FWRI INHOUSE REPORT IHR2023-001

Florida Fish and Wildlife Conservation Commission

Fish & Wildlife Research Institute

Fisheries-Independent Monitoring Program 2021 Annual Data Summary Report

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This research is funded in part by the Department of the Interior, U.S. Fish and Wildlife Service Federal Aid for Sport Fish Restoration, Project F-5407 and by funds from Florida Saltwater Fishing License sales.

Overview .... **OV-i**

Fisheries-Independent Monitoring

Introduction FIM-1

Methods FIM-4

Study Areas FIM-6

Tampa Bay TB-1

Charlotte Harbor CH-1

Northern Indian River Lagoon IR-1

Cedar Key CK-1

Apalachicola Bay AP-1

Northeast Florida JX-1

Southern Indian River Lagoon TQ-1

Fish Health Monitoring **FH-1**

Species Profiles

Introduction SP-1

Red Drum, *Sciaenops ocellatus* SP-4

Spotted Seatrout, *Cynoscion nebulosus* SP-16

Sheepshead, *Archosargus probatocephalus* SP-28

Striped Mullet, *Mugil cephalus* SP-37

Pinfish, *Lagodon rhomboides* SP-44

Common Snook, *Centropomus undecimalis* SP-53

Blue Crab, *Callinectes sapidus* SP-62

Overview

This report provides a summary of the data collected in 2021 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 OV21-01).

There were 1,557,369 animals collected in 6,184 samples from all study areas (Figure OV21-01). The most samples were collected with 21.3-m seines (n= 3,803), followed by 183-m haul seines (n=1,398), and 6.1-m otter trawls (n=983). Total sampling effort in the study areas ranged from 420 hauls made in southern Indian River Lagoon to 1,355 hauls made in northeast Florida (Table OV21-02). The total number of animals collected ranged from 74,302 in southern Indian River Lagoon to 479,978 in Tampa Bay. The majority of animals were collected in 21.3-m seines (n=1,251,701); 80.4% of the total catch).

The top five dominant taxa were *Anchoa mitchilli*, *Lagodon rhomboides*, *Eucinostomus* spp., *Menidia* spp., and *Leiostomus xanthurus*. Recreationally and commercially important animals (i.e., Selected Taxa; see OV21-05) accounted for 13% (n=203,043) of the overall catch and comprised between 4.6% (Tampa Bay) and 43.9% (northeast Florida) of the total SRS catches from each study area. A total of 8 Selected Taxa were among the 10 most abundant taxa in some areas (Tables OV21-03, -04, and -05).

A total of 1,103 fish and selected invertebrates were culled for fish health analyses of gross external abnormalities (including external parasites). Numbers of reported abnormalities from each study area ranged from seven (northeast Florida) to 961 (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).

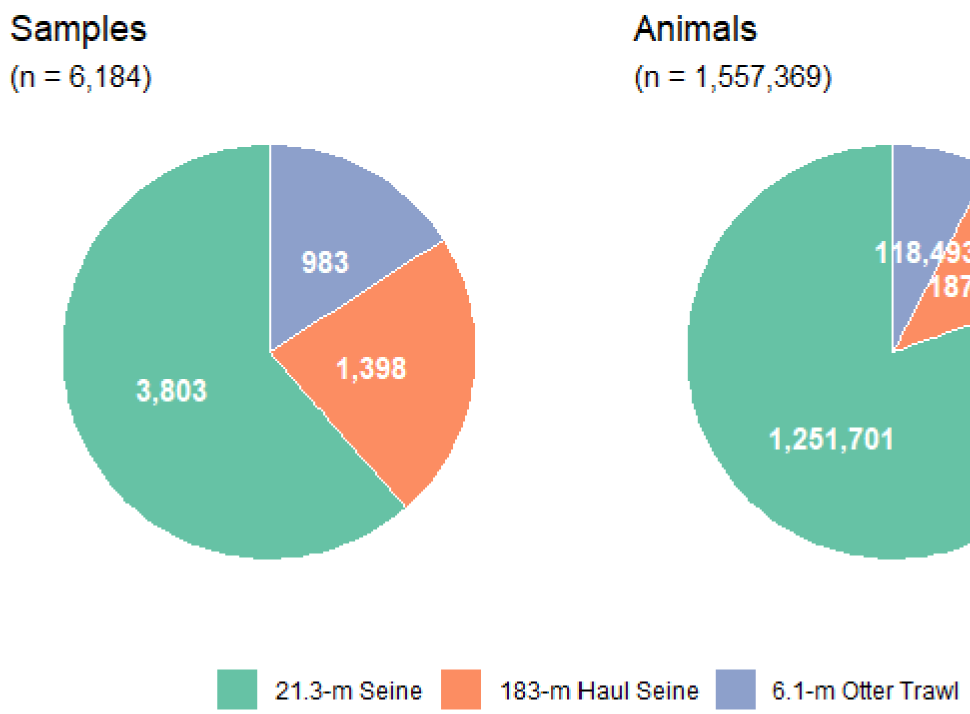

Figure OV21-01. Summary of 2021 FIM program catch and effort data. ‘Samples’ are the total number of deployments by gear type and ‘Animals’ are the total number of animals collected by each gear type.

Table OV21-01. Gear usage by field laboratory for FIM program stratified-random-sampling, 2021.

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
northern Indian River Lagoon	X	X	X	X
Cedar Key	X	X	X	X
southern Indian River Lagoon	--	X	X	--
Apalachicola Bay	X	X	X	X
northeast Florida	--	X	X	X

Table OV21-02. Summary of catch and effort data by area for FIM program stratified-random sampling, 2021. 'Hauls' are the total number of net deployments by each gear type and 'Animals' are the total number of animals collected by each gear type.

Field Lab	21.3-m Seines		183-m Haul Seines		6.1-m Otter Trawls		Totals	
	Hauls	Animals	Hauls	Animals	Hauls	Animals	Hauls	Animals
Tampa Bay	840	432,904	240	36,391	144	10,683	1,224	479,978
Charlotte Harbor	912	196,700	204	44,475	132	21,623	1,248	262,798
northern Indian River Lagoon	456	359,176	228	45,279	2	27	686	404,482
Cedar Key	420	54,983	192	18,105	45	6,225	657	79,313
southern Indian River Lagoon	276	60,001	144	14,301			420	74,302
Apalachicola Bay	324	55,435	198	23,840	72	25,750	594	105,025
northeast Florida	575	92,502	192	4,784	588	54,185	1,355	151,471

Table OV21-03. Selected taxa among the 10 most abundant taxa in FIM program stratified-random sample areas, 2021.

Estuary	**Selected taxa among the 10 most abundant taxa:**
Apalachicola Bay	*Mugil cephalus, Brevoortia* spp.*, Leiostomus xanthurus, Micropogonias undulatus, Litopenaeus setiferus*
Cedar Key	*Leiostomus xanthurus, Mugil cephalus, Brevoortia* spp.
Charlotte Harbor	*Leiostomus xanthurus*
northeast Florida	*Leiostomus xanthurus, Micropogonias undulatus, Litopenaeus setiferus, Brevoortia* spp.*, Mugil cephalus, Farfantepenaeus* spp.
northern Indian River Lagoon	*Brevoortia* spp.*, Leiostomus xanthurus, Mugil cephalus*
southern Indian River Lagoon	*Leiostomus xanthurus, Brevoortia* spp.*, Mugil curema*
Tampa Bay	*Elops saurus, Leiostomus xanthurus*

Table OV21-04. Top 10 numerically dominant taxa collected in FIM program stratified-random sample areas, 2021.

Tampa Bay		Charlotte Harbor	
Scientific Name	**Number**	**Scientific Name**	**Number**
Anchoa mitchilli	312,226	*Lagodon rhomboides*	72,156
Menidia spp.	35,005	*Eucinostomus* spp.	41,724
Lagodon rhomboides	30,910	*Anchoa mitchilli*	34,978
Eucinostomus spp.	20,385	*Lucania parva*	14,874
Eucinostomus gula	8,878	*Harengula jaguana*	13,417
Microgobius gulosus	8,206	*Menidia* spp.	10,774
Eucinostomus harengulus	7,346	*Opisthonema oglinum*	7,931
Elops saurus	4,452	*Eucinostomus gula*	7,766
Lucania parva	4,328	*Eucinostomus harengulus*	6,315
Leiostomus xanthurus	4,246	*Leiostomus xanthurus*	5,234
Total (Top Ten)	**435,982**	**Total (Top Ten)**	**215,169**
Total (Selected Taxa)	**22,318**	**Total (Selected Taxa)**	**17,044**
Grand Total of Animals Collected	**479,978**	**Grand Total of Animals Collected**	**262,798**

N. Indian River Lagoon		Cedar Key	
Scientific Name	**Number**	**Scientific Name**	**Number**
Anchoa mitchilli	300,514	*Anchoa mitchilli*	22,146
Diapterus auratus	20,350	*Leiostomus xanthurus*	11,117
Eucinostomus spp.	13,034	*Membras martinica*	5,535
Bairdiella chrysoura	7,276	*Lagodon rhomboides*	5,437
Lagodon rhomboides	5,992	*Bairdiella chrysoura*	4,822
Brevoortia spp.	5,796	*Mugil cephalus*	2,804
Harengula jaguana	5,776	*Menidia* spp.	2,533
Leiostomus xanthurus	4,730	*Ariopsis felis*	2,454
Eucinostomus harengulus	4,517	*Brevoortia* spp.	2,274
Mugil cephalus	3,694	*Dasyatis sabina*	1,986
Total (Top Ten)	**371,679**	**Total (Top Ten)**	**61,108**
Total (Selected Taxa)	**26,353**	**Total (Selected Taxa)**	**24,996**
Grand Total of Animals Collected	**404,482**	**Grand Total of Animals Collected**	**79,313**

S. Indian River Lagoon		Apalachicola Bay	
Scientific Name	**Number**	**Scientific Name**	**Number**
Anchoa mitchilli	32,487	*Anchoa mitchilli*	24,622
Diapterus auratus	7,041	*Lagodon rhomboides*	15,485
Eucinostomus spp.	5,179	*Mugil cephalus*	6,733
Leiostomus xanthurus	3,785	*Brevoortia* spp.	6,514
Brevoortia spp.	3,469	*Lucania parva*	5,146
Eucinostomus gula	1,789	*Bairdiella chrysoura*	4,855
Menidia spp.	1,722	*Leiostomus xanthurus*	4,731
Mugil curema	1,408	*Orthopristis chrysoptera*	4,243
Eucinostomus harengulus	1,386	*Micropogonias undulatus*	3,614
Gambusia holbrooki	1,256	*Litopenaeus setiferus*	3,192
Total (Top Ten)	**59,522**	**Total (Top Ten)**	**79,135**
Total (Selected Taxa)	**14,055**	**Total (Selected Taxa)**	**31,854**
Grand Total of Animals Collected	**74,302**	**Grand Total of Animals Collected**	**105,025**

Northeast Florida	
Scientific Name	**Number**
Anchoa mitchilli	38,915
Leiostomus xanthurus	25,131
Micropogonias undulatus	14,369
Menidia menidia	11,346
Litopenaeus setiferus	11,274
Menidia spp.	8,654
Brevoortia spp.	4,857
Stellifer lanceolatus	3,084
Mugil cephalus	2,581
Farfantepenaeus spp.	2,016
Total (Top Ten)	**122,227**
Total (Selected Taxa)	**66,423**
Grand Total of Animals Collected	**151,471**

Table OV21-05. Number of recreational or commercially important species (Selected Taxa) collected in FIM program stratified-random sampling, 2021. Field laboratories are labeled as follows: TB (Tampa Bay), CH (Charlotte Harbor), IR (northern Indian River Lagoon), CK (Cedar Key), TQ (southern Indian River Lagoon), AP (Apalachicola Bay), JX (northeast Florida).

Species	TB	CH	IR	CK	TQ	AP	JX
Albula spp.	1	.	23	.	30	.	1
Archosargus probatocephalus	1,395	855	493	88	405	112	90
Argopecten gibbus	.	6	.	.	.	.	.
Argopecten irradians	2	4	.	1	.	8	.
Brevoortia spp.	2,564	138	5,796	2,274	3,469	6,514	4,857
Calamus arctifrons	.	1	.	3	.	3	.
Calamus penna	.	17	7	.	.	.	.
Calamus spp.	2	11	1	.	.	.	.
Callinectes sapidus	336	459	567	547	417	1,235	1,372
Caranx crysos	1	.	.	.	10	.	.
Caranx hippos	59	157	231	20	98	16	50
Carcharhinus isodon	.	.	.	.	.	1	.
Carcharhinus leucas	1	1	.	3	3	.	.
Carcharhinus limbatus	1	.	.	8	.	.	.
Centropomus ensiferus	.	.	.	.	1	.	.
Centropomus parallelus	.	.	8	.	19	.	.
Centropomus pectinatus	.	.	10	.	3	.	.
Centropomus undecimalis	1,252	1,377	949	437	855	.	6
Centropristis philadelphica	.	.	.	.	.	2	30
Centropristis striata	7	72	.	87	.	63	5
Cynoscion arenarius	266	176	.	1,531	.	1,651	.
Cynoscion complex	.	.	90	.	4	.	1,056
Cynoscion nebulosus	637	498	298	206	1	402	97
Cynoscion nothus	.	.	.	.	.	3	3
Diplectrum formosum	10	36	.	10	.	11	.
Elops saurus	4,452	206	867	339	160	99	624
Epinephelus itajara	.	1	.	.	3	.	.
Farfantepenaeus aztecus	.	.	35	.	5	93	379
Farfantepenaeus duorarum	1,044	2,574	45	99	.	110	21
Farfantepenaeus spp.	.	.	1,237	520	1,166	1,003	2,016
Ginglymostoma cirratum	.	1	.	.	.	.	.
Haemulon aurolineatum	.	.	.	.	27	.	.
Haemulon parra	.	.	4	.	11	.	.
Haemulon plumierii	13	132	.	16	.	3	.
Lachnolaimus maximus	.	5	1	4	.	.	.
Leiostomus xanthurus	4,246	5,234	4,730	11,117	3,785	4,731	25,131

Species	TB	CH	IR	CK	TQ	AP	JX
Litopenaeus setiferus	.	.	107	760	138	3,192	11,274
Lobotes surinamensis	.	.	.	5	4	1	1
Lutjanus analis	.	10	19	.	82	.	.
Lutjanus apodus	.	.	1	.	.	.	.
Lutjanus griseus	284	899	148	27	97	72	35
Lutjanus jocu	.	.	1	.	1	.	.
Lutjanus synagris	39	409	.	41	90	97	21
Megalops atlanticus	.	48	41	2	15	1	.
Menippe spp.	66	480	4	19	.	32	6
Menticirrhus americanus	211	282	788	1,443	1	305	220
Menticirrhus littoralis	16	12	.	.	.	14	1
Menticirrhus saxatilis	22	11	.	46	.	33	4
Micropogonias undulatus	1	1	1,322	479	716	3,614	14,369
Mugil cephalus	3,486	758	3,694	2,804	565	6,733	2,581
Mugil curema	191	115	3,424	463	1,408	507	1,431
Mugil rubrioculus	.	.	48	.	58	.	.
Mugil trichodon	683	589	.	104	.	.	.
Mullus auratus	.	.	.	1	.	.	.
Mycteroperca microlepis	3	29	.	.	.	3	.
Negaprion brevirostris	.	2	1	.	.	.	1
Ocyurus chrysurus	.	7	.	.	1	.	.
Panulirus argus	.	.	.	.	2	.	.
Paralichthys albigutta	144	129	18	303	4	278	24
Paralichthys dentatus	.	.	.	.	.	.	46
Paralichthys lethostigma	.	.	1	2	6	89	257
Paralichthys squamilentus	.	.	.	.	.	1	.
Pogonias cromis	37	.	511	477	5	44	9
Pomatomus saltatrix	3	35	3	2	.	20	5
Rachycentron canadum	1	1	.	.	1	.	.
Sciaenops ocellatus	699	1,102	512	580	8	660	300
Scomberomorus maculatus	5	5	6	12	4	.	9
Scomberomorus regalis	.	.	.	.	3	.	.
Sphyraena barracuda	31	80	44	6	244	4	1
Sphyrna tiburo	19	14	15	18	.	6	4
Trachinotus carolinus	16	31	68	35	27	32	69
Trachinotus falcatus	72	34	185	57	103	56	17
Total	22,318	17,044	26,353	24,996	14,055	31,854	66,423

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 a number of 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 some information on the status of fish stocks; however, there are inherent problems 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 (Ulltang 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 management plans.

The Fish and Wildlife Research Institute initiated the FIM program 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 FIM21-01). 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, 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 therefore 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 utilizes a 366-m trammel net. After the 2008-2009 sampling season the seasonal directed sampling program was discontinued in both areas and has transitioned into a year-round monthly sampling survey completed every five years. In 1993, the FIM program implemented a seasonal directed sampling program in Tampa Bay for Red Drum (*Sciaenops ocellatus*) and further initiated a seasonal directed program for Red Drum in the northern Indian River Lagoon in 1995. The Red Drum sampling program utilizes a 547-m trammel net. The directed sampling in Indian River Lagoon was discontinued in 1999, but seasonal sampling for Red Drum in Tampa Bay continues at a reduced level. 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 2021. 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, providing critical information for these species while also describing some of the 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 FIM21-01). 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, depending upon habitat, to stratify the samples collected with the various gears. 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 IRL, Cedar Key, Apalachicola Bay, northeast Florida, southern IRL, and Charlotte Harbor's tidal creeks were not pre-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 2016).

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 for teleosts, precaudal length for sharks, disc width for rays, carapace width for crabs, and post-orbital head length for shrimp). A detailed explanation of the standard sample work-up for data collection is described in the FIM program's Procedure Manual (FWC-FWRI 2016).

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 Jr 1983). In 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 2016). 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 FIM21-02). 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 FIM21-01). 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 is described later in this report (Southern Indian River Lagoon section, TQ-1).

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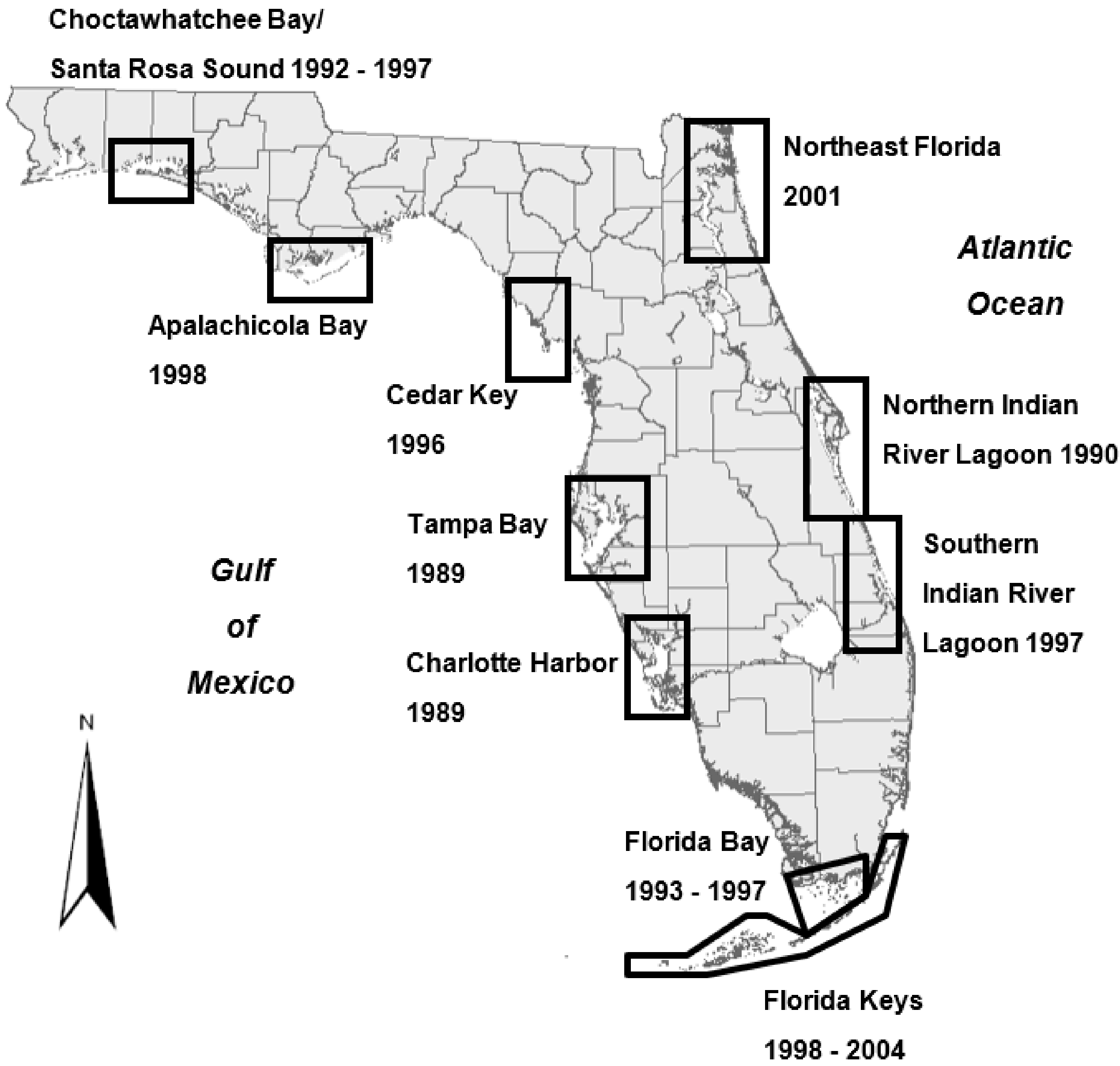

Figure FIM21-01. Locations of Fisheries-Independent Monitoring program field laboratories. Years indicate initiation of sampling. If sampling was discontinued at a field lab, the last year of sampling is also provided.

Table FIM21-01. Description of monthly monitoring sampling gears used in 2021. 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 FIM21-02. Animals designated as Selected Taxa by the Fisheries Independent Monitoring program because of their commercial or recreational importance.

Scientific Name	**Common Name**
Acanthocybium solandri	Wahoo
Albula goreensis	Channel Bonefish
Albula sp. cf. vulpes	.
Albula spp.	.
Albula vulpes	Bonefish
Alectis ciliaris	African Pompano
Alopias vulpinus	Common Thresher Shark
Alphestes afer	Mutton Hamlet
Apsilus dentatus	Black Snapper
Archosargus probatocephalus	Sheepshead
Argopecten gibbus	Atlantic Calico Scallop
Argopecten irradians	Bay Scallop
Balistes capriscus	Gray Triggerfish
Brevoortia spp.	Menhadens
Calamus arctifrons	Grass Porgy
Calamus bajonado	Jolthead Porgy
Calamus calamus	Saucereye Porgy
Calamus leucosteus	Whitebone Porgy
Calamus nodosus	Knobbed Porgy
Calamus penna	Sheepshead Porgy
Calamus proridens	Littlehead Porgy
Calamus spp.	.
Callinectes sapidus	Blue Crab
Caranx crysos	Blue Runner
Caranx hippos	Crevalle Jack
Carcharhinus acronotus	Blacknose Shark
Carcharhinus brevipinna	Spinner Shark
Carcharhinus falciformis	Silky Shark
Carcharhinus isodon	Finetooth Shark
Carcharhinus leucas	Bull Shark
Carcharhinus limbatus	Blacktip Shark
Carcharhinus longimanus	Oceanic Whitetip
Carcharhinus obscurus	Dusky Shark
Carcharhinus plumbeus	Sandbar Shark
Caulolatilus chrysops	Goldface Tilefish
Caulolatilus cyanops	Blackline Tilefish
Caulolatilus intermedius	Anchor Tilefish
Caulolatilus microps	Blueline Tilefish
Centropomus ensiferus	Swordspine Snook
Centropomus mexicanus	Largescale Fat Snook
Centropomus parallelus	Fat Snook
Centropomus pectinatus	Tarpon Snook
Centropomus undecimalis	Common Snook

Scientific Name	Common Name
Centropristis ocyurus	Bank Sea Bass
Centropristis philadelphica	Rock Sea Bass
Centropristis striata	Black Sea Bass
Cephalopholis cruentata	Graysby
Cephalopholis fulva	Coney
Coryphaena equiselis	Pompano Dolphin
Coryphaena hippurus	Dolphin
Cynoscion arenarius	Sand Seatrout
Cynoscion complex	*C. regalis* x *C. arenarius*
Cynoscion nebulosus	Spotted Seatrout
Cynoscion nothus	Silver Seatrout
Cynoscion regalis	Atlantic Weakfish
Dermatolepis inermis	Marbled Grouper
Diplectrum formosum	Sand Perch
Elops saurus	Ladyfish
Elops smithi	Malacho
Epinephelus adscensionis	Rock Hind
Epinephelus drummondhayi	Speckled Hind
Epinephelus guttatus	Red Hind
Epinephelus itajara	Goliath Grouper
Epinephelus morio	Red Grouper
Epinephelus striatus	Nassau Grouper
Etelis oculatus	Queen Snapper
Euthynnus alletteratus	Little Tunny
Farfantepenaeus aztecus	Brown Shrimp
Farfantepenaeus brasiliensis	Caribbean Brown Shrimp
Farfantepenaeus duorarum	Pink Shrimp
Farfantepenaeus spp.	Commercial Shrimps
Galeocerdo cuvier	Tiger Shark
Ginglymostoma cirratum	Nurse Shark
Haemulon album	Margate
Haemulon aurolineatum	Tomtate
Haemulon flavolineatum	French Grunt
Haemulon macrostomum	Spanish Grunt
Haemulon melanurum	Cottonwick
Haemulon parra	Sailors Choice
Haemulon plumierii	White Grunt
Haemulon sciurus	Bluestriped Grunt
Hyporthodus flavolimbatus	Yellowedge Grouper
Hyporthodus mystacinus	Misty Grouper
Hyporthodus nigritus	Warsaw Grouper
Hyporthodus niveatus	Snowy Grouper
Istiophorus platypterus	Sailfish
Isurus oxyrinchus	Shortfin Mako
Katsuwonus pelamis	Skipjack Tuna

Scientific Name	Common Name
Lachnolaimus maximus	Hogfish
Lamna nasus	Porbeagle
Leiostomus xanthurus	Spot
Litopenaeus setiferus	White Shrimp
Lobotes surinamensis	Tripletail
Lopholatilus chamaeleonticeps	Tilefish
Lutjanus analis	Mutton Snapper
Lutjanus apodus	Schoolmaster
Lutjanus buccanella	Blackfin Snapper
Lutjanus campechanus	Red Snapper
Lutjanus cyanopterus	Cubera Snapper
Lutjanus griseus	Gray Snapper
Lutjanus jocu	Dog Snapper
Lutjanus mahogoni	Mahogany Snapper
Lutjanus synagris	Lane Snapper
Lutjanus vivanus	Silk Snapper
Malacanthus plumieri	Sand Tilefish
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
Mulloidichthys martinicus	Yellow Goatfish
Mullus auratus	Red Goatfish
Mustelus spp.	.
Mycteroperca bonaci	Black Grouper
Mycteroperca interstitialis	Yellowmouth Grouper
Mycteroperca microlepis	Gag
Mycteroperca phenax	Scamp
Mycteroperca tigris	Tiger Grouper
Mycteroperca venenosa	Yellowfin Grouper
Negaprion brevirostris	Lemon Shark
Ocyurus chrysurus	Yellowtail Snapper
Pagrus pagrus	Red Porgy
Panulirus argus	Spiny Lobster
Paralichthys albigutta	Gulf Flounder
Paralichthys dentatus	Summer Flounder
Paralichthys lethostigma	Southern Flounder
Paralichthys oblongus	Fourspot Flounder

Scientific Name	Common Name
Paralichthys squamilentus	Broad Flounder
Paranthias furcifer	Creole-fish
Pogonias cromis	Black Drum
Pomatomus saltatrix	Bluefish
Prionace glauca	Blue Shark
Pristipomoides aquilonaris	Wenchman
Pseudupeneus maculatus	Spotted Goatfish
Pterois spp.	Lionfishes
Rachycentron canadum	Cobia
Rhizoprionodon terraenovae	Atlantic Sharpnose Shark
Rhomboplites aurorubens	Vermilion Snapper
Sciaenops ocellatus	Red Drum
Scomberomorus cavalla	King Mackerel
Scomberomorus maculatus	Spanish Mackerel
Scomberomorus regalis	Cero
Seriola dumerili	Greater Amberjack
Seriola fasciata	Lesser Amberjack
Seriola rivoliana	Almaco Jack
Seriola zonata	Banded Rudderfish
Sphyraena barracuda	Great Barracuda
Sphyrna tiburo	Bonnethead
Thunnus albacares	Yellowfin Tuna
Thunnus atlanticus	Blackfin Tuna
Thunnus obesus	Bigeye Tuna
Thunnus thynnus	Bluefin Tuna
Trachinotus carolinus	Florida Pompano
Trachinotus falcatus	Permit
Trachinotus goodei	Palometa
Upeneus parvus	Dwarf Goatfish

Tampa Bay

Tampa Bay is a drowned river estuary located on the west 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). Submerged 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 TB21-01). 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 2021 in Tampa Bay.

Stratified-Random Sampling

A total of 479,978 animals, which included 153 taxa of fishes and 9 taxa of selected invertebrates, were collected from 1,224 Tampa Bay SRS samples in 2021 (Table TB21-01, Appendices TB21-01, -02, and -03). *Anchoa mitchilli* (n=312,226) was the most numerous taxon collected, representing 65.1% of the total catch. *Menidia* spp. (n=35,005) and *Lagodon rhomboides* (n=30,910) were the next most abundant taxa collected, accounting for an additional 13.7% of the total catch. A total of 40 Selected Taxa (n=22,318 animals) composed 4.6% of the total catch. *Elops saurus* (n=4,452) was the most abundant Selected Taxon, representing 0.9% of the total catch. *Leiostomus xanthurus* (n=4,246), *Mugil cephalus* (n=3,486), *Brevoortia* spp. (n=2,564), and *Archosargus probatocephalus* (n=1,395) were the next most abundant

Selected Taxa, comprising 2.4% of the total catch. Collections in 2021 included 1 species new to the TB FIM collection*: Gobiomorus dormitor*.

Bay Sampling

21.3-m Bay Seines. A total of 106,260 animals were collected in 408 21.3-m bay seines, representing 22.1% of the overall SRS catch (Table TB21-01). *Anchoa mitchilli* (n = 42,181) and *Lagodon rhomboides* (n = 17,108) were the most abundant taxa, accounting for 55.8% of the bay seine catch (Table TB21-02). The taxa most frequently caught in 21.3-m bay seines were *Eucinostomus* spp. (42.2% occurrence) and *Microgobius gulosus* (37.7% occurrence).

A total of 7,060 animals from 24 Selected Taxa were collected, representing 6.6% of the entire 21.3-m bay seine catch (Table TB21-03). *Leiostomus xanthurus* (n=3,261) was the most abundant Selected Taxon, accounting for 46.2% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were *Farfantepenaeus duorarum* (24.8% occurrence) and *Cynoscion nebulosus* (15.7% occurrence).

183-m Haul Seines. A total of 36,391 animals were collected in 240 183-m haul seines, representing 7.6% of the overall SRS catch (Table TB21-01). *Lagodon rhomboides* (n = 12,579) was the most abundant taxon, accounting for 34.6% of the 183-m haul seine catch (Table TB21-04). The taxa most frequently caught in 183-m haul seines were *Lagodon rhomboides* (51.7% occurrence), *Centropomus undecimalis* (48.3% occurrence), and *Ariopsis felis* (44.6% occurrence).

A total of 8,710 animals from 36 Selected Taxa were collected, representing 23.9% of the entire 183-m haul seine catch (Table TB21-05). *Elops saurus* (n=4,430) and *Centropomus undecimalis* (n=1,038) were the most abundant Selected Taxa, accounting for 62.8% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Centropomus undecimalis* (48.3% occurrence) and *Archosargus probatocephalus* (44.6% occurrence).

6.1-m Bay Otter Trawls. A total of 3,695 animals were collected in 60 6.1-m bay otter trawls, representing 0.8% of the overall SRS catch (Table TB21-01). *Anchoa mitchilli* (n = 1,396), *Eucinostomus gula* (n = 558), *Portunus* spp. (n = 456), and *Prionotus scitulus* (n = 294) were the most abundant taxa, accounting for 73.2% of the 6.1-m bay otter trawl catch (Table TB21-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Prionotus scitulus* (71.7% occurrence), *Synodus foetens* (45.0% occurrence), and *Portunus* spp. (43.3% occurrence).

A total of 281 animals from 16 Selected Taxa were collected, representing 7.6% of the entire 6.1-m bay otter trawl catch (Table TB21-07). *Menippe* spp. (n=65), *Farfantepenaeus duorarum* (n=51), and *Menticirrhus americanus* (n=51) were the most abundant Selected Taxa, accounting for 59.4% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Menippe* spp. (26.7% occurrence), *Farfantepenaeus duorarum* (20.0% occurrence), and *Menticirrhus americanus* (18.3% occurrence).

River Sampling

21.3-m River Seines. A total of 326,644 animals were collected in 432 21.3-m river seines, representing 68.1% of the overall SRS catch (Table TB21-01). *Anchoa mitchilli* (n = 264,234) was the most abundant taxon collected, accounting for 80.9% of the 21.3-m river seine catch (Table TB21-08). *Menidia* spp. (n=29,312) and *Eucinostomus* spp. (n=9,050) were the next most abundant taxa, accounting for an additional 11.7% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines were *Menidia* spp. (83.3% occurrence), *Eucinostomus* spp. (66.0% occurrence), and *Eucinostomus harengulus* (64.1% occurrence).

A total of 5,819 animals from 18 Selected Taxa were collected, representing 1.8% of the entire 21.3-m river seine catch (Table TB21-09). *Brevoortia* spp. (n=2,439), and *Mugil cephalus* (n=1,370) were the most abundant Selected Taxa, accounting for 65.5% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Sciaenops ocellatus* (18.8% occurrence) and *Centropomus undecimalis* (17.4% occurrence).

6.1-m River Otter Trawls. A total of 6,988 animals were collected in 84 6.1-m river otter trawls, representing 1.5% of the overall SRS catch (Table TB21-01). *Anchoa mitchilli* (n = 4,415) was the most abundant taxon collected, accounting for 63.2% of the 6.1-m river otter trawl catch (Table TB21-10). The taxa most frequently caught in 6.1-m river otter trawls were *Anchoa mitchilli* (42.9% occurrence), *Microgobius gulosus* (41.7% occurrence), and *Callinectes sapidus* (41.7% occurrence).

A total of 448 animals from 11 Selected Taxa were collected, representing 6.4% of the entire 6.1-m river otter trawl catch (Table TB21-11). *Farfantepenaeus duorarum* (n=108), *Callinectes sapidus* (n=95), and *Cynoscion arenarius* (n=87) were the most abundant Selected Taxa, accounting for 64.7% 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* (41.7% occurrence) and *Farfantepenaeus duorarum* (29.8% occurrence).

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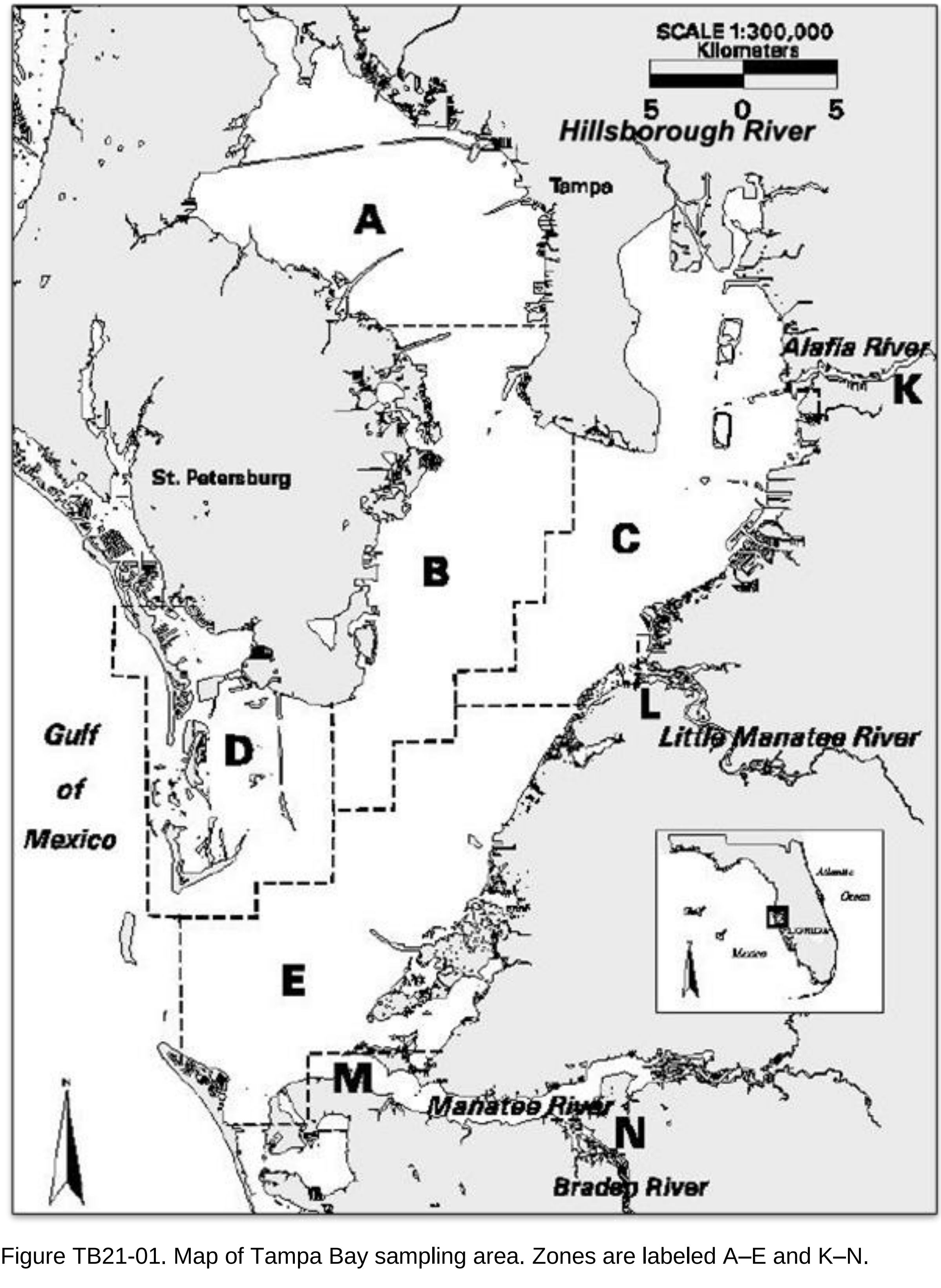

Figure TB21-01. Map of Tampa Bay sampling area. Zones are labeled A–E and K–N.

Table TB21-01. Summary of catch and effort data for Tampa Bay stratified-random sampling, 2021.

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	19,239	84	.	.	6,611	48	1,107	12	26,957	144
B	13,209	72	.	.	7,698	48	872	12	21,779	132
C	11,687	108	.	.	6,620	48	689	16	18,996	172
D	15,807	60	.	.	5,595	36	622	8	22,024	104
E	46,318	84	.	.	9,867	60	405	12	56,590	156
K	.	.	79,830	156	.	.	2,213	12	82,043	168
L	.	.	116,975	108	.	.	1,998	36	118,973	144
M	.	.	72,846	96	.	.	2,075	24	74,921	120
N	.	.	56,993	72	.	.	702	12	57,695	84
Totals	**106,260**	**408**	**326,644**	**432**	**36,391**	**240**	**10,683**	**144**	**479,978**	**1,224**

Table TB21-02. Catch statistics for 10 dominant taxa collected in 408 21.3-m bay seine samples during Tampa Bay stratified-random sampling, 2021. 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	42,181	39.7	15.4	77.25	42.98	1,098.80	16,257.14	30	0.03	15	59
Lagodon rhomboides	17,108	16.1	35.0	31.33	10.12	637.83	3,522.86	32	0.12	9	166
Eucinostomus spp.	10,942	10.3	42.2	20.04	3.16	311.49	500.71	27	0.07	10	41
Microgobius gulosus	6,059	5.7	37.7	11.10	2.24	399.03	585.00	26	0.08	11	58
Menidia spp.	5,691	5.4	17.2	10.42	2.36	446.37	392.14	36	0.16	11	83
Eucinostomus gula	4,646	4.4	30.9	8.51	2.91	675.75	1,085.71	53	0.12	40	92
Leiostomus xanthurus	3,261	3.1	10.0	5.97	3.43	1,134.77	1,294.29	23	0.14	8	184
Lucania parva	3,004	2.8	13.7	5.50	1.82	653.64	579.29	24	0.10	12	46
Mugil cephalus	1,638	1.5	4.7	3.00	2.56	1,686.97	992.86	24	0.30	11	439
Orthopristis chrysoptera	1,343	1.3	11.0	2.46	0.66	526.84	171.43	33	0.29	13	89
Subtotals	95,873	90.3	.	.	.	.	.	.	.	8	439
Totals	**106,260**	**100.0**	**.**	**186.03**	**44.61**	**484.37**	**17,044.29**	**.**	**.**	**2**	**455**

Table TB21-03. Catch statistics for Selected Taxa collected in 408 21.3-m bay seine samples during Tampa Bay stratified-random sampling, 2021. 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	3,261	3.1	10.0	5.71	3.28	1,160.80	1,294.29	23	0.14	8	184
Mugil cephalus	1,638	1.5	4.7	2.87	2.45	1,725.49	992.86	24	0.30	11	439
Farfantepenaeus duorarum	601	0.6	24.8	1.05	0.32	612.43	120.71	9	0.17	2	31
Mugil trichodon	524	0.5	3.2	0.92	0.78	1,719.00	317.86	26	0.66	12	153
Archosargus probatocephalus	366	0.3	9.1	0.64	0.29	899.88	76.43	28	1.75	11	325
Cynoscion nebulosus	283	0.3	15.7	0.50	0.09	383.15	20.71	37	1.42	11	261
Brevoortia spp.	81	0.1	1.0	0.14	0.13	1,800.60	51.43	21	0.12	19	24
Sciaenops ocellatus	65	0.1	4.4	0.11	0.05	849.03	17.14	46	8.88	13	455
Callinectes sapidus	57	0.1	9.1	0.10	0.02	380.55	3.57	56	5.46	12	157
Paralichthys albigutta	49	<0.1	8.6	0.09	0.02	376.28	2.86	47	7.32	12	346
Menticirrhus americanus	33	<0.1	2.9	0.06	0.03	1,033.38	11.43	34	2.12	11	70
Trachinotus falcatus	26	<0.1	0.7	0.05	0.03	1,418.02	12.14	41	1.53	20	53
Lutjanus griseus	22	<0.1	2.5	0.04	0.01	773.57	4.29	38	6.58	11	142
Menticirrhus saxatilis	19	<0.1	2.7	0.03	0.01	690.76	2.86	31	4.35	10	85
Lutjanus synagris	9	<0.1	0.7	0.02	0.01	1,435.35	4.29	27	3.38	19	51
Mugil curema	6	<0.1	1.0	0.01	0.01	1,163.32	2.14	120	22.33	26	170
Centropomus undecimalis	5	<0.1	1.2	0.01	<0.01	898.88	0.71	319	47.16	147	418
Cynoscion arenarius	5	<0.1	0.2	0.01	0.01	2,019.90	3.57	23	1.32	20	26
Haemulon plumierii	4	<0.1	0.5	0.01	0.01	1,595.69	2.14	50	10.47	37	81
Calamus spp.	2	<0.1	0.2	<0.01	<0.01	2,019.90	1.43	17	4.00	13	21
Centropristis striata	1	<0.1	0.2	<0.01	<0.01	2,019.90	0.71	89	.	89	89
Menippe spp.	1	<0.1	0.2	<0.01	<0.01	2,019.90	0.71	9	.	9	9

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Pogonias cromis	1	<0.1	0.2	<0.01	<0.01	2,019.90	0.71	18	.	18	18
Sphyraena barracuda	1	<0.1	0.2	<0.01	<0.01	2,019.90	0.71	37	.	37	37
Totals	**7,060**	**6.6**	**.**	**12.36**	**4.24**	**693.55**	**1,305.00**	**.**	**.**	**2**	**455**

Table TB21-04. Catch statistics for 10 dominant taxa collected in 240 183-m haul seine samples during Tampa Bay stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Lagodon rhomboides	12,579	34.6	51.7	53.30	8.00	230.72	786	108	0.27	48	255
Elops saurus	4,430	12.2	21.7	18.77	8.79	718.98	1,432	282	0.79	81	492
Eucinostomus gula	3,143	8.6	42.5	13.32	2.50	288.27	295	84	0.27	41	164
Ariopsis felis	2,924	8.0	44.6	12.39	3.60	446.48	656	250	1.01	113	392
Harengula jaguana	2,122	5.8	6.2	8.99	7.93	1,354.45	1,865	116	0.24	61	162
Bairdiella chrysoura	2,083	5.7	9.6	8.83	6.14	1,069.21	1,391	128	0.32	60	186
Centropomus undecimalis	1,038	2.9	48.3	4.40	0.83	289.00	125	410	2.89	136	904
Eucinostomus harengulus	1,002	2.8	26.7	4.25	1.13	407.78	139	90	0.26	40	131
Archosargus probatocephalus	830	2.3	44.6	3.52	0.58	253.46	83	190	2.85	28	409
Opisthonema oglinum	653	1.8	4.2	2.77	1.73	960.53	314	119	0.78	84	173
Subtotals	30,804	84.7	.	.	.	.	.	.	.	28	904
Totals	**36,391**	**100.0**	**.**	**151.63**	**20.81**	**212.64**	**3,430**	**.**	**.**	**10**	**1,422**

Table TB21-05. Catch statistics for Selected Taxa collected in 240 183-m haul seine samples during Tampa Bay stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Elops saurus	4,430	12.2	21.7	18.46	8.64	725.14	1,432	282	0.79	81	492
Centropomus undecimalis	1,038	2.9	48.3	4.32	0.81	291.72	125	410	2.89	136	904
Archosargus probatocephalus	830	2.3	44.6	3.46	0.57	255.92	83	190	2.85	28	409
Mugil cephalus	478	1.3	33.3	1.99	0.35	274.78	49	323	3.92	113	476
Sciaenops ocellatus	314	0.9	27.9	1.31	0.48	573.02	111	490	6.70	88	675
Lutjanus griseus	238	0.7	17.9	0.99	0.37	574.97	66	193	2.73	53	358
Cynoscion nebulosus	236	0.6	16.7	0.98	0.25	391.05	35	228	5.60	51	466
Farfantepenaeus duorarum	201	0.6	10.8	0.84	0.37	683.46	65	21	0.44	10	43
Mugil curema	180	0.5	10.4	0.75	0.47	974.35	112	249	3.85	112	311
Mugil trichodon	144	0.4	13.8	0.60	0.15	379.57	21	172	3.64	86	275
Callinectes sapidus	99	0.3	17.9	0.41	0.08	283.20	9	120	3.68	42	208
Leiostomus xanthurus	96	0.3	6.7	0.40	0.16	619.93	30	119	5.00	57	210
Paralichthys albigutta	72	0.2	16.7	0.30	0.07	345.25	12	124	7.49	56	305
Cynoscion arenarius	67	0.2	0.8	0.28	0.28	1,526.15	66	198	2.33	164	259
Caranx hippos	58	0.2	9.6	0.24	0.08	484.74	14	280	11.97	71	420
Trachinotus falcatus	46	0.1	3.3	0.19	0.10	773.41	17	248	14.96	57	453
Brevoortia spp.	35	0.1	1.7	0.15	0.12	1,296.12	29	111	11.87	61	266
Sphyraena barracuda	30	0.1	6.2	0.12	0.04	518.12	7	301	18.35	188	626
Pogonias cromis	20	0.1	2.9	0.08	0.06	1,030.74	13	439	25.29	166	681
Sphyrna tiburo	19	0.1	6.2	0.08	0.02	458.55	4	592	19.55	433	761
Lutjanus synagris	17	<0.1	2.9	0.07	0.03	717.87	5	90	7.02	41	136
Menticirrhus littoralis	16	<0.1	1.7	0.07	0.05	1,268.54	13	229	6.73	190	274

