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Florida Fish and Wildlife Conservation Commission

Fish & Wildlife Research Institute

Fisheries-Independent Monitoring Program 2020 Annual Data Summary Report

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Overview

This report provides a summary of the data collected in 2020 by the Florida Fish and Wildlife Conservation Commission (FWC) Fish and Wildlife Research Institute's (FWRI) Fisheries-Independent Monitoring (FIM) program. Monitoring was conducted monthly following a stratified-random sampling (SRS) design in Tampa Bay, Charlotte Harbor, the northern Indian River Lagoon, Cedar Key, the southern Indian River Lagoon, Apalachicola Bay, and northeast Florida. Gears used for routine monitoring in the various areas included 21.3-m seines, 6.1-m otter trawls, and 183-m haul seines (Table OV20-01).

There were 2,071,156 animals collected in 5,943 samples from all study areas (Figure OV20-01). The most samples were collected with 21.3-m seines (n=3,522), followed by 6.1-m otter trawls (n=1,233), and 183-m haul seines (n=1,188). Total sampling effort in the study areas ranged from 382 hauls made in southern Indian River Lagoon to 1,257 hauls made in Tampa Bay (Table OV20-02). The total number of animals collected ranged from 41,941 in southern Indian River Lagoon to 887,570 in Tampa Bay. The majority of animals were collected in 21.3-m seines (n=1,666,599; 80.5% of the total catch).

Small fishes such as *Anchoa mitchilli* (Bay Anchovy), *Lagodon rhomboides* (Pinfish), *Eucinostomus* spp. (Mojarras), and seasonal recruits such as *Leiostomus xanthurus* (Spot) and *Micropogonias undulatus* (Atlantic Croaker) dominated samples. Recreationally and commercially important animals (i.e., Selected Taxa; see Table FIM20-02) accounted for 8.2% (n=170,348 of the overall catch) and comprised between 2.1% (Tampa Bay) and 35.8% (northeast Florida) of the total SRS catches from each study area. Selected Taxa were among the 10 most abundant taxa in some areas: *Mugil cephalus* (Striped Mullet) and *Mugil curema* (White Mullet) in northern Indian River Lagoon; *Mugil cephalus* (Striped Mullet), *Mugil curema* (White Mullet), and *Centropomus undecimalis* (Common Snook) in southern Indian River Lagoon; *Leiostomus xanthurus* (Spot) and *Mugil cephalus* (Striped Mullet) in Cedar Key; *Micropogonias undulatus* (Atlantic Croaker), *Litopenaeus setiferus* (White Shrimp), and *Mugil cephalus* (Striped Mullet) in Apalachicola Bay; and *Micropogonias undulatus* (Atlantic Croaker), *Leiostomus* *xanthurus* (Spot)*, Litopenaeus setiferus* (White Shrimp) and *Mugil cephalus* (Striped Mullet) in northeast Florida (Tables OV20-03 and –04).

A total of 1,848 fish and select invertebrates were culled for fish health analyses of gross external abnormalities (including external parasites). Numbers of reported abnormalities from each study area ranged from 3 (southern Indian River Lagoon) to 1,640 (northern Indian River Lagoon; see Fish Health section).

Species profiles, including indices of young-of-the-year relative abundance, were generated for many species of commercial, recreational, or ecological importance: *Sciaenops ocellatus* (Red Drum), *Cynoscion nebulosus* (Spotted Seatrout), *Archosargus probatocephalus* (Sheepshead), *Mugil cephalus* (Striped Mullet), *Lagodon rhomboides* (Pinfish), *Centropomus undecimalis* (Common Snook), and *Callinectes sapidus* (Blue Crab; see Species Profile section).

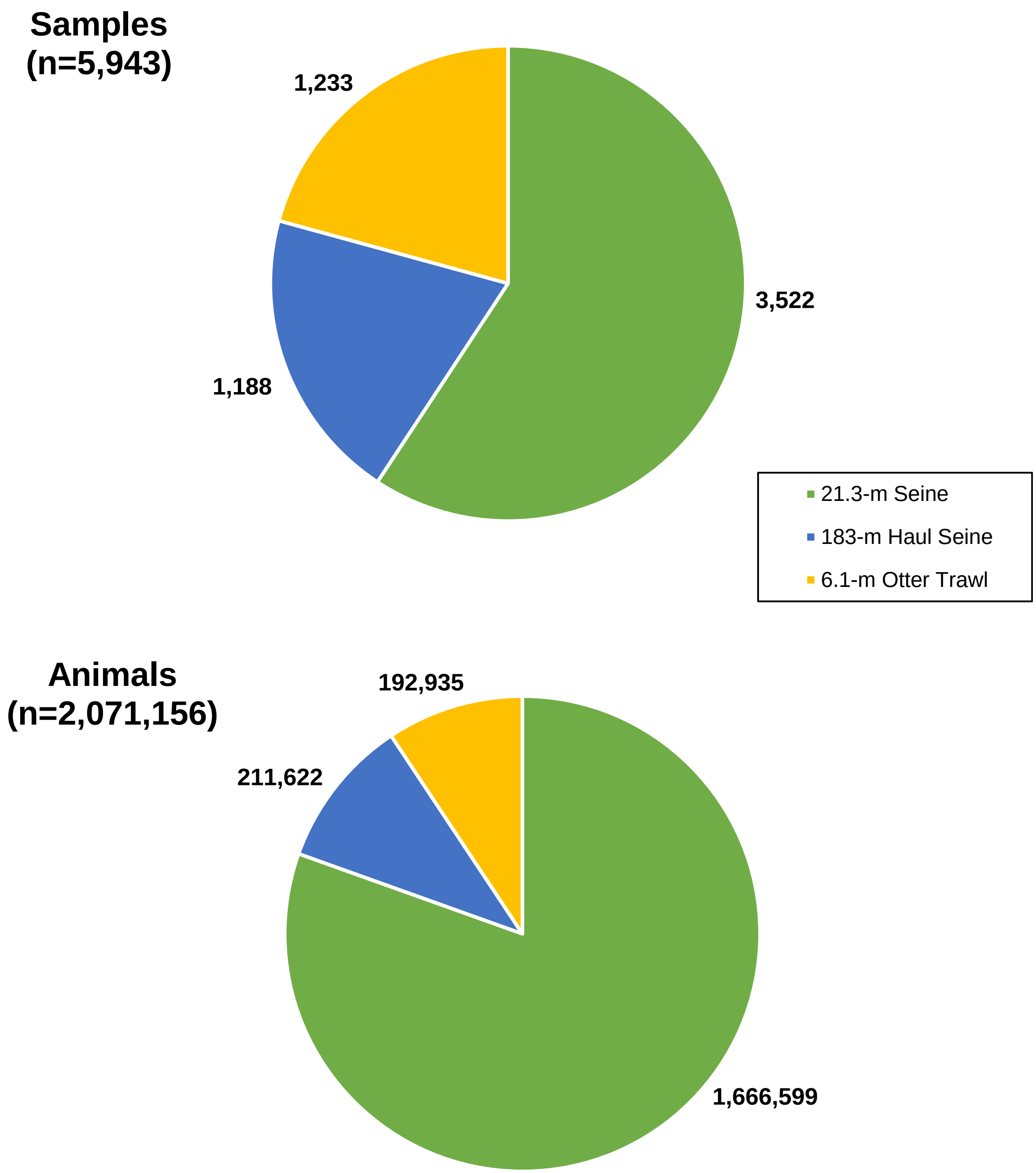

Figure OV20-01. Summary of 2020 FIM program catch and effort data. ‘Samples’ are the total number of deployments by gear, and ‘Animals’ are the total number of animals collected by each sampling method.

Table OV20-01. Gear usage by field laboratory for FIM program stratified-random sampling, 2020.

Field Lab	21.3-m Seines		183-m Haul Seines	6.1-m Otter Trawls
	Bay	River		
Tampa Bay	X	X	X	X
Charlotte Harbor	X	X	X	X
N. Indian River	X	X	X	X
Cedar Key	X	X	X	X
S. Indian River	--	X	X	--
Apalachicola	X	X	X	X
Northeast Florida	--	X	X	X

Table OV20-02. Summary of catch and effort data by area for FIM program stratified-random sampling, 2020. 'Hauls' are the total number of net deployments by each gear, and 'Animals' are the total number of animals collected by each sampling method.

Gear	Tampa Bay		Charlotte Harbor	
	Hauls	Animals	Hauls	Animals
21.3-m seine	797	777,117	848	385,555
183-m haul seine	220	52,288	170	74,503
6.1-m otter trawl	240	58,165	213	34,520
Totals	**1,257**	**887,570**	**1,231**	**494,578**

Gear	N. Indian River Lagoon		Cedar Key	
	Hauls	Animals	Hauls	Animals
21.3-m seine	413	275,830	385	54,548
183-m haul seine	193	29,325	176	16,301
6.1-m otter trawl	65	6,592	75	5,684
Totals	**671**	**311,747**	**636**	**76,533**

Gear	S. Indian River Lagoon		Apalachicola Bay	
	Hauls	Animals	Hauls	Animals
21.3-m seine	262	31,191	302	48,208
183-m haul seine	120	10,750	165	22,051
6.1-m otter trawl	.	.	115	27,891
Totals	**382**	**41,941**	**582**	**98,150**

Gear	Northeast Florida	
	Hauls	Animals
21.3-m seine	515	94,150
183-m haul seine	144	6,404
6.1-m otter trawl	525	60,083
Totals	**1,184**	**160,637**

Table OV20-03. Top 10 numerically dominant taxa collected in the FIM program's stratified-random sample areas, 2020.

Tampa Bay		Charlotte Harbor	
Scientific Name	**Number**	**Scientific Name**	**Number**
Anchoa mitchilli	653,510	*Anchoa mitchilli*	183,934
Eucinostomus spp.	47,998	*Lagodon rhomboides*	71,509
Lagodon rhomboides	40,949	*Eucinostomus* spp.	58,034
Menidia spp.	22,813	*Lucania parva*	37,129
Anchoa cubana	15,368	*Anchoa hepsetus*	36,466
Eucinostomus harengulus	13,797	*Menidia* spp.	12,930
Eucinostomus gula	10,382	*Harengula jaguana*	12,080
Harengula jaguana	8,526	*Eucinostomus gula*	12,057
Lucania parva	6,678	*Eucinostomus harengulus*	8,679
Brevoortia spp.	6,123	*Opisthonema oglinum*	8,439
Σ =	**826,144**		**441,257**
Total (Selected Taxa)	**18,797**		**17,227**
Grand Total of Animals Collected	**887,570**		**494,578**

N. Indian River Lagoon		Cedar Key	
Scientific Name	**Number**	**Scientific Name**	**Number**
Anchoa mitchilli	224,809	*Anchoa mitchilli*	19,780
Diapterus auratus	18,282	*Leiostomus xanthurus*	14,367
Mugil cephalus	12,289	*Lagodon rhomboides*	7,270
Eucinostomus spp.	8,200	*Menidia* spp.	4,250
Harengula jaguana	4,857	*Bairdiella chrysoura*	3,557
Eucinostomus harengulus	3,771	*Ariopsis felis*	3,057
Bairdiella chrysoura	3,724	*Eucinostomus* spp.	2,498
Brevoortia spp.	3,484	*Mugil cephalus*	2,176
Ariopsis felis	2,992	*Dasyatis sabina*	1,825
Mugil curema	2,618	*Membras martinica*	1,286
Σ =	**285,026**		**60,066**
Total (Selected Taxa)	**23,368**		**23,018**
Grand Total of Animals Collected	**311,747**		**76,533**

Table OV20-03. (Continued)

S. Indian River Lagoon		Apalachicola Bay	
Scientific Name	**Number**	**Scientific Name**	**Number**
Anchoa mitchilli	9,154	*Anchoa mitchilli*	30,939
Diapterus auratus	6,645	*Lagodon rhomboides*	10,539
Eucinostomus spp.	4,564	*Brevoortia* spp.	7,911
Menidia spp.	1,897	*Micropogonias undulatus*	5,867
Mugil cephalus	1,630	*Litopenaeus setiferus*	4,757
Brevoortia spp.	1,540	*Mugil cephalus*	3,302
Mugil curema	1,230	*Lucania parva*	2,850
Gambusia holbrooki	1,208	*Bairdiella chrysoura*	2,803
Centropomus undecimalis	1,124	*Menidia* spp.	2,562
Harengula jaguana	1,102	*Eucinostomus* spp.	2,227
Σ =	**30,094**		**73,757**
Total (Selected Taxa)	**6,794**		**23,608**
Grand Total of Animals Collected	**41,941**		**98,150**

Northeast Florida	
Scientific Name	**Number**
Anchoa mitchilli	52,746
Micropogonias undulatus	25,135
Leiostomus xanthurus	11,301
Litopenaeus setiferus	10,114
Menidia menidia	7,998
Menidia spp.	7,004
Stellifer lanceolatus	7,001
Anchoa hepsetus	6,911
Mugil cephalus	4,854
Dorosoma petenense	4,377
Σ =	**137,441**
Total (Selected Taxa)	**57,536**
Grand Total of Animals Collected	**160,637**

Table OV20-04. Number of recreational or commercially important species (Selected Taxa) collected in the FIM program's stratified-random sample areas, 2020.

Tampa Bay		Charlotte Harbor	
Scientific Name	**Number**	**Scientific Name**	**Number**
Farfantepenaeus duorarum	3,698	*Farfantepenaeus duorarum*	2,971
Mugil cephalus	2,885	*Centropomus undecimalis*	1,760
Centropomus undecimalis	2,492	*Sciaenops ocellatus*	1,638
Callinectes sapidus	1,734	*Cynoscion arenarius*	1,354
Sciaenops ocellatus	1,607	*Mugil trichodon*	1,315
Leiostomus xanthurus	1,275	*Callinectes sapidus*	1,067
Archosargus probatocephalus	889	*Lutjanus synagris*	916
Cynoscion nebulosus	737	*Lutjanus griseus*	900
Menticirrhus americanus	593	*Trachinotus falcatus*	862
Cynoscion arenarius	587	*Archosargus probatocephalus*	752
Mugil curema	527	*Mugil cephalus*	648
Elops saurus	481	*Menticirrhus americanus*	598
Mugil trichodon	403	*Cynoscion nebulosus*	596
Lutjanus griseus	258	*Menippe* spp.	564
Menippe spp.	163	*Elops saurus*	394
Paralichthys albigutta	141	*Leiostomus xanthurus*	333
Lutjanus synagris	118	*Mugil curema*	242
Menticirrhus littoralis	40	*Trachinotus carolinus*	94
Mycteroperca microlepis	40	*Mycteroperca microlepis*	93
Trachinotus falcatus	39	*Paralichthys albigutta*	48
Pogonias cromis	36	*Scomberomorus maculatus*	30
Scomberomorus maculatus	27	*Menticirrhus saxatilis*	18
Menticirrhus saxatilis	21	*Pomatomus saltatrix*	12
Micropogonias undulatus	4	*Pogonias cromis*	8
Penaeidae spp.	1	*Megalops atlanticus*	4
Trachinotus carolinus	1	*Epinephelus itajara*	3
		Epinephelus morio	2
		Lutjanus analis	2
		Lutjanus jocu	1
		Menticirrhus littoralis	1
		Rachycentron canadum	1
Total	**18,797**	**Total**	**17,227**

Table OV20-04. (Continued)

N. Indian River Lagoon		Cedar Key	
Scientific Name	**Number**	**Scientific Name**	**Number**
Mugil cephalus	12,289	*Leiostomus xanthurus*	14,367
Mugil curema	2,618	*Mugil cephalus*	2,176
Micropogonias undulatus	1,708	*Callinectes sapidus*	1,246
Leiostomus xanthurus	1,610	*Sciaenops ocellatus*	639
Farfantepenaeus spp.	826	*Elops saurus*	627
Elops saurus	663	*Pogonias cromis*	527
Centropomus undecimalis	599	*Menticirrhus americanus*	491
Menticirrhus americanus	543	*Centropomus undecimalis*	455
Sciaenops ocellatus	457	*Cynoscion arenarius*	453
Archosargus probatocephalus	398	*Farfantepenaeus* spp.	427
Lutjanus griseus	384	*Litopenaeus setiferus*	361
Cynoscion nebulosus	287	*Mugil curema*	260
Pogonias cromis	206	*Cynoscion nebulosus*	225
Callinectes sapidus	148	*Archosargus probatocephalus*	142
Cynoscion complex	140	*Paralichthys albigutta*	141
Litopenaeus setiferus	104	*Mugil trichodon*	139
Trachinotus falcatus	86	*Trachinotus falcatus*	74
Mugil rubrioculus	51	*Lutjanus griseus*	62
Farfantepenaeus duorarum	45	*Micropogonias undulatus*	53
Lutjanus analis	37	*Farfantepenaeus duorarum*	34
Trachinotus carolinus	37	*Menippe* spp.	33
Lutjanus synagris	23	*Lutjanus synagris*	31
Menippe spp.	22	*Menticirrhus saxatilis*	23
Farfantepenaeus aztecus	20	*Scomberomorus maculatus*	17
Albula vulpes	19	*Megalops atlanticus*	4
Paralichthys albigutta	11	*Pomatomus saltatrix*	3
Megalops atlanticus	10	*Trachinotus carolinus*	3
Pomatomus saltatrix	10	*Mycteroperca microlepis*	2
Scomberomorus maculatus	8	*Cynoscion* spp.	1
Scomberomorus regalis	3	*Paralichthys lethostigma*	1
Centropomus parallelus	2	*Rachycentron canadum*	1
Mugil trichodon	2		
Epinephelus itajara	1		
Panulirus argus	1		
Total	**23,368**	**Total**	**23,018**

Table OV20-04. (Continued)

S. Indian River Lagoon		Apalachicola Bay	
Scientific Name	**Number**	**Scientific Name**	**Number**
Mugil cephalus	1,630	*Micropogonias undulatus*	5,867
Mugil curema	1,230	*Litopenaeus setiferus*	4,757
Centropomus undecimalis	1,124	*Mugil cephalus*	3,302
Micropogonias undulatus	809	*Leiostomus xanthurus*	1,755
Farfantepenaeus spp.	531	*Farfantepenaeus* spp.	1,376
Archosargus probatocephalus	405	*Mugil curema*	1,302
Elops saurus	277	*Callinectes sapidus*	1,246
Lutjanus griseus	166	*Cynoscion arenarius*	1,202
Callinectes sapidus	148	*Sciaenops ocellatus*	515
Leiostomus xanthurus	123	*Menticirrhus americanus*	488
Lutjanus analis	61	*Cynoscion nebulosus*	464
Trachinotus falcatus	48	*Farfantepenaeus aztecus*	268
Sciaenops ocellatus	44	*Paralichthys albigutta*	229
Albula vulpes	37	*Elops saurus*	182
Mugil rubrioculus	29	*Farfantepenaeus duorarum*	119
Scomberomorus maculatus	25	*Pogonias cromis*	93
Pogonias cromis	23	*Archosargus probatocephalus*	75
Cynoscion complex	14	*Trachinotus falcatus*	63
Cynoscion nebulosus	14	*Lutjanus griseus*	56
Lutjanus synagris	14	*Paralichthys lethostigma*	51
Menticirrhus americanus	13	*Menippe* spp.	46
Trachinotus carolinus	6	*Lutjanus synagris*	39
Litopenaeus setiferus	4	*Trachinotus carolinus*	25
Lutjanus jocu	3	*Cynoscion nothus*	22
Paralichthys lethostigma	3	*Mycteroperca microlepis*	18
Scomberomorus regalis	3	*Menticirrhus saxatilis*	17
Lutjanus apodus	2	*Menticirrhus littoralis*	15
Megalops atlanticus	2	*Scomberomorus maculatus*	12
Paralichthys albigutta	2	*Lutjanus campechanus*	1
Pomatomus saltatrix	2	*Megalops atlanticus*	1
Farfantepenaeus aztecus	1	*Pomatomus saltatrix*	1
Farfantepenaeus duorarum	1	*Rachycentron canadum*	1
Total	**6,794**	**Total**	**23,608**

Table OV20-04. (Continued)

Northeast Florida	
Scientific Name	**Number**
Micropogonias undulatus	25,135
Leiostomus xanthurus	11,301
Litopenaeus setiferus	10,114
Mugil cephalus	4,854
Callinectes sapidus	1,746
Mugil curema	1,567
Farfantepenaeus spp.	673
Cynoscion complex	534
Elops saurus	309
Paralichthys lethostigma	289
Menticirrhus americanus	264
Farfantepenaeus aztecus	146
Cynoscion nebulosus	116
Sciaenops ocellatus	102
Archosargus probatocephalus	65
Farfantepenaeus duorarum	65
Trachinotus falcatus	58
Trachinotus carolinus	53
Lutjanus griseus	36
Menticirrhus littoralis	16
Lutjanus synagris	15
Paralichthys albigutta	15
Paralichthys dentatus	15
Centropomus undecimalis	11
Pogonias cromis	9
Pomatomus saltatrix	8
Megalops atlanticus	7
Scomberomorus maculatus	7
Menippe spp.	4
Paralichthys squamilentus	1
Trachinotus goodei	1
Total	**57,536**

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Fisheries-Independent Monitoring

Introduction

The Florida Fish and Wildlife Conservation Commission (FWC) Fish and Wildlife Research Institute's (FWRI) Fisheries-Independent Monitoring (FIM) program is a long-term program designed to monitor the relative abundance of fishery resources in Florida's major estuarine, coastal, and reef systems. The program was developed to 1) address the critical need for effective assessment techniques for an array of species and sizes of fishes and selected invertebrates; 2) provide timely information for use in management plans; and 3) monitor trends in the relative abundance of taxa in a variety of estuarine and marine systems throughout Florida.

Proper management of Florida's marine fisheries resources requires information from numerous sources. Traditional methods of monitoring changes in fish stocks have used catch-per-unit-effort (CPUE) data derived directly from commercial and recreational fisheries. Analysis of these fisheries-dependent data can provide valuable information on the status of fish stocks; however, there are inherent challenges in using data from these sources. Changes in vessel types, fleet size, fishing gear, or methods of operation can make fisheries-dependent data difficult to interpret (Ultang 1977). Additionally, closed seasons, changes in size or bag limits, and fluctuations in market values can further bias catch data and subsequent analyses. Fisheries-independent sampling, which targets juvenile and sub-adult fishes that have not been subjected to fishing pressure, can provide less biased estimates of trends in fish stocks than fisheries-dependent sampling (Myers and Cadigan 1993). Changes in juvenile abundance within a season can be attributed to natural mortality, immigration, emigration, or recruitment. Shifts in juvenile abundance can also be used to forecast changes in the adult stock, allowing necessary modifications to harvest regulations to be implemented before the fish have fully recruited to the fishery (Goodyear 1985). The FIM program was established to provide this type of timely information for use in conjunction with traditional management plans.

The FIM program was initiated by FWRI in 1985 with funding provided by a Federal Sport Fish Restoration (SFR) grant. In 1988, additional funding became available from special appropriations. The FIM program is also supported, in part, by funds from the sale of Florida saltwater fishing licenses. Fisheries-Independent Monitoring program sampling began in Tampa Bay and Charlotte Harbor during 1989, in the northern Indian River Lagoon (IRL) during 1990, in Cedar Key during 1996, in the southern IRL during 1997, in Apalachicola Bay during 1998, and in northeast Florida during 2001. Sampling was also conducted in Choctawhatchee Bay/Santa Rosa Sound between 1992 and 1997, in Florida Bay between 1993 and 1997, and in Florida Keys National Marine Sanctuary between 1998 and 2004 (Figure FIM20-01). A 2013 increase in Florida saltwater fishing licenses (i.e., Snook Stamp funding) allowed the FIM program to enhance current research efforts in several bay systems (Tampa Bay, Charlotte Harbor, northern IRL, and southern IRL). In 2016, these enhancements became a permanent part of the sampling design in each of the systems.

Florida’s coastline extends from subtropical to temperate regions and includes habitats such as seagrass beds, salt marshes, oyster reefs, and mangroves. These habitats provide critical nursery areas for many fish and invertebrate species. It is estimated that more than 70% of the recreationally-important species and more than 90% of the commercially-important species in the Gulf of Mexico are estuarine-dependent during at least one stage of their life histories (Lindall and Saloman 1977). The FIM program data are summarized and analyzed for all fish and selected invertebrate species collected, yielding information on the relative abundance, recruitment, habitat use, and distribution of hundreds of estuarine and marine species. This approach provides a unique source of information on economically valuable species, as well as on many poorly understood non-game species that may influence fisheries or may be important ecological indicators. This type of multi-species, multi-habitat, long-term monitoring program is extremely valuable for documenting ecosystem changes, evaluating the effects of natural and anthropogenic disturbances, and making management decisions (Coull 1985, Wolfe et al. 1987).

Although the FIM program has always used a suite of gears (e.g., seines, trawls, trammel nets) capable of capturing a broad range of fish species and sizes from a variety of habitats, initial program efforts focused primarily on collecting young-of-the-year (YOY) fishes that could be used to develop recruitment indices. The program expanded its efforts to monitor larger-sized fishes in Tampa Bay by developing 183-m haul seines (fixed stations sampled between 1993 and 1995; year-round stratified-random sampling [SRS] implemented in 1996), 183-m purse seines (implemented in 1997; discontinued in 2004), and by developing a visual sampling program for reef fishes in the Florida Keys (implemented in 1998; transferred from FIM program in 2004). The 183-m haul seine was implemented as part of the SRS component of the program in Charlotte Harbor during 1996, in the northern and southern IRL and Cedar Key during 1997, in Apalachicola Bay during 1998, and in northeast Florida during 2001. The purse seine was implemented for SRS in Charlotte Harbor in 1998 and was used on a trial basis in Apalachicola Bay during 2000 and 2001 but was no longer used in any sampling area after 2004. The FIM program initiated a visual survey in the Florida Keys in 1998 to obtain important fisheries data in this unique area of Florida. In 2004, the oversight and implementation of these ongoing surveys were assigned to other FWRI work groups and are no longer included in the FIM program annual summaries after 2004. The FIM program also implemented a seasonal directed sampling program for Striped Mullet (*Mugil cephalus*) in Tampa Bay and Charlotte Harbor in 1993. Directed sampling for the Striped Mullet program utilized a 366-m trammel net. After the 2008-2009 sampling season, the seasonal directed sampling program was discontinued in both areas and transitioned into a year-round monthly sampling survey completed every five years. The directed mullet sampling was discontinued in 2020 (last sampling event occurred in 2016). The FIM program implemented a seasonal directed sampling survey for Red Drum (Sciaenops ocellatus) for Tampa Bay and northern IRL in 1993 and 1995, respectively. The Red Drum sampling program utilized a 547-m trammel net. The directed sampling in the northern IRL was discontinued in 1999, and seasonal sampling for Red Drum in Tampa Bay was discontinued in 2019. The entire suite of gears and methods used by the FIM program captures fishes at various stages of development, from initial recruitment into the estuary through harvestable sizes, thereby providing a continuous gauge of a particular stock's relative abundance, age and size composition, and reproductive potential. This report summarizes FIM program SRS data collected during 2020. Results from the sampling efforts in each estuary are presented separately. This report also summarizes results from fish health monitoring of samples collected by the FIM program. Profiles of several species that are of particular interest, because of their recreational or commercial value in Florida, are also presented to provide critical information for these species and describe ways the FIM program data are used to assess the status of important Florida fisheries.

Methods

The FIM program uses a stratified-random sampling design in all study areas. Each study area was divided into sampling zones based upon geographic and logistical criteria, and each zone was further subdivided into 1-nm^2 grids that were randomly selected for sampling. Sampling grids were stratified by habitat and depth, thereby identifying the gear types that could be used in those areas. A single sample was collected at each randomly selected site. In most cases, the number of monthly samples collected in each zone with each gear was proportional to the number of grids in the zone that could be sampled with a particular gear.

The FIM program uses a multi-gear approach to collect data on various life history stages of fishes and selected invertebrates from a wide variety of habitats (Table FIM20-01). A 21.3-m center bag seine targeted YOY and juvenile fishes in shallow water (≤1.8 m); a 6.1-m otter trawl targeted YOY, juvenile, and adult fish in deep water (1.0-7.6 m); a 183-m haul seine targeted sub-adult and adult fish along shorelines in water depths ≤2.5 m. Several different techniques were used to stratify the samples collected with the various gears depending on habitat. The 21.3-m center bag seine was used in Tampa Bay, Charlotte Harbor, the northern IRL, Cedar Key, Apalachicola Bay, and northeast Florida. In 2016, 21.3-m seine sampling was also initiated in the southern IRL system within the Loxahatchee and St. Lucie Rivers, and in tidal creeks in Charlotte Harbor. Two deployment techniques were used. The bay seine technique was used in all estuaries except northeast Florida and the southern IRL to sample shallow areas and was pre-stratified by the presence or absence of bottom vegetation (except in the Cedar Key area) or the presence of a shoreline. The river seine technique was used in all estuaries to sample the shorelines of creeks and rivers. River seine deployments in Tampa Bay and Charlotte Harbor's rivers were pre-stratified by the presence or absence of overhanging shoreline vegetation. River seine deployments in the northern and southern IRL and Charlotte Harbor's tidal creeks were post-stratified by the presence or absence of overhanging shoreline vegetation while deployments in Cedar Key, Apalachicola Bay, and northeast Florida were not stratified by habitat type. Samples collected with 183-m haul seines in Tampa Bay and Charlotte Harbor were pre-stratified by the presence or absence of overhanging shoreline vegetation. Samples collected with 183-m haul seines in the northern and southern IRL were post-stratified by the presence or absence of overhanging shoreline vegetation. Samples collected with this gear were not stratified by habitat type in Cedar Key, Apalachicola Bay, and northeast Florida. All sampling was conducted during daytime hours (one hour after sunrise to one hour before sunset). Additional sampling details are described in the FIM program's Procedure Manual (FWC-FWRI 2020).

The sample work-up technique was similar for all samples, regardless of gear type or sampling regime. Environmental data consisting of water chemistry, habitat characteristics, and physical parameters, such as current and tidal conditions, were recorded for each sample. All fish and selected invertebrate species captured were identified to the lowest practical taxonomic level, counted, and a random sample of at least 10 individuals were measured (standard length (SL) for teleosts, precaudal length for sharks, disc width for rays, carapace width for crabs, and post-orbital head length for shrimp and lobster). A detailed explanation of the standard sample work-up for data collection is described in the FIM program's Procedure Manual (FWC-FWRI 2020).

Certain taxa were not identified to species because of the possibility of hybridization (e.g., *Brevoortia* spp., *Menidia* spp.; Dahlberg 1970, Middaugh et al. 1986) or because they were morphologically or meristically indistinguishable at small juvenile sizes (e.g., *Eucinostomus* spp. <40 mm SL; Matheson 1983). In the northern and southern IRL and northeast Florida sections, species accounts of *Cynoscion regalis* (Weakfish) and *Cynoscion arenarius* (Sand Seatrout) will be referred to collectively as *Cynoscion* complex. These two species mix and hybridize along the Atlantic coast of Florida and identification can only be determined with certainty by genetic testing (Tringali et al. 2004). Animals were released except for representative samples of each taxon (for laboratory confirmation of field identifications) and samples required for specific research projects. The taxonomic nomenclature in this report follows the American Fisheries Society's Common and Scientific Names of Fishes (Page et al. 2013). A detailed explanation of the standard sample work-up for data collection is described in the FIM program's Procedure Manual (FWC-FWRI 2020).

Data for this report were summarized separately for each estuarine system and for each gear type. Data were also summarized separately for all taxa and for taxa of recreational or commercial importance ('Selected Taxa'; Table FIM20-02). Abundance estimates were calculated for 21.3-m seines and 6.1-m trawls as the number of animals/100 m^2 of area sampled. Catch-per-unit-effort (CPUE) was calculated for 183-m haul seine samples as the number of animals/set. The appendices for each study area describe the catch by month, gear, stratum, and zone.

Study Areas

The FIM program conducted sampling in Tampa Bay, Charlotte Harbor, the northern IRL, Cedar Key, the southern IRL, Apalachicola Bay, and northeast Florida, (Figure FIM20-01). Sampling was conducted over a wide range of habitats encompassing different bottom types, shoreline types, and offshore areas. In addition to sampling in major estuaries, tidally influenced portions of rivers that flow into Tampa Bay (Alafia, Braden, Little Manatee, and Manatee Rivers), Charlotte Harbor (Peace, Myakka, and Caloosahatchee Rivers, and Alligator Creek), the Indian River Lagoon (Turkey Creek, St. Sebastian, Loxahatchee, and St. Lucie Rivers), the Cedar Key area (Suwannee River), Apalachicola Bay (Apalachicola River), and northeast Florida (St. Marys, Nassau, and St. Johns Rivers) were also sampled. The Tampa Bay, Charlotte Harbor, and northern IRL study areas were described in the FIM Program 1994 Annual Data Summary Report (FDEP-FMRI 1995). The Cedar Key study area was described in the FIM Program 1996 Annual Data Summary Report (FDEP-FMRI 1997); the southern IRL study area was described in the FIM Program 1997 Annual Data Summary Report (FDEP-FMRI 1998); the Apalachicola Bay study area and updates to the southern IRL study area were described in the FIM Program 1998 Annual Data Summary Report (FDEP-FMRI 1999); the northeast Florida study area was described in the FIM Program 2001 Annual Data Summary Report (FDEP-FMRI 2002); and expansion of 21.3-m seines in the southern IRL area was described in the FIM Program 2016 Annual Data Summary Report (FWC-FWRI 2017).

Sampling Deviations

In 2020, all estuaries sampled by the FIM program saw a reduction in annual sampling effort as a result of impacts caused by the COVID-19 pandemic. Statewide, the FIM program had a 15.2% reduction from the anticipated sampling effort, with individual estuaries varying from 9.0% (southern Indian River Lagoon) to 19.7% reduction in annual sampling effort (Cedar Key; Table FIM20-03). Annual effort reductions were most pronounced from April–June 2020. To mitigate reductions to programmatic funding related to COVID-19, several FIM labs (i.e., Apalachicola Bay, Cedar Key, Tampa Bay, and Charlotte Harbor) also reduced monthly trawling efforts beginning in May 2020 by either shifting to bimonthly trawl sampling or by eliminating trawling for an extended time period. Monthly sampling effort for all estuarine areas returned to anticipated levels in December 2020. Details of specific sampling effort reductions can be found in the summary sections for each estuarine system.

In addition to reductions related to COVID-19, analyses were conducted on historical data from Apalachicola Bay to address concerns regarding the utility of data collected with 21.3-m seines and 6.1-m trawls in the forested upper region of the tidal Apalachicola River (Zone C) and 183-m haul seines during the winter months when low water levels may preclude the use of standardized deployment and retrieval protocols for this sampling gear (FWC-FWRI 2020). The analyses indicated that the data collected in these areas and time periods did not improve the ability to estimate recreationally and commercially important estuarine-dependent fish abundance in this system. Only limited data had been collected on estuarine-dependent sportfish from 183-m haul seine sampling during the month of January and from all months of the year (January–December) in the upriver portions of Zone C sampled with the 21.3-m seine and 6.1-m trawl. As a result of the analyses, beginning in January 2020, no 183-m haul seine samples were collected during the month of January and all upriver 21.3-m seine (6 sites/month) and 6.1-m trawl (3 sites/month) sampling in Zone C were eliminated for all months. These sampling design changes resulted in an annual sampling effort reduction of 126 sites and will remain in effect for future sampling years to increase the utility of the data being collected and better align sampling efforts with the programmatic goals of the Apalachicola Bay sampling design.

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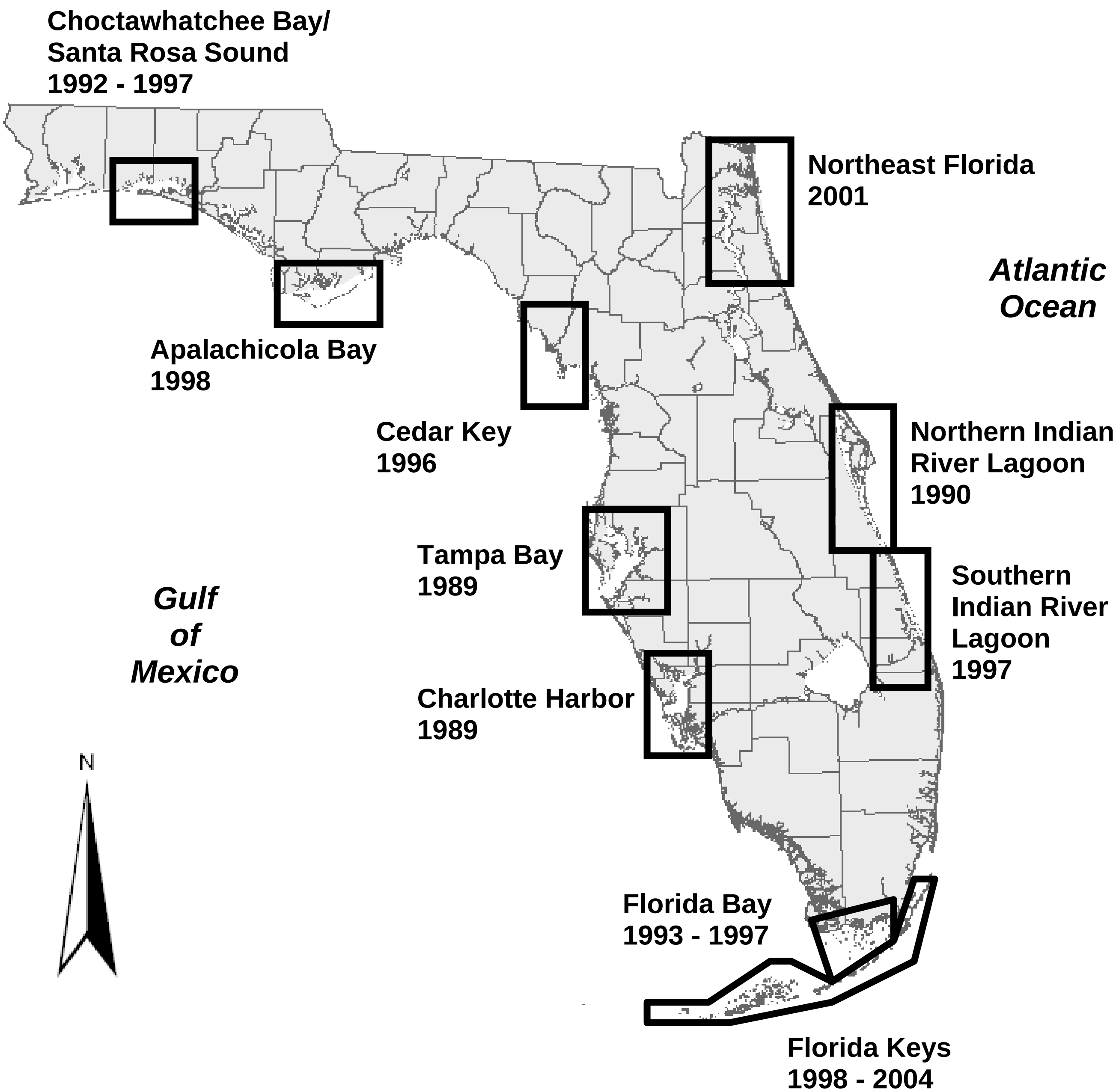

Figure FIM20-01. Locations of Fisheries-Independent Monitoring program field laboratories. Years indicate initiation of sampling. If sampling was discontinued at a field lab, the last year of sampling is also provided.

Table FIM20-01. Description of monthly monitoring sampling gears used in 2020. A more detailed description of each gear can be found in the FIM program's Procedure Manual.

Gear	Deployment	Mesh Size (mm)	Area Sampled	Description of use
21.3-m Seine (center bag)	Bay	3.2	140 m^2	• used in near-shore and shoreline areas ≤ 1.5 m
	River	3.2	68 m^2	• used along river shorelines ≤ 1.8 m
183-m Haul Seine (center bag)	Boat	38.1	4,120 m^2	• used along shorelines and exposed sandbars ≤ 2.5 m
6.1-m Otter Trawl	Straight Tow	38.1 (3.2-mm liner)	1,130 m^2-2,259 m^2	• used in areas from 1.8 m to 7.6 m deep
	Arc Tow	38.1 (3.2-mm liner)	1,130 m^2-2,259 m^2	• used in areas from 1.0 m to 1.7 m deep

Table FIM20-02. Animals designated as Selected Taxa by the Fisheries-Independent Monitoring program because of their commercial or recreational importance.

Scientific Name	**Common Name**
Albula vulpes	Bonefish
Alphestes afer	Mutton Hamlet
Archosargus probatocephalus	Sheepshead
Callinectes sapidus	Blue Crab
Centropomus undecimalis	Common Snook
Cephalopholis cruentata	Graysby
Cephalopholis fulva	Coney
Cynoscion arenarius	Sand Seatrout
Cynoscion complex	Seatrout
Cynoscion nebulosus	Spotted Seatrout
Cynoscion nothus	Silver Seatrout
Cynoscion regalis	Weakfish
Dermatolepis inermis	Marbled Grouper
Elops saurus	Ladyfish
Epinephelus adscensionis	Rock Hind
Epinephelus drummondhayi	Speckled Hind
Epinephelus guttatus	Red Hind
Epinephelus itajara	Atlantic Goliath Grouper
Epinephelus morio	Red Grouper
Epinephelus striatus	Nassau Grouper
Farfantepenaeus aztecus	Brown Shrimp
Farfantepenaeus brasiliensis	Pinkspot Shrimp
Farfantepenaeus duorarum	Pink Shrimp
Farfantepenaeus spp.	Penaeid Shrimps
Hyporthodus flavolimbatus	Yellowedge Grouper
Hyporthodus mystacinus	Misty Grouper
Hyporthodus nigritus	Warsaw Grouper
Hyporthodus niveatus	Snowy Grouper
Leiostomus xanthurus	Spot
Litopenaeus setiferus	White Shrimp
Lutjanus analis	Mutton Snapper
Lutjanus apodus	Schoolmaster
Lutjanus buccanella	Blackfin Snapper
Lutjanus campechanus	Red Snapper
Lutjanus cyanopterus	Cubera Snapper
Lutjanus griseus	Gray Snapper

Table FIM20-02. (Continued).

Scientific Name	**Common Name**
Lutjanus jocu	Dog Snapper
Lutjanus mahogoni	Mahogany Snapper
Lutjanus synagris	Lane Snapper
Lutjanus vivanus	Silk Snapper
Megalops atlanticus	Tarpon
Menippe spp.	Stone Crab
Menticirrhus americanus	Southern Kingfish
Menticirrhus littoralis	Gulf Kingfish
Menticirrhus saxatilis	Northern Kingfish
Micropogonias undulatus	Atlantic Croaker
Mugil cephalus	Striped Mullet
Mugil curema	White Mullet
Mugil liza	Liza
Mugil rubrioculus	Redeye Mullet
Mugil trichodon	Fantail Mullet
Mycteroperca bonaci	Black Grouper
Mycteroperca microlepis	Gag
Mycteroperca phenax	Scamp
Mycteroperca tigris	Tiger Grouper
Mycteroperca venenosa	Yellowfin Grouper
Panulirus argus	Spiny Lobster
Paralichthys albigutta	Gulf Flounder
Paralichthys dentatus	Summer Flounder
Paralichthys lethostigma	Southern Flounder
Paralichthys oblongus	Fourspot Flounder
Paralichthys squamilentus	Broad Flounder
Penaeidae spp.	Shrimps
Pogonias cromis	Black Drum
Pomatomus saltatrix	Bluefish
Rachycentron canadum	Cobia
Sciaenops ocellatus	Red Drum
Scomberomorus cavalla	King Mackerel
Scomberomorus maculatus	Spanish Mackerel
Scomberomorus regalis	Cero
Trachinotus carolinus	Florida Pompano
Trachinotus falcatus	Permit
Trachinotus goodei	Palometa

Table FIM20-03. Annual reduction of FIM sampling effort by estuarine system in 2020 due to impacts from COVID-19 (refer to estuary-focused sections for additional details on sampling reduction).

Estuary	Anticipated 2020 Sampling Effort	Actual 2020 Sampling Effort	Annual % Reduction
Tampa Bay	1,428	1,257	12.0%
Charlotte Harbor	1,476	1,231	16.6%
Northern Indian River Lagoon	824	671	18.6%
Cedar Key	792	636	19.7%
Southern Indian River Lagoon	420	382	9.0%
Apalachicola Bay	714	582	18.5%
Northeast Florida	1,356	1,184	12.7%
Total	**7,010**	**5,943**	**15.2%**

Tampa Bay

Tampa Bay is a drowned river estuary located on the western central coast of Florida. The bay is connected to the Gulf of Mexico through two main channels located on either side of Egmont Key and several smaller passes and channels to the north of Mullet and Long Keys and to the south of Anna Maria Island. Freshwater inflow comes from over 100 tributaries, although more than 80% enters from four main rivers (Alafia, Hillsborough, Manatee, and Little Manatee; Schmidt and Luther 2002). Shoreline vegetation consists largely of mangroves and marsh grasses, and bottom substrates are typically characterized as sand, mud, oysters, or a combination thereof (Flannery 1989). Seagrass meadows are the dominant vegetative cover in Tampa Bay and are widely distributed throughout the bay (Haddad 1989).

The Fisheries-Independent Monitoring (FIM) program has conducted intensive sampling of fish and selected invertebrates in Tampa Bay since 1989. The area sampled was divided into five geographically-defined bay zones (A–E) and four riverine zones (K–N; Figure TB20-01). The riverine zones were defined as the Alafia (K), Little Manatee (L), Manatee (M), and Braden (N) rivers. Monthly stratified-random sampling (SRS) was conducted in Zones A–E using 21.3-m bay seines, 183-m haul seines, and 6.1-m bay otter trawls. Monthly SRS was conducted in Zones K–N with 21.3-m river seines and 6.1-m river otter trawls. All methods were the same as those described in the Methods section of this report. This section summarizes data collected by the FIM program during 2020 in Tampa Bay.

Stratified-Random Sampling

A total of 887,570 animals, which included 173 taxa of fishes and 11 taxa of selected invertebrates, were collected from 1,257 Tampa Bay SRS samples in 2020 (Table TB20-01, Appendices TB20-01, -02, and -03). *Anchoa mitchilli* (n=653,510) was the most numerous taxon collected, representing 73.6% of the total catch. *Eucinostomus* spp. (n=47,998), *Lagodon rhomboides* (n=40,949), and *Menidia* spp. (n=22,813) were the next most abundant taxa collected, accounting for an additional 12.6% of the total catch. Twenty-six Selected Taxa (n=18,797 animals) composed 2.1% of the total catch. *Farfantepenaeus duorarum* (n=3,698) was the most abundant Selected Taxon, representing 0.4% of the total catch. *Mugil cephalus* (n= 2,885), *Centropomus undecimalis* (n= 2,492), and *Callinectes* *sapidus* (n= 1,734) were the next most abundant Selected Taxa, comprising an additional 0.8% of the total catch. Collections in 2020 included one species new to the Tampa Bay FIM collection: *Calamus bajonado* (Jolthead Porgy).

Monthly sampling efforts were reduced in Tampa Bay during 2020 as a result of impacts caused by the COVID-19 pandemic (Appendix TB20-04). Only Zones K and M were sampled in April 2020 (n=35 sites) before sampling ceased due to State of Florida and FIM safety protocols. In response to programmatic funding deficits as a result of COVID-19, no SRS trawling was completed during the months of June, August, and October 2020. The sampling effort for all zones and gears was completed as scheduled for the months of January, February, March, May, July, September, November, and December 2020.

Bay Sampling

21.3-m Bay Seines. A total of 272,956 animals were collected in 374 21.3-m bay seines, representing 30.8% of the overall SRS catch (Table TB20-01). *Anchoa mitchilli* (n=193,526), *Eucinostomus* spp. (n= 17,985), *Lagodon rhomboides* (n= 9,277), and *Anchoa cubana* (n= 7,774) were the most abundant taxa, accounting for 83.7% of the 21.3-m bay seine catch (Table TB20-02). The taxa most frequently caught in 21.3-m bay seines were *Eucinostomus* spp. (66.0% occurrence), *Microgobius gulosus* (39.6% occurrence), and *Eucinostomus gula* (35.6% occurrence).

A total of 5,655 animals from 21 Selected Taxa were collected, representing 2.1% of the entire 21.3-m bay seine catch (Table TB20-03). *Farfantepenaeus duorarum* (n= 2,253) was the most abundant Selected Taxon, accounting for 39.8% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were *Farfantepenaeus duorarum* (35.0% occurrence), *Cynoscion nebulosus* (25.4% occurrence), and *Callinectes sapidus* (12.6% occurrence).

183-m Haul Seines. A total of 52,288 animals were collected in 220 183-m haul seines, representing 5.9% of the overall SRS catch (Table TB20-01). *Lagodon rhomboides* (n= 30,353) was the most abundant taxon, accounting for 58.1% of the 183-m haul seine catch (Table TB20-04). The taxa most frequently caught in 183-m haul seines were *Centropomus undecimalis* (60.9% occurrence), *Eucinostomus gula* (55.5% occurrence), and *Lagodon rhomboides* (55.0% occurrence).

A total of 5,100 animals from 23 Selected Taxa were collected, representing 9.8% of the entire 183-m haul seine catch (Table TB20-05). *Centropomus undecimalis* (n=2,011), was the most abundant Selected Taxon, accounting for 39.4% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Centropomus undecimalis* (60.9% occurrence) and *Archosargus probatocephalus* (50.9% occurrence).

6.1-m Bay Otter Trawls. A total of 18,540 animals were collected in 120 6.1-m bay otter trawls (Zones A–E), representing 2.1% of the overall SRS catch (Table TB20-01). *Anchoa mitchilli* (n= 4,816), *Anchoa cubana* (n=3,939), *Eucinostomus gula* (n=1,292), and *Opisthonema oglinum* (n=1,229) were the most abundant taxa, accounting for 60.8% of the 6.1-m bay otter trawl catch (Table TB20-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Prionotus scitulus* (65.8% occurrence).

A total of 2,408 animals from 14 Selected Taxa were collected, representing 13.0% of the entire 6.1-m bay otter trawl catch (Table TB20-07). *Callinectes sapidus* (n=947), *Farfantepenaeus duorarum* (n=473), *Cynoscion arenarius* (n=443), and *Menticirrhus americanus* (n=214) were the most abundant Selected Taxa, accounting for 86.2% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Farfantepenaeus duorarum* (43.3% occurrence) and *Callinectes sapidus* (24.2% occurrence).

River Sampling

21.3-m River Seines. A total of 504,161 animals were collected in 423 21.3-m river seines, representing 56.8% of the overall SRS catch (Table TB20-01). *Anchoa mitchilli* (n=420,826) was the most abundant taxon collected, accounting for 83.5% of the 21.3-m river seine catch (Table TB20-08). *Eucinostomus* spp. (n=27,578) and *Menidia* spp. (n=17,094) were the next most abundant taxa, accounting for an additional 8.9% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines were *Eucinostomus* spp. (85.6% occurrence), *Eucinostomus harengulus* (76.8% occurrence), and *Menidia* spp. (74.5% occurrence).

A total of 4,418 animals from 16 Selected Taxa were collected, representing 0.9% of the entire 21.3-m river seine catch (Table TB20-09). *Mugil cephalus* (n=1,178) and *Sciaenops ocellatus* (n=1,037) were the most abundant Selected Taxa, accounting for 50.1% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Centropomus undecimalis* (26.0% occurrence) and *Farfantepenaeus duorarum* (26.0% occurrence).

6.1-m River Otter Trawls. A total of 39,625 animals were collected in 120 6.1-m river otter trawls (Zones K–N), representing 4.5% of the overall SRS catch (Table TB20-01). *Anchoa mitchilli* (n= 34,342) was the most abundant taxon collected, accounting for 86.7% of the 6.1-m river otter trawl catch (Table TB20-10). The taxa most frequently caught in 6.1-m river otter trawls were *Callinectes sapidus* (66.7% occurrence), *Farfantepenaeus duorarum* (41.7% occurrence), *Eucinostomus* spp. (40.8% occurrence), *Anchoa mitchilli* (40.0% occurrence), and *Microgobius gulosus* (40.0% occurrence).

A total of 1,216 animals from 14 Selected Taxa were collected, representing 3.1% of the entire 6.1-m river otter trawl catch (Table TB20-11). *Farfantepenaeus duorarum* (n=547) and *Callinectes sapidus* (n=350) were the most abundant Selected Taxa, accounting for 73.8% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in the 6.1-m river otter trawls were *Callinectes sapidus* (66.7% occurrence) and *Farfantepenaeus duorarum* (41.7% occurrence).

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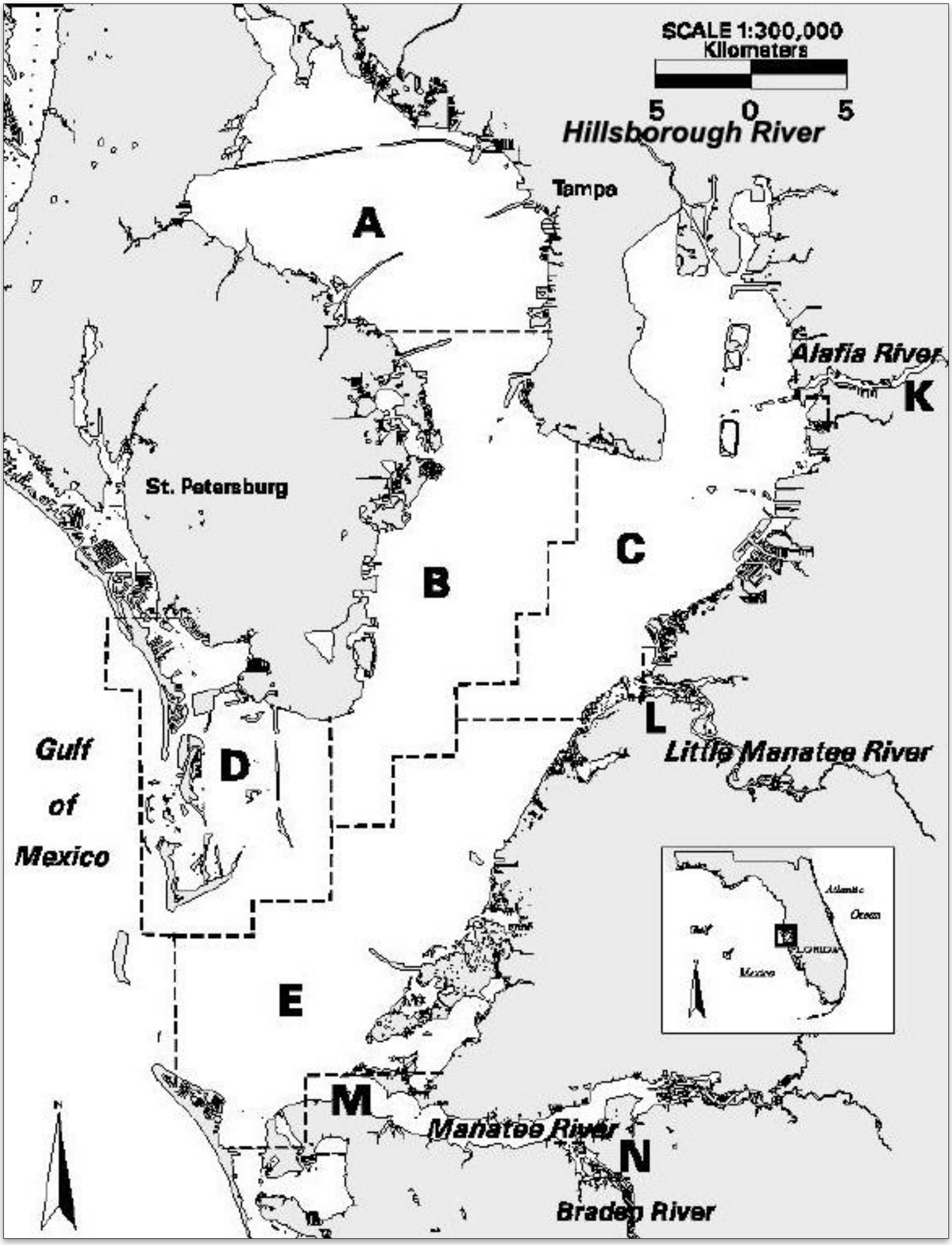

Figure TB20-01. Map of Tampa Bay sampling area. Zones are labeled A–E and K–N.

Table TB20-01. Summary of catch and effort data for Tampa Bay stratified-random sampling, 2020.

Zone	21.3-m bay seine		21.3-m river seine		183-m haul seine		6.1-m otter trawl		Totals	
	Animals	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**
A	24,704	77	.	.	3,022	44	4,914	24	32,640	145
B	11,053	66	.	.	6,293	44	1,579	24	18,925	134
C	41,856	99	.	.	2,768	44	7,714	32	52,338	175
D	46,284	55	.	.	18,129	33	3,573	16	67,986	104
E	149,059	77	.	.	22,076	55	760	24	171,895	156
K	.	.	334,620	156	.	.	15,845	18	350,465	174
L	.	.	59,893	99	.	.	20,032	48	79,925	147
M	.	.	63,924	96	.	.	3,021	36	66,945	132
N	.	.	45,724	72	.	.	727	18	46,451	90
Totals	**272,956**	**374**	**504,161**	**423**	**52,288**	**220**	**58,165**	**240**	**887,570**	**1,257**

Table TB20-02. Catch statistics for 10 dominant taxa collected in 374 21.3-m bay seine samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m²)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	193,526	70.9	25.1	369.61	204.58	1,070.42	74,253.57	32	0.01	15	50
Eucinostomus spp.	17,985	6.6	66.0	34.35	4.25	239.47	855.71	26	0.05	7	39
Lagodon rhomboides	9,277	3.4	33.7	17.72	5.54	604.68	1,826.43	34	0.18	11	132
Anchoa cubana	7,774	2.9	2.9	14.85	10.37	1,350.80	3,731.43	33	0.04	28	53
Harengula jaguana	6,718	2.5	12.8	12.83	5.50	829.41	1,680.00	37	0.17	17	98
Menidia spp.	5,716	2.1	19.0	10.92	2.81	497.41	559.29	43	0.10	13	82
Lucania parva	5,307	1.9	19.3	10.14	2.87	547.44	694.29	24	0.07	10	44
Eucinostomus gula	3,931	1.4	35.6	7.51	1.63	418.99	528.57	53	0.13	40	91
Microgobius gulosus	3,857	1.4	39.6	7.37	1.20	315.37	209.29	28	0.10	8	50
Floridichthys carpio	2,682	1.0	15.5	5.12	1.69	637.76	496.43	29	0.20	10	56
Subtotals	256,773	94.1	.	.	.	.	.	.	.	7	132
Totals	**272,956**	**100.0**	**.**	**521.31**	**206.74**	**766.97**	**74,644.29**	**.**	**.**	**2**	**709**

Table TB20-03. Catch statistics for Selected Taxa collected in 374 21.3-m bay seine samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Farfantepenaeus duorarum	2,253	0.8	35.0	4.30	0.85	383.39	160.00	8	0.07	2	21
Mugil cephalus	1,368	0.5	5.1	2.61	1.22	903.25	372.86	26	0.21	12	138
Leiostomus xanthurus	583	0.2	5.1	1.11	0.61	1,062.60	201.43	30	0.43	9	74
Cynoscion nebulosus	408	0.2	25.4	0.78	0.13	332.61	25.00	33	0.79	11	127
Sciaenops ocellatus	333	0.1	8.3	0.64	0.20	607.43	53.57	27	2.05	8	285
Mugil curema	271	0.1	1.1	0.52	0.50	1,855.92	185.71	37	0.27	28	49
Archosargus probatocephalus	103	<0.1	8.3	0.20	0.05	538.59	12.14	35	2.63	14	271
Callinectes sapidus	81	<0.1	12.6	0.15	0.03	334.24	4.29	49	4.63	9	181
Menticirrhus americanus	75	<0.1	4.8	0.14	0.05	650.11	12.14	23	1.07	9	48
Lutjanus synagris	44	<0.1	1.9	0.08	0.06	1,383.96	22.14	35	2.33	20	88
Lutjanus griseus	30	<0.1	4.5	0.06	0.02	553.75	3.57	74	9.76	13	214
Centropomus undecimalis	27	<0.1	2.7	0.05	0.02	802.04	5.71	135	31.32	29	700
Paralichthys albigutta	22	<0.1	3.7	0.04	0.01	626.79	2.86	94	20.27	10	348
Mugil trichodon	19	<0.1	3.2	0.04	0.01	644.88	2.86	45	6.25	14	94
Menticirrhus saxatilis	17	<0.1	1.9	0.03	0.01	854.17	3.57	25	3.31	11	56
Cynoscion arenarius	11	<0.1	1.6	0.02	0.01	874.51	2.14	26	2.37	17	39
Pogonias cromis	6	<0.1	0.8	0.01	0.01	1,203.46	2.14	119	49.24	9	244

Table TB20-03. (Continued).

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m²) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Penaeidae sp.	1	<0.1	0.3	<0.01	<0.01	1,933.91	0.71	5	.	5	5
Elops saurus	1	<0.1	0.3	<0.01	<0.01	1,933.91	0.71	290	.	290	290
Mycteroperca microlepis	1	<0.1	0.3	<0.01	<0.01	1,933.91	0.71	171	.	171	171
Trachinotus falcatus	1	<0.1	0.3	<0.01	<0.01	1,933.91	0.71	36	.	36	36
Totals	**5,655**	**2.1**	**.**	**10.80**	**1.90**	**339.80**	**376.43**	**.**	**.**	**2**	**700**

Table TB20-04. Catch statistics for 10 dominant taxa collected in 220 183-m haul seine samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Lagodon rhomboides	30,353	58.1	55.0	137.97	23.98	257.81	3,017.00	101	0.15	46	190
Eucinostomus gula	3,545	6.8	55.5	16.11	2.95	271.45	344.00	81	0.27	40	161
Opisthonema oglinum	2,987	5.7	7.3	13.58	9.69	1,058.68	2,079.00	142	0.48	48	167
Centropomus undecimalis	2,011	3.9	60.9	9.14	1.60	259.95	205.00	421	2.15	141	905
Orthopristis chrysoptera	1,717	3.3	21.4	7.80	2.73	518.42	509.00	112	0.67	60	221
Harengula jaguana	1,582	3.0	11.4	7.19	3.98	821.38	776.00	85	0.28	60	126
Ariopsis felis	1,528	2.9	38.2	6.95	1.75	372.68	311.00	281	1.05	143	385
Eucinostomus harengulus	1,060	2.0	43.2	4.82	1.08	331.48	133.00	87	0.28	51	115
Bairdiella chrysoura	841	1.6	7.7	3.82	2.80	1,085.60	609.00	123	0.60	60	168
Strongylura notata	788	1.5	43.6	3.58	1.29	534.78	276.00	338	1.07	113	420
Subtotals	46,412	88.8	.	.	.	.	.	.	.	40	905
Totals	**52,288**	**100.0**	**.**	**237.67**	**29.38**	**183.34**	**3,618.00**	**.**	**.**	**12**	**1,066**

Table TB20-05. Catch statistics for Selected Taxa collected in 220 183-m haul seine samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m²)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Centropomus undecimalis	2,011	3.9	60.9	9.14	1.60	259.95	205.00	421	2.15	141	905
Archosargus probatocephalus	658	1.3	50.9	2.99	0.38	190.61	39.00	175	3.32	35	379
Elops saurus	445	0.9	23.6	2.02	0.49	362.66	64.00	296	2.93	101	485
Mugil cephalus	339	0.7	38.2	1.54	0.32	303.91	59.00	290	5.55	78	502
Mugil trichodon	302	0.6	13.6	1.37	0.55	589.92	87.00	171	2.07	82	320
Mugil curema	237	0.5	15.5	1.08	0.31	427.26	47.00	171	3.27	100	300
Sciaenops ocellatus	190	0.4	31.4	0.86	0.13	230.51	19.00	366	12.22	72	708
Lutjanus griseus	176	0.3	21.4	0.80	0.16	301.40	18.00	170	2.98	75	285
Callinectes sapidus	152	0.3	17.3	0.69	0.31	663.27	64.00	91	2.66	33	187
Leiostomus xanthurus	134	0.3	9.1	0.61	0.20	497.68	35.00	131	3.66	40	215
Cynoscion nebulosus	120	0.2	23.2	0.55	0.11	302.58	15.00	218	9.07	81	460
Paralichthys albigutta	80	0.2	16.8	0.36	0.07	295.52	10.00	150	9.00	54	389
Lutjanus synagris	44	0.1	5.0	0.20	0.10	736.52	20.00	105	2.40	72	170
Menticirrhus littoralis	40	0.1	0.9	0.18	0.18	1,446.46	39.00	204	3.05	174	284
Mycteroperca microlepis	39	0.1	5.5	0.18	0.07	547.22	9.00	170	5.56	90	236
Trachinotus falcatus	38	0.1	4.1	0.17	0.07	642.16	13.00	213	13.27	54	364
Pogonias cromis	28	0.1	5.0	0.13	0.05	620.17	10.00	327	16.71	185	490

Table TB20-05. (Continued).

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Scomberomorus maculatus	27	0.1	5.5	0.12	0.04	521.43	6.00	355	19.99	158	530
Farfantepenaeus duorarum	25	0.1	5.5	0.11	0.04	483.68	5.00	18	0.80	12	24
Menticirrhus americanus	9	<0.1	1.8	0.04	0.03	914.21	5.00	200	14.47	119	237
Menippe spp.	3	<0.1	1.4	0.01	0.01	852.43	1.00	43	9.07	32	61
Cynoscion arenarius	2	<0.1	0.9	0.01	0.01	1,046.41	1.00	153	23.00	130	176
Trachinotus carolinus	1	<0.1	0.5	<0.01	<0.01	1,483.24	1.00	289	.	289	289
Totals	**5,100**	**9.8**	**.**	**23.18**	**2.53**	**161.90**	**339.00**	**.**	**.**	**12**	**905**

Table TB20-06. Catch statistics for 10 dominant taxa collected in 120 6.1-m bay otter trawl samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	4,816	26.0	20.0	2.70	0.81	328.49	51.07	32	0.13	14	55
Anchoa cubana	3,939	21.3	5.0	2.21	1.99	985.17	237.66	33	0.04	29	48
Eucinostomus gula	1,292	7.0	40.8	0.73	0.18	267.94	14.71	78	0.31	42	118
Opisthonema oglinum	1,229	6.6	3.3	0.69	0.69	1,087.89	82.37	31	0.16	26	134
Lagodon rhomboides	969	5.2	28.3	0.55	0.17	341.05	14.77	78	0.79	15	139
Callinectes sapidus	947	5.1	24.2	0.54	0.17	350.81	12.99	97	0.93	24	183
Eucinostomus spp.	872	4.7	14.2	0.49	0.22	496.26	20.84	24	0.27	10	39
Prionotus scitulus	541	2.9	65.8	0.30	0.05	187.16	3.85	85	1.34	21	198
Farfantepenaeus duorarum	473	2.6	43.3	0.27	0.07	269.13	5.26	19	0.37	4	46
Cynoscion arenarius	443	2.4	11.7	0.25	0.12	530.40	11.89	35	1.27	9	150
Subtotals	15,521	83.7	.	.	.	.	.	.	.	4	198
Totals	**18,540**	**100.0**	**.**	**10.46**	**2.92**	**306.38**	**327.44**	**.**	**.**	**4**	**631**

Table TB20-07. Catch statistics for Selected Taxa collected in 120 6.1-m bay otter trawl samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m²)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Callinectes sapidus	947	5.1	24.2	0.54	0.17	350.81	12.99	97	0.93	24	183
Farfantepenaeus duorarum	473	2.6	43.3	0.27	0.07	269.13	5.26	19	0.37	4	46
Cynoscion arenarius	443	2.4	11.7	0.25	0.12	530.40	11.89	35	1.27	9	150
Menticirrhus americanus	214	1.2	18.3	0.12	0.04	346.65	3.21	66	4.11	11	265
Menippe spp.	160	0.9	20.8	0.09	0.04	504.75	4.72	21	1.16	4	158
Cynoscion nebulosus	92	0.5	7.5	0.05	0.04	797.70	4.45	40	4.42	14	192
Paralichthys albigutta	35	0.2	20.8	0.02	<0.01	228.33	0.30	142	9.69	24	264
Lutjanus synagris	28	0.2	6.7	0.02	0.01	523.04	0.67	56	6.21	15	133
Lutjanus griseus	5	<0.1	3.3	<0.01	<0.01	573.36	0.13	86	13.82	61	140
Micropogonias undulatus	4	<0.1	1.7	<0.01	<0.01	857.12	0.20	40	3.07	35	48
Elops saurus	3	<0.1	0.8	<0.01	<0.01	1,095.45	0.20	34	1.45	32	37
Archosargus probatocephalus	2	<0.1	1.7	<0.01	<0.01	771.34	0.07	82	9.50	72	91
Menticirrhus saxatilis	1	<0.1	0.8	<0.01	<0.01	1,095.45	0.07	39	.	39	39
Sciaenops ocellatus	1	<0.1	0.8	<0.01	<0.01	1,095.45	0.07	15	.	15	15
Totals	**2,408**	**13.0**	**.**	**1.37**	**0.27**	**213.64**	**16.25**	**.**	**.**	**4**	**265**

Table TB20-08. Catch statistics for 10 dominant taxa collected in 423 21.3-m river seine samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Anchoa mitchilli	420,826	83.5	50.6	1,463.03	460.23	646.99	167,158.82	28	0.01	15	70
Eucinostomus spp.	27,578	5.5	85.6	95.88	9.18	197.02	1,476.47	28	0.04	10	39
Menidia spp.	17,094	3.4	74.5	59.43	6.93	239.89	1,963.24	37	0.07	12	78
Eucinostomus harengulus	11,021	2.2	76.8	38.32	3.97	213.23	814.71	57	0.10	40	104
Brevoortia spp.	5,804	1.2	8.0	20.18	10.77	1,097.56	4,282.35	38	0.15	17	84
Anchoa cubana	3,465	0.7	0.9	12.05	9.23	1,575.20	3,772.06	31	0.07	25	38
Anchoa hepsetus	2,364	0.5	2.6	8.22	6.99	1,748.25	2,925.00	40	0.10	26	52
Eugerres plumieri	1,912	0.4	35.7	6.65	1.12	347.38	360.29	41	0.57	9	239
Trinectes maculatus	1,415	0.3	43.7	4.92	0.80	333.70	264.71	21	0.21	4	60
Lucania parva	1,371	0.3	21.7	4.77	1.11	479.09	292.65	24	0.13	13	42
Subtotals	492,850	97.8	.	.	.	.	.	.	.	4	239
Totals	**504,161**	**100.0**	**.**	**1,752.75**	**466.12**	**546.95**	**167,411.76**	**.**	**.**	**2**	**598**

Table TB20-09. Catch statistics for Selected Taxa collected in 423 21.3-m river seine samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil cephalus	1,178	0.2	13.7	4.10	1.35	676.41	425.00	40	0.83	19	430
Sciaenops ocellatus	1,037	0.2	19.4	3.61	1.07	613.03	280.88	32	0.82	12	598
Leiostomus xanthurus	538	0.1	6.6	1.87	0.91	1,001.11	338.24	29	0.51	10	94
Centropomus undecimalis	453	0.1	26.0	1.57	0.29	380.63	82.35	101	4.26	15	483
Farfantepenaeus duorarum	400	0.1	26.0	1.39	0.20	296.25	50.00	7	0.17	2	20
Menticirrhus americanus	221	<0.1	1.4	0.77	0.72	1,936.65	305.88	27	0.48	14	66
Callinectes sapidus	204	<0.1	19.1	0.71	0.12	348.73	25.00	30	2.14	7	178
Archosargus probatocephalus	107	<0.1	13.2	0.37	0.07	404.56	19.12	70	6.42	11	371
Mugil trichodon	82	<0.1	4.0	0.29	0.10	705.85	25.00	44	3.02	15	113
Cynoscion nebulosus	75	<0.1	8.5	0.26	0.06	509.00	19.12	46	2.49	15	115
Cynoscion arenarius	37	<0.1	4.0	0.13	0.04	598.78	8.82	38	2.97	15	78
Lutjanus griseus	33	<0.1	5.9	0.11	0.02	443.09	4.41	102	11.92	25	206
Elops saurus	32	<0.1	2.4	0.11	0.05	904.49	16.18	54	5.91	17	165
Mugil curema	19	<0.1	1.4	0.07	0.04	1,116.56	13.24	45	4.96	28	98
Pogonias cromis	1	<0.1	0.2	<0.01	<0.01	2,056.70	1.47	35	.	35	35
Paralichthys albigutta	1	<0.1	0.2	<0.01	<0.01	2,056.70	1.47	20	.	20	20
Totals	**4,418**	**0.9**	**.**	**15.36**	**2.07**	**277.80**	**425.00**	**.**	**.**	**2**	**598**

Table TB20-10. Catch statistics for 11 dominant taxa collected in 120 6.1-m river otter trawl samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	34,342	86.7	40.0	39.05	12.24	343.35	749.19	26	0.04	12	62
Eucinostomus spp.	1,561	3.9	40.8	1.86	0.57	334.05	47.09	24	0.20	9	39
Farfantepenaeus duorarum	547	1.4	41.7	0.67	0.26	435.36	27.13	10	0.22	3	31
Microgobius gulosus	486	1.2	40.0	0.59	0.26	480.50	23.69	27	0.33	8	55
Trinectes maculatus	421	1.1	24.2	0.49	0.18	406.93	17.13	30	0.78	9	100
Callinectes sapidus	350	0.9	66.7	0.41	0.07	184.73	5.73	99	3.05	8	200
Eucinostomus gula	249	0.6	15.8	0.31	0.11	383.20	9.28	55	1.19	40	101
Eucinostomus harengulus	248	0.6	35.8	0.29	0.11	407.01	12.28	71	1.53	40	108
Ariopsis felis	198	0.5	33.3	0.23	0.08	372.67	7.69	231	3.64	95	359
Bairdiella chrysoura	177	0.5	11.7	0.22	0.17	869.47	20.84	48	1.28	10	122
Anchoa cubana	190	0.5	1.7	0.21	0.21	1,089.65	25.50	24	0.21	18	30
Subtotals	38,769	97.9	.	.	.	.	.	.	.	3	359
Totals	**39,625**	**100.0**	**.**	**45.35**	**12.24**	**295.75**	**752.70**	**.**	**.**	**3**	**1,182**

Table TB20-11. Catch statistics for Selected Taxa collected in 120 6.1-m river otter trawl samples during Tampa Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Farfantepenaeus duorarum	547	1.4	41.7	0.67	0.26	435.36	27.13	10	0.22	3	31
Callinectes sapidus	350	0.9	66.7	0.41	0.07	184.73	5.73	99	3.05	8	200
Cynoscion arenarius	95	0.2	16.7	0.11	0.04	396.85	3.90	31	2.75	11	238
Menticirrhus americanus	74	0.2	16.7	0.09	0.03	369.25	3.00	43	5.63	11	266
Sciaenops ocellatus	46	0.1	10.8	0.05	0.02	403.12	1.48	36	6.40	16	240
Cynoscion nebulosus	41	0.1	9.2	0.05	0.02	434.74	1.52	27	2.25	12	102
Leiostomus xanthurus	20	0.1	4.2	0.02	0.02	788.96	1.89	79	9.29	15	125
Archosargus probatocephalus	19	0.1	7.5	0.02	0.01	403.87	0.54	147	14.79	76	305
Lutjanus griseus	14	<0.1	6.7	0.02	0.01	405.49	0.45	160	7.26	97	198
Menticirrhus saxatilis	3	<0.1	1.7	<0.01	<0.01	802.71	0.27	31	10.40	13	49
Paralichthys albigutta	3	<0.1	2.5	<0.01	<0.01	629.28	0.15	146	28.42	93	190
Lutjanus synagris	2	<0.1	1.7	<0.01	<0.01	772.42	0.15	42	23.00	19	65
Centropomus undecimalis	1	<0.1	0.8	<0.01	<0.01	1,095.45	0.15	68	.	68	68
Pogonias cromis	1	<0.1	0.8	<0.01	<0.01	1,095.45	0.15	221	.	221	221
Totals	**1,216**	**3.1**	**.**	**1.46**	**0.30**	**226.19**	**28.78**	**.**	**.**	**3**	**305**

Appendix TB20-01. Monthly summary of species collected during Tampa Bay stratified-random sampling, 2020. Effort, or total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
	Month												
	E=119	**E=119**	**E=119**	**E=35**	**E=119**	**E=90**	**E=119**	**E=90**	**E=119**	**E=90**	**E=119**	**E=119**	**E=1,257**
Acanthostracion quadricornis	15	3	19	.	15	6	6	12	7	17	12	7	**119**
Achirus lineatus	23	7	2	1	11	15	33	32	57	28	39	15	**263**
Adinia xenica	34	3	.	.	.	.	.	.	.	.	.	8	**45**
Albula spp.	.	.	.	.	.	2	.	.	.	.	1	.	**3**
Aluterus schoepfii	.	.	.	.	1	6	1	.	1	1	2	1	**13**
Ameiurus catus	.	.	.	.	.	.	.	.	8	.	.	.	**8**
Anarchopterus criniger	2	.	.	.	.	.	1	.	.	.	.	2	**5**
Anchoa cubana	5	.	4	1	3,896	1,060	2	.	3,716	5,666	6	1,012	**15,368**
Anchoa hepsetus	10	.	.	.	2,456	19	2	.	.	.	5	16	**2,508**
Anchoa lyolepis	.	.	.	.	.	.	.	.	.	20	.	.	**20**
Anchoa mitchilli	8,111	12,245	41,001	50,314	106,732	183,097	28,693	7,074	16,882	46,868	127,983	24,510	**653,510**
Anchoa spp.	.	.	.	.	4	6	.	.	.	.	7	.	**17**
Ancylopsetta quadrocellata	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Archosargus probatocephalus	113	63	26	8	74	68	109	127	82	91	90	38	**889**
Argopecten irradians	.	.	.	.	1	2	2	.	.	.	.	1	**6**
Argopecten sp.	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Ariopsis felis	72	82	100	8	299	276	182	156	193	159	397	24	**1,948**
Bagre marinus	2	.	1	.	4	3	.	1	14	2	2	.	**29**
Bairdiella chrysoura	70	85	247	7	219	538	1,105	145	239	626	145	23	**3,449**
Bathygobius soporator	37	4	.	4	4	.	6	11	7	2	38	21	**134**
Belonesox belizanus	.	1	.	.	.	.	.	.	1	1	5	7	**15**
Brevoortia spp.	.	1	2,971	894	1,722	368	159	5	1	1	.	1	**6,123**

Appendix TB20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=119	E=119	E=35	E=119	E=90	E=119	E=90	E=119	E=90	E=119	E=119	E=1,257
Calamus arctifrons	.	.	1	.	.	2	.	.	.	.	1	.	**4**
Calamus bajonado	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Calamus penna	.	.	.	.	.	2	.	1	.	.	.	.	**3**
Calamus spp.	2	.	.	.	.	.	.	.	.	.	1	2	**5**
Callinectes ornatus	.	6	.	.	3	2	1	.	.	.	.	.	**12**
Callinectes sapidus	328	387	510	57	68	20	47	40	45	44	143	45	**1,734**
Callinectes similis	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Caranx crysos	2	5	.	.	.	.	.	.	.	.	.	.	**7**
Caranx hippos	3	22	.	.	17	14	4	1	9	4	1	.	**75**
Caranx latus	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Carcharhinus leucas	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Centropomus undecimalis	101	99	194	14	165	126	130	278	268	250	222	645	**2,492**
Centropristis striata	.	.	.	.	1	.	.	1	.	5	3	.	**10**
Chaetodipterus faber	9	.	1	.	51	7	59	43	38	362	66	64	**700**
Chasmodes saburrae	32	10	9	.	9	21	37	14	10	9	9	4	**164**
Chilomycterus schoepfii	43	24	31	6	21	11	15	10	24	16	23	30	**254**
Chloroscombrus chrysurus	.	.	.	.	.	7	24	2	24	7	9	.	**73**
Cichlasoma bimaculatum	.	.	.	.	.	.	.	.	8	.	10	1	**19**
Cichlasoma urophthalmus	1	.	1	.	.	.	44	.	1	.	4	1	**52**
Citharichthys macrops	3	1	6	.	2	.	3	.	2	.	.	6	**23**
Clupeidae spp.	.	.	.	1	.	1	.	.	.	.	.	.	**2**
Ctenogobius boleosoma	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Ctenogobius smaragdus	.	.	1	.	.	.	.	4	2	1	2	1	**11**

Appendix TB20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=119	E=119	E=35	E=119	E=90	E=119	E=90	E=119	E=90	E=119	E=119	E=1,257
Cynoscion arenarius	43	8	.	18	12	11	201	8	253	1	23	10	**588**
Cynoscion nebulosus	13	28	14	.	36	75	215	139	129	35	27	25	**736**
Cyprinodon variegatus	46	6	74	1	3	1	61	10	35	.	.	135	**372**
Dactyloscopus moorei	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Dasyatis americana	.	.	.	.	3	2	3	.	1	.	.	.	**9**
Dasyatis sabina	29	57	30	7	125	52	39	25	19	34	51	12	**480**
Dasyatis say	2	1	.	.	8	3	2	.	4	1	2	.	**23**
Diapterus auratus	17	33	17	2	34	99	8	27	37	52	16	46	**388**
Diplectrum formosum	.	.	.	.	.	.	1	.	2	.	.	8	**11**
Diplodus holbrookii	.	.	7	.	1	8	2	12	1	4	22	.	**57**
Dorosoma petenense	.	.	.	.	.	4	.	.	.	.	9	.	**13**
Echeneis naucrates	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Echeneis neucratoides	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Echeneis sp.	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Elopiformes sp.	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Elops saurus	30	61	43	13	53	10	26	45	21	37	107	35	**481**
Elops spp.	1	2	.	1	.	.	.	.	.	.	.	.	**4**
Etropus crossotus	1	.	1	.	.	.	.	.	5	.	1	5	**13**
Etropus cyclosquamus	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Eucinostomus argenteus	8	.	.	.	.	.	.	.	.	.	.	.	**8**
Eucinostomus gula	1,228	689	636	40	347	213	530	692	2,180	1,376	1,796	655	**10,382**
Eucinostomus harengulus	1,336	2,508	1,814	971	1,640	818	580	1,733	840	574	248	735	**13,797**
Eucinostomus spp.	8,693	6,066	4,974	2,136	1,533	1,748	5,982	6,507	2,814	2,516	2,642	2,387	**47,998**

Appendix TB20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=119	E=119	E=35	E=119	E=90	E=119	E=90	E=119	E=90	E=119	E=119	E=1,257
Eugerres plumieri	83	5	3	18	61	216	401	768	405	206	134	88	**2,388**
Farfantepenaeus duorarum	167	114	81	20	41	47	945	485	1,286	269	215	28	**3,698**
Floridichthys carpio	447	159	5	.	63	24	83	865	359	499	89	110	**2,703**
Fundulus confluentus	4	.	.	.	.	.	.	.	.	.	.	.	**4**
Fundulus grandis	159	130	10	4	3	1	5	23	11	10	1	45	**402**
Fundulus seminolis	1	.	.	.	8	.	.	.	3	.	.	4	**16**
Fundulus similis	16	5	95	.	3	96	2	1	224	24	1	8	**475**
Gambusia holbrooki	52	229	30	.	1	.	.	.	3	8	11	2	**336**
Gerreidae sp.	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Gerres cinereus	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Gobiesox strumosus	3	.	.	1	1	.	.	.	.	.	9	2	**16**
Gobiidae sp.	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Gobiosoma bosc	129	39	30	6	6	11	31	19	42	42	136	23	**514**
Gobiosoma longipala	1	.	3	.	.	.	1	.	.	.	1	1	**7**
Gobiosoma robustum	69	43	27	.	70	15	37	13	26	8	65	6	**379**
Gobiosoma spp.	45	18	6	.	53	40	156	98	353	32	129	19	**949**
Gymnura micrura	.	1	.	.	.	.	.	.	1	.	.	.	**2**
Haemulon plumierii	9	.	.	.	.	.	1	22	27	21	3	.	**83**
Halichoeres bivittatus	.	.	.	.	.	.	.	.	1	.	1	.	**2**
Harengula jaguana	804	8	12	.	106	502	2,549	1,927	729	1,375	511	3	**8,526**
Hemichromis letourneuxi	1	.	.	.	.	.	.	.	.	.	.	2	**3**
Heterandria formosa	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Hippocampus erectus	4	4	10	.	2	.	.	.	2	.	1	7	**30**

Appendix TB20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=119	E=119	E=35	E=119	E=90	E=119	E=90	E=119	E=90	E=119	E=119	E=1,257
Hippocampus zosterae	4	1	2	.	2	.	5	7	5	3	3	6	**38**
Hyporhamphus meeki	1	3	6	.	1	.	2	12	4	13	16	27	**85**
Hyporhamphus spp.	.	.	.	.	5	1	1	.	.	.	.	.	**7**
Hypsoblennius hentz	6	3	.	.	.	4	.	.	.	.	.	2	**15**
Labidesthes sicculus	.	.	.	.	.	.	.	1	.	.	1	.	**2**
Lagodon rhomboides	1,867	3,200	8,200	50	2,249	2,330	4,064	7,650	5,256	3,767	2,169	147	**40,949**
Leiostomus xanthurus	44	428	686	7	35	41	28	.	.	.	6	.	**1,275**
Lepisosteus osseus	2	1	.	.	.	.	.	.	.	.	.	3	**6**
Lepisosteus sp.	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Lepomis auritus	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Lepomis macrochirus	1	.	7	.	.	.	.	.	3	2	10	3	**26**
Lepomis microlophus	.	1	.	.	.	.	.	.	.	.	.	1	**2**
Lepomis punctatus	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Lepomis spp.	.	.	.	.	.	.	.	.	2	1	1	.	**4**
Limulus polyphemus	2	2	1	.	.	5	5	2	.	4	4	.	**25**
Lobotes surinamensis	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Lophogobius cyprinoides	8	.	1	.	.	.	.	6	13	8	8	3	**47**
Lucania goodei	.	.	.	.	.	2	.	.	1	.	.	.	**3**
Lucania parva	928	391	139	104	2,445	967	762	347	189	258	59	89	**6,678**
Lupinoblennius nicholsi	1	1	.	.	.	1	.	.	.	.	.	.	**3**
Lutjanus griseus	14	2	3	3	15	11	34	51	63	36	20	6	**258**
Lutjanus synagris	2	1	.	.	3	3	11	6	17	36	36	3	**118**
Membras martinica	.	.	.	.	23	32	14	36	.	1	.	.	**106**

Appendix TB20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=119	E=119	E=35	E=119	E=90	E=119	E=90	E=119	E=90	E=119	E=119	E=1,257
Menidia spp.	1,450	1,638	885	804	2,651	4,291	2,596	3,248	3,152	1,107	571	420	**22,813**
Menippe spp.	22	.	3	.	3	.	2	.	21	.	15	97	**163**
Menticirrhus americanus	12	20	3	.	24	234	82	6	91	3	91	27	**593**
Menticirrhus littoralis	.	.	.	.	40	.	.	.	.	.	.	.	**40**
Menticirrhus saxatilis	1	9	4	.	.	.	.	.	.	.	1	6	**21**
Microgobius gulosus	219	195	143	34	706	929	1,174	447	940	297	471	75	**5,630**
Microgobius thalassinus	4	.	3	.	.	.	7	.	4	.	3	1	**22**
Micropogonias undulatus	3	1	.	.	.	.	.	.	.	.	.	.	**4**
Micropterus salmoides	.	.	.	.	.	4	.	.	.	.	.	.	**4**
Monacanthus ciliatus	7	2	.	.	.	1	2	.	1	2	.	1	**16**
Mugil cephalus	94	522	1,242	559	97	49	93	76	23	15	81	34	**2,885**
Mugil curema	26	14	4	.	17	278	5	19	63	31	29	41	**527**
Mugil spp.	.	.	.	.	2	.	.	.	.	.	.	.	**2**
Mugil trichodon	62	42	23	2	18	9	10	5	11	1	27	193	**403**
Mycteroperca microlepis	.	.	.	.	.	6	5	10	7	9	3	.	**40**
Myrophis punctatus	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Negaprion brevirostris	.	.	.	.	1	.	1	.	.	.	.	.	**2**
Nicholsina usta	28	5	7	.	4	28	1	2	.	2	4	.	**81**
Notropis maculatus	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Notropis petersoni	61	.	.	.	.	3	.	.	.	.	.	1	**65**
Ocyurus chrysurus	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Ogcocephalus cubifrons	1	1	1	.	.	.	.	.	5	.	1	2	**11**
Oligoplites saurus	1	1	12	.	19	91	199	102	59	34	13	.	**531**

Appendix TB20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=119	E=119	E=35	E=119	E=90	E=119	E=90	E=119	E=90	E=119	E=119	E=1,257
Opisthonema oglinum	8	2	2,221	.	356	179	67	139	1,558	339	31	.	**4,900**
Opsanus beta	13	9	2	.	20	1	23	14	13	4	1	3	**103**
Oreochromis aureus	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Oreochromis/Sarotherodon spp.	.	1	.	.	5	2	9	2	1	.	.	.	**20**
Orthopristis chrysoptera	169	164	1,535	15	244	246	407	718	190	100	80	51	**3,919**
Paralichthys albigutta	8	6	31	1	14	15	23	1	16	5	11	10	**141**
Penaeidae sp.	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Poecilia latipinna	160	157	2	10	7	.	14	3	13	.	.	13	**379**
Pogonias cromis	.	5	.	1	.	.	1	3	5	3	5	13	**36**
Pomoxis nigromaculatus	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Portunus spp.	34	41	4	.	34	1	83	1	15	.	27	46	**286**
Prionotus scitulus	45	48	47	.	30	7	63	5	109	1	209	48	**612**
Prionotus tribulus	16	26	16	1	4	1	.	.	2	2	14	16	**98**
Pterygoplichthys spp.	.	.	.	.	.	.	.	.	5	.	.	.	**5**
Raja texana	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Rhinobatos lentiginosus	.	.	.	.	5	.	1	.	.	.	.	.	**6**
Rhinoptera bonasus	7	.	2	.	109	1	.	10	28	1	.	1	**159**
Rimapenaeus spp.	.	1	.	.	.	.	.	.	.	.	1	1	**3**
Sarotherodon melanotheron	8	.	.	.	5	.	5	7	3	4	20	17	**69**
Sciaenops ocellatus	200	47	45	1	16	9	14	11	18	182	322	742	**1,607**
Scomberomorus maculatus	3	1	2	.	8	.	1	.	5	7	.	.	**27**
Scorpaena brasiliensis	.	.	.	.	.	.	1	.	.	.	.	2	**3**
Selene vomer	.	.	.	.	10	2	.	1	4	7	1	.	**25**

