - sand perch

Distribution and abundance of all crustaceans combined is presented in Tables 73; for all fish combined in Table 74; and for all fauna in Table 75. One way ANOVA were run for each of the above 20 species by month and year testing for differences in mean catch per 5-minute tow among stations. All ANOVAS were significant at $\alpha = 0.03$. Multiple range tests were used to determine which stations had significantly different mean catches of each species. Results of these analyses are presented in Appendix V.

3.5.1. Shrimp (*Penaeus* spp.)

Penaeus spp. consists of *P. duorarum* and *P. brasiliensis* with *P. duorarum*, pink shrimp predominating. Station 29, north of Julia Tuttle Causeway, always had the highest shrimp catches of any station (Table 48). The overall mean catch of shrimp (196.17/5 minute tow) was more than 5 times higher than the station with the next most abundant mean shrimp catch (Table 68). Shrimp were most abundant at seagrass stations along the western side of the Bay. In South Bay, they were most abundant during fall and winter (Table 48a) but in North Bay they were most abundant in summer (Table 48b and Figure 23).

3.5.2. Blue crab (*Callinectes sapidus*)

Blue crabs were abundant in our trawls samples during the first few months of our survey (spring - summer 1982), but declined dramatically in abundance after summer, 1982 (Table 49). During spring - summer, 1982 they were most abundant at stations 16, 18 and 21, along the western side of Biscayne Bay south of Black Point. In North Bay, they were most abundant in October, 1982. In North Bay, blue crab catches did not increase in summer 1983. The four stations in South Bay which we sampled monthly for the duration of the project (Stations 10, 8, 6, 5) also did not produce blue crabs in summer 1983. Thus, the paucity of blue crabs in North Bay may be more indicative of a poor year class rather than a difference in abundance between North Bay and South Bay. Station 26, south of Venetian Causeway, was the North Bay area of greatest blue crab abundance as determined by trawl sampling (Table 49 and 69). The habitat here is unlike that of any South Bay station.

3.5.3. Spiny lobster (*Panulirus argus*)

Spiny lobster were rarely caught in North Bay (Table 50). Only 7 lobster were caught in North Bay north of Government Cut. A total of 25 lobster were caught in twelve months of sampling at North Bay stations 23 and 24 just north of Rickenbacker Causeway. In South Bay, lobster were collected in a variety of habitats (Table 68), with little apparent pattern to their distribution. This is probably a result of seasonal movement through the Bay and different habitat preference by size. Lobster catches in our trawls showed a distinct seasonal peak in spring-summer in South Bay (Table 50a).

3.5.4. Ornate crab (*Callinectes ornatus*)

Ornate crabs were much more abundant in all months than the closely related blue crabs except in April 1982, when blue crabs predominated. The decline in blue crabs at our trawl stations appears to have been followed by an increase in ornate crabs. In South Bay, ornate crab abundance increased through summer and gradually declined during winter. In North Bay the pattern was less clear; mean catch per tow was relatively constant through the year (Table 51). As with blue crabs, station 26 had the highest mean catch per tow of all North Bay stations. In South Bay, ornate crabs were most abundant at the southernmost stations along the mainland side of the Bay (Table 68).

3.5.5. Mutton snapper (*Lutjanus analis*)

Mutton snapper were never abundant in our samples and were virtually absent in North Bay (Table 52). In South Bay they were found most abundantly at mid-bay stations (Table 69) without apparent relation to north-south location in the Bay. Mutton snapper were too infrequently collected to determine seasonal pattern of abundance (Table 52a).

3.5.6. Yellowtail snapper (*Ocyurus chrysurus*)

Yellowtail snapper were virtually absent from North Bay trawl samples (Table 53b). In South Bay they were most abundant at stations to the south and to the west (mid-bay) of Key Biscayne (stations 10, 6, 7 in Table 69). These stations are in the same general geographic area but are not similar in habitat or bottom type. Although catches were low, it appears that yellowtail snapper juveniles are most abundant during summer and fall (Table 53a).

3.5.7. Lane snapper (*Lutjanus synagris*)

Lane snapper were rarely caught in trawl samples in North Bay, although they were fairly common in the recreational catch. In South Bay they are found most commonly in east and mid-bay stations (Table 69). Their seasonality was similar to yellowtail snapper, being most abundant during summer and fall (Table 54).

3.5.8. Pinfish (*Lagodon rhomboides*)

Pinfish were the most abundant fish species in our trawl samples. They are widely distributed in Biscayne Bay and were found at least once at every station but 23 and 35 (Table 70). They were most abundant in west-bay seagrass areas in the southernmost part of the Bay and became increasingly less abundant to the north. They were abundant in North Bay only at station 29, north of Julia Tuttle Causeway (85% of all pinfish caught in North Bay were caught at this station) (Table 55b). In South Bay pinfish were most abundant in spring and early summer while in North Bay they appeared to be more abundant in late summer and fall (Table 55a and b).

3.5.9. Silver jenny (*Eucinostomus gula*)

Silver jenny is neither a recreational nor bait species but is included in this discussion because their abundance makes them potentially important as a food source for other species. Silver jenny were most abundant in seagrass areas along the west side of the Bay and in the Julia Tuttle basin in North Bay (Table 56 and 71). They were rarely collected an the eastern side of the Bay and were absent entirely from stations 10 and 12 (Soldier Key - Black Ledge areas). In North Bay they were abundant at station 29 and in our August sample at station 35 in Dumfoundling Bay. Highest catches in both North and South Bays were in August - October (Table 56a and b).

3.5.10. Pigfish (*Orthopristis chrysoptera*)

Pigfish were most abundant at stations near Rickenbacker Causeway (Table 70). Pigfish were also relatively abundant at station 29, north of Julia Tuttle Causeway (Table 57b). There was no apparent seasonality in their abundance.

3.5.11. Gray snapper (*Lutjanus griseus*)

Gray snapper were most abundant at our trawl station near the mouth of Snapper Creek Canal (Station 5). Unlike other snapper species they were uncommon at stations in mid or east Bay (Table 69). This species was found associated with seagrass bottom an the west side of the Bay. As juveniles, gray snapper are apparently more estuarine than other species of snapper. In North Bay they were abundant at station 29 but were uncommon or absent elsewhere (Table 58). They were most abundant from September - December in our trawl catches. Their reduced numbers in the remaining months may be a reflection of their having grown beyond the size of vulnerability to our gear.

3.5.12. Toadfish (*Opsanus beta*)

Toadfish, while not of any commercial or recreational importance, were abundant in our trawl samples. Their distribution is very similar to that of shrimp (*Penaeus* spp.); the four stations at which shrimp were most abundant were the first four for toadfish as well. Station 29, north of Julia Tuttle Causeway, had the greatest abundance of toadfish. In South Bay, seagrass stations south of Shoal Point had the highest catches. Their relatively high abundance at station

10, near Soldier Key is an enigma (Table 71). Toadfish are resident in Biscayne Bay and this is reflected in their even distribution throughout the year (Table 59).

3.5.13. White grunt (*Haemulon plumieri*)

White grunts were five times more abundant at station 10, southwest of Soldier Key, than they were at the next most abundant station (Table 70). They were also abundant at mid-bay stations (9 and 14), particularly in summer. At west-bay stations, they were generally most abundant in spring and again in fall (Table 60). Overall, they were most abundant in our samples in summer and fall. In North Bay, the area north of Rickenbacker Causeway (station 24) and the area north of Julia Tuttle Causeway, produced the greatest numbers (Table 60b).

3.5.14. Bluestriped grunt (*Haemulon sciurus*)

Bluestriped grunts were abundant at none of the same stations as white grunt (e.g., 10, 14), but were most abundant at station 29 in North Bay (Table 70). This species, like white grunt was found in a variety of habitat types. Our data suggest that they are more abundant in mid-bay during summer and in west-bay seagrass beds during spring and fall (Table 61a). Lowest catches were in winter.

3.5.15. Sailor's choice (*Haemulon parrai*)

Sailor's choice were much less abundant in our trawl samples than either white or bluestriped grunt, and showed a somewhat different distribution. Sailor's choice were most abundant at stations along the eastern side of the Bay (Table 72). This species was most abundant in our trawl samples from May - September in South Bay (Table 62a). In North Bay, they were most abundant in October - December (Table 62b).

3.5.16. Hogfish (*Lachnolaimus maximus*)

Hogfish, as adults, are a highly desirable food and recreational species found on the reefs. They were never very abundant in our trawl samples, and were never collected in North Bay (Table 63). This species was most abundant at our station near Caesar's Creek (station 20), and was most often caught in east- and mid-bay stations (Table 71). Hogfish were most common in our samples in May - September.

3.5.17. Spotted seatrout (*Cynoscion nebulosus*)

Spotted seatrout are one of the most highly valued inshore sport fishes in the southern US. They were commonly recorded in the creel survey but were never abundant in our trawl samples (Table 71). The only area in which we caught them consistently was north of Julia Tuttle Causeway (Station 29). In South Bay, they were relatively abundant only in our July trawl samples at station 3 near the outside Dinner Key Channel marker. The few seatrout caught in our trawls in South Bay were caught May - September (Table 64a). In North Bay, they were most abundant from May - August (Table 64b). Seatrout are probably resident in Biscayne Bay, thus the seasonality of trawl catches is likely a reflection of their rapid growth and increasing ability to avoid the nets. The very low catch rates that we experienced may be a result of net avoidance, rather than low availability, or seatrout may normally be in areas too shallow for us to sample.

3.5.18. French grunt (*Haemulon flavolineatum*)

French grunt were relatively uncommon in our trawl samples (Table 72) and in the recreational fishery (Table 5). They were virtually absent from our trawl samples in North Bay (Table 65b). In South Bay, they were most abundant at east-bay stations (10, 20, 7) and were abundant only in May - September (Table 65a).

3.5.19. Tomtate (*Haemulon aurolineatum*)

Tomtates were distributed similarly to French grunt (Table 72), although they were somewhat more common in North Bay (Table 66b). This species, like most of the other grunt species, was most abundant at mid- and east-bay stations in South Bay. Tomtate were most abundant in our trawl samples in June - September and were rarely caught in winter (Table 66a).

3.5.20. Sand perch (*Diplectrum formosum*)

Sand perch was the most commonly caught serranid in our trawls and the most common serranid recreationally caught in Biscayne Bay. However, they were not abundant at any of our trawl stations (Table 72). In North Bay, they were most abundant at stations 26 near Venetian Causeway and at station 24 near Claughton Island. They were most abundant at South Bay station 20 near Caesar's Creek. They were absent during winter from our samples (Table 67).

In addition to looking at distribution and abundance on a species by species basis we have also combined all fishes, all crustaceans and all fauna (fishes and crustaceans) by station and month. Analyses of variance were run on each of these combined taxa groupings. Highly significant F values ($p < 0.001$) were found among stations and months for all tests. Multiple range tests were run to determine which stations were significantly different from one another. Results of these tests are given in Appendix III and presented in Table 99.

3.5.21. All Crustaceans (Biomass)

The station with the highest mean biomass of crustaceans was station 29, the station north of Julia Tuttle Causeway (Table 73). The second highest mean crustacean biomass in our trawl survey was at station 18, south of Turkey Point, near the old discharge canal. This station averaged only 51% as much crustacean biomass as found at station 29. Following, in order of abundance, were station 11, 21 and 8, all on the west side of the Bay and all characterized by dense seagrass communities. Stations similar to these but further north along the western side of the Bay had lower mean crustacean biomass (i.e., station 5 and 2). Station 5 is near the mouth of Snapper Creek Canal and station 2 is near the mouth of the Coral Gables Waterway, suggesting a possible relationship.

3.5.22. All Fish (Biomass)

Highest mean biomass of fish was found at station 29 (Table 74), was more than three times greater than the mean biomass at the next highest station (station 7), and nearly five times higher than the next highest North Bay station (station 24). Some stations in South Bay had high fish biomass in one or two months (e.g. station 18 in November, station 7 in June and July) but had reduced biomass in other months. In contrast, station 29 produced high fish biomass in all months. Results of the ANOVA and multiple range test showed that station 29 had significantly more fish biomass than any other station (Appendix V and Table 99).

In South Bay, stations with diverse habitat types had similar mean fish biomass. Results of the ANOVA and multiple range test indicated that there was no statistical difference in mean fish biomass among stations: 16, 6, 11, 10, 9, 22, 13, 18, 7.

Seasonally, total fish biomass is lowest in winter (Table 74). However, there is a general pattern of increased fish biomass in fall at west-bay seagrass stations (e.g. 11, 18, 5) while at east- and mid-bay stations there appears to be an increase in fish biomass in summer (e.g. stations 6, 7, 9, 14). Combining all stations, the highest fish biomass was recorded in spring-fall and the lowest in winter (Table 74).

3.5.23. All Fauna (Fish and Crustaceans) (Biomass)

Mean biomass of fish and crustaceans combined was highest at station 29 (Table 75). Analysis of variance and multiple range tests indicated that this station had significantly greater mean total biomass than any other station. Stations 11, 7, and 18 formed the subset with the next highest mean total biomass. Stations in North Bay generally had lower mean biomass than those in South Bay. Stations with high mean total biomass encompassed a variety of habitat types. Seasonally, the winter months had the lowest biomass.

3.6. and 3.9. "Identification of areas, habitats and environmental parameters with which important species of fish and crustaceans are associated in Biscayne Bay."

One of the objectives of this study is to define the habitat requirements and critical environmental factors associated with commercially important and numerically dominant species found in Biscayne Bay. This section is devoted to fulfilling this task and is based primarily on the results of multiple regression analysis, which are summarized in Table 76, the simple correlation coefficients between mean number (mean weight) and abiotic variables summarized in Table 77, and the abiotic data listed in Table 78.

Before discussing the individual species (species groups), it is necessary to provide a general description of habitats in Biscayne Bay. The most important parameters defining the different habitats are bottom type, salinity, water circulation patterns, local flushing of water and the apparent influence of human related activities through fresh water discharge and the alteration of natural habitats by dredging, sea-wall construction and shoreline development. It is the interaction of all these parameters that provide the following habitat types in Biscayne Bay.

1. The shallow, sparse to moderately dense west-bay grass beds extending south from Miami River to Coral Gables Waterway and bordered by developed shoreline (stations 24, 2 and 3). This area is characterized by moderately low salinities caused by river and canal discharge, but due to good local flushing attributed to bay-ocean water exchange through Government, Norris and Bear Cuts, exhibits only moderate seasonal fluctuation in salinity. Adjacent and to the east of this section is an area of mixed seagrass-hard bottom (sponges, calcareous algae, rock rubble) habitat which grades southward into naturally barren bottom strongly influenced by tidal water movement through these two cuts (stations 23, 1 and 4).

2. The grass bed section from Matheson Hammock south to Black Point, bordered by mangrove shoreline, extending continuously from the western to the eastern margins of the Bay. This area can be subdivided into two habitats. (a) The shallow, moderately dense west-bay grass beds (stations 5, 8, and 11) with low salinities that vary considerably with season, and moderate levels of water color due to canal discharge draining the mangrove shoreline. (b) The deeper mid- and east-bay area of dense grass beds with sponges and soft coral attached to the bottom (stations 6, 7, 9, 10 and 14). This area is also characterized by salinities greater than 32°/₀₀, and good local flushing due to bay-ocean exchange through the Safety Valve. Fine sediment accumulation is greatest in these dense grass beds and the

resulting high turbidity levels due to their resuspension is caused by the strong water currents specifically in the areas near Soldier Key (station 10) and the Featherbed Banks (station 14).

3. The deep, dense grass beds in southern Biscayne Bay and Card Sound (stations 19, 20 and 22) adjacent to the tidal creeks (Caesar's and Angelfish Creeks), and intermixed with dense hard bottom assemblages (sponges, calcareous algae, soft-coral, and coral rubble). This area also exhibits very good local flushing.

4. The mid-bay hard bottom habitat south of Featherbed Banks (stations 15 and 17) where the bottom is primarily sand with assemblages of sponges, calcareous algae, soft coral, rock and coral rubble.

5. The narrow belt of shallow, moderately dense grass beds intermixed with sparse hard bottom type assemblages, south of Black Point (stations 13, 16, 18 and 21). This area seems to receive the poorest local flushing and in conjunction with freshwater discharge from canals, also has the most pronounced salinity regime (14‰ in February 1983 and 39‰ in April 1982). Water color, possibly from mangrove forest runoff, reaches high levels in this habitat.

Another very distinct habitat is the dense grass bed located between Julia Tuttle and 79th Street Causeways (station 29). This area is characterized by consistent but moderately low salinity. It is flanked to the north and south by extensive areas of dredged bottom. This is where water of incoming tides entering Haulover and Government Cuts mix.

The following discussion an the individual species and species groups is based an the environmental factors characterizing these different habitat types in the Bay.

The data for 10 abiotic factors are listed in Table 78. Values for salinity, turbidity, color and fecal coliform counts are the means of 12 monthly measurements. Standard deviations for salinity and turbidity are used as indices describing the fluctuation of these two factors. Bottom type 1 and bottom type 2 are nominal variables for increasing grass blade and hard bottom assemblage densities respectively. Fecal coliform counts are used as an integrated indicator for possible effects by urban developed areas.

The overall results of the stepwise multiple regression (Table 76) are quite consistent with the simple correlation coefficients (Table 77), although some disagreement has resulted. We have attempted to explain these disagreements in the light of inter-correlations among the 10 abiotic variables and the ubiquity of estuarine species.

3.6.1. Total Fish Biomass

In south Biscayne Bay, comparable quantities of fish biomass are present in both the shallow, low salinity, west-bay seagrass beds, and in the deeper, denser, high salinity mid- and east-bay grass beds near the Bay-ocean exchange channels. Generally, the larger resident species are more abundant in the former, while the smaller non-resident species are more abundant in the latter areas. The important habitat factors associated with larger quantities of fish biomass are grass blade density, fine sand, low salinities (< 31‰) which are relatively stable, and shallow water depth where hard bottom assemblages are scarce and mean turbidity levels are low.

3.6.2. White grunt (*Haemulon plumieri*)

White grunts are a relatively ubiquitous species and occur over a fairly wide range of salinities. However, they are most abundant in the deep, dense grass beds adjacent to the Safety Valve, where levels of salinity and turbidity are high. The poor agreement between the regression results (Table 76) and the correlation coefficients (Table 77) is a mathematical shortcoming of the statistical method used, resulting from the occurrence of comparable numbers of white grunts in areas of low salinity and turbidity levels, and high fecal coliform counts, particularly in station 24, and areas of opposite water quality (see Table 78). The most important factors determining the abundance of white grunts are grass blade density and accumulation of fine sediment.

3.6.3. Bluestriped grunt (*Haemulon sciurus*)

Bluestriped grunts occur primarily in dense grass beds with consistent salinity regimes. They are most abundant in the shallow grass bed north of Julia Tuttle Causeway (station 29) where salinity is relatively constant but low. The most important factors determining their abundance are grass blade density, consistent salinity regime, shallow water depth where mean turbidity levels and fecal coliform counts are low, and the virtual absence of sponges and soft coral.

3.6.4. Tomtate (*Haemulon aurolineatum*)

Although tomtates occur over a wide variety of habitats, ranging from dredged bottom to grass beds, they are most abundant in the deeper and denser grass bed areas adjacent to hard bottom types, near bay-ocean exchange channels. The critical factor determining its presence or absence appears to be high salinities (>32‰). However, the most important factors determining its abundance are high grass blade and hard bottom assemblage densities, and high near-oceanic (34‰) salinity. The high correlation with high mean turbidity levels and large turbidity fluctuations is due to the resuspension of fine sediment which accumulates in these dense grass beds, by the strong water currents particularly characteristic of the Safety Valve and Featherbed Bank areas where the largest numbers of this species were recorded (Table 72).

3.6.5. French grunt (*Haemulon flavolineatum*)

Like most grunts, French grunts occur most frequently in the deeper and denser grass beds associated with hard bottom assemblages, in mid and east Bay. The important habitat factors are high near-oceanic salinity, and high grass blade and hard bottom assemblage densities in deep water where fine sediment accumulation and resuspension takes place.

3.6.6. Sailor's choice (*Haemulon parrai*)

The important factors determining the abundance of sailor's choice in deep water, bottom types of mixed grass and hard bottom assemblages, low water color levels, and little to moderate salinity fluctuation.

3.6.7. Pigfish (*Orthopristis chrysoptera*)

Pigfish occur over different bottom types and can tolerate considerable levels of fecal coliform counts, and other effects of human related activities as shown by their occurrence in comparable numbers in both north and south Biscayne Bay. Pigfish are primarily associated with the grass beds in the west- and mid-bay areas where salinities are less than 33‰. The most important factors for this species are grass blade density, high but consistent levels of

turbidity, a consistent salinity regime, deep water and high fecal coliform counts. The high correlation with high fecal coliform counts appears to be a reflection of its tolerance for human-related activities possibly in order to avoid competition with other species.

3.6.8. Yellowtail snapper (*Ocyurus chrysurus*)

Yellowtail snappers are most abundant in deep grass beds adjacent to hard bottom assemblages near bay-ocean exchange channels. The important factors determining its abundance are grass blade density, fine sediment, deep water with hard bottom assemblages and high levels of salinity and turbidity.

3.6.9. Lane snapper (*Lutjanus synagris*)

Lane snappers are primarily associated with the deep grass beds, specifically in the mid-bay area where salinity is high but exhibits moderately low seasonal fluctuation. They can tolerate relatively poor water quality, specifically moderate levels of water color and fecal coliform counts. The most important habitat features are high mean salinity which shows moderate seasonal changes, grass blade density, fine sediment, and deep water.

3.6.10. Mutton snapper (*Lutjanus analis*)

Very much like lane snappers, mutton snappers are closely associated with the deeper areas of mid Bay, north of Featherbed Banks, and with tidal creeks to the south associated with mixed bottoms of thick seagrass, sand patches, hard bottom type assemblages and coral rubble. The critical habitat factors are grass blade density, deep water, high mean salinity which varies moderately with seasons, sparse distribution of hard bottom assemblages, and consistent turbidity levels.

3.6.11. Gray snapper (*Lutjanus griseus*)

Gray snappers are very closely associated with the shallow west-bay grass beds bordered by mangrove shoreline where mean water color is high. Unlike the other snappers, gray snappers primarily occur from west to mid Bay where salinities are generally lower than 33°/oo. The most important habitat features for this species are grass blade density, low turbidity levels, sparse distribution of hard bottom assemblages, high levels of water color possibly due to mangrove runoff, and shallow water depth.

3.6.12. Sand perch (*Diplectrum formosum*)

Sand perch appear to be tolerant of considerable impact from urban areas and human-related activities as shown by their high correlation with high levels of fecal coliform counts and water color (Tables 76 and 77). However, this species is primarily associated with sandy bottoms. The critical environmental factors determining its abundance are consistently high salinity and sandy bottoms in deep water.

3.6.13. Spotted seatrout (*Cynoscion nebulosus*)

Essentially, all seatrout recorded occurred in the shallow dense *Syringodium* grass bed north of Julia Tuttle Causeway (Station 29), where salinity is consistently low. The most important habitat factors are grass blade density, consistent salinity regime, shallow water depth, and high levels of water color.

3.6.14. Hogfish (*Lachnolaimus maximus*)

Hogfish occur in comparable numbers in deep, dense grass beds and hard bottom type habitats, but are most abundant in mixed seagrass - hard bottom areas near bay-ocean exchange channels. The critical habitat features for this species are consistently high salinity, sand, high seagrass and hard bottom assemblage densities, and deep water.

3.6.15. Toadfish (*Opsanus beta*)

Toadfish are an ubiquitous resident species in Biscayne Bay. They occur in different habitats of mean salinities ranging from 22.6 to 34.7°/₀₀, and bottom types including shallow dense grass beds and deep areas of mixed seagrass - hard bottom assemblages. They are found most frequently in shallow low salinity grass beds. The most important factors determining toadfish abundance are grass blade density, sparsely distributed hard bottom assemblages, shallow water depth, and low mean turbidity levels.

3.6.16. Silver jenny (*Eucinostomus gula*)

The silver jenny is another ubiquitous resident species that occurs primarily in the shallow grass beds where mean salinities are less than 30°/₀₀. However, they are most abundant where the values are in the upper end (28.7 to 29.2°/₀₀) of this salinity range. Their primary habitats are characterized by moderate to dense grass beds, shallow water and high levels of water color.

3.6.17. Pinfish (*Lagodon rhomboides*)

Pinfish comprise the most numerically dominant fish species in our trawl samples and, similar to other resident species, occurs in a variety of habitats. They are most abundant in shallow low salinity grass beds. The most important habitat factors are large fluctuations in salinity, grass blade density, shallow water, and consistently low turbidity levels.

3.6.18. Total Crustacean Biomass

The largest crustacean biomass is supported by the shallow low salinity grass bed north of Julia Tuttle Causeway (station 29). In South Bay, large quantities are primarily associated with the shallow west-bay grass beds (see Table 73). The important factors for total crustacean biomass are grass blade density, shallow water depth, a consistent salinity regime, low mean turbidity levels, and fine sand.

3.6.19. Blue crab (*Callinectes sapidus*)

Blue crabs are most abundant in areas of low mean salinity and large salinity fluctuations, hard bottom type assemblages interspersed with seagrass and sand, shallow water and low turbidity but high water color levels.

3.6.20. Ornate crab (*Callinectes ornatus*)

Ornate crabs occur in comparable numbers in North and South Bay and are found in a wide range of habitat types. Although their habitat requirements are very similar to that of blue crabs, the single most important factor determining the abundance of this species is shallow water depth.

3.6.21. Shrimp (*Penaeus* spp.)

Aside from station 29 in North Bay, shrimp primarily occur in the shallow, low salinity west-bay grass beds. The critical factors are grass blade density, shallow water, consistent salinity regime, sand, and low turbidity levels.

3.6.22. Spiny lobster (*Panulirus* spp.)

The most critical environmental factors determining the abundance of spiny lobsters are dense hard bottom assemblages, deep water, and sand.

3.7. "Identification of fish nursery area in the Bay."

Seagrass beds are well recognized as important nursery areas for juvenile fish. In Biscayne Bay, seagrass beds cover about 64% of the bottom (Milano, 1983) and provide nursery grounds for particular species or groups of species.

For marine species, the deep, high salinity mid- to east-bay grass bed north of Featherbed Bank is the most favorable nursery ground for juveniles of *H. plumieri* and *H. sciurus* (Table 70) and, along with the South Bay - Card Sound areas where the bottom is a mixture of seagrass and hard bottom assemblages, form important nursery areas for juveniles of *H. aurolineatum*. *H. flavolineatum*, *H. parrai* (Table 72), *L. analis*, *L. synagris*, *O. chrysurus* (Table 69), and *L. maximus* (Table 71).

For juveniles of the estuarine species, such as *L. rhomboides* (Table 70), *E. gula* and *O. beta* (Table 71), the west-bay grass beds where marked seasonal salinity fluctuations occur, are the most favorable nursery grounds, particularly the areas south 61 Black Point and the area north of Julia Tuttle Causeway. These are likewise the nursery areas for juvenile *L. griseus* (Table 69). Juveniles of *O. chrysoptera*, however, favor the grass beds north of Shoal Point more.

The shallow dense grass bed north of Julia Tuttle Causeway forms the most important nursery area for both *C. nebulosus* (Table 71) and *Penaeus* spp. (Table 68), where 74% and 28%, respectively, of the total number of individuals of these species in our trawl survey were recorded.

Although species abundance provides a reasonable indicator of nursery grounds, defining the specific functions of these habitats requires detailed studies.

3.8. "Spawning periods of important species of fish and crustaceans in Biscayne Bay."

The spawning periods are defined in Table 95.

In general, the grunts exhibit peak spawning during spring. Snappers also exhibit peak spawning in spring excluding schoolmaster snapper which spawns during winter, and gray snapper which extends spawning from spring to summer. Similarly, both Spanish and cero mackerel spawn during the spring months of April to June, while the clupeids spawn from spring to summer. Spring spawning is also exhibited by the jacks (carangids), with the exception of crevalle jack which spawns in September and blue runner and pompano which spawn from winter to summer. Among the groupers, gag grouper spawns in the winter, red hind and Nassau grouper from winter to spring, red grouper in spring and summer, and jewfish in summer.

3.10. "Size frequency distribution of important species of crustaceans in Biscayne Bay."

Length (carapace length) frequency distributions of *Penaeus duorarum*, *Callinectes sapidus* and *Panulirus argus* are presented in Tables 23, 24 and 25, respectively. Because of the small three-inch gap between finger bars of the roller frame trawl, the sizes, particularly of blue crab and spiny lobster, are biased towards smaller individuals.

As mentioned earlier, 28% of all shrimp were recorded from station 29 in North Bay. The size range of shrimp in this area dominates the baywide size distribution which has a modal size of 13 - 14 mm CL, even though the modal size in South Bay is somewhat larger at 16 mm CL. Monthly length frequency distributions for North and South Bay are presented in Figures 22a and 22b.

The modal size of *P. argus* in North Bay is 61 - 65 mm CL, while that of South Bay is smaller, 16 - 20 mm CL.

Like spiny lobsters, most blue crabs were recorded in South Bay, where the size distribution shows two modes, at 31 - 40 mm and 51 - 60 mm CL. The modal size in North Bay was larger, 131 - 140 mm CL.

3.11. "Sex ratios of important crustaceans in Biscayne Bay."

Sex ratios recorded for important crustaceans were:

Species	Sample Size	M : F
Penaeus spp. (shrimp)	18,751 males : 19,470 females	0.96:1.0
P. argus (spiny lobster)	150 males : 98 females	1.53:1.0
C. sapidus (blue crab)	194 males : 930 females	0.21:1.0
M. mercenaria (stone crab)	645 males : 506 females	1.28:1.0

3.12. "Relative abundance of potential commercial and recreational macro invertebrates in North Biscayne Bay."

Mean number and mean weight (in lbs.) of stone crabs per trap recorded from the North Bay stone crab survey are given in Table 86. Monthly catches (mean no./trap) for six cells and total catch for each month were compared using ANOVA. The results showed no significant differences ($p > 0.05$) in all comparisons (Table 87).

However, commercial harvest of stone crab is reported in weight (lbs.). Thus, in order to compare our results to those of commercial harvest from the Bay, ANOVAs were performed an mean lbs. per trap for monthly data among cells, and for pooled data among months. All comparisons showed no significant differences ($p > 0.05$) (Table 89). Likewise, ANOVAs comparing our South Bay and North Bay data showed no significant differences ($p > 0.05$). A series of Student's t-tests were then performed comparing our monthly North Bay harvest data and the overall mean harvest by commercial stone crab fishermen (0.319 lbs./trap, October 1982 to May 1983), in order to detect differences, particularly before and after the open .season. All comparisons were not significant ($p > 0.05$).

It should be mentioned that the season covered by the survey (1982 - 1983 season) appears to have been a poor season as shown by commercial fishing harvest data. However, there are indications that certain areas in North Bay can support limited commercial fishing for stone crabs, particularly the areas around Allison Island, Julia Tuttle Causeway, and east of Star Island.

By-catch data for blue crab (from the stone crab survey) were used for comparing harvests between North and South Bay, since sizes of those caught by traps are more representative of harvestable individuals than sizes of those caught by the roller frame trawl. The results of the t-test showed no significant difference ($0.20 < p < 0.40$) between North Bay and South Bay catches.

Among all North Bay areas, lobsters were caught in highest numbers in areas 10 (station 24) and 11 (station 23) (Table 68). However, these figures are low compared to those areas in South Bay where lobsters were frequently caught.

Twenty-eight percent of all shrimp recorded in both North and South Bay were recorded from station 29. This area is an important nursery area for shrimp and had commercial quantities of shrimp in every month sampled. Table 80 lists those trawl stations at which shrimp were as abundant as in commercial catches (as determined from our monthly sampling aboard commercial bait shrimp vessels). Commercial catches were expressed as catch per 5-minute tow and the number divided by 1.6 to adjust for the larger net size used by commercial shrimpers. (Mean net width = 12.5 ft.).

4. CONCLUSIONS

Preceding sections have discussed the areal and temporal distribution and abundance of selected species and attempted to relate them to environmental parameters. In this section we discuss the generalizations and implications suggested by these findings.

The total area of Biscayne Bay is approximately 573.15 km^2. The area of North Bay = 64.40 km^2; South Bay = 508.75 km^2. North Bay is 11.24% of the total Bay area while South Bay represents 88.76% (Milano, 1983).

Total fishing effort in North Bay recorded in our creel survey was 284,834 man-hours over 21 months. In South Bay we estimated 714,606 man-hours of fishing effort. Fishing effort in North Bay is 28.5% of the baywide total. Fishing effort in South Bay is 71.5% of the baywide total (Figure 7). Thus, relative to its size, North Bay receives more than three times the fishing effort than does South Bay (Figure 8).

Based on our 21-month creel survey, the total catch of all species (not including shrimp and bait fish) was 935,905 individuals. Of this total 267,650 (28.6%) were caught in North Bay and 668,255 were caught in South Bay (71.4%). Thus, while North Bay makes up 11.2% of the total Bay area, it accounts for 28.6% of the total catch. Mean catch per unit effort for North Bay over all areas and months was 0.94 fish/man-hour (Figure 6). Mean CPUE was identical in South Bay (0.94 fish/man-hour). While this does not take into account the "quality" of the species caught, it does suggest that for general recreational fishing, fishing success in North Bay is equivalent to South Bay. This may be somewhat misleading because much of North Bay is accessible from shore while very little of South Bay is accessible from shore. Because of this, much of the effort in North Bay is from shore fishermen. In South Bay, most of the effort is from boat fishermen. Often on species caught from shore art smaller and/or less desirable than those caught from boats. Thus, the "quality" of fishing may be better in South Bay even though CPUE (in number of fish per man-hour of effort) is the same as in North Bay.

The seasonal distribution of recreational catch (mean numbers per month) and effort (mean man-hours per month) was:

Season	Effort	(%)	Catch	(%)	CPUE
Spring[Δ]	53,283	(28.3)	47,199	(26.3)	0.89
Summer[Δ]	46,295	(24.6)	44,980	(25.0)	0.97
Fall[Δ]	45,518	(24.2)	41,104	(22.9)	0.90
Winter[◊]	42,955	(22.8)	46,282	(25.8)	1.08

Those data reflect catch and effort of all species except shrimp. Catch and effort are very consistent, showing little seasonal variability. Highest CPUE was in winter, but it was only slightly higher than in other seasons.

Fishing effort by sub-area expressed in man-hours is summarized in Table 81. Areas 18, 15, 12, and 7 had the highest recorded effort per unit area. These areas are all accessible from shore, thus total effort reflects shore fishing as well as boat fishing effort. Areas 12, 15 and 18 are accessible from Rickenbacker and Cape Florida shore access points. In the southernmost parts of Biscayne Bay, areas with relatively high recorded effort (e.g., areas 24, and 27) are also areas with convenient shore access.

We recorded the least fishing effort in areas 32 and 33 in the southernmost part of Biscayne Bay. This is apparently an artifact of our sampling design since aerial overflights indicated that these areas received moderate fishing effort (Table 96). The discrepancy is probably due to boats fishing these areas having come from docks or ramps not covered in our survey. Based on 58 aerial overflights, area 18 near Key Biscayne, had the greatest amount of fishing effort, followed by areas 24, near black Point, and 15, also near Key Biscayne, in agreement with the independent estimates shown in Table 81. Least effort recorded from aerial over flights was in area 14, mid-way between Key Biscayne and Dinner Key and in area 28, mid-way between Elliott Key and Homestead Bayfront Park. (Table 96).

Area 15 produced the greatest total weight of fish per unit area recorded in the creel survey, followed closely by area 18 (Table 95). These areas also received the most fishing effort, thus, the high yields are a reflection of high effort. Fishing success expressed as CPUE was greatest in areas 20 and 28 in mid Bay. While these areas apparently do not have high effort, fishing success is generally best.

The creel survey was designed to sample what we believed would represent a large proportion of total fishing effort in Biscayne Bay. We recognized, however, that there would be some boats that would fish in the Bay that would hot be intercepted in our survey because we sampled only at eight public boat ramps. Boats launched at places other than these ramps, or boats moored at marinas or private docks would not be included. Additionally, some areas of shoreline were not covered in our survey. To determine the amount of effort not accounted for in our survey design, aerial over flights were conducted three times per month. These flights counted all fishermen in the Bay and thus represented the entire universe of fishermen at that instant in time. An explanation of the logic used to determine a correction factor to account for boats and shore fishermen not accounted for in our survey is given in Appendix VI.

Our original assumption that our survey would account for most of the fishing effort in the Bay was apparently correct. Our survey accounted for 93% of the total boat-fishing effort in the Bay. Catches presented previously in this report are uncorrected and should be multiplied by 1.0741 to derive the corrected total catch.

[Δ] Includes March - May 1982 and 1983 (six months).

[◊] Includes December - February 1982 and 1983 (three months).

Summarized results of the creel survey present data on catch and effort by species and area fished but do not indicate actual user patterns. Distribution of effort and fishermen by boat ramp and shore access point is presented in Tables 89 and 90. From these tables it can be seen that user patterns differ between weekend and weekday days and between days and nights on weekdays. Crandon Park Marina (access point 44) is the most-used ramp. Pelican Harbor (access point 42) is used by 11.3% of the fishermen using boat ramps during weekday days but they fish longer representing 21.4% of the man-hours of effort. Black Point, Homestead Bayfront Park and Matheson Hammock are used approximately the same percent during weekday days. On weekend days, Black Point and Matheson Hammock see the most use. On both weekday and weekend nights, Crandon Park Marina is used by the highest percentage of fishermen. The use of Crandon, in percent of the total marina use, increases considerably an weekend nights.