Species	Number No.	Number %	% Occur	Density Estimate (animals/set) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Trachinotus carolinus	16	<0.1	2.1	0.07	0.04	935.36	9	291	14.01	172	389
Haemulon plumierii	8	<0.1	0.8	0.03	0.02	1,127.07	5	82	4.81	61	102
Scomberomorus maculatus	5	<0.1	0.8	0.02	0.01	1,114.98	3	275	24.94	206	361
Centropristis striata	4	<0.1	0.4	0.02	0.02	1,549.19	4	97	0.75	95	98
Pomatomus saltatrix	3	<0.1	0.8	0.01	0.01	1,152.77	2	431	7.51	423	446
Mycteroperca microlepis	2	<0.1	0.8	0.01	0.01	1,093.15	1	236	36.50	200	273
Albula spp.	1	<0.1	0.4	<0.01	<0.01	1,549.19	1	224	.	224	224
Argopecten irradians	1	<0.1	0.4	<0.01	<0.01	1,549.19	1	38	.	38	38
Caranx crysos	1	<0.1	0.4	<0.01	<0.01	1,549.19	1	254	.	254	254
Carcharhinus leucas	1	<0.1	0.4	<0.01	<0.01	1,549.19	1	560	.	560	560
Carcharhinus limbatus	1	<0.1	0.4	<0.01	<0.01	1,549.19	1	380	.	380	380
Menticirrhus americanus	1	<0.1	0.4	<0.01	<0.01	1,549.19	1	196	.	196	196
Micropogonias undulatus	1	<0.1	0.4	<0.01	<0.01	1,549.19	1	211	.	211	211
Rachycentron canadum	1	<0.1	0.4	<0.01	<0.01	1,549.19	1	522	.	522	522
Totals	**8,710**	**23.9**	**.**	**36.29**	**9.02**	**385.11**	**1,442**	**.**	**.**	**10**	**904**

Table TB21-06. Catch statistics for 10 dominant taxa collected in 60 6.1-m bay otter trawl samples during Tampa Bay stratified-random sampling, 2021. 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	1,396	37.8	15.0	1.71	0.94	420.32	43.39	39	0.24	25	57
Eucinostomus gula	558	15.1	35.0	0.63	0.29	357.01	13.09	76	0.43	42	124
Portunus spp.	456	12.3	43.3	0.55	0.20	284.72	8.90	46	0.43	19	71
Prionotus scitulus	294	8.0	71.7	0.35	0.08	185.88	4.65	91	1.77	22	154
Lagodon rhomboides	121	3.3	25.0	0.14	0.06	337.87	2.49	97	2.65	14	152
Eucinostomus spp.	67	1.8	6.7	0.08	0.06	616.10	3.76	29	0.87	14	39
Menippe spp.	65	1.8	26.7	0.08	0.03	276.72	1.27	20	1.89	3	91
Orthopristis chrysoptera	60	1.6	16.7	0.07	0.03	283.46	1.07	101	6.55	19	181
Achirus lineatus	58	1.6	28.3	0.07	0.02	251.89	0.92	45	2.45	17	96
Synodus foetens	57	1.5	45.0	0.07	0.01	150.55	0.54	133	9.28	33	306
Subtotals	3,132	84.8	.	.	.	.	.	.	.	3	306
Totals	**3,695**	**100.0**	**.**	**4.34**	**1.04**	**185.28**	**48.29**	**.**	**.**	**3**	**576**

Table TB21-07. Catch statistics for Selected Taxa collected in 60 6.1-m bay otter trawl samples during Tampa Bay stratified-random sampling, 2021. 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
Menippe spp.	65	1.8	26.7	0.08	0.03	279.32	1.27	20	1.89	3	91
Farfantepenaeus duorarum	51	1.4	20.0	0.06	0.03	331.55	1.28	21	0.58	13	28
Menticirrhus americanus	51	1.4	18.3	0.06	0.02	271.74	0.85	72	7.50	13	195
Cynoscion arenarius	44	1.2	11.7	0.05	0.03	378.58	1.14	61	7.58	20	203
Paralichthys albigutta	18	0.5	18.3	0.02	0.01	271.61	0.30	136	15.74	42	262
Lutjanus synagris	13	0.4	13.3	0.02	0.01	287.38	0.22	72	6.26	44	122
Diplectrum formosum	10	0.3	15.0	0.01	<0.01	256.74	0.16	125	11.23	53	159
Callinectes sapidus	9	0.2	11.7	0.01	<0.01	317.52	0.20	43	10.68	11	122
Leiostomus xanthurus	7	0.2	5.0	0.01	0.01	508.94	0.28	42	9.74	18	77
Lutjanus griseus	4	0.1	3.3	<0.01	<0.01	543.76	0.14	165	7.18	145	178
Menticirrhus saxatilis	3	0.1	3.3	<0.01	<0.01	573.42	0.13	46	9.17	28	56
Centropristis striata	2	0.1	3.3	<0.01	<0.01	543.93	0.08	120	43.50	76	163
Archosargus probatocephalus	1	<0.1	1.7	<0.01	<0.01	774.60	0.07	108	.	108	108
Argopecten irradians	1	<0.1	1.7	<0.01	<0.01	774.60	0.07	25	.	25	25
Haemulon plumierii	1	<0.1	1.7	<0.01	<0.01	774.60	0.07	45	.	45	45
Mycteroperca microlepis	1	<0.1	1.7	<0.01	<0.01	774.60	0.07	125	.	125	125
Totals	**281**	**7.6**	**.**	**0.33**	**0.06**	**144.34**	**2.56**	**.**	**.**	**3**	**262**

Table TB21-08. Catch statistics for 10 dominant taxa collected in 432 21.3-m river seine samples during Tampa Bay stratified-random sampling, 2021. 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	264,234	80.9	54.2	910.02	176.95	401.80	39,905.88	28	0.01	14	63
Menidia spp.	29,312	9.0	83.3	100.95	10.24	209.68	1,533.82	33	0.06	11	76
Eucinostomus spp.	9,050	2.8	66.0	31.17	3.21	212.80	564.71	28	0.08	10	39
Eucinostomus harengulus	5,062	1.5	64.1	17.43	1.81	214.87	460.29	57	0.18	40	99
Anchoa hepsetus	3,164	1.0	2.5	10.90	7.99	1,516.09	3,347.06	42	0.15	27	60
Brevoortia spp.	2,439	0.7	8.1	8.40	5.61	1,380.54	2,376.47	26	0.15	18	60
Microgobius gulosus	1,814	0.6	51.9	6.25	0.95	313.91	307.35	25	0.17	11	56
Mugil cephalus	1,370	0.4	8.1	4.72	1.83	803.52	516.18	30	0.44	18	394
Lucania parva	1,324	0.4	18.3	4.56	1.22	555.11	344.12	20	0.13	10	45
Eugerres plumieri	1,057	0.3	30.8	3.64	0.63	356.98	148.53	46	0.96	15	235
Subtotals	318,826	97.6	.	.	.	.	.	.	.	10	394
Totals	**326,644**	**100.0**	**.**	**1,111.94**	**178.94**	**334.47**	**39,976.47**	**.**	**.**	**3**	**655**

Table TB21-09. Catch statistics for Selected Taxa collected in 432 21.3-m river seine samples during Tampa Bay stratified-random sampling, 2021. 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
Brevoortia spp.	2,439	0.7	8.1	8.30	5.55	1,388.62	2,376.47	26	0.15	18	60
Mugil cephalus	1,370	0.4	8.1	4.66	1.81	808.27	516.18	30	0.44	18	394
Leiostomus xanthurus	840	0.3	12.3	2.86	0.83	603.80	191.18	32	0.49	10	111
Sciaenops ocellatus	308	0.1	18.8	1.05	0.18	364.23	39.71	55	3.85	12	655
Centropomus undecimalis	209	0.1	17.4	0.71	0.15	430.07	41.18	150	7.96	14	587
Archosargus probatocephalus	164	0.1	15.3	0.56	0.13	466.15	39.71	62	5.09	13	331
Cynoscion nebulosus	106	<0.1	10.2	0.36	0.07	381.66	11.76	37	1.98	15	121
Menticirrhus americanus	84	<0.1	2.1	0.29	0.16	1,179.66	61.76	27	0.72	16	51
Farfantepenaeus duorarum	83	<0.1	11.1	0.28	0.06	429.18	19.12	8	0.40	3	18
Callinectes sapidus	76	<0.1	11.3	0.26	0.05	367.98	10.29	50	5.61	9	183
Cynoscion arenarius	63	<0.1	3.7	0.21	0.07	689.53	16.18	31	1.04	17	54
Elops saurus	22	<0.1	1.6	0.07	0.05	1,299.92	19.12	40	7.05	20	185
Lutjanus griseus	16	<0.1	2.5	0.05	0.02	705.27	4.41	95	15.63	13	232
Pogonias cromis	16	<0.1	1.2	0.05	0.03	1,215.90	10.29	20	1.69	10	35
Mugil trichodon	15	<0.1	1.6	0.05	0.02	1,004.96	8.82	38	4.80	16	95
Mugil curema	5	<0.1	0.9	0.02	0.01	1,096.53	2.94	106	37.85	31	241
Paralichthys albigutta	2	<0.1	0.5	0.01	<0.01	1,467.99	1.47	40	8.50	31	48
Caranx hippos	1	<0.1	0.2	<0.01	<0.01	2,078.46	1.47	75	.	75	75
Totals	**5,819**	**1.8**	**.**	**19.81**	**5.89**	**618.09**	**2,377.94**	**.**	**.**	**3**	**655**

Table TB21-10. Catch statistics for 10 dominant taxa collected in 84 6.1-m river otter trawl samples during Tampa Bay stratified-random sampling, 2021. 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	4,415	63.2	42.9	7.54	2.74	324.53	145.71	29	0.10	15	55
Microgobius gulosus	326	4.7	41.7	0.60	0.21	316.15	12.29	24	0.40	12	49
Bairdiella chrysoura	327	4.7	13.1	0.56	0.30	477.57	22.40	65	1.78	11	145
Eucinostomus spp.	323	4.6	29.8	0.56	0.23	359.90	12.14	27	0.41	10	39
Trinectes maculatus	242	3.5	31.0	0.43	0.15	312.13	9.89	37	0.83	11	65
Lagodon rhomboides	200	2.9	14.3	0.34	0.20	526.50	14.84	36	1.45	14	93
Anchoa hepsetus	151	2.2	2.4	0.25	0.25	887.79	20.24	29	0.12	26	32
Eucinostomus gula	120	1.7	13.1	0.21	0.09	379.92	4.45	63	1.30	40	89
Farfantepenaeus duorarum	108	1.5	29.8	0.19	0.06	298.57	4.20	11	0.50	3	25
Callinectes sapidus	95	1.4	41.7	0.17	0.03	169.51	1.80	117	4.87	17	198
Subtotals	6,307	90.4	.	.	.	.	.	.	.	3	198
Totals	**6,988**	**100.0**	**.**	**11.49**	**2.76**	**220.23**	**152.09**	**.**	**.**	**3**	**999**

Table TB21-11. Catch statistics for Selected Taxa collected in 84 6.1-m river otter trawl samples during Tampa Bay stratified-random sampling, 2021. 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	108	1.5	29.8	0.18	0.06	306.67	4.20	11	0.50	3	25
Callinectes sapidus	95	1.4	41.7	0.16	0.03	175.09	1.80	117	4.87	17	198
Cynoscion arenarius	87	1.2	11.9	0.15	0.10	618.40	8.39	28	2.30	8	83
Leiostomus xanthurus	42	0.6	9.5	0.07	0.03	441.14	2.16	33	3.30	15	110
Menticirrhus americanus	42	0.6	22.6	0.07	0.02	246.04	1.08	42	7.05	11	284
Archosargus probatocephalus	34	0.5	15.5	0.06	0.02	372.09	1.65	73	12.30	13	246
Cynoscion nebulosus	12	0.2	8.3	0.02	0.01	413.19	0.60	75	30.91	17	365
Sciaenops ocellatus	12	0.2	4.8	0.02	0.01	507.78	0.67	57	10.67	25	130
Brevoortia spp.	9	0.1	1.2	0.02	0.02	916.52	1.35	31	1.31	28	39
Lutjanus griseus	4	0.1	3.6	0.01	<0.01	550.88	0.27	98	29.43	55	183
Paralichthys albigutta	3	<0.1	1.2	0.01	0.01	916.52	0.45	135	17.10	107	166
Totals	**448**	**6.4**	**.**	**0.76**	**0.14**	**172.33**	**8.84**	**.**	**.**	**3**	**365**

Appendix TB21-01. Monthly summary of taxa collected during Tampa Bay stratified-random sampling, 2021. 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=119	E=90	E=104	E=105	E=104	E=90	E=119	E=90	E=104	E=105	E=104	E=90	E=1,224
Acanthostracion quadricornis	11	3	13	15	15	11	17	1	4	11	12	6	119
Achirus lineatus	4	1	4	10	5	10	36	17	79	56	24	27	273
Aetobatus narinari	.	.	.	.	.	.	1	.	.	.	.	.	1
Albula sp.	.	1	.	.	.	.	.	.	.	.	.	.	1
Aluterus schoepfii	.	.	.	2	1	1	4	.	.	.	.	.	8
Anarchopterus criniger	.	.	.	.	.	.	.	.	.	.	.	1	1
Anchoa cubana	1	.	.	.	.	.	.	.	.	.	.	.	1
Anchoa hepsetus	.	.	.	53	711	2,620	.	.	1	.	.	.	3,385
Anchoa mitchilli	11,781	4,898	12,021	72,596	27,273	54,526	24,461	32,831	7,784	33,271	13,020	17,764	312,226
Anchoa spp.	.	.	1	.	.	.	2	.	.	.	.	.	3
Archosargus probatocephalus	163	40	106	125	416	113	126	53	67	107	56	23	1,395
Argopecten irradians	1	.	.	1	.	.	.	.	.	.	.	.	2
Ariopsis felis	56	85	72	274	324	542	388	406	102	831	59	3	3,142
Bagre marinus	.	.	1	5	2	.	15	1	3	4	.	.	31
Bairdiella chrysoura	41	1,524	440	50	695	618	147	150	52	55	176	28	3,976
Bathygobius soporator	1	1	24	.	4	1	2	.	1	6	5	5	50
Belonesox belizanus	.	.	2	2	.	.	1	.	.	4	.	1	10
Brevoortia spp.	4	52	95	1,966	159	259	29	.	.	.	.	.	2,564
Calamus spp.	.	2	.	.	.	.	.	.	.	.	.	.	2
Callinectes ornatus	.	.	1	.	.	1	.	.	.	.	.	.	2

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=90	E=104	E=105	E=104	E=90	E=119	E=90	E=104	E=105	E=104	E=90	E=1,224
Callinectes sapidus	45	39	44	8	11	11	28	16	34	29	55	16	336
Caranx crysos	.	.	.	.	1	.	.	.	.	.	.	.	1
Caranx hippos	7	7	3	1	3	3	5	4	.	19	7	.	59
Carcharhinus leucas	.	.	.	.	.	.	.	1	.	.	.	.	1
Carcharhinus limbatus	.	.	.	.	.	1	.	.	.	.	.	.	1
Centropomus undecimalis	96	96	48	82	223	94	177	165	103	30	103	35	1,252
Centropristis striata	5	.	.	1	.	.	1	.	.	.	.	.	7
Chaetodipterus faber	20	.	3	9	19	27	58	.	73	49	1	.	259
Chasmodes saburrae	1	3	4	.	4	2	4	8	.	1	1	1	29
Chilomycterus schoepfii	28	2	3	20	8	17	13	14	10	12	12	7	146
Chloroscombrus chrysurus	.	.	.	.	.	.	.	.	.	2	.	1	3
Cichlasoma urophthalmus	3	.	1	.	.	.	.	.	.	.	.	2	6
Citharichthys macrops	3	.	.	2	.	.	4	.	.	.	.	.	9
Clupeidae spp.	.	.	1	.	1	.	1	.	.	.	.	.	3
Ctenogobius smaragdus	1	.	.	.	.	.	.	.	2	.	.	.	3
Cynoscion arenarius	11	66	.	12	90	32	27	.	16	12	.	.	266
Cynoscion nebulosus	34	57	25	37	105	75	44	34	91	38	43	54	637
Cyprinodon variegatus	12	29	5	.	1	28	3	4	1	2	67	7	159
Dactyloscopus moorei	.	.	.	.	.	1	.	.	.	1	.	.	2
Dasyatis americana	.	.	.	1	.	1	2	.	.	1	.	.	5
Dasyatis sabina	79	9	24	70	49	47	316	13	3	9	17	7	643
Dasyatis say	.	1	.	2	3	3	3	1	.	1	.	.	14

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=90	E=104	E=105	E=104	E=90	E=119	E=90	E=104	E=105	E=104	E=90	E=1,224
Diapterus auratus	36	2	2	7	29	21	21	126	37	70	3	.	354
Diplectrum formosum	2	.	.	4	.	.	.	.	.	4	.	.	10
Diplodus holbrookii	.	.	.	5	26	7	.	.	.	1	.	.	39
Dorosoma petenense	.	.	.	.	.	.	27	.	.	.	.	.	27
Echeneis neucratoides	.	.	1	.	1	.	.	.	.	.	.	.	2
Echeneis sp.	.	.	.	1	.	.	.	.	.	.	.	.	1
Elops saurus	1,625	862	64	1,472	27	27	57	3	1	34	269	11	4,452
Etropus crossotus	2	.	.	1	.	.	4	.	.	.	1	.	8
Eucinostomus gula	623	255	685	512	351	209	377	2,326	723	1,269	974	574	8,878
Eucinostomus harengulus	689	500	779	782	1,354	729	251	290	459	459	375	679	7,346
Eucinostomus spp.	2,563	2,290	1,740	933	1,429	3,416	2,556	2,262	1,663	442	328	763	20,385
Eugerres plumieri	86	34	17	16	9	126	304	280	313	53	89	111	1,438
Farfantepenaeus duorarum	45	27	75	10	41	91	410	50	39	70	142	44	1,044
Floridichthys carpio	123	44	12	5	10	32	108	5	121	99	222	98	879
Fundulus grandis	42	59	32	2	45	.	62	.	12	12	183	10	459
Fundulus seminolis	.	2	.	.	.	.	6	5	.	5	.	.	18
Fundulus similis	13	8	16	8	.	1	6	30	19	9	16	166	292
Gambusia holbrooki	96	4	.	.	.	.	14	.	207	60	5	12	398
Gerres cinereus	.	.	1	.	.	.	.	.	1	.	3	.	5
Gobiesox strumosus	.	.	.	.	.	.	2	.	.	.	.	1	3
Gobiomorus dormitor	.	.	.	.	.	.	.	.	.	1	.	1	2
Gobiosoma bosc	22	12	11	12	2	44	44	15	17	41	50	74	344

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=90	E=104	E=105	E=104	E=90	E=119	E=90	E=104	E=105	E=104	E=90	E=1,224
Gobiosoma longipala	1	1	.	.	.	.	.	.	.	.	.	.	2
Gobiosoma robustum	11	36	46	14	25	30	35	11	20	12	11	71	322
Gobiosoma spp.	6	51	9	.	35	99	222	102	96	74	32	274	1,000
Gymnura micrura	4	.	1	.	.	1	.	.	.	.	.	.	6
Haemulon plumierii	4	.	.	.	.	.	1	3	.	.	.	5	13
Harengula jaguana	12	1	11	1,868	187	30	25	234	234	84	5	.	2,691
Hemichromis letourneuxi	.	1	.	.	.	.	.	.	.	.	2	2	5
Hippocampus erectus	2	.	1	4	1	1	1	.	.	.	1	1	12
Hippocampus zosterae	18	3	4	1	2	1	.	3	.	.	.	23	55
Hyporhamphus meeki	.	.	.	.	.	.	2	.	.	.	6	.	8
Hyporhamphus spp.	.	.	.	.	2	.	.	.	.	.	.	.	2
Ictalurus punctatus	.	.	.	.	.	.	2	.	1	.	.	.	3
Labidesthes sicculus	.	.	.	7	.	.	2	.	.	14	.	.	23
Lagodon rhomboides	1,269	1,823	9,759	3,821	3,750	3,008	1,347	1,489	1,721	601	1,794	528	30,910
Leiostomus xanthurus	470	3,222	382	46	79	41	.	.	6	.	.	.	4,246
Lepisosteus osseus	1	.	.	.	.	.	3	1	.	.	1	.	6
Lepisosteus platyrhincus	.	.	.	1	.	.	.	.	.	.	.	.	1
Lepomis auritus	.	.	.	.	.	.	.	.	.	1	.	.	1
Lepomis gulosus	.	.	.	.	.	.	.	1	.	.	.	.	1
Lepomis macrochirus	.	10	2	.	.	.	28	22	5	11	1	10	89
Lepomis microlophus	.	.	1	.	.	.	.	.	.	2	.	.	3
Lepomis spp.	.	.	.	.	.	.	62	20	6	4	.	.	92

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=90	E=104	E=105	E=104	E=90	E=119	E=90	E=104	E=105	E=104	E=90	E=1,224
Limulus polyphemus	.	4	1	.	4	.	1	.	.	3	.	1	14
Lophogobius cyprinoides	.	.	9	.	3	.	2	6	181	6	3	14	224
Lucania goodei	.	1	.	.	.	.	.	1	.	.	.	.	2
Lucania parva	115	200	25	86	174	1,195	378	31	405	465	246	1,008	4,328
Lutjanus griseus	7	3	2	16	15	69	93	16	48	8	6	1	284
Lutjanus spp.	.	.	.	.	.	.	.	.	2	.	.	.	2
Lutjanus synagris	9	.	.	3	3	1	2	2	6	6	6	1	39
Membras martinica	.	.	.	354	52	738	25	1	9	53	.	.	1,232
Menidia spp.	524	867	606	5,222	3,713	4,012	3,357	3,899	3,131	3,352	2,971	3,351	35,005
Menippe spp.	15	1	.	28	.	.	16	.	.	6	.	.	66
Menticirrhus americanus	21	.	1	14	28	78	22	7	8	12	20	.	211
Menticirrhus littoralis	.	.	.	.	.	.	1	1	1	.	13	.	16
Menticirrhus saxatilis	7	3	4	4	2	.	.	.	.	.	.	2	22
Menticirrhus sp.	.	.	.	1	.	.	.	.	.	.	.	.	1
Microgobius gulosus	90	138	89	45	540	911	977	568	973	678	1,526	1,671	8,206
Microgobius thalassinus	1	.	3	1	1	.	8	.	.	.	.	.	14
Micropogonias undulatus	.	.	.	.	.	1	.	.	.	.	.	.	1
Micropterus salmoides	.	.	.	.	7	1	2	.	.	.	1	.	11
Monacanthus ciliatus	3	.	2	.	.	.	.	.	.	.	.	.	5
Mugil cephalus	135	2,020	596	465	90	49	12	51	14	18	25	11	3,486
Mugil curema	4	113	11	6	12	10	.	5	1	.	20	9	191
Mugil trichodon	487	39	62	14	15	13	18	10	3	12	5	5	683

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=90	E=104	E=105	E=104	E=90	E=119	E=90	E=104	E=105	E=104	E=90	E=1,224
Mycteroperca microlepis	.	.	.	.	1	.	1	.	1	.	.	.	3
Myrophis punctatus	.	.	.	.	.	.	2	.	.	.	.	.	2
Nicholsina usta	3	.	2	1	13	11	1	.	.	.	2	.	33
Notropis petersoni	.	.	.	.	.	.	.	.	1	.	.	.	1
Ogcocephalus cubifrons	2	.	1	1	.	.	.	.	.	.	.	.	4
Oligoplites saurus	2	5	.	4	2	102	16	93	99	23	8	2	356
Opisthonema oglinum	.	.	260	10	314	51	18	5	45	37	13	.	753
Opsanus beta	2	3	8	4	11	11	8	2	5	2	.	1	57
Oreochromis aureus	.	.	.	.	.	1	.	.	.	2	.	.	3
Oreochromis/Sarotherodon spp.	.	2	.	.	2	6	6	7	14	8	3	.	48
Orthopristis chrysoptera	74	105	186	665	376	226	52	26	68	.	23	.	1,801
Paralichthys albigutta	15	13	18	29	15	33	3	4	3	9	2	.	144
Peprilus paru	.	.	.	.	.	.	.	.	.	1	.	.	1
Poecilia latipinna	37	6	8	4	18	1	9	.	89	6	15	2	195
Pogonias cromis	.	.	1	17	2	2	.	.	1	13	1	.	37
Pomatomus saltatrix	.	.	.	2	.	.	.	.	.	1	.	.	3
Pomoxis nigromaculatus	.	.	.	.	.	.	2	.	.	.	.	.	2
Portunidae sp.	.	.	.	1	.	.	.	.	.	.	.	.	1
Portunus spp.	14	1	1	12	3	2	339	3	5	96	.	4	480
Prionotus rubio	.	.	.	1	.	.	.	.	.	.	.	.	1
Prionotus scitulus	77	9	3	70	8	11	35	2	2	134	2	2	355
Prionotus tribulus	18	6	.	17	1	2	1	.	1	.	7	3	56

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=90	E=104	E=105	E=104	E=90	E=119	E=90	E=104	E=105	E=104	E=90	E=1,224
Pterygoplichthys spp.	.	.	.	.	.	.	8	.	.	.	.	.	8
Rachycentron canadum	.	1	.	.	.	.	.	.	.	.	.	.	1
Raja texana	.	.	.	1	.	.	.	.	.	.	.	.	1
Rhinoptera bonasus	.	30	12	4	.	5	20	17	4	156	.	.	248
Rimapenaeus sp.	1	.	.	.	.	.	.	.	.	.	.	.	1
Sardinella aurita	.	.	.	.	.	.	.	1	.	.	.	.	1
Sarotherodon melanotheron	.	4	1	1	.	.	26	20	12	7	22	50	143
Sciaenops ocellatus	99	236	65	16	13	20	34	20	19	17	26	134	699
Scomberomorus maculatus	3	.	2	.	.	.	.	.	.	.	.	.	5
Scorpaena brasiliensis	.	.	.	2	.	.	.	.	.	.	.	.	2
Selene vomer	.	2	.	1	1	3	2	1	1	8	.	.	19
Serraniculus pumilio	.	.	.	1	.	.	.	.	.	1	.	.	2
Sphoeroides nephelus	33	19	29	38	48	60	18	21	14	3	25	68	376
Sphoeroides spengleri	.	2	.	.	.	.	.	.	.	1	.	1	4
Sphoeroides sp.	.	.	.	.	1	.	.	.	.	.	.	.	1
Sphyraena barracuda	1	4	1	1	.	.	.	1	2	1	8	12	31
Sphyrna tiburo	.	1	1	2	4	1	6	2	.	.	2	.	19
Stephanolepis hispidus	16	3	1	.	6	8	1	4	3	4	5	17	68
Strongylura marina	4	39	2	6	6	12	.	.	2	7	7	12	97
Strongylura notata	130	124	28	97	64	62	18	21	42	24	40	19	669
Strongylura spp.	.	.	.	6	10	8	.	1	1	.	3	.	29
Strongylura timucu	1	.	1	.	.	.	.	.	.	.	2	2	6

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=119	E=90	E=104	E=105	E=104	E=90	E=119	E=90	E=104	E=105	E=104	E=90	E=1,224
Symphurus plagiusa	14	4	4	14	3	12	2	.	1	2	2	.	58
Syngnathus floridae	4	4	5	8	11	6	2	5	.	7	2	.	54
Syngnathus louisianae	15	2	1	3	13	8	10	1	5	37	12	10	117
Syngnathus scovelli	41	33	38	27	52	40	133	33	14	8	35	68	522
Synodus foetens	47	19	24	57	43	34	17	6	14	30	45	41	377
Trachinotus carolinus	.	.	1	.	.	.	.	.	.	11	2	2	16
Trachinotus falcatus	6	14	.	.	.	17	.	6	5	23	1	.	72
Trinectes maculatus	76	48	138	60	13	36	175	28	116	97	90	164	1,041
Urophycis floridana	.	2	.	.	.	.	.	.	.	.	.	.	2
Xiphophorus spp.	.	1	.	.	.	.	.	1	.	.	.	.	2
Totals	22,326	20,294	28,845	92,318	43,241	74,827	37,773	45,926	19,498	43,378	23,418	28,134	479,978

Appendix TB21-02. Summary by gear and stratum of taxa collected during Tampa Bay stratified-random sampling, 2021. 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								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=112	E=129	E=167	E=228	E=204	E=182	E=58	E=144	E=1,224
Acanthostracion quadricornis	10	1	3	.	.	51	34	20	119
Achirus lineatus	23	37	74	14	30	4	5	86	273
Aetobatus narinari	.	.	.	.	.	.	1	.	1
Albula sp.	.	.	.	.	.	1	.	.	1
Aluterus schoepfii	.	1	.	.	.	1	1	5	8
Anarchopterus criniger	.	.	1	.	.	.	.	.	1
Anchoa cubana	.	.	1	.	.	.	.	.	1
Anchoa hepsetus	46	3	21	2,697	467	.	.	151	3,385
Anchoa mitchilli	4,201	4,726	33,254	183,247	80,987	.	.	5,811	312,226
Anchoa spp.	2	.	1	.	.	.	.	.	3
Archosargus probatocephalus	227	2	137	73	91	655	175	35	1,395
Argopecten irradians	.	.	.	.	.	1	.	1	2
Ariopsis felis	25	56	51	2	1	1,974	950	83	3,142
Bagre marinus	1	.	.	.	.	13	13	4	31
Bairdiella chrysoura	839	12	480	90	142	2,041	42	330	3,976
Bathygobius soporator	.	1	7	6	35	.	.	1	50
Belonesox belizanus	.	.	.	4	6	.	.	.	10
Brevoortia spp.	.	5	76	2,100	339	31	4	9	2,564
Calamus spp.	2	.	.	.	.	.	.	.	2
Callinectes ornatus	.	2	.	.	.	.	.	.	2
Callinectes sapidus	25	7	25	35	41	61	38	104	336
Caranx crysos	.	.	.	.	.	.	1	.	1
Caranx hippos	.	.	.	.	1	35	23	.	59
Carcharhinus leucas	.	.	.	.	.	1	.	.	1
Carcharhinus limbatus	.	.	.	.	.	1	.	.	1
Centropomus undecimalis	1	.	4	124	85	847	191	.	1,252
Centropristis striata	1	.	.	.	.	.	4	2	7
Chaetodipterus faber	.	.	2	.	2	173	29	53	259
Chasmodes saburrae	9	.	11	2	2	.	.	5	29

Species	Gear								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=112	E=129	E=167	E=228	E=204	E=182	E=58	E=144	E=1,224
Chilomycterus schoepfii	6	2	2	2	.	55	36	43	146
Chloroscombrus chrysurus	.	.	.	.	.	.	1	2	3
Cichlasoma urophthalmus	.	.	.	5	1	.	.	.	6
Citharichthys macrops	.	1	.	.	.	.	1	7	9
Clupeidae spp.	.	.	1	2	.	.	.	.	3
Ctenogobius smaragdus	.	.	2	.	1	.	.	.	3
Cynoscion arenarius	.	5	.	34	29	67	.	131	266
Cynoscion nebulosus	133	43	107	45	61	205	31	12	637
Cyprinodon variegatus	.	2	111	26	20	.	.	.	159
Dactyloscopus moorei	.	2	.	.	.	.	.	.	2
Dasyatis americana	.	.	.	.	.	3	.	2	5
Dasyatis sabina	1	4	6	2	2	252	306	70	643
Dasyatis say	.	.	2	.	.	6	3	3	14
Diapterus auratus	.	.	3	70	39	225	17	.	354
Diplectrum formosum	.	.	.	.	.	.	.	10	10
Diplodus holbrookii	36	.	.	.	.	1	2	.	39
Dorosoma petenense	.	.	.	.	27	.	.	.	27
Echeneis neucratoides	.	.	.	.	.	2	.	.	2
Echeneis sp.	.	.	.	.	.	1	.	.	1
Elops saurus	.	.	.	19	3	3,843	587	.	4,452
Etropus crossotus	.	.	.	.	.	.	1	7	8
Eucinostomus gula	1,032	281	3,333	154	257	2,167	976	678	8,878
Eucinostomus harengulus	44	231	908	2,372	2,690	770	232	99	7,346
Eucinostomus spp.	3,581	368	6,993	4,831	4,219	3	.	390	20,385
Eugerres plumieri	19	23	29	565	492	227	17	66	1,438
Farfantepenaeus duorarum	232	36	333	34	49	162	39	159	1,044
Floridichthys carpio	14	30	819	.	15	1	.	.	879
Fundulus grandis	.	37	207	93	120	2	.	.	459
Fundulus seminolis	.	.	.	12	6	.	.	.	18
Fundulus similis	.	3	89	1	194	2	3	.	292
Gambusia holbrooki	.	.	.	23	375	.	.	.	398
Gerres cinereus	.	.	1	.	1	3	.	.	5
Gobiesox strumosus	.	.	.	.	.	1	.	2	3
Gobiomorus dormitor	.	.	.	2	.	.	.	.	2
Gobiosoma bosc	1	.	33	145	157	.	.	8	344

Species	Gear								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=112	E=129	E=167	E=228	E=204	E=182	E=58	E=144	E=1,224
Gobiosoma longipala	.	.	1	.	.	.	.	1	2
Gobiosoma robustum	122	36	128	13	18	.	.	5	322
Gobiosoma spp.	187	115	234	193	232	.	.	39	1,000
Gymnura micrura	.	.	.	.	.	3	1	2	6
Haemulon plumierii	4	.	.	.	.	.	8	1	13
Harengula jaguana	228	60	260	12	8	1,953	169	1	2,691
Hemichromis letourneuxi	.	.	.	3	2	.	.	.	5
Hippocampus erectus	2	2	.	.	.	.	1	7	12
Hippocampus zosterae	36	2	17	.	.	.	.	.	55
Hyporhamphus meeki	3	5	.	.	.	.	.	.	8
Hyporhamphus spp.	.	.	2	.	.	.	.	.	2
Ictalurus punctatus	.	.	.	1	.	.	.	2	3
Labidesthes sicculus	.	.	.	22	1	.	.	.	23
Lagodon rhomboides	11,412	83	5,613	446	456	8,582	3,997	321	30,910
Leiostomus xanthurus	27	132	3,102	493	347	91	5	49	4,246
Lepisosteus osseus	.	.	.	2	1	1	.	2	6
Lepisosteus platyrhincus	.	.	.	1	.	.	.	.	1
Lepomis auritus	.	.	.	.	1	.	.	.	1
Lepomis gulosus	.	.	.	1	.	.	.	.	1
Lepomis macrochirus	.	.	.	53	36	.	.	.	89
Lepomis microlophus	.	.	.	1	2	.	.	.	3
Lepomis spp.	.	.	.	48	44	.	.	.	92
Limulus polyphemus	1	.	1	.	.	11	.	1	14
Lophogobius cyprinoides	.	7	186	20	11	.	.	.	224
Lucania goodei	.	.	.	1	1	.	.	.	2
Lucania parva	1,520	98	1,386	465	859	.	.	.	4,328
Lutjanus griseus	13	.	9	6	10	181	57	8	284
Lutjanus spp.	.	.	.	.	2	.	.	.	2
Lutjanus synagris	9	.	.	.	.	7	10	13	39
Membras martinica	.	1	455	18	758	.	.	.	1,232
Menidia spp.	112	175	5,404	13,154	16,158	2	.	.	35,005
Menippe spp.	.	1	.	.	.	.	.	65	66
Menticirrhus americanus	3	5	25	45	39	1	.	93	211
Menticirrhus littoralis	.	.	.	.	.	1	15	.	16
Menticirrhus saxatilis	2	6	11	.	.	.	.	3	22

Species	Gear								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=112	E=129	E=167	E=228	E=204	E=182	E=58	E=144	E=1,224
Menticirrhus sp.	.	1	.	.	.	.	.	.	1
Microgobius gulosus	1,982	1,364	2,713	940	874	.	.	333	8,206
Microgobius thalassinus	7	.	.	.	2	.	.	5	14
Micropogonias undulatus	.	.	.	.	.	1	.	.	1
Micropterus salmoides	.	.	.	9	2	.	.	.	11
Monacanthus ciliatus	.	.	2	.	.	2	1	.	5
Mugil cephalus	1	1,561	76	468	902	424	54	.	3,486
Mugil curema	1	.	5	2	3	165	15	.	191
Mugil trichodon	.	1	523	9	6	104	40	.	683
Mycteroperca microlepis	.	.	.	.	.	1	1	1	3
Myrophis punctatus	.	.	.	1	.	.	.	1	2
Nicholsina usta	5	.	.	.	.	21	6	1	33
Notropis petersoni	.	.	.	.	.	.	.	1	1
Ogcocephalus cubifrons	.	.	.	.	.	3	.	1	4
Oligoplites saurus	27	24	152	41	60	32	20	.	356
Opisthonema oglinum	52	29	8	7	.	282	371	4	753
Opsanus beta	1	.	5	4	5	26	6	10	57
Oreochromis aureus	1	.	.	.	2	.	.	.	3
Oreochromis/Sarotherodon spp.	14	.	7	7	16	4	.	.	48
Orthopristis chrysoptera	986	24	333	5	18	225	141	69	1,801
Paralichthys albigutta	10	16	23	1	1	60	12	21	144
Peprilus paru	.	.	.	.	.	1	.	.	1
Poecilia latipinna	.	.	15	9	171	.	.	.	195
Pogonias cromis	.	1	.	7	9	19	1	.	37
Pomatomus saltatrix	.	.	.	.	.	3	.	.	3
Pomoxis nigromaculatus	.	.	.	1	.	.	.	1	2
Portunidae sp.	.	.	1	.	.	.	.	.	1
Portunus spp.	8	9	3	1	.	.	2	457	480
Prionotus rubio	.	.	.	.	.	.	.	1	1
Prionotus scitulus	12	19	8	1	2	10	8	295	355
Prionotus tribulus	2	5	10	.	1	5	2	31	56
Pterygoplichthys spp.	.	.	.	3	3	1	.	1	8
Rachycentron canadum	.	.	.	.	.	1	.	.	1
Raja texana	.	.	.	.	.	.	.	1	1
Rhinoptera bonasus	.	.	.	.	.	238	9	1	248

Species	Gear								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=112	E=129	E=167	E=228	E=204	E=182	E=58	E=144	E=1,224
Rimapenaeus sp.	1	.	.	.	.	.	.	.	1
Sardinella aurita	.	.	.	.	1	.	.	.	1
Sarotherodon melanotheron	4	.	1	.	7	131	.	.	143
Sciaenops ocellatus	6	31	28	156	152	309	5	12	699
Scomberomorus maculatus	.	.	.	.	.	2	3	.	5
Scorpaena brasiliensis	.	.	.	.	.	.	.	2	2
Selene vomer	.	.	1	.	.	13	5	.	19
Serraniculus pumilio	.	.	.	.	.	.	.	2	2
Sphoeroides nephelus	57	24	98	1	3	137	36	20	376
Sphoeroides spengleri	1	.	.	.	.	1	1	1	4
Sphoeroides sp.	.	.	1	.	.	.	.	.	1
Sphyraena barracuda	1	.	.	.	.	15	15	.	31
Sphyrna tiburo	.	.	.	.	.	11	8	.	19
Stephanolepis hispidus	30	5	12	.	.	8	11	2	68
Strongylura marina	.	2	16	11	4	64	.	.	97
Strongylura notata	11	7	107	48	43	408	45	.	669
Strongylura spp.	1	.	6	11	11	.	.	.	29
Strongylura timucu	.	.	1	5	.	.	.	.	6
Symphurus plagiusa	7	11	3	1	.	.	1	35	58
Syngnathus floridae	48	2	1	.	.	.	.	3	54
Syngnathus louisianae	56	7	20	.	3	.	.	31	117
Syngnathus scovelli	271	25	184	12	14	.	.	16	522
Synodus foetens	54	97	94	5	16	19	15	77	377
Trachinotus carolinus	.	.	.	.	.	13	3	.	16
Trachinotus falcatus	.	17	9	.	.	22	24	.	72
Trinectes maculatus	3	37	11	407	336	2	.	245	1,041
Urophycis floridana	1	.	1	.	.	.	.	.	2
Xiphophorus spp.	.	.	.	1	1	.	.	.	2
Totals	**27,853**	**9,968**	**68,439**	**214,003**	**112,641**	**27,504**	**8,887**	**10,683**	**479,978**

Appendix TB21-03. Summary by zone of taxa collected during Tampa Bay stratified-random sampling, 2021. 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=144	**E=132**	**E=172**	**E=104**	**E=156**	**E=168**	**E=144**	**E=120**	**E=84**	**E=1,224**
Acanthostracion quadricornis	15	30	13	20	40	.	.	1	.	119
Achirus lineatus	41	47	87	12	14	20	36	9	7	273
Aetobatus narinari	1	.	.	.	.	.	.	.	.	1
Albula sp.	1	.	.	.	.	.	.	.	.	1
Aluterus schoepfii	1	3	.	.	4	.	.	.	.	8
Anarchopterus criniger	.	1	.	.	.	.	.	.	.	1
Anchoa cubana	.	.	.	1	.	.	.	.	.	1
Anchoa hepsetus	54	.	16	.	.	3,152	13	150	.	3,385
Anchoa mitchilli	9,151	5,602	3,636	312	24,876	58,649	104,855	61,509	43,636	312,226
Anchoa spp.	.	.	3	.	.	.	.	.	.	3
Archosargus probatocephalus	110	339	144	197	407	76	77	36	9	1,395
Argopecten irradians	.	.	.	1	1	.	.	.	.	2
Ariopsis felis	653	765	585	37	1,026	20	19	24	13	3,142
Bagre marinus	23	1	2	.	1	2	1	1	.	31
Bairdiella chrysoura	1,922	618	527	110	240	82	62	247	168	3,976
Bathygobius soporator	1	1	6	.	.	23	10	7	2	50
Belonesox belizanus	.	.	.	.	.	6	4	.	.	10
Brevoortia spp.	101	4	7	4	.	253	1,804	11	380	2,564
Calamus spp.	.	.	.	.	2	.	.	.	.	2
Callinectes ornatus	.	.	1	1	.	.	.	.	.	2
Callinectes sapidus	13	30	56	44	22	35	43	59	34	336
Caranx crysos	.	1	.	.	.	.	.	.	.	1
Caranx hippos	23	21	1	1	12	.	.	1	.	59
Carcharhinus leucas	.	.	1	.	.	.	.	.	.	1
Carcharhinus limbatus	.	.	.	1	.	.	.	.	.	1
Centropomus undecimalis	74	315	209	95	350	83	21	59	46	1,252
Centropristis striata	.	.	.	5	2	.	.	.	.	7
Chaetodipterus faber	16	25	51	80	83	2	.	2	.	259
Chasmodes saburrae	14	2	1	1	3	.	.	8	.	29
Chilomycterus schoepfii	20	35	23	26	37	.	.	5	.	146
Chloroscombrus chrysurus	.	.	1	1	1	.	.	.	.	3
Cichlasoma urophthalmus	.	.	.	.	.	.	6	.	.	6
Citharichthys macrops	.	.	.	3	6	.	.	.	.	9

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=144	E=132	E=172	E=104	E=156	E=168	E=144	E=120	E=84	E=1,224
Clupeidae spp.	1	.	.	.	.	1	1	.	.	3
Ctenogobius smaragdus	.	.	.	.	2	.	.	.	1	3
Cynoscion arenarius	103	10	2	.	1	128	4	17	1	266
Cynoscion nebulosus	158	119	86	51	105	38	24	29	27	637
Cyprinodon variegatus	30	.	77	4	2	17	.	25	4	159
Dactyloscopus moorei	.	1	.	.	1	.	.	.	.	2
Dasyatis americana	1	.	1	.	2	.	.	1	.	5
Dasyatis sabina	309	40	185	12	71	4	9	12	1	643
Dasyatis say	2	5	5	1	1	.	.	.	.	14
Diapterus auratus	2	37	83	43	80	34	10	31	34	354
Diplectrum formosum	.	2	.	3	5	.	.	.	.	10
Diplodus holbrookii	.	.	.	36	3	.	.	.	.	39
Dorosoma petenense	.	.	.	.	.	7	.	20	.	27
Echeneis neucratoides	1	1	.	.	.	.	.	.	.	2
Echeneis sp.	.	.	.	.	1	.	.	.	.	1
Elops saurus	2,234	372	1,589	216	19	21	.	1	.	4,452
Etropus crossotus	.	.	.	8	.	.	.	.	.	8
Eucinostomus gula	499	1,785	918	1,930	3,215	122	139	255	15	8,878
Eucinostomus harengulus	438	386	382	426	558	1,335	1,202	1,553	1,066	7,346
Eucinostomus spp.	1,322	1,720	1,571	1,402	4,997	3,014	1,728	2,617	2,014	20,385
Eugerres plumieri	23	10	239	6	37	511	186	260	166	1,438
Farfantepenaeus duorarum	118	69	167	200	299	36	55	79	21	1,044
Floridichthys carpio	318	48	382	5	111	15	.	.	.	879
Fundulus grandis	51	1	179	5	10	113	31	9	60	459
Fundulus seminolis	.	.	.	.	.	14	4	.	.	18
Fundulus similis	48	.	45	4	.	190	.	5	.	292
Gambusia holbrooki	.	.	.	.	.	8	.	1	389	398
Gerres cinereus	.	.	.	.	4	1	.	.	.	5
Gobiesox strumosus	1	.	.	.	.	.	1	1	.	3
Gobiomorus dormitor	.	.	.	.	.	2	.	.	.	2
Gobiosoma bosc	.	1	11	.	23	140	84	14	71	344
Gobiosoma longipala	.	.	.	.	2	.	.	.	.	2
Gobiosoma robustum	102	43	22	43	76	4	8	20	4	322
Gobiosoma spp.	139	128	29	3	238	172	168	50	73	1,000
Gymnura micrura	1	2	2	.	1	.	.	.	.	6
Haemulon plumierii	.	.	.	12	1	.	.	.	.	13

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=144	E=132	E=172	E=104	E=156	E=168	E=144	E=120	E=84	E=1,224
Harengula jaguana	222	51	1,899	353	145	19	1	1	.	2,691
Hemichromis letourneuxi	.	.	.	.	.	3	.	.	2	5
Hippocampus erectus	2	1	5	2	2	.	.	.	.	12
Hippocampus zosterae	9	20	1	16	9	.	.	.	.	55
Hyporhamphus meeki	2	5	.	.	1	.	.	.	.	8
Hyporhamphus spp.	2	.	.	.	.	.	.	.	.	2
Ictalurus punctatus	.	.	.	.	.	1	2	.	.	3
Labidesthes sicculus	.	.	.	.	.	11	.	.	12	23
Lagodon rhomboides	1,270	4,072	226	11,084	13,156	200	596	260	46	30,910
Leiostomus xanthurus	35	253	91	2,251	734	41	584	202	55	4,246
Lepisosteus osseus	.	.	1	.	.	1	4	.	.	6
Lepisosteus platyrhincus	.	.	.	.	.	.	.	.	1	1
Lepomis auritus	.	.	.	.	.	1	.	.	.	1
Lepomis gulosus	.	.	.	.	.	1	.	.	.	1
Lepomis macrochirus	.	.	.	.	.	80	5	.	4	89
Lepomis microlophus	.	.	.	.	.	1	1	.	1	3
Lepomis spp.	.	.	.	.	.	85	2	.	5	92
Limulus polyphemus	8	.	2	1	3	.	.	.	.	14
Lophogobius cyprinoides	.	185	8	.	.	10	11	4	6	224
Lucania goodei	.	.	.	.	.	1	1	.	.	2
Lucania parva	496	694	1,141	353	320	125	140	493	566	4,328
Lutjanus griseus	4	154	25	29	52	3	5	8	4	284
Lutjanus spp.	.	.	.	.	.	.	.	2	.	2
Lutjanus synagris	1	7	3	18	10	.	.	.	.	39
Membras martinica	44	55	354	3	.	775	1	.	.	1,232
Menidia spp.	1,129	943	491	979	2,151	10,440	5,520	5,853	7,499	35,005
Menippe spp.	.	20	12	2	32	.	.	.	.	66
Menticirrhus americanus	37	13	34	.	1	88	17	20	1	211
Menticirrhus littoralis	.	.	.	15	1	.	.	.	.	16
Menticirrhus saxatilis	3	3	7	4	5	.	.	.	.	22
Menticirrhus sp.	.	.	1	.	.	.	.	.	.	1
Microgobius gulosus	2,490	1,157	1,531	36	852	257	697	595	591	8,206
Microgobius thalassinus	9	.	1	.	.	3	.	1	.	14
Micropogonias undulatus	.	.	.	.	1	.	.	.	.	1
Micropterus salmoides	.	.	.	.	.	9	1	.	1	11
Monacanthus ciliatus	.	2	.	3	.	.	.	.	.	5

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=144	**E=132**	**E=172**	**E=104**	**E=156**	**E=168**	**E=144**	**E=120**	**E=84**	**E=1,224**
Mugil cephalus	1,482	132	64	207	231	973	122	4	271	3,486
Mugil curema	23	125	5	17	16	.	2	3	.	191
Mugil trichodon	29	28	497	69	45	1	8	6	.	683
Mycteroperca microlepis	.	.	.	2	1	.	.	.	.	3
Myrophis punctatus	.	.	.	.	.	.	2	.	.	2
Nicholsina usta	.	.	.	27	6	.	.	.	.	33
Notropis petersoni	.	.	.	.	.	.	1	.	.	1
Ogcocephalus cubifrons	.	.	3	1	.	.	.	.	.	4
Oligoplites saurus	56	52	85	21	41	27	19	41	14	356
Opisthonema oglinum	358	54	304	15	14	2	.	6	.	753
Opsanus beta	4	8	3	14	15	3	4	4	2	57
Oreochromis aureus	.	1	.	.	.	1	.	.	1	3
Oreochromis/Sarotherodon spp.	4	10	6	3	2	5	2	2	14	48
Orthopristis chrysoptera	301	377	34	458	599	2	1	29	.	1,801
Paralichthys albigutta	21	29	16	22	51	1	.	4	.	144
Peprilus paru	.	.	1	.	.	.	.	.	.	1
Poecilia latipinna	1	.	13	.	1	33	24	2	121	195
Pogonias cromis	1	.	1	.	19	16	.	.	.	37
Pomatomus saltatrix	.	.	.	2	1	.	.	.	.	3
Pomoxis nigromaculatus	.	.	.	.	.	.	.	2	.	2
Portunidae sp.	.	.	.	.	1	.	.	.	.	1
Portunus spp.	4	61	95	242	76	.	2	.	.	480
Prionotus rubio	.	.	.	.	1	.	.	.	.	1
Prionotus scitulus	107	42	88	46	68	2	.	2	.	355
Prionotus tribulus	15	7	18	1	8	1	3	3	.	56
Pterygoplichthys spp.	.	.	1	.	.	3	3	.	1	8
Rachycentron canadum	.	.	1	.	.	.	.	.	.	1
Raja texana	.	.	.	.	1	.	.	.	.	1
Rhinoptera bonasus	41	.	183	2	22	.	.	.	.	248
Rimapenaeus sp.	.	1	.	.	.	.	.	.	.	1
Sardinella aurita	.	.	.	.	.	.	.	1	.	1
Sarotherodon melanotheron	27	12	47	1	49	1	1	1	4	143
Sciaenops ocellatus	104	70	47	9	149	125	79	58	58	699
Scomberomorus maculatus	.	.	2	3	.	.	.	.	.	5
Scorpaena brasiliensis	.	.	.	1	1	.	.	.	.	2
Selene vomer	.	5	1	.	13	.	.	.	.	19

Species	Zone									Totals
	A	B	C	D	E	K	L	M	N	
	E=144	E=132	E=172	E=104	E=156	E=168	E=144	E=120	E=84	E=1,224
Serraniculus pumilio	.	.	.	.	2	.	.	.	.	2
Sphoeroides nephelus	90	113	52	42	67	2	7	3	.	376
Sphoeroides spengleri	.	.	.	3	1	.	.	.	.	4
Sphoeroides sp.	1	.	.	.	.	.	.	.	.	1
Sphyraena barracuda	.	4	.	12	15	.	.	.	.	31
Sphyrna tiburo	12	.	4	.	3	.	.	.	.	19
Stephanolepis hispidus	.	1	2	45	20	.	.	.	.	68
Strongylura marina	6	33	1	3	39	3	12	.	.	97
Strongylura notata	67	125	58	79	249	2	22	62	5	669
Strongylura spp.	5	1	.	1	.	9	5	4	4	29
Strongylura timucu	1	.	.	.	.	2	1	2	.	6
Symphurus plagiusa	12	11	24	1	4	3	1	2	.	58
Syngnathus floridae	7	23	1	16	7	.	.	.	.	54
Syngnathus louisianae	6	34	16	25	26	1	6	2	1	117
Syngnathus scovelli	209	66	27	44	138	8	17	8	5	522
Synodus foetens	63	61	59	52	101	9	13	17	2	377
Trachinotus carolinus	1	.	9	2	4	.	.	.	.	16
Trachinotus falcatus	.	37	4	23	8	.	.	.	.	72
Trinectes maculatus	1	1	46	.	8	322	422	85	156	1,041
Urophycis floridana	.	.	.	2	.	.	.	.	.	2
Xiphophorus spp.	.	.	.	.	.	1	1	.	.	2
Totals	**26,957**	**21,779**	**18,996**	**22,024**	**56,590**	**82,043**	**118,973**	**74,921**	**57,695**	**479,978**

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 CH21-01). 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. 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 2021 in Charlotte Harbor.