Appendix TB20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=119	E=119	E=35	E=119	E=90	E=119	E=90	E=119	E=90	E=119	E=119	E=1,257
Serraniculus pumilio	.	.	.	.	.	.	1	.	.	.	.	2	**3**
Serranus subligarius	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Sphoeroides nephelus	26	19	34	.	44	22	30	18	33	43	47	25	**341**
Sphoeroides spengleri	3	.	.	.	.	.	1	.	.	1	.	1	**6**
Sphoeroides sp.	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Sphyraena barracuda	5	1	62	.	13	5	5	1	8	3	4	.	**107**
Sphyraena borealis	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Sphyrna tiburo	3	123	1	.	6	5	6	.	2	22	4	.	**172**
Stephanolepis hispidus	58	5	4	.	13	30	1	4	2	5	2	15	**139**
Strongylura marina	2	19	4	1	3	6	4	.	1	13	10	23	**86**
Strongylura notata	50	23	52	2	77	166	101	80	69	139	46	347	**1,152**
Strongylura spp.	.	.	.	25	1	.	1	.	1	1	.	.	**29**
Strongylura timucu	.	1	3	.	.	.	2	2	1	4	1	5	**19**
Symphurus plagiusa	38	17	18	7	20	3	37	3	20	2	36	5	**206**
Syngnathus floridae	11	20	11	.	4	29	11	19	7	7	11	5	**135**
Syngnathus louisianae	8	4	2	1	14	15	19	11	24	15	26	13	**152**
Syngnathus scovelli	161	77	61	6	102	52	58	44	31	38	56	32	**718**
Syngnathus sp.	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Synodus foetens	33	27	33	2	45	36	31	33	25	37	95	67	**464**
Trachinotus carolinus	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Trachinotus falcatus	.	.	6	.	1	1	13	.	8	.	4	6	**39**
Trinectes maculatus	287	154	318	27	15	73	121	42	271	167	208	180	**1,863**
Tylosurus crocodilus	.	.	.	.	.	.	.	.	1	1	.	.	**2**

Appendix TB20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=119	E=119	E=35	E=119	E=90	E=119	E=90	E=119	E=90	E=119	E=119	E=1,257
Urophycis floridana	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Totals	**28,690**	**30,747**	**68,938**	**56,216**	**129,578**	**199,906**	**52,787**	**34,581**	**43,875**	**68,087**	**140,398**	**33,767**	**887,570**

Appendix TB20-02. Summary by gear and stratum of species collected during Tampa Bay stratified-random sampling, 2020. Sampling with 21.3-m bay seine was stratified by the presence or absence of a shoreline ('Shore' or offshore) within 5-m. Offshore sets were further stratified by the presence or absence of bottom vegetation ('Veg' or 'Unveg'). Sampling with 21.3-m river seine and 183-m haul seine was stratified by the presence or absence of overhanging vegetation ('Over' or 'Nonover'). Sampling with 6.1-m otter trawl was not stratified. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=111	E=109	E=154	E=254	E=169	E=164	E=56	E=240	E=1,257
Acanthostracion quadricornis	27	6	1	.	.	16	31	38	**119**
Achirus lineatus	17	27	66	40	24	.	1	88	**263**
Adinia xenica	2	.	6	3	34	.	.	.	**45**
Albula spp.	1	.	2	.	.	.	.	.	**3**
Aluterus schoepfii	5	.	.	.	.	2	1	5	**13**
Ameiurus catus	.	.	.	.	.	.	.	8	**8**
Anarchopterus criniger	.	2	.	.	.	2	.	1	**5**
Anchoa cubana	2,101	80	5,593	900	2,565	.	.	4,129	**15,368**
Anchoa hepsetus	48	1	1	2,076	288	.	.	94	**2,508**
Anchoa lyolepis	.	.	20	.	.	.	.	.	**20**
Anchoa mitchilli	21,561	6,293	165,672	235,425	185,401	.	.	39,158	**653,510**
Anchoa spp.	10	.	.	.	.	.	.	7	**17**
Ancylopsetta quadrocellata	.	.	.	.	.	.	.	1	**1**
Archosargus probatocephalus	53	1	49	54	53	518	140	21	**889**
Argopecten irradians	1	.	.	.	.	2	.	3	**6**
Argopecten sp.	.	.	.	.	.	1	.	.	**1**
Ariopsis felis	56	98	19	1	3	1,112	416	243	**1,948**
Bagre marinus	.	.	.	.	.	14	7	8	**29**
Bairdiella chrysoura	1,572	55	178	47	189	81	760	567	**3,449**
Bathygobius soporator	.	.	23	56	43	.	.	12	**134**
Belonesox belizanus	.	.	.	12	3	.	.	.	**15**
Brevoortia spp.	.	.	270	1,634	4,170	44	5	.	**6,123**
Calamus arctifrons	1	.	.	.	.	1	2	.	**4**
Calamus bajonado	.	.	.	.	.	.	.	1	**1**
Calamus penna	1	.	.	.	.	2	.	.	**3**
Calamus spp.	2	2	1	.	.	.	.	.	**5**
Callinectes ornatus	.	1	5	.	.	1	1	4	**12**
Callinectes sapidus	24	10	47	82	122	68	84	1,297	**1,734**

Appendix TB20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=111	E=109	E=154	E=254	E=169	E=164	E=56	E=240	E=1,257
Callinectes similis	.	.	.	.	.	.	.	1	**1**
Caranx crysos	.	.	.	.	.	6	1	.	**7**
Caranx hippos	.	.	.	.	.	55	20	.	**75**
Caranx latus	.	.	.	.	.	1	.	.	**1**
Carcharhinus leucas	.	1	.	.	.	.	.	.	**1**
Centropomus undecimalis	1	1	25	285	168	1,803	208	1	**2,492**
Centropristis striata	2	.	1	.	.	3	3	1	**10**
Chaetodipterus faber	4	1	18	2	.	560	12	103	**700**
Chasmodes saburrae	73	8	45	9	6	.	.	23	**164**
Chilomycterus schoepfii	29	2	4	.	.	85	26	108	**254**
Chloroscombrus chrysurus	24	.	4	.	.	.	31	14	**73**
Cichlasoma bimaculatum	.	.	.	8	11	.	.	.	**19**
Cichlasoma urophthalmus	.	.	46	2	4	.	.	.	**52**
Citharichthys macrops	.	.	1	.	.	.	.	22	**23**
Clupeidae spp.	1	.	.	1	.	.	.	.	**2**
Ctenogobius boleosoma	.	.	1	.	.	.	.	.	**1**
Ctenogobius smaragdus	.	.	3	6	1	.	.	1	**11**
Cynoscion arenarius	1	3	7	18	19	.	2	538	**588**
Cynoscion nebulosus	198	47	163	41	34	66	54	133	**736**
Cyprinodon variegatus	.	7	180	17	168	.	.	.	**372**
Dactyloscopus moorei	1	.	.	.	.	.	.	.	**1**
Dasyatis americana	.	.	.	.	.	5	4	.	**9**
Dasyatis sabina	5	5	6	2	1	272	60	129	**480**
Dasyatis say	.	.	.	.	.	18	.	5	**23**
Diapterus auratus	.	95	2	145	38	82	10	16	**388**
Diplectrum formosum	.	.	.	.	.	.	.	11	**11**
Diplodus holbrookii	7	.	.	.	.	44	6	.	**57**
Dorosoma petenense	.	.	.	9	4	.	.	.	**13**
Echeneis naucrates	.	.	.	.	.	1	.	.	**1**
Echeneis neucratoides	.	.	.	.	.	.	.	1	**1**
Echeneis sp.	.	.	.	.	.	.	1	.	**1**
Elopiformes sp.	.	1	.	.	.	.	.	.	**1**
Elops saurus	.	1	.	15	17	312	133	3	**481**

Appendix TB20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=111	E=109	E=154	E=254	E=169	E=164	E=56	E=240	E=1,257
Elops spp.	.	.	2	1	.	.	.	1	**4**
Etropus crossotus	.	1	.	.	.	.	.	12	**13**
Etropus cyclosquamus	.	.	.	.	.	.	.	1	**1**
Eucinostomus argenteus	.	.	.	.	.	.	.	8	**8**
Eucinostomus gula	1,451	485	1,995	896	469	2,488	1,057	1,541	**10,382**
Eucinostomus harengulus	120	252	1,086	6,614	4,407	700	360	258	**13,797**
Eucinostomus spp.	5,218	1,833	10,934	17,196	10,382	2	.	2,433	**47,998**
Eugerres plumieri	36	19	153	981	931	162	2	104	**2,388**
Farfantepenaeus duorarum	638	274	1,341	243	157	17	8	1,020	**3,698**
Floridichthys carpio	135	84	2,463	6	13	2	.	.	**2,703**
Fundulus confluentus	.	.	.	4	.	.	.	.	**4**
Fundulus grandis	2	.	50	30	311	8	1	.	**402**
Fundulus seminolis	.	.	.	5	11	.	.	.	**16**
Fundulus similis	.	.	298	2	174	1	.	.	**475**
Gambusia holbrooki	.	.	.	196	140	.	.	.	**336**
Gerreidae sp.	.	.	1	.	.	.	.	.	**1**
Gerres cinereus	.	.	.	.	.	1	.	.	**1**
Gobiesox strumosus	2	1	3	7	.	.	.	3	**16**
Gobiidae sp.	.	.	.	.	1	.	.	.	**1**
Gobiosoma bosc	4	2	5	260	237	.	.	6	**514**
Gobiosoma longipala	.	.	.	.	.	.	.	7	**7**
Gobiosoma robustum	135	24	129	12	13	.	.	66	**379**
Gobiosoma spp.	111	181	166	280	60	.	.	151	**949**
Gymnura micrura	.	.	.	.	.	.	1	1	**2**
Haemulon plumierii	45	.	10	.	.	21	.	7	**83**
Halichoeres bivittatus	2	.	.	.	.	.	.	.	**2**
Harengula jaguana	508	678	5,532	168	48	1,267	315	10	**8,526**
Hemichromis letourneuxi	.	.	.	3	.	.	.	.	**3**
Heterandria formosa	.	.	.	.	1	.	.	.	**1**
Hippocampus erectus	3	1	1	1	.	.	2	22	**30**
Hippocampus zosterae	25	3	10	.	.	.	.	.	**38**
Hyporhamphus meeki	2	12	1	.	.	45	25	.	**85**
Hyporhamphus spp.	1	6	.	.	.	.	.	.	**7**

Appendix TB20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=111	E=109	E=154	E=254	E=169	E=164	E=56	E=240	E=1,257
Hypsoblennius hentz	7	.	4	.	.	.	.	4	**15**
Labidesthes sicculus	.	.	.	1	1	.	.	.	**2**
Lagodon rhomboides	6,774	35	2,468	114	201	25,269	5,084	1,004	**40,949**
Leiostomus xanthurus	.	71	512	410	128	100	34	20	**1,275**
Lepisosteus osseus	.	.	.	.	.	.	.	6	**6**
Lepisosteus sp.	.	.	.	.	1	.	.	.	**1**
Lepomis auritus	.	.	.	1	.	.	.	.	**1**
Lepomis macrochirus	.	.	.	19	7	.	.	.	**26**
Lepomis microlophus	.	.	.	.	2	.	.	.	**2**
Lepomis punctatus	.	.	.	1	.	.	.	.	**1**
Lepomis spp.	.	.	.	1	3	.	.	.	**4**
Limulus polyphemus	1	7	2	.	.	13	1	1	**25**
Lobotes surinamensis	.	.	.	.	.	1	.	.	**1**
Lophogobius cyprinoides	1	.	.	26	15	.	.	5	**47**
Lucania goodei	.	.	.	3	.	.	.	.	**3**
Lucania parva	1,275	469	3,563	860	511	.	.	.	**6,678**
Lupinoblennius nicholsi	.	.	.	.	3	.	.	.	**3**
Lutjanus griseus	8	5	17	21	12	94	82	19	**258**
Lutjanus synagris	13	.	31	.	.	34	10	30	**118**
Membras martinica	.	2	39	35	30	.	.	.	**106**
Menidia spp.	382	997	4,337	9,093	8,001	2	.	1	**22,813**
Menippe spp.	.	.	.	.	.	3	.	160	**163**
Menticirrhus americanus	8	39	28	210	11	4	5	288	**593**
Menticirrhus littoralis	.	.	.	.	.	39	1	.	**40**
Menticirrhus saxatilis	5	1	11	.	.	.	.	4	**21**
Microgobius gulosus	924	1,004	1,929	768	316	.	.	689	**5,630**
Microgobius thalassinus	.	.	.	.	1	.	.	21	**22**
Micropogonias undulatus	.	.	.	.	.	.	.	4	**4**
Micropterus salmoides	.	.	.	4	.	.	.	.	**4**
Monacanthus ciliatus	9	.	2	.	.	1	1	3	**16**
Mugil cephalus	4	2	1,362	534	644	256	83	.	**2,885**
Mugil curema	.	.	271	12	7	200	37	.	**527**
Mugil spp.	.	.	2	.	.	.	.	.	**2**

Appendix TB20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=111	E=109	E=154	E=254	E=169	E=164	E=56	E=240	E=1,257
Mugil trichodon	1	.	18	32	50	246	56	.	**403**
Mycteroperca microlepis	1	.	.	.	.	36	3	.	**40**
Myrophis punctatus	.	.	.	.	.	.	.	1	**1**
Negaprion brevirostris	.	.	.	.	.	2	.	.	**2**
Nicholsina usta	28	.	14	.	.	32	3	4	**81**
Notropis maculatus	.	.	.	1	.	.	.	.	**1**
Notropis petersoni	.	.	.	3	62	.	.	.	**65**
Ocyurus chrysurus	.	.	.	.	.	1	.	.	**1**
Ogcocephalus cubifrons	.	.	.	.	.	1	.	10	**11**
Oligoplites saurus	22	29	186	122	104	27	41	.	**531**
Opisthonema oglinum	217	59	262	137	7	683	2,304	1,231	**4,900**
Opsanus beta	2	.	1	3	5	54	4	34	**103**
Oreochromis aureus	.	.	1	.	.	.	.	.	**1**
Oreochromis/Sarotherodon spp.	1	1	.	14	4	.	.	.	**20**
Orthopristis chrysoptera	1,956	.	46	2	8	1,431	286	190	**3,919**
Paralichthys albigutta	6	8	8	1	.	54	26	38	**141**
Penaeidae sp.	.	.	1	.	.	.	.	.	**1**
Poecilia latipinna	.	.	4	141	234	.	.	.	**379**
Pogonias cromis	1	.	5	1	.	25	3	1	**36**
Pomoxis nigromaculatus	.	.	.	1	.	.	.	.	**1**
Portunus spp.	7	1	1	.	.	2	.	275	**286**
Prionotus scitulus	11	20	11	3	2	6	4	555	**612**
Prionotus tribulus	4	2	11	2	.	7	5	67	**98**
Pterygoplichthys spp.	.	.	.	1	4	.	.	.	**5**
Raja texana	.	.	.	.	.	.	.	1	**1**
Rhinobatos lentiginosus	.	.	.	.	.	5	1	.	**6**
Rhinoptera bonasus	.	8	.	.	.	145	5	1	**159**
Rimapenaeus spp.	.	.	.	.	.	.	.	3	**3**
Sarotherodon melanotheron	1	.	.	7	7	54	.	.	**69**
Sciaenops ocellatus	141	5	187	662	375	156	34	47	**1,607**
Scomberomorus maculatus	.	.	.	.	.	10	17	.	**27**
Scorpaena brasiliensis	.	.	.	.	.	.	.	3	**3**
Selene vomer	.	.	2	.	.	13	9	1	**25**

Appendix TB20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=111	E=109	E=154	E=254	E=169	E=164	E=56	E=240	E=1,257
Serraniculus pumilio	.	.	.	.	.	.	.	3	**3**
Serranus subligarius	.	.	.	.	.	.	.	1	**1**
Sphoeroides nephelus	46	19	51	2	4	151	40	28	**341**
Sphoeroides spengleri	.	.	3	.	.	1	1	1	**6**
Sphoeroides sp.	.	.	1	.	.	.	.	.	**1**
Sphyraena barracuda	.	.	2	.	.	73	32	.	**107**
Sphyraena borealis	.	.	.	.	.	.	.	1	**1**
Sphyrna tiburo	1	.	.	.	.	160	11	.	**172**
Stephanolepis hispidus	31	.	34	.	.	7	24	43	**139**
Strongylura marina	1	.	11	5	1	30	38	.	**86**
Strongylura notata	5	22	226	72	39	686	102	.	**1,152**
Strongylura spp.	1	.	1	15	12	.	.	.	**29**
Strongylura timucu	.	.	4	7	1	7	.	.	**19**
Symphurus plagiusa	9	6	5	3	.	1	.	182	**206**
Syngnathus floridae	122	1	10	.	.	.	.	2	**135**
Syngnathus louisianae	51	9	36	4	1	.	.	51	**152**
Syngnathus scovelli	392	37	135	16	16	1	.	121	**718**
Syngnathus sp.	1	.	.	.	.	.	.	.	**1**
Synodus foetens	81	70	101	20	10	39	16	127	**464**
Trachinotus carolinus	.	.	.	.	.	.	1	.	**1**
Trachinotus falcatus	.	.	1	.	.	9	29	.	**39**
Trinectes maculatus	.	4	5	684	731	.	1	438	**1,863**
Tylosurus crocodilus	.	.	.	.	.	2	.	.	**2**
Urophycis floridana	.	.	1	.	.	.	.	.	**1**
Totals	**46,817**	**13,537**	**212,602**	**281,869**	**222,292**	**40,064**	**12,224**	**58,165**	**887,570**

Appendix TB20-03. Summary by zone of species collected during Tampa Bay stratified-random sampling, 2020. Zones A–E were located in Tampa Bay, while Zones K (Alafia River), L (Little Manatee River), M (Manatee River), and N (Braden River) were tributaries of Tampa Bay. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=145	E=134	E=175	E=104	E=156	E=174	E=147	E=132	E=90	E=1,257
Acanthostracion quadricornis	16	21	7	33	42	.	.	.	.	**119**
Achirus lineatus	51	26	34	32	49	38	19	11	3	**263**
Adinia xenica	8	.	.	.	.	.	.	34	3	**45**
Albula spp.	2	.	1	.	.	.	.	.	.	**3**
Aluterus schoepfii	2	6	.	3	2	.	.	.	.	**13**
Ameiurus catus	.	.	.	.	.	.	8	.	.	**8**
Anarchopterus criniger	.	.	.	.	5	.	.	.	.	**5**
Anchoa cubana	.	.	3,941	7,409	363	3,461	189	5	.	**15,368**
Anchoa hepsetus	.	1	83	60	.	2,343	18	.	3	**2,508**
Anchoa lyolepis	.	.	.	.	20	.	.	.	.	**20**
Anchoa mitchilli	15,104	2,420	26,091	24,416	130,311	307,942	58,986	53,992	34,248	**653,510**
Anchoa spp.	5	.	.	12	.	.	.	.	.	**17**
Ancylopsetta quadrocellata	.	.	.	.	1	.	.	.	.	**1**
Archosargus probatocephalus	106	245	54	139	219	79	23	14	10	**889**
Argopecten irradians	2	.	.	2	2	.	.	.	.	**6**
Argopecten sp.	.	.	.	1	.	.	.	.	.	**1**
Ariopsis felis	304	528	608	35	271	71	75	38	18	**1,948**
Bagre marinus	18	2	1	1	3	2	1	1	.	**29**
Bairdiella chrysoura	191	357	859	1,118	511	188	56	168	1	**3,449**
Bathygobius soporator	1	20	3	.	.	46	46	18	.	**134**
Belonesox belizanus	.	.	.	.	.	11	4	.	.	**15**
Brevoortia spp.	46	5	9	149	110	1,240	3,729	14	821	**6,123**
Calamus arctifrons	.	1	.	3	.	.	.	.	.	**4**
Calamus bajonado	.	.	.	.	1	.	.	.	.	**1**
Calamus penna	.	.	.	1	2	.	.	.	.	**3**
Calamus spp.	.	.	1	1	3	.	.	.	.	**5**
Callinectes ornatus	1	.	1	4	6	.	.	.	.	**12**
Callinectes sapidus	730	48	344	16	42	181	186	141	46	**1,734**
Callinectes similis	.	.	.	1	.	.	.	.	.	**1**
Caranx crysos	.	.	.	7	.	.	.	.	.	**7**
Caranx hippos	6	6	7	11	45	.	.	.	.	**75**
Caranx latus	.	.	.	.	1	.	.	.	.	**1**

Appendix TB20-03. (Continued).

Species	Zone									Totals
	A	**B**	**C**	**D**	**E**	**K**	**L**	**M**	**N**	
	E=145	**E=134**	**E=175**	**E=104**	**E=156**	**E=174**	**E=147**	**E=132**	**E=90**	**E=1,257**
Carcharhinus leucas	.	.	1	.	.	.	.	.	.	**1**
Centropomus undecimalis	141	334	141	601	821	189	111	104	50	**2,492**
Centropristis striata	.	1	.	8	1	.	.	.	.	**10**
Chaetodipterus faber	381	38	72	88	112	7	1	1	.	**700**
Chasmodes saburrae	43	17	23	17	37	.	16	11	.	**164**
Chilomycterus schoepfii	43	54	23	53	64	.	2	15	.	**254**
Chloroscombrus chrysurus	2	4	23	37	.	3	4	.	.	**73**
Cichlasoma bimaculatum	.	.	.	.	.	19	.	.	.	**19**
Cichlasoma urophthalmus	46	.	.	.	.	1	5	.	.	**52**
Citharichthys macrops	.	.	.	5	18	.	.	.	.	**23**
Clupeidae spp.	.	.	.	.	1	.	.	1	.	**2**
Ctenogobius boleosoma	.	.	.	1	.	.	.	.	.	**1**
Ctenogobius smaragdus	.	.	3	.	.	2	5	1	.	**11**
Cynoscion arenarius	436	.	20	.	.	85	14	30	3	**588**
Cynoscion nebulosus	234	75	145	86	80	46	26	34	10	**736**
Cyprinodon variegatus	178	6	2	.	1	80	.	24	81	**372**
Dactyloscopus moorei	.	1	.	.	.	.	.	.	.	**1**
Dasyatis americana	.	.	1	7	1	.	.	.	.	**9**
Dasyatis sabina	116	70	136	27	72	13	18	26	2	**480**
Dasyatis say	1	3	6	8	4	.	.	1	.	**23**
Diapterus auratus	13	1	95	34	46	91	51	25	32	**388**
Diplectrum formosum	.	.	.	2	9	.	.	.	.	**11**
Diplodus holbrookii	.	5	.	34	18	.	.	.	.	**57**
Dorosoma petenense	.	.	.	.	.	4	.	4	5	**13**
Echeneis naucrates	.	.	.	.	1	.	.	.	.	**1**
Echeneis neucratoides	.	.	1	.	.	.	.	.	.	**1**
Echeneis sp.	.	.	1	.	.	.	.	.	.	**1**
Elopiformes sp.	.	.	.	.	1	.	.	.	.	**1**
Elops saurus	50	40	127	83	149	24	.	.	8	**481**
Elops spp.	1	.	1	.	.	1	.	1	.	**4**
Etropus crossotus	.	.	.	8	5	.	.	.	.	**13**
Etropus cyclosquamus	.	.	.	.	1	.	.	.	.	**1**
Eucinostomus argenteus	.	.	.	8	.	.	.	.	.	**8**
Eucinostomus gula	886	1,076	1,638	2,903	2,265	328	563	649	74	**10,382**

Appendix TB20-03. (Continued).

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=145	E=134	E=175	E=104	E=156	E=174	E=147	E=132	E=90	E=1,257
Eucinostomus harengulus	628	426	739	163	572	5,724	1,561	1,847	2,137	**13,797**
Eucinostomus spp.	1,547	3,702	5,604	2,886	5,120	15,717	6,744	4,643	2,035	**47,998**
Eugerres plumieri	205	35	64	1	78	1,250	285	177	293	**2,388**
Farfantepenaeus duorarum	534	126	714	489	888	165	336	377	69	**3,698**
Floridichthys carpio	2,018	111	418	33	104	19	.	.	.	**2,703**
Fundulus confluentus	.	.	.	.	.	.	.	4	.	**4**
Fundulus grandis	41	1	9	4	6	18	31	126	166	**402**
Fundulus seminolis	.	.	.	.	.	7	9	.	.	**16**
Fundulus similis	251	15	30	3	.	176	.	.	.	**475**
Gambusia holbrooki	.	.	.	.	.	6	4	9	317	**336**
Gerreidae sp.	1	.	.	.	.	.	.	.	.	**1**
Gerres cinereus	.	.	.	.	1	.	.	.	.	**1**
Gobiesox strumosus	2	2	2	.	.	.	6	1	3	**16**
Gobiidae sp.	.	.	.	.	.	.	.	1	.	**1**
Gobiosoma bosc	8	.	2	.	1	220	114	32	137	**514**
Gobiosoma longipala	.	.	2	2	3	.	.	.	.	**7**
Gobiosoma robustum	157	28	33	20	93	1	20	27	.	**379**
Gobiosoma spp.	158	10	233	3	139	181	93	69	63	**949**
Gymnura micrura	2	.	.	.	.	.	.	.	.	**2**
Haemulon plumierii	.	.	8	37	38	.	.	.	.	**83**
Halichoeres bivittatus	.	.	.	2	.	.	.	.	.	**2**
Harengula jaguana	28	232	2,709	3,966	1,375	25	55	136	.	**8,526**
Hemichromis letourneuxi	.	.	.	.	.	2	.	.	1	**3**
Heterandria formosa	.	.	.	.	.	.	1	.	.	**1**
Hippocampus erectus	3	7	8	2	8	.	.	2	.	**30**
Hippocampus zosterae	9	7	5	4	13	.	.	.	.	**38**
Hyporhamphus meeki	30	23	22	1	9	.	.	.	.	**85**
Hyporhamphus spp.	.	6	.	1	.	.	.	.	.	**7**
Hypsoblennius hentz	6	2	1	1	5	.	.	.	.	**15**
Labidesthes sicculus	.	.	.	.	.	.	.	.	2	**2**
Lagodon rhomboides	817	4,178	259	17,247	18,098	84	149	80	37	**40,949**
Leiostomus xanthurus	5	20	150	404	138	15	411	21	111	**1,275**
Lepisosteus osseus	.	.	.	.	.	.	3	.	3	**6**
Lepisosteus sp.	.	.	.	.	.	.	1	.	.	**1**

Appendix TB20-03. (Continued).

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=145	E=134	E=175	E=104	E=156	E=174	E=147	E=132	E=90	E=1,257
Lepomis auritus	.	.	.	.	.	1	.	.	.	**1**
Lepomis macrochirus	.	.	.	.	.	17	.	7	2	**26**
Lepomis microlophus	.	.	.	.	.	.	2	.	.	**2**
Lepomis punctatus	.	.	.	.	.	1	.	.	.	**1**
Lepomis spp.	.	.	.	.	.	2	2	.	.	**4**
Limulus polyphemus	9	5	5	.	5	.	1	.	.	**25**
Lobotes surinamensis	.	1	.	.	.	.	.	.	.	**1**
Lophogobius cyprinoides	1	.	.	.	.	11	23	1	11	**47**
Lucania goodei	.	.	.	.	.	1	2	.	.	**3**
Lucania parva	2,446	535	986	122	1,218	529	185	34	623	**6,678**
Lupinoblennius nicholsi	.	.	.	.	.	3	.	.	.	**3**
Lutjanus griseus	7	48	21	69	66	.	17	21	9	**258**
Lutjanus synagris	.	2	4	83	27	.	1	1	.	**118**
Membras martinica	3	38	.	.	.	58	7	.	.	**106**
Menidia spp.	1,061	1,437	712	1,649	859	7,177	3,562	2,562	3,794	**22,813**
Menippe spp.	70	28	8	25	32	.	.	.	.	**163**
Menticirrhus americanus	206	2	78	8	4	238	42	15	.	**593**
Menticirrhus littoralis	.	.	.	40	.	.	.	.	.	**40**
Menticirrhus saxatilis	.	8	1	4	5	.	2	1	.	**21**
Microgobius gulosus	1,340	149	1,726	22	823	187	772	238	373	**5,630**
Microgobius thalassinus	11	.	2	5	.	1	2	1	.	**22**
Micropogonias undulatus	3	1	.	.	.	.	.	.	.	**4**
Micropterus salmoides	.	.	.	.	.	3	1	.	.	**4**
Monacanthus ciliatus	.	.	1	13	2	.	.	.	.	**16**
Mugil cephalus	610	46	494	420	137	825	167	28	158	**2,885**
Mugil curema	9	10	22	299	168	2	2	11	4	**527**
Mugil spp.	.	.	.	2	.	.	.	.	.	**2**
Mugil trichodon	15	48	10	110	138	25	2	40	15	**403**
Mycteroperca microlepis	.	.	.	11	29	.	.	.	.	**40**
Myrophis punctatus	.	.	.	.	.	.	.	1	.	**1**
Negaprion brevirostris	.	.	.	.	2	.	.	.	.	**2**
Nicholsina usta	.	.	.	47	34	.	.	.	.	**81**
Notropis maculatus	.	.	.	.	.	.	.	.	1	**1**
Notropis petersoni	.	.	.	.	.	65	.	.	.	**65**

Appendix TB20-03. (Continued).

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=145	E=134	E=175	E=104	E=156	E=174	E=147	E=132	E=90	E=1,257
Ocyurus chrysurus	.	.	.	1	.	.	.	.	.	**1**
Ogcocephalus cubifrons	.	.	1	6	4	.	.	.	.	**11**
Oligoplites saurus	46	62	75	48	74	111	41	55	19	**531**
Opisthonema oglinum	12	679	1,281	640	2,142	10	1	134	1	**4,900**
Opsanus beta	13	13	4	32	29	2	5	5	.	**103**
Oreochromis aureus	1	.	.	.	.	.	.	.	.	**1**
Oreochromis/Sarotherodon spp.	.	1	1	.	.	.	3	1	14	**20**
Orthopristis chrysoptera	178	213	35	865	2,602	1	.	25	.	**3,919**
Paralichthys albigutta	6	42	11	39	39	.	1	3	.	**141**
Penaeidae sp.	.	.	1	.	.	.	.	.	.	**1**
Poecilia latipinna	3	.	1	.	.	.	11	74	290	**379**
Pogonias cromis	3	1	7	11	12	.	1	.	1	**36**
Pomoxis nigromaculatus	.	.	.	.	.	1	.	.	.	**1**
Portunus spp.	8	72	70	43	93	.	.	.	.	**286**
Prionotus scitulus	75	119	209	44	146	9	5	5	.	**612**
Prionotus tribulus	26	15	23	7	12	2	4	7	2	**98**
Pterygoplichthys spp.	.	.	.	.	.	5	.	.	.	**5**
Raja texana	.	.	.	1	.	.	.	.	.	**1**
Rhinobatos lentiginosus	.	.	6	.	.	.	.	.	.	**6**
Rhinoptera bonasus	1	101	45	7	5	.	.	.	.	**159**
Rimapenaeus spp.	.	1	1	.	1	.	.	.	.	**3**
Sarotherodon melanotheron	14	25	.	1	15	.	6	5	3	**69**
Sciaenops ocellatus	163	104	139	20	98	296	150	593	44	**1,607**
Scomberomorus maculatus	2	2	10	11	2	.	.	.	.	**27**
Scorpaena brasiliensis	.	.	.	.	3	.	.	.	.	**3**
Selene vomer	1	1	6	16	1	.	.	.	.	**25**
Serraniculus pumilio	.	.	1	.	2	.	.	.	.	**3**
Serranus subligarius	.	.	.	.	1	.	.	.	.	**1**
Sphoeroides spengleri	.	.	.	5	1	.	.	.	.	**6**
Sphoeroides sp.	.	.	1	.	.	.	.	.	.	**1**
Sphyraena barracuda	.	15	1	48	43	.	.	.	.	**107**
Sphyraena borealis	.	.	.	1	.	.	.	.	.	**1**
Sphyrna tiburo	7	130	13	7	15	.	.	.	.	**172**
Sphoeroides nephelus	88	88	37	25	82	3	11	5	2	**341**

Appendix TB20-03. (Continued).

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=145	E=134	E=175	E=104	E=156	E=174	E=147	E=132	E=90	E=1,257
Stephanolepis hispidus	.	3	5	108	21	.	1	1	.	**139**
Strongylura marina	5	27	17	21	10	1	2	2	1	**86**
Strongylura notata	166	163	465	63	184	19	34	55	3	**1,152**
Strongylura spp.	1	.	.	.	1	23	1	1	2	**29**
Strongylura timucu	.	3	2	2	4	1	3	4	.	**19**
Symphurus plagiusa	50	8	73	24	6	32	3	9	1	**206**
Syngnathus floridae	3	42	5	57	28	.	.	.	.	**135**
Syngnathus louisianae	27	26	24	36	26	2	4	5	2	**152**
Syngnathus scovelli	271	147	81	81	87	13	21	10	7	**718**
Syngnathus sp.	.	.	.	.	1	.	.	.	.	**1**
Synodus foetens	50	103	83	50	138	9	15	16	.	**464**
Trachinotus carolinus	.	.	1	.	.	.	.	.	.	**1**
Trachinotus falcatus	.	19	7	4	9	.	.	.	.	**39**
Trinectes maculatus	15	.	11	.	1	674	831	54	277	**1,863**
Tylosurus crocodilus	.	.	.	.	2	.	.	.	.	**2**
Urophycis floridana	.	.	.	.	1	.	.	.	.	**1**
Totals	**32,640**	**18,925**	**52,338**	**67,986**	**171,895**	**350,465**	**79,925**	**66,945**	**46,451**	**887,570**

Appendix TB20-04. Summary of monthly sampling effort by gear during Tampa Bay stratified-random sampling, 2020.

Month	# SRS Sites			Totals
	21.3-m Seine	183-m Seine	6.1-m Trawl	
January	70	20	29	**119**
February	70	20	29	**119**
March	70	20	29	**119**
April	27	0	8	**35**
May	70	20	29	**119**
June	70	20	0	**90**
July	70	20	29	**119**
August	70	20	0	**90**
September	70	20	29	**119**
October	70	20	0	**90**
November	70	20	29	**119**
December	70	20	29	**119**
TOTALS	**797**	**220**	**240**	**1,257**

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Charlotte Harbor

Charlotte Harbor is a drowned river estuary located on the southwestern coast of Florida (Charlotte Harbor National Estuary Program 2000). The bay is connected to the Gulf of Mexico by passes at Boca Grande, San Carlos, and several smaller inlets. Freshwater inflow principally comes from the Peace, Caloosahatchee, and Myakka rivers. Shoreline vegetation consists largely of fringing mangroves, and seagrasses are the dominant bottom vegetation in shallow waters.

The Fisheries-Independent Monitoring (FIM) program has conducted intensive sampling of fish and selected invertebrates in Charlotte Harbor since 1989. The area sampled was divided into four geographically-defined bay zones (A–D) and three riverine zones (K, M, and P; Figure CH20-01). Monthly stratified-random sampling (SRS) was conducted in Zones A–D using 21.3-m bay seines, 183-m haul seines, and 6.1-m bay otter trawls. Monthly SRS was conducted in Zones M and P with 21.3-m river seines and 6.1-m river otter trawls, and Zone K with 21.3-m river seines (starting in 2016). Beginning in 2016, tidal creeks in Zones A, B, and C were sampled monthly using 21.3-m river seines (27 creeks total). All methods were the same as those described in the Methods section of this report. This section summarizes data collected by the FIM program during 2020 in Charlotte Harbor.

Stratified-Random Sampling

A total of 494,578 animals, which included 162 taxa of fishes and 13 taxa of selected invertebrates, were collected from 1,231 Charlotte Harbor SRS samples in 2020 (Table CH20-01, Appendices CH20-01, -02, and -03). *Anchoa mitchilli* (n=183,934) was the most numerous taxon collected, representing 37.2% of the total catch. *Lagodon rhomboides* (n=71,509), *Eucinostomus* spp. (n=58,034), and *Lucania parva* (n=37,129) were the next most abundant taxa collected, representing 33.7% of the total catch. Thirty-one Selected Taxa (n=17,227 animals) composed 3.5% of the total catch. *Farfantepenaeus duorarum* (n=2,971), *Centropomus undecimalis* (n=1,760), and *Sciaenops ocellatus* (n=1,638) were the most abundant Selected Taxa, comprising an 1.3% of the total catch. Collections in 2020 included two species new to the Charlotte Harbor FIM collection: *Lutjanus jocu* (Dog Snapper) and *Scorpaena calcarata* (Smooth-head Scorpionfish).

Monthly sampling efforts were reduced in Charlotte Harbor during 2020 as a result of impacts caused by the COVID-19 pandemic (Appendix CH20-04). Only two sampling trips were completed in April 2020 (n=15 sites) before sampling ceased due to State of Florida and FIM safety protocols. Only 21.3-m seine sampling (n=76 sites) was completed during May 2020. In response to programmatic funding deficits as a result of COVID-19, no SRS trawling was completed during the months of July, September, and November 2020. The sampling effort for all zones and gears was completed as scheduled for the months of January, February, March, June, August, October, and December 2020.

Bay Sampling

21.3-m Bay Seines. A total of 178,621 animals were collected in 377 21.3-m bay seines, representing 36.1% of the overall SRS catch (Table CH20-01). *Anchoa mitchilli* (n=45,522), *Anchoa hepsetus* (n=31,979), and *Eucinostomus* spp. (n=28,581) were the most abundant taxa, accounting for 59.4% of the 21.3-m bay seine catch (Table CH20-02). The taxa most frequently caught in 21.3-m bay seines were *Eucinostomus* spp. (83.3% occurrence), *Eucinostomus gula* (60.5% occurrence), and *Lagodon rhomboides* (49.1% occurrence).

A total of 4,190 animals from 22 Selected Taxa were collected, representing 2.4% of the entire 21.3-m bay seine catch (Table CH20-03). *Farfantepenaeus duorarum* (n=1,503) and *Mugil trichodon* (n=947) were the most abundant Selected Taxa, accounting for 58.5% of the Selected Taxa collected with this gear. The Selected Taxon most frequently caught in 21.3-m bay seines was *Farfantepenaeus duorarum* (50.7% occurrence).

183-m Haul Seines. A total of 74,503 animals were collected in 170 183-m haul seines, representing 15.1% of the total SRS catch (Table CH20-01). *Lagodon rhomboides* (n=56,079) was the most abundant taxon, accounting for 75.3% of the 183-m haul seine catch (Table CH20-04). The taxa most frequently caught in 183-m haul seines were *Lagodon rhomboides* (70.6% occurrence), *Sphoeroides nephelus* (62.4%), and *Centropomus undecimalis* (59.4%).

A total of 5,501 animals from 29 Selected Taxa were collected, representing 7.4% of the entire 183-m haul seine catch (Table CH20-05). *Centropomus undecimalis* (n=1,192) and *Trachinotus falcatus* (n=858) were the most abundant Selected Taxa, accounting for 37.3% of the Selected Taxa collected with this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Centropomus undecimalis* (59.4% occurrence), *Lutjanus griseus* (50.0% occurrence), and *Archosargus probatocephalus* (45.9% occurrence).

6.1-m Bay Otter Trawls. A total of 24,772 animals were collected in 168 6.1-m bay otter trawls, representing 5.0% of the overall SRS catch (Table CH20-01). *Portunus* spp. (n=4,852) and *Lagodon rhomboides* (n=3,014) were the most abundant taxa collected, accounting for 31.8% of the 6.1-m bay otter trawl catch (Table CH20-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Portunus* spp. (76.2% occurrence), *Prionotus scitulus* (75.6% occurrence), and *Farfantepenaeus duorarum* (58.3% occurrence).

A total of 2,480 animals from 13 Selected Taxa were collected, representing 10.0% of the entire 6.1-m bay otter trawl catch (Table CH20-07). *Farfantepenaeus duorarum* (n=644), *Menippe* spp. (n=561), and *Lutjanus synagris* (n=423) were the most abundant Selected Taxa, accounting for 65.6% of the Selected Taxa collected with this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Farfantepenaeus duorarum* (58.3% occurrence) and *Menippe* spp. (41.7% occurrence).

River Sampling

Tidal Creeks

21.3-m River Seines. A total of 115,640 animals were collected in 335 21.3-m river seine samples conducted in tidal creeks, representing 23.4% of the overall SRS catch (Table CH20-01). *Anchoa mitchilli* (n=57,574) and *Eucinostomus* spp. (n=21,059) were the most abundant taxa collected, accounting for 68.0% of the 21.3-m river seine catch (Table CH20-08). The taxa most frequently caught in 21.3-m river seines were *Eucinostomus* spp. (83.9% occurrence) and *Eucinostomus harengulus* (65.4% occurrence).

A total of 2,501 animals from 17 Selected Taxa were collected, representing 2.2% of the entire 21.3-m river seine catch (Table CH20-09). *Sciaenops ocellatus* (n=935), *Farfantepenaeus duorarum* (n=473), and *Centropomus undecimalis* (n=436) were the most abundant Selected Taxa, accounting for 73.7% of the Selected Taxa collected with this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Farfantepenaeus duorarum* (37.0% occurrence) and *Centropomus undecimalis* (28.7% occurrence).

Rivers

21.3-m River Seines. A total of 91,294 animals were collected in 136 21.3-m river seine samples conducted in tidal rivers, representing 18.5% of the overall SRS catch (Table CH20-01). *Anchoa mitchilli* (n=74,299) was the most abundant taxon collected, accounting for 81.4%

of the 21.3-m river seine catch (Table CH20-10). The taxa most frequently caught in 21.3-m river seines were *Eucinostomus* spp. (77.9% occurrence), *Eucinostomus harengulus* (66.9% occurrence), and *Menidia* spp. (56.6% occurrence).

A total of 799 animals from 16 Selected Taxa were collected, representing 0.9% of the entire 21.3-m river seine catch (Table CH20-11). *Callinectes sapidus* (n=166), *Farfantepenaeus duorarum* (n=149), and *Sciaenops ocellatus* (n=113) were the most abundant Selected Taxa, accounting for 53.6% of the Selected Taxa collected with this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Farfantepenaeus duorarum* (32.4% occurrence) and *Callinectes sapidus* (22.1% occurrence).

6.1-m River Otter Trawls. A total of 9,748 animals were collected in 45 6.1-m river otter trawls, representing 2.0% of the overall SRS catch (Table CH20-01). *Anchoa mitchilli* (n=3,989) and *Trinectes maculatus* (n=3,273) were the most abundant taxa collected, accounting for 74.5% of the 6.1-m river otter trawl catch (Table CH20-12). The taxa most frequently caught in 6.1-m river otter trawls were *Callinectes sapidus* (73.3% occurrence), *Trinectes maculatus* (66.7% occurrence), and *Farfantepenaeus duorarum* (62.2% occurrence).

A total of 1,756 animals from eight Selected Taxa were collected, representing 18.0% of the entire 6.1-m river otter trawl catch (Table CH20-13). *Cynoscion arenarius* (n=1,102) was the most abundant Selected Taxon, accounting for 62.8% of the Selected Taxa collected with this gear. The Selected Taxa most frequently caught in the 6.1-m river otter trawls were *Callinectes sapidus* (73.3% occurrence) and *Farfantepenaeus duorarum* (62.2% occurrence).

References

Charlotte Harbor National Estuary Program. 2000. Comprehensive Conservation and Management Plan, Volume 1. 250 pp.

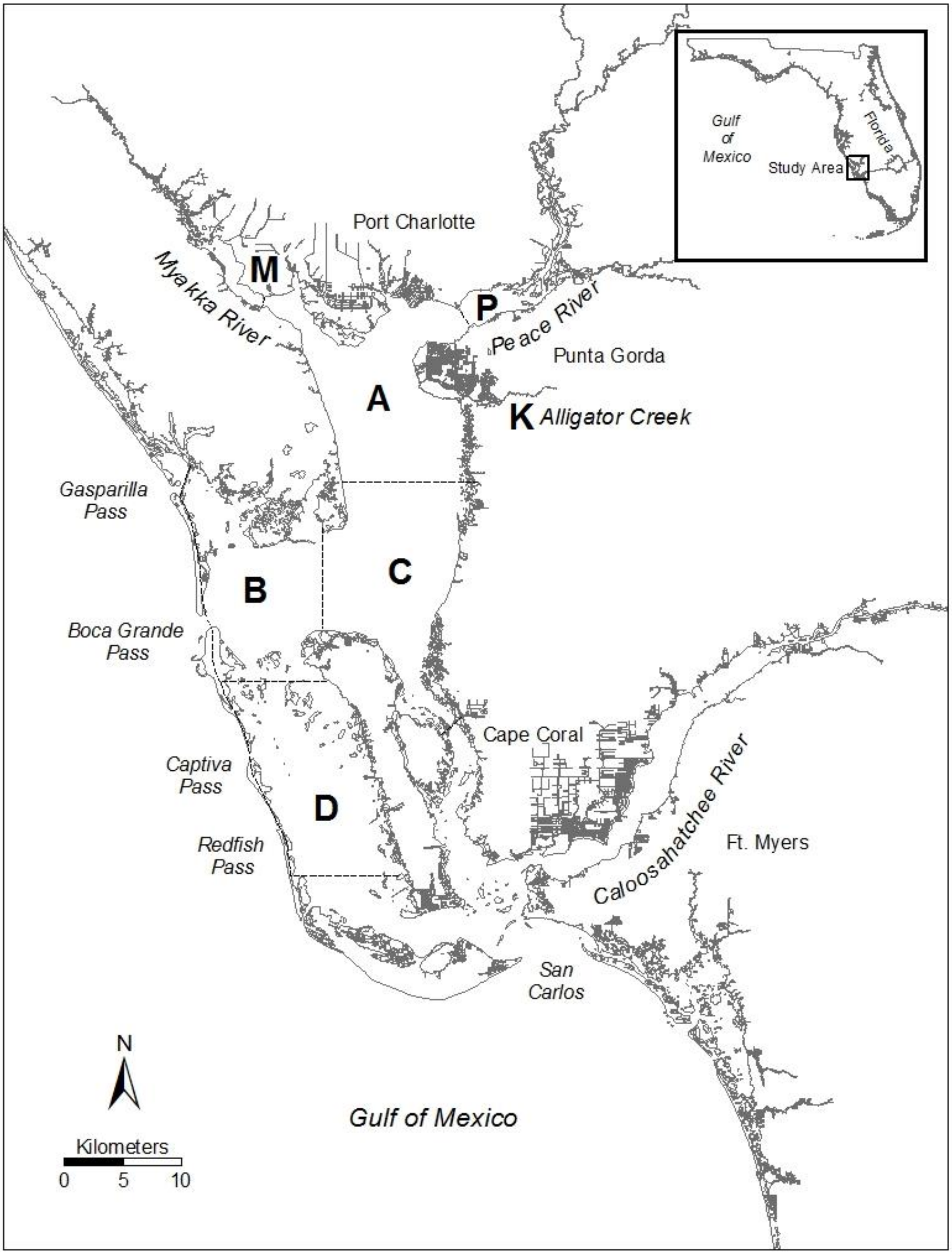

Figure CH20-01. Map of Charlotte Harbor sampling area. Zones are labeled A—D, K, M, and P.

Table CH20-01. Summary of catch and effort data for Charlotte Harbor stratified-random sampling, 2020.

Zone	21.3-m bay seine		21.3-m river seine		183-m haul seine		6.1-m otter trawl		Totals	
	Animals	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**
A	27,062	113	32,181	110	2,355	50	5,981	49	67,579	322
B	38,431	88	49,139	115	30,552	40	5,974	42	124,096	285
C	57,578	88	34,320	110	14,571	40	3,680	42	110,149	280
D	55,550	88	.	.	27,025	40	9,137	35	91,712	163
K	.	.	13,218	44	.	.	.	.	13,218	44
M	.	.	27,120	44	.	.	2,406	21	29,526	65
P	.	.	50,956	48	.	.	7,342	24	58,298	72
Totals	**178,621**	**377**	**206,934**	**471**	**74,503**	**170**	**34,520**	**213**	**494,578**	**1,231**

Table CH20-02. Catch statistics for 10 dominant taxa collected in 377 21.3-m bay seine samples during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	45,522	25.5	17.0	86.25	32.70	736.17	9,782.86	37	0.03	18	60
Anchoa hepsetus	31,979	17.9	2.4	60.59	42.21	1,352.58	15,040.00	40	0.04	28	90
Eucinostomus spp.	28,581	16.0	83.3	54.15	5.86	210.11	1,524.29	27	0.04	10	39
Lucania parva	24,902	13.9	37.1	47.18	17.01	699.94	5,960.00	24	0.03	2	42
Lagodon rhomboides	11,811	6.6	49.1	22.38	2.98	258.70	467.14	43	0.18	12	167
Harengula jaguana	6,637	3.7	15.4	12.57	3.55	548.16	719.29	41	0.14	21	128
Eucinostomus gula	6,493	3.6	60.5	12.30	1.21	190.50	214.29	55	0.13	40	91
Opisthonema oglinum	5,688	3.2	5.0	10.78	10.17	1,833.09	3,834.29	30	0.10	23	96
Menidia spp.	4,194	2.4	17.8	7.95	3.52	858.95	1,240.00	40	0.15	15	79
Eucinostomus harengulus	2,039	1.1	35.3	3.86	0.79	395.16	156.43	58	0.23	40	116
Subtotals	167,846	94.0	.	.	.	.	.	.	.	2	167
Totals	**178,621**	**100.0**	**.**	**338.43**	**62.58**	**359.04**	**16,646.43**	**.**	**.**	**2**	**690**

Table CH20-03. Catch statistics for Selected Taxa collected in 377 21.3-m bay seine samples during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Farfantepenaeus duorarum	1,503	0.8	50.7	2.85	0.36	248.50	80.71	9	0.11	2	28
Mugil trichodon	947	0.5	5.6	1.79	0.89	965.67	300.71	22	0.34	15	86
Sciaenops ocellatus	418	0.2	9.0	0.79	0.27	655.09	80.71	27	2.17	8	454
Cynoscion nebulosus	358	0.2	23.3	0.68	0.15	438.59	50.00	41	1.14	16	271
Lutjanus griseus	251	0.1	20.2	0.48	0.08	323.65	16.43	57	2.83	11	219
Lutjanus synagris	153	0.1	9.0	0.29	0.09	576.60	22.86	46	1.47	20	105
Archosargus probatocephalus	142	0.1	14.9	0.27	0.05	336.08	8.57	51	4.06	15	262
Mugil cephalus	95	0.1	4.0	0.18	0.09	966.24	25.00	48	4.72	20	304
Callinectes sapidus	89	0.1	16.2	0.17	0.02	265.75	3.57	51	5.48	6	171
Leiostomus xanthurus	76	<0.1	3.2	0.14	0.10	1,329.94	36.43	27	1.92	15	79
Centropomus undecimalis	51	<0.1	5.0	0.10	0.03	614.82	7.86	177	26.03	15	690
Menticirrhus americanus	26	<0.1	1.6	0.05	0.02	975.58	6.43	24	1.79	13	44
Cynoscion arenarius	26	<0.1	1.6	0.05	0.03	1,173.34	8.57	25	1.50	17	39
Mugil curema	24	<0.1	2.1	0.05	0.02	866.73	5.71	53	5.74	26	116
Menticirrhus saxatilis	15	<0.1	2.9	0.03	0.01	640.29	2.14	26	2.90	12	46
Trachinotus falcatus	4	<0.1	0.8	0.01	0.01	1,186.37	1.43	51	17.64	13	86
Paralichthys albigutta	4	<0.1	0.3	0.01	0.01	1,941.65	2.86	30	2.40	25	35

Table CH20-03. (Continued).

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Menippe spp.	3	<0.1	0.8	0.01	<0.01	1,118.03	0.71	20	8.76	6	36
Epinephelus itajara	2	<0.1	0.3	<0.01	<0.01	1,941.65	1.43	47	2.00	45	49
Elops saurus	1	<0.1	0.3	<0.01	<0.01	1,941.65	0.71	50	.	50	50
Mycteroperca microlepis	1	<0.1	0.3	<0.01	<0.01	1,941.65	0.71	63	.	63	63
Lutjanus analis	1	<0.1	0.3	<0.01	<0.01	1,941.65	0.71	40	.	40	40
Totals	**4,190**	**2.4**	**.**	**7.94**	**1.07**	**262.76**	**301.43**	**.**	**.**	**2**	**690**

Table CH20-04. Catch statistics for 10 dominant taxa collected in 170 183-m haul seine samples during Charlotte Harbor stratified- random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	**Number**		**% Occur**	**Catch-per-unit-effort (animals/set)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Lagodon rhomboides	56,079	75.3	70.6	329.88	46.53	183.92	4,097.00	101	0.11	33	203
Ariopsis felis	3,034	4.1	45.9	17.85	9.70	708.88	1,611.00	248	0.86	123	393
Eucinostomus gula	2,431	3.3	46.5	14.30	3.71	338.22	371.00	78	0.19	42	126
Orthopristis chrysoptera	1,805	2.4	32.4	10.62	2.14	262.55	201.00	110	0.58	35	196
Centropomus undecimalis	1,192	1.6	59.4	7.01	1.10	205.32	90.00	420	2.91	118	915
Eucinostomus harengulus	922	1.2	17.6	5.42	2.27	545.07	262.00	97	0.33	45	139
Trachinotus falcatus	858	1.2	15.3	5.05	4.27	1,103.89	725.00	288	1.25	64	374
Harengula jaguana	824	1.1	15.3	4.85	2.22	595.85	344.00	100	0.54	54	141
Sphoeroides nephelus	642	0.9	62.4	3.78	0.52	178.22	53.00	130	1.55	39	282
Lutjanus griseus	541	0.7	50.0	3.18	0.50	206.83	43.00	168	1.43	56	280
Subtotals	68,328	91.7	.	.	.	.	.	.	.	35	915
Totals	**74,503**	**100.0**	**.**	**438.25**	**52.95**	**157.52**	**4,320.00**	**.**	**.**	**35**	**920**

Table CH20-05. Catch statistics for Selected Taxa collected in 170 183-m haul seine samples during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Centropomus undecimalis	1,192	1.6	59.4	7.01	1.10	205.32	90.00	420	2.91	118	915
Trachinotus falcatus	858	1.2	15.3	5.05	4.27	1,103.89	725.00	288	1.25	64	374
Lutjanus griseus	541	0.7	50.0	3.18	0.50	206.83	43.00	168	1.43	56	280
Archosargus probatocephalus	538	0.7	45.9	3.16	0.65	268.20	83.00	197	3.62	45	492
Mugil cephalus	368	0.5	35.9	2.16	0.44	262.13	36.00	257	4.26	100	507
Elops saurus	368	0.5	26.5	2.16	0.77	461.81	116.00	277	2.49	148	501
Lutjanus synagris	339	0.5	17.1	1.99	0.64	417.52	67.00	99	0.92	44	205
Mugil trichodon	301	0.4	21.8	1.77	0.75	551.73	108.00	166	1.83	103	279
Callinectes sapidus	184	0.3	34.1	1.08	0.21	252.16	20.00	114	2.67	34	204
Cynoscion nebulosus	179	0.2	29.4	1.05	0.33	404.95	51.00	276	6.83	74	493
Sciaenops ocellatus	165	0.2	33.5	0.97	0.20	274.41	23.00	447	7.22	260	839
Mugil curema	107	0.1	14.7	0.63	0.20	410.40	19.00	212	4.84	113	310
Trachinotus carolinus	94	0.1	3.5	0.55	0.50	1,180.61	85.00	298	2.93	240	396
Mycteroperca microlepis	92	0.1	11.2	0.54	0.17	411.03	18.00	159	4.81	70	359
Leiostomus xanthurus	77	0.1	4.1	0.45	0.26	754.19	40.00	161	3.69	84	195
Paralichthys albigutta	34	0.1	10.6	0.20	0.06	390.72	6.00	186	10.93	82	438
Scomberomorus maculatus	28	<0.1	6.5	0.16	0.05	426.48	5.00	223	13.35	120	402

Table CH20-05. (Continued).

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Pomatomus saltatrix	12	<0.1	2.4	0.07	0.05	993.72	9.00	358	8.91	311	423
Pogonias cromis	7	<0.1	1.8	0.04	0.03	850.19	4.00	425	24.22	328	497
Farfantepenaeus duorarum	4	<0.1	1.2	0.02	0.02	1,028.94	3.00	23	2.14	20	29
Menticirrhus americanus	3	<0.1	1.2	0.02	0.01	969.52	2.00	231	34.04	164	275
Megalops atlanticus	2	<0.1	1.2	0.01	0.01	919.22	1.00	725	29.00	696	754
Cynoscion arenarius	2	<0.1	0.6	0.01	0.01	1,303.84	2.00	154	2.00	152	156
Epinephelus itajara	1	<0.1	0.6	0.01	0.01	1,303.84	1.00	350	.	350	350
Epinephelus morio	1	<0.1	0.6	0.01	0.01	1,303.84	1.00	143	.	143	143
Rachycentron canadum	1	<0.1	0.6	0.01	0.01	1,303.84	1.00	339	.	339	339
Lutjanus analis	1	<0.1	0.6	0.01	0.01	1,303.84	1.00	182	.	182	182
Lutjanus jocu	1	<0.1	0.6	0.01	0.01	1,303.84	1.00	89	.	89	89
Menticirrhus littoralis	1	<0.1	0.6	0.01	0.01	1,303.84	1.00	211	.	211	211
Totals	**5,501**	**7.4**	**.**	**32.36**	**4.96**	**199.97**	**732.00**	**.**	**.**	**20**	**915**

Table CH20-06. Catch statistics for 10 dominant taxa collected in 168 bay 6.1-m otter trawl samples during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Portunus spp.	4,852	19.6	76.2	1.99	0.29	185.54	24.50	44	0.16	9	84
Lagodon rhomboides	3,014	12.2	34.5	1.25	0.31	319.39	33.12	79	0.51	12	144
Anchoa mitchilli	2,550	10.3	10.1	1.02	0.43	540.66	42.63	35	0.12	22	60
Eucinostomus spp.	1,975	8.0	28.0	0.80	0.22	363.17	22.26	28	0.15	11	39
Anchoa hepsetus	1,635	6.6	6.0	0.66	0.59	1,171.82	99.57	32	0.08	23	43
Eucinostomus gula	1,414	5.7	32.7	0.58	0.14	322.58	14.77	65	0.44	40	115
Prionotus scitulus	1,209	4.9	75.6	0.50	0.06	163.64	5.33	81	0.99	15	175
Orthopristis chrysoptera	1,105	4.5	29.2	0.45	0.11	331.19	9.51	84	1.05	13	221
Farfantepenaeus duorarum	644	2.6	58.3	0.26	0.04	194.98	3.10	16	0.22	4	35
Chloroscombrus chrysurus	612	2.5	12.5	0.25	0.12	628.48	14.23	48	0.44	11	77
Subtotals	19,010	76.7	.	.	.	.	.	.	.	4	221
Totals	**24,772**	**100.0**	**.**	**10.09**	**1.22**	**156.36**	**145.04**	**.**	**.**	**3**	**823**

Table CH20-07. Catch statistics for Selected Taxa collected in 168 bay 6.1-m otter trawl samples during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Farfantepenaeus duorarum	644	2.6	58.3	0.26	0.04	194.98	3.10	16	0.22	4	35
Menippe spp.	561	2.3	41.7	0.23	0.05	296.89	5.87	20	0.54	3	83
Lutjanus synagris	423	1.7	26.8	0.17	0.05	364.73	6.61	74	1.47	19	126
Callinectes sapidus	391	1.6	36.3	0.15	0.03	250.81	2.36	78	2.01	12	169
Menticirrhus americanus	243	1.0	12.5	0.10	0.04	593.38	5.46	78	3.69	7	216
Cynoscion arenarius	160	0.7	9.5	0.06	0.03	599.39	3.58	28	2.36	8	209
Lutjanus griseus	21	0.1	6.0	0.01	<0.01	456.49	0.34	119	10.15	31	205
Leiostomus xanthurus	13	0.1	1.2	0.01	<0.01	1,200.00	0.81	106	8.10	18	136
Cynoscion nebulosus	10	<0.1	3.0	<0.01	<0.01	695.73	0.27	70	33.35	15	336
Paralichthys albigutta	8	<0.1	4.2	<0.01	<0.01	504.00	0.13	176	23.78	98	281
Archosargus probatocephalus	4	<0.1	1.8	<0.01	<0.01	789.75	0.13	48	15.36	18	90
Epinephelus morio	1	<0.1	0.6	<0.01	<0.01	1,296.15	0.07	141	.	141	141
Menticirrhus saxatilis	1	<0.1	0.6	<0.01	<0.01	1,296.15	0.07	219	.	219	219
Totals	**2,480**	**10.0**	**.**	**1.00**	**0.12**	**154.22**	**8.84**	**.**	**.**	**3**	**336**

Table CH20-08. Catch statistics for 10 dominant taxa collected in 335 21.3-m river seine samples conducted in tidal creeks during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Anchoa mitchilli	57,574	49.8	20.9	252.74	64.12	464.33	11,152.94	32	0.03	16	60
Eucinostomus spp.	21,059	18.2	83.9	92.45	16.73	331.25	4,845.59	24	0.05	10	42
Lucania parva	12,195	10.6	45.7	53.53	13.93	476.11	4,075.00	23	0.04	11	43
Menidia spp.	6,792	5.9	44.2	29.82	11.18	686.08	2,676.47	37	0.11	12	86
Eucinostomus harengulus	4,225	3.7	65.4	18.55	2.11	208.09	286.76	57	0.19	40	101
Anchoa hepsetus	2,432	2.1	0.3	10.68	10.68	1,830.30	3,576.47	40	0.05	36	45
Harengula jaguana	2,119	1.8	7.2	9.30	4.28	841.70	1,282.35	38	0.17	22	83
Eucinostomus gula	1,429	1.2	26.0	6.27	1.36	396.37	307.35	52	0.22	40	83
Eugerres plumieri	950	0.8	31.9	4.17	0.64	280.74	107.35	50	1.41	12	254
Sciaenops ocellatus	935	0.8	17.9	4.10	1.47	655.07	367.65	28	0.89	11	572
Subtotals	109,710	94.9	.	.	.	.	.	.	.	10	572
Totals	**115,640**	**100.0**	**.**	**507.64**	**76.25**	**274.93**	**12,376.47**	**.**	**.**	**3**	**603**

Table CH20-09. Catch statistics for Selected taxa collected in 335 21.3-m river seine samples conducted in tidal creeks during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Sciaenops ocellatus	935	0.8	17.9	4.10	1.47	655.07	367.65	28	0.89	11	572
Farfantepenaeus duorarum	473	0.4	37.0	2.08	0.29	254.28	48.53	8	0.16	3	24
Centropomus undecimalis	436	0.4	28.7	1.91	0.30	286.21	54.41	131	5.44	11	603
Leiostomus xanthurus	149	0.1	5.1	0.65	0.26	718.68	66.18	30	0.96	12	76
Callinectes sapidus	114	0.1	17.3	0.50	0.08	288.18	10.29	30	2.73	7	166
Mugil cephalus	84	0.1	6.6	0.37	0.17	826.63	51.47	98	13.31	18	457
Mugil curema	79	0.1	0.9	0.35	0.31	1,649.92	104.41	29	1.26	16	86
Lutjanus griseus	60	0.1	8.7	0.26	0.07	482.33	14.71	97	8.24	22	271
Mugil trichodon	55	0.1	1.8	0.24	0.20	1,538.14	67.65	26	3.33	15	151
Archosargus probatocephalus	52	<0.1	7.2	0.23	0.07	529.85	16.18	68	6.86	16	257
Cynoscion nebulosus	33	<0.1	6.3	0.14	0.04	463.90	7.35	53	7.12	20	245
Elops saurus	16	<0.1	2.1	0.07	0.04	1,082.23	13.24	45	3.00	25	67
Cynoscion arenarius	8	<0.1	1.2	0.04	0.02	1,208.30	7.35	30	1.64	20	34
Megalops atlanticus	2	<0.1	0.6	0.01	0.01	1,292.28	1.47	259	236.50	22	495
Paralichthys albigutta	2	<0.1	0.6	0.01	0.01	1,292.28	1.47	43	2.00	41	45
Scomberomorus maculatus	2	<0.1	0.3	0.01	0.01	1,830.30	2.94	67	1.00	66	68
Lutjanus synagris	1	<0.1	0.3	<0.01	<0.01	1,830.30	1.47	23	.	23	23
Totals	**2,501**	**2.2**	**.**	**10.98**	**1.64**	**272.73**	**369.12**	**.**	**.**	**3**	**603**

Table CH20-10. Catch statistics for 10 dominant taxa collected in 136 21.3-m river seine samples conducted in tidal rivers during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Anchoa mitchilli	74,299	81.4	39.7	803.41	515.53	748.32	63,529.41	34	0.02	12	58
Eucinostomus spp.	6,274	6.9	77.9	67.84	18.35	315.38	2,250.00	26	0.08	11	39
Harengula jaguana	2,492	2.7	6.6	26.95	20.72	896.54	2,776.47	29	0.17	21	57
Menidia spp.	1,944	2.1	56.6	21.02	4.02	222.99	314.71	38	0.14	20	90
Opisthonema oglinum	1,931	2.1	6.6	20.88	12.42	693.57	1,411.76	36	0.15	23	57
Eucinostomus harengulus	1,399	1.5	66.9	15.13	1.95	150.40	114.71	57	0.34	40	97
Anchoa hepsetus	420	0.5	2.9	4.54	4.50	1,155.02	611.76	40	0.15	18	57
Membras martinica	293	0.3	4.4	3.17	2.27	835.34	298.53	42	0.34	27	52
Eucinostomus gula	236	0.3	27.9	2.55	0.70	321.52	60.29	48	0.43	40	76
Callinectes sapidus	166	0.2	22.1	1.79	0.47	304.87	32.35	27	2.09	7	154
Subtotals	89,454	98.0	.	.	.	.	.	.	.	7	154
Totals	**91,294**	**100.0**	**.**	**987.18**	**519.42**	**613.61**	**63,541.18**	**.**	**.**	**3**	**600**

Table CH20-11. Catch statistics for Selected Taxa collected in 136 21.3-m river seine samples conducted in tidal rivers during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Callinectes sapidus	166	0.2	22.1	1.79	0.47	304.87	32.35	27	2.09	7	154
Farfantepenaeus duorarum	149	0.2	32.4	1.61	0.30	214.53	20.59	7	0.27	3	18
Sciaenops ocellatus	113	0.1	10.3	1.22	0.46	443.74	42.65	25	0.91	13	61
Mugil cephalus	101	0.1	7.4	1.09	0.51	546.53	45.59	48	2.28	20	149
Centropomus undecimalis	81	0.1	17.6	0.88	0.29	383.08	26.47	100	12.78	17	435
Cynoscion arenarius	56	0.1	7.4	0.61	0.26	495.92	22.06	28	1.19	15	57
Mugil curema	32	<0.1	2.9	0.35	0.23	758.92	27.94	52	1.08	38	66
Lutjanus griseus	26	<0.1	12.5	0.28	0.07	295.31	4.41	127	11.37	33	238
Leiostomus xanthurus	18	<0.1	2.2	0.19	0.15	923.34	20.59	38	2.30	15	57
Archosargus probatocephalus	16	<0.1	7.4	0.17	0.07	496.80	8.82	102	18.36	17	249
Cynoscion nebulosus	13	<0.1	4.4	0.14	0.08	672.33	10.29	33	2.72	15	50
Mugil trichodon	12	<0.1	2.2	0.13	0.09	786.05	10.29	45	8.82	17	140
Menticirrhus americanus	8	<0.1	3.7	0.09	0.05	646.59	5.88	42	3.62	26	53
Elops saurus	5	<0.1	2.9	0.05	0.03	611.18	2.94	51	10.58	17	77
Menticirrhus saxatilis	2	<0.1	0.7	0.02	0.02	1,166.19	2.94	57	7.50	49	64
Pogonias cromis	1	<0.1	0.7	0.01	0.01	1,166.19	1.47	600	.	600	600
Totals	**799**	**0.9**	**.**	**8.64**	**1.20**	**161.52**	**69.12**	**.**	**.**	**3**	**600**

Table CH20-12. Catch statistics for 10 dominant taxa collected in 45 river 6.1-m otter trawl samples during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	3,989	40.9	60.0	11.83	3.93	222.65	126.82	30	0.16	17	60
Trinectes maculatus	3,273	33.6	66.7	9.81	5.78	395.12	216.54	35	0.19	20	153
Cynoscion arenarius	1,102	11.3	44.4	3.30	1.74	352.76	66.24	43	0.44	11	224
Menticirrhus americanus	318	3.3	48.9	0.95	0.53	375.24	23.75	59	1.69	10	236
Farfantepenaeus duorarum	198	2.0	62.2	0.59	0.20	228.19	7.96	12	0.31	4	26
Eucinostomus spp.	145	1.5	20.0	0.43	0.33	514.81	14.84	30	0.43	11	39
Ariopsis felis	139	1.4	33.3	0.42	0.32	511.27	14.30	86	5.49	51	323
Callinectes sapidus	123	1.3	73.3	0.37	0.08	140.15	2.29	96	4.36	11	188
Symphurus plagiusa	106	1.1	46.7	0.32	0.12	244.57	4.72	56	2.20	24	126
Bairdiella chrysoura	57	0.6	17.8	0.17	0.10	383.97	4.05	49	2.47	17	121
Subtotals	9,450	96.9	.	.	.	.	.	.	.	4	323
Totals	**9,748**	**100.0**	**.**	**29.09**	**8.25**	**190.24**	**264.57**	**.**	**.**	**4**	**830**

Table CH20-13. Catch statistics for Selected Taxa collected in 45 river 6.1-m otter trawl samples during Charlotte Harbor stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Cynoscion arenarius	1,102	11.3	44.4	3.30	1.74	352.76	66.24	43	0.44	11	224
Menticirrhus americanus	318	3.3	48.9	0.95	0.53	375.24	23.75	59	1.69	10	236
Farfantepenaeus duorarum	198	2.0	62.2	0.59	0.20	228.19	7.96	12	0.31	4	26
Callinectes sapidus	123	1.3	73.3	0.37	0.08	140.15	2.29	96	4.36	11	188
Sciaenops ocellatus	7	0.1	8.9	0.02	0.01	399.13	0.49	15	1.26	11	21
Elops saurus	4	<0.1	2.2	0.01	0.01	670.82	0.54	39	0.48	38	40
Cynoscion nebulosus	3	<0.1	4.4	0.01	0.01	495.43	0.27	90	22.61	53	131
Lutjanus griseus	1	<0.1	2.2	<0.01	<0.01	670.82	0.13	209	.	209	209
Totals	**1,756**	**18.0**	**.**	**5.26**	**1.94**	**248.07**	**69.21**	**.**	**.**	**4**	**236**

Appendix CH20-01. Monthly summary of species collected during Charlotte Harbor stratified-random sampling, 2020. Effort, or total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=123	E=123	E=123	E=15	E=76	E=123	E=93	E=123	E=93	E=123	E=93	E=123	E=1,231
Acanthostracion quadricornis	20	16	12	.	.	19	4	19	1	28	4	26	**149**
Achiridae spp.	.	.	.	.	.	.	.	.	.	.	.	2	**2**
Achirus lineatus	14	41	17	4	5	73	17	27	14	31	32	27	**302**
Adinia xenica	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Albula spp.	.	4	2	2	.	2	2	.	.	.	1	.	**13**
Aluterus schoepfii	.	.	.	.	.	31	.	2	.	.	1	1	**35**
Anarchopterus criniger	.	.	.	.	.	2	.	.	.	.	.	1	**3**
Anchoa hepsetus	7,556	4,225	23,497	416	1	12	2	582	.	175	.	.	**36,466**
Anchoa mitchilli	7,197	6,998	17,708	5,500	71,246	3,725	24,608	20,629	4,906	3,735	8,587	9,095	**183,934**
Anchoa spp.	.	.	.	.	.	.	.	.	.	5	.	.	**5**
Ancylopsetta quadrocellata	.	2	3	.	.	.	.	3	.	2	.	.	**10**
Archosargus probatocephalus	45	18	49	1	59	63	41	37	46	98	130	165	**752**
Argopecten gibbus	.	2	.	.	.	2	.	29	.	67	.	34	**134**
Ariopsis felis	62	436	141	.	.	100	120	289	128	149	228	1,641	**3,294**
Astroscopus y-graecum	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Bagre marinus	.	1	.	.	.	8	1	18	22	2	1	3	**56**
Bairdiella chrysoura	.	3	1	.	127	308	85	118	199	25	53	70	**989**
Bathygobius soporator	32	43	47	.	1	5	4	1	8	.	35	27	**203**
Brevoortia spp.	3	7	255	.	10	.	5	.	.	.	2	1	**283**
Calamus penna	6	4	.	.	1	9	3	1	1	1	21	.	**47**
Calamus spp.	4	1	.	.	.	.	.	2	.	.	.	.	**7**
Callinectes ornatus	6	3	3	.	7	39	2	7	.	1	.	.	**68**

Appendix CH20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=123	E=123	E=123	E=15	E=76	E=123	E=93	E=123	E=93	E=123	E=93	E=123	E=1,231
Callinectes sapidus	190	114	112	12	16	67	61	169	33	165	68	60	**1,067**
Callinectes similis	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Caranx hippos	2	7	3	.	1	57	11	7	7	9	27	14	**145**
Carcharhinus leucas	.	.	1	.	.	1	1	1	2	.	.	.	**6**
Carcharhinus limbatus	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Centropomus undecimalis	134	120	114	1	24	86	144	97	134	325	218	363	**1,760**
Centropristis striata	.	.	1	.	.	2	.	6	5	2	2	3	**21**
Chaetodipterus faber	.	1	12	.	.	47	12	91	16	15	18	7	**219**
Chasmodes saburrae	.	2	2	.	3	13	4	3	9	1	3	3	**43**
Chilomycterus schoepfii	92	59	102	.	5	119	61	111	40	66	51	98	**804**
Chloroscombrus chrysurus	104	1	4	.	5	257	.	269	8	23	.	1	**672**
Cichlasoma urophthalmus	.	1	.	.	.	.	.	1	2	4	3	.	**11**
Citharichthys macrops	18	36	17	.	.	7	.	8	.	6	1	5	**98**
Ctenogobius boleosoma	.	.	.	.	.	.	.	1	.	.	19	2	**22**
Ctenogobius smaragdus	.	.	.	.	3	2	11	3	3	8	7	6	**43**
Cynoscion arenarius	5	5	2	.	.	978	25	175	4	154	3	3	**1,354**
Cynoscion nebulosus	8	60	3	.	38	58	128	61	80	80	48	32	**596**
Cyprinodon variegatus	2	120	289	122	33	1	19	2	14	.	2	27	**631**
Dasyatis americana	1	2	2	.	.	2	2	.	2	6	4	1	**22**
Dasyatis sabina	6	12	4	1	1	22	16	8	13	11	5	7	**106**
Dasyatis say	2	.	1	.	.	1	.	3	.	3	4	2	**16**
Diapterus auratus	116	27	12	.	9	2	11	34	12	16	485	372	**1,096**
Diodon holocanthus	.	.	.	.	.	.	.	1	.	.	.	.	**1**

Appendix CH20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=123	E=123	E=123	E=15	E=76	E=123	E=93	E=123	E=93	E=123	E=93	E=123	E=1,231
Diplectrum formosum	11	22	20	.	.	5	.	8	1	5	.	15	**87**
Diplodus holbrookii	.	.	.	.	.	3	.	1	3	.	3	.	**10**
Dormitator maculatus	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Echeneis neucratoides	.	.	.	.	.	1	.	.	.	.	.	1	**2**
Elops saurus	13	48	3	.	15	17	20	23	43	70	141	1	**394**
Epinephelus itajara	.	.	.	.	.	.	1	.	.	.	.	2	**3**
Epinephelus morio	.	.	.	.	.	.	.	.	1	1	.	.	**2**
Etropus crossotus	.	.	3	.	.	1	.	14	.	10	.	10	**38**
Eucinostomus gula	759	776	1,782	146	555	878	526	1,690	1,681	1,579	833	852	**12,057**
Eucinostomus harengulus	1,295	893	1,524	154	456	622	818	945	442	730	473	327	**8,679**
Eucinostomus spp.	3,387	2,278	1,927	26	4,026	8,644	5,813	4,253	5,090	8,845	5,773	7,972	**58,034**
Eugerres plumieri	31	50	8	.	205	127	465	189	50	151	68	104	**1,448**
Farfantepenaeus duorarum	264	222	112	13	114	513	405	200	362	329	137	300	**2,971**
Fistularia tabacaria	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Floridichthys carpio	.	22	6	1	39	148	212	51	62	130	22	33	**726**
Fundulus grandis	10	13	2	4	1	3	26	2	7	.	3	48	**119**
Fundulus similis	.	.	.	6	3	19	.	.	.	18	.	5	**51**
Gambusia holbrooki	48	80	.	.	.	3	2	1	.	2	33	9	**178**
Gerreidae spp.	.	.	.	.	.	.	.	.	16	.	1	.	**17**
Gerres cinereus	.	.	.	.	.	.	2	12	.	.	.	.	**14**
Ginglymostoma cirratum	.	.	.	.	.	.	1	.	1	.	1	.	**3**
Gobiesox strumosus	6	1	2	1	6	2	.	.	.	.	2	2	**22**
Gobionellus oceanicus	.	.	.	.	.	.	.	.	.	.	1	.	**1**

Appendix CH20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=123	E=123	E=123	E=15	E=76	E=123	E=93	E=123	E=93	E=123	E=93	E=123	E=1,231
Gobiosoma bosc	27	10	5	.	6	3	.	1	.	.	3	11	**66**
Gobiosoma longipala	23	33	12	.	.	5	.	7	.	5	.	8	**93**
Gobiosoma robustum	58	116	88	3	48	52	11	16	13	12	17	18	**452**
Gobiosoma spp.	18	18	.	.	8	40	1	22	8	17	20	19	**171**
Gymnura micrura	1	1	.	.	.	.	.	.	.	.	.	.	**2**
Haemulon plumierii	.	1	.	.	.	11	2	35	9	126	15	1	**200**
Harengula jaguana	4	28	43	.	48	2,592	4,733	2,956	764	462	54	396	**12,080**
Hemichromis letourneuxi	.	.	.	.	.	.	.	.	6	.	2	2	**10**
Hemiramphidae spp.	.	.	.	.	.	.	.	3	.	.	.	.	**3**
Hemiramphus brasiliensis	.	.	.	.	.	.	.	.	.	.	6	.	**6**
Hippocampus erectus	31	22	21	1	1	19	.	18	.	17	3	18	**151**
Hippocampus zosterae	.	1	.	.	4	.	4	3	1	5	5	4	**27**
Hypleurochilus caudovittatus	.	.	.	.	.	.	.	1	.	.	.	2	**3**
Hypoatherina harringtonensis	.	.	.	.	.	.	.	.	.	.	.	7	**7**
Hyporhamphus meeki	.	.	1	.	.	.	11	.	2	.	1	2	**17**
Hyporhamphus spp.	.	.	.	1	.	1	.	.	.	.	.	.	**2**
Hyporhamphus unifasciatus	.	.	.	.	.	.	.	.	.	3	.	.	**3**
Hypsoblennius hentz	1	3	3	.	.	2	1	9	.	.	.	1	**20**
Lagodon rhomboides	2,755	4,365	5,049	144	2,511	7,143	9,971	8,082	6,813	6,800	11,114	6,762	**71,509**
Leiostomus xanthurus	5	114	106	12	1	28	51	.	.	.	16	.	**333**
Lepisosteus osseus	1	10	.	.	.	1	.	1	.	.	.	1	**14**
Lepisosteus platyrhincus	.	.	.	.	.	.	.	.	.	2	.	1	**3**
Lepomis macrochirus	.	.	.	.	.	.	.	.	2	.	.	.	**2**

Appendix CH20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=123	**E=123**	**E=123**	**E=15**	**E=76**	**E=123**	**E=93**	**E=123**	**E=93**	**E=123**	**E=93**	**E=123**	**E=1,231**
Limulus polyphemus	.	1	2	.	.	.	1	.	5	3	.	.	**12**
Lophogobius cyprinoides	4	3	1	.	2	3	1	16	.	.	.	.	**30**
Lucania parva	1,077	957	1,011	306	4,119	3,740	3,911	4,020	2,157	5,706	499	9,626	**37,129**
Lupinoblennius nicholsi	2	.	.	.	.	.	.	.	.	.	.	.	**2**
Lutjanus analis	.	.	.	.	.	.	.	.	.	.	1	1	**2**
Lutjanus griseus	10	26	14	2	2	79	102	133	146	161	144	81	**900**
Lutjanus jocu	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Lutjanus synagris	.	.	8	.	.	20	24	209	211	257	129	58	**916**
Megalops atlanticus	.	.	.	.	.	2	1	.	.	1	.	.	**4**
Membras martinica	.	.	.	.	300	4	40	25	.	1	10	.	**380**
Menidia spp.	295	333	418	215	6,490	1,647	1,343	564	490	373	211	551	**12,930**
Menippe spp.	17	29	24	.	.	27	.	134	.	174	1	158	**564**
Menticirrhus americanus	101	5	3	.	2	67	5	265	1	116	15	18	**598**
Menticirrhus littoralis	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Menticirrhus saxatilis	5	1	1	2	3	1	.	.	.	1	1	3	**18**
Menticirrhus sp.	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Microgobius gulosus	53	107	59	37	357	283	186	217	121	77	242	149	**1,888**
Microgobius thalassinus	1	.	1	.	.	5	.	.	.	1	.	.	**8**
Monacanthus ciliatus	.	.	.	.	.	1	.	3	2	4	2	5	**17**
Mugil cephalus	81	206	40	28	54	15	43	22	17	11	38	93	**648**
Mugil curema	32	27	1	4	104	16	10	8	7	1	3	29	**242**
Mugil sp.	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Mugil trichodon	25	121	9	7	58	11	89	9	3	139	524	320	**1,315**

Appendix CH20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=123	E=123	E=123	E=15	E=76	E=123	E=93	E=123	E=93	E=123	E=93	E=123	E=1,231
Mullus auratus	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Mycteroperca microlepis	.	.	.	.	1	19	11	31	20	4	7	.	**93**
Negaprion brevirostris	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Nicholsina usta	1	1	49	.	1	212	23	19	57	5	78	4	**450**
Ocyurus chrysurus	.	.	.	.	.	3	.	9	20	4	5	.	**41**
Ogcocephalus cubifrons	1	5	1	.	.	1	.	1	.	5	2	7	**23**
Oligoplites saurus	.	.	.	.	50	151	159	167	55	23	4	.	**609**
Ophichthus gomesii	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Opisthonema oglinum	4	1	7	.	597	38	1,661	5,840	210	80	.	1	**8,439**
Opistognathus robinsi	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Opsanus beta	7	8	7	2	11	27	4	35	17	19	19	13	**169**
Oreochromis aureus	.	.	.	.	.	1	.	.	.	.	.	3	**4**
Oreochromis/Sarotherodon spp.	.	.	.	.	.	1	1	.	4	.	.	.	**6**
Orthopristis chrysoptera	136	384	317	4	169	898	390	464	516	216	283	105	**3,882**
Paraclinus marmoratus	.	.	.	.	.	1	1	.	3	.	1	.	**6**
Paralichthys albigutta	1	.	4	2	.	8	1	10	6	13	3	.	**48**
Peprilus paru	.	.	.	.	.	2	.	.	.	.	.	.	**2**
Poecilia latipinna	12	57	.	2	20	16	30	1	35	25	31	37	**266**
Pogonias cromis	.	.	.	.	.	2	4	1	.	1	.	.	**8**
Pomatomus saltatrix	9	.	.	.	.	.	1	.	.	1	1	.	**12**
Portunus spp.	989	1,030	651	.	.	1,116	.	248	.	443	.	400	**4,877**
Prionotus rubio	1	1	5	.	.	.	.	.	.	.	.	1	**8**
Prionotus scitulus	147	195	70	1	.	190	3	318	.	246	.	90	**1,260**

Appendix CH20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=123	**E=123**	**E=123**	**E=15**	**E=76**	**E=123**	**E=93**	**E=123**	**E=93**	**E=123**	**E=93**	**E=123**	**E=1,231**
Prionotus tribulus	39	11	11	.	.	4	.	4	.	56	14	55	**194**
Rachycentron canadum	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Rhinoptera bonasus	.	10	6	.	.	.	2	.	.	.	.	.	**18**
Rimapenaeus constrictus	7	32	8	.	.	.	.	.	.	2	.	3	**52**
Rimapenaeus spp.	48	35	.	.	.	24	.	10	.	27	.	13	**157**
Sardinella aurita	.	.	.	.	.	.	.	1	4	.	.	.	**5**
Sarotherodon melanotheron	.	.	.	.	.	.	7	.	1	1	.	.	**9**
Sciaenops ocellatus	68	27	13	.	.	5	17	24	15	136	397	936	**1,638**
Scomberomorus maculatus	.	.	.	.	.	.	13	4	5	8	.	.	**30**
Scorpaena brasiliensis	9	13	8	.	.	1	.	4	.	15	.	3	**53**
Scorpaena calcarata	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Selene vomer	.	.	.	.	.	1	2	.	11	1	3	.	**18**
Serraniculus pumilio	7	7	3	.	.	.	.	9	.	22	.	2	**50**
Serranus subligarius	1	.	.	.	.	5	.	2	.	.	.	.	**8**
Sicyonia laevigata	4	9	5	.	.	.	.	6	.	.	.	.	**24**
Sicyonia sp.	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Sicyonia typica	1	10	1	.	.	.	.	.	.	.	.	.	**12**
Sphoeroides nephelus	114	69	91	3	73	150	110	89	112	78	72	101	**1,062**
Sphoeroides spengleri	.	.	.	.	.	.	1	3	.	1	.	1	**6**
Sphyraena barracuda	1	1	1	.	.	2	.	.	2	5	5	6	**23**
Sphyraena borealis	.	.	.	.	1	1	.	.	.	.	.	.	**2**
Sphyrna tiburo	.	1	1	.	.	1	1	1	.	4	5	1	**15**
Stephanolepis hispidus	96	76	27	.	1	439	1	72	30	23	10	29	**804**

Appendix CH20-01. (Continued).

Species	Month												Totals
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	
	E=123	**E=123**	**E=123**	**E=15**	**E=76**	**E=123**	**E=93**	**E=123**	**E=93**	**E=123**	**E=93**	**E=123**	**E=1,231**
Strongylura marina	34	41	3	.	5	7	2	4	4	3	9	7	**119**
Strongylura notata	2	1	7	6	153	108	71	84	76	65	10	23	**606**
Strongylura spp.	.	.	1	1	1	.	.	.	.	2	1	.	**6**
Strongylura timucu	3	1	2	1	5	7	2	5	1	4	4	3	**38**
Symphurus plagiusa	19	13	29	.	.	40	8	95	13	64	9	40	**330**
Syngnathus floridae	3	3	.	.	3	45	5	8	3	7	3	9	**89**
Syngnathus louisianae	32	38	24	.	11	42	3	42	3	48	6	47	**296**
Syngnathus scovelli	23	59	46	4	57	88	32	10	2	16	2	15	**354**
Syngnathus springeri	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Synodus foetens	47	93	77	6	34	102	23	39	15	52	18	94	**600**
Trachinotus carolinus	85	1	.	.	.	.	.	1	.	7	.	.	**94**
Trachinotus falcatus	3	5	4	.	1	51	729	14	44	6	5	.	**862**
Trinectes maculatus	76	53	23	.	1	2,713	3	529	13	123	18	62	**3,614**
Tylosurus crocodilus	.	.	.	.	.	.	1	13	28	.	.	.	**42**
Urophycis floridana	.	7	.	.	.	.	.	.	.	.	.	.	**7**
Totals	**28,109**	**25,616**	**56,231**	**7,204**	**92,328**	**39,448**	**57,554**	**55,203**	**25,572**	**33,421**	**31,656**	**42,236**	**494,578**

Appendix CH20-02. Summary by gear and stratum of species collected during Charlotte Harbor stratified-random sampling, 2020. Sampling with 21.3-m bay seine was stratified by the presence or absence of a shoreline ('Shore' or offshore) within 5-m. Offshore sets were further stratified by the presence or absence of bottom vegetation ('Veg' or 'Unveg'). Sampling with 21.3-m river seine and 183-m haul seine was stratified by the presence or absence of overhanging vegetation ('Over' or 'Nonover'). Sampling with 6.1-m otter trawl was not stratified. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=131	E=57	E=189	E=393	E=78	E=130	E=40	E=213	E=1,231
Acanthostracion quadricornis	6	1	.	.	.	8	30	104	**149**
Achiridae spp.	.	.	.	2	.	.	.	.	**2**
Achirus lineatus	40	8	51	82	9	.	.	112	**302**
Adinia xenica	.	.	.	1	.	.	.	.	**1**
Albula spp.	.	1	4	1	.	.	2	5	**13**
Aluterus schoepfii	.	.	.	.	.	17	3	15	**35**
Anarchopterus criniger	.	.	.	.	.	.	.	3	**3**
Anchoa hepsetus	10,904	.	21,075	2,435	417	.	.	1,635	**36,466**
Anchoa mitchilli	2,858	744	41,920	123,560	8,313	.	.	6,539	**183,934**
Anchoa spp.	.	.	.	.	.	.	.	5	**5**
Ancylopsetta quadrocellata	.	.	.	.	.	.	.	10	**10**
Archosargus probatocephalus	34	.	108	55	13	442	96	4	**752**
Argopecten gibbus	.	.	.	.	.	.	.	134	**134**
Ariopsis felis	10	.	7	12	2	2,947	87	229	**3,294**
Astroscopus y-graecum	.	.	.	.	.	.	.	1	**1**
Bagre marinus	.	.	.	.	.	32	.	24	**56**
Bairdiella chrysoura	465	10	62	10	.	165	149	128	**989**
Bathygobius soporator	1	3	25	73	97	.	.	4	**203**
Brevoortia spp.	.	16	181	64	16	2	4	.	**283**
Calamus penna	.	1	1	.	.	17	25	3	**47**
Calamus spp.	1	.	.	.	.	.	2	4	**7**
Callinectes ornatus	1	6	8	2	.	.	2	49	**68**
Callinectes sapidus	24	9	56	151	129	127	57	514	**1,067**
Callinectes similis	.	.	.	.	.	.	.	1	**1**
Caranx hippos	.	.	.	1	1	102	41	.	**145**
Carcharhinus leucas	.	.	.	.	1	5	.	.	**6**
Carcharhinus limbatus	.	.	.	.	.	1	.	.	**1**

Appendix CH20-02. (Continued).