Of the shore access points we monitored, Rickenbacker Causeway including Cape Florida (shore access 53) was the most heavily used.

Relative fishing effort by time of day for weekend and weekday days is shown in Table 97. Not unexpectedly, boat fishermen return later on weekend days and a greater percentage of night fishermen return after midnight. Both boat and shore fishermen expend a significant percentage of effort during all time periods.

Using aerial overflight counts, distribution of fishing effort was determined (Table 99). The mean number of boat fishermen was somewhat higher than shore fishermen in both North and South Bay. The mean number of fishermen in South Bay (137) was 3.8 times greater than in North Bay (36) although the number of fishermen per unit area was twice as high in North Bay.

Abundance of 20 species as determined from trawl samples was compared between North and South Bay (Table 91). Mean numbers were compared using a Student's t-test and were considered significantly different if $p < 0.05$. Shrimp (*Penaeus* spp.) and spotted seatrout were significantly more abundant in North Bay than in South Bay. Between North Bay and South Bay, no difference in mean abundance could be detected for bluestriped grunt, tomtate, sand perch, silver jenny, toadfish or ornate crab. The remaining 10 species were more abundant in South Bay. The abundance of seatrout and shrimp in North Bay is primarily a reflection of trawl station 29, north of Julia Tuttle Causeway (Cell D). Seatrout were not caught abundantly anywhere in Biscayne Bay. Their actual abundance is probably much greater than our trawl catches indicate, but it is not known how they are able to avoid the nets.

Areas were ranked by their mean monthly fish diversity index for both creel and trawl surveys. For the trawl survey, stations were assigned to their equivalent sub-area. Diversity index is expressed as an annual diversity and as a mean per 5-minute tow, neither of which is directly comparable to the diversity index determined from the creel survey. The two surveys sample different components (species and sizes) of the fish fauna and are calculated over different time periods and with different sampling intensity. Thus, the absolute magnitude of the values cannot be directly compared, but the relative rankings can be compared for the two types of samples (Table 92, and Figures 3 and 12). Species richness and evenness are likewise ranked by area from creel and trawl surveys (Tables 93 and 94, and Figures 4, 5, 13 and 14). In the creel survey, richness (number of species) and diversity are correlated, and are apparently related largely to amount of effort (i.e., areas having the most effort appear to have the highest diversity and richness). Thus, in the creel results, diversity and richness are not accurate measures of community structure because they reflect varying amounts of sampling effort. In the trawl survey, a standard unit of sampling effort was used making areal comparisons valid. The seven richest areas (annual) were in mid or east Bay. Diversity follows a similar pattern with the most diverse stations in mid or east Bay (Table 92 and Figure 12).

Analysis of variance was performed testing mean weight of fish and crustaceans by station. Results were highly significant ($p < 0.001$). Duncan's multiple range test was run to determine which stations were significantly different (Table 99). Mean weight of both faunal groups and combined fish and crustaceans were significantly greater at station 29 than at any other station (Figures 9, 10 and 11). Crustaceans were always most abundant (by weight) at seagrass stations along the mainland shore in South Bay (Figure 10). For fish, many of the richest stations (by weight and diversity) were found in mid and east Bay (Figure 9). In part this reflects the smaller size of fish in west-bay grass beds which appear to have large populations of small juveniles. In deeper mid- and east-bay stations, the number of fish may be less than in west-bay grass beds but the mean size is larger. Of the ten stations having the lowest mean weight of fish, seven were in North Bay. For crustaceans, six of the ten lowest were in North Bay. From these results, it appears that fish and crustacean biomass is generally highest in South Bay seagrass beds or in deeper mid- and east-bay grass or hard bottom areas (Figure 11). The results of this analysis (Table 99) also suggest that fish and crustaceans are more abundant (by weight) in the southernmost seagrass beds than in seagrass beds closer to the city of Miami (i.e., stations 11, 13, 16 and 18 have higher mean weight of fish and crustaceans than stations 2, 5, and 8).

Surface areas of different bottom types in Biscayne Bay are shown in Table 82. On this classification, the dominant bottom type in Biscayne Bay is seagrass of varying densities. Hard bottom communities comprise 21.5% of the Bay bottom and are found primarily south of Featherbed Bank. The remaining 14.6% of the Bay bottom is barren.

Results of the multiple regression analysis (Table 76) show that seagrass is the single most important factor of those tested in determining the abundance of most of the important species of fish. This analysis also suggests that abundance of many species increases with increasing grass density. Of the 20 species used in the multiple regression analysis, none were negatively correlated with grass density (bottom type 1). A significant positive correlation was found for all species of fish except sand perch (*Diplectrum formosum*). This suggests that some increase in fish abundance could be realized, at least theoretically, even in existing seagrass areas if grass density could be increased. Considering the usual direction of environmental change, it is perhaps more pertinent to assess the potential loss in fish abundance if seagrass or hard bottom communities are destroyed. Table 93 shows the percent decrease in two important families of fish (grunts and snappers), all fish, all crustaceans, and all fauna that would be expected if seagrass and hard bottom were altered by dredging. Figures are based on the trawl survey results in which each of 34 stations was assigned to one of the bottom type categories and mean biomass calculated for all stations within each category. A 99% decrease in juvenile snappers per unit area would be predicted if the average seagrass bed were dredged. An 83% decrease in all fauna combined would be expected for each unit area of seagrass converted to dredged barren bottom.

If barren, dredged bottom could be converted to seagrass habitats, the theoretical percentage increase in mean biomass for dredged bottoms would be;

snappers:	7300%
grunt:	1043%
all fish:	874%
all crustaceans:	172%
all fauna:	473%

Table 84 gives the theoretical baywide percentage increase in biomass for these live groups of organisms.

5. RECOMMENDATIONS

1. Dredged and/or barren bottom is dramatically less productive than seagrass, algae or hard bottom areas. Therefore, we recommend that no further alteration of Bay bottom that results in removal of bottom cover be allowed.

2. Low fish abundance and diversity in north Biscayne Bay appears to be correlated with high turbidity. Therefore, we recommend that any activities which are associated with persistent increases in turbidity be prohibited.

3. Substantive increases in fish and crustacean productivity in north Biscayne Bay will occur only if seagrass communities can become re-established. Therefore, we recommend that sources of turbidity be identified and ameliorated to whatever extent is practical. If reduced turbidity allowed seagrasses to recognize all dredged barren bottom in North Bay, an increase in fish biomass of 358% would theoretically result.*

4. Deeper dredged areas in North Bay will not likely become recolonized with seagrass even if turbidity levels are reduced. Therefore, we recommend that, wherever possible, these areas be filled in to depths comparable to those in Cell D (approximately 2 - 4 ft. at MLW) to allow natural seagrass recolonization.

5. Hard bottom areas in South Bay are associated with high diversity of fish fauna and serve as nursery areas for several highly desirable species (e.g. hogfish, yellowtail snapper, lane snapper). These communities are believed to be more sensitive to environmental degradation than seagrass beds and require higher water quality (lower turbidity, stable salinities, more stable temperatures, greater water clarity, better water circulation, etc.). Because these communities are more sensitive, special precautions should be taken to prevent any environmental degradation that might affect them.

6. Cell D, between Julia Tuttle and 79th Street Causeways, was the richest area on either North or South Biscayne Bay for juvenile fish and shrimp. This basin can serve as a model for the potential of the remainder of North Bay. Because of the value of this area as a model for other urbanized bays, and because of its high productivity, we recommend that a special effort be made to preserve this area in its present condition. In addition, because of this area's importance as a seatrout nursery, we recommend that bait shrimper trawling or other bottom trawling activities be prohibited.

6. LITERATURE CITED

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* Calculated as follows: North Bay = 64.40 km^2; Dredged barren bottom, N. Bay = 26.47 km^2 = 41.02%; From trawl survey (Table 83), percent Increase in mean biomass of fish from dredged bottom to sea grass = 874%. Therefore: theoretical increase in fish biomass = (8.74)(0.4102) = 358%.

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Plate 2. Sampling at night. [Photograph courtesy of S. A. Berkeley.]

Table 1a. Monthly allocation of creel survey sampling effort (in hours) by type, kind of day, time of day, and access points. Values in parenthesis are the number of hours allocated to the major levels.*

BOAT RAMP SURVEY[Δ]
(458.1 hrs)

	Weekdays[ΔΔ] (321.5 hrs)				Weekends[ΔΔ] (136.6 hrs)			
	Day[◊◊]		Night[◊◊]		Day[◊◊]		Night[◊◊]	
	AM	PM	N1	N2	AM	PM	N1	N2
Ramp no.								
41	4.2	18.6	2.9	2.9	2.3	5.6	3.6	2.0
42	6.5	16.0	5.2	1.6	2.3	5.9	2.6	0.6
43	7.5	14.4	4.6	1.0	1.6	6.2	3.6	1.3
44	12.7	31.0	5.2	1.6	6.2	9.5	2.3	2.0
45	6.2	30.7	5.6	1.3	5.2	11.8	2.3	0
46	10.8	33.3	3.9	2.0	2.3	15.0	3.3	0.3
47	10.8	32.0	4.9	1.0	4.3	11.4	3.9	1.6
48[Δ]	11.4	31.4	-	-	3.3	14.4	-	-
Total for time shift	70.2	207.5	32.4	11.4	27.5	79.7	21.6	7.8

SHORELINE SURVEY [◊]
(101.9 hrs)

	Weekdays (48.7 hrs)				Weekends (53.2 hrs)			
	Day[◊◊]		Night[◊◊]		Day[◊◊]		Night[◊◊]	
	AM	PM	N1	N2	AM	PM	N1	N2
Shore access point								
51	0.3	6.5	4.6	2.9	2.9	3.9	3.3	3.6
52	2.0	3.9	3.0	1.6	3.9	4.6	3.6	3.9
53	4.2	3.3	3.9	1.0	2.9	4.9	3.3	4.2
54	1.3	5.6	3.6	1.0	1.0	2.0	3.3	2.0
Total for time shift	7.8	19.3	15.1	6.5	13.7	16.0	15.3	8.2

* All values are means from 21 months of sampling. The mean total sampling effort per month was 560 hours. Sampling was done in shifts of approximately 6 hours each.

[Δ] Boat ramp #48 (Matheson Hammock) is closed at night.

[ΔΔ] Weekdays include Monday through Friday, except holidays. Weekends include Saturday, Sunday and holidays.

[◊◊] Typical day sampling was stratified as AM (0601 - 1200) and PM (1201 - 1800) shifts. Typical night sampling was stratified as N1 (1801 - 0000) and N2 (0001 - 0600).

[◊] Shore access points 55, 56, 57, 58 and 59 are not included since these points were combined with access points 51, 53 and 54 in June 1982.

Table 1b. Actual number of times each boat/shore access point was surveyed for each time of day (TOD), kind of day (KOD) combination during the Biscayne Bay creel survey - March 1982 - November 1983.

	Weekday				Weekend			
TOD	AM	PM	N1	N2	AM	PM	N1	N2
Ramp No								
41	13	57	9	9	7	17	11	6
42	20	49	16	5	7	18	8	2
43	23	44	14	3	5	19	11	4
44	39	95	16	5	19	29	7	6
45	19	94	17	4	16	36	7	
46	33	102	12	6	7	46	10	1
47	33	98	15	3	13	35	12	5
48	35	96	-	-	10	44	-	-
Shore No.								
51	1	20	14	9	9	12	9	3
52	6	12	9	5	12	14	15	6
53	13	10	12	3	10	11	10	10
54	4	17	11	3	11	12	13	6
55***	0	2	1	0	1	0	0	1
56***	2	0	2	1	1	0	1	0
57**	1	0	0	0	0	2	0	0
58*	0	0	-	-	1	1	-	-
59	1	9	-	-	5	3	-	-

* Combined with Rickenbacker Causeway (#53) daytime sampling effort as of May 1982.
** Consolidated in shore point #51 as of June 1982.
*** Consolidated in shore point #54 as of June 1982.

Table 2. Species recorded for creel survey in Biscayne Bay - 1982-1983. Species are classified as: G = Important game or food species; R = recreational species; B = bait species; U = undesirable species.

Fam. Dasyatidae (stingrays)

U *Dasyatis americana* (southern stingray)

Fam. Rhinobatidae (guitarfishes)

U *Rhinobatos lentiginosus* (Atlantic guitarfish)

Fam. Carcharhinidae (requiem sharks)

U *Carcharhinus acronotus* (blacknose shark)
U *Carcharhinus limbatus* (blacktip shark)
U *Negaprion brevirostris* (lemon shark)

Fam. Orectolobidae (carpet sharks)

U *Ginglymostoma cirratum* (nurse shark)

Fam. Sphyrnidae (hammerhead sharks)

U *Sphyrna mokarran* (great hammerhead)
U *Sphyrna tiburo* (bonnethead)

Fam. Muraenidae (morays)

Fam. Elopidae (tarpons)

R *Elops saurus* (ladyfish)
G *Megalops atlanticus* (tarpon)

Fam. Albulidae (bonefishes)

G *Albula vulpes* (bonefish)

Fam. Clupeidae (herrings)

B *Harengula jaguana* (pilchard)
B *Opisthonema oglinum* (Atlantic thread herring)
B *Sardinella aurita* (Spanish sardine)

Fam. Engraulidae (anchovies)

B *Anchoa lamprotaenia* (bigeye anchovy)
B *Anchoa mitchilli* (bay anchovy)

Fam. Synodontidae (lizardfishes)

U *Synodus foetens* (inshore lizardfish)

Table 2. Species recorded for creel survey in Biscayne Bay - 1982-1983. Species are classified as: G = Important game or food species; R = recreational species; B = bait species; U = undesirable species (cont.).

Fam. Ariidae (catfishes)

U *Arius felis* (hardhead catfish)

Fam. Batrachoididae (toadfish)

U *Opsanus beta* (gulf toadfish)

Fam. Exocoetidae (flyingfishes)

B *Chriodorus atherinoides* (hardhead halfbeak)
B *Hemiramphus brasiliensis* (ballyhoo)

Fam. Belonidae (needlefishes)

U *Strongylura* sp. (needlefish)
U *Tylosurus crocodilus* (houndfish)

Fam. Centropomidae (snooks)

C *Centropomus undecimalis* (snook)

Fam. Serranidae (sea basses)

R *Diplectrum formosum* (sand perch)
G *Epinephelus adscensionis* (rock hind)
G *Epinephelus guttatus* (red hind)
G *Epinephelus itajara* (jewfish)
G *Epinephelus morio* (red grouper)
G *Epinephelus striatus* (Nassau grouper)
G *Mycteroperca bonaci* (black grouper
G *Mycteroperca microlepis* (gag grouper)

Fam. Malacanthidae (tilefishes)

U *Malacanthus plumieri* (sand tilefish)

Fam. Pomatomidae (bluefishes)

G *Pomatomus saltatrix* (bluefish)

Fam. Rachycentridae (cobias)

G *Rachycentron canadum* (cobia)

Table 2. Species recorded for creel survey in Biscayne Bay - 1982-1983. Species are classified as: G = Important game or food species; R = recreational species; B = bait species; U = undesirable species (cont.).

Fam. Carangidae (jacks)

G *Alectis ciliaris* (African pompano)
R *Caranx bartholomaei* (yellow jack)
R *Caranx crysos* (blue runner)
R *Caranx hippos* (crevalle jack)
R *Caranx latus* (horse-eye jack)
R *Caranx ruber* (bar jack)
R *Elagatis bipinnulata* (rainbow runner)
U *Oligoplites saurus* (leatherjacket)
R *Selene vomer* (lookdown)
G *Seriola dumerili* (greater amberjack)
G *Trachinotus carolinus* (Florida pompano)
G *Trachinotus falcatus* (permit)

Fam. Lutjanidae (snappers)

G *Lutjanus analis* (mutton snapper)
G *Lutjanus apodus* (school master)
G *Lutjanus griseus* (gray/mangrove snapper)
G *Lutjanus jocu* (dog snapper)
G *Lutjanus mahogoni* (mahogany snapper)
G *Lutjanus synagris* (lane snapper)
G *Ocyurus chrysurus* (yellowtail snapper)

Fam. Gerreidae (tomtates)

U *Eucinostomus gula* (silver Jenny)
U *Gerres cinereus* (yellowfin mojarra)

Fam. Sciaenidae (drums)

G *Cynoscion nebulosus* (spotted seatrout)
R *Pogonias cromis* (black drum)
R *Umbrina coroides* (sand drum)

Fam. Mullidae

U *Pseudupeneus maculatus* (spotted goatfish)

Table 2. Species recorded for creel survey in Biscayne Bay - 1982-1983. Species are classified as: G = Important game or food species; R = recreational species; B = bait species; U = undesirable species (cont.).

Fam. Haemulidae (grunts)

R *Anisotremus surinamensis* (black margate)
U *Anisotremus virginicus* (porkfish)
R *Haemulon album* (margate)
R *Haemulon aurolineatum* (tomtate)
R *Haemulon carbonarium* (Caesar grunt)
R *Haemulon chrysargyreum* (smallmouth grunt)
R *Haemulon flavolineatum* (French grunt)
R *Haemulon macrostomum* (Spanish grunt)
R *Haemulon parra* (sailor's choice)
R *Haemulon plumieri* (white grunt)
R *Haemulon sciurus* (bluestriped grunt)
U *Orthopristis chrysoptera* (pigfish)

Fam. Sparidae (porgies)

G *Archosargus probatocephalus* (sheepshead)
R *Archosargus rhomboidalis* (seabream)
R *Calamus arctifrons* (grass porgy)
R *Calamus bajonado* (jolthead porgy)
R *Calamus calamus* (saucereye porgy)
R *Calamus penna* (sheepshead porgy)
R *Diplodus holbrooki* (spottail pinfish)
B *Lagodon rhomboides* (pinfish)

Fam. Kyphosidae (sea chubs)

R *Kyphosus sectatrix* (Bermuda chub)

Fam. Ephippidae (spadefishes)

R *Chaetodipterus faber* (Atlantic spadefish)

Fam. Pomacanthidae (angelfishes)

U *Holacanthus ciliaris* (queen angelfish)
U *Pomacanthus arcuatus* (gray angelfish)

Fam. Pomacentridae (damselfishes)

U *Abudefduf saxatilis* (sargeant major)

Table 2. Species recorded for creel survey in Biscayne Bay - 1982-1983. Species are classified as: G = Important game or food species; R = recreational species; B = bait species; U = undesirable species (cont.).

Fam. Labridae (wrasses)

U *Bodianus rufus* (Spanish hogfish)
U *Halichoeres maculipinna* (clown wrasse)
G *Lachnolaimus maximus* (hogfish)

Fam. Scaridae (parrotfishes)

U *Scarus coeruleus* (blue parrotfish)

Fam. Mugilidae (mullets)

B *Mugil cephalus* (striped/black mullet)
B *Mugil curema* (white mullet)

Fam. Sphyraenidae (barracudas)

R *Sphyraena barracuda* (great barracuda)
U *Sphyraena guachancho* (guaguanche)

Fam. Acanthuridae (surgeonfishes)

U *Acanthurus chirurgus* (doctorfish)
U *Acanthurus coeruleus* (blue tang)

Fam. Scombridae (mackerels)

G *Scomberomorus cavalla* (king mackerel)
G *Scomberomorus maculatus* (Spanish mackerel)
G *Scomberomorus regalis* (cero mackerel)

Fam. Scorpaenidae (scorpionfishes)

U *Scorpaena* sp. (scorpionfish)

Fam. Triglidae (searobins)

U *Prionotus* sp. (searobin)

Fam. Bothidae (lefteye flounders)

U *Bothus lunatus* (peacock flounder)
G *Paralichthys albigutta* (gulf flounder)

Fam. Soleidae (soles)

U *Achirus lineatus* (lined sole)

Table 2. Species recorded for creel survey in Biscayne Bay - 1982-1983. Species are classified as: G = Important game or food species; R = recreational species; B = bait species; U = undesirable species (cont.).

	Fam. Balistidae (leatherjack)
U	*Balistes capriscus* (gray triggerfish)
U	*Balistes vetula* (queen triggerfish)
U	*Melichthys niger* (black durgon)
U	*Monacanthus hispidus* (planehead filefish)
	Fam. Ostraciidae (boxfishes)
U	*Lactophrys quadricornis* (scrawled cowfish)
U	*Lactophrys trigonus* (trunkfish)
	Fam. Tetradontidae (puffers)
U	*Sphoeroides spengleri* (bandtail puffer)
	Fam. Diodontidae (porcupine fishes)
U	*Chilomycterus* sp. (burrfish)
	Fam. Palinuridae (lobsters)
G	*Panulirus argus* (spiny lobster)
	Fam. Penaeidae (penaeid shrimps)
G	*Penaeus* sp. (penaeid shrimp)
	Fam. Portunidae (swimming crabs)
G	*Callinectes sapidus* (blue crab)
U	*Portunus* sp. (swimming crab)
U	Squid (unidentified squid)
U	Octopus (unidentified octopus)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983.

Fishes

Fam. Dasyatidae (stingrays)

Dasyatis sabina (Atlantic stingray)
Gymnura micrura (smooth butterfly ray)
Urolophus jamaicensis (yellow stingray)

Fam. Rajidae (skates)

Raja texana (Roundel skate)

Fam. Ophidiidae (cusk-eels)

Ophidion holbrooki (bank cusk-eel)

Fam. Elopidae (tarpons)

Elops saurus (ladyfish)

Fam. Muraenidae (morays)

Gymnothorax nigromarginatus (blackedge moray eel)
Gymnothorax vicinus (purplemouth moray eel)
Lycodontis funebris (moray eel)

Fam. Ophichthidae (snake eels)

Ahlia egmontis (key worm eel)
Myrichthys acuminatus (sharptail eel)
Ophichthus gomesi (shrimp eel)

Fam. Clupeidae (herrings)

Harengula clupeola (false pilchard)
Harengula humeralis (redear sardine)
Harengula jaguana (scaled sardine)
Jenkinsia lamprotaenia (dwarf herring)
Sardinella aurita (Spanish sardine)

Fam. Engraulidae (anchovies)

Anchoa mitchilli (bay anchovy)

Fam. Synodontidae (lizardfishes)

Synodus foetens (Inshore lizardfish)
Synodus synodus (red lizardfish)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Batrachoididae (toadfish)

Opsanus beta (Gulf toadfish)

Fam. Antennariidae (frog fishes)

Antennarius scaber (splidure frogfish)
Histrio histrio (sargassum fish)

Fam. Ogcocephalidae (bat fishes)

Ogcocephalus radiatus (polka-dot batfish)

Fam. Exocoetidae (flying fishes)

Chriodorus atherinoides (hardhead halfbeak)
Hemiramphus brasiliensis (ballyhoo)

Fam. Belonidae (needle fishes)

Strongylura notata (redfin needlefish)
Tylosurus crocodilus (houndfish)

Fam. Cyprinodontidae (killifishes)

Cyprinodon variegatus (sheepshead minnow)
Lucania parva (rainwater killifish)

Fam. Atherinidae (silversides)

Atherinomorus stipes (hardhead silverside)
Hypoatherina harringtonensis (reef silverside)

Fam. Holocentridae (squirrel fishes)

Holocentrus rufus (longspine squirrelfish)
Holocentrus vexillarius (dusky squirrelfish)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Syngnathidae (pipefishes)

Cosmocampus albirostris (whitenose pipefish)
Cosmocampus brachycephalus (crested pipefish)
Hippocampus erectus (lined seahorse)
Hippocampus reidi (longsnout seahorse)
Hippocampus zosterae (dwarf seahorse)
Micrognathus criniger (fringed pipefish)
Syngnathus elucens (shortfin pipefish)
Syngnathus floridae (dusky pipefish)
Syngnathus louisianae (chain pipefish)
Syngnathus pelagicus (sargassum pipefish)
Syngnathus scovelli (Gulf pipefish)
Syngnathus springeri (bull pipefish)

Fam. Serranidae (sea basses)

Diplectrum bivittatum (dwarf sand perch)
Diplectrum formosum (sand perch)
Epinephelus morio (red grouper)
Hypoplectrus unicolor (butter hamlet)
Mycteroperca microlepis (gag grouper)
Mycteroperca rubra (comb grouper)
Serranus baldwini (lantern bass)

Fam. Apogonidae (cardinal fishes)

Apogon aurolineatus (bridle cardinalfish)
Apogon binotatus (barred cardinalfish)
Apogon quadrisquamatus (sawcheek cardinalfish)
Astrapogon alutus (bronze cardinalfish)
Astrapogon puncticulatus (blackfin cardinalfish)
Astrapogon stellatus (conchfish)
Phaeoptyx pigmentaria (dusky cardinalfish)

Fam. Carangidae (jacks)

Caranx batholomaei (yellow jack)
Caranx crysos (blue runner)
Caranx hippos (crevalle jack)
Caranx ruber (barjack)
Oligoplites saurus (leatherjacket)
Selene setapinnis (Atlantic moonfish)
Selene vomer (lookdown)
Trachinotus carolinus (Florida pompano)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Lutjanidae (snappers)

Lutjanus analis (mutton snapper)
Lutjanus apodus (schoolmaster snapper)
Lutjanus griseus (Gray snapper)
Lutjanus synagris (lane snapper)
Ocyurus chrysurus (yellowtail snapper)

Fam. Gerreidae (mojarras)

Diapterus plumieri (striped mojarra)
Eucinostomus argenteus (spotfin mojarra)
Eucinostomus gula (silver jenny)
Eucinostomus havana (bigeye mojarra)
Eucinostomus jonesi (slender mojarra)
Eucinostomus lefroyi (mottled mojarra)

Fam. Haemulidae (grunts)

Anisotremus surinamensis (black margate)
Anisotremus virginicus (porkfish)
Haemulon aurolineatum (tomtate)
Haemulon flavolineatum (French grunt)
Haemulon melanurum (cottonwick)
Haemulon parra (sailor's choice)
Haemulon plumieri (white grunt)
Haemulon sciurus (bluestriped grunt)
Orthopristis chrysoptera (pigfish)

Fam. Sparidae (porgies)

Archosargus probatocephalus (sheepshead)
Archosargus rhomboidalis (sea bream)
Calamus arctifrons (grass porgy)
Calamus proridens (littlehead porgy)
Lagodon rhomboides (pinfish)

Fam. Sciaenidae (drums)

Bairdiella chrysoura (silver perch)
Cynoscion nebulosus (spotted seatrout)
Equetus acuminatus (high-hat)
Equetus lanceolatus (jack-knife fish)

Fam. Ariidae (sea catfishes)

Arius felis (hardhead catfish)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Kyphosidae (sea chubs)

Kyphosus sectatrix (Bermuda chub)

Fam. Chaetodontidae (butterflyfishes)

Chaetodon capistratus (roureye butterflyfish)
Chaetodon sedentarius (reef butterflyfish)
Chaetodon striatus (banded butterflyfish)

Fam. Pomacanthidae (angelfishes)

Pomacanthus arcuatus (gray angelfish)
Pomacanthus paru (French angelfish)

Fam. Pomacentridae (damselfishes)

Pomacentrus fuscus (dusky damselfish)
Pomacentrus variabilis (cocoa damselfish)

Fam. Labridae (wrasses)

Doratonotus megalepis (dwarf wrasse)
Lachnolaimus maximus (hogfish)

Fam. Scaridae (parrotfishes)

Nicholsina usta (emerald parrotfish)
Scarus coeruleus (blue parrotfish)
Scarus croicensus (striped parrotfish)
Scarus taeniopterus (princess parrotfish)
Scarus vetula (queen parrotfish)
Sparisoma aurofrenatum (redband parrotfish)
Sparisoma chrysopterum (redtail parrotfish)
Sparisoma radians (bucktooth parrotfish)
Sparisoma rubripinne (redfin parrotfish)
Sparisoma viride (stoplight parrotfish)

Fam. Mugilidae (mullets)

Mugil cephalus (striped mullet)
Mugil trichodon (fantail mullet)

Fam. Sphyraenidae (barracudas)

Sphyraena barracuda (great barracuda)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Clinidae (clinids)

Paraclinus fasciatus (banded blenny)
Paraclinus marmoratus (marbled blenny)

Fam. Blenniidae (combtooth blennies)

Chasmodes saburrae (Florida blenny)

Fam. Callionymidae (dragonets)

Callionymus pauciradiatus (spotted dragonet)

Fam. Gobiidae (gobies)

Bathygobius curacao (notchtongue qoby)
Bathygobius soporator (frillfin goby)
Bollmania sp. (goby)
Coryphopterus eidolon (pallid goby)
Coryphopterus glaucofraenum (bridled goby)
Gobionellus boleosoma (darter goby)
Gobionellus fasciatus (slashcheek goby)
Gobionellus saepepallens (dash goby)
Gobionellus smaragdus (emerald goby)
Gobionellus stigmaticus (marked goby)
Gobionellus stigmaturus (spottail goby)
Gobiosoma robustum (code goby)
Lophogobius cyprinoides (crested goby)
Microgobius gulosus (clown goby)
Microgobius microlepis (banner goby)
Nes longus (orangespotted goby)

Fam. Acanthuridae (surgeonfishes)

Acanthurus chirurgus (doctorfish)
Acanthurus coeruleus (blue tang)

Fam. Scorpaenidae (scorpionfishes)

Scorpaena bergi (goosehead scorpionfish)
Scorpaena brasiliensis (barbfish)
Scorpaena calcarata (smoothhead scorpionfish)
Scorpaena grandicornis (plumed scorpionfish)
Scorpaena inermis (mushroom scorpionfish)
Scorpaena plumieri (spotted scorpionfish)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Soleidae (soles)

Achirus lineatus (lined sole)
Trinectes inscriptus (scrawled sole)

Fam. Bothidae (lefteye flounders)

Bothus lunatus (peacock flounder)
Bothus ocellatus (eyed flounder)
Bothus robinsi (spot flounder)
Citharichthys macrops (spotted whiff)
Citharichthys spilopterus (bay whiff)
Paralichthys albigutta (Gulf flounder)
Syacium gunteri (shoal flounder)
Syacium micrurum (channel flounder)
Syacium papillosum (dusky flounder)

Fam. Cynoglossidae (tonguefishes)

Symphurus diomedianus (spottedfin tonguefish)
Symphurus pagliusa (blackcheek tonguefish)

Fam. Balistidae (leatherjackets)

Aluterus monoceros (unicorn filefish)
Aluterus schoepfi (orange filefish)
Aluterus scriptus (scrawled filefish)
Balistes capriscus (gray triggerfish)
Monacanthus ciliatus (fringed filefish)
Monacanthus hispidus (planehead filefish)
Monacanthus setifer (pygmy filefish)

Fam. Ostraciidae (boxfishes)

Lactophrys polygonia (honeycomb cowfish)
Lactophrys quadricornis (scrawled cowfish)
Lactophrys trigonus (trunkfish)

Fam. Tetraodontidae (puffers)

Canthigaster rostrata (sharpnose puffer)
Sphoeroides nephelus (southern puffer)
Sphoeroides parvus (least puffer)
Sphoeroides spengleri (bandtail puffer)
Sphoeroides testudineus (checkered puffer)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Diodontidae (porcupinefishes)

Chilomycterus antennatus (bridled burrfish)
Chilomycterus antillarium (web burrfish)
Chilomycterus schoepfi (striped burrfish)
Diodon holocanthus (balloonfish)

Fam. Triglidae (sea robins)

Prionotus ophryas (bandtail searobin)
Prionotus scitulus (leopard searobin)
Prionotus tribulus (bighead searobin)

Fam. Gobiesocidae (clingfishes)

Gobiesox sp. (clingfish)

Fam. Opistognathidae (jawfishes)

Opistognathus sp. (spotfin jawfish)

Fam. Mullidae (goatfishes)

Mulloidichthys martinicus (yellow goatfish)
Pseudupeneus maculatus (spotted goatfish)
Upeneus parvus (dwarf goatfish)

Fam. Dactyloscopidae (sand stargazers)

Dastyloscopus tridigitatus (sand stargazer)

Fam. Priacanthidae (bigeyes)

Pseudopriacanthus sp. (Bigeye)

Fam. Fistularidae (cornetfishes)

Fistularia tabacaria (bluespotted cometfish)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Crustaceans

Fam. Penaeidae (Penaeid shrimp)

Metapenaeopsis goodei (shrimp)
Penaeus brasiliensis (spotted shrimp)
Penaeus duorarum (pink shrimp)
Sicyonia brevirostris (rock shrimp)
Sicyonia dorsalis (rock shrimp)
Sicyonia laevigata (rock shrimp)
Sicyonia parri (rock shrimp)
Sicyonia typica (rock shrimp)
Trachipenaeus constrictus (roughneck shrimp)

Fam. Palaemonidae (Palaemonid shrimps)

Leander tenuicornis (shrimp)
Palaemonetes intermedius (shore shrimp)
Palaemonetes pugio (shore shrimp)
Palaemonetes vulgaris (common shore shrimp)
Periclimenes americanus (shrimp)
Periclimenes longicaudatus (shrimp)
Periclimenes pedersoni (Pederson's cleaning shrimp)
Periclimenes yucatanicus (spotted cleaning shrimp)

Fam. Alpheidae (snapping shrimps)

Alpheus armillatus (banded snapping shrimp)
Alpheus floridanus (snapping shrimp)
Alpheus heterochaelis (big-clawed snapping shrimp)
Alpheus normanni (green snapping shrimp)
Synalpheus minus (snapping shrimp)
Synalpheus townsendi (small snapping shrimp)

Fam. Hippolytidae (cock shrimps)

Hippolysmata wurdemanni (veined shrimp)
Hippolyte pleuracantha (grass shrimp)
Latreutes fucorum (aulfweed shrimp)
Thor floridanus (grass shrimp)
Tozuema carolinensis (arrow shrimp)

Fam. Processidae (Processid shrimp)

Nikoides schmitti (shrimp)
Processa bermudiensis (shrimp)

Fam. Stenopodidae (coral shrimp)

Stenopus hispidus (red-banded coral shrimp)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Gonodactylidae (mantis shrimp)

Gonodactylus oerestedii (swollen-claw squilla)
Pseudosquilla ciliata (cililiated false squilla)

Fam. Lysiosquillidae (mantis shrimp)

Lysiosquilla scabricauda (scaly-talled squilla)

Fam. Squillidae (mantis shrimp)

Alima hyalina (mantis shrimp)
Meiosquilla schmitti (mantis shrimp)

Fam. Palinuridae (spiny lobsters)

Panulirus argus (Caribbean spiny lobster)

Fam. Scyllaridae (slipper lobsters)

Scyllarides nodifer (ridged slipper lobster)
Scyllarus americanus (slipper lobster)
Scyllarus chacei (slipper lobster)

Fam. Porcellanidae (Porcellanid crabs)

Polynox gibbesi (crab)

Fam. Dromiidae (Dromid crabs)

Dromidia antillensis (lesser sponge crab)

Fam. Leucosiidae (Laucosid crabs)

Persephona punctata (purse crabs)

Fam. Calappidae (box crabs)

Calappa angusta (box crabs)
Calappa flammea (flamed box crab)
Calappa gallus (yellow box crab)
Calappa ocellata (box crab)
Hepatus ephiliticus (calico crab)
Hepatus pudibundus (box crab)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Fam. Portunidae (swimming crabs)

Arenaeus cribrarius (speckled swimming crab)
Callinectes bocourti (blunt tooth swimming crab)
Callinectes exasperatus (rugose swimming crab)
Callinectes marginatus (masked swimming crab)
Callinectes ornatus (Shellig's ornate crab)
Callinectes sapidus (blue crab)
Portunus depressifrons (flat-browed crab)
Portunus gibbesi (swimming crab)
Portunus ordwayi (swimming crab)
Portunus sayi (sargassum crab)
Portunus spinimanus (spiny-handed portunus)

Fam. Xanthidae (mud crabs)

Hexapanopeus caribbaeus (mud crab)
Lobopilumnus agassizii (mud crab)
Menippe mercenaria (stone crab)
Panopeus occidentalis (mud crab)
Pilumnus dasypodus (mud crab)
Pilumnus lacteus (mud crab)

Fam. Goneplacidae (Goneplacis crabs)

Euryplax nitida (crab)

Fam. Pinnotheridae (Pinnotherid crabs)

Fam. Parthenopidae (Parthenopid crabs)

Parthenope serrata (serrate crab)

Fam. Majidae (spider crab)

Chorinus heros (spider crab)
Libinia dubia (spider crab)
Macrocoeloma camptocerum (decorator crab)
Macrocoeloma trispinosum (decorator crab)
Mithrax hispidus (coral crab)
Mithrax pleuracanthus (spider crab)
Mithrax spinosissimus (granulated spider crab)
Mithrax verrucosus (granulated spider crab)
Pitho aculeata (spider crab)
Pitho anisodon (spider crab)
Pitho laevigata (spider crab)
Podochela riisei (spider crab)
Podochela sidneyi (spider crab)
Stenorhynchus seticornis (arrow crab)

Table 3. All species recorded in Biscayne Bay trawl survey. 1982 - 1983 (cont.).

Cephalopods

Fam. Octopodidae (octopus)

Octopus briareus (reef octopus)
Octopus joubini (dwarf octopus)

Fam. Loliginidae (squid)

Doryteuthis plei (squid)
Lolliguncula brevis (thumbstall squid)
Sepioteuthis sepioidea (reef squid)

Fam. Pickfordiateuthidea (squid)

Pickfordiateuthis pulchella (squid)

Table 4. Total number, total weight and mean weight of recreational and commercial species caught in Biscayne Bay trawl sampling. April 1982 - September 1983.