Stratified-Random Sampling

A total of 262,798 animals, which included 152 taxa of fishes and 12 taxa of selected invertebrates, were collected from 1,248 Charlotte Harbor SRS samples in 2021 (Table CH21-01, Appendices CH21-01, -02, and -03). *Lagodon rhomboides* (n=72,156) was the most numerous taxon collected, representing 27.5% of the total catch. *Eucinostomus* spp. (n=41,724) and *Anchoa mitchilli* (n=34,978) were the next most abundant taxa collected, accounting for an additional 29.2% of the total catch. A total of 46 Selected Taxa (n=17,044 animals) composed 6.5% of the total catch. *Leiostomus xanthurus* (n=5,234) was the most abundant Selected Taxon, representing 2% of the total catch. *Farfantepenaeus duorarum* (n=2,574), *Centropomus undecimalis* (n=1,377), *Sciaenops ocellatus* (n=1,102), and *Lutjanus griseus* (n=899) were the next most abundant Selected Taxa, comprising 2.3% of the total catch. Collections in 2021 included 1 species new to the CH FIM collection*: Anisotremus virginicus*.

Bay Sampling

21.3-m Bay Seines. A total of 97,296 animals were collected in 408 21.3-m bay seines, representing 37% of the overall SRS catch (Table CH21-01). *Lagodon rhomboides* (n = 36,675) and *Eucinostomus* spp. (n = 22,997) were the most abundant taxa, accounting for 61.3% of the bay seine catch (Table CH21-02). The taxa most frequently caught in 21.3-m bay seines were *Eucinostomus* spp. (69.9% occurrence) and *Lagodon rhomboides* (57.6% occurrence).

A total of 5,686 animals from 28 Selected Taxa were collected, representing 5.8% of the entire 21.3-m bay seine catch (Table CH21-03). *Leiostomus xanthurus* (n=2,860) was the most abundant Selected Taxon, accounting for 50.3% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were *Farfantepenaeus duorarum* (37.0% occurrence) and *Cynoscion nebulosus* (22.3% occurrence).

183-m Haul Seines. A total of 44,475 animals were collected in 204 183-m haul seines, representing 16.9% of the overall SRS catch (Table CH21-01). *Lagodon rhomboides* (n = 30,002) was the most abundant taxon, accounting for 67.5% of the 183-m haul seine catch (Table CH21-04). The taxa most frequently caught in 183-m haul seines were *Lagodon rhomboides* (62.3% occurrence), *Centropomus undecimalis* (52.9% occurrence), and *Archosargus probatocephalus* (46.1% occurrence).

A total of 4,478 animals from 40 Selected Taxa were collected, representing 10.1% of the entire 183-m haul seine catch (Table CH21-05). *Centropomus undecimalis* (n=983) and *Lutjanus griseus* (n=747) were the most abundant Selected Taxa, accounting for 38.6% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Centropomus undecimalis* (52.9% occurrence) and *Archosargus probatocephalus* (46.1% occurrence).

6.1-m Bay Otter Trawls. A total of 17,082 animals were collected in 96 6.1-m bay otter trawls, representing 6.5% of the overall SRS catch (Table CH21-01). *Lagodon rhomboides* (n = 3,078), *Anchoa mitchilli* (n = 2,456), *Portunus* spp. (n = 2,135), and *Eucinostomus* spp. (n = 1,688) were the most abundant taxa, accounting for 54.8% of the 6.1-m bay otter trawl catch (Table CH21-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Portunus* spp. (72.9% occurrence), *Prionotus scitulus* (70.8% occurrence), and *Lagodon rhomboides* (44.8% occurrence).

A total of 1,676 animals from 22 Selected Taxa were collected, representing 9.8% of the entire 6.1-m bay otter trawl catch (Table CH21-07). *Farfantepenaeus duorarum* (n=542), *Menippe* spp. (n=462), and *Lutjanus synagris* (n=268) were the most abundant Selected Taxa, accounting for 75.9% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Farfantepenaeus duorarum* (41.7% occurrence), *Menippe* spp. (39.6% occurrence), and *Lutjanus synagris* (31.2% occurrence).

River Sampling

Tidal Creeks

21.3-m River Seines. A total of 79,734 animals were collected in 360 21.3-m river seines in tidal creeks, representing 30.3% of the overall SRS catch (Table CH21-01). *Anchoa mitchilli* (n = 25,860) was the most abundant taxon collected, accounting for 32.4% of the 21.3-m river seine catch (Table CH21-08). *Eucinostomus* spp. (n=12,681) and *Lucania parva* (n=9,682) were the next most abundant taxa, accounting for an additional 28.0% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines in tidal creeks were *Eucinostomus* spp. (75.3% occurrence), *Eucinostomus harengulus* (60.6% occurrence), and *Microgobius gulosus* (58.6% occurrence).

A total of 3,922 animals from 18 Selected Taxa were collected, representing 4.9% of the entire 21.3-m river seine catch in tidal creeks (Table CH21-09). *Leiostomus xanthurus* (n=2,171), and *Sciaenops ocellatus* (n=555) were the most abundant Selected Taxa, accounting for 69.5% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines in tidal creeks were *Farfantepenaeus duorarum* (25.0% occurrence) and *Centropomus undecimalis* (24.7% occurrence).

Rivers

21.3-m River Seines. A total of 19,670 animals were collected in 144 21.3-m river seines, representing 7.5% of the overall SRS catch (Table CH21-01). *Eucinostomus* spp. (n = 4,347) was the most abundant taxon collected, accounting for 22.1% of the 21.3-m river seine catch (Table CH21-10). *Anchoa mitchilli* (n=3,248) and *Opisthonema oglinum* (n=2,921) were the next most abundant taxa, accounting for an additional 31.4% of the 21.3-m river seine catch. The taxa most frequently caught in

21.3-m river seines were *Eucinostomus* spp. (72.9% occurrence), *Menidia* spp. (61.1% occurrence), and *Eucinostomus harengulus* (53.5% occurrence).

A total of 883 animals from 14 Selected Taxa were collected, representing 4.5% of the entire 21.3-m river seine catch (Table CH21-11). *Mugil cephalus* (n=359), and *Leiostomus xanthurus* (n=187) were the most abundant Selected Taxa, accounting for 61.8% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Farfantepenaeus duorarum* (12.5% occurrence) and *Sciaenops ocellatus* (11.8% occurrence).

6.1-m River Otter Trawls. A total of 4,541 animals were collected in 36 6.1-m river otter trawls, representing 1.7% of the overall SRS catch (Table CH21-01). *Anchoa mitchilli* (n = 2,561) was the most abundant taxon collected, accounting for 56.4% of the 6.1-m river otter trawl catch (Table CH21-12). The taxa most frequently caught in 6.1-m river otter trawls were *Menticirrhus americanus* (63.9% occurrence), *Trinectes maculatus* (58.3% occurrence), and *Farfantepenaeus duorarum* (47.2% occurrence).

A total of 399 animals from 11 Selected Taxa were collected, representing 8.8% of the entire 6.1-m river otter trawl catch (Table CH21-13). *Cynoscion arenarius* (n=132), *Farfantepenaeus duorarum* (n=122), and *Menticirrhus americanus* (n=93) were the most abundant Selected Taxa, accounting for 87% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in the 6.1-m river otter trawls were *Menticirrhus americanus* (63.9% occurrence) and *Farfantepenaeus duorarum* (47.2% occurrence).

References

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

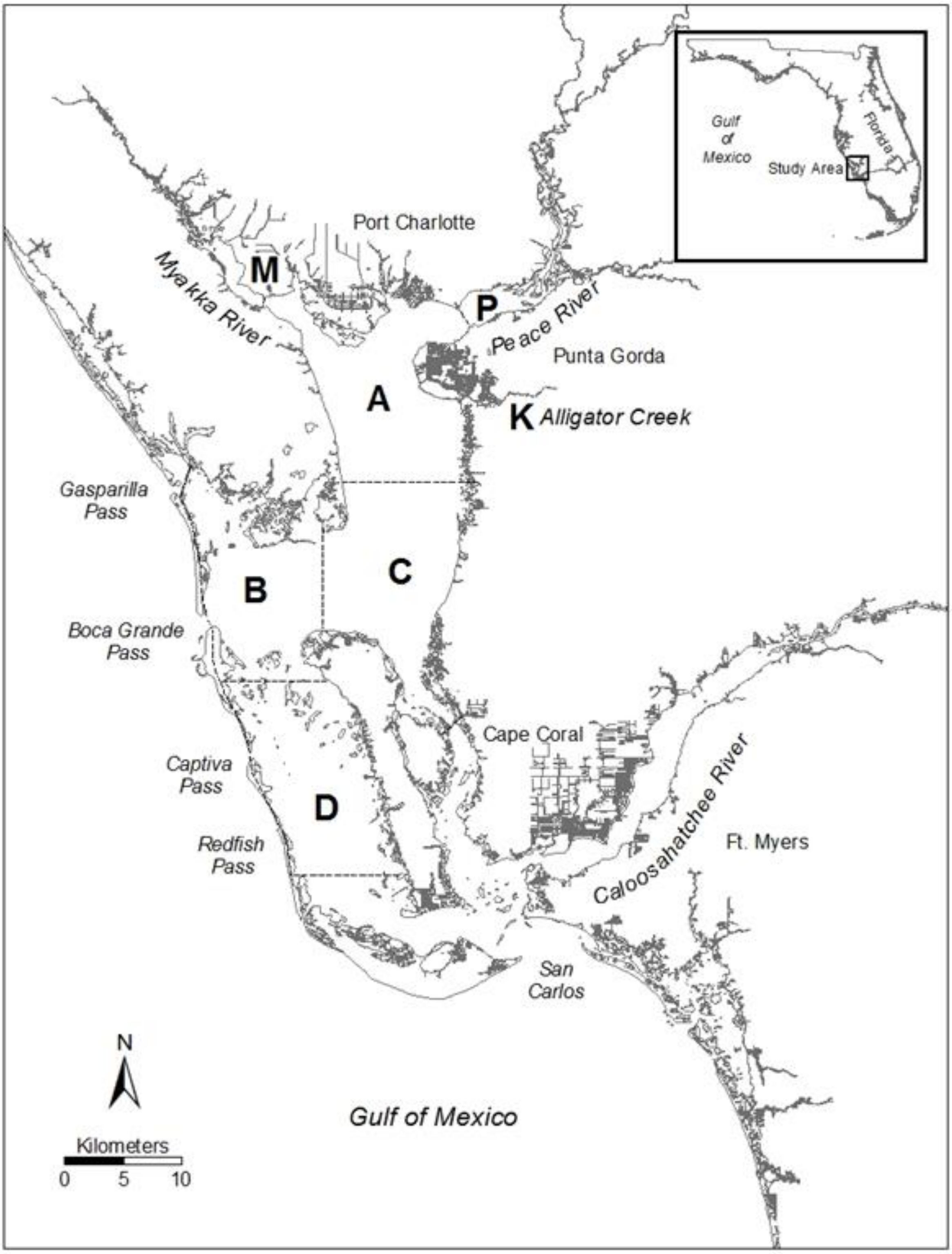

Figure CH21-01. Map of Charlotte Harbor sampling area. Zones are labeled A–D, K, M, and P.

Table CH21-01. Summary of catch and effort data for Charlotte Harbor stratified-random sampling, 2021.

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	14,822	120	23,744	120	1,694	60	3,529	28	43,789	328
B	34,165	96	39,240	120	14,822	48	4,815	24	93,042	288
C	18,025	96	16,750	120	5,849	48	4,938	24	45,562	288
D	30,284	96	.	.	22,110	48	3,800	20	56,194	164
K	.	.	5,719	48	.	.	.	.	5,719	48
M	.	.	9,370	48	.	.	3,172	18	12,542	66
P	.	.	4,581	48	.	.	1,369	18	5,950	66
Totals	**97,296**	**408**	**99,404**	**504**	**44,475**	**204**	**21,623**	**132**	**262,798**	**1,248**

Table CH21-02. Catch statistics for 10 dominant taxa collected in 408 21.3-m bay seine samples during Charlotte Harbor stratified-random sampling, 2021. 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
Lagodon rhomboides	36,675	37.7	57.6	65.00	9.18	283.62	1,547.86	37	0.10	11	158
Eucinostomus spp.	22,997	23.6	69.9	40.76	3.86	190.24	582.14	27	0.04	9	39
Harengula jaguana	6,305	6.5	10.5	11.18	3.74	671.19	1,191.43	40	0.14	20	92
Lucania parva	5,060	5.2	32.8	8.97	1.84	412.32	526.43	26	0.06	12	44
Eucinostomus gula	4,019	4.1	50.5	7.12	0.96	271.13	292.86	52	0.14	40	88
Leiostomus xanthurus	2,860	2.9	7.4	5.07	2.80	1,108.44	1,005.00	26	0.14	12	84
Menidia spp.	2,317	2.4	15.4	4.11	1.61	785.14	492.14	42	0.18	14	87
Orthopristis chrysoptera	2,091	2.1	18.6	3.71	0.97	523.11	302.86	35	0.28	13	104
Opisthonema oglinum	2,061	2.1	4.4	3.65	1.84	1,009.22	611.43	35	0.23	22	70
Microgobius gulosus	2,005	2.1	45.8	3.55	0.52	294.42	147.14	30	0.14	11	59
Subtotals	86,390	88.7	.	.	.	.	.	.	.	9	158
Totals	**97,296**	**100.0**	**.**	**170.34**	**13.04**	**154.61**	**1,800.00**	**.**	**.**	**3**	**614**

Table CH21-03. Catch statistics for Selected Taxa collected in 408 21.3-m bay seine samples during Charlotte Harbor stratified-random sampling, 2021. 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	2,860	2.9	7.4	5.01	2.76	1,115.33	1,005.00	26	0.14	12	84
Farfantepenaeus duorarum	1,484	1.5	37.0	2.60	0.44	345.11	79.29	9	0.09	3	27
Cynoscion nebulosus	327	0.3	22.3	0.57	0.08	290.41	16.43	39	0.95	12	144
Sciaenops ocellatus	256	0.3	9.3	0.45	0.12	531.79	25.00	35	3.32	11	614
Mugil trichodon	162	0.2	3.4	0.28	0.15	1,033.80	50.71	31	1.53	14	183
Archosargus probatocephalus	114	0.1	13.5	0.20	0.04	384.66	8.57	52	6.07	14	370
Callinectes sapidus	87	0.1	11.5	0.15	0.03	343.57	4.29	39	4.10	7	164
Lutjanus griseus	83	0.1	12.5	0.15	0.02	325.19	4.29	69	5.05	15	195
Mugil cephalus	71	0.1	2.7	0.12	0.10	1,653.72	41.43	47	7.64	22	369
Lutjanus synagris	49	0.1	4.9	0.09	0.02	582.40	6.43	41	2.26	16	91
Haemulon plumierii	42	<0.1	2.0	0.07	0.04	979.36	12.14	58	2.51	19	90
Menticirrhus americanus	30	<0.1	2.5	0.05	0.03	999.42	8.57	22	1.25	12	48
Centropomus undecimalis	25	<0.1	2.9	0.04	0.02	782.09	5.71	194	27.97	21	498
Paralichthys albigutta	24	<0.1	3.7	0.04	0.01	677.22	3.57	57	13.96	13	309
Centropristis striata	14	<0.1	2.0	0.02	0.01	1,076.36	5.00	65	12.54	21	156
Calamus penna	10	<0.1	1.2	0.02	0.01	1,026.34	2.86	44	4.55	33	83
Menticirrhus saxatilis	9	<0.1	1.5	0.02	0.01	864.52	1.43	31	5.90	13	61
Menippe spp.	7	<0.1	0.7	0.01	0.01	1,497.89	3.57	23	5.41	8	43
Menticirrhus littoralis	7	<0.1	0.5	0.01	0.01	1,754.53	4.29	28	4.51	17	49
Mugil curema	7	<0.1	0.5	0.01	0.01	1,754.53	4.29	32	1.14	25	33
Calamus spp.	4	<0.1	0.7	0.01	<0.01	1,234.40	1.43	19	2.04	16	25
Ocyurus chrysurus	4	<0.1	0.5	0.01	0.01	1,595.69	2.14	80	16.90	30	103

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Lutjanus analis	3	<0.1	0.7	0.01	<0.01	1,163.32	0.71	32	9.24	16	48
Cynoscion arenarius	2	<0.1	0.5	<0.01	<0.01	1,426.53	0.71	28	13.00	15	41
Trachinotus falcatus	2	<0.1	0.5	<0.01	<0.01	1,426.53	0.71	34	9.50	25	44
Argopecten irradians	1	<0.1	0.2	<0.01	<0.01	2,019.90	0.71	44	.	44	44
Caranx hippos	1	<0.1	0.2	<0.01	<0.01	2,019.90	0.71	38	.	38	38
Epinephelus itajara	1	<0.1	0.2	<0.01	<0.01	2,019.90	0.71	34	.	34	34
Totals	**5,686**	**5.8**	**.**	**9.95**	**2.84**	**577.02**	**1,022.14**	**.**	**.**	**3**	**614**

Table CH21-04. Catch statistics for 10 dominant taxa collected in 204 183-m haul seine samples during Charlotte Harbor stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Lagodon rhomboides	30,002	67.5	62.3	147.07	23.26	225.88	3,444	106	0.15	33	212
Eucinostomus gula	2,035	4.6	40.2	9.98	3.89	557.00	746	82	0.22	51	151
Ariopsis felis	1,654	3.7	40.7	8.11	2.52	444.39	390	257	1.15	97	391
Centropomus undecimalis	983	2.2	52.9	4.82	0.78	230.28	84	424	3.76	168	903
Orthopristis chrysoptera	953	2.1	20.1	4.67	1.55	472.45	245	100	0.79	34	221
Eucinostomus harengulus	889	2.0	22.1	4.36	1.73	566.56	269	92	0.27	43	143
Bairdiella chrysoura	856	1.9	15.2	4.20	2.75	935.79	553	127	0.65	72	197
Lutjanus griseus	747	1.7	42.2	3.66	0.72	282.17	92	178	1.55	58	344
Chaetodipterus faber	646	1.5	14.7	3.17	1.53	689.54	265	170	1.89	58	315
Archosargus probatocephalus	580	1.3	46.1	2.84	0.75	377.15	132	207	3.06	43	387
Subtotals	39,345	88.5	.	.	.	.	.	.	.	33	903
Totals	**44,475**	**100.0**	**.**	**218.01**	**28.55**	**187.04**	**4,268**	**.**	**.**	**16**	**927**

Table CH21-05. Catch statistics for Selected Taxa collected in 204 183-m haul samples during Charlotte Harbor stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Centropomus undecimalis	983	2.2	52.9	4.82	0.78	230.28	84	424	3.76	168	903
Lutjanus griseus	747	1.7	42.2	3.66	0.72	282.17	92	178	1.55	58	344
Archosargus probatocephalus	580	1.3	46.1	2.84	0.75	377.15	132	207	3.06	43	387
Mugil trichodon	420	0.9	19.1	2.06	0.75	521.12	98	177	1.66	72	301
Mugil cephalus	254	0.6	37.3	1.25	0.30	342.32	57	317	4.41	54	492
Elops saurus	205	0.5	17.2	1.00	0.45	646.39	86	281	3.81	218	506
Sciaenops ocellatus	203	0.5	27.9	1.00	0.26	377.92	35	489	6.84	100	652
Caranx hippos	155	0.3	14.2	0.76	0.35	666.45	57	291	4.68	72	552
Callinectes sapidus	133	0.3	26.5	0.65	0.12	266.82	13	122	3.60	40	206
Mugil curema	106	0.2	16.2	0.52	0.15	408.57	19	209	4.18	113	292
Lutjanus synagris	88	0.2	8.3	0.43	0.16	537.67	21	99	2.09	43	193
Cynoscion nebulosus	80	0.2	10.8	0.39	0.14	524.44	26	296	10.85	109	452
Sphyraena barracuda	73	0.2	16.2	0.36	0.08	306.93	8	331	9.43	161	557
Haemulon plumierii	69	0.2	4.9	0.34	0.17	699.29	30	89	1.64	74	141
Paralichthys albigutta	68	0.2	20.1	0.33	0.06	241.30	5	175	8.04	73	346
Brevoortia spp.	44	0.1	2.0	0.22	0.14	930.98	23	160	10.88	69	268
Pomatomus saltatrix	35	0.1	2.9	0.17	0.10	810.98	16	397	8.27	322	486
Farfantepenaeus duorarum	32	0.1	2.9	0.16	0.11	966.90	21	23	0.75	16	30
Trachinotus falcatus	32	0.1	6.4	0.16	0.06	523.67	7	253	12.95	116	355
Trachinotus carolinus	31	0.1	5.9	0.15	0.07	613.24	9	315	6.95	268	421
Mycteroperca microlepis	28	0.1	3.4	0.14	0.07	693.93	10	240	10.66	131	331
Centropristis striata	25	0.1	5.4	0.12	0.04	499.08	5	114	7.11	82	243

Species	Number		% Occur	Density Estimate (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Sphyrna tiburo	14	<0.1	4.4	0.07	0.02	511.76	3	635	29.91	445	779
Leiostomus xanthurus	13	<0.1	2.9	0.06	0.03	698.07	5	94	2.19	82	109
Menippe spp.	11	<0.1	2.0	0.05	0.03	785.38	4	53	9.14	16	98
Lutjanus analis	7	<0.1	2.9	0.03	0.01	605.38	2	149	16.86	87	208
Calamus penna	6	<0.1	1.5	0.03	0.02	887.24	3	113	14.40	69	159
Calamus spp.	6	<0.1	0.5	0.03	0.03	1,428.29	6	162	4.26	142	173
Lachnolaimus maximus	5	<0.1	1.5	0.02	0.01	853.21	2	98	15.45	65	150
Scomberomorus maculatus	5	<0.1	2.5	0.02	0.01	632.42	1	288	37.54	150	373
Megalops atlanticus	4	<0.1	2.0	0.02	0.01	708.85	1	546	79.58	415	776
Menticirrhus littoralis	4	<0.1	1.5	0.02	0.01	871.04	2	182	27.65	113	239
Diplectrum formosum	3	<0.1	1.0	0.01	0.01	1,062.48	2	141	6.44	128	149
Argopecten irradians	2	<0.1	1.0	0.01	0.01	1,007.46	1	39	6.00	33	45
Negaprion brevirostris	2	<0.1	1.0	0.01	0.01	1,007.46	1	684	136.50	548	821
Calamus arctifrons	1	<0.1	0.5	<0.01	<0.01	1,428.29	1	60	.	60	60
Carcharhinus leucas	1	<0.1	0.5	<0.01	<0.01	1,428.29	1	656	.	656	656
Ginglymostoma cirratum	1	<0.1	0.5	<0.01	<0.01	1,428.29	1	724	.	724	724
Ocyurus chrysurus	1	<0.1	0.5	<0.01	<0.01	1,428.29	1	112	.	112	112
Rachycentron canadum	1	<0.1	0.5	<0.01	<0.01	1,428.29	1	159	.	159	159
Totals	**4,478**	**10.1**	**.**	**21.95**	**2.53**	**164.79**	**346**	**.**	**.**	**16**	**903**

Table CH21-06. Catch statistics for 10 dominant taxa collected in 96 6.1-m bay otter trawl samples during Charlotte Harbor stratified-random sampling, 2021. 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
Lagodon rhomboides	3,078	18.0	44.8	2.21	0.70	307.24	37.57	71	0.54	16	146
Anchoa mitchilli	2,456	14.4	8.3	1.76	1.25	685.17	102.33	34	0.33	16	62
Portunus spp.	2,135	12.5	72.9	1.53	0.39	246.98	23.54	45	0.21	8	74
Eucinostomus spp.	1,688	9.9	22.9	1.21	0.61	488.93	51.07	32	0.15	12	39
Orthopristis chrysoptera	1,102	6.5	29.2	0.79	0.30	369.21	25.03	79	0.92	18	199
Prionotus scitulus	994	5.8	70.8	0.71	0.19	254.28	11.94	73	1.13	15	194
Eucinostomus gula	948	5.5	35.4	0.68	0.18	253.90	11.33	66	0.52	40	108
Farfantepenaeus duorarum	542	3.2	41.7	0.39	0.16	408.74	14.30	15	0.25	4	33
Anchoa cubana	504	3.0	1.0	0.36	0.36	969.54	34.00	29	0.10	25	33
Menippe spp.	462	2.7	39.6	0.34	0.13	375.38	9.59	22	0.65	3	107
Subtotals	13,909	81.5	.	.	.	.	.	.	.	3	199
Totals	**17,082**	**100.0**	**.**	**12.02**	**2.18**	**177.53**	**136.67**	**.**	**.**	**3**	**603**

Table CH21-07. Catch statistics for Selected Taxa collected in 96 6.1-m bay otter trawl samples during Charlotte Harbor stratified-random sampling, 2021. 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	542	3.2	41.7	0.38	0.16	413.28	14.30	15	0.25	4	33
Menippe spp.	462	2.7	39.6	0.33	0.13	379.60	9.59	22	0.65	3	107
Lutjanus synagris	268	1.6	31.2	0.19	0.05	272.38	3.44	54	1.94	17	147
Callinectes sapidus	93	0.5	14.6	0.07	0.04	629.50	3.98	104	3.03	43	168
Menticirrhus americanus	88	0.5	11.5	0.06	0.03	500.46	2.50	59	6.74	12	209
Paralichthys albigutta	36	0.2	16.7	0.03	0.01	392.65	0.88	115	6.51	61	197
Cynoscion nebulosus	35	0.2	5.2	0.02	0.01	528.15	0.94	56	8.40	14	324
Centropristis striata	33	0.2	13.5	0.02	0.01	295.47	0.40	74	5.43	28	174
Diplectrum formosum	33	0.2	16.7	0.02	0.01	326.48	0.61	72	7.94	13	194
Cynoscion arenarius	31	0.2	7.3	0.02	0.01	459.31	0.81	55	6.27	13	121
Haemulon plumierii	21	0.1	6.2	0.01	0.01	457.79	0.43	44	3.86	18	104
Lutjanus griseus	11	0.1	4.2	0.01	<0.01	520.10	0.27	142	11.75	70	218
Archosargus probatocephalus	7	<0.1	3.1	<0.01	<0.01	724.18	0.34	28	1.54	23	34
Argopecten gibbus	6	<0.1	3.1	<0.01	<0.01	685.13	0.27	46	0.60	45	48
Leiostomus xanthurus	2	<0.1	2.1	<0.01	<0.01	689.16	0.07	118	12.00	106	130
Ocyurus chrysurus	2	<0.1	2.1	<0.01	<0.01	689.40	0.07	30	1.50	29	32
Argopecten irradians	1	<0.1	1.0	<0.01	<0.01	979.80	0.07	46	.	46	46
Calamus penna	1	<0.1	1.0	<0.01	<0.01	979.80	0.07	73	.	73	73
Calamus spp.	1	<0.1	1.0	<0.01	<0.01	979.80	0.07	25	.	25	25
Menticirrhus littoralis	1	<0.1	1.0	<0.01	<0.01	979.80	0.07	228	.	228	228
Menticirrhus saxatilis	1	<0.1	1.0	<0.01	<0.01	979.80	0.07	84	.	84	84

Species	Number		% Occur	Density Estimate (animals/100m²)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mycteroperca microlepis	1	<0.1	1.0	<0.01	<0.01	979.80	0.07	339	.	339	339
Totals	**1,676**	**9.8**	**.**	**1.18**	**0.24**	**201.62**	**16.32**	**.**	**.**	**3**	**339**

Table CH21-08. Catch statistics for 10 dominant taxa collected in 360 21.3-m river seine samples conducted in tidal creeks during Charlotte Harbor stratified-random sampling, 2021. 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	25,860	32.4	12.8	109.91	38.15	645.71	8,841.18	35	0.04	17	55
Eucinostomus spp.	12,681	15.9	75.3	53.90	5.59	192.75	785.29	27	0.06	9	39
Lucania parva	9,682	12.1	48.9	41.15	6.05	273.66	1,030.88	23	0.04	11	42
Harengula jaguana	5,929	7.4	4.4	25.20	11.81	871.40	3,647.06	37	0.11	19	55
Menidia spp.	5,563	7.0	44.7	23.64	3.80	299.00	575.00	37	0.15	14	81
Opisthonema oglinum	2,639	3.3	3.1	11.22	9.43	1,564.40	3,247.06	50	0.20	17	68
Eucinostomus harengulus	2,487	3.1	60.6	10.57	1.36	239.03	298.53	54	0.27	40	111
Leiostomus xanthurus	2,171	2.7	14.4	9.23	3.93	791.59	1,002.94	23	0.22	12	96
Lagodon rhomboides	2,026	2.5	22.2	8.61	1.92	414.03	400.00	34	0.31	12	189
Microgobius gulosus	1,964	2.5	58.6	8.35	1.18	263.02	222.06	25	0.13	7	50
Subtotals	71,002	88.9	.	.	.	.	.	.	.	7	189
Totals	**79,734**	**100.0**	**.**	**325.71**	**45.20**	**263.33**	**9,329.41**	**.**	**.**	**3**	**573**

Table CH21-09. Catch statistics for Selected Taxa collected in 360 21.3-m river seine samples conducted in tidal creeks during Charlotte Harbor stratified-random sampling, 2021. 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	2,171	2.7	14.4	8.87	3.78	807.65	1,002.94	23	0.22	12	96
Sciaenops ocellatus	555	0.7	16.7	2.27	0.93	781.38	314.71	40	1.71	12	573
Farfantepenaeus duorarum	361	0.5	25.0	1.47	0.30	382.12	73.53	9	0.19	3	20
Centropomus undecimalis	353	0.4	24.7	1.44	0.40	532.81	98.53	190	5.07	21	554
Archosargus probatocephalus	119	0.1	14.7	0.49	0.09	359.75	19.12	76	7.24	11	328
Callinectes sapidus	80	0.1	13.6	0.33	0.05	298.74	7.35	27	3.25	8	157
Mugil cephalus	74	0.1	3.1	0.30	0.24	1,518.74	86.76	54	9.57	20	409
Menticirrhus americanus	64	0.1	0.6	0.26	0.24	1,754.99	86.76	30	0.73	15	44
Megalops atlanticus	44	0.1	1.1	0.18	0.12	1,218.79	33.82	139	13.33	49	384
Lutjanus griseus	33	<0.1	6.4	0.13	0.03	430.76	4.41	112	8.99	36	204
Brevoortia spp.	25	<0.1	1.4	0.10	0.09	1,600.10	30.88	24	0.83	16	34
Cynoscion nebulosus	25	<0.1	4.7	0.10	0.03	594.86	8.82	35	2.98	17	63
Sphyraena barracuda	7	<0.1	1.9	0.03	0.01	711.12	1.47	334	26.76	223	414
Mugil trichodon	6	<0.1	0.8	0.02	0.02	1,339.77	5.88	106	26.47	22	166
Mugil curema	2	<0.1	0.6	0.01	0.01	1,339.77	1.47	80	51.50	29	132
Caranx hippos	1	<0.1	0.3	<0.01	<0.01	1,897.37	1.47	33	.	33	33
Lutjanus synagris	1	<0.1	0.3	<0.01	<0.01	1,897.37	1.47	36	.	36	36
Paralichthys albigutta	1	<0.1	0.3	<0.01	<0.01	1,897.37	1.47	111	.	111	111
Totals	**3,922**	**4.9**	**.**	**16.02**	**4.11**	**487.04**	**1,047.06**	**.**	**.**	**3**	**573**

Table CH21-10. Catch statistics for 10 dominant taxa collected in 144 21.3-m river seine samples conducted in tidal rivers during Charlotte Harbor stratified-random sampling, 2021. 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.	4,347	22.1	72.9	44.70	6.72	179.81	552.94	27	0.10	10	39
Anchoa mitchilli	3,248	16.5	34.0	33.40	7.08	253.65	420.59	33	0.15	19	63
Opisthonema oglinum	2,921	14.9	2.8	30.04	29.62	1,179.00	4,235.29	51	0.06	26	55
Menidia spp.	2,893	14.7	61.1	29.75	5.75	230.93	601.47	37	0.14	16	70
Eugerres plumieri	1,296	6.6	25.7	13.33	6.91	619.81	942.65	26	0.65	14	282
Eucinostomus harengulus	964	4.9	53.5	9.91	1.56	188.11	104.41	53	0.34	40	103
Harengula jaguana	628	3.2	2.8	6.46	5.41	1,002.27	764.71	47	0.25	29	55
Sardinella aurita	536	2.7	0.7	5.51	5.51	1,195.83	788.24	62	0.22	55	69
Microgobius gulosus	376	1.9	45.8	3.87	0.76	234.91	79.41	25	0.37	13	51
Lagodon rhomboides	369	1.9	24.3	3.79	1.17	367.54	110.29	28	0.51	12	68
Subtotals	17,578	89.4	.	.	.	.	.	.	.	10	282
Totals	**19,670**	**100.0**	**.**	**200.88**	**41.91**	**250.37**	**5,813.24**	**.**	**.**	**3**	**420**

Table CH21-11. Catch statistics for Selected Taxa collected in 144 21.3-m river seine samples conducted in tidal rivers during Charlotte Harbor stratified-random sampling, 2021. 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	359	1.8	6.2	3.67	2.43	796.34	251.47	26	1.46	20	420
Leiostomus xanthurus	187	1.0	6.9	1.91	1.07	672.25	138.24	36	0.53	16	62
Sciaenops ocellatus	84	0.4	11.8	0.86	0.32	445.79	30.88	40	2.29	15	104
Brevoortia spp.	69	0.4	2.8	0.70	0.56	958.10	79.41	20	0.27	16	24
Farfantepenaeus duorarum	33	0.2	12.5	0.34	0.10	363.88	11.76	8	0.70	3	19
Archosargus probatocephalus	32	0.2	9.0	0.33	0.16	571.80	20.59	77	10.59	13	327
Callinectes sapidus	29	0.1	9.7	0.30	0.10	396.46	10.29	24	3.18	7	85
Cynoscion nebulosus	29	0.1	4.2	0.30	0.13	527.14	11.76	32	2.08	20	71
Lutjanus griseus	25	0.1	10.4	0.26	0.09	437.93	11.76	141	12.77	47	239
Centropomus undecimalis	16	0.1	7.6	0.16	0.06	452.96	7.35	251	22.81	106	413
Cynoscion arenarius	11	0.1	3.5	0.11	0.05	580.92	5.88	27	2.06	17	35
Menticirrhus americanus	7	<0.1	1.4	0.07	0.05	920.94	7.35	35	2.26	28	43
Elops saurus	1	<0.1	0.7	0.01	0.01	1,200.00	1.47	42	.	42	42
Mugil trichodon	1	<0.1	0.7	0.01	0.01	1,200.00	1.47	18	.	18	18
Totals	**883**	**4.5**	**.**	**9.02**	**2.95**	**393.15**	**276.47**	**.**	**.**	**3**	**420**

Table CH21-12. Catch statistics for 10 dominant taxa collected in 36 6.1-m river otter trawl samples during Charlotte Harbor stratified-random sampling, 2021. 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	2,561	56.4	38.9	9.60	4.67	291.94	119.27	31	0.19	18	59
Bairdiella chrysoura	575	12.7	19.4	2.15	2.09	582.88	75.42	62	0.54	16	83
Trinectes maculatus	412	9.1	58.3	1.54	0.52	201.49	12.14	40	0.46	23	83
Ariopsis felis	221	4.9	22.2	0.83	0.43	308.54	12.41	74	3.10	43	363
Cynoscion arenarius	132	2.9	38.9	0.49	0.19	224.52	4.86	31	1.55	13	96
Farfantepenaeus duorarum	122	2.7	47.2	0.46	0.14	178.07	3.37	15	0.41	3	27
Menticirrhus americanus	93	2.0	63.9	0.35	0.12	213.51	4.18	50	3.83	15	264
Microgobius gulosus	86	1.9	30.6	0.32	0.23	420.31	8.09	23	0.61	15	40
Eugerres plumieri	57	1.3	16.7	0.21	0.11	297.53	3.37	51	1.11	34	68
Symphurus plagiusa	40	0.9	22.2	0.15	0.08	328.24	2.70	68	4.06	25	110
Subtotals	4,299	94.8	.	.	.	.	.	.	.	3	363
Totals	**4,541**	**100.0**	**.**	**17.02**	**5.05**	**177.94**	**120.48**	**.**	**.**	**3**	**390**

Table CH21-13. Catch statistics for Selected Taxa collected in 36 6.1-m river otter trawl samples during Charlotte Harbor stratified-random sampling, 2021. 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	132	2.9	38.9	0.49	0.19	224.52	4.86	31	1.55	13	96
Farfantepenaeus duorarum	122	2.7	47.2	0.46	0.14	178.07	3.37	15	0.41	3	27
Menticirrhus americanus	93	2.0	63.9	0.35	0.12	213.51	4.18	50	3.83	15	264
Callinectes sapidus	37	0.8	44.4	0.14	0.04	173.25	1.08	80	7.01	21	179
Sciaenops ocellatus	4	0.1	5.6	0.01	0.01	470.26	0.40	55	14.52	12	73
Archosargus probatocephalus	3	0.1	8.3	0.01	0.01	336.37	0.13	37	20.41	14	78
Lutjanus synagris	3	0.1	8.3	0.01	0.01	336.37	0.13	50	2.73	45	54
Cynoscion nebulosus	2	<0.1	2.8	0.01	0.01	600.00	0.27	106	2.00	104	108
Leiostomus xanthurus	1	<0.1	2.8	<0.01	<0.01	600.00	0.13	28	.	28	28
Menticirrhus saxatilis	1	<0.1	2.8	<0.01	<0.01	600.00	0.13	53	.	53	53
Micropogonias undulatus	1	<0.1	2.8	<0.01	<0.01	600.00	0.13	44	.	44	44
Totals	**399**	**8.8**	**.**	**1.50**	**0.34**	**137.35**	**8.23**	**.**	**.**	**3**	**264**

Appendix CH21-01. Monthly summary of taxa collected during Charlotte Harbor stratified-random sampling, 2021. 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=93	E=123	E=93	E=123	E=93	E=99	E=117	E=99	E=93	E=123	E=93	E=99	E=1,248
Acanthostracion quadricornis	1	47	.	24	10	3	21	11	1	7	.	25	150
Achirus lineatus	41	15	9	12	9	9	35	8	15	29	11	13	206
Adinia xenica	.	7	1	.	.	.	.	.	.	.	.	1	9
Aluterus schoepfii	.	.	1	.	.	2	12	1	.	.	.	1	17
Anarchopterus criniger	.	.	.	.	.	.	3	.	.	.	.	.	3
Anchoa cubana	.	.	.	.	.	.	.	.	.	504	.	.	504
Anchoa hepsetus	.	.	1	15	30	2	1	.	.	19	.	.	68
Anchoa mitchilli	7,298	1,880	5,957	2,542	569	137	345	1,878	789	3,173	3,773	6,637	34,978
Ancylopsetta quadrocellata	.	1	.	6	1	.	4	.	.	1	.	.	13
Anisotremus virginicus	1	.	.	.	.	.	.	.	.	.	.	.	1
Archosargus probatocephalus	46	157	60	76	73	78	73	81	22	42	105	42	855
Argopecten gibbus	.	5	.	1	.	.	.	.	.	.	.	.	6
Argopecten irradians	.	2	.	.	.	2	.	.	.	.	.	.	4
Ariopsis felis	72	61	25	99	60	285	84	995	61	165	33	11	1,951
Astroscopus y-graecum	.	.	.	.	.	.	.	.	.	.	.	1	1
Bagre marinus	.	.	.	.	.	2	.	18	.	.	.	1	21
Bairdiella chrysoura	86	22	26	97	221	224	1,225	675	315	16	590	24	3,521
Bathygobius soporator	38	2	17	11	15	3	18	7	1	6	21	10	149
Brevoortia spp.	1	69	22	2	3	1	17	.	.	.	.	23	138
Calamus arctifrons	.	.	.	.	1	.	.	.	.	.	.	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=93	E=123	E=93	E=123	E=93	E=99	E=117	E=99	E=93	E=123	E=93	E=99	E=1,248
Calamus penna	1	.	.	4	.	6	4	.	2	.	.	.	17
Calamus spp.	1	2	.	6	.	.	.	.	.	.	.	2	11
Callinectes ornatus	4	5	.	3	1	1	5	.	.	.	.	.	19
Callinectes sapidus	52	115	17	49	33	24	33	4	9	23	22	78	459
Caranx hippos	12	4	3	3	3	100	4	16	4	1	2	5	157
Carcharhinus leucas	.	.	.	.	.	.	.	.	1	.	.	.	1
Centropomus undecimalis	236	152	87	77	48	181	120	140	124	94	76	42	1,377
Centropristis striata	3	4	7	15	2	3	22	5	5	2	1	3	72
Chaetodipterus faber	265	2	.	4	31	20	210	159	12	16	.	1	720
Chasmodes saburrae	15	19	9	3	22	16	23	5	2	7	13	19	153
Chilomycterus schoepfii	34	114	21	77	38	41	111	55	19	27	34	36	607
Chloroscombrus chrysurus	.	5	.	3	2	5	14	16	36	2	.	.	83
Cichlasoma urophthalmus	1	1	.	.	.	.	3	.	6	.	15	.	26
Citharichthys macrops	.	12	7	14	.	.	5	.	.	.	.	.	38
Ctenogobius boleosoma	3	2	1	.	.	.	2	.	1	.	.	.	9
Ctenogobius smaragdus	9	15	10	3	13	2	2	.	4	8	3	1	70
Cynoscion arenarius	.	14	1	2	.	43	8	78	1	27	1	1	176
Cynoscion nebulosus	7	34	.	4	22	51	167	37	19	83	68	6	498
Cyprinodon variegatus	71	174	39	28	9	9	8	1	6	2	8	95	450
Dasyatis americana	.	1	1	3	2	11	.	1	.	.	1	1	21
Dasyatis sabina	8	30	8	35	8	1	9	13	5	2	9	3	131
Dasyatis say	.	1	.	1	1	3	1	1	3	7	.	1	19

