

**Characterization of
Commercial Shrimp Trawl
Bycatch in Texas During
Spring and Fall Commercial
Bay Shrimp Seasons
1993-1995**

by
**Billy E. Fuls
Tom Wagner
and
Lawrence W. McEachron**

**Management Data Series
No. 180
2002**



COASTAL FISHERIES DIVISION

4200 Smith School Road
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CHARACTERIZATION OF COMMERCIAL SHRIMP TRAWL BYCATCH IN
TEXAS DURING SPRING AND FALL COMMERCIAL BAY-SHRIMP SEASONS:
1993-1995

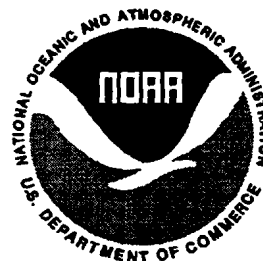
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ACKNOWLEDGEMENTS

This project was jointly funded by the Texas Parks and Wildlife Department and National Marine Fisheries Service Saltonstall-Kennedy Grant Program. Special thanks go to the Texas commercial bay shrimpers whose vessels samples were collected from, and all Coastal Fisheries staff who participated in bycatch sample collection and processing. This report is dedicated to Larry McEachron, former TPWD Coastal Fisheries Science Director, whose lifelong dedication to fisheries management and quality scientific data collection aided immensely in the successful completion of this study.

ABSTRACT

Commercial shrimp trawl bycatch samples were collected in Sabine Lake, Galveston Bay, Matagorda Bay, San Antonio Bay, Aransas Bay, Corpus Christi Bay and lower Laguna Madre to assess composition and magnitude of commercial bycatch along the Texas coast during the 1993, 1994, and 1995 spring and fall bay-shrimp open seasons. Major bycatch species found were gulf menhaden (*Brevoortia patronus*), Atlantic croaker (*Micropogonias undulatus*), bay anchovy (*Anchoa mitchilli*), spot (*Leiostomus xanthurus*), sand seatrout (*Cynoscion arenarius*), hardhead catfish (*Arius felis*), pinfish (*Lagodon rhomboides*), lesser blue crab (*Callinectes similis*), blue crab (*Callinectes sapidus*), Atlantic brief squid (*Lolliguncula brevis*) and cabbagehead jellyfish (*Stomolophus meleagris*). Bycatch ratios and mean catch per unit effort (CPUE) differed in number and weight of bycatch species and commercial shrimp among bays, years, and seasons. Commercial total bycatch to shrimp ratios (X:1) in number and weight were higher overall during fall than during spring in all bays, except in Aransas Bay during 1994 and Galveston Bay during 1995. During the spring season, total bycatch ratios were highest in Corpus Christi Bay (2.32:1 in 1993) and Aransas Bay (2.37:1 in 1994), and lowest in lower Laguna Madre (0.36:1 in 1993). During the fall season total bycatch ratios were highest in Matagorda Bay (4.25:1 in 1995) and lowest in Galveston Bay (0.77:1 in 1995). Overall mean CPUE in number and weight for bycatch organisms was higher during spring than fall in all bays, except Sabine Lake in number (1994) and San Antonio Bay in weight (1994, 1995). Overall mean CPUE for bycatch in number during spring was highest in Corpus Christi Bay (5,248/h/net in 1993) and lowest in Sabine Lake (1,328/h/net in 1994). Overall spring mean CPUE in weight was highest in lower Laguna Madre (54,643 g/h/net in 1993) and lowest in San Antonio Bay (34,522 g/h/net in 1994). Overall mean CPUE for bycatch in number during fall was highest in San Antonio Bay (3,675/h/net in 1995) and lowest in Matagorda Bay (969/h/net in 1995). Overall fall mean CPUE in weight was highest in San Antonio Bay (65,798 g/h/net in 1995) and lowest in Corpus Christi Bay (22,600 g/h/net in 1995).

INTRODUCTION

Incidental catch of non-target organisms in the commercial shrimp fishery within Texas coastal waters and throughout the Gulf of Mexico is of concern to state and federal marine fisheries managers, environmental groups and commercial shrimpers. Shrimp (*Farfantepenaeus*, *Litopenaeus*) are the most important commercial seafood product in Texas, annually accounting for over 90% by value and 80% by weight of all Texas seafood landings (Auil-Marshalleck et al. 2002). Bycatch of non-target species in this fishery impacts fish and other marine organisms that 1) have present or potential commercial value; 2) are recreational species managed or unmanaged by state and federal government; and 3) have ecological value to the preservation of biodiversity within Texas marine environments. These non-target marine organisms (bycatch) are returned to the water after commercial shrimp are removed from the trawl catch. This practice results in various levels of mortality due to handling and subsequent discard of bycatch organisms, and to subsequent predation when returned to the water. There is little in-depth information on the composition and quantity of bycatch associated with the commercial bay shrimp fishery in Texas.

During 1992 the National Marine Fisheries Service (NMFS) conducted research to assess commercial shrimp trawl bycatch in Galveston Bay under the auspices of the Galveston Bay National Estuary Program (Martinez and Nance 1993). Prior to the present study, Galveston Bay was the only Texas bay in which a major shrimp fishery bycatch characterization study had been conducted. To obtain knowledge about shrimp trawl bycatch in other Texas coastal areas, the present study's overall objective was to assess the magnitude of shrimp trawl bycatch in major Texas coastal bays during the spring and fall Texas commercial bay-shrimp open seasons. Specific objectives were to 1) determine commercial shrimp to bycatch ratios (X:1) in number and weight for total bycatch, finfish and invertebrates (other than commercial shrimp) during the 1993, 1994 and 1995 spring and fall bay shrimp seasons; and 2) determine catch per unit effort (CPUE, no./h and kg/h) and size composition (mm) of commercial shrimp and non-target bycatch species caught in commercial bay shrimp trawls.

MATERIALS AND METHODS

The study was conducted from 1993 to 1995 aboard commercial bay licensed shrimp vessels in Sabine Lake (1994), Galveston Bay (1995), Matagorda Bay (1994 and 1995), San Antonio Bay (1994 and 1995), Aransas Bay (1993 and 1994), and Corpus Christi Bay (1993 and 1995) (Figure 1). Sampling in these bays was exclusive of bait shrimping only areas and nursery areas. Samples in lower Laguna Madre (1993) were collected aboard commercial bait licensed vessels; law permits only bait-licensed vessels to shrimp in lower Laguna Madre. Sampling periods corresponded with the commercial bay license spring (15 May - 15 July) brown shrimp, and fall (15 August - 15 December) white shrimp seasons. To address temporal changes in populations of shrimp and bycatch organisms, goals were to collect 3-5 bycatch samples each ten days within each season, each area, and each year on a randomly preselected day. Due to weather or other fishery-related constraints, a leeway of 2-3 days around a preselected day was permitted as long as samples were collected within

the specific 10-day period. Prior to collecting commercial bycatch data, Texas Parks and Wildlife Department (TPWD) staff held meetings during April and May of each year with commercial shrimp fishermen along the Texas coast to explain project objectives and to obtain their assistance in collection of data.

Field Sample Procedures

The one stipulation made to commercial shrimpers by TPWD personnel collecting shrimp bycatch samples was that captains use normal trawling procedures on days and in areas in which they believed it worthwhile to shrimp. A bycatch characterization sample from a commercial vessel consisted of an 11.3 kg random subsample of the total commercial trawl haul including both commercial shrimp and bycatch organisms. For trawl catches < 11.3 kg, the entire catch was the sample. In all study areas except lower Laguna Madre, samples in total were placed on ice and taken to TPWD offices for processing. Weight of the total catch was obtained by 1) weighing the net and catch before the net was emptied, then 2) weighing the empty net again after the catch was released from the net onto the vessel's deck or into a culling box. Weights of large debris (tree stumps, barrels etc.) were subtracted from total catch weights. Field bycatch weights were obtained using a "First-Mate" (Hydroscale, Inc.) electronic scale (0.5-900 kg capacity). Additional information recorded included trawl size (headrope length), mesh size, door size, area trawled, trawling time, information on additional gear used (TEDs or BRDs), and hydrographic data

In lower Laguna Madre, total catch weight was obtained in the same manner as in all other bays; however, all shrimp were taken out of the catch and weighed en masse due to the high value of live bait shrimp. A subsample of about one liter was obtained to process at TPWD offices to determine size and weight of species in the total sample. The remaining bycatch was either processed in total, or a subsample of 11.3 kg was obtained for processing. If a subsample was collected, the remaining bycatch was weighed.

TPW Laboratory Procedures

Samples were sorted by species, enumerated, and weighed to the nearest gram (total of a single species). From each sample, up to 19 individuals of each species were measured (TL mm); with the exception that up to 35 blue crabs and 50 commercial shrimp were measured in each sample

Data Compilation

CPUE in number and weight were standardized according to tow duration (h) and net size. All data are presented in number/h and weight/h. During spring, CPUE was standardized to a 9.8 m trawl; this is the most common size net used due to gear size regulations. During fall in all bays except lower Laguna Madre, CPUE was standardized to a 16.5 m trawl; this was the average size net used. In lower Laguna Madre, fall data were standardized to a 9.8 m trawl; this is the most common size net used in the bait fishery due to bait shrimp license gear size regulations. Species-specific length data were averaged by sample and weighted by sample CPUE for season mean lengths.

Data were compiled and stored on computer. SAS procedures (SAS Institute Inc. 2000) were used for all statistical compilations and calculations. Because the actual number of commercial bycatch samples collected within a 10-day period ranged from 1 to 7 samples, commercial bycatch data were averaged by 10-day periods within a season for presentation to prevent temporal bias in CPUE and mean size of organisms. Bycatch to shrimp ratios (X:1) are presented by area and season.

Appendix 1 lists common and corresponding scientific names of species caught and identified.

RESULTS

Overall, 222 bycatch samples were collected in spring and 419 samples in fall (Table 1). Number of seasonal samples collected ranges from seven in Sabine Lake (spring 1994) to 57 in lower Laguna Madre (fall 1993). Although attempts were made to collect commercial bycatch samples in each 10-day period within each area and season, in some bays and years there was little to no shrimping activity during portions of November and December. Thus, occasionally no samples were collected during some of these periods. Few samples were collected in Sabine Lake in spring because of limited shrimping activity in some sample periods.

Commercial total bycatch to shrimp ratios in number and weight were higher overall during fall than during spring in all study areas, except Aransas Bay in 1994 and Galveston Bay in 1995 (Table 2). High and low finfish to shrimp ratios, and other invertebrates to shrimp ratios, generally followed the same pattern as total bycatch to shrimp ratios. Finfish to shrimp ratios exceeded those of other invertebrates to shrimp ratios.

Spring bycatch to shrimp ratios ranged from 0.36:1 in number and 1.51:1 in weight in lower Laguna Madre during 1993, to 2.37:1 in number in Aransas Bay during 1994 and 6.82:1 in weight in Corpus Christi Bay during 1993 (Table 1). Fall bycatch to shrimp ratios ranged from 0.77:1 in number and 1.88:1 in weight in Galveston Bay during 1995, to 4.25:1 in number and 11.78:1 in weight in Matagorda Bay during 1995. Overall, commercial bait shrimpers in lower Laguna Madre caught a greater proportion of shrimp and less bycatch than did commercial bay shrimpers along the rest of the coast.

Sabine Lake: 1994

In Sabine Lake, 30 bycatch species were collected in spring, with four species [hardhead catfish (*Arius felis*), sand seatrout (*Cynoscion arenarius*), Atlantic croaker (*Micropogonias undulatus*) and harvestfish (*Peprilus alepidotus*)] comprising 69% of the mean CPUE by number and 71% of the mean CPUE by weight (Table 2). Brown shrimp (*Farfantepenaeus aztecus*) comprised 51% and white shrimp (*Litopenaeus setiferus*) 12% of the total mean catch by number. Overall mean CPUE for bycatch organisms during spring was 1,328/h/net by number and 43.398 kg/h/net by weight.

A total of 57 species were collected during fall, with four species [sand seatrout, star drum (*Stellifer lanceolatus*), Atlantic croaker and blue crab (*Callinectes sapidus*)] comprising 84% of the mean CPUE by number and 69% of the mean CPUE by weight (Table 3). White shrimp comprised 57% and brown shrimp 2% of the total mean catch by number. Overall mean CPUE for bycatch organisms during fall was 3,326/h/net by number and 48.113 kg/h/net by weight.

Galveston Bay: 1995

In Galveston Bay, 49 species were identified during spring, with five species [Atlantic croaker, sand seatrout, seabob (*Xiphopenaeus kroyeri*), Gulf menhaden (*Brevoortia patronus*) and blue crab] comprising 72% of the mean CPUE by number and 74% of the mean CPUE by weight (Table 4). Brown shrimp comprised 66% and white shrimp 1% of the total mean catch by number. Overall mean CPUE for bycatch organisms during spring was 3,310/h/net by number and 40.392 kg/h/net by weight.

A total of 60 species were identified during fall, with 13 species [sand seatrout, Atlantic cutlassfish (*Trichiurus lepturus*), blue crab, Atlantic croaker, bay whiff (*Citharichthys spilopterus*), roughback shrimp (*Trachypenaeus similis*), mantis shrimp (*Squilla empusa*), bay anchovy (*Anchoa mitchilli*), iridescent swimming crab (*Portunus gibbesii*), hardhead catfish, Atlantic brief squid (*Lolliguncula brevis*), bighead sea robin (*Prionotus tribulus*) and Gulf menhaden] comprising 71% of the mean CPUE by number and 52% of the mean CPUE by weight (Table 5). White shrimp comprised 63% and brown shrimp 4% of the total mean catch by number. Overall mean CPUE for bycatch organisms in fall was 1,552/h/net by number and 32.011 kg/h/net by weight.

Matagorda Bay: 1994

In Matagorda Bay, 54 bycatch species were identified during spring, with four species (Atlantic croaker, sand seatrout, bay anchovy and blue crab) comprising 71% of the mean CPUE by number and 55% of the mean CPUE by weight (Table 6). Brown shrimp comprised 58% of the total mean catch by number. Overall mean CPUE for bycatch organisms during spring was 2,806/h/net by number and 45.984 kg/h/net by weight.

A total of 69 species were collected in fall, with six species [Gulf menhaden, bay anchovy, cabbagehead (*Stomolophus meleagris*), sand seatrout, least puffer (*Sphoeroides parvus*) and silver perch (*Bairdiella chrysoura*)] comprising 70% of the mean CPUE by number and 71% of the mean CPUE by weight (Table 7). White shrimp comprised 54% and brown shrimp 2% of the total mean catch by number. Overall mean CPUE for bycatch organisms during fall was 1,267/h/net by number and 25.507 kg/h/net by weight.

Matagorda Bay: 1995

During spring 1995, 53 bycatch species were collected, with four species (Gulf menhaden, Atlantic croaker, sand seatrout and bay anchovy) comprising 77% of the mean CPUE by number and 68% of the mean CPUE by weight (Table 8). Brown shrimp comprised 54% and white shrimp 2% of the total mean catch by number. Overall mean

CPUE for bycatch organisms during spring was 3,662/h/net by number and 40.937 kg/h/net by weight.

A total of 75 species were collected during fall, with 10 species [Gulf menhaden, sand seatrout, Atlantic brief squid, blue crab, cabbagehead, mantis shrimp, Atlantic bumper (*Chloroscombrus chrysurus*), peppermint shrimp (*Lysmata wurdemanni*), bay anchovy and Atlantic croaker] comprising 71% of the mean CPUE by number and 77% of the mean CPUE by weight (Table 9). White shrimp comprised 46%, brown shrimp 18%, and pink shrimp (*Farfantepenaeus duorarum*) 8% of the total mean catch by number. Overall mean CPUE for bycatch organisms in fall was 969/h/net by number and 23.365 kg/h/net by weight.

San Antonio Bay: 1994

In San Antonio Bay, 53 bycatch species were identified during spring, with four species [Gulf menhaden, bay anchovy, Atlantic croaker and spot croaker (*Leiostomus xanthurus*)] comprising 83% of the mean CPUE by number and 71% of the mean CPUE by weight (Table 10). Brown shrimp comprised 57% and white shrimp 2% of the total mean catch by number. Overall mean CPUE for bycatch organisms during spring was 3,248/h/net by number and 34.522 kg/h/net by weight.

A total of 63 species were documented in fall, with four species (Gulf menhaden, hardhead catfish, bay anchovy and spot croaker) comprising 74% of the mean CPUE by number and 46% of the mean CPUE by weight (Table 11). White shrimp comprised 44%, brown shrimp 8% and pink shrimp 4% of the total mean catch by number. Overall mean CPUE for bycatch organisms during fall was 2,282/h/net by number and 34.705 kg/h/net by weight.

San Antonio Bay: 1995

During spring 1995, 54 bycatch species were identified, with five species (spot croaker, Atlantic croaker, Gulf menhaden, bay anchovy and Atlantic brief squid) comprising 75% of the mean CPUE by number and 68% of the mean CPUE by weight (Table 12). Brown shrimp comprised 64% and white shrimp 1% of the total mean catch by number. Overall mean CPUE for bycatch organisms in spring was 4,101/h/net by number and 52.715 kg/h/net by weight.

A total of 49 species were collected during fall, with four species [Gulf menhaden, spot croaker, hardhead catfish and sea nettle (*Chrysaora quinquecirrha*)] comprising 75% of the mean CPUE by number and 60% of the mean CPUE by weight (Table 13). White shrimp comprised 43% and brown shrimp 6% of the total mean catch by number. Overall mean CPUE for bycatch organisms during fall was 3,675/h/net by number and 65.798 kg/h/net by weight.

Aransas Bay: 1993

In Aransas Bay, 42 species were identified during spring, with four species (Gulf menhaden, spot croaker, Atlantic croaker and blue crab) comprising 87% of the mean CPUE by number and 89% of the mean CPUE by weight (Table 14). Brown shrimp comprised 44% of the total mean catch by number. Overall mean CPUE for bycatch organisms in spring was 5,089/h/net by number and 46.559 kg/h/net by weight.

A total of 72 species were collected during fall, with four species [Gulf menhaden, pinfish (*Lagodon rhomboides*), bay anchovy and spot croaker] comprising 75% of the mean CPUE by number and 65% of the mean CPUE by weight (Table 15). Brown shrimp and white shrimp each comprised 15%, and pink shrimp 13% of the total mean catch by number. Overall mean CPUE for bycatch organisms in fall was 2,421/h/net by number and 32.613 kg/h/net by weight.

Aransas Bay: 1994

During spring 1994, 64 bycatch species were identified, with six species (spot croaker, Atlantic croaker, bay anchovy, Gulf menhaden, Atlantic brief squid and blue crab) comprising 78% of the mean CPUE by number and 76% of the mean CPUE by weight (Table 16). Brown shrimp comprised 51% of the total mean catch by number. Overall mean CPUE for bycatch organisms in spring was 3,711/h/net by number and 53.898 kg/h/net by weight.

A total of 86 species were collected during fall, with nine species [Gulf menhaden, lesser blue crab (*Callinectes similis*), least puffer, bay anchovy, hardhead catfish, Atlantic brief squid, mantis shrimp, roughback shrimp and spot croaker] comprising 76% of the mean CPUE by number and 41% of the mean CPUE by weight (Table 17). White shrimp comprised 18%, and brown shrimp and pink shrimp each comprised 13% of the total mean catch by number. Overall mean CPUE for bycatch organisms in fall was 1,600/h/net by number and 30.197 kg/h/net by weight.

Corpus Christi Bay: 1993

In Corpus Christi Bay, 69 species were collected during spring, with five species (sand seatrout, lesser blue crab, spot croaker, bay anchovy and Atlantic croaker) comprising 80% of the mean CPUE by number and 66% of the mean CPUE by weight (Table 18). Brown shrimp comprised 49% of the total mean catch by number. Overall mean CPUE for bycatch organisms in spring was 5,248/h/net by number and 51.865 kg/h/net by weight.

A total of 71 bycatch species were collected during fall, with seven species [Gulf menhaden, roughback shrimp, lesser blue crab, star drum, bay anchovy, sand seatrout and blackcheek tonguefish (*Symphurus plagiusa*)] comprising 70% of the mean CPUE by number and 50% of the mean CPUE by weight (Table 19). White shrimp comprised 40%, brown shrimp 6% and pink shrimp 1% of the total mean catch by number. Overall mean

CPUE for bycatch organisms during fall was 1,729/h/net by number and 25.828 kg/h/net by weight.

Corpus Christi Bay: 1995

During spring 1995, 80 bycatch species were identified, with seven species (Atlantic croaker, sand seatrout, lesser blue crab, spot croaker, star drum, hardhead catfish and Atlantic brief squid) comprising 70% of the mean CPUE by number and 65% of the mean CPUE by weight (Table 20). Brown shrimp comprised 61% and white shrimp 2% of the total mean catch by number. Overall mean CPUE for bycatch organisms in spring was 2,316/h/net by number and 37.074 kg/h/net by weight.

A total of 71 bycatch species were collected during fall, with nine species (lesser blue crab, sand seatrout, bay anchovy, Atlantic croaker, roughback shrimp, least puffer, Atlantic cutlassfish, hardhead catfish and Atlantic brief squid) comprising 70% of the mean CPUE by number and 31% of the mean CPUE by weight (Table 21). Brown shrimp comprised 21%, white shrimp 20%, and pink shrimp 11% of the total mean catch by number. Overall mean CPUE for bycatch organisms in during fall was 1,038/h/net by number and 22.600 kg/h/net by weight.

Lower Laguna Madre: 1993

In lower Laguna Madre, 83 bycatch species were collected in spring, with six species (lesser blue crab, Atlantic croaker, spot croaker, sand seatrout, bay anchovy and Atlantic cutlassfish) comprising 75% of the mean CPUE by number and 51% of the mean CPUE by weight (Table 22). Brown shrimp comprised 83%, pink shrimp 2%, and white shrimp 1% of the total mean catch by number. Overall mean CPUE for bycatch organisms in spring was 2,966/h/net by number and 54.643 kg/h/net by weight.

A total of 110 bycatch species were collected during fall, with seven species [sand seatrout, lesser blue crab, spotfin mojarra (*Eucinostomus argenteus*), hardhead catfish, Atlantic cutlassfish, Atlantic brief squid and spot croaker] comprising 71% of the mean CPUE by number and 57% of the mean CPUE by weight (Table 23). Brown shrimp comprised 30%, white shrimp 21% and pink shrimp 21% of the total mean catch by number. Overall mean CPUE for bycatch organisms in fall was 1,597/h/net by number and 27.775 kg/h/net by weight.

Overall CPUE among Bays and Seasons

Total bycatch organisms encountered by commercial trawling varied among bays, seasons and years with some of the highest abundance levels occurring on the central Texas coast. Overall mean CPUE in number ranged from 969/h/net in Matagorda Bay (fall 1995) to 5,248/h/net in Corpus Christi Bay (spring 1993)(Figure 2). Overall mean CPUE in weight ranged from 22.600 kg/h/net in Corpus Christi Bay (fall 1995) to 65.978 kg/h/net in San Antonio Bay (fall 1995)(Figure 3). Mean CPUE in number and weight was higher during spring than fall in all bays, except Sabine Lake in number (1994) and San Antonio Bay in weight (1994, 1995). Mean CPUE for bycatch in number during spring was highest

in Corpus Christi Bay (1993) and lowest in Sabine Lake (1994). Spring mean CPUE in weight was highest in lower Laguna Madre (1993) and lowest in San Antonio Bay (1994). Mean CPUE for bycatch in number during fall was highest in San Antonio Bay (1995) and lowest in Matagorda Bay (1995). Fall mean CPUE in weight was highest in San Antonio Bay (1995) and lowest in Corpus Christi Bay (1995).

Overall Dominant Bycatch Species

Gulf menhaden was the dominant bycatch species caught, with the highest CPUE in number in 10 of 22 bay/seasons sampled; CPUE was greatest in Aransas Bay during spring 1993. Atlantic croaker, bay anchovy, spot, and sand seatrout were commonly found among the top four most abundant species in bay/seasons sampled.

Dominant Bycatch Species among Bays, Seasons and Years in Number

Gulf menhaden was the dominant bycatch species in most bays, seasons, and years; however, abundance was lower in both Sabine Lake and lower Laguna Madre than all other bays. Atlantic croaker and spot croaker were highly abundant in most bays and years, but were much more abundant in spring than fall seasons. Sand seatrout were highly abundant in both spring and fall of each year throughout the coast; however, numbers were somewhat lower in both San Antonio and Aransas Bays compared to all other bays. Bay anchovy were most abundant on the central coast from Matagorda Bay south to Corpus Christi Bay.

Size Distribution of Bycatch Organisms

In general, size of bycatch organisms caught was smaller during spring than fall, except for hardhead catfish. Gulf menhaden were overall largest in Sabine Lake (164 mm TL; fall) and Corpus Christi Bay (148 mm TL; fall), and smallest in San Antonio Bay (85 mm TL; fall). There was little spatial variation in size for sand seatrout, Atlantic croaker, or spot croaker. Blue crabs were largest in Corpus Christi Bay and lower Laguna Madre and smallest in Sabine Lake and San Antonio Bay.

Bycatch of TPWD-Managed Recreational Species

Southern flounder was the most abundant recreational species found during this study in most bays and seasons. The CPUE in number was generally less than 0.2% of the total bycatch. Southern flounder CPUE was highest in Sabine Lake at 25.66/h (fall 1994) and lowest in Corpus Christi Bay at 0/h (fall 1993, 1995). Except for Sabine Lake, southern flounder CPUE was consistently greater in spring than fall. Mean length of southern flounder was greatest in Matagorda Bay at 283.93 mm TL (fall 1994) and smallest in Galveston Bay at 150.58 mm TL (spring 1995). Spotted seatrout catches ranged from 0/h in several areas to 8.87/h in Sabine Lake (fall 1994). Spotted seatrout CPUE was consistently higher in fall than spring. Mean length of spotted seatrout was greatest in San Antonio Bay at 264.67 mm TL (spring 1995) and least in Aransas Bay at 137.54 mm TL (fall 1993). Only ten red drum (*Sciaenops ocellatus*) were caught throughout the study period. Other recreationally important species caught in low numbers included red drum, sheepshead

(*Archosargus probatocephalus*), spanish mackerel (*Scomberomorus maculatus*), and king mackerel (*Scomberomorus cavalla*).

DISCUSSION

Findings within this report demonstrate variability in species composition and abundance among bays, years and seasons. This variability directly affects bycatch to shrimp ratios. Results reveal that overall, bycatch of finfish (number and biomass) is greater than that of other invertebrates, and is greatest during spring. Overall, Gulf menhaden, Atlantic croaker, sand seatrout and spot croaker were species impacted most by the Texas commercial bay shrimp fishery. Although CPUE of recreationally important species such as southern flounder, spotted seatrout, and red drum were relatively low, southern flounder was encountered in shrimp bycatch most often.

Based on catch per unit effort bycatch information within this report and NMFS inshore shrimping effort data (1993-1995), approximately 1 billion bycatch organisms are caught annually during the spring brown shrimp season by commercial bay shrimpers, and 0.4 billion during the fall white shrimp season. These estimates do not include additional bycatch encountered while bait shrimping, or during months not characterized by this study. Using 1993-1995 average annual bay landings (Auil-Marshalleck et al. 2002) and shrimp to bycatch ratios from this report, approximately 2 billion bycatch organisms are caught annually by commercial bay shrimpers.

Although exact estimates of survival of bycatch organisms encountered by commercial bay shrimp fishermen during open seasons is not known, bycatch mortality from shrimping activities can only be a negative factor in overall production of organisms encountered in the fishery. Following exposure to 70 o/oo salinity, similar to that found in shrimp vessel salt boxes, bycatch organisms had a 50% mortality rate (LE_{50}) ranging from 19 minutes exposure time for Atlantic croaker to 67 minutes for blue crabs (Colura and Bumguardner, 1996). Anecdotal statements and observations suggest survival for most finfishes and invertebrates encountered during shrimping may be low. Combined factors of speed and duration of trawling, quantity of catch, air and water temperature, and time before organisms are returned to the water after processing contribute to overall mortality. In view of this, it is imperative that fishery managers, in cooperation with the bay shrimping industry, develop methods to reduce bycatch organisms caught in shrimp trawls.

At present, shrimp trawl bycatch reduction devices (BRDs) are required in Gulf of Mexico, Florida, and Texas waters to reduce bycatch of specific organisms (Florida Statutes 1998, Gulf of Mexico Fishery Management Council 1995, Texas Parks and Wildlife Department 2001). Since completion of bycatch characterization studies reported here, TPWD has conducted BRD tests in Aransas Bay (1997), Matagorda Bay (1999), and Galveston Bay (2000) to ascertain effectiveness of various BRDs in reducing bycatch in the Texas bay shrimp trawling industry.

Based on these findings, Texas commercial shrimping regulations were amended to begin requirement of BRDs in bay shrimp trawls beginning 1 September 2001. One of TPWD's goals is to find BRDs that maximize shrimp trawl bycatch reduction while minimizing commercial shrimp loss. Proactive input by the Texas shrimp industry in assisting to find innovative BRD designs that increase effectiveness in reducing shrimp trawl bycatch while minimizing shrimp loss is paramount in helping to resolve conservation and industry bycatch concerns, and insuring renewable and sustainable Texas marine resources.

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Table 1. Total number of commercial bycatch samples collected by bay system during the spring (15 May-15 July) and fall (15 August-15 December) 1993-1995 commercial bay-shrimp seasons.

Bay System	Year	Samples Collected	
		Spring	Fall
Sabine Lake	1994	7	32
Galveston Bay	1995	15	28
Matagorda Bay	1994	20	36
Matagorda Bay	1995	20	38
San Antonio Bay	1994	22	31
San Antonio Bay	1995	21	23
Aransas Bay	1993	20	40
Aransas Bay	1994	20	43
Corpus Christi Bay	1993	27	43
Corpus Christi Bay	1995	23	48
Lower Laguna Madre	1993	27	57

Table 2. Mean ratios and standard error (SE) by number (no.) and weight (g) of commercial shrimp trawl bycatch to shrimp, finfish bycatch to shrimp, and other invertebrates to shrimp for samples collected by bay system during the spring (15 May-15 July) and fall (15 August-15 December) 1993-1995 commercial bay-shrimp seasons.