Species	Total Number	Total Weight (g)	Mean Weight (g)
Red-ear sardine (*Harengula humeralis*)	3	4.1	1.4
Scaled herring (*Harengula jaguana*)	14	271.9	19.4
Spanish sardine (*Sardinella aurita*)	1	13.8	13.8
Ballyhoo (*Hemiramphus brasiliensis*)	22	2191.4	99.6
Houndfish (*Tylosurus crocodilus*)	6	138.9	23.2
Sand perch (*Diplectrum formosum*)	189	1407.1	7.5
Dwarf sand perch (*Diplectrum bivittatum*)	14	117.7	8.4
Red grouper (*Epinephelus morio*)	3	10.2	3.4
Grouper (*Mycteroperca* sp.)	1	15.0	15.0
Gag grouper (*Mycteroperca microlepis*)	3	9.9	3.3
Lantern bass (*Serranus baldwini*)	1	3.2	3.2
Yellow jack (*Caranx bartholomaei*)	3	11.9	4.0
Bar jack (*Caranx ruber*)	4	13.7	3.4
Leatherjacket (*Oligoplites saurus*)	2	5.4	2.7
Lookdown (*Selene vomer*)	2	456.2	228.1
Florida pompano (*Trachinotus carolinus*)	1	471.2	471.2
Mutton snapper (*Lutjanus analis*)	56	856.1	15.3
Schoolmaster snapper (*Lutjanus apodus*)	1	3.7	3.7
Gray snapper (*Lutjanus griseus*)	348	9216.5	21.1
Lane snapper (*Lutjanus synagris*)	146	1889.6	12.9
Yellowtail snapper (*Ocyurus chrysurus*)	244	1775.9	7.3
Black margate (*Anisotremus surinamensis*)	2	2.7	1.4
Porkfish (*Anisotremus virginicus*)	5	5.4	1.1
Tomtate (*Haemulon aurolineatum*)	229	802.2	3.5
French grunt (*Haemulon flavolineatum*)	222	454.0	2.0
Sailor's choice (*Haemulon parra*)	534	909.0	1.7
White grunt (*Haemulon plumieri*)	4216	23428.1	5.6
Bluestriped grunt (*Haemulon sciurus*)	2487	18851.6	7.6
Cottonwick (*Haemulon melanurum*)	14	12.6	0.9
Pigfish (*Orthopristis chrysoptera*)	661	41031.2	62.1
Sheepshead (*Archosargus probatocephalus*)	21	469.0	22.3
Sea bream (*Archosargus rhomboidalis*)	131	5458.6	41.7
Porgy (*Calamus* sp.)	12	213.1	17.8
Grass porgy (*Calamus arctifrons*)	37	943.8	25.5
Littlehead porgy (*Calamus proridens*)	25	322.9	12.9
Pinfish (*Lagodon rhomboides*)	12659	218609.9	17.3
Spotted seatrout (*Cynoscion nebulosus*)	106	790.5	7.5
Bermuda chub (*Kyphosus sectatrix*)	1	1.8	1.8
Hogfish (*Lachnolaimus maximus*)	170	2032.7	12.0
Striped or Black mullet (*Mugil cephalus*)	2	315.1	157.6
Fantail mullet (*Mugil trichodon*)	1	320.3	320.3
Great barracuda (*Sphyraena barracuda*)	18	505.7	28.1
Gulf flounder (*Paralichthys albigutta*)	11	2003.4	182.1
Grey triggerfish (*Balistes capriscus*)	9	369.3	41.0
Yellow goatfish (*Mulloidichthys martinicus*)	2	3.9	2.0

Table 4. Total number, total weight and mean weight of recreational and commercial species caught in Biscayne Bay trawl sampling. April 1982 - September 1983 (cont.).

Species	Total Number	Total Weight (g)	Mean Weight (g)
Dwarf goatfish (*Upeneus parvus*)	1	1.8	1.8
Spotted goatfish (*Pseudupeneus maculatus*)	2	26.0	13.0
Rock shrimp (*Sicyonia* sp.)	2	0.8	0.4
Rock shrimp (*Sicyonia laevigata*)	71	81.6	1.2
Rock shrimp (*Sicyonia parri*)	5	5.0	1.0
Rock shrimp (*Sicyonia typica*)	83	72.4	0.9
Rock shrimp (*Sicyonia brevirostris*)	10	14.1	1.4
Rock shrimp (*Sicyonia dorsalis*)	11	11.0	1.0
Spiny lobster (*Panulirus argus*)	367	24407.1	665.5
Slipper lobster (*Scyllarus chacei*)	4	47.9	12.0
Slipper lobster (*Scyllarus americanus*)	9	58.5	6.5
Ridged slipper lobster (*Scyllarides nodifer*)	3	160.1	53.4
Ornate crab (*Callinectes ornatus*)	4408	65907.9	15.0
Blue crab (*Callinectes sapidus*)	308	16535.7	53.7
Stone crab (*Menippe mercenaria*)	2	83.9	42.0
Shrimp (*Penaeus* spp.)	58438	172077.9	2.9

Table 5. Total number, total weight, and mean weight of all recreational and commercial species caught and kept in Biscayne Bay Creel survey. March 1982 - November 1983.

Species	Total number	Total weight (lbs.)	Mean weight per individual (lbs.)
Southern stingray	2	36.0	18.0
Unidentified sharks	134	1650.8	12.3
Nurse shark	31	446.7	14.4
Lemon shark	29	1012.2	34.9
Blacktip shark	297	2157.8	7.3
Bonnethead shark	321	1732.1	5.4
Unidentified stingray(s)/skate	143	854.7	5.9
Ladyfish	3677	2937.2	0.8
Bonefish	1162	3336.2	2.8
Unidentified eels	51	10.2	0.2
Unidentified moray eels	67	117.5	1.7
Atlantic thread herring	24152	1138.9	0.04
Spanish sardine	65892	3907.2	0.15
Pilchard	915373	44862.2	0.05
Bay anchovy	77292	309.2	0.004
Big eye anchovy	62000	250.0	0.004
Lizardfish	130	46.4	0.35
Toadfish	218	49.9	0.2
Jolthead porgy	3713	4821.9	1.3
Unidentified porgy(s)	2275	2363.2	1.0
Saucereye porgy	605	546.1	0.9
Spottail porgy	518	236.2	0.45
Sheepshead porgy	17	38.9	2.3
Grass porgy	6	7.3	1.2
Unidentified croaker	370	458.8	1.2
Spotted sea trout	20967	25048.4	1.2
Black drum	39	196.2	5.0
Sand drum	34	27.6	0.8
Sea catfish	884	846.4	0.95
Bermuda chub	1360	1058.8	0.8
Sergeant major	765	153.0	0.2
Unidentified wrasse	692	429.5	0.6
Hogfish	724	676.6	0.9
Spanish hogfish	0.0	0.0	0.0
Clown wrasse	14	1.4	0.1
Unidentified parrotfish	1304	832.5	0.6
White mullet	104219	57984.9	0.55
Striped (black) mullet	15389	9238.6	0.6
Great barracuda	10454	22819.8	2.2
Guaguanche	216	178.7	0.8
Doctor fish	107	39.2	0.35
King mackerel	31	32	1.0
Spanish mackerel	11067	15049.8	1.35
Cero mackerel	375	755.0	2.0
Scorpionfish	122	28.2	0.2

Table 5. Total number, total weight, and mean weight of all recreational and commercial species caught and kept in Biscayne Bay Creel survey. March 1982 - November 1983 (cont.).

Species	Total number	Total weight (lbs.)	Mean weight per individual (lbs.)
Unidentified flounders	315	224.1	0.7
Peacock flounder	148	74.2	0.5
Gulf flounder	3	2.6	0.85
Lined sole	4	8.3	2.0
Unidentified triggerfish	2093	1661.4	0.8
Queen triggerfish	148	146.5	0.98
Grey triggerfish	2638	2920.0	1.1
Unidentified filefish	1283	308.5	0.25
Planehead filefish	87	18.9	0.2
Black durgon	5	6.5	1.3
Trunkfish	59	71.0	1.2
Cowfish	761	439.4	0.6
Unidentified puffers	550	314.3	0.55
Bandtail puffer	1298	137.1	1.0
Searobin	31	12.7	0.4
Spotted goatfish	3	1.6	0.5
Sand filefish	17	25.2	1.5
Spadefish	140	254.0	1.8
Ballyhoo	520	219.2	0.25
Hardhead half beak	17	3.5	0.2
Houndfish	1591	1348.5	0.8
Needlefish	1579	473.7	0.3
Squirrelfish	94	28.6	0.3
Snook	774	3849.2	4.9
Gag grouper	2049	3607.6	1.7
Sand perch	13156	4344.7	0.3
Red grouper	1563	1826.4	1.15
Red hind	238	155.3	0.65
Black grouper	474	462.9	0.9
Nassau grouper	136	220.8	1.6
Unidentified grouper(s)	141	229.0	1.6
Rock hind	18	9.1	0.5
Bluefish	1280	1660.2	1.2
Cobia	36	382.2	10.6
Unidentified jack(s)	206	162.3	0.7
Blue runner	29634	18178.5	0.6
Crevalle jack	17255	15377.8	0.9
Pompano	157	173.9	1.1
Horseeye jack	972	1599.7	1.6
Yellow jack	773	578.7	0.7
Skipjack/leatherjacket	1352	407.0	0.3
Lookdown	4254	1992.9	0.4
Barjack	493	658.0	1.3
Unidentified snapper	251	139.4	0.55
Mutton snapper	6576	6450.7	0.98

Table 5. Total number, total weight, and mean weight of all recreational and commercial species caught and kept in Biscayne Bay Creel survey. March 1982 - November 1983 (cont.).

Species	Total number	Total weight (lbs.)	Mean weight per individual (lbs.)
Grey snapper	127073	79912.4	0.6
Lane snapper	14366	5989.5	0.4
Yellowtail snapper	8728	3443.6	0.4
Schoolmaster snapper	264	67.6	0.25
Dog snapper	108	62.2	0.5
Mahogany snapper	144	60.0	0.4
Unidentified mojarra	3293	1673.8	0.5
Yellowfin mojarra	1546	1015.9	0.65
Silver jenny	785	555.3	0.7
Unidentified grunts	22417	7637.3	0.3
White grunt	104687	43442.4	0.4
Bluestriped grunt	32062	14238.6	0.45
Pigfish	22326	9325.8	0.4
Caesar grunt	119	45.7	0.4
Smallmouth grunt	41	18.2	0.45
French grunt	1332	259.9	0.2
Sailor's choice	10691	4816.8	0.45
Tomtate	14337	2059.9	0.1
Porkfish	2555	848.3	0.3
Sea bream	12658	8374.3	0.65
Sheepshead	740	1967.7	2.65
Pinfish	94364	18083.3	0.2
Blue crab	21118	8141.4	0.4
Stone crab	1665	726.7	0.4
Portunus spp.	112	3.4	0.03
Unidentified portunid crabs	19	5.5	0.3
Lobster	5619	9206.2	1.6
Shrimp	25104319	203462.7	0.008
Unidentified octopus	13	22.6	1.73
Amberjack	3	6.2	2.0
African pompano	5	5.1	1.0
Rainbow runner	14	4.1	0.3
Black margate	300	350.0	1.16
Margate	2493	1474.2	0.6
Spanish grunt	4	5.8	1.45
Unidentified species	284	81.4	0.3

Table 6. Length frequency distribution of sand perch, *Diplectrum formosum*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
100	2	-	2	0.88	-	0.66
100-109	1	1	2	0.44	1.33	0.66
110-119	1	-	1	0.44	-	0.33
120-129	3	2	5	1.32	2.66	1.65
130-139	2	1	3	0.88	1.33	0.99
140-149	4	1	5	1.76	1.33	1.65
150-159	5	3	8	2.20	4.00	2.65
160-169	28	6	34	12.33	8.00	11.25
170-179	31	6	37	13.65	8.00	12.25
180-189	68	16	84	29.95	21.33	27.81
190-199	37	15	52	16.30	20.00	17.22
200-209	26	5	31	11.45	6.67	10.26
210-219	10	7	17	4.40	9.33	5.63
220-229	5	6	11	2.20	8.00	3.64
230-239	-	5	5	-	6.67	1.65
240-249	2	-	2	0.88	-	0.66
250-259	2	-	2	0.88	-	0.66
260-269	-	1	1	-	1.33	0.33
N =	227	75	302			

Table 7. Length frequency distribution of blue runner, *Caranx crysos*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
110-119	2	1	3	0.48	0.42	0.45
120-129	1	-	1	0.24	-	0.15
130-139	1	2	3	0.24	0.83	0.45
140-149	1	1	2	0.24	0.42	0.30
150-159	2	-	2	0.48	-	0.30
160-169	9	1	10	2.16	0.42	1.52
170-179	14	2	16	3.36	0.83	2.44
180-189	42	1	43	10.09	0.42	6.55
190-199	42	5	47	10.09	2.08	7.16
200-209	42	7	49	10.09	2.91	7.47
210-219	50	16	66	12.02	6.67	10.06
220-229	27	8	35	6.49	3.33	5.33
230-239	21	22	43	5.05	9.16	6.55
240-249	21	38	59	5.05	15.83	8.99
250-259	25	20	45	6.00	8.33	6.85
260-269	26	33	59	6.25	13.75	8.99
270-279	25	22	47	6.00	9.16	7.16
280-289	22	19	41	5.29	7.92	6.25
290-299	10	12	22	2.40	5.00	3.35
300-309	6	10	16	1.44	4.16	2.44
310-319	6	4	10	1.44	1.66	1.52
320-329	4	3	7	0.96	1.25	1.06
330-339	3	-	3	0.72	-	0.45
340-349	3	4	7	0.72	1.66	1.06
350-359	4	2	6	0.96	0.83	0.91
360-369	2	2	4	0.48	0.83	0.61
370-379	-	1	1	-	0.42	0.15
380-389	3	2	5	0.72	0.83	0.76
390-399	2	2	4	0.89	0.83	0.61
N =	416	240	656			

Table 8. Length frequency distribution of pinfish, *Lagodon rhomboides*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
100	1	6	7	0.28	2.48	1.17
100-109	5	3	8	1.40	1.24	1.33
110-119	11	1	12	3.08	0.41	2.00
120-129	17	6	23	4.76	2.49	3.85
130-139	19	27	46	5.32	11.20	7.69
140-149	28	35	63	7.84	14.53	10.53
130-159	45	44	89	12.60	18.26	14.88
160-169	74	39	113	20.72	16.18	18.89
170-179	67	36	103	18.76	14.93	17.22
180-189	43	25	68	12.04	10.37	11.37
190-199	32	10	42	8.96	4.15	7.02
200-209	9	3	12	2.52	1.24	2.00
210-219	2	3	5	0.56	1.24	0.84
220-229	3	1	4	0.84	0.41	0.66
230-239	-	1	1	-	0.41	0.16
240-249	-	1	1	-	0.41	0.16
250-259	1	-	1	0.28	-	0.16
N =	357	241	598			

Table 9. Length frequency distribution of white grunt, *Haemulon plumieri*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
100	2	-	2	0.30	-	0.19
100-109	4	-	4	0.60	-	0.39
110-119	13	2	15	1.95	0.58	1.49
120-129	8	4	12	1.20	1.17	1.19
130-139	20	11	31	3.00	3.22	3.07
140-149	10	14	24	1.50	4.10	2.38
150-159	10	18	28	1.50	5.28	2.77
160-169	27	14	41	4.05	4.10	4.06
170-179	42	10	52	6.31	2.93	5.15
180-189	64	21	85	9.61	6.15	8.43
190-199	69	32	101	10.36	9.38	10.02
200-209	78	36	114	11.71	10.55	11.31
210-219	80	46	126	12.01	13.49	12.50
220-229	105	41	146	15.76	12.02	14.48
230-239	60	28	88	9.00	8.21	8.73
240-249	34	31	65	5.10	9.09	6.45
250-259	18	11	29	2.70	3.22	2.87
260-269	8	11	19	1.20	3.22	1.88
270-279	8	6	14	1.20	1.75	1.39
280-289	2	4	6	0.30	1.17	0.59
290-299	2	-	2	0.30	-	0.19
300-309	-	1	1	-	0.29	0.09
310-319	-	-	-	-	-	-
320-329	1	-	1	0.15	-	0.09
400-409	1	-	1	0.15	-	0.09
N =	666	341	1008			

Table 10. Length frequency distribution of bluestriped grunt, *Haemulon sciurus*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
100	2	3	5	0.62	1.22	0.88
100-109	1	1	2	0.31	0.41	0.35
110-119	-	3	3	-	1.22	0.53
120-129	2	3	5	0.62	1.22	0.88
130-139	3	3	6	0.94	1.22	1.06
140-149	3	3	6	0.94	1.22	1.06
150-159	9	12	21	2.81	4.89	3.72
160-169	12	14	26	3.75	5.71	4.60
170-179	13	17	30	4.06	6.94	5.31
180-189	19	10	29	5.94	4.08	5.13
190-199	28	12	40	8.75	4.89	7.08
200-209	39	31	70	12.18	12.65	12.39
210-219	29	33	62	9.06	13.47	10.97
220-229	40	21	61	12.50	8.57	10.79
230-239	46	24	70	14.37	9.79	12.39
240-249	26	23	49	8.12	9.38	8.67
250-259	19	11	30	5.94	4.49	5.30
260-269	14	14	28	4.37	5.71	4.95
270-279	3	6	9	0.94	2.45	1.59
280-289	6	-	6	1.87	-	1.06
290-299	6	1	7.	1.87	0.41	1.24
N =	320	245	565			

Table 11. Length frequency distribution of lane snapper, *Lutjanus synagris*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
110-119	1	-	1	0.38	-	0.26
120-129	2	-	2	0.76	-	0.53
130-139	2	-	2	0.76	-	0.53
140-149	3	-	3	1.14	-	0.79
150-159	13	2	15	4.96	1.71	3.96
160-169	15	2	17	5.73	1.71	4.48
170-179	32	2	34	12.21	1.71	8.97
180-189	40	5	45	15.26	4.27	11.87
190-199	25	13	38	9.54	11.11	10.03
200-209	35	17	52	13.56	14.52	13.72
210-219	34	19	53	12.97	16.24	13.98
220-229	17	12	29	6.49	10.26	7.65
230-239	11	12	23	4.19	10.26	6.07
240-249	8	11	19	3.05	9.40	5.01
250-259	8	10	18	3.05	8.55	4.75
260-269	3	1	4	1.14	0.85	1.05
270-279	2	7	9	0.76	5.98	2.37
280-289	7	2	9	2.67	1.71	2.37
290-299	2	-	2	0.76	-	0.53
300-309	-	-	-	-	-	-
310-319	-	1	1	-	0.85	0.26
320-329	-	-	-	-	-	-
330-339	-	-	-	-	-	-
340-349	-	1	1	-	0.85	0.26
350-359	2	-	2	0.76	-	0.53
N =	262	117	379			

Table 12. Length frequency distribution of pigfish, *Orthopristis chrysoptera*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
110-119	-	1	1	-	0.89	0.33
120-129	-	1	1	-	0.89	0.33
130-139	2	-	2	1.06	-	0.66
140-149	7	1	8	3.74	0.89	2.67
150-159	3	-	3	1.60	-	1.00
160-169	10	-	10	5.34	-	3.34
170-179	17	3	20	9.09	2.67	6.69
180-189	24	2	24	12.83	1.78	8.03
190-199	7	13	20	3.74	11.60	6.69
200-209	20	12	32	10.69	10.71	10.71
210-219	24	17	41	12.83	15.18	13.71
220-229	41	27	68	21.92	24.10	22.74
230-239	13	12	25	6.95	10.71	8.36
240-249	12	11	23	6.42	9.82	7.69
250-259	2	2	4	1.06	1.78	1.33
260-269	4	8	12	2.14	7.14	4.01
270-279	1	1	2	0.53	0.89	0.66
280-289	-	1	1	-	0.89	0.33
N =	187	112	299			

Table 13. Length frequency distribution of spotted seatrout, *Cynoscion nebulosus*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
220-239	7	1	8	1.11	0.32	0.85
240-259	7	4	11	1.11	1.29	1.17
260-279	12	5	17	1.91	1.62	1.82
280-299	13	15	28	2.07	4.85	2.99
300-319	68	63	131	10.84	20.39	13.99
320-339	89	42	131	14.19	13.59	13.99
340-359	73	42	115	11.64	13.59	12.28
360-379	92	31	123	14.67	10.03	13.14
380-399	70	27	97	11.16	8.73	10.36
400-419	58	23	81	9.25	7.44	8.65
420-439	51	19	70	8.13	6.15	7.48
440-459	34	13	47	5.42	4.21	5.02
460-479	26	6	32	4.14	1.94	3.42
480-499	17	6	23	2.71	1.94	2.45
500-519	5	5	10	0.79	1.62	1.06
520-539	4	1	5	0.64	0.32	0.53
540-559	-	3	3	-	0.97	0.32
560-579	-	1	1	-	0.32	0.11
580-599	1	-	1	0.16	-	0.11
600-619	-	1	1	-	0.32	0.11
620-639	-	1	1	-	0.32	0.11
N =	627	309	936			

Table 14. Length frequency distribution of mutton snapper, *Lutjanus analis*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
100-119	1	-	1	0.78	-	0.42
120-139	-	-	-	-	-	-
140-159	5	1	6	3.90	0.92	2.53
160-179	4	2	6	3.12	1.83	2.53
180-199	9	1	10	7.03	0.92	4.22
200-219	15	9	24	11.72	8.26	10.13
220-239	13	11	24	10.15	10.09	10.13
240-259	20	15	35	15.63	13.26	14.76
260-279	17	30	47	13.28	22.52	19.41
280-299	17	17	34	13.28	15.59	14.34
300-319	7	9	16	5.47	8.26	6.75
320-339	5	7	12	3.91	6.42	5.06
340-359	3	3	6	2.34	2.75	2.53
360-379	1	1	2	0.78	0.92	0.84
380-399	3	-	3	2.34	-	1.26
400-419	1	-	1	0.78	-	0.42
420-439	3	-	3	2.34	-	1.26
440-459	1	1	2	0.78	0.92	0.84
460-479	-	-	-	-	-	-
480-499	1	-	1	0.78	-	0.42
500-519	1	-	1	0.78	-	0.42
520-539	-	-	-	-	-	-
540-359	-	-	-	-	-	-
560-379	-	-	-	-	-	-
580-599	1	-	1	0.78	-	0.42
600-619	-	1	1	-	0.92	0.42
1020-1039	-	1	1	-	0.92	0.42
N =	128	109	237			

Table 15. Length frequency distribution of gray snapper, *Lutjanus griseus*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
100-119	4	1	5	0.28	0.07	0.18
120-139	4	7	11	0.28	0.54	0.41
140-159	26	19	45	1.92	1.46	0.22
160-179	77	21	98	5.46	1.62	3.62
180-199	177	53	230	12.57	4.09	8.50
200-219	238	131	369	16.90	10.10	13.64
220-239	216	236	452	15.34	18.21	16.71
240-259	235	319	554	16.69	24.61	20.49
260-279	169	219	358	12.00	16.89	14.35
280-299	92	114	206	6.53	8.79	7.62
300-319	46	89	135	3.26	6.87	4.99
320-339	32	30	62	2.27	2.31	2.29
240-359	17	21	38	1.21	1.62	1.40
360-379	28	17	45	1.98	1.31	1.66
380-399	16	8	24	1.13	0.62	0.88
400-419	17	2	19	1.21	0.15	0.70
420-439	8	4	12	0.57	0.31	0.44
440-459	4	1	5	0.28	0.07	0.18
460-479	1	1	2	0.07	0.07	0.07
480-499	-	-	-	-	-	-
500-519	-	-	-	-	-	-
520-539	-	1	1	-	0.07	0.03
660-679	-	1	1	-	0.07	0.03
680-699	-	1	1	-	0.07	0.03
N =	1407	1296	2703			

Table 16. Length frequency distribution of Spanish mackerel, *Scomberomorus maculatus*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
200-219	-	2	2	-	1.52	0.51
220-239	2	1	3	0.76	0.76	0.76
240-259	3	-	3	1.14	-	0.76
260-279	1	-	1	0.38	-	0.25
280-299	3	2	5	1.14	1.52	1.27
300-319	11	20	31	4.19	15.26	7.88
320-339	15	21	36	5.72	16.03	9.16
340-359	23	21	44	8.77	16.03	11.19
360-379	32	16	48	12.21	12.21	12.21
380-399	45	12	57	17.17	9.16	14.50
400-419	31	14	45	11.83	10.68	11.45
420-439	22	6	28	8.39	4.58	7.12
440-459	16	3	19	6.10	2.29	4.83
460-479	13	2	15	4.96	1.52	3.81
480-499	9	7	14	3.43	3.82	3.56
500-519	8	1	9	3.05	0.76	2.29
520-539	3	2	5	1.14	1.52	1.27
540-359	9	-	9	3.43	-	2.29
560-379	3	2	5	1.14	1.52	1.27
580-599	2	1	3	0.76	0.52	0.76
600-619	3	-	3	1.14	-	0.76
620-639	4	-	4	1.53	-	1.02
640-659	2	-	2	0.76	-	0.51
660-679	2	-	2	0.76	-	0.51
N =	262	131	393			

Table 17. Length frequency distribution of great barracuda, *Sphyraena barracuda*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
100-149	1	-	1	0.45	-	0.28
150-199	-	1	1	-	0.72	0.28
200-249	3	1	4	1.37	0.72	1.23
250-299	8	3	11	3.65	2.19	3.09
300-349	16	18	34	7.30	13.14	9.55
350-399	37	18	55	16.89	13.14	15.45
400-449	56	30	86	25.57	21.89	24.15
450-499	52	23	75	23.74	16.78	21.06
500-549	14	16	30	6.39	11.68	8.43
550-599	15	7	22	6.85	5.11	6.18
600-649	3	7	10	1.37	5.11	2.81
650-699	4	2	6	1.82	1.45	1.68
700-749	-	4	4	-	2.92	1.12
750-799	2	-	2	0.91	-	0.56
800-849	-	2	2	-	1.45	0.56
850-899	-	-	-	-	-	-
900-949	1	1	2	0.45	0.72	0.56
950-999	1	-	1	0.45	-	0.28
1000-1049	-	2	2	-	1.45	0.56
1050-1099	2	1	3	0.91	0.72	0.84
1100-1149	3	-	3	1.37	-	0.84
1150-1199	1	-	1	0.45	-	0.28
1200-1249	-	-	-	-	-	-
1250-1299	-	-	-	-	-	-
1300-1349	-	-	-	-	-	-
1350-1399	-	1	1	-	0.72	0.28
N =	219	137	356			

Table 18. Length frequency distribution of pinfish, *Lagodon rhomboides*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
15-19	1	-	1	0.09	-	0.01
20-24	-	7	7	-	0.09	0.08
25-29	3	54	57	0.28	0.69	0.64
30-34	6	185	191	0.56	2.37	2.15
35-39	24	213	237	2.22	2.73	2.67
40-44	26	175	201	2.40	2.24	2.26
45-49	12	151	163	1.11	1.93	1.83
50-54	13	118	131	1.20	1.51	1.47
55-59	24	185	209	2.22	2.37	2.35
60-64	14	270	284	1.29	3.46	3.19
65-69	9	360	369	0.83	4.61	4.15
70-74	10	435	445	0.93	5.57	5.01
75-79	4	500	504	0.37	6.40	5.67
80-84	8	636	644	0.74	8.14	7.25
85-89	5	712	717	0.46	9.12	8.07
90-94	9	805	814	0.83	10.31	9.16
95-99	16	694	710	1.48	8.89	7.98
100-104	20	681	701	1.85	8.72	7.89
105-109	21	533	554	1.95	6.83	6.23
110-114	32	361	393	2.97	4.62	4.42
115-119	65	222	287	6.02	2.84	3.23
120-124	98	205	303	9.08	2.63	3.41
125-129	131	116	247	12.14	1.48	2.78
130-134	136	69	205	12.60	0.88	2.31
135-139	122	43	165	11.31	0.55	1.86
140-144	111	26	137	10.29	0.33	1.54
145-149	74	21	95	6.86	0.27	1.07
150-154	43	15	58	3.98	0.19	0.65
155-159	21	7	28	1.95	0.09	0.32
160-164	12	5	17	1.11	0.06	0.19
165-169	4	2	6	0.37	0.03	0.07
170-174	3	2	5	0.28	0.03	0.05
175-179	2	-	2	0.18	-	0.02
215-219	-	1	1	-	0.01	0.01
N=	1079	7809	8888			

Table 19. Length frequency distribution of pigfish, *Orthopristis chrysoptera*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
20-24	1	-	1	0.45	-	0.18
25-29	-	1	1	-	0.31	0.18
30-34	2	1	3	0.90	0.31	0.55
35-39	7	2	9	3.15	0.62	1.65
40-44	7	4	11	3.15	1.23	2.01
45-49	6	1	7	2.70	0.31	1.28
50-54	17	1	18	7.66	0.31	3.29
55-59	21	4	25	9.46	1.23	4.57
60-64	17	3	20	7.66	0.92	3.65
65-69	16	2	18	7.21	0.62	3.29
70-74	6	6	12	2.70	1.85	2.19
75-79	6	9	15	2.70	2.77	2.74
80-84	5	3	8	2.25	0.92	1.46
85-89	4	9	13	1.80	2.77	2.38
90-94	5	0	5	2.25	0.00	0.91
95-99	3	6	9	1.35	1.85	1.65
100-104	5	10	15	2.25	3.08	2.74
105-109	2	7	9	0.90	2.15	1.65
110-114	4	5	9	1.80	1.54	1.65
115-119	4	2	6	1.80	0.62	1.09
120-124	-	4	4	-	1.23	0.73
125-129	3	3	6	1.35	0.92	1.09
130-134	-	1	1	-	0.31	0.18
135-139	2	5	7	0.90	1.54	1.28
140-144	1	5	6	0.45	1.54	1.09
145-149	1	12	13	0.45	3.69	2.38
150-154	1	17	18	0.45	5.23	3.29
155-159	1	25	26	0.45	7.69	4.75
160-164	2	19	21	0.90	5.85	3.84
165-169	2	17	19	0.45	5.23	3.47
170-174	3	19	22	1.35	5.85	4.02
175-179	6	16	22	2.70	4.92	4.02
180-184	6	14	20	2.70	4.31	3.65
185-189	7	22	29	3.15	6.76	5.30
190-194	11	29	40	4.95	8.92	7.31
195-199	5	12	17	2.25	3.69	3.11
200-204	8	9	17	3.60	2.77	3.11
205-209	4	6	10	1.80	1.85	1.83
210-214	7	4	11	3.15	1.23	2.01
215-219	6	2	8	2.70	0.62	1.46
220-224	4	2	6	1.80	0.62	1.09
225-229	1	3	4	0.45	0.92	0.73

Table 19. Length frequency distribution of pigfish, *Orthopristis chrysoptera*, from Biscayne Bay Creel Survey. 1982-1983 (cont.)

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
230-234	1	1	2	0.45	0.31	0.36
235-239	1	-	1	0.45	-	0.18
240-244	-	-	-	-	-	-
245-249	-	-	-	-	-	-
250-254	1	-	1	0.45		0.18
N =	222	325	547			

Table 20. Length frequency distribution of bluestriped grunt, *Haemulon sciurus*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
10-14	1	-	1	0.19	-	0.05
15-19	-	2	2	-	0.13	0.10
20-24	8	3	11	1.48	0.21	0.55
25-29	13	15	28	2.41	1.03	1.41
30-34	21	88	109	3.89	6.07	5.48
35-39	44	166	210	8.15	11.45	10.55
40-44	59	200	259	10.93	13.79	13.02
45-49	61	206	267	11.29	14.20	13.42
50-54	72	136	208	13.33	9.38	10.45
55-59	51	100	151	9.44	6.89	7.59
60-64	51	94	145	9.44	6.48	7.28
65-69	33	83	116	6.11	5.72	5.83
70-74	20	71	91	3.70	4.89	4.57
75-79	15	58	73	2.78	4.00	3.67
80-84	12	47	59	2.22	3.24	2.96
85-89	7	34	41	1.29	2.34	2.06
90-94	12	24	36	2.22	1.65	1.81
95-99	7	20	27	1.29	1.38	1.36
100-104	3	16	19	0.55	1.10	0.95
105-109	4	16	20	0.74	1.10	1.00
110-114	4	15	19	0.74	1.03	0.95
115-119	6	9	15	1.11	0.62	0.75
120-124	3	13	16	0.56	0.89	0.80
125-129	11	8	19	2.04	0.55	0.95
130-134	4	4	8	0.74	0.27	0.40
135-139	5	7	12	0.92	0.48	0.60
140-144	3	4	7	0.55	0.27	0.35
145-149	-	3	3	-	0.21	0.15
150-154	-	-	-	-	-	-
155-159	3	3	6	0.55	0.21	0.30
160-164	-	1	1	-	0.07	0.05
165-169	1	2	3	0.19	0.13	0.15
170-174	-	1	1	-	0.07	0.05
175-179	2	-	2	0.37	-	0.10
180-184	1	1	2	0.19	0.07	0.10
185-189	-	-	-	-	-	-
190-194	2	-	2	0.37	-	0.10
235-239	1	-	1	0.19	-	0.05
N =	540	1450	1990			

Table 21. Length frequency distribution of gray snapper, *Lutjanus griseus*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
25-29	1	-	-	1.78	-	0.24
30-34	-	3	3	-	0.84	0.72
35-39	1	8	9	1.78	2.23	2.17
40-44	1	17	18	1.78	4.74	4.34
45-49	4	29	33	7.14	8.08	7.95
50-54	4	32	36	7.14	8.91	8.67
55-59	9	36	45	16.07	10.03	10.84
60-64	6	36	42	10.71	10.03	10.12
65-69	5	33	38	8.93	9.19	9.16
70-74	1	21	22	1.78	5.84	5.30
75-79	-	16	16	-	4.46	3.85
80-84	2	12	14	3.57	3.34	3.37
85-89	1	12	13	1.78	3.34	3.13
90-94	4	11	15	7.14	3.06	3.61
95-99	2	8	10	3.57	2.23	2.41
100-104	-	7	7	-	1.95	1.68
105-109	1	11	12	1.78	3.06	2.89
110-114	-	3	3	-	0.84	0.72
115-119	3	6	9	5.36	1.67	2.17
120-124	1	6	7	1.78	1.67	1.68
125-129	1	7	8	1.78	1.95	1.93
130-134	-	8	8	-	2.23	1.93
135-139	-	6	6	-	1.67	1.45
140-144	-	4	4	-	1.11	0.96
145-149	-	3	3	-	0.84	0.72
150-154	-	4	4	-	1.11	0.96
155-159	3	3	6	5.36	0.84	1.45
160-164	2	3	5	3.57	0.84	1.20
165-169	-	3	3	-	0.84	0.72
170-174	-	1	1	-	0.28	0.24
175-179	1	2	3	1.78	0.56	0.72
180-184	-	2	2	-	0.56	0.48
185-189	-	2	2	-	0.56	0.48
190-194	-	-	-	-	-	-
195-199	1	1	2	1.78	0.28	0.48
200-204	-	2	2	-	0.56	0.48
205-209	-	-	-	-	-	-
210-214	-	-	-	-	-	-
215-219	-	1	1	-	0.28	0.24
220-224	-	-	-	-	-	-
225-229	1	-	1	1.78	-	0.24
230-234	-	-	-	-	-	-
235-239	1	-	-	1.78	-	0.24
N =	56	359	415			

Table 22. Length frequency distribution of white grunt, *Haemulon plumieri*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
10-14	1	-	1	0.34	-	0.05
15-19	-	-	-	-	-	-
20-24	-	2	2	-	0.12	0.10
25-29	1	5	6	0.34	0.30	0.31
30-34	6	37	43	2.03	2.23	2.19
35-39	29	105	134	9.83	6.33	6.85
40-44	53	138	191	17.97	8.31	9.76
45-49	36	228	264	12.20	13.73	13.50
50-54	27	225	252	9.15	13.55	12.89
55-59	18	214	232	6.10	12.89	11.86
60-64	28	136	164	9.49	8.19	8.39
65-69	15	124	139	5.08	7.47	7.11
70-74	11	122	133	3.73	7.35	6.80
75-79	18	83	101	6.10	5.00	5.16
80-84	12	53	65	4.07	3.19	3.32
85-89	6	39	45	2.03	2.35	2.30
90-94	2	26	28	0.67	1.57	1.43
95-99	6	20	26	2.03	1.20	1.33
100-104	4	15	19	1.35	0.90	0.97
105-109	2	19	21	0.67	1.14	1.07
110-114	8	16	24	2.71	0.96	1.23
115-119	5	9	14	1.69	0.54	0.72
120-124	1	15	16	0.34	0.90	0.82
125-129	1	7	8	0.34	0.42	0.41
130-134	2	5	7	0.67	0.30	0.36
135-139	1	2	3	0.34	0.12	0.15
140-144	-	1	1	-	0.06	0.05
145-149	1	3	4	0.34	0.18	0.20
150-154	-	4	4	-	0.24	0.20
155-159	1	3	4	0.34	0.18	0.20
160-164	-	-	-	-	-	-
163-169	-	1	1	-	0.06	0.05
170-174	-	-	-	-	-	-
175-179	-	3	3	-	0.18	0.15
N =	295	1660	1955			

Table 23. Length frequency distribution of pink shrimp, *Penaeus duorarum*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number 1982	Number 1983	Total Number Combined Years	% 1982	% 1983	% Total
6	1	7	8	0.01	0.04	0.03
7	17	16	33	0.11	0.09	0.10
8	227	37	264	1.46	0.23	0.83
9	1261	154	1415	8.10	0.96	4.47
10	1365	441	1806	3.76	2.73	5.70
11	1389	789	2178	8.92	4.89	6.87
12	1738	1205	2943	11.16	7.48	9.29
13	2098	1351	3449	13.48	8.38	10.89
14	1842	1537	3379	11.83	9.54	10.66
15	1333	1655	2988	8.56	10.27	9.43
16	969	1687	2656	6.22	10.47	8.38
17	1052	1645	2697	6.75	10.21	8.51
18	746	1520	2266	4.79	9.43	7.15
19	531	1284	1815	3.41	7.67	5.73
20	346	909	1255	2.22	5.64	3.96
21	215	672	887	1.38	4.17	2.80
22	144	448	592	0.92	3.03	1.87
23	99	295	394	0.63	1.83	1.24
24	68	190	258	0.43	1.18	0.81
25	42	110	152	0.27	0.68	0.48
26	15	74	89	0.09	0.46	0.28
27	35	43	78	0.22	0.27	0.25
28	20	23	43	0.13	0.14	0.14
29	1	11	12	0.01	0.07	0.04
30	2	7	9	0.01	0.04	0.03
31	2	1	3	0.01	0.01	0.01
32	1	-	1	0.01	-	0.00
33	-	-	-	-	-	-
34	1	-	1	0.01	-	0.00
35	-	-	-	-	-	-
36	3	-	3	0.02	-	0.01
41	2	-	2	0.01	-	0.01
42	1	-	1	0.01	-	0.00
N =	15567	16111	31678			

Table 24. Length frequency distribution of blue crab, *Callinectes sapidus*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number in North Bay	Number in South Bay	Total Number Measured Baywide	% North Bay	% 1983	% Baywide
21-30	-	7	7	-	6.93	5.56
31-40	1	20	21	4.00	19.80	16.67
41-50	-	9	9	-	8.91	7.14
51-60	1	16	17	4.00	15.84	13.49
61-70	1	10	11	4.00	9.90	8.73
71-80	2	10	12	8.00	9.90	9.52
81-90	-	5	5	-	4.95	3.97
91-100	-	4	4	-	3.96	3.18
101-110	2	-	2	8.00	-	1.59
111-120	4	3	7	16.00	2.97	5.56
121-130	4	7	11	16.00	6.93	8.73
131-140	5	6	11	20.00	5.94	8.73
141-190	1	4	5	4.00	3.96	3.97
151-160	3	-	3	12.00	-	2.38
161-170	-	-	-	-	-	-
171-180	1	-	1	4.00	-	0.79
N =	25	101	126			

Table 25. Length frequency distribution of blue crab, *Callinectes sapidus*, from Biscayne Bay Creel Survey. 1982-1983.