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=93	E=123	E=93	E=123	E=93	E=99	E=117	E=99	E=93	E=123	E=93	E=99	E=1,248
Diapterus auratus	1,045	171	7	54	65	72	97	151	54	16	78	2	1,812
Diplectrum formosum	.	11	1	1	.	.	23	.	.	.	.	.	36
Diplodus holbrookii	.	.	3	20	.	1	10	.	3	5	.	.	42
Echeneis neucratoides	.	.	.	.	.	.	.	1	.	.	.	.	1
Elops saurus	12	46	1	3	95	12	2	21	2	.	4	8	206
Epinephelus itajara	.	.	.	.	.	.	.	.	.	.	.	1	1
Etropus crossotus	1	4	.	1	.	.	8	.	.	6	.	.	20
Eucinostomus gula	535	359	253	239	350	432	1,298	481	515	1,276	1,332	696	7,766
Eucinostomus harengulus	657	475	415	750	913	1,021	490	431	375	269	340	179	6,315
Eucinostomus spp.	6,812	3,137	1,349	927	1,541	5,731	6,971	5,259	1,860	2,963	2,460	2,714	41,724
Eugerres plumieri	88	56	10	48	17	911	959	338	108	118	240	195	3,088
Farfantepenaeus duorarum	157	325	81	80	22	332	863	306	254	50	22	82	2,574
Fistularia tabacaria	.	1	.	.	.	.	.	.	.	.	.	.	1
Floridichthys carpio	52	53	6	38	34	52	55	15	18	25	3	40	391
Fundulus grandis	45	13	13	7	.	4	1	1	14	18	38	57	211
Fundulus seminolis	.	1	.	.	.	.	.	.	.	.	.	.	1
Fundulus similis	.	.	9	.	.	5	.	.	.	1	.	.	15
Gambusia holbrooki	44	15	.	1	5	.	.	.	4	22	14	39	144
Ginglymostoma cirratum	.	.	.	.	.	.	1	.	.	.	.	.	1
Gobiesox strumosus	9	7	2	1	.	1	1	4	.	1	3	4	33
Gobionellus oceanicus	2	.	.	.	.	.	.	.	.	.	.	.	2
Gobiosoma bosc	.	2	.	1	15	2	55	10	2	9	36	28	160

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=93	E=123	E=93	E=123	E=93	E=99	E=117	E=99	E=93	E=123	E=93	E=99	E=1,248
Gobiosoma longipala	.	29	.	5	.	.	8	.	.	.	.	.	42
Gobiosoma robustum	59	185	92	64	80	63	118	20	17	29	16	86	829
Gobiosoma spp.	40	6	8	16	36	36	162	28	10	25	38	79	484
Gymnura micrura	.	.	1	1	.	.	1	.	.	.	.	.	3
Haemulon plumierii	32	.	1	.	4	2	28	3	18	44	.	.	132
Halichoeres bivittatus	.	.	.	.	1	.	.	.	.	.	.	.	1
Harengula jaguana	24	1	3	11	410	6,434	5,145	686	564	101	18	20	13,417
Hemichromis letourneuxi	.	.	.	.	.	.	.	.	.	.	1	1	2
Hemiramphus brasiliensis	.	.	.	.	.	.	.	.	.	2	.	.	2
Hippocampus erectus	.	15	1	16	1	.	20	.	.	.	.	.	53
Hippocampus zosterae	5	9	3	1	1	1	1	1	.	2	1	5	30
Hyporhamphus meeki	.	1	1	.	.	.	.	.	1	.	.	.	3
Hyporhamphus spp.	.	.	.	.	1	.	1	.	.	1	.	.	3
Hyporhamphus unifasciatus	.	.	.	1	2	.	.	.	.	.	.	2	5
Hypsoblennius hentz	4	6	1	1	.	5	4	.	.	.	1	1	23
Jordanella floridae	.	.	.	.	.	.	1	.	.	.	.	.	1
Kryptolebias marmoratus	.	1	.	.	.	.	.	.	.	.	.	.	1
Lachnolaimus maximus	.	.	.	.	.	.	4	.	.	1	.	.	5
Lagodon rhomboides	1,975	9,178	13,285	10,781	7,452	6,578	6,154	2,921	2,395	4,083	4,609	2,745	72,156
Leiostomus xanthurus	1,903	2,902	282	120	18	8	1	.	.	.	.	.	5,234
Lepisosteus platyrhincus	.	.	.	.	.	.	.	.	.	.	.	1	1
Lepomis macrochirus	.	.	.	.	.	.	.	.	1	.	.	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=93	E=123	E=93	E=123	E=93	E=99	E=117	E=99	E=93	E=123	E=93	E=99	E=1,248
Limulus polyphemus	.	.	1	.	1	1	.	2	.	6	1	4	16
Lophogobius cyprinoides	3	.	.	1	2	5	45	25	6	7	20	16	130
Lucania parva	1,244	1,883	1,575	1,464	1,050	1,236	1,782	749	901	443	1,469	1,078	14,874
Lupinoblennius nicholsi	.	.	1	.	.	.	.	.	.	.	.	.	1
Lutjanus analis	1	.	.	1	1	1	3	.	2	1	.	.	10
Lutjanus griseus	45	14	13	51	48	229	104	180	60	112	29	14	899
Lutjanus synagris	.	36	3	24	22	2	217	11	15	69	7	3	409
Megalops atlanticus	.	1	.	.	.	.	5	.	26	.	16	.	48
Membras martinica	.	.	.	1	4	24	23	8	3	.	.	15	78
Menidia spp.	275	375	873	845	888	1,038	1,308	2,263	554	649	632	1,074	10,774
Menippe spp.	5	129	.	299	.	.	30	1	4	10	.	2	480
Menticirrhus americanus	.	10	5	26	.	54	63	21	.	95	4	4	282
Menticirrhus littoralis	.	.	.	3	2	.	1	.	6	.	.	.	12
Menticirrhus saxatilis	.	2	5	3	1	.	.	.	.	.	.	.	11
Microgobius gulosus	167	226	85	103	432	582	814	465	189	381	488	506	4,438
Microgobius thalassinus	.	1	.	.	.	.	.	1	.	.	.	.	2
Micropogonias undulatus	.	1	.	.	.	.	.	.	.	.	.	.	1
Monacanthus ciliatus	.	2	.	.	.	.	18	.	.	4	.	1	25
Mugil cephalus	370	155	88	25	30	5	21	13	5	16	15	15	758
Mugil curema	3	9	40	4	26	10	4	.	7	3	4	5	115
Mugil trichodon	139	167	124	31	33	11	21	2	1	17	15	28	589
Mycteroperca microlepis	.	.	.	3	2	.	9	.	3	2	10	.	29

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=93	E=123	E=93	E=123	E=93	E=99	E=117	E=99	E=93	E=123	E=93	E=99	E=1,248
Myrophis punctatus	.	.	.	1	.	.	.	.	.	.	.	.	1
Negaprion brevirostris	.	.	.	.	.	.	.	1	1	.	.	.	2
Nicholsina usta	4	5	4	9	30	2	25	.	.	1	.	.	80
Ocyurus chrysurus	1	.	.	.	.	.	2	.	.	4	.	.	7
Ogcocephalus cubifrons	3	17	4	5	.	.	4	2	.	1	.	.	36
Oligoplites saurus	.	.	4	4	14	300	112	44	17	13	4	.	512
Ophichthus gomesii	.	.	.	.	.	.	1	.	.	.	.	.	1
Opisthonema oglinum	4	.	.	4	205	7,091	494	113	16	3	.	1	7,931
Opistognathus robinsi	.	.	.	.	.	.	1	.	.	.	.	.	1
Opsanus beta	4	10	7	12	23	14	44	5	11	12	4	5	151
Oreochromis aureus	.	.	.	.	.	.	1	1	1	1	.	.	4
Oreochromis/Sarotherodon spp.	.	1	.	.	.	1	2	4	1	.	.	.	9
Orthopristis chrysoptera	37	561	1,006	771	221	396	985	77	53	38	5	2	4,152
Paraclinus marmoratus	.	.	.	.	.	1	2	.	.	.	.	.	3
Paralichthys albigutta	1	13	8	29	13	9	24	12	4	4	8	4	129
Poecilia latipinna	128	162	1	7	2	8	14	.	13	5	3	161	504
Pomatomus saltatrix	.	17	.	.	.	4	.	11	2	1	.	.	35
Portunus spp.	13	498	.	407	4	1	1,208	.	.	35	1	5	2,172
Prionotus rubio	.	1	.	2	.	.	.	.	.	.	.	.	3
Prionotus scitulus	12	180	2	119	2	5	654	5	.	61	6	10	1,056
Prionotus tribulus	12	45	1	6	1	3	6	.	1	.	2	2	79
Pristis pectinata	.	.	.	.	.	.	.	.	.	.	1	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=93	E=123	E=93	E=123	E=93	E=99	E=117	E=99	E=93	E=123	E=93	E=99	E=1,248
Pterygoplichthys disjunctivus	.	.	.	.	.	.	1	1	.	.	.	.	2
Rachycentron canadum	.	.	.	.	.	.	.	1	.	.	.	.	1
Rhinoptera bonasus	.	.	.	1	.	.	.	.	.	.	.	.	1
Rimapenaeus constrictus	.	2	.	.	.	.	7	.	.	.	.	.	9
Rimapenaeus spp.	5	3	.	1	.	.	226	.	.	.	.	.	235
Sardinella aurita	.	.	.	.	.	1,949	50	.	.	.	.	.	1,999
Sarotherodon melanotheron	4	3	4	.	.	.	2	4	2	7	1	1	28
Sciaenops ocellatus	465	89	23	15	10	4	8	47	10	62	173	196	1,102
Scomberomorus maculatus	.	.	1	1	.	1	.	1	1	.	.	.	5
Scorpaena brasiliensis	.	8	.	2	.	1	1	.	.	1	.	.	13
Selene vomer	2	3	.	3	6	.	3	3	.	1	.	.	21
Serraniculus pumilio	.	1	.	1	.	.	1	.	.	.	.	.	3
Serranus subligarius	.	.	.	.	.	.	.	.	1	.	.	.	1
Sicyonia laevigata	.	.	.	1	.	.	1	.	.	.	.	.	2
Sicyonia parri	.	.	.	.	.	.	1	.	.	.	.	.	1
Sphoeroides nephelus	48	80	57	55	30	58	46	31	30	21	36	43	535
Sphoeroides spengleri	.	1	.	.	1	.	2	.	.	.	.	2	6
Sphyraena barracuda	3	9	4	3	3	4	11	.	3	17	17	6	80
Sphyraena borealis	.	.	.	.	.	56	1	.	.	.	.	.	57
Sphyrna tiburo	2	1	.	.	1	3	.	.	.	1	3	3	14
Stephanolepis hispidus	4	19	1	10	11	27	96	1	3	7	20	50	249
Strongylura marina	5	6	1	4	2	3	.	1	5	8	.	4	39

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=93	E=123	E=93	E=123	E=93	E=99	E=117	E=99	E=93	E=123	E=93	E=99	E=1,248
Strongylura notata	12	31	20	17	36	74	62	71	75	62	85	25	570
Strongylura spp.	.	.	2	3	2	1	.	.	.	.	.	1	9
Strongylura timucu	3	.	4	1	.	2	4	3	2	2	7	2	30
Symphurus plagiusa	34	101	2	29	.	.	37	3	.	7	9	14	236
Syngnathus floridae	2	6	3	7	3	13	40	4	10	6	4	.	98
Syngnathus louisianae	5	23	4	19	2	.	37	1	2	23	.	5	121
Syngnathus scovelli	20	33	45	39	39	22	64	24	14	22	22	21	365
Synodus foetens	50	61	19	57	17	16	379	5	5	12	18	46	685
Trachinotus carolinus	2	2	.	.	.	.	10	5	1	.	10	1	31
Trachinotus falcatus	3	7	8	.	.	4	1	7	3	.	1	.	34
Trinectes maculatus	30	34	4	15	.	5	55	277	18	188	7	49	682
Urophycis floridana	.	2	.	.	.	.	.	.	.	.	.	.	2
Totals	**24,977**	**25,029**	**26,210**	**20,951**	**15,510**	**36,244**	**34,264**	**19,388**	**9,765**	**15,771**	**17,197**	**17,492**	**262,798**

Appendix CH21-02. Summary by gear and stratum of taxa collected during Charlotte Harbor stratified-random sampling, 2021. 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								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=143	E=61	E=204	E=421	E=83	E=156	E=48	E=132	E=1,248
Acanthostracion quadricornis	1	.	2	.	.	7	90	50	150
Achirus lineatus	13	13	45	77	7	2	1	48	206
Adinia xenica	.	.	8	1	.	.	.	.	9
Aluterus schoepfii	1	.	.	.	.	2	8	6	17
Anarchopterus criniger	.	.	.	.	.	.	.	3	3
Anchoa cubana	.	.	.	.	.	.	.	504	504
Anchoa hepsetus	.	.	3	1	30	.	.	34	68
Anchoa mitchilli	102	90	661	26,841	2,267	.	.	5,017	34,978
Ancylopsetta quadrocellata	.	.	.	.	.	1	.	12	13
Anisotremus virginicus	.	.	1	.	.	.	.	.	1
Archosargus probatocephalus	20	6	88	117	34	484	96	10	855
Argopecten gibbus	.	.	.	.	.	.	.	6	6
Argopecten irradians	.	.	1	.	.	2	.	1	4
Ariopsis felis	12	27	4	12	.	1,078	576	242	1,951
Astroscopus y-graecum	.	.	1	.	.	.	.	.	1
Bagre marinus	1	.	.	.	.	6	.	14	21
Bairdiella chrysoura	695	6	995	86	6	788	68	877	3,521
Bathygobius soporator	.	1	18	61	69	.	.	.	149
Brevoortia spp.	.	.	.	39	55	41	3	.	138
Calamus arctifrons	.	.	.	.	.	.	1	.	1
Calamus penna	5	3	2	.	.	1	5	1	17
Calamus spp.	3	.	1	.	.	6	.	1	11
Callinectes ornatus	.	.	9	.	.	2	3	5	19
Callinectes sapidus	24	3	60	87	22	116	17	130	459
Caranx hippos	.	.	1	1	.	112	43	.	157
Carcharhinus leucas	.	.	.	.	.	1	.	.	1
Centropomus undecimalis	.	.	25	363	6	937	46	.	1,377

Species	Gear								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=143	E=61	E=204	E=421	E=83	E=156	E=48	E=132	E=1,248
Centropristis striata	14	.	.	.	.	7	18	33	72
Chaetodipterus faber	1	1	2	3	.	630	16	67	720
Chasmodes saburrae	52	5	77	11	4	.	.	4	153
Chilomycterus schoepfii	31	9	8	.	.	191	167	201	607
Chloroscombrus chrysurus	3	.	4	.	.	38	13	25	83
Cichlasoma urophthalmus	1	2	.	14	9	.	.	.	26
Citharichthys macrops	1	.	7	.	.	4	.	26	38
Ctenogobius boleosoma	1	.	2	6	.	.	.	.	9
Ctenogobius smaragdus	1	.	13	53	3	.	.	.	70
Cynoscion arenarius	.	1	1	7	4	.	.	163	176
Cynoscion nebulosus	154	13	160	40	14	47	33	37	498
Cyprinodon variegatus	.	.	113	337	.	.	.	.	450
Dasyatis americana	.	.	.	.	.	15	6	.	21
Dasyatis sabina	1	2	.	1	.	78	16	33	131
Dasyatis say	.	.	.	1	.	13	5	.	19
Diapterus auratus	.	6	18	1,443	32	302	10	1	1,812
Diplectrum formosum	.	.	.	.	.	1	2	33	36
Diplodus holbrookii	23	.	1	.	.	15	3	.	42
Echeneis neucratoides	.	.	.	.	.	1	.	.	1
Elops saurus	.	.	.	.	1	73	132	.	206
Epinephelus itajara	.	.	1	.	.	.	.	.	1
Etropus crossotus	1	1	.	.	.	.	.	18	20
Eucinostomus gula	1,053	171	2,795	702	58	1,119	916	952	7,766
Eucinostomus harengulus	156	157	1,561	2,898	553	334	555	101	6,315
Eucinostomus spp.	5,689	1,742	15,566	14,244	2,784	.	.	1,699	41,724
Eugerres plumieri	2	6	186	1,584	1,090	154	.	66	3,088
Farfantepenaeus duorarum	733	45	706	365	29	27	5	664	2,574
Fistularia tabacaria	.	.	.	.	.	.	.	1	1
Floridichthys carpio	31	1	215	144	.	.	.	.	391
Fundulus grandis	3	.	127	77	4	.	.	.	211
Fundulus seminolis	.	.	.	1	.	.	.	.	1
Fundulus similis	.	.	5	9	1	.	.	.	15
Gambusia holbrooki	.	.	1	120	23	.	.	.	144

Species	Gear								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=143	E=61	E=204	E=421	E=83	E=156	E=48	E=132	E=1,248
Ginglymostoma cirratum	.	.	.	.	.	1	.	.	1
Gobiesox strumosus	.	2	11	14	4	.	.	2	33
Gobionellus oceanicus	.	.	.	.	2	.	.	.	2
Gobiosoma bosc	.	3	4	69	84	.	.	.	160
Gobiosoma longipala	.	.	.	.	.	.	.	42	42
Gobiosoma robustum	153	34	300	276	11	.	.	55	829
Gobiosoma spp.	29	18	54	251	57	.	.	75	484
Gymnura micrura	.	.	.	.	.	.	2	1	3
Haemulon plumierii	42	.	.	.	.	15	54	21	132
Halichoeres bivittatus	.	.	.	.	.	1	.	.	1
Harengula jaguana	1,182	1,727	3,396	6,557	.	416	130	9	13,417
Hemichromis letourneuxi	.	.	.	2	.	.	.	.	2
Hemiramphus brasiliensis	.	.	.	.	.	.	2	.	2
Hippocampus erectus	3	1	.	.	.	.	.	49	53
Hippocampus zosterae	17	.	10	2	.	.	.	1	30
Hyporhamphus meeki	.	.	.	.	.	2	1	.	3
Hyporhamphus spp.	2	.	1	.	.	.	.	.	3
Hyporhamphus unifasciatus	.	.	.	.	.	1	4	.	5
Hypsoblennius hentz	9	1	2	1	.	1	.	9	23
Jordanella floridae	.	.	.	.	1	.	.	.	1
Kryptolebias marmoratus	.	.	.	1	.	.	.	.	1
Lachnolaimus maximus	.	.	.	.	.	4	1	.	5
Lagodon rhomboides	21,689	683	14,303	2,137	258	21,986	8,016	3,084	72,156
Leiostomus xanthurus	7	5	2,848	2,201	157	8	5	3	5,234
Lepisosteus platyrhincus	.	.	.	1	.	.	.	.	1
Lepomis macrochirus	.	.	1	.	.	.	.	.	1
Limulus polyphemus	.	5	5	.	.	6	.	.	16
Lophogobius cyprinoides	.	2	2	61	65	.	.	.	130
Lucania parva	1,955	421	2,684	9,692	122	.	.	.	14,874
Lupinoblennius nicholsi	.	.	1	.	.	.	.	.	1
Lutjanus analis	3	.	.	.	.	3	4	.	10
Lutjanus griseus	37	1	45	41	17	592	155	11	899
Lutjanus synagris	36	1	12	1	.	48	40	271	409

Species	Gear								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=143	E=61	E=204	E=421	E=83	E=156	E=48	E=132	E=1,248
Megalops atlanticus	.	.	.	44	.	4	.	.	48
Membras martinica	.	15	54	6	3	.	.	.	78
Menidia spp.	49	12	2,256	6,516	1,940	.	.	1	10,774
Menippe spp.	1	5	1	.	.	3	8	462	480
Menticirrhus americanus	13	15	2	69	2	.	.	181	282
Menticirrhus littoralis	.	.	7	.	.	.	4	1	12
Menticirrhus saxatilis	3	2	4	.	.	.	.	2	11
Microgobius gulosus	722	298	985	2,086	254	.	.	93	4,438
Microgobius thalassinus	.	.	.	.	.	.	.	2	2
Micropogonias undulatus	.	.	.	.	.	.	.	1	1
Monacanthus ciliatus	.	.	.	.	.	2	5	18	25
Mugil cephalus	2	.	69	256	177	228	26	.	758
Mugil curema	.	.	7	2	.	73	33	.	115
Mugil trichodon	1	.	161	7	.	352	68	.	589
Mycteroperca microlepis	.	.	.	.	.	11	17	1	29
Myrophis punctatus	.	.	.	.	.	.	.	1	1
Negaprion brevirostris	.	.	.	.	.	2	.	.	2
Nicholsina usta	10	.	2	.	.	40	9	19	80
Ocyurus chrysurus	4	.	.	.	.	.	1	2	7
Ogcocephalus cubifrons	.	.	.	.	.	8	9	19	36
Oligoplites saurus	11	4	200	169	87	29	12	.	512
Ophichthus gomesii	.	.	.	.	.	.	.	1	1
Opisthonema oglinum	200	256	1,605	5,528	32	104	199	7	7,931
Opistognathus robinsi	.	.	.	.	.	.	.	1	1
Opsanus beta	1	.	3	31	1	59	15	41	151
Oreochromis aureus	.	.	.	4	.	.	.	.	4
Oreochromis/Sarotherodon spp.	1	.	4	2	2	.	.	.	9
Orthopristis chrysoptera	1,363	2	726	6	.	751	202	1,102	4,152
Paraclinus marmoratus	.	.	2	.	.	.	.	1	3
Paralichthys albigutta	4	11	9	1	.	44	24	36	129
Poecilia latipinna	2	.	273	209	20	.	.	.	504
Pomatomus saltatrix	.	.	.	.	.	29	6	.	35
Portunus spp.	24	5	4	3	.	1	.	2,135	2,172

Species	Gear								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=143	E=61	E=204	E=421	E=83	E=156	E=48	E=132	E=1,248
Prionotus rubio	.	.	.	.	.	.	.	3	3
Prionotus scitulus	22	5	6	2	1	10	9	1,001	1,056
Prionotus tribulus	5	5	2	7	.	8	1	51	79
Pristis pectinata	.	.	.	.	.	1	.	.	1
Pterygoplichthys disjunctivus	.	.	.	.	1	1	.	.	2
Rachycentron canadum	.	.	.	.	.	.	1	.	1
Rhinoptera bonasus	.	.	.	.	.	1	.	.	1
Rimapenaeus constrictus	.	.	.	.	.	.	.	9	9
Rimapenaeus spp.	2	1	3	.	.	.	.	229	235
Sardinella aurita	89	.	40	1,869	.	1	.	.	1,999
Sarotherodon melanotheron	.	.	2	12	.	14	.	.	28
Sciaenops ocellatus	71	17	168	609	30	163	40	4	1,102
Scomberomorus maculatus	.	.	.	.	.	3	2	.	5
Scorpaena brasiliensis	.	.	.	.	.	.	1	12	13
Selene vomer	.	.	.	.	.	17	4	.	21
Serraniculus pumilio	.	.	.	.	.	.	.	3	3
Serranus subligarius	.	.	.	.	.	.	1	.	1
Sicyonia laevigata	.	.	.	.	.	.	.	2	2
Sicyonia parri	.	.	.	.	.	.	.	1	1
Sphoeroides nephelus	55	9	45	13	3	281	84	45	535
Sphoeroides spengleri	.	.	.	1	.	1	3	1	6
Sphyraena barracuda	.	.	.	7	.	67	6	.	80
Sphyraena borealis	.	.	56	.	.	.	.	1	57
Sphyrna tiburo	.	.	.	.	.	7	7	.	14
Stephanolepis hispidus	78	.	21	.	.	20	21	109	249
Strongylura marina	1	.	3	2	1	3	29	.	39
Strongylura notata	6	2	144	211	5	177	25	.	570
Strongylura spp.	.	.	2	6	1	.	.	.	9
Strongylura timucu	.	.	3	21	.	5	1	.	30
Symphurus plagiusa	46	10	15	3	.	1	.	161	236
Syngnathus floridae	39	.	9	1	.	.	.	49	98
Syngnathus louisianae	16	1	9	4	.	.	.	91	121
Syngnathus scovelli	200	6	80	25	2	.	.	52	365

Species	Gear								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=143	E=61	E=204	E=421	E=83	E=156	E=48	E=132	E=1,248
Synodus foetens	85	15	81	21	10	19	7	447	685
Trachinotus carolinus	.	.	.	.	.	6	25	.	31
Trachinotus falcatus	.	.	2	.	.	32	.	.	34
Trinectes maculatus	.	7	22	76	66	2	3	506	682
Urophycis floridana	.	.	.	1	.	.	.	1	2
Totals	**37,118**	**5,918**	**54,260**	**88,883**	**10,521**	**32,299**	**12,176**	**21,623**	**262,798**

Appendix CH21-03. Summary by zone of taxa collected during Charlotte Harbor stratified-random sampling, 2021. Zones A–D were located in Charlotte Harbor, while Zones K (Alligator Creek), M (Myakka River) and P (Peace River) were 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=328	E=288	E=288	E=164	E=48	E=66	E=66	E=1,248
Acanthostracion quadricornis	2	76	15	57	.	.	.	150
Achirus lineatus	57	38	64	24	8	5	10	206
Adinia xenica	8	.	.	.	.	1	.	9
Aluterus schoepfii	1	.	8	8	.	.	.	17
Anarchopterus criniger	.	3	.	.	.	.	.	3
Anchoa cubana	.	.	504	.	.	.	.	504
Anchoa hepsetus	18	19	1	.	.	.	30	68
Anchoa mitchilli	7,519	15,267	6,374	9	7	3,976	1,826	34,978
Ancylopsetta quadrocellata	1	5	3	4	.	.	.	13
Anisotremus virginicus	.	.	.	1	.	.	.	1
Archosargus probatocephalus	72	364	145	239	18	6	11	855
Argopecten gibbus	.	5	.	1	.	.	.	6
Argopecten irradians	.	2	1	1	.	.	.	4
Ariopsis felis	345	431	791	163	.	70	151	1,951
Astroscopus y-graecum	.	.	1	.	.	.	.	1
Bagre marinus	5	.	2	.	.	11	3	21
Bairdiella chrysoura	1,317	1,084	210	298	1	568	43	3,521
Bathygobius soporator	50	4	6	2	26	20	41	149
Brevoortia spp.	26	43	.	.	.	54	15	138
Calamus arctifrons	.	.	.	1	.	.	.	1
Calamus penna	1	2	4	10	.	.	.	17
Calamus spp.	.	7	3	1	.	.	.	11
Callinectes ornatus	1	6	6	5	.	.	1	19
Callinectes sapidus	162	109	58	64	5	20	41	459
Caranx hippos	63	13	59	22	.	.	.	157
Carcharhinus leucas	1	.	.	.	.	.	.	1
Centropomus undecimalis	184	534	369	274	3	12	1	1,377
Centropristis striata	.	29	8	35	.	.	.	72
Chaetodipterus faber	62	127	221	294	.	5	11	720
Chasmodes saburrae	20	45	45	39	1	3	.	153
Chilomycterus schoepfii	54	216	196	141	.	.	.	607

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=328	E=288	E=288	E=164	E=48	E=66	E=66	E=1,248
Chloroscombrus chrysurus	11	56	8	3	.	.	5	83
Cichlasoma urophthalmus	7	1	3	.	1	.	14	26
Citharichthys macrops	1	30	2	5	.	.	.	38
Ctenogobius boleosoma	1	6	1	1	.	.	.	9
Ctenogobius smaragdus	18	16	24	8	2	1	1	70
Cynoscion arenarius	33	.	.	.	.	59	84	176
Cynoscion nebulosus	122	133	112	100	.	19	12	498
Cyprinodon variegatus	245	117	73	13	.	2	.	450
Dasyatis americana	6	2	5	8	.	.	.	21
Dasyatis sabina	41	17	37	4	.	6	26	131
Dasyatis say	4	2	12	1	.	.	.	19
Diapterus auratus	162	1,125	306	148	55	15	1	1,812
Diplectrum formosum	.	22	6	8	.	.	.	36
Diplodus holbrookii	.	36	2	4	.	.	.	42
Echeneis neucratoides	.	1	.	.	.	.	.	1
Elops saurus	13	130	20	42	.	.	1	206
Epinephelus itajara	.	.	.	1	.	.	.	1
Etropus crossotus	4	6	4	6	.	.	.	20
Eucinostomus gula	1,230	1,775	1,505	3,187	58	1	10	7,766
Eucinostomus harengulus	1,888	1,474	1,600	380	376	213	384	6,315
Eucinostomus spp.	7,002	12,897	8,482	8,985	2,451	896	1,011	41,724
Eugerres plumieri	654	441	634	6	1,021	186	146	3,088
Farfantepenaeus duorarum	752	911	490	266	13	52	90	2,574
Fistularia tabacaria	.	.	1	.	.	.	.	1
Floridichthys carpio	28	163	29	171	.	.	.	391
Fundulus grandis	100	40	21	32	.	15	3	211
Fundulus seminolis	.	.	1	.	.	.	.	1
Fundulus similis	.	.	.	5	.	9	1	15
Gambusia holbrooki	22	8	61	.	14	8	31	144
Ginglymostoma cirratum	.	.	.	1	.	.	.	1
Gobiesox strumosus	18	4	1	.	2	2	6	33
Gobionellus oceanicus	.	2	.	.	.	.	.	2
Gobiosoma bosc	11	10	23	.	.	52	64	160
Gobiosoma longipala	17	13	6	6	.	.	.	42

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=328	E=288	E=288	E=164	E=48	E=66	E=66	E=1,248
Gobiosoma robustum	175	307	187	137	9	1	13	829
Gobiosoma spp.	129	144	93	7	4	54	53	484
Gymnura micrura	2	.	.	1	.	.	.	3
Haemulon plumierii	.	48	16	68	.	.	.	132
Halichoeres bivittatus	.	1	.	.	.	.	.	1
Harengula jaguana	4,388	5,265	983	2,150	83	544	4	13,417
Hemichromis letourneuxi	.	.	2	.	.	.	.	2
Hemiramphus brasiliensis	.	.	.	2	.	.	.	2
Hippocampus erectus	4	24	11	14	.	.	.	53
Hippocampus zosterae	.	10	1	19	.	.	.	30
Hyporhamphus meeki	.	.	1	2	.	.	.	3
Hyporhamphus spp.	2	.	.	1	.	.	.	3
Hyporhamphus unifasciatus	1	.	.	4	.	.	.	5
Hypsoblennius hentz	3	2	15	3	.	.	.	23
Jordanella floridae	.	.	.	.	1	.	.	1
Kryptolebias marmoratus	.	.	1	.	.	.	.	1
Lachnolaimus maximus	.	4	1	.	.	.	.	5
Lagodon rhomboides	3,652	26,319	9,972	31,838	83	138	154	72,156
Leiostomus xanthurus	786	3,735	366	159	26	119	43	5,234
Lepisosteus platyrhincus	.	.	1	.	.	.	.	1
Lepomis macrochirus	1	.	.	.	.	.	.	1
Limulus polyphemus	9	1	6	.	.	.	.	16
Lophogobius cyprinoides	18	4	18	1	28	57	4	130
Lucania parva	1,959	7,767	3,796	1,220	130	1	1	14,874
Lupinoblennius nicholsi	1	.	.	.	.	.	.	1
Lutjanus analis	.	2	4	4	.	.	.	10
Lutjanus griseus	124	281	129	340	14	8	3	899
Lutjanus synagris	41	76	92	197	.	1	2	409
Megalops atlanticus	1	4	40	3	.	.	.	48
Membras martinica	39	23	.	8	.	3	5	78
Menidia spp.	2,083	4,173	1,535	89	1,034	1,145	715	10,774
Menippe spp.	21	186	178	95	.	.	.	480
Menticirrhus americanus	178	2	1	1	.	21	79	282
Menticirrhus littoralis	.	12	.	.	.	.	.	12

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=328	E=288	E=288	E=164	E=48	E=66	E=66	E=1,248
Menticirrhus saxatilis	4	6	.	.	.	1	.	11
Microgobius gulosus	1,376	1,086	1,192	322	155	190	117	4,438
Microgobius thalassinus	.	.	.	.	.	1	1	2
Micropogonias undulatus	.	.	.	.	.	1	.	1
Monacanthus ciliatus	.	2	.	23	.	.	.	25
Mugil cephalus	73	110	61	155	2	183	174	758
Mugil curema	14	50	19	32	.	.	.	115
Mugil trichodon	67	137	139	245	.	.	1	589
Mycteroperca microlepis	.	21	3	5	.	.	.	29
Myrophis punctatus	.	.	1	.	.	.	.	1
Negaprion brevirostris	.	1	.	1	.	.	.	2
Nicholsina usta	.	49	9	22	.	.	.	80
Ocyurus chrysurus	.	5	.	2	.	.	.	7
Ogcocephalus cubifrons	.	19	5	11	.	1	.	36
Oligoplites saurus	136	146	47	39	14	86	44	512
Ophichthus gomesii	.	.	1	.	.	.	.	1
Opisthonema oglinum	2,676	793	524	1,016	.	2,915	7	7,931
Opistognathus robinsi	1	.	.	.	.	.	.	1
Opsanus beta	5	65	18	60	1	1	1	151
Oreochromis aureus	1	.	.	.	.	2	1	4
Oreochromis/Sarotherodon spp.	2	4	1	.	2	.	.	9
Orthopristis chrysoptera	81	1,892	702	1,476	.	.	1	4,152
Paraclinus marmoratus	.	1	.	2	.	.	.	3
Paralichthys albigutta	12	45	46	26	.	.	.	129
Poecilia latipinna	141	65	154	121	20	3	.	504
Pomatomus saltatrix	.	14	5	16	.	.	.	35
Portunus spp.	197	715	983	277	.	.	.	2,172
Prionotus rubio	3	.	.	.	.	.	.	3
Prionotus scitulus	431	166	353	98	1	.	7	1,056
Prionotus tribulus	32	12	16	7	.	1	11	79
Pristis pectinata	1	.	.	.	.	.	.	1
Pterygoplichthys disjunctivus	1	.	.	.	.	.	1	2
Rachycentron canadum	.	1	.	.	.	.	.	1
Rhinoptera bonasus	1	.	.	.	.	.	.	1

Species	Zone							Totals
	A	B	C	D	K	M	P	
	E=328	E=288	E=288	E=164	E=48	E=66	E=66	E=1,248
Rimapenaeus constrictus	8	.	1	.	.	.	.	9
Rimapenaeus spp.	225	2	6	2	.	.	.	235
Sardinella aurita	1,269	127	.	67	.	536	.	1,999
Sarotherodon melanotheron	1	2	17	8	.	.	.	28
Sciaenops ocellatus	338	360	245	71	1	32	55	1,102
Scomberomorus maculatus	.	3	1	1	.	.	.	5
Scorpaena brasiliensis	.	7	1	5	.	.	.	13
Selene vomer	.	11	.	10	.	.	.	21
Serraniculus pumilio	.	.	2	1	.	.	.	3
Serranus subligarius	.	.	.	1	.	.	.	1
Sicyonia laevigata	.	1	1	.	.	.	.	2
Sicyonia parri	1	.	.	.	.	.	.	1
Sphoeroides nephelus	128	126	182	87	4	6	2	535
Sphoeroides spengleri	.	2	1	3	.	.	.	6
Sphyraena barracuda	.	23	22	35	.	.	.	80
Sphyraena borealis	.	57	.	.	.	.	.	57
Sphyrna tiburo	2	6	3	3	.	.	.	14
Stephanolepis hispidus	20	58	63	108	.	.	.	249
Strongylura marina	1	13	13	11	.	1	.	39
Strongylura notata	60	222	164	110	9	1	4	570
Strongylura spp.	3	1	1	.	.	3	1	9
Strongylura timucu	12	1	13	.	1	1	2	30
Symphurus plagiusa	132	9	42	11	1	.	41	236
Syngnathus floridae	1	49	7	41	.	.	.	98
Syngnathus louisianae	19	29	26	38	.	.	9	121
Syngnathus scovelli	57	147	67	84	1	6	3	365
Synodus foetens	125	74	363	85	7	17	14	685
Trachinotus carolinus	22	4	5	.	.	.	.	31
Trachinotus falcatus	.	21	6	7	.	.	.	34
Trinectes maculatus	133	24	19	2	26	175	303	682
Urophycis floridana	1	1	.	.	.	.	.	2
Totals	**43,789**	**93,042**	**45,562**	**56,194**	**5,719**	**12,542**	**5,950**	**262,798**

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 via 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 IR21-01). Monthly stratified-random sampling (SRS) was conducted in Zones C, D, and H using 21.3-m bay and 183-m haul seines. Monthly SRS was conducted in Zone E with only 183-m haul seines. Zone F was sampled monthly with 21.3-m river 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 2021 in the northern IRL.

Stratified-Random Sampling

A total of 404,482 animals, which included 157 taxa of fishes and 13 taxa of selected invertebrates, were collected from 686 northern Indian River Lagoon SRS samples in 2021 (Table IR21-01, Appendices IR21-01, -02, and -03). *Anchoa mitchilli* (n=300,514) was the most numerous taxon collected, representing 74.3% of the total catch. *Diapterus auratus* (n=20,350) and *Eucinostomus* spp. (n=13,034) were the next most abundant taxa collected, accounting for an additional 8.3% of the total catch. A total of 42 Selected Taxa (n=26,353 animals) composed 6.5% of the total catch. *Brevoortia* spp. (n=5,796) was the most abundant Selected Taxon, representing 1.4% of the total catch. *Leiostomus xanthurus* (n=4,730), *Mugil* *cephalus* (n=3,694), *Mugil curema* (n=3,424), and *Micropogonias undulatus* (n=1,322) were the next most abundant Selected Taxa, comprising 3.3% of the total catch. Collections in 2021 included 2 species new to the IR FIM collection*: Sparisoma chrysopterum, Umbrina coroides*.

Bay Sampling

21.3-m Bay Seines. A total of 277,018 animals were collected in 336 21.3-m bay seines, representing 68.5% of the overall SRS catch (Table IR21-01). *Anchoa mitchilli* (n = 242,448) and *Eucinostomus* spp. (n = 5,044) were the most abundant taxa, accounting for 89.3% of the bay seine catch (Table IR21-02). The taxa most frequently caught in 21.3-m bay seines were *Anchoa mitchilli* (44.3% occurrence) and *Eucinostomus* spp. (39.6% occurrence).

A total of 10,380 animals from 31 Selected Taxa were collected, representing 3.7% of the entire 21.3-m bay seine catch (Table IR21-03). *Brevoortia* spp. (n=3,186) was the most abundant Selected Taxon, accounting for 30.7% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were *Farfantepenaeus* spp. (21.7% occurrence) and *Menticirrhus americanus* (16.4% occurrence).

183-m Haul Seines. A total of 45,279 animals were collected in 228 183-m haul seines, representing 11.2% of the overall SRS catch (Table IR21-01). *Diapterus auratus* (n = 9,505) was the most abundant taxon, accounting for 21% of the 183-m haul seine catch (Table IR21-04). The taxa most frequently caught in 183-m haul seines were *Dasyatis sabina* (69.7% occurrence), *Mugil curema* (61.8% occurrence), and *Mugil cephalus* (60.5% occurrence).

A total of 11,543 animals from 36 Selected Taxa were collected, representing 25.5% of the entire 183-m haul seine catch (Table IR21-05). *Mugil curema* (n=2,931) and *Leiostomus xanthurus* (n=1,785) were the most abundant Selected Taxa, accounting for 40.9% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil curema* (61.8% occurrence) and *Mugil cephalus* (60.5% occurrence).

6.1-m Bay Otter Trawls. A total of 27 animals were collected in 2 6.1-m bay otter trawls, representing 0% of the overall SRS catch (Table IR21-01). *Eucinostomus* spp. (n = 10), *Gobiosoma* spp. (n = 3), *Syngnathus scovelli* (n = 3), and *Anchoa mitchilli* (n = 2) were the most abundant taxa, accounting for 66.7% of the 6.1-m bay otter trawl catch (Table IR21-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Gobiosoma* spp. (100.0%

occurrence), *Syngnathus scovelli* (100.0% occurrence), and *Eucinostomus* spp. (50.0% occurrence).

A total of 5 animals from 3 Selected Taxa were collected, representing 18.5% of the entire 6.1-m bay otter trawl catch (Table IR21-07). *Farfantepenaeus duorarum* (n=2), *Menippe* spp. (n=2), and *Farfantepenaeus* spp. (n=1) were the most abundant Selected Taxa, accounting for 100% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Farfantepenaeus duorarum* (50.0% occurrence), *Menippe* spp. (50.0% occurrence), and *Farfantepenaeus* spp. (50.0% occurrence).

River Sampling

21.3-m River Seines. A total of 82,158 animals were collected in 120 21.3-m river seines, representing 20.3% of the overall SRS catch (Table IR21-01). *Anchoa mitchilli* (n = 58,064) was the most abundant taxon collected, accounting for 70.7% of the 21.3-m river seine catch (Table IR21-08). *Eucinostomus* spp. (n=7,980) and *Diapterus auratus* (n=6,773) were the next most abundant taxa, accounting for an additional 18% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines were *Diapterus auratus* (86.7% occurrence), *Eucinostomus* spp. (82.5% occurrence), and *Eucinostomus harengulus* (75.0% occurrence).

A total of 4,425 animals from 25 Selected Taxa were collected, representing 5.4% of the entire 21.3-m river seine catch (Table IR21-09). *Leiostomus xanthurus* (n=2,033), and *Brevoortia* spp. (n=837) were the most abundant Selected Taxa, accounting for 64.9% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Centropomus undecimalis* (55.0% occurrence) and *Farfantepenaeus* spp. (45.0% occurrence).

References

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Figure IR21-01. Map of the northern Indian River Lagoon sampling area. Zones are labeled A–F, and H.

Table IR21-01. Summary of catch and effort data for northern Indian River Lagoon stratified-random sampling, 2021.