Bay System	Year	Spring Season				Fall Season			
		no.	SE	g	SE	no.	SE	g	SE
Sabine Lake	1994								
Total bycatch to shrimp (X:1)		0.88	0.44	9.09	7.16	3.45	1.65	9.46	3.14
Finfish bycatch to shrimp (X:1)		0.82	0.40	8.18	6.28	3.34	1.64	7.80	3.07
Other invertebrates to shrimp (X:1)		0.05	0.04	0.91	0.87	0.12	0.03	1.66	0.64
Galveston Bay	1995								
Total bycatch to shrimp (X:1)		0.86	0.28	2.70	0.96	0.77	0.10	1.88	0.29
Finfish bycatch to shrimp (X:1)		0.67	0.23	2.18	0.97	0.53	0.10	1.09	0.22
Other invertebrates to shrimp (X:1)		0.20	0.10	0.52	0.10	0.24	0.53	0.79	0.26
Matagorda Bay	1994								
Total bycatch to shrimp (X:1)		1.48	0.62	3.32	1.05	1.68	0.45	4.37	1.11
Finfish bycatch to shrimp (X:1)		1.20	0.48	2.28	0.89	1.36	0.42	2.02	0.28
Other invertebrates to shrimp (X:1)		0.28	0.14	1.04	0.19	0.32	0.11	2.34	0.95
Matagorda Bay	1995								
Total bycatch to shrimp (X:1)		1.04	0.31	2.39	0.65	4.25	1.64	11.78	3.42
Finfish bycatch to shrimp (X:1)		0.99	0.30	2.14	0.65	3.50	1.57	5.86	2.06
Other invertebrates to shrimp (X:1)		0.05	0.03	0.25	0.09	0.74	0.22	5.91	1.73
San Antonio Bay	1994								
Total bycatch to shrimp (X:1)		1.11	0.31	1.58	0.36	2.09	1.02	4.26	1.26
Finfish bycatch to shrimp (X:1)		1.06	0.31	1.40	0.32	2.02	1.02	3.50	1.16
Other invertebrates to shrimp (X:1)		0.04	0.01	0.18	0.05	0.07	0.02	0.76	0.41
San Antonio Bay	1995								
Total bycatch to shrimp (X:1)		0.91	0.25	1.65	0.34	2.59	1.11	5.30	1.51
Finfish bycatch to shrimp (X:1)		0.82	0.24	1.42	0.30	2.32	1.11	3.98	1.45
Other invertebrates to shrimp (X:1)		0.09	0.02	0.23	0.04	0.27	0.06	1.32	1.32

Table 2 (Cont'd.)

Bay System	Year	Spring Season				Fall Season			
		no.	SE	g	SE	no.	SE	g	SE
Aransas Bay	1993								
Total bycatch to shrimp (X:1)		1.22	0.22	2.35	0.43	1.91	0.60	4.85	1.28
Finfish bycatch to shrimp (X:1)		1.10	0.24	1.65	0.47	1.73	0.60	4.18	1.21
Other invertebrates to shrimp (X:1)		0.12	0.03	0.70	0.16	0.19	0.05	0.67	0.20
Aransas Bay	1994								
Total bycatch to shrimp (X:1)		2.37	0.93	6.72	3.10	1.50	0.36	4.67	1.17
Finfish bycatch to shrimp (X:1)		2.06	0.35	5.53	2.76	1.04	0.34	2.90	1.05
Other invertebrates to shrimp (X:1)		0.31	0.10	1.19	0.37	0.46	0.09	1.78	0.50
Corpus Christi Bay	1993								
Total bycatch to shrimp (X:1)		2.32	0.78	6.82	3.46	2.49	1.02	5.14	2.24
Finfish bycatch to shrimp (X:1)		1.65	0.61	5.19	2.94	1.86	0.95	4.12	2.12
Other invertebrates to shrimp (X:1)		0.67	0.18	1.61	0.52	0.63	0.31	1.03	0.48
Corpus Christi Bay	1995								
Total bycatch to shrimp (X:1)		1.02	0.29	2.73	0.72	1.27	0.35	5.65	1.50
Finfish bycatch to shrimp (X:1)		0.83	0.27	2.19	0.64	0.84	0.24	2.01	0.39
Other invertebrates to shrimp (X:1)		0.19	0.03	0.54	0.19	0.42	0.12	3.62	1.42
Lower Laguna Madre	1993								
Total bycatch to shrimp (X:1)		0.36	0.17	1.51	0.57	0.73	0.21	4.00	1.54
Finfish bycatch to shrimp (X:1)		0.24	0.12	0.96	0.28	0.49	0.13	2.62	0.70
Other invertebrates to shrimp (X:1)		0.11	0.05	0.55	0.30	0.24	0.13	1.37	0.98

Table 3. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Sabine Lake during the 1994 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Hardhead catfish	337.53	179.84	25.41	21,879.81	16,164.55	50.42	247.24	0.37	50	363
Sand seatrout	304.29	109.57	22.91	3,955.54	1,178.30	9.11	108.17	0.37	33	188
Atlantic croaker	161.65	50.46	12.17	4,335.28	1,492.75	9.99	108.95	1.41	38	276
Harvestfish	108.45	107.19	8.16	731.79	727.59	1.69	70.59	0.05	45	83
Gulf menhaden	87.92	48.69	6.62	2,128.80	1,621.01	4.91	111.99	2.33	43	244
Atlantic cutlassfish	83.12	43.22	6.26	2,835.02	1,475.87	6.53	385.53	0.83	246	500
Blue crab*	44.21	40.40	3.33	845.29	618.95	1.95	59.85	1.35	31	137
Gafftopsail catfish	44.03	44.03	3.31	329.67	329.67	0.76	107.08	2.00	83	144
Star drum	43.99	27.21	3.31	301.41	228.59	0.69	76.16	0.42	29	178
Bay anchovy	34.22	14.84	2.58	42.12	11.53	0.10	55.59	1.32	22	91
Gizzard shad	19.58	19.58	1.47	2,504.55	2,504.55	5.77	226.19	8.88	132	336
Spot croaker	7.07	4.83	0.53	89.92	70.39	0.21	102.35	1.20	64	127
Gulf butterfish	6.94	6.94	0.52	6.94	6.94	0.02	39.50	12.50	27	52
Atlantic spadefish	5.74	3.05	0.43	32.68	23.07	0.08	45.04	2.68	36	110
Southern flounder	4.74	3.33	0.36	305.30	152.89	0.70	161.79	11.31	95	301
Lesser blue crab*	4.59	3.07	0.35	19.28	10.71	0.04	46.00	4.93	38	65
Spotted seatrout	3.96	3.96	0.30	227.13	227.13	0.52	187.09	6.16	161	222
Atlantic rangia*	3.80	3.80	0.29	78.67	78.67	0.18	33.75	0.67	29	38
Hogchoker	3.47	3.47	0.26	24.30	24.30	0.06	71.00		71	71
Bay whiff	3.47	3.47	0.26	24.30	24.30	0.06	93.00		93	93
Bluntnose jack	3.47	3.47	0.26	6.94	6.94	0.02	43.00		43	43
Longnose spider crab*	3.47	3.47	0.26	13.88	13.88	0.03	25.00		25	25
Cabbagehead*	3.47	3.47	0.26	2,568.82	2,568.82	5.92				
Atlantic bumper	1.63	1.63	0.12	2.98	2.98	0.01	67.25	2.62	60	72
Blackcheek tonguefish	1.35	1.35	0.10	16.49	16.49	0.04	98.33	14.31	70	116
Threadfin shad	0.89	0.49	0.07	16.98	12.80	0.04	136.14	9.59	99	152
Atlantic brief squid*	0.56	0.56	0.04	8.41	8.41	0.02	59.00	1.00	58	60

Table 3 (Cont'd.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Atlantic threadfin	0.28	0.28	0.02	8.41	8.41	0.02	170.00		170	170
Lookdown	0.28	0.28	0.02	1.12	1.12	<0.01	60.00		60	60
Shrimp eel	0.28	0.28	0.02	56.06	56.06	0.13	553.00		553	553
Commercial Shrimp										
Brown shrimp*	1,894.60	991.00	51.45	6,018.83	3,796.17	11.15	81.88	0.09	45	130
White shrimp*	459.25	204.76	12.47	4,541.31	2,596.76	8.42	111.12	0.31	48	162

*Invertebrates

Table 4. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Sabine Lake during the 1994 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Sand seatrout	1,292.67	621.79	38.87	15,517.60	3,304.37	32.25	114.55	0.18	44	383
Star drum	1,127.74	441.46	33.91	2,797.74	1,130.44	5.81	66.28	0.05	23	139
Atlantic croaker	203.45	54.66	6.12	6,356.77	1,334.94	13.21	136.50	0.26	59	297
Blue crab*	167.06	49.20	5.02	8,613.43	1,939.86	17.90	82.09	0.41	19	189
Gulf menhaden	77.34	54.28	2.33	4,510.09	3,834.60	9.37	164.27	1.10	21	282
Atlantic bumper	67.92	67.66	2.04	177.61	177.35	0.37	62.75	0.01	51	72
Bay anchovy	65.23	35.24	1.96	77.07	39.86	0.16	52.33	0.44	23	80
Gafftopsail catfish	40.57	14.07	1.22	1,352.75	448.50	2.81	154.32	0.70	81	384
Bay whiff	36.66	24.52	1.10	399.90	256.88	0.83	103.28	0.06	76	133
Hogchoker	35.48	13.26	1.07	286.99	115.44	0.60	70.16	0.15	42	104
Southern flounder	25.66	9.28	0.77	2,734.07	1,247.37	5.68	198.92	1.78	110	372
Spot croaker	23.82	14.78	0.72	549.14	284.56	1.14	123.55	0.45	90	205
Atlantic midshipman	18.19	11.42	0.55	174.42	60.29	0.36	87.07	2.07	27	178
Hardhead catfish	17.76	6.47	0.53	758.82	291.51	1.58	151.06	1.51	73	396
Atlantic brief squid*	14.59	8.05	0.44	95.40	53.96	0.20	35.53	0.23	16	70
Silver seatrout	14.50	14.50	0.44	125.96	125.96	0.26	101.16	4.75	52	125
Silver perch	12.70	10.09	0.38	253.48	193.04	0.53	117.68	0.49	98	144
Seabob*	9.87	9.52	0.30	10.92	10.58	0.02	60.97	0.20	43	90
Spotted seatrout	8.87	4.14	0.27	571.48	195.85	1.19	186.78	4.28	126	351
Bighead searobin	8.65	5.74	0.26	43.70	29.81	0.09	50.53	1.81	26	228
Atlantic cutlassfish	7.36	4.60	0.22	314.05	207.38	0.65	391.32	1.02	255	576
Lesser blue crab*	7.11	3.81	0.21	139.86	118.65	0.29	41.36	0.34	24	78
Atlantic spadefish	5.82	2.53	0.18	126.81	56.85	0.26	75.68	1.25	29	136
Fringed flounder	5.05	4.85	0.15	45.78	44.61	0.10	101.85	0.32	91	128
Inshore lizardfish	4.86	4.86	0.15	235.97	235.97	0.49	200.69	3.83	172	223

Table 4 (Cont'd.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Ladyfish	2.76	1.92	0.08	320.03	238.02	0.67	280.34	1.62	227	327
Mantis shrimp*	2.25	1.62	0.07	13.73	10.78	0.03	76.62	1.17	56	93
Fat sleeper	1.99	1.03	0.06	39.03	21.88	0.08	117.12	1.29	91	136
Threadfin shad	1.91	1.53	0.06	36.17	29.93	0.08	122.34	1.80	97	138
Blue catfish	1.85	1.14	0.06	249.47	139.07	0.52	245.39	10.13	181	349
Finescale menhaden	1.50	1.22	0.05	11.62	10.83	0.02	112.08	3.52	87	193
Iridescent swimming crab*	1.43	1.29	0.04	5.54	5.00	0.01	38.89	0.14	35	43
Sharptail goby	1.26	0.96	0.04	26.34	21.66	0.05	175.33	1.09	167	180
Lookdown	1.08	0.62	0.03	4.43	2.94	0.01	58.71	1.81	33	97
Southern kingfish	1.04	0.86	0.03	6.85	4.60	0.01	91.92	5.36	60	130
Cabbagehead*	0.96	0.70	0.03	331.68	273.34	0.69				
Blackcheek tonguefish	0.90	0.62	0.03	6.35	3.70	0.01	84.13	4.22	39	107
Sheepshead	0.86	0.61	0.03	310.81	258.51	0.65	260.67	7.72	205	300
Skipjack herring	0.83	0.60	0.02	58.61	45.46	0.12	209.63	5.42	76	224
Gizzard shad	0.71	0.48	0.02	159.81	108.73	0.33	276.86	4.34	190	379
Black drum	0.62	0.26	0.02	93.68	46.52	0.19	219.72	9.43	184	285
Harvestfish	0.62	0.42	0.02	8.88	6.19	0.02	75.28	2.58	41	138
Striped anchovy	0.52	0.52	0.02	2.07	2.07	<0.01	82.67	7.36	68	91
Leatherjacket	0.35	0.35	0.01	1.40	1.40	<0.01	77.00	6.92	31	99
Striped burrfish	0.32	0.32	0.01	42.89	42.89	0.09	131.00		131	131
Ohio shrimp*	0.32	0.32	0.01	11.64	11.64	0.02	137.00		137	137
Moon jellyfish*	0.31	0.24	0.01	26.97	22.59	0.06				
Gulf butterfish	0.30	0.20	0.01	4.32	2.29	0.01	93.11	7.25	79	133
Atlantic rangia*	0.29	0.29	0.01	2.91	2.91	0.01	32.00		32	32
Striped mullet	0.27	0.27	0.01	43.09	43.09	0.09	247.50	8.50	239	256
Lined sole	0.27	0.27	0.01	0.81	0.81	<0.01	52.00		52	52
Pinfish	0.26	0.26	0.01	15.36	15.36	0.03	150.00		150	150
Least puffer	0.26	0.26	0.01	1.56	1.56	<0.01	67.00		67	67

Table 4 (Cont'd.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Smooth puffer	0.18	0.18	0.01	0.72	0.72	<0.01	72.00		72	72
Banded drum	0.16	0.16	<0.01	0.48	0.48	<0.01	61.00		61	61
Round herring	0.16	0.16	<0.01	4.33	4.33	0.01	157.00		157	157
Atlantic threadfin	0.15	0.15	<0.01	1.78	1.78	<0.01	114.00		114	114
Commercial Shrimp										
White shrimp*	4,571.28	998.44	56.95	16,213.66	2,984.98	25.02	87.90	0.05	21	149
Brown shrimp*	129.24	55.52	1.61	473.94	215.26	0.73	76.44	0.18	38	127

*Invertebrates

Table 5. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Galveston Bay during the 1995 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Atlantic croaker	838.48	528.24	25.32	9,259.22	4,857.15	22.92	97.50	0.03	39	229
Sand seatrout	755.09	279.05	22.81	6,864.25	2,427.39	16.99	96.16	0.14	25	199
Seabob*	316.49	306.56	9.56	641.16	600.75	1.59	73.20	0.06	52	120
Gulf menhaden	233.56	110.06	7.05	7,061.93	4,100.94	17.48	130.35	0.66	39	223
Blue crab*	230.64	61.62	6.97	6,084.51	1,960.57	15.06	71.29	0.31	22	165
Star drum	197.05	188.01	5.95	250.45	227.63	0.62	49.95	0.08	23	88
Atlantic cutlassfish	172.66	82.78	5.21	3,683.49	870.43	9.12	317.71	1.43	147	540
Atlantic spadefish	142.02	104.31	4.29	413.79	248.46	1.02	39.28	0.24	21	105
Atlantic brief squid*	81.73	62.81	2.47	895.46	755.87	2.22	48.75	0.24	20	85
Spot croaker	63.24	26.83	1.91	822.61	369.55	2.04	96.13	0.24	35	204
Atlantic bumper	35.29	21.97	1.07	133.43	94.09	0.33	64.11	0.73	36	176
Atlantic moonfish	31.69	23.90	0.96	120.79	101.23	0.30	64.77	0.61	41	84
Bay anchovy	27.34	7.48	0.83	63.25	16.91	0.16	60.30	0.85	34	88
Pinfish	23.85	23.12	0.72	217.25	211.04	0.54	82.46	0.01	70	96
Hardhead catfish	21.21	11.10	0.64	567.15	290.74	1.40	137.68	0.62	35	291
Bay whiff	20.10	11.39	0.61	71.55	47.22	0.18	71.26	0.45	47	96
Harvestfish	19.01	14.36	0.57	149.39	130.04	0.37	65.65	1.14	33	88
Sea nettle*	17.14	10.36	0.52	266.95	184.29	0.66				
Atlantic midshipman	14.51	8.93	0.44	467.91	265.80	1.16	125.19	3.46	31	187
Least puffer	8.62	2.60	0.26	52.46	21.57	0.13	55.79	2.39	23	91
Bighead searobin	7.50	2.07	0.23	53.16	31.96	0.13	62.26	2.10	40	128
Lesser blue crab*	6.86	6.12	0.21	17.68	16.92	0.04	32.97	0.54	21	50
Cabbagehead*	6.20	6.20	0.19	764.41	764.41	1.89				
Southern kingfish	5.43	4.07	0.16	223.11	189.75	0.55	117.43	2.44	61	272
Southern flounder	5.10	1.90	0.15	176.74	57.65	0.44	150.58	2.39	106	187

Table 5 (Cont'd.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Atlantic threadfin	4.45	1.66	0.13	127.09	64.10	0.31	138.69	2.67	109	156
Threadfin shad	2.56	2.56	0.08	49.48	49.48	0.12	127.25	5.57	111	135
Hogchoker	2.23	1.24	0.07	41.88	22.36	0.10	93.45	1.77	65	108
Roughback shrimp*	2.22	2.22	0.07	2.22	2.22	0.01	39.33	7.69	28	54
Inshore lizardfish	1.94	1.94	0.06	20.41	20.41	0.05	116.00		103	142
Gulf toadfish	1.61	1.39	0.05	113.97	112.85	0.28	147.28	11.22	72	210
Striped burrfish	1.58	1.58	0.05	13.23	13.23	0.03	47.00		47	47
Gafftopsail catfish	1.44	1.21	0.04	93.66	90.99	0.23	149.62	2.58	94	271
Silver perch	1.40	0.86	0.04	37.72	23.11	0.09	132.00		132	132
Thinstripe hermit crab*	1.32	1.32	0.04	7.91	7.91	0.02				
Banded drum	1.23	1.23	0.04	55.32	55.32	0.14	137.00		137	137
Fringed flounder	1.23	1.23	0.04	2.46	2.46	0.01	51.00		51	51
Bluntnose jack	0.94	0.94	0.03	1.88	1.88	<0.01	50.00		50	50
Unidentified grass shrimp*	0.87	0.87	0.03	0.87	0.87	<0.01	31.00	6.11	23	43
Spanish mackerel	0.82	0.60	0.02	38.24	25.88	0.09	204.54	3.05	200	225
Ohio shrimp*	0.76	0.57	0.02	4.81	3.98	0.01	59.62	1.77	57	74
Mantis shrimp*	0.74	0.74	0.02	8.15	8.15	0.02	101.00		101	101
Bluefish	0.62	0.62	0.02	37.27	37.27	0.09	183.00		183	183
Striped mullet	0.58	0.58	0.02	319.33	319.33	0.79	369.00		369	369
Gizzard shad	0.42	0.42	0.01	67.38	67.38	<0.01	255.00		255	255
Planehead filefish	0.39	0.39	0.01	1.18	1.18	<0.01	53.00		53	53
Striped blenny	0.19	0.19	0.01	1.33	1.33	<0.01	80.00		80	80
Gulf butterflyfish	0.19	0.19	0.01	0.95	0.95	<0.01	63.00		63	63
Violet goby	0.14	0.14	<0.01	22.86	22.86	0.06	458.00		458	458
Commercial Shrimp										
Brown shrimp*	6,681.74	1,102.20	66.02	24,508.22	4,613.93	36.94	79.11	0.06	41	165
White shrimp*	128.46	48.71	1.27	1,450.75	476.81	2.17	112.15	0.39	50	168

*Invertebrates

Table 6. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Galveston Bay during the 1995 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Sand seatrout	117.29	23.55	7.56	3,229.89	950.16	10.09	132.09	0.58	27	255
Atlantic cutlassfish	109.70	38.59	7.07	1,723.64	521.65	5.38	286.53	0.95	178	536
Blue crab*	109.69	24.39	7.07	3,404.85	846.12	10.64	74.29	0.22	31	185
Atlantic croaker	100.62	52.22	6.48	3,913.87	2,153.24	12.23	142.15	0.25	31	261
Bay whiff	86.36	28.98	5.57	909.69	261.84	2.84	101.45	0.19	51	195
Roughback shrimp*	83.39	49.92	5.37	112.98	68.62	0.35	52.46	0.12	32	78
Mantis shrimp*	82.77	43.54	5.33	730.65	350.04	2.28	88.08	0.21	62	190
Bay anchovy	78.88	32.14	5.08	125.34	62.98	0.39	60.32	0.28	33	80
Iridescent swimming crab*	74.82	41.85	4.82	181.14	75.02	0.57	33.27	0.95	22	51
Hardhead catfish	70.69	20.51	4.56	735.12	273.05	2.30	97.85	0.69	42	200
Atlantic brief squid*	66.83	45.73	4.31	394.49	237.80	1.23	37.75	0.24	18	91
Bighead searobin	61.48	43.29	3.96	367.83	163.84	1.15	64.90	0.58	26	181
Gulf menhaden	59.91	29.03	3.86	832.63	368.41	2.60	109.06	0.26	70	234
Atlantic spadefish	53.91	14.99	3.47	1,090.94	382.31	3.41	75.21	0.41	29	125
Fringed flounder	50.18	23.80	3.23	475.38	181.84	1.49	92.55	0.33	54	152
Lesser blue crab*	48.28	18.33	3.11	322.55	148.39	1.01	44.47	0.17	24	92
Atlantic bumper	40.28	19.46	2.60	99.51	42.14	0.31	62.05	0.52	33	101
Moon jellyfish*	33.18	16.22	2.14	8,217.65	4,460.52	25.67				
Star drum	28.68	11.96	1.85	231.01	131.93	0.72	81.56	1.01	38	131
Southern kingfish	21.01	5.87	1.35	969.36	255.63	3.03	152.36	1.34	56	286
Threadfin shad	20.95	16.03	1.35	326.27	252.21	1.02	115.29	0.02	102	140
Least puffer	18.74	7.61	1.21	129.69	57.52	0.41	64.64	0.80	44	150
Harvestfish	18.44	10.65	1.19	361.61	239.94	1.13	89.82	0.91	28	140
Sea nettle*	18.01	9.25	1.16	314.96	164.42	0.98				

Table 6 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Seabob*	16.31	6.41	1.05	53.38	21.66	0.17	80.11	0.69	40	105
Atlantic moonfish	10.56	4.26	0.68	79.16	34.65	0.25	66.33	0.39	45	108
Atlantic midshipman	7.45	2.47	0.48	82.93	32.74	0.26	86.15	2.68	51	65
Inshore lizardfish	7.03	2.58	0.45	307.12	115.32	0.96	193.60	4.48	88	303
Hogchoker	6.18	2.79	0.40	97.67	39.35	0.31	86.34	1.07	61	123
Lined sole	5.48	3.91	0.35	29.15	21.68	0.09	55.67	0.22	47	63
Blackcheek tonguefish	5.24	2.70	0.34	60.59	23.11	0.19	106.79	1.02	78	126
Gulf butterfish	4.69	2.56	0.30	36.85	22.24	0.12	77.15	0.85	38	108
Spot croaker	4.61	1.77	0.30	166.04	62.53	0.52	137.24	0.84	104	194
Pinfish	3.49	2.15	0.22	185.60	133.91	0.58	140.84	1.43	110	160
Gafftopsail catfish	3.08	0.86	0.20	128.79	42.55	0.40	165.28	1.55	138	194
Gulf toadfish	2.44	1.01	0.16	284.93	120.57	0.89	185.91	2.42	130	223
Silver perch	2.20	1.30	0.14	49.67	31.98	0.16	119.30	1.01	92	144
Lookdown	2.08	1.25	0.13	11.30	5.22	0.04	59.25	2.50	44	127
Striped anchovy	1.81	1.39	0.12	18.95	14.60	0.06	109.36	0.84	90	129
Skilletfish	1.67	1.67	0.11	9.99	9.99	0.03	68.71	4.35	58	90
Spanish mackerel	1.61	1.38	0.10	96.08	82.86	0.30	207.48	1.04	180	244
Cabbagehead*	1.60	0.67	0.10	568.76	332.73	1.78				
Bluntnose jack	1.34	1.11	0.09	28.79	26.39	0.09	111.42	3.59	67	120
Atlantic stingray	1.02	0.41	0.07	176.74	69.70	0.55	157.21	2.70	141	181
Southern flounder	1.01	0.51	0.07	88.79	56.73	0.28	184.41	11.24	109	255
Striped burrfish	1.01	1.01	0.07	86.68	86.68	0.27	119.00	31.00	88	150
Spotfin mojarra	0.97	0.55	0.06	10.28	5.98	0.03	92.32	1.41	75	116
White mullet	0.82	0.82	0.05	25.07	25.07	0.08	144.00	3.85	137	154
Sharptail goby	0.76	0.55	0.05	7.65	6.65	0.02	125.03	4.28	109	170
Estuarine snapping shrimp*	0.57	0.57	0.04	1.14	1.14	<0.01	36.00		36	36
Pigfish	0.50	0.50	0.03	34.27	34.27	0.11	178.00		178	178

Table 6 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Shrimp eel	0.32	0.32	0.02	46.24	46.24	0.14	454.00		454	454
Banded drum	0.30	0.30	0.02	0.90	0.90	<0.01	55.00		55	55
Rock sea bass	0.30	0.30	0.02	13.15	13.15	0.04	142.00		142	142
Crevalle jack	0.20	0.20	0.01	2.67	2.67	0.01	106.00		106	106
Speckled swimming crab*	0.16	0.16	0.01	12.20	12.20	0.04	104.00		104	104
Silver jenny	0.12	0.12	0.01	2.61	2.61	0.01	92.00		92	92
Flagfin mojarra	0.08	0.08	0.01	0.56	0.56	<0.01	86.00		86	86
Sheepshead	0.08	0.08	0.01	3.11	3.11	0.01	121.00		121	121
Spotted seatrout	0.04	0.04	<0.01	2.63	2.63	0.01	189.00		189	189
Commercial Shrimp										
White shrimp*	3,025.17	1,124.46	63.09	19,428.15	4,131.46	36.80	94.22	0.09	55	165
Brown shrimp*	200.23	58.45	4.18	1,208.46	383.59	2.29	88.42	0.09	21	132
Pink shrimp*	17.52	7.35	0.36	138.67	59.63	0.26	92.89	0.37	70	118

*Invertebrates

Table 7. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Matagorda Bay during the 1994 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Atlantic croaker	951.09	354.17	33.89	13,228.02	3,259.55	28.77	106.90	0.11	37	157
Sand seatrout	467.80	112.92	16.67	3,340.70	828.13	7.26	85.41	0.28	34	196
Bay anchovy	369.64	150.43	13.17	443.54	183.97	0.96	56.53	0.06	25	84
Blue crab*	198.91	31.61	7.09	8,272.81	1,706.11	17.99	78.52	0.23	17	192
Spot croaker	178.70	88.03	6.37	3,505.51	1,492.30	7.62	115.96	0.25	68	203
Atlantic brief squid*	141.88	68.84	5.06	1,042.98	523.00	2.27	42.96	0.31	15	102
Atlantic cutlassfish	70.43	30.58	2.51	3,168.88	1,362.05	6.89	401.97	1.33	124	774
Atlantic threadfin	55.72	41.51	1.99	1,400.15	1,140.66	3.04	141.10	0.68	49	170
Gulf menhaden	50.45	20.79	1.80	1,002.70	249.63	2.18	118.33	0.78	75	172
Bay whiff	40.05	10.97	1.43	330.54	103.70	0.72	91.70	0.19	49	113
Mantis shrimp*	27.64	12.21	0.98	131.88	69.89	0.29	72.08	0.69	43	99
Fringed flounder	23.38	10.96	0.83	214.29	101.51	0.47	89.72	1.31	41	125
Hardhead catfish	23.20	16.28	0.83	510.90	267.94	1.11	131.62	2.30	97	292
Harvestfish	19.88	5.28	0.71	457.89	152.67	1.00	92.82	1.52	48	152
Bighead searobin	19.73	3.59	0.70	233.42	51.95	0.51	87.97	0.39	33	137
Star drum	15.21	10.05	0.54	45.92	35.75	0.10	60.42	0.76	40	85
Cabbagehead*	15.21	10.39	0.54	5,149.38	2,690.04	11.20				
Least puffer	14.12	7.96	0.50	113.77	66.73	0.25	65.36	1.29	39	107
Pinfish	13.18	6.52	0.47	124.27	62.95	0.27	83.88	0.42	51	109
Blackcheek tonguefish	11.76	7.75	0.42	114.82	80.36	0.25	99.87	0.33	80	119
Inshore lizardfish	10.96	3.25	0.39	193.83	47.11	0.42	141.92	4.74	52	218
Southern kingfish	9.54	3.36	0.34	603.17	343.98	1.31	151.41	5.86	73	255
Atlantic midshipman	9.40	4.04	0.33	95.32	27.42	0.21	84.85	2.76	35	161
Shark eye*	7.80	5.26	0.28	66.31	53.72	0.14	25.17	0.29	20	39
Gulf butterfish	7.54	3.25	0.27	105.49	64.55	0.23	85.97	2.69	44	127