Length Class (mm)	Number in North Bay	Number in South Bay	Total Number Measured Baywide	% North Bay	% 1983	% Baywide
1-5	-	1	1	-	0.30	0.27
6-10	5	9	14	15.15	2.69	3.80
11-15	2	37	39	6.06	11.04	10.60
16-20	-	50	50	-	14.92	13.59
21-25	1	48	49	3.03	14.33	13.32
26-30	2	39	41	6.06	11.64	11.14
31-35	1	33	34	3.03	9.85	9.24
36-40	1	24	25	3.03	7.16	6.79
41-45	3	31	34	9.09	9.25	9.24
46-50	2	18	20	6.06	5.37	5.44
51-55	2	18	20	6.06	5.37	5.44
56-60	1	11	12	3.03	3.28	3.26
61-65	6	8	14	18.18	2.39	3.80
66-70	1	3	4	3.03	0.90	1.09
71-75	2	2	4	6.06	0.60	1.09
76-80	1	-	1	3.03	-	0.27
81-85	1	1	2	3.03	0.30	0.54
86-90	-	-	-	-	-	-
91-95	1	1	2	3.03	0.30	0.54
121-125	-	1	1	-	0.30	0.27
181-185	1	-	1	3.03	-	0.27
N =	33	335	368			

Table 26. Summary of 21 months of creel data, March 1982 - November 1983 for spotted seatrout, *Cynoscion nebulosus*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of spotted seatrout per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean weight Harvested/km^2	CPUE
1	0	0	0	0	0	-	-
2	68	9	35	43	5	1.22	0.0
3	131	19	131	110	16	0.84	0.0
4	1662	185	1157	1105	123	0.96	0.4
5	5044	503	3874	4878	487	1.26	0.4
6	746	86	552	612	70	1.11	0.2
7	252	54	187	82	18	0.44	0.0
8	87	21	87	120	29	1.38	0.0
9	148	36	148	200	48	1.35	0.0
10	26	7	26	5	1	0.20	0.0
11	0	0	0	0	0	-	-
12	1413	222	925	1006	158	1.09	0.4
13	4319	233	1636	1909	103	1.17	0.7
14	144	9	144	204	12	1.42	0.0
15	1558	221	1318	1491	212	1.13	0.4
16	566	37	164	202	13	1.23	0.3
17	143	10	68	64	5	0.94	0.0
18	435	44	333	536	55	1.61	0.2
19	445	15	273	341	11	1.25	0.3
20	14	<1	14	16	<1	1.13	0.0
21	173	5	85	97	3	1.15	0.1
22	1830	79	1144	1033	44	0.90	0.5
23	142	3	138	62	1	0.45	0.0
24	9454	166	6538	8503	149	1.30	0.5
25	58	3	7	10	<1	1.39	0.0
26	21	<1	16	14	<1	0.87	0.0
27	2572	71	1706	2102	58	1.23	0.7
28	25	1	25	27	1	1.06	0.0
29	28	1	13	31	1	2.42	0.1
30	45	2	11	6	<1	0.57	0.0
31	32	2	14	15	<1	1.09	0.0
32	9	<1	3	5	<1	1.50	0.0
33	32	3	12	16	1	1.31	0.0

Table 27. Summary of 21 months of creel data, March 1982 - November 1983 for gray snapper, *Lutjanus griseus*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of gray snapper per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean weight Harvested/km^2	CPUE
1	480	164	362	201	69	0.56	0.0
2	8552	1087	7064	4220	536	0.59	0.7
3	1454	206	1431	459	65	0.32	0.1
4	7181	801	5940	3376	376	0.57	2.7
5	3846	384	3511	2015	201	0.57	0.4
6	2441	281	1742	1556	179	0.89	0.2
7	4011	865	2523	2423	522	0.96	0.1
8	860	212	797	332	82	0.42	0.0
9	4771	1155	4605	3032	734	0.66	0.0
10	983	258	943	572	151	0.61	0.0
11	253	100	253	211	84	0.84	0.0
12	4680	736	4409	2689	423	0.61	0.2
13	3983	215	3482	1864	101	0.54	1.0
14	101	6	84	47	3	0.56	0.0
15	13819	1962	13177	8001	1136	0.61	0.2
16	1867	123	1435	761	50	0.53	0.2
17	668	48	614	438	31	0.71	0.6
18	22625	2308	16683	11651	1189	0.69	0.7
19	1802	60	1378	723	24	0.52	0.3
20	160	7	15	5	<1	0.34	0.0
21	6820	188	4790	3376	93	0.71	1.1
22	1420	61	1197	929	40	0.78	0.4
23	824	19	362	188	4	0.52	0.2
24	26216	459	19484	10522	185	0.54	1.0
25	579	28	400	242	12	0.61	0.1
26	5900	105	4257	2631	47	0.62	0.8
27	16188	445	12613	6878	189	0.55	1.0
28	525	26	432	199	10	0.46	0.0
29	1510	60	1038	613	25	0.59	0.7
30	1091	44	912	1681	68	1.84	0.2
31	12791	666	10890	7907	412	0.73	0.9
32	168	10	121	69	4	0.57	0.1
33	149	12	22	29	2	1.33	0.0

Table 28. Summary of 21 months of creel data, March 1982 - November 1983 for Spanish mackerel, *Scomberomorous maculatus*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of Spanish mackerel per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	0	0	0	0	0	-	-
2	3	<1	3	4	< 1	1.3	0.0
3	0	0	0	0	0	-	-
4	3	<1	0	0	0	-	-
5	10	1	10	10	1	0.97	0.0
6	0	0	0	0	0	-	-
7	9	2	9	16	4	1.77	0.0
8	0	0	0	0	0	-	-
9	5	<1	5	4	<1	0.80	0.0
10	182	48	162	182	48	1.12	0.0
11	12	5	12	29	12	2.43	0.0
12	2675	420	2620	3245	510	1.24	0.2
13	20	1	20	24	1	1.20	0.0
14	149	9	149	145	9	0.97	0.0
15	4799	681	4694	6422	911	1.37	0.1
16	43	3	43	66	4	1.53	0.1
17	1593	114	1522	2176	156	1.43	0.2
18	1216	124	1031	1329	136	1.29	0.1
19	40	1	24	71	2	2.96	0.0
20	283	13	269	646	29	2.40	0.1
21	279	8	236	405	11	1.71	0.0
22	15	<1	15	15	<1	0.98	0.0
23	47	1	15	18	<1	1.19	0.0
24	128	2	112	108	2	0.97	0.0
25	0	0	0	0	0	-	-
26	16	<1	12	13	<1	1.08	0.0
27	100	3	88	79	2	0.89	0.0
28	0	0	0	0	0	-	-
29	0	0	0	0	0	-	-
30	0	0	0	0	0	-	-
31	10	<1	4	13	<1	3.25	0.0
32	0	0	0	0	0	-	-
33	0	0	0	0	0	-	-

Table 29. Summary of 21 months of creel data, March 1982 - November 1983 for bonefish, *Albula vulpes*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of bonefish per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	0	0	0	0	0	-	-
2	11	2	11	44	6	4.01	0.0
3	0	0	0	0	0	-	-
4	7	<1	0	0	0	-	0.0
5	0	0	0	0	0	-	-
6	0	0	0	0	0	-	-
7	84	18	84	50	11	0.59	0.0
8	7	2	0	0	0	-	0.0
9	51	12	51	47	11	0.92	0.0
10	57	15	20	92	24	4.60	0.0
11	0	0	0	0	0	-	-
12	112	18	108	563	89	5.22	0.0
13	0	0	0	0	0	-	-
14	0	0	0	0	0	-	-
15	720	102	560	938	133	1.68	0.2
16	14	<1	0	0	0	-	0.0
17	0	0	0	0	0	-	-
18	1719	175	214	945	96	4.42	0.1
19	3	<1	0	0	0	-	0.0
20	7	<1	0	0	0	-	0.0
21	1589	44	62	231	6	3.72	0.1
22	8	<1	0	0	0	-	0.0
23	0	0	0	0	0	-	-
24	0	0	0	0	0	-	-
25	9	<1	0	0	0	-	0.0
26	585	10	41	325	6	7.93	0.1
27	5	<1	0	0	0	-	0.0
28	0	0	0	0	0	-	-
29	37	2	4	24	1	6.10	0.0
30	15	<1	8	76	3	9.49	0.0
31	146	8	0	0	0	-	0.0
32	22	1	0	0	0	-	0.0
33	8	<1	0	0	0	-	0.0

Table 30. Summary of 21 months of creel data, March 1982 - November 1983 for white mullet, *Mugil curema*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of white mullet per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	2041	698	2041	680	233	0.33	0.7
2	74658	9485	74543	41783	5308	0.56	24.0
3	210	30	105	84	12	0.80	2.9
4	1765	197	1765	454	51	0.26	11.5
5	8573	855	8573	6859	684	0.80	0.0
6	193	22	193	155	18	0.80	0.0
7	135	29	135	67	14	0.50	0.2
8	0	0	0	0	0	-	-
9	0	0	0	0	0	-	-
10	70	18	70	56	15	0.80	0.0
11	0	0	0	0	0	-	-
12	1357	213	1357	577	91	0.43	2.4
13	68	4	68	55	3	0.81	0.3
14	0	0	0	0	0	-	-
15	135	19	135	58	8	0.43	0.0
16	155	10	155	45	3	0.29	0.9
17	0	0	0	0	0	-	-
18	0	0	0	0	0	-	-
19	0	0	0	0	0	-	-
20	0	0	0	0	0	-	-
21	0	0	0	0	0	-	-
22	0	0	0	0	0	-	-
23	0	0	0	0	0	-	-
24	15070	264	14925	7001	123	0.47	6.2
25	62	3	62	50	3	0.80	0.0
26	0	0	0	0	0	-	-
27	92	2	92	61	2	0.66	0.1
28	0	0	0	0	0	-	-
29	0	0	0	0	0	-	-
30	0	0	0	0	0	-	-
31	0	0	0	0	0	-	-
32	0	0	0	0	0	-	-
33	0	0	0	0	0	-	-

Table 31. Summary of 21 months of creel data, March 1982 - November 1983 for pilchard, *Harengula jaguana*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of pilchard per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	65677	22462	65677	3284	1123	0.05	47.6
2	498010	63270	498010	24959	3171	0.05	68.7
3	1214	172	1214	65	9	0.05	0.0
4	13275	1480	13275	652	73	0.05	1.3
5	4278	427	4278	214	21	0.05	0.0
6	0	0	0	0	0	-	-
7	25606	5521	25592	1281	276	0.05	12.0
8	2740	676	2740	137	34	0.05	0.0
9	33707	8158	33707	1720	416	0.05	4.6
10	763	200	763	38	10	0.05	0.0
11	747	297	747	37	15	0.05	1.0
12	95454	15015	95454	4518	711	0.05	22.0
13	699	38	659	33	2	0.05	2.5
14	40	2	40	12	<1	0.31	0.0
15	157088	22297	155157	7035	999	0.05	32.8
16	5002	330	5002	250	16	0.05	8.4
17	0	0	0	0	0	-	-
18	1935	197	1829	65	7	0.04	2.9
19	8	<1	8	<1	<1	0.05	0.0
20	1080	48	1080	54	2	0.05	0.7
21	8020	221	8020	401	11	0.05	0.0
22	0	0	0	0	0	-	-
23	38	<1	38	2	<1	0.05	0.0
24	331	6	226	11	<1	0.05	0.0
25	0	0	0	0	0	-	-
26	733	13	733	37	<1	0.05	1.0
27	1050	29	1050	53	1	0.05	0.0
28	0	0	0	0	0	-	-
29	11	<1	0	0	0	-	0.0
30	0	0	0	0	0	-	-
31	0	0	0	0	0	-	-
32	0	0	0	0	0	-	-
33	0	0	0	0	0	-	-

Table 32. Summary of 21 months of creel data, March 1982 - November 1983 for pinfish, *Lagodon rhomboides*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of pinfish per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	183	63	183	52	18	0.29	0.0
2	1932	245	1433	370	47	0.26	0.0
3	185	26	162	32	5	0.20	0.0
4	35765	3988	27329	4134	461	0.15	3.5
5	9635	961	5039	1014	101	0.20	0.0
6	3202	368	1322	381	44	0.29	0.0
7	3516	758	2107	543	117	0.26	0.0
8	499	123	499	104	26	0.21	0.0
9	1971	477	1971	450	109	0.23	0.2
10	4159	1092	3222	642	169	0.20	0.0
11	218	87	218	28	11	0.13	0.0
12	10042	1579	8974	1709	269	0.19	2.2
13	5103	275	2346	778	42	0.33	4.2
14	90	6	48	14	1	0.29	0.0
15	15376	2182	11231	2310	328	0.21	0.8
16	4300	284	3360	661	44	0.19	3.9
17	1168	84	518	112	8	0.22	1.2
18	5011	511	2223	380	39	0.17	2.0
19	2961	99	1710	308	10	0.18	0.0
20	681	30	246	51	2	0.21	0.0
21	2471	67	1036	276	8	0.27	0.4
22	1177	51	345	68	3	0.20	0.0
23	565	13	179	36	<1	0.20	0.0
24	21791	382	11174	2078	36	0.18	0.0
25	316	15	154	26	1	0.17	0.7
26	1003	18	273	47	<1	0.17	3.4
27	10741	295	4744	1097	30	0.23	2.7
28	375	19	128	31	2	0.24	0.0
29	392	16	152	31	1	0.20	0.4
30	284	12	230	47	2	0.20	0.0
31	627	33	260	57	3	0.21	0.4
32	27	2	0	0	0	-	0.0
33	0	0	0	0	0	-	0.0

Table 33. Summary of 21 months of creel data, March 1982 - November 1983 for blue crab, *Callinectes sapidus*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of blue crab per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	33	12	33	10	4	0.29	0.0
2	385	49	296	171	22	0.58	0.0
3	494	70	494	148	21	0.30	0.6
4	7042	785	6485	3154	352	0.48	5.2
5	0	0	0	0	0	-	-
6	439	50	439	132	15	0.30	0.0
7	1148	247	864	259	56	0.30	0.2
8	364	89	364	151	37	0.41	0.0
9	223	54	210	63	15	0.29	0.0
10	1714	450	1674	546	143	0.33	0.0
11	0	0	0	0	0	-	-
12	1258	198	1062	395	62	0.37	0.2
13	369	20	369	121	6	0.33	0.0
14	0	0	0	0	0	-	-
15	1548	219	1403	508	72	0.36	0.2
16	2872	190	1867	560	37	0.30	1.0
17	0	0	0	0	0	-	-
18	0	0	0	0	0	-	-
19	1585	53	1505	502	17	0.33	0.1
20	0	0	0	0	0	-	-
21	9	<1	9	5	<1	0.50	0.0
22	136	6	103	31	1	0.30	0.2
23	0	0	0	0	0	-	-
24	2991	52	2327	887	16	0.38	0.8
25	0	0	0	0	0	-	-
26	73	1	0	0	0	-	-
27	1624	45	1233	386	11	0.31	0.5
28	472	24	109	33	2	0.30	0.0
29	200	8	165	49	2	0.30	0.0
30	0	0	0	0	0	-	-
31	13	<1	9	3	<1	0.33	0.0
32	0	0	0	0	0	-	-
33	0	0	0	0	0	-	-

Table 34. Summary of 21 months of creel data, March 1982 - November 1983 for lobster, *Panulirus argus,* for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of lobster per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	0	0	0	0	0	-	-
2	149	19	149	164	21	1.10	0.0
3	0	0	0	0	0	-	-
4	0	0	0	0	0	-	-
5	0	0	0	0	0	-	-
6	0	0	0	0	0	-	-
7	215	46	215	195	42	0.91	0.1
8	0	0	0	0	0	-	-
9	312	75	215	227	55	1.05	0.0
10	0	0	0	0	0	-	-
11	0	0	0	0	0	-	-
12	192	31	160	166	26	1.04	0.0
13	37	2	0	0	0	-	-
14	0	0	0	0	0	-	-
15	543	77	543	578	82	1.07	0.2
16	4	<1	4	4	<1	0.95	0.1
17	0	0	0	0	0	-	-
18	2322	237	1879	2123	216	1.13	0.3
19	0	0	0	0	0	-	-
20	0	0	0	0	0	-	-
21	857	24	721	851	23	1.18	0.2
22	5	<1	5	6	<1	1.20	0.0
23	0	0	0	0	0	-	-
24	0	0	0	0	0	-	-
25	0	0	0	0	0	-	-
26	167	3	115	153	3	1.33	0.1
27	0	0	0	0	0	-	-
28	0	0	0	0	0	-	-
29	0	0	0	0	0	-	-
30	0	0	0	0	0	-	-
31	1755	91	666	748	39	1.12	0.1
32	0	0	0	0	0	-	-
33	167	14	167	118	9	0.71	0.0

Table 35. Summary of 21 months of creel data, March 1982 - November 1983 for mutton snapper, *Lutjanus analis*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of mutton snapper per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	141	48	141	112	38	0.79	1.69
2	1832	233	863	772	98	0.89	3.83
3	0	0	0	0	0	-	-
4	203	23	203	107	12	0.53	0.38
5	15	1	15	15	1	0.99	0.06
6	64	7	64	63	7	0.98	0.66
7	272	59	222	173	37	0.78	0.51
8	7	2	7	1	1	0.20	0.05
9	190	46	183	281	68	1.54	0.52
10	36	9	36	107	28	2.96	0.13
11	2	1	2	4	2	2.00	0.03
12	884	139	884	734	116	0.83	0.89
13	85	5	32	18	1	0.58	0.58
14	6	<1	6	1	<1	0.18	0.46
15	1167	165	1124	993	141	0.88	0.77
16	8	<1	3	3	<1	0.87	0.06
17	8	1	8	5	<1	0.58	0.15
18	1003	102	941	1268	129	1.35	0.59
19	93	3	69	61	20	0.89	1.08
20	12	1	12	10	<1	0.82	0.31
21	519	14	495	481	13	0.97	1.46
22	38	2	23	16	1	0.69	0.82
23	16	<1	16	12	<1	0.72	0.54
24	347	6	344	183	3	0.53	0.38
25	13	1	0	0	0	-	0.70
26	182	3	172	419	8	2.44	0.66
27	633	17	543	396	11	0.73	1.34
28	0	0	0	0	0	-	-
29	0	0	0	0	0	-	-
30	7	<1	0	0	0	-	0.22
31	212	11	162	213	11	1.31	0.76
32	0	0	0	0	0	-	-
33	0	0	0	0	0	-	-

Table 36. Summary of 21 months of creel data, March 1982 - November 1983 for lane snapper, *Lutjanus synagris*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of lane snapper per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	54	19	54	30	10	0.55	0.65
2	1958	249	984	327	42	0.33	4.09
3	24	3	24	10	1	0.39	0.60
4	1680	187	1668	636	71	0.38	3.14
5	233	23	233	110	11	0.47	0.98
6	32	4	32	11	1	0.33	0.33
7	836	180	791	293	63	0.37	1.58
8	241	60	231	96	24	0.42	1.60
9	1093	264	1093	446	108	0.41	3.01
10	505	133	474	139	36	0.29	1.87
11	30	12	30	14	5	0.45	0.44
12	802	126	783	244	38	0.31	0.82
13	22	1	12	4	<1	0.37	0.16
14	5	<1	5	2	<1	0.38	0.32
15	1700	241	1542	622	88	0.40	1.12
16	84	6	9	4	<1	0.41	0.65
17	360	26	349	155	11	0.44	6.74
18	5281	539	4643	1915	195	0.41	3.11
19	71	2	71	28	1	0.39	0.83
20	228	10	208	116	5	0.56	5.83
21	1391	38	966	432	12	0.45	3.92
22	3	<1	3	1	<1	0.17	0.05
23	38	1	26	13	<1	0.50	1.27
24	121	2	64	23	<1	0.36	0.13
25	13	1	5	1	<1	0.22	0.68
26	415	7	377	211	4	0.56	1.49
27	119	3	84	32	1	0.39	0.25
28	12	1	12	2	<1	0.20	0.68
29	6	<1	0	0	0	-	0.16
30	0	0	0	0	0	-	-
31	118	6	118	47	3	0.40	0.42
32	29	2	29	6	<1	0.21	3.37
33	0	0	0	0	0	-	-

Table 37. Summary of 21 months of creel data, March 1982 - November 1983 for yellowtail snapper, *Ocyurus chrysurus*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of yellowtail snapper per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	0	0	0	0	0	-	-
2	239	30	96	81	10	0.85	0.50
3	7	1	0	0	0	-	0.16
4	0	0	0	0	0	-	-
5	36	4	7	1	<1	0.14	0.15
6	14	2	0	0	0	-	0.15
7	201	43	201	28	6	0.14	0.38
8	143	35	85	21	5	0.24	0.95
9	224	54	213	66	16	0.31	0.61
10	157	41	157	63	17	0.40	0.58
11	43	17	43	17	7	0.38	0.62
12	439	69	314	51	8	0.16	0.45
13	3	<1	0	0	0	-	0.01
14	21	1	21	3	<1	0.15	1.59
15	2215	314	2156	749	106	0.35	1.47
16	63	4	29	14	1	0.48	0.52
17	26	2	15	9	1	0.61	0.47
18	3373	344	2702	1378	141	0.51	1.99
19	168	6	94	32	1	0.34	1.95
20	17	1	0	0	0	-	0.43
21	1648	45	1003	341	9	0.34	4.65
22	28	1	23	6	<1	0.25	0.59
23	105	2	74	20	<1	0.27	3.53
24	225	4	60	17	<1	0.28	0.25
25	154	7	52	10	<1	0.19	8.38
26	1150	24	743	315	6	0.42	4.87
27	580	16	108	33	1	0.30	1.23
28	9	<1	9	5	<1	0.55	0.45
29	27	1	0	0	0	-	0.71
30	35	1	0	0	0	-	1.14
31	1040	54	512	181	9	0.35	3.71
32	16	1	8	3	<1	0.37	1.93
33	0	0	0	0	0	-	-

Table 38. Summary of 21 months of creel data, March 1982 - November 1983 for great barracuda, *Sphyraena barracuda*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of great barracuda per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	33	12	33	251	85	7.60	0.40
2	976	124	32	38	5	1.19	2.04
3	0	0	0	0	0	-	-
4	314	35	151	291	32	1.93	0.59
5	434	43	316	609	61	1.93	1.82
6	528	61	353	777	89	2.20	5.47
7	39	9	39	41	9	1.05	0.08
8	11	3	0	0	0	-	0.07
9	35	9	35	219	53	6.27	0.09
10	11	3	0	0	0	-	0.04
11	0	0	0	0	0	-	-
12	703	111	306	539	85	1.76	0.72
13	1413	76	1239	1621	88	1.31	9.71
14	170	10	127	622	38	4.89	12.76
15	783	111	709	1573	223	2.22	0.52
16	881	58	607	1119	74	1.84	6.76
17	205	15	186	393	28	2.12	3.86
18	721	73	376	1364	139	3.63	0.42
19	723	24	559	985	33	1.76	8.39
20	21	<1	21	20	<1	0.93	0.54
21	1008	28	578	1550	43	2.68	2.84
22	227	10	192	385	17	2.00	4.89
23	147	3	20	43	<1	2.14	4.95
24	2083	36	1515	3478	61	2.29	2.29
25	113	5	77	185	9	2.40	6.12
26	949	17	400	1069	19	2.67	3.41
27	1356	37	1046	1990	55	1.90	2.88
28	47	2	40	44	2	1.10	2.49
29	637	25	315	777	31	2.47	16.54
30	155	6	43	83	3	1.94	4.89
31	1361	71	949	2097	109	2.21	4.85
32	425	25	149	353	21	2.37	48.68
33	0	0	0	0	0	-	-

Table 39. Summary of 21 months of creel data, March 1982 - November 1983 for blue runner, *Caranx crysos*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of blue runner per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	113	38	113	45	15	0.40	1.35
2	1119	142	1049	907	115	0.87	2.34
3	41	6	41	17	2	0.42	1.09
4	388	43	245	133	15	0.54	0.73
5	307	31	35	18	2	0.51	1.29
6	57	7	57	43	5	0.76	0.59
7	829	179	829	685	148	0.83	1.57
8	256	63	154	83	20	0.54	0.17
9	800	194	783	574	138	0.73	2.21
10	1023	269	961	406	106	0.42	3.79
11	78	31	78	29	12	0.37	1.16
12	4504	708	3721	2008	316	0.54	4.58
13	569	31	282	182	10	0.65	3.91
14	296	18	212	90	5	0.42	22.49
15	12906	1832	11175	6645	944	0.60	8.54
16	460	30	216	100	7	0.47	3.53
17	746	54	574	340	24	0.59	13.98
18	4466	455	3187	2238	228	0.70	2.63
19	463	15	125	99	3	0.79	5.39
20	934	41	91	61	3	0.67	23.76
21	1962	54	773	543	15	0.70	5.53
22	101	4	67	28	1	0.41	2.18
23	279	6	232	130	3	0.56	9.33
24	2868	50	1891	919	16	0.49	3.16
25	206	10	50	24	1	0.48	11.09
26	929	17	536	333	9	0.62	3.34
27	2403	66	1613	1066	29	0.66	5.10
28	116	6	94	52	3	0.55	6.24
29	63	3	50	53	2	1.05	1.64
30	21	1	6	1	<1	0.18	0.67
31	695	36	441	288	15	0.65	2.48
32	17	1	17	8	<1	0.47	1.93
33	60	5	40	24	2	0.60	21.48

Table 40. Summary of 21 months of creel data, March 1982 - November 1983 for crevalle jack, *Caranx hippos*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of crevalle jack per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	33	11	33	36	12	1.09	0.40
2	311	39	178	107	14	0.60	0.65
3	145	21	145	138	20	0.95	3.77
4	1189	133	699	863	96	1.23	2.22
5	394	39	288	152	15	0.53	1.65
6	186	21	93	90	10	0.97	1.92
7	1023	220	594	591	127	0.99	1.93
8	207	51	195	183	45	0.94	1.38
9	831	201	758	516	125	0.68	2.29
10	339	89	248	158	41	0.64	1.25
11	9	3	9	8	3	0.90	0.13
12	4095	644	3528	1968	310	0.56	4.16
13	211	11	34	18	1	0.52	1.44
14	43	3	43	24	1	0.56	3.19
15	2566	364	2079	1681	239	0.81	1.69
16	357	24	127	115	8	0.91	2.74
17	116	8	84	60	4	0.71	2.17
18	2354	240	1323	1985	202	1.50	1.39
19	169	6	65	77	3	1.19	1.98
20	66	3	10	2	<1	0.17	1.71
21	742	20	377	991	27	2.63	2.09
22	139	6	113	67	3	0.59	2.99
23	130	3	45	23	<1	0.51	4.31
24	6441	113	3913	2898	51	0.74	7.10
25	109	5	29	32	1	1.11	5.89
26	221	4	77	296	5	3.84	0.80
27	3586	98	1872	1707	47	0.91	7.61
28	287	14	200	220	11	1.10	15.44
29	42	2	14	7	<1	0.49	1.09
30	0	0	0	0	0	0.00	-
31	430	22	32	76	4	2.35	1.54
32	3	1	0	0	0	-	0.24
33	0	0	0	0	0	-	-

Table 41. Summary of 21 months of creel data, March 1982 - November 1983 for white grunt, *Haemulon plumieri*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of white grunt per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	33	11	33	7	2	0.19	0.40
2	2972	378	2181	1003	128	0.46	6.22
3	140	20	140	34	5	0.24	3.66
4	1514	169	1378	545	61	0.39	2.83
5	507	50	351	137	14	0.39	2.13
6	744	85	744	270	31	0.36	7.71
7	7624	1643	4694	1296	279	0.28	14.40
8	1596	394	1555	419	104	0.27	10.59
9	10090	2442	9644	4236	1025	0.44	27.84
10	2405	632	2197	569	150	0.26	8.89
11	1127	448	1127	437	174	0.39	16.79
12	6180	972	5893	1492	235	0.25	6.28
13	822	44	577	275	15	0.48	5.65
14	51	3	42	12	<1	0.29	3.83
15	23334	3312	22237	8566	1216	0.39	15.44
16	623	41	299	157	10	0.53	4.78
17	272	20	107	50	4	0.47	5.12
18	37458	3821	33880	16288	1662	0.48	22.06
19	429	14	314	140	5	0.45	4.99
20	492	22	282	122	5	0.43	12.52
21	11861	327	7738	3490	96	0.45	33.43
22	233	10	146	75	3	0.51	5.03
23	150	3	54	25	<1	0.46	5.09
24	1376	24	1008	369	6	0.37	1.52
25	254	12	245	88	4	0.36	13.70
26	3917	70	3067	1228	22	0.40	14.11
27	1238	34	882	362	10	0.41	2.63
28	273	14	62	23	1	0.37	14.76
29	15	<1	0	0	0	-	0.38
30	117	5	0	0	0	-	3.76
31	5420	282	3683	1680	87	0.46	19.32
32	0	0	0	0	0	-	0.00
33	0	0	0	0	0		0.00

Table 42. Summary of 21 months of creel data, March 1982 - November 1983 for bluestriped grunt, *Haemulon sciurus*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of bluestriped grunt per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	261	89	261	729	249	2.79	3.12
2	2780	353	2344	1028	131	0.44	5.82
3	31	5	31	12	2	0.40	0.82
4	892	99	550	231	26	0.42	1.67
5	274	27	221	98	9	0.44	1.15
6	914	105	825	499	57	0.61	9.48
7	1862	402	1709	613	132	0.36	3.52
8	1006	248	855	244	60	0.29	6.67
9	3498	847	3377	1512	366	0.45	9.63
10	662	174	662	181	48	0.27	2.45
11	133	52	133	71	28	0.54	1.98
12	1795	283	1260	426	67	0.34	1.82
13	169	9	156	91	5	0.58	1.15
14	0	0	0	0	0	0.00	-
15	10463	1485	9479	3956	562	0.42	6.93
16	179	12	69	33	2	0.48	1.37
17	3	<1	3	3	<1	0.90	0.04
18	5101	520	4075	1733	177	0.43	3.00
19	87	3	69	34	1	0.49	1.02
20	0	0	0	0	0	0.00	-
21	1649	45	471	252	7	0.54	4.64
22	39	2	6	3	<1	0.45	0.86
23	182	4	27	14	<1	0.50	6.15
24	1090	19	893	331	6	0.37	1.20
25	119	6	79	40	2	0.50	6.46
26	1286	23	1086	521	9	0.48	4.63
27	715	20	459	211	6	0.46	1.52
28	178	9	170	78	4	0.46	9.65
29	11	<1	11	4	1	0.35	0.27
30	0	0	0	0	0	0.00	-
31	3406	177	2740	1275	66	0.47	12.14
32	25	2	25	12	<1	0.50	2.89
33	8	<1	8	4	<1	0.47	2.96

Table 43. Summary of 21 months of creel data, March 1982 - November 1983 for pigfish, *Orthopristis chrysoptera*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of pigfish per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	39	13	39	21	7	0.53	0.47
2	782	99	782	402	51	0.51	1.63
3	67	9	67	21	3	0.31	1.75
4	1756	196	1705	489	55	0.29	3.29
3	289	29	289	113	11	0.39	1.22
6	11	1	11	5	<1	0.45	0.11
7	3338	719	3250	1417	305	0.44	6.31
8	3034	749	3007	1418	349	0.47	20.14
9	2998	725	2998	1597	386	0.53	8.27
10	868	228	868	302	79	0.35	3.21
11	402	159	402	121	49	0.30	5.97
12	2906	457	2902	1260	198	0.43	2.95
13	446	24	446	196	11	0.44	0.45
14	10	1	6	2	<1	0.32	0.07
15	3588	509	3467	1172	166	0.34	2.38
16	44	3	44	13	1	0.30	0.34
17	221	16	177	65	5	0.37	4.13
18	473	48	354	124	13	0.35	0.28
19	55	2	39	16	<1	0.40	0.66
20	108	5	42	18	<1	0.42	2.73
21	225	6	225	125	3	0.55	0.63
22	10	<1	10	4	<1	0.41	0.23
23	8	<1	8	6	<1	0.75	0.28
24	720	13	715	270	5	0.38	0.79
25	0	0	0	0	0	-	-
26	16	<1	16	6	<1	0.38	0.06
27	196	5	177	70	2	0.39	0.42
28	97	5	97	43	2	0.44	5.22
29	0	0	0	0	0	-	-
30	0	0	0	0	0	-	-
31	72	2	56	28	1	0.49	0.26
32	4	<1	4	2	<1	0.50	0.48
33	0	0	0	0	0	-	-

Table 44. Summary of 21 months of creel data, March 1982 - November 1983 for gag grouper, *Mycteroperca microlepis*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of gag grouper per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	0	0	0	0	0	-	-
2	43	5	43	73	9	1.70	0.09
3	0	0	0	0	0	-	-
4	48	5	48	243	27	5.06	0.09
5	0	0	0	0	0	-	-
6	0	0	0	0	0	-	-
7	91	20	72	204	44	2.84	0.17
8	0	0	0	0	0	-	-
9	197	48	197	307	74	1.56	0.54
10	21	5	21	21	5	0.99	0.08
11	5	2	5	3	1	0.52	0.07
12	88	14	88	102	16	1.15	0.09
13	7	<1	7	9	<1	1.33	0.05
14	3	<1	3	5	<1	1.60	0.23
15	310	44	310	390	55	1.26	0.21
16	49	3	17	19	1	1.11	0.38
17	9	1	0	0	0	-	0.17
18	465	47	402	671	68	1.67	0.27
19	78	3	67	214	7	3.19	0.91
20	26	1	26	54	3	2.08	0.66
21	227	6	121	171	5	1.41	0.64
22	34	1	34	142	6	4.19	0.73
23	51	1	35	41	1	1.17	1.72
24	157	3	108	93	2	0.87	0.17
25	24	1	8	12	1	1.48	1.29
26	144	3	95	116	2	1.23	0.59
27	174	5	121	242	7	1.99	0.37
28	61	3	61	83	4	1.36	3.29
29	17	1	17	52	2	3.07	0.44
30	42	2	31	46	2	1.49	1.34
31	220	11	116	292	15	2.52	0.78
32	3	<1	3	2	<1	0.30	0.34
33	0	0	0	0	0	-	-

Table 45. Summary of 21 months of creel data, March 1982 - November 1983 for sand perch, *Diplectrum formosum*, for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of sand perch per man hours fishing effort for this species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	0	0	0	0	0	-	-
2	97	12	90	19	2	0.21	0.20
3	0	0	0	0	0	-	-
4	139	15	84	24	3	0.29	0.26
5	0	0	0	0	0	-	-
6	63	7	0	0	0	-	0.65
7	1043	225	924	205	44	0.22	1.97
8	72	18	72	14	4	0.20	0.47
9	160	39	160	38	9	0.24	0.44
10	915	241	892	180	47	0.20	3.39
11	183	73	183	39	16	0.21	2.72
12	3753	590	3188	804	127	0.25	3.81
13	279	15	126	38	2	0.30	1.92
14	236	14	147	38	2	0.26	17.86
15	4483	636	3991	947	134	0.24	2.96
16	497	33	305	84	6	0.28	3.81
17	372	27	324	103	7	0.32	6.85
18	1623	165	1013	299	30	0.29	0.96
19	553	18	253	77	3	0.30	6.41
20	473	21	240	80	4	0.34	12.04
21	445	12	329	99	3	0.30	1.26
22	181	8	46	11	<1	0.24	3.89
23	503	11	305	66	1	0.22	16.89
24	348	6	127	36	<1	0.28	0.38
25	65	3	33	9	<1	0.28	3.51
26	305	5	90	20	<1	0.22	1.11
27	432	12	126	34	1	0.27	0.92
28	22	1	22	7	<1	0.30	1.14
29	12	<1	0	0	0	-	0.33
30	6	<1	6	2	<1	0.27	0.20
31	74	4	4	1	<1	0.25	0.26
32	0	0	0	0	0	-	-
33	0	0	0	0	0	-	-

Table 46. Summary of 21 months of creel data, March 1982 - November 1983 for all species combined (excluding shrimp and baitfish) for 33 subareas of Biscayne Bay. CPUE is expressed as catch in numbers of fish per man hours fishing effort for any particular species.