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
C	191,807	120	.	.	11,992	48	.	.	203,799	168
D	48,232	96	.	.	6,108	72	.	.	54,340	168
E	.	.	.	.	7,787	48	.	.	7,787	48
F	.	.	82,158	120	.	.	.	.	82,158	120
H	36,979	120	.	.	19,392	60	27	2	56,398	182
Totals	**277,018**	**336**	**82,158**	**120**	**45,279**	**228**	**27**	**2**	**404,482**	**686**

Table IR21-02. Catch statistics for 10 dominant taxa collected in 336 21.3-m bay seine samples during northern Indian River Lagoon stratified-random sampling, 2021. 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	242,448	87.5	44.3	548.03	158.08	512.76	30,667.14	37	0.02	15	71
Eucinostomus spp.	5,044	1.8	39.6	11.40	1.99	310.83	314.29	26	0.10	8	39
Harengula jaguana	4,537	1.6	11.9	10.26	4.75	823.50	1,351.43	39	0.25	17	104
Diapterus auratus	4,072	1.5	31.5	9.20	1.58	304.55	241.43	38	0.31	11	149
Brevoortia spp.	3,186	1.2	9.5	7.20	3.69	910.17	947.86	37	0.23	18	134
Mugil cephalus	2,422	0.9	12.2	5.47	1.67	541.17	280.00	25	0.30	16	346
Menidia spp.	1,815	0.7	17.6	4.10	1.59	689.84	467.86	49	0.30	15	77
Bairdiella chrysoura	1,686	0.6	17.6	3.81	1.29	601.68	341.43	30	0.41	6	116
Eucinostomus gula	1,136	0.4	17.6	2.57	0.49	339.26	55.00	53	0.27	40	110
Farfantepenaeus spp.	957	0.3	21.7	2.16	0.57	468.61	115.00	7	0.09	2	16
Subtotals	267,303	96.5	.	.	.	.	.	.	.	2	346
Totals	**277,018**	**100.0**	**.**	**588.90**	**152.20**	**473.76**	**31,228.57**	**.**	**.**	**2**	**739**

Table IR21-03. Catch statistics for Selected Taxa collected in 336 21.3-m bay seine samples during northern Indian River Lagoon stratified-random sampling, 2021. 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
Brevoortia spp.	3,186	1.2	9.5	6.77	3.47	938.78	947.86	37	0.23	18	134
Mugil cephalus	2,422	0.9	12.2	5.15	1.57	558.55	280.00	25	0.30	16	346
Farfantepenaeus spp.	957	0.3	21.7	2.03	0.54	483.82	115.00	7	0.09	2	16
Leiostomus xanthurus	912	0.3	12.8	1.94	0.65	611.93	119.29	27	0.42	10	168
Menticirrhus americanus	538	0.2	16.4	1.14	0.41	656.51	117.86	36	0.77	9	177
Micropogonias undulatus	511	0.2	4.8	1.09	0.76	1,288.66	244.29	26	0.28	11	51
Callinectes sapidus	429	0.2	9.2	0.91	0.59	1,181.39	189.29	18	0.74	5	191
Mugil curema	429	0.2	10.7	0.91	0.42	852.55	130.71	43	1.21	15	206
Sciaenops ocellatus	175	0.1	7.1	0.37	0.21	1,028.56	67.14	35	2.76	13	427
Archosargus probatocephalus	162	0.1	11.3	0.34	0.08	418.50	12.14	41	3.16	13	287
Cynoscion nebulosus	153	0.1	13.1	0.33	0.07	395.65	14.29	37	2.10	12	243
Trachinotus falcatus	134	<0.1	3.9	0.28	0.17	1,064.76	49.29	24	1.70	11	143
Litopenaeus setiferus	77	<0.1	3.6	0.16	0.10	1,111.45	23.57	8	0.35	3	19
Cynoscion complex	74	<0.1	3.9	0.16	0.09	1,001.47	27.14	38	1.79	11	98
Pogonias cromis	53	<0.1	3.0	0.11	0.06	936.25	17.14	47	8.38	9	228
Lutjanus griseus	41	<0.1	5.7	0.09	0.02	494.55	4.29	129	12.08	13	248
Centropomus undecimalis	28	<0.1	5.1	0.06	0.02	555.03	3.57	128	28.37	20	572
Farfantepenaeus aztecus	17	<0.1	3.3	0.04	0.01	612.20	2.14	17	0.39	15	20
Mugil rubrioculus	17	<0.1	0.6	0.04	0.03	1,728.25	11.43	59	3.90	40	117
Elops saurus	15	<0.1	2.4	0.03	0.02	1,026.35	5.71	82	19.79	31	272
Albula spp.	13	<0.1	1.8	0.03	0.02	1,061.42	5.00	41	4.78	24	87
Paralichthys albigutta	9	<0.1	2.1	0.02	0.01	728.59	1.43	49	14.59	13	153

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Trachinotus carolinus	9	<0.1	1.5	0.02	0.01	973.08	2.86	32	4.11	13	48
Haemulon parra	4	<0.1	0.6	0.01	0.01	1,447.84	2.14	39	6.05	29	56
Caranx hippos	3	<0.1	0.9	0.01	<0.01	1,055.14	0.71	48	10.97	29	67
Lutjanus analis	3	<0.1	0.3	0.01	0.01	1,833.03	2.14	31	0.88	30	33
Sphyraena barracuda	3	<0.1	0.9	0.01	<0.01	1,055.14	0.71	130	74.13	45	278
Farfantepenaeus duorarum	2	<0.1	0.6	<0.01	<0.01	1,294.21	0.71	16	0.50	15	16
Menippe spp.	2	<0.1	0.6	<0.01	<0.01	1,294.21	0.71	57	33.00	24	90
Calamus penna	1	<0.1	0.3	<0.01	<0.01	1,833.03	0.71	38	.	38	38
Megalops atlanticus	1	<0.1	0.3	<0.01	<0.01	1,833.03	0.71	692	.	692	692
Totals	**10,380**	**3.7**	**.**	**22.07**	**4.20**	**348.88**	**960.71**	**.**	**.**	**2**	**692**

Table IR21-04. Catch statistics for 10 dominant taxa collected in 228 183-m haul seine samples during northern Indian River Lagoon stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Diapterus auratus	9,505	21.0	42.1	41.87	12.42	446.73	2,527	106	0.32	50	244
Bairdiella chrysoura	5,588	12.3	20.2	24.62	14.53	889.30	3,141	111	0.11	57	182
Lagodon rhomboides	5,170	11.4	33.8	22.78	5.34	353.43	673	110	0.30	30	204
Ariopsis felis	3,058	6.8	60.1	13.47	2.58	288.37	471	237	0.70	110	396
Mugil curema	2,931	6.5	61.8	12.91	2.76	321.73	343	139	0.51	82	296
Eucinostomus harengulus	2,817	6.2	39.5	12.41	2.87	348.40	405	101	0.21	53	136
Leiostomus xanthurus	1,785	3.9	17.1	7.86	4.60	882.18	1,024	152	0.56	60	245
Brevoortia spp.	1,773	3.9	10.1	7.81	5.74	1,106.39	1,264	161	1.39	58	288
Dasyatis sabina	1,341	3.0	69.7	5.91	1.05	267.32	183	226	1.41	86	481
Mugil cephalus	1,216	2.7	60.5	5.36	1.31	368.51	273	241	1.32	82	398
Subtotals	35,184	77.7	.	.	.	.	.	.	.	30	481
Totals	**45,279**	**100.0**	**.**	**198.59**	**33.86**	**257.45**	**6,514**	**.**	**.**	**12**	**1,074**

Table IR21-05. Catch statistics for Selected Taxa collected in 228 183-m haul seine samples during northern Indian River Lagoon stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil curema	2,931	6.5	61.8	12.86	2.75	322.50	343	139	0.51	82	296
Leiostomus xanthurus	1,785	3.9	17.1	7.83	4.58	884.13	1,024	152	0.56	60	245
Brevoortia spp.	1,773	3.9	10.1	7.78	5.71	1,108.83	1,264	161	1.39	58	288
Mugil cephalus	1,216	2.7	60.5	5.33	1.30	369.38	273	241	1.32	82	398
Elops saurus	831	1.8	34.6	3.64	1.10	455.75	150	287	1.62	172	459
Micropogonias undulatus	679	1.5	6.1	2.98	2.74	1,387.88	624	181	1.65	58	321
Pogonias cromis	458	1.0	21.5	2.01	0.61	459.12	86	497	7.06	83	765
Archosargus probatocephalus	282	0.6	33.3	1.24	0.19	236.19	17	215	5.07	33	382
Sciaenops ocellatus	277	0.6	31.6	1.21	0.46	572.73	103	397	8.19	101	995
Menticirrhus americanus	249	0.5	10.5	1.09	0.56	776.23	118	148	1.51	91	272
Caranx hippos	226	0.5	19.3	0.99	0.35	539.51	73	266	7.79	68	502
Centropomus undecimalis	213	0.5	21.1	0.93	0.24	389.92	35	561	14.17	85	909
Cynoscion nebulosus	144	0.3	15.4	0.63	0.25	590.85	49	241	8.62	60	631
Lutjanus griseus	72	0.2	12.7	0.32	0.07	330.50	8	186	5.87	82	277
Trachinotus carolinus	59	0.1	4.4	0.26	0.12	701.36	23	284	11.24	55	408
Callinectes sapidus	50	0.1	11.0	0.22	0.06	418.32	10	106	7.26	32	208
Trachinotus falcatus	49	0.1	6.1	0.21	0.07	524.54	10	90	5.52	34	184
Farfantepenaeus duorarum	40	0.1	3.5	0.18	0.12	1,035.38	27	19	0.73	15	32
Megalops atlanticus	40	0.1	4.8	0.18	0.07	608.83	12	593	31.18	284	1,074
Mugil rubrioculus	29	0.1	5.3	0.13	0.05	602.50	8	129	3.94	106	183
Sphyraena barracuda	25	0.1	5.7	0.11	0.03	462.02	4	248	10.46	196	445

Species	Number		% Occur	Density Estimate (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Cynoscion complex	16	<0.1	2.2	0.07	0.04	921.26	9	174	9.19	136	247
Lutjanus analis	16	<0.1	3.9	0.07	0.03	661.23	6	131	11.08	95	246
Farfantepenaeus aztecus	15	<0.1	1.3	0.07	0.04	998.79	7	27	1.20	18	32
Sphyrna tiburo	15	<0.1	2.6	0.07	0.04	879.58	8	704	27.33	449	876
Farfantepenaeus spp.	12	<0.1	2.2	0.05	0.03	938.36	7	13	0.21	12	14
Albula spp.	10	<0.1	1.3	0.04	0.03	1,021.46	6	163	13.51	44	185
Paralichthys albigutta	9	<0.1	2.6	0.04	0.02	685.99	3	150	17.31	81	228
Calamus penna	6	<0.1	0.4	0.03	0.03	1,509.97	6	102	6.14	84	120
Scomberomorus maculatus	6	<0.1	1.8	0.03	0.01	791.25	2	184	17.11	133	225
Litopenaeus setiferus	3	<0.1	1.3	0.01	0.01	867.93	1	30	2.65	25	34
Pomatomus saltatrix	3	<0.1	1.3	0.01	0.01	867.93	1	354	27.01	300	382
Calamus spp.	1	<0.1	0.4	<0.01	<0.01	1,509.97	1	38	.	38	38
Lachnolaimus maximus	1	<0.1	0.4	<0.01	<0.01	1,509.97	1	103	.	103	103
Negaprion brevirostris	1	<0.1	0.4	<0.01	<0.01	1,509.97	1	877	.	877	877
Paralichthys lethostigma	1	<0.1	0.4	<0.01	<0.01	1,509.97	1	50	.	50	50
Totals	**11,543**	**25.5**	**.**	**50.63**	**13.83**	**412.37**	**3,014**	**.**	**.**	**12**	**1,074**

Table IR21-06. Catch statistics for 10 dominant taxa collected in 2 6.1-m bay otter trawl samples during northern Indian River Lagoon stratified-random sampling, 2021. 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.	10	37.0	50	0.96	0.96	141.42	1.93	21	1.54	18	31
Gobiosoma spp.	3	11.1	100	0.29	0.10	47.14	0.39	19	0.33	18	19
Syngnathus scovelli	3	11.1	100	0.29	0.10	47.14	0.39	75	3.61	70	82
Anchoa mitchilli	2	7.4	50	0.19	0.19	141.42	0.39	36	5.50	30	41
Farfantepenaeus duorarum	2	7.4	50	0.19	0.19	141.42	0.39	23	5.00	18	28
Menippe spp.	2	7.4	50	0.19	0.19	141.42	0.39	50	9.00	41	59
Eucinostomus jonesii	1	3.7	50	0.10	0.10	141.42	0.19	51	.	51	51
Farfantepenaeus spp.	1	3.7	50	0.10	0.10	141.42	0.19	6	.	6	6
Gobiosoma robustum	1	3.7	50	0.10	0.10	141.42	0.19	20	.	20	20
Prionotus scitulus	1	3.7	50	0.10	0.10	141.42	0.19	144	.	144	144
Subtotals	26	96.2	.	.	.	.	.	.	.	6	144
Totals	**27**	**100.0**	**.**	**2.60**	**1.83**	**99.52**	**4.43**	**.**	**.**	**6**	**144**

Table IR21-07. Catch statistics for Selected Taxa collected in 2 6.1-m bay otter trawl samples during northern Indian River Lagoon stratified-random sampling, 2021. 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	7.4	50	0.19	0.19	141.42	0.39	23	5	18	28
Menippe spp.	2	7.4	50	0.19	0.19	141.42	0.39	50	9	41	59
Farfantepenaeus spp.	1	3.7	50	0.10	0.10	141.42	0.19	6	.	6	6
Totals	**5**	**18.5**	**.**	**0.48**	**0.48**	**141.42**	**0.96**	**.**	**.**	**6**	**59**

Table IR21-08. Catch statistics for 10 dominant taxa collected in 120 21.3-m river seine samples during northern Indian River Lagoon stratified-random sampling, 2021. 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	58,064	70.7	45.8	717.55	220.93	335.87	14,919.12	29	0.02	15	51
Eucinostomus spp.	7,980	9.7	82.5	98.62	31.29	346.17	3,398.53	22	0.08	8	39
Diapterus auratus	6,773	8.2	86.7	83.70	16.94	220.75	1,652.94	33	0.19	11	163
Leiostomus xanthurus	2,033	2.5	16.7	25.12	10.74	466.17	864.71	25	0.19	15	136
Eugerres plumieri	1,759	2.1	40.8	21.74	8.69	436.18	969.12	33	0.73	11	241
Eucinostomus harengulus	1,003	1.2	75.0	12.39	1.77	156.00	114.71	54	0.32	40	94
Brevoortia spp.	837	1.0	14.2	10.34	5.71	602.66	629.41	32	0.31	18	55
Centropomus undecimalis	708	0.9	55.0	8.75	2.43	302.94	245.59	39	1.51	9	344
Menidia spp.	528	0.6	46.7	6.52	1.36	226.61	89.71	37	0.38	14	65
Lagodon rhomboides	377	0.5	8.3	4.66	3.56	834.59	417.65	53	0.67	16	85
Subtotals	80,062	97.4	.	.	.	.	.	.	.	8	344
Totals	**82,158**	**100.0**	**.**	**1,006.84**	**224.96**	**244.76**	**14,961.76**	**.**	**.**	**2**	**425**

Table IR21-09. Catch statistics for Selected Taxa collected in 120 21.3-m river seine samples during northern Indian River Lagoon stratified-random sampling, 2021. 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	2,033	2.5	16.7	24.91	10.65	468.20	864.71	25	0.19	15	136
Brevoortia spp.	837	1.0	14.2	10.26	5.67	605.24	629.41	32	0.31	18	55
Centropomus undecimalis	708	0.9	55.0	8.68	2.41	304.34	245.59	39	1.51	9	344
Farfantepenaeus spp.	267	0.3	45.0	3.27	0.81	271.89	79.41	7	0.17	2	14
Micropogonias undulatus	132	0.2	17.5	1.62	0.43	290.94	25.00	31	1.13	9	71
Callinectes sapidus	88	0.1	25.8	1.08	0.29	297.25	26.47	28	4.10	3	166
Mugil curema	64	0.1	10.8	0.78	0.32	447.51	27.94	63	5.41	19	138
Sciaenops ocellatus	60	0.1	10.8	0.74	0.44	651.82	50.00	32	2.55	17	147
Mugil cephalus	56	0.1	8.3	0.69	0.53	843.96	63.24	70	11.09	20	354
Archosargus probatocephalus	49	0.1	19.2	0.60	0.21	381.64	22.06	85	10.07	11	234
Lutjanus griseus	35	<0.1	22.5	0.43	0.08	210.35	4.41	139	6.26	30	188
Litopenaeus setiferus	27	<0.1	8.3	0.33	0.14	473.25	13.24	5	0.38	3	12
Elops saurus	21	<0.1	3.3	0.26	0.17	724.56	17.65	42	1.55	30	58
Sphyraena barracuda	16	<0.1	10.0	0.20	0.06	362.94	5.88	96	17.86	31	333
Centropomus pectinatus	10	<0.1	2.5	0.12	0.10	888.02	11.76	27	1.31	24	40
Centropomus parallelus	8	<0.1	4.2	0.10	0.05	540.77	4.41	57	15.04	23	138
Farfantepenaeus aztecus	3	<0.1	1.7	0.04	0.03	813.75	2.94	17	0.58	16	18
Caranx hippos	2	<0.1	1.7	0.02	0.02	771.34	1.47	49	19.00	30	68
Mugil rubrioculus	2	<0.1	1.7	0.02	0.02	771.34	1.47	18	0.00	18	18
Trachinotus falcatus	2	<0.1	1.7	0.02	0.02	771.34	1.47	14	1.50	13	16
Cynoscion nebulosus	1	<0.1	0.8	0.01	0.01	1,095.45	1.47	15	.	15	15
Farfantepenaeus duorarum	1	<0.1	0.8	0.01	0.01	1,095.45	1.47	15	.	15	15

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Lutjanus apodus	1	<0.1	0.8	0.01	0.01	1,095.45	1.47	26	.	26	26
Lutjanus jocu	1	<0.1	0.8	0.01	0.01	1,095.45	1.47	59	.	59	59
Menticirrhus americanus	1	<0.1	0.8	0.01	0.01	1,095.45	1.47	15	.	15	15
Totals	**4,425**	**5.4**	**.**	**54.23**	**14.04**	**283.55**	**879.41**	**.**	**.**	**2**	**354**

Appendix IR21-01. Monthly summary of taxa collected during northern Indian River Lagoon stratified-random sampling, 2021. 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=59	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=686
Abudefduf saxatilis	.	.	.	.	.	.	.	1	.	.	.	.	1
Achirus lineatus	3	2	11	9	1	8	14	14	7	14	9	10	102
Agonostomus monticola	.	.	.	.	.	.	.	.	.	.	1	.	1
Albula spp.	.	7	.	7	2	1	1	.	1	.	4	.	23
Aluterus schoepfii	.	.	.	.	.	.	1	.	.	.	.	.	1
Anchoa hepsetus	.	.	4	16	21	6	4	.	1	8	.	.	60
Anchoa lamprotaenia	.	15	.	.	.	.	.	.	.	.	.	.	15
Anchoa lyolepis	.	.	.	14	.	2	.	.	1	.	.	.	17
Anchoa mitchilli	5,138	2,855	7,208	31,895	14,142	71,768	16,600	35,250	49,051	26,498	13,564	26,545	300,514
Anchoa sp.	.	.	.	.	.	1	.	.	.	.	.	.	1
Archosargus probatocephalus	19	29	42	36	39	123	32	71	33	20	45	4	493
Archosargus rhomboidalis	.	28	11	4	68	104	15	122	43	66	79	1	541
Archosargus spp.	.	.	.	.	.	.	.	.	1	1	.	.	2
Ariopsis felis	93	29	54	84	818	262	979	291	414	365	29	111	3,529
Bagre marinus	.	.	1	1	6	3	6	.	26	184	.	4	231
Bairdiella chrysoura	68	849	33	232	577	597	148	37	460	226	149	3,900	7,276
Bathygobius soporator	2	2	3	3	3	3	8	2	.	1	.	.	27
Brevoortia spp.	9	86	1,394	1,565	1,038	51	332	7	1,268	31	1	14	5,796
Calamus penna	.	1	.	.	.	.	6	.	.	.	.	.	7
Calamus sp.	.	.	1	.	.	.	.	.	.	.	.	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=59	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=686
Callinectes bocourti	.	.	1	1	.	.	.	.	.	.	.	.	2
Callinectes ornatus	.	2	4	3	1	4	32	1	.	.	2	1	50
Callinectes sapidus	7	9	22	7	7	18	5	23	67	81	306	15	567
Callinectes similis	.	2	1	10	6	.	7	6	.	.	29	9	70
Callinectes spp.	.	2	.	4	.	.	.	.	.	.	7	.	13
Caranx bartholomaei	.	.	.	.	.	1	.	.	.	.	.	.	1
Caranx hippos	1	7	14	5	8	3	20	20	83	10	25	35	231
Caranx latus	.	1	.	.	3	.	.	1	.	.	.	.	5
Caranx spp.	.	.	.	.	1	.	.	1	.	.	.	.	2
Centropomus parallelus	.	.	3	.	3	.	.	.	.	1	1	.	8
Centropomus pectinatus	.	.	9	.	1	.	.	.	.	.	.	.	10
Centropomus undecimalis	64	123	202	17	40	14	83	121	127	48	85	25	949
Chaetodipterus faber	.	.	.	.	.	108	3	7	12	.	.	.	130
Chasmodes saburrae	1	.	2	.	.	1	10	6	.	3	.	5	28
Chilomycterus schoepfii	13	7	7	5	11	10	20	6	13	4	1	3	100
Chloroscombrus chrysurus	.	.	1	.	.	.	3	1	93	10	.	.	108
Cichlasoma urophthalmus	16	.	4	.	.	.	.	1	2	1	2	3	29
Citharichthys spilopterus	1	7	12	21	8	4	16	20	10	3	.	3	105
Clupeidae spp.	2	.	.	.	.	1	.	.	.	.	.	.	3
Ctenogobius boleosoma	.	1	.	.	28	.	.	.	.	.	.	2	31
Ctenogobius fasciatus	.	1	.	.	.	.	.	.	.	.	.	.	1
Ctenogobius pseudofasciatus	2	.	1	.	.	.	.	.	.	.	.	.	3

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=59	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=686
Ctenogobius shufeldti	.	.	1	.	.	.	.	1	.	.	.	.	2
Ctenogobius smaragdus	1	.	.	.	1	1	.	1	.	.	.	1	5
Ctenogobius sp.	1	.	.	.	.	.	.	.	.	.	.	.	1
Cynoscion complex	1	.	.	.	9	3	.	1	12	15	11	38	90
Cynoscion nebulosus	.	32	1	4	5	11	40	27	83	46	30	19	298
Dasyatis sabina	41	57	57	142	73	144	289	188	78	203	55	75	1,402
Dasyatis say	11	13	14	25	19	17	25	44	40	43	29	27	307
Diapterus auratus	857	554	790	250	444	1,073	1,549	2,686	4,926	1,200	2,851	3,170	20,350
Diapterus rhombeus	.	8	.	1	.	8	83	50	488	54	6	1	699
Diplodus holbrookii	.	.	.	2	.	.	3	.	.	.	.	.	5
Dormitator maculatus	9	12	.	13	.	.	.	.	1	.	1	.	36
Dorosoma petenense	.	.	.	.	.	5	.	.	.	.	.	.	5
Echeneis neucratoides	.	.	1	.	.	.	.	.	.	.	.	.	1
Echeneis sp.	.	.	1	.	.	.	.	.	.	.	.	.	1
Elops saurus	185	130	17	15	105	17	16	120	37	178	19	28	867
Elops sp.	.	.	1	.	.	.	.	.	.	.	.	.	1
Eucinostomus argenteus	.	.	.	.	.	.	4	.	.	.	.	.	4
Eucinostomus gula	22	15	110	114	29	78	456	343	197	149	507	145	2,165
Eucinostomus harengulus	24	183	198	139	572	816	482	668	278	205	875	77	4,517
Eucinostomus jonesii	2	19	8	12	14	15	14	.	77	.	14	1	176
Eucinostomus lefroyi	.	.	.	.	1	.	.	.	.	.	.	.	1
Eucinostomus spp.	709	687	614	171	208	1,722	1,122	980	723	458	1,887	3,753	13,034

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=59	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=686
Eugerres plumieri	4	5	164	147	229	1,026	114	66	34	78	53	27	1,947
Evorthodus lyricus	5	1	.	.	.	.	.	.	2	3	1	.	12
Farfantepenaeus aztecus	1	.	1	1	5	21	5	1	.	.	.	.	35
Farfantepenaeus duorarum	3	2	7	27	.	3	3	.	.	.	.	.	45
Farfantepenaeus spp.	17	63	220	162	74	68	192	159	44	30	156	52	1,237
Floridichthys carpio	.	.	.	3	.	.	3	.	2	.	25	3	36
Fundulus grandis	20	.	.	.	.	.	.	.	.	.	.	.	20
Fundulus similis	1	.	.	.	.	.	.	.	.	.	1	.	2
Fundulus sp.	.	.	.	1	.	.	.	.	.	.	.	.	1
Gambusia holbrooki	127	7	49	.	.	17	2	52	1	1	40	31	327
Gerres cinereus	2	1	7	.	6	26	2	19	38	12	8	1	122
Gobiesox strumosus	.	.	2	4	1	3	.	.	.	.	.	.	10
Gobiomorus dormitor	.	4	.	.	.	.	.	.	.	.	.	.	4
Gobionellus oceanicus	1	.	9	3	8	5	1	.	4	.	.	1	32
Gobiosoma bosc	.	4	.	4	4	8	4	.	1	.	.	1	26
Gobiosoma robustum	4	5	41	4	13	23	93	27	6	7	28	9	260
Gobiosoma spp.	4	1	8	4	21	39	125	34	37	73	99	7	452
Gymnura micrura	.	1	5	3	3	1	3	4	3	7	1	2	33
Haemulon parra	.	.	.	.	.	.	4	.	.	.	.	.	4
Harengula humeralis	.	3	.	.	.	.	.	.	.	.	.	.	3
Harengula jaguana	.	2	4	.	50	1,175	418	2,513	635	563	356	60	5,776
Hemichromis letourneuxi	3	.	.	.	.	.	.	.	.	.	.	2	5

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=59	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=686
Heterandria formosa	.	1	.	.	.	.	.	.	.	.	.	.	1
Hippocampus erectus	.	.	.	.	.	1	.	.	.	.	.	.	1
Hippocampus zosterae	.	.	.	.	.	.	1	.	.	.	.	.	1
Histrio histrio	.	.	.	.	1	.	.	.	.	.	.	.	1
Hyporhamphus meeki	.	.	.	.	.	1	.	.	.	2	.	.	3
Hyporhamphus spp.	.	.	.	.	.	10	1	.	.	.	.	.	11
Labidesthes sicculus	.	10	.	.	.	.	4	12	.	.	26	2	54
Lachnolaimus maximus	.	.	.	.	.	1	.	.	.	.	.	.	1
Lagodon rhomboides	6	6	57	36	213	871	1,185	1,404	727	841	644	2	5,992
Leiostomus xanthurus	5	860	1,687	417	23	225	116	47	1,045	247	16	42	4,730
Lepisosteus osseus	.	.	.	.	.	.	.	.	.	.	1	.	1
Lepisosteus platyrhincus	.	.	.	.	1	2	.	.	1	.	.	.	4
Lepomis auritus	.	.	.	.	.	.	.	.	1	.	.	.	1
Lepomis gulosus	.	.	1	.	.	.	.	.	.	.	.	.	1
Lepomis macrochirus	1	.	.	.	.	.	.	1	.	.	.	.	2
Lepomis sp.	.	.	.	.	.	.	.	1	.	.	.	.	1
Limulus polyphemus	40	24	2	2	3	.	.	1	.	.	.	2	74
Litopenaeus setiferus	.	2	.	1	.	6	2	35	.	4	38	19	107
Lophogobius cyprinoides	10	14	25	1	13	46	5	2	5	8	15	1	145
Lucania goodei	.	.	1	.	.	.	.	.	.	.	.	.	1
Lucania parva	6	6	20	6	.	.	5	4	69	1	1	129	247
Lupinoblennius nicholsi	1	.	1	.	.	1	1	.	.	.	.	.	4

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=59	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=686
Lutjanus analis	.	.	2	.	.	3	10	1	1	1	1	.	19
Lutjanus apodus	.	.	.	.	.	.	.	.	.	.	.	1	1
Lutjanus griseus	.	4	9	2	6	21	30	23	36	10	4	3	148
Lutjanus jocu	.	.	.	.	1	.	.	.	.	.	.	.	1
Megalops atlanticus	.	.	1	9	1	1	15	4	10	.	.	.	41
Membras martinica	15	29	3	43	27	71	108	194	8	3	5	4	510
Menidia spp.	18	38	52	207	334	312	183	100	144	131	95	729	2,343
Menippe spp.	2	1	.	.	.	.	.	.	1	.	.	.	4
Menticirrhus americanus	3	.	9	214	206	49	20	12	5	197	27	46	788
Microgobius gulosus	.	18	8	5	19	53	103	162	56	68	33	19	544
Microgobius microlepis	.	.	7	.	.	.	3	.	.	.	.	.	10
Microgobius thalassinus	.	.	1	.	.	3	2	3	.	6	.	1	16
Micropogonias undulatus	68	371	45	133	1	5	.	6	652	14	2	25	1,322
Micropterus salmoides	.	.	.	1	.	.	.	.	.	1	.	.	2
Mugil cephalus	133	969	679	461	197	409	175	47	40	24	108	452	3,694
Mugil curema	161	233	446	147	142	598	124	89	25	68	498	893	3,424
Mugil rubrioculus	.	1	.	17	.	.	1	1	.	12	7	9	48
Negaprion brevirostris	.	.	1	.	.	.	.	.	.	.	.	.	1
Oligoplites saurus	2	12	4	3	33	90	51	67	65	56	10	27	420
Opisthonema oglinum	1	.	.	.	22	397	1	29	373	126	1	.	950
Opsanus tau	1	.	.	.	.	1	7	.	.	.	.	.	9
Oreochromis complex	.	1	.	.	.	.	.	.	.	.	.	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=59	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=686
Oreochromis/Sarotherodon spp.	.	.	.	1	.	.	.	.	.	1	.	.	2
Orthopristis chrysoptera	2	.	63	24	55	80	75	26	89	92	51	.	557
Paralichthys albigutta	2	2	2	2	2	.	1	4	.	2	1	.	18
Paralichthys lethostigma	.	.	.	.	.	.	1	.	.	.	.	.	1
Poecilia latipinna	.	2	4	1	.	5	.	5	.	1	17	.	35
Pogonias cromis	13	86	54	112	40	32	18	20	106	19	3	8	511
Pomatomus saltatrix	.	.	.	.	.	.	1	.	1	.	1	.	3
Portunus spp.	.	.	.	1	4	.	.	1	.	.	.	.	6
Prionotus scitulus	1	1	.	2	6	3	4	.	.	1	2	1	21
Prionotus tribulus	.	.	2	.	.	1	4	.	.	.	.	1	8
Sarotherodon melanotheron	.	.	.	.	.	.	1	2	.	.	.	1	4
Sciaenidae sp.	1	.	.	.	.	.	.	.	.	.	.	.	1
Sciaenops ocellatus	198	43	16	12	15	28	18	113	4	18	26	21	512
Scomberomorus maculatus	.	.	1	.	.	.	1	2	.	2	.	.	6
Scorpaena grandicornis	.	.	.	.	1	.	.	.	.	.	.	.	1
Scorpaena plumieri	.	.	.	.	.	.	.	1	.	.	.	.	1
Selene vomer	.	.	.	.	.	4	1	18	8	8	18	11	68
Sparisoma chrysopterum	.	.	.	.	.	.	.	.	1	.	.	.	1
Sphoeroides nephelus	9	8	21	19	27	78	68	87	92	19	26	14	468
Sphoeroides spengleri	1	.	1	.	.	.	.	.	.	.	.	3	5
Sphoeroides spp.	.	.	2	1	.	.	.	.	.	.	1	.	4
Sphoeroides testudineus	6	30	13	41	62	81	30	73	22	10	41	52	461

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=59	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=57	E=686
Sphyraena barracuda	.	.	.	.	1	5	3	6	13	9	4	3	44
Sphyrna tiburo	.	.	.	.	.	.	.	.	1	11	.	3	15
Stephanolepis hispidus	.	.	.	1	3	.	3	.	.	.	3	.	10
Stomolophus meleagris	.	.	.	1	.	.	.	.	.	.	.	.	1
Strongylura marina	.	3	.	.	3	.	1	1	1	12	15	11	47
Strongylura notata	6	.	2	6	3	6	15	11	13	6	41	9	118
Strongylura spp.	.	.	.	1	.	.	.	.	1	.	.	.	2
Strongylura timucu	.	.	.	.	.	.	.	.	.	.	2	.	2
Symphurus plagiusa	.	2	.	.	.	.	4	2	.	.	.	1	9
Syngnathus louisianae	.	.	.	2	2	2	6	2	1	.	.	.	15
Syngnathus scovelli	3	1	7	5	5	10	31	5	1	.	14	5	87
Synodus foetens	.	.	4	1	3	6	2	.	2	2	4	.	24
Tilapia mariae	.	.	.	.	.	.	.	.	.	.	.	1	1
Trachinotus carolinus	3	.	.	.	1	10	7	12	25	1	9	.	68
Trachinotus falcatus	.	.	5	2	7	24	118	9	6	9	5	.	185
Trinectes maculatus	2	1	5	1	1	8	.	.	1	3	1	1	24
Tylosurus crocodilus	.	.	.	.	.	.	.	1	3	1	9	.	14
Umbrina coroides	.	3	.	.	.	.	.	.	.	.	.	.	3
Totals	**8,214**	**8,656**	**14,638**	**37,131**	**20,210**	**82,978**	**25,963**	**46,639**	**63,115**	**32,947**	**23,218**	**40,773**	**404,482**

Appendix IR21-02. Summary by gear and stratum of taxa collected during northern Indian River Lagoon stratified-random sampling, 2021. 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								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=37	E=107	E=192	E=91	E=29	E=169	E=59	E=2	E=686
Abudefduf saxatilis	.	.	.	.	1	.	.	.	1
Achirus lineatus	7	14	38	8	3	20	12	.	102
Agonostomus monticola	.	.	.	.	1	.	.	.	1
Albula spp.	.	7	6	.	.	9	1	.	23
Aluterus schoepfii	.	.	.	.	.	.	1	.	1
Anchoa hepsetus	14	2	11	28	5	.	.	.	60
Anchoa lamprotaenia	.	.	15	.	.	.	.	.	15
Anchoa lyolepis	14	1	2	.	.	.	.	.	17
Anchoa mitchilli	13,779	21,323	207,346	50,077	7,987	.	.	2	300,514
Anchoa sp.	1	.	.	.	.	.	.	.	1
Archosargus probatocephalus	37	14	111	25	24	219	63	.	493
Archosargus rhomboidalis	2	4	23	.	.	407	105	.	541
Archosargus spp.	.	.	.	.	.	2	.	.	2
Ariopsis felis	27	258	171	15	.	1,599	1,459	.	3,529
Bagre marinus	.	3	.	.	.	196	32	.	231
Bairdiella chrysoura	716	285	685	2	.	5,092	496	.	7,276
Bathygobius soporator	3	.	13	4	7	.	.	.	27
Brevoortia spp.	2	1,286	1,898	833	4	1,409	364	.	5,796
Calamus penna	.	.	1	.	.	.	6	.	7
Calamus sp.	.	.	.	.	.	1	.	.	1
Callinectes bocourti	.	.	.	2	.	.	.	.	2
Callinectes ornatus	1	1	10	.	1	24	13	.	50
Callinectes sapidus	9	21	399	79	9	23	27	.	567
Callinectes similis	2	4	48	1	2	9	4	.	70
Callinectes spp.	4	1	7	1	.	.	.	.	13
Caranx bartholomaei	.	.	.	.	.	1	.	.	1
Caranx hippos	.	.	3	2	.	181	45	.	231
Caranx latus	.	.	.	.	.	5	.	.	5
Caranx spp.	1	.	1	.	.	.	.	.	2

Species	Gear								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=37	E=107	E=192	E=91	E=29	E=169	E=59	E=2	E=686
Centropomus parallelus	.	.	.	8	.	.	.	.	8
Centropomus pectinatus	.	.	.	9	1	.	.	.	10
Centropomus undecimalis	.	1	27	672	36	191	22	.	949
Chaetodipterus faber	3	1	5	.	.	120	1	.	130
Chasmodes saburrae	17	1	7	.	.	2	1	.	28
Chilomycterus schoepfii	3	1	3	.	.	45	48	.	100
Chloroscombrus chrysurus	.	1	.	.	.	20	87	.	108
Cichlasoma urophthalmus	.	.	.	25	3	1	.	.	29
Citharichthys spilopterus	7	18	34	9	1	29	7	.	105
Clupeidae spp.	1	.	.	.	2	.	.	.	3
Ctenogobius boleosoma	28	.	2	1	.	.	.	.	31
Ctenogobius fasciatus	.	.	.	1	.	.	.	.	1
Ctenogobius pseudofasciatus	.	.	.	1	2	.	.	.	3
Ctenogobius shufeldti	.	.	.	2	.	.	.	.	2
Ctenogobius smaragdus	.	.	2	2	1	.	.	.	5
Ctenogobius sp.	.	.	1	.	.	.	.	.	1
Cynoscion complex	1	12	61	.	.	6	10	.	90
Cynoscion nebulosus	52	13	88	1	.	122	22	.	298
Dasyatis sabina	6	24	29	2	.	707	634	.	1,402
Dasyatis say	.	3	6	.	.	184	114	.	307
Diapterus auratus	120	567	3,385	5,130	1,643	7,978	1,527	.	20,350
Diapterus rhombeus	3	19	63	9	.	579	26	.	699
Diplodus holbrookii	.	.	5	.	.	.	.	.	5
Dormitator maculatus	.	.	.	36	.	.	.	.	36
Dorosoma petenense	.	.	.	5	.	.	.	.	5
Echeneis neucratoides	.	.	.	.	.	1	.	.	1
Echeneis sp.	.	.	.	.	.	1	.	.	1
Elops saurus	.	10	5	21	.	738	93	.	867
Elops sp.	.	.	1	.	.	.	.	.	1
Eucinostomus argenteus	.	.	4	.	.	.	.	.	4
Eucinostomus gula	108	206	822	15	160	502	352	.	2,165
Eucinostomus harengulus	34	31	632	688	315	2,249	568	.	4,517
Eucinostomus jonesii	.	.	168	.	1	6	.	1	176
Eucinostomus lefroyi	.	.	.	1	.	.	.	.	1
Eucinostomus spp.	715	428	3,901	6,242	1,738	.	.	10	13,034

Species	Gear								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=37	E=107	E=192	E=91	E=29	E=169	E=59	E=2	E=686
Eugerres plumieri	.	11	157	1,695	64	19	1	.	1,947
Evorthodus lyricus	.	.	1	11	.	.	.	.	12
Farfantepenaeus aztecus	5	8	4	3	.	1	14	.	35
Farfantepenaeus duorarum	2	.	.	1	.	8	32	2	45
Farfantepenaeus spp.	259	92	606	243	24	11	1	1	1,237
Floridichthys carpio	.	.	35	.	.	1	.	.	36
Fundulus grandis	.	.	20	.	.	.	.	.	20
Fundulus similis	.	.	2	.	.	.	.	.	2
Fundulus sp.	.	.	.	.	1	.	.	.	1
Gambusia holbrooki	.	.	2	210	115	.	.	.	327
Gerres cinereus	6	.	28	17	12	54	5	.	122
Gobiesox strumosus	2	2	6	.	.	.	.	.	10
Gobiomorus dormitor	.	.	.	4	.	.	.	.	4
Gobionellus oceanicus	3	14	1	14	.	.	.	.	32
Gobiosoma bosc	2	.	6	18	.	.	.	.	26
Gobiosoma robustum	75	57	126	.	1	.	.	1	260
Gobiosoma spp.	192	56	172	28	1	.	.	3	452
Gymnura micrura	.	1	1	.	.	19	12	.	33
Haemulon parra	.	.	4	.	.	.	.	.	4
Harengula humeralis	.	.	3	.	.	.	.	.	3
Harengula jaguana	1	586	3,950	35	.	1,075	129	.	5,776
Hemichromis letourneuxi	.	.	.	5	.	.	.	.	5
Heterandria formosa	.	.	.	1	.	.	.	.	1
Hippocampus erectus	.	.	.	.	.	1	.	.	1
Hippocampus zosterae	1	.	.	.	.	.	.	.	1
Histrio histrio	.	.	1	.	.	.	.	.	1
Hyporhamphus meeki	.	.	.	.	.	3	.	.	3
Hyporhamphus spp.	9	.	2	.	.	.	.	.	11
Labidesthes sicculus	.	.	.	42	12	.	.	.	54
Lachnolaimus maximus	.	.	.	.	.	.	1	.	1
Lagodon rhomboides	142	4	299	7	370	4,397	773	.	5,992
Leiostomus xanthurus	5	9	898	1,090	943	1,394	391	.	4,730
Lepisosteus osseus	.	.	.	.	.	.	1	.	1
Lepisosteus platyrhincus	.	.	.	4	.	.	.	.	4
Lepomis auritus	.	.	.	1	.	.	.	.	1

Species	Gear								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=37	E=107	E=192	E=91	E=29	E=169	E=59	E=2	E=686
Lepomis gulosus	.	.	.	1	.	.	.	.	1
Lepomis macrochirus	.	.	.	2	.	.	.	.	2
Lepomis sp.	.	.	.	1	.	.	.	.	1
Limulus polyphemus	.	4	2	.	.	25	43	.	74
Litopenaeus setiferus	1	.	76	27	.	1	2	.	107
Lophogobius cyprinoides	.	.	6	122	17	.	.	.	145
Lucania goodei	.	.	.	1	.	.	.	.	1
Lucania parva	40	38	167	2	.	.	.	.	247
Lupinoblennius nicholsi	.	.	1	2	1	.	.	.	4
Lutjanus analis	3	.	.	.	.	9	7	.	19
Lutjanus apodus	.	.	.	.	1	.	.	.	1
Lutjanus griseus	3	3	35	28	7	40	32	.	148
Lutjanus jocu	.	.	.	1	.	.	.	.	1
Megalops atlanticus	.	1	.	.	.	40	.	.	41
Membras martinica	43	43	424	.	.	.	.	.	510
Menidia spp.	.	26	1,789	340	188	.	.	.	2,343
Menippe spp.	.	.	2	.	.	.	.	2	4
Menticirrhus americanus	20	51	467	1	.	121	128	.	788
Microgobius gulosus	121	152	233	27	11	.	.	.	544
Microgobius microlepis	10	.	.	.	.	.	.	.	10
Microgobius thalassinus	7	6	2	1	.	.	.	.	16
Micropogonias undulatus	1	2	508	101	31	653	26	.	1,322
Micropterus salmoides	.	.	.	1	1	.	.	.	2
Mugil cephalus	94	48	2,280	53	3	865	351	.	3,694
Mugil curema	.	7	422	56	8	2,456	475	.	3,424
Mugil rubrioculus	.	.	17	2	.	26	3	.	48
Negaprion brevirostris	.	.	.	.	.	1	.	.	1
Oligoplites saurus	22	25	158	13	1	152	49	.	420
Opisthonema oglinum	112	2	456	31	3	324	22	.	950
Opsanus tau	1	.	.	.	.	7	1	.	9
Oreochromis complex	.	.	.	1	.	.	.	.	1
Oreochromis/Sarotherodon spp.	.	.	.	2	.	.	.	.	2
Orthopristis chrysoptera	76	11	61	1	2	189	217	.	557
Paralichthys albigutta	2	3	4	.	.	8	1	.	18
Paralichthys lethostigma	.	.	.	.	.	.	1	.	1

Species	Gear								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=37	E=107	E=192	E=91	E=29	E=169	E=59	E=2	E=686
Poecilia latipinna	.	.	1	11	23	.	.	.	35
Pogonias cromis	.	15	38	.	.	375	83	.	511
Pomatomus saltatrix	.	.	.	.	.	1	2	.	3
Portunus spp.	.	.	4	.	1	1	.	.	6
Prionotus scitulus	.	.	1	.	.	12	7	1	21
Prionotus tribulus	.	.	1	.	.	5	2	.	8
Sarotherodon melanotheron	.	.	.	.	.	3	1	.	4
Sciaenidae sp.	.	.	1	.	.	.	.	.	1
Sciaenops ocellatus	23	7	145	43	17	235	42	.	512
Scomberomorus maculatus	.	.	.	.	.	5	1	.	6
Scorpaena grandicornis	1	.	.	.	.	.	.	.	1
Scorpaena plumieri	.	.	.	.	.	1	.	.	1
Selene vomer	.	.	.	.	.	53	15	.	68
Sparisoma chrysopterum	.	.	1	.	.	.	.	.	1
Sphoeroides nephelus	6	24	35	.	4	182	217	.	468
Sphoeroides spengleri	.	2	.	.	.	2	.	1	5
Sphoeroides spp.	.	3	1	.	.	.	.	.	4
Sphoeroides testudineus	2	10	86	5	14	242	102	.	461
Sphyraena barracuda	.	.	3	9	7	23	2	.	44
Sphyrna tiburo	.	.	.	.	.	12	3	.	15
Stephanolepis hispidus	.	.	6	.	1	2	1	.	10
Stomolophus meleagris	.	.	.	.	.	1	.	.	1
Strongylura marina	.	.	5	3	.	31	8	.	47
Strongylura notata	.	10	50	.	19	35	4	.	118
Strongylura spp.	.	.	1	1	.	.	.	.	2
Strongylura timucu	.	.	.	.	2	.	.	.	2
Symphurus plagiusa	.	3	4	.	.	2	.	.	9
Syngnathus louisianae	11	2	1	1	.	.	.	.	15
Syngnathus scovelli	13	32	36	3	.	.	.	3	87
Synodus foetens	1	1	14	.	.	7	1	.	24
Tilapia mariae	.	.	.	1	.	.	.	.	1
Trachinotus carolinus	.	.	9	.	.	27	32	.	68
Trachinotus falcatus	1	2	131	1	1	23	26	.	185
Trinectes maculatus	.	.	.	20	4	.	.	.	24
Tylosurus crocodilus	.	.	.	.	.	11	3	.	14

Species	Gear								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=37	E=107	E=192	E=91	E=29	E=169	E=59	E=2	E=686
Umbrina coroides	.	.	3	.	.	.	.	.	3
Totals	**17,035**	**25,933**	**234,050**	**68,301**	**13,857**	**35,869**	**9,410**	**27**	**404,482**

Appendix IR21-03. Summary by zone of taxa collected during northern Indian River Lagoon stratified-random sampling, 2021. Zones A–C and H were located in the Indian River; Zones D—E encompassed the Banana River; 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**					**Totals**
	C	**D**	**E**	**H**	**F**	
	E=168	**E=168**	**E=48**	**E=182**	**E=120**	**E=686**
Abudefduf saxatilis	.	.	.	.	1	1
Achirus lineatus	46	11	4	30	11	102
Agonostomus monticola	.	.	.	.	1	1
Albula spp.	1	.	.	22	.	23
Aluterus schoepfii	.	.	.	1	.	1
Anchoa hepsetus	12	.	.	15	33	60
Anchoa lamprotaenia	.	.	.	15	.	15
Anchoa lyolepis	.	.	.	17	.	17
Anchoa mitchilli	181,704	39,927	.	20,819	58,064	300,514
Anchoa sp.	.	.	.	1	.	1
Archosargus probatocephalus	62	76	32	274	49	493
Archosargus rhomboidalis	28	.	30	483	.	541
Archosargus spp.	.	.	1	1	.	2
Ariopsis felis	1,705	690	466	653	15	3,529
Bagre marinus	22	5	22	182	.	231
Bairdiella chrysoura	4,785	205	2,043	241	2	7,276
Bathygobius soporator	5	.	.	11	11	27
Brevoortia spp.	2,808	793	12	1,346	837	5,796
Calamus penna	.	.	.	7	.	7
Calamus sp.	.	.	.	1	.	1
Callinectes bocourti	.	.	.	.	2	2
Callinectes ornatus	.	.	.	49	1	50
Callinectes sapidus	27	2	6	444	88	567
Callinectes similis	.	.	.	67	3	70
Callinectes spp.	.	.	.	12	1	13
Caranx bartholomaei	.	.	.	1	.	1
Caranx hippos	25	102	18	84	2	231
Caranx latus	.	.	.	5	.	5
Caranx spp.	1	.	.	1	.	2
Centropomus parallelus	.	.	.	.	8	8
Centropomus pectinatus	.	.	.	.	10	10
Centropomus undecimalis	20	17	5	199	708	949

Species	Zone					Totals
	C	D	E	H	F	
	E=168	E=168	E=48	E=182	E=120	E=686
Chaetodipterus faber	6	.	109	15	.	130
Chasmodes saburrae	17	6	.	5	.	28
Chilomycterus schoepfii	26	1	15	58	.	100
Chloroscombrus chrysurus	88	.	.	20	.	108
Cichlasoma urophthalmus	1	.	.	.	28	29
Citharichthys spilopterus	4	.	.	91	10	105
Clupeidae spp.	.	.	.	1	2	3
Ctenogobius boleosoma	.	.	.	30	1	31
Ctenogobius fasciatus	.	.	.	.	1	1
Ctenogobius pseudofasciatus	.	.	.	.	3	3
Ctenogobius shufeldti	.	.	.	.	2	2
Ctenogobius smaragdus	.	.	.	2	3	5
Ctenogobius sp.	.	.	.	1	.	1
Cynoscion complex	70	9	4	7	.	90
Cynoscion nebulosus	145	43	8	101	1	298
Dasyatis sabina	724	163	188	325	2	1,402
Dasyatis say	103	24	37	143	.	307
Diapterus auratus	3,608	116	1,034	8,819	6,773	20,350
Diapterus rhombeus	9	.	.	681	9	699
Diplodus holbrookii	.	.	.	5	.	5
Dormitator maculatus	.	.	.	.	36	36
Dorosoma petenense	.	.	.	.	5	5
Echeneis neucratoides	.	.	.	1	.	1
Echeneis sp.	.	.	.	1	.	1
Elops saurus	65	235	156	390	21	867
Elops sp.	.	.	.	1	.	1
Eucinostomus argenteus	1	.	.	3	.	4
Eucinostomus gula	26	25	124	1,815	175	2,165
Eucinostomus harengulus	484	1,098	696	1,236	1,003	4,517
Eucinostomus jonesii	12	.	.	163	1	176
Eucinostomus lefroyi	.	.	.	.	1	1
Eucinostomus spp.	401	152	.	4,501	7,980	13,034
Eugerres plumieri	171	1	10	6	1,759	1,947
Evorthodus lyricus	.	.	.	1	11	12
Farfantepenaeus aztecus	8	7	8	9	3	35
Farfantepenaeus duorarum	3	.	2	39	1	45

Species	Zone					Totals
	C	D	E	H	F	
	E=168	E=168	E=48	E=182	E=120	E=686
Farfantepenaeus spp.	19	1	.	950	267	1,237
Floridichthys carpio	.	35	1	.	.	36
Fundulus grandis	.	20	.	.	.	20
Fundulus similis	.	2	.	.	.	2
Fundulus sp.	.	.	.	.	1	1
Gambusia holbrooki	.	.	.	2	325	327
Gerres cinereus	.	1	.	92	29	122
Gobiesox strumosus	1	8	.	1	.	10
Gobiomorus dormitor	.	.	.	.	4	4
Gobionellus oceanicus	.	8	.	10	14	32
Gobiosoma bosc	6	2	.	.	18	26
Gobiosoma robustum	89	9	.	161	1	260
Gobiosoma spp.	132	28	.	263	29	452
Gymnura micrura	15	.	3	15	.	33
Haemulon parra	.	.	.	4	.	4
Harengula humeralis	.	.	.	3	.	3
Harengula jaguana	760	2,482	528	1,971	35	5,776
Hemichromis letourneuxi	.	.	.	.	5	5
Heterandria formosa	.	.	.	.	1	1
Hippocampus erectus	.	.	.	1	.	1
Hippocampus zosterae	.	.	.	1	.	1
Histrio histrio	.	.	.	1	.	1
Hyporhamphus meeki	.	.	.	3	.	3
Hyporhamphus spp.	10	.	.	1	.	11
Labidesthes sicculus	.	.	.	.	54	54
Lachnolaimus maximus	.	.	.	1	.	1
Lagodon rhomboides	94	1,799	265	3,457	377	5,992
Leiostomus xanthurus	557	164	84	1,892	2,033	4,730
Lepisosteus osseus	1	.	.	.	.	1
Lepisosteus platyrhincus	.	.	.	.	4	4
Lepomis auritus	.	.	.	.	1	1
Lepomis gulosus	.	.	.	.	1	1
Lepomis macrochirus	.	.	.	.	2	2
Lepomis sp.	.	.	.	.	1	1
Limulus polyphemus	1	47	26	.	.	74
Litopenaeus setiferus	4	1	.	75	27	107

Species	Zone					Totals
	C	D	E	H	F	
	E=168	E=168	E=48	E=182	E=120	E=686
Lophogobius cyprinoides	2	.	.	4	139	145
Lucania goodei	.	.	.	.	1	1
Lucania parva	6	233	.	6	2	247
Lupinoblennius nicholsi	.	.	.	1	3	4
Lutjanus analis	.	.	.	19	.	19
Lutjanus apodus	.	.	.	.	1	1
Lutjanus griseus	35	6	7	65	35	148
Lutjanus jocu	.	.	.	.	1	1
Megalops atlanticus	.	24	12	5	.	41
Membras martinica	235	270	.	5	.	510
Menidia spp.	311	1,470	.	34	528	2,343
Menippe spp.	.	.	.	4	.	4
Menticirrhus americanus	415	289	24	59	1	788
Microgobius gulosus	142	260	.	104	38	544
Microgobius microlepis	.	.	.	10	.	10
Microgobius thalassinus	3	.	.	12	1	16
Micropogonias undulatus	25	.	20	1,145	132	1,322
Micropterus salmoides	.	.	.	.	2	2
Mugil cephalus	1,040	1,955	392	251	56	3,694
Mugil curema	1,387	536	971	466	64	3,424
Mugil rubrioculus	8	1	15	22	2	48
Negaprion brevirostris	.	.	.	1	.	1
Oligoplites saurus	205	47	30	124	14	420
Opisthonema oglinum	663	1	207	45	34	950
Opsanus tau	1	.	8	.	.	9
Oreochromis complex	.	.	.	.	1	1
Oreochromis/Sarotherodon spp.	.	.	.	.	2	2
Orthopristis chrysoptera	101	1	16	436	3	557
Paralichthys albigutta	.	.	.	18	.	18
Paralichthys lethostigma	.	.	.	1	.	1
Poecilia latipinna	.	.	.	1	34	35
Pogonias cromis	19	445	25	22	.	511
Pomatomus saltatrix	1	.	.	2	.	3
Portunus spp.	.	.	.	5	1	6
Prionotus scitulus	4	.	.	17	.	21
Prionotus tribulus	.	.	.	8	.	8

Species	Zone					Totals
	C	D	E	H	F	
	E=168	**E=168**	**E=48**	**E=182**	**E=120**	**E=686**
Sarotherodon melanotheron	2	.	1	1	.	4
Sciaenidae sp.	.	.	.	1	.	1
Sciaenops ocellatus	31	196	38	187	60	512
Scomberomorus maculatus	2	.	.	4	.	6
Scorpaena grandicornis	.	.	.	1	.	1
Scorpaena plumieri	.	.	.	1	.	1
Selene vomer	.	.	.	68	.	68
Sparisoma chrysopterum	.	.	.	1	.	1
Sphoeroides nephelus	140	176	71	77	4	468
Sphoeroides spengleri	.	.	1	4	.	5
Sphoeroides spp.	.	3	.	1	.	4
Sphoeroides testudineus	6	1	.	435	19	461
Sphyraena barracuda	.	.	.	28	16	44
Sphyrna tiburo	.	.	.	15	.	15
Stephanolepis hispidus	.	.	.	9	1	10
Stomolophus meleagris	.	.	.	1	.	1
Strongylura marina	5	35	.	4	3	47
Strongylura notata	8	54	6	31	19	118
Strongylura spp.	1	.	.	.	1	2
Strongylura timucu	.	.	.	.	2	2
Symphurus plagiusa	.	.	.	9	.	9
Syngnathus louisianae	8	2	.	4	1	15
Syngnathus scovelli	14	5	.	65	3	87
Synodus foetens	.	.	.	24	.	24
Tilapia mariae	.	.	.	.	1	1
Trachinotus carolinus	35	.	6	27	.	68
Trachinotus falcatus	28	7	.	148	2	185
Trinectes maculatus	.	.	.	.	24	24
Tylosurus crocodilus	4	8	.	2	.	14
Umbrina coroides	.	.	.	3	.	3
Totals	**203,799**	**54,340**	**7,787**	**56,398**	**82,158**	**404,482**

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 CK21-01). 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 2021 in the Cedar Key area.