Table 7 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Threadfin shad	6.61	6.08	0.24	126.48	118.09	0.28	123.16	0.04	107	168
Hogchoker	5.64	3.04	0.20	103.95	66.72	0.23	91.04	1.28	56	123
Silver perch	4.95	2.42	0.18	149.29	74.40	0.32	135.58	0.47	124	149
Atlantic bumper	4.90	4.90	0.17	6.67	6.67	0.01	54.44	2.45	46	65
Longnose spider crab*	4.16	2.08	0.15	21.28	13.52	0.05	28.83	0.98	15	40
Ocellated flounder	4.10	2.48	0.15	147.27	78.86	0.32	140.71	0.83	129	152
Flatclaw hermit crab*	4.10	3.34	0.15	52.13	48.54	0.11				
Crevalle jack	2.55	1.62	0.09	24.31	16.99	0.05	86.07	1.52	64	106
Atlantic spadefish	2.23	1.44	0.08	29.68	16.34	0.06	72.03	5.05	35	104
Southern flounder	1.61	0.79	0.06	108.59	70.22	0.24	156.17	0.70	112	193
Inland silverside	1.38	1.38	0.05	2.76	2.76	0.01	64.67	12.86	39	79
Atlantic moonfish	1.30	0.92	0.05	4.75	3.76	0.01	58.43	4.46	42	77
Atlantic stingray	1.23	0.89	0.04	734.10	650.37	1.60	237.00	5.90	196	318
Mottled purse crab*	0.92	0.58	0.03	4.99	4.45	0.01	26.50	2.71	16	37
Lined seahorse	0.89	0.56	0.03	3.60	3.11	0.01	70.67	0.67	68	73
Pigfish	0.79	0.51	0.03	3.96	2.54	0.01	80.00	1.29	75	85
Calico box crab*	0.75	0.75	0.03	6.81	6.81	0.01	32.00	10.00	22	42
Crested cusk-eel	0.67	0.67	0.02	6.00	6.00	0.01	120.00		120	120
Florida rocksnail*	0.56	0.56	0.02	3.37	3.37	0.01	24.00		24	24
Thinstripe hermit crab*	0.54	0.38	0.02	4.84	3.16	0.01				
Southern hake	0.45	0.45	0.02	9.95	9.95	0.02	128.00		128	128
Gafftopsail catfish	0.44	0.44	0.02	418.62	418.62	0.91	495.00		495	495
Skilletfish	0.44	0.44	0.02	0.44	0.44	<0.01	18.00		18	18
Bank cusk-eel	0.44	0.44	0.02	7.94	7.94	0.02	146.00		146	146
Spanish mackerel	0.40	0.40	0.01	6.73	6.73	0.01	142.00		142	142
Sharptail goby	0.35	0.35	0.01	4.86	4.86	0.01	151.00		151	151
Eastern oyster*	0.35	0.35	0.01	88.40	88.40	0.19	38.00		38	38
Gulf toadfish	0.18	0.18	0.01	4.84	4.84	0.01	151.00		151	151

Table 7 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Lookdown	0.15	0.15	0.01	1.08	1.08	<0.01	81.00		81	81
Commercial Shrimp										
Brown shrimp*	3,873.95	1,380.86	57.89	22,876.64	6,570.60	33.14	93.73	0.04	43	147
Pink shrimp*	7.92	7.29	0.12	111.33	105.96	0.16	121.51	0.67	100	135
White shrimp*	3.95	2.63	0.06	48.12	24.45	0.07	119.17	6.48	43	162

*Invertebrates

Table 8. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Matagorda Bay during the 1994 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	343.29	142.78	27.09	3,000.28	1,037.39	11.76	93.22	0.25	58	197
Bay anchovy	179.61	139.29	14.17	341.19	297.85	1.34	61.66	0.12	28	86
Cabbagehead*	158.32	67.67	12.49	11,253.98	5,687.12	44.12				
Sand seatrout	92.90	26.15	7.33	1,928.59	692.80	7.56	120.63	0.62	37	277
Least puffer	65.53	32.56	5.17	668.11	340.35	2.62	75.25	0.18	31	126
Silver perch	47.34	16.92	3.74	792.35	285.32	3.11	110.19	0.27	68	157
Hardhead catfish	45.50	17.45	3.59	516.39	178.08	2.02	101.86	0.44	66	366
Spot croaker	40.10	15.68	3.16	1,432.39	543.32	5.62	138.43	0.28	101	208
Atlantic croaker	37.18	17.50	2.93	463.93	193.07	1.82	82.11	2.43	17	217
Atlantic brief squid*	36.54	15.70	2.88	382.19	144.21	1.50	49.00	0.58	20	100
Blue crab*	31.77	7.92	2.51	607.73	151.37	2.38	57.79	0.55	19	167
Fringed flounder	27.43	14.11	2.16	296.44	142.32	1.16	95.10	0.58	57	184
Bighead searobin	23.74	10.00	1.87	154.54	57.95	0.61	64.19	0.75	25	214
Gafftopsail catfish	21.04	10.37	1.66	628.86	273.34	2.47	150.88	0.80	67	207
Inshore lizardfish	13.95	4.60	1.10	447.28	175.29	1.75	160.30	1.40	80	338
Star drum	11.07	5.16	0.87	124.30	69.78	0.49	87.67	1.21	30	119
Bay whiff	10.59	4.64	0.84	141.60	62.68	0.56	102.34	1.22	50	139
Atlantic cutlassfish	9.87	3.79	0.78	141.76	55.25	0.56	277.66	2.49	160	435
Harvestfish	8.32	2.95	0.66	115.96	52.54	0.45	79.02	1.24	43	129
Pinfish	7.52	3.89	0.59	258.06	136.51	1.01	124.17	1.84	126	2
Gulf butterfish	7.20	3.82	0.57	103.21	56.95	0.40	98.19	2.67	44	159
Southern kingfish	4.02	1.24	0.32	161.86	60.63	0.63	142.78	2.27	85	216
Atlantic spadefish	3.89	1.50	0.31	45.60	19.90	0.18	59.71	0.99	45	111
Gizzard shad	3.53	3.07	0.28	131.00	116.35	0.51	151.96	0.55	125	185
Spanish mackerel	3.40	2.68	0.27	176.10	158.09	0.69	175.34	6.20	78	280

Table 8 (cont.)

Species	Number			Weight			Length				
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max	
Bycatch											
White mullet	2.30	1.60	0.18	59.58	40.29	0.23	132.62	0.50	117	155	
Atlantic bumper	2.29	1.23	0.18	11.40	6.22	0.04	72.34	1.50	43	115	
Mantis shrimp*	2.16	0.80	0.17	15.82	5.79	0.06	81.96	1.53	41	110	
Finescale menhaden	2.08	1.54	0.16	35.02	25.81	0.14	116.23	0.26	86	147	
Atlantic stingray	2.05	0.60	0.16	298.25	85.32	1.17	151.45	2.16	138	199	
Lookdown	1.96	0.91	0.15	11.17	6.09	0.04	64.34	1.06	42	92	
Blackcheek tonguefish	1.93	0.62	0.15	26.87	7.94	0.11	113.34	0.97	102	129	
Pigfish	1.92	1.28	0.15	106.89	63.66	0.42	159.50	5.54	118	205	
Hogchoker	1.63	1.05	0.13	15.68	10.61	0.06	78.51	2.83	57	96	
Spotted seatrout	1.41	0.89	0.11	46.46	38.60	0.18	159.54	4.75	107	186	
Eastern oyster*	1.28	0.85	0.10	34.46	27.67	0.14	40.39	1.33	26	84	
Striped mullet	1.22	0.56	0.10	73.43	40.02	0.29	180.06	9.24	122	252	
Bluntnose jack	1.04	0.71	0.08	7.56	5.14	0.03	84.52	0.21	63	102	
Crevalle jack	0.94	0.51	0.07	7.01	3.61	0.03	81.29	2.37	61	100	
Ladyfish	0.83	0.81	0.07	162.10	154.99	0.64	339.00	14.14	298	363	
Longnose spider crab*	0.76	0.76	0.06	9.83	9.83	0.04	38.67	3.38	32	43	
Lined sole	0.68	0.68	0.05	2.48	2.48	0.01	51.00	1.73	48	54	
Atlantic midshipman	0.61	0.32	0.05	8.19	5.35	0.03	79.82	11.34	36	134	
Spotfin mojarra	0.60	0.32	0.05	5.88	3.21	0.02	86.15	5.02	65	113	
Lined seahorse	0.58	0.55	0.05	0.40	0.29	<0.01	55.50	2.50	50	103	
Family mud crabs*	0.55	0.55	0.04	0.28	0.28	<0.01	11.00	1.00	10	12	
Black drum	0.53	0.31	0.04	37.40	21.72	0.15	163.56	5.77	148	208	
Southern flounder	0.47	0.25	0.04	134.13	74.93	0.53	283.93	8.27	251	331	
Brown rock shrimp*	0.32	0.28	0.03	0.32	0.28	<0.01	51.80	0.20	50	52	
Flatclaw hermit crab*	0.30	0.30	0.02	2.60	2.60	0.01					
Speckled swimming crab*	0.29	0.29	0.02	3.54	3.54	0.01	67.00		67	67	

Table 8 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Striped burrfish	0.28	0.28	0.02	44.80	44.80	0.18	154.00		154	154
Threadfin shad	0.25	0.25	0.02	1.98	1.98	0.01	101.00		101	101
Shark eye*	0.25	0.25	0.02	6.30	6.30	0.02	37.00		37	37
Gulf stone crab*	0.24	0.17	0.02	0.75	0.59	<0.01	22.00	2.58	18	32
Atlantic rangia*	0.22	0.22	0.02	5.44	4.44	0.02	44.00		44	44
Atlantic moonfish	0.21	0.12	0.02	0.60	0.37	<0.01	59.30	1.85	52	70
Inland silverside	0.20	0.20	0.02	1.30	1.30	0.01	80.00	2.00	78	82
Sheepshead	0.20	0.16	0.02	2.62	2.20	0.01	87.17	1.83	78	89
Planehead filefish	0.19	0.16	0.01	2.34	2.06	0.01	79.27	0.13	73	81
Chain pipefish	0.16	0.16	0.01	0.16	0.16	<0.01	157.00		157	157
Thinstripe hermit crab*	0.16	0.16	0.01	1.16	1.16	<0.01				
Southern stargazer	0.15	0.15	0.01	0.27	0.27	<0.01	43.67	1.76	41	47
Violet goby	0.11	0.11	0.01	2.67	2.67	0.01	185.00		185	185
Mottled purse crab*	0.10	0.10	0.01	0.50	0.50	<0.01	30.00		30	30
Gulf toadfish	0.08	0.08	0.01	5.08	5.08	0.02	156.00		156	156
Cottonmouth jack	0.06	0.06	<0.01	0.08	0.08	<0.01	51.00	5.00	46	56
Scaled sardine	0.06	0.06	<0.01	0.19	0.19	<0.01	70.00		70	70
Striped anchovy	0.06	0.06	<0.01	0.57	0.57	<0.01	108.00		108	108
Commercial Shrimp										
White shrimp*	1,546.57	530.70	53.88	8,980.94	2,078.75	25.89	97.29	0.07	27	191
Brown shrimp*	44.17	20.12	1.54	156.84	54.13	0.45	75.17	0.49	41	161
Pink shrimp*	11.99	6.00	0.42	49.47	23.19	0.14	76.60	0.60	37	127

*Invertebrates

Table 9. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Matagorda Bay during the 1995 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	1,166.35	1,007.08	31.85	15,095.41	10,327.05	36.87	108.48	0.14	56	192
Atlantic croaker	804.52	92.61	21.97	9,189.93	1,501.69	22.45	105.21	0.09	68	154
Sand seatrout	507.15	172.93	13.85	3,270.64	1,028.33	7.99	89.04	0.15	15	190
Bay anchovy	323.71	155.07	8.84	327.88	119.26	0.80	51.20	0.24	25	89
Spot croaker	153.56	48.13	4.19	2,223.91	742.20	5.43	101.22	0.12	67	185
Gafftopsail catfish	119.61	112.31	3.27	1,251.88	990.02	3.06	109.25	0.76	77	254
Blue crab*	100.47	27.52	2.74	3,649.85	633.02	8.92	75.14	0.51	16	177
Star drum	58.61	58.04	1.60	179.77	178.42	0.44	64.22	0.15	33	135
Atlantic moonfish	47.33	47.33	1.29	207.65	207.65	0.51	68.82	11.85	42	88
Atlantic cutlassfish	41.89	21.90	1.14	892.50	515.14	2.18	305.87	3.25	119	490
Least puffer	34.43	8.43	0.94	180.25	44.42	0.44	57.38	1.00	25	103
Peppermint shrimp*	34.26	34.26	0.94	46.04	46.04	0.11	57.16	1.49	45	77
Bay whiff	29.06	7.72	0.79	135.64	49.39	0.33	77.45	0.45	40	102
Hardhead catfish	24.94	11.77	0.68	493.17	195.54	1.20	129.25	1.18	37	307
Atlantic brief squid*	24.91	9.46	0.68	237.63	108.80	0.58	44.16	0.76	18	96
Lesser blue crab*	22.64	22.64	0.62	35.90	35.90	0.09	34.24	1.59	21	53
Harvestfish	22.14	13.22	0.60	266.14	172.02	0.65	72.75	0.88	37	99
Atlantic midshipman	20.61	14.15	0.56	116.45	60.82	0.28	74.17	2.86	28	147
Crevalle jack	18.05	11.13	0.49	146.79	90.38	0.36	87.17	1.41	47	118
Gulf butterfish	15.68	7.51	0.43	121.70	66.50	0.30	70.26	0.86	31	125
Bighead searobin	10.95	4.43	0.30	64.98	30.24	0.16	70.07	1.30	31	110
Pinfish	8.30	2.88	0.23	64.54	26.89	0.16	78.87	0.93	53	108
Hogchoker	8.14	2.80	0.22	124.77	45.69	0.30	84.05	1.23	70	120
Fringed flounder	7.36	5.46	0.20	42.56	29.27	0.10	84.71	0.59	58	108
Atlantic spadefish	7.15	4.08	0.20	29.73	17.28	0.07	43.01	0.94	21	57
Spanish mackerel	7.01	3.47	0.19	149.62	85.14	0.37	141.26	3.31	98	206
Atlantic threadfin	6.94	4.21	0.19	171.11	105.88	0.42	140.59	0.94	127	162

Table 9 (cont.)

Species	Number			Weight			Length				
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max	
Bycatch											
Mantis shrimp*	5.88	5.88	0.16	14.58	14.58	0.04	64.46	4.68	41	97	
Inshore lizardfish	4.41	1.70	0.12	112.87	81.95	0.28	128.81	6.49	82	255	
Atlantic bumper	3.29	1.80	0.09	9.23	4.61	0.02	69.51	3.51	49	125	
Silver perch	2.99	1.34	0.08	65.08	29.04	0.16	149.42	10.15	70	244	
Blackcheek tonguefish	2.98	1.70	0.08	22.57	12.99	0.06	91.11	0.67	82	101	
Striped anchovy	2.67	1.71	0.07	6.61	4.21	0.02	71.31	1.04	66	83	
Atlantic stingray	2.55	0.91	0.07	616.16	214.53	1.51	182.35	2.48	160	232	
Southern flounder	2.29	1.49	0.06	141.88	87.02	0.35	169.13	3.06	122	240	
Bluntnose jack	1.02	0.51	0.03	11.41	6.34	0.03	93.74	6.52	53	111	
Eastern oyster*	0.97	0.97	0.03	134.68	134.68	0.33	95.25	11.89	63	116	
Southern kingfish	0.96	0.53	0.03	111.65	58.19	0.27	220.94	2.43	201	232	
Thinstripe hermit crab*	0.92	0.92	0.03	16.85	16.85	0.04					
Cownose ray	0.77	0.77	0.02	548.88	548.88	1.34	370.00		370	370	
Seabob*	0.76	0.76	0.02	0.76	0.76	<0.01	64.00	4.16	58	72	
Naked goby	0.58	0.58	0.02	0.25	0.25	<0.01	31.00		31	31	
Pigfish	0.55	0.55	0.02	53.53	53.53	0.13	193.00		193	193	
Ladyfish	0.55	0.55	0.02	43.15	43.15	0.11	258.00		258	258	
Brown rock shrimp*	0.54	0.54	0.01	0.54	0.54	<0.01	61.00		61	61	
Mottled purse crab*	0.54	0.54	0.01	0.54	0.54	<0.01	21.00		21	21	
Florida pompano	0.30	0.30	0.01	5.18	5.18	0.01	103.00		103	103	
Smooth puffer	0.30	0.30	0.01	5.18	5.18	0.01	89.00		89	89	
Ocellated flounder	0.21	0.21	0.01	2.94	2.94	0.01	110.00		110	110	
Squatter pea crab*	0.21	0.21	0.01	0.21	0.21	<0.01	18.00		18	18	
Portly spider crab*	0.21	0.21	0.01	3.78	3.78	0.01	50.00		50	50	
Gulf toadfish	0.16	0.16	<0.01	6.89	6.89	0.02	170.00		170	170	
Cabbagehead*				285.36	180.49	0.70					

Table 9 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Commercial Shrimp										
Brown shrimp*	4,527.01	1,015.15	53.84	20,768.89	3,836.02	32.83	88.13	0.02	41	135
White shrimp*	196.49	123.01	2.33	1,443.55	876.72	2.28	103.43	0.32	65	174
Pink shrimp*	21.37	13.65	0.25	105.81	66.92	0.11	89.02	0.12	52	122
*Invertebrates										

Table 10. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Matagorda Bay during the 1995 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	292.84	95.35	30.21	6,905.58	3,477.41	29.56	121.49	0.49	67	254
Sand seatrout	96.72	37.71	9.98	982.44	227.30	4.20	92.86	0.68	34	225
Atlantic brief squid*	61.26	21.64	6.32	724.13	252.25	3.10	47.27	0.29	14	102
Blue crab*	52.47	26.94	5.41	854.59	351.22	3.66	81.24	0.51	15	178
Cabbagehead*	38.04	22.10	3.92	7,247.42	1,925.21	31.02				
Mantis shrimp*	35.23	17.09	3.63	347.04	176.39	1.49	87.69	0.29	49	138
Atlantic bumper	33.56	22.90	3.46	258.83	202.63	1.11	89.53	0.46	37	171
Peppermint shrimp*	29.70	22.71	3.06	38.51	28.87	0.16	53.58	0.08	33	78
Bay anchovy	27.71	7.93	2.86	44.17	64.27	0.19	54.48	0.51	26	101
Atlantic croaker	21.04	7.95	2.17	567.46	189.54	2.43	129.26	0.85	22	185
Gulf butterfish	20.71	11.28	2.14	144.07	80.06	0.62	76.82	0.33	41	155
Lesser blue crab*	18.12	15.62	1.87	154.44	117.29	0.66	51.13	0.35	25	103
Hardhead catfish	16.93	6.99	1.75	388.48	162.77	1.66	115.09	2.49	32	359
Fringed flounder	16.52	5.07	1.70	210.62	65.35	0.90	99.56	0.69	56	185
Atlantic cutlassfish	16.24	6.69	1.68	307.60	107.76	1.32	315.99	4.01	191	478
Spot croaker	16.01	5.67	1.65	498.45	179.22	2.13	133.08	0.52	102	200
Least puffer	14.83	5.23	1.53	91.05	33.67	0.39	61.45	0.32	40	111
Inshore lizardfish	14.18	3.59	1.46	547.24	156.35	2.34	171.70	1.19	70	304
Bighead searobin	13.73	9.33	1.42	96.09	44.63	0.41	64.96	1.28	31	183
Star drum	13.11	9.01	1.35	75.29	27.36	0.32	75.81	1.44	39	146
Atlantic spadefish	12.38	5.06	1.28	404.34	205.49	1.73	91.01	0.70	41	119
Striped anchovy	11.33	9.32	1.17	137.08	111.71	0.59	115.37	0.19	102	140
Harvestfish	10.95	2.36	1.13	193.54	47.78	0.83	85.74	1.34	42	156
Bay whiff	9.99	3.08	1.03	106.48	33.49	0.46	96.67	0.84	51	137
Gafftopsail catfish	9.28	4.46	0.96	243.05	118.74	1.04	145.32	1.09	106	199
Dwarf surf clam*	7.41	6.19	0.76	28.46	20.18	0.12	37.31	0.29	26	58

Table 10 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Bluntnose jack	6.40	5.10	0.66	174.40	152.09	0.75	133.83	1.22	93	166
Threadfin shad	6.01	2.57	0.62	105.49	36.65	0.45	118.59	1.82	70	185
Silver perch	5.18	2.51	0.53	120.89	57.57	0.52	111.97	1.99	67	186
Crevalle jack	3.89	1.92	0.40	106.03	70.88	0.45	83.37	2.11	50	140
Eastern oyster*	3.73	3.25	0.38	65.46	48.23	0.28	56.53	9.33	32	94
Pinfish	3.01	1.57	0.31	81.66	38.52	0.35	117.95	1.57	88	158
Spanish mackerel	2.80	2.19	0.29	332.61	278.89	1.42	244.18	6.25	147	395
Spotfin mojarra	2.55	1.08	0.26	22.39	9.93	0.10	85.22	0.70	67	105
Lookdown	2.54	1.21	0.26	12.67	6.08	0.05	73.74	5.04	33	164
Scaled sardine	2.34	1.98	0.24	22.99	17.41	0.10	96.55	2.28	71	133
Blackcheek tonguefish	1.69	1.33	0.17	18.01	13.13	0.08	107.58	1.58	52	126
Lesser rock shrimp*	1.52	1.52	0.16	3.76	3.76	0.02	54.09	1.20	47	60
Pigfish	1.49	0.61	0.15	64.69	28.52	0.28	130.70	3.41	95	206
Atlantic midshipman	1.35	1.06	0.14	29.40	20.55	0.13	118.08	2.66	91	162
Southern kingfish	1.31	0.51	0.14	79.53	33.21	0.34	168.71	4.57	73	237
Moon jellyfish*	1.28	0.88	0.13	117.70	81.08	0.50				
Atlantic stingray	1.22	0.38	0.13	144.99	50.31	0.62	143.48	2.42	122	184
Spotted seatrout	1.20	1.02	0.12	20.06	16.65	0.09	128.42	0.75	115	162
Banded drum	1.12	1.02	0.12	2.02	1.92	0.01	58.62	1.69	46	68
Longnose spider crab*	0.94	0.41	0.10	23.52	11.79	0.10	44.59	1.63	28	58
White mullet	0.87	0.61	0.09	28.19	19.01	0.12	145.19	1.68	126	163
Brown rock shrimp*	0.75	0.75	0.08	1.53	1.53	0.01	54.28	2.73	42	62
Atlantic moonfish	0.70	0.43	0.07	4.40	2.50	0.02	77.52	5.61	52	116
Thinstripe hermit crab*	0.64	0.36	0.07	7.08	4.00	0.03				
Striped burrfish	0.45	0.23	0.05	7.98	4.44	0.03	54.68	5.45	40	102
Lightning whelk*	0.45	0.45	0.05	53.75	53.75	0.23	140.00		140	140
Flatclaw hermit crab*	0.45	0.34	0.05	3.26	2.40	0.01				
Striped mullet	0.34	0.24	0.04	7.45	6.34	0.03	137.40	3.75	125	146

Table 10 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Portly spider crab*	0.32	0.18	0.03	4.95	3.08	0.02	37.20	4.05	25	58
Sea walnut*	0.29	0.29	0.03	36.88	36.88	0.16				
Hogchoker	0.22	0.22	0.02	1.96	1.96	0.01	76.00	2.00	74	78
Rock sea bass	0.19	0.19	0.02	6.09	6.09	0.03	120.00		120	120
Lane snapper	0.16	0.16	0.02	5.11	5.11	0.02	110.00		110	110
Gulf kingfish	0.15	0.15	0.02	0.61	0.61	<0.01	68.00		68	68
Red snapper	0.13	0.13	0.01	1.18	1.18	0.01	75.00		75	75
Gizzard shad	0.12	0.09	0.01	4.65	3.14	0.02	166.25	25.75	140	192
Crested blenny	0.12	0.12	0.01	0.12	0.12	<0.01	61.00		61	61
Dwarf seahorse	0.12	0.12	0.01	1.11	1.11	<0.01	104.00		104	104
Bluefish	0.11	0.07	0.01	6.49	6.10	0.03	176.67	41.33	94	218
Dwarf sand perch	0.11	0.11	0.01	1.34	1.34	0.01	102.00		102	102
Southern flounder	0.10	0.10	0.01	8.97	8.97	0.04	177.00		117	117
Estuarine snapping shrimp*	0.10	0.10	0.01	0.10	0.10	<0.01	38.00		38	38
Chain pipefish	0.07	0.07	0.01	0.33	0.33	<0.01	234.00		234	234
Ocellated flounder	0.06	0.06	0.01	4.82	4.82	0.02	181.00		181	181
Gulf stone crab*	0.06	0.06	0.01	16.28	16.28	0.07	92.00		92	92
Leopard toadfish	0.04	0.04	<0.01	4.23	4.23	0.02	172.00		172	172
Inland silverside	0.04	0.04	<0.01	0.04	0.04	<0.01	70.00		70	70
Speckled swimming crab*	0.04	0.04	<0.01	0.55	0.55	<0.01	58.00		58	58
Leopard searobin	0.02	0.02	<0.01	0.46	0.46	<0.01	123.00		123	123
Commercial Shrimp										
White shrimp*	875.74	275.51	46.43	5,176.01	1,328.75	17.92	91.06	0.12	31	197
Brown shrimp*	30.24	18.02	1.60	270.72	201.23	0.94	96.67	0.50	57	153
Pink shrimp*	11.05	7.86	0.58	73.89	55.83	0.26	88.64	0.42	55	137

*Invertebrates

Table 11. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within San Antonio Bay during the 1994 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	901.73	181.97	27.76	7,306.67	1,266.48	21.17	88.43	0.16	52	207
Bay anchovy	767.12	59.95	23.61	393.27	148.69	1.14	44.65	0.13	19	76
Atlantic croaker	629.82	185.52	19.39	9,580.83	2,296.03	27.75	110.96	0.11	57	198
Spot croaker	383.53	98.10	11.81	7,170.78	1,782.75	20.77	108.75	0.11	40	190
Blue crab*	124.64	24.73	3.84	3,305.04	444.75	9.57	68.08	0.32	23	183
Sand seatrout	49.66	21.51	1.53	513.47	215.97	1.49	93.58	1.05	34	181
Hardhead catfish	49.23	29.68	1.52	1,263.98	641.99	3.66	137.59	0.74	78	257
Crevalle jack	45.39	35.93	1.40	409.87	295.96	1.19	74.98	0.28	22	112
Least puffer	40.65	24.34	1.25	145.45	79.00	0.42	49.93	0.34	27	112
Gafftopsail catfish	29.89	25.63	0.92	342.98	308.80	0.99	105.31	0.52	83	182
Atlantic brief squid*	29.86	20.96	0.92	466.18	378.00	1.35	43.79	0.12	12	99
Pinfish	25.49	15.43	0.78	240.57	140.74	0.70	82.26	0.31	55	107
Gizzard shad	22.63	19.22	0.70	241.67	177.99	0.70	103.84	0.21	79	153
Silver seatrout	20.20	18.88	0.62	257.29	229.42	0.75	97.13	0.94	55	210
Threadfin shad	20.16	17.93	0.62	562.48	543.80	1.63	127.88	1.55	77	159
Bay whiff	16.47	5.07	0.51	117.77	34.22	0.34	93.18	1.33	62	195
Atlantic thread herring	11.41	11.07	0.35	306.89	300.37	0.89	132.02	0.27	120	145
Silver perch	9.88	4.60	0.30	112.05	47.75	0.32	85.07	2.44	40	161
Southern flounder	8.02	4.99	0.25	455.53	320.06	1.32	157.90	1.89	116	206
Atlantic threadfin	7.28	3.98	0.22	170.93	108.14	0.50	135.68	0.83	107	154
Lesser blue crab*	6.73	2.84	0.21	50.85	28.52	0.15	42.61	1.01	26	101
Inshore lizardfish	4.63	2.35	0.14	96.07	59.94	0.28	144.34	5.04	86	218
FAMILY mud crabs*	3.50	1.71	0.11	4.68	2.42	0.01	13.70	0.16	9	22
Fringed flounder	3.39	1.03	0.10	63.72	25.88	0.18	108.95	2.28	84	129
Harvestfish	3.34	2.16	0.10	37.96	25.16	0.11	75.42	1.84	56	88
Bighead searobin	2.86	1.30	0.09	38.76	19.20	0.11	95.16	1.06	87	109

Table 11 (cont.)