Area	Total No. Caught	Total No. Caught/km^2	Total No. Harvested	Total Weight Harvested	Mean Weight Harvested/km^2	CPUE
1	3004	1027	2642	2268	7760	0.36
2	35753	4542	23500	14968	1902	0.75
3	4064	575	3761	1661	235	1.06
4	67830	7564	53577	18900	2107	1.27
5	23280	2323	15566	11809	1178	0.98
6	12374	1421	7796	5713	656	1.28
7	46570	10040	30177	14600	3148	0.88
8	12872	3175	10936	4572	1172	0.85
9	38389	9291	34961	18381	4448	1.06
10	19997	5254	15186	5348	1405	0.74
11	3517	1398	3252	1434	570	0.52
12	61224	9630	49810	26354	4145	0.62
13	18850	1018	11287	7855	426	1.29
14	1891	116	1577	1427	87	1.44
15	138938	19721	118183	59909	8503	0.92
16	14616	964	9422	4269	282	1.12
17	6987	501	5187	4861	349	1.31
18	145658	14859	91795	57089	5824	0.86
19	10951	365	7307	4371	145	1.27
20	4317	192	1701	1617	72	2.79
21	43889	1210	25821	19389	535	1.23
22	6261	269	3574	3605	155	1.35
23	4195	93	1731	815	18	1.41
24	87947	1542	56728	34513	605	0.97
25	2526	121	1344	986	47	1.36
26	22588	404	13311	9766	175	1.81
27	50287	1382	31428	19478	535	1.07
28	3536	176	2123	1160	58	1.91
29	3559	142	1894	2312	92	0.93
30	2205	89	1551	2624	106	0.70
31	36643	1908	23414	17403	906	1.31
32	761	46	372	469	28	0.87
33	426	34	249	191	15	1.50

Table 47. Mean number of shrimp per commercial shrimping vessel in Biscayne Bay for 1982 and 1983 based on available ships logs.

1982				1983			
Month	Mean	N	Total	Month	Mean	N	Total
JAN	9063	64	580,000	JAN	6183	164	1,014,000
FEB	77667	72	552,000	FEB	6018	150	902,750
MAR	6771	83	562,000	MAR	5229	140	732,000
APR	4331	86	372,500	APR	5165	98	506,200
MAY	2854	65	185,500	MAY	3444	63	217,000
JUN	7467	33	246,400	JUN	4604	36	165,750
JUL	7005	57	399,300	JUL	5191	101	524,250
AUG	5812	57	331,300	AUG	4869	84	490,000
SEP	5479	85	465,750	SEP	5168	70	361,750
OCT	4816	147	708,000	OCT	6189	61	377,500
NOV	5911	121	715,250	NOV	8833	51	450,500
DEC	5755	143	823,000	DEC	5486	92	504,750
ANNUAL	5865	1013	5,941,000	ANNUAL	5554	1110	6,165,450

Table 48a. Mean number of *Penaeus* sp./5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	5.33	3.83	0.00	1.17	3.83	16.50	-
2	5.25	14.50	10.00	2.00	5.17	16.83	10.17
3	9.75	14.83	2.67	7.67	10.00	13.17	10.83
4	3.83	0.50	0.00	6.33	2.33	5.83	-
5	5.25	6.17	5.00	22.00	8.17	20.67	12.83
6	13.00	20.50	11.67	7.17	5.33	31.33	-
7	19.83	8.83	10.33	9.00	5.33	16.00	-
8	90.00	65.17	16.67	15.83	16.17	25.33	9.50
9	26.00	8.83	7.83	7.17	6.33	9.67	-
10	11.83	10.50	4.67	3.50	2.50	4.00	-
11	48.50	33.00	20.17	22.67	4.67	36.67	-
12	6.00	2.50	3.83	2.67	1.67	2.17	1.00
13	17.75	31.33	7.83	23.50	22.00	26.00	21.33
14	20.50	11.50	8.50	11.17	9.67	38.50	38.50
15	7.25	2.00	0.00	0.00	0.00	0.67	-
16	26.75	13.83	7.17	7.75	8.17	11.33	-
17	6.75	3.17	0.00	0.50	0.83	3.33	-
18	45.25	37.33	18.83	5.20	7.33	24.00	-
19	19.50	11.00	10.00	5.00	5.33	17.33	-
20	16.75	19.00	11.40	4.83	3.17	13.33	-
21	33.25	32.00	11.00	6.33	7.50	20.75	13.67
22	18.50	25.67	16.33	3.67	8.83	7.80	-
Total	20.76	17.54	8.35	7.96	6.56	16.28	-

Table 48a. Mean number of *Penaeus* sp./5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	8.17	6.50	2.33	9.50	5.33	6.09
2	66.00	101.83	32.67	16.00	7.33	24.96
3	25.50	61.50	13.17	20.60	10.83	17.24
4	0.67	0.17	0.33	1.17	0.33	1.95
5	31.33	35.00	27.50	34.33	36.50	21.08
6	24.33	36.50	19.67	24.17	19.67	19.39
7	11.17	12.17	2.00	3.17	1.50	9.03
8	20.00	48.17	12.83	6.50	16.17	30.26
9	9.33	16.00	7.83	13.00	17.17	11.74
10	6.67	11.00	11.67	11.50	10.00	7.98
11	128.50	18.83	13.17	34.33	29.50	35.45
12	5.83	3.83	10.00	4.40	12.00	4.99
13	61.33	10.33	4.33	11.67	31.17	22.47
14	31.83	17.83	13.33	10.17	9.00	16.54
15	1.17	3.33	5.00	3.67	3.17	2.38
16	18.67	41.67	38.67	59.33	11.00	22.21
17	3.67	4.33	8.00	8.67	3.83	3.91
18	61.67	84.00	32.33	78.17	6.50	36.42
19	12.33	32.83	26.50	26.33	42.67	18.98
20	10.50	19.33	17.17	9.67	20.50	13.24
21	15.33	54.83	43.33	28.50	11.17	26.45
22	64.67	98.33	54.00	28.67	31.17	32.51
Total	28.12	32.65	17.99	20.16	15.29	

Table 48b. Mean number of *Penaeus* sp./5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	Apr
23	10.83	7.33	4.17	5.00	2.33	0.33	0.17
24	16.25	29.83	29.33	9.17	13.00	8.33	9.67
25	7.33	3.00	0.50	3.00	8.00	0.00	1.50
26	12.67	4.50	5.00	3.67	4.67	3.00	2.83
27	88.00	14.83	4.67	3.33	6.67	5.17	33.50
28	15.17	5.17	3.00	1.83	2.17	2.50	2.67
29	108.33	270.83	218.83	264.67	83.33	188.17	216.83
31	38.33	15.17	12.17	6.67	5.83	5.50	4.17
32	25.67	14.83	13.33	4.17	5.17	3.00	2.33
33	32.17	19.50	16.17	7.33	11.17	6.50	5.33
34	10.83	2.50	2.00	4.00	1.17	1.33	1.50
35	0.00	0.17	1.50	1.33	-	5.50	10.50
Total	30.46	32.30	25.89	26.18	13.04	19.11	24.25

Sta.	May	Jun	Jul	Aug	Sep	Total
23	0.33	1.50	3.33	7.67	15.67	4.89
24	8.50	47.00	54.83	52.00	62.00	28.32
25	4.67	9.50	4.50	11.67	11.67	5.44
26	2.33	11.83	5.67	12.67	8.17	6.42
27	4.17	6.83	15.50	13.00	23.17	18.23
28	6.00	17.17	27.83	22.00	44.83	12.53
29	251.33	158.00	239.33	195.67	108.67	196.17
31	5.67	16.00	14.50	28.00	18.83	14.23
32	14.00	69.67	56.67	32.67	15.33	21.40
33	4.33	35.50	36.50	108.33	59.33	28.51
34	1.67	20.00	30.67	20.00	13.50	9.09
35	10.50	28.83	8.83	16.83	4.33	8.03
Total	26.12	35.15	45.68	43.37	32.12	

Table 49a. Mean number of blue crabs/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.17	0.17	1.00	1.17	0.67	0.50	-
2	0.17	0.33	1.00	1.17	0.00	0.00	-
3	0.00	0.33	0.17	1.67	0.33	0.00	-
4	0.08	0.00	0.17	0.67	0.33	0.33	-
5	0.08	0.17	0.17	0.33	0.17	0.00	-
6	0.25	0.00	0.00	0.00	0.00	0.00	-
7	0.00	0.17	0.00	0.00	0.33	0.67	-
8	0.50	0.33	0.17	0.00	0.00	0.00	-
9	0.00	0.00	0.00	0.00	0.17	0.00	-
10	0.00	0.00	0.00	0.00	0.00	0.00	-
11	1.17	0.00	0.17	0.17	0.00	0.00	-
12	0.00	0.00	0.17	0.00	0.00	0.00	-
13	0.00	1.00	0.33	0.50	0.17	0.00	-
14	0.08	0.50	0.17	0.00	0.00	0.00	-
15	0.08	0.00	0.33	0.00	0.50	0.00	-
16	2.42	1.1	2.17	0.75	1.00	0.00	-
17	0.08	0.33	0.00	0.00	0.00	0.00	-
18	0.92	0.83	0.67	0.40	0.83	2.33	-
19	0.00	0.00	0.67	0.17	0.00	0.00	-
20	0.00	0.00	0.00	0.00	0.00	0.83	-
21	0.17	0.00	1.83	1.50	3.67	0.00	-
22	0.00	0.00	0.17	0.00	0.17	0.00	-
Total	0.03	0.24	0.42	0.34	0.38	0.21	-

Table 49a. Mean number of blue crabs/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.35
2	0.00	0.00	0.00	0.00	0.00	0.25
3	0.00	0.00	0.00	0.00	0.00	0.14
4	0.00	0.00	0.00	0.00	0.00	0.15
5	0.00	0.00	0.00	0.00	0.00	0.08
6	0.00	0.00	0.00	0.17	0.00	0.04
7	0.00	0.00	0.00	0.00	0.00	0.11
8	0.00	0.00	0.00	0.00	0.00	0.09
9	0.00	0.00	0.00	0.00	0.00	0.02
10	0.00	0.00	0.00	0.00	0.00	0.00
11	0.17	0.00	0.00	0.00	0.00	0.20
12	0.00	0.00	0.00	0.00	0.00	0.02
13	0.00	0.00	0.00	0.00	0.00	0.18
14	0.00	0.00	0.17	0.00	0.00	0.08
15	0.00	0.00	0.00	0.00	0.00	0.08
16	0.00	0.00	0.00	0.17	0.00	0.62
17	0.00	0.00	0.00	0.00	0.00	0.03
18	0.17	0.00	0.00	0.00	0.00	0.52
19	0.00	0.00	0.00	0.00	0.00	0.08
20	0.00	0.00	0.00	0.00	0.00	0.08
21	0.00	0.00	0.00	0.00	0.00	0.70
22	0.00	0.00	0.00	0.00	0.00	0.03
Total	0.02	0.00	0.01	0.02	0.00	

Table 49b. Mean number of blue crabs/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.25	0.00	0.00	0.00	0.00	0.00	
25	0.83	0.00	0.00	0.00	0.00	0.00	
26	0.83	0.33	0.00	0.50	0.50	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.00	0.00	0.00	0.00	0.00	0.00	
31	0.00	0.17	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.33	0.00	0.00	
34	0.17	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.17	0.04	0.00	0.07	0.04	0.00	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.17	0.01
24	0.00	0.00	0.00	0.00	0.00	0.00	0.02
25	0.00	0.00	0.00	0.00	0.00	0.00	0.07
26	0.00	0.00	0.00	0.00	0.17	0.00	0.19
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.01
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.17	0.00	0.00	0.00	0.04
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.01	0.00	0.01	0.01	

Table 50a. Mean number of spiny lobster/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.33	0.17	0.00	0.17	-
2	0.08	0.00	0.00	0.00	0.00	0.33	0.00
3	0.25	0.17	0.00	0.17	0.00	0.17	0.33
4	0.00	0.00	0.00	0.00	0.00	0.17	-
5	0.00	0.00	0.00	0.50	0.50	0.17	0.50
6	0.08	0.00	0.17	0.00	0.00	0.00	-
7	0.50	0.50	1.50	0.83	0.33	1.17	-
8	0.17	0.33	0.50	0.50	0.33	0.33	0.17
9	0.25	0.17	0.17	0.17	0.17	0.17	-
10	0.41	0.83	0.50	0.83	0.00	0.50	-
11	0.25	0.00	0.17	0.17	0.00	0.00	-
12	0.17	0.33	0.83	0.00	0.17	0.00	0.00
13	0.08	0.00	0.00	0.00	0.00	0.17	0.00
14	0.08	0.67	0.17	0.50	0.33	0.00	0.33
15	0.17	0.17	0.00	0.00	0.00	0.00	-
16	0.00	0.00	0.00	0.00	0.00	0.17	-
17	0.08	0.00	0.17	0.00	0.17	0.00	-
18	0.00	0.17	0.18	0.00	0.17	0.00	-
19	0.08	0.00	0.83	0.00	0.17	0.33	-
20	0.17	0.17	0.40	0.00	0.17	0.33	-
21	0.33	0.17	1.00	0.83	1.33	1.25	0.00
22	0.08	1.00	0.17	0.83	0.50	0.40	-
Total	0.15	0.21	0.32	0.25	0.20	0.27	-

Table 50a. Mean number of spiny lobster/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.17	0.08
2	0.33	0.17	0.17	0.00	0.00	0.10
3	0.00	0.00	0.00	0.00	0.00	0.07
4	0.00	0.00	0.17	0.00	0.00	0.03
5	0.17	0.33	0.00	0.00	0.33	0.18
6	0.17	0.00	0.00	0.00	0.00	0.04
7	0.00	0.50	0.00	0.00	0.00	0.48
8	0.33	0.33	0.33	0.17	0.67	0.36
9	1.67	0.17	0.00	0.00	0.17	0.28
10	0.33	0.50	0.00	0.00	0.17	0.37
11	0.00	0.00	0.00	0.00	0.00	0.05
12	0.00	0.33	0.00	0.00	0.00	0.17
13	0.00	0.00	0.00	0.00	0.00	0.02
14	0.00	0.17	0.00	0.00	0.00	0.17
15	0.00	0.00	0.00	0.00	0.00	0.03
16	0.00	0.00	0.00	0.00	0.00	0.02
17	0.17	0.00	0.00	0.00	0.00	0.05
18	0.17	0.00	0.00	0.00	0.00	0.06
19	0.00	0.00	0.00	0.17	0.33	0.17
20	0.00	0.33	0.00	0.31	0.17	0.19
21	0.50	0.33	0.17	0.00	0.00	0.54
22	0.00	0.00	0.00	0.00	0.00	0.27
Total	0.17	0.14	0.04	0.03	0.09	

Table 50b. Mean number of spiny lobster/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.33	0.00	0.50	0.00	0.00	0.17	
24	0.00	0.50	0.17	0.00	0.00	0.33	
25	0.00	0.00	0.17	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.00	0.00	0.00	0.00	0.00	0.00	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	0.00	0.00	
34	0.00	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.03	0.04	0.07	0.00	0.00	0.04	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.17	0.33	0.00	0.33	0.15
24	0.17	0.00	0.17	0.50	0.33	0.17	0.20
25	0.00	0.33	0.00	0.00	0.00	0.00	0.04
26	0.00	0.00	0.00	0.00	0.33	0.00	0.03
27	0.33	0.00	0.00	0.00	0.00	0.00	0.03
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.17	0.00	0.01
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.17	0.00	0.00	0.01
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.04	0.03	0.03	0.08	0.07	0.04	

Table 51a. Mean number of ornate crabs/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.17	0.00	0.17	0.00	0.17	3.50	-
2	0.00	0.17	1.17	0.17	1.50	2.50	1.67
3	0.00	0.83	1.33	2.83	5.50	6.00	5.17
4	0.17	0.00	0.17	0.00	1.50	1.17	-
5	0.00	0.17	2.50	6.67	1.50	5.83	4.67
6	0.00	1.00	0.67	0.33	0.50	0.67	-
7	0.33	0.50	1.00	0.33	1.17	4.00	-
8	0.00	4.00	6.00	12.17	6.00	3.33	1.67
9	0.00	0.00	0.17	1.00	0.00	0.17	-
10	0.00	0.00	0.00	0.00	0.00	0.17	-
11	0.00	2.50	6.67	4.67	0.50	4.00	-
12	0.00	0.17	0.00	0.00	0.17	0.33	0.17
13	0.00	1.33	0.33	10.17	2.83	3.33	1.83
14	0.00	1.67	1.83	2.83	1.17	1.33	1.83
15	0.00	2.00	0.33	1.17	2.00	2.83	-
16	0.00	0.67	1.67	8.75	7.83	4.33	-
17	0.00	1.17	1.33	0.83	0.67	0.67	-
18	1.17	5.67	11.17	34.40	26.17	21.83	-
19	0.00	0.50	1.5	0.83	1.83	2.50	-
20	0.41	0.00	0.00	0.00	0.00	1.33	-
21	0.00	3.83	6.00	11.67	10.50	11.75	3.00
22	0.00	0.17	0.50	0.17	0.33	1.20	-
Total	0.10	1.20	2.04	4.20	3.27	3.66	

Table 51a. Mean number of ornate crabs/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	1.33	1.83	0.50	0.83	0.67	0.83
2	5.83	6.17	2.17	0.80	1.00	1.95
3	4.33	2.00	1.67	1.60	0.50	2.42
4	0.33	0.00	0.17	0.00	0.17	0.33
5	4.17	0.83	0.50	0.17	0.67	2.09
6	1.67	2.17	1.50	1.50	0.33	0.94
7	3.17	1.00	0.00	0.17	0.33	1.09
8	1.17	1.83	1.00	0.00	0.83	3.30
9	0.00	0.33	0.00	0.00	0.00	0.15
10	0.33	0.17	0.33	0.00	0.00	0.09
11	2.17	1.67	0.17	0.17	2.67	2.29
12	0.17	0.17	0.00	0.40	0.00	0.13
13	2.67	0.33	0.00	0.17	6.00	2.47
14	1.50	0.33	2.33	1.00	1.33	1.39
15	1.17	1.67	0.17	0.17	0.17	1.06
16	10.67	6.67	4.50	1.83	1.33	4.39
17	0.00	0.33	0.33	0.17	0.17	0.52
18	18.33	13.00	1.83	2.17	0.83	12.42
19	1.00	4.50	1.17	1.83	1.50	1.56
20	0.00	0.33	0.17	0.00	0.50	0.25
21	4.67	1.67	4.17	2.00	2.67	5.36
22	0.33	0.33	0.67	1.83	0.83	0.61
Total	2.96	2.15	1.06	0.84	1.02	

Table 51b. Mean number of ornate crabs/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Now	Dec	Jan	Feb	Mar	
23	0.00	0.17	0.33	0.00	0.00	0.00	
24	0.50	0.83	0.50	0.17	4.33	0.00	
25	1.67	0.33	0.50	0.33	0.17	0.17	
26	9.00	11.67	11.17	0.67	5.50	2.33	
27	1.80	0.50	0.50	0.17	0.50	0.17	
28	0.33	0.33	0.00	0.50	0.00	0.67	
29	0.00	0.00	0.33	0.17	0.33	0.17	
31	4.17	0.67	1.83	0.33	0.17	0.83	
32	3.83	0.50	2.83	0.67	1.50	2.33	
33	4.50	1.67	2.83	1.17	3.67	15.50	
34	2.83	1.00	2.00	0.50	0.83	0.67	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	2.45	1.47	1.90	0.39	1.55	1.50	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.33	0.17	0.17	0.00	0.33	0.13
24	0.00	0.00	0.50	0.00	0.17	0.00	0.58
25	0.00	0.50	0.33	0.00	0.17	0.33	0.38
26	7.50	3.00	3.50	4.50	4.67	3.83	5.61
27	1.50	0.17	1.17	1.00	1.00	0.17	0.72
28	2.17	0.17	1.50	1.17	2.50	1.50	0.90
29	0.17	0.67	0.00	0.67	0.00	0.67	0.31
31	0.50	1.17	2.83	0.50	0.33	0.50	1.19
32	4.67	3.17	10.17	7.67	1.33	1.33	3.33
33	4.83	0.17	4.83	1.33	3.50	11.17	4.60
34	0.00	1.17	0.50	2.33	1.00	2.00	1.24
35	0.00	0.17	0.17	0.00	0.00	0.00	0.03
Total	1.78	0.89	2.14	1.61	1.22	1.82	

Table 52a. Mean number of mutton snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.00	0.00	0.00	0.00	0.00	0.17	-
3	0.00	0.00	0.00	0.00	0.00	0.83	0.17
4	0.00	0.00	0.00	0.00	0.00	0.00	-
5	0.00	0.00	0.00	0.00	0.00	0.00	0.33
6	0.00	0.00	0.00	0.00	0.17	0.33	-
7	0.00	0.00	0.00	0.00	0.00	0.00	-
8	0.00	0.00	0.00	0.00	0.00	0.17	0.00
9	0.08	0.00	0.00	0.00	0.00	0.17	-
10	0.00	0.00	0.00	0.00	0.00	0.17	-
11	0.00	0.17	0.00	0.00	0.00	0.00	-
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.17	0.00	0.00	0.00	0.00	0.00
14	0.33	0.00	0.00	0.00	0.00	0.50	0.50
15	0.00	0.00	0.00	0.00	0.00	0.00	-
16	0.00	0.00	0.00	0.00	0.00	0.00	-
17	0.00	0.00	0.00	0.00	0.00	0.00	-
18	0.00	0.00	0.00	0.00	0.17	0.00	-
19	0.00	0.00	0.00	0.00	0.00	0.00	-
20	0.00	0.00	0.00	0.17	0.00	0.00	-
21	0.00	0.00	0.00	0.00	0.00	0.25	0.00
22	0.00	0.00	0.00	0.00	0.00	0.20	-
Total	0.02	0.01	0.00	0.01	0.01	0.12	-

Table 52a. Mean number of mutton snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.17	0.00	0.00	0.00	0.03
3	0.00	0.00	0.00	0.00	0.00	0.07
4	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00
6	0.17	0.50	0.00	0.17	0.17	0.13
7	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.01
9	0.17	0.67	0.00	0.00	0.17	0.11
10	0.00	0.00	0.00	0.00	0.00	0.01
11	0.00	0.00	0.00	0.00	0.00	0.01
12	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.01
14	0.00	0.00	0.00	0.00	0.00	0.07
15	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.17	0.00	0.00	0.00	0.01
17	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.17	0.00	0.00	0.03
19	0.00	0.33	0.33	0.17	0.00	0.07
20	0.00	0.00	0.00	0.00	0.00	0.01
21	0.00	0.00	0.00	0.00	0.00	0.02
22	0.17	0.17	0.33	0.00	0.00	0.08
Total	0.02	0.09	0.04	0.01	0.01	

Table 52b. Mean number of mutton snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Now	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.00	0.17	0.00	0.00	0.00	0.00	
25	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.17	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.00	0.00	0.00	0.00	0.00	0.00	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.17	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	0.00	0.00	
34	0.00	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.01	0.01	0.01	0.00	0.00	0.00	

Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.01
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.01
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.01
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	

Table 53a. Mean number of yellowtail snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.00	0.00	0.00	0.00	0.00	0.17	0.00
3	0.00	0.00	0.00	0.17	0.00	1.17	0.33
4	0.00	0.00	0.00	0.17	0.67	1.7	-
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.17	0.17	0.50	0.67	1.50	-
7	0.00	0.17	0.67	1.50	0.50	1.00	-
8	0.17	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.67	0.00	-
10	0.17	0.00	0.17	1.50	1.50	0.67	-
11	0.00	0.00	0.00	0.00	0.00	0.00	-
12	0.00	0.00	0.00	0.00	0.33	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.17	0.67	0.83	1.00	0.83
15	0.00	0.00	0.00	0.00	0.00	0.00	-
16	0.00	0.00	0.00	0.00	0.00	0.00	-
17	0.00	0.00	0.00	0.00	0.00	0.00	-
18	0.00	0.00	0.00	0.00	0.00	0.00	-
19	0.00	0.00	0.00	0.00	0.00	0.00	-
20	0.00	0.00	0.00	0.17	0.50	0.33	-
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.33	0.00	-
Total	0.02	0.02	0.05	0.21	0.27	0.34	

Table 53a. Mean number of yellowtail snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.02
3	0.17	0.00	0.00	0.00	0.00	0.14
4	0.00	0.00	0.00	0.00	0.00	0.09
5	0.00	0.00	0.00	0.33	0.00	0.03
6	0.67	1.50	0.17	0.33	0.00	0.52
7	0.83	0.00	0.00	0.00	0.00	0.42
8	0.00	0.00	0.00	0.00	0.00	0.02
9	0.50	0.50	0.00	0.17	0.33	0.20
10	2.00	2.33	0.67	1.00	0.50	0.96
11	0.17	0.00	0.00	0.00	0.00	0.02
12	0.00	0.00	0.00	0.00	0.00	0.03
13	0.00	0.00	0.00	0.00	0.00	0.00
14	0.33	0.17	0.00	0.00	0.00	0.28
15	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.17	0.00	0.02
20	0.50	0.00	0.00	0.00	0.00	0.14
21	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.03
Total	0.24	0.20	0.04	0.09	0.04	

Table 53b. Mean number of yellowtail snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar
23	0.00	0.17	0.00	0.00	0.00	0.00
24	0.00	0.33	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00
28	0.17	0.00	0.00	0.17	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	-	0.00
Total	0.01	0.04	0.00	0.01	0.00	0.00

Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.01
24	0.00	0.00	0.00	0.00	0.33	0.00	0.06
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.17	0.00	0.04
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.04	0.00	

Table 54a. Mean number of lane snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.00	0.00	0.00	0.00	0.00	0.00	0.17
3	0.00	0.00	0.00	0.00	0.00	0.33	-
4	0.00	0.00	0.00	0.17	0.00	0.00	-
5	0.00	0.00	0.00	0.00	0.00	0.50	-
6	0.00	0.00	0.00	0.33	0.00	1.17	-
7	0.00	0.00	0.00	0.17	0.50	0.67	-
8	0.00	0.00	0.00	0.00	0.17	0.00	-
9	0.00	0.00	0.00	0.00	0.17	0.00	-
10	0.00	0.00	0.00	0.00	0.00	0.33	-
11	0.00	0.17	0.00	0.00	0.00	0.00	-
12	0.00	0.00	0.00	0.17	0.00	0.00	-
13	0.00	0.00	0.00	0.00	0.00	0.00	-
14	0.00	0.00	0.33	0.83	0.00	0.17	1.00
15	0.00	0.00	0.00	0.00	0.00	0.00	-
16	0.00	0.00	0.00	0.00	0.00	0.00	-
17	0.00	0.00	0.00	0.00	0.00	0.17	-
18	0.00	0.00	0.00	0.00	0.00	0.00	-
19	0.08	0.00	0.17	0.17	0.33	0.00	-
20	0.00	0.00	0.00	0.17	1.17	2.00	-
21	0.00	0.00	0.00	0.00	0.17	0.00	-
22	0.00	0.00	0.67	0.00	0.00	0.00	-
Total	0.00	0.01	0.05	0.09	0.11	0.25	-

Table 54a. Mean number of lane snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	bee	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00
3	0.17	0.00	0.00	0.00	0.00	0.05
4	0.00	0.00	0.00	0.00	0.00	0.02
5	0.00	0.00	0.00	0.00	0.00	0.05
6	0.83	0.33	0.00	0.00	0.00	0.24
7	0.17	0.00	0.00	0.00	0.00	0.13
8	0.00	0.00	0.00	0.00	0.00	0.02
9	0.17	0.83	0.33	0.00	0.00	0.13
10	0.00	0.00	0.00	0.00	0.00	0.03
11	0.00	0.00	0.00	0.00	0.00	0.02
12	0.00	0.00	0.00	0.00	0.00	0.02
13	0.00	0.00	0.00	0.00	0.00	0.00
14	0.50	0.00	0.33	0.00	0.00	0.19
15	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.02
18	0.17	0.00	0.00	0.00	0.00	0.02
19	0.00	0.00	0.00	0.00	0.17	0.11
20	1.00	0.83	0.67	0.17	0.00	0.55
21	0.17	0.00	0.00	0.00	0.00	0.03
22	0.83	0.50	0.00	0.00	0.00	0.18
Total	0.18	0.11	0.06	0.01	0.01	

Table 54b. Mean number of lane snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
23	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.17	0.00	0.00	0.00	0.00	0.00	
29	0.17	0.00	0.00	0.00	0.00	0.00	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.50	0.00	0.00	0.00	
34	0.17	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	-	0.00	
Total	0.04	0.00	0.04	0.00	0.00	0.00	

Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.17	0.01
23	0.00	0.00	0.00	0.00	0.17	0.00	0.01
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.01
29	0.00	0.00	0.00	0.00	0.00	0.00	0.01
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.01
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.01	0.01	

Table 55a. Mean number of pinfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	1.67	0.00	0.00	0.00	0.33	-
2	0.83	4.17	6.67	0.33	0.00	1.33	0.33
3	2.33	8.33	3.83	0.83	0.17	1.17	0.50
4	0.00	0.00	0.00	0.00	0.50	0.00	-
5	0.67	6.83	6.50	22.50	3.83	7.17	4.00
6	2.67	6.50	8.00	3.83	2.67	1.17	-
7	3.00	6.00	8.33	2.50	0.83	0.83	-
8	12.73	7.83	8.17	7.50	1.83	12.33	1.33
9	6.83	4.83	20.00	3.50	4.50	1.00	-
10	0.25	1.33	1.50	0.50	0.50	0.00	-
11	27.08	38.67	6.33	14.17	2.50	23.50	-
12	0.75	0.33	0.17	0.00	0.67	0.67	0.67
13	20.67	33.50	23.50	18.17	47.17	46.5	6.83
14	10.33	3.00	5.33	12.83	6.83	3.50	6.33
15	1.17	0.50	0.33	0.00	0.00	0.50	-
16	44.08	31.83	35.67	32.75	28.83	19.00	-
17	0.25	1.50	0.83	0.83	0.33	0.33	-
18	31.50	70.67	72.83	13.80	44.67	49.33	-
19	3.83	4.33	13.00	0.67	0.83	1.83	-
20	0.33	1.00	1.60	0.17	0.00	1.67	-
21	5.25	23.50	24.00	2.00	0.67	0.25	0.17
22	7.25	16.67	27.83	4.00	11.17	0.60	-
Total	8.26	12.64	12.56	5.94	7.20	8.04	-

Table 55a. Mean number of pinfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.17	0.00	0.00	0.20
2	2.83	2.83	0.00	0.00	1.67	1.88
3	4.83	0.83	0.17	0.00	0.17	2.06
4	0.00	0.00	0.00	0.00	0.00	0.05
5	24.3	7.83	2.00	1.67	7.50	8.25
6	5.67	2.33	0.00	3.50	1.50	3.44
7	0.67	5.00	0.50	1.17	0.17	2.63
8	4.17	1.83	0.17	0.33	0.83	5.25
9	6.50	10.67	0.33	1.50	0.17	5.44
10	0.17	0.00	0.33	0.50	0.00	0.46
11	19.50	1.00	1.67	2.17	0.00	12.57
12	0.67	0.50	0.00	0.00	0.00	0.34
13	9.00	4.50	3.83	4.00	2.17	19.37
14	2.17	0.50	2.33	0.50	0.00	4.30
15	0.00	0.00	0.00	0.00	0.00	0.23
16	11.50	14.50	8.67	14.83	3.67	22.31
17	0.00	0.17	2.50	0.17	0.33	0.66
18	64.33	10.17	5.50	16.17	1.33	34.57
19	0.17	2.83	1.17	1.00	1.00	2.79
20	1.00	2.00	1.67	0.00	0.17	0.87
21	0.50	0.33	0.33	0.50	0.50	5.71
22	5.83	6.67	3.17	0.67	6.00	8.17
Total	7.45	3.39	1.57	2.21	1.24	

Table 55b. Mean number of pinfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.25	0.33	2.00	0.17	0.33	0.00	
25	0.17	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.17	0.00	0.00	
27	2.60	1.83	3.67	0.33	0.33	0.33	
28	1.33	0.00	0.50	0.17	0.17	0.00	
29	11.67	20.50	8.67	11.33	8.50	16.33	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.33	0.00	0.00	0.00	0.17	0.17	
33	0.00	0.00	0.17	0.00	0.00	0.00	
34	0.17	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	-	0.00	
Total	1.38	1.89	1.25	1.01	0.86	1.40	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.50	0.33	0.83	0.33	1.00	1.17	0.60
25	0.00	0.00	0.00	0.00	0.00	0.00	0.01
26	0.00	0.00	0.00	0.00	0.00	0.00	0.01
27	7.00	0.17	0.00	0.50	0.33	1.17	1.52
28	0.00	1.17	0.33	1.33	0.33	0.67	0.50
29	18.33	13.33	15.33	12.33	28.00	32.00	16.36
31	0.00	0.00	0.00	0.17	0.00	0.17	0.03
32	0.33	0.17	0.17	0.33	0.17	0.00	0.15
33	0.00	0.00	0.00	0.00	0.00	0.00	0.01
34	0.00	0.00	0.00	0.00	0.00	0.00	0.01
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.18	1.26	1.39	1.25	2.49	2.93	

Table 56a. Mean number of silver jennys/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.08	0.33	0.00	0.00	0.00	7.50	-
2	0.08	0.83	7.33	3.17	6.00	17.00	1.17
3	0.17	0.83	4.83	2.33	0.83	1.33	1.00
4	0.00	0.00	0.00	0.00	0.00	0.00	-
5	0.17	0.33	0.50	5.33	1.50	11.50	17.33
6	0.00	1.50	2.33	1.33	1.50	1.83	-
7	0.41	0.17	1.00	1.67	0.17	0.33	-
8	1.75	0.83	2.17	4.83	2.00	19.50	9.17
9	0.17	0.00	2.00	0.33	2.50	1.33	-
10	0.00	0.00	0.00	0.00	0.00	0.00	-
11	2.42	0.83	0.33	8.17	0.33	9.67	-
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	1.50	9.17	7.17	18.50	6.83	3.67
14	0.08	0.00	0.83	1.50	1.50	2.00	4.17
15	0.00	0.00	0.33	0.00	0.00	0.17	-
16	2.16	1.33	2.00	4.00	2.50	14.17	-
17	0.00	0.17	0.00	0.00	0.00	0.17	-
18	0.67	7.67	9.00	10.80	16.00	40.83	-
19	0.00	0.00	0.50	1.00	2.00	3.83	-
20	0.08	0.33	0.60	0.17	0.17	1.33	-
21	0.08	0.00	0.50	1.00	0.33	1.00	0.00
22	0.00	0.00	2.00	0.50	1.50	1.40	-
Total	0.37	0.76	2.07	2.33	2.61	6.10	-

Table 56a. Mean number of silver jennys/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.72
2	2.00	1.50	0.17	0.00	0.00	3.46
3	3.50	1.83	0.33	0.00	0.00	1.45
4	0.17	0.17	0.17	0.00	0.00	0.05
5	12.50	9.67	5.50	4.67	2.50	4.92
6	1.50	2.67	0.00	1.17	0.17	1.27
7	0.00	1.33	0.17	0.00	0.17	0.49
8	3.17	1.50	0.00	0.33	0.67	3.34
9	0.33	0.33	0.00	0.33	0.17	0.68
10	0.00	0.00	0.00	0.00	0.00	0.00
11	7.17	0.00	0.50	0.33	0.00	2.70
12	0.00	0.00	0.00	0.00	0.00	0.00
13	4.50	0.50	0.67	0.67	1.00	4.59
14	0.00	0.33	0.17	0.00	0.00	0.58
13	0.17	0.00	0.00	0.00	0.00	0.06
16	26.67	1.67	4.33	3.00	0.67	4.77
17	0.00	0.33	0.00	0.00	0.00	0.06
18	33.17	7.67	1.00	7.50	0.17	12.23
19	0.83	0.67	0.33	0.00	0.17	0.85
20	0.00	0.17	0.17	0.00	0.00	0.27
21	0.83	0.67	0.17	0.00	0.17	0.43
22	3.00	2.17	1.67	0.00	0.17	1.13
Total	4.52	1.51	0.69	0.82	0.27	