Species	21.3-m bay seine Veg	21.3-m bay seine Unveg	21.3-m bay seine Shore	21.3-m river seine Over	21.3-m river seine Nonover	183-m haul seine Over	183-m haul seine Nonover	6.1-m otter trawl	Totals
	E=131	**E=57**	**E=189**	**E=393**	**E=78**	**E=130**	**E=40**	**E=213**	**E=1,231**
Centropomus undecimalis	.	2	49	473	44	938	254	.	**1,760**
Centropristis striata	2	.	1	.	.	8	6	4	**21**
Chaetodipterus faber	4	2	11	1	.	76	7	118	**219**
Chasmodes saburrae	24	2	8	.	.	.	.	9	**43**
Chilomycterus schoepfii	29	2	4	.	.	314	133	322	**804**
Chloroscombrus chrysurus	30	.	.	7	.	9	1	625	**672**
Cichlasoma urophthalmus	.	.	.	7	4	.	.	.	**11**
Citharichthys macrops	.	4	2	.	.	.	1	91	**98**
Ctenogobius boleosoma	.	.	.	22	.	.	.	.	**22**
Ctenogobius smaragdus	1	.	.	35	7	.	.	.	**43**
Cynoscion arenarius	1	2	23	36	28	.	2	1,262	**1,354**
Cynoscion nebulosus	171	2	185	45	1	137	42	13	**596**
Cyprinodon variegatus	2	233	97	299	.	.	.	.	**631**
Dasyatis americana	.	.	.	.	.	13	8	1	**22**
Dasyatis sabina	.	.	5	4	.	60	18	19	**106**
Dasyatis say	.	.	1	.	.	12	3	.	**16**
Diapterus auratus	.	.	35	893	5	111	52	.	**1,096**
Diodon holocanthus	.	.	.	.	.	1	.	.	**1**
Diplectrum formosum	1	.	.	.	.	.	.	86	**87**
Diplodus holbrookii	.	.	.	.	.	4	6	.	**10**
Dormitator maculatus	.	.	.	1	.	.	.	.	**1**
Echeneis neucratoides	.	.	.	.	.	.	1	1	**2**
Elops saurus	.	1	.	16	5	301	67	4	**394**
Epinephelus itajara	.	.	2	.	.	1	.	.	**3**
Epinephelus morio	.	.	.	.	.	.	1	1	**2**
Etropus crossotus	.	.	.	.	.	.	1	37	**38**
Eucinostomus gula	1,947	226	4,320	1,479	186	1,915	516	1,468	**12,057**
Eucinostomus harengulus	145	65	1,829	4,829	795	598	324	94	**8,679**
Eucinostomus spp.	9,004	1,143	18,434	23,092	4,241	.	.	2,120	**58,034**
Eugerres plumieri	.	107	172	1,022	50	83	.	14	**1,448**
Farfantepenaeus duorarum	773	46	684	537	85	4	.	842	**2,971**
Fistularia tabacaria	.	.	.	.	.	.	.	1	**1**

Appendix CH20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=131	E=57	E=189	E=393	E=78	E=130	E=40	E=213	E=1,231
Floridichthys carpio	39	151	277	251	8	.	.	.	**726**
Fundulus grandis	.	.	27	87	5	.	.	.	**119**
Fundulus similis	.	.	4	5	42	.	.	.	**51**
Gambusia holbrooki	.	.	1	129	48	.	.	.	**178**
Gerreidae spp.	.	.	.	17	.	.	.	.	**17**
Gerres cinereus	.	.	.	.	.	12	2	.	**14**
Ginglymostoma cirratum	.	.	.	.	.	3	.	.	**3**
Gobiesox strumosus	.	2	2	8	9	.	.	1	**22**
Gobionellus oceanicus	.	.	.	.	1	.	.	.	**1**
Gobiosoma bosc	.	1	1	35	29	.	.	.	**66**
Gobiosoma longipala	.	.	.	.	.	.	.	93	**93**
Gobiosoma robustum	144	10	161	63	3	.	.	71	**452**
Gobiosoma spp.	23	4	26	45	10	.	.	63	**171**
Gymnura micrura	.	.	.	.	.	2	.	.	**2**
Haemulon plumierii	25	.	17	.	.	13	141	4	**200**
Harengula jaguana	3,165	100	3,372	2,441	2,170	669	155	8	**12,080**
Hemichromis letourneuxi	.	.	.	10	.	.	.	.	**10**
Hemiramphidae spp.	.	.	.	.	.	.	3	.	**3**
Hemiramphus brasiliensis	.	.	.	.	.	.	6	.	**6**
Hippocampus erectus	6	3	.	.	.	4	2	136	**151**
Hippocampus zosterae	16	1	9	1	.	.	.	.	**27**
Hypleurochilus caudovittatus	.	.	.	.	.	.	.	3	**3**
Hypoatherina harringtonensis	.	5	2	.	.	.	.	.	**7**
Hyporhamphus meeki	11	.	.	.	.	2	4	.	**17**
Hyporhamphus spp.	.	1	.	.	1	.	.	.	**2**
Hyporhamphus unifasciatus	.	.	.	.	.	3	.	.	**3**
Hypsoblennius hentz	2	.	.	.	.	.	.	18	**20**
Lagodon rhomboides	5,262	91	6,458	583	9	44,179	11,900	3,027	**71,509**
Leiostomus xanthurus	2	.	74	151	16	19	58	13	**333**
Lepisosteus osseus	.	.	.	.	.	9	1	4	**14**
Lepisosteus platyrhincus	.	.	.	2	1	.	.	.	**3**
Lepomis macrochirus	.	.	.	2	.	.	.	.	**2**

Appendix CH20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=131	E=57	E=189	E=393	E=78	E=130	E=40	E=213	E=1,231
Limulus polyphemus	2	.	2	1	.	6	1	.	**12**
Lophogobius cyprinoides	.	.	.	29	1	.	.	.	**30**
Lucania parva	5,189	434	19,279	12,201	22	.	.	4	**37,129**
Lupinoblennius nicholsi	.	.	2	.	.	.	.	.	**2**
Lutjanus analis	.	.	1	.	.	1	.	.	**2**
Lutjanus griseus	64	14	173	64	22	382	159	22	**900**
Lutjanus jocu	.	.	.	.	.	1	.	.	**1**
Lutjanus synagris	84	5	64	1	.	117	222	423	**916**
Megalops atlanticus	.	.	.	2	.	2	.	.	**4**
Membras martinica	3	2	77	29	269	.	.	.	**380**
Menidia spp.	138	4	4,052	7,693	1,043	.	.	.	**12,930**
Menippe spp.	2	.	1	.	.	.	.	561	**564**
Menticirrhus americanus	10	9	7	5	3	3	.	561	**598**
Menticirrhus littoralis	.	.	.	.	.	1	.	.	**1**
Menticirrhus saxatilis	5	5	5	.	2	.	.	1	**18**
Menticirrhus sp.	1	.	.	.	.	.	.	.	**1**
Microgobius gulosus	505	100	638	572	64	.	.	9	**1,888**
Microgobius thalassinus	.	.	.	.	.	.	.	8	**8**
Monacanthus ciliatus	6	.	1	.	.	1	1	8	**17**
Mugil cephalus	.	7	88	85	100	338	30	.	**648**
Mugil curema	.	.	24	79	32	102	5	.	**242**
Mugil sp.	.	.	1	.	.	.	.	.	**1**
Mugil trichodon	.	1	946	60	7	219	82	.	**1,315**
Mullus auratus	.	.	.	.	.	.	.	1	**1**
Mycteroperca microlepis	1	.	.	.	.	62	30	.	**93**
Negaprion brevirostris	.	.	.	.	.	.	1	.	**1**
Nicholsina usta	7	.	8	.	.	191	152	92	**450**
Ocyurus chrysurus	5	.	.	.	.	7	28	1	**41**
Ogcocephalus cubifrons	.	.	.	.	.	1	2	20	**23**
Oligoplites saurus	64	14	198	199	80	34	20	.	**609**
Ophichthus gomesii	.	.	.	.	.	.	.	1	**1**
Opisthonema oglinum	5,584	2	102	1,163	1,296	253	29	10	**8,439**

Appendix CH20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=131	E=57	E=189	E=393	E=78	E=130	E=40	E=213	E=1,231
Opistognathus robinsi	.	.	.	.	.	.	.	1	**1**
Opsanus beta	3	1	11	16	.	62	25	51	**169**
Oreochromis aureus	.	.	.	.	.	3	1	.	**4**
Oreochromis/Sarotherodon spp.	3	.	1	2	.	.	.	.	**6**
Orthopristis chrysoptera	741	3	216	6	1	1,068	737	1,110	**3,882**
Paraclinus marmoratus	1	.	4	.	.	.	.	1	**6**
Paralichthys albigutta	.	.	4	2	.	28	6	8	**48**
Peprilus paru	.	.	.	.	.	.	.	2	**2**
Poecilia latipinna	.	.	43	125	98	.	.	.	**266**
Pogonias cromis	.	.	.	1	.	7	.	.	**8**
Pomatomus saltatrix	.	.	.	.	.	.	12	.	**12**
Portunus spp.	6	11	1	.	.	7	.	4,852	**4,877**
Prionotus rubio	.	.	.	.	.	.	.	8	**8**
Prionotus scitulus	10	7	7	.	.	8	7	1,221	**1,260**
Prionotus tribulus	11	4	8	6	2	6	1	156	**194**
Rachycentron canadum	.	.	.	.	.	.	1	.	**1**
Rhinoptera bonasus	.	.	.	.	.	18	.	.	**18**
Rimapenaeus constrictus	.	.	.	.	.	.	.	53	**53**
Rimapenaeus spp.	6	1	1	.	.	.	.	150	**158**
Sardinella aurita	3	.	2	.	.	.	.	.	**5**
Sarotherodon melanotheron	5	.	1	1	.	2	.	.	**9**
Sciaenops ocellatus	179	70	169	1,039	9	127	38	7	**1,638**
Scomberomorus maculatus	.	.	.	2	.	20	8	.	**30**
Scorpaena brasiliensis	.	.	.	.	.	.	.	53	**53**
Scorpaena calcarata	.	.	.	.	.	.	.	1	**1**
Selene vomer	.	.	.	.	.	6	12	.	**18**
Serraniculus pumilio	1	.	.	.	.	.	.	49	**50**
Serranus subligarius	.	.	.	.	.	.	.	8	**8**
Sicyonia laevigata	.	.	.	.	.	.	.	24	**24**
Sicyonia sp.	.	1	.	.	.	.	.	.	**1**
Sicyonia typica	.	.	.	.	.	.	.	12	**12**
Sphoeroides nephelus	114	35	94	16	5	461	181	156	**1,062**

Appendix CH20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=131	E=57	E=189	E=393	E=78	E=130	E=40	E=213	E=1,231
Sphoeroides spengleri	.	.	.	.	.	1	.	5	**6**
Sphyraena barracuda	.	.	1	2	.	18	2	.	**23**
Sphyraena borealis	2	.	.	.	.	.	.	.	**2**
Sphyrna tiburo	.	.	.	.	.	10	4	1	**15**
Stephanolepis hispidus	65	.	11	.	.	294	65	369	**804**
Strongylura marina	5	.	7	1	.	31	75	.	**119**
Strongylura notata	7	7	201	308	39	33	10	1	**606**
Strongylura spp.	.	.	4	2	.	.	.	.	**6**
Strongylura timucu	3	.	8	24	3	.	.	.	**38**
Symphurus plagiusa	22	8	28	3	4	.	1	264	**330**
Syngnathus floridae	28	1	13	.	.	.	.	47	**89**
Syngnathus louisianae	53	.	12	3	.	.	.	228	**296**
Syngnathus scovelli	157	8	49	12	4	.	.	124	**354**
Syngnathus springeri	.	.	.	.	.	.	.	1	**1**
Synodus foetens	90	54	77	31	9	25	22	292	**600**
Trachinotus carolinus	.	.	.	.	.	3	91	.	**94**
Trachinotus falcatus	.	.	4	.	.	122	736	.	**862**
Trinectes maculatus	.	6	7	131	25	5	.	3,440	**3,614**
Tylosurus crocodilus	.	.	.	.	.	27	15	.	**42**
Urophycis floridana	.	.	.	.	.	.	.	7	**7**
Totals	**48,358**	**3,819**	**126,444**	**186,993**	**19,941**	**57,478**	**17,025**	**34,520**	**494,578**

Appendix CH20-03. Summary by zone of species collected during Charlotte Harbor stratified-random sampling, 2020. Zones A-D were located in Charlotte Harbor, while Zones M (Myakka River) and P (Peace River) represent tributaries of Charlotte Harbor. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=322	E=285	E=280	E=163	E=44	E=65	E=72	E=1,231
Acanthostracion quadricornis	2	34	32	81	.	.	.	**149**
Achiridae spp.	.	.	2	.	.	.	.	**2**
Achirus lineatus	113	72	69	25	3	5	15	**302**
Adinia xenica	.	1	.	.	.	.	.	**1**
Albula spp.	6	1	1	5	.	.	.	**13**
Aluterus schoepfii	.	20	.	15	.	.	.	**35**
Anarchopterus criniger	.	.	3	.	.	.	.	**3**
Anchoa hepsetus	2,979	10,324	185	22,558	2	2	416	**36,466**
Anchoa mitchilli	28,965	24,527	44,777	7,377	4,331	24,286	49,671	**183,934**
Anchoa spp.	5	.	.	.	.	.	.	**5**
Ancylopsetta quadrocellata	3	5	.	2	.	.	.	**10**
Archosargus probatocephalus	54	244	180	258	10	3	3	**752**
Argopecten gibbus	.	131	1	2	.	.	.	**134**
Ariopsis felis	403	379	730	1,640	2	18	122	**3,294**
Astroscopus y-graecum	1	.	.	.	.	.	.	**1**
Bagre marinus	31	.	8	.	.	12	5	**56**
Bairdiella chrysoura	142	315	339	135	1	15	42	**989**
Bathygobius soporator	42	2	2	1	12	71	73	**203**
Brevoortia spp.	244	10	13	4	.	12	.	**283**
Calamus penna	.	30	4	13	.	.	.	**47**
Calamus spp.	.	5	2	.	.	.	.	**7**
Callinectes ornatus	3	36	14	14	.	.	1	**68**
Callinectes sapidus	468	110	148	52	35	108	146	**1,067**
Callinectes similis	.	.	1	.	.	.	.	**1**
Caranx hippos	9	74	39	22	.	.	1	**145**
Carcharhinus leucas	4	.	1	.	.	1	.	**6**
Carcharhinus limbatus	.	.	1	.	.	.	.	**1**
Centropomus undecimalis	214	623	512	330	50	11	20	**1,760**
Centropristis striata	.	13	3	5	.	.	.	**21**
Chaetodipterus faber	62	45	88	9	.	2	13	**219**
Chasmodes saburrae	10	10	20	3	.	.	.	**43**

Appendix CH20-03. (Continued).

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=322	E=285	E=280	E=163	E=44	E=65	E=72	E=1,231
Chilomycterus schoepfii	69	221	270	244	.	.	.	**804**
Chloroscombrus chrysurus	501	120	5	28	.	5	13	**672**
Cichlasoma urophthalmus	3	4	.	.	.	1	3	**11**
Citharichthys macrops	.	53	6	39	.	.	.	**98**
Ctenogobius boleosoma	1	.	21	.	.	.	.	**22**
Ctenogobius smaragdus	26	.	10	.	4	.	3	**43**
Cynoscion arenarius	188	8	.	.	.	156	1,002	**1,354**
Cynoscion nebulosus	68	139	281	92	.	6	10	**596**
Cyprinodon variegatus	29	260	30	311	.	1	.	**631**
Dasyatis americana	2	10	4	6	.	.	.	**22**
Dasyatis sabina	62	6	24	.	.	7	7	**106**
Dasyatis say	.	5	5	6	.	.	.	**16**
Diapterus auratus	260	390	271	139	32	4	.	**1,096**
Diodon holocanthus	.	1	.	.	.	.	.	**1**
Diplectrum formosum	.	53	1	33	.	.	.	**87**
Diplodus holbrookii	.	10	.	.	.	.	.	**10**
Dormitator maculatus	.	.	1	.	.	.	.	**1**
Echeneis neucratoides	.	1	.	.	.	1	.	**2**
Elops saurus	85	39	134	127	.	7	2	**394**
Epinephelus itajara	.	1	.	2	.	.	.	**3**
Epinephelus morio	.	2	.	.	.	.	.	**2**
Etropus crossotus	2	9	13	14	.	.	.	**38**
Eucinostomus gula	1,903	4,262	2,341	3,261	101	46	143	**12,057**
Eucinostomus harengulus	3,206	1,687	1,925	422	558	398	483	**8,679**
Eucinostomus spp.	10,008	17,288	17,087	7,232	4,204	1,669	546	**58,034**
Eugerres plumieri	507	234	571	1	34	80	21	**1,448**
Farfantepenaeus duorarum	1,038	774	619	193	63	108	176	**2,971**
Fistularia tabacaria	.	.	1	.	.	.	.	**1**
Floridichthys carpio	44	240	271	163	8	.	.	**726**
Fundulus grandis	45	35	8	10	1	16	4	**119**
Fundulus similis	6	.	.	3	.	.	42	**51**
Gambusia holbrooki	8	4	71	.	5	;59	31	**178**
Gerreidae spp.	16	.	.	.	1	.	.	**17**

Appendix CH20-03. (Continued).

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=322	E=285	E=280	E=163	E=44	E=65	E=72	E=1,231
Gerres cinereus	.	12	.	2	.	.	.	**14**
Ginglymostoma cirratum	.	2	.	1	.	.	.	**3**
Gobiesox strumosus	8	.	.	.	3	6	5	**22**
Gobionellus oceanicus	.	.	.	.	.	.	1	**1**
Gobiosoma bosc	9	3	.	.	2	18	34	**66**
Gobiosoma longipala	6	46	14	27	.	.	.	**93**
Gobiosoma robustum	35	133	192	88	1	3	.	**452**
Gobiosoma spp.	33	37	49	26	6	11	9	**171**
Gymnura micrura	1	1	.	.	.	.	.	**2**
Haemulon plumierii	.	23	5	172	.	.	.	**200**
Harengula jaguana	1,565	3,755	2,664	1,604	2,167	16	309	**12,080**
Hemichromis letourneuxi	.	6	4	.	.	.	.	**10**
Hemiramphidae spp.	.	3	.	.	.	.	.	**3**
Hemiramphus brasiliensis	.	.	6	.	.	.	.	**6**
Hippocampus erectus	19	60	22	46	.	3	1	**151**
Hippocampus zosterae	.	11	7	9	.	.	.	**27**
Hypleurochilus caudovittatus	.	1	1	1	.	.	.	**3**
Hypoatherina harringtonensis	.	.	1	6	.	.	.	**7**
Hyporhamphus meeki	1	3	11	2	.	.	.	**17**
Hyporhamphus spp.	.	1	.	.	.	.	1	**2**
Hyporhamphus unifasciatus	3	.	.	.	.	.	.	**3**
Hypsoblennius hentz	4	6	10	.	.	.	.	**20**
Lagodon rhomboides	922	29,862	13,540	27,158	8	6	13	**71,509**
Leiostomus xanthurus	32	167	68	48	.	.	18	**333**
Lepisosteus osseus	11	1	.	.	.	1	1	**14**
Lepisosteus platyrhincus	1	.	.	.	2	.	.	**3**
Lepomis macrochirus	.	2	.	.	.	.	.	**2**
Limulus polyphemus	10	.	2	.	.	.	.	**12**
Lophogobius cyprinoides	6	1	22	.	1	.	.	**30**
Lucania parva	1,655	12,942	12,244	10,260	23	2	3	**37,129**
Lupinoblennius nicholsi	2	.	.	.	.	.	.	**2**
Lutjanus analis	.	.	.	2	.	.	.	**2**
Lutjanus griseus	129	332	181	231	11	10	6	**900**

Appendix CH20-03. (Continued).

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=322	E=285	E=280	E=163	E=44	E=65	E=72	E=1,231
Lutjanus jocu	.	.	.	1	.	.	.	**1**
Lutjanus synagris	28	456	181	251	.	.	.	**916**
Megalops atlanticus	2	.	2	.	.	.	.	**4**
Membras martinica	45	15	26	1	.	274	19	**380**
Menidia spp.	1,518	4,068	3,076	2,324	104	1,027	813	**12,930**
Menippe spp.	3	209	85	267	.	.	.	**564**
Menticirrhus americanus	259	4	9	.	.	65	261	**598**
Menticirrhus littoralis	.	.	1	.	.	.	.	**1**
Menticirrhus saxatilis	4	10	2	.	.	.	2	**18**
Menticirrhus sp.	.	1	.	.	.	.	.	**1**
Microgobius gulosus	650	497	567	76	39	31	28	**1,888**
Microgobius thalassinus	2	.	.	.	.	3	3	**8**
Monacanthus ciliatus	.	6	1	10	.	.	.	**17**
Mugil cephalus	178	225	79	65	.	51	50	**648**
Mugil curema	39	57	99	15	.	2	30	**242**
Mugil sp.	1	.	.	.	.	.	.	**1**
Mugil trichodon	69	194	346	694	.	1	11	**1,315**
Mullus auratus	.	1	.	.	.	.	.	**1**
Mycteroperca microlepis	.	47	37	9	.	.	.	**93**
Negaprion brevirostris	.	1	.	.	.	.	.	**1**
Nicholsina usta	.	315	5	130	.	.	.	**450**
Ocyurus chrysurus	.	33	.	8	.	.	.	**41**
Ogcocephalus cubifrons	.	11	4	8	.	.	.	**23**
Oligoplites saurus	261	84	105	28	32	42	57	**609**
Ophichthus gomesii	.	.	.	1	.	.	.	**1**
Opisthonema oglinum	5,485	758	230	35	1,274	594	63	**8,439**
Opistognathus robinsi	.	1	.	.	.	.	.	**1**
Opsanus beta	6	50	32	81	.	.	.	**169**
Oreochromis aureus	1	.	3	.	.	.	.	**4**
Oreochromis/Sarotherodon spp.	.	.	6	.	.	.	.	**6**
Orthopristis chrysoptera	105	1,662	576	1,533	.	1	5	**3,882**
Paraclinus marmoratus	.	1	.	5	.	.	.	**6**
Paralichthys albigutta	3	21	22	2	.	.	.	**48**

Appendix CH20-03. (Continued).

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=322	E=285	E=280	E=163	E=44	E=65	E=72	E=1,231
Peprilus paru	1	.	.	.	.	1	.	**2**
Poecilia latipinna	18	77	22	41	14	73	21	**266**
Pogonias cromis	.	2	1	4	1	.	.	**8**
Pomatomus saltatrix	.	1	2	9	.	.	.	**12**
Portunus spp.	338	2,567	1,708	264	.	.	.	**4,877**
Prionotus rubio	1	3	3	1	.	.	.	**8**
Prionotus scitulus	284	515	278	171	.	.	12	**1,260**
Prionotus tribulus	98	12	41	7	1	13	22	**194**
Rachycentron canadum	.	.	1	.	.	.	.	**1**
Rhinoptera bonasus	16	.	2	.	.	.	.	**18**
Rimapenaeus constrictus	25	2	26	.	.	.	.	**53**
Rimapenaeus spp.	81	7	65	3	.	.	2	**158**
Sardinella aurita	.	4	.	1	.	.	.	**5**
Sarotherodon melanotheron	.	1	8	.	.	.	.	**9**
Sciaenops ocellatus	696	349	415	58	12	51	57	**1,638**
Scomberomorus maculatus	4	11	14	1	.	.	.	**30**
Scorpaena brasiliensis	.	43	.	10	.	.	.	**53**
Scorpaena calcarata	.	.	.	1	.	.	.	**1**
Selene vomer	.	14	2	2	.	.	.	**18**
Serraniculus pumilio	.	32	3	15	.	.	.	**50**
Serranus subligarius	.	.	.	8	.	.	.	**8**
Sicyonia laevigata	.	9	12	3	.	.	.	**24**
Sicyonia sp.	.	1	.	.	.	.	.	**1**
Sicyonia typica	.	8	4	.	.	.	.	**12**
Sphoeroides nephelus	183	344	373	153	1	.	8	**1,062**
Sphoeroides spengleri	.	6	.	.	.	.	.	**6**
Sphyraena barracuda	1	17	.	5	.	.	.	**23**
Sphyraena borealis	.	1	1	.	.	.	.	**2**
Sphyrna tiburo	.	4	4	7	.	.	.	**15**
Stephanolepis hispidus	12	354	35	403	.	.	.	**804**
Strongylura marina	4	43	58	14	.	.	.	**119**
Strongylura notata	97	238	164	59	43	3	2	**606**
Strongylura spp.	2	.	3	.	1	.	.	**6**

Appendix CH20-03. (Continued).

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=322	E=285	E=280	E=163	E=44	E=65	E=72	E=1,231
Strongylura timucu	12	13	6	3	4	.	.	**38**
Symphurus plagiusa	166	22	25	4	.	29	84	**330**
Syngnathus floridae	3	17	12	57	.	.	.	**89**
Syngnathus louisianae	65	71	97	58	.	.	5	**296**
Syngnathus scovelli	96	67	152	28	.	3	8	**354**
Syngnathus springeri	.	1	.	.	.	.	.	**1**
Synodus foetens	189	111	156	119	5	4	16	**600**
Trachinotus carolinus	1	3	5	85	.	.	.	**94**
Trachinotus falcatus	81	38	736	7	.	.	.	**862**
Trinectes maculatus	155	43	31	3	6	72	3,304	**3,614**
Tylosurus crocodilus	.	40	1	1	.	.	.	**42**
Urophycis floridana	2	1	1	3	.	.	.	**7**
Totals	**67,579**	**124,096**	**110,149**	**91,712**	**13,218**	**29,526**	**58,298**	**494,578**

Appendix CH20-04. Summary of monthly sampling effort by gear during Charlotte Harbor stratified-random sampling, 2020.

Month	# SRS Sites			Totals
	21.3-m Seine	183-m Seine	6.1-m Trawl	
January	76	17	30	**123**
February	76	17	30	**123**
March	76	17	30	**123**
April	12	0	3	**15**
May	76	0	0	**76**
June	76	17	30	**123**
July	76	17	0	**93**
August	76	17	30	**123**
September	76	17	0	**93**
October	76	17	30	**123**
November	76	17	0	**93**
December	76	17	30	**123**
TOTALS	**848**	**170**	**213**	**1,231**

Northern Indian River Lagoon

The sampling area identified as the northern Indian River Lagoon (IRL) system is a narrow estuary located along the eastern central coast of Florida, which extends from the northern terminus of the Indian River Lagoon proper south to Vero Beach. The northern IRL is connected to the Atlantic Ocean by one permanent inlet (Sebastian Inlet) and one intermittently open conduit at the Canaveral Locks that links the Banana River to the Atlantic Ocean just south of Cape Canaveral. Freshwater inflow primarily comes from the St. Sebastian River and from numerous creeks located mainly along the western shoreline (Paperno and Brodie 2004). Shoreline vegetation consists largely of fringing mangrove, Brazilian pepper, and marsh grasses. Bottom substrates are typically characterized as sand or mud mixed with shell hash and occasional oysters. Seagrasses, primarily *Halodule wrightii*, are the dominant vegetative cover in the northern IRL (Steward et al. 2006).

The Fisheries-Independent Monitoring (FIM) program has conducted intensive sampling of fish and selected invertebrates in the northern IRL since 1990. The area sampled was divided into six geographically-defined bay zones (A-E, and H) and one riverine zone that includes Turkey Creek and St. Sebastian River (F; Figure IR20-01). Monthly stratified-random sampling (SRS) was conducted in Zones C, D, and H using 21.3-m bay and 183-m haul seines. Zone H was also sampled monthly with 6.1-m bay otter trawls. Monthly SRS was conducted in Zone E with only 183-m haul seines. Zone F was sampled monthly with 21.3-m river seines. Zones A, B, and E were sampled seasonally (October and November) with 21.3-m bay seines. All methods were the same as those described in the Methods section of this report. This section summarizes data collected by the FIM program during 2020 in the northern IRL.

Stratified-Random Sampling

A total of 311,747 animals, which included 152 taxa of fishes and 14 taxa of selected invertebrates, were collected from 671 northern IRL samples in 2020 (Table IR20-01; Appendices IR20-01, -02, and -03). *Anchoa mitchilli* (n=224,809) was the most numerous taxon collected, representing 72.1% of the total catch. The four next most abundant taxa, *Diapterus auratus* (n=18,282), *Mugil cephalus* (n=12,289), *Eucinostomus* spp. (n=8,200), and *Harengula jaguana* (n=4,857) accounted for an additional 14.0% of the total catch. Thirty-four Selected Taxa (n=23,368 animals) composed 7.5% of the total catch. *Mugil cephalus* (n=12,289), *Mugil curema* (n=2,618), *Micropogonias undulatus* (n=1,708), *Leiostomus xanthurus* (n = 1,610), and *Farfantepenaeus* spp. (n=826) were the most abundant Selected Taxa, representing 6.1% of the total catch. Collections in 2020 included no species new to the northern IRL FIM collection.

Monthly sampling efforts were reduced in the northern Indian River Lagoon during 2020 as a result of impacts caused by the COVID-19 pandemic (Appendix IR20-04). Only 11 sampling sites were completed in April 2020 before sampling ceased due to State of Florida and FIM safety protocols. Only 21.3-m river seine sampling (n=10 sites) was completed during May 2020. Only 21.3-m river seine sampling (n=10 sites) and 183-m haul seines (n=19 sites) were completed in June 2020. In response to programmatic funding deficits as a result of COVID-19, no SRS trawling was completed during July 2020. The sampling effort for all zones and gears was completed as scheduled for the months of January, February, March, August, September, October, November, and December 2020.

Bay Sampling

21.3-m Bay Seines. A total of 128,842 animals were collected in 301 21.3-m bay seines, representing 41.3% of the overall SRS catch (Table IR20-01). *Anchoa mitchilli* (n=96,512) was the most abundant taxon collected, accounting for 74.9% of the animals collected in 21.3-m bay seine catch (Table IR20-02). The taxa most frequently caught in the 21.3-m bay seines were *Anchoa mitchilli* (61.8% occurrence), *Eucinostomus* spp. (43.9% occurrence), and *Diapterus auratus* (43.5% occurrence).

A total of 15,175 animals from 26 Selected Taxa were collected, representing 11.8% of the entire 21.3-m bay seine catch (Table IR20-03). *Mugil cephalus* (n=11,415) *Leiostomus xanthurus* (n=1,208), and *Micropogonias undulatus* (n=1,033) were the most abundant Selected Taxa, accounting for 90.0% of the Selected Taxa collected with this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were

Farfantepenaeus spp. (21.6% occurrence), *Cynoscion nebulosus* (16.9% occurrence), and *Mugil curema* (15.0% occurrence).

183-m Haul Seines. A total of 29,325 animals were collected in 193 183-m haul seines, representing 9.4% of the overall SRS catch (Table IR20-01). *Diapterus auratus* (n=8,455), *Bairdiella chrysoura* (n=2,793), *Ariopsis felis* (n=2,440), and *Eucinostomus harengulus* (n=2,426) were the most abundant taxa, accounting for 54.9% of the 183-m haul seine catch (Table IR20-04). The taxa most frequently caught in the 183-m haul seines were *Mugil curema* (81.9% occurrence), *Dasyatis sabina* (76.7% occurrence), and *Ariopsis felis* (70.5% occurrence).

A total of 5,909 animals from 28 Selected Taxa were collected, representing 20.2% of the entire 183-m haul seine catch (Table IR20-05). *Mugil curema* (n=2,401) and *Mugil cephalus* (n=782) were the most abundant Selected Taxa, accounting for 53.9% of the Selected Taxa collected with this gear. The Selected Taxa most frequently caught in the 183-m haul seines were *Mugil curema* (81.9% occurrence), *Mugil cephalus* (63.7% occurrence), and *Elops saurus* (43.5% occurrence).

6.1-m Bay Otter Trawls. A total of 6,592 animals were collected in 65 6.1-m bay otter trawls, representing 2.1% of the overall SRS catch (Table IR20-01). *Anchoa mitchilli* (n=1,184), *Diapterus auratus* (n=1,472), and *Gobiosoma* spp. (n=1,006) were the most abundant taxa, accounting for 55.6% of the 6.1-m bay otter trawl catch (Table IR20-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Farfantepenaeus* spp. (70.8% occurrence) and *Gobiosoma* spp. (56.9% occurrence).

A total of 1,058 animals from 22 Selected Taxa were collected, representing 16.1% of the entire 6.1-m bay otter trawl catch (Table IR20-07). *Micropogonias undulatus* (n=305), *Leiostomus xanthurus* (n=229), and *Farfantepenaeus* spp. (n=210) were the most abundant Selected Taxa, accounting for 70.3% of the Selected Taxa collected in this gear. The Selected Taxa most frequently caught in the 6.1-m bay otter trawl were *Farfantepenaeus* spp. (70.8% occurrence) and *Micropogonias undulatus* (21.5% occurrence).

River Sampling

21.3-m River Seines. A total of 146,988 animals were collected in 112 21.3-m river seines, representing 47.1% of the overall SRS collections (Table IR20-01). *Anchoa mitchilli* (n=127,113) was the most abundant taxon collected, accounting for 86.5% of the 21.3-m river seine catch (Table IR20-08). *Diapterus auratus* (n=4,860), *Eucinostomus* spp. (n=3,568), and *Brevoortia* spp. (n=2,718) were the next most abundant taxa, accounting for an additional 7.6% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines were *Eucinostomus* spp. (81.3% occurrence), *Diapterus auratus* (73.2% occurrence) and *Eucinostomus harengulus* (63.4% occurrence).

A total of 1,224 animals from 16 Selected Taxa were collected, representing 0.8% of the entire 21.3-m river seine catch (Table IR20-09). *Centropomus undecimalis* (n=408), *Micropogonias undulatus* (n=305), and *Farfantepenaeus* spp. (n=163) were the most abundant Selected Taxa, accounting for 71.6% of the Selected Taxa collected in this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Centropomus undecimalis* (47.3% occurrence) and *Farfantepenaeus* spp. (27.7% occurrence).

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Figure IR20-01. Map of the northern Indian River Lagoon sampling area. Zones are labeled A–F, and H.

Table IR20-01. Summary of catch and effort data for northern Indian River Lagoon stratified-random sampling, 2020.

Zone	21.3-m bay seine		21.3-m river seine		183-m haul seine		6.1-m otter trawl		Totals	
	Animals	Hauls	Animals	Hauls	Animals	Hauls	Animals	Hauls	Animals	Hauls
A	1,447	16	.	.	.	.	.	.	1,447	16
B	770	14	.	.	.	.	.	.	770	14
C	34,931	94	.	.	9,549	42	.	.	44,480	136
D	9,911	72	.	.	4,904	60	.	.	14,815	132
E	2,560	14	.	.	4,257	40	.	.	6,817	54
F	.	.	146,988	112	.	.	.	.	146,988	112
H	79,223	91	.	.	10,615	51	6,592	65	96,430	207
Totals	**128,842**	**301**	**146,988**	**112**	**29,325**	**193**	**6,592**	**65**	**311,747**	**671**

Table IR20-02. Catch statistics for 10 dominant taxa collected in 301 21.3-m bay seine samples during northern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Anchoa mitchilli	96,512	74.9	61.8	229.03	56.92	431.18	12,914.29	33	0.02	15	56
Mugil cephalus	11,415	8.9	13.0	27.09	15.74	1,008.02	4,171.43	22	0.20	16	351
Eucinostomus spp.	4,166	3.2	43.9	9.89	2.33	408.19	470.71	25	0.13	9	39
Diapterus auratus	3,495	2.7	43.5	8.29	1.69	352.81	237.86	32	0.26	11	149
Harengula jaguana	1,956	1.5	12.0	4.64	1.75	655.49	381.43	48	0.32	17	93
Leiostomus xanthurus	1,208	0.9	5.3	2.87	1.26	759.69	272.86	27	0.21	13	134
Micropogonias undulatus	1,033	0.8	9.6	2.45	1.07	755.08	274.29	23	0.22	10	62
Eucinostomus gula	962	0.8	14.3	2.28	0.61	463.81	110.71	57	0.39	40	98
Bairdiella chrysoura	845	0.7	22.3	2.01	0.54	468.28	126.43	72	0.99	9	168
Brevoortia spp.	675	0.5	5.0	1.60	0.97	1,051.64	206.43	26	0.54	19	236
Subtotals	122,267	94.9	.	.	.	.	.	.	.	9	351
Totals	**128,842**	**100.0**	**.**	**305.75**	**61.65**	**349.82**	**13,031.43**	**.**	**.**	**2**	**674**

Table IR20-03. Catch statistics for Selected Taxa collected in 301 21.3-m bay seine samples during northern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil cephalus	11,415	8.9	13.0	27.09	15.74	1,008.02	4,171.43	22	0.20	16	351
Leiostomus xanthurus	1,208	0.9	5.3	2.87	1.26	759.69	272.86	27	0.21	13	134
Micropogonias undulatus	1,033	0.8	9.6	2.45	1.07	755.08	274.29	23	0.22	10	62
Farfantepenaeus spp.	453	0.4	21.6	1.07	0.24	379.83	45.71	7	0.13	2	14
Sciaenops ocellatus	287	0.2	13.3	0.68	0.19	482.57	37.14	37	2.86	13	529
Mugil curema	187	0.2	15.0	0.44	0.16	610.87	42.14	61	4.17	12	253
Cynoscion nebulosus	113	0.1	16.9	0.27	0.05	308.57	6.43	55	5.65	13	366
Callinectes sapidus	81	0.1	5.6	0.19	0.09	841.72	21.43	54	5.59	7	181
Litopenaeus setiferus	74	0.1	9.0	0.18	0.06	628.31	13.57	12	0.71	2	37
Archosargus probatocephalus	73	0.1	8.3	0.17	0.06	615.87	12.86	78	10.44	9	303
Lutjanus griseus	56	<0.1	6.0	0.13	0.07	934.89	20.71	68	9.79	10	222
Menticirrhus americanus	53	<0.1	8.6	0.13	0.03	461.00	6.43	63	8.23	16	206
Elops saurus	33	<0.1	5.3	0.08	0.03	594.36	5.71	68	12.23	35	309
Mugil rubrioculus	27	<0.1	1.7	0.06	0.04	1,156.00	12.14	37	4.06	18	123
Trachinotus falcatus	19	<0.1	2.7	0.05	0.02	904.53	6.43	37	3.05	11	62
Albula vulpes	16	<0.1	1.7	0.04	0.02	1,081.51	6.43	59	4.23	21	83
Centropomus undecimalis	12	<0.1	3.3	0.03	0.01	570.55	1.43	224	54.74	8	674

Table IR20-03. (Continued).

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Lutjanus analis	11	<0.1	1.0	0.03	0.02	1,209.36	5.00	34	5.53	15	62
Farfantepenaeus aztecus	8	<0.1	1.7	0.02	0.01	966.30	2.86	17	0.80	15	22
Farfantepenaeus duorarum	4	<0.1	1.3	0.01	<0.01	863.12	0.71	20	2.06	15	23
Cynoscion complex	4	<0.1	1.3	0.01	<0.01	863.12	0.71	43	11.30	21	73
Pogonias cromis	2	<0.1	0.7	<0.01	<0.01	1,224.74	0.71	419	14.50	404	433
Menippe spp.	2	<0.1	0.3	<0.01	<0.01	1,734.94	1.43	6	3.00	3	9
Lutjanus synagris	2	<0.1	0.3	<0.01	<0.01	1,734.94	1.43	23	1.00	22	24
Megalops atlanticus	1	<0.1	0.3	<0.01	<0.01	1,734.94	0.71	331	.	331	331
Mugil trichodon	1	<0.1	0.3	<0.01	<0.01	1,734.94	0.71	16	.	16	16
Totals	**15,175**	**11.8**	**.**	**36.01**	**16.80**	**809.18**	**4,485.00**	**.**	**.**	**2**	**674**

Table IR20-04. Catch statistics for 10 dominant taxa collected in 193 183-m haul seine samples during northern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Diapterus auratus	8,455	28.8	64.8	43.81	8.62	273.33	907.00	96	0.31	40	265
Bairdiella chrysoura	2,793	9.5	32.6	14.47	4.27	409.65	549.00	113	0.29	59	208
Ariopsis felis	2,440	8.3	70.5	12.64	1.95	214.72	259.00	244	0.83	85	393
Eucinostomus harengulus	2,426	8.3	39.4	12.57	3.31	366.30	388.00	98	0.25	59	149
Mugil curema	2,401	8.2	81.9	12.44	1.89	211.10	274.00	144	0.62	68	334
Lagodon rhomboides	1,483	5.1	22.3	7.68	2.37	428.02	277.00	126	0.53	64	202
Harengula jaguana	976	3.3	14.0	5.06	3.17	869.63	598.00	85	0.31	61	181
Dasyatis sabina	856	2.9	76.7	4.44	0.43	133.30	36.00	228	1.35	96	431
Mugil cephalus	782	2.7	63.7	4.05	0.59	202.83	62.00	236	1.67	95	423
Archosargus rhomboidalis	763	2.6	16.6	3.95	1.27	447.51	183.00	164	1.20	61	271
Subtotals	23,375	79.7	.	.	.	.	.	.	.	40	431
Totals	**29,325**	**100.0**	**.**	**151.94**	**14.21**	**129.97**	**1,394.00**	**.**	**.**	**13**	**1,041**

Table IR20-05. Catch statistics for Selected Taxa collected in 193 183-m haul seine samples during northern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	Number		%	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%	Occur	Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil curema	2,401	8.2	81.9	12.44	1.89	211.10	274.00	144	0.62	68	334
Mugil cephalus	782	2.7	63.7	4.05	0.59	202.83	62.00	236	1.67	95	423
Elops saurus	517	1.8	43.5	2.68	0.52	269.22	59.00	261	2.00	134	438
Menticirrhus americanus	454	1.6	24.4	2.35	0.57	337.06	80.00	155	1.31	101	318
Archosargus probatocephalus	287	1.0	36.8	1.49	0.27	249.84	37.00	231	4.14	48	404
Lutjanus griseus	270	0.9	18.7	1.40	0.50	500.43	84.00	176	2.06	87	266
Pogonias cromis	204	0.7	24.9	1.06	0.29	385.29	34.00	455	11.27	152	822
Centropomus undecimalis	179	0.6	28.5	0.93	0.17	257.25	16.00	530	14.29	136	925
Sciaenops ocellatus	155	0.5	31.1	0.80	0.18	304.80	23.00	438	18.21	102	1,031
Cynoscion nebulosus	146	0.5	24.9	0.76	0.18	332.89	22.00	263	8.57	92	514
Cynoscion complex	133	0.5	5.2	0.69	0.58	1,166.62	111.00	171	1.47	141	267
Trachinotus falcatus	67	0.2	7.8	0.35	0.14	574.52	21.00	145	11.13	49	371
Micropogonias undulatus	65	0.2	4.7	0.34	0.28	1,156.57	54.00	229	5.25	95	311
Leiostomus xanthurus	57	0.2	9.3	0.30	0.09	420.53	11.00	166	4.19	56	211
Trachinotus carolinus	37	0.1	7.8	0.19	0.08	611.55	15.00	340	10.41	54	413
Callinectes sapidus	28	0.1	9.3	0.15	0.05	439.16	7.00	152	7.60	67	216
Litopenaeus setiferus	24	0.1	6.7	0.12	0.04	438.22	4.00	22	1.29	13	34

Table IR20-05. (Continued).

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Farfantepenaeus duorarum	22	0.1	5.7	0.11	0.06	726.00	11.00	21	1.23	16	34
Lutjanus analis	18	0.1	3.6	0.09	0.05	676.02	7.00	115	7.21	81	166
Mugil rubrioculus	16	0.1	5.2	0.08	0.03	497.61	3.00	157	10.09	103	251
Pomatomus saltatrix	10	<0.1	2.6	0.05	0.03	875.20	6.00	404	11.31	346	456
Paralichthys albigutta	9	<0.1	4.1	0.05	0.02	503.40	2.00	173	10.62	125	211
Megalops atlanticus	9	<0.1	3.1	0.05	0.02	630.17	3.00	692	74.20	478	1,041
Scomberomorus maculatus	8	<0.1	3.1	0.04	0.02	643.69	3.00	217	32.39	119	387
Farfantepenaeus aztecus	5	<0.1	2.1	0.03	0.01	730.18	2.00	28	2.73	19	36
Scomberomorus regalis	3	<0.1	1.0	0.02	0.01	1,033.32	2.00	272	34.28	221	337
Albula vulpes	2	<0.1	1.0	0.01	0.01	979.78	1.00	166	44.00	122	210
Menippe sp.	1	<0.1	0.5	0.01	0.01	1,389.24	1.00	36	.	36	36
Totals	**5,909**	**20.2**	**.**	**30.62**	**2.54**	**115.35**	**278.00**	**.**	**.**	**13**	**1,041**

Table IR20-06. Catch statistics for 11 dominant taxa collected in 65 6.1-m bay otter trawl samples during northern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Anchoa mitchilli	1,184	18.0	29.2	3.97	1.66	335.83	70.83	24	0.20	15	48
Diapterus auratus	1,472	22.3	21.5	3.86	3.41	711.47	221.43	22	0.12	12	83
Gobiosoma spp.	1,006	15.3	56.9	3.09	1.14	296.16	61.68	16	0.07	8	19
Eucinostomus spp.	466	7.1	46.2	1.37	0.39	230.30	16.70	21	0.34	8	51
Micropogonias undulatus	305	4.6	21.5	0.97	0.60	499.19	36.43	13	0.24	5	51
Gobiosoma robustum	224	3.4	43.1	0.69	0.22	251.22	11.56	22	0.17	20	32
Farfantepenaeus spp.	210	3.2	70.8	0.64	0.12	148.34	5.59	7	0.20	3	14
Eucinostomus gula	169	2.6	32.3	0.52	0.16	249.78	7.29	69	1.22	41	112
Leiostomus xanthurus	229	3.5	6.2	0.50	0.43	700.77	27.79	14	0.14	11	39
Lagodon rhomboides	129	2.0	21.5	0.39	0.18	377.10	10.02	23	1.75	11	130
Syngnathus scovelli	129	2.0	41.5	0.38	0.09	200.39	4.05	65	1.01	33	88
Subtotals	5,523	83.8	.	.	.	.	.	.	.	3	130
Totals	**6,592**	**100.0**	**.**	**19.57**	**4.75**	**195.71**	**268.65**	**.**	**.**	**3**	**798**

Table IR20-07. Catch statistics for Selected Taxa collected in 65 6.1-m bay otter trawl samples during northern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Micropogonias undulatus	305	4.6	21.5	0.97	0.60	499.19	36.43	13	0.24	5	51
Farfantepenaeus spp.	210	3.2	70.8	0.64	0.12	148.34	5.59	7	0.20	3	14
Leiostomus xanthurus	229	3.5	6.2	0.50	0.43	700.77	27.79	14	0.14	11	39
Elops saurus	101	1.5	10.8	0.23	0.16	562.06	9.85	40	0.29	25	46
Menticirrhus americanus	36	0.6	13.8	0.11	0.08	590.94	5.20	29	7.30	13	282
Cynoscion nebulosus	26	0.4	13.8	0.09	0.05	414.71	2.43	22	1.05	14	34
Lutjanus griseus	27	0.4	15.4	0.08	0.03	303.01	1.35	48	10.52	14	189
Lutjanus synagris	21	0.3	12.3	0.07	0.03	385.79	1.89	62	8.01	17	124
Farfantepenaeus duorarum	19	0.3	13.8	0.06	0.02	309.93	1.16	16	0.32	15	20
Menippe spp.	19	0.3	12.3	0.06	0.03	351.49	1.35	17	1.34	6	26
Archosargus probatocephalus	19	0.3	15.4	0.06	0.02	331.50	1.35	37	9.17	12	167
Callinectes sapidus	19	0.3	13.8	0.05	0.02	310.46	0.96	38	9.00	11	150
Lutjanus analis	8	0.1	9.2	0.03	0.01	338.41	0.45	66	19.42	20	138
Farfantepenaeus aztecus	6	0.1	9.2	0.02	0.01	317.25	0.22	20	2.24	15	29
Cynoscion complex	3	0.1	3.1	0.01	0.01	608.66	0.39	20	2.19	16	23
Litopenaeus setiferus	2	<0.1	3.1	0.01	<0.01	567.34	0.22	4	0.00	4	4
Sciaenops ocellatus	2	<0.1	3.1	0.01	<0.01	565.62	0.19	15	0.50	14	15
Paralichthys albigutta	2	<0.1	3.1	0.01	<0.01	565.62	0.19	285	90.00	195	375
Albula vulpes	1	<0.1	1.5	<0.01	<0.01	806.23	0.22	62	.	62	62
Panulirus argus	1	<0.1	1.5	<0.01	<0.01	806.23	0.19	4	.	4	4
Epinephelus itajara	1	<0.1	1.5	<0.01	<0.01	806.23	0.19	35	.	35	35
Mugil cephalus	1	<0.1	1.5	<0.01	<0.01	806.23	0.19	20	.	20	20
Totals	**1,058**	**16.1**	**.**	**3.00**	**0.89**	**238.47**	**40.61**	**.**	**.**	**3**	**375**

Table IR20-08. Catch statistics for 10 dominant taxa collected in 112 21.3-m river seine samples during northern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	127,113	86.5	49.1	1,669.03	764.75	484.91	71,529.41	29	0.01	17	57
Diapterus auratus	4,860	3.3	73.2	63.81	16.03	265.88	1,161.76	31	0.21	11	184
Eucinostomus spp.	3,568	2.4	81.3	46.85	6.54	147.75	307.35	27	0.11	10	39
Brevoortia spp.	2,718	1.9	17.9	35.69	21.53	638.31	1,919.12	24	0.06	18	49
Harengula jaguana	1,920	1.3	3.6	25.21	14.57	611.85	1,082.35	31	0.21	21	69
Opisthonema oglinum	1,263	0.9	3.6	16.58	12.22	779.93	1,223.53	33	0.25	24	61
Eugerres plumieri	1,186	0.8	51.8	15.57	4.02	273.05	264.71	34	0.89	7	229
Eucinostomus harengulus	791	0.5	63.4	10.39	2.11	214.86	185.29	51	0.30	40	101
Gambusia holbrooki	656	0.5	33.0	8.61	3.34	410.77	350.00	25	0.17	14	37
Menidia spp.	423	0.3	33.9	5.55	1.51	288.25	108.82	33	0.41	13	56
Subtotals	144,498	98.3	.	.	.	.	.	.	.	7	229
Totals	**146,988**	**100.0**	**.**	**1,929.99**	**792.41**	**434.51**	**73,938.24**	**.**	**.**	**2**	**561**

Table IR20-09. Catch statistics for Selected Taxa collected in 112 21.3-m river seine samples during northern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Centropomus undecimalis	408	0.3	47.3	5.36	1.13	222.49	79.41	47	2.64	11	368
Micropogonias undulatus	305	0.2	16.1	4.00	1.77	468.84	161.76	30	0.55	12	74
Farfantepenaeus spp.	163	0.1	27.7	2.14	0.78	387.91	79.41	6	0.22	2	13
Leiostomus xanthurus	116	0.1	8.9	1.52	0.66	461.67	58.82	34	1.22	15	81
Mugil cephalus	91	0.1	9.8	1.19	1.02	907.22	114.71	42	6.42	18	362
Lutjanus griseus	31	<0.1	15.2	0.41	0.11	279.48	7.35	135	9.64	32	243
Mugil curema	30	<0.1	11.6	0.39	0.13	336.10	8.82	56	9.53	16	236
Callinectes sapidus	20	<0.1	8.9	0.26	0.10	419.97	8.82	21	7.15	5	155
Archosargus probatocephalus	19	<0.1	14.3	0.25	0.06	272.82	4.41	124	16.81	23	262
Sciaenops ocellatus	13	<0.1	4.5	0.17	0.11	681.68	11.76	37	3.52	15	55
Elops saurus	12	<0.1	5.4	0.16	0.08	521.95	7.35	37	2.20	28	50
Mugil rubrioculus	8	<0.1	1.8	0.11	0.08	834.40	8.82	31	2.03	25	42
Litopenaeus setiferus	4	<0.1	2.7	0.05	0.03	643.19	2.94	8	0.63	6	9
Cynoscion nebulosus	2	<0.1	1.8	0.03	0.02	744.95	1.47	21	0.50	20	21
Farfantepenaeus aztecus	1	<0.1	0.9	0.01	0.01	1,058.30	1.47	16	.	16	16
Mugil trichodon	1	<0.1	0.9	0.01	0.01	1,058.30	1.47	41	.	41	41
Totals	**1,224**	**0.8**	**.**	**16.07**	**2.79**	**183.53**	**182.35**	**.**	**.**	**2**	**368**

Appendix IR20-01. Monthly summary of species collected during northern Indian River Lagoon stratified-random sampling, 2020. Effort, or total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=65	E=65	E=65	E=11	E=10	E=29	E=57	E=65	E=65	E=87	E=87	E=65	E=671
Achirus lineatus	10	20	11	.	3	3	16	9	20	19	33	7	**151**
Agonostomus monticola	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Albula vulpes	1	.	.	.	.	.	13	2	.	1	.	2	**19**
Anchoa cubana	.	.	.	.	.	.	1	10	.	30	.	.	**41**
Anchoa hepsetus	.	.	1	16	.	.	29	4	.	1	6	.	**57**
Anchoa lyolepis	.	.	.	.	.	.	.	223	.	23	.	2	**248**
Anchoa mitchilli	21,702	50,985	26,800	4	125	5,985	793	55,477	16,965	15,767	22,360	7,846	**224,809**
Anguilla rostrata	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Anisotremus virginicus	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Archosargus probatocephalus	26	20	71	1	2	48	59	53	41	20	11	46	**398**
Archosargus rhomboidalis	.	3	8	183	.	105	13	41	114	151	104	49	**771**
Archosargus spp.	.	.	1	.	.	.	1	.	1	.	.	1	**4**
Ariopsis felis	38	108	123	16	1	623	224	313	493	551	351	151	**2,992**
Bagre marinus	6	2	.	.	.	10	1	8	3	22	13	.	**65**
Bairdiella chrysoura	137	96	594	481	.	200	89	107	455	447	620	498	**3,724**
Balistidae sp.	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Bathygobius soporator	.	1	4	.	.	4	2	3	.	.	.	1	**15**
Brevoortia spp.	25	2,633	704	14	12	31	4	7	8	.	34	12	**3,484**
Callinectes ornatus	7	15	59	.	.	1	5	2	5	8	4	6	**112**
Callinectes sapidus	13	56	53	1	1	3	3	6	2	1	2	7	**148**
Callinectes similis	8	2	41	.	.	2	2	3	.	.	4	1	**63**

Appendix IR20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=65	E=65	E=65	E=11	E=10	E=29	E=57	E=65	E=65	E=87	E=87	E=65	E=671
Callinectes spp.	8	20	4	.	.	.	1	1	.	.	.	1	**35**
Caranx hippos	7	.	12	6	.	13	11	12	12	10	12	6	**101**
Caranx latus	.	.	6	.	.	5	.	2	14	6	25	.	**58**
Carcharhinus leucas	.	.	.	.	.	.	.	.	.	3	.	.	**3**
Centropomus parallelus	.	.	.	.	.	.	.	2	.	.	.	.	**2**
Centropomus undecimalis	25	49	35	18	3	61	121	41	63	70	36	77	**599**
Chaetodipterus faber	.	.	.	.	.	12	15	7	1	118	24	2	**179**
Charybdis hellerii	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Chasmodes saburrae	3	5	13	.	.	.	69	11	5	3	1	.	**110**
Chilomycterus schoepfii	14	12	5	5	.	5	22	22	52	31	22	24	**214**
Chilomycterus sp.	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Chloroscombrus chrysurus	.	.	.	.	.	.	.	3	.	1	.	.	**4**
Cichlasoma urophthalmus	.	2	5	.	.	2	7	6	.	.	.	.	**22**
Citharichthys spilopterus	18	30	70	.	.	.	3	33	4	4	.	2	**164**
Clupeidae spp.	.	.	2	.	.	.	.	.	.	.	1	.	**3**
Ctenogobius boleosoma	18	3	1	.	.	.	.	5	.	.	1	3	**31**
Ctenogobius pseudofasciatus	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Ctenogobius smaragdus	.	5	1	.	.	.	3	3	.	3	1	.	**16**
Ctenogobius sp.	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Ctenogobius stigmaticus	.	1	7	.	.	.	.	1	.	.	.	.	**9**
Cynoscion complex	14	1	.	.	.	111	1	1	4	1	3	4	**140**
Cynoscion nebulosus	25	9	29	3	1	6	26	33	39	49	40	27	**287**

Appendix IR20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=65	E=65	E=65	E=11	E=10	E=29	E=57	E=65	E=65	E=87	E=87	E=65	E=671
Dasyatis sabina	62	88	103	20	.	93	130	130	62	73	76	113	**950**
Dasyatis say	14	13	26	7	.	14	33	30	23	23	14	33	**230**
Diapterus auratus	1,771	726	583	803	35	805	2,342	3,739	2,843	1,384	1,670	1,581	**18,282**
Diapterus rhombeus	.	34	.	.	.	.	3	3	7	.	83	7	**137**
Diplodus holbrookii	.	.	.	.	.	.	.	.	1	.	.	1	**2**
Dormitator maculatus	2	1	.	.	.	.	.	1	.	2	.	.	**6**
Echeneis sp.	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Eleotridae sp.	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Elops saurus	35	109	66	5	7	39	86	47	53	81	49	86	**663**
Elops smithi	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Elops spp.	.	33	1	.	.	.	.	.	.	.	1	1	**36**
Epinephelus itajara	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Etheostoma fusiforme	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Etropus crossotus	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Eucinostomus argenteus	.	.	1	.	.	.	5	.	.	.	.	.	**6**
Eucinostomus gula	25	177	65	.	.	.	314	444	689	77	99	80	**1,970**
Eucinostomus harengulus	42	150	201	40	234	623	750	713	792	86	92	48	**3,771**
Eucinostomus jonesii	7	.	8	1	1	.	1	32	5	.	3	5	**63**
Eucinostomus lefroyi	1	.	.	.	.	.	.	2	.	.	.	.	**3**
Eucinostomus melanopterus	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Eucinostomus spp.	695	530	649	84	584	334	581	1,375	689	630	471	1,578	**8,200**
Eugerres plumieri	.	60	12	.	297	124	520	151	51	49	25	33	**1,322**

Appendix IR20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=65	E=65	E=65	E=11	E=10	E=29	E=57	E=65	E=65	E=87	E=87	E=65	E=671
Evorthodus lyricus	.	.	.	.	2	.	.	.	.	.	.	.	**2**
Farfantepenaeus aztecus	2	3	1	.	1	.	4	.	2	2	4	1	**20**
Farfantepenaeus duorarum	.	.	.	.	.	.	.	2	7	10	8	18	**45**
Farfantepenaeus spp.	58	223	228	1	15	2	36	98	47	64	30	24	**826**
Floridichthys carpio	1	8	1	.	.	.	69	29	.	.	.	.	**108**
Fundulus chrysotus	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Fundulus grandis	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Fundulus similis	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Gambusia holbrooki	41	61	287	2	2	36	40	42	45	40	22	38	**656**
Gerres cinereus	2	2	10	.	.	12	3	18	8	10	31	2	**98**
Gobiesox strumosus	.	.	1	.	.	.	.	3	.	.	.	.	**4**
Gobiomorus dormitor	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Gobionellus oceanicus	.	5	3	.	.	.	.	.	1	.	.	3	**12**
Gobiosoma bosc	3	5	12	.	10	3	.	1	.	1	1	.	**36**
Gobiosoma robustum	2	81	38	10	.	.	26	133	33	35	20	5	**383**
Gobiosoma spp.	14	69	20	1	11	7	79	438	132	464	109	14	**1,358**
Gymnura micrura	8	3	3	.	.	4	2	11	5	4	1	4	**45**
Haemulon parra	.	.	.	.	.	.	1	1	1	.	.	.	**3**
Harengula jaguana	28	12	14	.	.	4	1,594	786	891	1,043	459	26	**4,857**
Hemichromis letourneuxi	.	.	3	.	.	.	.	.	.	.	2	1	**6**
Heterandria formosa	4	.	5	.	.	.	1	3	7	.	.	.	**20**
Hippocampus erectus	.	1	1	.	.	1	2	.	.	1	.	.	**6**

Appendix IR20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=65	E=65	E=65	E=11	E=10	E=29	E=57	E=65	E=65	E=87	E=87	E=65	E=671
Hippocampus zosterae	.	.	.	.	.	.	1	1	.	.	.	.	**2**
Hyporhamphus meeki	.	.	.	.	.	.	.	.	2	6	4	47	**59**
Labidesthes sicculus	36	45	3	1	.	.	.	4	1	.	38	13	**141**
Lactophrys trigonus	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Lagodon rhomboides	13	90	115	.	.	6	165	83	565	334	280	64	**1,715**
Leiostomus xanthurus	15	591	863	83	8	2	1	9	11	12	2	13	**1,610**
Lepisosteus platyrhincus	2	.	.	.	.	1	1	1	.	.	.	.	**5**
Lepomis gulosus	1	.	.	.	.	.	.	7	1	.	.	.	**9**
Lepomis macrochirus	.	.	2	.	.	.	1	10	2	1	.	2	**18**
Lepomis microlophus	1	.	.	.	.	.	.	.	2	.	.	.	**3**
Lepomis spp.	.	.	.	.	.	3	2	2	7	2	.	.	**16**
Limulus polyphemus	4	24	8	.	.	1	3	4	1	25	36	13	**119**
Litopenaeus setiferus	.	.	.	.	.	.	.	.	5	40	45	14	**104**
Lobotes surinamensis	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Lophogobius cyprinoides	5	1	.	.	11	54	67	16	77	2	9	19	**261**
Lucania goodei	2	.	2	.	.	.	.	1	.	.	.	.	**5**
Lucania parva	12	6	11	.	.	1	130	9	7	1	.	.	**177**
Lupinoblennius nicholsi	.	.	.	2	1	.	1	1	.	.	.	.	**5**
Lutjanus analis	2	.	.	.	.	.	8	6	8	5	7	1	**37**
Lutjanus griseus	8	17	15	11	7	4	92	37	125	59	2	7	**384**
Lutjanus synagris	1	1	.	.	.	.	2	2	9	7	.	1	**23**
Megalops atlanticus	.	.	.	.	.	3	1	4	.	2	.	.	**10**

Appendix IR20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=65	E=65	E=65	E=11	E=10	E=29	E=57	E=65	E=65	E=87	E=87	E=65	E=671
Membras martinica	3	.	4	.	.	.	.	.	2	4	10	86	**109**
Menidia spp.	105	99	103	43	20	78	398	86	37	66	36	9	**1,080**
Menippe spp.	.	1	1	.	.	.	.	3	12	5	.	.	**22**
Menticirrhus americanus	46	38	34	.	.	13	19	39	120	62	115	57	**543**
Microgobius gulosus	6	18	14	1	29	58	110	217	26	80	20	9	**588**
Microgobius microlepis	.	.	.	.	.	.	18	11	6	26	7	10	**78**
Microgobius thalassinus	3	5	1	.	.	1	1	2	3	1	4	1	**22**
Micropogonias undulatus	558	313	318	.	.	.	1	54	3	1	109	351	**1,708**
Monacanthidae sp.	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Monacanthus ciliatus	.	.	2	.	.	.	.	.	.	.	.	.	**2**
Mugil cephalus	8,618	518	2,437	12	1	68	96	108	113	54	98	166	**12,289**
Mugil curema	420	468	143	15	1	205	100	312	248	183	191	332	**2,618**
Mugil rubrioculus	2	18	5	.	2	1	.	1	1	13	4	4	**51**
Mugil trichodon	.	1	.	.	.	.	.	.	.	.	1	.	**2**
Oligoplites saurus	12	4	130	9	11	17	73	60	20	22	8	11	**377**
Opisthonema oglinum	.	.	7	.	4	22	140	1,046	470	122	219	3	**2,033**
Opsanus tau	.	2	2	1	.	.	1	.	6	.	3	.	**15**
Oreochromis/Sarotherodon sp.	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Orthopristis chrysoptera	1	30	67	2	.	.	4	27	16	10	8	7	**172**
Panulirus argus	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Paralichthys albigutta	.	.	.	.	.	1	1	2	2	2	1	2	**11**
Poecilia latipinna	.	2	8	.	.	4	13	.	1	.	.	.	**28**

Appendix IR20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=65	E=65	E=65	E=11	E=10	E=29	E=57	E=65	E=65	E=87	E=87	E=65	E=671
Pogonias cromis	45	5	4	1	.	52	1	13	13	3	7	62	**206**
Pomadasys crocro	.	2	.	.	.	.	.	.	.	.	.	.	**2**
Pomatomus saltatrix	.	.	.	1	.	.	.	1	2	.	.	6	**10**
Portunidae sp.	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Portunus spp.	.	.	.	.	.	.	.	.	1	.	1	.	**2**
Prionotus scitulus	1	.	.	.	.	1	5	2	1	3	3	.	**16**
Prionotus tribulus	1	5	3	.	.	.	.	1	2	1	1	3	**17**
Rhinoptera bonasus	.	.	.	.	.	8	.	2	.	.	.	.	**10**
Sardinella aurita	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Sarotherodon melanotheron	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Sciaenops ocellatus	77	47	53	2	1	42	25	30	16	3	70	91	**457**
Scomberomorus maculatus	1	.	.	.	.	.	.	1	4	2	.	.	**8**
Scomberomorus regalis	.	.	2	.	.	.	.	.	.	.	1	.	**3**
Scomberomorus spp.	.	.	.	.	.	.	.	64	.	.	.	.	**64**
Scorpaena grandicornis	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Selene vomer	1	2	.	.	.	6	.	3	39	.	38	.	**89**
Sphoeroides nephelus	15	36	22	12	.	8	14	23	46	28	24	7	**235**
Sphoeroides spengleri	.	2	1	.	.	.	.	2	2	1	3	2	**13**
Sphoeroides testudineus	23	47	27	.	1	36	14	23	43	5	13	22	**254**
Sphyraena barracuda	1	6	.	.	.	1	1	9	4	.	2	4	**28**
Sphyraena guachancho	.	.	.	.	.	.	.	14	.	.	.	.	**14**
Sphyrna tiburo	.	.	.	.	.	.	.	.	6	2	.	.	**8**

Appendix IR20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=65	E=65	E=65	E=11	E=10	E=29	E=57	E=65	E=65	E=87	E=87	E=65	E=671
Stephanolepis hispidus	.	.	1	.	.	.	.	1	2	.	.	2	**6**
Strongylura marina	4	.	2	.	.	1	.	1	1	1	.	.	**10**
Strongylura notata	10	4	2	.	.	5	30	32	13	31	8	1	**136**
Strongylura spp.	.	.	2	.	.	.	.	.	.	.	.	.	**2**
Strongylura timucu	.	.	.	.	.	.	.	.	1	.	1	.	**2**
Symphurus plagiusa	1	2	1	.	.	.	.	2	.	.	2	2	**10**
Syngnathus louisianae	2	1	2	.	.	.	2	.	.	.	5	2	**14**
Syngnathus scovelli	34	82	42	12	7	1	29	15	11	18	16	3	**270**
Synodus foetens	.	1	.	.	.	.	1	8	.	2	1	3	**16**
Trachinotus carolinus	1	16	3	.	.	1	1	3	3	1	8	.	**37**
Trachinotus falcatus	.	.	.	.	.	2	11	30	18	15	7	3	**86**
Trinectes maculatus	11	5	2	.	1	1	2	10	1	2	.	1	**36**
Tylosurus crocodilus	.	.	.	.	.	.	.	.	1	2	.	.	**3**
Totals	**35,027**	**59,027**	**35,468**	**1,930**	**1,453**	**10,040**	**9,744**	**67,144**	**26,838**	**22,691**	**28,448**	**13,937**	**311,747**

Appendix IR20-02. Summary by gear and stratum of species collected during northern Indian River Lagoon stratified-random sampling, 2020. Sampling with 21.3-m bay seine was stratified by the presence or absence of a shoreline ('Shore' or offshore) within 5-m. Offshore sets were further stratified by the presence or absence of bottom vegetation ('Veg' or 'Unveg'). Sampling with 21.3-m river seine and 183-m haul seine was post-stratified by the presence or absence of overhanging vegetation ('Over' or 'Nonover'). Sampling with 6.1-m otter trawl was not stratified. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=53	E=79	E=169	E=79	E=33	E=142	E=51	E=65	E=671
Achirus lineatus	13	11	41	10	2	40	20	14	**151**
Agonostomus monticola	.	.	.	1	.	.	.	.	**1**
Albula vulpes	2	.	14	.	.	2	.	1	**19**
Anchoa cubana	1	.	30	.	.	.	.	10	**41**
Anchoa hepsetus	14	.	31	1	8	.	.	3	**57**
Anchoa lyolepis	.	.	23	.	192	.	.	33	**248**
Anchoa mitchilli	6,237	8,044	82,231	19,232	107,881	.	.	1,184	**224,809**
Anguilla rostrata	.	.	.	.	.	1	.	.	**1**
Anisotremus virginicus	.	.	.	.	.	.	1	.	**1**
Archosargus probatocephalus	19	19	35	8	11	195	92	19	**398**
Archosargus rhomboidalis	2	1	5	.	.	597	166	.	**771**
Archosargus spp.	.	.	.	.	.	2	2	.	**4**
Ariopsis felis	132	188	166	11	1	1,739	701	54	**2,992**
Bagre marinus	3	1	.	.	.	32	29	.	**65**
Bairdiella chrysoura	579	45	221	.	.	2,428	365	86	**3,724**
Balistidae sp.	.	.	1	.	.	.	.	.	**1**
Bathygobius soporator	.	.	8	4	3	.	.	.	**15**
Brevoortia spp.	.	4	671	1,684	1,034	65	24	2	**3,484**
Callinectes ornatus	5	21	5	.	2	12	.	67	**112**
Callinectes sapidus	33	11	37	19	1	11	17	19	**148**
Callinectes similis	2	24	11	.	2	5	1	18	**63**
Callinectes spp.	10	3	9	.	.	.	.	13	**35**
Caranx hippos	.	.	2	6	1	72	20	.	**101**
Caranx latus	.	.	3	1	4	43	7	.	**58**
Carcharhinus leucas	.	.	.	.	.	2	1	.	**3**
Centropomus parallelus	.	.	.	.	.	2	.	.	**2**

Appendix IR20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=53	E=79	E=169	E=79	E=33	E=142	E=51	E=65	E=671
Centropomus undecimalis	.	.	12	372	36	135	44	.	**599**
Chaetodipterus faber	1	.	1	.	.	155	16	6	**179**
Charybdis hellerii	.	.	.	.	.	.	.	1	**1**
Chasmodes saburrae	81	1	15	.	.	.	.	13	**110**
Chilomycterus schoepfii	.	1	4	.	.	73	70	66	**214**
Chilomycterus sp.	.	.	.	.	.	.	.	1	**1**
Chloroscombrus chrysurus	.	.	.	.	.	.	.	4	**4**
Cichlasoma urophthalmus	.	.	.	16	6	.	.	.	**22**
Citharichthys spilopterus	15	24	78	.	.	30	2	15	**164**
Clupeidae spp.	.	.	.	2	.	.	.	1	**3**
Ctenogobius boleosoma	6	3	20	.	.	.	.	2	**31**
Ctenogobius pseudofasciatus	.	.	.	1	.	.	.	.	**1**
Ctenogobius smaragdus	1	6	8	.	.	.	.	1	**16**
Ctenogobius sp.	.	.	.	.	.	.	.	1	**1**
Ctenogobius stigmaticus	.	1	7	.	.	.	.	1	**9**
Cynoscion complex	.	3	1	.	.	21	112	3	**140**
Cynoscion nebulosus	29	9	75	1	1	104	42	26	**287**
Dasyatis sabina	11	24	33	1	.	594	262	25	**950**
Dasyatis say	2	3	7	.	.	148	63	7	**230**
Diapterus auratus	822	194	2,479	2,935	1,925	5,960	2,495	1,472	**18,282**
Diapterus rhombeus	.	.	133	.	.	4	.	.	**137**
Diplodus holbrookii	.	.	.	.	.	1	1	.	**2**
Dormitator maculatus	.	.	.	4	2	.	.	.	**6**
Echeneis sp.	.	.	.	.	.	.	1	.	**1**
Eleotridae sp.	.	.	.	.	1	.	.	.	**1**
Elops saurus	.	7	26	12	.	433	84	101	**663**
Elops smithi	.	.	.	1	.	.	.	.	**1**
Elops spp.	.	.	4	.	.	.	.	32	**36**
Epinephelus itajara	.	.	.	.	.	.	.	1	**1**
Etheostoma fusiforme	.	.	.	.	1	.	.	.	**1**
Etropus crossotus	.	.	.	.	.	.	.	1	**1**
Eucinostomus argenteus	5	.	.	.	.	.	.	1	**6**

Appendix IR20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=53	E=79	E=169	E=79	E=33	E=142	E=51	E=65	E=671
Eucinostomus gula	147	28	787	55	23	646	115	169	**1,970**
Eucinostomus harengulus	41	47	458	581	210	2,123	303	8	**3,771**
Eucinostomus jonesii	6	2	50	1	.	.	.	4	**63**
Eucinostomus lefroyi	3	.	.	.	.	.	.	.	**3**
Eucinostomus melanopterus	.	.	.	.	1	.	.	.	**1**
Eucinostomus spp.	1,050	253	2,863	2,449	1,119	.	.	466	**8,200**
Eugerres plumieri	11	16	37	1,025	161	41	31	.	**1,322**
Evorthodus lyricus	.	.	.	2	.	.	.	.	**2**
Farfantepenaeus aztecus	4	1	3	.	1	2	3	6	**20**
Farfantepenaeus duorarum	2	1	1	.	.	16	6	19	**45**
Farfantepenaeus spp.	119	103	231	150	13	.	.	210	**826**
Floridichthys carpio	.	.	108	.	.	.	.	.	**108**
Fundulus chrysotus	.	.	.	1	.	.	.	.	**1**
Fundulus grandis	.	.	1	.	.	.	.	.	**1**
Fundulus similis	.	.	1	.	.	.	.	.	**1**
Gambusia holbrooki	.	.	.	423	233	.	.	.	**656**
Gerres cinereus	1	.	33	16	10	36	2	.	**98**
Gobiesox strumosus	.	.	4	.	.	.	.	.	**4**
Gobiomorus dormitor	.	.	.	1	.	.	.	.	**1**
Gobionellus oceanicus	.	4	3	4	1	.	.	.	**12**
Gobiosoma bosc	1	.	15	18	2	.	.	.	**36**
Gobiosoma robustum	51	25	81	2	.	.	.	224	**383**
Gobiosoma spp.	141	47	133	21	10	.	.	1,006	**1,358**
Gymnura micrura	.	.	2	.	.	26	11	6	**45**
Haemulon parra	1	.	.	.	.	.	2	.	**3**
Harengula jaguana	315	32	1,609	1	1,919	840	136	5	**4,857**
Hemichromis letourneuxi	.	.	.	4	2	.	.	.	**6**
Heterandria formosa	.	.	.	6	14	.	.	.	**20**
Hippocampus erectus	.	.	1	.	.	2	1	2	**6**
Hippocampus zosterae	.	.	2	.	.	.	.	.	**2**
Hyporhamphus meeki	.	.	.	.	.	12	47	.	**59**
Labidesthes sicculus	.	.	.	86	55	.	.	.	**141**

Appendix IR20-02. (Continued)

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=53	E=79	E=169	E=79	E=33	E=142	E=51	E=65	E=671
Lactophrys trigonus	.	.	.	.	.	.	.	1	**1**
Lagodon rhomboides	11	40	42	.	10	1,182	301	129	**1,715**
Leiostomus xanthurus	.	14	1,194	43	73	41	16	229	**1,610**
Lepisosteus platyrhincus	.	.	.	5	.	.	.	.	**5**
Lepomis gulosus	.	.	.	.	9	.	.	.	**9**
Lepomis macrochirus	.	.	.	8	10	.	.	.	**18**
Lepomis microlophus	.	.	.	1	2	.	.	.	**3**
Lepomis spp.	.	.	.	8	8	.	.	.	**16**
Limulus polyphemus	.	5	7	.	.	48	59	.	**119**
Litopenaeus setiferus	1	27	46	4	.	12	12	2	**104**
Lobotes surinamensis	.	.	.	.	.	.	.	1	**1**
Lophogobius cyprinoides	.	.	1	83	177	.	.	.	**261**
Lucania goodei	.	.	.	2	3	.	.	.	**5**
Lucania parva	41	1	123	11	1	.	.	.	**177**
Lupinoblennius nicholsi	.	.	.	3	2	.	.	.	**5**
Lutjanus analis	10	.	1	.	.	18	.	8	**37**
Lutjanus griseus	35	2	19	15	16	148	122	27	**384**
Lutjanus synagris	2	.	.	.	.	.	.	21	**23**
Megalops atlanticus	.	.	1	.	.	8	1	.	**10**
Membras martinica	1	14	93	1	.	.	.	.	**109**
Menidia spp.	14	29	614	111	312	.	.	.	**1,080**
Menippe spp.	2	.	.	.	.	1	.	19	**22**
Menticirrhus americanus	1	22	30	.	.	233	221	36	**543**
Microgobius gulosus	166	88	194	35	70	.	.	35	**588**
Microgobius microlepis	12	.	39	.	.	.	.	27	**78**
Microgobius thalassinus	5	6	8	.	1	.	.	2	**22**
Micropogonias undulatus	18	105	910	304	1	65	.	305	**1,708**
Monacanthidae sp.	.	.	1	.	.	.	.	.	**1**
Monacanthus ciliatus	.	1	.	.	.	.	.	1	**2**
Mugil cephalus	1	7	11,407	84	7	494	288	1	**12,289**
Mugil curema	7	22	158	12	18	1,703	698	.	**2,618**
Mugil rubrioculus	.	.	27	2	6	14	2	.	**51**

Appendix IR20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=53	E=79	E=169	E=79	E=33	E=142	E=51	E=65	E=671
Mugil trichodon	.	.	1	.	1	.	.	.	**2**
Oligoplites saurus	7	24	90	12	2	219	23	.	**377**
Opisthonema oglinum	115	28	286	4	1,259	246	92	3	**2,033**
Opsanus tau	.	1	3	.	.	6	3	2	**15**
Oreochromis/Sarotherodon sp.	.	.	.	1	.	.	.	.	**1**
Orthopristis chrysoptera	6	11	3	.	.	38	27	87	**172**
Panulirus argus	.	.	.	.	.	.	.	1	**1**
Paralichthys albigutta	.	.	.	.	.	8	1	2	**11**
Poecilia latipinna	.	.	.	15	13	.	.	.	**28**
Pogonias cromis	.	1	1	.	.	137	67	.	**206**
Pomadasys crocro	.	1	.	1	.	.	.	.	**2**
Pomatomus saltatrix	.	.	.	.	.	2	8	.	**10**
Portunidae sp.	.	.	1	.	.	.	.	.	**1**
Portunus spp.	.	.	.	.	.	.	.	2	**2**
Prionotus scitulus	.	.	1	.	.	10	2	3	**16**
Prionotus tribulus	3	.	3	.	.	2	2	7	**17**
Rhinoptera bonasus	.	.	.	.	.	.	10	.	**10**
Sardinella aurita	1	.	.	.	.	.	.	.	**1**
Sarotherodon melanotheron	.	.	.	.	.	1	.	.	**1**
Sciaenops ocellatus	12	8	267	2	11	125	30	2	**457**
Scomberomorus maculatus	.	.	.	.	.	7	1	.	**8**
Scomberomorus regalis	.	.	.	.	.	3	.	.	**3**
Scomberomorus spp.	.	.	.	.	64	.	.	.	**64**
Scorpaena grandicornis	.	.	.	.	.	.	.	1	**1**
Selene vomer	.	.	.	.	1	86	2	.	**89**
Sphoeroides nephelus	4	6	3	.	.	96	113	13	**235**
Sphoeroides spengleri	.	1	2	.	.	2	3	5	**13**
Sphoeroides testudineus	4	16	50	1	17	81	61	24	**254**
Sphyraena barracuda	.	.	2	4	4	15	3	.	**28**
Sphyraena guachancho	.	.	.	.	.	.	.	14	**14**
Sphyrna tiburo	.	1	.	.	.	2	5	.	**8**
Stephanolepis hispidus	.	.	.	.	.	.	1	5	**6**

Appendix IR20-02. (Continued).

Species	Gear and Strata								Totals
	21.3-m bay seine			21.3-m river seine		183-m haul seine		6.1-m otter trawl	
	Veg	Unveg	Shore	Over	Nonover	Over	Nonover		
	E=53	E=79	E=169	E=79	E=33	E=142	E=51	E=65	E=671
Strongylura marina	.	.	.	1	.	2	7	.	**10**
Strongylura notata	3	34	61	4	10	15	9	.	**136**
Strongylura spp.	.	1	1	.	.	.	.	.	**2**
Strongylura timucu	.	.	1	.	1	.	.	.	**2**
Symphurus plagiusa	.	1	1	.	.	2	1	5	**10**
Syngnathus louisianae	2	.	2	.	.	.	.	10	**14**
Syngnathus scovelli	88	9	31	10	1	2	.	129	**270**
Synodus foetens	4	.	1	.	.	7	.	4	**16**
Trachinotus carolinus	.	.	.	.	.	33	4	.	**37**
Trachinotus falcatus	1	.	18	.	.	63	4	.	**86**
Trinectes maculatus	.	.	.	21	14	.	1	.	**36**
Tylosurus crocodilus	.	.	.	.	.	2	1	.	**3**
Totals	**10,495**	**9,733**	**108,614**	**29,976**	**117,012**	**21,829**	**7,496**	**6,592**	**311,747**

Appendix IR20-03. Summary by zone of species collected during northern Indian River Lagoon stratified-random sampling, 2020. Zones A-C and H were located in the Indian River; Zones D-E encompassed the Banana River; and Zone F encompassed the lower Sebastian River and Turkey Creek. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	**Zone**							
	A	**B**	**C**	**D**	**E**	**H**	**F**	**Total**
	E=16	**E=14**	**E=136**	**E=132**	**E=54**	**E=207**	**E=112**	**E=671**
Achirus lineatus	2	.	38	32	15	52	12	**151**
Agonostomus monticola	.	.	.	.	.	.	1	**1**
Albula vulpes	.	.	9	1	.	9	.	**19**
Anchoa cubana	.	.	.	.	.	41	.	**41**
Anchoa hepsetus	.	.	10	.	1	37	9	**57**
Anchoa lyolepis	.	.	.	.	.	56	192	**248**
Anchoa mitchilli	1,135	578	29,639	8,325	2,253	55,766	127,113	**224,809**
Anguilla rostrata	.	.	.	1	.	.	.	**1**
Anisotremus virginicus	.	.	.	.	.	1	.	**1**
Archosargus probatocephalus	1	.	37	73	31	237	19	**398**
Archosargus rhomboidalis	.	.	25	.	27	719	.	**771**
Archosargus spp.	.	.	.	.	.	4	.	**4**
Ariopsis felis	63	75	793	1,027	538	484	12	**2,992**
Bagre marinus	1	.	19	19	18	8	.	**65**
Bairdiella chrysoura	19	25	2,058	683	804	135	.	**3,724**
Balistidae sp.	.	.	.	.	.	1	.	**1**
Bathygobius soporator	.	.	2	.	.	6	7	**15**
Brevoortia spp.	.	.	48	10	44	664	2,718	**3,484**
Callinectes ornatus	.	.	.	.	.	110	2	**112**
Callinectes sapidus	.	.	35	8	8	77	20	**148**
Callinectes similis	.	.	.	.	.	61	2	**63**
Callinectes spp.	.	.	.	.	.	35	.	**35**
Caranx hippos	.	.	4	18	.	72	7	**101**
Caranx latus	.	.	2	5	2	44	5	**58**
Carcharhinus leucas	.	.	3	.	.	.	.	**3**
Centropomus parallelus	.	.	.	.	.	2	.	**2**
Centropomus undecimalis	.	1	23	33	23	111	408	**599**
Chaetodipterus faber	.	.	34	11	1	133	.	**179**
Charybdis hellerii	.	.	.	.	.	1	.	**1**
Chasmodes saburrae	.	1	27	.	.	82	.	**110**

Appendix IR20-03. (Continued).

Species	Zone							
	A	B	C	D	E	H	F	Total
	E=16	E=14	E=136	E=132	E=54	E=207	E=112	E=671
Chilomycterus schoepfii	1	1	44	28	4	136	.	**214**
Chilomycterus sp.	.	.	.	.	.	1	.	**1**
Chloroscombrus chrysurus	.	.	.	.	.	4	.	**4**
Cichlasoma urophthalmus	.	.	.	.	.	.	22	**22**
Citharichthys spilopterus	.	.	1	.	.	163	.	**164**
Clupeidae spp.	.	.	.	.	.	1	2	**3**
Ctenogobius boleosoma	.	.	.	.	.	31	.	**31**
Ctenogobius pseudofasciatus	.	.	.	.	.	.	1	**1**
Ctenogobius smaragdus	.	.	.	.	.	16	.	**16**
Ctenogobius sp.	.	.	.	.	.	1	.	**1**
Ctenogobius stigmaticus	.	.	.	.	.	9	.	**9**
Cynoscion complex	.	.	1	5	129	5	.	**140**
Cynoscion nebulosus	28	7	63	38	38	111	2	**287**
Dasyatis sabina	2	6	210	273	151	307	1	**950**
Dasyatis say	.	.	38	43	51	98	.	**230**
Diapterus auratus	9	21	5,076	638	811	6,867	4,860	**18,282**
Diapterus rhombeus	.	.	4	.	.	133	.	**137**
Diplodus holbrookii	.	.	1	.	.	1	.	**2**
Dormitator maculatus	.	.	.	.	.	.	6	**6**
Echeneis sp.	.	.	.	.	.	1	.	**1**
Eleotridae sp.	.	.	.	.	.	.	1	**1**
Elops saurus	.	.	83	209	58	301	12	**663**
Elops smithi	.	.	.	.	.	.	1	**1**
Elops spp.	.	.	1	.	.	35	.	**36**
Epinephelus itajara	.	.	.	.	.	1	.	**1**
Etheostoma fusiforme	.	.	.	.	.	.	1	**1**
Etropus crossotus	.	.	.	.	.	1	.	**1**
Eucinostomus argenteus	.	.	.	.	.	6	.	**6**
Eucinostomus gula	.	.	58	4	15	1,815	78	**1,970**
Eucinostomus harengulus	4	1	1,428	436	254	857	791	**3,771**
Eucinostomus jonesii	.	.	4	.	.	58	1	**63**
Eucinostomus lefroyi	.	.	.	.	.	3	.	**3**
Eucinostomus melanopterus	.	.	.	.	.	.	1	**1**

Appendix IR20-03. (Continued).

Species	Zone							
	A	B	C	D	E	H	F	Total
	E=16	E=14	E=136	E=132	E=54	E=207	E=112	E=671
Eucinostomus spp.	28	3	599	41	16	3,945	3,568	**8,200**
Eugerres plumieri	4	4	63	19	42	4	1,186	**1,322**
Evorthodus lyricus	.	.	.	.	.	.	2	**2**
Farfantepenaeus aztecus	1	.	2	5	.	11	1	**20**
Farfantepenaeus duorarum	1	.	8	3	2	31	.	**45**
Farfantepenaeus spp.	6	2	6	.	.	649	163	**826**
Floridichthys carpio	.	.	33	75	.	.	.	**108**
Fundulus chrysotus	.	.	.	.	.	.	1	**1**
Fundulus grandis	.	.	.	1	.	.	.	**1**
Fundulus similis	.	.	.	1	.	.	.	**1**
Gambusia holbrooki	.	.	.	.	.	.	656	**656**
Gerres cinereus	.	.	.	1	.	71	26	**98**
Gobiesox strumosus	.	.	1	2	.	1	.	**4**
Gobiomorus dormitor	.	.	.	.	.	.	1	**1**
Gobionellus oceanicus	.	.	.	.	.	7	5	**12**
Gobiosoma bosc	.	.	8	4	.	4	20	**36**
Gobiosoma robustum	.	.	77	6	4	294	2	**383**
Gobiosoma spp.	31	.	58	15	.	1,223	31	**1,358**
Gymnura micrura	.	.	7	8	4	26	.	**45**
Haemulon parra	.	.	.	.	.	3	.	**3**
Harengula jaguana	2	1	169	32	102	2,631	1,920	**4,857**
Hemichromis letourneuxi	.	.	.	.	.	.	6	**6**
Heterandria formosa	.	.	.	.	.	.	20	**20**
Hippocampus erectus	.	.	3	.	.	3	.	**6**
Hippocampus zosterae	.	.	.	.	.	2	.	**2**
Hyporhamphus meeki	.	.	.	.	4	55	.	**59**
Labidesthes sicculus	.	.	.	.	.	.	141	**141**
Lactophrys trigonus	.	.	.	.	.	1	.	**1**
Lagodon rhomboides	.	.	31	62	3	1,609	10	**1,715**
Leiostomus xanthurus	.	1	553	7	8	925	116	**1,610**
Lepisosteus platyrhincus	.	.	.	.	.	.	5	**5**
Lepomis gulosus	.	.	.	.	.	.	9	**9**
Lepomis macrochirus	.	.	.	.	.	.	18	**18**

Appendix IR20-03. (Continued).