Stratified-Random Sampling

A total of 79,313 animals, which included 150 taxa of fishes and 11 taxa of selected invertebrates, were collected from 657 Cedar Key SRS samples in 2021 (Table CK21-01, Appendices CK21-01, -02, and -03). *Anchoa mitchilli* (n=22,146) was the most numerous taxon collected, representing 27.9% of the total catch. *Leiostomus xanthurus* (n=11,117) and *Membras martinica* (n=5,535) were the next most abundant taxa collected, accounting for an additional 21% of the total catch. A total of 42 Selected Taxa (n=24,996 animals) composed 31.5% of the total catch. *Leiostomus xanthurus* (n=11,117) was the most abundant Selected Taxon, representing 14% of the total catch. *Mugil cephalus* (n=2,804), *Brevoortia* spp. (n=2,274), *Cynoscion arenarius* (n=1,531), and *Menticirrhus americanus* (n=1,443) were the next most abundant Selected Taxa, comprising 10.2% of the total catch. Collections in 2021 included 2 species new to the CK FIM collection*: Caranx latus, Notropis maculatus*.

Bay Sampling

21.3-m Bay Seines. A total of 32,559 animals were collected in 252 21.3-m bay seines, representing 41.1% of the overall SRS catch (Table CK21-01). *Anchoa mitchilli* (n = 8,058) and *Leiostomus xanthurus* (n = 7,971) were the most abundant taxa, accounting for 49.2% of the bay seine catch (Table CK21-02). The taxa most frequently caught in 21.3-m bay seines were *Lagodon rhomboides* (48.8% occurrence) and *Anchoa mitchilli* (38.9% occurrence).

A total of 11,614 animals from 29 Selected Taxa were collected, representing 35.7% of the entire 21.3-m bay seine catch (Table CK21-03). *Leiostomus xanthurus* (n=7,971) was the most abundant Selected Taxon, accounting for 68.6% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were *Menticirrhus americanus* (25.0% occurrence) and *Leiostomus xanthurus* (24.2% occurrence).

183-m Haul Seines. A total of 18,105 animals were collected in 192 183-m haul seines, representing 22.8% of the overall SRS catch (Table CK21-01). *Bairdiella chrysoura* (n = 2,670) was the most abundant taxon, accounting for 14.7% of the 183-m haul seine catch (Table CK21-04). The taxa most frequently caught in 183-m haul seines were *Dasyatis sabina* (76.6% occurrence), *Mugil cephalus* (69.8% occurrence), and *Lagodon rhomboides* (55.7% occurrence).

A total of 7,071 animals from 33 Selected Taxa were collected, representing 39.1% of the entire 183-m haul seine catch (Table CK21-05). *Mugil cephalus* (n=1,678) and *Brevoortia* spp. (n=1,652) were the most abundant Selected Taxa, accounting for 47.1% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil cephalus* (69.8% occurrence) and *Sciaenops ocellatus* (50.0% occurrence).

6.1-m Bay Otter Trawls. A total of 6,040 animals were collected in 40 6.1-m bay otter trawls, representing 7.6% of the overall SRS catch (Table CK21-01). *Anchoa mitchilli* (n = 1,560), *Cynoscion arenarius* (n = 1,220), *Bairdiella chrysoura* (n = 322), and *Menticirrhus americanus* (n = 346) were the most abundant taxa, accounting for 57.1% of the 6.1-m bay otter trawl catch (Table CK21-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Etropus crossotus* (75.0% occurrence), *Portunus* spp. (42.5% occurrence), and *Lagodon rhomboides* (37.5% occurrence).

A total of 2,547 animals from 20 Selected Taxa were collected, representing 42.2% of the entire 6.1-m bay otter trawl catch (Table CK21-07). *Cynoscion arenarius* (n=1,220), *Menticirrhus americanus* (n=346), and *Farfantepenaeus* spp. (n=318) were the most abundant Selected Taxa, accounting for 74% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Farfantepenaeus duorarum* (30.0% occurrence), *Menticirrhus americanus* (27.5% occurrence), and *Farfantepenaeus* spp. (22.5% occurrence).

River Sampling

Tidal Creeks

21.3-m River Seines. A total of 19,198 animals were collected in 108 21.3-m river seines in tidal creeks, representing 24.2% of the overall SRS catch (Table CK21-01). *Anchoa mitchilli* (n = 11,282) was the most abundant taxon collected, accounting for 58.8% of the 21.3-m river seine catch in tidal creeks (Table CK21-08). *Leiostomus xanthurus* (n=2,393) and *Menidia* spp. (n=1,355) were the next most abundant taxa, accounting for an additional 19.5% of the 21.3-m river seine catch in tidal creeks. The taxa most frequently caught in 21.3-m river seines in tidal creeks were *Menidia* spp. (64.8% occurrence), *Lagodon rhomboides* (53.7% occurrence), and *Anchoa mitchilli* (50.9% occurrence).

A total of 3,386 animals from 17 Selected Taxa were collected, representing 17.6% of the entire 21.3-m river seine catch in tidal creeks (Table CK21-09). *Leiostomus xanthurus* (n=2,393), and *Brevoortia* spp. (n=273) were the most abundant Selected Taxa, accounting for 78.7% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines in tidal creeks were *Leiostomus xanthurus* (38.9% occurrence) and *Callinectes sapidus* (38.9% occurrence).

Lower Suwannee River

21.3-m River Seines. A total of 3,226 animals were collected in 60 21.3-m river seine samples conducted in the Lower Suwannee River (LSR), representing 4.1% of the overall SRS catch (Table CK21-01). *Anchoa mitchilli* (n = 1,207) was the most abundant taxon collected, accounting for 37.4% of the 21.3-m river seine catch in the LSR (Table CK21-10). *Gambusia holbrooki* (n=435) and *Lagodon rhomboides* (n=206) were the next most abundant taxa, accounting for an additional 19.9% of the 21.3-m river seine catch in the LSR. The taxa most frequently caught in 21.3-m river seines in the LSR were *Lagodon rhomboides* (38.3% occurrence), *Eucinostomus* spp. (35.0% occurrence), and *Menidia* spp. (33.3% occurrence).

A total of 252 animals from 8 Selected Taxa were collected, representing 7.8% of the entire 21.3-m river seine catch in the LSR (Table CK21-11). *Callinectes sapidus* (n=92), and *Leiostomus xanthurus* (n=76) 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 21.3-m river seines in the LSR were *Callinectes sapidus* (30.0% occurrence) and *Leiostomus xanthurus* (18.3% occurrence).

6.1-m River Otter Trawls. A total of 185 animals were collected in 5 6.1-m river otter trawl samples conducted in the LSR, representing 0.2% of the overall SRS catch (Table CK21-01). *Micropogonias undulatus* (n = 92) was the most abundant taxon collected, accounting for 49.7% of the 6.1-m river otter trawl catch in the LSR (Table CK21-12). The taxa most frequently caught in 6.1-m river otter trawls in the LSR were *Lutjanus griseus* (60.0% occurrence), *Micropogonias undulatus* (40.0% occurrence), and *Anchoa mitchilli* (40.0% occurrence).

A total of 126 animals from 6 Selected Taxa were collected, representing 68.1% of the entire 6.1-m river otter trawl catch in the LSR (Table CK21-13). *Micropogonias undulatus* (n=92), *Callinectes sapidus* (n=19), and *Farfantepenaeus* spp. (n=10) were the most abundant Selected Taxa, accounting for 96% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in the 6.1-m river otter trawls in the LSR were *Lutjanus griseus* (60.0% occurrence) and *Micropogonias undulatus* (40.0% occurrence).

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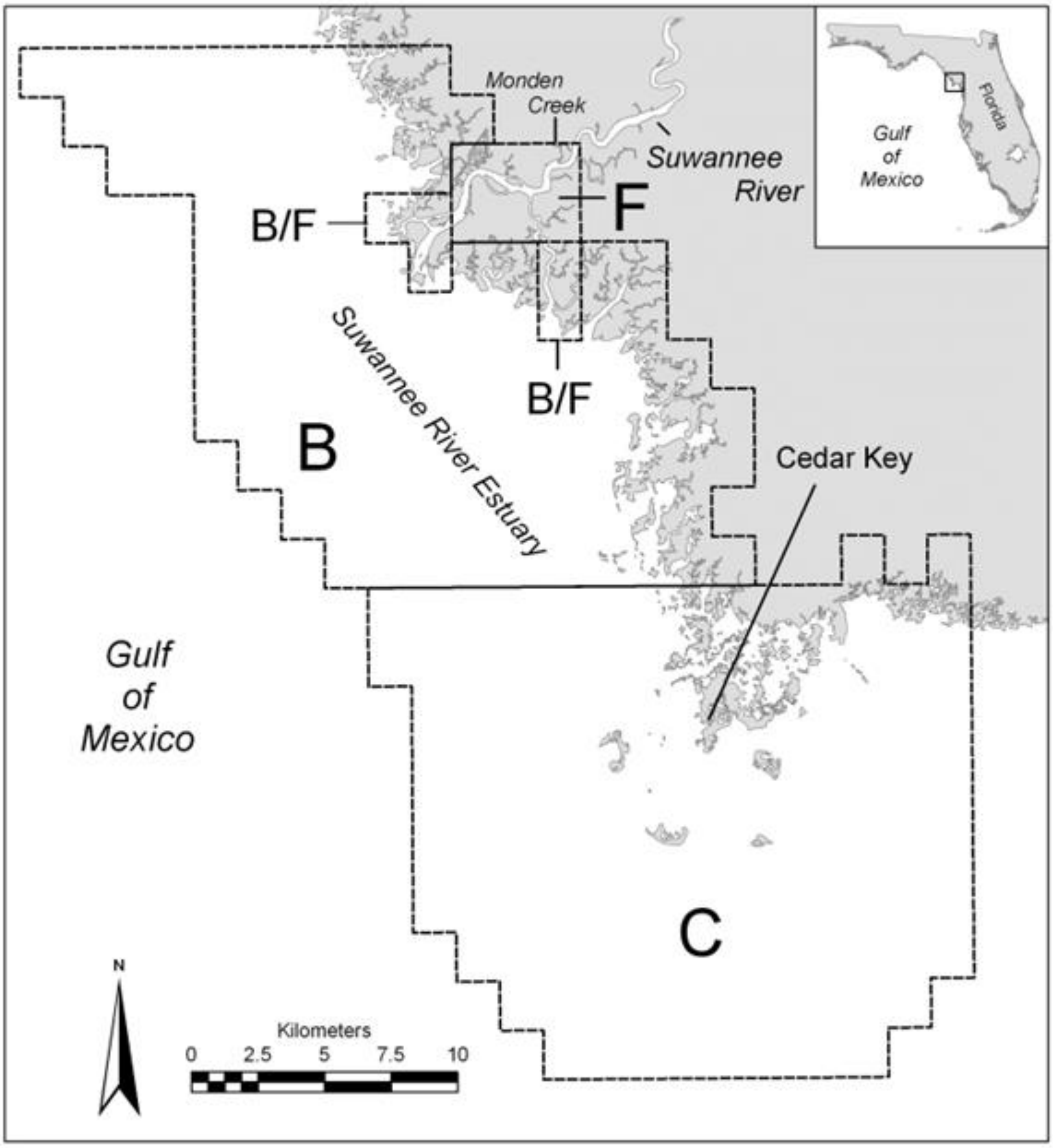

Figure CK21-01. Map of Cedar Key sampling area. Zones are labeled B, C, and F. Grids containing portions of Zones B and F are labeled B/F.

Table CK21-01. Summary of catch and effort data for Cedar Key stratified-random sampling, 2021.

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	14,127	120	19,198	108	7,128	96	3,881	20	44,334	344
C	18,432	132	.	.	10,977	96	2,159	20	31,568	248
F	.	.	3,226	60	.	.	185	5	3,411	65
Totals	**32,559**	**252**	**22,424**	**168**	**18,105**	**192**	**6,225**	**45**	**79,313**	**657**

Table CK21-02. Catch statistics for 10 dominant taxa collected in 252 21.3-m bay seine samples during Cedar Key stratified-random sampling, 2021. 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	8,058	24.7	38.9	23.88	6.87	446.88	1,414.29	41	0.12	18	79
Leiostomus xanthurus	7,971	24.5	24.2	23.62	11.72	769.88	2,012.86	26	0.12	13	134
Membras martinica	4,563	14.0	22.2	13.52	4.12	472.43	784.29	41	0.15	23	95
Bairdiella chrysoura	1,554	4.8	19.4	4.61	1.42	478.10	212.86	38	0.61	10	130
Lagodon rhomboides	1,468	4.5	48.8	4.35	0.78	276.72	104.29	45	0.57	12	132
Eucinostomus spp.	1,353	4.2	22.2	4.01	1.44	558.80	306.43	27	0.19	14	39
Menidia spp.	1,060	3.3	29.4	3.14	0.71	349.14	102.86	51	0.43	21	91
Menticirrhus americanus	1,027	3.2	25.0	3.04	1.57	799.77	346.43	41	0.54	14	251
Mugil cephalus	855	2.6	13.9	2.53	1.44	882.89	310.00	31	0.88	15	287
Litopenaeus setiferus	434	1.3	9.1	1.29	0.58	703.07	115.00	15	0.21	7	30
Subtotals	28,343	87.1	.	.	.	.	.	.	.	7	287
Totals	**32,559**	**100.0**	**.**	**92.29**	**15.41**	**264.99**	**2,310.71**	**.**	**.**	**2**	**791**

Table CK21-03. Catch statistics for Selected Taxa collected in 252 21.3-m bay seine samples during Cedar Key stratified-random sampling, 2021. 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	7,971	24.5	24.2	22.59	11.21	787.47	2,012.86	26	0.12	13	134
Menticirrhus americanus	1,027	3.2	25.0	2.91	1.50	818.02	346.43	41	0.54	14	251
Mugil cephalus	855	2.6	13.9	2.42	1.38	902.98	310.00	31	0.88	15	287
Litopenaeus setiferus	434	1.3	9.1	1.23	0.56	719.19	115.00	15	0.21	7	30
Brevoortia spp.	345	1.1	11.1	0.98	0.28	454.89	37.86	38	1.69	19	132
Callinectes sapidus	203	0.6	22.6	0.58	0.17	473.61	39.29	18	1.37	6	160
Farfantepenaeus spp.	177	0.5	17.5	0.50	0.11	359.09	17.86	9	0.22	2	14
Cynoscion arenarius	171	0.5	12.7	0.48	0.12	377.03	12.86	31	0.89	14	80
Paralichthys albigutta	116	0.4	16.7	0.33	0.07	344.34	10.71	41	3.94	14	312
Sciaenops ocellatus	63	0.2	7.9	0.18	0.07	590.63	10.71	120	11.15	17	322
Cynoscion nebulosus	41	0.1	5.6	0.12	0.04	581.06	7.14	52	3.93	18	132
Menticirrhus saxatilis	40	0.1	5.2	0.11	0.04	517.94	5.71	34	2.42	13	81
Trachinotus carolinus	34	0.1	0.4	0.10	0.10	1,587.45	24.29	30	1.22	20	45
Lutjanus synagris	23	0.1	3.6	0.07	0.03	622.03	3.57	42	2.92	20	71
Micropogonias undulatus	22	0.1	4.8	0.06	0.02	569.66	4.29	55	9.68	18	195
Trachinotus falcatus	21	0.1	3.2	0.06	0.03	691.09	4.29	34	2.14	20	58
Farfantepenaeus duorarum	17	0.1	3.2	0.05	0.03	825.57	5.71	18	0.73	15	25
Haemulon plumierii	16	<0.1	2.0	0.05	0.02	813.64	3.57	33	2.46	21	49
Pogonias cromis	15	<0.1	4.4	0.04	0.01	520.65	2.14	181	46.89	63	791
Centropristis striata	6	<0.1	1.6	0.02	0.01	912.86	2.14	77	11.75	55	126
Mugil curema	5	<0.1	1.6	0.01	0.01	835.69	1.43	78	22.55	24	131
Lutjanus griseus	3	<0.1	0.8	0.01	0.01	1,181.33	1.43	82	34.15	37	149

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Elops saurus	2	<0.1	0.8	0.01	<0.01	1,120.26	0.71	273	20.00	253	293
Mugil trichodon	2	<0.1	0.8	0.01	<0.01	1,120.26	0.71	28	11.00	17	39
Archosargus probatocephalus	1	<0.1	0.4	<0.01	<0.01	1,587.45	0.71	254	.	254	254
Centropomus undecimalis	1	<0.1	0.4	<0.01	<0.01	1,587.45	0.71	430	.	430	430
Diplectrum formosum	1	<0.1	0.4	<0.01	<0.01	1,587.45	0.71	85	.	85	85
Menippe spp.	1	<0.1	0.4	<0.01	<0.01	1,587.45	0.71	34	.	34	34
Scomberomorus maculatus	1	<0.1	0.4	<0.01	<0.01	1,587.45	0.71	29	.	29	29
Totals	**11,614**	**35.7**	**.**	**32.92**	**12.70**	**612.60**	**2,283.57**	**.**	**.**	**2**	**791**

Table CK21-04. Catch statistics for 10 dominant taxa collected in 192 183-m haul seine samples during Cedar Key stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Bairdiella chrysoura	2,670	14.7	27.6	13.98	4.75	469.89	663	132	0.30	75	182
Lagodon rhomboides	2,650	14.6	55.7	13.87	2.89	288.26	353	94	0.43	45	212
Dasyatis sabina	1,868	10.3	76.6	9.78	2.23	315.11	350	224	0.82	59	335
Ariopsis felis	1,750	9.7	49.5	9.16	2.88	434.50	503	236	0.90	113	338
Mugil cephalus	1,678	9.3	69.8	8.79	1.31	206.44	154	215	1.48	86	383
Brevoortia spp.	1,652	9.1	14.6	8.65	4.77	761.41	733	106	0.45	46	258
Leiostomus xanthurus	589	3.3	27.6	3.08	1.07	479.80	157	106	0.89	70	206
Ogcocephalus cubifrons	577	3.2	26.6	3.02	0.71	326.00	76	154	0.97	67	207
Sciaenops ocellatus	488	2.7	50.0	2.55	0.52	282.65	67	355	5.78	104	755
Pogonias cromis	462	2.6	39.6	2.42	0.66	374.42	110	321	10.75	77	810
Subtotals	14,384	79.5	.	.	.	.	.	.	.	45	810
Totals	**18,105**	**100.0**	**.**	**94.30**	**9.51**	**139.77**	**854**	**.**	**.**	**14**	**1,240**

Table CK21-05. Catch statistics for Selected Taxa collected in 192 183-m haul samples during Cedar Key stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil cephalus	1,678	9.3	69.8	8.74	1.31	207.10	154	215	1.48	86	383
Brevoortia spp.	1,652	9.1	14.6	8.60	4.74	763.42	733	106	0.45	46	258
Leiostomus xanthurus	589	3.3	27.6	3.07	1.07	481.10	157	106	0.89	70	206
Sciaenops ocellatus	488	2.7	50.0	2.54	0.52	283.48	67	355	5.78	104	755
Pogonias cromis	462	2.6	39.6	2.41	0.65	375.47	110	321	10.75	77	810
Mugil curema	458	2.5	28.1	2.39	0.86	502.25	120	154	1.47	104	286
Centropomus undecimalis	435	2.4	37.0	2.27	0.49	297.33	49	579	6.18	177	892
Elops saurus	337	1.9	42.7	1.76	0.29	229.66	27	276	3.00	51	465
Paralichthys albigutta	167	0.9	28.1	0.87	0.22	353.51	37	164	6.58	59	402
Cynoscion nebulosus	157	0.9	26.6	0.82	0.16	275.40	17	249	6.65	60	432
Litopenaeus setiferus	102	0.6	12.0	0.53	0.19	493.69	25	27	0.79	14	43
Mugil trichodon	102	0.6	12.0	0.53	0.20	509.22	29	140	3.24	94	266
Micropogonias undulatus	96	0.5	14.1	0.50	0.12	346.11	12	179	3.79	83	282
Archosargus probatocephalus	84	0.5	21.4	0.44	0.08	261.11	9	279	5.04	180	409
Menticirrhus americanus	60	0.3	17.7	0.31	0.06	257.06	4	209	7.29	65	297
Callinectes sapidus	49	0.3	10.9	0.26	0.07	376.66	7	97	6.50	31	172
Trachinotus falcatus	35	0.2	3.1	0.18	0.15	1,114.68	28	102	4.14	54	164
Caranx hippos	20	0.1	7.8	0.10	0.03	379.94	3	281	21.92	106	575
Sphyrna tiburo	18	0.1	7.3	0.09	0.03	395.91	3	695	17.11	492	798
Cynoscion arenarius	14	0.1	4.7	0.07	0.03	552.32	4	152	10.92	99	270
Lutjanus griseus	14	0.1	5.2	0.07	0.03	475.69	3	154	8.84	75	186
Farfantepenaeus duorarum	11	0.1	3.6	0.06	0.03	623.47	4	24	1.47	16	32

Species	Number		% Occur	Density Estimate (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Scomberomorus maculatus	10	0.1	4.7	0.05	0.02	470.70	2	319	26.51	207	459
Carcharhinus limbatus	8	<0.1	2.1	0.04	0.02	808.33	4	424	11.78	376	488
Sphyraena barracuda	6	<0.1	1.6	0.03	0.02	977.23	4	262	12.32	224	315
Lobotes surinamensis	5	<0.1	1.6	0.03	0.02	916.06	3	309	13.46	285	360
Lutjanus synagris	4	<0.1	1.6	0.02	0.01	844.82	2	95	1.89	90	99
Carcharhinus leucas	3	<0.1	1.6	0.02	0.01	795.80	1	596	43.23	512	655
Megalops atlanticus	2	<0.1	1.0	0.01	0.01	977.23	1	850	134.50	715	984
Pomatomus saltatrix	2	<0.1	0.5	0.01	0.01	1,385.64	2	418	7.00	411	425
Menippe spp.	1	<0.1	0.5	0.01	0.01	1,385.64	1	31	.	31	31
Menticirrhus saxatilis	1	<0.1	0.5	0.01	0.01	1,385.64	1	198	.	198	198
Trachinotus carolinus	1	<0.1	0.5	0.01	0.01	1,385.64	1	356	.	356	356
Totals	**7,071**	**39.1**	**.**	**36.83**	**5.49**	**206.50**	**766**	**.**	**.**	**14**	**984**

Table CK21-06. Catch statistics for 10 dominant taxa collected in 40 6.1-m bay otter trawl samples during Cedar Key stratified-random sampling, 2021. 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	1,560	25.8	27.5	3.25	1.50	291.28	41.82	46	0.30	20	76
Cynoscion arenarius	1,220	20.2	17.5	2.29	1.90	526.54	76.00	36	0.75	13	160
Bairdiella chrysoura	322	5.3	22.5	0.88	0.67	481.56	26.44	86	1.90	12	175
Menticirrhus americanus	346	5.7	27.5	0.63	0.31	307.63	9.44	41	1.66	10	261
Farfantepenaeus spp.	318	5.3	22.5	0.57	0.43	482.95	17.20	10	0.15	3	14
Ariopsis felis	174	2.9	22.5	0.56	0.53	598.24	21.18	85	4.95	41	250
Micropogonias undulatus	266	4.4	5.0	0.50	0.50	628.09	19.86	55	1.22	24	147
Lagodon rhomboides	243	4.0	37.5	0.44	0.22	314.68	7.56	79	2.11	16	135
Etropus crossotus	211	3.5	75.0	0.40	0.09	145.91	2.02	73	1.49	25	123
Portunus spp.	178	2.9	42.5	0.32	0.19	385.09	7.69	31	0.52	13	53
Subtotals	4,838	80.0	.	.	.	.	.	.	.	3	261
Totals	**6,040**	**100.0**	**.**	**12.14**	**4.50**	**234.26**	**117.38**	**.**	**.**	**3**	**723**

Table CK21-07. Catch statistics for Selected Taxa collected in 40 6.1-m bay otter trawl samples during Cedar Key stratified-random sampling, 2021. 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	1,220	20.2	17.5	2.29	1.90	526.54	76.00	36	0.75	13	160
Menticirrhus americanus	346	5.7	27.5	0.63	0.31	307.63	9.44	41	1.66	10	261
Farfantepenaeus spp.	318	5.3	22.5	0.57	0.43	482.95	17.20	10	0.15	3	14
Micropogonias undulatus	266	4.4	5.0	0.50	0.50	628.09	19.86	55	1.22	24	147
Leiostomus xanthurus	87	1.4	15.0	0.20	0.12	380.80	4.05	81	1.26	55	120
Litopenaeus setiferus	66	1.1	22.5	0.15	0.07	304.81	2.56	26	0.69	16	39
Centropristis striata	80	1.3	12.5	0.14	0.08	339.95	2.23	71	3.83	36	187
Farfantepenaeus duorarum	70	1.2	30.0	0.14	0.05	251.05	1.48	19	0.48	13	30
Callinectes sapidus	24	0.4	20.0	0.04	0.02	332.89	0.88	52	9.27	12	167
Menippe spp.	17	0.3	15.0	0.03	0.02	318.96	0.54	24	3.22	12	56
Paralichthys albigutta	14	0.2	20.0	0.03	0.01	237.34	0.27	142	10.28	95	199
Lutjanus synagris	14	0.2	17.5	0.02	0.01	292.49	0.39	76	8.69	20	115
Diplectrum formosum	9	0.1	12.5	0.02	0.01	290.49	0.20	97	12.20	66	174
Menticirrhus saxatilis	5	0.1	7.5	0.01	0.01	371.77	0.14	40	6.98	19	63
Lachnolaimus maximus	4	0.1	2.5	0.01	0.01	632.46	0.27	78	15.39	33	103
Calamus arctifrons	3	<0.1	5.0	0.01	<0.01	466.54	0.13	94	37.83	56	170
Argopecten irradians	1	<0.1	2.5	<0.01	<0.01	632.46	0.07	45	.	45	45
Cynoscion nebulosus	1	<0.1	2.5	<0.01	<0.01	632.46	0.07	14	.	14	14
Mullus auratus	1	<0.1	2.5	<0.01	<0.01	632.46	0.07	45	.	45	45
Scomberomorus maculatus	1	<0.1	2.5	<0.01	<0.01	632.46	0.07	22	.	22	22
Totals	**2,547**	**42.2**	**.**	**4.78**	**2.69**	**355.61**	**102.31**	**.**	**.**	**3**	**261**

Table CK21-08. Catch statistics for 10 dominant taxa collected in 108 21.3-m river seine samples conducted in tidal creeks during Cedar Key stratified-random sampling, 2021. 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	11,282	58.8	50.9	156.52	63.01	414.50	5,319.12	33	0.08	18	68
Leiostomus xanthurus	2,393	12.5	38.9	33.20	7.40	229.40	400.00	27	0.21	12	84
Menidia spp.	1,355	7.1	64.8	18.80	4.28	234.23	379.41	45	0.28	20	86
Membras martinica	967	5.0	13.9	13.42	9.73	746.52	1,004.41	30	0.16	18	64
Lagodon rhomboides	864	4.5	53.7	11.99	2.82	242.53	211.76	31	0.42	12	110
Eucinostomus spp.	305	1.6	36.1	4.23	0.96	234.38	64.71	29	0.42	10	39
Bairdiella chrysoura	274	1.4	25.9	3.80	1.11	299.51	67.65	41	1.24	12	133
Brevoortia spp.	273	1.4	13.0	3.79	3.05	829.01	322.06	43	0.59	19	58
Mugil cephalus	198	1.0	13.0	2.75	1.18	442.27	101.47	36	1.86	19	222
Callinectes sapidus	160	0.8	38.9	2.22	0.57	262.82	42.65	20	1.92	6	153
Subtotals	18,071	94.1	.	.	.	.	.	.	.	6	222
Totals	**19,198**	**100.0**	**.**	**261.41**	**63.33**	**251.78**	**5,392.65**	**.**	**.**	**5**	**493**

Table CK21-09. Catch statistics for Selected Taxa collected in 108 21.3-m river seine samples conducted in tidal creeks during Cedar Key stratified-random sampling, 2021. 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	2,393	12.5	38.9	32.58	7.27	231.94	400.00	27	0.21	12	84
Brevoortia spp.	273	1.4	13.0	3.72	2.99	836.84	322.06	43	0.59	19	58
Mugil cephalus	198	1.0	13.0	2.70	1.16	446.60	101.47	36	1.86	19	222
Callinectes sapidus	160	0.8	38.9	2.18	0.56	265.62	42.65	20	1.92	6	153
Litopenaeus setiferus	158	0.8	16.7	2.15	1.08	519.77	88.24	13	0.35	7	22
Cynoscion arenarius	125	0.7	15.7	1.70	0.69	422.47	52.94	38	1.30	15	75
Sciaenops ocellatus	27	0.1	13.0	0.37	0.11	309.96	7.35	72	17.50	14	493
Farfantepenaeus spp.	15	0.1	7.4	0.20	0.09	476.76	8.82	7	0.39	5	11
Menticirrhus americanus	10	0.1	2.8	0.14	0.11	842.24	11.76	54	4.73	36	88
Cynoscion nebulosus	7	<0.1	5.6	0.10	0.04	436.04	2.94	57	15.21	17	123
Lutjanus griseus	7	<0.1	4.6	0.10	0.04	484.38	2.94	80	14.45	34	138
Paralichthys albigutta	6	<0.1	5.6	0.08	0.03	414.23	1.47	51	24.13	19	170
Micropogonias undulatus	3	<0.1	2.8	0.04	0.02	594.37	1.47	62	19.55	23	84
Centropomus undecimalis	1	<0.1	0.9	0.01	0.01	1,039.23	1.47	87	.	87	87
Centropristis striata	1	<0.1	0.9	0.01	0.01	1,039.23	1.47	36	.	36	36
Paralichthys lethostigma	1	<0.1	0.9	0.01	0.01	1,039.23	1.47	110	.	110	110
Trachinotus falcatus	1	<0.1	0.9	0.01	0.01	1,039.23	1.47	16	.	16	16
Totals	**3,386**	**17.6**	**.**	**46.11**	**8.35**	**188.12**	**420.59**	**.**	**.**	**5**	**493**

Table CK21-10. Catch statistics for 10 dominant taxa collected in 60 21.3-m river seine samples conducted in the Lower Suwanee River (LSR) during Cedar Key stratified-random sampling, 2021. 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	1,207	37.4	23.3	31.14	18.70	453.44	879.41	24	0.11	18	46
Gambusia holbrooki	435	13.5	20.0	11.22	6.65	447.12	357.35	26	0.21	15	45
Lagodon rhomboides	206	6.4	38.3	5.31	1.54	218.55	63.24	31	0.80	11	68
Notropis petersoni	203	6.3	15.0	5.24	2.54	365.87	100.00	36	0.46	23	48
Eucinostomus spp.	151	4.7	35.0	3.90	1.13	218.08	41.18	26	0.50	14	39
Menidia spp.	118	3.7	33.3	3.04	0.78	194.27	26.47	47	1.11	22	80
Trinectes maculatus	117	3.6	25.0	3.02	2.16	541.05	122.06	23	0.90	12	50
Callinectes sapidus	92	2.9	30.0	2.37	0.90	285.79	42.65	21	2.15	8	154
Eucinostomus harengulus	80	2.5	23.3	2.06	1.32	484.53	75.00	57	1.06	40	70
Leiostomus xanthurus	76	2.4	18.3	1.96	1.13	433.48	60.29	25	1.73	15	108
Subtotals	2,685	83.4	.	.	.	.	.	.	.	8	154
Totals	**3,226**	**100.0**	**.**	**79.07**	**21.48**	**210.42**	**975.00**	**.**	**.**	**8**	**434**

Table CK21-11. Catch statistics for Selected Taxa collected in 60 21.3-m river seine samples conducted in the Lower Suwanee River (LSR) during Cedar Key stratified-random sampling, 2021. 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	92	2.9	30.0	2.25	0.86	293.99	42.65	21	2.15	8	154
Leiostomus xanthurus	76	2.4	18.3	1.86	1.07	445.14	60.29	25	1.73	15	108
Mugil cephalus	73	2.3	5.0	1.79	1.36	587.67	76.47	54	0.95	25	69
Brevoortia spp.	4	0.1	1.7	0.10	0.10	774.60	5.88	26	0.50	24	26
Archosargus probatocephalus	3	0.1	3.3	0.07	0.05	573.42	2.94	252	11.02	238	274
Sciaenops ocellatus	2	0.1	3.3	0.05	0.03	543.06	1.47	239	152.00	87	391
Cynoscion arenarius	1	<0.1	1.7	0.02	0.02	774.60	1.47	31	.	31	31
Paralichthys lethostigma	1	<0.1	1.7	0.02	0.02	774.60	1.47	192	.	192	192
Totals	**252**	**7.8**	**.**	**6.18**	**1.87**	**234.51**	**77.94**	**.**	**.**	**8**	**391**

Table CK21-12. Catch statistics for 10 dominant taxa collected in 5 6.1-m river otter trawl samples in the Lower Suwanee River (LSR) during Cedar Key stratified-random sampling, 2021. 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	92	49.7	40	4.16	3.86	160.88	11.87	21	0.69	14	40
Anchoa mitchilli	39	21.1	40	1.94	1.81	161.30	5.55	34	1.24	21	48
Callinectes sapidus	19	10.3	40	0.93	0.68	126.30	2.25	24	3.95	8	75
Ictalurus punctatus	11	5.9	20	0.62	0.62	173.21	1.86	108	13.94	63	205
Farfantepenaeus spp.	10	5.4	20	0.50	0.50	173.21	1.50	8	0.76	6	13
Lagodon rhomboides	6	3.2	20	0.30	0.30	173.21	0.90	17	2.18	14	28
Lutjanus griseus	3	1.6	60	0.15	0.01	11.18	0.17	90	6.44	77	98
Portunus spp.	2	1.1	20	0.09	0.09	173.21	0.27	35	3.00	32	38
Farfantepenaeus duorarum	1	0.5	20	0.05	0.05	173.21	0.15	18	.	18	18
Leiostomus xanthurus	1	0.5	20	0.05	0.05	173.21	0.15	16	.	16	16
Subtotals	184	99.3	.	.	.	.	.	.	.	6	205
Totals	**185**	**100.0**	**.**	**5.30**	**2.87**	**121.23**	**13.22**	**.**	**.**	**6**	**205**

Table CK21-13. Catch statistics for Selected Taxa collected in 5 6.1-m river otter trawl samples in the Lower Suwanee River (LSR) during Cedar Key stratified-random sampling, 2021. 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	92	49.7	40	2.49	2.35	210.43	11.87	21	0.69	14	40
Callinectes sapidus	19	10.3	40	0.56	0.44	174.61	2.25	24	3.95	8	75
Farfantepenaeus spp.	10	5.4	20	0.30	0.30	223.61	1.50	8	0.76	6	13
Lutjanus griseus	3	1.6	60	0.09	0.04	92.23	0.17	90	6.44	77	98
Farfantepenaeus duorarum	1	0.5	20	0.03	0.03	223.61	0.15	18	.	18	18
Leiostomus xanthurus	1	0.5	20	0.03	0.03	223.61	0.15	16	.	16	16
Totals	**126**	**68.1**	**.**	**3.50**	**2.44**	**155.81**	**12.55**	**.**	**.**	**6**	**98**

Appendix CK21-01. Monthly summary of taxa collected during Cedar Key stratified-random sampling, 2021. 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=51**	**E=51**	**E=61**	**E=51**	**E=51**	**E=61**	**E=51**	**E=51**	**E=61**	**E=51**	**E=51**	**E=657**
Acanthostracion quadricornis	3	.	.	4	.	.	6	2	.	1	.	.	16
Achirus lineatus	.	.	.	1	.	2	1	7	2	.	1	.	14
Adinia xenica	20	11	1	.	.	.	1	1	.	.	.	.	34
Aluterus schoepfii	.	.	.	.	.	.	1	.	1	.	.	.	2
Ameiurus catus	2	1	1	.	.	.	1	.	2	.	1	.	8
Anarchopterus criniger	.	.	.	.	.	.	.	.	1	.	.	.	1
Anchoa hepsetus	.	.	.	10	58	202	67	19	19	10	2	.	387
Anchoa mitchilli	282	67	268	1,157	1,322	5,944	3,950	510	3,794	4,263	389	200	22,146
Ancylopsetta quadrocellata	.	3	1	2	.	.	.	.	.	.	.	.	6
Archosargus probatocephalus	3	.	7	8	18	8	20	4	6	4	7	3	88
Argopecten irradians	.	.	.	.	.	.	1	.	.	.	.	.	1
Ariopsis felis	49	516	56	42	150	452	474	330	121	182	68	14	2,454
Astroscopus y-graecum	.	.	1	.	.	.	.	.	.	.	.	.	1
Bagre marinus	.	.	.	2	8	19	24	6	35	27	8	.	129
Bairdiella chrysoura	143	326	1,136	130	937	526	352	128	597	376	121	50	4,822
Bathygobius soporator	1	.	4	5	4	2	24	.	28	.	2	.	70
Brevoortia spp.	28	95	25	230	182	20	35	6	1,051	104	492	6	2,274
Calamus arctifrons	.	.	.	.	.	.	3	.	.	.	.	.	3
Callinectes ornatus	.	.	.	.	.	1	.	.	.	.	.	.	1
Callinectes sapidus	132	74	46	48	16	15	84	23	9	22	48	30	547

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=657
Caranx hippos	1	.	1	.	6	6	1	.	2	3	.	.	20
Caranx latus	.	.	.	.	.	.	.	.	.	1	1	.	2
Carcharhinus leucas	.	.	.	1	.	.	2	.	.	.	.	.	3
Carcharhinus limbatus	.	.	.	.	.	7	1	.	.	.	.	.	8
Centropomus undecimalis	82	6	9	65	14	38	35	24	89	29	45	1	437
Centropristis striata	.	.	.	22	.	2	58	.	1	1	.	3	87
Chaetodipterus faber	.	.	2	.	5	4	70	39	86	17	6	.	229
Chasmodes saburrae	.	.	.	.	.	.	2	3	1	.	.	.	6
Chilomycterus schoepfii	10	.	1	3	3	.	18	3	6	6	7	13	70
Chloroscombrus chrysurus	.	.	.	.	.	.	7	3	73	13	2	.	98
Citharichthys macrops	8	.	.	2	.	.	5	.	.	.	.	.	15
Citharichthys sp.	.	.	.	.	.	.	.	.	1	.	.	.	1
Ctenogobius boleosoma	.	1	.	.	4	5	2	1	3	.	.	.	16
Ctenogobius smaragdus	.	1	.	.	.	.	.	.	.	1	.	.	2
Cynoscion arenarius	9	.	4	1,027	101	49	199	49	68	20	5	.	1,531
Cynoscion nebulosus	23	37	15	3	5	4	11	30	19	15	20	24	206
Cyprinodon variegatus	12	.	1	.	.	.	.	2	.	.	.	.	15
Dasyatis americana	.	.	.	.	.	6	4	.	1	.	.	.	11
Dasyatis sabina	263	108	237	125	116	510	189	43	108	96	101	90	1,986
Dasyatis say	.	.	1	102	64	36	23	2	7	3	.	.	238
Diplectrum formosum	1	.	.	1	.	.	5	.	.	2	1	.	10
Diplodus holbrookii	.	.	.	.	.	3	1	.	.	.	.	.	4

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=657
Dorosoma cepedianum	.	7	.	.	.	.	.	.	1	.	.	1	9
Dorosoma petenense	2	.	1	.	5	.	.	.	.	2	1	8	19
Echeneis neucratoides	.	.	.	2	10	12	1	3	5	2	.	.	35
Elops saurus	37	5	23	10	51	19	19	17	21	45	58	34	339
Esox niger	.	.	.	1	.	.	.	.	.	.	1	.	2
Etropus crossotus	65	11	2	10	.	2	99	10	39	80	22	12	352
Etropus cyclosquamus	.	.	.	2	.	.	4	.	.	.	.	.	6
Eucinostomus gula	5	.	.	.	.	.	6	73	44	43	22	11	204
Eucinostomus harengulus	14	2	1	1	5	1	75	100	112	50	46	90	497
Eucinostomus spp.	67	6	8	.	.	137	673	429	191	139	133	27	1,810
Farfantepenaeus duorarum	5	1	5	22	3	1	46	3	.	2	.	11	99
Farfantepenaeus spp.	12	4	.	2	.	19	349	41	38	36	9	10	520
Floridichthys carpio	.	.	.	.	.	.	.	.	.	.	1	.	1
Fundulus confluentus	.	.	.	6	.	.	.	.	.	.	2	.	8
Fundulus grandis	60	15	35	2	.	3	12	.	13	4	7	6	157
Fundulus seminolis	12	7	2	5	.	3	2	4	.	.	30	.	65
Fundulus similis	53	4	38	7	.	1	1	6	35	5	.	.	150
Gambusia holbrooki	6	5	.	248	.	.	2	.	3	28	153	.	445
Gobiesox strumosus	.	1	.	.	.	3	6	1	.	1	2	.	14
Gobionellus oceanicus	.	.	.	.	.	.	.	.	.	1	.	.	1
Gobiosoma bosc	5	9	1	.	2	2	33	.	3	1	.	.	56
Gobiosoma robustum	.	.	.	1	.	.	1	2	.	.	.	.	4