Table 56b. Mean number of silver jennys/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.17	0.00	0.00	0.00	
24	0.00	1.33	1.67	0.17	0.17	0.00	
25	0.17	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	2.33	0.00	0.17	0.00	
27	8.20	3.33	1.67	0.33	0.33	0.00	
28	0.83	0.17	0.83	0.17	0.00	0.00	
29	10.17	13.67	25.83	0.00	0.67	0.83	
31	7.00	1.00	3.67	0.00	0.83	0.00	
32	8.33	0.33	2.17	0.17	2.33	0.00	
33	4.33	1.50	0.67	0.17	0.17	0.00	
34	0.33	0.00	0.20	0.00	0.00	0.00	
35	0.00	0.00	0.17	0.00	-	0.00	
Total	3.28	1.78	3.28	0.08	0.43	0.07	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.01
24	0.17	0.33	2.00	5.50	9.50	8.17	2.42
25	0.00	0.00	0.00	0.00	0.00	0.17	0.06
26	1.50	0.00	0.00	0.33	0.00	0.00	0.36
27	1.17	0.00	0.00	0.50	0.83	5.17	1.70
28	0.17	0.00	0.00	0.50	4.00	11.17	1.49
29	0.17	0.33	0.33	6.00	22.67	31.33	9.33
31	0.00	0.00	1.00	4.17	1.33	1.00	1.67
32	0.33	0.33	8.83	6.33	9.00	3.00	3.43
33	0.00	0.00	0.17	0.33	1.67	0.67	0.81
34	0.00	0.00	0.00	0.67	0.00	0.33	0.13
35	0.00	0.00	0.33	0.33	23.83	2.00	2.52
Total	0.29	0.08	1.14	2.06	6.07	5.25	

Table 57a. Mean number of pigfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.33	0.00	0.00	0.00	0.00	-
2	0.25	1.83	1.33	0.00	0.17	0.17	0.00
3	0.42	2.17	2.50	2.50	0.33	1.33	0.00
4	0.08	0.00	0.00	0.00	0.17	0.17	-
5	0.08	0.00	0.00	0.17	0.33	0.00	0.00
6	1.00	1.00	2.00	1.83	2.00	0.67	-
7	0.67	0.50	1.33	1.50	0.00	0.50	-
8	0.00	0.00	0.00	0.17	0.00	0.17	0.00
9	0.33	0.17	0.50	0.33	1.33	0.50	-
10	0.00	0.00	0.33	0.00	0.17	0.17	-
11	0.17	0.33	0.17	0.00	0.33	0.17	-
12	0.17	0.17	0.17	0.00	0.00	0.67	0.00
13	0.17	0.00	0.17	0.17	0.50	0.17	0.00
14	0.08	0.17	1.83	0.67	0.50	1.50	1.17
15	0.00	0.00	0.00	0.00	0.00	0.00	-
16	0.00	0.17	0.00	0.00	0.17	0.33	-
17	0.17	0.00	0.00	0.17	0.17	0.17	-
18	0.00	0.17	0.17	0.20	0.00	0.00	-
19	0.00	0.00	0.05	0.33	0.00	0.00	-
20	0.17	0.00	0.00	0.00	0.00	0.33	-
21	0.17	0.00	0.00	0.00	0.00	0.00	0.00
22	0.17	0.00	0.33	0.33	0.00	0.40	-
Total	0.19	0.32	0.52	0.39	0.28	0.34	-

Table 57a. Mean number of pigfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.17	0.00	0.00	0.04
2	0.17	0.17	0.00	0.00	0.00	0.37
3	0.17	0.50	0.33	0.00	0.17	0.95
4	0.00	0.00	0.00	0.00	0.00	0.04
5	0.00	0.17	0.17	0.00	0.17	0.09
6	1.17	1.50	0.17	0.50	0.00	1.07
7	0.83	1.00	0.00	0.17	0.17	0.61
8	0.00	0.17	0.00	0.00	0.00	0.05
9	0.00	0.33	0.00	0.00	0.17	0.33
10	0.17	0.00	0.00	0.00	0.17	0.09
11	0.00	0.00	0.00	0.00	0.17	0.12
12	0.00	0.00	0.00	0.00	0.17	0.12
13	0.17	0.00	0.00	0.00	0.50	0.17
14	0.17	0.17	0.17	0.00	0.00	0.48
15	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.17	0.08
17	0.00	0.00	0.00	0.00	0.00	0.06
18	0.00	0.00	0.00	0.50	0.00	0.09
19	0.17	0.00	0.00	0.00	0.00	0.09
20	0.33	0.17	0.00	0.00	0.00	0.09
21	0.00	0.00	0.00	0.00	0.00	0.01
22	0.17	0.33	0.00	0.00	1.17	0.26
Total	0.16	0.20	0.05	0.53	0.14	

Table 57b. Mean number of pigfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.67	0.17	0.00	0.00	
24	0.00	0.00	5.83	0.00	0.00	0.00	
25	0.00	0.00	0.33	0.17	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.17	0.00	
27	0.00	0.33	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.17	0.00	0.00	0.00	
29	0.17	0.00	0.00	0.00	2.67	5.50	
31	0.17	0.00	0.17	0.00	1.17	0.17	
32	0.00	0.33	0.00	0.17	0.00	0.17	
33	0.17	0.17	0.00	0.00	0.00	0.00	
34	0.00	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.17	0.00	0.00	-	0.00	
Total	0.04	0.08	0.59	0.04	0.36	0.49	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.07
24	1.33	3.00	1.33	0.67	0.00	0.00	1.01
25	0.00	0.00	0.00	0.00	0.00	0.00	0.04
26	0.00	0.00	0.00	0.00	0.00	0.17	0.03
27	4.50	0.33	0.00	0.00	0.17	0.50	0.49
28	0.17	0.17	0.50	0.67	1.00	0.33	0.25
29	0.33	0.17	0.00	0.00	0.00	0.67	0.79
31	0.17	0.00	0.17	0.00	0.17	0.00	0.18
32	0.17	1.17	0.67	1.00	0.50	0.17	0.36
33	0.00	0.00	0.00	0.00	0.00	0.00	0.03
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Total	0.56	0.40	0.22	0.19	0.15	0.15	

Table 58a. Mean number of gray snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.17	0.00	0.33	0.00	0.00	0.33	0.00
3	0.00	0.00	0.17	0.00	0.00	0.17	0.00
4	0.00	0.00	0.00	0.33	0.17	0.00	-
5	0.00	0.00	0.83	0.33	0.00	1.67	1.83
6	0.00	0.00	0.33	0.17	0.33	0.00	-
7	0.00	0.00	0.50	0.33	0.00	0.00	-
8	0.17	0.17	0.17	0.33	0.00	0.50	1.17
9	0.66	0.00	0.50	0.33	0.50	0.00	-
10	0.00	0.00	0.00	0.00	0.17	0.00	-
11	0.42	0.17	0.50	0.50	0.00	1.00	-
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.83	0.33	0.50	0.33	0.83	0.33
14	0.00	0.00	0.33	0.17	0.33	0.67	0.83
15	0.00	0.00	0.00	0.00	0.00	0.00	-
16	0.33	0.00	0.17	0.25	0.17	0.33	-
17	0.00	0.00	0.00	0.00	0.00	0.00	-
18	0.25	1.67	0.83	0.40	0.67	0.83	-
19	0.42	0.33	0.67	0.00	0.17	1.50	-
20	0.00	0.00	0.00	0.00	0.00	0.33	-
21	0.00	0.00	0.33	0.00	0.00	0.25	0.17
22	0.00	0.83	0.33	0.33	0.33	0.20	-
Total	0.11	0.18	0.29	0.19	0.14	0.40	-

Table 58a. Mean number of gray snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.83	0.50	0.33	0.00	0.17	0.24
3	0.17	0.17	0.00	0.00	0.00	0.06
4	0.00	0.00	0.00	0.00	0.00	0.05
5	1.67	1.67	0.50	1.00	1.17	0.80
6	0.00	0.17	0.00	0.33	0.00	0.12
7	0.17	0.17	0.00	0.00	0.00	0.11
8	0.83	1.17	0.00	0.00	0.17	0.35
9	0.17	0.33	0.00	0.00	0.17	0.24
10	0.17	0.00	0.17	0.00	0.00	0.04
11	0.67	0.00	0.17	0.67	0.33	0.40
12	0.00	0.00	0.00	0.00	0.00	0.00
13	0.33	0.17	0.00	0.00	0.33	0.33
14	0.17	0.00	0.00	0.00	0.00	0.15
15	0.17	0.00	0.00	0.00	0.00	0.01
16	0.83	0.00	0.00	0.00	0.00	0.19
17	0.00	0.00	0.00	0.00	0.00	0.00
18	1.50	0.67	0.17	0.33	0.00	0.66
19	0.00	0.00	0.00	0.00	0.17	0.29
20	0.00	0.17	0.00	0.00	0.00	0.05
21	0.67	0.17	0.00	0.17	0.00	0.14
22	1.33	2.50	0.83	0.09	0.67	0.64
Total	0.44	0.36	0.09	0.11	0.14	

Table 58b. Mean number of gray snapper/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.00	0.00	0.33	0.00	0.00	0.00	
25	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.83	0.33	1.67	0.17	0.33	0.33	
31	1.67	0.00	0.00	0.00	0.17	0.00	
32	0.17	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.17	0.17	0.00	0.00	0.00	
34	0.00	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.23	0.04	0.18	0.01	0.04	0.03	
Sta.	Apr	May	Jun	Jul	Aug	Sept	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.17	0.00	0.17	0.00	0.05
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.83	0.50	1.33	1.33	0.33	1.33	0.77
31	0.00	0.00	0.00	0.00	0.00	0.00	0.15
32	0.00	0.00	0.17	0.33	0.00	0.17	0.07
33	0.00	0.00	0.00	0.00	0.00	0.00	0.03
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.07	0.04	0.14	0.14	0.04	0.13	

Table 59a. Mean number of toadfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.17	0.00	0.00	0.00	0.17	-
2	0.00	0.17	1.17	0.17	0.33	0.33	0.50
3	0.00	0.17	0.50	0.17	0.17	0.33	0.17
4	0.17	0.00	0.00	0.00	0.17	0.00	-
5	0.25	0.50	1.33	2.50	0.83	2.00	2.83
6	0.08	0.50	1.17	1.17	0.33	0.67	-
7	0.58	1.17	1.50	2.67	0.33	1.00	-
8	8.50	2.17	6.00	2.67	0.50	1.33	1.17
9	3.25	0.17	2.50	1.17	0.83	2.00	-
10	1.42	1.33	4.83	3.50	7.00	2.00	-
11	7.58	5.50	4.17	4.33	0.50	6.50	-
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.83	2.17	2.67	2.83	8.33	5.33	3.33
14	1.00	1.17	1.17	2.67	1.00	1.67	2.33
15	0.00	0.17	0.33	0.00	0.00	0.00	-
16	0.75	0.67	1.00	0.50	1.33	1.17	-
17	0.00	0.17	0.00	0.00	0.00	0.00	-
18	0.33	2.67	2.17	1.00	1.83	5.50	-
19	0.17	0.33	1.67	0.00	0.33	0.50	-
20	0.33	1.17	0.20	0.17	0.33	1.17	-
21	0.08	0.67	0.50	0.50	0.17	0.50	0.17
22	0.42	2.50	16.50	1.67	1.50	0.20	-
Total	1.17	1.07	2.26	1.27	1.17	1.50	-

Table 59a. Mean number of toadfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.17	0.00	0.00	0.17	0.00	0.06
2	0.33	1.00	0.00	0.00	0.83	0.39
3	0.50	0.50	0.67	0.60	0.17	0.34
4	0.00	0.00	1.17	0.17	0.00	0.15
5	2.33	2.00	0.00	1.00	0.67	1.22
6	0.00	0.67	0.00	0.17	0.33	0.46
7	0.50	0.17	0.50	0.50	0.17	0.83
8	0.67	0.83	0.00	0.67	1.00	2.21
9	0.33	1.50	0.00	0.50	0.00	1.11
10	3.67	1.17	0.50	0.83	0.00	2.39
11	6.33	1.67	4.00	3.50	0.33	4.04
12	0.00	0.00	0.00	0.00	0.17	0.01
13	1.00	0.50	0.33	0.83	0.33	2.29
14	3.50	0.33	0.17	0.50	0.00	1.19
15	0.00	0.00	0.00	0.00	0.17	0.06
16	1.00	0.50	4.17	4.83	2.17	1.64
17	0.00	0.00	0.00	0.00	0.00	0.01
18	7.00	1.50	1.83	3.83	1.33	2.63
19	0.17	0.50	0.17	0.67	1.00	0.50
20	0.00	1.33	0.50	0.00	0.17	0.49
21	0.33	0.00	2.00	0.67	0.67	0.55
22	6.33	9.50	3.50	0.50	1.83	0.04
Total	1.55	1.07	0.89	0.90	0.51	

Table 59b. Mean number of toadfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar
23	0.00	0.00	0.00	0.00	0.00	0.00
24	0.25	0.83	1.17	0.17	0.00	0.50
25	0.00	0.00	0.00	0.00	0.00	0.00
26	0.17	0.33	0.00	0.00	0.00	0.33
27	0.20	0.00	0.17	0.17	0.00	0.00
28	0.17	0.00	0.00	0.00	0.00	0.00
29	3.67	6.83	8.33	8.33	11.33	14.33
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.17
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.17	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	-	0.00
Total	0.39	0.67	0.81	0.72	1.03	1.28

Sta.	Apr	May	Jun	Jul	Aug	Sept	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.50	0.67	0.33	0.83	1.33	0.83	0.62
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.17	0.00	0.17	0.17	0.17	0.13
27	0.50	0.00	0.00	0.00	0.00	0.00	0.09
28	0.00	0.00	0.00	0.17	0.00	0.00	0.03
29	11.33	4.17	8.67	4.67	14.33	10.00	8.83
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.01
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.17	0.00	0.00	0.03
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.03	0.42	0.75	0.50	1.32	0.92	

Table 60a. Mean number of white grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.17	0.00	0.00	0.00	0.67	-
2	0.00	0.00	0.00	0.17	0.00	1.17	0.00
3	0.00	0.50	0.67	0.50	0.33	0.53	0.00
4	0.17	0.00	0.00	0.83	1.00	0.00	-
5	0.08	0.50	0.00	1.17	0.50	1.17	1.17
6	0.00	0.67	2.83	0.33	1.33	6.33	-
7	0.58	2.33	3.67	2.50	5.00	3.50	-
8	2.50	4.67	1.00	1.50	0.33	3.00	0.83
9	1.08	1.00	8.00	5.17	8.00	10.33	-
10	6.42	8.67	23.17	45.17	34.50	43.83	-
11	5.08	2.33	1.00	0.83	0.00	0.50	-
12	0.42	0.83	1.00	0.50	0.33	0.00	0.17
13	0.08	0.50	0.00	0.00	0.33	0.50	0.00
14	0.17	0.67	6.00	9.33	7.17	13.67	8.33
15	0.00	0.00	0.00	0.00	0.17	0.00	-
16	0.25	0.00	0.00	0.00	0.00	0.17	-
17	0.00	0.00	0.17	0.00	0.00	0.17	-
18	0.25	0.00	0.33	0.00	0.00	0.00	-
19	1.00	0.00	0.50	0.67	1.17	7.50	-
20	0.00	0.17	0.40	0.00	2.83	6.50	-
21	0.17	0.00	0.00	0.17	0.33	0.00	0.00
22	0.83	0.83	0.83	0.33	1.50	2.20	-
Total	0.87	1.08	2.27	3.22	2.95	4.71	-

Table 60a. Mean number of white grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.07
2	0.00	0.50	0.00	0.00	0.00	0.16
3	0.33	0.17	0.00	0.00	0.00	0.26
4	0.00	0.00	0.17	0.00	0.00	0.19
5	0.83	1.17	0.67	1.83	0.00	0.72
6	2.00	0.67	0.00	0.33	0.00	1.32
7	2.00	0.33	0.33	0.00	0.00	1.84
8	1.33	5.67	0.50	0.00	1.33	1.98
9	4.67	2.83	0.00	0.50	0.00	3.78
10	27.33	11.83	2.17	4.67	2.50	19.11
11	7.50	0.33	1.00	3.17	0.00	1.97
12	0.17	0.17	0.50	0.00	0.50	0.40
13	0.33	0.00	0.00	0.00	0.50	0.18
14	0.50	0.00	0.17	0.00	0.33	3.45
15	0.00	0.00	0.00	0.00	0.00	0.01
16	0.17	0.00	0.17	0.00	0.17	0.08
17	0.00	0.00	0.17	0.17	0.00	0.06
18	1.00	0.17	0.17	0.00	0.00	0.17
19	0.67	0.17	0.33	0.17	0.00	1.10
20	1.17	1.67	0.33	0.00	0.33	1.22
21	0.33	0.17	0.00	0.17	0.00	0.15
22	1.00	2.50	0.83	0.17	1.50	1.14
Total	3.15	1.29	0.34	0.51	0.65	

Table 60b. Mean number of white grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.00	1.83	1.50	0.00	0.33	0.17	
25	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.17	0.00	0.00	0.00	0.00	
29	0.00	0.33	0.67	0.00	0.33	4.17	
31	0.17	0.00	0.00	0.00	0.67	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	0.00	0.00	
34	1.00	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.10	0.19	0.18	0.00	0.12	0.36	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.33	0.00	0.03
24	0.00	0.00	0.17	6.17	10.17	4.00	2.03
25	0.00	0.00	0.00	0.00	0.00	1.00	0.08
26	0.00	0.00	0.00	0.00	0.17	0.17	0.03
27	0.33	0.00	0.00	1.00	0.33	2.33	0.33
28	0.00	0.00	0.00	4.33	2.17	4.00	0.89
29	0.50	0.83	1.33	1.67	2.33	3.33	1.29
31	0.00	0.00	0.00	0.00	0.00	0.00	0.07
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.17	0.00	0.00	0.01
34	0.00	0.00	0.00	0.67	0.00	0.17	0.15
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.69	0.69	0.13	1.17	1.29	1.25	

Table 61a. Mean number of bluestriped grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.17	0.00	0.09	0.00	0.17	-
2	0.00	0.17	0.17	0.17	0.00	0.17	0.00
3	0.08	0.17	1.67	1.33	0.00	0.00	0.00
4	0.00	0.00	0.00	0.33	0.00	0.00	-
5	0.00	0.00	0.17	0.00	0.00	0.17	0.00
6	0.00	2.00	5.17	1.50	3.83	0.33	-
7	0.08	1.83	3.00	5.33	4.00	3.33	-
8	2.25	1.67	0.83	0.00	0.17	0.67	0.00
9	0.00	1.83	4.50	2.00	2.50	0.50	-
10	0.75	2.67	10.00	10.33	9.17	7.83	-
11	3.58	2.17	1.17	0.50	0.33	3.50	-
12	0.17	0.17	0.00	0.00	0.00	0.17	0.00
13	0.33	0.67	0.50	0.00	0.67	1.83	0.17
14	0.00	0.67	4.67	11.17	4.50	5.67	4.33
15	0.08	0.83	0.33	0.17	0.00	0.00	-
16	0.08	0.00	0.33	0.00	1.17	1.00	-
17	0.00	0.00	0.17	0.00	0.00	0.00	-
18	0.25	0.00	0.67	2.00	3.00	4.17	-
19	0.50	0.17	2.00	2.17	1.00	7.00	-
20	0.50	0.33	1.80	1.17	1.33	5.00	-
21	0.00	0.17	0.17	0.67	0.00	0.50	0.00
22	0.08	0.83	2.50	1.00	3.83	1.20	-
Total	0.37	0.75	1.81	1.84	1.61	1.99	-

Table 61a. Mean number of bluestriped grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.03
2	0.00	0.00	0.00	0.00	0.33	0.09
3	0.00	0.33	0.00	0.00	0.00	0.32
4	0.00	0.00	0.00	0.00	0.00	0.03
5	0.50	0.33	0.00	1.67	1.67	0.41
6	1.33	0.33	0.00	0.00	0.00	1.32
7	1.17	0.67	0.00	0.17	0.00	1.78
8	0.50	0.83	0.17	0.00	0.83	0.73
9	0.33	0.17	0.00	0.17	0.00	1.09
10	1.17	0.50	0.00	0.50	0.17	3.92
11	3.33	0.50	0.83	1.83	0.00	1.61
12	0.00	0.00	0.00	0.00	0.17	0.05
13	2.33	0.00	0.00	0.33	4.83	1.04
14	0.00	0.00	0.17	0.00	0.17	2.46
15	0.00	0.00	0.00	0.00	0.00	0.13
16	0.50	1.50	0.83	1.33	0.50	0.66
17	0.00	0.00	0.00	0.00	0.00	0.02
18	4.83	3.17	0.00	0.67	0.00	1.71
19	1.17	0.17	0.33	0.17	0.50	1.38
20	0.83	1.17	1.83	0.00	0.17	1.28
21	0.50	0.33	0.00	0.00	0.00	0.21
22	1.00	0.83	0.83	0.17	6.00	1.66
Total	0.88	0.49	0.22	0.32	0.69	

Table 61b. Mean number of bluestriped grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.17	0.00	0.00	0.00	0.00	
24	0.25	0.83	0.33	0.00	0.00	0.00	
25	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.33	0.00	0.00	0.00	
27	1.00	0.00	0.00	0.00	0.17	0.00	
28	0.17	0.00	0.00	0.00	0.00	0.00	
29	0.33	0.67	3.17	4.33	11.33	16.67	
31	0.00	0.00	0.00	0.00	1.33	0.00	
32	0.00	0.00	0.17	0.00	0.00	0.00	
33	0.33	0.00	0.00	0.00	0.00	0.00	
34	2.50	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.38	0.14	0.33	0.36	1.17	1.39	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.17	0.03
24	0.17	0.00	0.67	0.17	0.17	0.17	0.23
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.17	0.04
27	4.00	0.00	0.00	0.17	0.00	0.33	0.47
28	0.00	0.00	0.00	0.33	0.17	1.67	0.19
29	13.00	19.17	9.33	7.67	9.00	2.67	8.11
31	0.00	0.00	0.00	0.00	0.00	0.00	0.11
32	0.00	0.00	0.00	0.33	0.50	0.00	0.08
33	0.00	0.00	0.00	0.17	0.17	0.50	0.09
34	0.00	0.00	0.00	1.17	0.00	0.00	0.30
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.43	1.59	0.83	0.83	0.83	0.47	

Table 62a. Mean number of sailor's choice/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.00	0.33	0.00	0.00	0.17	0.00	0.00
3	0.00	0.00	0.50	0.00	0.00	0.17	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	-
3	0.00	0.00	0.00	0.17	0.00	0.00	0.00
6	0.00	0.67	0.50	0.33	0.83	0.83	-
7	0.00	8.33	2.83	2.00	0.83	0.00	-
8	0.08	0.00	0.50	0.00	0.17	0.00	0.00
9	0.08	1.17	0.33	1.67	0.67	0.67	-
10	0.00	3.67	6.17	0.00	3.50	0.33	-
11	0.00	0.50	0.33	0.17	0.00	0.17	-
12	0.00	0.33	0.83	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	1.00	0.83	1.00	0.00	1.33	2.00
15	0.00	0.00	0.00	0.00	0.00	0.17	-
16	0.00	0.00	0.17	0.50	0.67	0.50	-
17	0.00	0.00	0.00	0.00	0.17	0.00	-
18	0.00	0.00	1.17	0.60	0.00	0.00	-
19	0.00	0.00	0.50	0.00	0.33	1.00	-
20	0.00	0.33	1.00	0.00	2.17	2.17	-
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.25	1.00	0.00	0.50	0.33	1.00	-
Total	0.02	0.79	0.71	0.33	0.45	0.38	-

Table 62a. Mean number of sailor's choice/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.05
3	0.17	0.17	0.00	0.00	0.00	0.09
4	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.17	0.33	0.06
6	0.50	0.00	0.00	0.00	0.00	0.33
7	1.17	0.00	0.00	0.00	0.33	1.41
8	0.50	0.67	0.00	0.00	0.33	0.20
9	0.17	0.00	0.00	0.00	0.00	0.43
10	0.17	0.17	0.00	0.17	0.00	1.29
11	0.17	0.00	0.17	0.00	0.33	0.16
12	0.83	0.00	0.17	0.00	0.33	0.23
13	0.00	0.00	0.00	0.00	0.50	0.05
14	0.00	0.00	0.00	0.00	0.00	0.38
15	0.00	0.00	0.17	0.00	0.00	0.03
16	0.00	0.33	0.17	0.00	0.00	0.21
17	0.00	0.00	0.17	0.00	0.00	0.03
18	0.50	0.00	0.00	0.00	0.00	0.21
19	0.00	0.17	0.00	0.00	0.00	0.18
20	0.83	0.67	0.17	0.00	0.00	0.67
21	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.50	3.33	0.00	1.67	0.78
Total	0.22	0.12	0.06	0.02	0.17	

Table 62b. Mean number of sailor's choice/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.75	0.83	1.67	0.00	0.00	0.00	
25	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.17	0.00	0.00	0.17	0.00	
28	0.17	0.17	0.00	0.17	0.00	0.00	
29	0.00	0.17	0.33	0.17	0.00	0.00	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.17	0.00	0.00	0.00	0.00	0.00	
34	2.67	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.30	0.11	0.17	0.03	0.02	0.00	

Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.17	0.50	0.33
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	1.00	0.00	0.00	0.00	0.00	0.00	0.11
28	0.00	0.00	0.17	0.00	0.00	0.00	0.06
29	0.00	0.00	0.00	0.00	0.00	0.00	0.06
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.01
34	0.00	0.00	0.00	0.00	0.00	0.00	0.22
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.08	0.00	0.01	0.00	0.01	0.04	

Table 63a. Mean number of hogfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.00	0.00	0.00	0.00	0.00	0.17	0.00
3	0.00	0.00	0.17	0.17	0.00	0.00	0.17
4	0.00	0.00	0.00	0.00	0.00	0.00	-
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.50	0.17	0.33	0.50	0.00	-
7	0.08	0.17	1.00	0.33	0.00	0.00	-
8	0.00	0.00	0.00	0.00	0.00	0.17	0.00
9	0.00	0.00	0.67	0.00	0.50	0.17	-
10	0.00	0.00	0.00	0.67	1.67	0.83	-
11	0.00	0.00	0.00	0.00	0.00	0.00	-
12	0.00	0.50	0.17	0.17	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.17	0.00
14	0.00	0.33	0.00	0.33	0.67	0.50	0.17
15	0.00	0.00	0.00	0.00	0.00	0.00	-
16	0.00	0.00	0.00	0.00	0.00	0.00	-
17	0.33	0.00	0.17	0.00	0.17	0.17	-
18	0.00	0.00	0.00	0.00	0.00	0.00	-
19	0.00	0.00	0.00	0.00	0.00	0.67	-
20	0.75	1.33	1.20	2.33	0.67	0.83	-
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.50	0.50	0.17	0.00	0.40	0.00
Total	0.05	0.15	0.18	0.21	0.19	0.19	0.04

Table 63a. Mean number of hogfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.02
3	0.00	0.00	0.00	0.00	0.00	0.03
4	0.00	0.00	0.00	0.00	0.00	0.00
5	0.33	0.00	0.00	0.00	0.00	0.03
6	0.00	0.00	0.00	0.00	0.00	0.14
7	0.00	0.00	0.00	0.00	0.00	0.14
8	0.17	0.00	0.00	0.00	0.00	0.03
9	0.17	0.50	0.00	0.00	0.00	0.18
10	0.00	0.00	0.00	0.00	0.00	0.29
11	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.17	0.20	0.00	0.11
13	0.00	0.00	0.00	0.00	0.00	0.02
14	0.00	0.33	0.00	0.17	0.00	0.21
15	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00
17	0.50	0.00	0.17	0.00	0.00	0.14
18	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.06
20	0.67	0.33	0.33	0.00	0.17	0.78
21	0.00	0.00	0.00	0.00	0.00	0.00
22	0.17	0.17	0.00	0.00	0.00	0.17
Total	0.09	0.06	0.03	0.02	0.01	

Table 63b. Mean number of hogfish/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.00	0.00	0.00	0.00	0.00	0.00	
25	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.00	0.00	0.00	0.00	0.00	0.00	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	0.00	0.00	
34	0.00	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	-	0.00	0.00	
Total	0.00	0.00	0.00	0.00	0.00	0.00	

Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	

Table 64a. Mean number of spotted seatrout/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.00	0.00	0.00	0.17	0.00	0.17	0.00
3	0.00	0.00	0.00	1.17	0.00	0.17	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	-
3	0.00	0.17	0.00	0.17	0.17	0.17	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	-
7	0.00	0.00	0.00	0.00	0.00	0.00	-
8	0.00	0.00	0.00	0.00	0.00	0.17	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	-
10	0.00	0.00	0.00	0.00	0.00	0.00	-
11	0.00	0.00	0.00	0.00	0.00	0.33	-
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	-
16	0.00	0.00	0.00	0.00	0.00	0.00	-
17	0.00	0.00	0.00	0.00	0.00	0.00	-
18	0.00	0.00	0.00	0.00	0.00	0.00	-
19	0.00	0.00	0.00	0.00	0.00	0.00	-
20	0.00	0.00	0.00	0.00	0.00	0.00	-
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	-
Total	0.00	0.01	0.00	0.07	0.01	0.05	0.00

Table 64a. Mean number of spotted seatrout/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.03
3	0.00	0.00	0.00	0.00	0.00	0.03
4	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.06
6	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.02
9	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.03
12	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	

Table 64b. Mean number of spotted seatrout/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
21	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.00	0.00	0.00	0.00	0.00	0.00	
23	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.00	0.33	0.00	0.17	0.50	0.33	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	0.00	0.00	
34	0.00	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.00	0.03	0.00	0.01	0.04	0.03	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.17	0.00	0.00	0.01
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.17	0.00	0.00	0.01
28	0.00	0.00	0.17	0.00	0.17	0.17	0.04
29	0.17	1.67	2.67	3.33	3.33	0.00	1.04
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.67	0.00	0.17	0.00	0.07
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.01	0.14	0.29	0.30	0.30	0.01	

Table 65a. Mean number of French grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.00	0.00	0.00	0.00	0.00	0.00	-
3	0.00	0.83	0.17	0.17	0.00	0.00	0.00
4	0.17	0.00	0.00	0.00	0.00	0.00	-
5	0.00	0.00	0.00	0.00	0.00	0.00	0.17
6	0.00	0.00	0.17	0.33	0.17	0.67	-
7	0.00	1.00	1.33	0.17	0.00	0.00	-
8	0.08	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.67	1.33	0.00	0.00	-
10	0.00	0.17	5.67	0.17	6.83	2.33	-
11	0.00	0.00	0.67	0.00	0.00	0.00	-
12	0.58	0.00	0.00	0.00	0.17	0.00	0.00
13	0.08	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.33	0.83	0.00	0.00	0.83	0.00
15	0.33	0.00	0.00	0.00	0.00	0.17	-
16	0.00	0.00	0.00	0.00	0.17	0.00	-
17	0.00	0.00	0.00	0.00	0.00	0.00	-
18	0.00	0.17	0.00	0.00	0.50	0.17	-
19	0.00	0.00	0.17	0.33	0.17	0.00	-
20	0.58	0.00	3.20	0.00	0.00	0.00	-
21	0.17	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	-
Total	0.09	0.11	0.56	0.12	0.36	0.19	0.02

Table 65a. Mean number of French grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.17	0.02
3	0.00	0.00	0.00	0.00	0.00	0.11
4	0.00	0.00	0.00	0.00	0.00	0.02
5	0.00	0.00	0.00	0.00	0.33	0.03
6	0.00	0.00	0.00	0.00	0.00	0.12
7	0.00	0.00	0.00	0.00	0.00	0.23
8	0.00	0.00	0.00	0.00	0.67	0.07
9	0.00	0.00	0.00	0.00	0.00	0.18
10	0.00	0.00	0.00	0.00	0.00	1.38
11	0.00	0.00	0.00	0.00	0.00	0.06
12	0.00	0.00	0.00	0.33	0.00	0.09
13	0.00	0.00	0.00	0.00	0.00	0.04
14	0.00	0.00	0.00	0.00	0.00	0.18
15	0.00	0.00	0.00	0.00	0.00	0.04
16	0.00	0.00	0.00	0.00	0.17	0.03
17	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.07
19	0.00	0.00	0.00	0.00	0.00	0.06
20	0.00	0.00	0.00	0.17	0.00	0.36
21	0.00	0.00	0.00	0.00	0.00	0.02
22	0.00	0.00	0.00	0.00	0.00	0.02
Total	0.00	0.00	0.00	0.01	0.08	

Table 65b. Mean number of French grunts/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.25	0.00	0.00	0.00	0.00	0.00	
25	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.17	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.00	0.00	0.00	0.00	0.00	0.00	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	0.00	0.00	
34	0.00	0.00	0.00	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.03	0.00	0.00	0.00	0.00	0.00	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.17	0.00	0.00	0.00	0.03
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.01
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	

Table 66a. Mean number of tomtate/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.00	0.00	0.00	0.00	0.00	-
2	0.00	0.00	0.00	0.00	0.00	0.00	-
3	0.00	0.00	0.17	0.17	0.00	0.00	0.00
4	0.00	0.00	0.00	0.17	0.00	0.00	-
5	0.00	0.17	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.17	0.17	0.67	0.00	-
7	0.00	0.17	0.00	0.00	0.00	0.33	-
8	0.00	0.00	0.00	0.17	0.00	0.00	0.00
9	0.00	0.33	1.33	0.67	0.17	0.00	
10	0.75	0.83	4.33	3.83	2.83	2.67	-
11	0.00	0.17	0.00	0.00	0.00	0.33	-
12	0.17	0.00	0.00	0.33	0.00	0.17	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	3.33	0.00	0.00	0.17	0.17
15	0.00	0.00	0.00	0.33	0.00	0.00	-
16	0.00	0.00	0.00	0.00	0.00	0.00	-
17	0.00	0.33	0.33	0.00	0.00	0.00	-
18	0.00	0.00	0.00	0.00	0.17	0.00	-
19	0.00	0.00	0.00	0.17	0.00	0.00	-
20	0.00	0.00	0.00	0.33	0.17	t.33	-
21	0.17	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	-
Total	0.09	0.09	0.44	0.30	0.20	0.23	0.02

Table 66a. Mean number of tomtate/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.03
4	0.17	0.00	0.00	0.00	0.00	0.03
5	0.00	0.00	0.00	0.00	0.00	0.02
6	0.33	0.00	0.00	0.00	0.00	0.12
7	0.00	0.00	0.17	0.00	0.00	0.06
8	0.00	0.00	0.00	0.17	0.00	0.03
9	0.00	0.00	0.00	0.00	0.00	0.23
10	0.00	0.17	0.00	0.00	0.17	1.42
11	0.17	0.00	0.00	0.00	0.00	0.06
12	0.00	0.17	0.33	0.00	0.00	0.11
13	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.17	0.35
15	0.00	0.00	0.00	0.00	0.00	0.03
16	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.06
18	0.00	0.00	0.00	0.00	0.00	0.02
19	0.00	0.00	0.00	0.17	0.00	0.03
20	0.00	0.17	0.00	0.08	6.00	0.18
21	0.00	0.00	0.00	0.00	0.00	0.02
22	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.03	0.02	0.02	0.02	0.02	

Table 66b. Mean number of tomtate/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
21	0.00	0.00	0.33	0.00	0.00	0.00	
22	0.00	0.00	0.17	0.17	0.00	0.00	
23	0.33	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.17	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.00	0.17	0.00	0.00	0.00	0.00	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	0.00	0.00	
34	0.17	0.00	0.20	0.00	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.04	0.01	0.07	0.01	0.00	0.00	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
21	0.00	0.00	0.00	0.00	0.00	0.00	0.03
22	0.00	0.00	0.17	0.00	0.00	0.00	0.04
23	0.00	0.00	0.00	0.00	0.00	1.00	0.11
26	0.00	0.00	0.00	0.00	0.67	0.17	0.08
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.01
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.03
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.01	0.00	0.05	0.09	

Table 67a. Mean number of sand perch/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Apr	May	Jun	Jul	Aug	Sep	Oct
1	0.00	0.33	0.00	0.00	0.00	0.00	-
2	0.00	0.00	0.17	0.00	0.00	0.00	0.00
3	0.00	0.00	0.17	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.17	0.00	0.00	-
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.17	0.17	0.17	0.00	0.00	-
7	0.08	0.00	0.00	0.00	0.00	0.00	-
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	-
10	0.17	0.00	0.00	0.00	0.00	0.00	-
11	0.00	0.00	0.00	0.00	0.00	0.00	-
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.12	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	-
16	0.00	0.00	0.00	0.00	0.00	0.00	-
17	0.00	0.00	0.00	0.00	0.00	0.00	-
18	0.00	0.00	0.00	0.00	0.00	0.00	-
19	0.00	0.00	0.17	0.00	0.00	0.00	-
20	0.37	0.33	0.00	0.00	0.33	0.17	-
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.17	0.17	0.00	0.00	-
Total	0.07	0.04	0.04	0.02	0.02	0.01	-

Table 67a. Mean number of sand perch/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983 (cont.).