Species	Zone							
	A	B	C	D	E	H	F	Total
	E=16	E=14	E=136	E=132	E=54	E=207	E=112	E=671
Lepomis microlophus	.	.	.	.	.	.	3	**3**
Lepomis spp.	.	.	.	.	.	.	16	**16**
Limulus polyphemus	5	4	21	68	21	.	.	**119**
Litopenaeus setiferus	32	2	33	14	9	10	4	**104**
Lobotes surinamensis	.	.	.	.	.	1	.	**1**
Lophogobius cyprinoides	.	.	.	.	.	1	260	**261**
Lucania goodei	.	.	.	.	.	.	5	**5**
Lucania parva	.	.	157	4	1	3	12	**177**
Lupinoblennius nicholsi	.	.	.	.	.	.	5	**5**
Lutjanus analis	.	.	.	.	.	37	.	**37**
Lutjanus griseus	3	.	36	9	37	268	31	**384**
Lutjanus synagris	.	.	.	.	.	23	.	**23**
Megalops atlanticus	1	.	1	8	.	.	.	**10**
Membras martinica	5	2	5	96	.	.	1	**109**
Menidia spp.	17	16	138	477	9	.	423	**1,080**
Menippe spp.	.	.	.	.	.	22	.	**22**
Menticirrhus americanus	12	8	20	292	162	49	.	**543**
Microgobius gulosus	14	2	89	109	11	258	105	**588**
Microgobius microlepis	.	.	.	.	.	78	.	**78**
Microgobius thalassinus	3	.	.	1	1	16	1	**22**
Micropogonias undulatus	.	.	29	14	2	1,358	305	**1,708**
Monacanthidae sp.	.	.	.	.	.	1	.	**1**
Monacanthus ciliatus	.	.	.	.	.	2	.	**2**
Mugil cephalus	2	1	1,059	384	79	10,673	91	**12,289**
Mugil curema	.	3	658	633	750	544	30	**2,618**
Mugil rubrioculus	.	.	21	6	1	15	8	**51**
Mugil trichodon	.	1	.	.	.	.	1	**2**
Oligoplites saurus	.	1	189	45	15	113	14	**377**
Opisthonema oglinum	11	.	206	166	112	275	1,263	**2,033**
Opsanus tau	.	.	12	.	1	2	.	**15**
Oreochromis/Sarotherodon sp.	.	.	.	.	.	.	1	**1**
Orthopristis chrysoptera	.	.	28	.	.	144	.	**172**
Panulirus argus	.	.	.	.	.	1	.	**1**

Appendix IR20-03. (Continued).

Species	**Zone**							
	A	**B**	**C**	**D**	**E**	**H**	**F**	**Total**
	E=16	**E=14**	**E=136**	**E=132**	**E=54**	**E=207**	**E=112**	**E=671**
Paralichthys albigutta	.	.	.	.	.	11	.	**11**
Poecilia latipinna	.	.	.	.	.	.	28	**28**
Pogonias cromis	.	1	7	127	19	52	.	**206**
Pomadasys crocro	.	.	.	.	.	1	1	**2**
Pomatomus saltatrix	.	.	1	.	.	9	.	**10**
Portunidae sp.	.	.	.	.	.	1	.	**1**
Portunus spp.	.	.	.	.	.	2	.	**2**
Prionotus scitulus	.	.	7	.	.	9	.	**16**
Prionotus tribulus	.	.	1	.	.	16	.	**17**
Rhinoptera bonasus	.	.	8	2	.	.	.	**10**
Sardinella aurita	.	.	.	.	.	1	.	**1**
Sarotherodon melanotheron	.	.	.	.	1	.	.	**1**
Sciaenops ocellatus	2	1	51	78	49	263	13	**457**
Scomberomorus maculatus	.	.	.	.	.	8	.	**8**
Scomberomorus regalis	.	.	2	.	.	1	.	**3**
Scomberomorus spp.	.	.	.	.	.	.	64	**64**
Scorpaena grandicornis	.	.	.	.	.	1	.	**1**
Selene vomer	.	.	2	.	.	86	1	**89**
Sphoeroides nephelus	.	1	84	34	39	77	.	**235**
Sphoeroides spengleri	.	.	.	.	.	13	.	**13**
Sphoeroides testudineus	.	.	6	1	.	229	18	**254**
Sphyraena barracuda	.	.	.	.	.	20	8	**28**
Sphyraena guachancho	.	.	.	.	.	14	.	**14**
Sphyrna tiburo	.	.	.	.	.	8	.	**8**
Stephanolepis hispidus	.	.	.	.	.	6	.	**6**
Strongylura marina	.	.	3	3	2	1	1	**10**
Strongylura notata	.	.	45	24	27	26	14	**136**
Strongylura spp.	.	.	.	1	.	1	.	**2**
Strongylura timucu	.	.	.	.	.	1	1	**2**
Symphurus plagiusa	.	.	.	2	.	8	.	**10**
Syngnathus louisianae	.	.	1	2	.	11	.	**14**
Syngnathus scovelli	2	.	71	10	5	171	11	**270**
Synodus foetens	.	.	.	.	.	16	.	**16**

Appendix IR20-03. (Continued).

Species	Zone							
	A	B	C	D	E	H	F	Total
	E=16	E=14	E=136	E=132	E=54	E=207	E=112	E=671
Trachinotus carolinus	.	.	19	.	2	16	.	**37**
Trachinotus falcatus	.	.	33	3	1	49	.	**86**
Trinectes maculatus	.	.	1	.	.	.	35	**36**
Tylosurus crocodilus	.	.	.	.	.	3	.	**3**
Totals	**1,447**	**770**	**44,480**	**14,815**	**6,817**	**96,430**	**146,988**	**311,747**

Appendix IR20-04. Summary of monthly sampling effort by gear during northern Indian River Lagoon stratified-random sampling, 2020.

Month	**# SRS Sites**			**Totals**
	21.3-m Seine	**183-m Seine**	**6.1-m Trawl**	
January	38	19	8	**65**
February	38	19	8	**65**
March	38	19	8	**65**
April	7	3	1	**11**
May	10	0	0	**10**
June	10	19	0	**29**
July	38	19	0	**57**
August	38	19	8	**65**
September	38	19	8	**65**
October	60	19	8	**87**
November	60	19	8	**87**
December	38	19	8	**65**
TOTALS	**413**	**193**	**65**	**671**

Cedar Key

Cedar Key is in the Suwannee River estuary, an open system located along the Gulf Coast of Florida within the area known as the Big Bend. Freshwater inflow into the estuary comes primarily from the Suwannee River with additional input from many fringing marsh tidal creeks (Lindberg et al. 1992). The shoreline consists largely of marsh grasses, oyster bars, and mud flats. Seagrass meadows primarily occur in the southern portions of the estuary (Tuckey and Dehaven 2006).

The Fisheries-Independent Monitoring (FIM) program has conducted intensive sampling in the Cedar Key area since 1996. The area sampled was divided into two geographically-defined bay zones (B and C) and one riverine zone (F; Figure CK20-01). Monthly stratified-random sampling (SRS) was conducted in Zones B and C using 21.3-m bay seines, 183-m haul seines, and 6.1-m bay otter trawls. Tidal creeks in Zone B were sampled using 21.3-m river seines. Monthly SRS was conducted in Zone F with 21.3-m river seines and 6.1-m river otter trawls. All methods were the same as those described in the Methods section of this report. This section summarizes data collected by the FIM program during 2020 in the Cedar Key area.

Stratified-Random Sampling

A total of 76,533 animals, which included 147 taxa of fishes and nine taxa of selected invertebrates, were collected from 636 Cedar Key SRS samples in 2020 (Table CK20-01; Appendices CK20-01 and -02). *Anchoa mitchilli* (n=19,780) was the most numerous taxon collected, representing 25.8% of the total catch. *Leiostomus xanthurus* (n= 14,367), *Lagodon rhomboides* (n=7,270), and *Menidia* spp. (n=4,250) were the next most abundant taxa collected, accounting for an additional 33.8% of the total catch. Thirty-one Selected Taxa (n=23,018 animals) composed 30.1% of the total catch. *Leiostomus xanthurus* (n=14,367), *Mugil cephalus* (n=2,176), and *Callinectes sapidus* (n=1,246) were the most abundant Selected Taxa, representing 23.2% of the total catch. Collections in 2020 included one species new to the Cedar Key FIM collection: *Morone saxatilis* (Striped Bass).

Monthly sampling efforts were reduced in Cedar Key during 2020 as a result of impacts caused by the COVID-19 pandemic (Appendix CK20-03). No sampling was completed in Cedar Key in April 2020 due to State of Florida and FIM safety protocols. In response to programmatic funding deficits as a result of COVID-19, no SRS trawling was completed during the months of June, July, August, September, October, and November 2020. The sampling effort for all zones and gears was completed as scheduled for the months of January, February, March, May, and December 2020.

Bay Sampling

21.3-m Bay Seine. A total of 33,015 animals were collected in 231 21.3-m bay seines, representing 43.1% of the overall SRS catch (Table CK20-01). *Leiostomus xanthurus* (n=8,622), *Anchoa mitchilli* (n=7,001), *Lagodon rhomboides* (n=3,691), and *Eucinostomus* spp. (n=3,690) were the most abundant taxa, accounting for 69.7% of the 21.3-m bay seine catch (Table CK20-02). The taxa most frequently caught in 21.3-m bay seines were *Anchoa mitchilli* (37.7% occurrence) and *Lagodon rhomboides* (35.1% occurrence).

A total of 10,732 animals from 24 Selected Taxa were collected, representing 32.5% of the entire 21.3-m bay seine catch (Table CK20-03). *Leiostomus xanthurus* (n=8,622) was the most abundant Selected Taxon, accounting for 80.3% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were *Callinectes sapidus* (30.7% occurrence), *Farfantepenaeus* spp. (24.2% occurrence), and *Menticirrhus americanus* (23.4% occurrence).

183-m Haul Seine. A total of 16,301 animals were collected in 176 183-m haul seines, representing 21.3% of the overall SRS catch (Table CK20-01). *Bairdiella chrysoura* (n=2,687), *Lagodon rhomboides* (n=2,124), and *Leiostomus xanthurus* (n=1,540) were the most abundant taxa, accounting for 39.0% of the 183-m haul seine catch (Table CK20-04). The taxa most frequently caught in 183-m haul seines were *Dasyatis sabina* (81.3% occurrence), *Mugil cephalus* (65.3% occurrence), *Ariopsis felis* (56.3% occurrence), and *Elops saurus* (52.3% occurrence).

A total of 5,787 animals from 30 Selected Taxa were collected, representing 35.5% of the entire 183-m haul seine catch (Table CK20-05). *Leiostomus xanthurus* (n=1,540) and *Mugil cephalus* (n=990) were the most abundant Selected Taxa, accounting for 43.7% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil cephalus* (65.3% occurrence), *Elops saurus* (52.3% occurrence), *Sciaenops ocellatus* (48.3% occurrence), and *Centropomus undecimalis* (40.9% occurrence).

6.1-m Bay Otter Trawl. A total of 4,532 animals were collected in 50 6.1-m bay otter trawls, representing 5.9% of the overall SRS catch (Table CK20-01). *Anchoa mitchilli* (n=2,104) was the most abundant taxon, accounting for 46.4% of the 6.1-m bay otter trawl catch (Table CK20-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Etropus crossotus* (78.0% occurrence), *Prionotus scitulus* (68.0% occurrence), and *Portunus* spp. (60.0% occurrence).

A total of 240 animals from 10 Selected Taxa were collected, representing 5.3% of the entire 6.1-m bay otter trawl catch (Table CK20-07). *Menticirrhus americanus* (n=61), *Litopenaeus setiferus* (n=40), and *Menippe* spp. (n=32) were the most abundant Selected Taxa, accounting for 55.4% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Callinectes sapidus* (36.0% occurrence), *Menticirrhus americanus* (32.0% occurrence), and *Menippe* spp. (30.0% occurrence).

River Sampling

Tidal Creeks

21.3-m River Seines. A total of 16,187 animals were collected in 99 21.3-m river seines conducted in tidal creeks, representing 21.2% of the overall SRS catch (Table CK20-01). *Anchoa mitchilli* (n=8,041) and *Leiostomus xanthurus* (n=3,834) were the most abundant taxa collected, accounting for 73.4% of the total 21.3-m river seine catch in tidal creeks (Table CK20-08). The taxa most frequently caught in 21.3-m river seines conducted in tidal creeks were *Anchoa mitchilli* (66.7% occurrence), *Menidia* spp. (54.5% occurrence), and *Eucinostomus* spp. (53.5% occurrence).

A total of 5,299 animals from 17 Selected Taxa were collected, representing 32.7% of the entire 21.3-m river seine catch in tidal creeks (Table CK20-09). *Leiostomus* *xanthurus* (n=3,834), *Mugil cephalus* (n=833), and *Callinectes sapidus* (n=386) were the most abundant Selected Taxa, accounting for 95.4% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines conducted in tidal creeks were *Callinectes sapidus* (37.4% occurrence) and *Leiostomus xanthurus* (26.3% occurrence).

Lower Suwannee River

21.3-m River Seines. A total of 5,346 animals were collected in 55 21.3-m river seine samples conducted in the Lower Suwannee River (LSR), representing 7.0% of the overall SRS catch (Table CK20-01). *Anchoa mitchilli* (n=2,471), *Lagodon rhomboides* (n=551), and *Eucinostomus* spp. (n=499) were the most abundant taxa collected, accounting for 65.9% of the total 21.3-m river seine catch in the LSR (Table CK20-10). The taxa most frequently caught in 21.3-m river seines conducted in the LSR were *Eucinostomus* spp. (54.5% occurrence), *Callinectes sapidus* (43.6% occurrence), and *Eucinostomus harengulus* (41.8% occurrence).

A total of 506 animals from 8 Selected Taxa were collected, representing 9.5% of the entire 21.3-m river seine catch in the LSR (Table CK20-11). *Callinectes sapidus* (n=227) and *Leiostomus xanthurus* (n=195) were the most abundant Selected Taxa, accounting for 83.4% of the Selected Taxa collected by this gear. The Selected Taxon most frequently caught in 21.3-m river seines conducted in the LSR was *Callinectes sapidus* (43.6% occurrence).

6.1-m River Otter Trawl. A total of 1,152 animals were collected in 25 6.1-m river otter trawl samples conducted in the LSR, representing 1.5% of the overall SRS catch (Table CK20-01). *Eucinostomus* spp. (n=282), *Callinectes sapidus* (n=184), and *Anchoa mitchilli* (n=163) were the most abundant taxa collected, accounting for 54.6% of the 6.1-m river otter trawl catch (Table CK20-12). The taxa most frequently caught in 6.1-m river otter trawls conducted in the LSR were *Leiostomus xanthurus* (48.0% occurrence), *Eucinostomus* spp. (44.0% occurrence), and *Trinectes maculatus* (44.0% occurrence).

A total of 454 animals from 10 Selected Taxa were collected, representing 39.4% of the entire 6.1-m river otter trawl catch in the LSR (Table CK20-13). *Callinectes sapidus* (n=184) and *Leiostomus xanthurus* (n=153) were the most abundant Selected Taxa, accounting for 74.2% of the Selected Taxa captured by this gear. The Selected Taxa most frequently caught in 6.1-m river otter trawls conducted in the LSR were *Leiostomus xanthurus* (48.0% occurrence), *Callinectes sapidus* (40.0% occurrence), and *Micropogonias undulatus* (36.0% occurrence).

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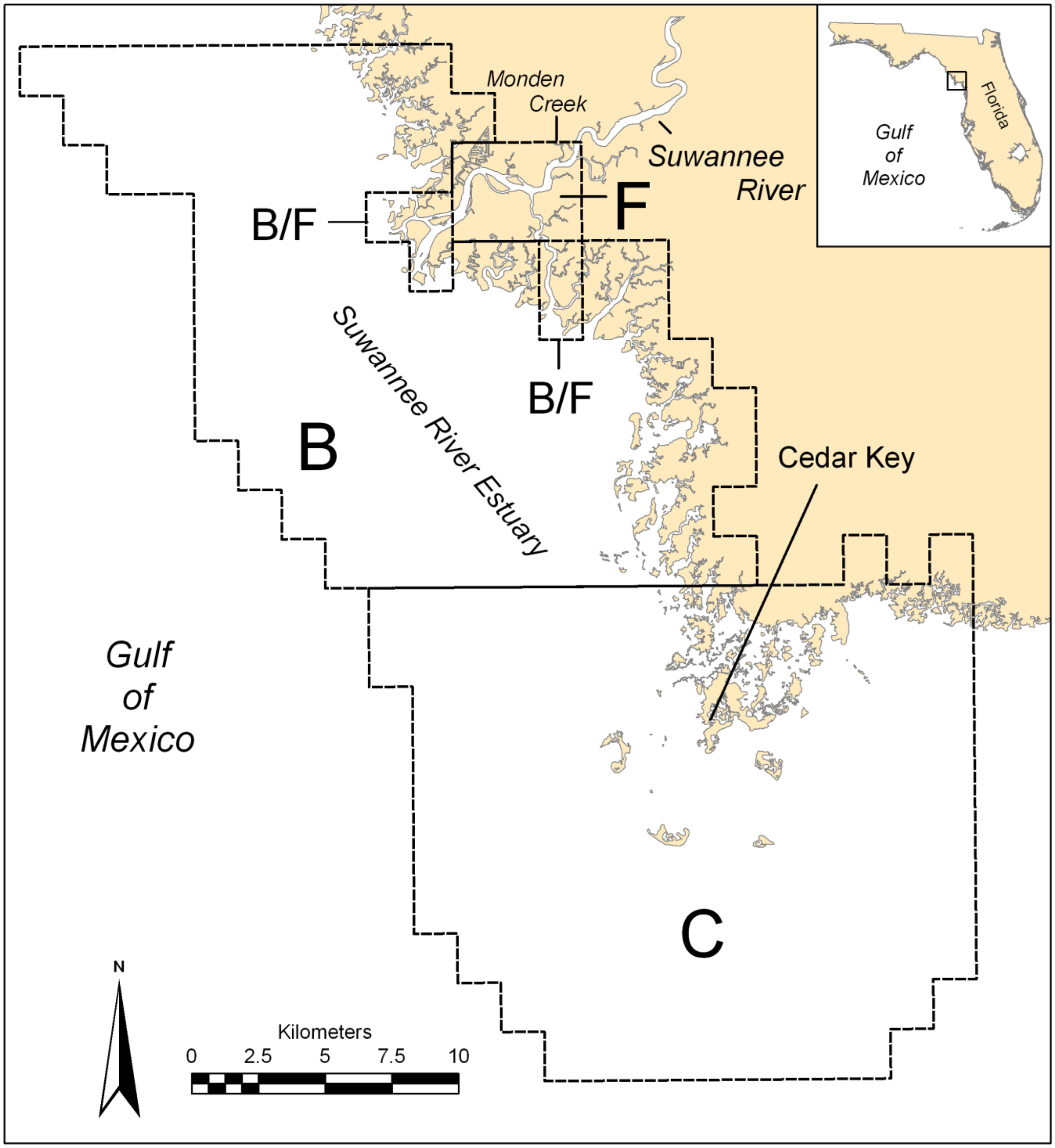

Figure CK20-01. Map of Cedar Key sampling area. Zones are labeled B, C, and F. Grids containing portions of Zones B and F are labeled B/F.

Table CK20-01. Summary of catch and effort data for Cedar Key stratified-random sampling, 2020.

Zone	21.3-m bay seine		21.3-m river seine		183-m haul seine		6.1-m otter trawl		Totals	
	Animals	Hauls	Animals	Hauls	Animals	Hauls	Animals	Hauls	Animals	Hauls
B	9,670	110	16,187	99	7,369	88	3,243	25	36,469	322
C	23,345	121	.	.	8,932	88	1,289	25	33,566	234
F	.	.	5,346	55	.	.	1,152	25	6,498	80
Totals	**33,015**	**231**	**21,533**	**154**	**16,301**	**176**	**5,684**	**75**	**76,533**	**636**

Table CK20-02. Catch statistics for 10 dominant taxa collected in 231 21.3-m bay seine samples during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Leiostomus xanthurus	8,622	26.1	20.3	26.66	16.90	963.27	3,763.57	23	0.09	11	145
Anchoa mitchilli	7,001	21.2	37.7	21.65	6.11	428.85	948.57	33	0.10	18	68
Lagodon rhomboides	3,691	11.2	35.1	11.41	5.31	706.51	1,049.29	29	0.30	11	156
Menidia spp.	3,690	11.2	23.8	11.41	9.25	1,232.21	2,130.71	38	0.19	26	102
Ariopsis felis	1,652	5.0	20.3	5.11	2.81	835.65	602.14	78	1.29	38	310
Membras martinica	1,259	3.8	16.5	3.89	2.48	968.51	547.14	52	0.35	22	101
Anchoa hepsetus	1,071	3.2	16.9	3.31	1.95	892.83	401.43	35	0.28	24	95
Eucinostomus spp.	1,010	3.1	31.6	3.12	0.80	389.49	145.00	25	0.24	8	39
Harengula jaguana	652	2.0	11.3	2.02	0.88	663.01	167.14	42	0.34	22	90
Bairdiella chrysoura	436	1.3	13.4	1.35	0.53	600.04	82.14	51	1.26	12	145
Subtotals	29,084	88.1	.	.	.	.	.	.	.	8	310
Totals	**33,015**	**100.0**	**.**	**102.09**	**21.90**	**326.04**	**3,842.86**	**.**	**.**	**2**	**795**

Table CK20-03. Catch statistics for Selected Taxa collected in 231 21.3-m bay seine samples during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Leiostomus xanthurus	8,622	26.1	20.3	26.66	16.90	963.27	3,763.57	23	0.09	11	145
Callinectes sapidus	371	1.1	30.7	1.15	0.33	430.62	65.00	21	1.24	5	167
Mugil cephalus	352	1.1	10.8	1.09	0.46	642.26	70.71	37	2.20	18	307
Farfantepenaeus spp.	344	1.0	24.2	1.06	0.35	499.85	59.29	6	0.16	2	14
Menticirrhus americanus	315	1.0	23.4	0.97	0.20	316.91	30.00	43	1.15	13	126
Cynoscion arenarius	269	0.8	13.0	0.83	0.23	412.29	35.00	36	0.90	14	88
Mugil trichodon	101	0.3	2.6	0.31	0.28	1,342.35	63.57	33	1.50	16	118
Sciaenops ocellatus	94	0.3	15.6	0.29	0.09	466.76	17.86	88	8.94	12	356
Litopenaeus setiferus	55	0.2	5.2	0.17	0.09	781.30	18.57	12	0.65	6	25
Pogonias cromis	50	0.2	3.5	0.15	0.13	1,249.81	29.29	175	21.90	106	795
Cynoscion nebulosus	47	0.1	7.8	0.15	0.04	434.12	5.71	42	3.78	16	132
Lutjanus synagris	26	0.1	3.0	0.08	0.04	670.71	5.00	35	2.71	21	87
Menticirrhus saxatilis	16	0.1	4.3	0.05	0.02	529.11	2.14	39	4.96	18	89
Trachinotus falcatus	15	0.1	2.2	0.05	0.03	896.97	5.71	34	7.59	13	138
Paralichthys albigutta	15	0.1	4.8	0.05	0.02	537.57	2.86	56	10.12	26	142
Mugil curema	11	<0.1	3.0	0.03	0.02	685.06	2.86	35	5.61	23	85
Micropogonias undulatus	11	<0.1	1.7	0.03	0.03	1,128.99	5.71	26	1.22	16	30

Table CK20-03. (Continued).

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Farfantepenaeus duorarum	5	<0.1	2.2	0.02	0.01	673.77	0.71	16	0.97	15	20
Lutjanus griseus	5	<0.1	2.2	0.02	0.01	673.77	0.71	101	28.84	22	160
Centropomus undecimalis	3	<0.1	0.9	0.01	0.01	1,130.87	1.43	551	71.27	409	629
Elops saurus	2	<0.1	0.9	0.01	<0.01	1,072.37	0.71	216	28.50	187	244
Mycteroperca microlepis	1	<0.1	0.4	<0.01	<0.01	1,519.87	0.71	195	.	195	195
Archosargus probatocephalus	1	<0.1	0.4	<0.01	<0.01	1,519.87	0.71	270	.	270	270
Scomberomorus maculatus	1	<0.1	0.4	<0.01	<0.01	1,519.87	0.71	105	.	105	105
Totals	**10,732**	**32.5**	**.**	**33.18**	**17.26**	**790.43**	**3,837.86**	**.**	**.**	**2**	**795**

Table CK20-04. Catch statistics for 10 dominant taxa collected in 176 183-m haul seine samples during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	**Number**		**% Occur**	**Catch-per-unit-effort (animals/set)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Bairdiella chrysoura	2,687	16.5	29.5	15.27	5.55	482.19	656.00	137	0.30	94	173
Lagodon rhomboides	2,124	13.0	51.1	12.07	2.46	270.63	222.00	101	0.57	56	207
Leiostomus xanthurus	1,540	9.5	34.1	8.75	4.02	609.58	659.00	160	0.55	80	282
Dasyatis sabina	1,477	9.1	81.3	8.39	0.92	145.82	77.00	221	0.95	111	396
Ariopsis felis	1,361	8.4	56.3	7.73	1.23	211.49	109.00	230	1.35	86	355
Mugil cephalus	990	6.1	65.3	5.63	0.71	167.57	62.00	219	1.79	25	379
Ogcocephalus cubifrons	751	4.6	34.1	4.27	0.84	259.67	69.00	157	0.92	50	267
Elops saurus	624	3.8	52.3	3.55	0.55	207.30	51.00	265	1.58	148	444
Bagre marinus	494	3.0	19.3	2.81	1.63	768.47	282.00	228	3.44	90	402
Pogonias cromis	477	2.9	38.1	2.71	0.60	294.60	81.00	369	9.75	119	827
Subtotals	12,525	76.8	.	.	.	.	.	.	.	25	827
Totals	**16,301**	**100.0**	**.**	**92.62**	**10.47**	**149.96**	**1,140.00**	**.**	**.**	**12**	**1,720**

Table CK20-05. Catch statistics for Selected Taxa collected in 176 183-m haul seine samples during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Leiostomus xanthurus	1,540	9.5	34.1	8.75	4.02	609.58	659.00	160	0.55	80	282
Mugil cephalus	990	6.1	65.3	5.63	0.71	167.57	62.00	219	1.79	25	379
Elops saurus	624	3.8	52.3	3.55	0.55	207.30	51.00	265	1.58	148	444
Pogonias cromis	477	2.9	38.1	2.71	0.60	294.60	81.00	369	9.75	119	827
Centropomus undecimalis	444	2.7	40.9	2.52	0.70	367.09	104.00	586	6.23	144	849
Sciaenops ocellatus	427	2.6	48.3	2.43	0.52	284.22	74.00	323	5.55	70	735
Litopenaeus setiferus	264	1.6	8.5	1.50	0.66	586.19	64.00	25	0.20	18	35
Mugil curema	249	1.5	30.1	1.41	0.45	424.66	73.00	150	2.44	101	342
Cynoscion nebulosus	162	1.0	36.4	0.92	0.14	203.65	12.00	267	6.99	84	506
Archosargus probatocephalus	139	0.9	29.0	0.79	0.13	221.02	10.00	258	4.60	125	425
Paralichthys albigutta	105	0.6	27.3	0.60	0.11	240.53	10.00	192	7.09	49	412
Menticirrhus americanus	96	0.6	19.3	0.55	0.17	407.75	25.00	208	4.95	92	321
Trachinotus falcatus	58	0.4	5.1	0.33	0.19	765.92	30.00	83	7.45	45	340
Callinectes sapidus	49	0.3	14.8	0.28	0.07	336.24	9.00	107	5.70	40	168
Mugil trichodon	37	0.2	8.5	0.21	0.07	421.21	7.00	135	4.37	94	209
Micropogonias undulatus	29	0.2	5.1	0.16	0.07	558.54	8.00	189	8.15	111	250
Lutjanus griseus	28	0.2	8.5	0.16	0.05	390.51	5.00	163	6.47	80	231

Table CK20-05. (Continued).

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Cynoscion arenarius	25	0.2	4.5	0.14	0.08	736.34	13.00	195	5.22	142	261
Scomberomorus maculatus	16	0.1	5.7	0.09	0.03	474.37	4.00	290	26.71	107	407
Farfantepenaeus duorarum	7	<0.1	2.8	0.04	0.02	677.90	3.00	22	1.15	19	27
Lutjanus synagris	5	<0.1	1.7	0.03	0.02	791.94	2.00	80	10.82	37	95
Megalops atlanticus	4	<0.1	1.1	0.02	0.02	935.40	2.00	759	19.53	704	795
Pomatomus saltatrix	3	<0.1	1.7	0.02	0.01	761.55	1.00	300	85.87	131	412
Trachinotus carolinus	3	<0.1	1.1	0.02	0.01	986.56	2.00	312	18.48	280	344
Farfantepenaeus sp.	1	<0.1	0.6	0.01	0.01	1,326.65	1.00	12	.	12	12
Menippe sp.	1	<0.1	0.6	0.01	0.01	1,326.65	1.00	30	.	30	30
Mycteroperca microlepis	1	<0.1	0.6	0.01	0.01	1,326.65	1.00	166	.	166	166
Rachycentron canadum	1	<0.1	0.6	0.01	0.01	1,326.65	1.00	188	.	188	188
Cynoscion sp.	1	<0.1	0.6	0.01	0.01	1,326.65	1.00	405	.	405	405
Paralichthys lethostigma	1	<0.1	0.6	0.01	0.01	1,326.65	1.00	340	.	340	340
Totals	**5,787**	**35.5**	**.**	**32.88**	**4.75**	**191.49**	**712.00**	**.**	**.**	**12**	**849**

Table CK20-06. Catch statistics for 10 dominant taxa collected in 50 6.1-m bay otter trawl samples during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	2,104	46.4	38.0	2.64	2.08	558.48	104.31	33	0.24	26	71
Lagodon rhomboides	411	9.1	50.0	0.57	0.17	214.73	5.85	86	0.70	13	124
Dasyatis sabina	312	6.9	56.0	0.42	0.14	237.40	6.25	216	1.86	25	292
Orthopristis chrysoptera	274	6.1	40.0	0.37	0.27	518.11	13.63	111	1.23	20	166
Prionotus scitulus	212	4.7	68.0	0.28	0.06	149.22	2.36	91	1.89	24	164
Etropus crossotus	208	4.6	78.0	0.28	0.06	156.82	2.57	91	1.27	31	160
Bairdiella chrysoura	136	3.0	28.0	0.19	0.12	438.32	5.73	102	1.67	19	150
Portunus spp.	123	2.7	60.0	0.17	0.05	203.79	2.06	37	1.04	11	67
Ogcocephalus cubifrons	71	1.6	50.0	0.09	0.02	165.45	0.59	129	6.27	31	232
Citharichthys macrops	63	1.4	48.0	0.09	0.02	194.31	0.94	67	2.34	39	112
Subtotals	3,914	86.4	.	.	.	.	.	.	.	11	292
Totals	**4,532**	**100.0**	**.**	**5.92**	**2.18**	**260.45**	**108.67**	**.**	**.**	**4**	**1,120**

Table CK20-07. Catch statistics for Selected Taxa collected in 50 6.1-m bay otter trawl samples during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Menticirrhus americanus	61	1.4	32.0	0.08	0.03	237.13	1.14	121	6.12	17	237
Litopenaeus setiferus	40	0.9	16.0	0.05	0.04	466.17	1.75	32	0.68	22	38
Menippe spp.	32	0.7	30.0	0.04	0.01	201.47	0.39	22	1.55	4	43
Callinectes sapidus	29	0.6	36.0	0.04	0.01	167.34	0.28	114	8.74	12	183
Leiostomus xanthurus	23	0.5	12.0	0.03	0.02	406.10	0.78	39	11.27	12	156
Farfantepenaeus duorarum	22	0.5	26.0	0.03	0.01	207.52	0.27	22	0.90	16	30
Paralichthys albigutta	18	0.4	28.0	0.02	0.01	176.03	0.14	154	13.13	75	254
Cynoscion arenarius	10	0.2	16.0	0.01	<0.01	246.35	0.13	138	23.64	17	266
Farfantepenaeus spp.	3	0.1	4.0	<0.01	<0.01	519.10	0.13	11	0.58	10	12
Menticirrhus saxatilis	2	<0.1	4.0	<0.01	<0.01	495.46	0.07	49	24.00	25	73
Totals	**240**	**5.3**	**.**	**0.32**	**0.06**	**141.08**	**2.56**	**.**	**.**	**4**	**266**

Table CK20-08. Catch statistics for 10 dominant taxa collected in 99 21.3-m river seine samples conducted in tidal creeks during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Anchoa mitchilli	8,041	49.7	66.7	119.44	25.65	213.67	1,430.88	30	0.10	18	57
Leiostomus xanthurus	3,834	23.7	26.3	56.95	34.68	605.84	3,286.76	21	0.11	12	173
Mugil cephalus	833	5.2	19.2	12.37	5.71	458.81	429.41	25	0.91	16	290
Eucinostomus spp.	707	4.4	53.5	10.50	2.23	211.03	135.29	26	0.29	10	39
Menidia spp.	460	2.8	54.5	6.83	1.47	214.43	100.00	45	0.63	19	85
Lagodon rhomboides	434	2.7	37.4	6.45	2.02	312.25	152.94	26	0.81	12	92
Callinectes sapidus	386	2.4	37.4	5.73	1.80	312.22	129.41	13	0.45	5	97
Bairdiella chrysoura	298	1.8	16.2	4.43	2.00	450.65	152.94	49	1.00	14	105
Brevoortia spp.	221	1.4	11.1	3.28	2.18	661.50	207.35	24	0.26	18	43
Eucinostomus harengulus	146	0.9	25.3	2.17	0.57	263.57	29.41	51	0.60	40	72
Subtotals	15,360	94.9	.	.	.	.	.	.	.	5	290
Totals	**16,187**	**100.0**	**.**	**240.45**	**43.89**	**181.64**	**3,329.41**	**.**	**.**	**3**	**458**

Table CK20-09. Catch statistics for Selected Taxa collected in 99 21.3-m river seine samples conducted in tidal creeks during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Leiostomus xanthurus	3,834	23.7	26.3	56.95	34.68	605.84	3,286.76	21	0.11	12	173
Mugil cephalus	833	5.2	19.2	12.37	5.71	458.81	429.41	25	0.91	16	290
Callinectes sapidus	386	2.4	37.4	5.73	1.80	312.22	129.41	13	0.45	5	97
Cynoscion arenarius	88	0.5	20.2	1.31	0.48	367.15	36.76	31	0.96	12	57
Farfantepenaeus spp.	58	0.4	22.2	0.86	0.24	276.96	16.18	7	0.28	3	13
Sciaenops ocellatus	46	0.3	11.1	0.68	0.41	590.05	38.24	24	3.79	10	151
Menticirrhus americanus	18	0.1	6.1	0.27	0.13	467.24	8.82	48	3.34	26	74
Cynoscion nebulosus	15	0.1	6.1	0.22	0.11	474.84	7.35	60	8.77	17	128
Menticirrhus saxatilis	5	<0.1	1.0	0.07	0.07	994.99	7.35	16	0.73	13	17
Lutjanus griseus	4	<0.1	4.0	0.06	0.03	489.82	1.47	120	46.75	15	202
Centropomus undecimalis	3	<0.1	3.0	0.04	0.03	568.56	1.47	108	30.99	57	164
Paralichthys albigutta	3	<0.1	3.0	0.04	0.03	568.56	1.47	111	41.16	32	171
Litopenaeus setiferus	2	<0.1	2.0	0.03	0.02	699.96	1.47	12	1.50	10	13
Elops saurus	1	<0.1	1.0	0.01	0.01	994.99	1.47	229	.	229	229
Trachinotus falcatus	1	<0.1	1.0	0.01	0.01	994.99	1.47	28	.	28	28
Archosargus probatocephalus	1	<0.1	1.0	0.01	0.01	994.99	1.47	277	.	277	277
Mugil trichodon	1	<0.1	1.0	0.01	0.01	994.99	1.47	17	.	17	17
Totals	**5,299**	**32.7**	**.**	**78.71**	**35.56**	**449.51**	**3,288.24**	**.**	**.**	**3**	**290**

Table CK20-10. Catch statistics for 10 dominant taxa collected in 55 21.3-m river seine samples conducted in the Lower Suwannee River (LSR) during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Anchoa mitchilli	2,471	46.2	32.7	66.07	29.54	331.61	1,086.76	27	0.08	17	36
Lagodon rhomboides	551	10.3	16.4	14.73	14.24	717.03	783.82	14	0.16	12	64
Eucinostomus spp.	499	9.3	54.5	13.34	3.95	219.81	139.71	29	0.31	10	39
Gambusia holbrooki	299	5.6	18.2	7.99	3.55	329.03	129.41	24	0.29	15	38
Fundulus seminolis	249	4.7	38.2	6.66	1.97	219.77	80.88	46	1.04	23	101
Callinectes sapidus	227	4.3	43.6	6.07	2.35	287.37	92.65	19	1.26	6	158
Leiostomus xanthurus	195	3.7	10.9	5.21	3.88	551.98	205.88	16	0.35	12	70
Eucinostomus harengulus	155	2.9	41.8	4.14	1.51	270.07	69.12	52	0.80	40	85
Menidia spp.	100	1.9	34.5	2.67	0.97	269.46	38.24	47	1.49	24	86
Lepomis punctatus	82	1.5	20.0	2.19	1.20	406.53	51.47	34	1.34	20	86
Subtotals	4,828	90.3	.	.	.	.	.	.	.	6	158
Totals	**5,346**	**100.0**	**.**	**142.94**	**34.26**	**177.76**	**1,110.29**	**.**	**.**	**4**	**282**

Table CK20-11. Catch statistics for Selected Taxa collected in 55 21.3-m river seine samples conducted in the Lower Suwannee River (LSR) during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Callinectes sapidus	227	4.3	43.6	6.07	2.35	287.37	92.65	19	1.26	6	158
Leiostomus xanthurus	195	3.7	10.9	5.21	3.88	551.98	205.88	16	0.35	12	70
Sciaenops ocellatus	57	1.1	5.5	1.52	1.47	715.35	80.88	25	2.13	13	131
Lutjanus griseus	14	0.3	12.7	0.37	0.17	331.44	7.35	81	13.15	11	168
Centropomus undecimalis	5	0.1	3.6	0.13	0.11	608.88	5.88	38	3.08	26	44
Farfantepenaeus spp.	4	0.1	3.6	0.11	0.08	583.04	4.41	6	1.18	4	9
Cynoscion arenarius	3	0.1	3.6	0.08	0.06	548.66	2.94	47	3.79	41	54
Mugil cephalus	1	<0.1	1.8	0.03	0.03	741.62	1.47	22	.	22	22
Totals	**506**	**9.5**	**.**	**13.53**	**5.34**	**292.45**	**205.88**	**.**	**.**	**4**	**168**

Table CK20-12. Catch statistics for 10 dominant taxa collected in 25 6.1-m river otter trawl samples conducted in the Lower Suwannee River (LSR) during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Eucinostomus spp.	282	24.5	44.0	1.55	1.07	342.98	26.71	23	0.29	15	39
Callinectes sapidus	184	16.0	40.0	1.10	0.85	385.02	21.29	36	2.84	6	162
Anchoa mitchilli	163	14.2	28.0	0.91	0.51	279.84	9.17	24	0.23	17	29
Leiostomus xanthurus	153	13.3	48.0	0.85	0.44	258.54	9.71	24	1.17	11	122
Trinectes maculatus	72	6.3	44.0	0.46	0.31	338.95	7.93	44	0.95	24	60
Lagodon rhomboides	59	5.1	32.0	0.34	0.20	289.37	4.50	15	0.30	11	23
Cynoscion arenarius	58	5.0	16.0	0.31	0.21	335.75	4.59	40	1.19	24	70
Eucinostomus harengulus	49	4.3	40.0	0.27	0.12	212.74	2.56	61	2.59	41	96
Gobiosoma bosc	18	1.6	4.0	0.11	0.11	500.00	2.70	28	1.28	20	37
Farfantepenaeus spp.	17	1.5	8.0	0.10	0.09	447.41	2.25	10	0.39	8	14
Subtotals	1,055	91.6	.	.	.	.	.	.	.	6	162
Totals	**1,152**	**100.0**	**.**	**6.60**	**1.78**	**134.65**	**32.83**	**.**	**.**	**6**	**1,116**

Table CK20-13. Catch statistics for Selected Taxa collected in 25 6.1-m river otter trawl samples conducted in the Lower Suwannee River (LSR) during Cedar Key stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Callinectes sapidus	184	16.0	40.0	1.10	0.85	385.02	21.29	36	2.84	6	162
Leiostomus xanthurus	153	13.3	48.0	0.85	0.44	258.54	9.71	24	1.17	11	122
Cynoscion arenarius	58	5.0	16.0	0.31	0.21	335.75	4.59	40	1.19	24	70
Farfantepenaeus spp.	17	1.5	8.0	0.10	0.09	447.41	2.25	10	0.39	8	14
Sciaenops ocellatus	15	1.3	28.0	0.08	0.03	201.99	0.67	43	8.04	25	137
Micropogonias undulatus	13	1.1	36.0	0.07	0.02	151.06	0.34	32	5.88	13	70
Lutjanus griseus	11	1.0	16.0	0.07	0.04	275.37	0.84	101	4.42	83	136
Archosargus probatocephalus	1	0.1	4.0	0.01	0.01	500.00	0.15	136	.	136	136
Cynoscion nebulosus	1	0.1	4.0	0.01	0.01	500.00	0.13	179	.	179	179
Menticirrhus americanus	1	0.1	4.0	0.01	0.01	500.00	0.13	284	.	284	284
Totals	**454**	**39.4**	**.**	**2.62**	**1.01**	**193.49**	**23.54**	**.**	**.**	**6**	**284**

Appendix CK20-01. Monthly summary of species collected during Cedar Key stratified-random sampling, 2020. Effort, or total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=66	E=66	E=0	E=66	E=51	E=51	E=51	E=51	E=51	E=51	E=66	E=636
Acanthostracion quadricornis	2	.	2	.	1	.	2	.	.	1	1	.	**9**
Achirus lineatus	.	1	.	.	.	1	9	3	2	.	.	.	**16**
Acipenser oxyrhynchus desotoi	.	.	.	.	.	.	.	.	4	.	.	.	**4**
Adinia xenica	.	6	.	.	1	10	.	4	.	.	103	.	**124**
Alosa alabamae	2	2	.	.	.	.	.	.	.	.	.	.	**4**
Ameiurus catus	1	2	9	.	2	.	.	.	.	.	.	.	**14**
Anchoa hepsetus	2	.	1	.	926	47	3	46	8	76	8	1	**1,118**
Anchoa lyolepis	.	.	.	.	.	.	.	2	.	.	.	.	**2**
Anchoa mitchilli	1,698	229	108	.	3,586	2,257	1,311	2,595	1,262	2,560	3,027	1,147	**19,780**
Ancylopsetta quadrocellata	1	1	.	.	1	.	.	.	.	.	.	1	**4**
Archosargus probatocephalus	1	2	12	.	24	12	14	20	18	21	14	4	**142**
Ariopsis felis	95	4	124	.	249	447	275	1,500	91	192	35	45	**3,057**
Astroscopus y-graecum	1	1	1	.	.	.	.	.	.	.	.	.	**3**
Bagre marinus	4	.	1	.	25	73	7	330	48	65	1	.	**554**
Bairdiella chrysoura	210	749	416	.	290	205	358	774	195	140	53	167	**3,557**
Bathygobius soporator	11	.	.	.	.	.	.	.	3	6	52	4	**76**
Brevoortia spp.	146	68	1	.	124	42	12	21	57	42	1	.	**514**
Callinectes sapidus	312	192	55	.	29	20	29	51	83	45	370	60	**1,246**
Caranx hippos	.	2	.	.	2	23	.	7	1	3	5	.	**43**
Carcharhinus leucas	.	.	.	.	.	.	1	.	1	.	.	.	**2**
Carcharhinus limbatus	.	.	.	.	1	1	.	.	.	.	.	.	**2**
Centropomus undecimalis	.	3	14	.	28	41	23	112	160	21	34	19	**455**

Appendix CK20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=66	E=66	E=0	E=66	E=51	E=51	E=51	E=51	E=51	E=51	E=66	E=636
Centropristis striata	1	.	1	.	5	.	2	1	.	8	6	1	**25**
Chaetodipterus faber	1	.	.	.	34	19	12	92	62	28	.	.	**248**
Chasmodes saburrae	2	.	.	.	1	2	29	1	2	.	2	.	**39**
Chilomycterus schoepfii	10	16	1	.	13	1	2	8	13	9	7	16	**96**
Chloroscombrus chrysurus	.	.	.	.	.	2	5	15	14	3	.	.	**39**
Citharichthys macrops	7	8	13	.	7	1	.	.	.	.	7	31	**74**
Ctenogobius boleosoma	.	.	.	.	.	.	2	6	12	.	12	.	**32**
Ctenogobius smaragdus	.	.	.	.	.	2	.	.	1	.	2	1	**6**
Cynoscion arenarius	2	.	.	.	86	34	55	188	58	23	5	2	**453**
Cynoscion nebulosus	11	17	17	.	7	36	24	13	36	19	14	31	**225**
Cynoscion sp.	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Cyprinodon variegatus	1	8	2	.	.	.	.	.	.	.	.	.	**11**
Dasyatis americana	.	.	.	.	1	9	2	10	1	.	.	.	**23**
Dasyatis sabina	184	160	233	.	158	376	117	89	136	100	146	126	**1,825**
Dasyatis say	.	.	.	.	35	38	16	6	6	15	1	.	**117**
Diapterus auratus	.	.	.	.	.	.	.	1	.	.	1	.	**2**
Diplectrum formosum	.	.	.	.	1	.	.	.	.	1	.	2	**4**
Diplodus holbrookii	.	.	.	.	.	7	.	.	.	.	1	2	**10**
Dorosoma cepedianum	.	3	12	.	.	1	.	.	.	.	.	3	**19**
Echeneis neucratoides	.	.	1	.	17	3	1	3	3	2	1	.	**31**
Elops saurus	.	46	57	.	44	108	19	12	57	145	83	56	**627**
Erimyzon sucetta	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Etropus crossotus	70	75	31	.	13	9	1	13	24	22	45	42	**345**

Appendix CK20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=66	E=66	E=0	E=66	E=51	E=51	E=51	E=51	E=51	E=51	E=66	E=636
Eucinostomus gula	27	19	4	.	.	.	.	85	25	17	70	15	**262**
Eucinostomus harengulus	66	35	34	.	15	10	20	83	108	34	81	98	**584**
Eucinostomus spp.	511	44	34	.	1	195	193	223	516	111	410	260	**2,498**
Farfantepenaeus duorarum	7	4	6	.	5	1	.	2	.	1	.	8	**34**
Farfantepenaeus spp.	20	4	1	.	15	26	48	177	79	25	30	2	**427**
Floridichthys carpio	.	.	.	.	.	7	.	.	.	.	.	.	**7**
Fundulus confluentus	.	2	.	.	.	.	.	.	.	.	.	.	**2**
Fundulus grandis	28	19	1	.	1	16	2	22	22	21	86	4	**222**
Fundulus seminolis	23	11	8	.	.	20	.	40	32	44	.	75	**253**
Fundulus similis	28	84	16	.	6	76	26	43	15	2	.	1	**297**
Gambusia holbrooki	.	71	2	.	.	.	.	1	1	42	28	165	**310**
Gobiesox strumosus	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Gobionellus oceanicus	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Gobiosoma bosc	18	1	2	.	1	1	1	6	3	.	3	11	**47**
Gobiosoma longipala	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Gobiosoma robustum	1	1	.	.	.	3	.	.	.	.	.	.	**5**
Gobiosoma spp.	2	.	1	.	.	2	2	3	.	.	3	.	**13**
Gymnura micrura	.	.	.	.	6	1	1	1	.	3	1	.	**13**
Haemulon plumierii	.	.	.	.	.	.	.	.	5	20	14	.	**39**
Halichoeres bivittatus	.	.	.	.	.	.	1	.	.	1	.	.	**2**
Harengula jaguana	.	7	55	.	102	124	93	547	140	88	11	.	**1,167**
Heterandria formosa	.	.	.	.	.	.	.	.	.	1	1	.	**2**
Hippocampus erectus	3	2	.	.	.	.	.	.	.	.	.	.	**5**

Appendix CK20-01. (Continued).

Species	Month												Totals
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	
	E=66	**E=66**	**E=66**	**E=0**	**E=66**	**E=51**	**E=51**	**E=51**	**E=51**	**E=51**	**E=51**	**E=66**	**E=636**
Hippocampus zosterae	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Hyporhamphus meeki	.	.	.	.	.	10	.	.	10	.	.	.	**20**
Hyporhamphus spp.	.	.	.	.	.	4	.	.	1	.	.	.	**5**
Hypsoblennius hentz	.	.	.	.	2	.	.	.	.	.	2	.	**4**
Ictalurus punctatus	14	.	.	.	.	.	.	.	.	.	.	.	**14**
Labidesthes sicculus	4	.	4	.	.	.	.	.	.	1	.	.	**9**
Lachnolaimus maximus	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Lagodon rhomboides	928	2,145	1,196	.	390	527	453	270	605	521	191	44	**7,270**
Leiostomus xanthurus	284	11,666	823	.	91	1,147	38	146	89	59	24	.	**14,367**
Lepisosteus osseus	1	2	1	.	3	2	27	7	3	2	6	3	**57**
Lepisosteus platyrhincus	.	.	.	.	1	.	1	.	.	.	.	.	**2**
Lepomis auritus	.	.	5	.	.	.	1	.	.	4	.	.	**10**
Lepomis macrochirus	5	.	4	.	.	.	1	.	1	1	.	.	**12**
Lepomis microlophus	.	.	1	.	.	3	.	.	1	.	1	.	**6**
Lepomis punctatus	2	3	.	.	.	.	.	4	3	36	31	4	**83**
Lepomis spp.	.	.	.	.	.	1	.	.	.	2	1	.	**4**
Limulus polyphemus	2	2	.	.	.	.	.	.	1	3	2	1	**11**
Litopenaeus setiferus	33	4	3	.	.	1	18	99	124	77	2	.	**361**
Lobotes surinamensis	.	.	1	.	1	3	.	.	.	2	.	.	**7**
Lucania goodei	2	.	.	.	.	.	.	.	.	.	.	.	**2**
Lucania parva	3	17	.	.	.	6	.	4	1	.	2	6	**39**
Lutjanus griseus	1	1	10	.	2	2	11	8	5	11	4	7	**62**
Lutjanus synagris	.	.	.	.	.	.	19	2	8	1	1	.	**31**

Appendix CK20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=66	E=66	E=0	E=66	E=51	E=51	E=51	E=51	E=51	E=51	E=66	E=636
Megalops atlanticus	.	.	2	.	2	.	.	.	.	.	.	.	**4**
Membras martinica	1	.	1	.	138	1,013	36	51	31	11	4	.	**1,286**
Menidia spp.	74	99	144	.	3,102	307	43	60	78	31	176	136	**4,250**
Menippe spp.	7	5	2	.	7	.	.	1	.	.	.	11	**33**
Menticirrhus americanus	15	13	3	.	100	100	31	37	49	96	27	20	**491**
Menticirrhus saxatilis	4	.	.	.	4	3	.	.	.	.	10	2	**23**
Microgobius gulosus	1	1	1	.	.	1	.	.	.	.	.	.	**4**
Microgobius thalassinus	1	.	.	.	.	.	1	1	.	.	4	.	**7**
Micropogonias undulatus	14	1	3	.	15	1	1	1	10	2	.	5	**53**
Micropterus notius	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Micropterus salmoides	.	1	.	.	.	3	.	.	.	.	4	.	**8**
Monacanthidae sp.	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Monacanthus ciliatus	.	.	.	.	.	.	1	2	4	27	5	3	**42**
Morone saxatilis	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Mugil cephalus	198	997	169	.	141	152	50	70	53	55	85	206	**2,176**
Mugil curema	97	8	8	.	9	5	3	13	45	13	5	54	**260**
Mugil trichodon	5	.	.	.	2	.	10	3	1	13	14	91	**139**
Mycteroperca microlepis	.	.	.	.	.	.	1	.	1	.	.	.	**2**
Nicholsina usta	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Notemigonus crysoleucas	4	.	.	.	.	.	.	.	.	.	.	.	**4**
Notropis petersoni	12	.	.	.	.	9	.	7	.	.	.	.	**28**
Ogcocephalus cubifrons	70	56	129	.	83	131	3	96	38	169	42	10	**827**
Oligoplites saurus	.	.	1	.	2	1	28	24	25	10	2	.	**93**

Appendix CK20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=66	E=66	E=0	E=66	E=51	E=51	E=51	E=51	E=51	E=51	E=66	E=636
Opisthonema oglinum	.	.	4	.	5	7	5	76	12	15	.	.	**124**
Opsanus beta	.	.	.	.	1	.	.	.	1	.	.	1	**3**
Opsopoeodus emiliae	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Orthopristis chrysoptera	4	16	203	.	88	69	15	16	54	29	5	36	**535**
Paralichthys albigutta	6	24	15	.	32	21	13	5	5	7	3	10	**141**
Paralichthys lethostigma	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Peprilus burti	.	.	5	.	.	.	.	.	.	.	.	.	**5**
Peprilus paru	.	.	.	.	.	20	.	.	.	1	.	.	**21**
Poecilia latipinna	.	.	.	.	.	.	.	.	1	2	.	.	**3**
Pogonias cromis	5	19	33	.	102	29	38	166	60	27	15	33	**527**
Pomatomus saltatrix	.	.	1	.	.	.	.	1	1	.	.	.	**3**
Portunus spp.	51	44	7	.	25	1	.	.	3	.	9	7	**147**
Prionotus martis	.	1	18	.	.	.	.	.	.	.	.	.	**19**
Prionotus scitulus	109	32	14	.	13	3	2	.	.	6	7	49	**235**
Prionotus tribulus	31	8	16	.	12	1	.	1	9	4	14	8	**104**
Rachycentron canadum	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Rhinoptera bonasus	.	1	9	.	5	2	4	6	11	4	2	1	**45**
Rimapenaeus constrictus	.	.	1	.	.	.	.	.	.	.	.	1	**2**
Rimapenaeus spp.	.	.	2	.	.	.	.	.	.	.	.	.	**2**
Sardinella aurita	.	.	.	.	.	.	3	4	.	.	.	.	**7**
Sciaenops ocellatus	29	29	37	.	34	89	59	35	102	16	139	70	**639**
Scomberomorus maculatus	.	.	1	.	2	4	2	6	.	2	.	.	**17**
Scorpaena brasiliensis	1	.	.	.	.	.	.	.	.	.	.	1	**2**

Appendix CK20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=66	E=66	E=0	E=66	E=51	E=51	E=51	E=51	E=51	E=51	E=66	E=636
Selene vomer	.	.	.	.	1	8	4	17	13	1	.	.	**44**
Serraniculus pumilio	1	.	.	.	.	.	.	.	1	.	.	2	**4**
Sphoeroides nephelus	3	1	3	.	11	8	.	.	4	7	7	6	**50**
Sphyrna tiburo	.	.	.	.	1	2	.	2	2	4	.	.	**11**
Stephanolepis hispidus	2	.	.	.	9	10	5	5	2	.	3	4	**40**
Strongylura marina	1	.	1	.	9	.	.	1	1	1	.	1	**15**
Strongylura notata	.	.	.	.	.	2	.	3	3	.	1	.	**9**
Strongylura sp.	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Strongylura timucu	.	.	.	.	.	4	1	.	.	.	.	.	**5**
Symphurus plagiusa	16	4	10	.	12	7	7	15	5	2	7	4	**89**
Syngnathus floridae	1	1	.	.	4	5	5	3	8	10	6	7	**50**
Syngnathus louisianae	4	1	.	.	1	1	.	1	.	.	.	1	**9**
Syngnathus scovelli	.	1	.	.	.	1	8	2	3	3	.	2	**20**
Synodus foetens	7	3	3	.	21	9	3	.	1	1	.	2	**50**
Trachinotus carolinus	.	.	2	.	.	.	.	.	.	.	1	.	**3**
Trachinotus falcatus	.	1	.	.	.	2	15	9	12	30	3	2	**74**
Trinectes maculatus	4	4	65	.	9	1	6	1	17	44	12	5	**168**
Tylosurus spp.	.	.	.	.	.	.	1	.	1	.	.	.	**2**
Urophycis floridana	2	19	1	.	.	.	.	.	.	.	.	.	**22**
Totals	**5,568**	**17,134**	**4,238**	**0**	**10,358**	**8,047**	**3,692**	**8,437**	**4,828**	**5,321**	**5,654**	**3,256**	**76,533**

Appendix CK20-02. Summary by gear, stratum, and zone of species collected during Cedar Key stratified-random sampling, 2020. Sampling with 21.3-m bay seine was stratified by the presence or absence of a shoreline ('Shore' or offshore) within 5-m. Offshore sets were post-stratified by the presence or absence of bottom vegetation ('Veg' or 'Unveg'). Sampling with 21.3-m river seine, 183-m haul seine, and 6.1-m otter trawl were not stratified. Zone B encompassed the northern portion of the universe and included all tidal creeks; Zone C encompassed the southern portion of the universe; and Zone F encompassed the lower Suwannee River. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				B	C	F	
	E=21	E=111	E=99	E=154	E=176	E=75	E=322	E=234	E=80	E=636
Acanthostracion quadricornis	4	.	.	.	.	5	2	7	.	**9**
Achirus lineatus	.	4	10	1	.	1	10	6	.	**16**
Acipenser oxyrhynchus desotoi	.	.	.	.	4	.	4	.	.	**4**
Adinia xenica	.	.	1	123	.	.	115	1	8	**124**
Alosa alabamae	.	.	.	.	4	.	4	.	.	**4**
Ameiurus catus	.	.	.	.	2	12	2	.	12	**14**
Anchoa hepsetus	4	418	649	34	.	13	451	645	22	**1,118**
Anchoa lyolepis	.	.	2	.	.	.	.	2	.	**2**
Anchoa mitchilli	.	1,588	5,413	10,512	.	2,267	14,029	3,117	2,634	**19,780**
Ancylopsetta quadrocellata	.	.	.	.	.	4	.	4	.	**4**
Archosargus probatocephalus	.	.	1	1	139	1	66	75	1	**142**
Ariopsis felis	4	1,115	533	.	1,361	44	932	2,120	5	**3,057**
Astroscopus y-graecum	.	1	2	.	.	.	.	3	.	**3**
Bagre marinus	.	44	11	.	494	5	131	423	.	**554**
Bairdiella chrysoura	32	25	379	298	2,687	136	1,459	2,098	.	**3,557**
Bathygobius soporator	.	2	7	56	.	11	33	3	40	**76**
Brevoortia spp.	.	21	97	268	128	.	388	79	47	**514**
Callinectes sapidus	3	55	313	613	49	213	683	152	411	**1,246**
Caranx hippos	.	.	1	.	42	.	21	22	.	**43**
Carcharhinus leucas	.	.	.	.	2	.	1	1	.	**2**
Carcharhinus limbatus	.	.	.	.	2	.	1	1	.	**2**
Centropomus undecimalis	.	1	2	8	444	.	83	367	5	**455**
Centropristis striata	17	.	.	.	2	6	.	25	.	**25**
Chaetodipterus faber	1	4	23	1	214	5	115	133	.	**248**
Chasmodes saburrae	34	4	1	.	.	.	1	38	.	**39**
Chilomycterus schoepfii	11	2	1	.	39	43	9	87	.	**96**

Appendix CK20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				B	C	F	
	E=21	E=111	E=99	E=154	E=176	E=75	E=322	E=234	E=80	E=636
Chloroscombrus chrysurus	3	2	13	.	21	.	27	12	.	**39**
Citharichthys macrops	.	7	3	.	1	63	45	29	.	**74**
Ctenogobius boleosoma	.	6	3	23	.	.	23	4	5	**32**
Ctenogobius smaragdus	.	.	1	5	.	.	4	1	1	**6**
Cynoscion arenarius	.	70	199	91	25	68	218	174	61	**453**
Cynoscion nebulosus	18	3	26	15	162	1	113	111	1	**225**
Cynoscion sp.	.	.	.	.	1	.	1	.	.	**1**
Cyprinodon variegatus	.	.	.	11	.	.	11	.	.	**11**
Dasyatis americana	.	.	.	.	23	.	1	22	.	**23**
Dasyatis sabina	.	19	16	1	1,477	312	957	868	.	**1,825**
Dasyatis say	.	1	.	.	112	4	26	91	.	**117**
Diapterus auratus	.	.	.	.	2	.	1	1	.	**2**
Diplectrum formosum	1	1	.	.	.	2	.	4	.	**4**
Diplodus holbrookii	7	.	.	.	1	2	2	8	.	**10**
Dorosoma cepedianum	.	.	.	.	19	.	16	3	.	**19**
Echeneis neucratoides	.	.	.	.	31	.	8	23	.	**31**
Elops saurus	.	2	.	1	624	.	414	213	.	**627**
Erimyzon sucetta	.	.	.	1	.	.	.	.	1	**1**
Etropus crossotus	.	18	3	.	116	208	97	248	.	**345**
Eucinostomus gula	14	56	72	26	58	36	45	209	8	**262**
Eucinostomus harengulus	2	60	155	301	16	50	246	134	204	**584**
Eucinostomus spp.	224	139	647	1,206	.	282	886	831	781	**2,498**
Farfantepenaeus duorarum	2	1	2	.	7	22	12	22	.	**34**
Farfantepenaeus spp.	13	142	189	62	1	20	139	267	21	**427**
Floridichthys carpio	.	.	7	.	.	.	.	7	.	**7**
Fundulus confluentus	.	.	.	2	.	.	2	.	.	**2**
Fundulus grandis	.	1	128	92	1	.	134	78	10	**222**
Fundulus seminolis	.	.	.	253	.	.	4	.	249	**253**
Fundulus similis	5	.	230	49	13	.	154	143	.	**297**
Gambusia holbrooki	.	.	.	310	.	.	11	.	299	**310**
Gobiesox strumosus	.	.	1	.	.	.	1	.	.	**1**
Gobionellus oceanicus	.	.	.	1	.	.	1	.	.	**1**
Gobiosoma bosc	.	2	5	22	.	18	9	4	34	**47**

Appendix CK20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				B	C	F	
	E=21	E=111	E=99	E=154	E=176	E=75	E=322	E=234	E=80	E=636
Gobiosoma longipala	.	.	.	.	.	1	1	.	.	**1**
Gobiosoma robustum	3	.	1	.	.	1	.	5	.	**5**
Gobiosoma spp.	.	1	5	7	.	.	3	5	5	**13**
Gymnura micrura	.	.	.	.	12	1	.	13	.	**13**
Haemulon plumierii	38	.	1	.	.	.	.	39	.	**39**
Halichoeres bivittatus	2	.	.	.	.	.	.	2	.	**2**
Harengula jaguana	234	89	329	183	328	4	485	605	77	**1,167**
Heterandria formosa	.	.	.	2	.	.	.	.	2	**2**
Hippocampus erectus	.	.	.	.	.	5	.	5	.	**5**
Hippocampus zosterae	1	.	.	.	.	.	.	1	.	**1**
Hyporhamphus meeki	10	10	.	.	.	.	.	20	.	**20**
Hyporhamphus spp.	.	4	1	.	.	.	.	5	.	**5**
Hypsoblennius hentz	2	1	.	.	.	1	1	3	.	**4**
Ictalurus punctatus	.	.	.	.	.	14	.	.	14	**14**
Labidesthes sicculus	.	.	.	9	.	.	.	.	9	**9**
Lachnolaimus maximus	1	.	.	.	.	.	.	1	.	**1**
Lagodon rhomboides	2,319	100	1,272	985	2,124	470	2,028	4,632	610	**7,270**
Leiostomus xanthurus	359	318	7,945	4,029	1,540	176	6,637	7,382	348	**14,367**
Lepisosteus osseus	.	.	.	3	51	3	45	8	4	**57**
Lepisosteus platyrhincus	.	.	.	2	.	.	2	.	.	**2**
Lepomis auritus	.	.	.	10	.	.	.	.	10	**10**
Lepomis macrochirus	.	.	.	12	.	.	1	.	11	**12**
Lepomis microlophus	.	.	.	6	.	.	.	.	6	**6**
Lepomis punctatus	.	.	.	83	.	.	1	.	82	**83**
Lepomis spp.	.	.	.	4	.	.	.	.	4	**4**
Limulus polyphemus	.	.	1	.	7	3	2	9	.	**11**
Litopenaeus setiferus	2	7	46	2	264	40	211	150	.	**361**
Lobotes surinamensis	.	.	.	.	7	.	6	1	.	**7**
Lucania goodei	.	.	.	2	.	.	.	.	2	**2**
Lucania parva	.	.	.	39	.	.	.	.	39	**39**
Lutjanus griseus	1	3	1	18	28	11	30	7	25	**62**
Lutjanus synagris	22	.	4	.	5	.	.	31	.	**31**
Megalops atlanticus	.	.	.	.	4	.	4	.	.	**4**

Appendix CK20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				B	C	F	
	E=21	E=111	E=99	E=154	E=176	E=75	E=322	E=234	E=80	E=636
Membras martinica	2	101	1,156	27	.	.	452	834	.	**1,286**
Menidia spp.	.	171	3,519	560	.	.	788	3,362	100	**4,250**
Menippe spp.	.	.	.	.	1	32	3	30	.	**33**
Menticirrhus americanus	.	92	223	18	96	62	286	204	1	**491**
Menticirrhus saxatilis	.	8	8	5	.	2	7	16	.	**23**
Microgobius gulosus	.	2	.	2	.	.	3	1	.	**4**
Microgobius thalassinus	.	5	.	1	.	1	3	4	.	**7**
Micropogonias undulatus	.	.	11	.	29	13	10	30	13	**53**
Micropterus notius	.	.	.	1	.	.	.	.	1	**1**
Micropterus salmoides	.	.	.	8	.	.	1	.	7	**8**
Monacanthidae sp.	.	.	1	.	.	.	1	.	.	**1**
Monacanthus ciliatus	40	.	1	.	.	1	1	41	.	**42**
Morone saxatilis	.	.	.	.	1	.	1	.	.	**1**
Mugil cephalus	2	7	343	834	990	.	1,567	608	1	**2,176**
Mugil curema	.	.	11	.	249	.	175	85	.	**260**
Mugil trichodon	.	.	101	1	37	.	3	136	.	**139**
Mycteroperca microlepis	1	.	.	.	1	.	.	2	.	**2**
Nicholsina usta	1	.	.	.	.	.	.	1	.	**1**
Notemigonus crysoleucas	.	.	.	4	.	.	.	.	4	**4**
Notropis petersoni	.	.	.	28	.	.	.	.	28	**28**
Ogcocephalus cubifrons	.	2	3	.	751	71	69	758	.	**827**
Oligoplites saurus	2	15	39	26	11	.	63	28	2	**93**
Opisthonema oglinum	2	41	39	6	33	3	74	48	2	**124**
Opsanus beta	1	.	.	.	.	2	.	3	.	**3**
Opsopoeodus emiliae	.	.	.	1	.	.	.	.	1	**1**
Orthopristis chrysoptera	48	13	46	11	143	274	264	271	.	**535**
Paralichthys albigutta	1	4	10	3	105	18	43	98	.	**141**
Paralichthys lethostigma	.	.	.	.	1	.	1	.	.	**1**
Peprilus burti	.	.	.	.	1	4	5	.	.	**5**
Peprilus paru	.	.	.	.	21	.	20	1	.	**21**
Poecilia latipinna	.	.	.	3	.	.	3	.	.	**3**
Pogonias cromis	.	4	46	.	477	.	272	255	.	**527**
Pomatomus saltatrix	.	.	.	.	3	.	2	1	.	**3**

Appendix CK20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				B	C	F	
	E=21	E=111	E=99	E=154	E=176	E=75	E=322	E=234	E=80	E=636
Portunus spp.	.	11	12	.	1	123	89	58	.	**147**
Prionotus martis	.	.	.	.	.	19	3	16	.	**19**
Prionotus scitulus	3	12	8	.	.	212	82	153	.	**235**
Prionotus tribulus	.	6	16	7	26	49	40	64	.	**104**
Rachycentron canadum	.	.	.	.	1	.	1	.	.	**1**
Rhinoptera bonasus	.	2	.	.	41	2	15	30	.	**45**
Rimapenaeus constrictus	.	.	.	.	.	2	2	.	.	**2**
Rimapenaeus spp.	.	.	.	.	.	2	2	.	.	**2**
Sardinella aurita	4	.	3	.	.	.	.	7	.	**7**
Sciaenops ocellatus	1	8	85	103	427	15	331	236	72	**639**
Scomberomorus maculatus	.	1	.	.	16	.	5	12	.	**17**
Scorpaena brasiliensis	.	.	.	.	.	2	1	1	.	**2**
Selene vomer	.	.	.	.	44	.	13	31	.	**44**
Serraniculus pumilio	.	.	1	.	.	3	.	4	.	**4**
Sphoeroides nephelus	8	14	7	2	16	3	13	37	.	**50**
Sphyrna tiburo	.	.	.	.	11	.	4	7	.	**11**
Stephanolepis hispidus	19	1	3	1	1	15	10	29	1	**40**
Strongylura marina	.	4	5	.	6	.	10	5	.	**15**
Strongylura notata	.	.	2	5	2	.	6	3	.	**9**
Strongylura sp.	.	.	1	.	.	.	1	.	.	**1**
Strongylura timucu	.	.	4	.	1	.	1	4	.	**5**
Symphurus plagiusa	.	18	27	8	1	35	28	53	8	**89**
Syngnathus floridae	41	4	.	.	.	5	1	49	.	**50**
Syngnathus louisianae	.	1	1	.	.	7	4	4	1	**9**
Syngnathus scovelli	18	.	2	.	.	.	.	20	.	**20**
Synodus foetens	5	10	13	2	1	19	11	38	1	**50**
Trachinotus carolinus	.	.	.	.	3	.	1	2	.	**3**
Trachinotus falcatus	.	1	14	1	58	.	47	27	.	**74**
Trinectes maculatus	.	.	3	81	1	83	14	7	147	**168**
Tylosurus spp.	.	1	.	1	.	.	1	1	.	**2**
Urophycis floridana	.	.	1	.	.	21	11	11	.	**22**
Totals	**3,592**	**4,906**	**24,517**	**21,533**	**16,301**	**5,684**	**36,469**	**33,566**	**6,498**	**76,533**

Appendix CK20-03. Summary of monthly sampling effort by gear during Cedar Key stratified-random sampling, 2020.

Month	**# SRS Sites**			**Totals**
	21.3-m Seine	**183-m Seine**	**6.1-m Trawl**	
January	35	16	15	**66**
February	35	16	15	**66**
March	35	16	15	**66**
April	0	0	0	**0**
May	35	16	15	**66**
June	35	16	0	**51**
July	35	16	0	**51**
August	35	16	0	**51**
September	35	16	0	**51**
October	35	16	0	**51**
November	35	16	0	**51**
December	35	16	15	**66**
TOTALS	**385**	**176**	**75**	**636**

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Apalachicola Bay

Apalachicola Bay is a shallow, semi-enclosed estuary, located on the northwestern coast of Florida. The estuary, bounded by a barrier island complex (St. Vincent Island, Little St. George Island, St. George Island, and Dog Island), is connected to the Gulf of Mexico through four passes (Indian Pass, West Pass, East Pass, and Sikes Cut). East of Dog Island, St. George Sound is open to the Gulf (Figure AP20-01). Freshwater inflow to Apalachicola Bay primarily comes from the Apalachicola River and to a lesser extent the Carrabelle River (Livingston 1983). Shoreline vegetation consists largely of marsh grasses and bottom substrates are typically characterized as sand or mud with oyster beds scattered throughout the bay (Ingle and Dawson 1953). Mapping conducted in 2010 estimated seagrass coverage present in 14,611 acres with 55% of the total being continuous beds (Brooke et al. 2018).

The Fisheries-Independent Monitoring (FIM) program has conducted intensive sampling of fish and selected invertebrates in Apalachicola Bay since 1998. The area sampled was divided into two geographically defined bay zones (A and B) and one riverine zone (C; Figure AP20-01). Monthly stratified-random sampling (SRS) was conducted in Zones A and B using 21.3-m bay seines, 183-m haul seines, and 6.1-m bay otter trawls. Monthly SRS was conducted in Zone C with 21.3-m river seines and 6.1-m river otter trawls.

Analyses were conducted on historical data from Apalachicola Bay in 2019 to address concerns regarding the utility of data collected with 21.3-m seines and 6.1-m trawls in the forested upper region of the tidal Apalachicola River (Zone C) and 183-m haul seines during the winter months when low water levels may preclude the use of standardized deployment and retrieval protocols for this sampling gear (FWC-FWRI 2020). The analyses indicated that the data collected in these areas and time periods did not improve the ability to estimate recreationally and commercially important estuarine-dependent fish abundance in this system. Only limited data had been collected on estuarine-dependent sportfish from 183-m haul seine sampling during the month of January and from all months of the year (January–December) in the upriver portions of Zone C sampled with the 21.3-m seine and 6.1-m trawl. As a result of the analyses, beginning in January 2020, no 183-m haul seine samples were collected during the month of January and all upriver 21.3-m seine (6 sites/month) and 6.1-m trawl (3 sites/month) sampling in Zone C were eliminated for all months. These sampling design changes resulted in an annual sampling effort reduction of 126 sites and will remain in effect for future sampling years to increase the utility of the data being collected and better align sampling efforts with the programmatic goals of the Apalachicola Bay sampling design.

All methods were the same as those described in the Methods section of this report. This section summarizes data collected by the FIM program during 2020 in Apalachicola Bay.

Stratified-Random Sampling

A total of 98,150 animals, which included 182 taxa of fishes and 17 taxa of selected invertebrates, were collected from 582 Apalachicola Bay SRS samples in 2020 (Table AP20-01; Appendices AP20-01, -02, and -03). *Anchoa mitchilli* (n=30,939) and *Lagodon rhomboides* (n=10,539) were the most numerous taxa collected, representing 42.3% of the total catch. *Brevoortia* spp. (n=7,911), *Micropogonias undulatus* (n=5,867), and *Litopenaeus setiferus* (n=4,757) were the next most abundant taxa collected, accounting for an additional 18.9% of the total catch. Thirty-two Selected Taxa (n=23,608) composed 24.1% of the total catch. The most abundant Selected Taxa were *Micropogonias undulatus* (n=5,867), *Litopenaeus setiferus* (n=4,757), and *Mugil cephalus* (n=3,302), representing 14.2% of the total catch. Collections in 2020 included no new species to the Apalachicola Bay FIM collection.

Monthly sampling efforts were reduced in Apalachicola Bay during 2020 as a result of impacts caused by the COVID-19 pandemic (Appendix AP20-03). Only two sampling trips were completed in April 2020 (n=11 sites) before sampling ceased due to State of Florida and FIM safety protocols. Only 21.3-m seine sampling (n=27 sites) was completed in May 2020. In response to programmatic funding deficits as a result of COVID-19, no SRS trawling was completed during the months of July, September, and November 2020. The sampling effort for all zones and gears was completed as scheduled for the months of January, February, March, May, June, August, October, and December 2020.

Bay Sampling

21.3-m Bay Seines. A total of 40,648 animals were collected in 225 21.3-m bay seines, representing 41.4% of the overall SRS catch (Table AP20-01). *Anchoa mitchilli* (n=12,667), *Brevoortia* spp. (n=4,565), and *Lagodon rhomboides* (n=3,794) were the most abundant taxa, accounting for 51.7% of the 21.3-m bay seine catch (Table AP20-02). The taxa most frequently caught in 21.3-m bay seines were *Lagodon rhomboides* (47.6% occurrence), *Anchoa mitchilli* (35.6% occurrence), and *Eucinostomus* spp. (31.6% occurrence).

A total of 9,615 animals from 24 Selected Taxa were collected, representing 23.7% of the entire 21.3-m bay seine catch (Table AP20-03). *Litopenaeus setiferus* (n=2,222), *Micropogonias undulatus* (n=1,791), and *Mugil cephalus* (n=1,249) were the most abundant Selected Taxa, accounting for 54.7% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were *Farfantepenaeus* spp. (36.4% occurrence), *Callinectes sapidus* (34.2% occurrence), and *Micropogonias undulatus* (24.0% occurrence).

183-m Haul Seines. A total of 22,051 animals were collected in 165 183-m haul seines, representing 22.5% of the overall SRS catch (Table AP20-01). *Lagodon rhomboides* (n=6,643), *Brevoortia* spp. (n=2,982), and *Mugil cephalus* (n=2,049) were the most abundant taxa, accounting for 52.9% of the 183-m haul seine catch (Table AP20-04). The taxa most frequently caught in 183-m haul seines were *Lagodon rhomboides* (74.5% occurrence), *Mugil cephalus* (71.5% occurrence), and *Dasyatis sabina* (69.7% occurrence).

A total of 7,783 animals from 28 Selected Taxa were collected, representing 35.3% of the entire 183-m haul seine catch (Table AP20-05). *Mugil cephalus* (n=2,049), *Litopenaeus setiferus* (n=1,815), and *Leiostomus xanthurus* (n=1,006) were the most abundant Selected Taxa, accounting for 62.6% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil cephalus* (71.5% occurrence), *Sciaenops ocellatus* (51.5% occurrence), and *Leiostomus xanthurus* (46.7% occurrence).

6.1-m Bay Otter Trawls. A total of 12,331 animals were collected in 87 6.1-m bay otter trawls, representing 12.6% of the overall SRS catch (Table AP20-01). *Anchoa mitchilli* (n=2,963) and *Micropogonias undulatus* (n=2,553) were the most abundant taxa collected, accounting for 44.7% of the 6.1-m bay otter trawl catch (Table AP20-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Etropus crossotus* (82.8% occurrence), *Micropogonias undulatus* (52.9% occurrence), and *Callinectes sapidus* (51.7% occurrence).

A total of 4,560 animals from 18 Selected Taxa were collected, representing 37.0% of the entire 6.1-m bay otter trawl catch (Table AP20-07). *Micropogonias undulatus* (n=2,553), *Litopenaeus setiferus* (n=585), and *Cynoscion arenarius* (n=388) were the most abundant Selected Taxa, accounting for 77.3% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Micropogonias undulatus* (52.9% occurrence), *Callinectes sapidus* (51.7% occurrence), and *Farfantepenaeus duorarum* (39.1% occurrence).

River Sampling

21.3-m River Seines. A total of 7,560 animals were collected in 77 21.3-m river seines, representing 7.7% of the overall SRS catch (Table AP20-01). *Notropis petersoni* (n=1,810), *Anchoa mitchilli* (n=1,500), and *Menidia* spp. (n=966) were the most abundant taxa collected, accounting for 56.6% of the 21.3-m river seine catch (Table AP20-08). The taxa most frequently caught in 21.3-m river seines was *Callinectes sapidus* (54.5% occurrence), *Notropis petersoni* (42.9% occurrence), and *Lucania parva* (40.3% occurrence).

A total of 282 animals from 10 Selected Taxa were collected, representing 3.7% of the entire 21.3-m river seine catch (Table AP20-09). *Callinectes sapidus* (n=201) was the most abundant Selected Taxon, accounting for 71.3% of the Selected Taxa collected by this gear. The Selected Taxon most frequently caught in 21.3-m river seines was *Callinectes sapidus* (54.5% occurrence).

6.1-m River Otter Trawls. A total of 15,560 animals were collected in 28 6.1-m river otter trawls, representing 15.9% of the overall SRS catch (Table AP20-01). *Anchoa mitchilli* (n=13,803) was the most abundant taxon collected, accounting for 88.7% of the 6.1-m river otter trawl catch (Table AP20-10). The taxa most frequently caught in 6.1-m river otter trawls were *Anchoa mitchilli* (57.1% occurrence), *Callinectes sapidus* (57.1% occurrence), and *Trinectes maculatus* (57.1% occurrence).

A total of 1,368 animals from 12 Selected Taxa were collected, representing 8.8% of the entire 6.1-m river otter trawl catch (Table AP20-11). *Micropogonias undulatus* (n=554), *Cynoscion arenarius* (n = 476), and *Callinectes sapidus* (n=118) were the most abundant Selected Taxa, accounting for 83.9% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m river otter trawls were *Callinectes sapidus* (57.1% occurrence), *Micropogonias undulatus* (32.1% occurrence), and *Cynoscion arenarius* (25.0% occurrence).

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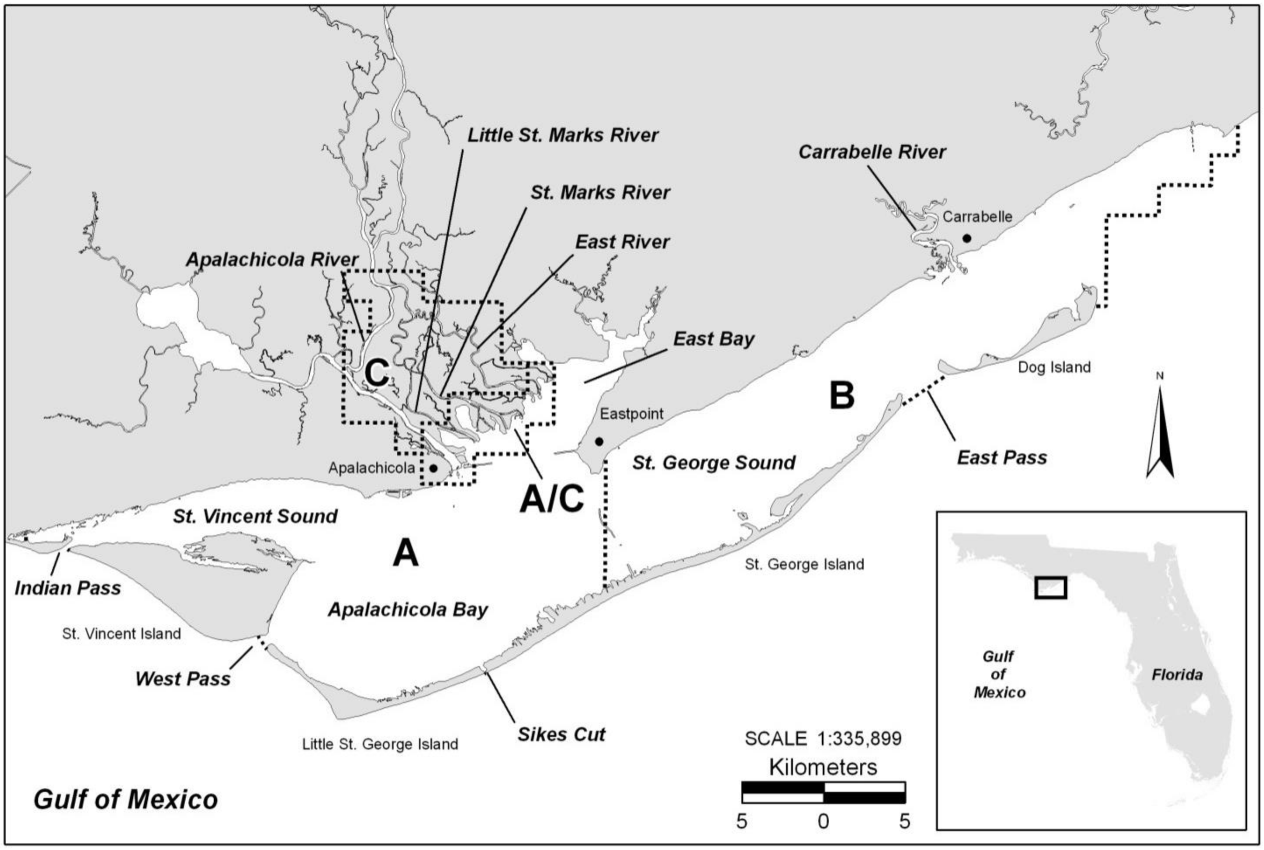

Figure AP20-01. Map of Apalachicola Bay sampling area. Zones are labeled A–C. Grids containing portions of Zones A and C are labeled A/C.

Table AP20-01. Summary of catch and effort data for Apalachicola Bay stratified-random sampling, 2020.

Zone	**21.3-m bay seine**		**21.3-m river seine**		**183-m haul seine**		**6.1-m otter trawl**		**Totals**	
	Animals	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**
A	29,977	112	.	.	12,698	81	9,033	43	51,708	236
B	10,671	113	.	.	9,353	84	3,298	44	23,322	241
C	.	.	7,560	77	.	.	15,560	28	23,120	105
Totals	**40,648**	**225**	**7,560**	**77**	**22,051**	**165**	**27,891**	**115**	**98,150**	**582**

Table AP20-02. Catch statistics for 10 dominant taxa collected in 225 21.3-m bay seine samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m²)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	12,667	31.2	35.6	40.21	16.69	622.51	3,446.43	31	0.06	17	63
Brevoortia spp.	4,565	11.2	9.8	14.49	8.61	891.40	1,596.43	43	0.26	21	80
Lagodon rhomboides	3,794	9.3	47.6	12.04	2.49	309.94	329.29	38	0.30	12	155
Litopenaeus setiferus	2,222	5.5	17.8	7.05	3.22	684.21	537.86	8	0.11	2	22
Lucania parva	2,048	5.0	13.8	6.50	3.23	744.68	646.43	25	0.10	17	41
Eucinostomus spp.	1,943	4.8	31.6	6.17	1.23	300.18	182.14	23	0.16	8	39
Micropogonias undulatus	1,791	4.4	24.0	5.69	1.58	417.80	220.71	26	0.38	9	196
Menidia spp.	1,585	3.9	28.0	5.03	1.55	461.32	282.14	50	0.38	24	106
Mugil cephalus	1,249	3.1	10.7	3.97	2.26	854.51	408.57	25	0.45	18	292
Bairdiella chrysoura	1,172	2.9	21.8	3.72	1.13	454.68	180.71	43	0.62	8	145
Subtotals	33,036	81.3	.	.	.	.	.	.	.	2	292
Totals	**40,648**	**100.0**	**.**	**129.04**	**21.43**	**249.14**	**3,542.14**	**.**	**.**	**2**	**428**

Table AP20-03. Catch statistics for Selected Taxa collected in 225 21.3-m bay seine samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Litopenaeus setiferus	2,222	5.5	17.8	7.05	3.22	684.21	537.86	8	0.11	2	22
Micropogonias undulatus	1,791	4.4	24.0	5.69	1.58	417.80	220.71	26	0.38	9	196
Mugil cephalus	1,249	3.1	10.7	3.97	2.26	854.51	408.57	25	0.45	18	292
Farfantepenaeus spp.	1,046	2.6	36.4	3.32	0.86	389.42	140.00	7	0.09	2	14
Mugil curema	1,027	2.5	6.2	3.26	3.16	1,453.15	710.71	31	0.31	5	123
Callinectes sapidus	614	1.5	34.2	1.95	0.34	262.85	48.57	14	0.63	4	170
Leiostomus xanthurus	536	1.3	22.2	1.70	0.43	374.76	42.86	31	0.92	10	198
Menticirrhus americanus	361	0.9	15.1	1.15	0.36	469.96	62.14	30	0.85	11	135
Cynoscion arenarius	329	0.8	14.2	1.04	0.28	397.93	27.86	29	0.48	13	67
Cynoscion nebulosus	168	0.4	21.8	0.53	0.11	304.32	12.14	43	2.35	14	134
Sciaenops ocellatus	86	0.2	10.2	0.27	0.10	562.96	15.71	63	9.39	11	428
Paralichthys albigutta	41	0.1	10.2	0.13	0.03	373.08	5.00	50	8.21	14	217
Lutjanus griseus	34	0.1	5.8	0.11	0.05	648.13	9.29	32	4.54	12	170
Lutjanus synagris	32	0.1	4.9	0.10	0.04	622.28	7.14	34	1.83	18	66
Farfantepenaeus aztecus	26	0.1	3.6	0.08	0.04	715.20	7.14	17	0.44	15	23
Elops saurus	20	0.1	1.8	0.06	0.05	1,280.54	12.14	41	2.23	31	71
Farfantepenaeus duorarum	10	<0.1	4.0	0.03	0.01	511.04	1.43	17	0.79	14	21

Table AP20-03. (Continued).