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=657
Gobiosoma spp.	.	2	.	.	.	1	2	.	.	1	.	.	6
Gymnura micrura	.	.	.	.	4	7	2	3	11	.	.	.	27
Haemulon plumierii	.	.	.	.	.	.	5	4	2	5	.	.	16
Harengula jaguana	.	.	33	.	7	28	22	216	143	79	5	.	533
Hemicaranx amblyrhynchus	.	.	.	.	.	.	.	.	.	1	.	.	1
Heterandria formosa	.	.	.	2	.	.	.	.	.	.	.	.	2
Hippocampus erectus	1	.	.	5	.	.	1	.	.	1	1	.	9
Hypleurochilus caudovittatus	1	.	.	.	.	.	.	.	.	.	.	.	1
Hyporhamphus meeki	.	.	.	.	.	2	.	2	1	.	.	.	5
Hypsoblennius hentz	.	.	.	.	1	.	4	.	2	.	.	.	7
Ictalurus punctatus	11	.	.	.	.	.	.	.	.	.	.	.	11
Labidesthes sicculus	.	.	.	.	.	.	.	.	3	4	36	.	43
Lachnolaimus maximus	.	.	.	.	.	.	4	.	.	.	.	.	4
Lagodon rhomboides	93	257	563	549	757	523	676	408	424	299	702	186	5,437
Leiostomus xanthurus	639	7,336	1,752	643	255	76	251	9	82	29	23	22	11,117
Lepisosteus osseus	2	.	1	.	.	1	13	7	2	5	4	1	36
Lepisosteus platyrhincus	.	.	1	.	.	2	.	.	.	.	.	.	3
Lepomis auritus	.	1	.	.	.	.	.	.	.	.	1	.	2
Lepomis gulosus	.	.	.	.	.	.	.	.	.	.	1	.	1
Lepomis macrochirus	.	2	.	7	.	.	1	.	.	2	50	.	62
Lepomis marginatus	.	.	.	.	.	.	.	.	.	.	1	.	1
Lepomis microlophus	.	.	.	.	.	.	.	.	.	.	1	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=657
Lepomis punctatus	.	.	.	.	.	.	.	1	.	.	20	.	21
Lepomis spp.	.	.	.	.	.	.	.	.	.	4	14	.	18
Limulus polyphemus	2	.	1	3	.	.	.	3	4	1	1	.	15
Litopenaeus setiferus	9	.	8	10	28	3	235	188	162	84	27	6	760
Lobotes surinamensis	.	.	.	3	.	1	.	1	.	.	.	.	5
Lucania goodei	.	.	.	2	.	.	.	.	.	.	1	.	3
Lucania parva	1	.	.	28	.	10	.	.	.	.	5	.	44
Lutjanus griseus	4	1	.	1	1	4	2	.	4	5	5	.	27
Lutjanus synagris	.	.	.	.	.	.	10	1	14	14	1	1	41
Megalops atlanticus	1	.	.	.	.	.	.	.	1	.	.	.	2
Membras martinica	.	.	13	.	75	3,663	1,170	30	257	326	1	.	5,535
Menidia spp.	37	122	76	43	43	351	744	287	214	106	366	144	2,533
Menippe spp.	.	2	.	5	.	.	12	.	.	.	.	.	19
Menticirrhus americanus	4	1	9	101	246	603	287	48	77	38	23	6	1,443
Menticirrhus saxatilis	.	.	1	20	5	5	.	.	.	.	9	6	46
Microgobius gulosus	.	.	2	2	2	.	.	.	1	.	1	.	8
Microgobius thalassinus	.	.	.	.	.	3	6	3	.	1	.	2	15
Micropogonias undulatus	97	2	2	288	3	6	9	27	27	18	.	.	479
Micropterus notius	.	.	.	.	.	.	.	.	.	.	1	.	1
Micropterus salmoides	.	.	.	6	.	1	1	.	.	1	3	.	12
Monacanthus ciliatus	.	.	4	.	.	.	10	2	1	3	.	3	23
Mugil cephalus	330	918	177	104	262	170	101	46	97	68	156	375	2,804

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=657
Mugil curema	129	117	6	7	10	17	2	12	25	6	27	105	463
Mugil trichodon	.	3	.	2	.	18	32	.	9	3	17	20	104
Mullus auratus	.	.	.	1	.	.	.	.	.	.	.	.	1
Myrophis punctatus	.	.	.	.	.	1	.	.	.	.	.	.	1
Nicholsina usta	.	.	.	.	.	.	.	.	.	1	.	.	1
Notemigonus crysoleucas	.	.	.	3	.	2	.	2	1	1	2	.	11
Notropis maculatus	.	.	.	.	.	.	.	.	.	.	42	.	42
Notropis petersoni	.	.	.	.	.	.	.	92	1	1	109	.	203
Notropis spp.	.	.	.	.	.	22	.	.	.	6	.	.	28
Ogcocephalus cubifrons	80	.	32	133	33	54	14	26	80	97	21	49	619
Oligoplites saurus	.	.	.	2	4	26	34	21	9	14	23	6	139
Opisthonema oglinum	.	.	.	.	1	3	6	1	40	13	.	.	64
Opsanus beta	.	.	.	.	.	2	13	.	.	2	.	.	17
Opsopoeodus emiliae	.	.	.	.	.	.	.	.	.	.	10	.	10
Orthopristis chrysoptera	10	.	6	158	189	30	120	20	43	12	9	2	599
Paralichthys albigutta	13	37	48	77	15	30	33	6	19	18	7	.	303
Paralichthys lethostigma	.	.	.	.	1	.	1	.	.	.	.	.	2
Peprilus paru	.	.	15	4	.	44	.	.	.	1	13	174	251
Poecilia latipinna	1	.	.	.	.	.	3	.	.	1	1	.	6
Pogonias cromis	7	.	28	55	36	47	131	27	39	43	54	10	477
Pomatomus saltatrix	.	.	.	.	.	2	.	.	.	.	.	.	2
Portunus spp.	18	.	.	10	.	4	149	1	2	6	.	1	191

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=657
Prionotus martis	10	.	.	1	.	.	.	.	.	.	.	.	11
Prionotus scitulus	21	.	.	3	9	15	33	1	.	16	1	1	100
Prionotus tribulus	6	.	3	6	1	.	2	2	1	11	3	7	42
Raja texana	1	.	.	.	.	.	.	.	.	.	.	.	1
Rhinoptera bonasus	.	14	35	1	2	4	4	.	3	8	4	2	77
Rimapenaeus spp.	2	.	.	.	.	.	.	.	.	.	.	1	3
Sardinella aurita	.	.	.	.	1	.	.	.	.	.	.	.	1
Sciaenops ocellatus	40	11	86	31	89	72	82	31	35	34	39	30	580
Scomberomorus maculatus	.	.	2	1	.	2	1	1	2	3	.	.	12
Selene vomer	.	.	.	.	.	3	25	1	1	.	.	.	30
Serraniculus pumilio	2	.	.	.	.	.	.	.	.	1	.	3	6
Sicyonia typica	.	.	.	3	.	.	.	.	.	.	.	.	3
Sphoeroides nephelus	.	.	1	30	25	5	8	1	3	7	63	1	144
Sphyraena barracuda	.	.	.	.	.	.	.	.	.	1	5	.	6
Sphyrna tiburo	.	.	.	1	2	2	3	2	4	4	.	.	18
Stephanolepis hispidus	.	.	.	3	4	2	52	1	.	.	9	18	89
Strongylura marina	1	2	.	4	6	4	2	.	1	1	1	3	25
Strongylura notata	.	.	2	3	1	.	.	2	1	2	.	.	11
Strongylura spp.	.	.	.	.	5	1	2	1	.	.	.	.	9
Strongylura timucu	.	.	.	.	2	1	2	6	3	.	.	.	14
Symphurus plagiusa	8	1	1	7	1	6	96	17	15	20	.	.	172
Syngnathus floridae	2	.	.	2	.	5	24	18	5	7	.	8	71

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=66	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=61	E=51	E=51	E=657
Syngnathus louisianae	1	.	.	.	.	1	6	2	1	6	.	.	17
Syngnathus scovelli	2	.	2	.	.	2	7	24	33	.	1	.	71
Syngnathus springeri	1	.	.	.	.	.	.	.	.	.	.	.	1
Synodus foetens	1	1	1	7	11	8	7	3	1	9	3	2	54
Trachinotus carolinus	.	.	.	1	.	34	.	.	.	.	.	.	35
Trachinotus falcatus	2	.	.	.	.	.	2	7	.	35	8	3	57
Trinectes maculatus	2	6	3	2	1	4	6	5	9	1	98	.	137
Tylosurus crocodilus	.	.	.	.	.	.	1	1	.	.	.	.	2
Urophycis floridana	7	1	.	1	.	.	.	.	.	.	.	.	9
Totals	**3,014**	**10,160**	**4,847**	**5,690**	**5,227**	**13,997**	**11,477**	**3,544**	**8,551**	**7,121**	**3,843**	**1,842**	**79,313**

Appendix CK21-02. Summary by gear and stratum of taxa collected during Cedar Key stratified-random sampling, 2021. 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. 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				
	E=27	E=117	E=108	E=168	E=192	E=45	E=657
Acanthostracion quadricornis	4	.	.	.	1	11	16
Achirus lineatus	2	3	8	.	.	1	14
Adinia xenica	.	.	1	33	.	.	34
Aluterus schoepfii	1	.	.	.	.	1	2
Ameiurus catus	.	.	1	3	4	.	8
Anarchopterus criniger	1	.	.	.	.	.	1
Anchoa hepsetus	1	55	241	84	.	6	387
Anchoa mitchilli	105	2,887	5,066	12,489	.	1,599	22,146
Ancylopsetta quadrocellata	.	.	.	.	5	1	6
Archosargus probatocephalus	.	.	1	3	84	.	88
Argopecten irradians	.	.	.	.	.	1	1
Ariopsis felis	9	338	24	159	1,750	174	2,454
Astroscopus y-graecum	.	.	1	.	.	.	1
Bagre marinus	.	11	.	.	94	24	129
Bairdiella chrysoura	343	885	326	276	2,670	322	4,822
Bathygobius soporator	.	9	2	59	.	.	70
Brevoortia spp.	.	118	227	277	1,652	.	2,274
Calamus arctifrons	.	.	.	.	.	3	3
Callinectes ornatus	.	.	1	.	.	.	1
Callinectes sapidus	.	58	145	252	49	43	547
Caranx hippos	.	.	.	.	20	.	20
Caranx latus	.	.	1	.	1	.	2
Carcharhinus leucas	.	.	.	.	3	.	3
Carcharhinus limbatus	.	.	.	.	8	.	8
Centropomus undecimalis	.	1	.	1	435	.	437
Centropristis striata	6	.	.	1	.	80	87
Chaetodipterus faber	1	9	14	.	150	55	229
Chasmodes saburrae	3	1	2	.	.	.	6
Chilomycterus schoepfii	14	2	1	.	35	18	70
Chloroscombrus chrysurus	1	12	8	66	1	10	98

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				
	E=27	E=117	E=108	E=168	E=192	E=45	E=657
Citharichthys macrops	.	1	.	.	.	14	15
Citharichthys sp.	.	.	1	.	.	.	1
Ctenogobius boleosoma	.	5	3	8	.	.	16
Ctenogobius smaragdus	.	.	1	1	.	.	2
Cynoscion arenarius	.	35	136	126	14	1,220	1,531
Cynoscion nebulosus	10	2	29	7	157	1	206
Cyprinodon variegatus	.	.	3	12	.	.	15
Dasyatis americana	.	.	.	.	11	.	11
Dasyatis sabina	1	23	23	.	1,868	71	1,986
Dasyatis say	.	1	2	.	225	10	238
Diplectrum formosum	.	1	.	.	.	9	10
Diplodus holbrookii	3	.	.	.	.	1	4
Dorosoma cepedianum	.	.	.	.	9	.	9
Dorosoma petenense	.	.	.	.	19	.	19
Echeneis neucratoides	.	2	.	.	33	.	35
Elops saurus	.	2	.	.	337	.	339
Esox niger	.	.	.	2	.	.	2
Etropus crossotus	2	15	6	.	118	211	352
Etropus cyclosquamus	.	.	.	.	.	6	6
Eucinostomus gula	34	15	103	4	22	26	204
Eucinostomus harengulus	1	45	225	197	20	9	497
Eucinostomus spp.	116	544	693	456	.	1	1,810
Farfantepenaeus duorarum	1	12	4	.	11	71	99
Farfantepenaeus spp.	32	69	76	15	.	328	520
Floridichthys carpio	.	.	1	.	.	.	1
Fundulus confluentus	.	.	.	8	.	.	8
Fundulus grandis	.	.	54	103	.	.	157
Fundulus seminolis	.	.	.	65	.	.	65
Fundulus similis	.	.	107	38	5	.	150
Gambusia holbrooki	.	1	1	443	.	.	445
Gobiesox strumosus	.	5	5	3	.	1	14
Gobionellus oceanicus	.	.	.	.	1	.	1
Gobiosoma bosc	.	10	4	42	.	.	56
Gobiosoma robustum	.	.	2	.	.	2	4
Gobiosoma spp.	.	1	2	3	.	.	6

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				
	E=27	E=117	E=108	E=168	E=192	E=45	E=657
Gymnura micrura	.	.	.	.	26	1	27
Haemulon plumierii	16	.	.	.	.	.	16
Harengula jaguana	244	5	128	7	149	.	533
Hemicaranx amblyrhynchus	.	1	.	.	.	.	1
Heterandria formosa	.	.	.	2	.	.	2
Hippocampus erectus	.	1	.	.	.	8	9
Hypleurochilus caudovittatus	.	.	.	.	.	1	1
Hyporhamphus meeki	3	2	.	.	.	.	5
Hypsoblennius hentz	2	.	1	.	.	4	7
Ictalurus punctatus	.	.	.	.	.	11	11
Labidesthes sicculus	.	.	.	43	.	.	43
Lachnolaimus maximus	.	.	.	.	.	4	4
Lagodon rhomboides	645	217	606	1,070	2,650	249	5,437
Leiostomus xanthurus	.	630	7,341	2,469	589	88	11,117
Lepisosteus osseus	.	.	.	3	33	.	36
Lepisosteus platyrhincus	.	.	.	2	1	.	3
Lepomis auritus	.	.	.	2	.	.	2
Lepomis gulosus	.	.	.	1	.	.	1
Lepomis macrochirus	.	.	.	62	.	.	62
Lepomis marginatus	.	.	.	1	.	.	1
Lepomis microlophus	.	.	.	1	.	.	1
Lepomis punctatus	.	.	.	21	.	.	21
Lepomis spp.	.	.	.	18	.	.	18
Limulus polyphemus	.	.	2	.	11	2	15
Litopenaeus setiferus	.	14	420	158	102	66	760
Lobotes surinamensis	.	.	.	.	5	.	5
Lucania goodei	.	.	.	3	.	.	3
Lucania parva	.	.	.	44	.	.	44
Lutjanus griseus	.	.	3	7	14	3	27
Lutjanus synagris	19	4	.	.	4	14	41
Megalops atlanticus	.	.	.	.	2	.	2
Membras martinica	356	2,846	1,361	972	.	.	5,535
Menidia spp.	2	81	977	1,473	.	.	2,533
Menippe spp.	.	1	.	.	1	17	19
Menticirrhus americanus	.	109	918	10	60	346	1,443

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				
	E=27	E=117	E=108	E=168	E=192	E=45	E=657
Menticirrhus saxatilis	.	15	25	.	1	5	46
Microgobius gulosus	.	2	5	1	.	.	8
Microgobius thalassinus	1	10	4	.	.	.	15
Micropogonias undulatus	.	11	11	3	96	358	479
Micropterus notius	.	.	.	1	.	.	1
Micropterus salmoides	.	.	.	12	.	.	12
Monacanthus ciliatus	13	.	.	.	.	10	23
Mugil cephalus	.	16	839	271	1,678	.	2,804
Mugil curema	.	.	5	.	458	.	463
Mugil trichodon	.	.	2	.	102	.	104
Mullus auratus	.	.	.	.	.	1	1
Myrophis punctatus	1	.	.	.	.	.	1
Nicholsina usta	1	.	.	.	.	.	1
Notemigonus crysoleucas	.	.	.	11	.	.	11
Notropis maculatus	.	.	.	42	.	.	42
Notropis petersoni	.	.	.	203	.	.	203
Notropis spp.	.	.	.	28	.	.	28
Ogcocephalus cubifrons	1	1	6	.	577	34	619
Oligoplites saurus	.	23	65	28	23	.	139
Opisthonema oglinum	5	1	2	10	46	.	64
Opsanus beta	1	1	.	.	2	13	17
Opsopoeodus emiliae	.	.	.	10	.	.	10
Orthopristis chrysoptera	85	169	130	13	61	141	599
Paralichthys albigutta	2	46	68	6	167	14	303
Paralichthys lethostigma	.	.	.	2	.	.	2
Peprilus paru	.	.	.	.	251	.	251
Poecilia latipinna	.	.	.	6	.	.	6
Pogonias cromis	.	5	10	.	462	.	477
Pomatomus saltatrix	.	.	.	.	2	.	2
Portunus spp.	.	9	.	1	1	180	191
Prionotus martis	.	.	.	.	.	11	11
Prionotus scitulus	.	17	12	3	.	68	100
Prionotus tribulus	.	7	6	2	15	12	42
Raja texana	.	.	.	.	.	1	1
Rhinoptera bonasus	.	.	.	.	77	.	77

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				
	E=27	E=117	E=108	E=168	E=192	E=45	E=657
Rimapenaeus spp.	3	.	.	.	.	.	3
Sardinella aurita	.	.	.	1	.	.	1
Sciaenops ocellatus	.	4	59	29	488	.	580
Scomberomorus maculatus	.	.	1	.	10	1	12
Selene vomer	.	.	.	1	28	1	30
Serraniculus pumilio	3	1	.	.	.	2	6
Sicyonia typica	.	.	.	.	.	3	3
Sphoeroides nephelus	17	62	36	3	18	8	144
Sphyraena barracuda	.	.	.	.	6	.	6
Sphyrna tiburo	.	.	.	.	18	.	18
Stephanolepis hispidus	33	6	1	.	.	49	89
Strongylura marina	.	6	5	1	13	.	25
Strongylura notata	.	.	9	.	2	.	11
Strongylura spp.	.	.	9	.	.	.	9
Strongylura timucu	.	1	9	1	3	.	14
Symphurus plagiusa	.	18	28	2	.	124	172
Syngnathus floridae	60	.	1	.	.	10	71
Syngnathus louisianae	2	1	5	.	.	9	17
Syngnathus scovelli	52	2	12	1	.	4	71
Syngnathus springeri	.	.	.	.	.	1	1
Synodus foetens	6	13	19	3	1	12	54
Trachinotus carolinus	.	.	34	.	1	.	35
Trachinotus falcatus	.	.	21	1	35	.	57
Trinectes maculatus	2	2	6	123	3	1	137
Tylosurus crocodilus	1	.	.	.	1	.	2
Urophycis floridana	.	1	.	.	.	8	9
Totals	**2,267**	**9,539**	**20,753**	**22,424**	**18,105**	**6,225**	**79,313**

Appendix CK21-03. Summary by zone of taxa collected during Cedar Key stratified-random sampling, 2021. Zone B encompassed the northern portion of the universe and included all tidal creeks; Zone C encompassed the southern portion of the universe; Zone F encompassed the lower Suwanee River. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Zone			Totals
	B	C	F	
	E=344	E=248	E=65	E=657
Acanthostracion quadricornis	1	15	.	16
Achirus lineatus	3	11	.	14
Adinia xenica	34	.	.	34
Aluterus schoepfii	.	2	.	2
Ameiurus catus	7	.	1	8
Anarchopterus criniger	.	1	.	1
Anchoa hepsetus	296	90	1	387
Anchoa mitchilli	17,623	3,277	1,246	22,146
Ancylopsetta quadrocellata	1	5	.	6
Archosargus probatocephalus	39	46	3	88
Argopecten irradians	.	1	.	1
Ariopsis felis	1,321	1,133	.	2,454
Astroscopus y-graecum	1	.	.	1
Bagre marinus	37	92	.	129
Bairdiella chrysoura	1,521	3,299	2	4,822
Bathygobius soporator	30	.	40	70
Brevoortia spp.	1,018	1,252	4	2,274
Calamus arctifrons	.	3	.	3
Callinectes ornatus	.	1	.	1
Callinectes sapidus	340	96	111	547
Caranx hippos	8	12	.	20
Caranx latus	1	1	.	2
Carcharhinus leucas	3	.	.	3
Carcharhinus limbatus	1	7	.	8
Centropomus undecimalis	187	250	.	437
Centropristis striata	1	86	.	87
Chaetodipterus faber	61	168	.	229
Chasmodes saburrae	1	5	.	6
Chilomycterus schoepfii	2	68	.	70
Chloroscombrus chrysurus	81	17	.	98
Citharichthys macrops	9	6	.	15
Citharichthys sp.	1	.	.	1

Species	Zone			Totals
	B	C	F	
	E=344	E=248	E=65	E=657
Ctenogobius boleosoma	12	3	1	16
Ctenogobius smaragdus	1	1	.	2
Cynoscion arenarius	1,446	84	1	1,531
Cynoscion nebulosus	139	67	.	206
Cyprinodon variegatus	13	2	.	15
Dasyatis americana	.	11	.	11
Dasyatis sabina	744	1,242	.	1,986
Dasyatis say	3	235	.	238
Diplectrum formosum	.	10	.	10
Diplodus holbrookii	.	4	.	4
Dorosoma cepedianum	8	1	.	9
Dorosoma petenense	4	15	.	19
Echeneis neucratoides	14	21	.	35
Elops saurus	221	118	.	339
Esox niger	.	.	2	2
Etropus crossotus	170	182	.	352
Etropus cyclosquamus	4	2	.	6
Eucinostomus gula	35	169	.	204
Eucinostomus harengulus	216	200	81	497
Eucinostomus spp.	803	856	151	1,810
Farfantepenaeus duorarum	40	58	1	99
Farfantepenaeus spp.	369	141	10	520
Floridichthys carpio	.	1	.	1
Fundulus confluentus	.	.	8	8
Fundulus grandis	144	6	7	157
Fundulus seminolis	2	.	63	65
Fundulus similis	116	34	.	150
Gambusia holbrooki	10	.	435	445
Gobiesox strumosus	12	1	1	14
Gobionellus oceanicus	.	1	.	1
Gobiosoma bosc	23	1	32	56
Gobiosoma robustum	.	4	.	4
Gobiosoma spp.	2	1	3	6
Gymnura micrura	.	27	.	27
Haemulon plumierii	.	16	.	16
Harengula jaguana	89	444	.	533

Species	Zone			Totals
	B	C	F	
	E=344	E=248	E=65	E=657
Hemicaranx amblyrhynchus	1	.	.	1
Heterandria formosa	.	.	2	2
Hippocampus erectus	.	9	.	9
Hypleurochilus caudovittatus	1	.	.	1
Hyporhamphus meeki	.	5	.	5
Hypsoblennius hentz	.	7	.	7
Ictalurus punctatus	.	.	11	11
Labidesthes sicculus	.	.	43	43
Lachnolaimus maximus	.	4	.	4
Lagodon rhomboides	1,922	3,303	212	5,437
Leiostomus xanthurus	3,715	7,325	77	11,117
Lepisosteus osseus	24	10	2	36
Lepisosteus platyrhincus	2	.	1	3
Lepomis auritus	.	.	2	2
Lepomis gulosus	.	.	1	1
Lepomis macrochirus	7	.	55	62
Lepomis marginatus	.	.	1	1
Lepomis microlophus	.	.	1	1
Lepomis punctatus	.	.	21	21
Lepomis spp.	.	.	18	18
Limulus polyphemus	6	9	.	15
Litopenaeus setiferus	615	145	.	760
Lobotes surinamensis	.	5	.	5
Lucania goodei	.	.	3	3
Lucania parva	3	.	41	44
Lutjanus griseus	21	3	3	27
Lutjanus synagris	2	39	.	41
Megalops atlanticus	1	1	.	2
Membras martinica	3,650	1,880	5	5,535
Menidia spp.	1,988	427	118	2,533
Menippe spp.	.	19	.	19
Menticirrhus americanus	1,293	150	.	1,443
Menticirrhus saxatilis	34	12	.	46
Microgobius gulosus	4	4	.	8
Microgobius thalassinus	3	12	.	15
Micropogonias undulatus	306	81	92	479

Species	Zone			Totals
	B	C	F	
	E=344	E=248	E=65	E=657
Micropterus notius	.	.	1	1
Micropterus salmoides	3	.	9	12
Monacanthus ciliatus	.	23	.	23
Mugil cephalus	1,574	1,157	73	2,804
Mugil curema	269	194	.	463
Mugil trichodon	12	92	.	104
Mullus auratus	.	1	.	1
Myrophis punctatus	.	1	.	1
Nicholsina usta	.	1	.	1
Notemigonus crysoleucas	5	.	6	11
Notropis maculatus	.	.	42	42
Notropis petersoni	.	.	203	203
Notropis spp.	.	.	28	28
Ogcocephalus cubifrons	15	604	.	619
Oligoplites saurus	84	54	1	139
Opisthonema oglinum	43	21	.	64
Opsanus beta	.	17	.	17
Opsopoeodus emiliae	.	.	10	10
Orthopristis chrysoptera	149	450	.	599
Paralichthys albigutta	100	203	.	303
Paralichthys lethostigma	1	.	1	2
Peprilus paru	13	238	.	251
Poecilia latipinna	5	.	1	6
Pogonias cromis	354	123	.	477
Pomatomus saltatrix	.	2	.	2
Portunus spp.	22	167	2	191
Prionotus martis	1	10	.	11
Prionotus scitulus	31	69	.	100
Prionotus tribulus	25	17	.	42
Raja texana	.	1	.	1
Rhinoptera bonasus	24	53	.	77
Rimapenaeus spp.	.	3	.	3
Sardinella aurita	.	.	1	1
Sciaenops ocellatus	410	168	2	580
Scomberomorus maculatus	4	8	.	12
Selene vomer	14	16	.	30

Species	Zone			Totals
	B	C	F	
	E=344	E=248	E=65	E=657
Serraniculus pumilio	.	6	.	6
Sicyonia typica	.	3	.	3
Sphoeroides nephelus	35	109	.	144
Sphyraena barracuda	.	6	.	6
Sphyrna tiburo	5	13	.	18
Stephanolepis hispidus	4	85	.	89
Strongylura marina	14	11	.	25
Strongylura notata	5	6	.	11
Strongylura spp.	5	4	.	9
Strongylura timucu	2	12	.	14
Symphurus plagiusa	143	29	.	172
Syngnathus floridae	1	70	.	71
Syngnathus louisianae	2	15	.	17
Syngnathus scovelli	7	63	1	71
Syngnathus springeri	1	.	.	1
Synodus foetens	20	34	.	54
Trachinotus carolinus	34	1	.	35
Trachinotus falcatus	14	43	.	57
Trinectes maculatus	16	4	117	137
Tylosurus crocodilus	.	2	.	2
Urophycis floridana	2	7	.	9
Totals	**44,334**	**31,568**	**3,411**	**79,313**

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 AP21-01). 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). Less than 7% of the substrate is covered by seagrass (Continental Shelf Associates, Inc. 1985).

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 AP21-01). 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. 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 2021 in Apalachicola Bay.

Stratified-Random Sampling

A total of 105,025 animals, which included 186 taxa of fishes and 16 taxa of selected invertebrates, were collected from 594 Apalachicola Bay SRS samples in 2021 (Table AP21-01, Appendices AP21-01, -02, and -03). *Anchoa mitchilli* (n=24,622) was the most numerous taxon collected, representing 23.4% of the total catch. *Lagodon rhomboides* (n=15,485) and *Mugil cephalus* (n=6,733) were the next most abundant taxa collected, accounting for an additional 21.2% of the total catch. A total of 42 Selected Taxa (n=31,854 animals) composed 30.3% of the total catch. *Mugil cephalus* (n=6,733) was the most abundant Selected Taxon, representing 6.4% of the total catch. *Brevoortia* spp. (n=6,514), *Leiostomus xanthurus* (n=4,731), *Micropogonias undulatus* (n=3,614), and *Litopenaeus setiferus* (n=3,192) were the next most abundant Selected Taxa, comprising 17.2% of the total catch. Collections in 2021 included 0 species new to the AP FIM collection.

Bay Sampling

21.3-m Bay Seines. A total of 48,765 animals were collected in 240 21.3-m bay seines, representing 46.4% of the overall SRS catch (Table AP21-01). *Anchoa mitchilli* (n = 6,771) and *Brevoortia* spp. (n = 6,170) were the most abundant taxa, accounting for 26.5% of the bay seine catch (Table AP21-02). The taxa most frequently caught in 21.3-m bay seines were *Lagodon rhomboides* (51.7% occurrence) and *Menidia* spp. (29.2% occurrence).

A total of 18,562 animals from 32 Selected Taxa were collected, representing 38.1% of the entire 21.3-m bay seine catch (Table AP21-03). *Brevoortia* spp. (n=6,170) was the most abundant Selected Taxon, accounting for 33.2% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m bay seines were *Callinectes sapidus* (33.8% occurrence) and *Farfantepenaeus* spp. (32.1% occurrence).

183-m Haul Seines. A total of 23,840 animals were collected in 198 183-m haul seines, representing 22.7% of the overall SRS catch (Table AP21-01). *Lagodon rhomboides* (n = 8,336) was the most abundant taxon, accounting for 35% of the 183-m haul seine catch (Table AP21-04). The taxa most frequently caught in 183-m haul seines were *Lagodon rhomboides* (68.2% occurrence), *Mugil cephalus* (66.2% occurrence), and *Dasyatis sabina* (63.6% occurrence).

A total of 8,216 animals from 34 Selected Taxa were collected, representing 34.5% of the entire 183-m haul seine catch (Table AP21-05). *Leiostomus xanthurus* (n=2,561) and *Mugil cephalus* (n=1,896) were the most abundant Selected Taxa, accounting for 54.2% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil cephalus* (66.2% occurrence) and *Sciaenops ocellatus* (54.0% occurrence).

6.1-m Bay Otter Trawls. A total of 13,262 animals were collected in 48 6.1-m bay otter trawls, representing 12.6% of the overall SRS catch (Table AP21-01). *Anchoa mitchilli* (n = 4,468), *Micropogonias undulatus* (n = 1,491), *Lagodon rhomboides* (n = 1,039), and *Cynoscion arenarius* (n = 878) were the most abundant taxa, accounting for 59.4% of the 6.1-m bay otter trawl catch (Table AP21-06). The taxa most frequently caught in 6.1-m bay otter trawls were *Etropus crossotus* (85.4% occurrence), *Micropogonias undulatus* (66.7% occurrence), and *Cynoscion arenarius* (45.8% occurrence).

A total of 4,079 animals from 22 Selected Taxa were collected, representing 30.8% of the entire 6.1-m bay otter trawl catch (Table AP21-07). *Micropogonias undulatus* (n=1,491), *Cynoscion arenarius* (n=878), and *Leiostomus xanthurus* (n=463) were the most abundant Selected Taxa, accounting for 69.4% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 6.1-m bay otter trawls were *Micropogonias undulatus* (66.7% occurrence), *Farfantepenaeus duorarum* (60.4% occurrence), and *Cynoscion arenarius* (45.8% occurrence).

River Sampling

21.3-m River Seines. A total of 6,670 animals were collected in 84 21.3-m river seines, representing 6.4% of the overall SRS catch (Table AP21-01). *Anchoa mitchilli* (n = 1,913) was the most abundant taxon collected, accounting for 28.7% of the 21.3-m river seine catch (Table AP21-08). *Notropis petersoni* (n=1,487) and *Gambusia holbrooki* (n=517) were the next most abundant taxa, accounting for an additional 30% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines were *Notropis petersoni* (60.7% occurrence), *Lucania parva* (51.2% occurrence), and *Callinectes sapidus* (46.4% occurrence).

A total of 332 animals from 8 Selected Taxa were collected, representing 5% of the entire 21.3-m river seine catch (Table AP21-09). *Callinectes sapidus* (n=272), and *Brevoortia* spp. (n=21) were the most abundant Selected Taxa, accounting for 88.3% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Callinectes sapidus* (46.4% occurrence) and *Brevoortia* spp. (6.0% occurrence).

6.1-m River Otter Trawls. A total of 12,488 animals were collected in 24 6.1-m river otter trawls, representing 11.9% of the overall SRS catch (Table AP21-01). *Anchoa mitchilli* (n = 11,470) was the most abundant taxon collected, accounting for 91.8% of the 6.1-m river otter trawl catch (Table AP21-10). The taxa most frequently caught in 6.1-m river otter trawls were *Callinectes sapidus* (70.8% occurrence), *Anchoa mitchilli* (66.7% occurrence), and *Trinectes maculatus* (45.8% occurrence).

A total of 665 animals from 10 Selected Taxa were collected, representing 5.3% of the entire 6.1-m river otter trawl catch (Table AP21-11). *Callinectes sapidus* (n=297), *Cynoscion arenarius* (n=248), and *Micropogonias undulatus* (n=42) were the most abundant Selected Taxa, accounting for 88.3% 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* (70.8% occurrence) and *Cynoscion arenarius* (33.3% occurrence).

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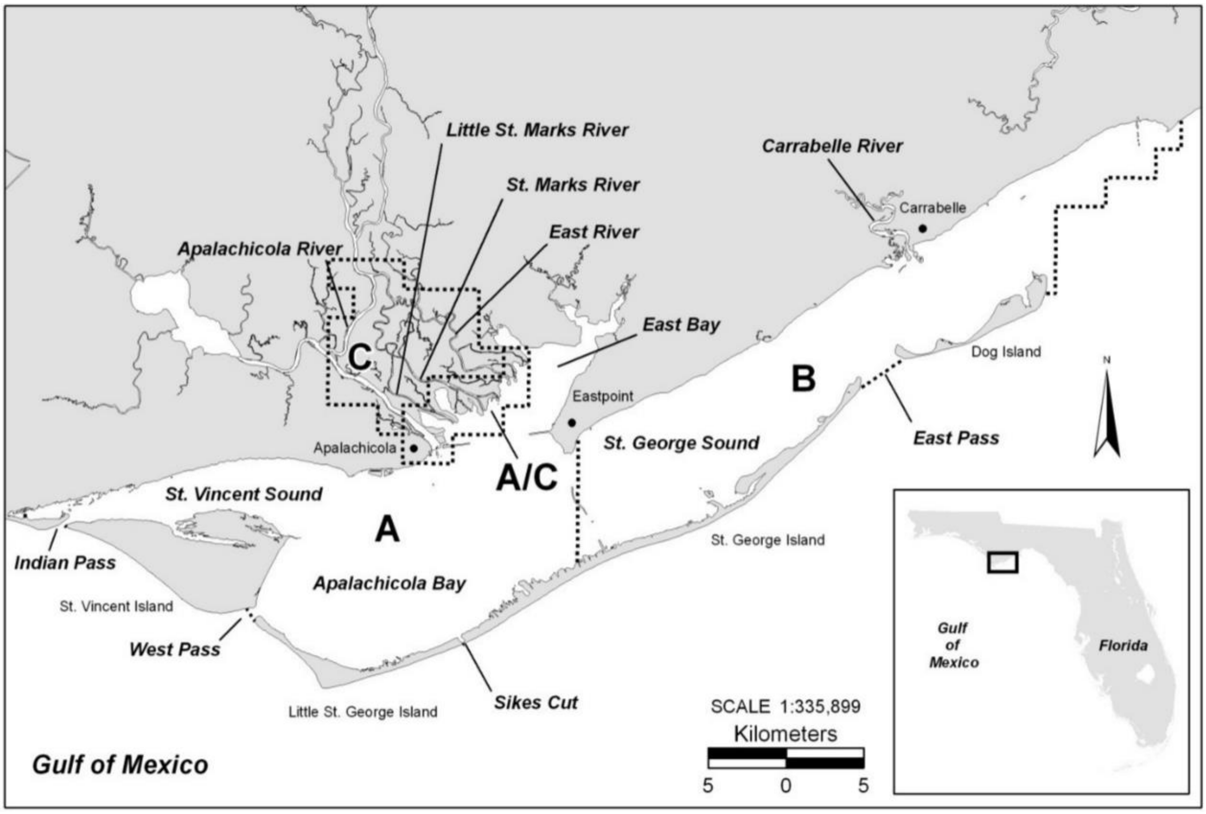

Figure AP21-01. Map of Apalachicola Bay sampling area. Zones are labeled A–C. Grids containing portions of Zones A and C are labeled A/C.

Table AP21-01. Summary of catch and effort data for Apalachicola Bay stratified-random sampling, 2021.

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	35,075	120	.	.	9,828	99	6,085	24	50,988	243
B	13,690	120	.	.	14,012	99	7,177	24	34,879	243
C	.	.	6,670	84	.	.	12,488	24	19,158	108
Totals	**48,765**	**240**	**6,670**	**84**	**23,840**	**198**	**25,750**	**72**	**105,025**	**594**

Table AP21-02. Catch statistics for 10 dominant taxa collected in 240 21.3-m bay seine samples during Apalachicola Bay stratified-random sampling, 2021. 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	6,771	13.9	25.4	20.67	7.28	538.63	1,126.43	36	0.12	17	68
Brevoortia spp.	6,170	12.7	7.5	18.83	12.37	1,004.64	2,648.57	29	0.09	21	206
Lagodon rhomboides	6,034	12.4	51.7	18.42	5.51	457.41	998.57	39	0.28	11	163
Mugil cephalus	4,817	9.9	14.2	14.70	7.84	815.33	1,372.14	24	0.17	17	328
Lucania parva	4,794	9.8	10.8	14.63	8.26	863.07	1,546.43	25	0.07	15	40
Orthopristis chrysoptera	2,705	5.5	24.2	8.26	2.51	465.02	357.14	33	0.29	10	168
Litopenaeus setiferus	2,627	5.4	15.0	8.02	3.69	703.11	610.00	9	0.05	2	22
Menidia spp.	2,294	4.7	29.2	7.00	2.73	596.31	569.29	43	0.33	25	99
Eucinostomus spp.	2,116	4.3	29.2	6.46	1.37	324.12	145.71	24	0.13	11	39
Leiostomus xanthurus	1,696	3.5	26.7	5.18	1.80	530.59	329.29	28	0.41	11	172
Subtotals	40,024	82.1	.	.	.	.	.	.	.	2	328
Totals	**48,765**	**100.0**	**.**	**145.13**	**22.07**	**235.57**	**3,374.29**	**.**	**.**	**2**	**770**

Table AP21-03. Catch statistics for Selected Taxa collected in 240 21.3-m bay seine samples during Apalachicola Bay stratified-random sampling, 2021. 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
Brevoortia spp.	6,170	12.7	7.5	18.36	12.06	1,017.51	2,648.57	29	0.09	21	206
Mugil cephalus	4,817	9.9	14.2	14.34	7.64	825.83	1,372.14	24	0.17	17	328
Litopenaeus setiferus	2,627	5.4	15.0	7.82	3.59	712.21	610.00	9	0.05	2	22
Leiostomus xanthurus	1,696	3.5	26.7	5.05	1.75	537.57	329.29	28	0.41	11	172
Farfantepenaeus spp.	646	1.3	32.1	1.92	0.39	313.27	69.29	8	0.12	2	14
Callinectes sapidus	529	1.1	33.8	1.57	0.31	301.18	35.71	15	0.63	4	179
Cynoscion arenarius	523	1.1	11.7	1.56	0.44	436.95	60.71	26	0.38	9	58
Micropogonias undulatus	476	1.0	14.2	1.42	0.57	621.83	124.29	34	0.90	9	156
Cynoscion nebulosus	211	0.4	18.3	0.63	0.14	338.56	18.57	48	1.75	19	269
Sciaenops ocellatus	189	0.4	14.2	0.56	0.20	552.24	39.29	55	5.75	11	582
Menticirrhus americanus	187	0.4	10.4	0.56	0.29	802.63	66.43	36	1.47	15	210
Mugil curema	179	0.4	4.2	0.53	0.42	1,222.57	99.29	28	1.43	22	132
Lutjanus synagris	77	0.2	9.2	0.23	0.06	424.01	8.57	36	1.33	15	77
Paralichthys albigutta	77	0.2	15.8	0.23	0.05	321.51	6.43	44	4.42	13	196
Lutjanus griseus	47	0.1	7.1	0.14	0.05	540.53	7.86	35	1.85	14	71
Menticirrhus saxatilis	31	0.1	7.5	0.09	0.02	403.73	2.86	52	5.92	11	143
Archosargus probatocephalus	15	<0.1	1.7	0.04	0.03	1,003.76	6.43	66	22.38	16	265
Paralichthys lethostigma	14	<0.1	4.2	0.04	0.02	638.77	3.57	115	30.32	20	371
Farfantepenaeus duorarum	13	<0.1	3.8	0.04	0.01	588.62	2.14	16	0.37	15	19
Trachinotus carolinus	7	<0.1	0.4	0.02	0.02	1,549.19	5.00	73	4.25	53	87
Trachinotus falcatus	7	<0.1	1.2	0.02	0.01	1,011.35	2.86	23	4.01	14	38
Caranx hippos	5	<0.1	1.2	0.01	0.01	1,024.88	2.14	37	2.44	29	43

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Calamus arctifrons	3	<0.1	0.8	0.01	0.01	1,152.77	1.43	33	1.76	30	36
Centropristis striata	3	<0.1	1.2	0.01	0.01	890.68	0.71	108	7.54	93	118
Diplectrum formosum	3	<0.1	1.2	0.01	0.01	890.68	0.71	56	12.33	32	72
Haemulon plumierii	2	<0.1	0.8	0.01	<0.01	1,093.15	0.71	28	8.50	20	37
Menippe spp.	2	<0.1	0.4	0.01	0.01	1,549.19	1.43	4	0.50	4	5
Menticirrhus littoralis	2	<0.1	0.4	0.01	0.01	1,549.19	1.43	111	2.00	109	113
Elops saurus	1	<0.1	0.4	<0.01	<0.01	1,549.19	0.71	67	.	67	67
Paralichthys squamilentus	1	<0.1	0.4	<0.01	<0.01	1,549.19	0.71	32	.	32	32
Pogonias cromis	1	<0.1	0.4	<0.01	<0.01	1,549.19	0.71	183	.	183	183
Sphyrna tiburo	1	<0.1	0.4	<0.01	<0.01	1,549.19	0.71	770	.	770	770
Totals	**18,562**	**38.1**	**.**	**55.24**	**17.40**	**488.02**	**3,371.43**	**.**	**.**	**2**	**770**

Table AP21-04. Catch statistics for 10 dominant taxa collected in 198 183-m haul seine samples during Apalachicola Bay stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Lagodon rhomboides	8,336	35.0	68.2	42.97	7.10	230.12	717	106	0.34	49	190
Bairdiella chrysoura	3,032	12.7	30.3	15.63	6.38	568.78	1,030	127	0.40	35	170
Leiostomus xanthurus	2,561	10.7	51.5	13.20	2.81	296.33	340	134	0.76	56	209
Mugil cephalus	1,896	8.0	66.2	9.77	1.96	279.91	271	213	1.70	66	409
Micropogonias undulatus	1,604	6.7	29.8	8.27	1.90	320.00	213	156	0.66	57	267
Dasyatis sabina	1,286	5.4	63.6	6.63	1.40	294.61	208	219	1.13	105	360
Orthopristis chrysoptera	740	3.1	24.7	3.81	1.12	410.76	184	118	1.67	53	206
Eucinostomus gula	576	2.4	10.1	2.97	2.32	1,089.94	447	68	0.39	42	100
Sciaenops ocellatus	467	2.0	54.0	2.41	0.33	191.11	30	324	5.98	53	760
Mugil curema	328	1.4	32.8	1.69	0.33	275.04	40	143	2.61	73	285
Subtotals	20,826	87.4	.	.	.	.	.	.	.	35	760
Totals	**23,840**	**100.0**	**.**	**120.40**	**12.66**	**147.93**	**1,207**	**.**	**.**	**10**	**893**

Table AP21-05. Catch statistics for Selected Taxa collected in 198 183-m haul seine samples during Apalachicola Bay stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Leiostomus xanthurus	2,561	10.7	51.5	12.93	2.75	299.70	340	134	0.76	56	209
Mugil cephalus	1,896	8.0	66.2	9.58	1.93	283.13	271	213	1.70	66	409
Micropogonias undulatus	1,604	6.7	29.8	8.10	1.86	323.59	213	156	0.66	57	267
Sciaenops ocellatus	467	2.0	54.0	2.36	0.32	193.60	30	324	5.98	53	760
Mugil curema	328	1.4	32.8	1.66	0.33	278.22	40	143	2.61	73	285
Brevoortia spp.	320	1.3	9.1	1.62	0.74	646.98	110	126	3.12	50	221
Cynoscion nebulosus	186	0.8	31.3	0.94	0.19	280.65	26	182	7.51	36	575
Paralichthys albigutta	185	0.8	31.3	0.93	0.18	271.76	28	162	4.57	50	348
Elops saurus	96	0.4	17.7	0.48	0.12	340.03	16	288	5.22	185	483
Litopenaeus setiferus	86	0.4	7.6	0.43	0.18	566.96	22	20	0.62	11	34
Archosargus probatocephalus	74	0.3	21.7	0.37	0.07	265.76	10	278	9.03	52	395
Callinectes sapidus	73	0.3	17.7	0.37	0.09	325.71	13	117	5.29	27	195
Paralichthys lethostigma	58	0.2	9.1	0.29	0.09	454.38	11	184	10.95	52	421
Trachinotus falcatus	49	0.2	7.1	0.25	0.10	579.29	17	74	4.98	34	173
Pogonias cromis	43	0.2	12.6	0.22	0.05	352.82	7	309	30.39	116	825
Menticirrhus americanus	39	0.2	8.6	0.20	0.06	430.00	7	126	5.56	78	242
Trachinotus carolinus	25	0.1	4.0	0.13	0.06	681.45	10	83	4.13	60	147
Pomatomus saltatrix	20	0.1	4.5	0.10	0.05	661.60	8	97	5.79	66	150
Farfantepenaeus spp.	17	0.1	3.5	0.09	0.04	640.31	6	13	0.43	10	17
Lutjanus griseus	17	0.1	2.5	0.09	0.06	1,014.76	12	71	9.83	43	190
Farfantepenaeus duorarum	12	0.1	4.5	0.06	0.02	567.12	4	18	0.81	15	23
Menticirrhus littoralis	12	0.1	3.5	0.06	0.02	567.12	3	148	12.39	113	270

Species	Number		% Occur	Density Estimate (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Caranx hippos	11	<0.1	2.0	0.06	0.03	834.96	5	121	4.23	93	154
Centropristis striata	8	<0.1	1.5	0.04	0.03	893.54	4	116	5.49	101	150
Lutjanus synagris	6	<0.1	2.5	0.03	0.01	657.41	2	67	6.21	49	86
Farfantepenaeus aztecus	5	<0.1	2.5	0.03	0.01	622.86	1	18	1.02	16	21
Sphyrna tiburo	5	<0.1	2.5	0.03	0.01	622.86	1	633	38.29	495	710
Sphyraena barracuda	4	<0.1	1.0	0.02	0.01	992.46	2	270	12.10	247	304
Mycteroperca microlepis	3	<0.1	1.0	0.02	0.01	1,046.68	2	199	4.10	191	205
Menticirrhus saxatilis	2	<0.1	1.0	0.01	0.01	992.46	1	88	4.50	84	93
Carcharhinus isodon	1	<0.1	0.5	0.01	0.01	1,407.12	1	392	.	392	392
Cynoscion arenarius	1	<0.1	0.5	0.01	0.01	1,407.12	1	70	.	70	70
Lobotes surinamensis	1	<0.1	0.5	0.01	0.01	1,407.12	1	224	.	224	224
Megalops atlanticus	1	<0.1	0.5	0.01	0.01	1,407.12	1	165	.	165	165
Totals	**8,216**	**34.5**	**.**	**41.49**	**4.54**	**153.85**	**396**	**.**	**.**	**10**	**825**

Table AP21-06. Catch statistics for 10 dominant taxa collected in 48 6.1-m bay otter trawl samples during Apalachicola Bay stratified-random sampling, 2021. 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	4,468	33.7	43.8	6.21	2.52	281.07	101.06	47	0.26	12	74
Micropogonias undulatus	1,491	11.2	66.7	2.08	0.58	194.36	16.04	64	0.89	10	167
Lagodon rhomboides	1,039	7.8	31.2	1.43	1.13	547.67	54.03	72	1.19	12	161
Cynoscion arenarius	878	6.6	45.8	1.17	0.49	288.54	20.75	39	0.96	7	186
Orthopristis chrysoptera	798	6.0	35.4	1.10	0.78	491.71	37.30	110	1.57	26	192
Anchoa lyolepis	501	3.8	4.2	0.70	0.69	683.46	33.32	31	0.09	26	37
Leiostomus xanthurus	463	3.5	35.4	0.63	0.22	247.51	6.48	84	1.14	10	185
Litopenaeus setiferus	446	3.4	41.7	0.60	0.49	567.30	23.64	19	0.19	6	31
Etropus crossotus	356	2.7	85.4	0.49	0.07	97.52	1.86	73	0.96	24	130
Farfantepenaeus spp.	339	2.6	41.7	0.45	0.25	377.41	11.37	9	0.20	3	14
Subtotals	10,779	81.3	.	.	.	.	.	.	.	3	192
Totals	**13,262**	**100.0**	**.**	**18.27**	**4.08**	**154.92**	**136.65**	**.**	**.**	**2**	**535**