Species	Number			Weight			Length				
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max	
Bycatch											
Mantis shrimp*	2.74	2.03	0.08	31.86	25.57	0.09	85.42	3.47	47	100	
Gulf butterfish	2.72	1.70	0.08	31.97	18.51	0.09	82.27	0.95	61	108	
Iridescent swimming crab*	2.41	1.36	0.07	14.88	7.94	0.04	42.76	0.57	35	48	
Spotted seatrout	2.37	2.06	0.07	345.29	337.27	1.00	229.80	6.56	143	289	
Blackcheek tonguefish	2.29	1.07	0.07	19.20	8.31	0.06	78.08	2.25	54	111	
Ladyfish	2.10	1.49	0.06	96.70	61.38	0.28	145.20	7.65	112	210	
Atlantic rangia*	1.97	1.97	0.06	37.79	37.79	0.11	35.14	0.74	33	38	
Pigfish	1.79	1.14	0.06	10.43	6.60	0.03	73.37	0.79	63	86	
Shoal flounder	1.60	1.60	0.05	13.37	13.37	0.04	90.67	1.67	89	94	
Hogchoker	1.05	0.39	0.03	15.71	6.16	0.05	87.08	3.02	64	109	
Rough silverside	1.03	0.81	0.03	4.31	4.07	0.01	49.14	4.87	33	98	
Southern kingfish	0.96	0.68	0.03	62.36	50.11	0.18	178.45	3.40	153	196	
Lined sole	0.88	0.40	0.03	10.62	5.73	0.03	82.40	2.78	67	94	
Atlantic bumper	0.84	0.69	0.03	1.62	1.38	<0.01	44.70	1.44	42	60	
Roughback shrimp*	0.81	0.81	0.02	3.26	3.26	0.01	76.00	3.00	73	79	
Ohio shrimp*	0.71	0.46	0.02	2.72	1.72	0.01	64.75	1.25	61	71	
Striped mullet	0.68	0.47	0.02	17.62	14.83	0.05	128.72	6.04	94	164	
Atlantic cutlassfish	0.68	0.43	0.02	60.55	42.87	0.18	562.00				
Atlantic midshipman	0.68	0.33	0.02	7.94	4.90	0.02	100.33	7.75	64	120	
Atlantic spadefish	0.66	0.66	0.02	18.46	18.46	0.05	88.00		88	88	
Gulf kingfish	0.61	0.61	0.02	1.21	1.21	<0.01	81.00		81	81	
Naked goby	0.29	0.29	0.01	0.29	0.29	<0.01	49.00		49	49	
Scaled sardine	0.25	0.25	0.01	7.94	7.94	0.02	147.00		147	147	
Spanish mackerel	0.23	0.23	0.01	13.06	13.06	0.04	211.00		211	211	
Bluntnose jack	0.23	0.23	0.01	0.45	0.45	<0.01	41.00		41	41	
Eastern oyster*	0.23	0.23	0.01	22.01	22.01	0.06	41.00		41	41	
Ocellated flounder	0.21	0.21	0.01	14.54	14.54	0.04	160.00		160	160	

Table 11 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Commercial Shrimp										
Brown shrimp*	4,606.64	1,449.18	57.38	32,558.33	10,352.35	47.78	96.88	0.02	56	190
White shrimp*	169.74	122.44	2.11	1,033.05	814.54	1.52	93.31	0.28	52	193
Pink shrimp*	3.47	3.47	0.04	29.39	29.39	0.04	95.00	3.89	86	102

*Invertebrates

Table 12. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within San Antonio Bay during the 1994 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	1,297.54	566.60	56.86	11,251.32	3,707.20	32.42	85.36	0.14	56	202
Hardhead catfish	174.84	50.15	7.66	1,735.40	704.96	5.00	96.55	0.18	60	334
Bay anchovy	107.04	39.82	4.69	221.51	132.58	0.64	55.20	0.13	19	76
Spot croaker	102.70	43.18	4.50	2,879.02	1,087.04	8.30	126.07	0.30	100	194
Atlantic thread herring	75.30	66.85	3.30	2,167.04	1,870.73	6.24	136.86	0.22	94	188
Pinfish	64.49	28.38	2.83	1,681.38	743.43	4.84	117.35	0.23	80	146
Atlantic brief squid*	50.06	24.99	2.19	726.14	410.64	2.09	49.62	0.27	20	103
Silver perch	42.36	14.43	1.86	994.57	345.83	2.87	117.36	0.31	81	172
Sand seatrout	33.18	7.84	1.45	681.24	185.08	1.96	119.99	1.17	48	344
Gafftopsail catfish	31.25	16.47	1.37	1,023.54	452.52	2.95	151.51	0.91	85	223
Mantis shrimp*	27.28	21.35	1.20	223.24	152.37	0.64	83.80	0.33	46	134
Blue crab*	23.06	10.02	1.01	638.22	226.76	1.84	66.57	1.01	21	172
Gizzard shad	20.50	7.48	0.90	502.21	162.54	1.45	134.10	1.60	86	287
Lesser blue crab*	17.35	15.74	0.76	154.26	141.20	0.44	47.22	0.09	22	82
White mullet	17.13	9.67	0.75	517.10	305.99	1.49	140.36	0.49	95	172
Silver seatrout	16.32	11.28	0.72	160.85	81.04	0.46	94.21	1.61	48	234
Inshore lizardfish	14.76	7.16	0.65	646.65	328.40	1.86	174.11	0.74	43	319
Striped anchovy	13.92	9.71	0.61	168.65	118.01	0.49	112.03	0.21	58	123
Threadfin shad	13.48	10.32	0.59	405.82	321.99	1.17	142.60	0.65	114	161
Bay whiff	13.26	10.28	0.58	185.17	149.61	0.53	106.76	0.48	70	141
Atlantic bumper	12.72	10.99	0.56	52.80	46.24	0.15	73.06	0.65	41	100
Atlantic croaker	9.96	5.81	0.44	459.49	195.32	1.32	151.12	2.21	108	232
Fringed flounder	9.70	7.83	0.43	119.44	89.02	0.34	100.46	0.51	64	135
Least puffer	9.39	2.75	0.41	102.75	31.80	0.30	77.18	0.58	55	105
Cabbagehead*	8.83	3.91	0.39	3,497.72	1,677.93	10.08				
Atlantic rangia*	8.52	8.52	0.37	17.04	17.04	0.05	13.68	1.95	7	36
Spotted seatrout	7.51	1.74	0.33	430.15	149.70	1.24	172.20	1.70	115	315
Black drum	6.77	3.96	0.30	932.29	535.24	2.69	199.68	0.81	155	263

Table 12 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Scaled sardine	5.08	4.31	0.22	59.15	50.13	0.17	96.71	0.18	82	108
Harvestfish	4.52	1.75	0.20	113.12	47.49	0.33	99.62	2.33	60	175
Eastern oyster*	4.35	4.35	0.19	357.91	357.91	1.03	62.35	5.74	25	118
Spotfin mojarra	3.41	2.60	0.15	29.94	22.69	0.09	84.59	0.67	61	113
Lookdown	3.03	1.76	0.13	18.33	12.52	0.05	67.91	1.70	51	107
Crevalle jack	2.94	2.64	0.13	95.53	89.76	0.28	135.74	1.67	100	171
Atlantic stingray	2.74	1.00	0.12	320.17	117.88	0.92	139.50	1.91	115	198
Striped mullet	2.53	1.93	0.11	174.21	151.51	0.50	165.69	2.15	105	281
Bighead searobin	2.49	1.43	0.11	21.32	15.21	0.06	75.70	3.71	30	130
Lined sole	2.41	1.54	0.11	55.95	49.46	0.16	86.17	4.67	47	130
Pigfish	2.09	1.95	0.09	44.74	39.91	0.13	109.43	2.94	76	144
Southern flounder	1.92	1.38	0.08	139.19	102.38	0.40	180.66	2.89	121	207
Gulf butterfish	1.89	1.28	0.08	63.39	43.12	0.18	128.42	1.03	118	142
Southern kingfish	1.84	1.54	0.08	117.26	113.03	0.34	157.32	5.95	109	235
Atlantic cutlassfish	1.42	0.76	0.06	160.52	121.86	0.46	529.09	25.64	285	645
Hogchoker	1.22	0.68	0.05	6.05	3.25	0.02	53.14	0.83	45	68
Trachypenaeid species*	1.22	1.22	0.05	2.44	2.44	0.01	65.00		65	65
Sheepshead	0.97	0.56	0.04	59.41	42.46	0.17	106.76	6.66	80	225
Longnose anchovy	0.77	0.71	0.03	9.56	8.89	0.03	112.15	0.19	98	131
Blackcheek tonguefish	0.73	0.50	0.03	12.74	9.47	0.04	125.96	1.79	110	137
Atlantic spadefish	0.68	0.47	0.03	21.36	16.87	0.06	80.24	1.26	63	96
Cero	0.55	0.55	0.02	9.91	9.91	0.03	148.00	3.06	144	154
Inland silverside	0.53	0.53	0.02	0.53	0.53	<0.01	57.00	3.00	54	60
Star drum	0.50	0.35	0.02	8.04	6.79	0.02	103.67	4.28	81	115
Bluntnose jack	0.44	0.44	0.02	12.30	12.30	0.04	138.00		138	138
Ladyfish	0.41	0.29	0.02	95.76	65.39	0.28	327.94	2.90	305	343
Atlantic midshipman	0.41	0.41	0.02	6.64	6.64	0.02	111.00		111	111
Southern stingray	0.34	0.34	0.01	98.46	98.46	0.28	204.00		204	204
Arrow squid*	0.31	0.31	0.01	2.88	2.88	0.01	44.80	1.88	40	51
Shark eye*	0.24	0.24	0.01	0.49	0.49	<0.01				
Iridescent swimming crab*	0.24	0.24	0.01	0.73	0.73	<0.01	36.00		36	36

Table 12 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Sea nettle*	0.21	0.21	0.01	5.75	5.75	0.02				
Violet goby	0.11	0.11	<0.01	3.35	3.35	0.01	206.00		206	206
Spanish mackerel	0.08	0.08	<0.01	2.04	2.04	0.01				
Atlantic moonfish	0.08	0.08	<0.01	0.45	0.45	<0.01	69.00		69	69
Commercial Shrimp										
White shrimp*	2,327.25	622.73	44.29	14,838.93	2,805.38	28.03	96.40	0.05	41	156
Brown shrimp*	435.84	297.27	8.29	2,422.99	1,593.60	4.58	84.22	0.05	41	148
Pink shrimp*	209.73	186.97	3.99	978.28	861.84	1.85	79.98	0.01	50	112
*Invertebrates										

Table 13. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within San Antonio Bay during the 1995 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Spot croaker	1,197.96	460.82	29.21	15,324.06	6,407.23	29.07	100.39	0.04	65	147
Atlantic croaker	771.57	229.81	18.81	12,947.72	4,959.36	24.56	112.77	0.11	57	196
Gulf menhaden	428.67	242.60	10.45	4,130.31	2,257.87	7.84	91.04	0.31	50	226
Bay anchovy	392.08	176.67	9.56	653.95	348.48	1.24	60.66	0.13	25	97
Atlantic brief squid*	267.68	119.87	6.53	3,011.04	1,241.51	5.71	41.84	0.12	15	96
Gafftopsail catfish	191.42	142.36	4.67	2,054.85	833.21	3.90	107.18	0.88	60	272
Silver perch	152.73	56.73	3.72	1,053.45	318.44	2.00	78.56	0.81	40	160
Sand seatrout	114.04	32.49	2.78	1,375.40	501.66	2.61	99.33	0.91	31	217
Hardhead catfish	89.55	41.01	2.18	2,031.91	688.76	3.85	136.81	0.49	45	275
Bay whiff	81.15	23.78	1.98	540.47	133.17	1.03	87.07	0.23	56	133
Pinfish	70.95	31.92	1.73	670.84	287.47	1.27	83.22	0.41	52	176
Blue crab*	55.05	15.90	1.34	2,088.31	446.73	3.96	81.24	0.51	26	161
Lesser blue crab*	53.74	19.11	1.31	566.52	195.78	1.07	53.21	0.19	18	89
Atlantic thread herring	28.87	17.07	0.70	905.62	568.04	1.72	140.75	0.37	94	161
Least puffer	28.14	13.70	0.69	97.95	39.37	0.19	53.72	0.57	32	106
Inshore lizardfish	23.80	9.28	0.58	333.69	114.47	0.63	125.38	1.51	58	210
Mantis shrimp*	18.07	7.91	0.44	209.36	112.36	0.40	94.92	0.99	58	122
Pigfish	15.15	9.55	0.37	214.42	159.22	0.41	88.66	0.24	64	170
Gizzard shad	11.46	7.07	0.28	506.96	202.59	0.96	155.51	2.49	124	236
Gulf butterfish	10.74	9.24	0.26	252.16	233.12	0.48	105.83	1.80	67	148
Atlantic bumper	9.58	9.14	0.23	14.36	12.66	0.03	48.98	0.53	42	65
Cabbagehead*	7.46	2.44	0.18	649.01	318.36	1.23				
Hogchoker	7.42	3.45	0.18	218.62	121.07	0.41	105.96	2.14	62	176
Atlantic threadfin	6.00	6.00	0.15	257.22	257.22	0.49	161.38		75	180
Atlantic cutlassfish	5.90	3.28	0.14	193.86	164.00	0.37	408.36	17.01	125	520
Crevalle jack	5.37	3.62	0.13	59.37	50.78	0.11	89.15	2.56	44	120
Blackcheek tonguefish	5.20	1.69	0.13	54.96	18.41	0.10	103.57	1.27	78	121

Table 13 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Fringed flounder	5.14	5.14	0.13	116.05	116.05	0.22	119.80	1.53	115	123
Bighead searobin	4.52	2.48	0.11	114.38	81.60	0.22	108.35	5.90	54	180
White mullet	4.27	3.68	0.10	61.88	54.12	0.12	108.13	0.38	97	127
Atlantic midshipman	4.21	3.12	0.10	39.76	26.95	0.08	94.80	2.25	53	146
Ocellated flounder	4.18	4.18	0.10	238.99	238.99	0.45	157.02		133	173
Ladyfish	3.20	1.59	0.08	100.22	47.99	0.19	183.16	2.12	125	260
Southern flounder	3.04	3.04	0.07	68.30	68.30	0.13	132.74		122	142
Atlantic spadefish	2.76	1.63	0.07	69.54	66.08	0.13	81.84	4.74	36	105
Southern kingfish	2.48	1.19	0.06	193.83	97.98	0.37	196.15	2.14	175	212
Silver seatrout	2.42	1.86	0.06	37.25	23.65	0.07	110.10	4.31	55	147
Longnose spider crab*	2.18	1.38	0.05	3.84	2.49	0.01	16.35	0.29	12	22
Gulf stone crab*	1.71	1.71	0.04	25.63	25.63	0.05	87.00		87	87
Lined sole	1.65	1.15	0.04	35.28	31.12	0.07	89.80	3.96	68	124
Spanish mackerel	1.29	1.29	0.03	58.90	58.90	0.11	190.67	32.77	127	236
Harvestfish	1.19	1.03	0.03	6.85	5.17	0.01	59.57	1.41	49	75
Gulf flounder	1.14	1.14	0.03	17.13	17.13	0.03	114.00		114	114
Lined seahorse	0.95	0.95	0.02	6.66	6.66	0.01	132.00		132	132
FAMILY porcelain crabs*	0.87	0.56	0.02	0.87	0.56	<0.01	8.60	0.67	5	11
Spotted seatrout	0.69	0.44	0.02	126.69	86.04	0.24	264.67	4.67	246	281
Unidentified grass shrimp*	0.54	0.54	0.01	0.54	0.54	<0.01	39.00	3.00	36	42
Star drum	0.52	0.52	0.01	0.52	0.52	<0.01	27.00		27	27
Gulf kingfish	0.52	0.52	0.01	59.75	59.75	0.11	215.00		215	215
Atlantic stingray	0.52	0.52	0.01	64.54	64.54	0.12	149.00		149	149
Shoal flounder	0.52	0.52	0.01	23.42	23.42	0.04	148.00		148	148
Thinstripe hermit crab*	0.52	0.52	0.01	6.81	6.81	0.01				
Roughback shrimp*	0.37	0.37	0.01	0.74	0.74	<0.01	55.00		55	55
CLASS jellyfish*			<0.01	820.34	354.14	1.56				

Table 13 (cont.)

Species	Number			Weight			Length				
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max	
Commercial Shrimp											
Brown shrimp*	7,365.20	2,581.20	63.69	41,843.46	14,353.27	44.04	86.26	0.02	32	177	
White shrimp*	96.06	81.17	0.83	456.75	258.90	0.48	88.12	0.56	52	162	
Pink shrimp*	1.14	1.14	0.01	3.43	3.43	-	71.00		71	71	

*Invertebrates

Table 14. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within San Antonio Bay during the 1995 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	1,981.38	909.84	53.92	21,283.34	9,627.16	32.35	99.73	0.07	68	189
Spot croaker	284.24	181.62	7.73	8,988.21	3,951.65	13.66	126.84	0.38	27	230
Hardhead catfish	264.34	127.26	7.19	2,541.26	923.79	3.86	98.46	0.33	62	256
Sea nettle*	221.15	126.74	6.02	6,558.18	3,700.53	9.97				
Pinfish	175.53	145.17	4.78	3,431.98	2,602.98	5.22	106.96	0.18	75	147
Bay anchovy	138.15	56.68	3.76	124.65	60.25	0.19	46.87	0.21	22	86
Silver perch	111.03	30.89	3.02	2,275.40	692.93	3.46	116.71	0.38	84	167
Atlantic croaker	109.31	94.48	2.97	3,764.66	3,011.50	5.72	149.02	0.16	109	182
Cabbagehead*	58.07	30.18	1.58	4,078.24	2,855.44	6.20				
Least puffer	53.08	19.42	1.44	446.61	195.22	0.68	71.55	0.20	48	116
Gafftopsail catfish	52.66	38.08	1.43	1,349.66	780.81	2.05	148.32	0.54	89	200
Sand seatrout	38.05	21.45	1.04	751.74	342.90	1.14	119.51	1.21	85	280
Hooked mussel*	26.58	26.58	0.72	75.69	75.69	0.12	25.40	1.21	18	45
White mullet	25.74	16.02	0.70	757.71	458.23	1.15	142.49	0.44	114	167
Silver seatrout	21.26	10.41	0.58	500.24	306.03	0.76	119.50	1.36	60	216
Blue crab*	15.99	6.57	0.44	430.94	225.82	0.65	65.45	1.64	36	152
Threadfin shad	14.65	14.38	0.40	233.65	230.70	0.36	118.32	0.33	84	151
Harvestfish	13.42	12.81	0.37	567.94	558.69	0.86	115.15	1.16	65	151
Atlantic spadefish	9.65	6.30	0.26	404.82	271.95	0.62	98.10	2.31	62	131
Atlantic brief squid*	8.42	6.01	0.23	159.24	132.64	0.24	50.48	0.44	31	82
Moon jellyfish*	5.43	5.43	0.15	52.78	52.78	0.08				
Bay whiff	5.30	4.62	0.14	78.71	62.99	0.12	118.02	1.12	106	137
Inshore lizardfish	5.04	4.58	0.14	129.12	113.60	0.20	163.08	0.95	134	194
Striped mullet	4.74	2.92	0.13	851.21	722.66	1.29	256.37	4.24	150	304
Atlantic stingray	3.59	1.49	0.10	372.44	167.60	0.57	140.43	0.53	131	146
Irish pompano	3.55	2.83	0.10	31.99	26.84	0.05	91.73	0.55	82	97
Spotted seatrout	3.22	1.51	0.09	140.18	74.35	0.21	163.57	7.38	94	242

Table 14 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Atlantic threadfin	2.93	2.93	0.08	166.78	166.78	0.25	186.08		181	195
Atlantic cutlassfish	2.41	2.41	0.07	203.41	203.41	0.31	491.50	31.97	409	545
Eastern oyster*	2.26	1.69	0.06	144.84	114.30	0.22	55.71	1.69	34	98
Pigfish	2.09	1.69	0.06	59.11	42.38	0.09	129.85	3.18	101	151
Southern flounder	1.34	0.88	0.04	194.73	137.29	0.30	241.66	2.82	220	253
Longnose anchovy	1.20	1.20	0.03	7.20	7.20	0.01	88.00		88	88
Atlantic midshipman	1.13	0.80	0.03	12.35	8.33	0.02	96.75	0.58	95	102
Lesser blue crab*	0.88	0.88	0.02	4.95	4.95	0.01	41.50	0.50	41	42
Lined sole	0.79	0.79	0.02	3.14	3.14	<0.01	54.00	4.00	46	58
Sheepshead	0.68	0.68	0.02	19.06	19.06	0.03	133.00		133	133
Crevalle jack	0.62	0.62	0.02	23.40	23.40	0.04	141.00		141	141
Ocellated flounder	0.62	0.62	0.02	33.26	33.26	0.05	154.00		154	154
Ladyfish	0.62	0.62	0.02	40.65	10.65	0.06	233.00		233	233
Atlantic moonfish	0.62	0.62	0.02	12.32	12.32	0.02	112.00		112	112
Southern kingfish	0.62	0.62	0.02	67.75	67.75	0.10	209.00		209	209
Gulf butterfish	0.58	0.58	0.02	35.71	35.71	0.05	175.00		175	175
Mantis shrimp*	0.58	0.58	0.02	4.61	4.61	0.01	87.00		87	87
Gizzard shad	0.46	0.46	0.01	15.20	15.20	0.02	147.17		119	191
Red drum	0.38	0.38	0.01	138.29	138.29	0.21	333.00		333	333
Spanish mackerel	0.36	0.36	0.01	2.52	2.52	<0.01	101.00		101	101
Thinstripe hermit crab*	0.24	0.24	0.01	3.58	3.58	0.01				
CLASS jellyfish*				4,214.30	2,299.93	6.40				
Commercial Shrimp										
White shrimp*	3,044.31	763.97	42.62	18,362.84	2,725.47	21.34	90.06	0.06	45	166
Brown shrimp*	420.61	185.28	5.89	1,849.07	771.73	2.15	78.21	0.10	46	118
Pink shrimp*	2.38	2.38	0.03	20.04	20.04	0.02	95.00	3.35	84	111

*Invertebrates

Table 15. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Aransas Bay during the 1993 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	2,754.37	1,171.48	54.12	17,515.90	10,443.32	37.62	85.46	0.08	55	165
Spot croaker	782.03	243.89	15.37	7,166.54	2,334.11	15.39	89.18	0.01	60	175
Atlantic croaker	544.94	139.28	10.71	5,956.82	1,274.15	12.79	103.46	0.14	62	165
Blue crab*	367.22	77.19	7.22	10,887.67	2,444.54	23.38	76.81	0.19	18	170
Bay anchovy	276.28	73.64	5.43	369.92	94.99	0.79	58.31	0.07	31	81
Sand seatrout	86.76	23.96	1.70	973.02	299.18	2.09	97.37	0.39	25	162
Lesser blue crab*	79.43	36.97	1.56	527.42	331.03	1.13	36.87	0.08	20	65
Pinfish	45.78	19.88	0.90	388.53	122.75	0.83	80.96	0.36	48	134
Bay whiff	36.26	13.68	0.71	183.85	49.76	0.39	81.11	0.45	48	112
Silver perch	27.31	17.03	0.54	104.58	48.99	0.22	63.16	0.89	35	206
Hardhead catfish	15.16	4.34	0.30	483.34	123.56	1.04	146.55	3.99	59	294
Blackcheek tonguefish	7.95	3.09	0.16	66.73	27.54	0.14	91.32	0.51	60	116
Least puffer	6.90	2.81	0.14	51.99	26.49	0.11	59.55	1.42	30	119
Atlantic spadefish	6.67	4.87	0.13	24.06	14.12	0.05	30.39	1.87	28	74
Hogchoker	5.80	5.35	0.11	22.94	11.34	0.05	52.46	5.77	22	124
Sharptail goby	5.79	5.28	0.11	70.14	64.48	0.15	98.00	0.13	109	190
Atlantic midshipman	5.35	1.97	0.11	31.90	16.53	0.07	59.99	4.87	36	160
Lined sole	4.24	2.47	0.08	38.71	26.98	0.08	64.32	0.64	54	69
Southern flounder	3.74	1.24	0.07	153.05	62.87	0.33	152.92	2.98	115	196
Atlantic threadfin	3.56	1.79	0.07	62.06	28.21	0.13	121.94	3.67	89	165
Harvestfish	3.56	2.16	0.07	113.09	95.24	0.24	96.61	5.90	52	138
Atlantic cutlassfish	2.97	1.96	0.06	65.90	39.71	0.14	292.44	5.23	154	468
Inshore lizardfish	2.33	2.33	0.05	60.61	60.61	0.13	157.00		157	157
Spotfin mojarra	2.33	2.33	0.05	13.99	13.99	0.03	87.00		87	87

NOTICE OR ERRATA

**FOR RECEIPTS OF TEXAS PARKS AND WILDLIFE
MANAGEMENT DATA SERIES REPORT No. 194.**

TRENDS IN TEXAS COMMERCIAL FISHERY LANDINGS, 1972-1999
by Stephanie Auil-Marshalleck, Page Campbell, Linda Butler, and Lance
Robinson, 2001.

Please replace the following pages with the corrected tables. We are sorry
for any inconvenience.

J. Dale Shively
Texas Parks and Wildlife
Coastal Fisheries Division
4200 Smith School Rd.
Austin, TX 78744
(512)389-4686

ERRATA

Table 3. (Continued) is to be placed as Page 14.

Table 4. (Continued) is to be placed as Page 16

Table 11. (Continued) is to be placed as Page 30.

Table 12. (Continued) is to be placed as Page 32.

Table E.11 is to be placed as Page 148.

Table E.12 is to be placed as Page 149.

Table 3. (Continued).

Year	Finfish						Shellfish									Grand Total
	Black drum	Flounder	Sheeps-head	Snapper	Other	Total	Shrimp			Total	Blue Crab	Eastern Oyster	Other	Total		
							Brown and Pink	White	Other							
1991	665.8	275.6	25.9	370.4	474.9	1812.6	70744.4	18478.9	1885.6	91108.9	6137.1	2988.2	103.4	100337.7	102150.3	
1992	846.1	297.6	31.6	1059.2	1276.6	3511.1	49782.2	20788.7	6287.3	76858.3	6135.4	2705.7	75.6	85774.9	89286.0	
1993	841.0	212.6	36.6	1472.0	1262.7	3824.9	46954.0	17106.4	9554.8	73615.3	8288.2	2964.4	26.3	84894.1	88719.0	
1994	1822.8	211.0	39.5	1164.4	1348.8	4586.5	52023.7	15961.5	3007.3	70992.5	5154.4	4581.5	41.9	80770.3	85356.8	
1995	2915.6	274.2	54.1	1244.1	1961.8	6449.9	51882.4	16166.0	2252.5	70300.9	5786.5	4670.6	56.1	80814.0	87263.8	
1996	4253.0	218.2	103.2	1687.0	1616.3	7877.8	47491.1	21366.0	3591.8	72448.9	6311.4	5705.4	127.5	84593.3	92471.0	
1997	2775.8	135.7	65.3	1930.6	1621.1	6528.4	40583.8	19013.3	5006.0	64603.0	5739.0	4579.1	60.5	74981.6	81510.0	
1998	2690.6	221.0	117.2	1626.6	1616.7	6272.1	52167.2	22101.1	3352.9	77621.2	6989.1	3437.9	84.7	88133.0	94405.1	
1999	2838.0	287.8	118.2	1629.4	1762.6	6635.8	43216.1	20131.3	1263.1	64610.7	6472.1	5183.3	97.7	77591.7	84227.5	

Table 4. (Continued).

Year	Finfish						Shellfish								Grand Total
	Black drum	Flounder	Sheeps-head	Snapper	Other	Total	Shrimp			Blue Crab	Eastern Oyster	Other	Total		
							Brown and Pink	White	Other						
1991	512.4	319.2	8.0	687.8	560.8	2088.2	145594.8	41227.8	837.1	187659.7	2276.8	7223.3	207.1	197366.8	199455.1
1992	670.1	377.8	13.3	1781.4	1655.6	4498.3	104533.2	42330.8	2784.6	149648.5	2775.1	5085.9	84.2	157593.7	162092.0
1993	651.2	328.3	14.7	2729.9	1604.4	5328.6	94909.8	32992.6	3097.0	130999.4	3960.7	4624.0	26.1	139610.2	144938.8
1994	1452.1	356.1	16.7	2301.0	1673.2	5799.3	135047.4	44106.5	1574.6	180728.6	3056.6	7798.5	40.4	191624.1	197423.3
1995	2506.6	483.9	25.8	2424.2	2576.4	8016.8	119216.3	40300.2	1537.0	161053.4	4062.0	8788.0	108.1	174011.4	182028.2
1996	3868.8	407.6	42.9	3178.1	2109.0	9606.4	108525.7	51667.3	2373.2	162566.1	4211.6	12589.7	174.8	179542.3	189148.7
1997	2362.9	236.8	31.9	3296.2	2378.4	8306.3	109542.4	53056.7	2862.7	165461.8	3670.7	11200.2	89.3	180422.0	188728.4
1998	2816.2	429.9	49.9	3361.4	2368.2	9025.6	111488.5	54967.7	1954.6	168410.8	4549.8	8282.5	133.2	181376.3	190401.9
1999	2742.9	603.0	48.0	3291.0	2987.7	9672.7	110842.3	58235.6	741.4	169819.2	4294.9	11216.4	168.7	188103.2	197775.9

Table 11. (Continued).

Year	Finfish									Shellfish							Grand Total
	Black drum	Flounder	Sheeps-head	Mullet	Cobia	Grouper	Snapper	Other	Total	Shrimp				Blue crab	Other	Total	
										Brown and Pink	White	Other	Total				
1991	2.2	42.5	1.6	19.2	8.7	126.8	370.4	212.0	783.4	56648.5	10654.8	1885.3	69188.6	11.2	6.1	69205.9	69989.3
1992	34.9	45.4	0.7	12.2	7.1	145.5	1059.2	860.9	2165.8	40534.0	10389.2	6277.8	57201.0	7.4	10.3	57218.7	59384.5
1993	13.8	24.3	0.9	22.3	10.0	196.7	1472.0	760.7	2500.8	36572.6	8990.8	9554.4	55117.8	2.5	4.2	55124.5	57662.8
1994	54.2	18.5	1.0	1.3	6.5	175.0	1164.4	831.1	2251.9	38071.0	8982.1	3006.4	50059.5	41.5	3.5	50104.6	52356.5
1995	127	36.2	1.4	1.0	6.1	199.8	1244.1	1400.0	3015.4	40151.0	9913.2	2252.4	52316.6	3.5	7.8	52327.9	55343.4
1996	58.9	14.5	0.8	1.3	9.0	82.1	1687.0	1154.8	3008.5	38157.0	14211.9	3591.8	55960.7	40.1	4.7	56005.5	59014.0
1997	0.0	4.4	2.9	0.6	6.4	89.5	1930.6	1259.8	3294.2	28827.3	11202.9	4981.9	45012.1	25.3	5.4	45042.8	48337.0
1998	15.8	5.3	0.4	1.9	12.6	164.9	1626.6	1066.3	2893.9	42165.6	15826.5	3346.3	61338.3	6.7	9.2	61354.1	64248.0
1999	39.3	3.6	0.8	4.4	11.1	240.8	1629.4	1088.2	3017.5	37578.4	15294.3	1203.3	54076.1	0.2	11.2	54087.5	57140.8

Table 12. (Continued).