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Menticirrhus saxatilis	8	<0.1	2.7	0.03	0.01	643.21	1.43	24	4.61	10	46
Trachinotus carolinus	5	<0.1	0.4	0.02	0.02	1,500.00	3.57	19	2.42	14	28
Archosargus probatocephalus	4	<0.1	1.8	0.01	0.01	744.96	0.71	88	64.43	20	281
Paralichthys lethostigma	2	<0.1	0.9	0.01	0.00	1,058.29	0.71	45	2.00	43	47
Mycteroperca microlepis	2	<0.1	0.4	0.01	0.01	1,500.00	1.43	124	30.50	93	154
Menippe sp.	1	<0.1	0.4	<0.01	<0.01	1,500.00	0.71	10	.	10	10
Menticirrhus littoralis	1	<0.1	0.4	<0.01	<0.01	1,500.00	0.71	26	.	26	26
Totals	**9,615**	**23.7**	**.**	**30.52**	**5.75**	**282.71**	**728.57**	**.**	**.**	**2**	**428**

Table AP20-04. Catch statistics for 10 dominant taxa collected in 165 183-m haul seine samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	**Number**		**% Occur**	**Catch-per-unit-effort (animals/set)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Lagodon rhomboides	6,643	30.1	74.5	40.26	6.73	214.82	820.00	109	0.41	21	212
Brevoortia spp.	2,982	13.5	16.4	18.07	9.63	684.47	1,369.00	148	0.57	60	218
Mugil cephalus	2,049	9.3	71.5	12.42	2.10	217.18	191.00	206	1.74	71	443
Litopenaeus setiferus	1,815	8.2	9.1	11.00	7.47	872.50	1,126.00	20	0.07	9	32
Bairdiella chrysoura	1,298	5.9	31.5	7.87	2.60	425.15	360.00	132	0.54	32	183
Leiostomus xanthurus	1,006	4.6	46.7	6.10	0.97	203.87	62.00	144	1.30	42	210
Micropogonias undulatus	958	4.3	33.9	5.81	1.26	278.26	126.00	138	1.21	53	243
Dasyatis sabina	946	4.3	69.7	5.73	0.96	214.94	109.00	221	1.21	98	357
Orthopristis chrysoptera	546	2.5	30.3	3.31	0.80	311.98	82.00	105	1.80	31	201
Harengula jaguana	494	2.2	6.7	2.99	2.81	1,204.02	463.00	116	0.43	62	145
Subtotals	18,737	85.0	.	.	.	.	.	.	.	9	443
Totals	**22,051**	**100.0**	**.**	**133.64**	**16.03**	**154.11**	**1,404.00**	**.**	**.**	**7**	**840**

Table AP20-05. Catch statistics for Selected Taxa collected in 165 183-m haul seine samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	**Number**		**% Occur**	**Catch-per-unit-effort (animals/set)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Mugil cephalus	2,049	9.3	71.5	12.42	2.10	217.18	191.00	206	1.74	71	443
Litopenaeus setiferus	1,815	8.2	9.1	11.00	7.47	872.50	1,126.00	20	0.07	9	32
Leiostomus xanthurus	1,006	4.6	46.7	6.10	0.97	203.87	62.00	144	1.30	42	210
Micropogonias undulatus	958	4.3	33.9	5.81	1.26	278.26	126.00	138	1.21	53	243
Sciaenops ocellatus	425	1.9	51.5	2.58	0.38	190.35	33.00	338	5.56	72	620
Cynoscion nebulosus	288	1.3	34.5	1.75	0.44	320.22	56.00	234	5.89	45	513
Mugil curema	275	1.3	27.3	1.67	0.41	314.94	49.00	147	2.47	92	295
Elops saurus	156	0.7	24.8	0.95	0.20	268.46	18.00	252	3.89	96	400
Paralichthys albigutta	147	0.7	33.9	0.89	0.16	229.24	14.00	163	6.49	45	437
Farfantepenaeus spp.	146	0.7	6.7	0.88	0.41	593.62	53.00	12	0.13	7	14
Pogonias cromis	93	0.4	23.0	0.56	0.13	302.45	13.00	250	14.57	73	810
Callinectes sapidus	74	0.3	22.4	0.45	0.09	265.66	11.00	115	5.58	31	182
Archosargus probatocephalus	64	0.3	16.4	0.39	0.09	293.93	7.00	293	7.86	102	422
Trachinotus falcatus	63	0.3	4.2	0.38	0.22	731.96	27.00	115	8.19	39	223
Menticirrhus americanus	37	0.2	9.1	0.22	0.07	401.14	7.00	130	6.45	56	278
Paralichthys lethostigma	36	0.2	7.9	0.22	0.13	764.38	21.00	233	16.51	79	491
Farfantepenaeus aztecus	32	0.2	4.2	0.19	0.09	620.89	13.00	18	0.44	15	24

Table AP20-05. (Continued).

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Farfantepenaeus duorarum	23	0.1	6.1	0.14	0.05	440.36	4.00	17	0.58	15	24
Trachinotus carolinus	20	0.1	4.8	0.12	0.05	560.05	7.00	96	3.33	67	120
Mycteroperca microlepis	16	0.1	2.4	0.10	0.06	757.33	7.00	131	13.84	70	214
Lutjanus griseus	14	0.1	6.1	0.08	0.03	439.56	3.00	131	14.17	35	190
Menticirrhus littoralis	14	0.1	2.4	0.08	0.06	942.19	10.00	203	13.65	99	262
Scomberomorus maculatus	12	0.1	1.8	0.07	0.06	1,079.73	10.00	311	22.87	90	410
Menticirrhus saxatilis	9	<0.1	3.0	0.05	0.03	648.32	3.00	132	4.72	104	149
Cynoscion arenarius	8	<0.1	3.6	0.05	0.02	594.20	3.00	139	27.01	52	245
Megalops atlanticus	1	<0.1	0.6	0.01	0.01	1,284.52	1.00	483	.	483	483
Pomatomus saltatrix	1	<0.1	0.6	0.01	0.01	1,284.52	1.00	394	.	394	394
Rachycentron canadum	1	<0.1	0.6	0.01	0.01	1,284.52	1.00	105	.	105	105
Totals	**7,783**	**35.3**	**.**	**47.17**	**8.49**	**231.22**	**1,208.00**	**.**	**.**	**7**	**810**

Table AP20-06. Catch statistics for 10 dominant taxa collected in 87 6.1-m bay otter trawl samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	2,963	24.0	43.7	2.29	0.66	268.44	36.56	42	0.25	15	74
Micropogonias undulatus	2,553	20.7	52.9	1.97	0.87	413.94	62.67	39	0.78	7	170
Etropus crossotus	965	7.8	82.8	0.74	0.09	115.34	4.18	72	0.55	20	113
Ariopsis felis	924	7.5	40.2	0.70	0.31	417.03	23.45	80	1.33	40	328
Litopenaeus setiferus	585	4.7	27.6	0.44	0.16	348.71	11.56	20	0.20	7	40
Cynoscion arenarius	388	3.2	33.3	0.29	0.09	293.37	4.69	59	1.80	9	204
Orthopristis chrysoptera	376	3.1	25.3	0.29	0.11	370.61	8.84	106	1.17	12	182
Bairdiella chrysoura	320	2.6	31.0	0.25	0.09	358.78	5.73	102	0.91	20	160
Callinectes sapidus	239	1.9	51.7	0.18	0.05	265.17	3.98	66	2.94	7	190
Rimapenaeus spp.	233	1.9	42.5	0.18	0.06	312.41	4.18	6	0.14	2	10
Subtotals	9,546	77.4	.	.	.	.	.	.	.	2	328
Totals	**12,331**	**100.0**	**.**	**9.44**	**1.46**	**143.78**	**87.63**	**.**	**.**	**2**	**504**

Table AP20-07. Catch statistics for Selected Taxa collected in 87 6.1-m bay otter trawl samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Micropogonias undulatus	2,553	20.7	52.9	1.97	0.87	413.94	62.67	39	0.78	7	170
Litopenaeus setiferus	585	4.7	27.6	0.44	0.16	348.71	11.56	20	0.20	7	40
Cynoscion arenarius	388	3.2	33.3	0.29	0.09	293.37	4.69	59	1.80	9	204
Callinectes sapidus	239	1.9	51.7	0.18	0.05	265.17	3.98	66	2.94	7	190
Farfantepenaeus aztecus	195	1.6	23.0	0.15	0.04	254.84	1.67	22	0.30	15	34
Leiostomus xanthurus	165	1.3	27.6	0.12	0.04	311.81	2.31	75	4.44	7	167
Farfantepenaeus spp.	123	1.0	35.6	0.09	0.03	259.93	1.89	10	0.26	3	14
Menticirrhus americanus	90	0.7	35.6	0.07	0.02	211.61	0.90	81	3.84	18	217
Farfantepenaeus duorarum	86	0.7	39.1	0.07	0.01	207.40	0.94	20	0.52	13	33
Menippe spp.	45	0.4	18.4	0.03	0.01	298.29	0.57	19	1.40	4	45
Paralichthys albigutta	41	0.3	23.0	0.03	0.01	236.50	0.39	149	9.15	76	284
Cynoscion nothus	22	0.2	3.4	0.02	0.02	850.82	1.35	60	10.14	22	187
Lutjanus synagris	7	0.1	6.9	0.01	<0.01	389.96	0.13	57	7.83	30	90
Paralichthys lethostigma	7	0.1	6.9	0.01	<0.01	386.28	0.13	219	29.96	124	346
Elops saurus	6	0.1	1.1	<0.01	<0.01	932.74	0.40	43	0.43	41	44
Cynoscion nebulosus	6	0.1	5.7	<0.01	<0.01	431.62	0.13	178	4.53	165	195
Lutjanus campechanus	1	<0.1	1.1	<0.01	<0.01	932.74	0.07	80	.	80	80
Sciaenops ocellatus	1	<0.1	1.1	<0.01	<0.01	932.74	0.07	9	.	9	9
Totals	**4,560**	**37.0**	**.**	**3.49**	**0.94**	**252.59**	**65.57**	**.**	**.**	**3**	**346**

Table AP20-08. Catch statistics for 10 dominant taxa collected in 77 21.3-m river seine samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Notropis petersoni	1,810	23.9	42.9	34.55	15.77	400.43	1,144.12	32	0.13	11	58
Anchoa mitchilli	1,500	19.8	33.8	28.65	11.36	347.98	605.88	28	0.14	15	44
Menidia spp.	966	12.8	22.1	18.45	13.40	637.18	1,020.59	38	0.17	19	81
Lucania parva	799	10.6	40.3	15.26	8.15	468.84	613.24	24	0.17	12	43
Brevoortia spp.	329	4.4	7.8	6.28	3.54	494.23	189.71	24	0.09	14	27
Notemigonus crysoleucas	275	3.6	20.8	5.25	2.06	343.87	105.88	46	0.92	21	125
Callinectes sapidus	201	2.7	54.5	3.84	0.73	166.42	33.82	14	1.02	4	147
Gambusia holbrooki	198	2.6	16.9	3.78	2.28	530.20	166.18	20	0.26	14	31
Lepomis microlophus	183	2.4	33.8	3.50	1.29	323.49	91.18	48	2.46	20	195
Ctenogobius boleosoma	158	2.1	32.5	3.02	1.22	354.87	88.24	24	0.31	14	35
Subtotals	6,418	84.9	.	.	.	.	.	.	.	4	195
Totals	**7,560**	**100.0**	**.**	**144.39**	**30.83**	**187.36**	**1,379.41**	**.**	**.**	**4**	**555**

Table AP20-09. Catch statistics for Selected Taxa collected in 77 21.3-m river seine samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Callinectes sapidus	201	2.7	54.5	3.84	0.73	166.42	33.82	14	1.02	4	147
Litopenaeus setiferus	51	0.7	9.1	0.97	0.84	757.13	64.71	5	0.16	4	10
Micropogonias undulatus	11	0.2	5.2	0.21	0.14	586.92	10.29	19	1.79	14	29
Farfantepenaeus spp.	6	0.1	5.2	0.11	0.06	454.50	2.94	8	1.25	6	14
Mugil cephalus	4	0.1	3.9	0.08	0.05	531.43	2.94	24	1.04	21	26
Lutjanus griseus	3	<0.1	3.9	0.06	0.03	499.91	1.47	37	10.33	17	52
Paralichthys lethostigma	3	<0.1	3.9	0.06	0.03	499.91	1.47	198	68.62	114	334
Archosargus probatocephalus	1	<0.1	1.3	0.02	0.02	877.50	1.47	54	.	54	54
Cynoscion nebulosus	1	<0.1	1.3	0.02	0.02	877.50	1.47	42	.	42	42
Cynoscion arenarius	1	<0.1	1.3	0.02	0.02	877.50	1.47	20	.	20	20
Totals	**282**	**3.7**	**.**	**5.39**	**1.23**	**199.75**	**75.00**	**.**	**.**	**4**	**334**

Table AP20-10. Catch statistics for 10 dominant taxa collected in 28 6.1-m river otter trawl samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	13,803	88.7	57.1	65.64	35.31	284.61	926.20	31	0.07	19	59
Micropogonias undulatus	554	3.6	32.1	2.67	1.69	334.54	47.09	28	0.50	11	68
Cynoscion arenarius	476	3.1	25.0	2.27	1.84	430.23	51.40	48	0.61	12	78
Callinectes sapidus	118	0.8	57.1	0.56	0.21	203.30	4.59	32	3.78	5	150
Litopenaeus setiferus	84	0.5	17.9	0.40	0.29	377.76	7.42	7	0.17	5	12
Eucinostomus spp.	70	0.5	28.6	0.33	0.14	225.56	3.10	26	0.97	11	39
Farfantepenaeus spp.	55	0.4	7.1	0.27	0.26	519.26	7.29	9	0.47	3	14
Eucinostomus harengulus	55	0.4	32.1	0.26	0.13	271.00	3.64	59	1.50	40	85
Leiostomus xanthurus	48	0.3	7.1	0.23	0.23	517.84	6.34	19	3.19	13	165
Trinectes maculatus	49	0.3	57.1	0.23	0.05	124.99	0.98	47	2.31	12	74
Subtotals	15,312	98.4	.	.	.	.	.	.	.	3	165
Totals	**15,560**	**100.0**	**.**	**74.01**	**36.05**	**257.74**	**939.29**	**.**	**.**	**3**	**430**

Table AP20-11. Catch statistics for Selected Taxa collected in 28 6.1-m river otter trawl samples during Apalachicola Bay stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Micropogonias undulatus	554	3.6	32.1	2.67	1.69	334.54	47.09	28	0.50	11	68
Cynoscion arenarius	476	3.1	25.0	2.27	1.84	430.23	51.40	48	0.61	12	78
Callinectes sapidus	118	0.8	57.1	0.56	0.21	203.30	4.59	32	3.78	5	150
Litopenaeus setiferus	84	0.5	17.9	0.40	0.29	377.76	7.42	7	0.17	5	12
Farfantepenaeus spp.	55	0.4	7.1	0.27	0.26	519.26	7.29	9	0.47	3	14
Leiostomus xanthurus	48	0.3	7.1	0.23	0.23	517.84	6.34	19	3.19	13	165
Farfantepenaeus aztecus	15	0.1	7.1	0.07	0.07	493.83	1.89	16	0.32	15	18
Archosargus probatocephalus	6	<0.1	21.4	0.03	0.01	195.28	0.13	243	46.00	124	405
Lutjanus griseus	5	<0.1	17.9	0.02	0.01	218.59	0.13	74	11.29	50	112
Paralichthys lethostigma	3	<0.1	10.7	0.01	0.01	293.97	0.13	157	24.04	110	190
Sciaenops ocellatus	3	<0.1	3.6	0.01	0.01	529.15	0.40	53	0.58	52	54
Cynoscion nebulosus	1	<0.1	3.6	<0.01	<0.01	529.15	0.13	355	.	355	355
Totals	**1,368**	**8.8**	**.**	**6.55**	**2.99**	**241.98**	**68.13**	**.**	**.**	**3**	**405**

Appendix AP20-01. Monthly summary of species collected during Apalachicola Bay stratified-random sampling, 2020. Effort, or total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=61	E=61	E=11	E=27	E=61	E=45	E=61	E=45	E=61	E=45	E=61	E=582
Acanthostracion quadricornis	.	1	6	.	.	1	.	.	.	1	.	1	**10**
Achirus lineatus	.	.	.	.	.	.	1	.	1	.	.	.	**2**
Adinia xenica	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Aetobatus narinari	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Alosa alabamae	.	.	2	.	.	.	.	.	.	.	.	.	**2**
Alosa chrysochloris	.	.	.	.	.	.	.	.	2	3	.	.	**5**
Aluterus schoepfii	.	.	.	.	1	1	.	1	.	.	1	.	**4**
Ameiurus catus	.	.	.	.	.	30	1	.	.	.	.	1	**32**
Anchoa cubana	1	.	.	.	.	.	.	1	.	85	.	.	**87**
Anchoa hepsetus	3	.	.	.	31	53	18	24	4	68	.	.	**201**
Anchoa lyolepis	1	.	.	.	.	.	.	21	1	7	.	.	**30**
Anchoa mitchilli	10,327	1,197	105	6	6,564	1,863	3,773	3,814	163	1,494	441	1,192	**30,939**
Anchoa sp.	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Ancylopsetta quadrocellata	2	3	10	2	.	2	.	1	.	1	.	1	**22**
Anguilla rostrata	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Aphredoderus sayanus	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Archosargus probatocephalus	2	10	5	.	2	16	4	3	12	11	7	3	**75**
Argopecten irradians	.	1	.	1	.	.	.	.	.	.	.	.	**2**
Ariopsis felis	178	7	139	7	2	111	55	789	26	130	30	162	**1,636**
Astroscopus y-graecum	3	.	1	1	.	.	.	.	.	.	.	.	**5**
Bagre marinus	.	.	1	.	.	3	1	3	.	9	2	1	**20**
Bairdiella chrysoura	77	110	783	79	154	207	598	172	430	67	81	45	**2,803**

Appendix AP20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=61	E=61	E=11	E=27	E=61	E=45	E=61	E=45	E=61	E=45	E=61	E=582
Bathygobius soporator	.	.	.	1	.	.	.	.	2	.	1	2	**6**
Brevoortia spp.	207	280	436	8	2,382	1,552	498	1,410	744	386	8	.	**7,911**
Callinectes sapidus	97	221	52	123	35	192	109	50	58	39	56	214	**1,246**
Callinectes similis	48	4	15	1	1	31	2	28	4	14	.	13	**161**
Caranx crysos	.	.	.	.	.	.	.	.	5	.	.	.	**5**
Caranx hippos	.	.	.	.	.	23	9	3	2	2	.	.	**39**
Caranx latus	.	.	.	.	.	.	1	.	1	.	7	1	**10**
Centrarchidae spp.	.	.	.	.	2	.	.	.	.	.	.	.	**2**
Centropristis philadelphica	.	.	.	.	.	3	.	1	.	3	.	1	**8**
Centropristis sp.	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Centropristis striata	.	.	.	.	.	1	.	2	.	2	1	.	**6**
Chaetodipterus faber	.	.	.	1	.	1	.	4	6	5	.	.	**17**
Chasmodes saburrae	.	.	.	.	.	.	4	2	1	.	.	1	**8**
Chilomycterus schoepfii	2	6	3	3	.	2	.	3	3	12	3	1	**38**
Chloroscombrus chrysurus	.	.	.	.	.	2	.	17	.	7	.	1	**27**
Citharichthys macrops	7	10	15	2	.	4	4	17	1	1	10	6	**77**
Citharichthys spilopterus	.	1	.	3	.	23	8	12	1	.	.	1	**49**
Citharichthys spp.	.	1	.	.	.	2	.	.	.	.	.	.	**3**
Ctenogobius boleosoma	80	55	27	104	4	27	115	25	160	35	59	177	**868**
Ctenogobius sp.	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Cynoscion arenarius	3	2	2	14	47	305	62	605	31	120	4	7	**1,202**
Cynoscion nebulosus	1	8	50	1	1	10	56	65	102	54	34	82	**464**
Cynoscion nothus	.	.	.	.	.	.	.	.	.	21	.	1	**22**

Appendix AP20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=61	E=61	E=11	E=27	E=61	E=45	E=61	E=45	E=61	E=45	E=61	E=582
Cyprinodon variegatus	3	.	.	.	.	.	.	25	.	.	.	.	**28**
Cyprinus carpio	.	.	.	.	3	.	.	.	.	.	.	.	**3**
Dasyatis americana	.	.	.	.	.	2	2	.	.	.	.	.	**4**
Dasyatis sabina	14	57	165	13	5	116	180	120	92	150	128	38	**1,078**
Dasyatis say	.	.	.	4	.	15	17	15	4	26	1	.	**82**
Diplectrum formosum	.	.	.	.	.	.	.	1	.	2	1	1	**5**
Dorosoma cepedianum	.	1	3	.	.	1	4	2	7	3	.	.	**21**
Dorosoma petenense	5	6	2	.	8	105	4	.	.	35	1	3	**169**
Echeneis neucratoides	.	.	.	.	.	3	4	.	.	.	.	.	**7**
Elops saurus	.	.	8	3	18	15	26	20	24	25	35	8	**182**
Enneacanthus gloriosus	.	.	.	.	.	7	1	7	5	.	.	.	**20**
Erimyzon sucetta	.	.	.	.	1	23	.	6	2	.	.	.	**32**
Esox niger	.	.	1	.	1	.	5	.	.	.	.	.	**7**
Etheostoma fusiforme	.	.	.	.	2	12	1	.	2	.	.	.	**17**
Etheostoma sp.	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Etropus crossotus	129	106	46	32	.	82	6	228	2	274	51	118	**1,074**
Etropus cyclosquamus	.	.	.	.	.	16	1	16	.	.	.	.	**33**
Etropus spp.	.	.	.	.	.	4	.	.	.	.	.	.	**4**
Eucinostomus argenteus	.	.	.	.	.	.	.	1	4	.	.	.	**5**
Eucinostomus gula	13	2	1	5	.	1	24	34	14	16	68	5	**183**
Eucinostomus harengulus	29	.	.	.	.	19	61	44	24	7	34	34	**252**
Eucinostomus spp.	50	.	.	.	2	69	933	445	459	113	54	102	**2,227**
Evorthodus lyricus	.	.	.	.	.	.	1	.	.	.	.	.	**1**

Appendix AP20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=61	E=61	E=11	E=27	E=61	E=45	E=61	E=45	E=61	E=45	E=61	E=582
Farfantepenaeus aztecus	2	1	1	.	14	167	2	74	.	5	1	1	**268**
Farfantepenaeus duorarum	16	17	10	1	.	19	7	32	5	6	1	5	**119**
Farfantepenaeus spp.	264	27	18	90	15	111	282	152	262	54	8	93	**1,376**
Fundulus chrysotus	.	.	.	.	.	8	6	12	11	.	6	.	**43**
Fundulus confluentus	.	.	.	.	.	.	.	.	.	.	.	25	**25**
Fundulus grandis	.	1	.	3	.	.	1	.	.	.	5	5	**15**
Fundulus similis	.	1	.	.	.	76	25	7	.	.	3	1	**113**
Fundulus sp.	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Gambusia holbrooki	7	3	.	.	2	1	.	.	.	.	153	33	**199**
Gobionellus oceanicus	1	.	9	.	.	1	.	4	2	6	6	2	**31**
Gobiosoma bosc	5	12	1	.	.	3	34	.	5	1	9	28	**98**
Gobiosoma robustum	2	1	3	2	.	1	6	2	.	.	.	.	**17**
Gobiosoma spp.	3	1	.	.	.	.	8	3	5	2	7	6	**35**
Gymnura micrura	.	.	.	.	.	2	5	1	5	8	4	1	**26**
Halichoeres bivittatus	.	.	.	.	.	.	.	5	.	.	.	.	**5**
Harengula jaguana	.	.	13	5	3	1	2	25	473	192	1	.	**715**
Hemicaranx amblyrhynchus	.	.	.	.	.	.	.	4	.	11	.	1	**16**
Heterandria formosa	1	6	3	.	5	10	4	1	6	.	42	1	**79**
Hippocampus erectus	.	2	1	.	.	1	.	1	.	.	1	.	**6**
Hippocampus zosterae	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Hypleurochilus caudovittatus	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Hyporhamphus meeki	.	.	.	.	.	.	.	3	2	7	29	2	**43**
Hyporhamphus spp.	.	.	.	.	2	3	.	1	.	.	.	.	**6**

Appendix AP20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=61	E=61	E=11	E=27	E=61	E=45	E=61	E=45	E=61	E=45	E=61	E=582
Hypsoblennius hentz	1	1	.	.	.	.	.	.	.	.	2	4	**8**
Ictaluridae sp.	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Ictalurus sp.	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Ictalurus furcatus	1	4	4	.	.	1	.	.	.	.	.	1	**11**
Ictalurus punctatus	.	6	3	.	.	3	.	1	.	3	.	2	**18**
Labidesthes sicculus	.	.	.	.	1	.	1	.	.	.	.	.	**2**
Lagodon rhomboides	393	840	995	362	428	1,331	1,415	1,133	2,220	837	470	115	**10,539**
Larimus fasciatus	1	.	.	.	.	2	.	.	.	.	.	.	**3**
Leiostomus xanthurus	184	263	231	90	26	341	216	86	113	101	77	27	**1,755**
Lepisosteus oculatus	.	.	.	.	.	.	1	1	.	.	1	.	**3**
Lepisosteus osseus	.	.	3	.	.	.	1	.	4	.	.	.	**8**
Lepisosteus sp.	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Lepomis macrochirus	.	.	.	.	.	5	.	.	1	1	.	.	**7**
Lepomis microlophus	5	1	1	.	11	60	69	7	10	5	33	16	**218**
Lepomis punctatus	.	.	.	.	1	57	3	21	12	2	29	10	**135**
Lepomis spp.	.	.	.	.	31	19	5	.	5	.	7	4	**71**
Litopenaeus setiferus	79	3	77	20	1	67	982	766	93	281	2,062	326	**4,757**
Lobotes surinamensis	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Lucania parva	8	201	2	.	266	22	168	1,254	37	328	109	455	**2,850**
Lutjanus campechanus	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Lutjanus griseus	1	.	.	.	.	2	5	4	31	8	1	4	**56**
Lutjanus synagris	.	1	.	.	.	.	.	8	20	9	1	.	**39**
Megalops atlanticus	.	.	.	.	.	.	.	.	.	1	.	.	**1**

Appendix AP20-01. (Continued).

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
	Month												
	E=43	**E=61**	**E=61**	**E=11**	**E=27**	**E=61**	**E=45**	**E=61**	**E=45**	**E=61**	**E=45**	**E=61**	**E=582**
Membras martinica	.	1	11	.	18	44	73	92	3	5	.	.	**247**
Menidia spp.	30	37	39	.	189	345	814	807	184	20	96	1	**2,562**
Menippe spp.	3	12	8	4	.	4	.	3	.	9	.	3	**46**
Menticirrhus americanus	17	5	4	3	6	41	19	127	123	69	47	27	**488**
Menticirrhus littoralis	.	.	.	.	.	.	1	12	2	.	.	.	**15**
Menticirrhus saxatilis	.	.	.	1	.	.	5	5	.	1	3	2	**17**
Menticirrhus spp.	.	.	.	.	.	.	.	.	4	.	.	.	**4**
Microgobius gulosus	4	1	.	.	18	17	21	3	10	5	2	1	**82**
Microgobius sp.	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Microgobius thalassinus	2	6	3	.	.	26	.	7	.	4	.	.	**48**
Micropogonias undulatus	1,670	607	932	196	82	722	169	207	132	277	348	525	**5,867**
Micropterus salmoides	13	3	1	.	63	50	16	7	6	.	7	8	**174**
Minytrema melanops	1	1	.	.	.	1	.	.	.	.	.	.	**3**
Monacanthus ciliatus	.	.	.	.	.	.	.	1	1	.	.	1	**3**
Mugil cephalus	395	702	936	39	35	303	35	47	105	161	336	208	**3,302**
Mugil curema	.	7	68	.	7	1,004	3	13	69	36	51	44	**1,302**
Mycteroperca microlepis	.	.	.	.	.	9	2	1	6	.	.	.	**18**
Myrophis punctatus	3	.	.	.	.	.	.	.	.	.	.	.	**3**
Nicholsina usta	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Notemigonus crysoleucas	.	.	.	.	6	51	27	73	79	3	38	.	**277**
Notropis maculatus	.	.	.	.	.	.	1	.	.	2	.	1	**4**
Notropis petersoni	.	3	1	.	142	174	905	186	276	44	38	69	**1,838**
Notropis texanus	.	.	.	.	17	6	.	.	.	.	.	.	**23**

Appendix AP20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=61	E=61	E=11	E=27	E=61	E=45	E=61	E=45	E=61	E=45	E=61	E=582
Ogcocephalus cubifrons	.	2	2	2	.	1	.	1	.	8	4	1	**21**
Oligoplites saurus	.	.	2	.	.	2	23	8	9	3	1	.	**48**
Ophidion holbrookii	.	.	.	1	.	.	.	.	.	.	.	.	**1**
Opisthonema oglinum	.	.	.	.	.	.	.	.	.	2	.	.	**2**
Opsanus beta	.	.	1	2	.	1	.	.	3	.	1	.	**8**
Orthopristis chrysoptera	62	42	8	136	40	305	189	129	154	176	10	133	**1,384**
Paralichthyidae spp.	.	3	.	.	.	3	.	.	.	.	.	.	**6**
Paralichthys albigutta	8	14	28	15	4	45	22	28	25	19	15	6	**229**
Paralichthys lethostigma	.	2	.	1	.	8	3	27	3	4	2	1	**51**
Peprilus burti	6	2	6	.	.	.	.	1	.	.	.	8	**23**
Peprilus paru	.	.	1	1	.	.	.	1	.	11	.	.	**14**
Poecilia latipinna	.	.	.	.	.	.	1	.	.	.	1	.	**2**
Pogonias cromis	.	11	18	.	.	11	11	21	3	13	3	2	**93**
Pomatomus saltatrix	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Pomoxis nigromaculatus	.	.	.	.	.	.	2	1	.	.	.	.	**3**
Porichthys plectrodon	.	.	.	.	.	3	.	3	.	.	.	.	**6**
Portunus spp.	16	11	5	1	.	60	.	9	.	10	.	4	**116**
Prionotus rubio	.	.	.	.	.	1	.	1	.	.	.	2	**4**
Prionotus scitulus	16	25	24	1	.	30	.	20	1	25	3	10	**155**
Prionotus tribulus	31	13	11	16	.	1	.	3	2	6	5	8	**96**
Rachycentron canadum	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Rhinoptera bonasus	.	.	.	.	.	.	1	.	1	.	.	.	**2**
Rhizoprionodon terraenovae	.	.	.	.	.	1	.	.	1	.	.	.	**2**

Appendix AP20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=61	E=61	E=11	E=27	E=61	E=45	E=61	E=45	E=61	E=45	E=61	E=582
Rimapenaeus constrictus	.	1	.	.	.	.	.	.	.	.	.	.	1
Rimapenaeus similis	1	1	1	.	.	62	.	8	.	.	.	5	78
Rimapenaeus spp.	18	10	5	.	.	68	.	50	.	77	.	23	251
Sciaenidae sp.	.	1	.	.	.	.	.	.	.	.	.	.	1
Sciaenops ocellatus	26	78	40	4	1	64	19	18	49	71	66	79	515
Scomberomorus maculatus	.	.	10	1	.	.	1	.	.	.	.	.	12
Scorpaena brasiliensis	.	.	.	.	.	.	.	1	.	1	.	.	2
Selene setapinnis	.	.	.	.	.	.	.	.	.	1	.	.	1
Selene vomer	.	.	.	.	.	.	2	1	5	1	.	2	11
Serraniculus pumilio	.	3	.	.	.	1	.	1	.	2	5	1	13
Serranus subligarius	.	.	.	.	.	.	.	1	.	1	.	.	2
Sicyonia dorsalis	1	.	.	.	.	.	.	1	.	.	.	.	2
Sicyonia laevigata	.	2	.	.	.	.	.	.	.	1	.	.	3
Sicyonia typica	.	.	1	.	.	.	.	.	.	.	.	.	1
Sphoeroides nephelus	.	2	.	.	10	7	3	1	5	5	4	2	39
Sphoeroides parvus	.	.	.	.	.	.	.	1	.	.	.	1	2
Sphoeroides spp.	.	.	.	5	6	9	.	.	.	1	7	3	31
Sphyraena barracuda	.	.	.	.	.	.	1	.	1	.	.	.	2
Sphyraena borealis	.	.	.	.	.	4	.	.	1	.	.	.	5
Sphyrna tiburo	1	.	.	.	.	.	.	1	2	2	.	.	6
Stellifer lanceolatus	.	.	.	6	10	.	.	.	.	35	.	5	56
Stephanolepis hispidus	2	2	.	.	2	5	.	6	1	1	4	3	26
Stomolophus meleagris	.	1	.	.	.	.	2	2	.	7	1	3	16

Appendix AP20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=61	E=61	E=11	E=27	E=61	E=45	E=61	E=45	E=61	E=45	E=61	E=582
Strongylura marina	.	12	3	.	7	7	33	3	2	2	4	1	**74**
Strongylura notata	.	.	.	1	.	1	12	2	5	.	1	2	**24**
Strongylura spp.	.	.	.	.	4	4	2	.	.	.	.	.	**10**
Symphurus civitatium	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Symphurus plagiusa	54	19	28	4	.	18	9	47	5	62	2	22	**270**
Syngnathus floridae	2	3	2	.	1	2	.	23	1	.	1	3	**38**
Syngnathus louisianae	5	3	.	.	2	18	3	10	1	5	.	2	**49**
Syngnathus scovelli	22	14	25	6	18	13	30	7	9	13	4	25	**186**
Syngnathus springeri	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Synodus foetens	8	3	5	11	10	92	6	27	11	20	23	12	**228**
Trachinotus carolinus	.	.	1	.	5	3	6	9	.	1	.	.	**25**
Trachinotus falcatus	.	28	.	.	.	.	.	3	.	4	28	.	**63**
Trinectes maculatus	11	7	11	2	1	41	15	22	17	50	16	76	**269**
Tylosurus crocodilus	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Urophycis floridana	5	9	9	1	.	.	.	.	.	.	.	.	**24**
Xiphopenaeus kroyeri	.	.	.	.	.	.	.	1	.	6	1	.	**8**
Totals	**14,691**	**5,191**	**5,503**	**1,447**	**10,779**	**10,962**	**12,327**	**13,737**	**7,038**	**6,380**	**5,367**	**4,728**	**98,150**

Appendix AP20-02. Summary by gear, stratum, and zone of species collected during Apalachicola Bay stratified-random sampling, 2020. Sampling with 21.3-m bay seine was stratified by the presence or absence of a shoreline ('Shore' or offshore) within 5-m. Offshore sets were post-stratified by the presence or absence of bottom vegetation ('Veg' or 'Unveg'). Sampling with 21.3-m river seine, 183-m haul seine, and 6.1-m otter trawl were not stratified. Zones A and B were located in Apalachicola Bay, and Zone C encompassed the lower Apalachicola River. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				A	B	C	
	E=66	E=58	E=101	E=77	E=165	E=115	E=236	E=241	E=105	E=582
Acanthostracion quadricornis	.	.	.	.	.	10	.	10	.	**10**
Achirus lineatus	1	.	1	.	.	.	.	2	.	**2**
Adinia xenica	.	.	1	.	.	.	1	.	.	**1**
Aetobatus narinari	.	.	.	.	1	.	.	1	.	**1**
Alosa alabamae	.	.	.	.	2	.	2	.	.	**2**
Alosa chrysochloris	.	.	.	.	5	.	5	.	.	**5**
Aluterus schoepfii	.	1	.	.	1	2	.	4	.	**4**
Ameiurus catus	.	.	.	31	.	1	.	.	32	**32**
Anchoa cubana	1	.	39	.	.	47	8	79	.	**87**
Anchoa hepsetus	2	23	75	.	.	101	97	104	.	**201**
Anchoa lyolepis	18	.	7	.	.	5	2	28	.	**30**
Anchoa mitchilli	1,994	1,552	9,121	1,500	6	16,766	13,555	2,081	15,303	**30,939**
Anchoa sp.	.	1	.	.	.	.	.	1	.	**1**
Ancylopsetta quadrocellata	.	1	.	.	4	17	2	20	.	**22**
Anguilla rostrata	.	.	.	1	.	.	.	.	1	**1**
Aphredoderus sayanus	.	.	.	1	.	.	.	.	1	**1**
Archosargus probatocephalus	3	.	1	1	64	6	33	35	7	**75**
Argopecten irradians	.	.	.	.	1	1	.	2	.	**2**
Ariopsis felis	25	269	90	.	321	931	1,370	259	7	**1,636**
Astroscopus y-graecum	.	1	3	.	.	1	3	2	.	**5**
Bagre marinus	.	.	1	.	14	5	9	10	1	**20**
Bairdiella chrysoura	620	91	461	8	1,298	325	2,041	749	13	**2,803**
Bathygobius soporator	.	.	4	.	.	2	3	2	1	**6**
Brevoortia spp.	2,236	140	2,189	329	2,982	35	6,915	642	354	**7,911**
Callinectes sapidus	81	136	397	201	74	357	693	234	319	**1,246**
Callinectes similis	.	1	30	.	1	129	118	43	.	**161**
Caranx crysos	.	.	.	.	5	.	.	5	.	**5**
Caranx hippos	.	.	.	.	36	3	35	4	.	**39**

Appendix AP20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				A	B	C	
	E=66	E=58	E=101	E=77	E=165	E=115	E=236	E=241	E=105	E=582
Caranx latus	.	1	.	.	8	1	2	7	1	**10**
Centrarchidae spp.	.	.	.	2	.	.	.	.	2	**2**
Centropristis philadelphica	.	.	.	.	.	8	2	6	.	**8**
Centropristis sp.	.	.	1	.	.	.	.	1	.	**1**
Centropristis striata	1	.	.	.	2	3	.	6	.	**6**
Chaetodipterus faber	.	.	7	.	3	7	2	15	.	**17**
Chasmodes saburrae	5	.	.	.	3	.	3	5	.	**8**
Chilomycterus schoepfii	4	1	2	.	17	14	1	37	.	**38**
Chloroscombrus chrysurus	.	.	4	.	13	10	21	6	.	**27**
Citharichthys macrops	.	2	9	.	16	50	5	72	.	**77**
Citharichthys spilopterus	.	.	6	.	16	27	47	1	1	**49**
Citharichthys spp.	.	.	2	.	.	1	3	.	.	**3**
Ctenogobius boleosoma	88	100	487	158	.	35	532	168	168	**868**
Ctenogobius sp.	.	.	.	.	.	1	.	.	1	**1**
Cynoscion arenarius	11	22	296	1	8	864	580	145	477	**1,202**
Cynoscion nebulosus	67	13	88	1	288	7	249	213	2	**464**
Cynoscion nothus	.	.	.	.	.	22	22	.	.	**22**
Cyprinodon variegatus	.	.	28	.	.	.	25	3	.	**28**
Cyprinus carpio	2	.	.	1	.	.	2	.	1	**3**
Dasyatis americana	.	.	.	.	4	.	.	4	.	**4**
Dasyatis sabina	9	4	9	.	946	110	405	672	1	**1,078**
Dasyatis say	.	.	.	.	81	1	7	75	.	**82**
Diplectrum formosum	1	.	.	.	1	3	.	5	.	**5**
Dorosoma cepedianum	.	.	.	.	21	.	21	.	.	**21**
Dorosoma petenense	8	2	3	3	121	32	129	14	26	**169**
Echeneis neucratoides	.	.	.	.	7	.	4	3	.	**7**
Elops saurus	1	1	18	.	156	6	103	79	.	**182**
Enneacanthus gloriosus	.	.	.	20	.	.	.	.	20	**20**
Erimyzon sucetta	.	.	.	32	.	.	.	.	32	**32**
Esox niger	.	.	.	7	.	.	.	.	7	**7**
Etheostoma fusiforme	.	.	.	16	.	1	.	.	17	**17**
Etheostoma sp.	.	.	.	1	.	.	.	.	1	**1**
Etropus crossotus	.	2	12	.	95	965	612	462	.	**1,074**

Appendix AP20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				A	B	C	
	E=66	E=58	E=101	E=77	E=165	E=115	E=236	E=241	E=105	E=582
Etropus cyclosquamus	.	1	.	.	.	32	.	33	.	**33**
Etropus spp.	.	.	.	.	.	4	4	.	.	**4**
Eucinostomus argenteus	.	4	.	.	.	1	.	5	.	**5**
Eucinostomus gula	14	2	18	.	107	42	21	162	.	**183**
Eucinostomus harengulus	9	22	72	20	69	60	81	96	75	**252**
Eucinostomus spp.	976	163	804	148	2	134	654	1,355	218	**2,227**
Evorthodus lyricus	.	.	.	1	.	.	.	.	1	**1**
Farfantepenaeus aztecus	.	7	19	.	32	210	221	32	15	**268**
Farfantepenaeus duorarum	2	.	8	.	23	86	51	68	.	**119**
Farfantepenaeus spp.	314	31	701	6	146	178	704	611	61	**1,376**
Fundulus chrysotus	.	.	.	43	.	.	.	.	43	**43**
Fundulus confluentus	.	.	3	22	.	.	3	.	22	**25**
Fundulus grandis	.	.	4	2	9	.	4	9	2	**15**
Fundulus similis	.	.	2	.	111	.	52	61	.	**113**
Fundulus sp.	.	.	.	1	.	.	.	.	1	**1**
Gambusia holbrooki	.	.	1	198	.	.	1	.	198	**199**
Gobionellus oceanicus	4	.	.	8	.	19	21	1	9	**31**
Gobiosoma bosc	4	18	16	57	.	3	36	2	60	**98**
Gobiosoma robustum	5	1	6	.	.	5	3	14	.	**17**
Gobiosoma spp.	3	1	7	23	.	1	9	3	23	**35**
Gymnura micrura	.	.	2	.	22	2	2	24	.	**26**
Halichoeres bivittatus	5	.	.	.	.	.	.	5	.	**5**
Harengula jaguana	203	13	4	.	494	1	23	692	.	**715**
Hemicaranx amblyrhynchus	.	4	.	.	.	12	7	9	.	**16**
Heterandria formosa	.	.	.	79	.	.	.	.	79	**79**
Hippocampus erectus	.	.	1	.	.	5	1	5	.	**6**
Hippocampus zosterae	.	1	.	.	.	.	1	.	.	**1**
Hypleurochilus caudovittatus	.	.	.	.	.	1	.	1	.	**1**
Hyporhamphus meeki	11	.	27	.	5	.	.	43	.	**43**
Hyporhamphus spp.	.	.	6	.	.	.	3	3	.	**6**
Hypsoblennius hentz	3	1	2	.	.	2	.	8	.	**8**
Ictaluridae sp.	.	.	.	1	.	.	.	.	1	**1**
Ictalurus sp.	.	.	.	.	.	1	.	.	1	**1**

Appendix AP20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				A	B	C	
	E=66	E=58	E=101	E=77	E=165	E=115	E=236	E=241	E=105	E=582
Ictalurus furcatus	.	.	.	.	.	11	.	.	11	**11**
Ictalurus punctatus	.	.	.	.	.	18	.	.	18	**18**
Labidesthes sicculus	.	.	.	2	.	.	.	.	2	**2**
Lagodon rhomboides	3,070	68	656	1	6,643	101	4,367	6,170	2	**10,539**
Larimus fasciatus	.	.	.	.	.	3	2	1	.	**3**
Leiostomus xanthurus	56	44	436	.	1,006	213	710	997	48	**1,755**
Lepisosteus oculatus	.	.	.	3	.	.	.	.	3	**3**
Lepisosteus osseus	.	.	.	1	6	1	6	.	2	**8**
Lepisosteus sp.	.	.	.	1	.	.	.	.	1	**1**
Lepomis macrochirus	.	.	.	7	.	.	.	.	7	**7**
Lepomis microlophus	3	.	7	183	.	25	10	.	208	**218**
Lepomis punctatus	.	.	.	127	.	8	.	.	135	**135**
Lepomis spp.	.	.	.	71	.	.	.	.	71	**71**
Litopenaeus setiferus	6	149	2,067	51	1,815	669	3,114	1,508	135	**4,757**
Lobotes surinamensis	.	.	.	.	1	.	1	.	.	**1**
Lucania parva	734	88	1,226	799	.	3	2,047	1	802	**2,850**
Lutjanus campechanus	.	.	.	.	.	1	.	1	.	**1**
Lutjanus griseus	13	1	20	3	14	5	14	34	8	**56**
Lutjanus synagris	31	.	1	.	.	7	4	35	.	**39**
Megalops atlanticus	.	.	.	.	1	.	1	.	.	**1**
Membras martinica	60	9	178	.	.	.	144	103	.	**247**
Menidia spp.	688	75	822	966	10	1	1,223	372	967	**2,562**
Menippe spp.	1	.	.	.	.	45	1	45	.	**46**
Menticirrhus americanus	2	24	335	.	37	90	310	178	.	**488**
Menticirrhus littoralis	.	.	1	.	14	.	1	14	.	**15**
Menticirrhus saxatilis	1	1	6	.	9	.	3	14	.	**17**
Menticirrhus spp.	.	.	4	.	.	.	.	4	.	**4**
Microgobius gulosus	11	4	49	17	.	1	37	27	18	**82**
Microgobius sp.	.	.	.	.	.	1	1	.	.	**1**
Microgobius thalassinus	.	.	1	.	.	47	27	21	.	**48**
Micropogonias undulatus	29	644	1,118	11	958	3,107	4,877	425	565	**5,867**
Micropterus salmoides	34	.	10	114	.	16	44	.	130	**174**
Minytrema melanops	.	.	1	1	.	1	1	.	2	**3**

Appendix AP20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				A	B	C	
	E=66	E=58	E=101	E=77	E=165	E=115	E=236	E=241	E=105	E=582
Monacanthus ciliatus	2	.	.	.	1	.	.	3	.	**3**
Mugil cephalus	4	1	1,244	4	2,049	.	2,296	1,002	4	**3,302**
Mugil curema	2	.	1,025	.	275	.	1,134	168	.	**1,302**
Mycteroperca microlepis	2	.	.	.	16	.	18	.	.	**18**
Myrophis punctatus	.	.	.	.	.	3	3	.	.	**3**
Nicholsina usta	1	.	.	.	.	.	1	.	.	**1**
Notemigonus crysoleucas	2	.	.	275	.	.	2	.	275	**277**
Notropis maculatus	.	.	.	4	.	.	.	.	4	**4**
Notropis petersoni	.	.	1	1,810	.	27	1	.	1,837	**1,838**
Notropis texanus	.	.	.	21	.	2	.	.	23	**23**
Ogcocephalus cubifrons	.	1	.	.	6	14	2	19	.	**21**
Oligoplites saurus	11	7	22	.	8	.	27	21	.	**48**
Ophidion holbrookii	.	.	.	.	.	1	1	.	.	**1**
Opisthonema oglinum	2	.	.	.	.	.	.	2	.	**2**
Opsanus beta	1	.	.	.	5	2	3	5	.	**8**
Orthopristis chrysoptera	416	13	33	.	546	376	448	936	.	**1,384**
Paralichthyidae spp.	.	.	3	.	.	3	6	.	.	**6**
Paralichthys albigutta	1	11	29	.	147	41	54	175	.	**229**
Paralichthys lethostigma	.	.	2	3	36	10	38	7	6	**51**
Peprilus burti	.	.	1	.	7	15	6	17	.	**23**
Peprilus paru	.	.	.	.	5	9	2	12	.	**14**
Poecilia latipinna	.	.	1	1	.	.	.	1	1	**2**
Pogonias cromis	.	.	.	.	93	.	73	20	.	**93**
Pomatomus saltatrix	.	.	.	.	1	.	.	1	.	**1**
Pomoxis nigromaculatus	.	.	.	3	.	.	.	.	3	**3**
Porichthys plectrodon	.	.	.	.	.	6	5	1	.	**6**
Portunus spp.	.	1	1	.	.	114	23	93	.	**116**
Prionotus rubio	.	.	.	.	.	4	.	4	.	**4**
Prionotus scitulus	1	.	2	.	3	149	16	139	.	**155**
Prionotus tribulus	.	3	8	.	20	65	58	38	.	**96**
Rachycentron canadum	.	.	.	.	1	.	.	1	.	**1**
Rhinoptera bonasus	.	.	.	.	2	.	2	.	.	**2**
Rhizoprionodon terraenovae	.	.	.	.	1	1	1	1	.	**2**

Appendix AP20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				A	B	C	
	E=66	E=58	E=101	E=77	E=165	E=115	E=236	E=241	E=105	E=582
Rimapenaeus constrictus	.	.	.	.	.	1	.	1	.	**1**
Rimapenaeus similis	.	.	.	.	.	78	17	61	.	**78**
Rimapenaeus spp.	1	2	15	.	.	233	130	121	.	**251**
Sciaenidae sp.	.	.	.	.	.	1	1	.	.	**1**
Sciaenops ocellatus	7	3	76	.	425	4	334	178	3	**515**
Scomberomorus maculatus	.	.	.	.	12	.	1	11	.	**12**
Scorpaena brasiliensis	.	.	.	.	.	2	.	2	.	**2**
Selene setapinnis	.	.	.	.	1	.	.	1	.	**1**
Selene vomer	.	.	.	.	9	2	5	6	.	**11**
Serraniculus pumilio	5	1	.	.	.	7	.	13	.	**13**
Serranus subligarius	.	.	.	.	.	2	.	2	.	**2**
Sicyonia dorsalis	.	.	.	.	.	2	1	1	.	**2**
Sicyonia laevigata	.	.	.	.	.	3	1	2	.	**3**
Sicyonia typica	.	.	.	.	.	1	.	1	.	**1**
Sphoeroides nephelus	7	2	14	.	14	2	14	25	.	**39**
Sphoeroides parvus	.	.	.	.	.	2	.	2	.	**2**
Sphoeroides spp.	12	3	15	.	.	1	6	25	.	**31**
Sphyraena barracuda	.	.	1	.	1	.	.	2	.	**2**
Sphyraena borealis	4	.	.	.	1	.	.	5	.	**5**
Sphyrna tiburo	.	.	.	.	5	1	1	5	.	**6**
Stellifer lanceolatus	.	.	22	.	.	34	46	10	.	**56**
Stephanolepis hispidus	13	2	2	.	2	7	5	21	.	**26**
Stomolophus meleagris	.	1	.	.	4	11	4	12	.	**16**
Strongylura marina	7	1	8	.	58	.	22	52	.	**74**
Strongylura notata	2	.	11	.	11	.	10	14	.	**24**
Strongylura spp.	3	.	7	.	.	.	4	6	.	**10**
Symphurus civitatium	.	.	.	.	.	1	1	.	.	**1**
Symphurus plagiusa	1	11	33	.	1	224	159	107	4	**270**
Syngnathus floridae	37	.	.	.	.	1	1	37	.	**38**
Syngnathus louisianae	11	.	4	.	.	34	20	29	.	**49**
Syngnathus scovelli	86	8	26	35	.	31	68	70	48	**186**
Syngnathus springeri	.	.	.	.	.	1	.	1	.	**1**
Synodus foetens	17	17	33	.	34	127	56	172	.	**228**

Appendix AP20-02. (Continued).

Species	Gear and Strata						Zone			Totals
	21.3-m bay seine			21.3-m river seine	183-m haul seine	6.1-m otter trawl				
	Veg	Unveg	Shore				A	B	C	
	E=66	E=58	E=101	E=77	E=165	E=115	E=236	E=241	E=105	E=582
Trachinotus carolinus	.	.	5	.	20	.	7	18	.	**25**
Trachinotus falcatus	.	.	.	.	63	.	5	58	.	**63**
Trinectes maculatus	3	1	5	123	10	127	44	53	172	**269**
Tylosurus crocodilus	.	.	.	.	1	.	.	1	.	**1**
Urophycis floridana	2	.	.	.	.	22	7	17	.	**24**
Xiphopenaeus kroyeri	.	.	4	.	2	2	2	6	.	**8**
Totals	**12,133**	**3,829**	**24,686**	**7,560**	**22,051**	**27,891**	**51,708**	**23,322**	**23,120**	**98,150**

Appendix AP20-03. Summary of monthly sampling effort by gear during Apalachicola Bay stratified-random sampling, 2020.

Month	**# SRS Sites**			**Totals**
	21.3-m Seine	**183-m Seine**	**6.1-m Trawl**	
January	27	0	16	**43**
February	27	18	16	**61**
March	27	18	16	**61**
April	5	3	3	**11**
May	27	0	0	**27**
June	27	18	16	**61**
July	27	18	0	**45**
August	27	18	16	**61**
September	27	18	0	**45**
October	27	18	16	**61**
November	27	18	0	**45**
December	27	18	16	**61**
TOTALS	**302**	**165**	**115**	**582**

Southern Indian River Lagoon

Along the eastern central coast of Florida, the sampling area identified as the southern Indian River Lagoon (IRL) system is a narrow estuary that extends from Vero Beach south to the Jupiter Inlet. The southern IRL is connected to the Atlantic Ocean by three inlets (Ft. Pierce, St. Lucie, and Jupiter). Freshwater inflow comes primarily from the St. Lucie and Loxahatchee rivers. In addition, there is freshwater input from numerous creeks and canals along the western shoreline. Shoreline vegetation consists largely of fringing mangrove, Brazilian pepper, and marsh grasses. Bottom substrates are typically characterized as sand or mud mixed with shell hash and oysters. Seagrasses, primarily shoal grass (*Halodule wrightii*), are the dominant vegetative cover in the southern IRL (Sime 2005).

The Fisheries-Independent Monitoring (FIM) program has conducted sampling of fish and selected invertebrates in the southern IRL utilizing 183-m haul seines since 1997. Monthly stratified-random sampling (SRS) has been focused in two geographically defined bay zones (I and J) and one riverine zone (T; Figure TQ20-01). Beginning in 2016, to expand the collection of juvenile fish data in the region, monthly sampling with 21.3-m seines was initiated in the St. Lucie and Loxahatchee rivers (Zones T and L; Figure TQ20-01). As a result, the 21.3-m seine sampling universe in Zone T was expanded to include the upstream and backwater areas of the St. Lucie River that were not previously accessible with the 183-m haul seines.

The Loxahatchee River (Zone L) covers an ecosystem of approximately 673 km^2 in Martin and Palm Beach counties and is one of only two river systems in Florida designated as a “National Wild and Scenic River”. The Loxahatchee River includes the North Fork, Northwest Fork, and the Southwest Fork, all of which drain into the Atlantic Ocean through Jupiter Inlet at the terminus of the Southern Indian River Lagoon. Shoreline slopes can be steep along much of the sampling area, with many shorelines closer to urbanization and characterized by man-made habitats including seawalls, rip-rap, and docks. Much of the sampling area is brackish with shoreline vegetation consisting of a mixture of salt-tolerant overhanging trees and shrubs while upstream habitats include freshwater marsh vegetation (swamp lily, lily pads, leather fern, etc.). Upriver and backwater areas typically have a mud/detritus substrate while the mainstem and areas closer to the Indian River Lagoon are composed of mainly sand/shell hash due to stronger water flow. Submerged aquatic vegetation is minimal but can include tapegrass (*Vallisneria* spp.) in low salinity habitats and shoal grass in higher salinity habitats closer to the mouth of the river. All sampling methods were the same as those described in the Methods section of this report. This section summarizes data collected by the FIM program during 2020 in the southern IRL.

Stratified-Random Sampling

A total of 41,941 animals, which included 155 taxa of fishes and 10 taxa of selected invertebrates, were collected from 382 southern IRL samples in 2020 (Table TQ20-01; Appendices TQ20-01 and TQ20-02). *Anchoa mitchilli* (n=9,154) was the most numerous species collected, representing 21.8% of the total catch. The four next most abundant taxa, *Diapterus auratus* (n=6,645), *Eucinostomus* spp. (n=4,564), *Menidia* spp. (n=1,897), and *Mugil cephalus* (n=1,630) accounted for an additional 35.1% of the total catch. Thirty-two Selected Taxa (n=6,794 animals) composed 16.2% of the total catch. *Mugil cephalus* (n=1,630), *Mugil curema* (n=1,230), *Centropomus undecimalis* (n=1,124), *Micropogonias undulatus* (n=809), and *Farfantepenaeus* spp. (n=531) were the most abundant Selected Taxa, representing 12.7% of the total catch. Collections in 2020 included three species new to the southern IRL FIM collection: *Caranx ruber* (Bar Jack), *Ctenogobius saepepallens* (Dash Goby), and *Pristis pectinata* (Smalltooth Sawfish).

Monthly sampling efforts were reduced in the southern Indian River Lagoon during 2020 as a result of impacts caused by the COVID-19 pandemic (Appendix TQ20-03). Only Zone T was sampled in April 2020 (n=9 sites) before sampling ceased due to State of Florida and FIM safety protocols. Only 21.3-m river seine sampling (n=23 sites) was completed during May 2020. The sampling effort for all zones and gears was completed as scheduled for the months of January, February, March, June, July, August, September, October, November, and December 2020.

183-m Haul Seines. A total of 10,750 animals were collected in 120 183-m haul seines, representing 25.6% of the overall SRS collections (Table TQ20-01, Appendices TQ20-01 and -02). *Diapterus auratus* (n=4,497), *Mugil curema* (n=863), and *Ariopsis felis* (n=794) were the most numerous taxa collected, representing 57.2% of the 183-m haul seine catch (Table TQ20-02). The taxa most frequently caught in 183-m haul seines were

Diapterus auratus (74.2% occurrence), *Ariopsis felis* (65.8% occurrence), *Mugil curema* (60.0% occurrence), and *Archosargus probatocephalus* (54.2% occurrence).

A total of 2,732 animals from 26 Selected Taxa were collected, representing 25.4% of the entire 183-m haul seine catch (Table TQ20-03). *Mugil curema* (n=863), *Micropogonias undulatus* (n=398), and *Archosargus probatocephalus* (n=372) were the most abundant Selected Taxa, accounting for 59.8% of the Selected Taxa collected with this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil curema* (60.0% occurrence), *Archosargus probatocephalus* (54.2% occurrence), and *Centropomus undecimalis* (53.3% occurrence).

River Sampling

21.3-m River Seines. A total of 31,191 animals were collected in 262 21.3-m river seines, representing 74.4% of the overall SRS collections (Table TQ20-01, Appendices TQ20-01 and -02). *Anchoa mitchilli* (n=9,154), *Eucinostomus* spp. (n=4,564), and *Diapterus auratus* (n=2,148) were the most abundant taxa collected, accounting for 50.9% of the 21.3-m river seine catch (Table TQ20-04). The taxa most frequently caught in 21.3-m river seines were *Eucinostomus* spp. (71.4% occurrence), *Diapterus auratus* and *Menidia* spp. (both 54.6% occurrence).

A total of 4,062 animals from 22 Selected Taxa were collected, representing 13.0% of the entire 21.3-m river seine catch (Table TQ20-05). *Mugil cephalus* (n=1,378) and *Centropomus undecimalis* (n=914) were the most abundant Selected Taxa, accounting for 56.4% of the Selected Taxa collected in this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Centropomus undecimalis* (47.7% occurrence), *Farfantepenaeus* spp. (37.4% occurrence), and *Callinectes sapidus* (22.5% occurrence).

Reference

Sime, P. 2005. St. Lucie Estuary and Indian River Lagoon conceptual ecological model. Wetlands 25(4):898-907.

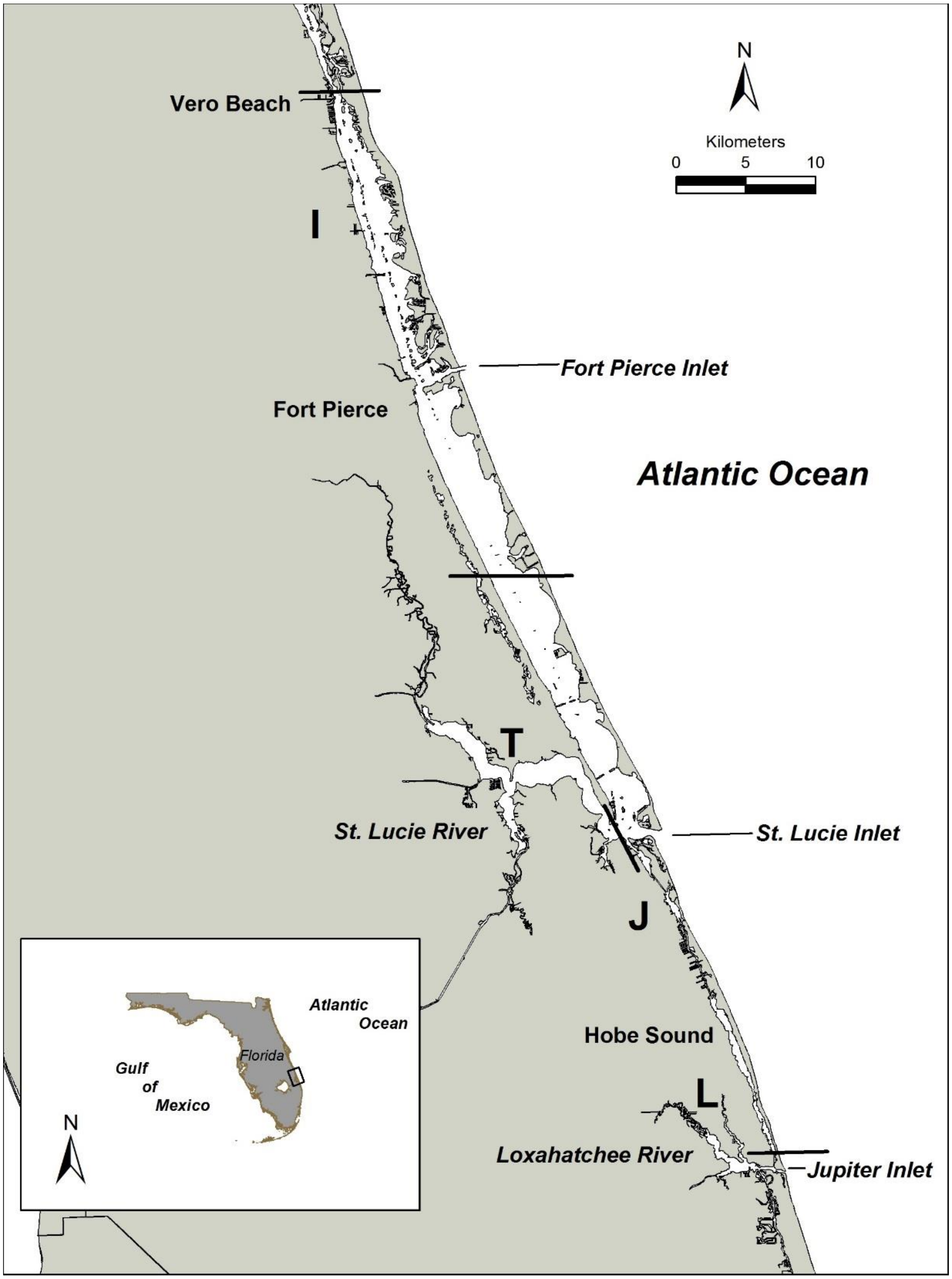

Figure TQ20-01. Map of southern Indian River Lagoon sampling area, separated into four geographic zones; I, J, L, and T.

Table TQ20-01. Summary of catch and effort data for Southern Indian River Lagoon stratified-random sampling, 2020.

Zone	21.3-m river seine		183-m haul seine		Totals	
	Animals	Hauls	Animals	Hauls	Animals	Hauls
I	.	.	4,242	40	4,242	40
J	.	.	4,691	40	4,691	40
L	6,067	55	.	.	6,067	55
T	25,124	207	1,817	40	26,941	247
Totals	**31,191**	**262**	**10,750**	**120**	**41,941**	**382**

Table TQ20-02. Catch statistics for 10 dominant taxa collected in 120 183-m haul seine samples during Southern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Diapterus auratus	4,497	41.8	74.2	37.48	8.29	242.28	768.00	147	0.46	46	277
Mugil curema	863	8.0	60.0	7.19	1.48	224.94	131.00	189	1.50	103	390
Ariopsis felis	794	7.4	65.8	6.62	1.37	227.13	136.00	228	1.69	115	375
Micropogonias undulatus	398	3.7	26.7	3.32	1.45	477.77	167.00	243	2.89	99	378
Lagodon rhomboides	392	3.7	20.0	3.27	1.07	360.18	93.00	123	1.25	70	187
Archosargus probatocephalus	372	3.5	54.2	3.10	0.56	199.31	43.00	261	2.43	119	400
Archosargus rhomboidalis	285	2.7	23.3	2.38	0.76	349.82	48.00	188	1.74	90	286
Mugil cephalus	252	2.3	40.8	2.10	0.50	260.63	34.00	291	3.28	108	439
Elops saurus	251	2.3	29.2	2.09	0.56	292.49	36.00	284	3.85	148	529
Sphoeroides testudineus	238	2.2	34.2	1.98	0.73	400.60	80.00	122	2.21	61	222
Subtotals	8,342	77.6	.	.	.	.	.	.	.	46	529
Totals	**10,750**	**100.0**	**.**	**89.58**	**11.09**	**135.61**	**851.00**	**.**	**.**	**44**	**1,450**

Table TQ20-03. Catch statistics for Selected Taxa collected in 120 183-m haul seine samples during Southern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil curema	863	8.0	60.0	7.19	1.48	224.94	131.00	189	1.50	103	390
Micropogonias undulatus	398	3.7	26.7	3.32	1.45	477.77	167.00	243	2.89	99	378
Archosargus probatocephalus	372	3.5	54.2	3.10	0.56	199.31	43.00	261	2.43	119	400
Mugil cephalus	252	2.3	40.8	2.10	0.50	260.63	34.00	291	3.28	108	439
Elops saurus	251	2.3	29.2	2.09	0.56	292.49	36.00	284	3.85	148	529
Centropomus undecimalis	210	2.0	53.3	1.75	0.29	183.60	24.00	443	10.60	212	936
Lutjanus griseus	124	1.2	14.2	1.03	0.57	603.50	63.00	185	2.19	85	245
Lutjanus analis	61	0.6	10.0	0.51	0.27	571.97	28.00	146	4.18	94	252
Albula vulpes	34	0.3	7.5	0.28	0.12	471.49	11.00	195	9.87	133	340
Trachinotus falcatus	29	0.3	5.8	0.24	0.14	623.28	13.00	138	4.24	62	166
Pogonias cromis	23	0.2	10.8	0.19	0.06	340.19	4.00	274	16.01	113	404
Scomberomorus maculatus	19	0.2	4.2	0.16	0.12	818.77	14.00	266	23.28	168	629
Cynoscion nebulosus	14	0.1	5.8	0.12	0.05	460.63	4.00	365	22.82	200	468
Lutjanus synagris	14	0.1	5.0	0.12	0.07	610.49	7.00	111	4.58	85	149
Cynoscion complex	14	0.1	0.8	0.12	0.12	1,095.45	14.00	174	7.68	133	220
Menticirrhus americanus	11	0.1	5.8	0.09	0.05	547.67	5.00	183	21.36	105	299
Leiostomus xanthurus	11	0.1	4.2	0.09	0.05	648.03	6.00	183	8.56	112	215

Table TQ20-03. (Continued)

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Callinectes sapidus	8	0.1	5.8	0.07	0.03	423.07	2.00	90	14.29	54	154
Trachinotus carolinus	6	0.1	5.0	0.05	0.02	437.72	1.00	290	28.76	185	363
Sciaenops ocellatus	6	0.1	4.2	0.05	0.02	508.75	2.00	476	34.44	374	598
Scomberomorus regalis	3	<0.1	2.5	0.03	0.01	627.12	1.00	189	8.76	173	203
Megalops atlanticus	2	<0.1	1.7	0.02	0.01	771.34	1.00	564	76.50	487	640
Pomatomus saltatrix	2	<0.1	1.7	0.02	0.01	771.34	1.00	370	40.50	329	410
Paralichthys albigutta	2	<0.1	1.7	0.02	0.01	771.34	1.00	166	49.00	117	215
Paralichthys lethostigma	2	<0.1	1.7	0.02	0.01	771.34	1.00	298	7.50	290	305
Lutjanus apodus	1	<0.1	0.8	0.01	0.01	1,095.45	1.00	147	.	147	147
Totals	**2,732**	**25.4**	**.**	**22.77**	**2.62**	**126.08**	**176.00**	**.**	**.**	**54**	**936**

Table TQ20-04. Catch statistics for 10 dominant taxa collected in 262 21.3-m river seine samples conducted in tidal rivers during Southern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Anchoa mitchilli	9,154	29.4	29.8	51.38	17.52	551.79	3,652.94	32	0.07	16	61
Eucinostomus spp.	4,564	14.6	71.4	25.62	3.86	243.99	455.88	25	0.11	8	45
Diapterus auratus	2,148	6.9	54.6	12.06	1.74	233.00	194.12	39	0.45	11	173
Menidia spp.	1,897	6.1	54.6	10.65	1.52	231.06	177.94	31	0.15	15	64
Brevoortia spp.	1,513	4.9	9.9	8.49	3.04	578.58	416.18	26	0.12	16	52
Mugil cephalus	1,378	4.4	12.6	7.73	5.82	1,218.99	1,511.76	28	0.78	15	352
Gambusia holbrooki	1,208	3.9	24.8	6.78	1.76	419.07	304.41	23	0.17	8	41
Harengula jaguana	973	3.1	2.7	5.46	4.07	1,204.94	986.76	33	0.30	22	122
Centropomus undecimalis	914	2.9	47.7	5.13	0.82	257.31	141.18	59	2.69	10	700
Eucinostomus harengulus	913	2.9	43.5	5.12	0.84	264.55	101.47	54	0.36	40	91
Subtotals	24,662	79.1	.	.	.	.	.	.	.	8	700
Totals	**31,191**	**100.0**	**.**	**175.07**	**23.84**	**220.44**	**3,777.94**	**.**	**.**	**2**	**700**

Table TQ20-05. Catch statistics for Selected Taxa collected in 262 21.3-m river seine samples conducted in tidal rivers during Southern Indian River Lagoon stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m²)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Mugil cephalus	1,378	4.4	12.6	7.73	5.82	1,218.99	1,511.76	28	0.78	15	352
Centropomus undecimalis	914	2.9	47.7	5.13	0.82	257.31	141.18	59	2.69	10	700
Farfantepenaeus spp.	531	1.7	37.4	2.98	0.46	248.58	64.71	6	0.10	2	18
Micropogonias undulatus	411	1.3	13.4	2.31	1.02	716.73	242.65	34	0.75	9	72
Mugil curema	367	1.2	14.1	2.06	0.69	543.13	114.71	42	1.95	16	238
Callinectes sapidus	140	0.5	22.5	0.79	0.20	404.14	47.06	21	1.75	6	143
Leiostomus xanthurus	112	0.4	5.0	0.63	0.32	827.77	57.35	25	1.23	9	108
Lutjanus griseus	42	0.1	11.1	0.24	0.05	330.51	5.88	64	8.72	13	194
Sciaenops ocellatus	38	0.1	3.1	0.21	0.13	999.50	32.35	24	1.55	15	63
Archosargus probatocephalus	33	0.1	9.9	0.19	0.04	343.46	5.88	127	18.94	12	315
Mugil rubrioculus	29	0.1	1.5	0.16	0.15	1,453.75	38.24	22	2.65	16	95
Elops saurus	26	0.1	5.7	0.15	0.05	519.70	7.35	65	13.79	25	269
Trachinotus falcatus	19	0.1	3.1	0.11	0.06	901.78	14.71	42	4.46	10	77
Scomberomorus maculatus	6	<0.1	0.4	0.03	0.03	1,618.64	8.82	33	2.18	26	40
Litopenaeus setiferus	4	<0.1	1.5	0.02	0.01	804.66	1.47	6	1.19	3	8
Albula vulpes	3	<0.1	1.1	0.02	0.01	930.94	1.47	41	9.61	22	54
Lutjanus jocu	3	<0.1	0.8	0.02	0.01	1,204.61	2.94	135	22.15	105	178

Table TQ20-05. (Continued)

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Menticirrhus americanus	2	<0.1	0.4	0.01	0.01	1,618.64	2.94	26	1.50	24	27
Farfantepenaeus aztecus	1	<0.1	0.4	0.01	0.01	1,618.64	1.47	16	.	16	16
Farfantepenaeus duorarum	1	<0.1	0.4	0.01	0.01	1,618.64	1.47	16	.	16	16
Lutjanus apodus	1	<0.1	0.4	0.01	0.01	1,618.64	1.47	36	.	36	36
Paralichthys lethostigma	1	<0.1	0.4	0.01	0.01	1,618.64	1.47	342	.	342	342
Totals	**4,062**	**13.0**	**.**	**22.80**	**6.44**	**457.19**	**1,592.65**	**.**	**.**	**2**	**700**

Appendix TQ20-01. Monthly summary of species collected during Southern Indian River Lagoon stratified-random sampling, 2020. Effort, or total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=9	E=23	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=382
Acanthostracion quadricornis	.	.	.	.	.	1	6	.	.	.	.	.	**7**
Achirus lineatus	3	5	2	.	2	1	3	.	7	4	1	8	**36**
Aetobatus narinari	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Agonostomus monticola	.	.	.	.	.	.	.	.	.	2	.	.	**2**
Albula vulpes	.	9	1	.	1	3	4	3	11	4	1	.	**37**
Ameiurus catus	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Amia calva	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Anchoa hepsetus	.	1	161	.	460	.	1	.	.	.	.	.	**623**
Anchoa lamprotaenia	.	108	.	.	.	.	.	.	.	.	.	.	**108**
Anchoa lyolepis	.	.	.	.	331	.	.	.	1	.	.	291	**623**
Anchoa mitchilli	2,545	2,697	996	87	389	167	21	271	116	74	288	1,503	**9,154**
Archosargus probatocephalus	50	23	50	1	1	52	50	36	42	22	47	31	**405**
Archosargus rhomboidalis	49	6	38	.	.	56	11	43	17	7	48	10	**285**
Ariopsis felis	9	53	91	.	2	117	267	82	45	65	24	49	**804**
Bagre marinus	1	.	.	.	.	.	5	.	.	1	2	.	**9**
Bairdiella chrysoura	2	.	.	.	.	.	.	.	.	1	9	3	**15**
Bathygobius soporator	2	2	2	.	.	7	.	14	.	.	.	5	**32**
Brevoortia spp.	9	38	1,194	278	10	1	.	.	1	.	.	9	**1,540**
Callinectes bocourti	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Callinectes ornatus	.	.	2	.	11	1	4	.	.	.	.	.	**18**
Callinectes sapidus	16	39	16	11	5	9	7	20	2	7	5	11	**148**
Callinectes similis	3	4	12	24	1	.	3	1	1	3	.	1	**53**

Appendix TQ20-01. (Continued)

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=9	E=23	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=382
Callinectes spp.	.	4	3	1	.	.	2	.	.	.	.	8	**18**
Caranx crysos	.	1	.	.	.	.	.	.	1	5	2	.	**9**
Caranx hippos	26	20	16	.	1	3	2	1	13	12	13	29	**136**
Caranx latus	.	9	2	.	.	.	1	2	5	10	10	2	**41**
Caranx ruber	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Carcharhinus leucas	.	.	.	.	.	1	1	1	.	.	1	.	**4**
Centropomus parallelus	1	.	15	.	.	.	.	.	.	2	2	.	**20**
Centropomus pectinatus	.	.	1	.	.	1	2	.	.	.	.	1	**5**
Centropomus undecimalis	70	90	93	11	14	36	88	121	83	268	156	94	**1,124**
Chaetodipterus faber	.	.	.	.	.	.	.	.	3	.	2	.	**5**
Chilomycterus schoepfii	.	6	5	.	.	2	4	2	2	3	5	1	**30**
Cichlasoma urophthalmus	1	4	11	2	2	1	1	7	2	.	.	2	**33**
Citharichthys spilopterus	.	4	8	1	8	13	10	4	4	4	2	4	**62**
Clupeidae spp.	.	.	.	.	195	.	.	.	.	.	.	.	**195**
Ctenogobius boleosoma	6	5	2	.	.	.	.	.	.	4	.	1	**18**
Ctenogobius fasciatus	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Ctenogobius pseudofasciatus	.	.	.	.	1	2	.	.	.	.	.	1	**4**
Ctenogobius saepepallens	.	.	2	.	.	.	.	.	.	.	.	.	**2**
Ctenogobius smaragdus	1	.	1	.	.	.	.	1	.	10	.	1	**14**
Ctenogobius stigmaticus	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Ctenogobius stigmaturus	.	.	5	.	.	.	.	.	.	.	.	.	**5**
Cynoscion complex	.	.	.	.	.	.	.	.	.	.	.	14	**14**
Cynoscion nebulosus	2	2	1	.	.	4	.	.	3	2	.	.	**14**

Appendix TQ20-01. (Continued)

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
	E=35	E=35	E=35	E=9	E=23	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=382
Dasyatis sabina	7	18	18	.	1	16	22	6	12	14	3	18	**135**
Dasyatis say	3	11	10	.	.	10	6	22	6	4	6	1	**79**
Diapterus auratus	446	944	644	18	98	159	928	418	1,480	514	407	589	**6,645**
Diapterus rhombeus	1	.	.	.	.	.	.	.	95	2	.	.	**98**
Diplodus holbrookii	.	43	46	.	.	.	.	.	.	.	.	.	**89**
Dormitator maculatus	1	.	1	.	.	.	.	.	.	.	.	.	**2**
Dorosoma cepedianum	.	.	.	.	.	.	.	.	.	.	1	1	**2**
Dorosoma petenense	.	.	.	.	.	36	.	.	.	8	3	20	**67**
Echeneis naucrates	.	.	1	.	.	.	.	.	.	.	2	.	**3**
Elops saurus	12	32	46	2	.	8	28	6	10	8	85	40	**277**
Elops smithi	.	1	.	1	.	.	.	.	.	.	.	.	**2**
Elops spp.	.	2	.	.	.	.	.	.	.	.	.	.	**2**
Erotelis smaragdus	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Etropus crossotus	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Eucinostomus gula	61	17	8	.	.	9	69	16	35	53	23	23	**314**
Eucinostomus harengulus	62	98	163	8	271	140	106	63	51	47	26	29	**1,064**
Eucinostomus jonesii	.	8	174	.	.	.	1	.	1	6	.	.	**190**
Eucinostomus melanopterus	.	.	1	.	.	.	1	.	.	.	.	.	**2**
Eucinostomus spp.	167	507	1,060	98	463	651	152	293	267	264	75	567	**4,564**
Eugerres plumieri	18	29	33	22	41	118	94	58	6	14	5	13	**451**
Evorthodus lyricus	4	.	.	2	2	4	1	1	.	3	.	.	**17**
Farfantepenaeus aztecus	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Farfantepenaeus duorarum	.	1	.	.	.	.	.	.	.	.	.	.	**1**

Appendix TQ20-01. (Continued)

Species	Month												Totals
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	
	E=35	**E=35**	**E=35**	**E=9**	**E=23**	**E=35**	**E=35**	**E=35**	**E=35**	**E=35**	**E=35**	**E=35**	**E=382**
Farfantepenaeus spp.	27	98	194	37	60	7	27	48	3	8	2	20	**531**
Gambusia holbrooki	135	185	353	115	29	11	102	161	75	12	18	12	**1,208**
Gerreidae spp.	7	.	.	.	.	.	.	.	.	.	.	.	**7**
Gerres cinereus	25	27	13	.	.	9	59	33	21	13	6	63	**269**
Gobiomorus dormitor	.	.	2	.	1	.	.	3	1	.	.	.	**7**
Gobionellus oceanicus	6	1	4	1	1	13	1	3	.	5	2	8	**45**
Gobiosoma bosc	11	3	5	1	1	2	8	1	1	.	2	2	**37**
Gobiosoma robustum	.	.	.	.	.	.	.	.	.	.	.	2	**2**
Gobiosoma spp.	41	14	11	3	7	6	34	22	6	3	3	3	**153**
Gymnura micrura	3	1	1	.	.	.	.	1	3	.	.	.	**9**
Haemulon parra	.	.	1	.	.	.	.	.	2	1	1	.	**5**
Harengula humeralis	.	213	.	.	.	.	.	.	.	.	.	.	**213**
Harengula jaguana	5	48	55	.	947	.	.	3	2	.	20	22	**1,102**
Hemiramphus balao	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Heterandria formosa	1	1	.	1	.	.	.	.	.	.	.	.	**3**
Hippocampus erectus	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Ictalurus punctatus	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Labidesthes sicculus	.	25	16	18	3	1	2	13	22	12	5	12	**129**
Lactophrys trigonus	1	1	1	.	.	2	2	.	.	.	.	2	**9**
Lagodon rhomboides	16	43	96	6	8	34	114	74	14	39	51	.	**495**
Leiostomus xanthurus	1	15	98	.	1	1	.	.	.	.	7	.	**123**
Lepisosteus platyrhincus	.	1	6	.	1	2	1	2	.	2	1	1	**17**
Lepomis gulosus	.	.	.	.	.	1	.	.	.	.	.	.	**1**

Appendix TQ20-01. (Continued)

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=9	E=23	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=382
Lepomis macrochirus	.	3	7	3	1	3	6	24	26	.	5	3	**80**
Lepomis microlophus	.	.	.	.	.	5	.	.	1	.	.	.	**6**
Lepomis spp.	5	.	.	.	.	15	23	31	33	11	1	.	**119**
Litopenaeus setiferus	.	.	.	.	1	.	.	1	.	1	1	.	**4**
Lophogobius cyprinoides	6	4	.	.	14	40	14	44	5	17	1	9	**154**
Lucania goodei	.	.	.	1	.	.	.	.	.	.	.	.	**1**
Lupinoblennius nicholsi	.	1	1	.	.	1	.	.	.	.	.	.	**3**
Lutjanus analis	1	.	1	.	.	3	3	1	.	10	41	1	**61**
Lutjanus apodus	.	.	.	.	.	.	1	.	.	1	.	.	**2**
Lutjanus griseus	1	5	1	.	3	3	76	41	13	8	4	11	**166**
Lutjanus jocu	.	.	.	.	.	1	2	.	.	.	.	.	**3**
Lutjanus synagris	.	.	.	.	.	1	10	1	1	1	.	.	**14**
Megalops atlanticus	.	.	.	.	.	.	.	.	.	.	1	1	**2**
Menidia spp.	61	84	212	137	27	94	150	312	249	72	306	193	**1,897**
Menticirrhus americanus	1	2	1	.	.	1	1	.	1	.	5	1	**13**
Microgobius gulosus	4	5	6	.	11	6	55	51	53	29	10	17	**247**
Microgobius microlepis	.	1	1	.	.	.	.	.	.	.	.	.	**2**
Microgobius thalassinus	.	.	.	.	1	.	.	1	.	3	.	.	**5**
Microphis brachyurus	2	1	7	4	.	.	2	1	.	.	1	3	**21**
Micropogonias undulatus	42	261	149	4	.	68	16	4	183	12	20	50	**809**
Micropterus salmoides	.	.	.	1	1	1	.	.	.	.	.	.	**3**
Mugil cephalus	41	157	1,258	1	9	22	7	23	3	6	81	22	**1,630**
Mugil curema	124	403	214	2	4	53	18	30	68	69	80	165	**1,230**

Appendix TQ20-01. (Continued)

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=9	E=23	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=382
Mugil rubrioculus	.	.	.	.	.	.	.	1	1	.	27	.	**29**
Mugil sp.	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Myrophis punctatus	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Narcine bancroftii	.	.	.	.	.	.	.	.	.	.	2	.	**2**
Notropis maculatus	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Oligoplites saurus	17	8	2	.	5	3	1	4	28	20	30	12	**130**
Opisthonema oglinum	8	15	2	.	.	.	.	.	2	1	1	22	**51**
Opsanus tau	1	.	.	.	.	.	.	.	.	.	1	.	**2**
Oreochromis complex	1	1	3	.	5	6	7	1	.	.	2	2	**28**
Oreochromis/Sarotherodon spp.	.	1	.	1	.	17	7	3	1	.	.	.	**30**
Orthopristis chrysoptera	20	2	.	.	.	.	.	.	.	1	53	.	**76**
Paralichthys albigutta	.	1	.	.	.	.	.	.	1	.	.	.	**2**
Paralichthys lethostigma	.	.	.	.	1	1	.	.	1	.	.	.	**3**
Penaeus monodon	.	.	.	.	2	.	.	.	.	.	.	.	**2**
Poecilia latipinna	.	.	.	1	.	.	.	.	.	.	.	.	**1**
Pogonias cromis	2	5	.	.	.	.	1	1	5	.	5	4	**23**
Pomatomus saltatrix	1	.	.	.	.	.	.	1	.	.	.	.	**2**
Prionotus tribulus	1	2	.	.	.	.	.	.	.	.	.	.	**3**
Pristis pectinata	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Pterygoplichthys spp.	.	.	2	.	.	2	2	.	2	.	.	2	**10**
Rhinoptera bonasus	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Sardinella aurita	.	1	.	.	1	.	.	.	.	.	.	.	**2**
Sciaenops ocellatus	2	3	1	.	.	.	1	1	2	.	.	34	**44**

Appendix TQ20-01. (Continued)

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=9	E=23	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=382
Scomberomorus maculatus	14	.	2	.	6	.	.	.	1	.	2	.	**25**
Scomberomorus regalis	.	.	.	.	.	.	.	1	2	.	.	.	**3**
Scorpaena grandicornis	.	2	.	.	.	.	1	.	.	.	.	.	**3**
Scorpaena plumieri	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Selene setapinnis	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Selene vomer	5	13	15	.	1	7	15	3	32	14	22	57	**184**
Sphoeroides nephelus	.	3	3	.	2	.	1	2	1	1	.	.	**13**
Sphoeroides spengleri	.	.	.	.	.	.	1	.	.	.	1	.	**2**
Sphoeroides spp.	.	2	.	.	.	.	.	.	.	.	.	.	**2**
Sphoeroides testudineus	36	111	27	.	2	26	18	28	46	47	20	36	**397**
Sphyraena barracuda	11	13	19	.	4	12	6	7	17	25	3	9	**126**
Sphyrna tiburo	.	.	.	.	.	.	.	.	.	.	1	1	**2**
Stephanolepis hispidus	.	2	.	.	.	.	.	.	.	.	.	1	**3**
Strongylura marina	.	.	1	.	.	.	.	.	.	.	.	1	**2**
Strongylura notata	.	3	2	.	.	3	1	1	1	2	.	13	**26**
Strongylura spp.	1	.	.	2	.	.	.	.	.	.	.	.	**3**
Syngnathus louisianae	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Syngnathus scovelli	2	7	1	1	3	.	.	.	.	1	.	.	**15**
Synodus foetens	.	7	.	.	6	1	1	1	.	.	.	.	**16**
Tilapia mariae	.	7	.	.	.	.	1	.	.	2	1	.	**11**
Trachinotus carolinus	.	1	1	.	.	.	1	.	1	.	.	2	**6**
Strongylura timucu	.	.	.	.	.	3	.	.	3	.	.	.	**6**
Trachinotus falcatus	11	2	1	.	2	1	10	3	2	1	1	14	**48**

Appendix TQ20-01. (Continued)

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=9	E=23	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=382
Trichiurus lepturus	.	.	.	.	.	.	.	.	.	.	2	.	**2**
Trinectes maculatus	7	5	17	1	.	5	2	8	10	5	5	14	**79**
Tylosurus crocodilus	.	.	.	.	.	.	.	.	1	8	1	.	**10**
Tylosurus sp.	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Xiphophorus spp.	.	.	.	.	.	2	.	.	.	.	.	.	**2**
Totals	**4,288**	**6,664**	**7,750**	**908**	**3,485**	**2,125**	**2,713**	**2,487**	**3,270**	**1,910**	**2,112**	**4,229**	**41,941**

Appendix TQ20-02. Summary by gear, stratum, and zone of species collected during southern Indian River Lagoon stratified-random sampling, 2020. Sampling with 21.3-m river seine and 183-m haul seine was post-stratified by the presence or absence of overhanging vegetation ('Over' or 'Nonover'). Zones I and J were in the Indian River, Zone T encompassed the lower St. Lucie River, and Zone L represents the Loxahatchee River. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata				Zone				Totals
	21.3-m river seine		183-m haul seine						
	Over	Nonover	Over	Nonover	I	J	L	T	
	E=194	E=68	E=85	E=35	E=40	E=40	E=55	E=247	E=382
Acanthostracion quadricornis	.	.	1	6	.	7	.	.	**7**
Achirus lineatus	24	3	6	3	5	1	7	23	**36**
Aetobatus narinari	.	.	1	.	.	1	.	.	**1**
Agonostomus monticola	.	2	.	.	.	.	.	2	**2**
Albula vulpes	2	1	29	5	2	29	.	6	**37**
Ameiurus catus	.	1	.	.	.	.	.	1	**1**
Amia calva	1	.	.	.	.	.	.	1	**1**
Anchoa hepsetus	4	619	.	.	.	.	1	622	**623**
Anchoa lamprotaenia	108	.	.	.	.	.	108	.	**108**
Anchoa lyolepis	.	623	.	.	.	.	2	621	**623**
Anchoa mitchilli	4,333	4,821	.	.	.	.	1,387	7,767	**9,154**
Archosargus probatocephalus	25	8	261	111	142	115	5	143	**405**
Archosargus rhomboidalis	.	.	243	42	217	68	.	.	**285**
Ariopsis felis	7	3	615	179	236	224	5	339	**804**
Bagre marinus	.	.	.	9	.	.	.	9	**9**
Bairdiella chrysoura	.	.	11	4	12	.	.	3	**15**
Bathygobius soporator	21	11	.	.	.	.	26	6	**32**
Brevoortia spp.	1,496	17	11	16	8	2	245	1,285	**1,540**
Callinectes bocourti	1	.	.	.	.	.	.	1	**1**
Callinectes ornatus	16	1	1	.	.	1	14	3	**18**
Callinectes sapidus	117	23	3	5	.	4	23	121	**148**
Callinectes similis	32	3	16	2	4	11	5	33	**53**
Callinectes spp.	14	4	.	.	.	.	8	10	**18**
Caranx crysos	.	.	7	2	.	9	.	.	**9**
Caranx hippos	1	1	90	44	52	44	1	39	**136**
Caranx latus	6	1	27	7	10	24	4	3	**41**
Caranx ruber	.	.	1	.	.	1	.	.	**1**
Carcharhinus leucas	.	.	3	1	1	2	.	1	**4**
Centropomus parallelus	18	.	.	2	.	.	.	20	**20**

Appendix TQ20-02. (Continued)

Species	Gear and Strata				Zone				Totals
	21.3-m river seine		183-m haul seine						
	Over	Nonover	Over	Nonover	I	J	L	T	
	E=194	E=68	E=85	E=35	E=40	E=40	E=55	E=247	E=382
Centropomus pectinatus	5	.	.	.	.	.	.	5	**5**
Centropomus undecimalis	755	159	108	102	107	37	15	965	**1,124**
Chaetodipterus faber	.	.	3	2	1	4	.	.	**5**
Chilomycterus schoepfii	.	.	20	10	14	15	.	1	**30**
Cichlasoma urophthalmus	32	1	.	.	.	.	.	33	**33**
Citharichthys spilopterus	27	8	17	10	5	6	17	34	**62**
Clupeidae spp.	.	195	.	.	.	.	.	195	**195**
Ctenogobius boleosoma	13	5	.	.	.	.	10	8	**18**
Ctenogobius fasciatus	1	.	.	.	.	.	1	.	**1**
Ctenogobius pseudofasciatus	4	.	.	.	.	.	2	2	**4**
Ctenogobius saepepallens	2	.	.	.	.	.	2	.	**2**
Ctenogobius smaragdus	3	11	.	.	.	.	14	.	**14**
Ctenogobius stigmaticus	1	.	.	.	.	.	1	.	**1**
Ctenogobius stigmaturus	5	.	.	.	.	.	5	.	**5**
Cynoscion complex	.	.	14	.	.	.	.	14	**14**
Cynoscion nebulosus	.	.	13	1	6	8	.	.	**14**
Dasyatis sabina	7	1	88	39	56	19	4	56	**135**
Dasyatis say	.	.	68	11	52	26	.	1	**79**
Diapterus auratus	1,644	504	3,842	655	1,261	2,777	240	2,367	**6,645**
Diapterus rhombeus	.	2	95	1	.	95	.	3	**98**
Diplodus holbrookii	43	46	.	.	.	.	43	46	**89**
Dormitator maculatus	2	.	.	.	.	.	.	2	**2**
Dorosoma cepedianum	1	1	.	.	.	.	.	2	**2**
Dorosoma petenense	6	41	20	.	.	.	.	67	**67**
Echeneis naucrates	.	.	2	1	.	3	.	.	**3**
Elops saurus	23	3	147	104	120	49	.	108	**277**
Elops smithi	1	1	.	.	.	.	.	2	**2**
Elops spp.	2	.	.	.	.	.	2	.	**2**
Erotelis smaragdus	1	.	.	.	.	.	1	.	**1**
Etropus crossotus	.	.	.	1	.	.	.	1	**1**
Eucinostomus gula	118	50	139	7	132	13	105	64	**314**
Eucinostomus harengulus	644	269	122	29	108	42	325	589	**1,064**

Appendix TQ20-02. (Continued)

Species	Gear and Strata				Zone				Totals
	21.3-m river seine		183-m haul seine						
	Over	Nonover	Over	Nonover	I	J	L	T	
	E=194	E=68	E=85	E=35	E=40	E=40	E=55	E=247	E=382
Eucinostomus jonesii	12	176	2	.	.	2	12	176	**190**
Eucinostomus melanopterus	.	.	1	1	.	1	.	1	**2**
Eucinostomus spp.	2,700	1,864	.	.	.	.	1,795	2,769	**4,564**
Eugerres plumieri	389	49	12	1	.	7	72	372	**451**
Evorthodus lyricus	14	3	.	.	.	.	6	11	**17**
Farfantepenaeus aztecus	.	1	.	.	.	.	.	1	**1**
Farfantepenaeus duorarum	.	1	.	.	.	.	.	1	**1**
Farfantepenaeus spp.	372	159	.	.	.	.	143	388	**531**
Gambusia holbrooki	999	209	.	.	.	.	16	1,192	**1,208**
Gerreidae spp.	7	.	.	.	.	.	7	.	**7**
Gerres cinereus	128	19	110	12	40	80	74	75	**269**
Gobiomorus dormitor	6	1	.	.	.	.	.	7	**7**
Gobionellus oceanicus	39	6	.	.	.	.	14	31	**45**
Gobiosoma bosc	31	6	.	.	.	.	.	37	**37**
Gobiosoma robustum	1	1	.	.	.	.	.	2	**2**
Gobiosoma spp.	130	23	.	.	.	.	5	148	**153**
Gymnura micrura	.	.	4	5	.	6	.	3	**9**
Haemulon parra	.	1	4	.	1	3	.	1	**5**
Harengula humeralis	213	.	.	.	.	.	213	.	**213**
Harengula jaguana	7	966	60	69	18	57	23	1,004	**1,102**
Hemiramphus balao	.	.	1	.	1	.	.	.	**1**
Heterandria formosa	3	.	.	.	.	.	.	3	**3**
Hippocampus erectus	1	.	.	.	.	.	1	.	**1**
Ictalurus punctatus	1	.	.	.	.	.	.	1	**1**
Labidesthes sicculus	121	8	.	.	.	.	1	128	**129**
Lactophrys trigonus	.	.	7	2	.	9	.	.	**9**
Lagodon rhomboides	71	32	382	10	375	17	27	76	**495**
Leiostomus xanthurus	56	56	9	2	10	1	16	96	**123**
Lepisosteus platyrhincus	14	.	1	2	.	.	.	17	**17**
Lepomis gulosus	1	.	.	.	.	.	.	1	**1**
Lepomis macrochirus	59	21	.	.	.	.	.	80	**80**

Appendix TQ20-02. (Continued)

Species	Gear and Strata				Zone				Totals
	21.3-m river seine		183-m haul seine						
	Over	Nonover	Over	Nonover	I	J	L	T	
	E=194	E=68	E=85	E=35	E=40	E=40	E=55	E=247	E=382
Lepomis microlophus	.	6	.	.	.	.	.	6	**6**
Lepomis spp.	88	31	.	.	.	.	5	114	**119**
Litopenaeus setiferus	3	1	.	.	.	.	.	4	**4**
Lophogobius cyprinoides	97	57	.	.	.	.	100	54	**154**
Lucania goodei	1	.	.	.	.	.	.	1	**1**
Lupinoblennius nicholsi	3	.	.	.	.	.	2	1	**3**
Lutjanus analis	.	.	47	14	41	20	.	.	**61**
Lutjanus apodus	1	.	1	.	.	1	1	.	**2**
Lutjanus griseus	28	14	124	.	106	13	19	28	**166**
Lutjanus jocu	3	.	.	.	.	.	3	.	**3**
Lutjanus synagris	.	.	10	4	7	7	.	.	**14**
Megalops atlanticus	.	.	1	1	.	.	.	2	**2**
Menidia spp.	1,297	600	.	.	.	.	410	1,487	**1,897**
Menticirrhus americanus	.	2	4	7	6	2	.	5	**13**
Microgobius gulosus	181	66	.	.	.	.	45	202	**247**
Microgobius microlepis	2	.	.	.	.	.	2	.	**2**
Microgobius thalassinus	.	5	.	.	.	.	4	1	**5**
Microphis brachyurus	18	3	.	.	.	.	.	21	**21**
Micropogonias undulatus	367	44	329	69	21	260	58	470	**809**
Micropterus salmoides	2	1	.	.	.	.	.	3	**3**
Mugil cephalus	325	1,053	127	125	88	42	85	1,415	**1,630**
Mugil curema	195	172	572	291	500	224	81	425	**1,230**
Mugil rubrioculus	3	26	.	.	.	.	1	28	**29**
Mugil sp.	1	.	.	.	.	.	1	.	**1**
Myrophis punctatus	1	.	.	.	.	.	.	1	**1**
Narcine bancroftii	.	.	.	2	2	.	.	.	**2**
Notropis maculatus	1	.	.	.	.	.	.	1	**1**
Oligoplites saurus	4	8	84	34	67	51	1	11	**130**
Opisthonema oglinum	10	24	16	1	15	2	8	26	**51**
Opsanus tau	.	.	2	.	2	.	.	.	**2**
Oreochromis complex	24	1	1	2	.	.	.	28	**28**
Oreochromis/Sarotherodon spp.	28	2	.	.	.	.	16	14	**30**

Appendix TQ20-02. (Continued)

Species	Gear and Strata				Zone				Totals
	21.3-m river seine		183-m haul seine						
	Over	Nonover	Over	Nonover	I	J	L	T	
	E=194	E=68	E=85	E=35	E=40	E=40	E=55	E=247	E=382
Orthopristis chrysoptera	2	.	74	.	74	.	2	.	**76**
Paralichthys albigutta	.	.	2	.	2	.	.	.	**2**
Paralichthys lethostigma	.	1	2	.	.	2	.	1	**3**
Penaeus monodon	2	.	.	.	.	.	2	.	**2**
Poecilia latipinna	1	.	.	.	.	.	.	1	**1**
Pogonias cromis	.	.	17	6	14	7	.	2	**23**
Pomatomus saltatrix	.	.	1	1	1	1	.	.	**2**
Prionotus tribulus	.	2	.	1	.	.	.	3	**3**
Pristis pectinata	.	.	1	.	.	.	.	1	**1**
Pterygoplichthys spp.	8	.	1	1	.	.	.	10	**10**
Rhinoptera bonasus	.	.	.	1	.	1	.	.	**1**
Sardinella aurita	1	1	.	.	.	.	1	1	**2**
Sciaenops ocellatus	14	24	6	.	3	1	33	7	**44**
Scomberomorus maculatus	.	6	15	4	16	1	.	8	**25**
Scomberomorus regalis	.	.	1	2	.	3	.	.	**3**
Scorpaena grandicornis	3	.	.	.	.	.	3	.	**3**
Scorpaena plumieri	.	.	.	1	.	1	.	.	**1**
Selene setapinnis	.	.	1	.	.	1	.	.	**1**
Selene vomer	2	.	168	14	70	101	1	12	**184**
Sphoeroides nephelus	4	1	7	1	7	1	.	5	**13**
Sphoeroides spengleri	.	.	.	2	.	2	.	.	**2**
Sphoeroides spp.	1	1	.	.	.	.	2	.	**2**
Sphoeroides testudineus	100	59	184	54	143	13	99	142	**397**
Sphyraena barracuda	16	1	103	6	30	79	11	6	**126**
Sphyrna tiburo	.	.	2	.	1	1	.	.	**2**
Stephanolepis hispidus	3	.	.	.	.	.	3	.	**3**
Strongylura marina	.	.	2	.	1	1	.	.	**2**
Strongylura notata	2	4	18	2	15	5	1	5	**26**
Strongylura spp.	2	1	.	.	.	.	.	3	**3**
Strongylura timucu	3	3	.	.	.	.	.	6	**6**
Syngnathus louisianae	1	.	.	.	.	.	.	1	**1**
Syngnathus scovelli	11	4	.	.	.	.	2	13	**15**

Appendix TQ20-02. (Continued)

Species	Gear and Strata				Zone				Totals
	21.3-m river seine		183-m haul seine						
	Over	Nonover	Over	Nonover	I	J	L	T	
	E=194	E=68	E=85	E=35	E=40	E=40	E=55	E=247	E=382
Synodus foetens	10	6	.	.	.	.	6	10	**16**
Tilapia mariae	10	1	.	.	.	.	2	9	**11**
Trachinotus carolinus	.	.	6	.	1	2	.	3	**6**
Trachinotus falcatus	2	17	25	4	10	17	1	20	**48**
Trichiurus lepturus	.	.	.	2	2	.	.	.	**2**
Trinectes maculatus	70	7	.	2	.	.	3	76	**79**
Tylosurus crocodilus	.	.	8	2	1	9	.	.	**10**
Tylosurus sp.	.	1	.	.	.	.	.	1	**1**
Xiphophorus spp.	.	2	.	.	.	.	.	2	**2**
Totals	**17,892**	**13,299**	**8,579**	**2,171**	**4,242**	**4,691**	**6,067**	**26,941**	**41,941**

Appendix TQ20-03. Summary of monthly sampling effort by gear during southern Indian River Lagoon stratified-random sampling, 2020.