Sta.	Nov	Dec	Jan	Feb	Mar	Total
1	0.00	0.00	0.00	0.00	0.00	0.03
2	0.00	0.00	0.00	0.00	0.00	0.02
3	0.00	0.00	0.00	0.00	0.00	0.02
4	0.00	0.00	0.00	0.00	0.00	0.02
5	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.05
7	0.17	0.00	0.00	0.00	0.00	0.03
8	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.33	0.00	0.00	0.00	0.03
10	0.00	0.00	0.00	0.00	0.00	0.02
11	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.02
15	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.02
20	0.50	0.33	0.00	0.00	0.00	0.18
21	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.03
Total	0.03	0.03	0.00	0.00	0.00	

Table 67b. Mean number of sand perch/5 min. tow for trawl survey of south Biscayne Bay. 1982 - 1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	0.00	0.00	0.00	0.00	0.00	0.00	
24	0.00	0.00	0.00	0.00	0.00	0.00	
25	0.00	0.00	0.00	0.00	0.00	0.00	
26	0.00	0.00	0.00	0.00	0.00	0.00	
27	0.00	0.00	0.00	0.00	0.00	0.00	
28	0.00	0.00	0.00	0.00	0.00	0.00	
29	0.00	0.00	0.00	0.17	0.00	0.00	
31	0.00	0.00	0.00	0.00	0.00	0.00	
32	0.00	0.00	0.00	0.00	0.00	0.00	
33	0.00	0.00	0.00	0.00	0.00	0.00	
34	0.00	0.00	0.00	0.17	0.00	0.00	
35	0.00	0.00	0.00	0.00	-	0.00	
Total	0.00	0.00	0.00	0.03	0.00	0.00	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	0.00	0.00	0.00	0.00	0.17	0.00	0.01
24	0.00	0.00	0.33	0.17	0.33	0.33	0.10
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.17	0.33	0.17	0.50	0.33	0.12
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.17	0.00	0.01
29	0.00	0.00	0.00	0.00	0.00	0.00	0.01
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00	0.01
35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.01	0.05	0.03	0.10	0.05	

Table 68. Station ranks based on the mean number of individuals of "important" species (stations 1 to 22 do not include October 1982).

	Penaeus spp.		*Callinectes sapidus*		*Callinectes ornatus*		*Panulirus argus*	
Rank	Station	Mean Number	Station	Mean Number	Station	Mean Number	Station	Mean Number
1	29	196.17	21	0.70	18	12.42	21	0.54
2	18	36.42	16	0.62	26	5.61	7	0.48
3	11	35.45	18	0.52	21	5.36	10	0.37
4	22	32.51	1	0.35	33	4.60	8	0.36
5	8	30.26	2	0.25	16	4.39	9	0.28
6	33	28.51	11	0.20	32	3.33	22	0.27
7	24	28.32	26	0.19	8	3.30	24	0.20
8	2	24.96	13	0.18	13	2.47	20	0.19
9	21	24.45	4	0.15	3	2.42	5	0.18
10	13	22.47	3	0.14	11	2.29	12	0.17
11	16	22.21	7	0.11	5	2.09	14	0.17
12	32	21.40	8	0.09	2	1.95	19	0.17
13	5	21.08	5	0.08	19	1.56	23	0.15
14	6	19.39	14	0.08	14	1.39	2	0.10
15	19	18.98	15	0.08	34	1.24	1	0.08
16	27	18.23	19	0.08	31	1.15	3	0.07
17	3	17.24	20	0.08	7	1.09	18	0.06
18	14	16.54	25	0.07	15	1.06	11	0.05
19	31	14.23	6	0.04	6	0.94	17	0.05
20	20	13.24	33	0.04	28	0.90	6	0.04
21	28	12.53	17	0.03	1	0.83	25	0.04
22	9	11.74	22	0.03	27	0.72	4	0.03
23	34	9.09	9	0.02	22	0.61	15	0.03
24	7	9.03	12	0.02	24	0.58	26	0.03
25	35	8.03	24	0.02	17	0.52	27	0.03
26	10	7.98	23	0.01	25	0.38	13	0.02
27	26	6.42	31	0.01	4	0.33	16	0.02
28	1	6.09	34	0.01	29	0.31	32	0.01
29	25	5.44	10	0.00	20	0.25	34	0.01
30	12	4.99	27	0.00	9	0.15	28	0.00
31	23	4.89	28	0.00	12	0.13	29	0.00
32	17	3.91	29	0.00	23	0.13	31	0.00
33	15	2.38	32	0.00	10	0.09	33	0.00
34	4	1.95	35	0.00	35	0.03	35	0.00

Table 69. Station ranks based on the mean number of individuals of "important" species (stations 1 to 22 do not include October 1982).

	Lutjanus griseus		*Lutjanus synagris*		*Ocyurus chrysurus*		*Lutjanus analis*	
Rank	Station	Mean Number	Station	Mean Number	Station	Mean Number	Station	Mean Number
1	5	0.80	20	0.54	10	0.96	6	0.14
2	29	0.77	6	0.29	6	0.52	9	0.11
3	18	0.66	14	0.23	7	0.42	19	0.09
4	22	0.64	22	0.20	14	0.28	3	0.08
5	11	0.40	9	0.17	9	0.20	22	0.08
6	8	0.35	7	0.14	3	0.14	14	0.06
7	13	0.33	19	0.11	20	0.14	2	0.03
8	19	0.29	3	0.04	4	0.09	18	0.03
9	2	0.24	5	0.04	24	0.06	21	0.03
10	9	0.24	33	0.04	28	0.04	10	0.02
11	16	0.19	10	0.03	5	0.03	11	0.02
12	14	0.15	21	0.03	12	0.03	13	0.02
13	31	0.15	4	0.02	22	0.03	16	0.02
14	21	0.14	8	0.02	2	0.02	20	0.02
15	6	0.12	11	0.02	8	0.02	24	0.01
16	7	0.11	12	0.02	11	0.02	26	0.01
17	32	0.07	17	0.02	19	0.02	32	0.01
18	3	0.06	18	0.02	23	0.01	1	0.00
19	4	0.05	24	0.01	1	0.00	4	0.00
20	20	0.05	25	0.01	13	0.00	5	0.00
21	24	0.05	28	0.01	15	0.00	7	0.00
22	10	0.04	29	0.01	16	0.00	8	0.00
23	33	0.03	34	0.01	17	0.00	12	0.00
24	15	0.01	1	0.00	18	0.00	15	0.00
25	1	0.00	2	0.00	21	0.00	17	0.00
26	12	0.00	13	0.00	25	0.00	23	0.00
27	17	0.00	15	0.00	26	0.00	24	0.00
28	23	0.00	16	0.00	27	0.00	27	0.00
29	25	0.00	23	0.00	29	0.00	28	0.00
30	26	0.00	26	0.00	31	0.00	29	0.00
31	27	0.00	27	0.00	32	0.00	31	0.00
32	28	0.00	31	0.00	33	0.00	33	0.00
33	34	0.00	32	0.00	34	0.00	34	0.00
34	35	0.00	35	0.00	35	0.00	35	0.00

Table 70. Station ranks based on the mean number of individuals of "important" species (stations 1 to 22 do not include October 1982).

	Haemulon plumieri		*Haemulon sciurus*		*Orthopristis chrysoptera*		*Lagodon rhomboides*	
Rank	Station	Mean Number	Station	Mean Number	Station	Mean Number	Station	Mean Number
1	10	19.11	29	8.11	6	1.07	18	34.57
2	9	3.78	10	3.92	24	1.01	16	22.31
3	14	3.45	14	2.46	3	0.95	13	19.37
4	24	2.03	7	1.78	29	0.79	29	16.36
5	8	1.98	18	1.70	7	0.61	11	12.57
6	11	1.97	22	1.66	27	0.49	5	8.25
7	7	1.84	11	1.61	14	0.48	22	8.17
8	6	1.32	19	1.38	2	0.37	21	5.71
9	29	1.29	6	1.32	32	0.36	9	5.44
10	20	1.22	20	1.28	9	0.33	8	5.25
11	22	1.14	9	1.09	22	0.26	14	4.30
12	19	1.10	13	1.04	28	0.25	6	3.44
13	28	0.89	8	0.73	31	0.18	19	2.79
14	5	0.72	16	0.66	13	0.17	7	2.63
15	12	0.40	27	0.47	11	0.12	3	2.06
16	27	0.33	5	0.41	12	0.12	2	1.88
17	3	0.26	3	0.32	5	0.9	27	1.52
18	4	0.19	34	0.30	10	0.09	20	0.87
19	13	0.18	24	0.23	18	0.09	17	0.66
20	18	0.17	21	0.21	19	0.09	24	0.60
21	2	0.16	28	0.19	20	0.09	28	0.50
22	21	0.15	15	0.13	16	0.08	10	0.46
23	34	0.15	31	0.11	23	0.07	12	0.34
24	16	0.08	2	0.09	17	0.06	15	0.23
25	25	0.08	33	0.09	8	0.05	1	0.20
26	1	0.07	32	0.08	1	0.04	32	0.15
27	31	0.07	12	0.05	4	0.04	4	0.05
28	17	0.06	26	0.04	25	0.04	31	0.03
29	23	0.03	1	0.03	26	0.03	25	0.01
30	26	0.03	4	0.03	33	0.03	26	0.01
31	15	0.01	23	0.03	21	0.01	33	0.01
32	33	0.01	17	0.02	35	0.01	34	0.01
33	32	0.00	25	0.00	15	0.00	23	0.00
34	35	0.00	35	0.00	34	0.00	35	0.00

Table 71. Station ranks based on the mean number of individuals of "important" species (stations 1 to 22 do not include October 1982).

	Cynoscion nebulosus		*Lachnolaimus maximus*		*Opsanus beta*		*Eucinostomus gula*	
Rank	Station	Mean Number	Station	Mean Number	Station	Mean Number	Station	Mean Number
1	29	1.04	20	0.78	29	8.83	18	12.23
2	3	0.12	10	0.29	11	4.04	29	9.33
3	32	0.07	14	0.21	22	4.04	5	4.92
4	5	0.06	9	0.18	18	2.63	16	4.77
5	28	0.04	22	0.17	10	2.39	13	4.59
6	2	0.03	6	0.14	13	2.29	2	3.46
7	11	0.03	7	0.14	8	2.21	32	3.43
8	8	0.02	17	0.14	16	1.64	8	3.34
9	24	0.01	12	0.11	5	1.22	11	2.70
10	27	0.01	19	0.06	14	1.19	35	2.52
11	1	0.00	3	0.03	9	1.11	24	2.42
12	4	0.00	5	0.03	7	0.83	27	1.70
13	6	0.00	8	0.03	24	0.62	31	1.67
14	7	0.00	2	0.02	21	0.55	28	1.49
15	9	0.00	13	0.02	19	0.50	3	1.45
16	10	0.00	1	0.00	20	0.49	6	1.27
17	12	0.00	4	0.00	6	0.46	22	1.13
18	13	0.00	11	0.00	2	0.39	19	0.85
19	14	0.00	15	0.00	3	0.34	33	0.81
20	15	0.00	16	0.00	4	0.15	1	0.72
21	16	0.00	18	0.00	26	0.13	9	0.68
22	17	0.00	21	0.00	27	0.09	14	0.58
23	18	0.00	23	0.00	1	0.06	7	0.49
24	19	0.00	24	0.00	15	0.0	21	0.43
25	20	0.00	25	0.00	28	0.03	26	0.36
26	21	0.00	26	0.00	34	0.03	20	0.27
27	22	0.00	27	0.00	12	0.01	34	0.13
28	23	0.00	28	0.00	17	0.01	15	0.06
29	25	0.00	29	0.00	32	0.01	17	0.06
30	26	0.00	31	0.00	23	0.00	4	0.05
31	31	0.00	32	0.00	25	0.00	25	0.03
32	33	0.00	33	0.00	31	0.00	23	0.01
33	34	0.00	34	0.00	33	0.00	10	0.00
34	35	0.00	35	0.00	35	0.00	12	0.00

Table 72. Station ranks based on the mean number of individuals of "important" species (stations 1 to 22 do not include October 1982).

	Haemulon aurolineatum		*Haemulon flavolineatum*		*Haemulon parrai*		*Diplectrum formosum*	
Rank	Station	Mean Number	Station	Mean Number	Station	Mean Number	Station	Mean Number
1	10	1.42	10	1.38	7	1.41	20	0.18
2	14	0.35	20	0.36	10	1.29	26	0.12
3	9	0.23	7	0.23	22	0.78	24	0.10
4	20	0.18	9	0.18	20	0.67	6	0.05
5	6	0.12	14	0.18	9	0.43	1	0.03
6	12	0.11	6	0.12	14	0.38	7	0.03
7	25	0.11	3	0.11	6	0.33	9	0.03
8	26	0.08	12	0.09	24	0.33	22	0.03
9	7	0.06	8	0.07	12	0.23	2	0.02
10	17	0.06	18	0.07	34	0.22	3	0.02
11	11	0.06	11	0.06	16	0.21	4	0.02
12	24	0.04	19	0.06	18	0.21	10	0.02
13	3	0.03	13	0.04	8	0.20	14	0.02
14	4	0.03	15	0.04	19	0.18	19	0.02
15	8	0.03	5	0.03	11	0.16	23	0.01
16	15	0.03	16	0.03	27	0.11	28	0.01
17	19	0.03	24	0.03	3	0.09	29	0.01
18	23	0.03	2	0.02	5	0.06	34	0.00
19	34	0.03	4	0.02	28	0.06	5	0.00
20	5	0.02	21	0.02	29	0.06	8	0.00
21	18	0.02	22	0.02	2	0.05	11	0.00
22	21	0.02	26	0.01	13	0.05	12	0.00
23	29	0.01	1	0.00	15	0.03	13	0.00
24	1	0.00	17	0.00	17	0.03	15	0.00
25	2	0.00	23	0.00	33	0.01	16	0.00
26	13	0.00	25	0.00	1	0.00	17	0.00
27	16	0.00	27	0.00	4	0.00	18	0.00
28	22	0.00	28	0.00	21	0.00	21	0.00
29	27	0.00	29	0.00	23	0.00	25	0.00
30	28	0.00	31	0.00	25	0.00	27	0.00
31	31	0.00	32	0.00	26	0.00	31	0.00
32	32	0.00	33	0.00	31	0.00	32	0.00
33	33	0.00	34	0.00	32	0.00	33	0.00
34	35	0.00	35	0.00	35	0.00	35	0.00

Table 73a. Mean biomass of crustaceans/5 min. tow for trawl survey of south Biscayne Bay, 1982 - 1983.

	Apr 82	May	June	July	Aug	Sep	Oct
1	78.5	59.3	182.5	123.1	93.8	187.4	-
2	58.7	103.4	257.7	139.1	23.2	86.4	58.9
3	92.6	121.0	62.2	200.2	251.7	203.9	233.9
4	53.1	2.0	29.9	96.9	97.9	120.6	-
5	22.1	37.5	42.1	202.9	60.5	139.8	113.5
6	121.7	137.7	104.9	39.6	54.2	77.8	-
7	204.4	121.1	288.0	81.2	105.8	436.3	-
8	147.0	487.1	192.7	247.0	218.7	139.0	58.3
9	149.4	48.0	91.6	71.2	54.0	43.3	-
10	269.0	230.4	212.0	204.4	171.3	93.2	-
11	331.4	181.5	222.4	243.4	33.4	320.1	-
12	52.5	37.7	86.3	21.0	62.1	15.1	4.1
13	112.1	153.0	75.4	153.4	145.7	219.3	104.4
14	146.0	212.9	103.5	166.1	161.4	175.3	168.8
15	68.7	94.3	40.8	50.9	90.8	115.3	-
16	177.5	102.8	133.8	83.7	133.9	99.8	-
17	57.8	67.5	28.5	55.1	53.2	18.4	-
18	228.0	167.5	183.7	220.2	267.2	253.8	-
19	122.8	48.1	96.7	45.5	106.0	86.6	-
20	125.5	103.0	54.2	52.0	27.1	118.2	-
21	207.8	233.2	272.1	307.2	217.1	163.3	115.5
22	96.3	124.1	110.2	93.4	88.8	80.5	-
Total	132.9	130.6	130.5	131.7	114.4	145.2	107.1

Table 73a. Mean biomass of crustaceans/5 min. tow for trawl survey of south Biscayne Bay, 1982 - 1983 (cont.).

	Nov	Dec	Jan	Feb	Mar	Total a◊
1	81.2	74.7	32.5	89.2	69.4	97.4
2	390.1	484.2	243.1	124.8	47.4	178.0
3	221.9	308.5	113.2	139.0	104.3	165.3
4	22.6	0.3	26.4	6.2	5.8	41.9
5	149.4	159.9	79.6	119.9	178.4	108.4
6	119.7	199.0	185.5	201.6	146.4	126.2
7	148.8	114.0	13.5	33.7	21.1	142.5
8	173.8	247.4	112.0	49.1	179.7	199.4
9	93.3	92.8	43.3	111.1	164.5	87.5
10	119.0	130.3	97.1	96.4	87.2	155.5
11	555.5	91.1	55.9	182.0	168.6	216.8
12	30.4	29.6	71.0	50.7	103.2	51.8
13	211.0	37.0	18.0	58.7	244.4	129.8
14	188.1	108.9	102.3	81.0	79.2	138.6
15	51.7	68.3	24.1	21.1	16.3	58.4
16	213.4	203.6	208.9	294.5	63.0	155.9
17	36.7	22.6	63.9	80.7	32.9	47.0
18	360.7	387.0	119.3	294.4	26.1	228.0
19	72.6	286.2	213.8	214.2	291.9	144.0
20	36.7	115.6	117.4	83.0	156.1	89.9
21	216.3	213.2	206.2	174.4	101.1	210.2
22	156.2	201.0	192.2	152.9	133.9	130.0
Total	165.9	162.5	106.3	120.8	110.0	

◊ Total a - Overall station mean, not including October 1982 (from April 1982 to March 1983).

Table 73a. Mean biomass of crustaceans/5 min. tow for trawl survey of south Biscayne Bay, 1982 - 1983 (cont.).

	Apr	May	June	July	Aug	Sep	Total b$^{\Delta}$
1	-	-	-	-	-	-	
2	-	-	-	-	-	-	
3	-	-	-	-	-	-	
4	-	-	-	-	-	-	
5	139.0	192.8	324.5	235.7	246.7	168.3	147.0
6	142.8	148.3	163.6	129.9	74.6	116.2	127.3
7	-	-	-	-	-	-	
8	176.4	142.5	223.4	210.5	233.1	91.2	192.4
9	-	-	-	-	-	-	
10	99.2	82.1	198.1	137.7	106.1	130.8	143.0
11	-	-	-	-	-	-	
12	-	-	-	-	-	-	
13	-	-	-	-	-	-	
14	-	-	-	-	-	-	
15	-	-	-	-	-	-	
16	-	-	-	-	-	-	
17	-	-	-	-	-	-	
18	-	-	-	-	-	-	
19	-	-	-	-	-	-	
20	-	-	-	-	-	-	
21	-	-	-	-	-	-	
22	-	-	-	-	-	-	
Total	129.4	142.4	227.4	178.4	165.1	126.6	

$^{\Delta}$ Total b - Overall station mean, not including October 1982 for stations 5,6,8 and 10 (April 1982 to September 1983).

Table 73b. Mean biomass of crustaceans/5 min. tow for trawl survey of north Biscayne Bay. 1982-1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	62.8	23.3	117.3	28.0	13.8	37.9	
24	26.0	222.6	82.6	54.9	126.6	131.0	
25	129.5	18.8	57.0	29.5	61.7	6.4	
26	169.0	112.3	97.1	88.0	210.8	57.0	
27	206.0	71.0	32.5	15.8	48.1	36.5	
28	33.3	21.1	9.6	16.6	11.9	45.0	
29	183.8	506.8	456.3	685.5	233.5	460.0	
31	96.4	26.0	41.7	25.6	25.3	22.3	
32	84.5	39.6	60.5	31.9	21.8	25.6	
33	69.9	74.1	90.9	44.7	152.5	91.7	
34	98.8	44.6	47.2	85.4	26.1	28.0	
35	0.0	1.1	1.2	1.1	-	5.5	
Total	96.7	96.8	91.2	92.2	84.7	78.9	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	1.5	9.6	73.0	170.4	30.6	255.4	68.6
24	86.0	35.5	227.6	212.4	109.6	231.2	128.8
25	18.5	142.6	37.0	12.8	41.6	82.9	53.2
26	92.8	76.5	117.2	73.2	145.0	94.5	111.1
27	155.9	23.5	52.9	51.9	69.5	66.4	69.2
28	35.3	28.9	80.3	77.3	116.3	172.6	54.0
29	521.6	741.7	254.9	366.7	647.4	306.1	447.0
31	15.9	28.2	59.5	26.3	43.2	35.5	37.2
32	43.4	40.0	158.9	142.5	59.7	36.3	62.1
33	70.2	19.2	71.7	93.1	209.2	170.5	96.5
34	6.9	33.2	55.4	148.3	63.3	77.2	59.5
35	9.2	11.4	26.1	7.3	19.9	5.4	8.8
Total	88.1	99.2	101.2	115.1	129.6	127.8	

Table 74a. Mean biomass of fish/5 min. tow for trawl survey of south Biscayne Bay, 1982 - 1983.

	Apr 82	May	June	July	Aug	Sep	Oct
1	24.3	203.0	33.1	36.1	8.3	108.5	-
2	132.3	560.1	598.9	206.4	172.5	395.0	75.7
3	183.9	391.1	566.4	275.0	70.3	392.4	106.7
4	74.0	12.9	0	197.5	280.8	17.0	-
5	27.7	119.5	139.8	622.4	217.8	418.4	453.4
6	197.1	416.9	657.0	554.2	506.9	368.4	-
7	448.9	595.0	1299.4	1021.4	336.2	691.3	-
8	538.3	372.4	402.7	357.3	225.2	658.6	272.9
9	539.8	338.1	106.0	406.4	484.0	515.2	-
10	362.4	460.7	739.3	597.3	725.6	650.3	-
11	526.1	614.5	392.0	395.2	148.7	1037.3	-
12	128.6	167.7	163.9	123.5	107.2	163.3	77.9
13	358.9	529.5	451.9	565.8	1308.3	1253.3	361.4
14	354.5	183.3	358.3	753.9	338.9	625.1	706.4
15	68.8	42.9	25.7	14.7	50.7	80.5	-
16	583.7	337.6	423.7	645.6	597.1	448.7	-
17	42.0	115.3	65.4	65.3	69.3	158.0	-
18	335.1	673.9	705.4	304.5	784.7	775.1	-
19	106.8	155.1	426.0	149.1	151.8	222.6	-
20	173.8	241.3	260.2	256.8	183.9	429.4	-
21	190.9	172.0	223.7	251.1	163.7	146.1	61.4
22	362.7	530.0	919.5	289.6	548.7	299.7	-
Total	261.8	328.7	450.6	367.7	340.0	447.9	264.5

Table 74a. Mean biomass of fish/5 min. tow for trawl survey of south Biscayne Bay, 1982 - 1983 (cont.).

	Nov	Dec	Jan	Feb	Mar	Total a◊
1	64.1	43.3	42.7	47.0	14.7	56.8
2	353.1	317.8	63.4	27.8	114.8	267.5
3	727.3	453.3	164.4	99.9	78.4	309.3
4	49.1	38.0	4.0	20.1	2.7	63.2
5	1361.5	663.5	200.7	179.4	227.6	379.8
6	473.8	437.2	62.7	318.4	192.3	380.4
7	514.5	595.6	207.2	233.2	59.5	545.6
8	283.4	174.4	38.4	43.5	103.1	290.7
9	448.5	728.3	34.3	224.9	164.9	449.5
10	688.5	322.8	109.8	257.4	93.5	455.2
11	1090.4	108.3	166.5	242.4	42.3	433.1
12	182.8	64.6	57.3	4.3	109.3	115.7
13	516.5	154.1	132.9	82.2	73.7	493.4
14	280.4	117.2	175.9	85.8	62.7	303.3
15	39.2	78.6	100.4	12.9	27.4	49.2
16	409.5	452.0	345.0	420.9	44.8	428.0
17	77.8	131.8	319.5	31.2	69.4	104.1
18	1165.3	366.3	171.1	381.9	11.8	515.9
19	107.7	134.5	91.8	59.6	96.9	154.7
20	281.6	369.8	317.8	26.2	52.7	235.8
21	131.2	113.2	315.5	64.0	59.5	166.4
22	620.0	810.0	334.0	144.6	295.8	468.6
Total	448.5	303.4	157.1	136.7	90.8	

◊ Total a - Overall station mean, not including October 1982 (from April 1982 to March 1983).

Table 74a. Mean biomass of fish/5 min. tow for trawl survey of south Biscayne Bay, 1982 - 1983 (cont.).

	Apr	May	June	July	Aug	Sep	Total b$^{\Delta}$
1	-	-	-	-	-	-	
2	-	-	-	-	-	-	
3	-	-	-	-	-	-	
4	-	-	-	-	-	-	
5	235.2	407.7	580.3	517.2	557.4	183.7	391.8
6	229.2	155.3	739.3	704.4	655.4	493.9	421.3
7	-	-	-	-	-	-	
8	91.4	136.2	476.0	419.0	373.1	160.6	285.5
9	-	-	-	-	-	-	
10	120.1	293.3	473.9	299.8	791.2	496.3	440.1
11	-	-	-	-	-	-	
12	-	-	-	-	-	-	
13	-	-	-	-	-	-	
14	-	-	-	-	-	-	
15	-	-	-	-	-	-	
16	-	-	-	-	-	-	
17	-	-	-	-	-	-	
18	-	-	-	-	-	-	
19	-	-	-	-	-	-	
20	-	-	-	-	-	-	
21	-	-	-	-	-	-	
22	-	-	-	-	-	-	
Total	169.0	248.1	567.4	485.1	594.3	333.6	

$^{\Delta}$ Total b - Overall station mean, not including October 1982 for stations 5,6,8 and 10 (April 1982 to September 1983).

Table 74b. Mean biomass of fish/5 min. tow for trawl survey of north Biscayne Bay. 1982-1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	82.9	98.1	214.6	52.8	5.8	9.1	
24	85.4	320.5	1311.7	262.8	82.6	108.7	
25	24.4	1.0	53.5	27.8	1.9	0.0	
26	60.1	68.8	51.3	61.5	43.1	47.3	
27	324.2	231.6	201.5	29.3	21.5	15.3	
28	158.4	48.3	68.3	13.9	14.0	0.0	
29	1083.6	1581.7	1137.1	1139.4	1312.3	1490.3	
31	240.7	53.5	69.0	7.9	143.7	29.4	
32	119.6	49.3	46.5	27.2	53.6	16.9	
33	76.8	106.8	145.2	590.8	123.5	38.4	
34	187.2	0.8	19.7	13.9	59.4	62.0	
35	0.0	120.4	0.6	0.0	-	0.0	
Total	203.6	223.4	276.8	185.6	169.2	151.4	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	10.6	25.2	56.2	70.2	58.3	35.3	59.9
24	250.0	278.0	232.7	281.2	507.2	439.6	346.7
25	4.2	0.0	18.6	1.3	22.4	145.5	25.1
26	67.1	140.7	131.0	18.3	50.2	77.3	68.1
27	555.5	6.7	3.9	67.8	50.1	221.7	144.1
28	1.6	59.6	23.1	168.7	173.0	192.0	76.7
29	1375.2	1011.4	1466.8	1406.4	3467.0	3452.5	1660.3
31	114.9	1.2	39.7	35.5	42.3	88.4	72.2
32	91.2	14.5	171.1	193.8	162.8	91.2	86.7
33	7.8	451.1	124.1	56.7	54.4	73.5	154.1
34	4.4	2.7	35.9	160.5	8.8	33.1	50.9
35	2.3	2.8	19.5	3.3	150.4	13.9	31.3
Total	207.1	166.2	195.4	205.3	391.8	405.3	

Table 75a. Mean biomass of total fauna/5 min. tow for trawl survey of north Biscayne Bay. 1982-1983.

	Apr 82	May	June	July	Aug	Sep	Oct
1	102.8	262.3	215.5	159.3	102.1	295.9	-
2	191.0	663.5	856.6	345.5	195.7	481.4	134.6
3	276.5	512.1	628.6	475.2	321.9	596.4	340.2
4	127.0	14.5	29.9	294.4	378.7	137.6	-
5	49.7	157.0	181.9	825.3	278.3	558.2	566.9
6	318.8	554.7	762.0	593.8	561.0	446.2	-
7	653.3	716.1	1587.4	1102.6	442.0	1127.6	-
8	685.3	859.5	595.4	604.3	444.0	797.6	331.2
9	689.2	386.1	1151.7	477.6	538.0	558.5	-
10	631.5	691.1	951.2	801.7	896.9	743.5	-
11	857.4	796.1	614.4	638.5	182.1	1357.5	-
12	181.1	205.4	250.2	144.5	169.3	178.4	81.9
13	471.0	682.5	527.3	719.2	1454.1	1472.6	465.8
14	500.6	396.2	461.9	920.1	500.3	800.4	875.2
15	137.5	137.2	66.6	65.6	141.5	195.7	-
16	761.2	440.5	557.4	729.4	731.0	548.5	-
17	99.8	182.9	93.9	120.4	122.5	176.4	-
18	563.1	841.5	889.1	524.7	1052.0	1028.9	-
19	229.5	203.2	522.7	194.6	257.8	309.2	-
20	299.3	344.3	314.4	308.9	211.0	547.6	-
21	398.8	405.2	495.9	558.3	380.8	309.4	177.0
22	459.0	654.1	1029.6	383.0	637.5	380.2	-
Total	394.7	459.4	581.1	499.4	454.5	593.1	371.6

Table 75a. Mean biomass of total fauna/5 min. tow for trawl survey of north Biscayne Bay. 1982-1983 (cont.).

	Nov	Dec	Jan	Feb	Mar	Total a◊
1	145.5	118.0	75.2	136.2	84.2	154.2
2	743.2	802.8	306.5	152.7	162.2	445.2
3	949.2	761.8	277.6	238.9	182.6	474.6
4	71.7	38.3	30.4	26.3	8.5	105.2
5	1510.9	823.4	280.3	299.3	406.0	488.2
6	593.6	636.2	248.2	520.1	338.7	506.7
7	663.3	709.6	220.7	267.0	80.6	688.2
8	457.2	421.8	150.4	92.7	282.8	490.1
9	541.9	821.1	77.6	336.0	329.5	537.0
10	807.5	453.1	206.9	353.8	180.7	610.7
11	1645.9	199.4	222.3	424.4	210.9	649.9
12	213.2	94.1	128.3	55.0	212.6	166.6
13	727.5	191.1	150.9	140.8	318.2	623.2
14	468.6	226.2	278.2	166.8	141.9	441.9
15	90.9	147.0	124.5	34.0	43.8	107.7
16	622.9	655.6	553.9	715.4	107.8	584.0
17	114.5	154.3	383.4	112.0	102.3	151.0
18	1526.0	753.3	290.4	676.3	37.9	743.9
19	180.3	420.7	305.5	273.8	388.8	298.7
20	318.3	485.6	435.1	109.2	208.8	325.7
21	347.5	326.4	521.7	238.4	160.7	376.6
22	776.2	1011.0	526.2	297.5	429.7	598.5
Total	614.4	465.9	263.4	257.6	200.2	

◊ Total a - Overall station mean, not including October 1982 (from April 1982 to March 1983).

Table 75a. Mean biomass of total fauna/5 min. tow for trawl survey of north Biscayne Bay. 1982-1983 (cont.).

	Apr	May	June	July	Aug	Sep	Total b$^{\Delta}$
1	-	-	-	-	-	-	
2	-	-	-	-	-	-	
3	-	-	-	-	-	-	
4	-	-	-	-	-	-	
5	374.2	600.5	904.8	752.9	804.2	352.0	538.8
6	372.0	303.6	902.9	834.3	730.0	610.0	548.6
7	-	-	-	-	-	-	
8	267.8	278.7	699.5	629.5	606.2	251.8	477.9
9	-	-	-	-	-	-	
10	179.3	381.4	672.0	437.5	897.3	627.1	583.1
11	-	-	-	-	-	-	
12	-	-	-	-	-	-	
13	-	-	-	-	-	-	
14	-	-	-	-	-	-	
15	-	-	-	-	-	-	
16	-	-	-	-	-	-	
17	-	-	-	-	-	-	
18	-	-	-	-	-	-	
19	-	-	-	-	-	-	
20	-	-	-	-	-	-	
21	-	-	-	-	-	-	
22	-	-	-	-	-	-	
Total	298.3	391.0	794.8	663.6	759.4	460.2	

$^{\Delta}$ Total b - Overall station mean, not including October 1982 for stations 5,6,8 and 10 (April 1982 to September 1983).

Table 75b. Mean biomass of total fauna/5 min. tow for trawl survey of north Biscayne Bay. 1982-1983.

Sta.	Oct	Nov	Dec	Jan	Feb	Mar	
23	145.8	121.5	331.9	80.8	19.5	47.0	
24	111.3	543.1	1394.3	317.17	209.2	239.8	
25	154.0	19.8	110.5	57.3	63.6	6.4	
26	229.1	181.2	148.4	149.4	253.9	104.3	
27	530.1	302.7	233.9	45.1	69.7	51.8	
28	191.6	69.4	77.9	30.5	26.0	45.0	
29	1267.3	2088.5	1593.4	1824.8	1545.8	1950.3	
31	337.1	79.5	110.8	33.5	169.0	51.7	
32	204.2	88.9	109.9	59.1	75.4	42.5	
33	146.7	180.9	236.1	635.5	276.0	130.1	
34	286.0	45.4	66.9	99.3	85.4	90.0	
35	0.0	120.4	0.6	0.0	-	5.5	
Total	300.3	320.1	367.9	277.8	254.0	230.4	
Sta.	Apr	May	Jun	Jul	Aug	Sep	Total
23	12.1	34.7	129.2	240.6	88.9	290.7	128.6
24	336.0	313.4	460.3	493.6	616.8	670.8	475.5
25	22.7	142.6	55.6	14.2	64.1	228.3	78.3
26	159.9	217.2	248.2	91.5	195.2	171.8	179.2
27	711.4	30.2	56.8	119.7	119.6	288.1	213.3
28	36.9	88.6	103.4	246.0	289.3	364.6	130.8
29	1896.8	1753.1	1721.7	1772.7	4114.4	3758.5	2107.3
31	130.8	29.5	99.2	61.8	85.4	123.9	109.3
32	134.6	54.5	330.0	336.3	222.6	127.5	148.8
33	78.0	470.3	195.8	149.8	263.6	244.0	250.6
34	11.3	35.9	113.4	308.8	72.1	110.3	110.4
35	11.5	14.1	45.5	10.6	170.3	19.2	40.1
Total	295.2	265.3	296.6	320.5	525.2	533.1	

Table 76. Summary of stepwise multiple regression of the mean abundance of 20 species and weight of all fish and all crustaceans, on 10 abiotic variables. Only regressions significant at the α = 0.05 level are included. For each species, the upper row is the percent variation explained by the variable. The lower row of numbers in parentheses is the standardized regression coefficient.

	Mean Salinity (‰)	Std. deviation Salinity	Mean Turbidity (NTU)	Std. deviation Turbidity	Mean Color (PCU)	Mean fecal coliform (no./100 mL)
Lutjanus analis	0.7 (0.324)	2.2 (0.302)	- -	1.0 (-0.126)	0.3 (0.087)	0.2 (0.051)
Lutjanus griseus	- -	0.5 (-0.108)	9.9 (-0.507)	0.6 (0.176)	5.7 (0.182)	- -
Lutjanus synagris	12.7 (0.748)	14.1 (0.667)	0.4 (0.064)	- -	0.3 (0.102)	0.9 (0.105)
Ocyurus chrysurus	0.1 (0.051)	- -	1.1 (0.211)	2.3 (0.006)	- -	- -
Haemulon aurolineatum	8.3 (0.147)	- -	0.3 (0.110)	18.6 (0.162)	- -	- -
Haemulon flavolineatum	13.7 (0.180)	- -	1.0 (0.184)	- -	- -	- -
Haemulon parra	- -	1.8 (0.118)	- -	- -	1.4 (0.278)	0.9 (0.122)
Haemulon plumieri	3.6 (-0.037)	- -	1.1 (-0.001)	- -	- -	0.6 (0.077)
Haemulon sciurus	- -	2.6 (-0.276)	1.3 (-0.308)	1.2 (0.183)	- -	0.3 (-0.048)
Orthopristis chrysoptera	- -	3.4 (-0.168)	1.9 (0.381)	1.2 (-0.407)	0.1 (0.049)	18.7 (0.402)

Table 76. Summary of stepwise multiple regression of the mean abundance of 20 species and weight of all fish and all crustaceans, on 10 abiotic variables. Only regressions significant at the α = 0.05 level are included. For each species, the upper row is the percent variation explained by the variable. The lower row of numbers in parentheses is the standardized regression coefficient (cont.).

	Water depth (ft)	Median sediment size (phi)	Bottom type 1	Bottom type 2	Cumulative* R
Lutjanus analis	14.5 (0.362)	0.1 (0.037)	43.5 (0.719)	0.7 (-0.149)	63.2 -
Lutjanus griseus	1.8 (-0.162)	0.4 (-0.077)	34.4 (0.696)	1.4 (-0.264)	54.7 -
Lutjanus synagris	4.2 (0.204)	7.4 (0.237)	18.6 (0.378)	- -	58.6 -
Ocyurus chrysurus	7.3 (0.256)	16.8 (0.334)	23.6 (0.480)	1.9 (0.201)	53.1 -
Haemulon aurolineatum	0.9 (0.114)	4.6 (0.349)	8.4 (0.282)	0.8 (0.231)	41.9 -
Haemulon flavolineatum	0.8 (0.104)	12.4 (0.400)	9.2 (0.348)	1.3 (0.243)	38.4 -
Haemulon parra	14.5 (0.403)	6.9 (0.400)	10.4 (0.265)	3.7 (0.124)	41.6 -
Haemulon plumieri	- -	10.7 (0.310)	16.8 (0.394)	- -	32.8 -
Haemulon sciurus	2.3 (-0.253)	- -	30.8 (0.687)	3.7 (-0.354)	42.4 -
Orthopristis chrysoptera	0.2 (0.060)	1.4 (-0.142)	15.0 (0.573)	8.2 (-0.167)	50.1 -

* Cumulative percent of total variation in mean number (mean weight) explained by the abiotic variables.