Year	Finfish									Shellfish							Grand Total
	Black drum	Flounder	Sheeps-head	Mullet	Cobia	Grouper	Snapper	Other	Total	Shrimp			Blue crab	Other	Total		
										Brown and Pink	White	Other					
1991	2.0	51.9	0.6	4.6	7.9	183.9	687.8	314.2	1252.8	131761.1	28024.4	836.9	160622.4	4.7	2.4	160629.5	161882.3
1992	23.0	50.6	0.3	2.2	6.7	224.4	1781.4	1289.0	3377.5	95288.5	25897.7	2782.1	123968.3	3.9	6.6	123978.8	127356.3
1993	11.7	30.6	0.4	5.5	9.7	322.5	2729.9	1105.9	4216.2	86091.7	21998.7	3096.8	111187.3	1.3	3.0	111191.6	115474.2
1994	37.4	24.2	0.6	2.0	6.6	305.8	2301.0	1058.5	3736.1	117269.8	29200.3	1574.4	148044.4	35.3	3.0	148082.7	151818.8
1995	107	64.1	0.7	0.6	7.3	355.1	2424.2	1812.2	4770.8	107255.2	30690.1	1536.9	139482.3	2.9	4.1	139489.3	144260.1
1996	45.1	22.0	0.4	1.3	10.5	156.4	3178.1	1541.2	4955.1	99048.3	38560.5	2373.2	139981.9	24.0	3.3	140009.3	144964.4
1997	0.0	5.8	4.4	0.5	5.9	172.4	3296.2	1795.3	5280.6	93499.3	37330.7	2851.9	133682.0	14.5	2.9	133699.4	138980.0
1998	13.5	9.4	0.2	2.5	16.2	336.4	3361.4	1455.1	5194.7	102382.5	45915.2	1949.5	150247.2	3.5	3.6	150254.3	155449.0
1999	53.0	5.9	0.3	5.6	14.6	487.8	3291.0	1701.6	5559.9	105984.5	50140.0	722.6	156847.0	0.2	17.4	156864.6	162455.3

Table E.11. Weight (lb) of each shrimp species (heads-on) landed commercially from the Gulf of Mexico during 1999.

Month	Brown and Pink	White	Other	Total
January	904,113	905,529	119,156	1,928,799
February	1,473,117	647,390	206,302	2,326,809
March	736,596	720,001	171,145	1,627,742
April	730,217	840,318	270,992	1,841,527
May	1,033,473	1,467,585	163,610	2,664,668
June	1,870,691	811,572	39,340	2,721,604
July	6,172,072	2,054,633	29,734	8,256,439
August	10,964,696	2,607,024	24,168	12,595,888
September	5,687,154	1,408,341	22,167	7,117,662
October	2,745,214	1,925,947	47,797	4,718,958
November	2,555,867	1,975,523	58,023	4,589,413
December	2,705,203	930,433	50,913	3,686,548
Total	37,548,687	15,294,294	1,203,348	54,076,056

Table E.12. Ex-vessel value (\$) of each shrimp species (heads-on) landed commercially from the Gulf of Mexico during 1999.

Month	Brown and Pink	White	Other	Total
January	2,730,834	3,011,100	61,059	5,802,993
February	4,714,446	1,627,220	91,355	6,433,021
March	2,641,778	2,161,801	73,000	4,876,579
April	2,612,943	3,026,271	185,809	5,825,023
May	2,577,802	4,496,694	123,177	7,197,673
June	3,652,218	2,413,393	25,110	6,090,721
July	13,854,358	8,637,998	16,725	22,509,081
August	27,342,613	6,015,364	17,842	33,375,819
September	16,731,880	4,048,513	25,947	20,806,340
October	9,805,694	6,021,688	50,666	15,878,048
November	9,117,111	6,096,423	24,130	15,237,664
December	10,202,785	2,583,565	27,738	12,814,088
Total	105,897,865	50,140,030	722,558	156,847,050

NOTICE OR ERRATA

**FOR RECEIPTS OF TEXAS PARKS AND WILDLIFE
MANAGEMENT DATA SERIES REPORT No. 194.**

TRENDS IN TEXAS COMMERCIAL FISHERY LANDINGS, 1972-1999
by Stephanie Auil-Marshalleck, Page Campbell, Linda Butler, and Lance
Robinson, 2001.

Please replace the following pages with the corrected tables. We are sorry
for any inconvenience.

J. Dale Shively
Texas Parks and Wildlife
Coastal Fisheries Division
4200 Smith School Rd.
Austin, TX 78744
(512)389-4686

ERRATA

Table 3. (Continued) is to be placed as Page 14.

Table 4. (Continued) is to be placed as Page 16

Table 11. (Continued) is to be placed as Page 30.

Table 12. (Continued) is to be placed as Page 32.

Table E.11 is to be placed as Page 148.

Table E.12 is to be placed as Page 149.

Table 3. (Continued).

Year	Finfish						Shellfish								Grand Total
	Black drum	Flounder	Sheeps-head	Snapper	Other	Total	Shrimp				Blue Crab	Eastern Oyster	Other	Total	
							Brown and Pink	White	Other	Total					
1991	665.8	275.6	25.9	370.4	474.9	1812.6	70744.4	18478.9	1885.6	91108.9	6137.1	2988.2	103.4	100337.7	102150.3
1992	846.1	297.6	31.6	1059.2	1276.6	3511.1	49782.2	20788.7	6287.3	76858.3	6135.4	2705.7	75.6	85774.9	89286.0
1993	841.0	212.6	36.6	1472.0	1262.7	3824.9	46954.0	17106.4	9554.8	73615.3	8288.2	2964.4	26.3	84894.1	88719.0
1994	1822.8	211.0	39.5	1164.4	1348.8	4586.5	52023.7	15961.5	3007.3	70992.5	5154.4	4581.5	41.9	80770.3	85356.8
1995	2915.6	274.2	54.1	1244.1	1961.8	6449.9	51882.4	16166.0	2252.5	70300.9	5786.5	4670.6	56.1	80814.0	87263.8
1996	4253.0	218.2	103.2	1687.0	1616.3	7877.8	47491.1	21366.0	3591.8	72448.9	6311.4	5705.4	127.5	84593.3	92471.0
1997	2775.8	135.7	65.3	1930.6	1621.1	6528.4	40583.8	19013.3	5006.0	64603.0	5739.0	4579.1	60.5	74981.6	81510.0
1998	2690.6	221.0	117.2	1626.6	1616.7	6272.1	52167.2	22101.1	3352.9	77621.2	6989.1	3437.9	84.7	88133.0	94405.1
1999	2838.0	287.8	118.2	1629.4	1762.6	6635.8	43216.1	20131.3	1263.1	64610.7	6472.1	5183.3	97.7	77591.7	84227.5

Table 4. (Continued).

Year	Finfish						Shellfish								Grand Total
	Black drum	Flounder	Sheeps-head	Snapper	Other	Total	Shrimp				Blue Crab	Eastern Oyster	Other	Total	
							Brown and Pink	White	Other	Total					
1991	512.4	319.2	8.0	687.8	560.8	2088.2	145594.8	41227.8	837.1	187659.7	2276.8	7223.3	207.1	197366.8	199455.1
1992	670.1	377.8	13.3	1781.4	1655.6	4498.3	104533.2	42330.8	2784.6	149648.5	2775.1	5085.9	84.2	157593.7	162092.0
1993	651.2	328.3	14.7	2729.9	1604.4	5328.6	94909.8	32992.6	3097.0	130999.4	3960.7	4624.0	26.1	139610.2	144938.8
1994	1452.1	356.1	16.7	2301.0	1673.2	5799.3	135047.4	44106.5	1574.6	180728.6	3056.6	7798.5	40.4	191624.1	197423.3
1995	2506.6	483.9	25.8	2424.2	2576.4	8016.8	119216.3	40300.2	1537.0	161053.4	4062.0	8788.0	108.1	174011.4	182028.2
1996	3868.8	407.6	42.9	3178.1	2109.0	9606.4	108525.7	51667.3	2373.2	162566.1	4211.6	12589.7	174.8	179542.3	189148.7
1997	2362.9	236.8	31.9	3296.2	2378.4	8306.3	109542.4	53056.7	2862.7	165461.8	3670.7	11200.2	89.3	180422.0	188728.4
1998	2816.2	429.9	49.9	3361.4	2368.2	9025.6	111488.5	54967.7	1954.6	168410.8	4549.8	8282.5	133.2	181376.3	190401.9
1999	2742.9	603.0	48.0	3291.0	2987.7	9672.7	110842.3	58235.6	741.4	169819.2	4294.9	11216.4	168.7	188103.2	197775.9

Table 11. (Continued).

Year	Finfish									Shellfish							Grand Total
	Black drum	Flounder	Sheeps-head	Mullet	Cobia	Grouper	Snapper	Other	Total	Shrimp				Blue crab	Other	Total	
										Brown and Pink	White	Other	Total				
1991	2.2	42.5	1.6	19.2	8.7	126.8	370.4	212.0	783.4	56648.5	10654.8	1885.3	69188.6	11.2	6.1	69205.9	69989.3
1992	34.9	45.4	0.7	12.2	7.1	145.5	1059.2	860.9	2165.8	40534.0	10389.2	6277.8	57201.0	7.4	10.3	57218.7	59384.5
1993	13.8	24.3	0.9	22.3	10.0	196.7	1472.0	760.7	2500.8	36572.6	8990.8	9554.4	55117.8	2.5	4.2	55124.5	57662.8
1994	54.2	18.5	1.0	1.3	6.5	175.0	1164.4	831.1	2251.9	38071.0	8982.1	3006.4	50059.5	41.5	3.5	50104.6	52356.5
1995	127	36.2	1.4	1.0	6.1	199.8	1244.1	1400.0	3015.4	40151.0	9913.2	2252.4	52316.6	3.5	7.8	52327.9	55343.4
1996	58.9	14.5	0.8	1.3	9.0	82.1	1687.0	1154.8	3008.5	38157.0	14211.9	3591.8	55960.7	40.1	4.7	56005.5	59014.0
1997	0.0	4.4	2.9	0.6	6.4	89.5	1930.6	1259.8	3294.2	28827.3	11202.9	4981.9	45012.1	25.3	5.4	45042.8	48337.0
1998	15.8	5.3	0.4	1.9	12.6	164.9	1626.6	1066.3	2893.9	42165.6	15826.5	3346.3	61338.3	6.7	9.2	61354.1	64248.0
1999	39.3	3.6	0.8	4.4	11.1	240.8	1629.4	1088.2	3017.5	37578.4	15294.3	1203.3	54076.1	0.2	11.2	54087.5	57140.8

Table 12. (Continued).

Year	Finfish									Shellfish							Grand Total
	Black drum	Flounder	Sheeps-head	Mullet	Cobia	Grouper	Snapper	Other	Total	Shrimp				Blue crab	Other	Total	
										Brown and Pink	White	Other	Total				
1991	2.0	51.9	0.6	4.6	7.9	183.9	687.8	314.2	1252.8	131761.1	28024.4	836.9	160622.4	4.7	2.4	160629.5	161882.3
1992	23.0	50.6	0.3	2.2	6.7	224.4	1781.4	1289.0	3377.5	95288.5	25897.7	2782.1	123968.3	3.9	6.6	123978.8	127356.3
1993	11.7	30.6	0.4	5.5	9.7	322.5	2729.9	1105.9	4216.2	86091.7	21998.7	3096.8	111187.3	1.3	3.0	111191.6	115474.2
1994	37.4	24.2	0.6	2.0	6.6	305.8	2301.0	1058.5	3736.1	117269.8	29200.3	1574.4	148044.4	35.3	3.0	148082.7	151818.8
1995	107	64.1	0.7	0.6	7.3	355.1	2424.2	1812.2	4770.8	107255.2	30690.1	1536.9	139482.3	2.9	4.1	139489.3	144260.1
1996	45.1	22.0	0.4	1.3	10.5	156.4	3178.1	1541.2	4955.1	99048.3	38560.5	2373.2	139981.9	24.0	3.3	140009.3	144964.4
1997	0.0	5.8	4.4	0.5	5.9	172.4	3296.2	1795.3	5280.6	93499.3	37330.7	2851.9	133682.0	14.5	2.9	133699.4	138980.0
1998	13.5	9.4	0.2	2.5	16.2	336.4	3361.4	1455.1	5194.7	102382.5	45915.2	1949.5	150247.2	3.5	3.6	150254.3	155449.0
1999	53.0	5.9	0.3	5.6	14.6	487.8	3291.0	1701.6	5559.9	105984.5	50140.0	722.6	156847.0	0.2	17.4	156864.6	162455.3

Table E.11. Weight (lb) of each shrimp species (heads-on) landed commercially from the Gulf of Mexico during 1999.

Month	Brown and Pink	White	Other	Total
January	904,113	905,529	119,156	1,928,799
February	1,473,117	647,390	206,302	2,326,809
March	736,596	720,001	171,145	1,627,742
April	730,217	840,318	270,992	1,841,527
May	1,033,473	1,467,585	163,610	2,664,668
June	1,870,691	811,572	39,340	2,721,604
July	6,172,072	2,054,633	29,734	8,256,439
August	10,964,696	2,607,024	24,168	12,595,888
September	5,687,154	1,408,341	22,167	7,117,662
October	2,745,214	1,925,947	47,797	4,718,958
November	2,555,867	1,975,523	58,023	4,589,413
December	2,705,203	930,433	50,913	3,686,548
Total	37,548,687	15,294,294	1,203,348	54,076,056

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March	2,641,778	2,161,801	73,000	4,876,579
April	2,612,943	3,026,271	185,809	5,825,023
May	2,577,802	4,496,694	123,177	7,197,673
June	3,652,218	2,413,393	25,110	6,090,721
July	13,854,358	8,637,998	16,725	22,509,081
August	27,342,613	6,015,364	17,842	33,375,819
September	16,731,880	4,048,513	25,947	20,806,340
October	9,805,694	6,021,688	50,666	15,878,048
November	9,117,111	6,096,423	24,130	15,237,664
December	10,202,785	2,583,565	27,738	12,814,088
Total	105,897,865	50,140,030	722,558	156,847,050

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Table 15 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Bighead searobin	2.11	1.18	0.04	34.85	16.08	0.07	101.62	4.35	56	121
Atlantic brief squid*	1.67	1.09	0.03	15.96	10.24	0.03	40.80	0.01	29	65
Roughback shrimp*	1.62	1.62	0.03	3.89	3.89	0.01	52.80	<0.01	48	60
Fringed flounder	1.38	1.38	0.03	11.01	11.01	0.02	92.25	<0.01	79	110
Atlantic stingray	1.11	0.97	0.02	40.00	25.67	0.09	95.14	6.49	75	150
Gulf grassflat crab*	0.62	0.49	0.01	0.62	0.49	<0.01	12.00		12	12
Pigfish	0.58	0.37	0.01	27.92	19.61	0.06	139.50	5.83	95	157
Ohio shrimp*	0.51	0.32	0.01	1.67	1.10	<0.01	68.67	1.05	62	72
Thinstripe hermit crab*	0.50	0.50	0.01	4.96	4.96	0.01				
Gizzard shad	0.44	0.29	0.01	14.30	12.43	0.03	137.00	32.00	105	169
Southern kingfish	0.44	0.44	0.01	47.96	47.96	0.10	211.00		211	211
Ladyfish	0.34	0.34	0.01	6.88	6.88	0.01	163.00		163	163
Gulf toadfish	0.34	0.34	0.01	8.25	8.25	0.02	113.00		113	113
Shrimp eel	0.26	0.26	0.01	29.49	29.49	0.06	370.00		370	370
Spotted seatrout	0.19	0.19	<0.01	24.68	24.68	0.05	240.00		240	240
Blotched swimming crab*	0.13	0.13	<0.01	4.84	4.84	0.01	70.00		70	70
Iridescent swimming crab*	0.13	0.13	<0.01	1.27	1.27	<0.01	50.00		50	50
Dwarf surf clam*				947.65	361.28	2.04	<10			
Commercial Shrimp										
Brown shrimp*	4,074.79	348.52	44.42	19,465.25	1,356.59	29.40	87.22	0.02	49	140
White shrimp*	8.34	4.03	0.09	185.21	106.60	<0.01	148.46	0.46	123	160
Pink shrimp*	0.32	0.32	<0.00	3.24	3.24	<0.01	80.00		80	80

* Invertebrates

Table 16. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Aransas Bay during the 1993 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Gulf menhaden	1,041.11	563.43	43.01	10,368.83	5,342.23	31.79	99.91	0.05	55	195
Pinfish	303.90	163.19	12.56	5,174.86	2,642.28	15.87	99.14	0.09	70	159
Bay anchovy	257.50	94.62	10.64	341.53	123.91	1.05	57.50	0.05	25	84
Spot croaker	211.22	100.23	8.73	5,467.20	2,495.08	16.76	125.42	0.05	91	205
Sand seatrout	102.64	31.80	4.24	1,440.69	511.33	4.42	110.57	0.28	45	263
Blue crab*	89.43	35.35	3.69	2,647.69	966.69	8.12	68.50	0.43	19	189
Hardhead catfish	70.64	6.03	2.92	2,490.33	72.59	7.64	121.85	0.63	65	421
Atlantic brief squid*	63.97	33.93	2.64	291.54	121.40	0.89	33.00	0.15	15	96
Lesser blue crab*	56.20	24.80	2.32	358.24	174.27	1.10	46.02	0.25	20	89
Silver perch	42.62	22.50	1.76	802.99	449.15	2.46	111.48	0.17	57	165
Atlantic croaker	18.16	6.18	0.75	733.69	232.54	2.25	151.92	1.10	103	213
Atlantic bumper	18.01	15.27	0.74	47.32	40.24	0.15	61.77	0.27	37	93
Lined sole	13.02	9.91	0.54	72.08	50.97	0.22	59.30	0.46	31	129
Gulf butterflyfish	9.56	7.32	0.39	49.61	41.36	0.15	62.80	0.53	37	86
Mantis shrimp*	9.10	6.84	0.38	48.50	40.69	0.15	73.48	1.23	40	117
Inshore lizardfish	9.04	2.91	0.37	223.86	60.69	0.69	140.86	1.65	90	317
Roughback shrimp*	8.78	5.84	0.36	17.44	12.23	0.05	57.65	0.69	39	85
Least puffer	8.59	2.84	0.35	58.28	21.83	0.18	61.63	1.33	30	103
Spotfin mojarra	8.57	5.02	0.35	51.20	28.72	0.16	75.13	0.82	53	109
Fringed flounder	7.11	3.84	0.29	50.08	27.34	0.15	79.76	1.38	45	129
Iridescent swimming crab*	6.33	2.62	0.26	20.34	8.94	0.06	36.43	0.24	26	48
Two-spined starfish*	6.15	6.15	0.25	69.21	69.21	0.21	28.95	0.91	25	38
Shark eye*	6.08	5.59	0.25	102.55	95.14	0.31	32.68	0.05	27	43
Atlantic cutlassfish	5.24	3.68	0.22	47.99	27.95	0.15	260.02	4.55	210	563
White mullet	4.54	3.55	0.19	104.39	81.22	0.32	121.00	0.86	110	147
Spotted seatrout	4.03	2.15	0.17	104.62	52.23	0.32	137.54	3.56	87	364
Bay whiff	3.61	2.62	0.15	38.84	27.78	0.12	88.31	2.02	48	134

Table 16 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gafftopsail catfish	3.52	1.49	0.15	144.03	58.08	0.44	154.00	3.26	68	214
Bighead searobin	3.36	1.56	0.14	16.84	7.37	0.05	60.82	2.04	23	206
Harvestfish	3.04	2.46	0.13	17.64	14.14	0.05	61.11	0.39	46	75
Blackcheek tonguefish	2.95	1.65	0.12	50.29	29.76	0.15	123.52	0.74	81	135
Southern kingfish	2.52	1.21	0.10	51.72	27.76	0.16	117.10	3.39	74	208
Threadfin shad	2.00	1.14	0.08	49.52	36.95	0.15	125.57	2.71	80	179
Cabbagehead*	1.76	1.19	0.07	288.04	203.94	0.88				
Southern flounder	1.34	0.56	0.06	173.34	62.44	0.53	224.74	3.80	192	283
Silver jenny	1.33	0.77	0.05	8.30	4.93	0.03	80.29	0.86	63	90
Inland silverside	1.07	1.07	0.04	4.30	4.30	0.01	78.20	0.66	76	80
Atlantic spadefish	1.00	0.54	0.04	17.02	9.21	0.05	62.28	4.88	37	104
Lookdown	0.94	0.50	0.04	3.13	1.76	0.01	57.47	0.84	41	72
Lesser rock shrimp*	0.78	0.42	0.03	2.00	1.09	0.01	50.19	0.29	47	52
Pigfish	0.70	0.47	0.03	28.77	21.38	0.09	143.31	1.70	107	157
Rough silverside	0.65	0.65	0.03	4.22	4.22	0.01	92.27	2.33	75	108
Longnose spider crab*	0.65	0.44	0.03	3.28	2.29	0.01	25.34	0.79	23	30
Gulf toadfish	0.63	0.30	0.03	54.92	28.71	0.17	159.21	8.08	47	222
Lined seahorse	0.60	0.60	0.02	1.21	1.21	<0.01	65.81	4.00	62	70
Scaled sardine	0.53	0.53	0.02	7.12	7.12	0.02	111.75	2.14	107	117
Atlantic stingray	0.49	0.24	0.02	62.12	34.55	0.19	147.95	2.27	133	159
Spanish mackerel	0.48	0.28	0.02	38.57	17.21	0.12	223.45	18.36	102	360
Sheepshead	0.46	0.25	0.02	7.14	3.98	0.02	93.68	1.18	85	98
Star drum	0.43	0.29	0.02	0.42	0.42	<0.01	78.27	3.07	66	89
Atlantic moonfish	0.42	0.32	0.02	2.08	1.84	0.01	68.05	1.67	59	73
Thinstripe hermit crab*	0.38	0.26	0.02	0.75	0.51	<0.01				
Eastern oyster*	0.37	0.37	0.02	17.06	17.06	0.05	59.91	3.60	55	75
Silverstripe halfbeak	0.35	0.35	0.01	1.42	1.42	<0.01	122.00		122	122
Freckled blenny	0.31	0.31	0.01	1.23	1.23	<0.01	52.00		52	52
Gulf kingfish	0.22	0.22	0.01	1.30	1.30	<0.01	97.00		97	97

Table 16 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Striped mullet	0.21	0.21	0.01	6.24	6.24	0.02	141.50	1.50	140	143
Gulf pipefish	0.21	0.21	0.01	0.21	0.21	<0.01	91.00		91	91
Striped anchovy	0.21	0.21	0.01	1.13	1.13	<0.01	90.71		85	95
Longfin squid*	0.20	0.20	0.01	1.22	1.22	<0.01	57.00		57	57
Hogchoker	0.19	0.14	0.01	7.38	6.24	0.02	126.25	14.87	62	130
Pink purse crab*	0.16	0.12	0.01	0.89	0.71	<0.01	25.00	1.26	21	27
Tripletail	0.13	0.13	0.01	0.13	0.13	<0.01	24.00		24	24
Sharptail goby	0.13	0.13	0.01	4.48	4.48	0.01	218.00		218	218
Atlantic midshipman	0.13	0.13	0.01	0.13	0.13	<0.01	64.00		64	64
Crevalle jack	0.12	0.09	<0.01	3.08	2.90	0.01	93.33	39.33	54	172
Dwarf sand perch	0.12	0.12	<0.01	0.47	0.47		68.00		68	68
Lightning whelk*	0.12	0.12	<0.01	0.12	0.12	<0.01	16.00		16	16
Blotched swimming crab*	0.11	0.11	<0.01	0.43	0.43	<0.01	31.00		31	31
Ladyfish	0.06	0.06	<0.01	8.04	8.04	0.02	300.00		300	300
Dwarf surf clam*				263.62	251.70	0.81	< 10			
Sea nettle*				34.14	34.14	0.10				
Commercial Shrimp										
White shrimp*	633.77	163.64	14.95	4,696.04	961.78	11.10	100.61	0.16	23	168
Brown shrimp*	630.92	190.70	14.85	3,214.84	1,206.69	7.60	84.12	0.09	45	135
Pink shrimp*	563.39	213.39	13.26	1,783.38	678.14	4.22	75.19	0.04	43	110

*Invertebrates

Table 17. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Aransas Bay during the 1994 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Spot croaker	1,207.68	422.98	32.54	19,572.41	7,104.70	36.31	110.20	0.06	77	148
Atlantic croaker	541.01	133.56	14.58	7,396.38	1,982.97	13.72	111.38	0.17	74	158
Bay anchovy	504.08	87.76	13.58	666.94	167.54	1.24	59.11	0.09	29	87
Gulf menhaden	229.82	103.55	6.19	2,980.49	1,030.39	5.53	108.40	0.30	67	195
Atlantic brief squid*	227.94	80.47	6.14	2,408.34	937.34	4.47	45.45	0.12	16	96
Blue crab*	198.14	79.96	5.34	7,672.33	1,941.81	14.23	82.31	0.13	20	178
Sand seatrout	129.06	24.49	3.48	888.93	188.59	1.65	84.58	0.53	46	187
Sea nettle*	82.72	82.72	2.23	1,473.07	1,473.07	2.73				
Pinfish	76.30	28.19	2.06	824.23	323.98	1.53	87.88	0.13	63	144
Atlantic cutlassfish	61.27	38.09	1.65	3,000.23	1,760.08	5.57	424.92	1.00	259	601
Bay whiff	53.62	31.42	1.44	460.38	243.44	0.85	96.81	0.22	56	142
Crevalle jack	49.78	33.93	1.34	559.09	432.57	1.04	93.38	0.58	47	130
Lesser blue crab*	47.86	19.74	1.29	152.80	62.00	0.28	36.76	0.14	17	58
Silver perch	35.12	16.80	0.95	500.23	258.81	0.93	97.30	1.48	45	147
Gafftopsail catfish	32.36	21.48	0.87	357.97	265.92	0.66	105.95	0.63	54	125
Blackcheek tonguefish	25.19	12.52	0.68	173.35	74.48	0.32	89.02	0.62	58	115
Pigfish	21.92	17.30	0.59	186.70	137.20	0.35	83.30	0.30	65	116
Hardhead catfish	21.64	9.19	0.58	1,410.76	619.66	2.62	164.21	3.92	53	385
Least puffer	20.77	12.63	0.56	111.27	50.94	0.21	56.92	0.64	18	112
Fringed flounder	13.64	12.35	0.37	117.79	100.50	0.22	81.14	1.14	47	123
Atlantic midshipman	11.04	4.97	0.30	30.10	13.73	0.06	55.13	0.55	27	126
Inshore lizardfish	9.54	6.58	0.26	176.56	109.16	0.33	144.46	2.02	79	200
Mantis shrimp*	8.60	5.32	0.23	81.64	42.71	0.15	92.92	1.58	60	116
Atlantic threadfin	8.57	4.81	0.23	269.37	198.10	0.50	143.00	2.08	98	170
Sharptail goby	8.46	6.63	0.23	243.98	210.89	0.45	231.41	3.63	118	284
Harvestfish	8.24	5.10	0.22	45.24	19.80	0.08	59.30	0.89	46	155

Table 17 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Threadfin shad	7.79	3.25	0.21	216.94	91.76	0.40	138.42	0.18	130	147
Roughback shrimp*	7.61	7.61	0.21	18.38	18.38	0.03	67.72	1.63	56	82
Gulf butterfish	5.88	2.09	0.16	62.08	29.57	0.12	78.74	1.96	39	118
Scaled sardine	5.50	5.50	0.15	5.33	5.33	0.01	37.00	0.91	30	43
Ocellated flounder	4.52	4.01	0.12	249.86	226.15	0.46	150.27	0.09	131	167
Atlantic bumper	4.22	2.76	0.11	7.71	5.60	0.01	52.68	0.95	34	65
Bighead searobin	4.00	1.70	0.11	62.88	29.72	0.12	99.44	2.54	61	132
Southern flounder	3.93	1.63	0.11	150.66	60.08	0.28	150.17	2.09	120	185
Southern kingfish	3.76	2.70	0.10	147.96	95.54	0.27	137.10	2.43	37	180
Cabbagehead*	3.35	2.12	0.09	470.89	250.71	0.87				
Shark eye*	3.28	2.14	0.09	76.47	49.08	0.14	36.29	0.18	34	40
Iridescent swimming crab*	3.18	2.08	0.09	12.58	7.55	0.02	37.27	0.42	27	50
Striped mullet	2.33	2.33	0.06	34.67	34.67	0.06	112.25	1.93	108	116
Longnose spider crab*	2.16	1.33	0.06	1.35	0.86	<0.01	10.65	0.63	8	20
Lookdown	1.63	0.87	0.04	4.08	1.84	0.01	54.31	1.81	45	76
Ladyfish	1.38	0.72	0.04	57.66	29.92	0.11	198.55	0.60	185	223
Hogchoker	1.36	0.93	0.04	82.54	52.92	0.15	136.93	3.37	110	162
Crested cusk-eel	0.90	0.90	0.02	25.21	25.21	0.05	171.00		171	171
Striped anchovy	0.88	0.88	0.02	2.35	2.35	<0.01	75.00	3.00	72	78
ORDER anemones*	0.81	0.81	0.02	6.50	6.50	0.01	25.00	5.00	20	30
Lined sole	0.80	0.50	0.02	9.51	6.11	0.02	84.50	1.52	79	80
Rough silverside	0.75	0.48	0.02	10.00	8.22	0.02	70.50	0.50	70	71
Atlantic stingray	0.71	0.52	0.02	96.22	65.45	0.18	161.86	2.92	154	176
Lined seahorse	0.68	0.68	0.02	4.13	4.13	0.01	98.00		98	98
Gizzard shad	0.66	0.66	0.02	55.51	55.51	0.10	200.00		200	200
Eastern oyster*	0.66	0.66	0.02	40.97	40.97	0.08	32.00		32	32
Gray snapper	0.56	0.56	0.02	3.38	3.38	0.01	70.00		70	70
Leatherjacket	0.53	0.53	0.01	3.18	3.18	0.01	68.00		68	68