Month	**# SRS Sites**		**Totals**
	21.3-m Seine	**183-m Seine**	
January	23	12	**35**
February	23	12	**35**
March	23	12	**35**
April	9	0	**9**
May	23	0	**23**
June	23	12	**35**
July	23	12	**35**
August	23	12	**35**
September	23	12	**35**
October	23	12	**35**
November	23	12	**35**
December	23	12	**35**
TOTALS	**262**	**120**	**382**

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Northeast Florida

Northeast Florida encompasses three coastal plain estuaries; each defined by their respective lower river basins (St. Marys River, Nassau River, and St. Johns River) and interconnected via the Intracoastal Waterway (ICW; Figure JX20-01). Shoreline vegetation in the lower St. Marys and Nassau rivers is characterized by an expansive saltmarsh system, while the lower St. Johns River is characterized by marshes, hardwood forests, and hardwood swamps (St. Johns River Water Management District 1993; St. Johns River Water Management District 2000). Bottom substrates are typically characterized as mud, sand, and occasional oysters (Solomon et al. 2006). Bottom vegetation is only present upriver of downtown Jacksonville in the oligohaline reaches of the St. Johns River (Burns et al. 1997).

The Fisheries-Independent Monitoring (FIM) program has conducted intensive sampling of fish and selected invertebrates in northeast Florida since 2001. The area sampled was divided into six geographically-defined riverine zones (A–F; Figure JX20-01). Monthly stratified-random sampling (SRS) was conducted in Zones A–D using 21.3-m river seines, 183-m haul seines, and 6.1-m river otter trawls. Monthly SRS was conducted in Zone E and F with 21.3-m river seines and 6.1-m river otter trawls. All methods were the same as those described in the Methods section of this report. This section summarizes data collected by the FIM program during 2020 in northeast Florida.

Stratified-Random Sampling

A total of 160,637 animals, which included 155 taxa of fishes and 17 taxa of selected invertebrates, were collected from 1,184 northeast Florida samples in 2020 (Table JX20-01; Appendices JX20-01 and -02). *Anchoa mitchilli* (n=52,746) was the most numerous species collected, representing 32.8% of the total catch. The next four most abundant taxa, *Micropogonias undulatus* (n=25,135), *Leiostomus xanthurus* (n=11,301), *Litopenaeus setiferus* (n=10,114), and *Menidia menidia* (n=7,998) accounted for an additional 34.0% of the total catch. Thirty-one Selected Taxa (n=57,536 animals) composed 35.8% of the total catch. *Micropogonias undulatus* (n=25,135) was the most abundant Selected Taxon, representing 15.6% of the annual catch. *Leiostomus xanthurus* (n=11,301), *Litopenaeus setiferus* (n=10,114), and *Mugil cephalus* (n=4,854), were the next three most abundant Selected Taxa, comprising 16.4% of the total catch. Collections in 2020 included no new species to the northeast Florida FIM collection.

Monthly sampling efforts were reduced in northeast Florida during 2020 as a result of impacts caused by the COVID-19 pandemic (Appendix JX20-03). In response to State of Florida and FIM safety protocols, only 21.3-m river seines and 6.1-m trawls were completed in April and May 2020, predominately from Zones E and F. All zones (A-F) were sampled in June 2020 with 21.3-m seines (n=48 sites) and 6.1-m trawls (n=49 sites). The sampling effort for all zones and gears was completed as scheduled for the months of January, February, March, July, August, September, October, November, and December 2020.

21.3-m River Seines. A total of 94,150 animals were collected in 515 21.3-m river seine samples, representing 58.6% of the overall SRS collections (Table JX20-01). *Anchoa mitchilli* (n=40,818) was the most abundant species, accounting for 43.4% of the 21.3-m river seine catch (Table JX20-02). *Menidia menidia* (n=7,998), *Leiostomus xanthurus* (n=7,827), and *Menidia* spp. (n=7,002) were the next three most abundant species, accounting for an additional 24.2% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines were *Menidia* spp. (47.3% occurrence) and *Anchoa mitchilli* (47.1% occurrence).

A total of 19,528 animals from 28 Selected Taxa were collected, representing 20.7% of the entire 21.3-m river seine catch (Table JX20-03). *Leiostomus xanthurus* (n=7,827), *Litopenaeus setiferus* (n=4,948), *Mugil cephalus* (n=3,782), and *Micropogonias undulatus* (n=1,893) were the most abundant Selected Taxa, accounting for 94.5% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Leiostomus xanthurus* (28.2% occurrence), *Litopenaeus setiferus* (23.0% occurrence), and *Mugil cephalus* (21.6% occurrence).

183-m Haul Seines. A total of 6,404 animals were collected in 144 183-m haul seines, representing 4.0% of the overall SRS catch (Table JX20-01). *Mugil curema* (n=1,368) was the most abundant species, accounting for 21.4% of the 183-m haul seine catch (Table JX20-04). *Mugil cephalus* (n=1,071) and *Diapterus auratus* (n=498) were the next most abundant species, accounting for an additional 24.5% of the 183-m haul seine catch. The taxa most frequently caught in the 183-m haul seines were *Mugil cephalus* (68.8% occurrence) and *Mugil curema* (52.1% occurrence).

A total of 3,658 animals from 24 Selected Taxa were collected, representing 57.1% of the entire 183-m haul seine catch (Table JX20-05). *Mugil curema* (n=1,368) and *Mugil cephalus* (n=1,071) were the most abundant Selected Taxa, accounting for 66.7% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil cephalus* (68.8% occurrence), *Mugil curema* (52.1% occurrence), and *Leiostomus xanthurus* (35.4% occurrence).

6.1-m River Otter Trawl. A total of 60,083 animals were collected in 525 6.1-m river otter trawl samples, representing 37.4% of the overall SRS catch (Table JX20-01). *Micropogonias undulatus* (n=23,183) was the most abundant species, accounting for 38.6% of the 6.1-m river otter trawl catch (Table JX20-06). *Anchoa mitchilli* (n=11,928) *Stellifer lanceolatus* (n=7,001), and *Litopenaeus setiferus* (n=4,812) were the next three most abundant species, accounting for an additional 39.6% of the 6.1-m river otter trawl catch. The taxa most frequently caught in 6.1-m river otter trawls were *Micropogonias undulatus* (64.4% occurrence), *Anchoa mitchilli* (53.7% occurrence), and *Callinectes sapidus* (52.2% occurrence).

A total of 34,350 animals from 24 Selected Taxa were collected, representing 57.2% of the entire 6.1-m river otter trawl catch (Table JX20-07). *Micropogonias undulatus* (n=23,183), *Litopenaeus setiferus* (n=4,812), and *Leiostomus xanthurus* (n=3,118) were the most abundant Selected Taxa, accounting for 90.6% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in the 6.1-m river otter trawls were *Micropogonias undulatus* (64.4% occurrence), *Callinectes sapidus* (52.2% occurrence), and *Litopenaeus setiferus* (49.0% occurrence).

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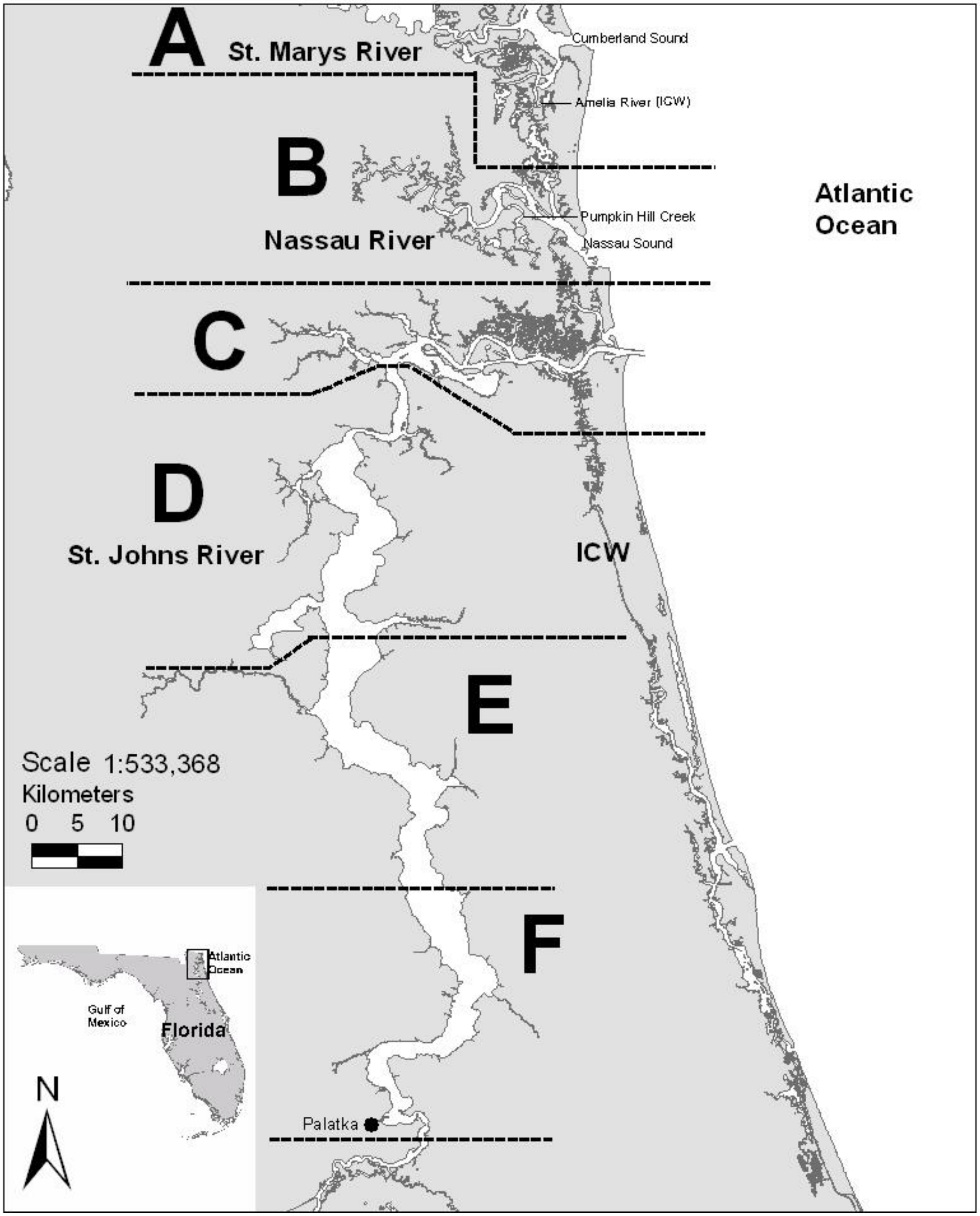

Figure JX20-01. Map of northeast Florida sampling area. Zones are labeled A–F. ICW = Intracoastal Waterway.

Table JX20-01. Summary of catch and effort data for northeast Florida stratified-random sampling, 2020.

Zone	**21.3-m river seine**		**183-m haul seine**		**6.1-m otter trawl**		**Totals**	
	Animals	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**
A	27,175	70	914	27	11,837	70	39,926	167
B	20,807	70	1,630	27	13,875	70	36,312	167
C	17,525	92	2,658	45	6,287	93	26,470	230
D	8,619	91	1,202	45	8,061	100	17,882	236
E	8,805	96	.	.	10,831	96	19,636	192
F	11,219	96	.	.	9,192	96	20,411	192
Totals	**94,150**	**515**	**6,404**	**144**	**60,083**	**525**	**160,637**	**1,184**

Table JX20-02. Catch statistics for 10 dominant taxa collected in 515 21.3-m river seine samples during northeast Florida stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	**Number**		**% Occur**	**Density Estimate (animals/100m^2)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Anchoa mitchilli	40,818	43.4	47.1	116.78	18.72	363.48	4,819.12	31	0.04	14	68
Menidia menidia	7,998	8.5	29.0	22.88	4.58	453.43	1,452.94	42	0.14	21	86
Leiostomus xanthurus	7,827	8.3	28.2	22.39	5.14	520.60	1,726.47	21	0.13	9	149
Menidia spp.	7,002	7.4	47.3	20.03	2.66	301.57	602.94	35	0.10	12	65
Anchoa hepsetus	6,241	6.6	13.2	17.86	6.72	853.83	2,264.71	33	0.09	15	83
Litopenaeus setiferus	4,948	5.3	23.0	14.16	3.65	584.79	1,498.53	11	0.05	3	26
Dorosoma petenense	4,309	4.6	2.1	12.33	7.71	1,416.96	3,327.94	74	0.22	35	97
Mugil cephalus	3,782	4.0	21.6	10.82	3.71	776.99	1,317.65	28	0.41	15	352
Micropogonias undulatus	1,893	2.0	16.3	5.42	1.39	580.99	500.00	24	0.23	10	115
Eucinostomus spp.	1,304	1.4	26.1	3.73	0.68	413.94	170.59	27	0.20	10	39
Subtotals	86,122	91.5	.	.	.	.	.	.	.	3	352
Totals	**94,150**	**100.0**	**.**	**268.85**	**23.82**	**201.07**	**5,092.65**	**.**	**.**	**3**	**533**

Table JX20-03. Catch statistics for Selected Taxa collected in 515 21.3-m river seine samples during northeast Florida stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Leiostomus xanthurus	7,827	8.3	28.2	22.39	5.14	520.60	1,726.47	21	0.13	9	149
Litopenaeus setiferus	4,948	5.3	23.0	14.16	3.65	584.79	1,498.53	11	0.05	3	26
Mugil cephalus	3,782	4.0	21.6	10.82	3.71	776.99	1,317.65	28	0.41	15	352
Micropogonias undulatus	1,893	2.0	16.3	5.42	1.39	580.99	500.00	24	0.23	10	115
Callinectes sapidus	209	0.2	19.1	0.60	0.11	417.73	45.59	50	2.94	5	161
Farfantepenaeus spp.	202	0.2	12.6	0.58	0.10	402.97	25.00	8	0.18	3	14
Mugil curema	199	0.2	10.5	0.57	0.12	492.08	39.71	74	2.75	14	165
Sciaenops ocellatus	73	0.1	5.6	0.21	0.07	778.19	32.35	39	4.23	13	225
Cynoscion nebulosus	67	0.1	5.1	0.19	0.07	775.54	27.94	48	6.53	16	289
Menticirrhus americanus	63	0.1	3.3	0.18	0.07	827.15	20.59	46	2.80	17	152
Trachinotus falcatus	54	0.1	1.8	0.15	0.13	1,853.08	64.71	27	1.36	13	54
Paralichthys lethostigma	52	0.1	6.8	0.15	0.03	429.24	7.35	107	11.92	14	349
Trachinotus carolinus	49	0.1	1.4	0.14	0.08	1,239.55	27.94	32	1.71	18	73
Elops saurus	32	<0.1	4.5	0.09	0.02	511.43	4.41	95	14.55	25	263
Lutjanus griseus	22	<0.1	2.9	0.06	0.02	660.97	5.88	57	8.97	16	191
Menticirrhus littoralis	14	<0.1	0.4	0.04	0.03	1,617.88	11.76	86	12.96	21	205
Paralichthys albigutta	9	<0.1	1.0	0.03	0.01	1,205.13	5.88	60	10.82	20	122
Farfantepenaeus aztecus	8	<0.1	1.2	0.02	0.01	977.55	2.94	17	0.85	15	22

Table JX20-03. (Continued).

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Cynoscion complex	5	<0.1	0.8	0.01	0.01	1,196.66	2.94	34	5.17	15	45
Archosargus probatocephalus	4	<0.1	0.8	0.01	0.01	1,130.26	1.47	160	44.52	97	292
Lutjanus synagris	4	<0.1	0.4	0.01	0.01	1,791.30	4.41	23	1.85	20	28
Menippe spp.	3	<0.1	0.6	0.01	<0.01	1,306.39	1.47	14	5.00	9	24
Farfantepenaeus duorarum	3	<0.1	0.2	0.01	0.01	2,267.16	4.41	16	0.67	15	17
Centropomus undecimalis	2	<0.1	0.2	0.01	0.01	2,267.16	2.94	98	4.00	94	102
Trachinotus goodei	1	<0.1	0.2	<0.01	<0.01	2,267.16	1.47	142	.	142	142
Pogonias cromis	1	<0.1	0.2	<0.01	<0.01	2,267.16	1.47	303	.	303	303
Paralichthys dentatus	1	<0.1	0.2	<0.01	<0.01	2,267.16	1.47	12	.	12	12
Paralichthys squamilentus	1	<0.1	0.2	<0.01	<0.01	2,267.16	1.47	14	.	14	14
Totals	**19,528**	**20.7**	**.**	**55.76**	**8.23**	**335.13**	**2,110.29**	**.**	**.**	**3**	**352**

Table JX20-04. Catch statistics for 10 dominant taxa collected in 144 183-m haul seine samples during northeast Florida stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	**Number**		**% Occur**	**Catch-per-unit-effort (animals/set)**				**Standard Length (mm)**			
	No.	**%**		**Mean**	**Stderr**	**CV**	**Max**	**Mean**	**Stderr**	**Min**	**Max**
Mugil curema	1,368	21.4	52.1	9.50	2.75	347.12	316.00	123	0.63	74	291
Mugil cephalus	1,071	16.7	68.8	7.44	1.28	206.13	112.00	186	1.36	84	392
Diapterus auratus	498	7.8	35.4	3.46	1.09	379.86	104.00	108	1.24	51	194
Lagodon rhomboides	413	6.5	31.3	2.87	1.49	622.25	211.00	115	1.24	52	176
Brevoortia spp.	361	5.6	13.9	2.51	1.08	515.26	119.00	123	1.86	61	194
Leiostomus xanthurus	356	5.6	35.4	2.47	0.82	398.45	109.00	115	1.63	57	234
Litopenaeus setiferus	354	5.5	11.8	2.46	1.26	616.27	156.00	16	0.19	9	31
Bairdiella chrysoura	343	5.4	16.0	2.38	0.93	470.73	94.00	128	0.96	87	208
Chloroscombrus chrysurus	328	5.1	11.1	2.28	1.19	626.33	141.00	83	0.70	53	113
Dasyatis sabina	160	2.5	31.9	1.11	0.28	306.48	35.00	204	3.60	61	318
Subtotals	5,252	82.0	.	.	.	.	.	.	.	9	392
Totals	**6,404**	**100.0**	**.**	**44.47**	**5.32**	**143.59**	**422.00**	**.**	**.**	**9**	**1,498**

Table JX20-05. Catch statistics for Selected Taxa collected in 144 183-m haul seine samples during northeast Florida stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean catch-per-unit-effort.

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil curema	1,368	21.4	52.1	9.50	2.75	347.12	316.00	123	0.63	74	291
Mugil cephalus	1,071	16.7	68.8	7.44	1.28	206.13	112.00	186	1.36	84	392
Leiostomus xanthurus	356	5.6	35.4	2.47	0.82	398.45	109.00	115	1.63	57	234
Litopenaeus setiferus	354	5.5	11.8	2.46	1.26	616.27	156.00	16	0.19	9	31
Callinectes sapidus	139	2.2	23.6	0.97	0.40	491.51	47.00	119	3.24	31	189
Elops saurus	84	1.3	18.1	0.58	0.16	334.67	15.00	251	5.01	132	472
Micropogonias undulatus	59	0.9	13.2	0.41	0.11	335.88	10.00	132	5.25	71	241
Paralichthys lethostigma	51	0.8	16.7	0.35	0.12	395.76	15.00	204	12.12	104	463
Cynoscion nebulosus	44	0.7	16.0	0.31	0.07	271.70	5.00	221	10.82	82	461
Archosargus probatocephalus	37	0.6	13.2	0.26	0.07	304.42	5.00	255	16.04	81	441
Sciaenops ocellatus	26	0.4	11.8	0.18	0.05	338.15	4.00	367	26.61	193	642
Menticirrhus americanus	13	0.2	4.2	0.09	0.06	762.87	8.00	134	5.60	111	173
Centropomus undecimalis	9	0.1	4.2	0.06	0.03	508.39	2.00	438	67.82	127	661
Cynoscion complex	8	0.1	1.4	0.06	0.04	871.94	5.00	187	27.37	110	291
Pomatomus saltatrix	6	0.1	4.2	0.04	0.02	481.26	1.00	244	42.41	105	347

Table JX20-05. (Continued).

Species	Number		% Occur	Catch-per-unit-effort (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Scomberomorus maculatus	6	0.1	2.8	0.04	0.02	687.96	3.00	201	22.07	101	252
Pogonias cromis	5	0.1	2.8	0.03	0.02	629.25	2.00	294	43.87	150	405
Paralichthys albigutta	4	0.1	2.1	0.03	0.02	730.55	2.00	119	36.93	60	218
Trachinotus falcatus	4	0.1	1.4	0.03	0.02	845.56	2.00	88	22.87	47	131
Trachinotus carolinus	4	0.1	1.4	0.03	0.02	946.69	3.00	67	3.04	62	73
Lutjanus griseus	3	0.1	2.1	0.02	0.01	687.96	1.00	192	10.27	172	205
Paralichthys dentatus	3	0.1	1.4	0.02	0.02	891.92	2.00	81	10.27	65	100
Megalops atlanticus	2	<0.1	1.4	0.01	0.01	845.56	1.00	557	45.00	512	602
Menticirrhus littoralis	2	<0.1	1.4	0.01	0.01	845.56	1.00	187	34.00	153	221
Totals	**3,658**	**57.1**	**.**	**25.40**	**3.99**	**188.72**	**371.00**	**.**	**.**	**9**	**661**

Table JX20-06. Catch statistics for 10 dominant taxa collected in 525 6.1-m river otter trawl samples during northeast Florida stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m²)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Micropogonias undulatus	23,183	38.6	64.4	6.23	1.26	463.56	504.72	25	0.12	5	184
Anchoa mitchilli	11,928	19.9	53.7	3.17	0.43	311.24	73.15	37	0.11	14	95
Stellifer lanceolatus	7,001	11.7	8.6	1.99	1.51	1,736.20	786.11	37	0.09	9	105
Litopenaeus setiferus	4,812	8.0	49.0	1.28	0.19	336.86	57.74	19	0.08	3	36
Leiostomus xanthurus	3,118	5.2	19.0	0.84	0.27	728.79	108.23	23	0.44	10	173
Callinectes sapidus	1,398	2.3	52.2	0.37	0.04	247.71	12.29	91	1.34	4	252
Microgobius gulosus	1,092	1.8	18.3	0.28	0.06	477.54	20.91	26	0.23	10	56
Trinectes maculatus	1,036	1.7	37.0	0.27	0.04	355.05	14.03	51	0.60	8	134
Anchoa hepsetus	670	1.1	5.7	0.19	0.12	1,542.89	63.41	37	0.40	23	95
Cynoscion complex	521	0.9	23.6	0.14	0.02	308.04	3.75	51	1.33	10	231
Subtotals	54,759	91.1	.	.	.	.	.	.	.	3	252
Totals	**60,083**	**100.0**	**.**	**16.16**	**2.11**	**299.55**	**818.04**	**.**	**.**	**2**	**1,111**

Table JX20-07. Catch statistics for Selected Taxa collected in 525 6.1-m river otter trawl samples during northeast Florida stratified-random sampling, 2020. Percent (%) is the percent of the total catch represented by that taxon; percent occurrence (% Occur) is the percentage of samples in which that taxon was collected; CV is the coefficient of variation of the mean. Taxa are ranked in order of decreasing mean density.

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Micropogonias undulatus	23,183	38.6	64.4	6.23	1.26	463.56	504.72	25	0.12	5	184
Litopenaeus setiferus	4,812	8.0	49.0	1.28	0.19	336.86	57.74	19	0.08	3	36
Leiostomus xanthurus	3,118	5.2	19.0	0.84	0.27	728.79	108.23	23	0.44	10	173
Callinectes sapidus	1,398	2.3	52.2	0.37	0.04	247.71	12.29	91	1.34	4	252
Cynoscion complex	521	0.9	23.6	0.14	0.02	308.04	3.75	51	1.33	10	231
Farfantepenaeus spp.	471	0.8	17.7	0.13	0.02	377.62	5.53	10	0.13	3	14
Elops saurus	193	0.3	5.7	0.05	0.02	868.69	7.35	42	1.77	27	278
Menticirrhus americanus	188	0.3	9.9	0.05	0.01	472.41	2.70	36	1.41	10	133
Paralichthys lethostigma	186	0.3	23.4	0.05	<0.01	234.05	1.18	142	4.64	11	314
Farfantepenaeus aztecus	138	0.2	6.9	0.04	0.01	553.06	2.70	20	0.29	15	30
Farfantepenaeus duorarum	62	0.1	4.4	0.02	<0.01	568.48	1.05	19	0.43	15	32
Archosargus probatocephalus	24	<0.1	3.2	0.01	<0.01	635.44	0.54	165	18.75	62	398
Paralichthys dentatus	11	<0.1	1.3	<0.01	<0.01	1,020.42	0.54	163	10.06	118	215
Lutjanus griseus	11	<0.1	2.1	<0.01	<0.01	686.10	0.17	124	16.39	55	198
Lutjanus synagris	11	<0.1	1.1	<0.01	<0.01	1,028.68	0.40	62	6.37	25	107
Cynoscion nebulosus	5	<0.1	1.0	<0.01	<0.01	1,023.38	0.17	108	19.45	35	152
Megalops atlanticus	5	<0.1	0.4	<0.01	<0.01	1,916.42	0.60	23	0.87	20	25

Table JX20-07. (Continued).

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Pogonias cromis	3	<0.1	0.4	<0.01	<0.01	1,706.52	0.27	338	67.55	221	455
Sciaenops ocellatus	3	<0.1	0.6	<0.01	<0.01	1,321.64	0.13	263	92.17	81	378
Paralichthys albigutta	2	<0.1	0.2	<0.01	<0.01	2,291.29	0.30	13	1.50	11	14
Pomatomus saltatrix	2	<0.1	0.4	<0.01	<0.01	1,618.64	0.13	137	2.00	135	139
Mugil cephalus	1	<0.1	0.2	<0.01	<0.01	2,291.29	0.13	163	.	163	163
Scomberomorus maculatus	1	<0.1	0.2	<0.01	<0.01	2,291.29	0.13	35	.	35	35
Menippe spp.	1	<0.1	0.2	<0.01	<0.01	2,291.29	0.12	7	.	7	7
Totals	**34,350**	**57.2**	**.**	**9.20**	**1.33**	**331.99**	**504.86**	**.**	**.**	**3**	**455**

Appendix JX20-01. Monthly summary of species collected during northeast Florida stratified-random sampling, 2020. Effort, or total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=35	E=35	E=97	E=113	E=113	E=113	E=113	E=113	E=113	E=1,184
Achirus lineatus	1	4	1	.	.	1	5	1	3	4	5	7	**32**
Albula spp.	.	.	.	1	.	.	.	.	.	.	.	1	**2**
Alosa aestivalis	.	.	.	.	.	.	.	.	3	.	2	.	**5**
Alosa mediocris	.	.	1	4	.	.	.	.	.	.	.	.	**5**
Alosa sapidissima	.	.	1	12	.	1	.	.	.	.	.	.	**14**
Ameiurus catus	73	49	29	22	15	14	63	31	14	40	31	68	**449**
Ameiurus nebulosus	1	1	.	.	.	.	.	3	.	.	.	.	**5**
Amia calva	.	.	1	.	1	.	.	.	.	.	.	1	**3**
Anchoa hepsetus	5	2	20	.	11	756	2,740	2,717	182	457	12	9	**6,911**
Anchoa lyolepis	.	.	.	1	.	132	.	283	.	161	.	.	**577**
Anchoa mitchilli	2,691	2,018	4,094	245	52	11,063	5,969	2,759	2,545	6,423	8,122	6,765	**52,746**
Anchoa spp.	.	.	.	.	.	4	.	1	.	.	.	.	**5**
Ancylopsetta quadrocellata	4	13	24	.	.	1	.	.	.	.	.	.	**42**
Anguilla rostrata	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Archosargus probatocephalus	8	5	17	.	.	2	4	10	4	5	5	5	**65**
Ariopsis felis	47	1	.	.	.	13	6	19	14	16	12	1	**129**
Astroscopus y-graecum	1	.	1	.	.	.	.	1	.	.	.	.	**3**
Bagre marinus	.	.	.	.	.	5	7	9	.	.	.	.	**21**
Bairdiella chrysoura	110	67	9	1	.	116	47	136	46	8	106	43	**689**
Bathygobius soporator	2	.	4	.	.	.	12	1	2	2	1	6	**30**
Brevoortia spp.	36	390	216	1	.	12	3	64	2	31	1	4	**760**

Appendix JX20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	**E=113**	**E=113**	**E=35**	**E=35**	**E=97**	**E=113**	**E=113**	**E=113**	**E=113**	**E=113**	**E=113**	**E=1,184**
Callinectes ornatus	.	4	10	.	.	.	3	12	1	.	.	.	**30**
Callinectes sapidus	97	79	65	24	12	320	400	171	150	132	189	107	**1,746**
Callinectes similis	21	22	10	6	3	122	56	17	20	14	14	29	**334**
Callinectes sp.	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Caranx hippos	2	.	.	.	.	5	5	10	3	8	5	1	**39**
Centropomus undecimalis	4	.	.	.	.	.	.	2	1	2	2	.	**11**
Centropristis philadelphica	.	.	.	.	.	10	2	1	2	4	2	5	**26**
Chaetodipterus faber	.	.	.	.	.	2	14	8	2	22	2	.	**50**
Charybdis hellerii	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Chasmodes bosquianus	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Chilomycterus schoepfii	1	.	.	.	.	.	2	3	3	3	4	1	**17**
Chloroscombrus chrysurus	.	.	.	.	.	2	22	133	5	167	42	4	**375**
Citharichthys macrops	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Citharichthys spilopterus	1	1	2	6	6	41	18	45	6	1	1	.	**128**
Ctenogobius boleosoma	20	2	4	1	.	20	99	14	11	5	8	13	**197**
Ctenogobius shufeldti	10	6	6	.	.	147	139	93	71	189	36	72	**769**
Ctenogobius smaragdus	1	2	.	.	.	.	68	18	21	5	4	3	**122**
Ctenogobius sp.	.	.	.	.	1	.	.	.	.	.	.	.	**1**
Ctenogobius stigmaticus	1	.	.	.	.	1	.	3	.	.	.	.	**5**
Cynoscion complex	9	8	4	3	7	80	88	139	57	110	18	11	**534**
Cynoscion nebulosus	9	10	12	1	.	9	25	8	13	13	3	13	**116**
Cyprinodon variegatus	2	1	.	.	.	.	.	.	.	.	.	.	**3**

Appendix JX20-01. (Continued).

Species	Month												Totals
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	
	E=113	**E=113**	**E=113**	**E=35**	**E=35**	**E=97**	**E=113**	**E=113**	**E=113**	**E=113**	**E=113**	**E=113**	**E=1,184**
Dasyatis sabina	31	30	28	2	2	14	22	39	52	31	23	28	**302**
Dasyatis say	.	.	.	.	.	1	2	.	3	2	.	.	**8**
Diapterus auratus	121	29	3	.	2	.	29	144	80	115	29	19	**571**
Dormitator maculatus	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Dorosoma cepedianum	11	44	8	1	.	2	3	25	3	32	33	16	**178**
Dorosoma petenense	17	6	.	.	.	1	349	3,708	245	10	39	2	**4,377**
Elopiformes sp.	.	.	.	1	.	.	.	.	.	.	.	.	**1**
Elops saurus	2	55	94	58	1	1	7	5	27	24	23	12	**309**
Etropus crossotus	49	9	20	.	.	96	20	29	19	40	63	41	**386**
Eucinostomus gula	45	5	3	.	.	2	10	6	3	19	4	13	**110**
Eucinostomus harengulus	125	56	75	8	6	31	196	81	85	111	99	69	**942**
Eucinostomus spp.	72	15	46	1	2	138	83	170	268	340	63	225	**1,423**
Evorthodus lyricus	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Farfantepenaeus aztecus	.	1	3	5	16	66	42	9	1	3	.	.	**146**
Farfantepenaeus duorarum	7	5	15	.	1	33	2	1	.	.	1	.	**65**
Farfantepenaeus spp.	24	14	4	68	18	170	91	96	65	51	41	31	**673**
Fundulus chrysotus	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Fundulus confluentus	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Fundulus heteroclitus	465	8	18	7	.	73	36	16	28	8	66	131	**856**
Fundulus majalis	18	7	1	.	.	10	6	.	.	2	.	9	**53**
Fundulus seminolis	41	12	14	14	7	128	150	9	1	3	1	35	**415**
Gambusia holbrooki	10	1	153	11	13	1	.	3	9	27	2	228	**458**

Appendix JX20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	**E=113**	**E=113**	**E=35**	**E=35**	**E=97**	**E=113**	**E=113**	**E=113**	**E=113**	**E=113**	**E=113**	**E=1,184**
Gobiesox strumosus	.	.	.	.	.	.	.	.	.	.	.	1	**1**
Gobioides broussonetii	6	2	4	3	1	1	29	1	1	7	4	1	**60**
Gobionellus oceanicus	.	2	2	1	.	13	.	4	.	1	5	5	**33**
Gobiosoma bosc	8	15	25	12	1	13	5	3	.	3	4	1	**90**
Gobiosoma ginsburgi	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Gobiosoma spp.	17	17	17	1	11	56	12	29	19	52	7	9	**247**
Gymnura micrura	.	.	1	.	.	1	2	4	9	.	3	.	**20**
Harengula jaguana	.	.	.	.	.	3	8	40	5	1	.	2	**59**
Hypsoblennius hentz	.	.	.	.	.	1	.	1	.	.	.	.	**2**
Hypsoblennius ionthas	.	.	.	.	.	.	3	2	.	.	.	.	**5**
Ictalurus punctatus	12	8	1	5	2	12	11	20	3	8	42	36	**160**
Labidesthes sicculus	55	4	177	.	.	2	7	1	4	2	4	8	**264**
Lagocephalus laevigatus	.	.	.	.	.	.	.	.	.	.	2	.	**2**
Lagodon rhomboides	21	6	68	9	9	24	105	247	26	73	14	6	**608**
Larimus fasciatus	.	.	1	.	.	.	.	1	.	.	.	.	**2**
Leiostomus xanthurus	650	7,113	2,290	319	90	447	181	31	34	64	38	44	**11,301**
Lepisosteus osseus	4	3	14	.	1	.	6	11	6	3	4	1	**53**
Lepisosteus platyrhincus	.	.	.	.	1	.	1	.	.	1	3	1	**7**
Lepomis auritus	31	8	1	.	11	5	7	7	4	4	4	9	**91**
Lepomis gulosus	1	.	.	.	.	.	.	.	.	.	.	2	**3**
Lepomis macrochirus	19	6	2	.	13	13	45	7	19	11	18	49	**202**
Lepomis microlophus	1	2	4	.	4	1	3	2	4	.	3	4	**28**

Appendix JX20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=35	E=35	E=97	E=113	E=113	E=113	E=113	E=113	E=113	E=1,184
Lepomis spp.	.	.	.	.	.	10	33	.	2	3	.	1	**49**
Limulus polyphemus	1	.	.	.	.	1	.	.	2	.	.	.	**4**
Litopenaeus setiferus	201	528	78	22	9	363	1,440	1,322	1,096	2,759	1,232	1,064	**10,114**
Lobotes surinamensis	.	.	.	.	.	.	2	2	2	.	.	1	**7**
Lucania goodei	.	.	.	.	.	.	.	.	.	.	.	10	**10**
Lucania parva	.	.	4	1	7	10	35	.	.	.	.	.	**57**
Lutjanus griseus	1	3	.	.	3	2	.	5	10	4	2	6	**36**
Lutjanus synagris	1	.	.	.	.	4	.	5	3	2	.	.	**15**
Megalops atlanticus	.	.	.	.	.	.	.	4	.	1	2	.	**7**
Membras martinica	.	.	1	1	.	.	72	1	.	5	.	.	**80**
Menidia menidia	733	200	138	.	4	2,075	1,706	392	961	780	439	570	**7,998**
Menidia spp.	455	646	480	433	513	282	1,175	491	298	299	695	1,237	**7,004**
Menippe spp.	1	.	.	.	.	.	.	1	1	.	.	1	**4**
Menticirrhus americanus	6	.	.	.	.	15	82	63	61	31	4	2	**264**
Menticirrhus littoralis	.	.	.	.	.	.	14	.	1	1	.	.	**16**
Microgobius gulosus	40	20	41	34	8	161	122	283	443	264	40	49	**1,505**
Microgobius thalassinus	3	.	7	1	.	5	9	23	3	6	1	1	**59**
Micropogonias undulatus	3,384	11,811	3,707	1,009	203	384	428	144	50	279	1,058	2,678	**25,135**
Micropterus salmoides	.	.	4	2	2	14	17	3	1	2	.	2	**47**
Morone chrysops x saxatilis	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Morone saxatilis	.	.	.	.	.	.	1	6	1	.	.	.	**8**
Mugil cephalus	618	2,249	1,056	126	108	21	159	222	137	83	26	49	**4,854**

Appendix JX20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=35	E=35	E=97	E=113	E=113	E=113	E=113	E=113	E=113	E=1,184
Mugil curema	420	305	38	.	1	12	34	44	74	126	68	445	**1,567**
Myrophis punctatus	1	.	.	.	.	.	2	.	1	2	.	1	**7**
Notemigonus crysoleucas	.	.	.	.	3	1	46	52	.	6	.	11	**119**
Notropis chalybaeus	.	.	.	.	.	.	.	1	.	.	.	.	**1**
Notropis maculatus	.	.	.	.	.	.	.	.	.	1	.	.	**1**
Ogcocephalus cubifrons	.	.	.	.	.	.	.	.	.	.	2	.	**2**
Oligoplites saurus	.	.	.	.	.	1	11	8	13	3	3	7	**46**
Ophichthus gomesii	.	.	.	.	.	.	.	.	1	.	.	.	**1**
Opisthonema oglinum	1	1	3	.	.	.	.	.	.	.	.	.	**5**
Opsanus tau	.	1	.	.	.	4	3	.	.	2	.	.	**10**
Oreochromis complex	3	.	.	.	.	2	31	.	.	.	.	.	**36**
Oreochromis/Sarotherodon spp.	.	.	.	.	24	15	4	.	.	.	.	.	**43**
Orthopristis chrysoptera	.	.	.	.	.	8	12	2	.	3	.	.	**25**
Paralichthyidae spp.	.	.	.	.	.	3	.	.	.	.	.	.	**3**
Paralichthys albigutta	1	2	2	.	.	7	1	.	1	.	1	.	**15**
Paralichthys dentatus	.	1	.	.	.	.	7	2	1	3	1	.	**15**
Paralichthys lethostigma	10	39	21	15	8	33	32	41	17	34	21	18	**289**
Paralichthys squamilentus	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Penaeus monodon	.	.	.	.	.	.	1	.	.	1	.	.	**2**
Peprilus paru	1	.	3	.	.	1	.	.	.	1	1	3	**10**
Peprilus sp.	.	.	.	.	.	1	.	.	.	.	.	.	**1**
Peprilus triacanthus	.	7	3	.	.	.	.	.	1	.	.	2	**13**
Poecilia latipinna	6	.	3	2	.	4	.	.	.	.	5	2	**22**

Appendix JX20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	**E=113**	**E=113**	**E=35**	**E=35**	**E=97**	**E=113**	**E=113**	**E=113**	**E=113**	**E=113**	**E=113**	**E=1,184**
Pogonias cromis	2	.	3	.	.	.	.	2	.	2	.	.	**9**
Pomatomus saltatrix	1	1	1	.	.	.	.	2	.	.	.	3	**8**
Pomoxis nigromaculatus	16	6	1	.	7	1	2	.	1	.	2	2	**38**
Portunus spp.	1	1	1	.	.	11	1	1	.	1	.	.	**17**
Prionotus carolinus	.	.	1	.	.	.	.	.	.	.	.	1	**2**
Prionotus evolans	7	17	21	.	.	14	1	.	.	1	9	2	**72**
Prionotus scitulus	.	.	.	.	.	10	1	2	.	1	3	.	**17**
Prionotus tribulus	8	4	5	.	.	3	1	1	.	.	1	.	**23**
Pterygoplichthys spp.	1	.	.	.	.	1	.	.	1	.	.	1	**4**
Rimapenaeus constrictus	.	.	.	.	.	.	10	.	.	1	.	1	**12**
Rimapenaeus spp.	16	10	3	.	.	13	281	44	31	24	5	4	**431**
Sciaenidae spp.	.	.	.	.	.	9	1	.	.	.	.	.	**10**
Sciaenops ocellatus	17	8	2	.	.	2	2	6	9	37	3	16	**102**
Scomberomorus maculatus	.	.	4	.	.	1	1	.	.	.	1	.	**7**
Scorpaena brasiliensis	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Selene vomer	.	.	.	.	.	.	2	4	.	2	6	1	**15**
Sphoeroides nephelus	1	2	2	.	.	20	4	4	.	.	2	1	**36**
Sphoeroides spengleri	.	1	.	.	.	.	.	.	.	.	.	.	**1**
Sphyrna tiburo	.	.	.	.	.	.	2	1	4	.	2	.	**9**
Stellifer lanceolatus	.	3	.	.	.	12	165	5,560	320	482	75	384	**7,001**
Stephanolepis hispidus	.	1	1	.	.	1	1	.	3	.	1	.	**8**
Stomolophus meleagris	31	8	13	.	.	.	.	.	.	3	.	21	**76**
Strongylura marina	.	2	2	6	5	5	5	5	2	.	2	.	**34**

Appendix JX20-01. (Continued).

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=35	E=35	E=97	E=113	E=113	E=113	E=113	E=113	E=113	E=1,184
Strongylura notata	.	.	.	.	.	.	1	.	.	.	.	.	**1**
Strongylura spp.	.	.	1	24	11	10	3	7	2	1	.	.	**59**
Strongylura timucu	.	.	.	.	.	.	.	.	.	.	1	.	**1**
Symphurus civitatium	.	.	.	.	.	.	2	.	.	.	.	.	**2**
Symphurus plagiusa	8	13	12	1	.	13	64	37	11	26	90	18	**293**
Symphurus sp.	.	.	1	.	.	.	.	.	.	.	.	.	**1**
Syngnathus fuscus	1	.	1	.	.	.	.	.	.	.	1	.	**3**
Syngnathus louisianae	2	.	.	1	.	6	4	3	1	4	3	2	**26**
Syngnathus scovelli	5	4	2	5	7	16	6	.	.	1	.	1	**47**
Synodus foetens	.	.	.	.	.	30	4	3	1	1	.	1	**40**
Trachinotus carolinus	.	.	.	.	.	19	26	8	.	.	.	.	**53**
Trachinotus falcatus	.	.	.	.	.	3	2	1	1	46	4	1	**58**
Trachinotus goodei	1	.	.	.	.	.	.	.	.	.	.	.	**1**
Trichiurus lepturus	2	1	.	1	.	4	.	.	.	.	.	6	**14**
Trinectes maculatus	240	101	23	15	28	113	99	149	69	74	64	92	**1,067**
Urophycis regia	.	2	1	.	.	.	.	.	.	.	.	.	**3**
Xiphopenaeus kroyeri	.	.	.	.	.	.	1	.	.	9	.	.	**10**
Totals	**11,268**	**26,169**	**13,314**	**2,553**	**1,271**	**17,995**	**17,446**	**20,422**	**7,841**	**14,287**	**13,145**	**14,926**	**160,637**

Appendix JX20-02. Summary by gear and zone of species collected during northeast Florida stratified-random sampling, 2020. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata			Zone						Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	A	B	C	D	E	F	
	E=515	E=144	E=525	E=167	E=167	E=230	E=236	E=192	E=192	E=1,184
Achirus lineatus	10	4	18	8	6	13	4	1	.	**32**
Albula spp.	1	.	1	.	1	.	.	1	.	**2**
Alosa aestivalis	5	.	.	.	.	.	.	1	4	**5**
Alosa mediocris	4	.	1	.	.	.	.	2	3	**5**
Alosa sapidissima	13	.	1	.	.	.	.	1	13	**14**
Ameiurus catus	5	28	416	54	8	13	89	119	166	**449**
Ameiurus nebulosus	.	.	5	.	.	.	.	1	4	**5**
Amia calva	3	.	.	.	.	.	1	2	.	**3**
Anchoa hepsetus	6,241	.	670	514	4,242	2,023	113	19	.	**6,911**
Anchoa lyolepis	349	.	228	.	465	91	21	.	.	**577**
Anchoa mitchilli	40,818	.	11,928	22,048	9,147	9,288	4,147	2,228	5,888	**52,746**
Anchoa spp.	2	.	3	.	1	.	4	.	.	**5**
Ancylopsetta quadrocellata	2	22	18	26	5	11	.	.	.	**42**
Anguilla rostrata	.	1	.	.	.	.	1	.	.	**1**
Archosargus probatocephalus	4	37	24	3	11	42	9	.	.	**65**
Ariopsis felis	.	7	122	6	22	83	18	.	.	**129**
Astroscopus y-graecum	1	1	1	1	2	.	.	.	.	**3**
Bagre marinus	.	5	16	3	16	.	.	2	.	**21**
Bairdiella chrysoura	135	343	211	215	314	70	51	36	3	**689**
Bathygobius soporator	26	1	3	6	13	3	8	.	.	**30**
Brevoortia spp.	363	361	36	81	170	329	145	23	12	**760**
Callinectes ornatus	14	4	12	21	1	8	.	.	.	**30**
Callinectes sapidus	209	139	1,398	174	178	266	397	282	449	**1,746**
Callinectes similis	117	22	195	195	55	65	19	.	.	**334**
Callinectes sp.	1	.	.	1	.	.	.	.	.	**1**
Caranx hippos	11	28	.	2	12	14	11	.	.	**39**
Centropomus undecimalis	2	9	.	.	.	2	7	2	.	**11**
Centropristis philadelphica	.	.	26	15	1	9	1	.	.	**26**
Chaetodipterus faber	1	27	22	17	29	4	.	.	.	**50**
Charybdis hellerii	.	.	1	.	.	1	.	.	.	**1**
Chasmodes bosquianus	1	.	.	.	.	1	.	.	.	**1**

Appendix JX20-02. (Continued).

Species	Gear and Strata			Zone						Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	A	B	C	D	E	F	
	E=515	E=144	E=525	E=167	E=167	E=230	E=236	E=192	E=192	E=1,184
Chilomycterus schoepfii	4	7	6	5	7	5	.	.	.	**17**
Chloroscombrus chrysurus	5	328	42	22	47	273	33	.	.	**375**
Citharichthys macrops	1	.	.	.	1	.	.	.	.	**1**
Citharichthys spilopterus	21	4	103	4	20	33	32	17	22	**128**
Ctenogobius boleosoma	148	.	49	37	42	49	57	10	2	**197**
Ctenogobius shufeldti	316	.	453	28	4	21	547	83	86	**769**
Ctenogobius smaragdus	112	.	10	12	8	102	.	.	.	**122**
Ctenogobius sp.	1	.	.	.	.	.	.	.	1	**1**
Ctenogobius stigmaticus	.	.	5	.	.	5	.	.	.	**5**
Cynoscion complex	5	8	521	64	146	52	161	86	25	**534**
Cynoscion nebulosus	67	44	5	21	33	43	11	8	.	**116**
Cyprinodon variegatus	3	.	.	1	2	.	.	.	.	**3**
Dasyatis sabina	6	160	136	84	57	63	34	39	25	**302**
Dasyatis say	.	5	3	5	3	.	.	.	.	**8**
Diapterus auratus	55	498	18	13	75	254	214	13	2	**571**
Dormitator maculatus	.	.	1	.	.	.	1	.	.	**1**
Dorosoma cepedianum	12	158	8	1	10	62	96	5	4	**178**
Dorosoma petenense	4,309	52	16	1	1	43	24	3,675	633	**4,377**
Elopiformes sp.	1	.	.	.	.	.	.	1	.	**1**
Elops saurus	32	84	193	28	33	41	139	58	10	**309**
Etropus crossotus	44	12	330	212	77	93	4	.	.	**386**
Eucinostomus gula	65	19	26	9	8	91	2	.	.	**110**
Eucinostomus harengulus	843	33	66	109	98	359	233	105	38	**942**
Eucinostomus spp.	1,304	.	119	98	148	859	240	59	19	**1,423**
Evorthodus lyricus	1	.	.	.	.	1	.	.	.	**1**
Farfantepenaeus aztecus	8	.	138	66	28	7	15	29	1	**146**
Farfantepenaeus duorarum	3	.	62	29	10	12	13	1	.	**65**
Farfantepenaeus spp.	202	.	471	115	95	270	107	86	.	**673**
Fundulus chrysotus	1	.	.	.	.	.	1	.	.	**1**
Fundulus confluentus	1	.	.	.	.	.	.	1	.	**1**
Fundulus heteroclitus	855	.	1	109	622	60	65	.	.	**856**
Fundulus majalis	53	.	.	14	21	18	.	.	.	**53**
Fundulus seminolis	415	.	.	.	.	.	19	16	380	**415**

Appendix JX20-02. (Continued).

Species	Gear and Strata			Zone						Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	A	B	C	D	E	F	
	E=515	E=144	E=525	E=167	E=167	E=230	E=236	E=192	E=192	E=1,184
Gambusia holbrooki	457	.	1	23	6	67	198	7	157	**458**
Gobiesox strumosus	1	.	.	.	1	.	.	.	.	**1**
Gobioides broussonetii	2	.	58	.	.	1	45	11	3	**60**
Gobionellus oceanicus	1	.	32	.	1	18	10	2	2	**33**
Gobiosoma bosc	67	.	23	3	.	11	19	23	34	**90**
Gobiosoma ginsburgi	1	.	.	.	1	.	.	.	.	**1**
Gobiosoma spp.	211	.	36	.	.	7	66	49	125	**247**
Gymnura micrura	.	10	10	7	13	.	.	.	.	**20**
Harengula jaguana	53	3	3	2	5	51	1	.	.	**59**
Hypsoblennius hentz	1	.	1	.	1	1	.	.	.	**2**
Hypsoblennius ionthas	3	.	2	3	.	2	.	.	.	**5**
Ictalurus punctatus	5	23	132	11	.	.	27	34	88	**160**
Labidesthes sicculus	264	.	.	5	.	.	251	.	8	**264**
Lagocephalus laevigatus	.	.	2	2	.	.	.	.	.	**2**
Lagodon rhomboides	181	413	14	55	45	370	93	41	4	**608**
Larimus fasciatus	.	.	2	1	.	1	.	.	.	**2**
Leiostomus xanthurus	7,827	356	3,118	3,940	1,908	2,833	1,557	625	438	**11,301**
Lepisosteus osseus	4	46	3	28	4	.	20	.	1	**53**
Lepisosteus platyrhincus	6	.	1	.	.	.	.	3	4	**7**
Lepomis auritus	86	.	5	.	.	.	8	6	77	**91**
Lepomis gulosus	2	.	1	.	.	.	3	.	.	**3**
Lepomis macrochirus	173	4	25	2	2	2	89	41	66	**202**
Lepomis microlophus	7	3	18	.	.	.	10	3	15	**28**
Lepomis spp.	49	.	.	2	.	.	8	1	38	**49**
Limulus polyphemus	.	.	4	4	.	.	.	.	.	**4**
Litopenaeus setiferus	4,948	354	4,812	2,336	4,183	1,078	995	889	633	**10,114**
Lobotes surinamensis	.	6	1	2	4	1	.	.	.	**7**
Lucania goodei	10	.	.	.	.	.	10	.	.	**10**
Lucania parva	57	.	.	.	.	.	.	1	56	**57**
Lutjanus griseus	22	3	11	1	13	8	7	3	4	**36**
Lutjanus synagris	4	.	11	3	5	7	.	.	.	**15**
Megalops atlanticus	.	2	5	6	.	1	.	.	.	**7**
Membras martinica	80	.	.	.	.	.	6	73	1	**80**

Appendix JX20-02. (Continued).

Species	Gear and Strata			Zone						Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	A	B	C	D	E	F	
	E=515	E=144	E=525	E=167	E=167	E=230	E=236	E=192	E=192	E=1,184
Menidia menidia	7,998	.	.	3,127	3,025	1,520	326	.	.	**7,998**
Menidia spp.	7,002	.	2	148	49	72	426	2,087	4,222	**7,004**
Menippe spp.	3	.	1	2	2	.	.	.	.	**4**
Menticirrhus americanus	63	13	188	64	108	74	18	.	.	**264**
Menticirrhus littoralis	14	2	.	1	6	9	.	.	.	**16**
Microgobius gulosus	413	.	1,092	1	.	.	317	310	877	**1,505**
Microgobius thalassinus	13	.	46	6	.	28	23	1	1	**59**
Micropogonias undulatus	1,893	59	23,183	3,799	3,319	1,051	4,673	7,638	4,655	**25,135**
Micropterus salmoides	47	.	.	.	.	3	15	5	24	**47**
Morone chrysops x saxatilis	1	.	.	.	.	.	.	1	.	**1**
Morone saxatilis	8	.	.	7	.	.	.	.	1	**8**
Mugil cephalus	3,782	1,071	1	309	495	2,585	656	221	588	**4,854**
Mugil curema	199	1,368	.	91	149	1,043	249	14	21	**1,567**
Myrophis punctatus	1	.	6	.	4	1	1	1	.	**7**
Notemigonus crysoleucas	119	.	.	.	.	.	18	3	98	**119**
Notropis chalybaeus	1	.	.	1	.	.	.	.	.	**1**
Notropis maculatus	.	.	1	.	.	.	.	.	1	**1**
Ogcocephalus cubifrons	.	.	2	.	2	.	.	.	.	**2**
Oligoplites saurus	44	2	.	4	13	19	10	.	.	**46**
Ophichthus gomesii	.	.	1	1	.	.	.	.	.	**1**
Opisthonema oglinum	3	2	.	.	4	1	.	.	.	**5**
Opsanus tau	2	.	8	4	2	4	.	.	.	**10**
Oreochromis complex	36	.	.	.	.	.	.	.	36	**36**
Oreochromis/Sarotherodon spp.	43	.	.	.	.	.	3	.	40	**43**
Orthopristis chrysoptera	17	2	6	13	2	7	2	1	.	**25**
Paralichthyidae spp.	3	.	.	.	3	.	.	.	.	**3**
Paralichthys albigutta	9	4	2	3	5	7	.	.	.	**15**
Paralichthys dentatus	1	3	11	12	.	3	.	.	.	**15**
Paralichthys lethostigma	52	51	186	23	58	49	52	67	40	**289**
Paralichthys squamilentus	1	.	.	.	1	.	.	.	.	**1**
Penaeus monodon	2	.	.	.	1	.	1	.	.	**2**
Peprilus paru	.	3	7	4	2	2	2	.	.	**10**
Peprilus sp.	.	.	1	.	.	1	.	.	.	**1**

Appendix JX20-02. (Continued).

Species	Gear and Strata			Zone						Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	A	B	C	D	E	F	
	E=515	E=144	E=525	E=167	E=167	E=230	E=236	E=192	E=192	E=1,184
Peprilus triacanthus	1	5	7	2	7	3	1	.	.	**13**
Poecilia latipinna	22	.	.	1	12	6	2	1	.	**22**
Pogonias cromis	1	5	3	1	1	6	1	.	.	**9**
Pomatomus saltatrix	.	6	2	5	2	1	.	.	.	**8**
Pomoxis nigromaculatus	4	.	34	.	.	.	9	6	23	**38**
Portunus spp.	6	2	9	7	7	3	.	.	.	**17**
Prionotus carolinus	.	.	2	1	1	.	.	.	.	**2**
Prionotus evolans	12	1	59	39	7	20	6	.	.	**72**
Prionotus scitulus	7	.	10	9	6	2	.	.	.	**17**
Prionotus tribulus	1	2	20	5	4	14	.	.	.	**23**
Pterygoplichthys spp.	1	.	3	.	.	.	2	1	1	**4**
Rimapenaeus constrictus	1	.	11	11	.	1	.	.	.	**12**
Rimapenaeus spp.	34	.	397	240	152	37	2	.	.	**431**
Sciaenidae spp.	2	.	8	1	.	1	8	.	.	**10**
Sciaenops ocellatus	73	26	3	1	12	44	30	11	4	**102**
Scomberomorus maculatus	.	6	1	.	4	3	.	.	.	**7**
Scorpaena brasiliensis	.	.	1	.	.	1	.	.	.	**1**
Selene vomer	2	9	4	5	3	7	.	.	.	**15**
Sphoeroides nephelus	16	4	16	10	11	14	1	.	.	**36**
Sphoeroides spengleri	.	.	1	1	.	.	.	.	.	**1**
Sphyrna tiburo	.	9	.	6	3	.	.	.	.	**9**
Stellifer lanceolatus	.	.	7,001	736	6,165	1	99	.	.	**7,001**
Stephanolepis hispidus	2	.	6	.	3	5	.	.	.	**8**
Stomolophus meleagris	4	52	20	25	.	51	.	.	.	**76**
Strongylura marina	23	10	1	1	.	9	2	10	12	**34**
Strongylura notata	1	.	.	.	.	1	.	.	.	**1**
Strongylura spp.	59	.	.	.	.	.	3	23	33	**59**
Strongylura timucu	1	.	.	1	.	.	.	.	.	**1**
Symphurus civitatium	2	.	.	.	.	2	.	.	.	**2**
Symphurus plagiusa	143	.	150	131	89	54	19	.	.	**293**
Symphurus sp.	1	.	.	.	.	1	.	.	.	**1**
Syngnathus fuscus	1	.	2	2	1	.	.	.	.	**3**
Syngnathus louisianae	10	.	16	8	4	12	1	1	.	**26**

Appendix JX20-02. (Continued).

Species	Gear and Strata			Zone						Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	A	B	C	D	E	F	
	E=515	E=144	E=525	E=167	E=167	E=230	E=236	E=192	E=192	E=1,184
Syngnathus scovelli	44	.	3	.	3	5	10	13	16	**47**
Synodus foetens	22	1	17	4	23	12	1	.	.	**40**
Trachinotus carolinus	49	4	.	32	20	1	.	.	.	**53**
Trachinotus falcatus	54	4	.	5	2	51	.	.	.	**58**
Trachinotus goodei	1	.	.	1	.	.	.	.	.	**1**
Trichiurus lepturus	.	.	14	10	3	1	.	.	.	**14**
Trinectes maculatus	27	4	1,036	80	30	11	375	397	174	**1,067**
Urophycis regia	.	.	3	2	.	.	1	.	.	**3**
Xiphopenaeus kroyeri	.	.	10	10	.	.	.	.	.	**10**
Totals	**94,150**	**6,404**	**60,083**	**39,926**	**36,312**	**26,470**	**17,882**	**19,636**	**20,411**	**160,637**

Appendix JX20-03. Summary of monthly sampling effort by gear during northeast Florida stratified-random sampling, 2020.

Month	**# SRS Sites**			**Totals**
	21.3-m Seine	**183-m Seine**	**6.1-m Trawl**	
January	48	16	49	**113**
February	48	16	49	**113**
March	48	16	49	**113**
April	17	0	18	**35**
May	18	0	17	**35**
June	48	0	49	**97**
July	48	16	49	**113**
August	48	16	49	**113**
September	48	16	49	**113**
October	48	16	49	**113**
November	48	16	49	**113**
December	48	16	49	**113**
TOTALS	**515**	**144**	**525**	**1,184**

Fish Health Monitoring

Introduction

Long-term, multi-gear and multi-habitat sampling programs, such as the Fisheries-Independent Monitoring (FIM) program, not only provide fish population information to fisheries managers, but also help to document changes and evaluate the effects of natural and anthropogenic disturbances to ecosystems (Wolfe et al. 1987). Increased urban development in coastal areas has made adjacent aquatic ecosystems (estuaries, bays, and tidal rivers) some of the most intensively fertilized environments on earth (Cloern et al. 1995). The influx of nutrients and other materials commonly associated with urban development and industry has led to concerns about the concomitant eutrophication and degradation of water quality in Florida's coastal systems. Evidence of a correlation between environmental degradation and the occurrence of certain fish diseases continues to accumulate (Sinderman 1979). The incidence of gross external abnormalities (GEAs) in marine species, defined as those illnesses or deformations easily observed in the field, provide valuable information on the level of environmental stress placed upon species in estuarine and coastal waters (Fournie et al. 1996). Baseline information on the frequency of occurrence of GEAs is necessary to identify changes in the ecological health of Florida's estuaries.

The Fish and Wildlife Research Institute's (FWRI) FIM program began to document visually observed GEAs (including parasites) on fish and select invertebrates in Florida's estuaries in April 1998. The main objectives of the fish health monitoring component of the FIM program are to categorize prominent types of GEAs observed, identify which species are most susceptible, and document normal background levels of fish health problems. This report summarizes the occurrence of GEAs observed on fish ≥ 75 mm standard length (SL) and selected invertebrates collected during routine stratified-random sampling (SRS) in select Florida estuaries in 2020 (Figure FIM 20-01).

Methods

Fish health monitoring was conducted in all Florida estuarine areas sampled by the FIM program. All fish (≥ 75 mm SL) and selected invertebrates were visually examined for GEAs. Abnormalities that were opportunistically observed on specimens < 75 mm SL were also recorded; however, they are not presented in this report. Specimens with gross external abnormalities were assigned a Gross External Abnormality (GEA) code in the field by FIM staff, packed on ice, and returned to the lab. These specimens were sent to the FWRI's Fish and Wildlife Health (FWH) group in St. Petersburg, Florida for detailed diagnosis. Specimens collected from estuaries outside the Tampa Bay region were either fixed in 10% formalin or shipped on ice to the FWH group. After evaluating each specimen, the FWH group assigned a GEA code to each specimen and provided these data to the FIM program for input into a database. Gross external abnormality codes assigned by fish pathologists in the FWH group took priority over those assigned in the field. Specimens that were assigned a GEA code and released in the field (i.e., fish with scoliosis or gill isopods) retained their original GEA code assigned in the field. Nine GEA codes were used:

P	Parasitic infestation
B	Red or bloody areas (no scale loss)
F	Fin rot (inflamed or frayed fins)
U	Ulcer or lesion (muscle tissue affected)
E	Erosion or scale loss (only epidermis or dermis involved, muscle tissue not affected)
S	Skeletal abnormalities (vertebral, opercular, or fin deformities)
T	Tumor, cyst (raised area)
O	Other (i.e., emaciated fish, healing wound, eye discoloration, missing parts, and mechanical damage)
D	Dead prior to collection

Results and Discussion

Of the 226,100 fish (≥ 75 mm SL) and selected invertebrates that were collected statewide during 2020 FIM SRS, 1,848 (52 taxa, 0.8%) were observed to have a GEA (Table FH20-01). The northern Indian River Lagoon had the highest incidence of specimens with GEAs (5.7%). Apalachicola Bay (0.2%), Tampa Bay (0.2%), Charlotte Harbor (<0.1%), Cedar Key (<0.1%), northeast Florida (<0.1%) and southern Indian River Lagoon (<0.1%) all had very low incidences of specimens with observed GEAs. Statewide, all nine categories of GEAs were observed in 2020. The most often identified GEA was parasitic infection (P; n=1,467; Table FH20-02) accounting for 79% of all GEA's observed from all estuaries. The next two most common GEAs observed were other (O; n=124) and red or bloody areas (B; n=105). Five of the top 10 taxa observed to have a GEA were of recreational or commercial importance (i.e., Selected Taxa). *Ariopsis felis* (n=1,539) and *Mugil curema* (n=114) were the most commonly affected taxa. The majority of the GEA's for those two species were parasitic infestation (P): *Ariopsis felis* (n=1,306), *Mugil curema* (n=105). *Callinectes sapidus* was the only invertebrate collected with a GEA during routine monitoring in 2020 with three collected in Charlotte Harbor and one in northeast Florida.

Incidence by Lab

Apalachicola Bay: Apalachicola Bay staff examined 22,909 specimens for GEAs. Thirty-seven individuals (0.2%) from 16 taxa, nine of which were Selected Taxa, had a GEA (Table FH20-03). Fin rot (F; n=14) and parasitic infestation (P; n=7) were the most common GEAs observed and accounted for 57% of the affected specimens within Apalachicola Bay.

Cedar Key: Cedar Key staff examined 18,741 specimens for GEAs. Sixteen individuals (<0.1%) from nine taxa, five of which were Selected Taxa, had a GEA (Table FH20-04). Ulcer or lesion (U; n=6) was the most common GEA observed on specimens during 2020 in Cedar Key.

Charlotte Harbor: Charlotte Harbor staff examined 76,385 specimens for GEAs. Forty-nine individuals (<0.1%) from 11 taxa, six of which were Selected Taxa, had a GEA

(Table FH20-05). Of those, 30 specimens (61%) had parasitic infestation (P). Twenty-one of those were *Ariopsis felis.*

Northern Indian River Lagoon: Northern Indian River Lagoon staff examined 28,832 specimens for GEAs and had the highest occurrence of specimens with GEAs. One thousand six hundred forty individuals (5.7%) from 26 taxa, 10 of which were Selected Taxa, had a GEA (Table FH20-06). Parasitic infestation (P; n=1,422) accounted for 87% of the affected specimens within the northern Indian River Lagoon system. Parasitic infection was primarily observed on *Ariopsis felis* (n=1,283).

Northeast Florida: Northeast Florida staff examined 13,044 specimens for GEAs. Only seven individuals (<0.1%) from six taxa, two of which were Selected Taxa, had a GEA (Table FH20-07). Parasitic infection (P; n=2) and ulcer or lesion (U; n=2) were the most common GEAs observed in northeast Florida.

Tampa Bay: Tampa Bay staff examined 54,848 specimens for GEAs. Ninety-six individuals (0.2%) from 16 taxa, five of which were Selected Taxa, had a GEA (Table FH20-08). Red or bloody areas (B; n=47) and fin rot (F; n=27) were the most common GEAs observed and comprised 77% of the GEAs observed in Tampa Bay. Sixty-nine of those GEAs were observed in *Ariopsis felis* (B; n=47, F; n=22).

Southern Indian River Lagoon: Southern Indian River Lagoon staff examined 11,341 specimens for GEAs. Three individuals (<0.1%) from three taxa, two of which were Selected Taxa, had a GEA (Table FH20-09). Ulcer or lesion (U; n=2) and dead prior to collection (D; n=1) were the only GEAs observed in the southern Indian River Lagoon.

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Table FH20-01. Incidence of external abnormalities in fish and selected invertebrates collected during stratified-random sampling at each FIM field lab during 2020. Data are based only on fish ≥ 75 mm SL and include total number collected, number affected by gross external abnormalities, and percentage affected by gross external abnormalities.

Field Laboratory	Number Collected	Number Affected	Percent Affected
Apalachicola Bay	22,909	37	0.2
Cedar Key	18,741	16	<0.1
Charlotte Harbor	76,385	49	<0.1
Northern Indian River Lagoon	28,832	1,640	5.7
Northeast Florida	13,044	7	<0.1
Tampa Bay	54,848	96	0.2
Southern Indian River Lagoon	11,341	3	<0.1
Totals	**226,100**	**1,848**	**0.8**

Table FH20-02. Top 10 taxa having gross external abnormalities, sorted by Percent Affected, collected from all estuaries sampled by the Fisheries-Independent Monitoring program during stratified-random sampling, 2020. Number collected = total number of each species collected (≥ 75 mm SL). Number affected = total number of individuals (≥ 75 mm SL) observed with abnormalities. The number of fish affected is further broken down by specific GEA Code. Percent affected = (number affected / number collected) ∗ 100. Taxa in bold font are categorized as Selected Taxa by the FIM program.

Scientific Name	Number Collected (≥ 75 mm)	Number Affected (≥ 75 mm)	Gross External Abnormality (GEA) Code [1]									Percent Affected
			P	B	F	U	E	S	T	O	D	
Ariopsis felis	10,726	1,539	1,306	103	26	2	1	.	.	95	6	14.3
Mugil curema	2,694	114	105	.	7	2	.	.	.	.	.	4.2
Sciaenops ocellatus	855	10	8	.	1	1	.	.	.	.	.	1.2
Mugil cephalus	4,770	27	16	1	7	.	.	.	.	2	1	0.6
Strongylura notata	1,756	10	.	.	.	.	.	2	1	7	.	0.6
Bairdiella chrysoura	4,937	19	2	.	.	.	.	.	.	.	17	0.4
Leiostomus xanthurus	2,598	8	.	.	5	2	.	1	.	.	.	0.3
Centropomus undecimalis	4,416	11	.	.	1	3	1	2	1	3	.	0.2
Dasyatis sabina	3,272	8	2	.	.	.	.	2	.	2	2	0.2
Lagodon rhomboides	89,223	9	.	.	1	2	.	3	.	3	.	<0.1
Subtotals (top 10 taxa with GEAs)	**125,247**	**1,755**	**1,439**	**104**	**48**	**12**	**2**	**10**	**2**	**112**	**26**	**1.4**
Totals (all taxa)	**226,100**	**1,848**	**1,467**	**105**	**65**	**26**	**5**	**19**	**4**	**124**	**33**	**0.8**

[1] P = parasitic infestation; B = red or bloody areas; F = fin rot; U = ulcer or lesion; E = erosion or scale loss; S = skeletal abnormalities; T = tumor/cysts; O = other; D = dead.

Table FH20-03. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in Apalachicola Bay during stratified-random sampling, 2020. Number collected = total number of each species collected (≥ 75 mm SL). Number affected = total number of individuals (≥ 75 mm SL) observed with abnormalities. The number of fish affected is further broken down by specific GEA Code. Percent affected = (number affected / number collected) ∗ 100. Taxa in bold font are categorized as Selected Taxa by the FIM program.

Scientific Name	Number Collected (≥ 75 mm SL)	Number Affected (≥ 75 mm SL)	Gross External Abnormality (GEA) Code [1]									Percent Affected
			P	B	F	U	E	S	T	O	D	
Lepisosteus osseus	8	3	3	.	.	.	.	.	.	.	.	37.5
Ictalurus punctatus	15	2	1	.	.	.	.	.	1	.	.	13.3
Menticirrhus saxatilis	9	1	.	.	.	.	.	.	.	1	.	11.1
Paralichthys lethostigma	49	2	.	.	.	.	2	.	.	.	.	4.1
Micropterus salmoides	40	1	.	.	.	.	.	1	.	.	.	2.5
Cynoscion arenarius	127	2	.	.	2	.	.	.	.	.	.	1.6
Archosargus probatocephalus	72	1	.	.	.	.	.	.	.	1	.	1.4
Pogonias cromis	92	1	.	.	.	1	.	.	.	.	.	1.1
Fundulus similis	104	1	.	.	.	.	.	.	1	.	.	1.0
Leiostomus xanthurus	1,018	7	.	.	5	2	.	.	.	.	.	0.7
Elops saurus	157	1	.	.	1	.	.	.	.	.	.	0.6
Micropogonias undulatus	1,497	6	1	1	3	.	.	1	.	.	.	0.4
Ariopsis felis	897	2	1	.	.	.	1	.	.	.	.	0.2
Lagodon rhomboides	5,792	3	.	.	.	.	.	.	.	3	.	<0.1
Mugil cephalus	2,030	3	.	.	3	.	.	.	.	.	.	<0.1
Bairdiella chrysoura	1,717	1	1	.	.	.	.	.	.	.	.	<0.1
Totals (all taxa)	**22,909**	**37**	**7**	**1**	**14**	**3**	**3**	**2**	**2**	**5**	**.**	**0.2**

[1] P = parasitic infestation; B = red or bloody areas; F = fin rot; U = ulcer or lesion; E = erosion or scale loss; S = skeletal abnormalities; T = tumor/cysts; O = other; D = dead.

Table FH20-04. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in Cedar Key during stratified-random sampling, 2020. Number collected = total number of each species collected (≥ 75 mm SL). Number affected = total number of individuals (≥ 75 mm SL) observed with abnormalities. The number of fish affected is further broken down by specific GEA Code. Percent affected = (number affected / number collected) ∗ 100. Taxa in bold font are categorized as Selected Taxa by the FIM program.

	Number Collected	Number Affected	Gross External Abnormality (GEA) Code [1]									Percent
Scientific Name	**(≥ 75 mm SL)**	**(≥ 75 mm SL)**	**P**	**B**	**F**	**U**	**E**	**S**	**T**	**O**	**D**	**Affected**
Ameiurus catus	11	2	2	.	.	.	.	.	.	.	.	18.2
Archosargus probatocephalus	142	2	.	.	.	1	.	1	.	.	.	1.4
Pogonias cromis	522	4	.	.	1	3	.	.	.	.	.	0.8
Dasyatis sabina	1,843	3	1	.	.	.	.	.	.	1	1	0.2
Centropomus undecimalis	463	1	.	.	.	.	.	.	.	1	.	0.2
Sciaenops ocellatus	471	1	.	.	.	1	.	.	.	.	.	0.2
Ariopsis felis	1,788	1	.	.	.	1	.	.	.	.	.	<0.1
Leiostomus xanthurus	1,580	1	.	.	.	.	.	1	.	.	.	<0.1
Lagodon rhomboides	2,208	1	.	.	.	.	.	1	.	.	.	<0.1
Totals (all taxa)	**18,741**	**16**	**3**	**.**	**1**	**6**	**.**	**3**	**.**	**2**	**1**	**<0.1**

[1] P = parasitic infestation; B = red or bloody areas; F = fin rot; U = ulcer or lesion; E = erosion or scale loss; S = skeletal abnormalities; T = tumor/cysts; O = other; D = dead.

Table FH20-05. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in Charlotte Harbor during stratified-random sampling, 2020. Number collected = total number of each species collected (≥ 75 mm SL). Number affected = total number of individuals (≥ 75 mm SL) observed with abnormalities. The number of fish affected is further broken down by specific GEA Code. Percent affected = (number affected / number collected) ∗ 100. Taxa in bold font are categorized as Selected Taxa by the FIM program.

Scientific Name	Number Collected (≥ 75 mm SL)	Number Affected (≥ 75 mm SL)	Gross External Abnormality (GEA) Code [1]									Percent Affected
			P	B	F	U	E	S	T	O	D	
Oreochromis aureus	4	1	.	.	.	.	.	1	.	.	.	25.0
Sciaenops ocellatus	180	8	8	.	.	.	.	.	.	.	.	4.4
Lutjanus synagris	595	7	.	.	.	.	.	.	.	7	.	1.2
Ariopsis felis	3,164	21	21	.	.	.	.	.	.	.	.	0.7
Callinectes sapidus	457	3	.	.	.	.	.	.	.	.	3	0.7
Menticirrhus americanus	137	1	.	.	1	.	.	.	.	.	.	0.7
Strongylura notata	545	2	.	.	.	.	.	1	.	1	.	0.4
Mugil trichodon	326	1	.	.	.	1	.	.	.	.	.	0.3
Centropomus undecimalis	1,511	1	.	.	.	.	1	.	.	.	.	<0.1
Lagodon rhomboides	51,599	3	.	.	.	2	.	1	.	.	.	<0.1
Eucinostomus gula	2,248	1	1	.	.	.	.	.	.	.	.	<0.1
Totals (all taxa)	**76,385**	**49**	**30**	**.**	**1**	**3**	**1**	**3**	**.**	**8**	**3**	**<0.1**

[1] P = parasitic infestation; B = red or bloody areas; F = fin rot; U = ulcer or lesion; E = erosion or scale loss; S = skeletal abnormalities; T = tumor/cysts; O = other; D = dead.

Table FH20-06. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in northern Indian River Lagoon during stratified-random sampling, 2020. Number collected = total number of each species collected (≥ 75 mm SL). Number affected = total number of individuals (≥ 75 mm SL) observed with abnormalities. The number of fish affected is further broken down by specific GEA Code. Percent affected = (number affected / number collected) ∗ 100. Taxa in bold font are categorized as Selected Taxa by the FIM program.

Scientific Name	Number Collected (≥ 75 mm SL)	Number Affected (≥ 75 mm SL)	Gross External Abnormality (GEA) Code [1]									Percent Affected
			P	B	F	U	E	S	T	O	D	
Ariopsis felis	2,930	1,444	1,283	56	4	.	.	.	.	95	6	49.3
Lepisosteus platyrhincus	5	1	.	.	1	.	.	.	.	.	.	20.0
Scomberomorus maculatus	8	1	1	.	.	.	.	.	.	.	.	12.5
Bagre marinus	65	6	6	.	.	.	.	.	.	.	.	9.2
Strongylura notata	125	6	.	.	.	.	.	.	.	6	.	4.8
Mugil curema	2,456	113	105	.	7	1	.	.	.	.	.	4.6
Brevoortia spp.	90	3	1	.	2	.	.	.	.	.	.	3.3
Trachinotus carolinus	36	1	.	.	.	1	.	.	.	.	.	2.8
Mugil cephalus	840	20	16	.	3	.	.	.	.	1	.	2.4
Gymnura micrura	45	1	.	.	.	.	.	.	.	1	.	2.2
Chilomycterus schoepfii	205	4	1	.	.	.	.	.	.	.	3	2.0
Trachinotus falcatus	51	1	1	.	.	.	.	.	.	.	.	2.0
Cynoscion nebulosus	166	2	2	.	.	.	.	.	.	.	.	1.2
Eugerres plumieri	107	1	.	.	1	.	.	.	.	.	.	0.9
***Cynoscion* complex**	139	1	.	.	1	.	.	.	.	.	.	0.7
Bairdiella chrysoura	3,220	18	1	.	.	.	.	.	.	.	17	0.6
Chaetodipterus faber	166	1	.	.	.	1	.	.	.	.	.	0.6
Pogonias cromis	205	1	.	.	.	.	.	1	.	.	.	0.5
Dasyatis sabina	950	4	1	.	.	.	.	1	.	1	1	0.4
Centropomus undecimalis	235	1	.	.	.	.	.	1	.	.	.	0.4

Table FH20-06. (Continued).

Scientific Name	Number Collected (≥ 75 mm SL)	Number Affected (≥ 75 mm SL)	Gross External Abnormality (GEA) Code [1]									Percent Affected
			P	B	F	U	E	S	T	O	D	
Dasyatis say	230	1	1	.	.	.	.	.	.	.	.	0.4
Sphoeroides nephelus	223	1	.	.	.	.	.	.	.	1	.	0.4
Elops saurus	505	1	1	.	.	.	.	.	.	.	.	0.2
Archosargus rhomboidalis	759	1	.	.	.	1	.	.	.	.	.	0.1
Diapterus auratus	6,142	5	2	.	2	.	.	1	.	.	.	<0.1
Lagodon rhomboides	1,509	1	.	.	1	.	.	.	.	.	.	<0.1
Totals (all taxa)	**28,832**	**1,640**	**1,422**	**56**	**22**	**4**	**.**	**4**	**.**	**105**	**27**	**5.7**

[1] P = parasitic infestation; B = red or bloody areas; F = fin rot; U = ulcer or lesion; E = erosion or scale loss; S = skeletal abnormalities; T = tumor/cysts; O = other; D = dead.

Table FH20-07. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in northeast Florida during stratified-random sampling, 2020. Number collected = total number of each species collected (≥ 75 mm SL). Number affected = total number of individuals (≥ 75 mm SL) observed with abnormalities. The number of fish affected is further broken down by specific GEA Code. Percent affected = (number affected / number collected) ∗ 100. Taxa in bold font are categorized as Selected Taxa by the FIM program.