Table 77. Simple correlation coefficients between mean number (mean wt.) of species and abiotic variables.

	Mean Salinity (‰)	Std. deviation Salinity	Mean Turbidity (NTU)	Std. deviation Turbidity	Mean Color (PCU)	Mean fecal coliform (no./100 mL)
Lutjanus analis	0.227	0.059	0.053	0.234	-0.228	-0.123
Lutjanus griseus	-0.196	0.257	-0.289	-0.006	0.106	-0.069
Lutjanus synagris	0.413	0.107	0.092	0.300	-0.334	-0.133
Ocyurus chrysurus	0.376	-0.223	0.364	0.431	-0.291	-0.061
Haemulon aurolineatum	0.404	-0.244	0.342	0.431	-0.286	-0.076
Haemulon flavolineatum	0.370	-0.150	0.220	0.299	-0.289	-0.091
Haemulon parra	0.372	-0.101	0.102	0.220	-0.361	-0.033
Haemulon plumieri	0.313	-0.208	0.252	0.339	-0.274	0.005
Haemulon sciurus	0.094	-0.106	0.040	0.222	-0.125	-0.093
Orthopristis chrysoptera	-0.036	-0.218	0.243	0.096	-0.024	0.433
Diplectrum formosum	0.239	-0.041	0.117	-0.006	-0.111	0.323
Cynoscion nebulosus	-0.123	-0.143	-0.086	-0.065	0.079	0.007
Lachnolaimus maximus	0.471	0.082	0.066	0.259	-0.367	-0.138
Opsanus beta	-0.137	0.145	-0.182	0.015	-0.010	-0.051
Eucinostomus gula	-0.491	0.349	-0.221	-0.124	0.448	0.079
Lagodon rhomboides	-0.367	0.471	-0.276	-0.071	0.242	-0.098
Penaeus spp.	-0.205	0.006	-0.160	-0.070	0.083	0.061
Panulirus argus	0.358	-0.119	-0.045	0.138	-0.401	0.012
Callinectes ornatus	-0.249	0.299	-0.104	0.081	0.222	-0.086
Callinectes sapidus	-0.267	0.360	-0.163	-0.089	0.050	-0.159
All Fish (wt.)	-0.115	0.049	-0.121	0.028	-0.026	0.035
All Crustaceans (wt.)	-0.093	0.076	-0.117	0.036	-0.095	-0.008

Table 77. Simple correlation coefficients between mean number (mean wt.) of species and abiotic variables (cont.).

	Water depth (ft)	Median sediment size (phi)	Bottom type 1	Bottom type 2
Lutjanus analis	0.413	-0.115	0.660	0.161
Lutjanus griseus	-0.205	-0.351	0.587	0.218
Lutjanus synagris	0.308	0.125	0.431	0.275
Ocyurus chrysurus	0.368	0.228	0.486	0.152
Haemulon aurolineatum	0.245	0.274	0.344	0.181
Haemulon flavolineatum	0.205	0.278	0.352	0.231
Haemulon parra	0.381	0.201	0.340	0.191
Haemulon plumieri	0.217	0.175	0.410	0.173
Haemulon sciurus	-0.057	-0.147	0.555	0.097
Orthopristis chrysoptera	0.160	0.096	0.340	-0.131
Diplectrum formosum	0.196	0.281	-0.023	0.008
Cynoscion nebulosus	-0.226	-0.260	0.285	-0.076
Lachnolaimus maximus	0.207	0.212	0.347	0.399
Opsanus beta	-0.198	-0.367	0.538	0.136
Eucinostomus gula	-0.482	-0.170	0.314	0.015
Lagodon rhomboides	-0.394	-0.207	0.380	0.168
Penaeus spp.	-0.313	-0.314	0.389	<0.001
Panulirus argus	0.357	-0.314	0.366	0.367
Callinectes ornatus	-0.350	-0.011	0.087	0.002
Callinectes sapidus	-0.197	-0.255	0.072	0.117
All Fish (wt.)	-0.133	-0.262	0.571	0.079
All Crustaceans (wt.)	-0.225	-0.452	0.562	0.131

Table 78. Abiotic data used in stepwise multiple regression.

	Mean Salinity (‰)	Std. deviation Salinity	Mean Turbidity (NTU)	Std. deviation Turbidity	Mean Color (PCU)	Mean fecal coliform (no./100 mL)
1	29.0	2.60	5.0	2.00	5.7	22.8
2	29.5	4.05	2.4	1.45	7.5	7.8
3	30.6	2.90	4.2	2.28	7.0	2.7
4	32.2	2.13	4.3	1.46	6.1	3.2
5	28.7	3.45	3.1	3.61	10.4	111.6
6	32.0	3.28	3.7	2.86	6.1	2.1
7	32.1	2.19	3.5	1.49	5.8	1.0
8	29.7	4.05	2.3	1.15	6.1	6.2
9	32.9	3.42	2.5	1.39	6.1	7.6
10	34.7	1.63	4.6	4.79	4.2	1.0
11	28.7	7.20	2.7	1.78	6.0	1.0
12	34.1	2 64	2.7	1.78	6.0	1.0
13	26.6	6.81	2.5	1.64	9.8	55.0
14	34.0	2.30	8.6	14.28	5.4	8.5
15	33.4	3.58	1.7	2.03	4.5	1.0
16	22.6	7.04	2.0	0.95	10.0	8.9
17	33.9	3.18	1.9	1.05	4.1	1.0
18	29.2	5.27	2.0	0.95	10.0	8.9
19	32.9	3.53	1.7	1.59	5.0	1.0
20	34.4	2.44	2.4	1.86	4.8	1.0
21	31.0	4.35	1.7	1.59	5.0	1.0
22	31.4	3.96	1.7	1.59	5.0	1.0
23	31.0	2.44	3.1	1.03	7.5	66.1
24	27.9	3.07	3.6	0.95	7.9	1630.4
25	33.1	1.44	3.6	1.03	7.5	35.1
26	31.1	1.46	4.7	1.45	10.4	32.1
27	29.6	1.62	3.9	2.02	8.3	33.6
28	29.7	1.60	2.8	0.87	8.3	91.0
29	28.7	2.15	2.3	1.15	8.1	46.8
31	28.8	2.91	3.7	2.02	7.9	3.4
32	27.0	4.66	4.9	2.61	9.6	183.2
33	29.1	4.23	2.9	1.27	6.7	36.8
34	32.8	2.55	2.5	1.52	5.0	8.2
35	21.2	8.05	1.6	0.47	17.9	13.2

Table 78. Abiotic data used in stepwise multiple regression.

	Water depth (ft)	Median sediment size (phi)	Bottom type 1	Bottom type 2
1	10.5	2.81	2	1
2	6.0	1.75	4	4
3	8.0	1.86	6	2
4	11.0	2.71	2	1
5	6.0	2.10	6	4
6	11.0	2.20	7	4
7	11.0	2.71	2	2
8	7.0	0.00	6	4
9	11.0	2.30	7	3
10	8.5	3.43	7	5
11	4.5	0.89	4	4
12	7.0	2.12	3	6
13	3.5	1.86	4	4
14	9.0	2.14	7	3
15	4.0	1.65	2	5
16	3.5	1.80	5	4
17	8.0	2.29	3	6
18	4.0	3.10	5	4
19	7.0	1.90	6	5
20	5.5	3.00	5	6
21	5.5	0.00	5	6
22	10.0	1.90	7	5
23	7.0	2.18	2	5
24	6.0	2.25	3	3
25	7.0	3.24	1	2
26	9.0	3.24	1	1
27	4.5	2.47	3	3
28	4.0	2.47	3	3
29	4.0	1.08	7	3
31	5.0	2.82	3	4
32	5.0	2.11	3	3
33	4.0	4.18	3	2
34	7.5	2.20	1	1
35	8.0	2.21	1	1

Table 79. Monthly mean catch (in numbers) by season for 20 important and/or abundant species recorded in Biscayne Bay creel survey. Seasonal distribution for all species combined (excluding shrimp and baitfish) is also given.

	Mean Monthly Catches			
	Winter	Spring	Summer	Fall
Pinfish	10730.00	8654.83	3401.83	5821.00
Lobster	0.67	69.67	1019.33	72.67
Blue crab	440.67	1782.83	1140.17	1040.50
Great barracuda	187.00	758.00	1279.50	626.00
Spanish mackerel	547.33	755.16	0.00	913.33
White mullet	18.67	4128.33	10451.33	2573.17
Spotted seatrout	907.33	1445.00	1683.33	1752.50
Pigfish	4750.00	969.33	262.33	193.00
Bluestriped grunt	1766.67	1801.83	1400.50	2386.17
White grunt	4177.33	6263.33	7130.17	5088.83
Yellowtail snapper	221.67	669.33	700.33	621.50
Lane snapper	653.33	806.83	1150.00	643.50
Grey snapper	9386.00	6866.50	7974.00	6952.17
Mutton snapper	155.00	429.00	576.00	245.33
Jack crevalle	893.33	1137.50	1119.00	1767.50
Blue runner	1266.00	1115.17	1100.50	3370.83
Sand perch	1280.00	1586.83	320.00	359.17
Gag grouper	92.67	242.00	76.67	65.67
Pilchard	33919.33	26138.50	16888.17	89347.67
Bonefish	335.33	290.67	241.83	171.00
All species (numbers)	46282.00	47199.00	44980.00	41104.00
All species (weights)	17177.30	19684.70	17847.76	17500.23

Table 80. Trawl Sampling stations having commercial quantities of shrimp for each month April, 1982 to September, 1983. Commercial catch is adjusted to be equivalent to a trawl sample.

Month	Mean commercial catch/5 min. tow	Stations with mean catch/5 min tow commercial catches	
		South Bay	North Bay
APR 1982	52.08	8	*
MAY	23.84	8, 11, 13, 18, 21, 22	*
JUN	22.22	-	*
JUL	11.72	5, 8, 11, 13	*
AUG	54.25	-	*
SEP	39.53	-	*
OCT	15.36	13, 14	24, 27, 29, 31, 32, 33
NOV	-	-	-
DEC	31.67	2, 3, 5, 6, 8, 16 18, 19, 21, 22	29
JAN 1983	53.61	22	29
FEB	15.22	2, 3, 5, 6, 11, 16, 18, 19, 21, 22	29
MAR	19.02	5, 6, 11, 13 19, 20, 22	29
APR	29.17	*	27, 29
MAY	60.09	*	29
JUN	33.45	*	24, 29, 32, 33
JUL	34.44	*	24, 29, 32, 33
AUG	30.23	*	24, 29, 32, 33
SEP	16.28	*	24, 27, 28, 29, 31, 33

* Not sampled.

Table 81. Summary of fishing effort recorded in 33 subareas of Biscayne Bay from creel survey, 1982-1983.

Area	Total	Mean Man hours/month	Standard Error	Effort/km^2	Effort/km^2/month
1	8348	397.5	128.78	2854.99	135.95
2	47796	2276.0	209.07	6072.26	289.16
3	3843	183.0	40.90	544.03	25.91
4	53432	2544.4	382.61	5958.07	283.72
5	23791	1132.9	143.23	2373.66	113.03
6	9641	459.1	146.49	1107.35	52.73
7	52924	2520.2	300.07	11409.96	543.33
8	15068	717.5	153.87	3716.91	176.99
9	36243	1725.9	270.23	8771.29	417.68
10	27035	1287.4	295.60	7102.51	338.21
11	6713	319.7	155.29	2668.97	127.09
12	98442	4687.7	492.04	15484.87	737.37
13	14559	693.3	88.07	785.90	37.42
14	1317	62.7	22.91	80.68	3.34
15	151107	7195.6	675.76	21447.92	1021.33
16	13015	619.8	178.59	858.83	40.89
17	5331	253.9	108.73	382.29	18.20
18	169828	8087.0	2081.65	17325.15	825.01
19	8613	410.1	56.94	286.72	13.65
20	3925	186.9	67.99	174.35	8.30
21	35477	1689.4	194.94	978.41	46.59
22	4632	220.6	32.51	199.21	9.49
23	2971	141.5	39.88	66.19	3.15
24	90674	4317.8	455.14	1589.83	75.71
25	1854	88.3	18.42	88.65	4.22
26	27749	1321.4	205.33	496.23	23.65
27	47081	2242.0	181.37	1294.00	61.62
28	1850	88.1	31.34	91.99	4.38
29	3847	183.2	32.97	153.79	7.32
30	3128	149.0	110.33	126.32	6.01
31	28051	1335.8	185.78	1460.59	69.55
32	871	41.5	13.39	52.28	2.49
33	284	13.5	6.44	22.83	1.09

Table 82. Surface areas and distribution of bottom types in Biscayne Bay.*

Bottom Type	Surface Area (km^2)	% of Whole Bay
1. Seagrass	366.43	63.9%
2. Hard bottom	123.11	21.5%
3. Barren	83.61	14.6%
(a) Undredged	53.21	9.3%
(b) Dredged	30.40	5.3%

Total surface area of the Bay = 573.15 km^2.

* From Milano, G. R. (In prep.) Bottom communities of Biscayne Bay.

Table 83. Mean biomass (grams)/5 minute tow of 5 faunal groupings collected from 5 bottom types and theoretical decrease resulting from bottom type modification.

Bottom Type	Grunts (6 spp.)	Snappers (4 spp.)	All Fish	All Crustaceans	All Fauna
Seagrass (63.9)	48.0	7.4	426.5	158.2	584.7
Hard bottom (21.5)	11.8	1.9	121.8	87.6	209.5
Barren (14.6)	7.3	1.3	67.6	63.1	130.7
undredged (9.3)	9.7	2.2	86.6	67.0	153.6
dredged (5.3)	4.2	0.1	43.8	58.2	102.0
% decrease in mean biomass/tow from hard bottom to barren (dredged)	64%	95%	64%	34%	51%
% decrease in mean biomass/tow from seagrass to barren (dredged)	91%	99%	90%	63%	93%

Table 84. Theoretical percent baywide increase in biomass for 5 groups of organisms should dredged bottom areas be modified.

Bottom Type	Grunts (6 spp.)	Snappers (4 spp.)	All Fish	All Crustaceans	All Fauna
All dredged areas converted to hard bottom	1.2%	1.8%	1.3%	1.2%	1.3%
All dredged areas converted to seagrass	6.8%	7.2%	6.6%	4.1%	5.8%

Table 85. Spawning seasons of some important species.

Species	Months (season)
Tarpon (*Megalops atlanticus*)	spring - summer
Ladyfish (*Elops saurus*)	year-round
Bonefish (*Albula vulpes*)	year-round, peaks winter (Feb - Sept), eastern Gulf
Atlantic thread herring (*Opisthonema oglinum*)	April - August
Spanish sardine (*Sardinella aurita*)	May - September
Pilchard (*Harengula jaguana*)	February - July
Bay anchovy (*Anchoa mitchilli*)	March - November
Snook (*Centropomus undecimalis*)	March - July
Gag grouper (*Mycteroperca microlepis)*	January - March
Red grouper (*Epinephelus morio*)	March - July
Red hind (*Epinephelus guttatus*)	December - April
Nassau grouper (*Epinephelus striatus*)	January - May
Jewfish (*Epinephelus itajara*)	July - August
Bluefish (*Pomatomus saltatrix*)	Summer
Blue runner (*Caranx crysos*)	January - August
Crevalle jack (*Caranx hypos*)	September
Horseeye jack (*Caranx latu*)	March - May
Bar jack (*Caranx ruber*)	March - May
Pompano (*Trachinotus carolinus*)	March - September
Permit (*Trachinotus falcatus*)	April - June
Mutton snapper (*Lutjanus analis*)	March - May
Grey snapper (*Lutjanus griseus*)	May - August
Lane snapper (*Lutjanus synagris*)	March - May
Yellowtail snapper (*Ocyurus chrysurus*)	year-round, peaks spring
Schoolmaster snapper (*Lutjanus apodus*)	winter
Dog snapper (*Lutjanus jocu*)	March - May
While grunt (*Haemulon plumieri*)	year-round, peaks spring
Bluestriped grunt (*Haemulon sciurus*)	March - May
Pigfish (*Orthopristis chrysoptera*)	spring
French grunt (*Haemulon flavolineatum*)	year-round, peaks spring
Tomtate (*Haemulon aurolineatum*)	year-round
Sea bream (*Archosargus rhomboidalis*)	December - February
Sheepshead (*Archosargus probatocephalus*)	spring
Pinfish (*Lagodon rhomboides*)	autumn - winter
Jolthead porgy (*Calamus bajonado*)	December - February
Spotted seatrout (*Cynoscion nebulosus*)	spring - summer
Hogfish (*Lachnolaimos maximus*)	December - February
White mullet (*Mugil curema*)	April - May
Striped (black) mullet (*Mugil cephalus*)	autumn - winter
Great barracuda (*Sphyraena barracuda)*	April - October
Spanish mackerel (*Scomberomorus maculatus*)	April - June
Cero mackerel (*Scomberomorus regalis*)	April - June
Cobia (*Rachycenton canadum*)	June - August
Lookdown (*Selene vomer*)	year-round

Table 85. Spawning seasons of some important species (cont.).

Species	Months (season)
Leatherjacket (*Oligoplites saurus*)	spring - summer
Ballyhoo (*Hemiramphus brasiliensis*)	March-July
Spiny lobster (*Panulirus argus*)	February - August
Ornate crab (*Callinectes ornatus*)	year-round
Blue crab (*Callinectes sapidus*)	spring - summer
Stone crab (*Menippe mercenaria*)	July - September (peak)
Pink shrimp (*Penaeus duorarum*)	March - June

Table 86. Mean number of stone crabs, mean weight of harvestable claws and number of traps fished in north Biscayne Bay.

	Mean number of stone crabs per trap	Mean weight of claws per trap	Total number of traps fished*
November, 1982			
A	0.80	0.15	15
B	1.07	0.26	15
C	0.87	0.10	15
D	0.47	0.31	15
E	0.13	0.02	15
F	0.67	0.14	15
January, 1933			
A	1.00	0.19	14
B	0.80	0.31	5
C	1.00	0.33	10
D	1.50	0.42	15
E	1.25	0.46	20
F	0.60	0.24	10
March 1983			
A	0.73	0.04	15
B	0.93	0.38	15
C	1.07	0.30	15
D	1.40	0.39	15
E	0.73	0.25	15
F	0.47	0.24	15
May, 1983			
A	1.40	0.35	15
B	1.13	0.27	15
C	0.93	0.18	15
0	1.27	0.40	15
E	1.20	0.58	15
F	0.93	0.24	15
July, 1983			
A	0.67	0.24	15
B	1.40	0.33	15
C	1.93	0.62	15
D	1.13	0.38	15
E	0.07	0.06	15
F	0.53	0.15	15

Table 86. Mean number of stone crabs, mean weight of harvestable claws and number of traps fished in north Biscayne Bay (cont.).

	Mean number of stone crabs per trap	Mean weight of claws per trap	Total number of traps fished*
September, 1983			
A	0.67	0.32	15
B	0.33	0.03	15
C	1.27	0.56	15
D	0.47	0.27	15
E	1.13	0.33	15
F	1.07	0.25	15

* Generally, 3 traps were fished in each cell, pulled and relocated within the cell approximately every 5 days for 15 days per sampling period.

Table 87. Analysis of variance testing mean stone crab catches (mean no.) by cell in north Biscayne Bay and all areas combined by month.

Cell

November, 1982

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	4.0	5.3	4.3	2.3	0.7	3.3	0.80	p > 0.50

January, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.10}$	Significant level
	4.7	4.0	5.0	7.7	6.3	3.0	0.44	p > 0.50

March, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	3.7	4.7	5.3	7.0	3.7	2.3	0.25	p > 0.50

May, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	7.0	5.7	4.7	6.3	6.0	4.7	0.15	p > 0.50

July, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	3.3	7.0	9.7	5.7	0.3	2.7	1.52	p > 0.10

September, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	3.3	1.7	6.3	2.3	5.7	5.3	0.88	p > 0.50

Months

Mean no. per 5 traps	Nov 1982	Jan 1983	Mar 1983	May 1983	Jul 1983	Sep 1983	$F_{5.100}$	Significant level
	3.33	5.31	4.44	5.72	4.78	4.11	0.81	p > 0.10

Table 88. Analysis of variance testing mean stone crab catches (mean weight in pounds) by cell in north Biscayne Bay and all areas combined by month.

Cell

November, 1982

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	0.75	1.30	0.50	1.55	0.10	0.70	0.72	p > 0.50

January, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.10}$	Significant level
	0.95	1.55	1.65	2.10	2.30	1.20	0.48	p > 0.50

March, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	0.20	1.90	1.50	1.95	1.25	1.20	0.39	p > 0.50

May, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	1.75	1.35	0.90	2.00	2.90	1.20	0.58	p > 0.50

July, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	1.20	1.65	3.10	1.90	0.30	0.75	1.44	p > 0.10

September, 1983

Mean no. per 5 traps	A	B	C	D	E	F	$F_{5.12}$	Significant level
	1.60	0.15	2.80	1.35	1.65	1.25	0.62	p > 0.50

Months

Mean no. per 5 traps	Nov 1982	Jan 1983	Mar 1983	May 1983	Jul 1983	Sep 1983	$F_{5.100}$	Significant level
	0.81	1.65	1.33	1.68	1.48	1.47	0.84	p > 0.10

Table 89. Distribution of fishing effort (percent of total man hours) for all access points by kind of day and time of day recorded from the Biscayne Bay Creel Survey. March 1982 - November 1983.

	Weekday		Weekend	
Ramp	Day	Night	Day	Night
41	3.7	5.4	3.7	3.0
42	21.4	16.8	10.1	6.3
43	3.1	18.9	3.9	15.9
44	22.6	29.6	17.6	58.3
45	5.7	9.2	6.6	5.9
46	14.9	8.0	21.0	3.8
47	14.0	12.3	16.6	6.8
48*	14.7	0.0	20.5	0.0
Shore access pt.				
51	13.1	11.4	6.3	13.0
52	8.2	22.8	7.2	16.7
53	36.7	54.2	25.2	57.0
54	11.8	77.7	11.1	5.4
55****	10.6	0.6	1.0	2.6
56****	1.6	3.4	3.7	5.4
57***	14.3	0.0	4.1	0.0
58**	0.0	0.0	40.4	0.0
59*	3.8	0.0	1.1	0.0

* Closed at night.
** Combined with Rickenbacker Causeway (#53) as of May 1982; closed at night.
*** Consolidated in shore point #51 as of June 1982; closed at night.
**** Consolidated in shore point #54 as of June 1982.

Table 90. Mean number and percent of total number (in parentheses) of fishermen for all access points by kind of day and time of day recorded from the Biscayne Bay Creel Survey. March 1982 - November 1983.

	Weekday				Weekend			
	Day		Night		Day		Night	
Ramp #								
41	2.8	(5.3)	2.1	(5.1)	8.5	(4.8)	2.9	(3.9)
42	6.1	(11.3)	6.6	(16.4)	16.3	(9.2)	6.0	(7.9)
43	2.2	(4.0)	7.7	(19.0)	8.7	(4.9)	11.9	(15.7)
44	11.4	(21.4)	11.0	(27.1)	28.5	(16.2)	39.6	(52.1)
45	3.6	(6.7)	3.6	(8.9)	11.6	(6.6)	5.9	(7.7)
46	8.7	(16.2)	3.3	(8.2)	37.1	(21.0)	3.8	(5.0)
47	8.8	(16.4)	6.2	(15.4)	28.4	(16.1)	5.8	(7.7)
48*	9.9	(18.6)	0.0	(0.0)	37.5	(21.2)	0.0	(0.0)
Shore access pt.								
51	15.7	(14.6)	16.9	(14.3)	21.1	(7.4)	24.1	(13.8)
52	11.6	(10.7)	30.4	(25.7)	24.4	(8.5)	35.8	(20.5)
53	35.1	(32.6)	56.3	(47.6)	67.0	(23.4)	90.0	(51.5)
54	16.0	(14.8)	10.1	(8.5)	39.0	(13.6)	12.9	(7.4)
55****	10.0	(9.3)	1.0	(0.8)	3.0	(1.0)	2.0	(1.1)
56****	2.5	(2.3)	3.7	(3.1)	13.0	(4.5)	10.0	(5.7)
57***	12.0	(11.2)	0.0	(0.0)	12.0	(4.2)	0.0	(0.0)
58**	0.0	(0.0)	0.0	(0.0)	102.5	(35.8)	0.0	(0.0)
59*	4.8	(4.5)	0.0	(0.0)	4.4	(1.5)	0.0	(0.0)

* Closed at night.
** Combined with Rickenbacker Causeway (#53) as of May 1982; closed at night.
*** Consolidated in shore point #51 as of June 1982; closed at night.
**** Consolidated in shore point #54 as of June 1982.

Table 91. Results of t - statistic comparing the means of north and south Biscayne Bay. Mean numbers/5 min. tow for 20 important species. Mean weights (g)/3 min. tow for total fauna, fish, and crustacean biomass.

Species	Mean No. North Bay	Mean No. South Bay	Level of Significance
Shrimp	29.5903	17.4265	$0.001 < p < 0.005$
Blue crab	0.1486	0.1765	$p > 0.5$
Lobster	0.0397	0.1702	$p < 0.001$
Gray snapper	0.0909	0.2226	$p < 0.001$
Lane snapper	0.0036	0.0364	$p < 0.001$
Mutton snapper	0.0094	0.0817	$p < 0.001$
Yellowtail snapper	0.0094	0.1381	$p < 0.001$
Spotted seatrout	0.0992	0.0118	$0.005 < p < 0.01$
Hogfish	0.0000	0.1068	$p < 0.001$
Pinfish	1.6131	6.4262	$p < 0.001$
White grunt	0.4127	1.7915	$0.001 < p < 0.005$
Bluestriped grunt	0.8120	0.9970	$0.40 < p < 0.50$
Pigfish	0.2744	0.2382	$p > 0.5$
Sailor's choice	0.0661	0.3088	$p < 0.001$
French grunt	0.0041	0.1421	$0.010 < p < 0.025$
Tomtate	0.0386	0.1259	$0.05 < p < 0.10$
Sand perch	0.0234	0.0230	$p > 0.5$
Silver jenny	2.9934	2.0033	$0.1 < p < 0.2$
Toadfish	0.8168	1.2117	$0.05 < p < 0.1$
Ornate crab	1.5874	2.0732	$0.1 < p < 0.2$
Fish Biomass	232.5175	303.0194	$0.05 < p < 0.1$
Crustacean Biomass	100.2392	131.8950	$0.005 < p < 0.050$
Total fauna	332.7392	434.9029	$0.025 < p < 0.050$

Table 92. Fish diversity by sub-area of Biscayne Bay from creel and trawl surveys ranked from highest to lowest.

	Creel Survey		Trawl Survey			
Rank	Area	Mean monthly diversity	Area*	Mean diversity per/5 min tow	Area*	Annual diversity
1	18	2.30	17	1.97	31	3.30
2	21	2.04	33	1.92	18	3.05
3	26	1.99	31	1.88	23	3.05
4	15	1.91	20	1.85	17	3.04
3	27	1.90	18	1.83	2	2.99
6	24	1.87	21	1.78	14	2.98
7	31	1.81	4	1.65	11	2.96
8	12	1.69	25	1.63	12	2.96
9	7	1.67	19	1.56	7	2.90
10	19	1.65	30	1.50	10	2.90
11	9	1.63	14	1.47	25	2.90
12	2	1.51	22	1.47	15	2.89
13	13	1.51	10	1.37	30	2.98
14	4	1.36	16	1.36	33	2.98
13	22	1.19	13	1.19	20	2.85
16	16	1.16	32	1.12	26	2.78
17	5	1.14	23	1.04	28	2.67
18	8	1.14	29	1.04	21	2.53
19	10	1.08	24	1.02	19	2.50
20	23	1.06	27	0.92	13	2.35
21	25	1.01	2	0.65	6	2.24
22	29	0.99	28	0.60	3	2.23
23	6	0.95	26	0.59	32	2.21
24	17	0.90	3	0.56	4	2.19
25	20	0.65	6	0.55	16	2.10
26	28	0.59	7	0.49	22	2.10
27	1	0.58	12	0.44	24	1.41
28	3	0.56	11	0.32	29	1.37
29	14	0.49	15	0.29	27	1.34
30	30	0.44	1	0.09	1	1.10
31	11	0.36				
32	32	0.29				
33	33	0.07				

* Areas 5, 8, 9 had no trawl stations.
Areas 2, 3, 6, 7 had two trawl stations. Value given is the arithmetic mean of the two stations.

Table 93. Fish richness by sub-area of Biscayne Bay from creel and trawl surveys ranked from highest to lowest.

	Creel Survey		Trawl Survey			
Rank	Area	Mean monthly richness	Area*	Mean richness per/5 min tow	Area*	Annual richness
1	18	30.1	21	11.7	21	71
2	15	26.6	33	10.6	33	70
3	21	21.2	17	10.1	17	65
4	24	20.3	18	10.0	25	63
5	31	18.1	20	9.8	18	62
6	26	17.7	4	9.6	20	62
7	12	17.1	31	8.8	31	62
8	27	16.7	25	8.4	10	60
9	7	16.3	19	7.6	13	57
10	2	15.0	22	7.5	14	57
11	9	13.4	16	7.3	30	57
12	4	11.3	14	6.4	4	56
13	13	9.7	29	6.3	16	53
14	19	9.7	30	6.2	22	52
15	16	8.2	10	5.8	29	52
16	5	7.4	27	5.5	2	51
17	22	6.5	24	5.4	32	51
18	10	6.3	13	4.9	19	50
19	8	5.9	32	4.9	23	50
20	23	5.3	23	3.6	27	50
21	17	4.8	2	2.4	24	48
22	29	4.5	3	2.3	7	38
23	6	4.4	6	2.2	3	36
24	25	4.1	28	2.2	26	35
25	20	4.0	26	2.0	28	35
26	3	2.9	7	1.9	12	34
27	11	2.7	12	1.7	6	32
28	1	2.4	15	1.5	15	32
29	14	2.4	11	1.3	11	30
30	28	2.4	1	0.7	1	9
31	30	2.0				
32	32	1.4				
33	33	0.3				

* Areas 5, 8, 9 had no trawl stations.
Areas 2, 3, 6, 7 had two trawl stations. Value given is the arithmetic mean of the two stations.

Table 94. Fish evenness by sub-area of Biscayne Bay from creel and trawl surveys ranked from highest to lowest.

	Creel Survey		Trawl Survey			
Rank	Area	Mean monthly evenness	Area*	Mean evenness per/5 min tow	Area*	Annual evenness
1	19	0.78	31	0.92	11	0.87
2	26	0.71	30	0.89	12	0.84
3	13	0.69	17	0.87	15	0.83
4	21	0.69	18	0.84	7	0.80
5	27	0.69	25	0.84	31	0.80
6	18	0.68	33	0.84	23	0.78
7	25	0.68	20	0.83	26	0.78
8	29	0.66	19	0.80	2	0.76
9	8	0.65	10	0.79	28	0.75
10	31	0.65	14	0.79	14	0.74
11	9	0.64	22	0.78	18	0.74
12	22	0.63	23	0.77	17	0.73
13	24	0.63	4	0.76	10	0.71
14	12	0.62	16	0.76	30	0.71
15	7	0.61	32	0.76	25	0.70
16	6	0.60	21	0.75	20	0.69
17	5	0.59	13	0.72	33	0.68
18	15	0.59	24	0.66	6	0.65
19	4	0.57	3	0.62	19	0.64
20	23	0.57	29	0.59	3	0.62
21	2	0.56	27	0.57	21	0.59
22	16	0.54	26	0.56	13	0.58
23	10	0.52	28	0.56	32	0.56
24	17	0.49	2	0.54	4	0.34
25	3	0.44	12	0.45	16	0.53
26	1	0.42	6	0.43	22	0.53
27	28	0.42	7	0.43	1	0.50
28	30	0.37	11	0.36	24	0.36
29	20	0.36	15	0.18	29	0.35
30	14	0.35	1	0.11	27	0.34
31	32	0.31				
32	11	0.20				
33	33	0.09				

* Areas 5, 8, 9 had no trawl stations.
Areas 2, 3, 6, 7 had two trawl stations. Value given is the arithmetic mean of the two stations.

Table 95. Mean monthly catch of fish by sub-area of Biscayne Bay from creel and trawl surveys ranked from highest to lowest.

	Creel Survey		Trawl Survey	
Area rank	Area	Mean monthly wt. (lbs.)	Area*	Mean wt./ 5 min tow (g)
1	15	2852.8	4	1660.3
2	18	2718.5	18	545.6
3	24	1643.5	29	525.0
4	12	1254.9	24	497.6
5	27	927.5	33	474.6
6	21	923.3	21	455.2
7	4	900.0	20	449.5
8	9	875.3	22	433.1
9	31	828.7	27	423.6
10	2	712.8	17	380.4
11	7	695.2	16	379.8
12	5	562.3	10	346.7
13	26	465.0	14	316.6
14	13	375.5	25	303.3
15	6	272.0	19	290.7
16	10	254.7	13	267.5
17	17	231.5	31	235.8
18	8	217.7	32	166.4
19	19	208.1	30	154.7
20	16	203.3	23	115.7
21	22	171.7	6	110.4
22	30	124.9	28	104.1
23	29	110.1	2	102.5
24	1	108.0	3	79.5
25	3	79.1	15	63.2
26	20	77.0	11	59.5
27	11	68.3	12	56.8
28	14	67.9	26	48.7
29	28	55.2	7	46.6
30	25	46.9	1	28.5
31	23	38.8		
32	32	22.3		
33	33	9.1		

* Areas 5, 8, 9 had no trawl stations.
Areas 2, 3, 6, 7 had two trawl stations. Value given is the arithmetic mean of the two stations.

Table 96. Mean number and standard deviation of boat and shore fishermen by area in Biscayne Bay counted in 58 aerial overflights.

	Boat		Shore		Combined boat and shore	
Area	Mean number	Standard deviation	Mean number	Standard deviation	Mean number	Standard deviation
1	1.24	2.77	0.24	0.89	1.48	2.94
2	2.32	3.80	0.92	2.79	3.20	5.09
3	1.54	3.04	0.14	0.50	1.68	3.03
4	1.96	2.80	1.96	2.58	3.92	3.70
5	4.48	5.47	0.56	1.62	5.04	5.83
6	1.94	2.77	0.46	0.68	2.40	3.34
7	0.54	1.54	2.54	3.95	3.08	4.44
8	0.24	0.87	0.32	1.38	0.56	1.58
9	3.92	4.52	1.52	3.43	5.44	6.40
10	0.76	1.97	6.44	8.64	7.20	9.45
11	1.32	2.33	0.08	0.57	1.40	2.36
12	0.78	2.19	10.88	9.73	11.66	10.87
13	1.38	2.49	0.34	1.69	1.72	3.12
14	0.12	0.85	-	-	0.12	0.85
15	3.50	3.93	15.46	10.50	18.96	13.01
16	2.04	3.01	1.06	6.37	3.10	6.91
17	0.74	3.50	-	-	0.74	3.50
18	9.84	10.65	12.90	10.96	22.74	19.28
19	5.18	4.81	0.22	1.02	5.40	4.96
20	0.76	1.82	-	-	0.76	1.82
21	12.88	12.57	-	-	12.98	12.51
22	1.46	3.78	0.18	1.27	1.64	4.80
23	1.26	2.65	-	-	1.26	2.65
24	10.16	9.38	13.26	10.55	23.42	16.46
25	0.26	1.05	-	-	0.26	1.05
26	5.58	6.25	0.08	0.57	5.66	6.26
27	6.12	5.94	9.22	9.51	15.34	11.52
28	0.12	0.63	-	-	0.12	0.63
29	1.36	2.40	0	-	1.36	2.40
30	0.40	1.32	-	-	0.40	1.32
31	5.48	6.72	0.14	0.99	5.62	6.67
32	0.30	0.76	0.10	0.46	0.40	0.86
33	1.68	3.92	-	-	1.68	3.92

Table 97. Percent of effort by time of day for boat and shore fishing in Biscayne Bay. Each column equals 100%.

	Week day		Weekend	
Time Period*	Boat ramp	Shore access	Boat Ramp	Shore access
A.M.	13.28	23.93	10.17	21.43
P.M.	42.35	18.60	49.11	28.64
Night 1	27.43	37.10	13.11	33.81
Night 2	16.94	20.37	27.61	16.11

Each period approximately equals 6-hour time periods where:
AM = 6 AM - 12 noon
PM = 12 noon - 6 PM
Night 1 = 6 PM - midnight
Night 2 = midnight - 6 AM

Exact time periods were adjusted according to time of sunrise and sunset.

Table 98. Comparison of north and south Biscayne Bay fishing efforts based on 59 aerial overflights. March 1982 - November 1983.

	North Bay	South Bay	North and south Bay
% of boat-fishing effort in each basin	59	53	54
% of shore-fishing effort in each basin	41	47	46
Boat-fishing effort as % of baywide (total) effort	22	78	100
Shore-fishing effort as % of baywide (total) effort	19	81	100
Mean number of boat-fishermen	21.1	73.1	-
Mean number of shore-fishermen	14.9	64.5	-
Total	36.0	137.6	-
Mean number of fishermen/km^2	0.56	0.27	-