Table 17 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Bluntnose jack	0.53	0.53	0.01	1.06	1.06	<0.01	50.00		50	50
Shrimp eel	0.44	0.44	0.01	51.71	51.71	0.10	456.00		456	456
Scrawled filefish	0.35	0.35	0.01	2.10	2.10	<0.01	110.00		110	110
Lightning whelk*	0.29	0.29	0.01	5.27	5.27	0.01	37.00		37	37
Atlantic moonfish	0.25	0.25	0.01	1.01	1.01	<0.01	62.00		62	62
Spotted seatrout	0.22	0.22	0.01	19.04	19.04	0.04	209.00		209	209
Chain pipefish	0.22	0.22	0.01	0.88	0.88	<0.01	225.00		225	225
Skilletfish	0.22	0.22	0.01	2.66	2.66	<0.01	146.00		146	146
Thinstripe hermit crab*	0.20	0.20	0.01	2.82	2.82	0.01				
Dwarf surf clam*				132.37	129.84	0.25				
Commercial Shrimp										
Brown shrimp*	3,891.65	1,387.63	50.95	20,186.92	5,958.48	27.19	88.18	0.03	57	123
White shrimp*	34.95	17.40	0.46	151.16	70.99	0.20	78.02	1.34	26	160
*Invertebrates										

Table 18. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Aransas Bay during the 1994 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	332.50	176.66	20.77	4,664.09	1,970.92	15.45	108.50	0.14	77	185
Lesser blue crab*	295.50	106.74	18.46	1,422.94	535.52	4.71	42.95	0.14	21	160
Least puffer	109.01	59.92	6.81	1,408.59	920.36	4.66	85.02	0.20	42	134
Bay anchovy	99.28	32.06	6.20	113.62	31.65	0.38	52.46	0.20	25	77
Hardhead catfish	98.69	65.42	6.17	1,029.47	616.70	3.41	102.98	0.14	53	335
Atlantic brief squid*	90.71	27.90	5.67	1,120.12	357.10	3.71	47.31	0.15	14	101
Mantis shrimp*	86.54	39.57	5.41	605.90	278.65	2.01	87.37	0.27	37	138
Roughback shrimp*	48.39	31.85	3.02	84.98	50.54	0.28	58.02	0.12	34	88
Spot croaker	47.96	13.59	3.00	2,027.64	594.82	6.71	142.12	0.51	89	237
Bighead searobin	36.98	22.89	2.31	154.02	73.32	0.51	58.23	0.62	21	221
Sand seatrout	34.16	13.18	2.13	732.53	348.10	2.43	115.03	0.86	45	280
Pinfish	29.97	15.03	1.87	829.69	393.85	2.75	122.99	0.31	92	152
Cabbagehead*	29.62	12.24	1.85	9,194.39	3,543.21	30.45				
Sea nettle*	28.85	17.10	1.80	866.67	422.56	2.87				
Fringed flounder	27.05	10.38	1.69	224.04	65.51	0.74	85.88	0.71	44	145
Atlantic croaker	26.56	15.30	1.66	546.16	232.67	1.81	106.23	2.50	32	233
Silver perch	20.27	8.91	1.27	437.56	193.72	1.45	115.96	0.51	37	180
Blue crab*	19.32	4.21	1.21	559.77	132.62	1.85	65.32	0.89	21	165
Atlantic cutlassfish	17.60	6.11	1.10	500.72	151.35	1.66	327.14	5.04	169	672
Inshore lizardfish	14.48	4.89	0.90	703.34	271.94	2.33	184.00	1.73	69	329
Gafftopsail catfish	11.86	3.86	0.74	426.95	131.54	1.41	160.46	1.60	76	235
Gulf butterflyfish	9.81	4.80	0.61	290.19	158.02	0.96	126.65	1.15	67	155
Atlantic bumper	8.79	5.30	0.55	26.40	14.10	0.09	63.52	0.93	35	114

Table 18 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Blackcheek tonguefish	8.43	6.74	0.53	154.58	128.86	0.51	121.03	0.84	59	138
Iridescent swimming crab*	8.22	3.88	0.51	31.88	13.31	0.11	39.26	0.31	23	74
Bay whiff	7.03	1.41	0.44	95.16	24.46	0.32	94.39	1.75	11	151
Shark eye*	6.46	4.00	0.40	145.13	87.40	0.48	35.96	0.21	25	44
Spotfin mojarra	5.32	2.01	0.33	49.42	19.96	0.16	85.43	0.35	45	97
Pigfish	4.78	2.28	0.30	197.47	92.89	0.65	143.44	2.05	100	192
Harvestfish	3.74	1.36	0.23	68.49	29.05	0.23	86.22	2.57	48	162
Lined sole	3.65	1.75	0.23	23.64	8.91	0.08	61.52	0.77	45	103
Atlantic stingray	3.56	1.94	0.22	753.01	454.69	2.49	166.14	1.83	111	244
Spotted seatrout	2.10	0.79	0.13	67.46	31.42	0.22	146.85	4.32	87	227
Hogchoker	1.81	1.11	0.11	16.71	8.89	0.06	70.83	3.72	47	137
Striped anchovy	1.73	0.90	0.11	14.18	6.48	0.05	96.71	1.01	68	123
Scaled sardine	1.49	1.10	0.09	3.19	1.89	0.01	47.01	2.85	32	102
Crevalle jack	1.38	0.69	0.09	43.82	24.13	0.15	122.42	5.93	60	174
Flatclaw hermit crab*	1.32	0.62	0.08	19.02	10.90	0.06				
Southern kingfish	1.27	0.36	0.08	57.72	15.45	0.19	151.03	5.26	34	232
Longnose spider crab*	1.19	0.72	0.07	67.87	40.95	0.22	55.32	4.32	15	77
Atlantic midshipman	1.07	0.62	0.07	4.54	2.55	0.02	61.71	2.62	48	129
Lookdown	1.06	0.72	0.07	5.68	3.20	0.02	59.50	1.66	39	78
Gulf flounder	0.81	0.46	0.05	53.20	26.53	0.18	186.38	7.01	130	227
Moon jellyfish*	0.81	0.55	0.05	28.59	23.60	0.09				
Silver jenny	0.80	0.68	0.05	9.34	7.79	0.03	113.50	2.74	77	182
Atlantic moonfish	0.78	0.40	0.05	2.51	1.48	0.01	57.31	1.12	53	85
Bluntnose jack	0.70	0.57	0.04	13.58	11.92	0.04	103.07	1.76	77	127
Southern flounder	0.64	0.30	0.04	79.69	36.04	0.26	218.48	7.26	150	304
Spanish mackerel	0.63	0.38	0.04	10.80	6.29	0.04	136.20	6.99	87	188

Table 18 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gizzard shad	0.56	0.56	0.03	14.83	14.83	0.05	139.20	8.08	116	161
Lesser rock shrimp*	0.49	0.23	0.03	1.24	0.62	<0.01	55.48	0.50	50	57
Star drum	0.47	0.47	0.03	7.54	7.54	0.02	104.00	15.00	74	119
Southern stargazer	0.44	0.44	0.03	0.88	0.88	<0.01	38.00	1.73	35	41
Sharptail goby	0.36	0.36	0.02	9.13	9.13	0.03	173.50	66.50	107	240
Eastern oyster*	0.36	0.36	0.02	11.25	11.25	0.04	37.44	2.15	28	49
White mullet	0.33	0.26	0.02	6.12	4.99	0.02	119.11	0.07	115	134
Northern kingfish	0.31	0.31	0.02	3.76	3.76	0.01	96.50	33.50	63	130
Atlantic spadefish	0.24	0.09	0.01	1.34	0.58	<0.01	51.60	6.84	37	66
Gulf kingfish	0.22	0.16	0.01	48.97	42.23	0.16	218.00	23.43	121	275
Threadfin shad	0.21	0.12	0.01	6.74	4.46	0.02	145.62	6.50	121	165
Blackwing searobin	0.20	0.20	0.01	1.59	1.59	0.01	82.50	5.50	77	88
Planehead filefish	0.18	0.12	0.01	8.94	7.46	0.03	165.56	23.89	90	221
Lesser mantis shrimp*	0.18	0.18	0.01	5.40	5.40	0.02	149.00		149	149
Banded drum	0.17	0.17	0.01	1.02	1.02	<0.01	72.00		72	72
Red drum	0.13	0.13	0.01	0.79	0.79	<0.01	89.00		89	89
Ocellated flounder	0.10	0.07	0.01	6.55	4.51	0.02	170.67	23.17	136	217
Atlantic threadfin	0.09	0.09	0.01	7.25	7.25	0.02	200.50	6.50	194	207
Striped mullet	0.08	0.08	<0.01	1.60	1.60	0.01	130.00	2.00	128	132
Rough silverside	0.07	0.07	<0.01	0.54	0.54	<0.01	93.50	0.50	93	94
Rainwater killifish	0.07	0.07	<0.01	0.27	0.27	<0.01	55.00		55	55
ORDER anemones*	0.07	0.07	<0.01	0.71	0.71	<0.01	30.00		30	30
Black drum	0.05	0.05	<0.01	5.59	5.59	0.02	199.00		199	199
Leatherjacket	0.05	0.05	<0.01	0.97	0.97	<0.01	141.50	2.50	139	144
Striped burrfish	0.05	0.05	<0.01	5.50	5.50	0.02	127.50	1.50	126	129
Smooth puffer	0.05	0.05	<0.01	10.41	10.41	0.03	229.00		229	229

Table 18 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Yellow box crab*	0.05	0.05	<0.01	0.88	0.88	<0.01	50.00		50	50
Code goby	0.04	0.04	<0.01	8.41	8.41	0.03	96.00		96	96
Southern quahog*	0.04	0.04	<0.01	20.82	20.82	0.07	112.00		112	112
Thinstripe hermit crab*	0.04	0.04	<0.01	1.22	1.22	<0.01				
Gulf stone crab*	0.04	0.04	<0.01	0.72	0.72	<0.01	35.00		35	35
Tripletail	0.03	0.03	<0.01	0.07	0.07	<0.01	38.00		38	38
Sheepshead	0.02	0.02	<0.01	0.26	0.26	<0.01	82.00		82	82
Bluefish	0.02	0.02	<0.01	1.60	1.60	0.01	220.00		220	220
King mackerel	0.02	0.02	<0.01	0.35	0.35	<0.01	130.00		130	130
Hooked mussel*	0.02	0.02	<0.01	1.04	0.04	<0.01	50.00		50	50
Dwarf surf clam*			<0.01	5.64	5.64	0.02				
Commercial Shrimp										
White shrimp*	513.13	99.47	17.89	3,994.41	704.26	10.35	101.32	0.10	55	180
Brown shrimp*	386.76	90.13	13.49	2,228.98	499.36	5.78	88.24	0.04	42	151
Pink shrimp*	367.20	115.67	12.80	2,156.98	652.38	5.59	86.30	0.06	40	168

*Invertebrates

Table 19. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Corpus Christi Bay during the 1993 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Sand seatrout	1,480.24	566.69	28.35	12,114.91	5,335.24	23.36	94.58	0.07	28	193
Lesser blue crab*	1,191.87	387.46	22.83	9,958.75	3,401.28	19.20	51.59	0.02	8	99
Spot croaker	713.07	346.63	13.66	8,485.17	3,718.87	16.36	97.50	0.10	64	170
Bay anchovy	430.60	197.33	8.25	691.10	326.45	1.33	59.88	0.04	29	85
Atlantic croaker	344.88	92.08	6.61	2,787.93	823.47	5.38	87.08	0.43	44	194
Atlantic brief squid*	298.43	144.26	5.72	2,327.64	1,130.70	4.49	41.00	0.05	12	90
Roughback shrimp*	174.60	94.20	3.34	307.49	166.41	0.59	59.14	0.10	33	97
Atlantic cutlassfish	72.83	32.56	1.39	3,042.20	1,387.06	5.87	390.79	2.73	130	607
Blue crab*	64.88	17.80	1.24	5,597.03	929.57	10.79	110.95	0.50	37	276
Bay whiff	52.07	12.51	1.00	406.07	114.49	0.78	88.95	0.35	60	114
Pinfish	46.61	36.33	0.89	1,357.23	1,218.58	2.62	115.17	0.59	63	149
Iridescent swimming crab*	40.69	13.83	0.78	386.99	78.72	0.75	45.90	0.21	24	77
Roughneck shrimp*	38.83	23.58	0.74	71.66	43.69	0.14	59.80	0.10	32	73
Blackcheek tonguefish	32.57	18.54	0.62	482.54	256.92	0.93	106.95	0.41	50	224
Gulf menhaden	22.60	6.12	0.43	445.46	138.20	0.86	111.83	1.08	58	188
Gulf grassflat crab*	22.16	22.16	0.42	37.09	37.09	0.07	9.08	0.28	6	13
Least puffer	21.96	7.15	0.42	132.51	48.18	0.26	57.23	0.37	36	100
Atlantic threadfin	21.68	7.63	0.42	279.69	105.19	0.54	101.86	1.24	65	152
Mantis shrimp*	18.22	4.59	0.35	259.30	131.23	0.50	77.67	1.30	34	145
Gulf butterfish	16.22	15.02	0.31	83.28	70.68	0.16	63.33	1.64	33	130
Atlantic midshipman	15.86	2.99	0.30	149.49	34.19	0.29	83.26	1.44	27	182
Seabob*	15.20	15.20	0.29	37.16	37.16	0.07	71.75	1.60	59	88
Harvestfish	14.86	14.25	0.28	188.36	155.39	0.36	72.40	1.67	45	138
Silver perch	5.69	1.45	0.11	104.47	57.54	0.20	98.70	4.17	27	144
Sharptail goby	5.58	3.57	0.11	95.67	59.75	0.18	160.15	3.71	72	245
Scaled sardine	5.00	2.25	0.10	142.84	84.80	0.28	135.04	1.23	98	153
Lesser rock shrimp*	4.34	1.84	0.08	34.18	29.82	0.07	39.73	0.92	25	54

Table 19 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Lookdown	4.20	4.20	0.08	7.34	7.34	0.01	45.25	1.27	35	50
Pink purse crab*	4.12	2.67	0.08	16.04	9.96	0.03	22.34	0.60	16	31
Hardhead catfish	3.29	1.75	0.06	245.24	169.20	0.47	164.14	7.66	90	283
Blotched swimming crab*	3.10	2.03	0.06	39.61	21.57	0.08	48.51	1.42	25	73
Thinstripe hermit crab*	3.03	2.47	0.06	72.29	55.45	0.14				
Lined sole	2.45	1.12	0.05	44.89	33.34	0.09	67.40	0.52	52	85
Inshore lizardfish	2.08	0.69	0.04	161.37	124.73	0.31	163.63	9.92	117	309
Crested cusk-eel	2.05	0.77	0.04	49.04	20.81	0.09	154.94	1.07	144	200
Bighead searobin	2.02	1.60	0.04	76.73	73.17	0.15	120.34	3.68	83	169
Atlantic spadefish	1.90	1.90	0.04	5.67	5.67	0.01	36.50	3.62	25	51
Longnose spider crab*	1.88	1.18	0.04	50.25	39.46	0.10	51.42	6.07	9	90
Ocellated flounder	1.69	0.84	0.03	92.04	64.25	0.18	134.02	6.80	82	183
Southern kingfish	1.48	0.86	0.03	137.31	82.99	0.26	207.69	14.41	105	309
Fringed flounder	1.33	1.02	0.03	19.90	15.44	0.04	107.22	1.75	87	134
Blackwing searobin	1.33	0.84	0.03	37.29	33.56	0.07	67.42	0.75	35	102
Calico box crab*	1.32	0.67	0.03	48.95	31.13	0.09	56.96	1.32	49	77
Sargassum swimming crab*	1.23	1.06	0.02	7.66	7.66	0.01	52.00	1.07	34	70
Southern hake	1.17	1.17	0.02	46.77	46.77	0.09	161.76	12.52	144	199
Southern flounder	1.03	1.03	0.02	63.67	63.67	0.12	179.00	13.00	166	192
Flatclaw hermit crab*	1.03	1.03	0.02	16.43	16.43	0.03				
Atlantic thread herring	0.97	0.97	0.02	14.77	14.77	0.03	96.81	30.42	32	127
Atlantic bumper	0.80	0.80	0.02	0.54	0.54	<0.01	24.67	2.40	20	28
Bearded brotula	0.80	0.54	0.02	9.82	6.26	0.02	132.14	5.10	84	150
Gafftopsail catfish	0.52	0.52	0.01	113.93	113.93	0.22	304.00		304	304
Atlantic stingray	0.51	0.51	0.01	105.26	105.26	0.20	168.00		168	168
Pigfish	0.39	0.39	0.01	5.49	5.49	0.01	104.00		104	104

Table 19 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Giant hermit crab*	0.39	0.39	0.01	50.97	50.97	0.10				
Florida lady crab*	0.39	0.39	0.01	1.57	1.57	<0.01	28.00		28	28
Puerto Rican sand crab*	0.38	0.38	0.01	15.83	15.83	0.03	71.00		71	71
Spanish mackerel	0.32	0.32	0.01	3.84	3.84	0.01	125.00		125	125
Bigeye searobin	0.30	0.30	0.01	0.60	0.60	<0.01	88.00		88	88
Shrimp eel	0.29	0.29	0.01	27.97	27.97	0.05	412.00		412	412
Chain pipefish	0.27	0.27	0.01	1.63	1.63	<0.01	235.00		235	235
Threadfin shad	0.27	0.27	0.01	4.83	4.83	0.01	129.00		129	129
Spotted scorpionfish	0.27	0.27	0.01	18.64	18.64	0.04	140.00		140	140
Cabbagehead*	0.27	0.27	0.01	29.29	29.29	0.06				
Atlantic moonfish	0.23	0.23	<0.01	0.23	0.23	<0.01	49.00		49	49
Yellow box crab*	0.23	0.23	<0.01	6.58	6.58	0.01	58.00		58	58
Smooth puffer	0.19	0.19	<0.01	0.75	0.75	<0.01	52.00		52	52
Gulf toadfish	0.15	0.15	<0.01	1.91	1.91	<0.01	99.00		99	99
Sea nettle*				123.75	96.42	0.24				
Phosphorus jelly*				73.64	68.19	0.14				
Commercial Shrimp										
Brown shrimp*	5,093.67	990.46	49.31	21,864.58	3,150.94	29.55	87.57	0.02	48	151
Pink shrimp*	10.48	8.67	0.10	117.34	93.35	0.16	107.01	0.17	67	130
White shrimp*	4.17	1.78	0.04	163.60	85.00	0.22	160.96	1.34	128	188

*Invertebrates

Table 20. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Corpus Christi Bay during the 1993 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Gulf menhaden	261.63	205.86	15.33	6,657.23	4,665.10	25.77	133.37	0.10	63	255
Roughback shrimp*	260.13	204.09	15.25	570.22	452.31	2.21	67.41	0.05	32	83
Lesser blue crab*	215.00	85.57	12.60	2,172.59	872.47	8.41	53.81	0.13	17	113
Star drum	174.92	91.80	10.25	798.92	329.83	3.09	70.06	0.31	33	128
Bay anchovy	112.68	51.97	6.60	67.08	28.81	0.26	42.41	0.11	22	78
Sand seatrout	108.14	19.43	6.34	1,335.98	206.10	5.17	104.04	0.33	20	267
Blackcheek tonguefish	63.31	31.44	3.71	1,213.10	559.36	4.70	123.62	0.34	46	167
Atlantic brief squid*	59.17	17.62	3.47	666.37	217.77	2.58	44.16	0.28	19	104
Pinfish	55.69	35.42	3.26	1,792.44	933.23	6.94	121.25	0.59	77	204
Fringed flounder	52.74	34.56	3.09	544.65	338.24	2.11	99.30	0.18	11	136
Spot croaker	39.30	21.45	2.30	1,609.02	975.80	6.23	140.66	0.74	74	210
Atlantic croaker	30.89	6.48	1.81	1,426.03	310.08	5.52	153.37	0.59	76	341
Least puffer	28.29	16.82	1.66	352.46	216.90	1.36	79.39	0.27	44	122
Silver perch	27.47	9.54	1.61	416.08	135.70	1.61	105.86	0.18	80	138
Cabbagehead*	25.68	25.45	1.51	329.28	265.00	1.27				
Hardhead catfish	25.32	8.61	1.48	900.22	353.65	3.49	130.59	1.44	80	425
Mantis shrimp*	24.77	15.16	1.45	254.25	177.10	0.98	88.14	0.54	45	139
Seabob*	19.32	14.16	1.13	82.29	63.72	0.32	83.72	0.28	55	106
Blue crab*	15.07	4.84	0.88	781.35	196.19	3.03	77.03	2.03	18	177
Iridescent swimming crab*	14.10	4.18	0.83	91.00	31.20	0.35	44.31	0.36	24	66
Atlantic midshipman	14.01	7.09	0.82	101.99	46.10	0.39	85.60	0.57	45	173
Lined sole	11.61	8.13	0.68	97.54	77.02	0.38	64.20	0.28	51	95
Southern kingfish	7.42	3.82	0.43	210.29	109.92	0.81	135.17	1.05	57	204
Atlantic cutlassfish	7.30	2.73	0.43	276.78	92.01	1.07	365.45	9.44	212	647
Bay whiff	6.61	1.74	0.39	140.17	57.11	0.54	104.14	1.05	44	152
Gafftopsail catfish	3.87	1.89	0.23	238.99	127.42	0.93	185.00	2.08	87	216
White mullet	3.36	3.36	0.20	104.07	104.07	0.40	137.80	1.98	131	143

Table 20 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Striped anchovy	3.00	2.40	0.18	26.24	19.61	0.10	102.78	1.14	80	124
Lesser rock shrimp*	2.85	1.90	0.17	5.83	3.92	0.02	51.80	0.60	40	67
Inshore lizardfish	2.50	0.66	0.15	188.76	53.83	0.73	198.36	3.20	120	340
Gulf butterfish	2.46	1.43	0.14	22.24	14.62	0.09	68.44	2.99	28	133
Atlantic spadefish	2.43	0.57	0.14	116.09	48.01	0.45	90.56	4.06	46	197
Harvestfish	2.38	1.45	0.14	34.50	19.35	0.13	85.88	2.64	37	155
Bighead searobin	2.19	1.76	0.13	42.63	25.03	0.17	85.42	9.75	35	237
Bluntnose jack	1.90	0.79	0.11	32.01	18.50	0.12	106.62	3.11	37	147
Longnose spider crab*	1.68	1.50	0.10	159.34	145.10	0.62	73.13	2.18	32	91
Atlantic moonfish	1.33	1.15	0.08	7.13	5.84	0.03	71.38	0.86	49	89
Lookdown	1.26	0.56	0.07	6.31	2.55	0.02	67.60	3.52	39	124
Blotched swimming crab*	1.04	0.42	0.06	16.72	6.52	0.06	55.64	1.96	29	82
Silver jenny	1.02	0.69	0.06	5.79	3.81	0.02	68.75	2.70	52	97
Red drum	0.96	0.96	0.06	0.96	0.96	<0.01	36.17	0.88	35	38
Lightning whelk*	0.87	0.72	0.05	62.11	51.89	0.24	105.75	4.70	97	118
FAMILY Anchovies	0.82	0.76	0.05	7.02	6.38	0.03	100.50	0.51	93	110
Flatclaw hermit crab*	0.80	0.80	0.05	11.05	11.05	0.04				
Atlantic stingray	0.77	0.21	0.05	119.06	49.06	0.46	140.74	4.38	112	204
Atlantic bumper	0.76	0.35	0.04	1.97	0.88	0.01	62.73	1.56	45	77
Spotted seatrout	0.72	0.50	0.04	20.18	14.30	0.08	154.82	0.99	135	160
Pigfish	0.69	0.36	0.04	46.32	22.38	0.18	163.96	4.77	110	195
Crested cusk-eel	0.67	0.47	0.04	30.63	22.12	0.12	190.74	0.16	179	200
Blackwing searobin	0.52	0.31	0.03	18.23	9.61	0.07	127.75	6.41	85	168
Gulf pipefish	0.51	0.51	0.03	4.58	4.58	0.02	264.00		264	264
Spanish mackerel	0.50	0.32	0.03	75.64	42.21	0.29	262.86	21.52	165	365
Crevalle jack	0.46	0.20	0.03	12.22	6.36	0.05	105.06	7.75	72	162
Atlantic threadfin	0.45	0.45	0.03	3.02	3.02	0.01	97.12	1.20	95	99
Speckled swimming crab*	0.44	0.44	0.03	16.97	16.97	0.07	76.40	22.00	50	94
Ladyfish	0.42	0.24	0.02	56.71	34.35	0.22	266.50	8.13	244	313
Spotfin mojarra	0.38	0.20	0.02	2.06	1.13	0.01	69.50	1.34	63	75

Table 20 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Southern hake	0.28	0.28	0.02	13.73	13.73	0.05	165.92	35.50	84	191
Yellow box crab*	0.21	0.14	0.01	10.93	7.49	0.04	63.33	0.53	62	65
Threadfin shad	0.19	0.19	0.01	3.58	3.58	0.01	126.50	2.53	120	131
Scaled sardine	0.16	0.16	0.01	3.92	3.92	0.02	126.00		126	126
Shrimp eel	0.14	0.10	0.01	15.22	11.85	0.06	468.80	49.72	347	550
Thinstripe hermit crab*	0.14	0.14	0.01	1.66	1.66	0.01				
Spotted scorpionfish	0.13	0.13	0.01	24.27	24.27	0.09	193.67	15.00	173	204
Atlantic thread herring	0.12	0.12	0.01	5.83	5.83	0.02	168.00		168	168
Pink purse crab*	0.10	0.10	0.01	0.21	0.21	<0.01	18.00		18	18
Ocellated flounder	0.08	0.08	<0.01	8.89	8.89	0.03	189.00		189	189
Gulf kingfish	0.08	0.08	<0.01	0.33	0.33	<0.01	91.00		91	91
Gulf flounder	0.08	0.08	<0.01	7.64	7.64	0.03	213.00		213	213
ORDER Whipcorals*				0.18	0.18	<0.01				
Sea nettle*				1,349.20	544.56	5.22				
Commercial Shrimp										
White shrimp*	1,279.29	344.94	39.53	10,375.15	2,509.95	27.60	102.65	0.05	58	192
Brown shrimp*	204.39	73.05	6.32	1,128.11	423.54	3.00	88.38	0.10	51	149
Pink shrimp*	46.05	19.31	1.42	266.35	122.82	0.71	86.07	0.22	52	161

*Invertebrates

Table 21. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Corpus Christi Bay during the 1995 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Atlantic croaker	544.67	142.88	23.51	7,771.08	2,181.52	20.95	113.32	0.22	62	183
Sand seatrout	351.82	212.08	15.19	4,076.61	2,341.93	11.00	101.67	0.08	35	200
Lesser blue crab*	181.72	31.86	7.84	2,001.76	367.14	5.40	54.47	0.07	25	112
Spot croaker	170.15	71.77	7.35	4,089.28	1,758.31	11.03	114.27	0.77	56	208
Star drum	145.69	121.41	6.29	411.41	357.54	1.11	60.76	0.16	22	79
Hardhead catfish	131.26	41.84	5.67	4,554.36	1,415.50	12.28	158.81	0.23	108	355
Atlantic brief squid*	104.39	20.16	4.51	1,056.73	231.49	2.85	43.25	0.15	15	105
Silver seatrout	87.56	41.72	3.78	632.03	295.52	1.70	90.91	0.26	42	137
Bay anchovy	70.94	22.17	3.06	102.90	27.93	0.28	60.35	0.11	31	90
Roughback shrimp*	58.37	29.61	2.52	140.54	63.25	0.38	64.76	0.20	42	90
Mantis shrimp*	54.80	15.62	2.37	314.21	51.74	0.85	72.40	0.56	40	137
Atlantic cutlassfish	46.24	17.69	2.00	1,391.00	386.46	3.75	348.07	3.46	155	690
Gulf menhaden	46.23	14.77	2.00	2,074.00	551.22	5.59	160.71	0.83	65	260
Silver perch	34.36	21.44	1.48	920.07	505.81	2.48	132.23	0.51	66	164
Bay whiff	32.26	17.28	1.39	222.54	130.89	0.60	84.62	0.28	55	123
Blue crab*	23.92	5.26	1.03	1,386.10	253.30	3.74	87.67	1.15	27	168
Sea nettle*	23.36	18.49	1.01	470.88	442.67	1.27				
Pigfish	22.75	21.07	0.98	178.35	145.96	0.48	80.39	0.39	61	188
Iridescent swimming crab*	17.17	8.53	0.74	125.56	42.89	0.34	44.19	0.37	23	68
Atlantic threadfin	15.53	4.74	0.67	321.46	102.40	0.87	129.68	1.83	85	168
Blackcheek tonguefish	15.20	6.32	0.66	147.58	57.08	0.40	101.47	0.22	68	128
Harvestfish	9.36	5.54	0.40	146.67	35.47	0.40	88.72	4.97	33	179
Atlantic midshipman	7.68	4.08	0.33	62.76	22.32	0.17	80.33	2.68	24	140
Gafftopsail catfish	7.21	6.11	0.31	137.92	52.61	0.37	137.92	8.13	58	234
Lightning whelk*	7.15	7.15	0.31	686.06	686.06	1.85	112.56	8.59	40	185
Moon jellyfish*	6.19	4.14	0.27	224.90	145.42	0.61				
Atlantic bumper	6.04	3.78	0.26	15.02	6.94	0.04	64.02	2.74	46	131

Table 21 (cont.)