Scientific Name	Number Collected (≥ 75 mm SL)	Number Affected (≥ 75 mm SL)	Gross External Abnormality (GEA) Code [1]									Percent Affected
			P	B	F	U	E	S	T	O	D	
Lepisosteus osseus	53	1	1	.	.	.	.	.	.	.	.	1.9
Menidia menidia	137	1	.	.	.	.	.	1	.	.	.	0.7
Dorosoma cepedianum	176	1	.	.	.	1	.	.	.	.	.	0.6
Brevoortia spp.	372	2	.	.	.	1	1	.	.	.	.	0.5
Callinectes sapidus	918	1	1	.	.	.	.	.	.	.	.	0.1
Mugil cephalus	1,196	1	.	1	.	.	.	.	.	.	.	<0.1
Totals (all taxa)	**13,044**	**7**	**2**	**1**	**.**	**2**	**1**	**1**	**.**	**.**	**.**	**<0.1**

[1] P = parasitic infestation; B = red or bloody areas; F = fin rot; U = ulcer or lesion; E = erosion or scale loss; S = skeletal abnormalities; T = tumor/cysts; O = other; D = dead.

Table FH20-08. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in Tampa Bay during stratified-random sampling, 2020. Number collected = total number of each species collected (≥ 75 mm SL). Number affected = total number of individuals (≥ 75 mm SL) observed with abnormalities. The number of fish affected is further broken down by specific GEA Code. Percent affected = (number affected / number collected) ∗ 100. Taxa in bold font are categorized as Selected Taxa by the FIM program.

Scientific Name	Number Collected (≥ 75 mm SL)	Number Affected (≥ 75 mm SL)	Gross External Abnormality (GEA) Code [1]									Percent Affected
			P	B	F	U	E	S	T	O	D	
Negaprion brevirostris	2	1	.	.	.	.	.	1	.	.	.	50.0
Lepisosteus osseus	6	2	2	.	.	.	.	.	.	.	.	33.3
Fundulus grandis	14	1	.	.	1	.	.	.	.	.	.	7.1
Ariopsis felis	1,947	71	1	47	22	1	.	.	.	.	.	3.6
Acanthostracion quadricornis	74	1	.	.	.	.	.	.	.	1	.	1.4
Caranx hippos	75	1	.	.	.	.	.	.	.	.	1	1.3
Menticirrhus americanus	87	1	.	.	1	.	.	.	.	.	.	1.1
Mugil cephalus	427	2	.	.	1	.	.	.	.	1	.	0.5
Sciaenops ocellatus	204	1	.	.	1	.	.	.	.	.	.	0.5
Synodus foetens	206	1	.	.	.	1	.	.	.	.	.	0.5
Centropomus undecimalis	2,207	8	.	.	1	3	.	1	1	2	.	0.4
Mugil curema	238	1	.	.	.	1	.	.	.	.	.	0.4
Strongylura notata	1,086	2	.	.	.	.	.	1	1	.	.	0.2
Chaetodipterus faber	557	1	.	.	.	.	.	1	.	.	.	0.2
Dasyatis sabina	479	1	.	.	.	.	.	1	.	.	.	0.2
Lagodon rhomboides	28,115	1	.	.	.	.	.	1	.	.	.	<0.1
Totals (all taxa)	**54,848**	**96**	**3**	**47**	**27**	**6**	**.**	**6**	**2**	**4**	**1**	**0.2**

[1] P = parasitic infestation; B = red or bloody areas; F = fin rot; U = ulcer or lesion; E = erosion or scale loss; S = skeletal abnormalities; T = tumor/cysts; O = other; D = dead.

Table FH20-09. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in southern Indian River Lagoon during stratified-random sampling, 2020. Number collected = total number of each species collected (≥ 75 mm SL). Number affected = total number of individuals (≥ 75 mm SL) observed with abnormalities. The number of fish affected is further broken down by specific GEA Code. Percent affected = (number affected / number collected) ∗ 100. Taxa in bold font are categorized as Selected Taxa by the FIM program.

Scientific Name	Number Collected (≥ 75 mm SL)	Number Affected (≥ 75 mm SL)	Gross External Abnormality (GEA) Code [1]									Percent Affected
			P	B	F	U	E	S	T	O	D	
Oreochromis complex	28	1	.	.	.	1	.	.	.	.	.	3.6
Mugil cephalus	277	1	.	.	.	.	.	.	.	.	1	0.4
Archosargus probatocephalus	390	1	.	.	.	1	.	.	.	.	.	0.3
Totals (all taxa)	**11,341**	**3**	**.**	**.**	**.**	**2**	**.**	**.**	**.**	**.**	**1**	**<0.1**

[1] P = parasitic infestation; B = red or bloody areas; F = fin rot; U = ulcer or lesion; E = erosion or scale loss; S = skeletal abnormalities; T = tumor/cysts; O = other; D = dead.

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Species Profiles

Introduction

An important use of Fisheries-Independent Monitoring (FIM) program data is to track the relative abundance of fish stocks and provide information for species management plans, including information on the abundance of juvenile fish. Juvenile indices of abundance (IOAs) measure the relative abundance of newly-recruited or young-of-the-year (YOY) fish and may be used to describe recruitment processes and forecast population trends. Similarly, adult IOAs measure the relative abundance of larger, older fish and may be used to describe the sexually mature portion of a population and also help forecast future population trends. When combined, these two pieces of information can provide a comprehensive picture of the relative condition of a fish population within an estuarine system. This section provides profiles of target species that are routinely collected in FIM program sampling and are of recreational or commercial importance in Florida (e.g., Red Drum, Spotted Seatrout, Sheepshead, Striped Mullet, Pinfish, Common Snook, and Blue Crab).

Similar analyses were used to develop recruitment indices for each species examined. Data from stratified-random sampling (SRS) were used to create IOAs for YOY and adults of target species. Starting with the 2013 FIM Annual Report, only monthly SRS data (1996 to present) were used for IOAs as opposed to previous reporting years (1989-2012) that also included seasonal sampling (spring and fall, 1989-1995). Study areas (i.e., estuarine systems) included in the analyses were selected based upon adequate sample sizes of the target species and years of available data, and separate IOAs were calculated for each study area. The specific time periods and sizes of specimens included in the analyses varied among species based upon their individual patterns of recruitment and growth. In general, for each species, only months of peak abundance were included in the analyses. Prior to IOA analyses, length-frequency histograms were examined to determine the size at which the target species fully recruited to the sampling gears.

The annual IOAs representing either juvenile recruitment (YOY IOAs) or the sub-adult and adult portion of the population (Adult IOAs) were computed using generalized linear models. The FIM program's SRS design generates count data, the distribution of which is bounded by zero. Often, the frequency distribution of these counts is highly non-normal; therefore, a Poisson or negative binomial distribution was used to create IOAs. This report represents a data summary and not an in-depth analysis of factors affecting abundance, therefore, year is the only factor retained in the model runs for the FIM Annual Report Species Profiles. All IOAs were completed by using the GLIMMIX procedure (SAS Institute Inc. 2006).

Relative abundance was calculated as the median annual number of fish per set. Median values were determined from the least-squares adjusted means by multiplying the standard error by a random normal deviate (μ=0, σ=1) and adding it to the least-squares mean. These data were then back-transformed (e^x). The process was repeated 500 times for each year to create a sampling distribution of back-transformed values and summary statistics (median, 25th, and 75th percentiles) were then calculated and plotted to view annual trends in IOAs (Sokal and Rohlf 1981).

References

SAS Institute, Inc. 2006. The GLIMMIX Procedure. SAS/STAT® 9.2 User's Guide. SAS Institute Inc., Cary, North Carolina.

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Red Drum, *Sciaenops ocellatus*

The Red Drum, *Sciaenops ocellatus*, is an estuarine-dependent species inhabiting coastal waters from Massachusetts to northern Mexico (Yokel 1966; Reagan 1985). This species supports important recreational fisheries throughout the U.S. South Atlantic and Gulf of Mexico coasts. In Florida, dramatic stock reductions in the mid-1980s resulted in a 1986 moratorium on commercial and recreational Red Drum fisheries. In 1989, the fishery was reopened with strict size and bag limits, as well as a no-sale provision that effectively eliminated the commercial Red Drum fishery in Florida. Since that time, Red Drum stocks have recovered significantly. In the 2020 stock assessment, model predictions for age-specific indices of Red Drum indicated that populations in Florida exceeded the Florida Fish and Wildlife Conservation Commission's (FWC) management target of at least a 40% escapement rate (geometric mean of the last three years, 2017-2019) in three (NW, SW, NE) of the four statewide assessment regions (Addis 2020). In these three regions, Red Drum are not considered overfished nor undergoing overfishing. The SE region of Florida exceeded the escapement rate management target in 2019, the terminal year of the assessment (55%), but did not meet the escapement rate management target over the three-year time period analyzed. Current escapement rates for 2017-2019 were 48% in the NW, 72% in the SW, 61% in the NE, and 35% in the SE region (Addis 2020). In addition, continued improvement of escapement rates within the northeast management region of the state led to an increase of the daily bag limit from one to two fish in early 2012 and a renewed interest in opening coastal Red Drum to harvest in the Gulf. However, bag limits within the southern and northwest management areas of the state are at one fish per person per day. Bag limits within the southern management areas of the state have remained at one fish per person per day since 1989. Following a red tide event that persisted for 16 months in southwest Florida (2017-2019) the Red Drum fishery was closed through Executive Order (FWC Executive Order No. EO 20-05, "Temporary Modification of Regulations for Red Drum, Snook, and Spotted Seatrout in Southwest Florida") in August 2018 through May 2021 covering Pasco County south to Gordan Pass (Collier County), and, through an extension of that Executive Order, will remain closed from June 2021 through May 2022 covering Sarasota Bay south to Gordan Pass.

In Florida, adult Red Drum spawn from mid-August through late November (Yokel 1966). Spawning occurs primarily near bay mouths, inlets, or over nearshore continental shelf waters (Mercer 1984; Murphy and Taylor 1990), and in some locations inside estuaries (Murphy and Taylor 1990; Johnson and Funicelli 1991). In Florida estuaries, recruitment of juveniles begins in September and continues through February, with peaks occurring in October and November (Reagan 1985; Peters and McMichael 1987; Daniel 1988). Settlement of young-of-the-year (YOY) Red Drum typically occurs in the middle to upper reaches of estuaries, away from ocean inlets or passes, and can be strongly influenced by the availability of low to moderate salinity habitats (Bachelor et al. 2008). On both coasts, large juvenile Red Drum enter the fishery at approximately 15-18 months of age, and are fully recruited at the beginning of their third year (age-2; Chagaris et al. 2015). The legal recreational slot limit (457-686 mm total length [TL]; 18-27 inch TL) includes predominantly age-1 and age-2 fish. Red Drum greater than 700 mm standard length (SL) are uncommon in the Fisheries-Independent Monitoring (FIM) program samples from west Florida estuaries, but are occasionally collected on the east coast in the Indian River Lagoon (IRL; FWC-FWRI 2015).

In an effort to monitor year-class strength and to improve the ability to predict future adult Red Drum abundances, relative indices of abundance (IOAs) were developed to estimate YOY Red Drum recruitment into selected Florida estuaries. Abundance data for YOY Red Drum (≤ 40 mm SL) that were collected in stratified-random 21.3-m seine samples were examined to assess recruitment in six Florida estuaries: Tampa Bay, Charlotte Harbor, northern IRL, Cedar Key, Apalachicola Bay, and northeast Florida. Young-of-the-year Red Drum recruited to habitats sampled with 21.3-m seines primarily from September through February. Data collected from September through December of each year were combined with data from January through February of the following year to create a biological year of data. The IOAs for 2020, therefore, only included data from September through December 2020. Separate analyses for river and bay sets were conducted when possible to examine differences in recruitment between the two habitats. Indices were not calculated for estuaries with insufficient data or where 21.3-m seines were not deployed. Annual IOAs were also developed for legal-size Red Drum that fall within the permitted recreational harvest size range (457-686 mm TL; 374-565 mm SL; Murphy and Taylor 1990) in each estuary, including the southern IRL. These IOAs included all legal-size Red Drum collected in stratified-random 183-m haul seines during each calendar year (January-December).

Annual IOAs in estuaries on the northwest coast of Florida (Apalachicola Bay and Cedar Key) trended different from each other over time (Figure SP20-01). Young-of-the-year IOAs in Apalachicola Bay indicated strong year classes in 1998 and 2002 followed by consistently low recruitment through 2020. The IOAs for legal-size Red Drum in Apalachicola Bay has shown a steady increase over time with peaks in abundance in 2003, 2007-2009, 2012-2013, and 2020. Young-of-the-year IOAs in Cedar Key riverine habitats indicated a relatively strong year class in 1997 and 2018; otherwise, YOY Red Drum IOAs remained fairly low and stable. In Cedar Key bay habitats, YOY IOAs were low and without trend with the catch rates slightly above zero during most years, except for peaks in abundance in 2003, 2013, and 2017. The IOAs for legal-size Red Drum in Cedar Key showed peak abundances during 1999-2001. Starting in 2002 through the present, abundance of legal-size Red Drum has been stable, but relatively low.

Annual IOAs in estuaries on the central-west coast of Florida (Tampa Bay and Charlotte Harbor) trended similar to each other over time (Figure SP20-02). Annual IOAs for YOY Red Drum in Tampa Bay riverine habitats peaked during 2003 and 2004, but otherwise have been relatively low but stable over the time series (Figure SP20-02). In Tampa Bay, annual IOAs for YOY Red Drum in bay habitats show two distinct time periods. The first period with relatively low and stable abundance (1996-2012) and the second with generally higher catch rates (2013 through the present). Annual IOAs for legal-size fish in Tampa Bay have varied without trend, with peak abundance in 2008, 2012, and 2013. The IOAs for YOY Red Drum in Charlotte Harbor riverine habitats have been relatively low, but stable since 1996 with peaks in abundance during 2002-2003 and with smaller increases in 2010, 2014-2015, and 2020. In Charlotte Harbor bay habitats, annual IOAs for YOY Red Drum have been relatively stable since 1996 with only one strong year class evident in 2013. Abundance of legal-size fish in Charlotte Harbor has varied since 1996 with the highest abundances occurring in 1998, 2003, 2007, 2013, and 2020.

Red Drum IOAs varied substantially between estuaries on Florida's Atlantic coast (Figure SP20-03). Indices of abundance for YOY Red Drum in northeast Florida estuaries varied without trend from 2001 through 2020 with stronger year classes in 2003 and 2012. Annual IOAs for legal-size Red Drum in northeast Florida show a consistent low level of abundance except for a period of increased abundance from 2004 through 2006. In the northern IRL, recruitment of YOY Red Drum has varied without trend with several peak years observed (2000, 2004, 2006-2008, 2013, and 2019) in riverine habitats and a strong year class in 2015 in bay habitats. Following the 2015 peak in YOY Red Drum abundance, there has been a steady decline thru 2020. Annual IOAs for legal-size Red Drum in the northern and southern IRL have both varied without trend, with peak abundance in 1998, 2007-08, 2012, and 2015. Throughout the timeseries the abundance of legal-sized Red Drum has been much higher in the northern IRL than in the southern IRL, except for the last four years where abundances have reached record lows for that estuary. The adult Red Drum IOA in the northern IRL mirrored the decline observed in YOY Red Drum found in bay habitats.

Length-frequency data for Red Drum that were collected with 183-m haul seines provides valuable information on larger juveniles and adults (Figures SP20-04, SP20-05). In most estuaries, there were multiple cohorts observed in the length-frequency distributions with one mode between ~100-200 mm SL (large YOY), a second mode from ~300-400 mm SL (~age-1), and a third from ~450-600 mm SL (~age-2 –3). In Tampa Bay, Charlotte Harbor (Figure SP20-04), and the northern IRL (Figure SP20-05), abundances of individuals within the legal slot-limit were roughly equivalent to the abundance of individuals approaching the minimum slot-limit length. In contrast, in Apalachicola Bay, Cedar Key (Figure SP20-04), northeast Florida, and the southern IRL (Figure SP20-05), the abundances of Red Drum within the legal slot-limit dropped off sharply from the abundances of individuals approaching the legal harvestable size range. Legal-size Red Drum were likely age-2 and age-3 individuals, and the length-frequency distributions dropped off sharply after the upper slot limit in all estuaries. This may have been due to the fact that older Red Drum (age-4 and older), once sexually mature, typically leave the estuaries, with the exception of a small portion of the population in the northern IRL (Johnson and Funicelli, 1991), and move to coastal areas to join schools of other reproductively mature individuals and become unavailable to routine FIM sampling gears.

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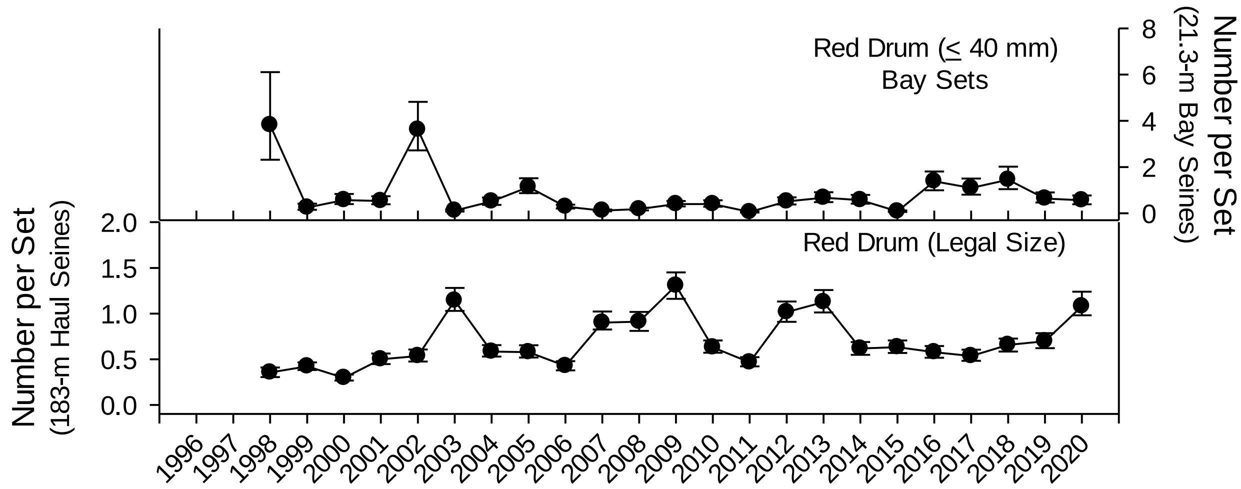
Apalachicola Bay



Cedar Key

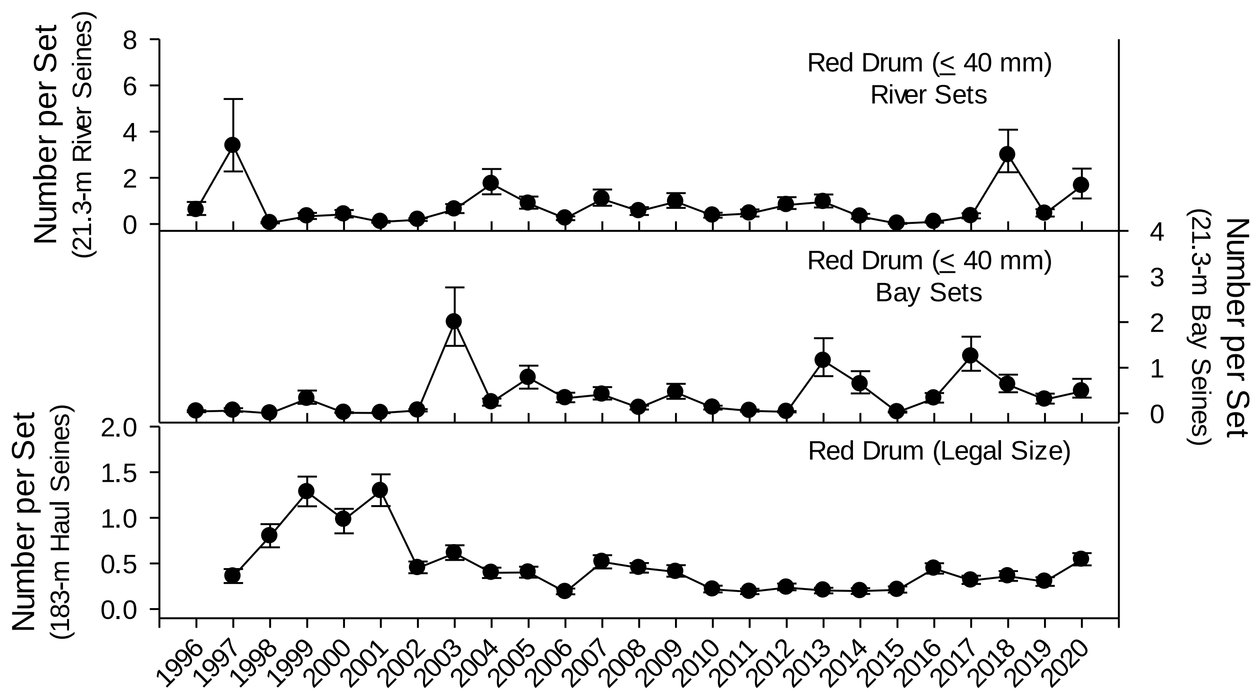
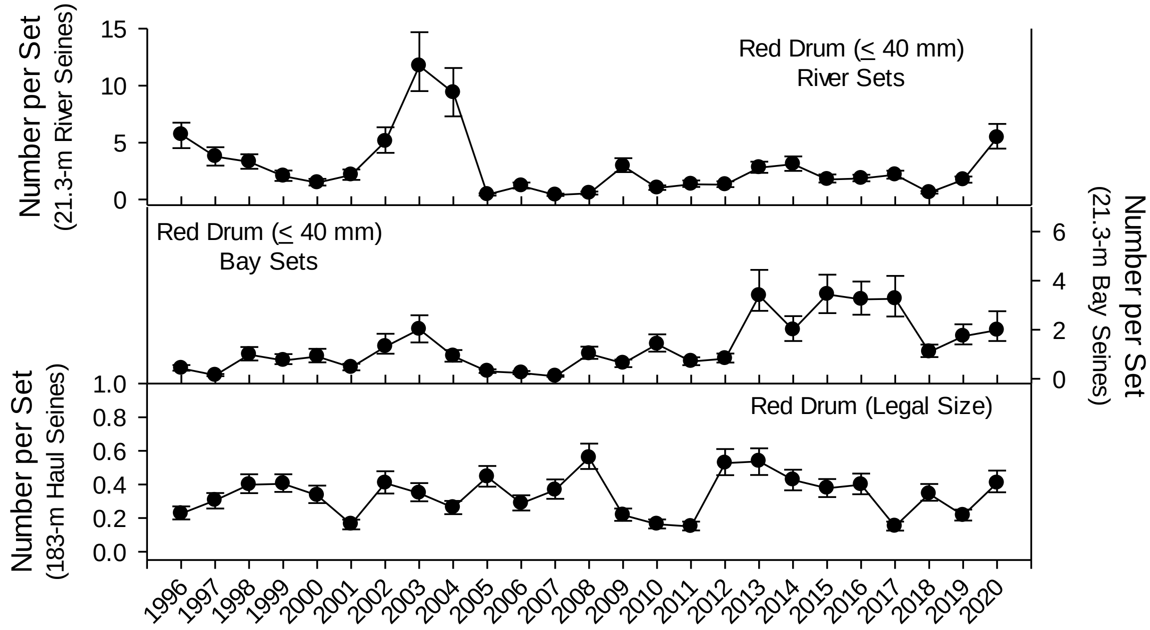


Figure SP20-01. Relative abundance of young-of-the-year Red Drum (≤ 40 mm SL) collected in 21.3-m seines and of legal-size Red Drum (374-565 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Apalachicola Bay and Cedar Key. In Cedar Key, where sufficient numbers of individuals were captured, separate plots for river and bay sets were created to examine differences in YOY recruitment between the two habitats. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales of abundance among plots for different gears and estuaries.

Tampa Bay



Charlotte Harbor

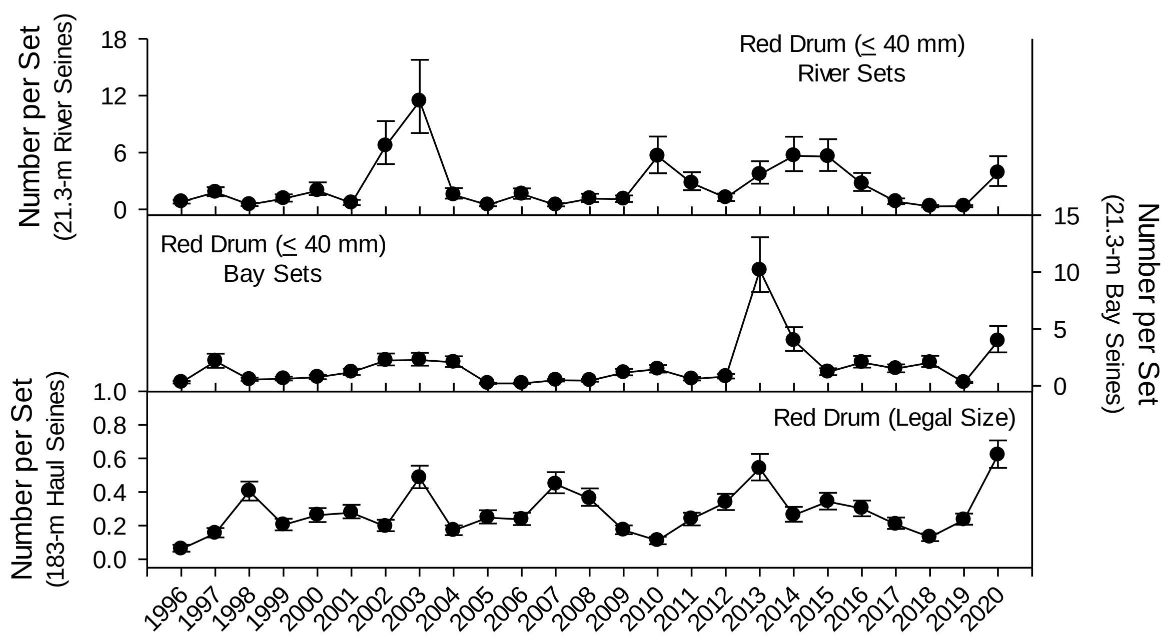
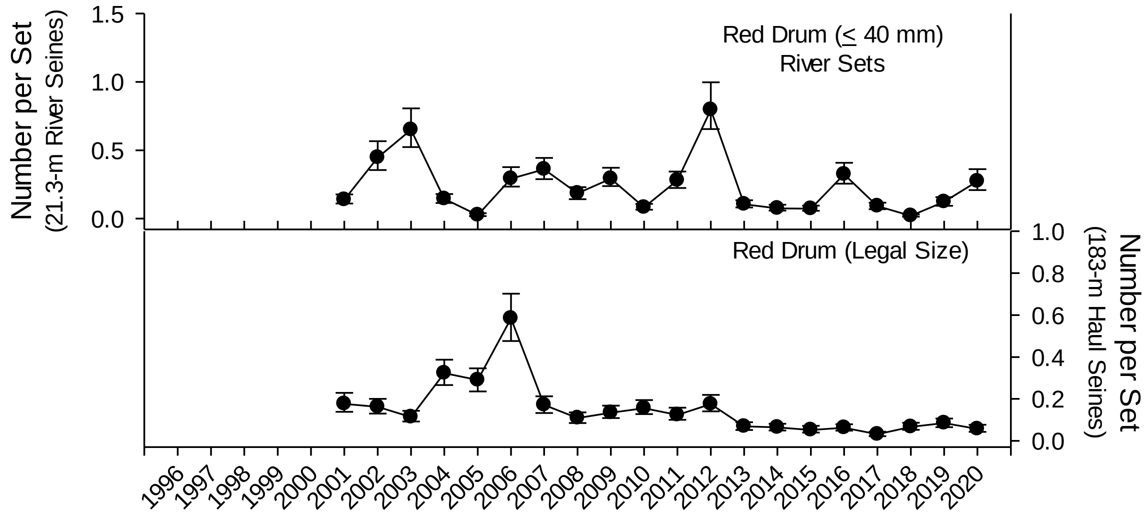


Figure SP20-02. Relative abundance of young-of-the-year Red Drum (≤ 40 mm SL) collected in 21.3-m seines and of legal-size Red Drum (374-565 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Separate plots for river and bay sets were created to examine differences in YOY recruitment between the two habitats. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales of abundance among plots for different gears and estuaries.

Northeast Florida



Indian River Lagoon

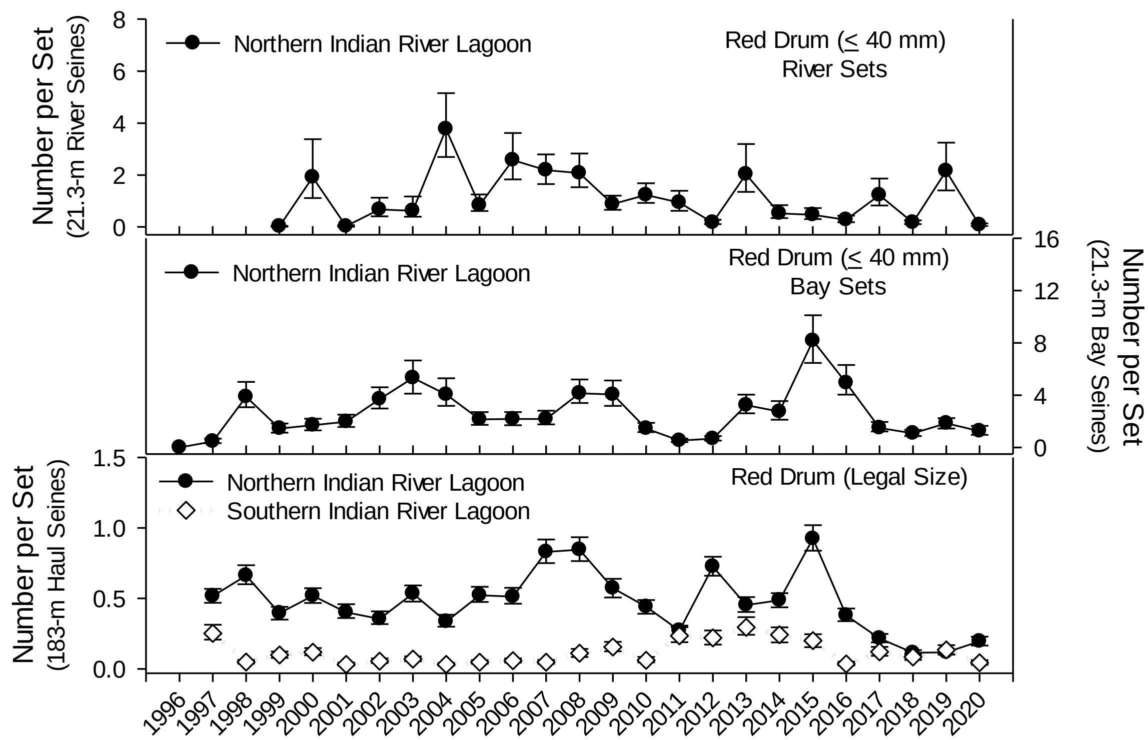


Figure SP20-03. Relative abundance of young-of-the-year Red Drum (≤ 40 mm SL) collected in 21.3-m seines and of legal-size Red Drum (374-565 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Northeast Florida and Indian River Lagoon. In the northern Indian River Lagoon, where sufficient numbers of individuals were captured, separate plots for river and bay sets were created to examine differences in YOY recruitment between the two habitats. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales of abundance among plots for different gears and estuaries.

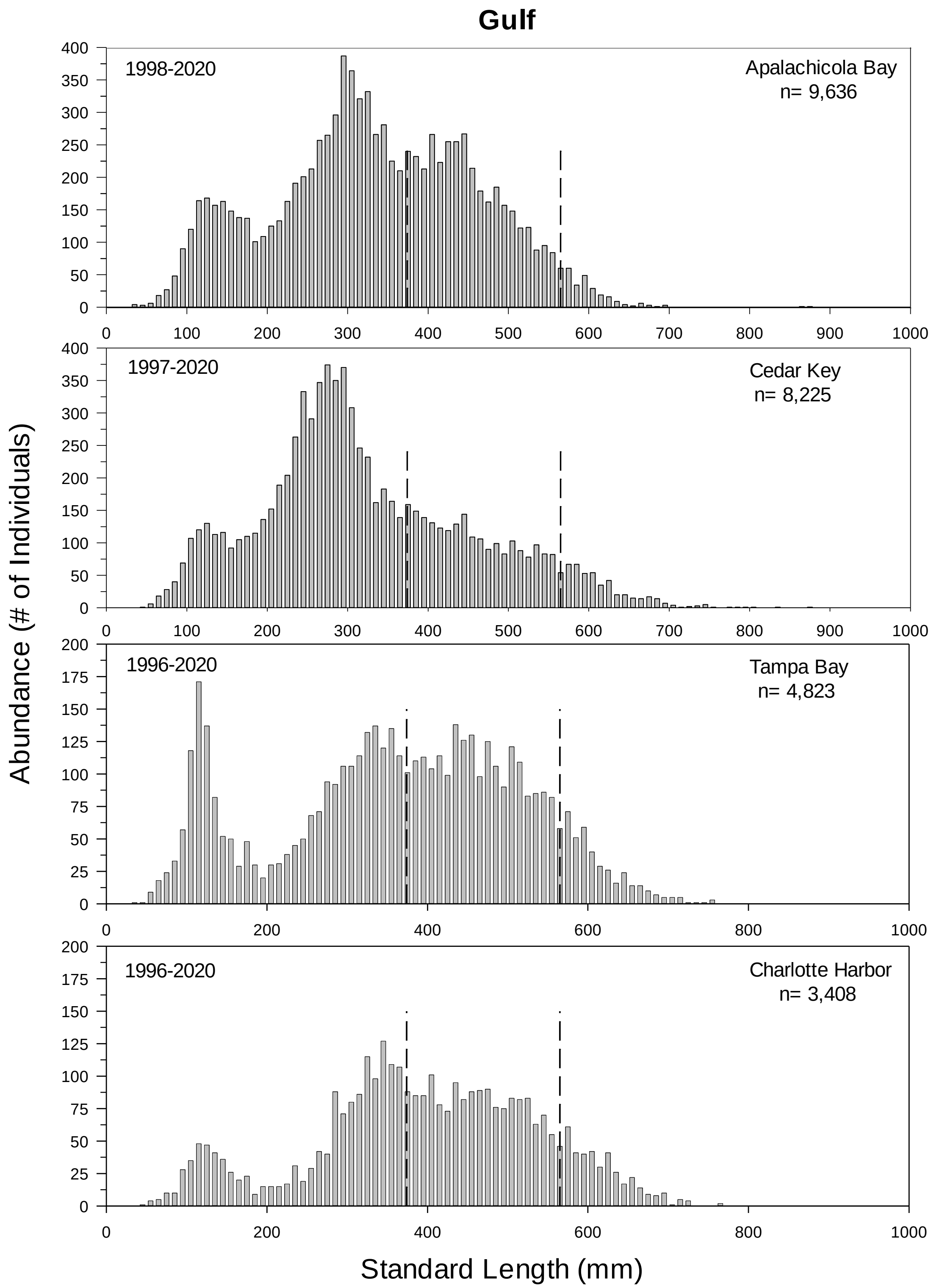


Figure SP20-04. Length frequency diagrams of Red Drum collected in 183-m haul seines from four Florida Gulf coast estuarine systems. Area between dashed lines (- - -) indicates permitted recreational harvest size range (374-565 mm SL). All lengths are standard length (SL). Note different scales and years of collection among plots.

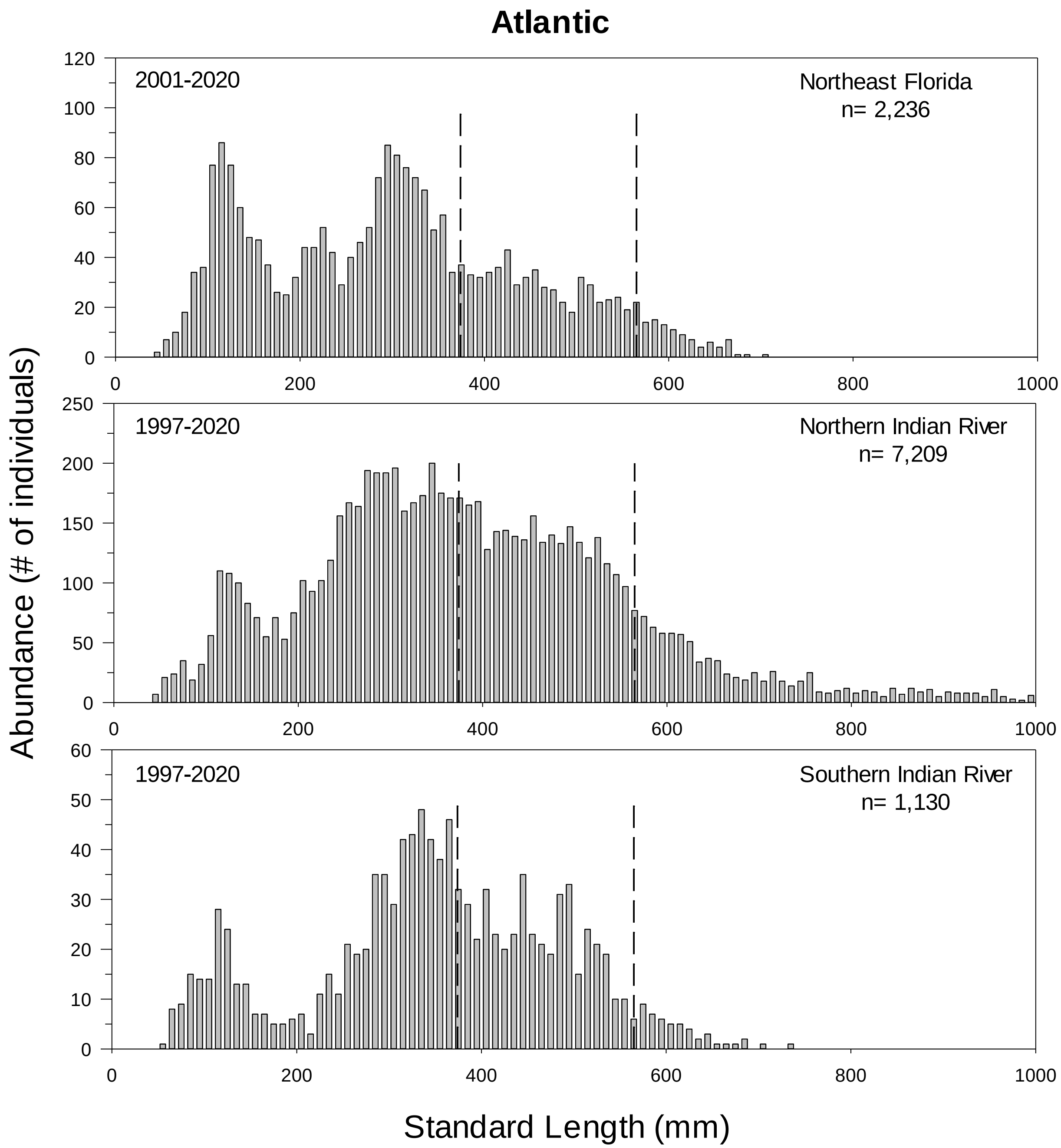


Figure SP20-05. Length frequency diagrams of Red Drum collected in 183-m haul seines from three Florida Atlantic coast estuarine systems. Area between dashed lines (- - -) indicates permitted recreational harvest size range (374-565 mm SL). All lengths are standard length (SL). Note different scales and years of collection among plots.

Spotted Seatrout, *Cynoscion nebulosus*

Spotted Seatrout, *Cynoscion nebulosus*, occur in temperate to tropical estuarine and coastal waters on the Atlantic and Gulf of Mexico (Gulf) coasts of the United States (Bortone 2003). In Florida, Spotted Seatrout have historically supported economically important recreational and commercial fisheries. Overall, annual commercial landings of Spotted Seatrout in Florida declined quite slowly during the period 1950 through the 1970s (Murphy et al. 2011). During the early 1990s, statewide commercial landings never exceeded much more than 500,000 fish and dropped drastically to fewer than 50,000 fish after implementation of the constitutional amendment banning the use of entangling gear in 1995 and the establishment of a 3-month open season in 1996 (Murphy et al. 2011). Declines in the number of commercial trips from the mid-1980s to more recent years were over 90% on the Atlantic coast and nearly 99% on the Gulf coast (Murphy et al. 2011). With these regulatory changes, the Spotted Seatrout fishery has moved from a mixed-sector fishery, to primarily a recreational fishery that makes up more than 99% of the total landings in Florida (13,133,000 fish during 2011-2015; Addis et al. 2018). Between 1990 and 2020 various commercial and recreational fishing regulations have been adopted in an effort to support the rebuilding of Spotted Seatrout stocks (Murphy et al. 1999; Addis et al. 2020). In Florida, studies have indicated the presence of Spotted Seatrout stock subdivisions with most of the major estuaries having a separate stock (Iversen and Tabb; 1962; Seyoum et al. 2014). Since 2012 the FWC has managed Spotted Seatrout in four different regions, increasing to five regions in 2020, with different regulations in each region (Addis et al. 2020). Over the years, various management regulations have been exercised based upon updated stock assessments and regional responses to environmental perturbations (i.e., red tides) which at various times have resulted in seasonal and emergency closures for each of the management zones. There have also been adjustments to the legal harvest size of Spotted Seatrout, with the most recent change adopted February 1, 2020 which set a recreational slot limit of 325-410 mm SL.

Adult Spotted Seatrout begin to spawn in March or April in Tampa Bay and Charlotte Harbor (McMichael and Peters 1989) and in April or May in the northern Indian River Lagoon (IRL), Cedar Key, Apalachicola (Tabb 1961; Crabtree and Adams 1998;

Moody 1950; Devries et al. 2002), and Northeast Florida (MacDonald et al. 2009). Spotted Seatrout are generally reproductively mature at age 2 (males > 200 mm standard length [SL]; females > 235 mm SL; Murphy et al. 2006). Protracted spawning of Spotted Seatrout continues throughout the summer and into late September or October, depending upon location (Murphy et al. 1999). Spawning generally occurs during the evening hours in deep channels and depressions near grass flats in estuarine areas with water temperatures >21°C (Tabb 1966; Helser et al. 1993). Estuarine water temperatures below 20°C may reduce hatching success for Spotted Seatrout (Gray et al. 1991).

In an effort to monitor year-class strength and to improve the ability to predict future adult Spotted Seatrout abundances, relative indices of abundance (IOAs) were developed for young-of-the-year (YOY) Spotted Seatrout recruitment into selected Florida estuaries. Abundance data for YOY Spotted Seatrout (≤ 100 mm SL) collected from stratified-random 21.3-m seine samples were examined to assess recruitment in six Florida estuaries: Apalachicola Bay, Cedar Key, Tampa Bay, Charlotte Harbor, northeast Florida, and northern IRL. Young-of-the-year Spotted Seatrout recruited to habitats sampled with 21.3-m seines primarily from April through October in Tampa Bay and Charlotte Harbor, and from May through November in the northern IRL, northeast Florida, and Cedar Key. In Apalachicola Bay, recruitment of YOY Spotted Seatrout was evident from June through October. These recruitment periods coincide with published recruitment and spawning periods of Spotted Seatrout throughout Florida (Moody 1950; Nelson and Leffler 2001; Devries et al. 2002; Walters et al. 2007). Therefore, these bay-specific months were used to define the respective recruitment seasons for each estuary in subsequent analyses. Indices were not calculated for estuaries where 21.3-m seines were not deployed or where limited data were available. Data from stratified-random 183-m haul seines collected within these same Florida estuarine systems (including the southern IRL) were used to develop IOAs for adult Spotted Seatrout (≥ 200 mm SL). These IOAs were derived by including all Spotted Seatrout ≥ 200 mm SL collected between January and December from 1996 to 2020.

Indices of abundance for YOY Spotted Seatrout on Florida's northwest coast have been variable, but relatively stable since 1998 (Figure SP20-06). The IOAs of YOY Spotted Seatrout in Apalachicola Bay varied without trend with relatively stronger year classes in 1998, 2006, 2009, 2010, 2015, and 2019 (Figure SP20-06). In Cedar Key, strong year classes were evident in riverine habitats during 1997-1998 and 2002. Populations have otherwise remained at relatively lower abundances with seven of the nine years since 2011 being very low historically. In Cedar Key bay habitats, strong year classes were evident from 1996-1998 and have since remained low, but stable through 2020. The IOAs for adult Spotted Seatrout in Apalachicola Bay indicated a stable population, with a peak in abundance in 2010, 2018, and 2019. In Cedar Key, a peak in abundance was observed in adult Spotted Seatrout in 1998 and subsequent abundances were stable, but low through 2020 (Figure SP20-06).

Trends in relative abundance of juvenile Spotted Seatrout in Tampa Bay have remained relatively stable since the mid-1990s (Figure SP20-07). With the exception of strong year classes in 1996, 1997, 1999, and 2004, recruitment of YOY Spotted Seatrout in riverine habitats has been relatively stable, but low and on a slow downward trend since 2005. In bay habitats, peaks in abundance were observed periodically between 1996 and 2004; a lower, but stable trend was observed from 2005 through 2020. Abundance of YOY Spotted Seatrout in Charlotte Harbor riverine habitats has remained stable since 1996, with one strong year class in 1998. In Charlotte Harbor bay habitats, abundance has remained stable through 2020 after strong year classes in 1996 and 1997. Patterns of relative abundance for adult Spotted Seatrout in Tampa Bay and Charlotte Harbor have been variable, but relatively stable since 1996 (Figure SP20-07). Periods of greater abundance occurred in 2002 and 2020 in Charlotte Harbor, and varied without trend in Tampa Bay. Overall, adult catches in these systems were low and as such, the magnitude of peaks in abundance was small as well.

Trends in YOY Spotted Seatrout abundance on Florida's Atlantic coast have been relatively stable with periodic small fluctuations in recruitment (Figure SP20-08). In northeast Florida, IOAs for YOY Spotted Seatrout varied without trend, with peak abundances observed in 2007 and 2011. In the northern Indian River Lagoon, abundance indices for YOY Spotted Seatrout have shown a cyclical pattern with peaks in abundance in 1996, 2005, and 2015 with each peak followed by several declining years. Historically low abundances occurred in both 2013 and 2020. Indices of abundance for adult Spotted Seatrout in northeast Florida were relatively stable from 2001-2012, with the exception of a decrease in 2004, and showed decreased abundances since 2013. Adult Spotted Seatrout indices in the northern Indian River Lagoon have generally fluctuated without trend with the exception of increased abundance in 2010-2011, 2016, and 2018. In the southern Indian River Lagoon, relative abundance of adult Spotted Seatrout has remained low, but stable since 1997; however, due to the comparatively small sample size in this area, results should be interpreted with caution.

The 183-m haul seine provides valuable length-frequency data on sub-adult and adult Spotted Seatrout (Figure SP20-09 and SP20-10). Two distinct peaks in size frequency were evident from the 183-m haul seine data collected within the Gulf coast estuaries with the first peak occurring at ~120-170mm SL and the second peak occurring at ~300mm SL. Length frequency data from Spotted Seatrout collected in Apalachicola Bay showed an additional peak at ~220mm SL. The size distributions of Spotted Seatrout collected with 183-m haul seines in the Atlantic coast estuaries indicated two distinct peaks in northeast Florida, but was more unimodal in both the northern and southern Indian River Lagoon. In all sampling areas, abundance dropped off sharply as the minimum recreational harvest size (325 mm SL) was reached.

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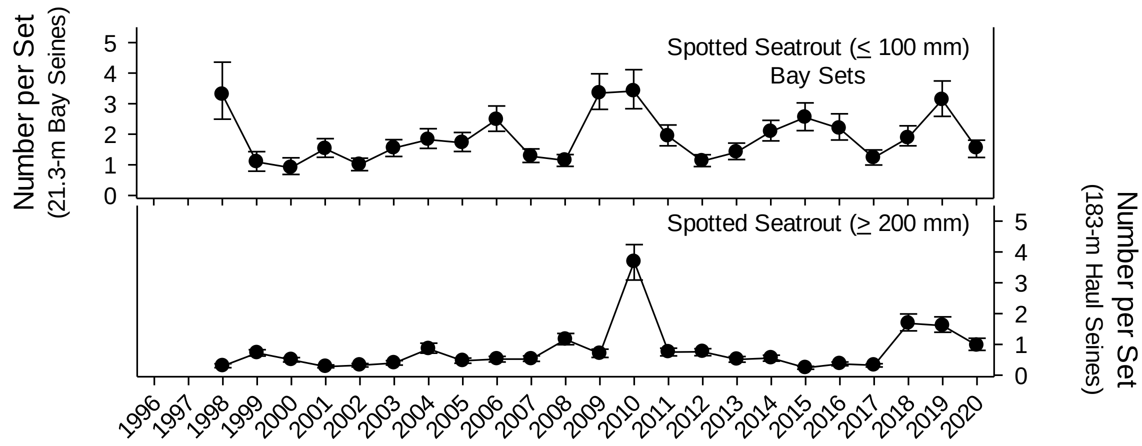
Apalachicola Bay



Cedar Key

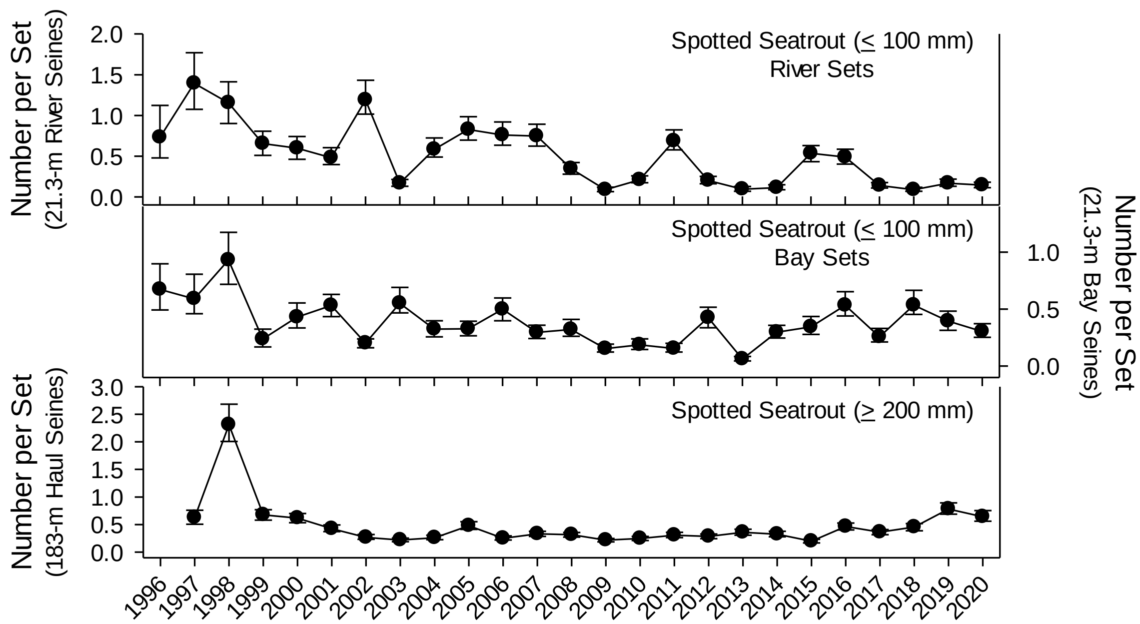
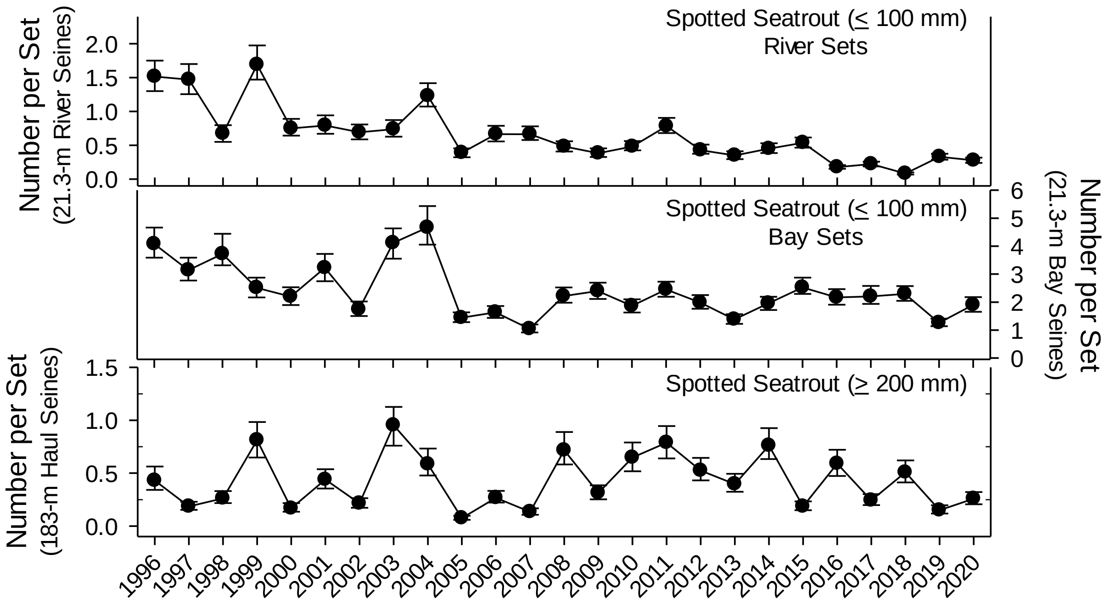


Figure SP20-06. Relative abundance of young-of-the-year Spotted Seatrout (≤ 100 mm SL) collected in 21.3-m seines and of reproductively mature Spotted Seatrout (≥ 200 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling of Apalachicola Bay and Cedar Key. Points represent the median estimate while the vertical bars represent the 25^{th}-75^{th} percentiles. Note different scales in some cases for estimates from 21.3-m and 183-m seines.

Tampa Bay



Charlotte Harbor

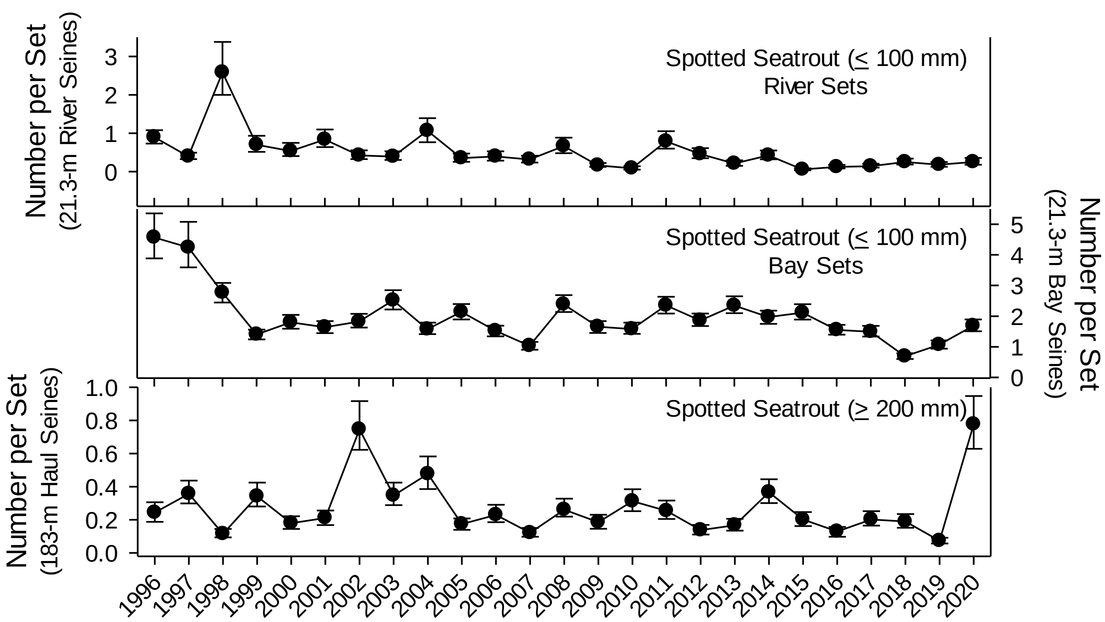
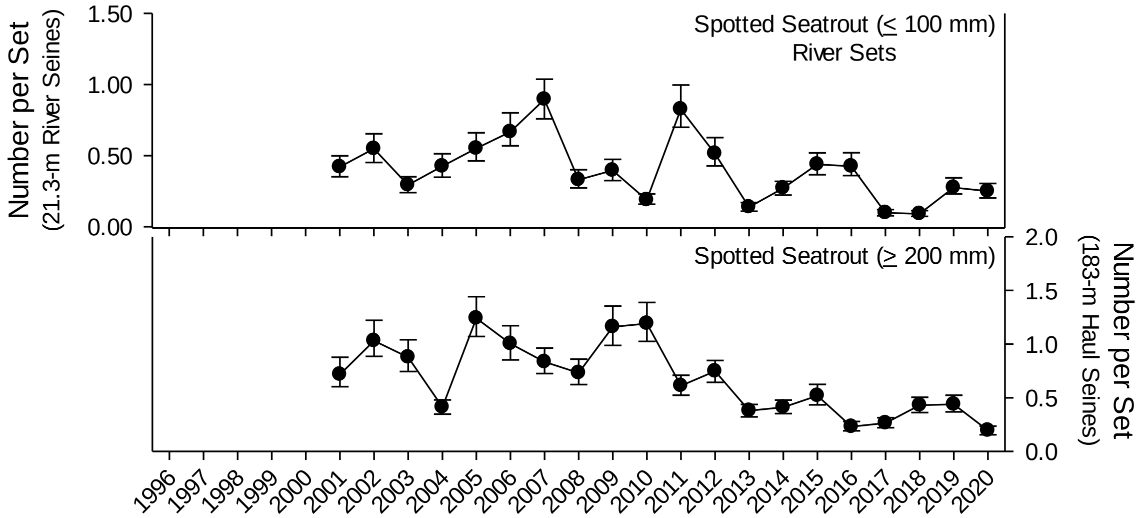


Figure SP20-07. Relative abundance of young-of-the-year Spotted Seatrout (≤ 100 mm SL) collected in 21.3-m seines and of reproductively mature Spotted Seatrout (≥ 200 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales in some cases for estimates from 21.3-m and 183-m seines.

Northeast Florida



Indian River Lagoon

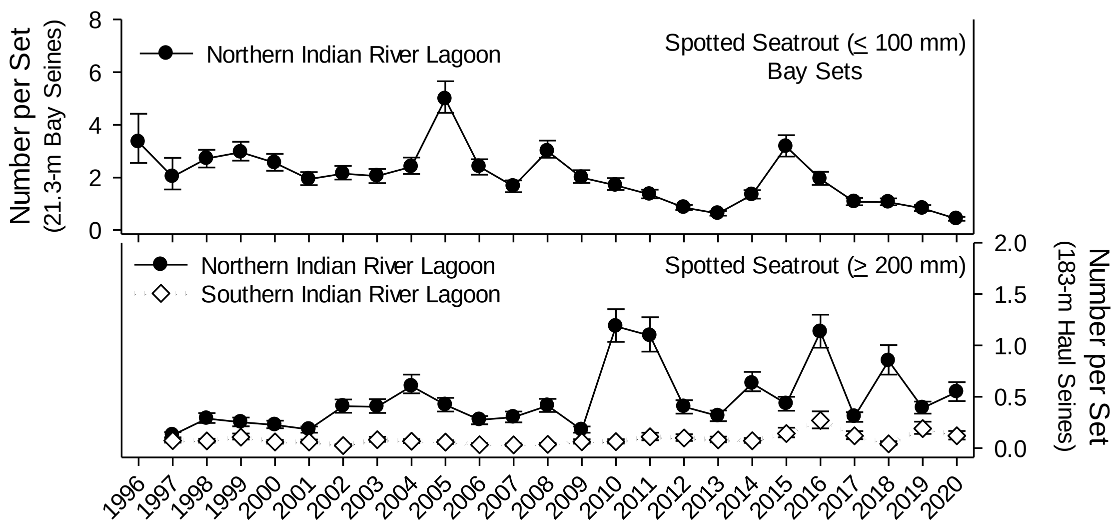


Figure SP20-08. Relative abundance of young-of-the-year Spotted Seatrout (≤ 100 mm SL) collected in 21.3-m seines and of reproductively mature Spotted Seatrout (≥ 200 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Northeast Florida and the Indian River Lagoon. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales in some cases for estimates from 21.3-m and 183-m seines.

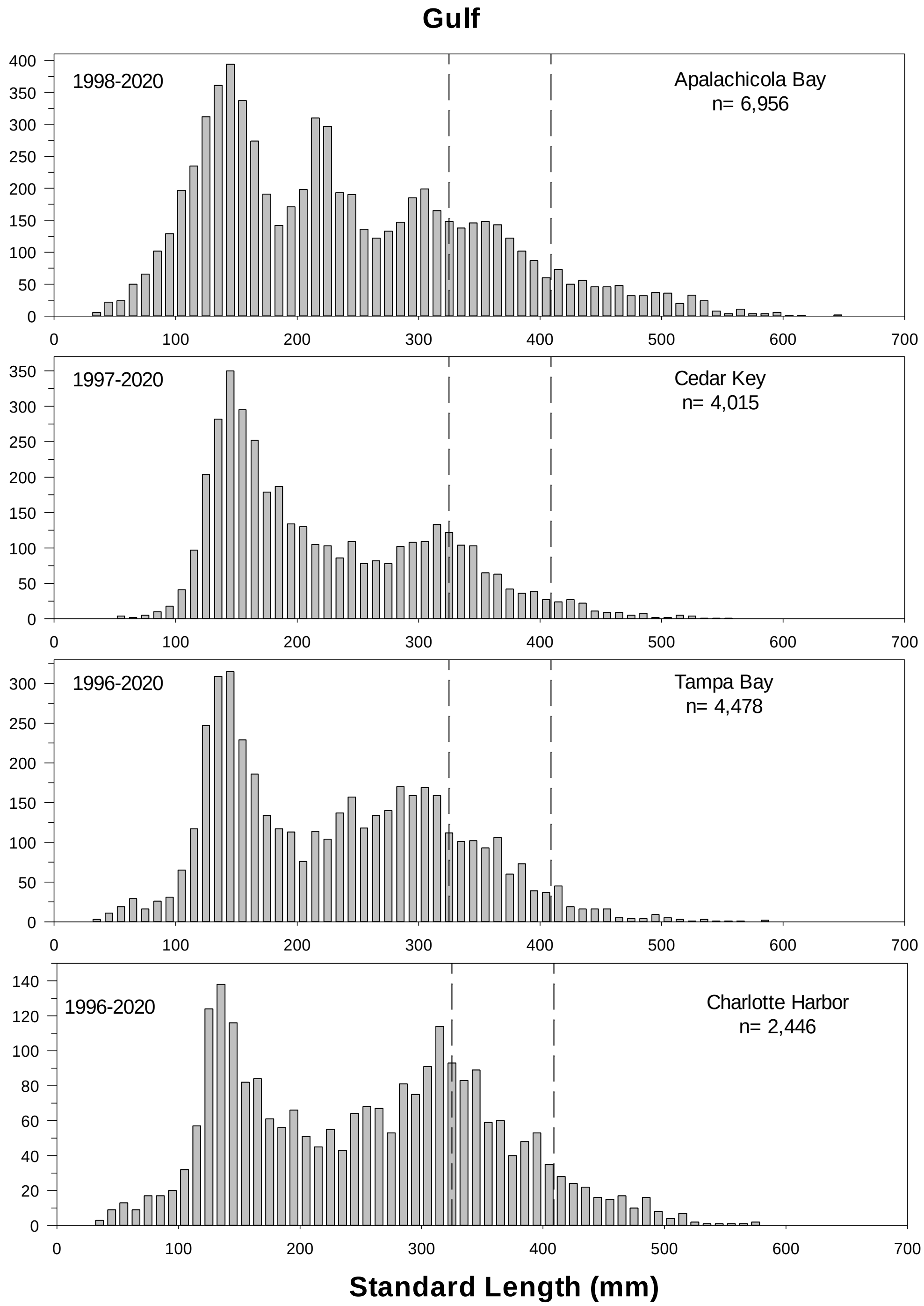


Figure SP20-09. Length frequency diagrams of Spotted Seatrout collected in 183-m haul seines from four Florida Gulf coast estuarine systems. Area between dashed lines (- - -) indicates permitted 2020 recreational harvest size range (325 to 410 mm SL). Current Florida regulations allow anglers to keep one fish greater than the maximum slot limit size. All lengths are standard length (SL). Note different scales and years of collection among plots.

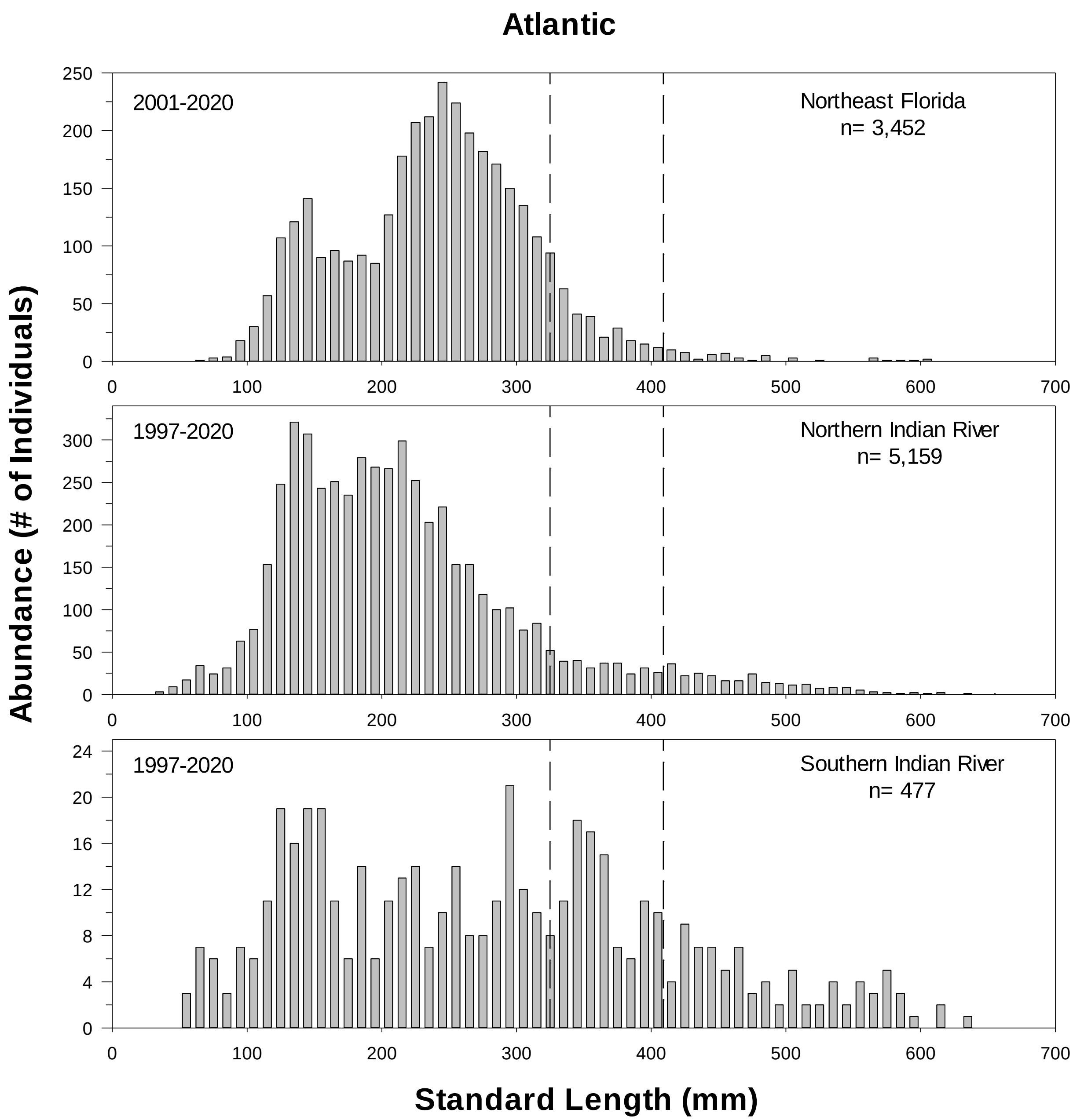


Figure SP20-10. Length frequency diagrams of Spotted Seatrout collected in 183-m haul seines from three Florida estuarine systems. Area between dashed lines (- - -) indicates permitted 2020 recreational harvest size range (325 to 410 mm SL). Current Florida regulations allow anglers to keep one fish greater than the maximum slot limit size. All lengths are standard length (SL). Note different scales and years of collection among plots.

Sheepshead, *Archosargus probatocephalus*

Sheepshead (*Archosargus probatocephalus*) occurs from Nova Scotia (Gilhen et al., 1976) to Brazil (Caldwell, 1965) and is common in coastal waters of the United States from the Chesapeake Bay to Texas (Bigelow and Schroeder, 1953). Historically, more Sheepshead have been landed by recreational fishers than by commercial fishers (82-99% of the combined annual landings during 2000-2015) along Florida's Gulf coast (Munyandorero et al., 2017). Sheepshead in Florida waters are currently regulated by minimum size (305 mm total length) and a bag limit (8 fish/day). The most recent stock assessment for Sheepshead used Fisheries-Independent Monitoring (FIM) program data to derive annual indices of abundance (IOAs) during different life history stages to guide coast-specific catch-at-age models (Munyandorero et al. 2017). This stock assessment determined that Sheepshead stocks on the Gulf and Atlantic coasts appeared abundant enough to supply adequate numbers of new recruits while maintaining current harvest rates.

The spawning season for Sheepshead is February through April in Florida waters and newly recruited young-of-the-year (YOY) are most abundant in shallow estuarine areas between April and June. Regression analyses conducted by FIM for YOY Sheepshead show they reach 40 mm standard length (SL) at approximately 90 days and 130 mm SL at one year of age. Sheepshead in Florida waters enter the fishery at 242 mm SL, which typically corresponds to an age of 3 to 6 years (Dutka-Gianelli and Murie 2001).

To monitor year-class strength and improve the ability to predict future adult Sheepshead abundance, the FIM program developed annual IOAs for two life history stages: YOY and fully recruited. Abundance data for YOY ($\leq$40 mm SL) collected in stratified-random 21.3-m seines were examined to assess recruitment in three Florida estuaries: Tampa Bay, Charlotte Harbor, and the northern Indian River Lagoon (IRL). This life history stage was not examined for Apalachicola Bay, Cedar Key, northeast Florida, or southern IRL due to small sample sizes. Young-of-the-year Sheepshead recruited to habitats sampled with 21.3-m seines primarily from April through June. These months were used to define the respective recruitment seasons for each estuary in subsequent analyses. Abundance indices were also calculated for Sheepshead fully recruited to the fishery (≥242 mm SL) for seven Florida estuarine areas: Tampa Bay, Charlotte Harbor, northern Indian River Lagoon, southern Indian River Lagoon, Cedar Key, Apalachicola Bay, and northeast Florida. Data from stratified-random 183-m haul seines were used to develop IOAs for fully recruited Sheepshead from January through December of each year.

In the two northwest Florida estuaries of Apalachicola Bay and Cedar Key, annual IOAs were only calculated for fully recruited Sheepshead (Figure SP20-11). Annual IOAs for fully recruited Sheepshead in Apalachicola Bay were relatively low in 1998 and 1999, then increased through 2001 and remained relatively consistent through 2008, decreased slightly in 2009, and has exhibited a slight decreasing trend from 2014 to 2020. Abundance of fully recruited Sheepshead in Cedar Key exhibited a slight decreasing trend from 1997 through 2006, and have remained relatively consistent since; however, the lowest abundance levels observed since 1997 occurred in 2017 and have been slowly increasing each year since.

Annual trends in YOY Sheepshead IOAs were variable between the two southwest Florida estuaries, Tampa Bay and Charlotte Harbor. Young-of-the-year IOAs for both estuaries have been relatively stable since 1996 with infrequent strong year classes evident (Figure SP20-12). In Tampa Bay, stronger year classes occurred in 2009 and 2014 in the river habitats and in 2008, 2014, and 2016 in the bay habitats. In Charlotte Harbor, YOY Sheepshead IOAs were relatively stable from 1996 through 2007, with a strong year class in 2008, similar to that observed in Tampa Bay. Since 2008, YOY Sheepshead IOAs in Charlotte Harbor decreased significantly in 2009 and remained at more normal levels (pre-2008) through 2020. Annual IOAs of fully recruited Sheepshead in Tampa Bay have remained relatively stable from 1996 through 2020 with slight peaks in 1999, 2004, 2010 and 2016. Abundance of fully recruited Sheepshead in Charlotte Harbor varied only slightly from 1996 through 2020, with peaks in 2002, 2008, and 2013. Since 2016, the abundance of fully recruited Sheepshead in Charlotte Harbor has remained relatively high with a slight decrease in 2019.

Abundance estimates for fully recruited Sheepshead in northeast Florida increased from 2001-2004, followed by a slight decrease through 2006, and have remained relatively stable since; however, 2016 to 2020 has been a period of reduced abundance for Sheepshead (Figure SP20-13). Young-of-the-year IOAs for northern IRL riverine habitats were quite variable with strong year classes evident in 2001 and 2004. Extremely low abundances were seen in 1999, 2002, 2003, and 2014 through 2020 (Figure SP20-13). Young-of-the-year IOAs in northern IRL bay habitats were stable at low abundances from 1998-2019 with peaks in abundance occurring in 2004 and 2007. Sampling in the northern IRL bay habitats during the recruitment period of 2020 was reduced by the COVID-19 pandemic making an accurate estimate of abundance for this year difficult. Annual IOAs of fully recruited Sheepshead in the southern IRL have been relatively stable between 1997 and 2020, with peaks in 1998, 2004, and 2015 through 2017. Northern IRL IOAs of fully recruited Sheepshead were lower than the southern IRL. Abundance estimates were relatively stable at low abundances from 1997-2016, with the lowest abundance of the past 24-years occurring in 2019 and a slight increase in 2020.

Length-frequency data collected with 183-m haul seines provides valuable information on multiple life stages of Sheepshead (Figure SP20-14 and SP20-15). Length frequency data generally indicated multiple cohorts captured with the 183-m seines. The smallest cohort captured with this gear included late YOY Sheepshead ranging from 60-100 mm. The presence of these juvenile Sheepshead in the catch was more prevalent in the more southern estuaries sampled by FIM (Tampa Bay, Charlotte Harbor, and the Indian River Lagoon). Pre-fishery sized Sheepshead (100-200 mm SL) were most prevalent in Tampa Bay, Charlotte Harbor, and the northern Indian River Lagoon. This fully recruited mode (cohort) was generally shifted to the right in the northern Florida estuaries (~315 mm SL; Apalachicola Bay, Cedar Key, northeast Florida, and northern IRL) and was slightly smaller in the southern Florida estuaries (~240 mm SL, Tampa Bay, Charlotte Harbor, and southern IRL). Modal peaks in length frequencies do not appear to be truncated above the legal minimum size.

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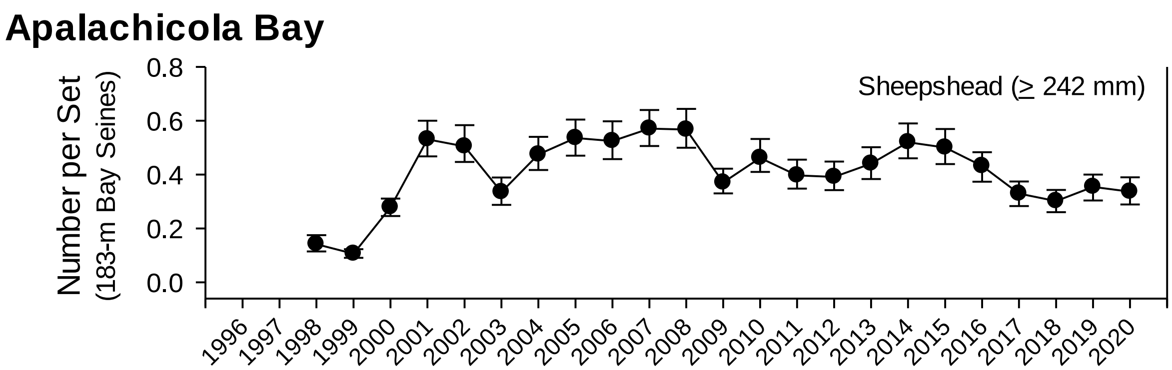


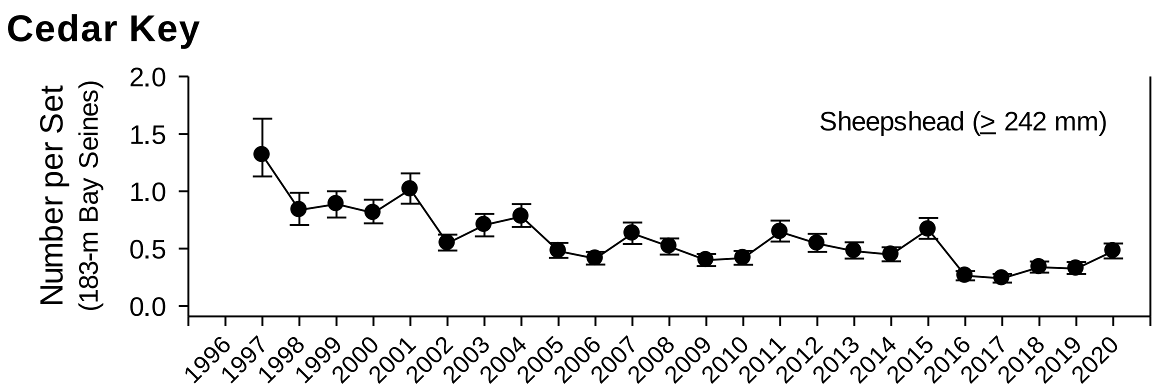
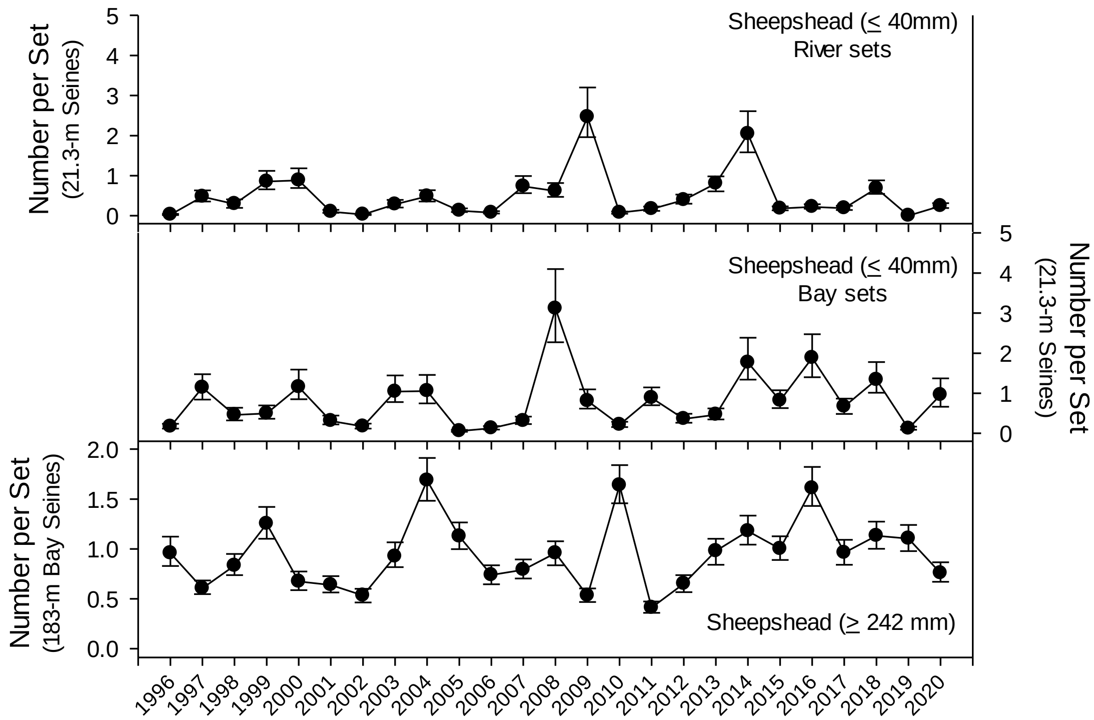


Figure SP20-11. Relative abundance of fully-recruited Sheepshead (≥ 242 mm SL) collected in 183-m haul seines between 1997 and 2020 during stratified-random sampling in the Apalachicola and Cedar Key estuarine systems. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales of abundance among plots for different gears and estuaries.

Tampa Bay



Charlotte Harbor

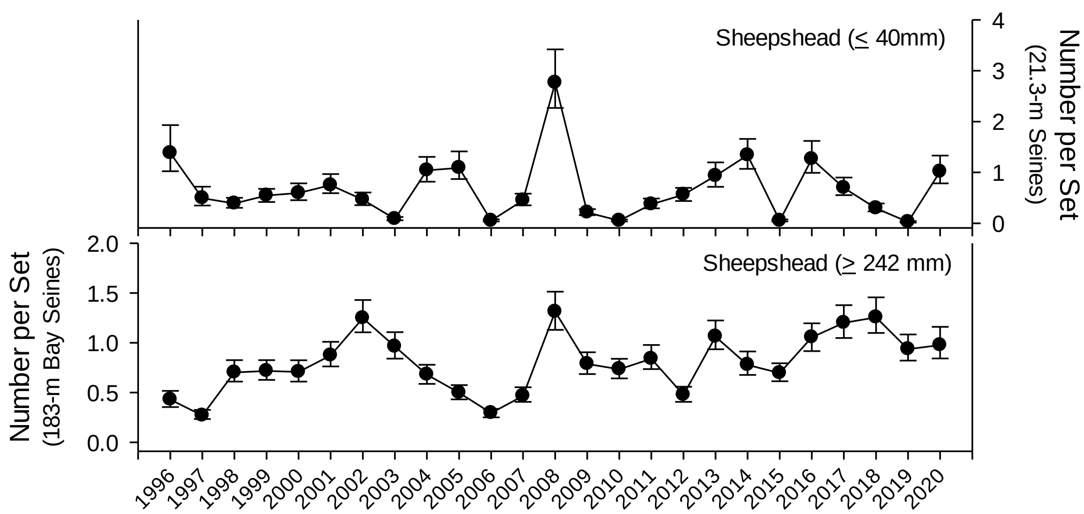
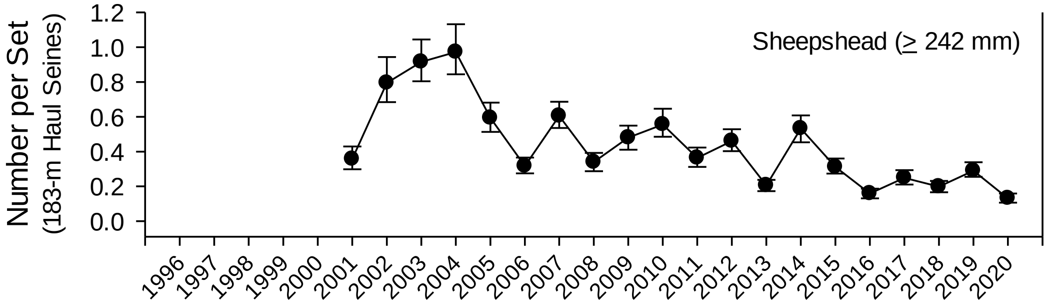


Figure SP20-12. Relative abundance of young-of-the-year Sheepshead (≤ 40 mm SL) collected in 21.3-m seines between 1996 and 2020 and fully-recruited Sheepshead (≥ 242 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Tampa Bay and Charlotte Harbor estuarine systems. Points represent the median estimate while the vertical bars represent the 25^{th}-75^{th} percentiles. Note different scales of abundance among plots for different gears and estuaries.

Northeast Florida



Indian River Lagoon

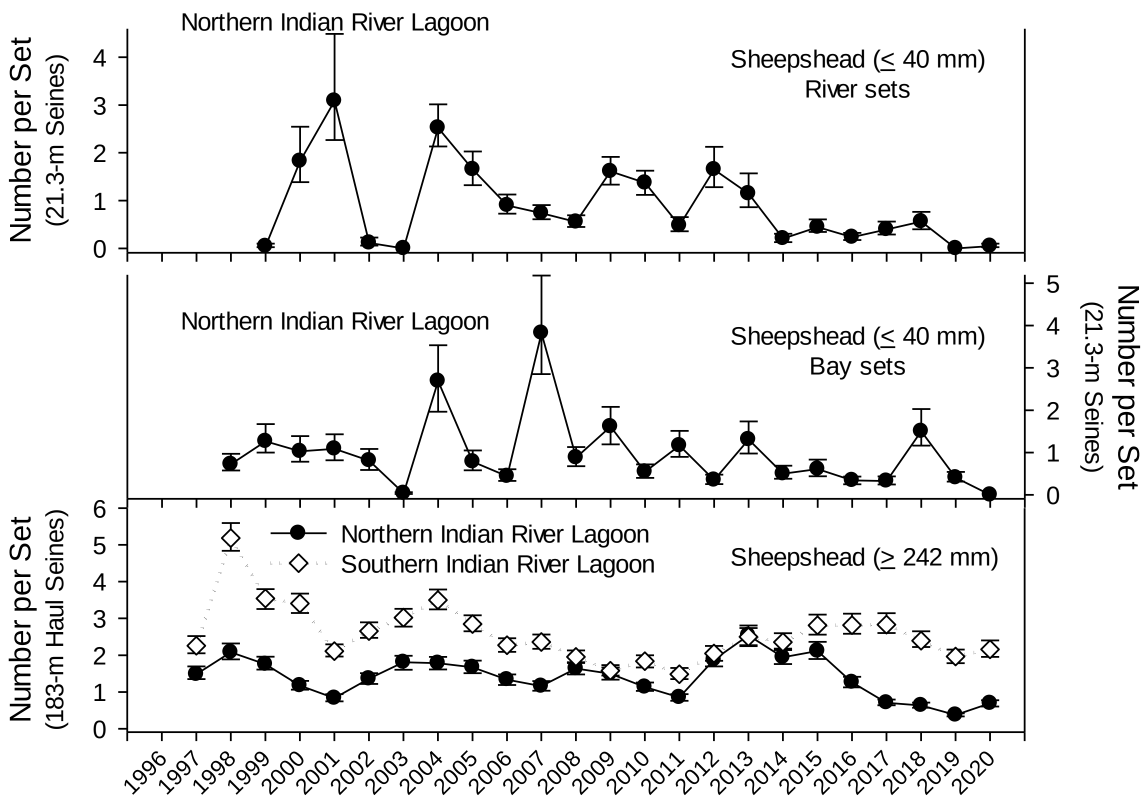


Figure SP20-13. Relative abundance of young-of-the-year Sheepshead (≤40 mm SL) collected in 21.3-m seines between 1998 and 2020 and fully-recruited Sheepshead (≥ 242 mm SL) collected in 183-m haul seines between 1997 and 2020 during stratified-random sampling from Northeast Florida, Northern and Southern Indian River Lagoon estuarine systems. Points represent the median estimate while the vertical bars represent the 25^{th}-75^{th} percentiles. Note different scales of abundance among plots for different gears and estuaries.

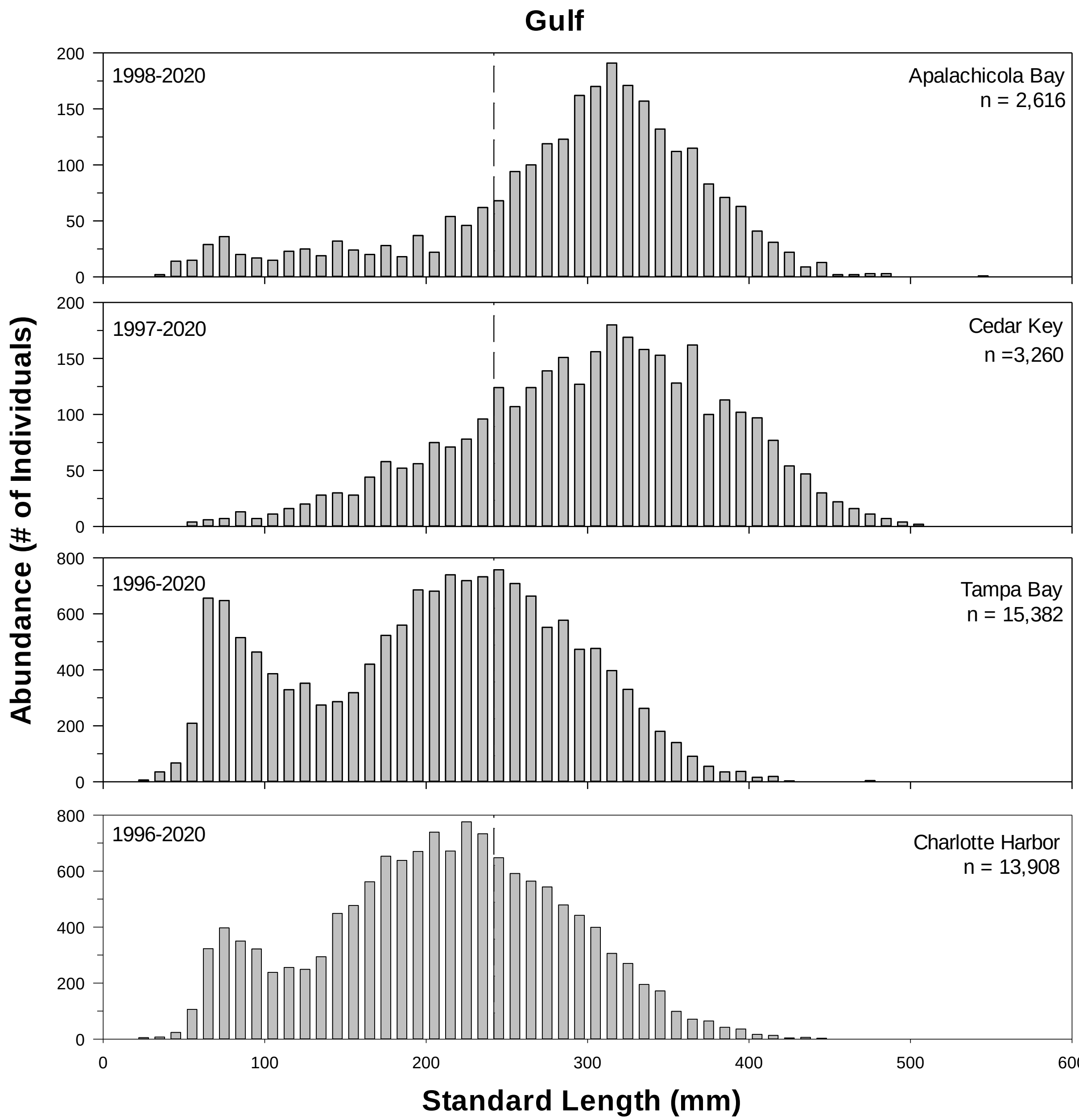


Figure SP20-14. Length frequency diagrams of Sheepshead collected in 183-m haul seines from Gulf coast Florida estuarine systems. Area after dashed line (- - -) indicates permitted recreational minimum harvest length (242 mm SL). All lengths are standard length (SL). Note different scales and years of collection among plots.