Species	Number			Weight			Length				
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max	
Bycatch											
Pinfish	5.98	5.82	0.26	111.42	110.76	0.30	95.74	1.43	12	148	
Seabob*	5.77	3.86	0.25	22.93	16.30	0.06	83.19	0.26	66	105	
Sharptail goby	5.15	4.16	0.22	67.97	49.74	0.18	164.84	1.22	106	273	
Gulf butterfish	5.10	2.13	0.22	151.90	67.16	0.41	129.71	2.59	50	159	
Least puffer	4.69	1.53	0.20	56.99	25.37	0.15	81.89	1.66	54	120	
Mottled purse crab*	4.57	4.57	0.20	42.71	42.71	0.12	26.35	0.78	21	32	
Bighead searobin	4.38	2.32	0.19	113.96	49.74	0.31	110.52	5.18	81	237	
Cabbagehead*	4.31	2.06	0.19	1,247.62	878.75	3.37					
Blackwing searobin	4.10	4.10	0.18	90.47	90.47	0.24	112.44	4.34	92	138	
Southern kingfish	3.88	2.22	0.17	169.84	81.16	0.46	142.59	6.39	67	228	
Lined sole	3.19	1.13	0.14	50.04	23.78	0.13	86.94	2.01	63	128	
Longnose spider crab*	3.07	1.42	0.13	68.41	61.91	0.18	26.66	1.56	17	81	
Cancellate cantharus*	2.73	2.73	0.12	11.36	11.36	0.03	30.40	1.46	22	37	
Shoal flounder	2.67	2.67	0.12	14.33	14.33	0.04	85.89	1.99	78	94	
CLASS sessile tunicates*	2.54	1.89	0.11	15.49	14.36	0.04	28.00	4.00	24	32	
Flatclaw hermit crab*	2.51	1.93	0.11	41.21	36.61	0.11					
Bluntnose jack	2.47	0.87	0.11	28.79	12.99	0.08	72.68	5.70	31	125	
Inshore lizardfish	2.46	0.92	0.11	45.85	18.74	0.12	143.22	7.44	72	214	
Atlantic spadefish	2.23	1.68	0.10	10.57	7.01	0.03	54.34	0.42	48	66	
Fringed flounder	2.22	1.31	0.10	29.39	19.58	0.08	100.20	3.68	70	118	
Hogchoker	2.16	1.73	0.09	30.13	24.15	0.08	85.50	1.11	52	122	
Calico box crab*	2.12	1.49	0.09	64.40	47.27	0.17	49.56	0.05	36	78	
Phosphorus jelly*	2.02	2.02	0.09	21.06	21.06	0.06					
Atlantic stingray	1.39	0.74	0.06	502.53	250.79	1.36	194.81	4.13	160	232	
Pink purse crab*	1.32	0.75	0.06	7.98	3.92	0.02	24.87	1.44	18	40	
ORDER anemones*	1.31	1.31	0.06	10.23	10.23	0.03					
Threadfin shad	1.02	1.02	0.04	17.07	17.07	0.05	123.75	4.03	115	132	
Lookdown	0.91	0.59	0.04	1.04	1.04	<0.01	48.33	0.59	47	52	
Banded drum	0.89	0.89	0.04	35.76	35.76	0.10	139.00	11.79	123	162	
Southern hake	0.82	0.57	0.04	13.35	12.15	0.04	105.15	12.55	70	160	
Lesser rock shrimp*	0.68	0.44	0.03	1.92	1.24	0.01	49.95	1.39	43	55	

Table 21 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Crevalle jack	0.58	0.58	0.03	8.12	8.12	0.02	99.00		99	99
Ladyfish	0.57	0.37	0.02	23.67	21.52	0.06	205.00	14.03	125	237
Spotted seatrout	0.52	0.33	0.02	75.49	54.79	0.20	247.67	11.33	208	293
Thinstripe hermit crab*	0.39	0.39	0.02	24.29	24.29	0.07				
Planehead filefish	0.34	0.34	0.01	2.73	2.73	0.01	72.00		72	72
Shark eye*	0.34	0.34	0.01	1.38	1.38	<0.01	24.00		24	24
Blotched swimming crab*	0.33	0.33	0.01	12.49	12.49	0.03	88.00		88	88
Bearded brotula	0.30	0.30	0.01	0.60	0.60	<0.01	118.00		118	118
King mackerel	0.29	0.29	0.01	4.64	4.64	0.01	141.00		141	141
Silver jenny	0.28	0.28	0.01	6.80	6.80	0.02	118.00		118	118
Spotted porcelain crab*	0.28	0.28	0.01	0.28	0.28	<0.01	6.00		6	6
Large sea star*	0.28	0.28	0.01	0.85	0.85	<0.01				
Southern flounder	0.26	0.26	0.01	17.49	17.49	0.05	188.00		188	188
Atlantic thread herring	0.26	0.26	0.01	6.79	6.79	0.02	145.00		145	145
Gulf flounder	0.26	0.26	0.01	11.32	11.32	0.03	163.00		163	163
Giant hermit crab*	0.26	0.26	0.01	78.41	78.41	0.21				
Green porcelain crab*	0.26	0.26	0.01	12.02	12.02	0.03	71.00		71	71
Yellowline arrow crab*	0.26	0.26	0.01	0.52	0.52	<0.01	10.00		10	10
Spanish mackerel	0.25	0.25	0.01	6.01	6.01	0.02	155.00		155	155
Estuarine snapping shrimp*	0.25	0.25	0.01	1.00	1.00	<0.01	56.00		56	56
Shrimp eel	0.23	0.23	0.01	17.58	17.58	0.05	414.00		414	414
Gulf toadfish	0.19	0.19	0.01	13.19	13.19	0.04	156.00		156	156
Commercial Shrimp										
Brown shrimp*	3,806.95	685.30	61.05	18,623.73	3,178.60	32.47	87.22	0.02	58	133
White shrimp*	107.27	79.60	1.72	1,616.07	959.65	2.82	121.88	0.83	52	186
Pink shrimp*	4.84	2.11	0.08	37.00	16.02	0.06	91.92	1.60	65	137

*Invertebrates

Table 22. Mean catch rate ± 1 SE in number (no./h/16.5 m trawl) and weight (g/h/16.5 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within Corpus Christi Bay during the 1995 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Lesser blue crab*	189.52	85.50	18.26	1,092.00	291.84	4.83	45.11	0.16	24	135
Sand seatrout	140.32	77.51	13.52	1,771.57	499.38	7.84	101.45	0.46	12	314
Bay anchovy	82.78	53.72	7.97	85.80	53.74	0.38	54.59	0.21	21	78
Atlantic croaker	77.74	43.40	7.49	864.06	257.89	3.82	68.61	1.39	16	231
Roughback shrimp*	74.67	48.13	7.19	161.16	100.68	0.71	65.29	0.07	36	85
Least puffer	51.89	34.64	5.00	496.03	362.67	2.19	77.80	0.26	35	123
Atlantic cutlassfish	45.42	18.98	4.38	1,321.55	489.91	5.85	345.01	1.78	166	642
Hardhead catfish	35.29	16.57	3.40	737.69	298.35	3.26	119.46	1.26	58	387
Atlantic brief squid*	33.00	11.37	3.18	417.31	162.12	1.85	45.90	0.28	15	116
Moon jellyfish*	26.53	13.65	2.56	3,981.82	2,253.57	17.62				
Mantis shrimp*	20.40	4.74	1.97	176.21	64.50	0.78	82.55	0.89	41	133
Blackcheek tonguefish	20.38	14.19	1.96	387.27	284.12	1.71	122.91	0.49	11	150
CLASS bony fishes	19.99	19.99	1.93	0.56	0.56	<0.01	19.70	0.77	12	26
Bay whiff	19.79	10.96	1.91	266.73	175.44	1.18	100.42	1.15	42	157
Star drum	19.09	8.58	1.84	117.63	47.79	0.52	73.24	0.51	40	147
Cabbagehead*	18.04	8.72	1.74	6,441.20	2,669.86	28.50				
Seabob*	16.58	10.99	1.60	57.57	36.58	0.25	82.40	0.26	54	109
Pinfish	14.61	12.16	1.41	459.06	379.93	2.03	125.22	0.35	89	149
Silver perch	10.45	6.01	1.01	197.45	97.41	0.87	117.74	0.95	31	197
Bighead searobin	10.41	7.57	1.00	79.23	38.04	0.35	65.56	2.62	26	183
Gulf menhaden	10.12	3.36	0.97	429.43	110.43	1.90	148.17	1.93	82	267
Blue crab*	8.94	2.11	0.86	411.09	127.31	1.82	80.88	2.36	12	195
Spot croaker	7.62	3.51	0.73	445.50	218.96	1.97	157.65	1.09	101	205
Atlantic midshipman	7.31	4.60	0.70	64.01	26.74	0.28	88.89	1.38	48	157
Fringed flounder	7.19	4.45	0.69	126.60	73.71	0.56	109.76	1.27	63	152

Table 22 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Atlantic spadefish	7.09	2.16	0.68	144.00	51.98	0.64	76.97	0.66	30	148
Blackwing searobin	6.49	6.49	0.63	17.32	17.32	0.08	55.47	2.23	34	74
Inshore lizardfish	6.14	3.34	0.59	350.39	202.92	1.55	206.03	1.31	130	298
Iridescent swimming crab*	5.42	1.57	0.52	40.18	11.12	0.18	47.64	0.23	28	66
Gulf grassflat crab*	4.23	4.23	0.41	1.88	1.88	0.01	11.27	0.51	8	18
Atlantic moonfish	3.10	1.76	0.30	15.88	9.62	0.07	69.26	0.47	42	88
Banded drum	2.87	2.05	0.28	11.97	8.19	0.05	61.22	0.40	40	135
Striped anchovy	2.82	1.16	0.27	35.40	13.81	0.16	113.01	1.46	88	135
Shoal flounder	2.77	1.15	0.27	43.01	19.08	0.19	105.92	1.76	55	135
Pigfish	2.25	0.78	0.22	105.26	54.70	0.47	142.33	2.74	98	207
Sea nettle*	2.17	0.71	0.21	94.89	40.07	0.42				
Gulf butterflyfish	2.14	1.33	0.21	40.31	22.04	0.18	106.79	5.13	52	163
Spotted seatrout	2.12	1.12	0.20	65.24	36.74	0.29	153.79	1.27	118	188
Southern kingfish	1.81	0.59	0.17	41.42	14.99	0.18	121.91	3.31	52	207
Gafftopsail catfish	1.69	0.55	0.16	79.93	30.15	0.35	170.44	3.28	131	210
Harvestfish	1.64	0.71	0.16	40.68	21.92	0.18	94.86	3.34	63	174
Scaled sardine	1.41	0.77	0.14	32.64	19.98	0.14	121.61	4.41	36	163
Lined sole	1.34	0.72	0.13	5.39	2.82	0.02	55.14	0.43	45	66
Atlantic stingray	1.31	0.96	0.13	507.34	457.22	2.24	184.18	7.18	123	272
Atlantic bumper	1.24	0.63	0.12	9.10	5.13	0.04	81.97	2.17	25	115
Spotfin mojarra	1.18	0.64	0.11	6.76	3.64	0.03	73.46	0.47	63	84
Silver jenny	1.11	0.43	0.11	10.09	3.28	0.04	88.98	2.51	65	111
Lookdown	1.01	0.50	0.10	5.57	3.10	0.02	62.90	2.08	42	115
Pancake batfish	0.95	0.68	0.09	4.65	3.34	0.02	55.18	0.18	45	66
Shrimp eel	0.75	0.75	0.07	29.43	29.43	0.13	334.87	9.45	267	407
Gulf pipefish	0.44	0.32	0.04	2.25	1.53	0.01	233.00	7.09	174	267
Bluntnose jack	0.35	0.25	0.03	2.70	2.23	0.01	73.57	12.35	35	125

Table 22 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Hogchoker	0.31	0.18	0.03	0.90	0.51	<0.01	54.60	0.62	50	56
Southern hake	0.27	0.23	0.03	11.46	9.96	0.05	185.49	1.92	142	198
Lightning whelk*	0.26	0.26	0.03	38.06	38.06	0.17	127.50	7.50	120	135
Striped burrfish	0.23	0.23	0.02	112.84	112.84	0.50	227.00		227	227
Florida rocksnail*	0.21	0.21	0.02	0.59	0.59	0.00	25.50	0.50	25	26
Spanish mackerel	0.20	0.14	0.02	6.59	5.49	0.03	156.10	12.92	135	205
Ocellated flounder	0.17	0.13	0.02	25.61	19.58	0.11	208.33	0.84	207	211
Longnose spider crab*	0.15	0.15	0.01	29.37	29.37	0.13	115.00		115	115
Trachypenaeid species*	0.15	0.15	0.01	0.20	0.20	<0.01	58.00	2.64	53	62
Flatclaw hermit crab*	0.14	0.14	0.01	0.28	0.28	<0.01				
Ladyfish	0.13	0.08	0.01	20.81	14.03	0.09	305.57	1.62	298	320
Planehead filefish	0.13	0.11	0.01	4.71	4.09	0.02	122.50	2.50	120	125
Giant manta shrimp*	0.13	0.13	0.01	7.99	7.99	0.04	180.00		180	180
Crested cusk-eel	0.12	0.12	0.01	4.96	4.96	0.02	179.00	6.24	167	188
Sharptail goby	0.06	0.06	0.01	2.94	2.94	0.01	195.00		195	195
Bluefish	0.06	0.06	0.01	0.24	0.24	<0.01	62.00		62	62
Pink purse crab*	0.04	0.04	<0.01	0.31	0.31	<0.01	28.00		28	28
Lesser rock shrimp*	0.03	0.03	<0.01	0.07	0.07	<0.01	45.00		45	45
Gizzard shad	0.02	0.02	<0.01	0.43	0.43	<0.01	133.00		133	133
Commercial Shrimp										
White shrimp*	442.43	82.97	20.66	4,000.37	774.98	13.41	107.33	0.06	50	193
Brown shrimp*	433.68	153.39	20.25	2,182.99	626.65	7.32	84.70	0.10	41	144
Pink shrimp*	227.84	61.38	10.64	1,053.99	296.96	3.53	84.36	0.13	50	144

*Invertebrates

Table 23. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within lower Laguna Madre during the 1993 spring commercial bay-shrimp season (15 May-15 July). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Lesser blue crab*	709.08	398.01	23.91	5,642.84	2,401.68	10.33	55.08	0.09	21	140
Atlantic croaker	475.16	194.92	16.02	8,621.87	4,174.36	15.78	121.85	0.34	27	212
Spot croaker	425.43	127.32	14.35	6,122.50	1,555.81	11.20	94.51	0.32	35	220
Sand seatrout	216.30	83.41	7.29	3,168.68	608.01	5.80	114.92	0.54	14	268
Bay anchovy	200.68	163.57	6.77	232.93	181.06	0.43	59.98	0.04	35	81
Atlantic cutlassfish	200.28	59.39	6.75	4,066.74	540.27	7.44	306.82	1.50	30	687
Pinfish	104.44	39.53	3.52	1,484.50	803.35	2.72	97.79	0.45	52	176
Blue crab*	74.64	46.34	2.52	7,851.74	5,085.78	14.37	121.10	0.22	35	174
Bay whiff	70.38	32.55	2.37	430.73	188.03	0.79	82.47	0.26	45	179
Blackcheek tonguefish	68.30	46.72	2.30	1,824.99	1,341.91	3.34	130.02	0.54	77	165
Silver seatrout	64.66	45.21	2.18	2,834.57	1,950.25	5.19	129.10	0.78	48	230
Mantis shrimp*	46.91	19.77	1.58	506.52	269.52	0.93	86.97	0.68	40	142
Atlantic threadfin	40.14	24.42	1.35	868.58	673.92	1.59	128.26	1.20	76	176
Hardhead catfish	31.42	20.41	1.06	3,383.75	2,619.87	6.19	208.36	1.44	48	394
Atlantic brief squid*	25.24	4.77	0.85	256.13	61.00	0.47	41.05	0.44	15	98
Lesser rock shrimp*	23.20	10.14	0.78	31.28	13.90	0.06	45.53	0.76	15	75
Iridescent swimming crab*	19.08	8.49	0.64	95.53	36.52	0.17	36.96	0.48	15	79
Atlantic midshipman	17.33	14.70	0.58	108.76	91.96	0.20	69.32	1.46	27	146
Star drum	13.64	9.27	0.46	275.43	176.70	0.50	113.19	0.72	78	150
Spotfin mojarra	12.34	6.42	0.42	122.19	72.87	0.22	86.69	0.79	36	116
Gulf menhaden	8.25	6.70	0.28	167.09	131.28	0.31	120.68	1.56	61	180
Blotched swimming crab*	7.44	3.33	0.25	111.77	64.61	0.20	44.47	0.65	21	73
Gafftopsail catfish	7.04	7.04	0.24	548.47	548.47	1.00	213.04	3.27	200	232
Banded drum	6.87	4.82	0.23	162.75	95.38	0.30	118.72	0.77	56	151
Lookdown	6.71	5.42	0.23	13.02	10.33	0.02	45.22	0.32	27	81
Least puffer	5.91	2.56	0.20	14.36	6.05	0.03	47.00	0.69	26	70
Harvestfish	5.41	2.39	0.18	41.49	18.44	0.08	67.84	2.50	25	139
Inshore lizardfish	4.73	1.64	0.16	160.05	62.61	0.29	161.36	2.02	100	320

Table 23 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Atlantic moonfish	4.54	2.70	0.15	10.86	6.48	0.02	56.07	0.85	41	75
Blackwing searobin	4.31	2.39	0.15	92.59	57.95	0.17	103.82	2.11	21	241
Southern flounder	4.15	2.69	0.14	363.77	218.34	0.67	175.51	2.52	75	243
Pigfish	4.14	3.81	0.14	292.35	288.41	0.54	150.98	6.40	78	189
Silver jenny	3.93	2.06	0.13	38.76	20.87	0.07	93.43	1.64	56	117
Silver perch	3.89	1.51	0.13	132.32	59.23	0.24	136.11	2.81	62	160
Spotted seatrout	3.72	2.37	0.13	599.04	381.58	1.10	232.43	4.50	167	275
Atlantic stingray	3.69	2.24	0.12	2,220.95	1,779.99	4.06	223.40	6.07	155	294
Ocellated flounder	3.67	2.46	0.12	274.46	229.62	0.50	163.95	5.59	43	193
Shrimp eel	3.31	2.09	0.11	186.57	118.00	0.34	377.68	0.21	312	435
Longnose spider crab*	3.17	1.80	0.11	136.94	118.53	0.25	42.38	2.90	12	62
Yellowfin mojarra	3.03	2.81	0.10	23.48	21.95	0.04	85.72	0.08	65	102
Bighead searobin	2.98	2.12	0.10	148.17	134.09	0.27	129.14	6.18	61	189
Gizzard shad	2.28	1.69	0.08	224.80	203.33	0.41	194.28	7.22	154	238
Rock sea bass	2.27	1.11	0.08	19.58	9.22	0.04	82.27	1.26	60	102
Gulf toadfish	1.67	0.90	0.06	69.43	47.21	0.13	132.70	5.14	77	175
Threadfin shad	1.60	1.60	0.05	16.78	16.78	0.03	114.50	13.50	101	128
Fringed flounder	1.20	0.82	0.04	25.81	19.00	0.05	115.20	0.98	103	118
Shoal flounder	1.20	1.20	0.04	5.50	5.50	0.01	103.43	19.47	61	182
Offshore lizardfish	1.16	1.16	0.04	9.73	9.73	0.02	124.24	24.78	80	207
Spotted scorpionfish	1.14	0.78	0.04	90.60	69.62	0.17	166.55	9.94	75	195
Roughneck shrimp*	1.12	0.66	0.04	1.10	0.74	<0.01	53.42	2.26	35	76
Atlantic bumper	1.00	0.75	0.03	0.72	0.45	<0.01	37.75	0.66	25	55
Sharptail goby	0.90	0.54	0.03	4.58	2.75	0.01	104.46	20.68	24	209
Roughback shrimp*	0.81	0.66	0.03	1.85	1.55	<0.01	62.86	1.90	52	84
Gulf flounder	0.80	0.80	0.03	70.31	70.31	0.13	192.00		192	192
Shark eye*	0.75	0.75	0.03	7.46	7.46	0.01	28.00		28	28
Chain pipefish	0.69	0.47	0.02	1.33	0.90	<0.01	181.22	5.79	170	250
Southern hake	0.63	0.55	0.02	15.75	11.68	0.03	160.20	3.54	155	194
Dwarf sand perch	0.60	0.60	0.02	3.33	3.33	0.01	74.40	2.06	70	82
Florida pompano	0.56	0.56	0.02	79.92	79.92	0.15	185.00		185	185

Table 23 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Smooth puffer	0.55	0.26	0.02	10.90	5.48	0.02	94.93	8.41	28	135
Planehead filefish	0.53	0.39	0.02	5.74	4.79	0.01	79.17	1.48	60	105
Thinstripe hermit crab*	0.46	0.46	0.02	0.92	0.92	<0.01				
Finescale menhaden	0.44	0.36	0.01	26.46	22.56	0.05	152.84	3.33	122	241
Southern kingfish	0.38	0.24	0.01	19.95	13.14	0.04	163.46	5.46	155	217
Blackedge moray	0.35	0.35	0.01	37.99	37.99	0.07	418.67	14.22	400	449
Gulf butterflyfish	0.32	0.32	0.01	0.26	0.26	<0.01	58.88	1.50	57	60
Spotted moray	0.26	0.26	0.01	28.65	28.65	0.05	424.50	0.50	424	425
Striped mullet	0.20	0.20	0.01	37.45	37.45	0.07	264.00		264	264
Striped burrfish	0.20	0.20	0.01	37.12	37.12	0.07	177.00		177	177
Scaled sardine	0.20	0.20	0.01	3.71	3.71	0.01	125.00		125	125
Northern pipefish	0.20	0.20	0.01	21.29	21.29	0.04	254.00		254	254
Longfin squid*	0.19	0.19	0.01	1.68	1.68	<0.01	65.00		65	65
Crevalle jack	0.14	0.14	<0.01	2.72	2.72	<0.01	117.00		117	117
Gray triggerfish	0.13	0.13	<0.01	1.17	1.17	<0.01	75.00		75	75
Spotted batfish	0.10	0.10	<0.01	1.56	1.56	<0.01	106.00		106	106
Hogchoker	0.10	0.10	<0.01	5.21	5.21	0.01	139.00		139	139
Sheepshead	0.10	0.10	<0.01	0.10	0.10	<0.01	23.00		23	23
Round herring	0.10	0.10	<0.01	3.12	3.12	0.01	172.00		172	172
Permit	0.10	0.10	<0.01	3.44	3.44	0.01	120.00		120	120
Roundel skate	0.07	0.07	<0.01	38.13	38.13	0.07	311.00		311	311
Singlepot frogfish	0.07	0.07	<0.01	0.44	0.44	<0.01	60.00		60	60
Common octopus*	0.07	0.07	<0.01	37.07	37.07	0.07	162.00		162	162
Sea nettle*										
Commercial Shrimp										
Brown shrimp*	17,057.48	3,383.39	83.10	51,728.82	10,061.87	47.69	73.86	0.01	34	128
Pink shrimp*	322.72	274.82	1.57	980.85	795.68	0.90	71.35	0.07	38	100
White shrimp*	180.35	142.09	0.88	1,116.08	516.13	1.03	95.86	0.58	51	166

*Invertebrates

Table 24. Mean catch rate ± 1 SE in number (no./h/9.8 m trawl) and weight (g/h/9.8 m trawl), and mean size ± 1 SE (TL mm), of bycatch organisms and commercial shrimp caught in commercial shrimp trawls within lower Laguna Madre during the 1993 fall commercial bay-shrimp season (15 August-15 December). Percent for bycatch organisms is percent of total bycatch. Percent for commercial shrimp is percent of total catch.

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Sand seatrout	471.96	153.02	29.56	3,537.35	734.15	12.74	98.22	0.23	23	262
Lesser blue crab*	231.61	110.00	14.51	4,574.95	2,661.88	16.47	64.87	0.17	12	130
Spotfin mojarra	165.66	76.34	10.38	589.92	256.10	2.12	67.68	0.04	41	123
Hardhead catfish	106.31	56.65	6.66	1,502.02	926.70	5.41	124.20	0.54	57	433
Atlantic cutlassfish	68.16	43.48	4.27	4,559.92	3,276.56	16.42	474.40	1.99	103	681
Atlantic brief squid*	48.98	13.05	3.07	311.60	52.43	1.12	37.38	0.18	15	93
Spot croaker	47.96	38.13	3.00	743.93	450.68	2.68	109.30	0.32	72	202
Silver perch	41.93	31.10	2.63	363.31	260.59	1.31	89.92	0.21	52	162
Mantis shrimp*	41.64	13.05	2.61	398.82	122.10	1.44	88.92	0.51	48	151
Pinfish	37.36	20.73	2.34	547.16	304.21	1.97	101.56	0.33	45	192
Silver jenny	36.12	24.58	2.26	150.27	92.27	0.54	68.28	0.15	42	109
Silver seatrout	31.09	13.68	1.95	217.33	110.53	0.78	88.70	0.38	47	315
Atlantic croaker	28.21	11.12	1.77	1,190.31	385.19	4.29	154.12	0.62	20	303
Star drum	24.44	16.02	1.53	129.63	84.50	0.47	75.86	0.58	42	130
Lesser rock shrimp*	22.99	11.52	1.44	33.60	17.55	0.12	46.75	0.24	25	65
Bay whiff	21.26	8.30	1.33	223.19	86.36	0.80	98.18	0.36	50	164
Pigfish	17.68	14.13	1.11	1,128.02	1,022.56	4.06	150.76	1.36	86	257
Bay anchovy	12.32	6.31	0.77	29.83	15.86	0.11	57.86	1.52	27	140
Blackcheek tonguefish	12.19	5.04	0.76	159.39	53.53	0.57	106.54	1.08	45	165
Spotted scorpionfish	11.91	5.34	0.75	2,397.08	1,105.85	8.63	192.43	0.67	24	281
Blotched swimming crab*	6.90	1.86	0.43	151.25	42.57	0.54	52.13	0.62	15	82
Roughback shrimp*	6.80	2.57	0.43	12.69	4.66	0.05	60.10	0.40	44	80
Atlantic moonfish	6.71	2.27	0.42	25.47	8.15	0.09	62.00	1.33	34	127
Lookdown	6.51	3.65	0.41	20.75	9.92	0.07	54.89	0.62	33	122

Table 24 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Inshore lizardfish	5.85	1.32	0.37	223.30	78.44	0.80	160.97	4.69	57	345
Iridescent swimming crab*	5.55	1.96	0.35	39.62	15.46	0.14	43.18	0.36	30	65
Shoal flounder	5.37	2.82	0.34	55.43	27.96	0.20	98.79	1.00	58	150
Southern kingfish	5.24	3.05	0.33	197.28	128.59	0.71	148.04	2.78	50	206
Atlantic stingray	4.27	1.50	0.27	647.96	213.75	2.33	155.54	3.00	70	248
Roughneck shrimp*	4.27	2.08	0.27	7.00	3.17	0.03	59.27	0.68	40	79
Blue crab*	3.89	1.72	0.24	567.90	252.80	2.04	130.10	3.32	41	180
Least puffer	3.84	2.35	0.24	30.01	23.33	0.11	60.46	2.20	21	112
Ocellated flounder	3.81	1.40	0.24	321.26	113.56	1.16	157.93	3.14	103	248
Blackwing searobin	3.72	2.37	0.23	48.23	21.34	0.17	97.27	1.51	49	160
Gafftopsail catfish	3.68	1.80	0.23	158.42	95.91	0.57	141.75	3.16	66	270
Rock sea bass	3.54	1.53	0.22	156.72	81.55	0.56	128.11	4.73	57	185
Atlantic spadefish	2.96	1.25	0.19	46.38	18.13	0.17	68.92	1.99	28	118
Fringed flounder	2.46	1.11	0.15	17.04	6.68	0.06	82.99	1.59	50	120
Striped burrfish	2.07	0.96	0.13	411.04	190.37	1.48	166.85	0.94	112	242
Scaled sardine	1.85	0.59	0.12	59.29	18.16	0.21	144.64	2.44	85	168
Barbfish	1.73	0.95	0.11	319.22	197.05	1.15	182.10	3.92	110	253
Sooty seahare*	1.69	1.07	0.11	59.01	41.62	0.21				
Hogchoker	1.58	0.67	0.10	24.97	13.91	0.09	75.28	3.26	40	125
Guaguanche	1.36	0.61	0.09	10.22	4.36	0.04	107.28	5.11	53	165
Blackedge moray	1.32	0.68	0.08	201.23	101.49	0.72	458.98	3.68	398	551
Atlantic threadfin	1.18	0.61	0.07	73.10	37.50	0.26	188.25	1.39	163	219
Crevalle jack	1.11	0.56	0.07	35.98	26.91	0.13	120.17	5.74	55	160
Harvestfish	1.08	0.44	0.07	36.72	21.08	0.13	99.23	9.34	40	178
Atlantic midshipman	0.90	0.37	0.06	23.38	10.14	0.08	131.77	3.07	97	197
Gulf menhaden	0.82	0.48	0.05	40.43	24.99	0.15	156.79	7.78	95	208
Banded drum	0.72	0.32	0.05	10.99	6.00	0.04	82.70	6.42	36	153

Table 24 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Shrimp eel	0.71	0.53	0.04	71.53	49.55	0.26	452.56	10.47	301	547
Planehead filefish	0.70	0.44	0.04	8.56	5.86	0.03	83.96	2.37	43	140
Gulf kingfish	0.66	0.40	0.04	19.96	16.93	0.07	125.94	11.01	45	175
Bighead searobin	0.60	0.35	0.04	19.82	11.30	0.07	107.40	10.95	34	220
Gulf butterfish	0.60	0.52	0.04	0.66	0.58	<0.01	32.64	3.11	22	60
Red goatfish	0.59	0.31	0.04	6.46	4.78	0.02	64.19	6.97	25	141
Trachypenaeid species*	0.55	0.55	0.03	0.55	0.55	<0.01	47.82	1.90	34	57
Atlantic bumper	0.54	0.33	0.03	1.38	0.80	<0.01	61.52	0.74	47	75
Southern flounder	0.49	0.22	0.03	77.29	32.69	0.28	237.37	5.89	207	300
Smooth butterfly ray	0.49	0.27	0.03	294.56	212.76	1.06	389.68	10.66	270	540
Lined sole	0.44	0.26	0.03	6.43	4.27	0.02	85.08	2.81	65	100
Gulf toadfish	0.42	20.00	0.03	50.64	25.53	0.18	174.83	10.68	106	220
Gray snapper	0.42	0.39	0.03	36.49	32.64	0.13	165.71	2.93	50	203
Gulf grassflat crab*	0.40	0.27	0.03	0.83	0.63	<0.01	20.64	0.97	10	24
Sharptail goby	0.35	0.27	0.02	1.80	1.27	0.01	108.15	7.91	83	174
Southern hake	0.35	0.35	0.02	9.79	9.79	0.04	178.00		178	178
Calico box crab*	0.35	0.35	0.02	12.94	12.94	0.05	70.00		70	70
Gray triggerfish	0.34	0.13	0.02	16.70	11.65	0.06	105.63	18.20	36	204
Red sea urchin*	0.34	0.24	0.02	17.84	11.97	0.06	81.69	0.13	81	82
Offshore lizardfish	0.31	0.25	0.02	1.99	1.71	0.01	108.35	2.39	99	131
Yellowfin mojarra	0.28	0.28	0.02	1.22	1.22	<0.01	69.12	5.13	60	94
Chain pipefish	0.28	0.16	0.02	0.39	0.23	<0.01	174.58	2.85	160	185
Lesser electric ray	0.24	0.12	0.02	80.88	52.46	0.29	165.92	11.02	90	187
Batfish species	0.22	0.22	0.01	8.40	8.40	0.03	132.00		132	132
Speckled swimming crab*	0.22	0.12	0.01	15.41	10.24	0.06	97.19	8.09	41	107
Scrawled cowfish	0.20	0.20	0.01	0.81	0.81	<0.01	38.00	19.50	25	64
Longspine porgy	0.20	0.20	0.01	15.12	15.12	0.05	193.00	1.73	190	196

Table 24 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Yellow box crab*	0.19	0.12	0.01	62.50	35.69	0.23	123.00	3.60	115	133
Dwarf sand perch	0.17	0.17	0.01	2.83	2.83	0.01	112.50	6.43	100	122
Spotted seatrout	0.16	0.12	0.01	17.85	13.00	0.06	191.43	18.43	173	302
False arrow crab*	0.15	0.15	0.01	0.49	0.49	<0.01	21.00	2.08	18	25
Gulf flounder	0.14	0.14	0.01	22.80	22.80	0.08	236.50	24.50	212	
Polka-dot batfish	0.13	0.09	0.01	10.63	7.78	0.04	151.17	12.22	130	176
Belted sandfish	0.13	0.13	0.01	1.76	1.76	0.01	87.00		87	87
Spanish sardine	0.12	0.12	0.01	3.00	3.00	0.01	132.33	19.00	107	145
Longspine swimming crab*	0.12	0.12	0.01	1.34	1.34	<0.01	47.00		47	47
Longfin squid*	0.11	0.09	0.01	2.49	1.68	0.01	69.20	2.20	67	78
Finescale menhaden	0.09	0.09	0.01	2.06	2.06	0.01	130.67	21.46	100	172
Longnose gar	0.09	0.09	0.01	1.02	1.02	<0.01	103.00	9.00	94	112
Round herring	0.09	0.09	0.01	3.66	3.66	0.01	176.00		176	176
Gulf stone crab*	0.09	0.09	0.01	0.43	0.43	<0.01	25.00		25	25
Silverstripe halfbeak	0.07	0.07	<0.01	1.71	1.71	0.01	210.00		210	210
Emerald sleeper	0.07	0.07	<0.01	0.69	0.69	<0.01	140.00		140	140
Smooth puffer	0.07	0.07	<0.01	0.50	0.50	<0.01	70.00	3.00	67	73
Bluntnose jack	0.07	0.07	<0.01	0.40	0.40	<0.01	76.00	1.00	75	77
Seabob*	0.07	0.07	<0.01	0.22	0.22	<0.01	91.00		91	91
Striped mullet	0.06	0.06	<0.01	4.80	4.80	0.02	205.00		205	205
Tripletail	0.06	0.06	<0.01	1.67	1.67	0.01	110.00		110	110
Sheepshead minnow	0.06	0.06	<0.01	0.62	0.62	<0.01	106.00	1.00	105	107
Blackedge cusk eel	0.06	0.04	<0.01	10.53	7.67	0.04	474.00	31.00	443	505
Seahare species*	0.06	0.06	<0.01	5.80	5.80	0.02				
Bigmouth sleeper	0.05	0.05	<0.01	2.37	2.37	0.01	93.00		93	93
Permit	0.05	0.05	<0.01	1.85	1.85	0.01	133.00		130	136
Brown rock shrimp*	0.05	0.05	<0.01	0.39	0.39	<0.01	76.00		76	76

Table 24 (cont.)