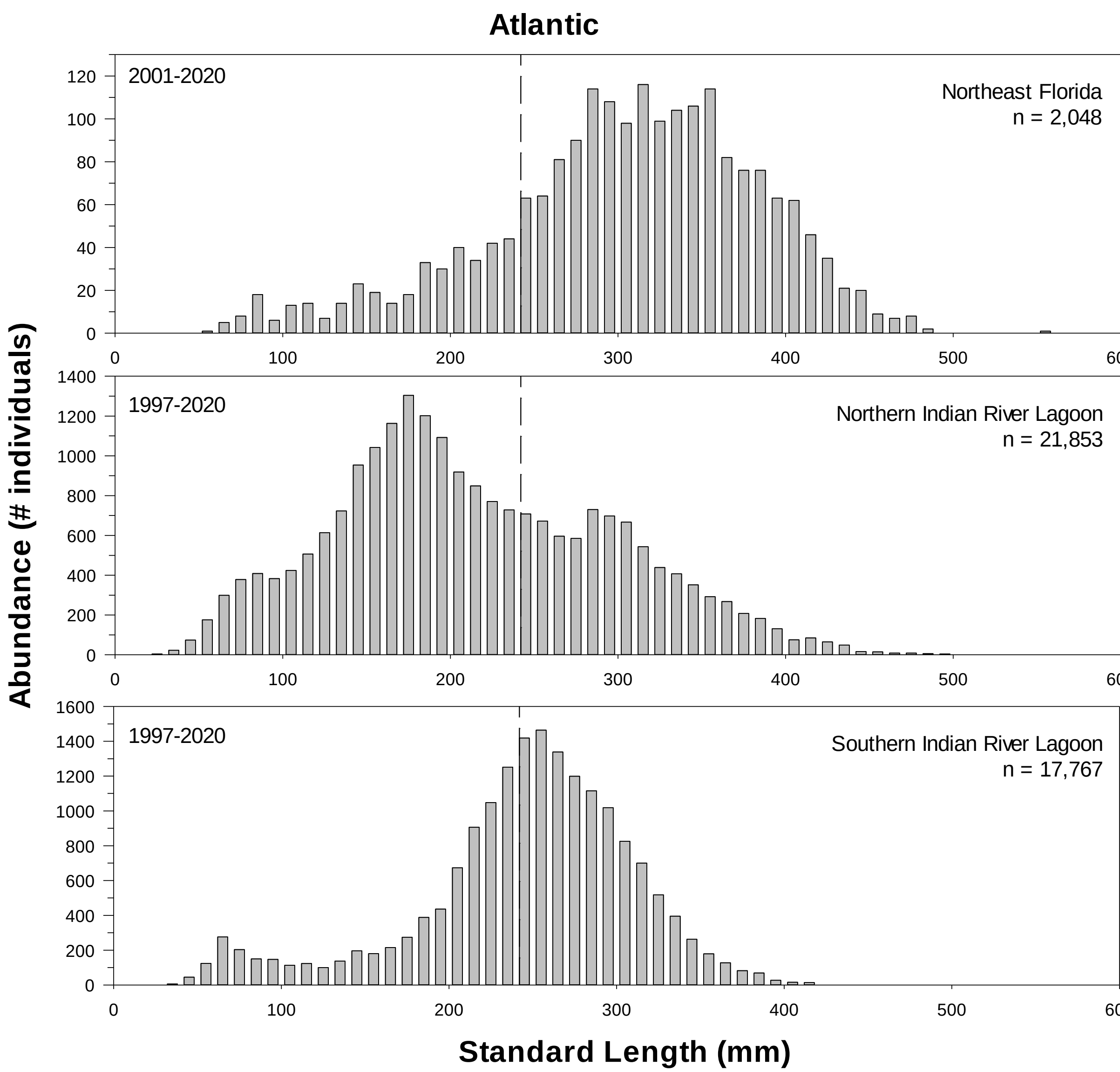


Figure SP20-15. Length frequency diagrams of Sheepshead collected in 183-m haul seines from Atlantic coast Florida estuarine systems. Area after dashed line (- - -) indicates permitted recreational minimum harvest length (242 mm SL). All lengths are standard length (SL). Note different scales and years of collection among plots.

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Striped Mullet, *Mugil cephalus*

Striped Mullet, *Mugil cephalus*, are one of Florida's most abundant and widespread estuarine-dependent fishes (Odum 1970; Leard et al. 1995). Striped Mullet supported a valuable commercial fishery from the early 1960s through the early 1990s, with approximately 90% of all U.S. landings occurring in the Gulf of Mexico (Gulf) and over 80% of all commercial landings occurring in Florida waters (Rivas 1980; Leard et al. 1995; Mahmoudi 1997). From 1930 to 1993 Florida Gulf coast landings averaged 26 million pounds annually (Chagaris et al. 2014). Changes were documented from 1991 to 1994 when commercial Striped Mullet landings in Florida severely declined from 79% to 46% of the total Gulf production (Leard et al. 1995). Following the implementation of the Florida net limitation referendum (July 1, 1995), which eliminated the use of entangling nets within three miles of the Atlantic coast and nine miles of the Gulf coast, Striped Mullet commercial landings were further reduced to approximately 5 million pounds (Mahmoudi 2005). After an initial decline in fishing effort and landings following the net limitation referendum, fishing effort and landings in Florida waters have gradually increased to approximately 9 million pounds annually. Due to substantial declines in fishing mortality rates since the net limitation, overall stock size and spawning stock biomass have increased significantly. Stocks throughout the state of Florida are healthy, and current levels of fishing effort appear to be sustainable (Chagaris et al. 2014).

Striped Mullet form large schools in estuarine and nearshore waters from October to December. These schools then migrate to offshore spawning areas over the outer continental shelf and slope during the passage of weather fronts from October through February. Typically, young-of-the-year (YOY) Striped Mullet recruit to Florida's estuaries at 20 to 35 mm standard length (SL; Kilby 1949; Futch 1966). Recruitment usually begins in January and continues through April, with peaks in abundance during February and March; however, previous analyses of length-frequency data indicated that recruitment has occurred in Florida's estuaries as early as the end of December.

To monitor year-class strength and to improve the ability to predict future adult Striped Mullet abundances, indices of relative abundance (IOAs) were developed for YOY Striped Mullet recruitment into selected Florida estuaries. Abundance data for YOY

Striped Mullet (≤ 35 mm SL) that were collected in stratified-random 21.3-m seine samples were examined to assess recruitment into six Florida estuaries: Tampa Bay, Charlotte Harbor, northern IRL, Cedar Key, southern IRL, Apalachicola Bay, and northeast Florida. Young-of-the-year Striped Mullet recruited to habitats sampled with 21.3-m seines primarily from January to March. Therefore, these specific months were used to define the respective recruitment seasons for each estuary in subsequent analyses. Separate analyses for river and bay sets were conducted when possible to examine differences in recruitment between the two habitats. Indices were not calculated for estuaries where 21.3-m seines were not deployed or where limited data were available.

Indices of abundance for YOY Striped Mullet on Florida's northwest coast were variable. In Apalachicola Bay, IOAs for YOY Striped Mullet reveal one strong year class in 2001 for riverine habitats and many strong classes from 1998 to 2018 for bay habitats (Figure SP20-16). In Cedar Key, IOAs for YOY Striped Mullet reveal strong year classes in 2006, 2011, and 2020 for riverine habitats and 2006, 2008, and 2014 through 2019 for bay habitats.

In Tampa Bay, IOAs for YOY Striped Mullet show highly variable catch rates. In riverine habitats, 2001, 2006-2007, and 2010-2011 were strong year classes. In bay habitats, only one strong year class was evident in 2010 (Figure SP20-17). In Charlotte Harbor, IOAs for YOY Striped Mullet have also varied without trend in riverine and bay habitats. Several strong year classes were evident in 2001, 2006, and 2010-2011 in riverine habitats, and in bay habitats, 2008 and 2010. The similarity in the patterns of YOY abundance between Tampa Bay and Charlotte Harbor in riverine habitats (high recruitment in 2001, 2006, 2010, and 2011) and bay habitats (high recruitment in 2010) observed for more than 20 years suggests that YOY Striped Mullet recruitment along parts of Florida's Gulf coast may be influenced by factors which operate over regional scales.

Annual IOAs of YOY Striped Mullet in northeast Florida show three strong year classes in 2010, 2011, and 2018 in riverine habitats (Figure SP20-18). Annual IOAs of YOY Striped Mullet in the northern IRL reveal one strong year class in 2001 and two minor peaks in 2005, and 2010 in riverine habitats and 1998, 2000, 2001, 2010, 2015, and 2020 in bay habitats. Since the southern IRL 21.3-m seine sampling was initiated in 2016, the IOAs for YOY Striped Mullet reveal strong year classes in 2018 and 2020 for riverine habitats.

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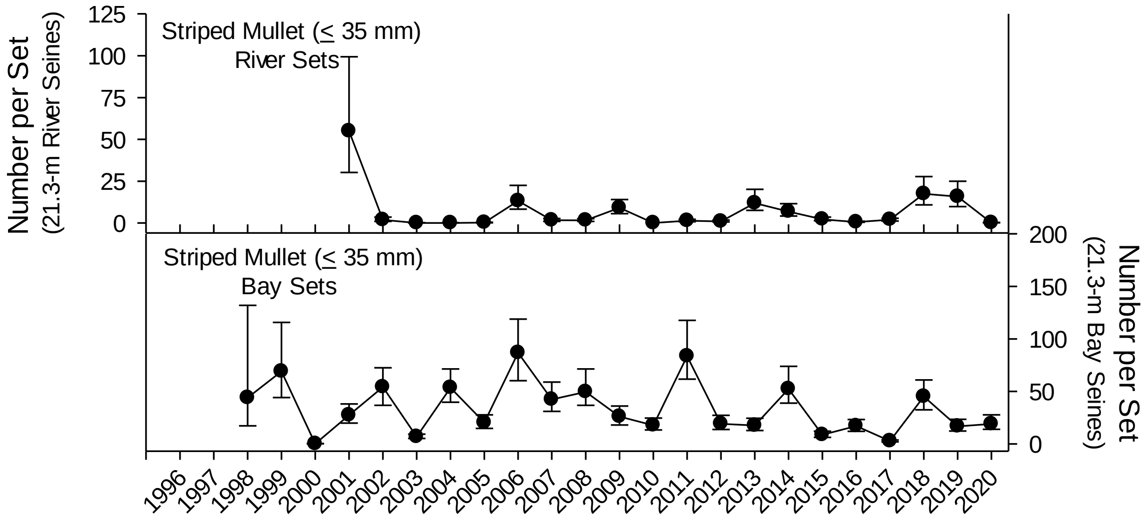
Apalachicola Bay



Cedar Key

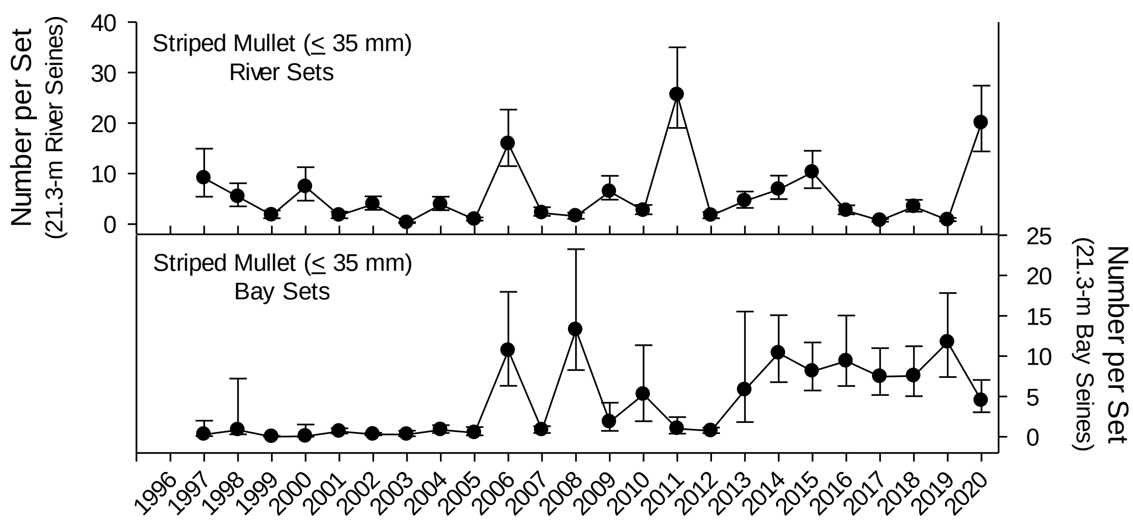
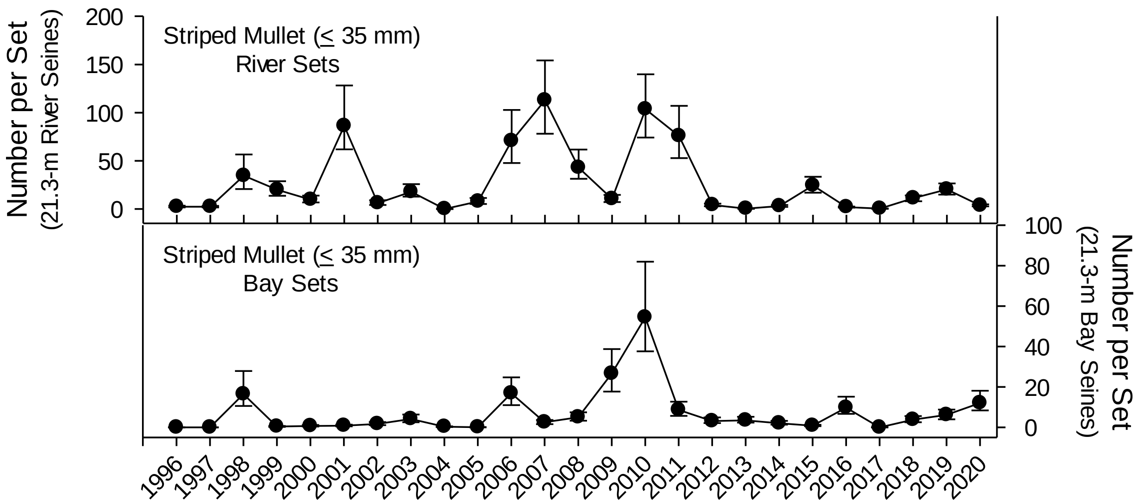


Figure SP20-16. Relative abundance of young-of-the-year Striped Mullet (≤ 35 mm SL) collected in 21.3-m seines between 1997 and 2020 during stratified-random sampling from Apalachicola Bay and Cedar Key. Separate plots for river and bay sets were created to examine differences in recruitment between the two habitats. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales of abundance among plots for different gear deployment techniques and estuaries.

Tampa Bay



Charlotte Harbor

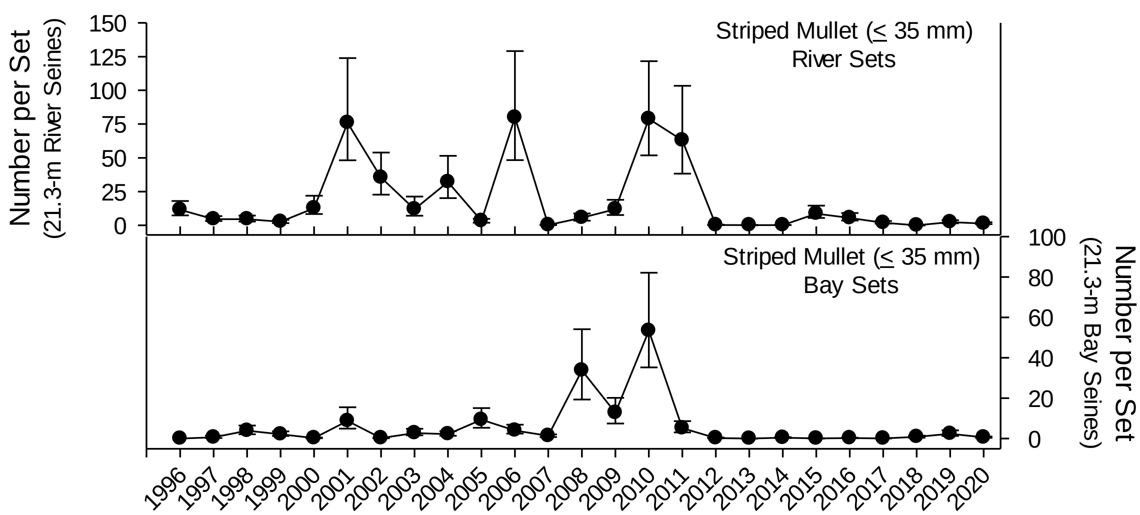
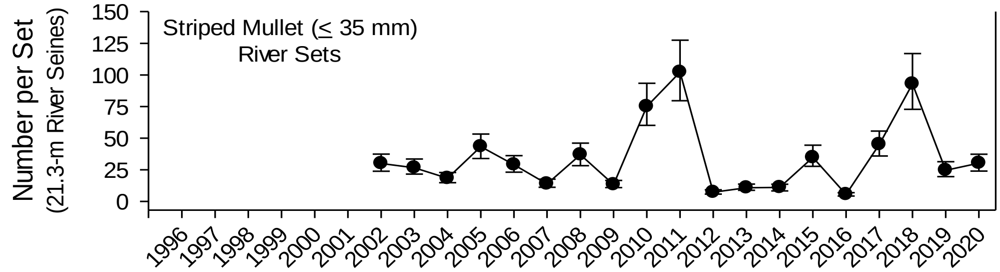


Figure SP20-17. Relative abundance of young-of-the-year Striped Mullet (≤ 35 mm SL) collected in 21.3-m seines between 1996 and 2020 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Separate plots for river and bay sets were created to examine differences in recruitment between the two habitats. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales of abundance among plots for different gear deployment techniques and estuaries.

Northeast Florida



Indian River Lagoon

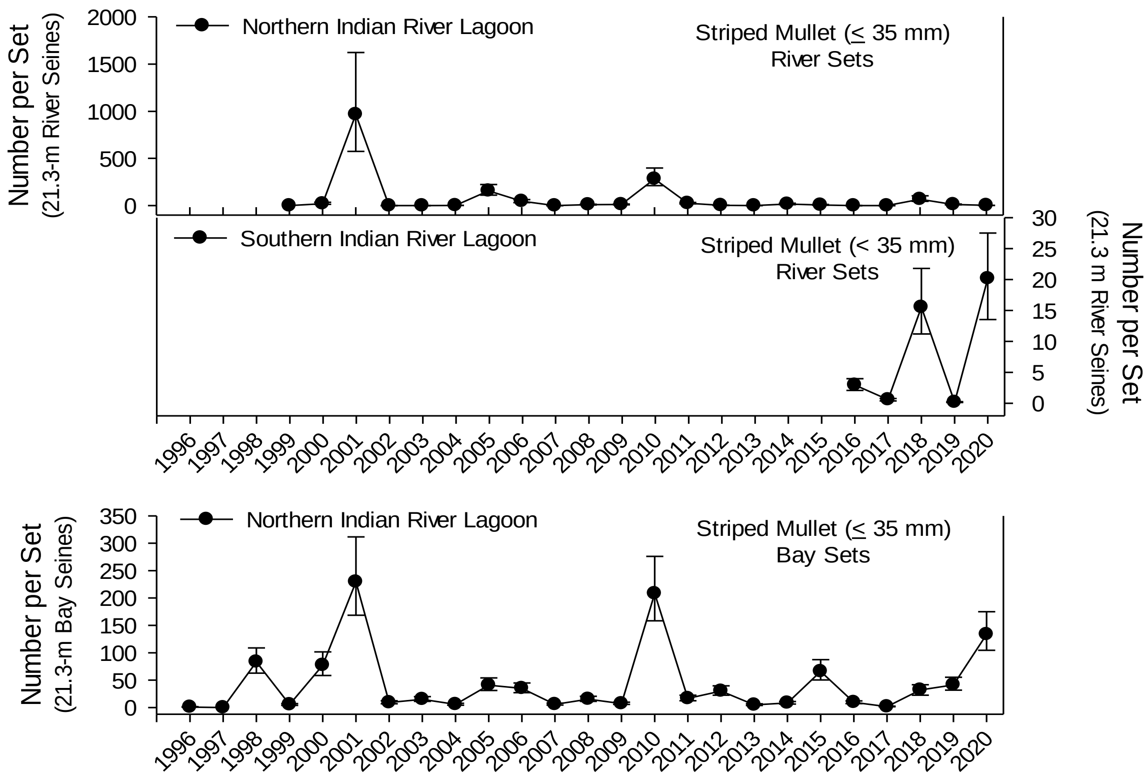


Figure SP20-18. Relative abundance of young-of-the-year Striped Mullet (≤ 35 mm SL) collected in 21.3-m seines between 1996 and 2020 during stratified-random sampling from Northeast Florida and both the northern and southern Indian River Lagoon. Separate plots for river and bay sets were created to examine differences in recruitment between the two habitats. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales of abundance among plots for different gear deployment techniques and estuaries.

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Pinfish, *Lagodon rhomboides*

Pinfish, *Lagodon rhomboides*, is an ecologically and recreationally important sparid found in marine and estuarine waters from Massachusetts to Texas (Bigelow and Schroeder 1953; Caldwell 1957). It is one of the most abundant resident species in estuaries of the northeastern Gulf of Mexico (Hoese and Jones 1963; Hansen 1970; Ogren and Brusher 1977). Densities of Pinfish have been found to be positively correlated to seagrass and drift algae cover (Faletti et al. 2019; Rydene and Matheson 2003). Studies have shown that predation by Pinfish plays a role in the organization of seagrass macro benthic faunal assemblages (Young et al. 1976; Young and Young 1977). Pinfish are a major link between primary and secondary production as individuals >60 mm standard length (SL) consume and digest seagrasses and encrusting epiphytes (Stoner 1980; Weinstein et al. 1982; Montgomery and Targett 1992). Pinfish represent a large percentage of the offshore movement of nearshore nutrients and carbon to reef fish stocks in the Gulf of Mexico (Nelson et al. 2013). Pinfish of all sizes are commonly targeted by anglers for use as bait for recreationally important species such as Sailfish (*Istiophorus platypterus*), Red Drum (*Sciaenops ocellatus*), Spotted Seatrout (*Cynoscion nebulosus*), Southern Flounder (*Paralichthys lethostigma*), Common Snook (*Centropomus undecimalis*), and Gag Grouper (*Mycteroperca microlepis*).

To monitor year-class strength and improve the ability to predict future Pinfish abundances, indices of relative abundance (IOAs) were developed for young-of-the-year (YOY) Pinfish recruitment into selected Florida estuaries. Abundance data for YOY Pinfish ≤ 80 mm SL that were collected in stratified-random 21.3-m seine samples were examined to assess recruitment into six Florida estuaries: Tampa Bay, Charlotte Harbor, northern Indian River Lagoon (IRL), Cedar Key, Apalachicola Bay, and northeast Florida. Young-of-the-year Pinfish recruited to habitats sampled with 21.3-m seines primarily from January through June and IOAs were calculated using catch data from these months only. This time period coincides with the published recruitment period for this species (Nelson 1998). The maximum size that individuals of YOY cohorts attain by June is 80 mm SL (Nelson 1998). Indices of abundance for YOY Pinfish were not calculated for the southern IRL where 21.3-m seines were not included as a sampling gear. Data from stratified-random 183-m haul seines were used to develop IOAs for sub-adult/adult fish (≥ 100 mm SL) collected throughout the year for seven Florida estuaries: Tampa Bay, Charlotte Harbor, northern Indian River Lagoon (IRL), southern Indian River Lagoon, Cedar Key, Apalachicola Bay, and northeast Florida. All IOAs were calculated using data beginning in 1996, however estuaries varied in the specific time period sampled. Due to historical changes in sampling design and available habitat, only consistently sampled zones and habitats (bay or river) in each estuary were included to generate annual IOAs.

Annual IOAs of Pinfish in Apalachicola Bay and Cedar Key varied with no distinct trends (Figure SP20-19). Annual IOAs of YOY Pinfish in bay habitats in Apalachicola Bay were low in 1998 and 1999 and have remained at higher but variable levels until 2019 when recruitment declined to nearly pre-2000 levels before slightly increasing again in 2020. In Cedar Key bay habitats, annual IOAs were low in 1996 through 1999 before increasing to a peak in 2000. After 2000, recruitment was variable with highs in 2004, 2007, 2018, and 2020 and lows in 2005, 2013, and 2019. In Cedar Key, recruitment patterns of Pinfish in riverine habitats have been stable but low since a large peak in recruitment in 2011. The trend of annual IOAs of sub-adult and adult Pinfish in Apalachicola Bay was variable but stable from 1998 to 2020, with the highest relative abundance occurring in 2007 and 2010 and the lowest in 2014 and 2019. In Cedar Key, annual IOAs for sub-adult and adult Pinfish displayed a downward trend from 1998 to 2006. Abundances fluctuated from 2006 to 2016, and became more stable at relatively low abundances with a slight downward trend detected from 2017 to 2020.

Annual IOAs for Pinfish in estuaries on the southwest coast of Florida (Tampa Bay and Charlotte Harbor) exhibited similar trends in abundance for YOY fish in bay habitats (SP20-20) and represent the greatest abundance of all Florida estuaries sampled. Recruitment of YOY fish was variable between 1996 and 2010 with peaks in recruitment evident in 2001 and 2010 for both estuaries. The peak in recruitment in 2010 was also observable in riverine habitats of Tampa Bay. Since the peak in 2010, recruitment of YOY Pinfish has declined and remained consistently low in riverine habitats of Tampa Bay as well as in bay habitats of Charlotte Harbor. Recruitment of YOY pinfish in bay habitats of Tampa Bay have remained relatively low since 2015. Annual IOAs for sub-adult and adult Pinfish from Tampa Bay and Charlotte Harbor were relatively stable between 1996 and

2007, increasing sharply in 2008 in both estuaries. Since 2008, IOAs for sub-adult and adult Pinfish have remained high in Tampa Bay. In 2018, the relative abundance of sub-adult and adult Pinfish in Charlotte Harbor declined to pre-2008 levels and coincided with a persistent 18-month Red Tide event in the area in 2018 and 2019. Following this decline, however, was a large increase in pinfish abundance with 2019 and 2020 having the highest abundance estimates during the time series. The abundance estimate for sub-adult/adult pinfish in Charlotte Harbor in 2020 was nearly double that of 2019's estimate.

Annual IOAs for Pinfish in estuaries on the east coast of Florida suggest a possible link between recruitment and sub-adult/adult abundance (Figure SP20-21). In northeast Florida, recruitment of YOY Pinfish in river systems was typically low except for strong year classes in 2010, 2011, 2013, and 2019. The strong year classes of 2010 and 2011 translated to a peak in sub-adult and adult Pinfish abundance in 2011, however no peaks were observed corresponding to the 2013 and 2019 peaks. Sub-adult and adult Pinfish IOAs in northeast Florida have remained relatively low since 2012. Recruitment of YOY Pinfish in northern IRL was variable from 1998 to 2010 with peaks in 2003 and 2010. Since 2010, recruitment has remained relatively low and are some of the lowest abundances recorded over the past 23 years of sampling. Sub-adult and adult Pinfish IOAs for northern IRL were highest in 2004 and 2011 which coincide with high levels of YOY recruitment during the previous year. Since peaking in 2011, sub-adult and adult Pinfish relative abundance has dropped to historically low levels in northern IRL. Sub-adult and adult Pinfish IOAs in southern IRL have typically been lower than those of northern IRL over the course of the time series, but have been nearly identical to the lows observed in northern IRL in recent years.

Length-frequency data collected across all years sampled with 183-m haul seines indicate that this gear provides valuable information on sub-adult and adult Pinfish (Figure SP20-22). Length-frequency distributions were generally unimodal in Tampa Bay, Charlotte Harbor, Cedar Key, northeast Florida, and northern/southern IRL, while in Apalachicola Bay the distribution was bimodal. Sub-adult and adult Pinfish become susceptible to capture in 183-m haul seines at ~50 mm SL. The Gulf estuaries with unimodal length frequencies peaked around 70-80 mm SL, while the northern IRL and northeast Florida peaked between 100 and 120 mm SL.

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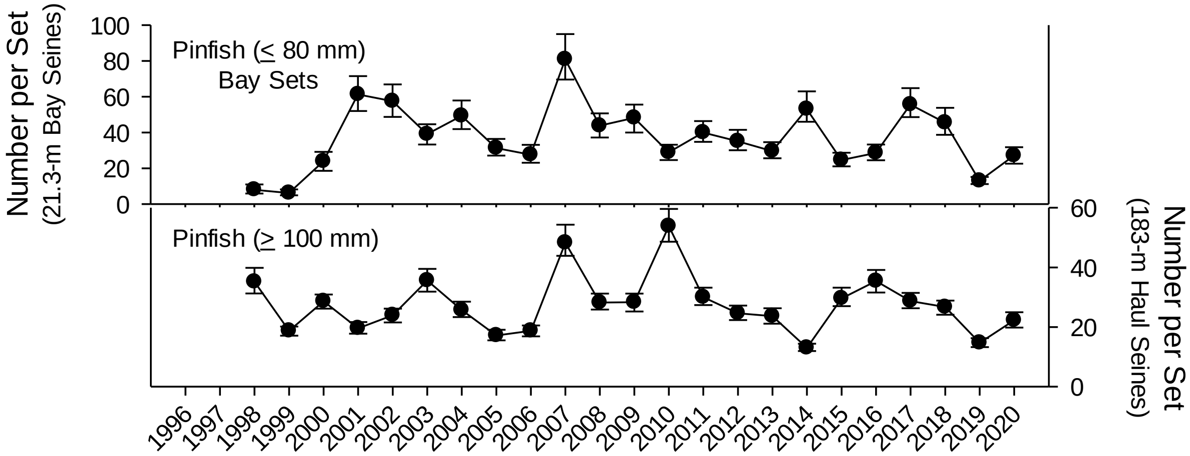
Apalachicola Bay



Cedar Key

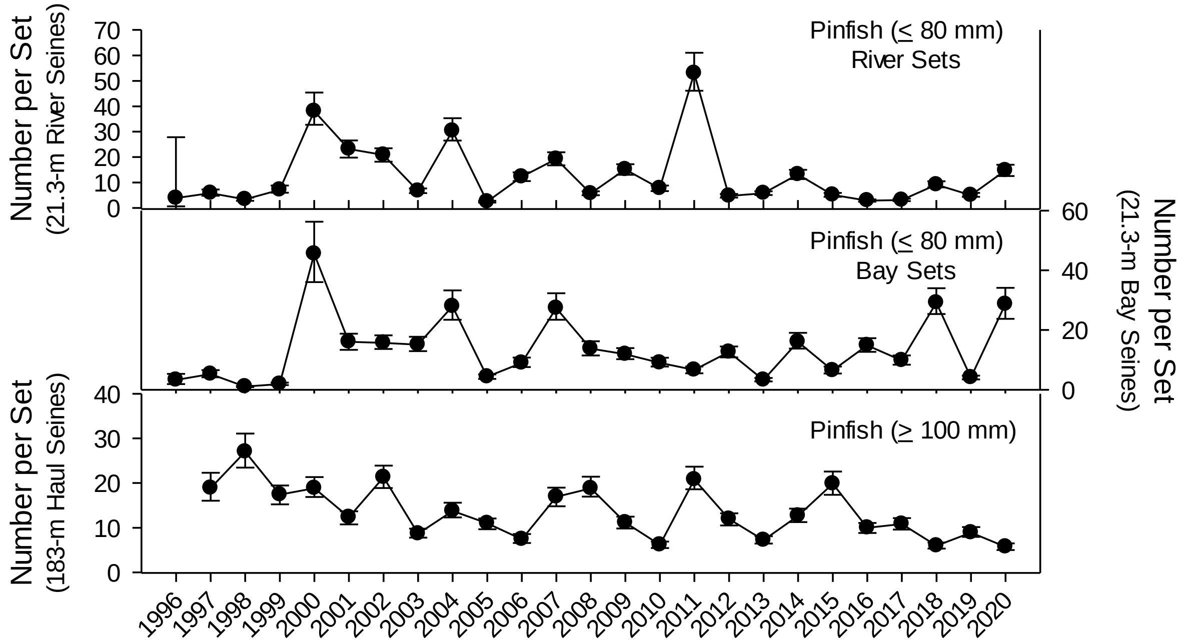
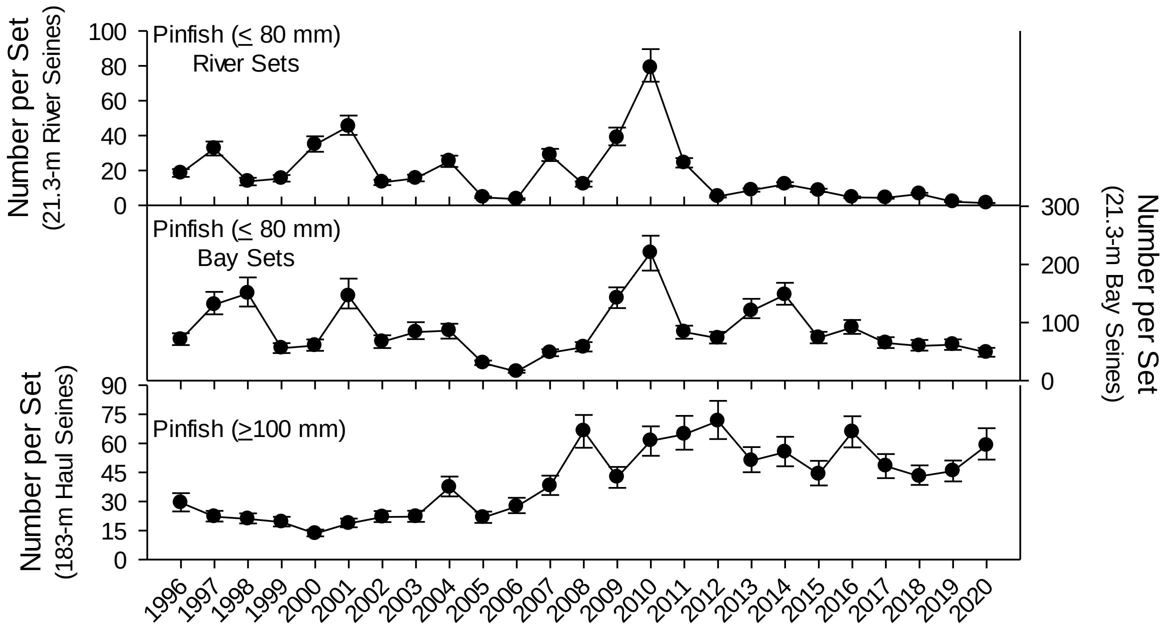


Figure SP20-19. Relative abundance of young-of-the-year Pinfish (≤ 80 mm SL) collected in 21.3-m seines and of reproductively mature Pinfish (≥ 100 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling of Apalachicola Bay and Cedar Key. Points represent the median estimate while the vertical bars represent the 25^{th}-75^{th} percentiles. Note different scales of abundance among plots for different gears and estuaries.

Tampa Bay



Charlotte Harbor

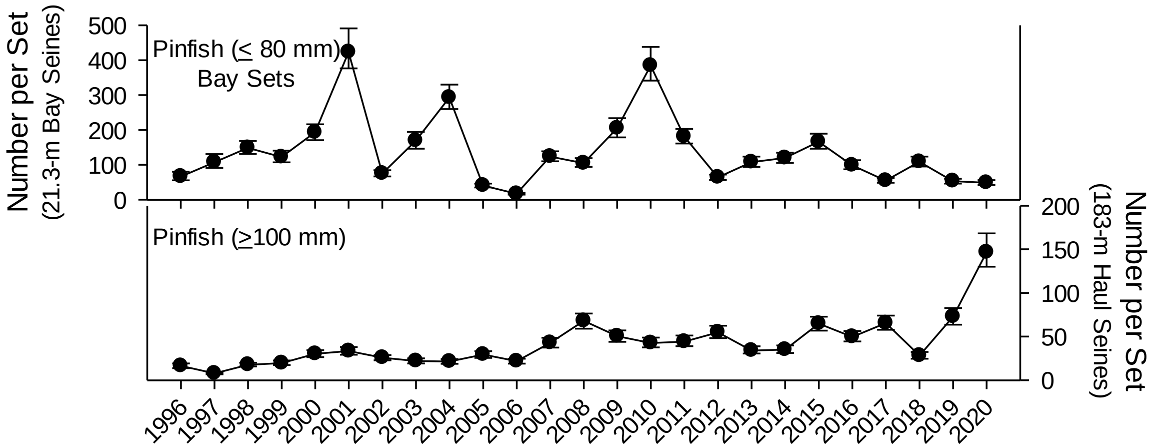
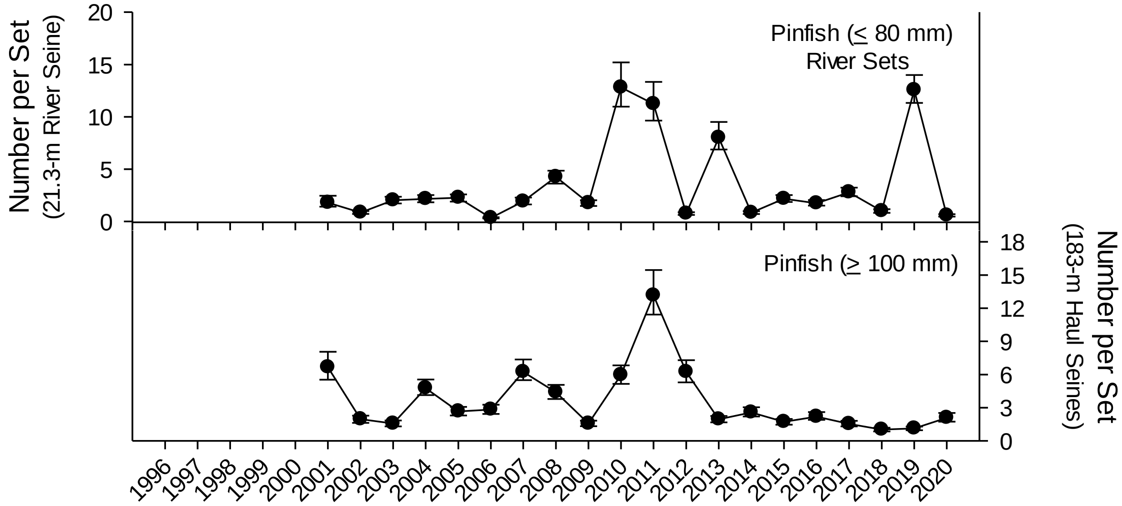


Figure SP20-20. Relative abundance of young-of-the-year Pinfish (≤ 80 mm SL) collected in 21.3-m seines and of reproductively mature Pinfish (≥ 100 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales for estimates from 21.3-m and 183-m seines.

Northeast Florida



Indian River Lagoon

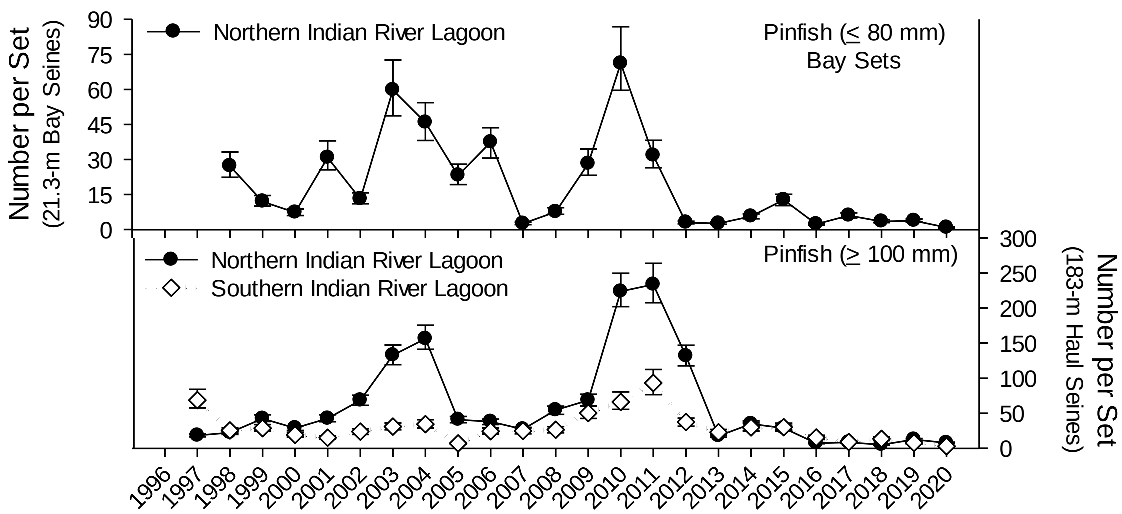


Figure SP20-21. Relative abundance of young-of-the-year Pinfish (≤ 80 mm SL) collected in 21.3-m seines and of reproductively mature Pinfish (≥ 100 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Northeast Florida and the Indian River Lagoon. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales for estimates from 21.3-m and 183-m seines.

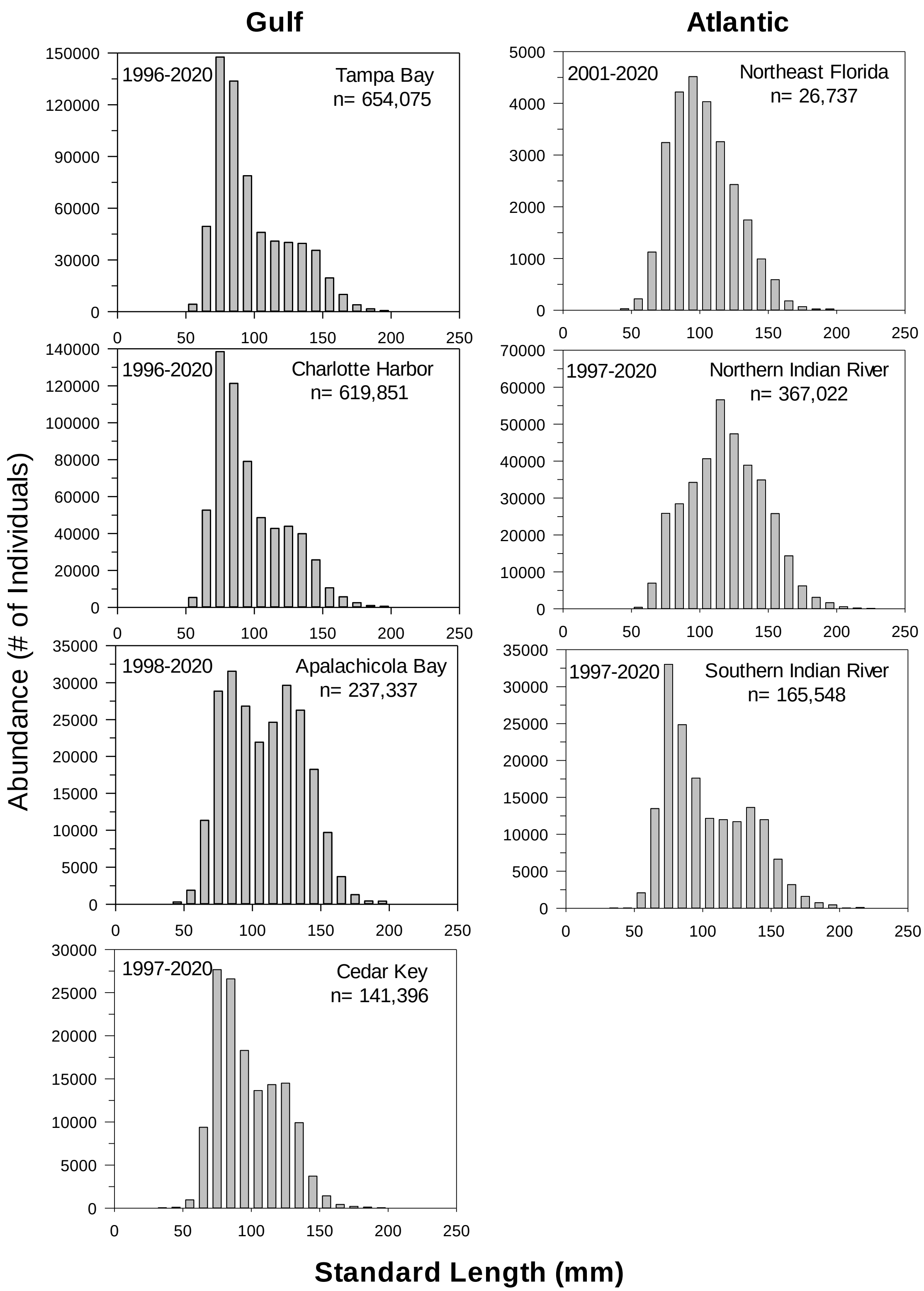


Figure SP20-22. Length frequency diagrams of Pinfish collected in 183-m haul seines. All lengths are standard length (SL). Note different scales and years of collection.

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Common Snook, *Centropomus undecimalis*

Common Snook, *Centropomus undecimalis*, are found in estuaries, adjacent rivers, and in nearshore waters of the tropical and subtropical western Atlantic and Gulf of Mexico (Gilmore et al. 1983; Rivas 1986; Winner et al. 2010). This species supports an important recreational fishery in Florida and is one of the most popular gamefish in state waters. There has been no legal commercial harvest of Common Snook in Florida since the State Legislature declared it a gamefish in 1957 and prohibited its sale. Fishing effort targeting Common Snook has increased consistently over the past 30 years on both coasts, but more so on Florida's Gulf coast (Munyandorero et al. 2020). While the overall harvest of Common Snook has declined since the mid-1990s, the numbers of fish caught and released has remained consistently high over the past 25 years (Munyandorero et al. 2020). Recent estimates of transitional spawning potential ratios were above the 40% management goal for both coasts (52% on Atlantic coast and 54% on the Gulf coast), therefore both stocks are currently meeting agency management objectives (Munyandorero et al. 2020). In response to cold weather induced fish kills that occurred statewide during January 2010, the FWC issued executive orders that prohibited the harvest of Common Snook through August 31, 2010, and subsequent executive orders extended the closure through August 31, 2011 (State of Florida Executive Order No. E0 10-45). At the June 2011 Florida Fish and Wildlife Conservation Commission Meeting, Commissioners concluded that the Atlantic coast stock was less severely impacted by cold weather than the Gulf coast stock. Based on this information, the Commissioners ruled to reopen Common Snook harvest on September 1, 2011 in Atlantic waters, but Gulf coast waters remained closed through August 31, 2013. Following a red tide event that persisted in the Gulf of Mexico for 16 months (2017-2019), the FWC closed the fishery throughout southwest Florida in August 2018 and it is slated to remain closed through May 2022.

In Florida, Common Snook populations from the Atlantic and Gulf coasts have been genetically identified as separate stocks and are managed separately (Tringali and Bert 1996; Taylor et al. 1993). Histological evidence shows that Common Snook are protandric hermaphrodites; they begin life as males and some become females after maturation (Taylor et al. 2000). Males typically become sexually mature at ~200 mm standard length (SL) and females at ~680 mm SL. The spawning season for Common Snook extends at least six months; April through September on the Gulf coast and April through October on the Atlantic coast (Taylor et al. 1998).

To monitor year-class strength and to improve the ability to predict future adult Common Snook abundances, the FIM program developed indices of relative abundance (IOAs) of young-of-the-year (YOY) Common Snook recruitment into selected Florida estuaries. Abundance data for YOY Common Snook ≤ 50 mm SL collected in stratified-random 21.3-m seine samples were examined to assess recruitment into three Florida estuaries: Tampa Bay and Charlotte Harbor on the Gulf coast and the northern and the southern Indian River Lagoon (IRL) on the Atlantic coast. Although collected in limited numbers throughout the year, YOY Common Snook were primarily captured in riverine/creek habitats sampled with 21.3-m seines during their recruitment windows into each estuary: August through November in Tampa Bay, August through February in Charlotte Harbor, July through February in the northern IRL, and August through February in the southern IRL. Data collected from August through December of each year were combined with data from January and February of the following year to create a biological year. Only data from this habitat and these primary time periods were used in developing IOAs for YOY Common Snook.

The FIM program also monitored the relative abundances of large juvenile and adult Common Snook in Florida estuaries within the range of this species. Individuals between 200 mm and 609 mm SL were included in the IOA since they are typically reproductively mature males and serve as a “pre-recruitment” indicator for the fishery. The upper limit of 609 mm SL used in this IOA corresponds to the lower regulatory minimum size of 711 mm total length (TL). Data from stratified-random 183-m haul seines were used to develop IOAs for reproductively mature Common Snook within Tampa Bay, Charlotte Harbor, Cedar Key, northern IRL, and southern IRL. These IOAs were derived by including all Common Snook between 200-609 mm SL collected between January and December from 1996-2020.

Annual IOAs of YOY Common Snook in Tampa Bay have been fairly stable, albeit low, between 1996 and 2020 with the exception of strong year classes evident in 1999, 2012, and 2013 (Figure SP20-23). After two consecutive years of peak juvenile recruitment (2012 and 2013) in Tampa Bay, IOAs of YOY Common Snook declined significantly to a level more consistent with previous years until a peak in 2017. Annual IOAs of pre-fishery adult Common Snook (200-609 mm SL) on Florida’s west coast varied within each estuary. In Tampa Bay, adult Common Snook relative abundance increased gradually from 1996 through 2003, followed by a decline in 2004 and remained stable through 2007. In 2008, relative abundance peaked again followed by a sharp decline in 2009 through 2011. Adult Common Snook relative abundance in Tampa Bay has increased each year since 2011 with a peak in abundance observed in 2018. Sampling for YOY Common Snook in Charlotte Harbor began in 2016. Annual IOAs of YOY Common Snook in Charlotte Harbor peaked in 2017 before a dramatic decline in 2018, coinciding with the red tide event in Southwest Florida that persisted from 2017 to 2019 (Figure SP20-23). Annual IOAs of pre-fishery adult Common Snook in Charlotte Harbor remained stable from 1996 through 2009, with slight peaks in 2001 and 2002. After a decline in the IOAs of pre-fishery adult Common Snook in 2010 (concurrent with a cold-kill event), abundances increased from 2011 through 2017, with a slight decline in 2018 and 2019 before rebounding in 2020 to the highest abundance observed in 20 years (Figure SP20-23). In the Cedar Key estuary, Common Snook catches were zero or near-zero between 1997 and 2016 (Figure SP20-23). These low levels of abundance in Cedar Key waters are consistent with the historical range of this temperature-sensitive species in Florida (Taylor et al. 1993, Winner et al. 2010). However, recent effects of climate change (i.e., increasing water temperatures, more mild temperature winters) have resulted in an obvious range extension for Common Snook on Florida’s Gulf coast. Annual IOAs of pre-fishery adult Common Snook in Cedar Key increased measurably in 2017 and have continued to rise each subsequent year (Figure SP20-23).

Annual IOAs of YOY Common Snook in northern IRL have fluctuated substantially beginning in 1999 (Figure SP20-24). Abundance peaked in 1999 followed by a decline through 2004. In 2004, abundance was substantially lower than any years prior or since. This year of extremely low recruitment may have resulted from displacement due to multiple hurricanes and not an actual decrease in abundance within the riverine habitats of this estuarine system. Young-of-the-year recruitment increased after 2004 through

2007. In 2009 and 2010 there was another decline followed by increasing abundance from 2011 through 2013. Similar to the Tampa Bay estuarine system, YOY recruitment in the northern IRL decreased markedly in 2014 to a more historically average level and has varied without trend in subsequent years. Annual IOAs of pre-fishery adult Common Snook (200-609 mm SL) remained stable from 1997 through 2009 in the northern IRL with a slight peak in 2004. Abundance in the northern IRL declined sharply beginning in 2010 (concurrent with a cold kill event), remained low for five years, increased in 2015, and decreased slightly through 2017. Abundance has remained stable and on a slight increase from 2018 to 2020. Sampling for YOY Common Snook in the southern IRL began in 2016. Annual IOAs of YOY Common Snook in the southern IRL peaked in 2016, before a sharp decline in 2017 and 2018. In 2020, relative abundance increased to the highest observed numbers of the five-year time frame. Annual IOAs of pre-fishery adult Common Snook in the southern IRL were highest in 1997 and declined each year through 2002. Relative abundance remained stable through 2009; however, as was observed in the other estuaries analyzed, abundance decreased even further in 2010 (i.e., cold kill event). Relative abundance remained low through 2012, and increased through 2014, followed by six years of decline from 2015 through 2020 (Figure SP20-24).

Length-frequency data collected with 183-m haul seines indicate that this gear provides valuable information on larger juvenile and adult Common Snook (Figure SP20-25). Length-frequency distributions for Tampa Bay and Charlotte Harbor were unimodal with a peak in distribution at 380-500 mm SL. Similarly, there was a unimodal pattern within the larger juvenile and adult Common Snook length frequency distributions for the northern and southern Indian River Lagoon sampled areas. There was no indication that the number of individuals declined rapidly upon entering the legal slot-limit (609-699 mm SL on the Gulf coast and 60 677 mm SL on the Atlantic coast).

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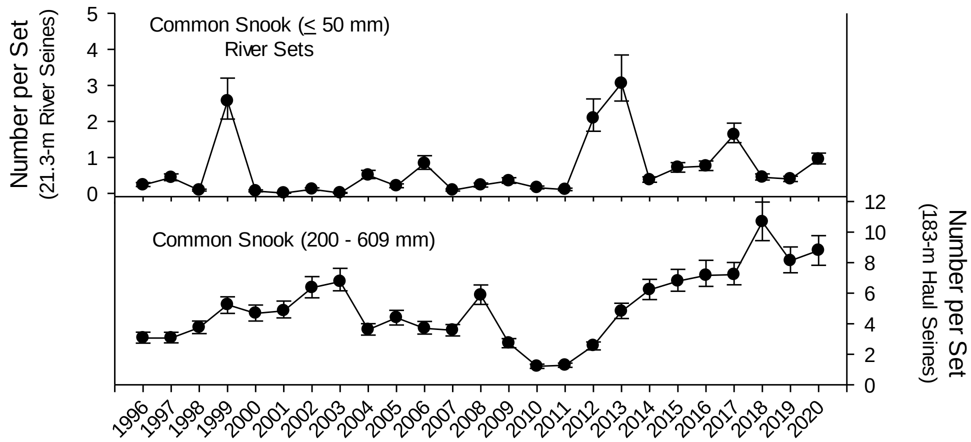
Tampa Bay



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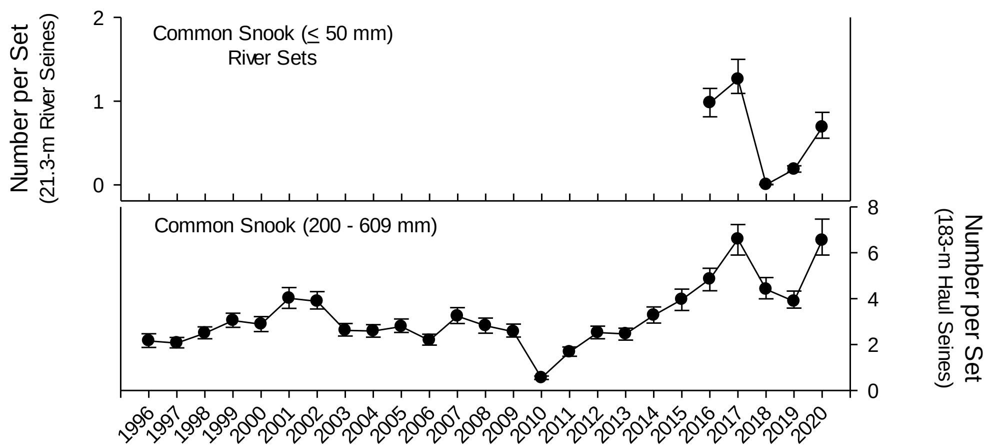


Cedar Key

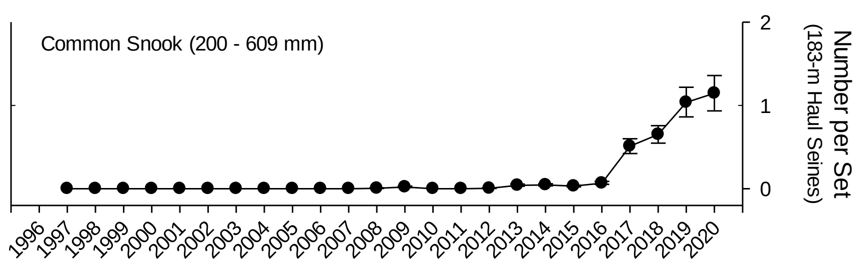
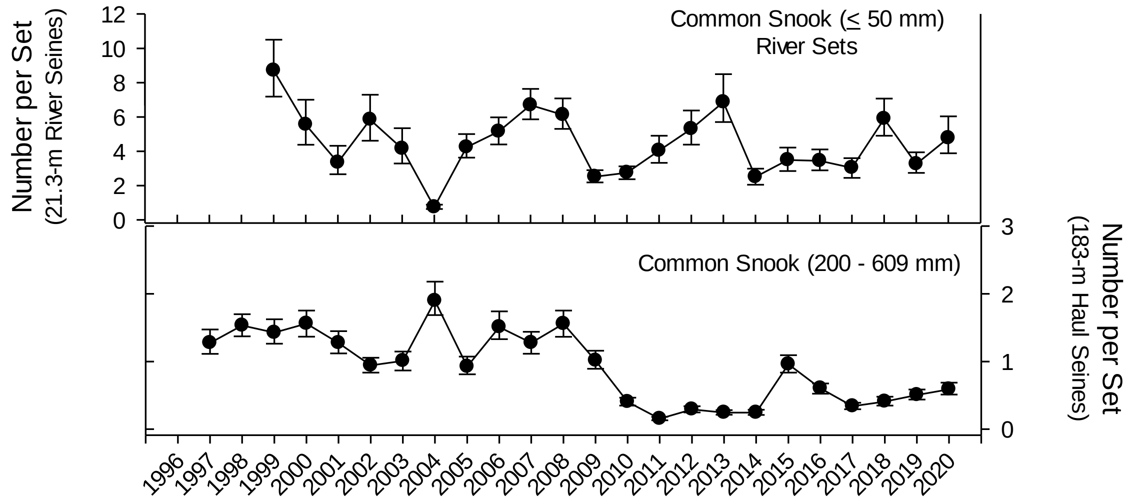


Figure SP20-23. Relative abundance of young-of-the-year Common Snook (≤ 50 mm SL) collected in 21.3-m seines and pre-fishery adult Common Snook (200 - 609 mm SL) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from three Florida estuarine systems. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales of abundance among plots for different gears and estuaries.

Northern Indian River Lagoon



Southern Indian River Lagoon

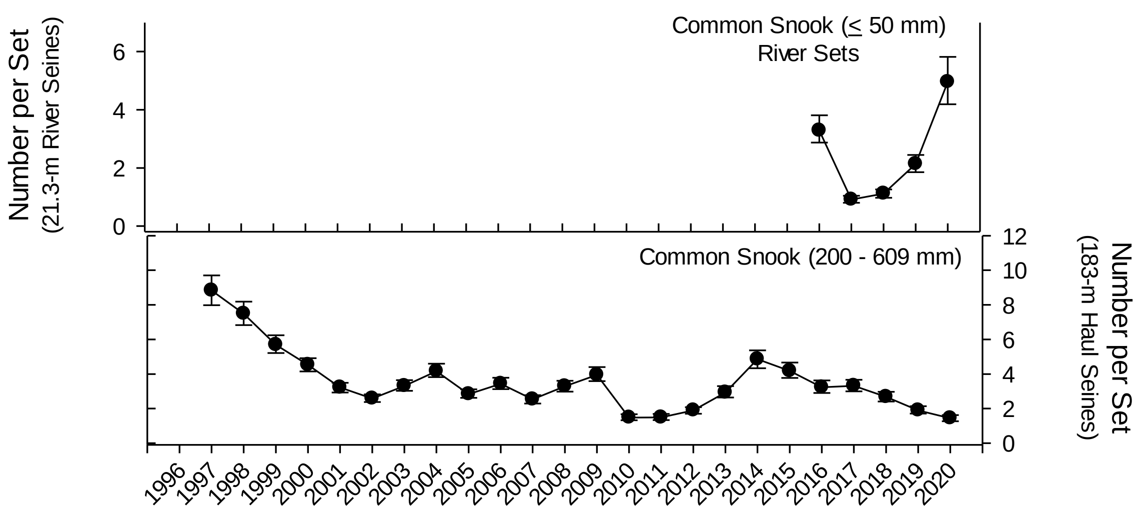


Figure SP20-24. Relative abundance of young-of-the-year Common Snook (≤ 50 mm SL) collected in 21.3-m seines and pre-fishery adult Common Snook (200 - 609 mm SL) collected in 183-m haul seines between 1997 and 2020 during stratified-random sampling from the Indian River Lagoon system. Points represent the median estimate while the vertical bars represent the 25^{th}-75^{th} percentiles. Note different scales of abundance among plots for different gears and estuaries.

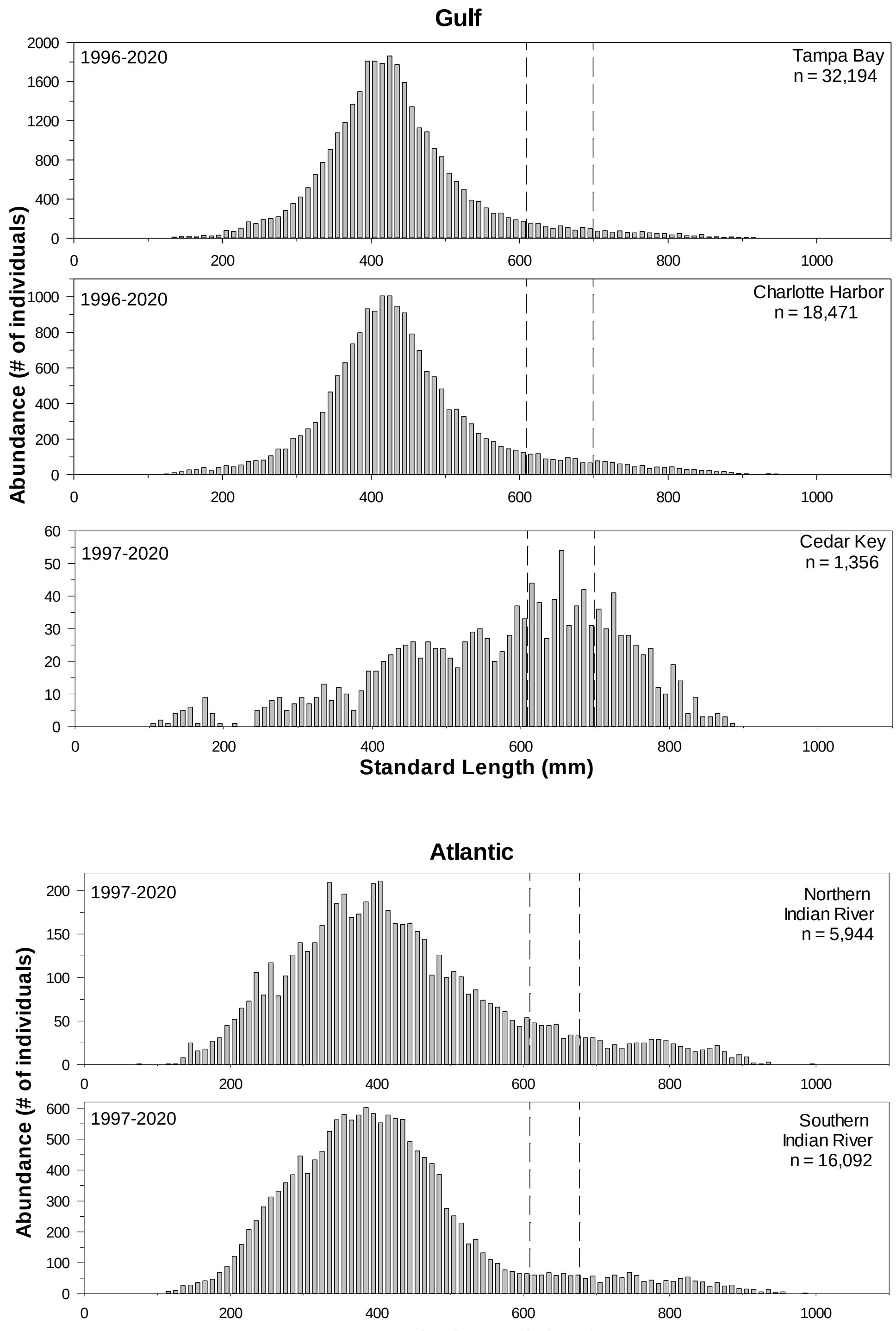


Figure SP20-25. Length frequency diagrams of sub-adult and adult Common Snook collected in 183-m haul seines. All lengths are standard length (SL). Area between dashed lines denote the recreational slot limit for this species (609 to 699 mm SL on the Gulf coast and 609 to 677 mm SL on the Atlantic coast). Note different scales and years of collection.

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Blue Crab, *Callinectes sapidus*

Blue Crab, *Callinectes sapidus*, support valuable commercial and recreational fisheries along the Gulf of Mexico (Gulf) and Atlantic coasts of Florida. From 1996 to 2018, commercial landings on Florida's Gulf and Atlantic coasts averaged 6.6 and 3.3 million pounds per year and were worth an estimated 6.7 and 4.1 million dollars, respectively (NMFS 2018). Following the implementation of the Florida net limitation referendum (July 1, 1995), which eliminated the use of entangling nets within three miles of the Atlantic coast and nine miles of the Gulf coast, concerns were raised that Blue Crab populations might experience increased fishing pressure from former net fishers. Even though annual commercial landings in the Gulf peaked in 1998 at almost 13 million pounds, catch-per-unit effort was already beginning to decline (Steele and Bert 1998). Landings have decreased over the years, with the lowest commercial landings of Blue Crab occurring in 2008 for the Gulf coast and 2014 for the Atlantic coast (Addis et al. 2020, NMFS 2018). Commercial fishing effort for Blue Crab has been limited in recent years by restricted species permits although there are no quotas for Blue Crab landings. The annual recreational harvest of Blue Crab is not currently known or surveyed, so the total catch may be much higher than the recorded commercial landings. The two most recent Blue Crab stock assessments for Florida indicate that Blue Crabs are highly resilient to fishing pressure and despite a generally decreasing trend in fishing mortality, abundances have remained relatively stable since the 1990's, (Murphy et al. 2007; Cooper et al. 2013).

Blue Crabs are an integral part of estuarine ecosystems in Florida, whether scavenging carrion or preying upon young-of-the-year (YOY) fishes, mollusks, and crustaceans. They play a valuable role in controlling populations of other estuarine species. In areas with depleted Blue Crab populations, mollusks that graze on *Spartina alterniflora* can become overpopulated and contribute to salt marsh die-offs (Sillman and Bertness 2002). Blue Crab are prey for important sportfish species such as Black Drum (Simmons and Breuer 1962), Red Drum (Gunter 1945; Scharf and Schlicht 2000), Common Snook (Blewett et al. 2006), and Cobia (Meyer and Franks 1996). In addition to predation and harvest by humans, Blue Crab populations are affected by a myriad of other factors such as freshwater inflows (Wilber 1994; Flaherty and Guenther 2011), pollution, disease, and habitat alteration. Spawning in Florida generally occurs from March through October with some limited spawning reported during winter months (Steele and Bert 1994).

To monitor year-class strength and improve the ability to predict future adult Blue Crab abundances, indices of relative abundance (IOAs) were developed for YOY Blue Crab in selected Florida estuaries. Abundance data for YOY Blue Crab (≤ 80 mm carapace width [CW]; Archambault et al. 1990; Steele and Bert 1994) collected in stratified-random 21.3-m seine samples were examined to assess recruitment into six Florida estuaries: Apalachicola Bay, Cedar Key, Tampa Bay, Charlotte Harbor, Northeast Florida, and northern Indian River Lagoon (IRL). Young-of-the-year Blue Crabs were collected with 21.3-m seines during all months, but length-frequency histograms indicate they were primarily collected from August through March. These months were therefore used to define the recruitment seasons for each estuary in subsequent analyses. Data collected from August through December of each year were combined with data from January through March of the following year to create a biological year of data. The IOA for 2020 therefore only included data from August through December 2020. Separate analyses for river and bay sets were conducted when possible to examine differences in recruitment between the two habitats. Although sampling with 21.3-m seines began earlier in northern IRL, YOY Blue Crab IOAs were only calculated for data after 1997 for bay seines and 2000 for river seines, following the addition of spatial zones that yielded adequate numbers of YOY Blue Crab for analyses. Indices were not calculated for estuaries where 21.3-m seines were not deployed or where limited time series data were available.

The FIM program also monitored the abundance of adult Blue Crab (> 80 mm CW) within these same Florida estuaries (including southern IRL) using stratified-random 183-m haul seines. Note, however, that some individuals classified as adults (> 80 mm CW) may still have been reproductively immature as a result of individual variation in growth rates and timing of maturity (Archambault et al. 1990; Steele and Bert 1994).

The trends in annual IOAs of Blue Crab on Florida’s northwest coast varied between estuaries (Figure SP20-26). Annual IOAs of YOY Blue Crab in both riverine and bay habitats of Apalachicola Bay were relatively stable with both showing a peak in 2006. Annual IOAs of adult Blue Crab in Apalachicola Bay have remained relatively low and stable with peaks of abundance observed in 1998 and 2006. In Cedar Key, relative abundance of YOY Blue Crab in riverine habitats peaked in 1999 and, after declining in 2000, remained at lower but stable levels until an increase in abundance in 2020. Young-of-the-year Blue Crab abundance in bay habitats of Cedar Key were relatively stable with peaks of abundance occurring in 1998-1999, 2006, 2010, 2017, and 2019. Annual IOAs of adult Blue Crab in Cedar Key peaked in 1998, similar to the peak observed in Apalachicola Bay, and have varied without trend since 1999.

Annual IOAs of YOY Blue Crab in riverine habitats of Tampa Bay have remained relatively stable with a peak of abundance in 2010 while YOY Blue Crab in bay habitats of Tampa Bay have remained relatively stable since 1996 (Figure SP20-27). Adult Blue Crab abundances in Tampa Bay peaked in 1996 and 1998 and varied without trend from 1999-2020. Annual IOAs of YOY Blue Crab in Charlotte Harbor indicated strong year classes in 1998, 2000, 2003, 2010, and 2012 for riverine habitats, and 1998, 2003, and 2017 in bay habitats. Adult Blue Crab abundance in Charlotte Harbor peaked in 1998-1999 and have varied without trend since 2000.

Annual IOAs of Blue Crab on Florida's Atlantic coast varied by estuary and year (Figure SP20-28). Annual IOAs of YOY Blue Crab in northeast Florida peaked in 2003. There was a gradual increase in abundance observed between 2013-2018 which was followed by a decline in abundance in 2019 and 2020. Adult Blue Crab abundances in northeast Florida have been variable since 2001. There was a peak in abundance in 2007 that was followed by a decline until 2010; abundances have varied without trend since. Annual IOAs of YOY Blue Crab in riverine portions of the northern IRL peaked in 2006 and 2010-2011 before declining to consistently lower levels of abundance from 2012-2020. Young-of-the-year IOAs from bay habitats of the northern IRL have been relatively stable with a peak in abundance in 2018 followed by a return to lower levels in 2019 and 2020. Annual IOAs for adult Blue Crab in the northern and southern IRL have been relatively low but stable with a peaks in abundance in 2005 in the northern IRL and in

2006 in the southern IRL.

Length-frequency data collected with 183-m haul seines indicate that this gear provides valuable information on adult Blue Crab in Florida estuaries (Figure SP20-29). Length-frequency distributions for Tampa Bay, Charlotte Harbor, and northern IRL were unimodal with the primary range of Blue Crab sizes between ~70-150 mm CW, while in Cedar Key, the distribution favored smaller Blue Crab (~50-80 mm CW). The size distributions for Apalachicola Bay, Northeast Florida, and southern IRL were similar but bimodal, with modes occurring at ~50-70 mm CW and ~120-160 mm CW.

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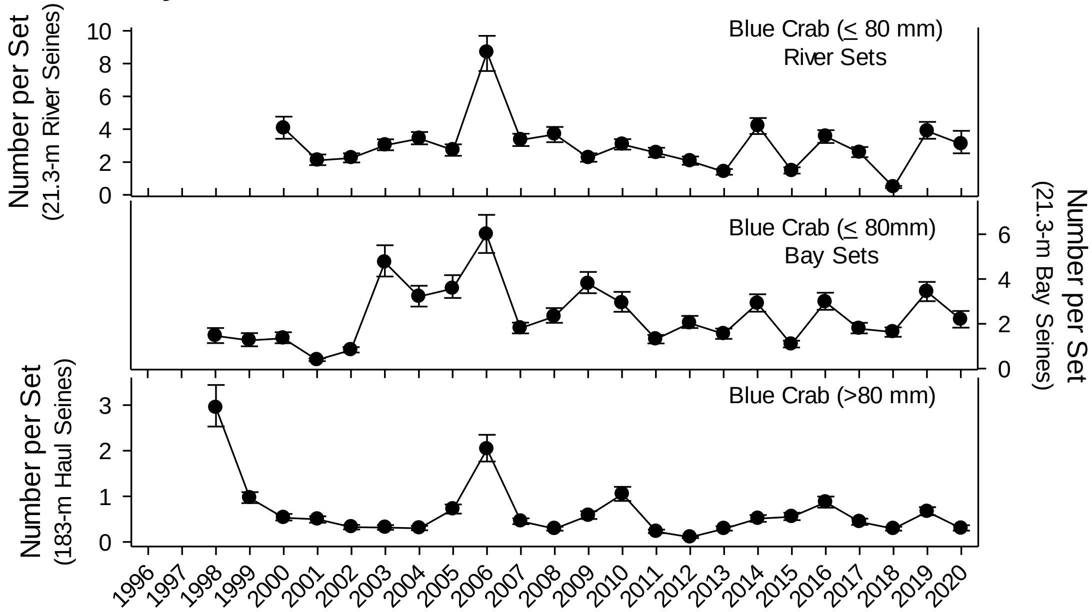
Apalachicola Bay



Cedar Key

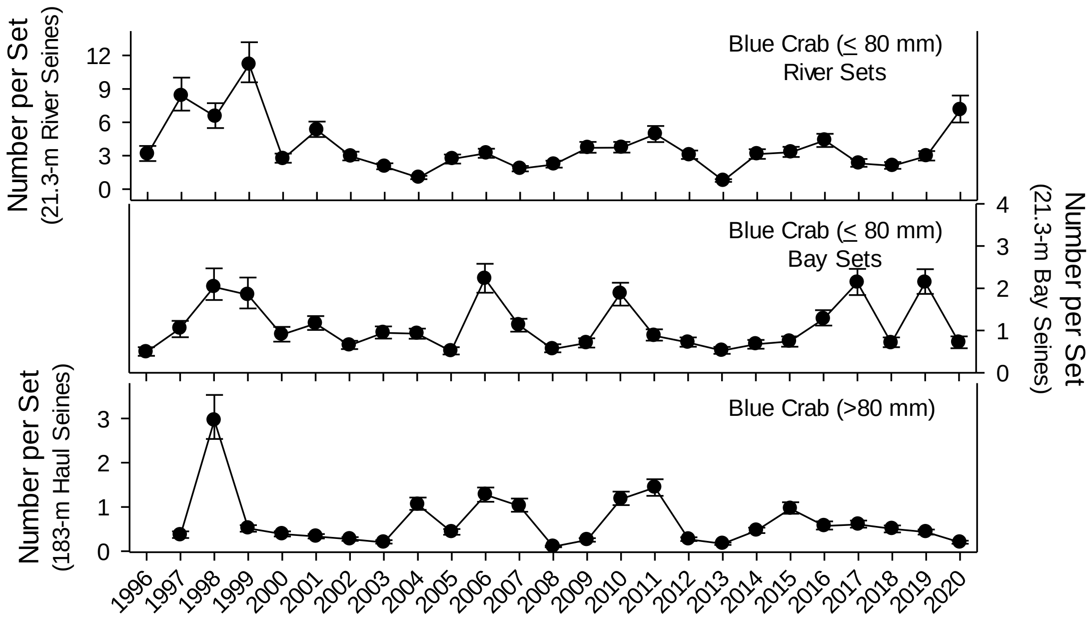
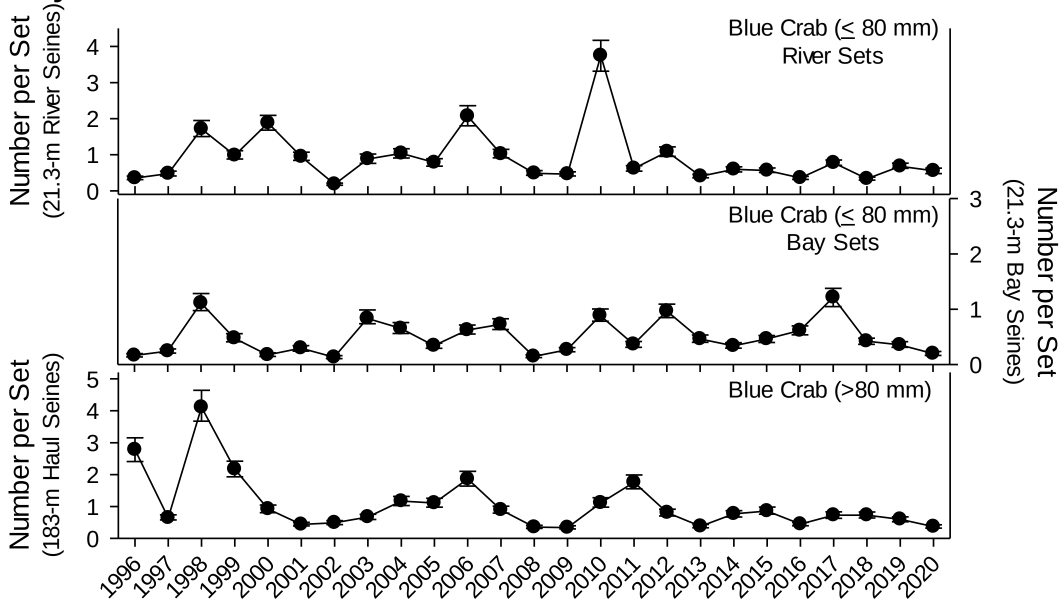


Figure SP20-26. Relative abundance of young-of-the-year Blue Crab (≤ 80 mm CW) collected in 21.3-m seines and of adult Blue Crab (> 80 mm CW) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling of Apalachicola Bay and Cedar Key. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales for estimates from 21.3-m and 183-m seines.

Tampa Bay



Charlotte Harbor

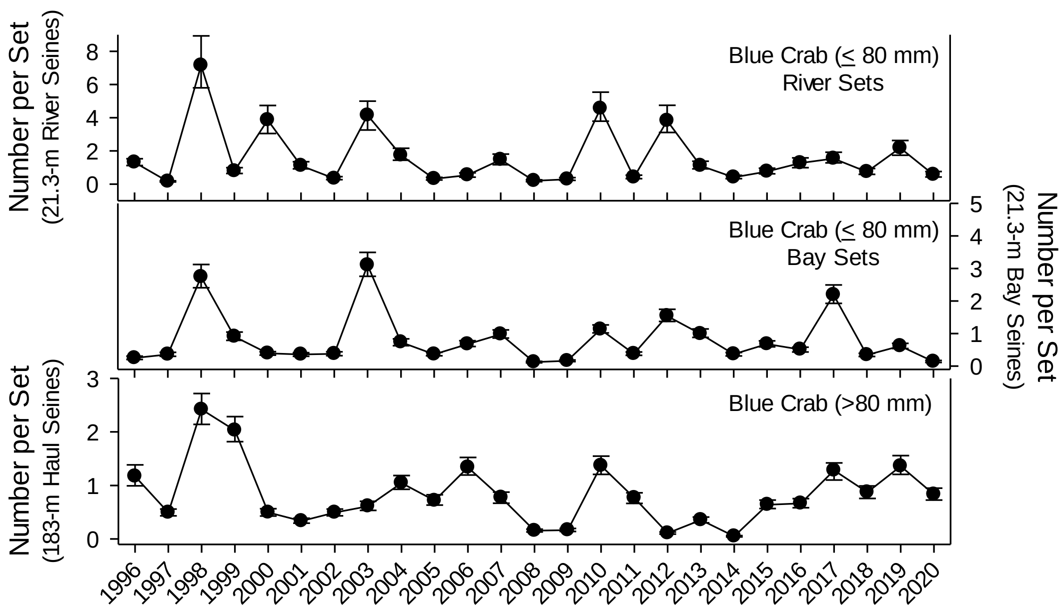
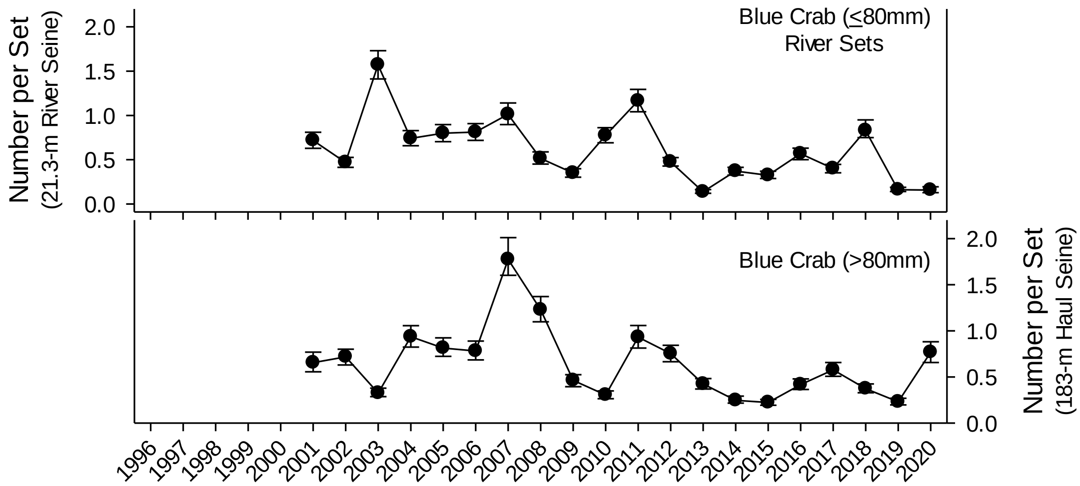


Figure SP20-27. Relative abundance of young-of-the-year Blue Crab (≤ 80 mm CW) collected in 21.3-m seines and of adult Blue Crab (> 80 mm CW) collected in 183-m haul seines between 1996 and 2020 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales for estimates from 21.3-m and 183-m seines.

Northeast Florida



Indian River Lagoon

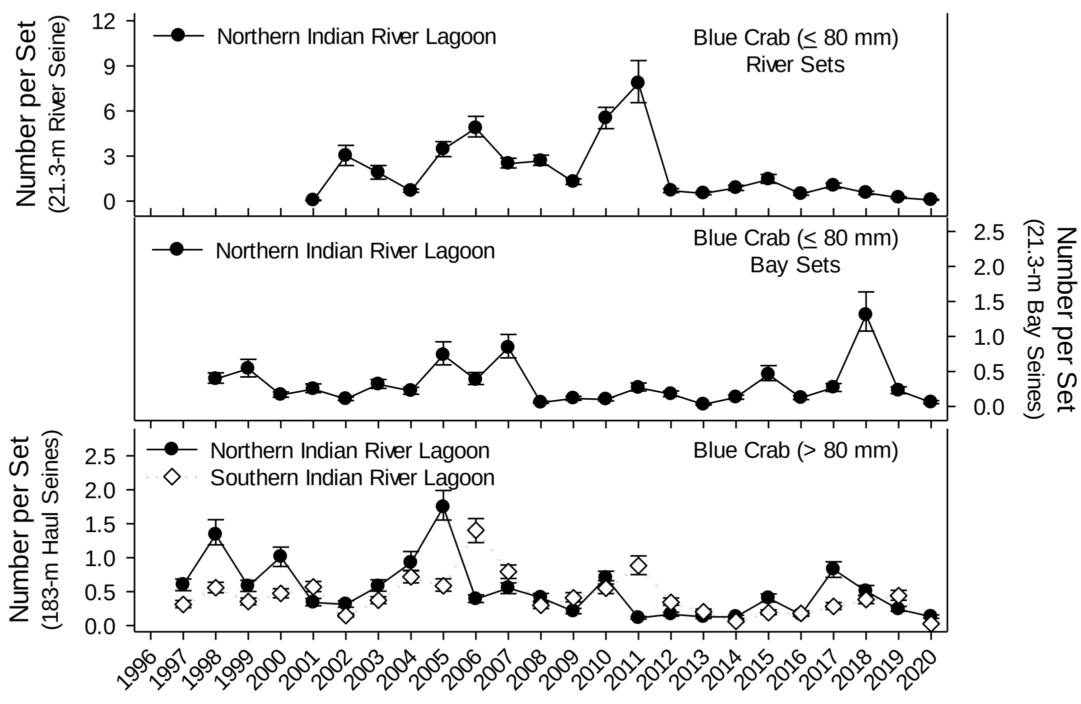


Figure SP20-28. Relative abundance of young-of-the-year Blue Crab (≤ 80 mm CW) collected in 21.3-m seines and of adult Blue Crab (> 80 mm CW) collected in 183-m haul seines between 1997 and 2020 during stratified-random sampling from Northeast Florida and the Indian River Lagoon. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales for estimates from 21.3-m and 183-m seines.

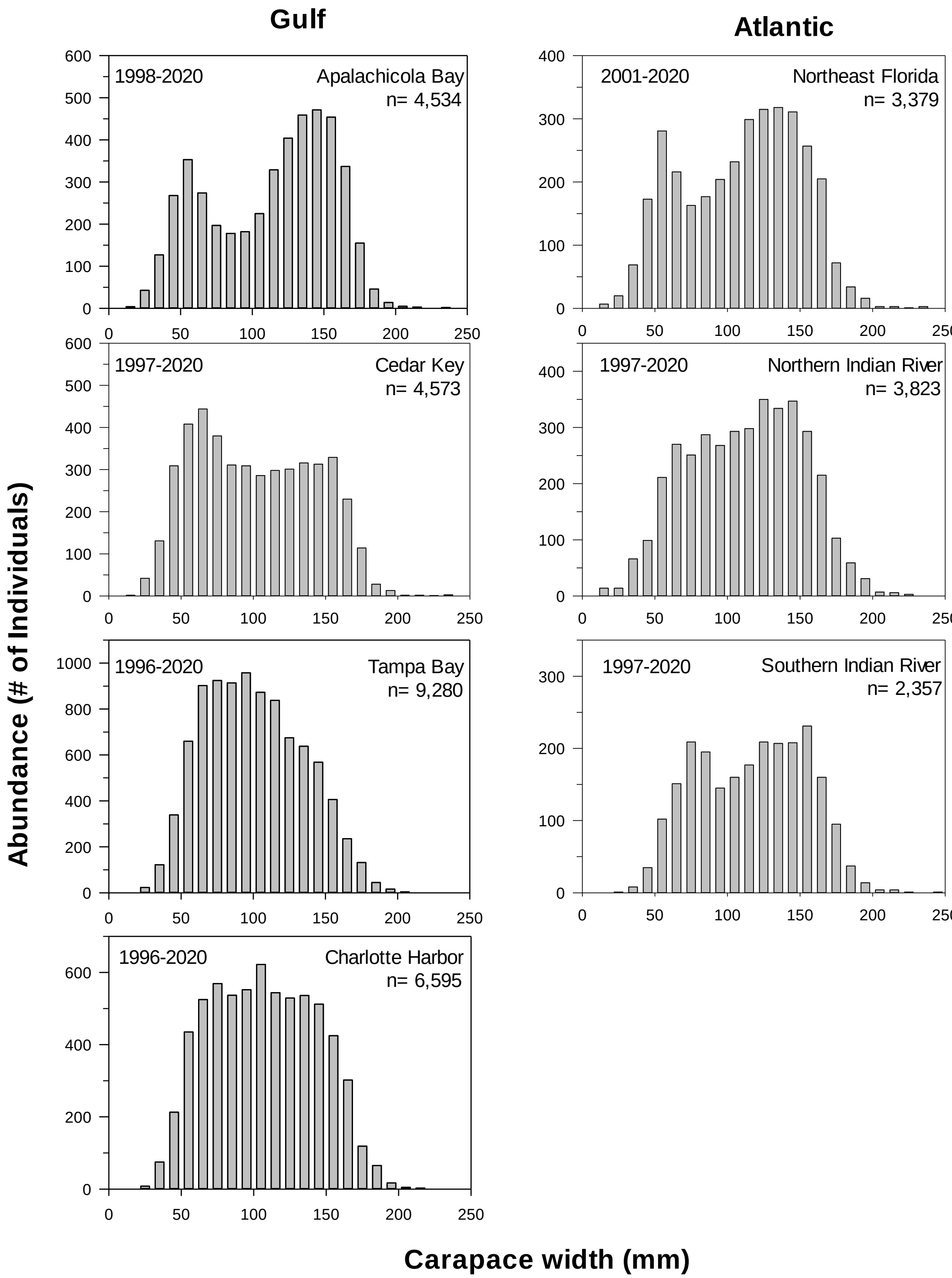


Figure SP20-29. Length frequency diagrams of Blue Crab collected in 183-m haul seines. All lengths are carapace width (CW). Note different scales and years of collection.