Species	Number			Weight			Length			
	no./h/net	SE	%	g/h/net	SE	%	TL	SE	Min	Max
Bycatch										
Florida lady crab*	0.05	0.05	<0.01	0.23	0.23	<0.01	35.00		35	35
Red drum	0.04	0.04	<0.01	10.21	10.21	0.04	302.00		302	302
Spotted batfish	0.04	0.04	<0.01	1.87	1.87	0.01	139.00		139	139
Large sea star*	0.03	0.03	<0.01	0.24	0.24	<0.01	109.00		109	109
Moon jellyfish										
Commercial Shrimp										
Brown shrimp*	1,756.19	622.99	30.47	4,483.79	1,656.37	11.00	68.69	0.04	33	139
White shrimp*	1,186.65	474.16	20.59	4,806.29	1,613.18	11.79	82.55	0.05	33	169
Pink shrimp*	1,224.74	514.81	21.25	3,689.36	1,600.96	9.05	72.14	0.03	37	120

*Invertebrates

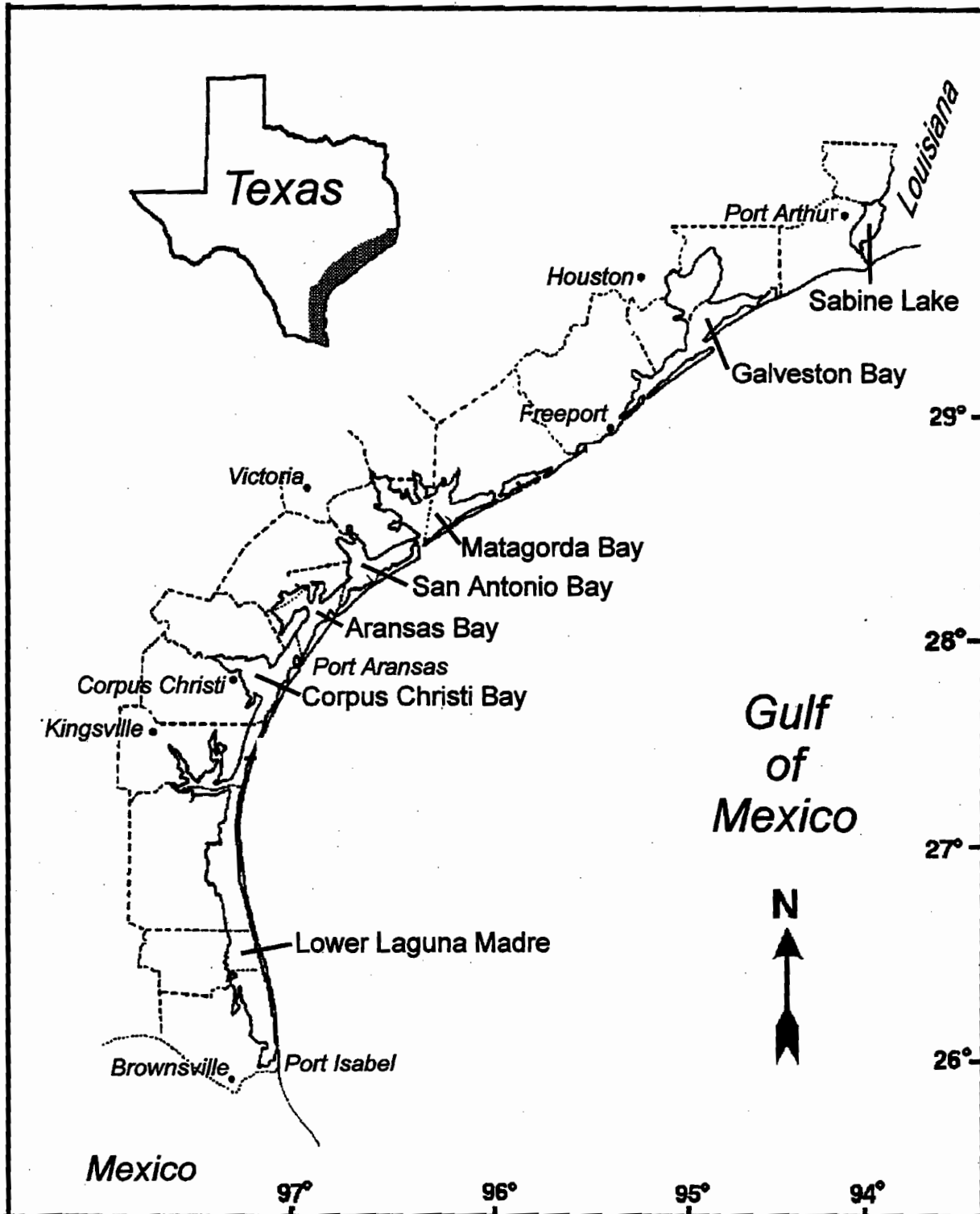


Figure 1. Texas bay systems where commercial shrimp bycatch characterization samples were collected from 1993-1995.

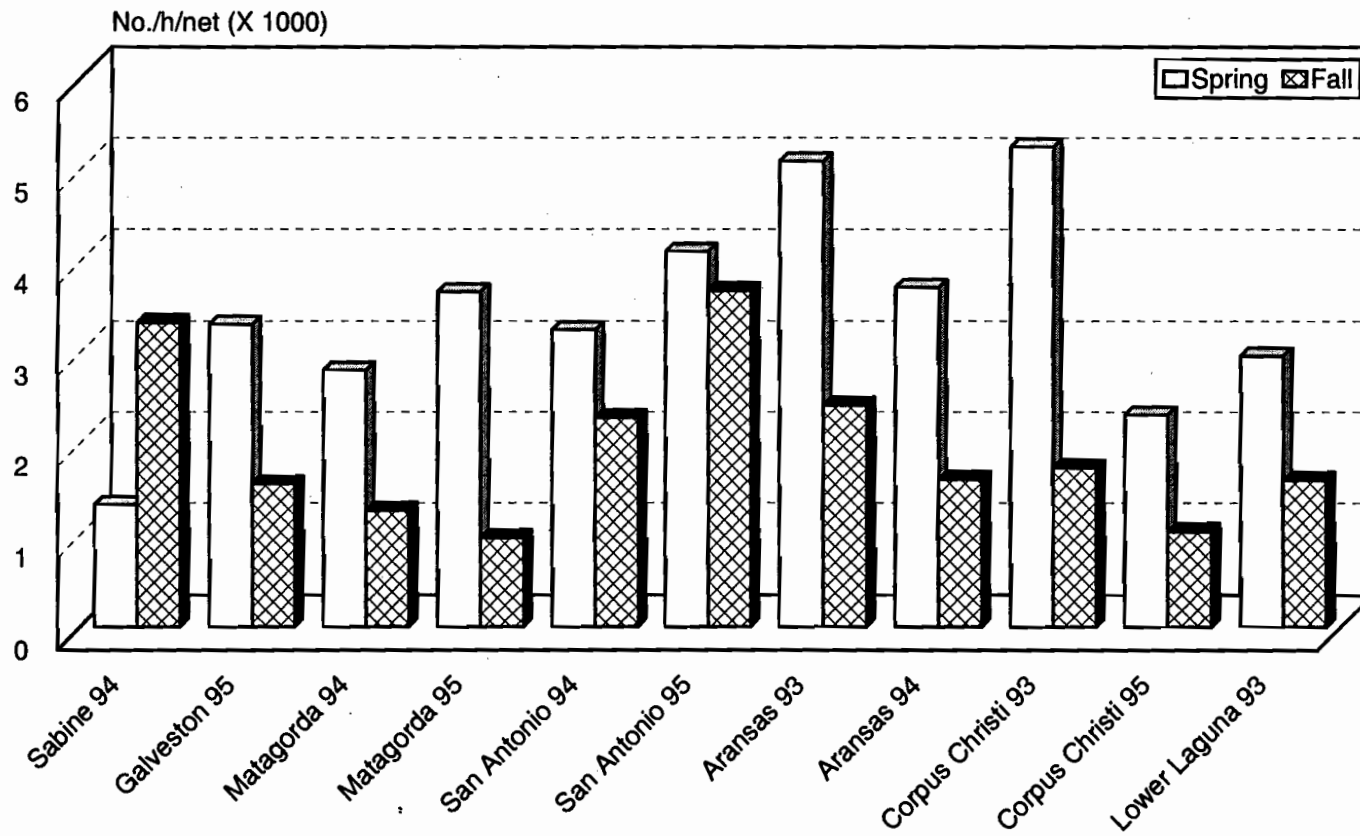


Figure 2. Mean total bycatch catch per unit of effort (no./h/net) aboard commercial shrimp vessels sampled during spring and fall commercial bay shrimp seasons within select bays and years from 1993-1995.

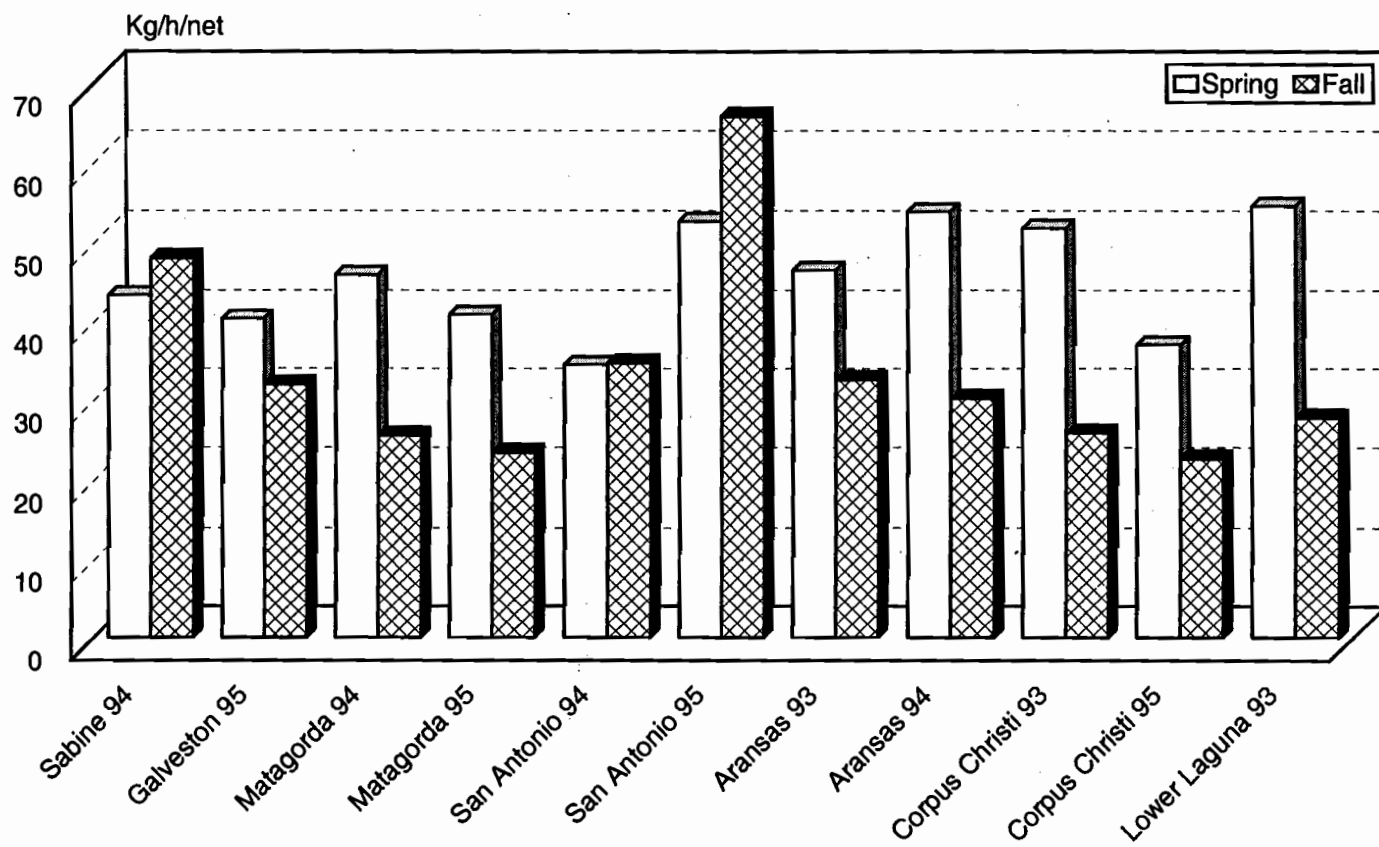


Figure 3. Mean total bycatch catch per unit of effort (kg/h/net) aboard commercial shrimp vessels sampled during spring and fall commercial bay shrimp seasons within select bays and years from 1993-1995.

Appendix 1. Common and scientific names of organisms collected in commercial bycatch samples during the 1993-95 spring and fall shrimping seasons.

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Arrow squid*	<u>Loligo pleii</u>	Blue crab*	<u>Callinectes sapidus</u>
Atlantic brief squid*	<u>Lolliguncula brevis</u>	Bluefish	<u>Pomatomus saltatrix</u>
Atlantic bumper	<u>Chloroscombrus chrysurus</u>	Bluntnose jack	<u>Hemicaranx amblyrhynchus</u>
Atlantic croaker	<u>Micropogonias undulatus</u>	Brown rock shrimp*	<u>Sicyonia brevirostris</u>
Atlantic cutlassfish	<u>Trichiurus lepturus</u>	Brown shrimp*	<u>Penaeus aztecus</u>
Atlantic midshipman	<u>Porichthys plectrodon</u>	Cabbagehead*	<u>Stomolophus meleagris</u>
Atlantic moonfish	<u>Selene setapinnis</u>	Calico box crab*	<u>Hepatus epheliticus</u>
Atlantic rangia*	<u>Rangia cuneata</u>	Cancellate cantharus*	<u>Cantharus cancellarius</u>
Atlantic spadefish	<u>Chaetodipterus faber</u>	Cero	<u>Scomberomorus regalis</u>
Atlantic stingray	<u>Dasyatis sabina</u>	Chain pipefish	<u>Syngnathus louisianae</u>
Atlantic thread herring	<u>Opisthonema oglinum</u>	CLASS bony fishes	CLASS <u>OSTEICHTHYES</u>
Atlantic threadfin	<u>Polydactylus octonemus</u>	CLASS jellyfish*	CLASS <u>SCYPHOZOA</u>
Banded drum	<u>Larimus fasciatus</u>	CLASS sessile tunicates*	CLASS <u>ASCIDIACEA</u>
Bank cusk eel	<u>Ophidion holbrookii</u>	Code goby	<u>Gobiosoma robustum</u>
Barbfish	<u>Scorpaena brasiliensis</u>	Common octopus*	<u>Octopus vulgaris</u>
Batfish species	<u>Ogcocephalus sp.</u>	Cottonmouth jack	<u>Uraspis secunda</u>
Bay anchovy	<u>Anchoa mitchilli</u>	Cownose ray	<u>Rhinoptera bonasus</u>
Bay whiff	<u>Citharichthys spilopterus</u>	Crested blenny	<u>Hyppleurochilus geminatus</u>
Bearded brotula	<u>Brotula barbata</u>	Crested cusk-eel	<u>Ophidion welshi</u>
Belted sandfish	<u>Serranus subligarius</u>	Crevalle jack	<u>Caranx hippos</u>
Bigeye searobin	<u>Prionotus longispinosus</u>	Dwarf sand perch	<u>Diplectrum bivittatum</u>
Bighead searobin	<u>Prionotus tribulus</u>	Dwarf seahorse	<u>Hippocampus zosterae</u>
Bigmouth sleeper	<u>Gobiomorus dormitor</u>	Dwarf surf clam*	<u>Mulinia lateralis</u>
Black drum	<u>Pogonias cromis</u>	Eastern oyster*	<u>Crassostrea virginica</u>
Blackcheek tonguefish	<u>Symphurus plagiosa</u>	Emerald sleeper	<u>Erotelis smaragdus</u>
Blackedge cusk eel	<u>Lepophidium brevibarbe</u>	Estuarine snapping shrimp*	<u>Alpheus estuariensis</u>
Blackedge moray	<u>Gymnothorax nigromarginatus</u>	False arrow crab*	<u>Metoporphaphis calcarata</u>
Blackwing searobin	<u>Prionotus rubio</u>	FAMILY anchovies	FAMILY <u>ENGRAULIDAE</u>
Blotched swimming crab*	<u>Portunus spinimanus</u>	FAMILY mud crabs*	FAMILY <u>XANTHIDAE</u>
Blue catfish	<u>Ictalurus furcatus</u>	FAMILY porcelain crabs*	FAMILY <u>PORCELLANIDAE</u>

Appendix 1. (Cont'd.)

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Fat sleeper	<u>Dormitator maculatus</u>	Iridescent swimming crab*	<u>Portunus gibbesii</u>
Finescale menhaden	<u>Brevoortia gunteri</u>	Irish pompano	<u>Diapterus auratus</u>
Flagfin mojarra	<u>Eucinostomus melanopterus</u>	King mackerel	<u>Scomberomorus cavalla</u>
Flatclaw hermit crab*	<u>Pagurus pollicaris</u>	Ladyfish	<u>Elops saurus</u>
Florida lady crab*	<u>Ovalipes floridanus</u>	Lane snapper	<u>Lutjanus synagris</u>
Florida pompano	<u>Trachinotus carolinus</u>	Large sea star*	<u>Luidia clathrata</u>
Florida rocksnail*	<u>Thais haemastoma floridana</u>	Least puffer	<u>Sphoeroides parvus</u>
Freckled blenny	<u>Hypsoblennius ionthas</u>	Leatherjacket	<u>Oligoplites saurus</u>
Fringed flounder	<u>Etropus crossotus</u>	Leopard searobin	<u>Prionotus scitulus</u>
Gafftopsail catfish	<u>Bagre marinus</u>	Leopard toadfish	<u>Opsanus pardus</u>
Giant hermit crab*	<u>Petrochirus diogenes</u>	Lesser blue crab*	<u>Callinectes similis</u>
Giant manta shrimp*	<u>Lysiosquilla scabricauda</u>	Lesser electric ray	<u>Narcine brasiliensis</u>
Gizzard shad	<u>Dorosoma cepedianum</u>	Lesser mantis shrimp*	<u>Squilla neglecta</u>
Gray snapper	<u>Lutjanus griseus</u>	Lesser rock shrimp*	<u>Sicyonia dorsalis</u>
Gray triggerfish	<u>Balistes capriscus</u>	Lightning whelk*	<u>Busycon sinistrum</u>
Green porcelain crab*	<u>Petrolisthes armatus</u>	Lined seahorse	<u>Hippocampus erectus</u>
Guaganche	<u>Sphyraena guachancho</u>	Lined sole	<u>Achirus lineatus</u>
Gulf butterflyfish	<u>Peprilus burti</u>	Longfin squid*	<u>Loligo pealeii</u>
Gulf flounder	<u>Paralichthys albigutta</u>	Longnose anchovy	<u>Anchoa nasuta</u>
Gulf grassflat crab*	<u>Dyspanopeus texana</u>	Longnose gar	<u>Lepisosteus osseus</u>
Gulf kingfish	<u>Menticirrhus littoralis</u>	Longnose spider crab*	<u>Libinia dubia</u>
Gulf menhaden	<u>Brevoortia patronus</u>	Longspine porgy	<u>Stenotomus caprinus</u>
Gulf pipefish	<u>Syngnathus scovelli</u>	Longspine swimming crab*	<u>Portunus spinicarpus</u>
Gulf stone crab*	<u>Menippe adina</u>	Lookdown	<u>Selene vomer</u>
Gulf toadfish	<u>Opsanus beta</u>	Mantis shrimp*	<u>Squilla empusa</u>
Hardhead catfish	<u>Arius felis</u>	Moon jellyfish*	<u>Aurelia aurita</u>
Harvestfish	<u>Peprilus alepidotus</u>	Mottled purse crab*	<u>Persephona mediterranea</u>
Hogchoker	<u>Trinectes maculatus</u>	Naked goby	<u>Gobiosoma bosci</u>
Hooked mussel*	<u>Ischadium recurvum</u>	Northern kingfish	<u>Menticirrhus saxatilis</u>
Inland silverside	<u>Menidia beryllina</u>	Northern pipefish	<u>Syngnathus fuscus</u>
Inshore lizardfish	<u>Synodus foetens</u>	Ocellated flounder	<u>Ancylopsetta quadrocellata</u>

Appendix 1. (Cont'd.)

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Offshore lizardfish	<u>Synodus poeyi</u>	Scrawled cowfish	<u>Lactophrys quadricornis</u>
Ohio shrimp*	<u>Macrobrachium ohione</u>	Scrawled filefish	<u>Aluterus scriptus</u>
ORDER anemones*	ORDER <u>ACTINIARIA</u>	Sea nettle*	<u>Chrysaora quinquecirrha</u>
ORDER whip corals*	ORDER <u>GORGONACEA</u>	Sea walnut*	<u>Beroe ovata</u>
Pancake batfish	<u>Halieutichthys aculeatus</u>	Seabob*	<u>Xiphopenaeus kroyeri</u>
Peppermint shrimp*	<u>Lysmata wurdemanni</u>	Seahare species*	<u>Aplysia sp.</u>
Permit	<u>Trachinotus falcatus</u>	Shark eye*	<u>Neverita duplicata</u>
Phosphorus jelly*	<u>Mnemiopsis mccradyi</u>	Sharptail goby	<u>Gobionellus hastatus</u>
PHYLUM ctenophores*	PHYLUM <u>CTENOPHORA</u>	Sheepshead	<u>Archosargus probatocephalus</u>
Pigfish	<u>Orthopristis chrysoptera</u>	Sheepshead minnow	<u>Cyprinodon variegatus</u>
Pinfish	<u>Lagodon rhomboides</u>	Shoal flounder	<u>Syacium gunteri</u>
Pink purse crab*	<u>Persephona crinita</u>	Shrimp eel	<u>Ophichthus gomesi</u>
Pink shrimp*	<u>Penaeus duorarum</u>	Silver jenny	<u>Eucinostomus gula</u>
Planehead filefish	<u>Monacanthus hispidus</u>	Silver perch	<u>Bairdiella chrysoura</u>
Polka-dot batfish	<u>Ogcocephalus radiatus</u>	Silver seatrout	<u>Cynoscion nothus</u>
Portly spider crab*	<u>Libinia emarginata</u>	Silverstripe halfbeak	<u>Hyporhamphus unifasciatus</u>
Puerto Rican sand crab*	<u>Emerita portoricensis</u>	Singlespot frogfish	<u>Antennarius radiosus</u>
Rainwater killifish	<u>Lucania parva</u>	Skilletfish	<u>Gobiesox strumosus</u>
Red drum	<u>Sciaenops ocellatus</u>	Skipjack herring	<u>Alosa chrysochloris</u>
Red goatfish	<u>Mullus auratus</u>	Smooth butterfly ray	<u>Gymnura micrura</u>
Red sea urchin*	<u>Arbacia punctulata</u>	Smooth puffer	<u>Lagocephalus laevigatus</u>
Red snapper	<u>Lutjanus campechanus</u>	Sooty seahare*	<u>Aplysia brasiliana</u>
Rock sea bass	<u>Centropristis philadelphia</u>	Southern flounder	<u>Paralichthys lethostigma</u>
Rough silverside	<u>Membras martinica</u>	Southern hake	<u>Urophycis floridana</u>
Roughback shrimp*	<u>Trachypenaeus similis</u>	Southern kingfish	<u>Menticirrhus americanus</u>
Roughneck shrimp*	<u>Trachypenaeus constrictus</u>	Southern quahog*	<u>Mercenaria campechiensis</u>
Round herring	<u>Etrumeus teres</u>	Southern stargazer	<u>Astroscopus y-graecum</u>
Roundel skate	<u>Raja texana</u>	Southern stingray	<u>Dasyatis americana</u>
Sand seatrout	<u>Cynoscion arenarius</u>	Spanish mackerel	<u>Scomberomorus maculatus</u>
Sargassum swimming crab*	<u>Portunus sayi</u>	Spanish sardine	<u>Sardinella aurita</u>
Scaled sardine	<u>Harengula jaguana</u>	Speckled swimming crab*	<u>Arenaeus cribrarius</u>

Appendix 1. (Cont'd.)

COMMON NAME	SCIENTIFIC NAME
Spot croaker	<u>Leiostomus xanthurus</u>
Spotfin mojarra	<u>Eucinostomus argenteus</u>
Spotted batfish	<u>Ogcocephalus pantostictus</u>
Spotted moray	<u>Gymnothorax moringa</u>
Spotted porcelain crab*	<u>Porcellana sayana</u>
Spotted scorpionfish	<u>Scorpaena plumieri</u>
Spotted seatrout	<u>Cynoscion nebulosus</u>
Squatter pea crab*	<u>Pinnotheres maculatus</u>
Star drum	<u>Stellifer lanceolatus</u>
Striped anchovy	<u>Anchoa hepsetus</u>
Striped blenny	<u>Chasmodes bosquianus</u>
Striped burrfish	<u>Chilomycterus schoepfi</u>
Striped mullet	<u>Mugil cephalus</u>
Thinstripe hermit crab*	<u>Clibanarius vittatus</u>
Threadfin shad	<u>Dorosoma pentenense</u>
Trachypenaeid species*	<u>Trachypenaeus sp.</u>
Tripletail	<u>Lobotes surinamensis</u>
Two-spined starfish*	<u>Astropecten duplicatus</u>
Unidentified grass shrimp*	<u>Palaemonetes sp.</u>
Violet goby	<u>Gobioides broussoneti</u>
White mullet	<u>Mugil curema</u>
White shrimp*	<u>Penaeus setiferus</u>
Yellow box crab*	<u>Calappa sulcata</u>
Yellowfin mojarra	<u>Gerres cinereus</u>
Yellowline arrow crab*	<u>Stenorhynchus seticornis</u>

*Invertebrates

PWD RP V3400-886 (1/03)

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