Table AP21-07. Catch statistics for Selected Taxa collected in 48 6.1-m bay otter trawl samples during Apalachicola Bay stratified-random sampling, 2021. 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	1,491	11.2	66.7	2.08	0.58	194.36	16.04	64	0.89	10	167
Cynoscion arenarius	878	6.6	45.8	1.17	0.49	288.54	20.75	39	0.96	7	186
Leiostomus xanthurus	463	3.5	35.4	0.63	0.22	247.51	6.48	84	1.14	10	185
Litopenaeus setiferus	446	3.4	41.7	0.60	0.49	567.30	23.64	19	0.19	6	31
Farfantepenaeus spp.	339	2.6	41.7	0.45	0.25	377.41	11.37	9	0.20	3	14
Farfantepenaeus aztecus	88	0.7	20.8	0.12	0.06	329.28	2.15	26	0.44	16	33
Farfantepenaeus duorarum	85	0.6	60.4	0.12	0.02	111.99	0.55	20	0.43	15	32
Menticirrhus americanus	79	0.6	33.3	0.11	0.05	337.12	1.93	60	3.35	13	194
Callinectes sapidus	64	0.5	37.5	0.09	0.02	165.53	0.55	55	5.69	4	170
Centropristis striata	52	0.4	6.2	0.07	0.07	629.75	3.17	95	2.11	79	162
Menippe spp.	30	0.2	22.9	0.04	0.01	244.52	0.49	20	2.08	5	50
Paralichthys albigutta	16	0.1	18.8	0.02	0.01	289.37	0.34	128	12.70	65	219
Lutjanus synagris	14	0.1	12.5	0.02	0.01	319.15	0.34	80	8.97	19	140
Argopecten irradians	8	0.1	4.2	0.01	0.01	616.65	0.47	47	3.48	24	56
Diplectrum formosum	8	0.1	10.4	0.01	0.01	385.47	0.27	73	9.69	25	124
Paralichthys lethostigma	5	<0.1	10.4	0.01	<0.01	296.57	0.07	189	28.02	139	291
Brevoortia spp.	3	<0.1	4.2	<0.01	<0.01	515.51	0.13	129	48.67	32	178
Cynoscion nothus	3	<0.1	4.2	<0.01	<0.01	505.52	0.12	22	3.18	18	28
Centropristis philadelphica	2	<0.1	2.1	<0.01	<0.01	692.82	0.12	94	1.50	92	95
Cynoscion nebulosus	2	<0.1	2.1	<0.01	<0.01	692.82	0.13	30	6.00	24	36
Elops saurus	2	<0.1	4.2	<0.01	<0.01	484.84	0.07	41	1.00	40	42

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Haemulon plumierii	1	<0.1	2.1	<0.01	<0.01	692.82	0.07	29	.	29	29
Totals	**4,079**	**30.8**	**.**	**5.56**	**1.21**	**151.05**	**36.62**	**.**	**.**	**3**	**291**

Table AP21-08. Catch statistics for 10 dominant taxa collected in 84 21.3-m river seine samples during Apalachicola Bay stratified-random sampling, 2021. 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	1,913	28.7	35.7	34.31	12.83	338.66	851.47	28	0.10	18	52
Notropis petersoni	1,487	22.3	60.7	26.67	7.84	266.09	495.59	34	0.18	17	57
Gambusia holbrooki	517	7.8	26.2	9.27	5.35	522.18	423.53	24	0.22	13	33
Micropterus salmoides	352	5.3	42.9	6.31	2.61	373.94	197.06	44	2.99	15	323
Lucania parva	350	5.2	51.2	6.28	1.81	260.73	132.35	23	0.24	13	37
Trinectes maculatus	301	4.5	35.7	5.40	2.67	448.28	208.82	20	0.35	8	43
Callinectes sapidus	272	4.1	46.4	4.88	1.52	281.25	100.00	17	0.77	5	138
Lepomis punctatus	168	2.5	31.0	3.01	0.77	232.62	35.29	46	2.16	20	144
Enneacanthus gloriosus	130	1.9	17.9	2.33	0.77	298.00	35.29	25	0.65	9	52
Lepomis microlophus	129	1.9	39.3	2.31	1.04	407.21	83.82	66	3.55	20	192
Subtotals	5,619	84.2	.	.	.	.	.	.	.	5	323
Totals	**6,670**	**100.0**	**.**	**116.77**	**17.80**	**139.74**	**935.29**	**.**	**.**	**5**	**522**

Table AP21-09. Catch statistics for Selected Taxa collected in 84 21.3-m river seine samples during Apalachicola Bay stratified-random sampling, 2021. 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	272	4.1	46.4	4.76	1.48	285.05	100.00	17	0.77	5	138
Brevoortia spp.	21	0.3	6.0	0.37	0.22	537.28	16.18	25	0.29	22	27
Mugil cephalus	20	0.3	1.2	0.35	0.35	916.52	29.41	25	0.31	22	28
Leiostomus xanthurus	7	0.1	2.4	0.12	0.11	794.86	8.82	49	5.62	38	80
Paralichthys lethostigma	7	0.1	6.0	0.12	0.06	464.14	4.41	166	51.18	61	405
Cynoscion nebulosus	3	<0.1	2.4	0.05	0.04	679.83	2.94	22	0.33	22	23
Cynoscion arenarius	1	<0.1	1.2	0.02	0.02	916.52	1.47	27	.	27	27
Micropogonias undulatus	1	<0.1	1.2	0.02	0.02	916.52	1.47	18	.	18	18
Totals	**332**	**5.0**	**.**	**5.81**	**1.53**	**240.76**	**100.00**	**.**	**.**	**5**	**405**

Table AP21-10. Catch statistics for 10 dominant taxa collected in 24 6.1-m river otter trawl samples during Apalachicola Bay stratified-random sampling, 2021. 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	11,470	91.8	66.7	67.11	51.30	366.60	1,150.16	32	0.04	21	50
Callinectes sapidus	297	2.4	70.8	1.61	1.27	377.92	29.44	19	1.06	4	156
Cynoscion arenarius	248	2.0	33.3	1.45	0.92	305.41	19.56	45	0.87	20	69
Trinectes maculatus	76	0.6	45.8	0.44	0.28	304.97	6.48	33	1.62	13	68
Ictalurus furcatus	58	0.5	16.7	0.35	0.27	377.41	6.21	68	5.38	27	175
Ictalurus punctatus	54	0.4	41.7	0.31	0.15	233.73	3.37	83	7.27	20	245
Micropogonias undulatus	42	0.3	29.2	0.24	0.10	205.12	2.02	32	2.79	12	126
Litopenaeus setiferus	33	0.3	16.7	0.19	0.12	305.12	2.29	13	0.88	3	25
Archosargus probatocephalus	23	0.2	16.7	0.13	0.08	287.18	1.62	237	13.14	97	360
Notropis petersoni	22	0.2	4.2	0.12	0.12	479.58	2.70	42	0.93	34	54
Subtotals	12,323	98.7	.	.	.	.	.	.	.	3	360
Totals	**12,488**	**100.0**	**.**	**69.84**	**49.38**	**346.36**	**1,157.72**	**.**	**.**	**3**	**432**

Table AP21-11. Catch statistics for Selected Taxa collected in 24 6.1-m river otter trawl samples during Apalachicola Bay stratified-random sampling, 2021. 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	297	2.4	70.8	1.54	1.21	386.27	29.44	19	1.06	4	156
Cynoscion arenarius	248	2.0	33.3	1.39	0.88	312.41	19.56	45	0.87	20	69
Micropogonias undulatus	42	0.3	29.2	0.23	0.10	210.41	2.02	32	2.79	12	126
Litopenaeus setiferus	33	0.3	16.7	0.18	0.11	312.11	2.29	13	0.88	3	25
Archosargus probatocephalus	23	0.2	16.7	0.13	0.08	293.85	1.62	237	13.14	97	360
Lutjanus griseus	8	0.1	8.3	0.04	0.04	434.79	0.94	61	3.55	50	75
Paralichthys lethostigma	5	<0.1	12.5	0.03	0.02	284.08	0.27	153	29.07	75	225
Leiostomus xanthurus	4	<0.1	4.2	0.02	0.02	489.90	0.49	68	2.59	63	74
Sciaenops ocellatus	4	<0.1	8.3	0.02	0.02	388.08	0.40	276	85.57	32	432
Farfantepenaeus spp.	1	<0.1	4.2	0.01	0.01	489.90	0.13	12	.	12	12
Totals	**665**	**5.3**	**.**	**3.59**	**1.58**	**215.47**	**31.03**	**.**	**.**	**3**	**432**

Appendix AP21-01. Monthly summary of taxa collected during Apalachicola Bay stratified-random sampling, 2021. 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=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Acanthostracion quadricornis	.	.	1	.	.	1	3	.	.	.	.	.	5
Achirus lineatus	.	.	.	.	.	.	3	2	3	.	.	.	8
Alosa chrysochloris	.	.	.	.	.	1	2	3	.	.	.	.	6
Aluterus schoepfii	.	.	.	.	.	.	2	.	.	1	.	.	3
Ameiurus catus	.	.	1	.	4	24	.	.	3	.	1	.	33
Amia calva	.	.	.	.	.	.	.	.	.	.	.	1	1
Anchoa hepsetus	31	.	.	12	296	282	65	11	10	174	5	.	886
Anchoa lyolepis	1	.	.	.	43	108	7	.	.	494	.	.	653
Anchoa mitchilli	267	7	1	1,977	782	2,597	5,182	855	1,712	2,290	8,941	11	24,622
Anchoa spp.	.	.	.	1	.	.	14	.	.	10	.	.	25
Ancylopsetta quadrocellata	7	.	.	15	1	.	5	.	.	2	.	.	30
Anguilla rostrata	.	.	.	.	.	.	.	.	1	.	1	.	2
Aphredoderus sayanus	.	.	.	1	4	1	.	.	.	.	4	.	10
Archosargus probatocephalus	15	2	2	3	26	16	8	12	6	3	14	5	112
Arenaeus cribrarius	.	.	.	.	.	.	.	.	.	.	2	.	2
Argopecten irradians	.	.	.	1	.	.	7	.	.	.	.	.	8
Ariopsis felis	12	3	9	55	62	128	114	199	43	95	2	.	722
Astroscopus y-graecum	1	1	.	.	.	.	.	.	.	.	.	1	3
Bagre marinus	.	.	1	.	4	3	23	3	.	1	.	.	35
Bairdiella chrysoura	5	1,116	289	67	214	790	786	375	245	920	41	7	4,855

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Bathygobius sp.	.	.	.	.	.	.	1	.	.	.	.	.	1
Brevoortia spp.	2	5,364	54	239	646	47	21	102	30	8	.	1	6,514
Calamus arctifrons	.	.	.	.	.	.	3	.	.	.	.	.	3
Callinectes sapidus	127	85	102	68	35	22	478	46	37	10	90	135	1,235
Callinectes similis	2	.	.	1	.	.	8	.	.	4	10	.	25
Caranx hippos	.	.	.	.	.	3	8	4	1	.	.	.	16
Caranx latus	.	.	.	.	.	.	3	.	1	8	1	.	13
Carcharhinus isodon	.	.	.	.	.	.	.	.	1	.	.	.	1
Centrarchidae sp.	.	.	.	.	1	.	.	.	.	.	.	.	1
Centrarchus macropterus	.	1	.	.	.	.	.	.	.	.	.	.	1
Centropristis philadelphica	.	.	.	.	.	.	.	.	.	2	.	.	2
Centropristis spp.	1	1	.	.	.	.	.	.	.	.	.	.	2
Centropristis striata	.	.	.	.	1	.	55	.	4	3	.	.	63
Chaetodipterus faber	4	.	.	1	5	28	.	1	2	8	.	.	49
Chasmodes saburrae	.	.	.	.	1	.	.	5	1	1	.	.	8
Chilomycterus schoepfii	2	.	4	1	3	.	6	.	7	10	4	.	37
Chloroscombrus chrysurus	.	.	.	.	.	.	7	.	.	39	.	.	46
Citharichthys macrops	9	5	3	9	.	1	11	.	1	5	.	3	47
Citharichthys spilopterus	2	.	2	10	5	1	6	11	5	.	2	.	44
Citharichthys spp.	.	.	.	.	.	.	.	.	.	2	.	.	2
Clupeidae spp.	.	.	.	3	2	.	.	.	.	.	.	.	5
Ctenogobius boleosoma	83	89	68	243	153	34	34	132	46	34	147	175	1,238

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Ctenogobius shufeldti	2	.	6	2	.	.	3	.	.	.	.	1	14
Ctenogobius sp.	.	.	.	.	.	.	1	.	.	.	.	.	1
Cynoscion arenarius	4	.	.	72	57	32	873	142	151	148	171	1	1,651
Cynoscion nebulosus	.	6	27	3	13	21	58	99	94	43	26	12	402
Cynoscion nothus	.	.	.	.	.	.	.	.	.	3	.	.	3
Cyprinodon variegatus	1	.	.	.	.	.	.	.	.	.	.	.	1
Cyprinus carpio	2	.	.	.	.	.	1	.	.	.	.	.	3
Dasyatis americana	.	.	.	1	3	2	2	1	.	.	.	.	9
Dasyatis sabina	22	236	68	77	204	66	300	166	94	97	49	5	1,384
Dasyatis say	.	.	.	3	22	14	12	13	15	20	.	.	99
Diplectrum bivittatum	2	.	.	.	.	.	.	.	.	2	.	.	4
Diplectrum formosum	.	.	.	.	.	.	4	.	.	6	1	.	11
Diplodus holbrookii	.	.	.	2	3	.	5	.	13	4	.	.	27
Dormitator maculatus	.	.	.	.	.	1	.	1	.	.	1	.	3
Dorosoma cepedianum	.	2	13	3	15	11	38	6	16	.	.	.	104
Dorosoma petenense	.	.	1	1	7	12	15	2	2	.	.	.	40
Echeneis neucratoides	.	.	.	.	.	.	.	2	.	.	.	.	2
Elassoma zonatum	.	.	.	.	2	.	.	.	.	.	.	.	2
Eleotris amblyopsis	.	.	.	.	.	1	.	.	.	.	.	.	1
Elops saurus	.	.	2	2	12	16	28	8	6	15	8	2	99
Enneacanthus gloriosus	8	.	1	.	5	60	13	.	20	.	6	17	130
Erimyzon sucetta	.	.	.	.	3	5	.	.	.	.	.	1	9

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Esox niger	.	.	.	1	.	.	.	.	.	.	.	.	1
Etropus crossotus	102	11	7	40	.	.	84	6	11	139	10	1	411
Etropus cyclosquamus	.	.	.	3	.	.	12	.	.	.	.	.	15
Etropus spp.	.	1	.	.	1	.	.	.	1	.	.	.	3
Eucinostomus argenteus	.	.	.	.	.	.	2	.	.	3	.	.	5
Eucinostomus gula	20	.	.	3	.	.	4	47	43	68	8	522	715
Eucinostomus harengulus	.	.	.	.	.	.	9	95	58	60	22	139	383
Eucinostomus spp.	.	.	.	.	.	11	282	765	623	252	207	61	2,201
Farfantepenaeus aztecus	.	.	.	2	1	3	85	1	.	1	.	.	93
Farfantepenaeus duorarum	15	1	4	40	3	.	18	1	5	17	5	1	110
Farfantepenaeus spp.	17	10	31	263	81	20	209	72	46	84	137	33	1,003
Fundulus chrysotus	11	4	.	1	1	2	4	.	4	.	1	9	37
Fundulus confluentus	7	.	.	1	.	.	.	.	.	.	.	.	8
Fundulus grandis	1	47	12	.	.	.	.	.	.	1	4	1	66
Fundulus similis	1	1	10	.	7	40	10	7	7	.	.	.	83
Fundulus spp.	.	.	.	.	.	3	.	.	.	.	.	.	3
Gambusia holbrooki	362	32	4	11	.	2	.	.	3	.	81	24	519
Gobiesox strumosus	.	.	.	.	.	.	.	.	.	1	.	.	1
Gobiidae spp.	.	1	.	.	12	.	4	.	.	.	.	.	17
Gobionellus oceanicus	1	.	1	.	.	.	1	.	2	10	.	3	18
Gobiosoma bosc	14	35	32	.	1	.	2	5	.	.	.	7	96
Gobiosoma robustum	.	5	.	.	2	1	3	1	3	.	.	.	15

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Gobiosoma spp.	7	5	4	.	.	.	1	1	1	1	2	2	24
Gymnura micrura	.	.	1	2	6	.	7	5	.	2	1	.	24
Haemulon plumierii	.	.	.	.	.	.	2	.	1	.	.	.	3
Halichoeres bivittatus	.	.	.	.	.	.	21	1	10	3	.	.	35
Harengula jaguana	.	.	.	.	28	34	99	108	84	15	.	.	368
Hemicaranx amblyrhynchus	.	.	.	.	.	.	4	2	1	1	.	.	8
Heterandria formosa	46	13	.	5	3	8	.	.	2	.	25	21	123
Hippocampus erectus	.	.	.	1	.	.	2	.	.	.	.	.	3
Hippocampus zosterae	.	1	.	.	.	.	.	.	.	.	.	.	1
Hyporhamphus meeki	.	.	.	.	.	2	2	.	19	3	.	18	44
Hyporhamphus spp.	.	.	.	.	.	11	.	.	1	.	.	.	12
Hypsoblennius hentz	.	.	.	.	.	.	4	3	2	3	.	.	12
Ictalurus furcatus	1	.	8	.	.	.	46	.	3	.	.	.	58
Ictalurus punctatus	2	.	11	.	10	.	28	.	3	.	.	.	54
Labidesthes sicculus	.	.	.	10	.	.	.	2	.	.	2	.	14
Lagodon rhomboides	12	411	1,047	3,526	1,161	1,402	2,138	950	1,269	1,443	548	1,578	15,485
Larimus fasciatus	.	.	.	.	.	.	1	.	.	.	.	.	1
Leiostomus xanthurus	55	622	725	510	559	749	843	387	136	129	15	1	4,731
Lepisosteus oculatus	.	.	.	1	2	.	.	2	.	.	1	.	6
Lepisosteus osseus	.	.	.	.	.	1	4	2	.	1	.	2	10
Lepisosteus spp.	.	.	.	1	.	1	.	.	.	.	1	.	3
Lepomis macrochirus	.	13	2	6	2	7	.	.	2	.	.	.	32

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Lepomis microlophus	64	.	7	9	3	7	2	12	7	4	11	14	140
Lepomis punctatus	19	10	.	5	12	39	13	5	4	4	36	22	169
Lepomis spp.	15	1	.	1	28	26	.	.	15	1	8	8	103
Litopenaeus setiferus	14	3	51	41	.	.	800	347	512	1,308	62	54	3,192
Lobotes surinamensis	.	.	.	.	.	.	.	.	1	.	.	.	1
Lucania goodei	1	.	.	.	.	.	.	1	.	.	1	5	8
Lucania parva	170	3	15	131	390	2,309	1,713	63	72	194	45	41	5,146
Lutjanus griseus	.	.	.	.	.	.	.	10	34	16	11	1	72
Lutjanus synagris	.	.	.	.	.	.	17	21	32	26	1	.	97
Megalops atlanticus	.	.	.	.	.	.	.	.	1	.	.	.	1
Membras martinica	.	.	.	2	.	28	9	230	19	32	.	.	320
Menidia spp.	32	5	57	33	12	1,093	221	659	142	124	27	14	2,419
Menippe spp.	9	.	.	5	.	.	5	.	.	11	.	2	32
Menticirrhus americanus	4	2	.	2	13	14	179	12	54	18	7	.	305
Menticirrhus littoralis	.	1	.	.	.	.	2	.	4	1	5	1	14
Menticirrhus saxatilis	.	.	.	5	14	7	3	.	.	.	4	.	33
Menticirrhus spp.	.	.	.	.	.	.	.	.	1	2	.	.	3
Microgobius gulosus	.	.	.	3	9	9	34	19	9	12	2	1	98
Microgobius thalassinus	.	.	.	1	.	.	164	.	.	8	.	.	173
Micropogonias undulatus	163	209	92	1,146	135	427	707	222	139	210	123	41	3,614
Micropterus salmoides	17	1	5	77	237	101	22	6	3	4	6	10	489
Minytrema melanops	2	.	.	.	3	.	2	.	.	.	.	.	7

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Monacanthus ciliatus	.	.	.	.	.	.	19	.	.	.	.	.	19
Mugil cephalus	2,008	1,722	1,785	80	86	204	103	57	75	75	432	106	6,733
Mugil curema	.	52	146	26	41	6	8	55	43	26	48	56	507
Mugil sp.	.	1	.	.	.	.	.	.	.	.	.	.	1
Mycteroperca microlepis	.	.	.	.	.	.	.	.	.	3	.	.	3
Myrophis punctatus	1	.	.	1	.	.	.	.	1	.	.	.	3
Nicholsina usta	.	.	.	.	.	.	.	.	.	.	1	.	1
Notemigonus crysoleucas	.	2	5	12	12	30	4	9	7	7	.	6	94
Notropis maculatus	.	.	.	.	.	2	.	1	.	.	.	.	3
Notropis petersoni	31	9	75	212	34	52	45	550	74	32	210	193	1,517
Notropis spp.	.	.	.	2	.	.	.	.	.	.	.	.	2
Notropis texanus	.	.	1	.	5	.	.	.	.	.	.	.	6
Noturus gyrinus	.	.	.	.	.	.	.	.	.	.	1	.	1
Ogcocephalus cubifrons	3	1	5	16	1	1	4	.	1	.	1	.	33
Oligoplites saurus	.	.	.	.	.	2	5	14	95	6	.	.	122
Ophichthus gomesii	.	.	.	.	.	.	1	.	.	.	.	.	1
Opisthonema oglinum	.	.	.	1	2	.	.	.	1	.	.	.	4
Opsanus beta	.	.	.	.	.	1	3	.	5	.	.	.	9
Orthopristis chrysoptera	9	1	1	553	1,042	808	1,068	112	269	289	91	.	4,243
Paralichthyidae sp.	.	1	.	.	.	.	.	.	.	.	.	.	1
Paralichthys albigutta	10	15	34	27	39	22	20	15	17	53	20	6	278
Paralichthys lethostigma	4	7	2	18	17	8	8	5	10	3	3	4	89

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Paralichthys squamilentus	.	1	.	.	.	.	.	.	.	.	.	.	1
Peprilus burti	1	.	5	7	.	.	.	.	.	.	.	.	13
Peprilus paru	.	.	.	1	.	.	.	.	1	.	26	.	28
Pogonias cromis	.	2	4	9	3	2	2	10	3	3	1	5	44
Pomatomus saltatrix	.	.	10	6	3	.	1	.	.	.	.	.	20
Pomoxis nigromaculatus	.	.	.	.	.	.	1	.	.	.	.	.	1
Porichthys plectrodon	.	.	.	.	1	.	7	.	.	.	.	.	8
Portunus spp.	14	.	.	12	.	.	105	.	.	10	.	1	142
Prionotus rubio	1	.	.	.	.	.	.	.	.	.	.	.	1
Prionotus scitulus	22	.	.	2	3	1	21	.	2	10	2	1	64
Prionotus spp.	21	.	.	.	.	.	.	.	.	.	.	.	21
Prionotus tribulus	9	4	2	10	.	.	1	.	2	11	7	6	52
Rhinoptera bonasus	.	.	.	3	.	.	4	.	.	.	.	.	7
Rimapenaeus constrictus	1	.	.	1	.	.	.	.	.	.	.	.	2
Rimapenaeus similis	8	.	.	2	.	.	.	.	.	.	.	.	10
Rimapenaeus spp.	31	.	.	1	.	.	13	.	.	25	17	4	91
Sciaenidae spp.	1	1	.	.	.	.	3	.	.	.	.	.	5
Sciaenops ocellatus	11	25	61	110	83	26	14	61	22	49	120	78	660
Scorpaena brasiliensis	1	.	.	.	.	.	.	.	.	.	.	.	1
Selene setapinnis	.	.	.	.	.	.	.	.	1	.	.	.	1
Selene vomer	.	.	.	.	1	.	2	.	.	1	.	.	4
Serraniculus pumilio	2	.	.	.	.	.	.	.	.	2	.	.	4

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Serranus subligarius	.	.	.	.	.	.	3	.	.	1	.	.	4
Sicyonia laevigata	.	.	.	1	.	.	.	.	.	.	.	.	1
Sphoeroides nephelus	.	.	.	.	3	15	13	.	4	11	2	.	48
Sphoeroides parvus	1	.	.	.	.	.	1	.	.	2	.	.	4
Sphoeroides spengleri	.	.	.	.	.	.	1	.	.	.	.	.	1
Sphoeroides spp.	.	.	1	5	19	3	.	.	1	3	3	1	36
Sphyraena barracuda	.	.	.	.	.	.	.	.	.	2	2	.	4
Sphyraena borealis	.	.	.	1	1	6	1	.	.	.	.	.	9
Sphyrna tiburo	.	.	.	.	.	2	1	1	1	1	.	.	6
Stellifer lanceolatus	.	.	.	.	.	.	19	.	2	.	.	.	21
Stephanolepis hispidus	.	.	.	1	.	5	148	2	3	3	.	.	162
Stomolophus meleagris	.	.	.	1	.	.	.	.	.	.	2	.	3
Strongylura marina	.	1	5	1	2	14	10	5	17	8	3	74	140
Strongylura notata	.	.	.	.	1	7	1	1	4	5	.	1	20
Strongylura spp.	.	.	.	.	1	3	.	.	.	.	.	.	4
Symphurus civitatium	.	.	.	1	.	.	.	.	.	.	.	.	1
Symphurus plagiusa	20	4	1	13	2	.	24	.	2	13	1	.	80
Syngnathus floridae	.	1	.	.	1	.	67	.	5	5	1	.	80
Syngnathus louisianae	2	.	.	1	1	.	11	4	.	6	.	.	25
Syngnathus scovelli	19	6	3	15	5	21	30	21	10	29	16	10	185
Syngnathus springeri	1	.	.	.	.	.	.	.	.	.	.	.	1
Synodus foetens	4	.	.	3	13	10	20	4	15	21	8	6	104

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=43	E=45	E=49	E=57	E=49	E=45	E=61	E=45	E=49	E=57	E=49	E=45	E=594
Trachinotus carolinus	.	1	.	.	.	5	19	1	2	.	4	.	32
Trachinotus falcatus	.	.	.	.	.	.	2	1	14	6	23	10	56
Trinectes maculatus	30	3	8	166	59	3	78	12	23	12	27	45	466
Tylosurus crocodilus	.	.	.	.	.	.	.	.	1	.	.	.	1
Urophycis floridana	10	.	.	2	.	.	.	.	.	.	.	.	12
Xiphopenaeus kroyeri	.	.	.	.	.	.	6	.	.	.	.	.	6
Totals	**4,072**	**10,226**	**4,935**	**10,084**	**6,851**	**11,944**	**17,956**	**7,212**	**6,692**	**9,407**	**12,018**	**3,628**	**105,025**

Appendix AP21-02. Summary by gear and stratum of taxa collected during Apalachicola Bay stratified-random sampling, 2021. 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. 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				
	E=75	E=57	E=108	E=84	E=198	E=72	E=594
Acanthostracion quadricornis	.	.	.	.	2	3	5
Achirus lineatus	.	1	7	.	.	.	8
Alosa chrysochloris	.	.	.	.	6	.	6
Aluterus schoepfii	.	.	.	.	.	3	3
Ameiurus catus	1	.	.	27	.	5	33
Amia calva	.	.	.	1	.	.	1
Anchoa hepsetus	292	105	274	2	2	211	886
Anchoa lyolepis	102	17	33	.	.	501	653
Anchoa mitchilli	453	1,605	4,713	1,913	.	15,938	24,622
Anchoa spp.	1	.	.	.	.	24	25
Ancylopsetta quadrocellata	.	.	.	.	4	26	30
Anguilla rostrata	.	.	.	2	.	.	2
Aphredoderus sayanus	.	.	.	10	.	.	10
Archosargus probatocephalus	1	.	14	.	74	23	112
Arenaeus cribrarius	.	.	2	.	.	.	2
Argopecten irradians	.	.	.	.	.	8	8
Ariopsis felis	5	291	30	.	219	177	722
Astroscopus y-graecum	.	1	2	.	.	.	3
Bagre marinus	.	1	.	.	33	1	35
Bairdiella chrysoura	1,180	118	208	36	3,032	281	4,855
Bathygobius sp.	.	.	1	.	.	.	1
Brevoortia spp.	36	743	5,391	21	320	3	6,514
Calamus arctifrons	3	.	.	.	.	.	3
Callinectes sapidus	120	61	348	272	73	361	1,235
Callinectes similis	.	.	13	.	.	12	25
Caranx hippos	.	4	1	.	11	.	16
Caranx latus	.	.	2	.	11	.	13
Carcharhinus isodon	.	.	.	.	1	.	1
Centrarchidae sp.	.	.	.	.	.	1	1
Centrarchus macropterus	.	.	.	.	1	.	1

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				
	E=75	E=57	E=108	E=84	E=198	E=72	E=594
Centropristis philadelphica	.	.	.	.	.	2	2
Centropristis spp.	1	.	.	.	.	1	2
Centropristis striata	3	.	.	.	8	52	63
Chaetodipterus faber	.	.	1	.	35	13	49
Chasmodes saburrae	7	.	.	.	1	.	8
Chilomycterus schoepfii	2	.	.	.	26	9	37
Chloroscombrus chrysurus	1	.	.	.	1	44	46
Citharichthys macrops	1	2	1	.	12	31	47
Citharichthys spilopterus	.	3	1	.	20	20	44
Citharichthys spp.	.	.	2	.	.	.	2
Clupeidae spp.	.	.	3	.	.	2	5
Ctenogobius boleosoma	282	55	723	127	.	51	1,238
Ctenogobius shufeldti	.	.	3	9	.	2	14
Ctenogobius sp.	.	.	.	.	.	1	1
Cynoscion arenarius	1	111	411	1	1	1,126	1,651
Cynoscion nebulosus	147	10	54	3	186	2	402
Cynoscion nothus	.	.	.	.	.	3	3
Cyprinodon variegatus	.	.	1	.	.	.	1
Cyprinus carpio	.	.	.	1	.	2	3
Dasyatis americana	1	.	.	.	8	.	9
Dasyatis sabina	10	21	9	.	1,286	58	1,384
Dasyatis say	1	.	1	.	95	2	99
Diplectrum bivittatum	.	.	.	.	.	4	4
Diplectrum formosum	3	.	.	.	.	8	11
Diplodus holbrookii	13	.	.	.	13	1	27
Dormitator maculatus	.	.	.	3	.	.	3
Dorosoma cepedianum	.	.	1	.	103	.	104
Dorosoma petenense	.	9	1	8	22	.	40
Echeneis neucratoides	.	.	.	.	2	.	2
Elassoma zonatum	.	.	.	2	.	.	2
Eleotris amblyopsis	.	.	.	1	.	.	1
Elops saurus	1	.	.	.	96	2	99
Enneacanthus gloriosus	.	.	.	130	.	.	130
Erimyzon sucetta	.	.	.	9	.	.	9
Esox niger	.	.	.	1	.	.	1

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				
	E=75	E=57	E=108	E=84	E=198	E=72	E=594
Etropus crossotus	1	3	9	.	42	356	411
Etropus cyclosquamus	.	.	.	.	.	15	15
Etropus spp.	.	.	3	.	.	.	3
Eucinostomus argenteus	2	.	3	.	.	.	5
Eucinostomus gula	34	13	37	.	576	55	715
Eucinostomus harengulus	2	37	96	5	219	24	383
Eucinostomus spp.	1,011	231	874	30	10	45	2,201
Farfantepenaeus aztecus	.	.	.	.	5	88	93
Farfantepenaeus duorarum	9	.	4	.	12	85	110
Farfantepenaeus spp.	452	27	167	.	17	340	1,003
Fundulus chrysotus	.	.	.	37	.	.	37
Fundulus confluentus	.	.	1	7	.	.	8
Fundulus grandis	1	.	13	.	52	.	66
Fundulus similis	.	.	15	.	68	.	83
Fundulus spp.	.	.	.	3	.	.	3
Gambusia holbrooki	.	.	2	517	.	.	519
Gobiesox strumosus	.	.	1	.	.	.	1
Gobiidae spp.	.	.	.	1	.	16	17
Gobionellus oceanicus	.	3	.	6	.	9	18
Gobiosoma bosc	64	1	6	25	.	.	96
Gobiosoma robustum	4	4	7	.	.	.	15
Gobiosoma spp.	11	.	4	7	.	2	24
Gymnura micrura	.	.	1	.	17	6	24
Haemulon plumierii	1	1	.	.	.	1	3
Halichoeres bivittatus	24	10	.	.	.	1	35
Harengula jaguana	148	7	1	.	211	1	368
Hemicaranx amblyrhynchus	.	1	.	.	2	5	8
Heterandria formosa	.	1	.	122	.	.	123
Hippocampus erectus	.	.	.	.	.	3	3
Hippocampus zosterae	.	.	1	.	.	.	1
Hyporhamphus meeki	.	.	2	.	42	.	44
Hyporhamphus spp.	1	2	9	.	.	.	12
Hypsoblennius hentz	8	.	.	.	.	4	12
Ictalurus furcatus	.	.	.	.	.	58	58
Ictalurus punctatus	.	.	.	.	.	54	54

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				
	E=75	E=57	E=108	E=84	E=198	E=72	E=594
Labidesthes sicculus	.	.	.	14	.	.	14
Lagodon rhomboides	3,670	76	2,288	61	8,336	1,054	15,485
Larimus fasciatus	.	.	1	.	.	.	1
Leiostomus xanthurus	77	433	1,186	7	2,561	467	4,731
Lepisosteus oculatus	1	.	.	3	2	.	6
Lepisosteus osseus	.	.	.	5	5	.	10
Lepisosteus spp.	.	.	.	3	.	.	3
Lepomis macrochirus	.	.	.	32	.	.	32
Lepomis microlophus	5	.	.	129	2	4	140
Lepomis punctatus	.	.	.	168	.	1	169
Lepomis spp.	1	.	1	101	.	.	103
Litopenaeus setiferus	13	56	2,558	.	86	479	3,192
Lobotes surinamensis	.	.	.	.	1	.	1
Lucania goodei	.	.	.	8	.	.	8
Lucania parva	2,890	1,595	309	350	.	2	5,146
Lutjanus griseus	35	1	11	.	17	8	72
Lutjanus synagris	64	12	1	.	6	14	97
Megalops atlanticus	.	.	.	.	1	.	1
Membras martinica	.	18	302	.	.	.	320
Menidia spp.	1,042	141	1,111	122	2	1	2,419
Menippe spp.	.	2	.	.	.	30	32
Menticirrhus americanus	5	19	163	.	39	79	305
Menticirrhus littoralis	.	.	2	.	12	.	14
Menticirrhus saxatilis	4	1	26	.	2	.	33
Menticirrhus spp.	.	1	.	.	.	2	3
Microgobius gulosus	20	7	34	29	.	8	98
Microgobius thalassinus	.	1	.	.	.	172	173
Micropogonias undulatus	14	139	323	1	1,604	1,533	3,614
Micropterus salmoides	99	6	14	352	1	17	489
Minytrema melanops	.	.	.	2	.	5	7
Monacanthus ciliatus	.	.	.	.	.	19	19
Mugil cephalus	.	66	4,751	20	1,896	.	6,733
Mugil curema	.	1	178	.	328	.	507
Mugil sp.	.	1	.	.	.	.	1
Mycteroperca microlepis	.	.	.	.	3	.	3

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				
	E=75	E=57	E=108	E=84	E=198	E=72	E=594
Myrophis punctatus	1	.	.	.	.	2	3
Nicholsina usta	1	.	.	.	.	.	1
Notemigonus crysoleucas	7	.	1	86	.	.	94
Notropis maculatus	.	.	.	3	.	.	3
Notropis petersoni	7	.	1	1,487	.	22	1,517
Notropis spp.	.	.	.	2	.	.	2
Notropis texanus	.	.	.	1	.	5	6
Noturus gyrinus	.	.	.	1	.	.	1
Ogcocephalus cubifrons	.	.	.	.	29	4	33
Oligoplites saurus	2	9	21	.	90	.	122
Ophichthus gomesii	.	.	.	.	.	1	1
Opisthonema oglinum	1	.	.	.	3	.	4
Opsanus beta	.	.	.	.	7	2	9
Orthopristis chrysoptera	2,384	12	309	.	740	798	4,243
Paralichthyidae sp.	.	.	1	.	.	.	1
Paralichthys albigutta	8	14	55	.	185	16	278
Paralichthys lethostigma	1	9	4	7	58	10	89
Paralichthys squamilentus	.	.	1	.	.	.	1
Peprilus burti	.	.	.	.	5	8	13
Peprilus paru	.	.	.	.	27	1	28
Pogonias cromis	.	.	1	.	43	.	44
Pomatomus saltatrix	.	.	.	.	20	.	20
Pomoxis nigromaculatus	.	.	.	1	.	.	1
Porichthys plectrodon	.	1	.	.	.	7	8
Portunus spp.	.	2	.	.	.	140	142
Prionotus rubio	.	.	.	.	.	1	1
Prionotus scitulus	2	1	5	.	1	55	64
Prionotus spp.	.	.	1	.	.	20	21
Prionotus tribulus	3	2	11	.	6	30	52
Rhinoptera bonasus	.	.	.	.	7	.	7
Rimapenaeus constrictus	.	.	.	.	.	2	2
Rimapenaeus similis	.	.	.	.	.	10	10
Rimapenaeus spp.	3	2	22	.	.	64	91
Sciaenidae spp.	.	.	1	.	.	4	5
Sciaenops ocellatus	5	2	182	.	467	4	660

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				
	E=75	E=57	E=108	E=84	E=198	E=72	E=594
Scorpaena brasiliensis	.	.	.	.	.	1	1
Selene setapinnis	.	.	.	.	1	.	1
Selene vomer	1	.	.	.	2	1	4
Serraniculus pumilio	.	.	.	.	.	4	4
Serranus subligarius	1	.	.	.	.	3	4
Sicyonia laevigata	.	.	.	.	.	1	1
Sphoeroides nephelus	7	1	15	.	17	8	48
Sphoeroides parvus	.	.	.	.	.	4	4
Sphoeroides spengleri	1	.	.	.	.	.	1
Sphoeroides spp.	17	5	14	.	.	.	36
Sphyraena barracuda	.	.	.	.	4	.	4
Sphyraena borealis	9	.	.	.	.	.	9
Sphyrna tiburo	.	.	1	.	5	.	6
Stellifer lanceolatus	.	.	2	.	.	19	21
Stephanolepis hispidus	23	.	2	.	3	134	162
Stomolophus meleagris	.	.	.	.	2	1	3
Strongylura marina	1	1	23	.	115	.	140
Strongylura notata	1	.	5	.	14	.	20
Strongylura spp.	.	.	3	1	.	.	4
Symphurus civitatium	.	.	.	.	.	1	1
Symphurus plagiusa	8	1	8	.	3	60	80
Syngnathus floridae	31	.	.	.	.	49	80
Syngnathus louisianae	6	1	.	.	.	18	25
Syngnathus scovelli	109	7	29	34	.	6	185
Syngnathus springeri	.	.	.	.	.	1	1
Synodus foetens	12	8	24	.	26	34	104
Trachinotus carolinus	.	.	7	.	25	.	32
Trachinotus falcatus	.	.	7	.	49	.	56
Trinectes maculatus	14	15	22	301	4	110	466
Tylosurus crocodilus	.	.	.	.	1	.	1
Urophycis floridana	6	.	.	.	.	6	12
Xiphopenaeus kroyeri	.	.	.	.	.	6	6
Totals	**15,053**	**6,168**	**27,544**	**6,670**	**23,840**	**25,750**	**105,025**

Appendix AP21-03. Summary by zone of taxa collected during Apalachicola Bay stratified-random sampling, 2021. 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	Zone			Totals
	A	B	C	
	E=243	E=243	E=108	E=594
Acanthostracion quadricornis	.	5	.	5
Achirus lineatus	1	7	.	8
Alosa chrysochloris	6	.	.	6
Aluterus schoepfii	.	3	.	3
Ameiurus catus	1	.	32	33
Amia calva	.	.	1	1
Anchoa hepsetus	522	362	2	886
Anchoa lyolepis	527	126	.	653
Anchoa mitchilli	7,143	4,096	13,383	24,622
Anchoa spp.	23	1	1	25
Ancylopsetta quadrocellata	6	24	.	30
Anguilla rostrata	.	.	2	2
Aphredoderus sayanus	.	.	10	10
Archosargus probatocephalus	45	44	23	112
Arenaeus cribrarius	.	2	.	2
Argopecten irradians	.	8	.	8
Ariopsis felis	434	286	2	722
Astroscopus y-graecum	1	2	.	3
Bagre marinus	33	2	.	35
Bairdiella chrysoura	1,877	2,941	37	4,855
Bathygobius sp.	.	1	.	1
Brevoortia spp.	6,452	41	21	6,514
Calamus arctifrons	.	3	.	3
Callinectes sapidus	564	102	569	1,235
Callinectes similis	23	2	.	25
Caranx hippos	10	6	.	16
Caranx latus	8	5	.	13
Carcharhinus isodon	.	1	.	1
Centrarchidae sp.	.	.	1	1
Centrarchus macropterus	1	.	.	1
Centropristis philadelphica	.	2	.	2
Centropristis spp.	.	2	.	2
Centropristis striata	.	63	.	63

Species	Zone			Totals
	A	B	C	
	E=243	E=243	E=108	E=594
Chaetodipterus faber	24	25	.	49
Chasmodes saburrae	1	7	.	8
Chilomycterus schoepfii	.	37	.	37
Chloroscombrus chrysurus	19	27	.	46
Citharichthys macrops	5	42	.	47
Citharichthys spilopterus	39	2	3	44
Citharichthys spp.	2	.	.	2
Clupeidae spp.	.	3	2	5
Ctenogobius boleosoma	960	130	148	1,238
Ctenogobius shufeldti	3	.	11	14
Ctenogobius sp.	1	.	.	1
Cynoscion arenarius	962	440	249	1,651
Cynoscion nebulosus	239	160	3	402
Cynoscion nothus	.	3	.	3
Cyprinodon variegatus	.	1	.	1
Cyprinus carpio	.	.	3	3
Dasyatis americana	.	9	.	9
Dasyatis sabina	529	852	3	1,384
Dasyatis say	12	87	.	99
Diplectrum bivittatum	.	4	.	4
Diplectrum formosum	3	8	.	11
Diplodus holbrookii	2	25	.	27
Dormitator maculatus	.	.	3	3
Dorosoma cepedianum	98	6	.	104
Dorosoma petenense	28	4	8	40
Echeneis neucratoides	2	.	.	2
Elassoma zonatum	.	.	2	2
Eleotris amblyopsis	.	.	1	1
Elops saurus	57	42	.	99
Enneacanthus gloriosus	.	.	130	130
Erimyzon sucetta	.	.	9	9
Esox niger	.	.	1	1
Etropus crossotus	177	234	.	411
Etropus cyclosquamus	.	15	.	15
Etropus spp.	2	1	.	3
Eucinostomus argenteus	3	2	.	5

Species	Zone			Totals
	A	B	C	
	E=243	E=243	E=108	E=594
Eucinostomus gula	49	666	.	715
Eucinostomus harengulus	180	183	20	383
Eucinostomus spp.	969	1,197	35	2,201
Farfantepenaeus aztecus	83	10	.	93
Farfantepenaeus duorarum	49	61	.	110
Farfantepenaeus spp.	647	355	1	1,003
Fundulus chrysotus	.	.	37	37
Fundulus confluentus	1	.	7	8
Fundulus grandis	61	5	.	66
Fundulus similis	11	72	.	83
Fundulus spp.	.	.	3	3
Gambusia holbrooki	2	.	517	519
Gobiesox strumosus	.	1	.	1
Gobiidae spp.	4	.	13	17
Gobionellus oceanicus	11	1	6	18
Gobiosoma bosc	71	.	25	96
Gobiosoma robustum	5	10	.	15
Gobiosoma spp.	12	3	9	24
Gymnura micrura	8	16	.	24
Haemulon plumierii	1	2	.	3
Halichoeres bivittatus	10	25	.	35
Harengula jaguana	46	322	.	368
Hemicaranx amblyrhynchus	6	2	.	8
Heterandria formosa	1	.	122	123
Hippocampus erectus	1	2	.	3
Hippocampus zosterae	.	1	.	1
Hyporhamphus meeki	5	39	.	44
Hyporhamphus spp.	4	8	.	12
Hypsoblennius hentz	.	12	.	12
Ictalurus furcatus	.	.	58	58
Ictalurus punctatus	.	.	54	54
Labidesthes sicculus	.	.	14	14
Lagodon rhomboides	3,433	11,976	76	15,485
Larimus fasciatus	.	1	.	1
Leiostomus xanthurus	2,283	2,437	11	4,731
Lepisosteus oculatus	3	.	3	6

Species	Zone			Totals
	A	B	C	
	E=243	E=243	E=108	E=594
Lepisosteus osseus	4	1	5	10
Lepisosteus spp.	.	.	3	3
Lepomis macrochirus	.	.	32	32
Lepomis microlophus	7	.	133	140
Lepomis punctatus	.	.	169	169
Lepomis spp.	2	.	101	103
Litopenaeus setiferus	3,045	114	33	3,192
Lobotes surinamensis	1	.	.	1
Lucania goodei	.	.	8	8
Lucania parva	4,793	1	352	5,146
Lutjanus griseus	45	19	8	72
Lutjanus synagris	15	82	.	97
Megalops atlanticus	1	.	.	1
Membras martinica	26	294	.	320
Menidia spp.	1,923	373	123	2,419
Menippe spp.	1	31	.	32
Menticirrhus americanus	120	185	.	305
Menticirrhus littoralis	2	12	.	14
Menticirrhus saxatilis	14	19	.	33
Menticirrhus spp.	2	1	.	3
Microgobius gulosus	42	19	37	98
Microgobius thalassinus	19	154	.	173
Micropogonias undulatus	2,997	574	43	3,614
Micropterus salmoides	120	.	369	489
Minytrema melanops	.	.	7	7
Monacanthus ciliatus	.	19	.	19
Mugil cephalus	6,265	448	20	6,733
Mugil curema	407	100	.	507
Mugil sp.	.	1	.	1
Mycteroperca microlepis	3	.	.	3
Myrophis punctatus	1	1	1	3
Nicholsina usta	1	.	.	1
Notemigonus crysoleucas	8	.	86	94
Notropis maculatus	.	.	3	3
Notropis petersoni	8	.	1,509	1,517
Notropis spp.	.	.	2	2

Species	Zone			Totals
	A	B	C	
	E=243	E=243	E=108	E=594
Notropis texanus	.	.	6	6
Noturus gyrinus	.	.	1	1
Ogcocephalus cubifrons	.	33	.	33
Oligoplites saurus	16	106	.	122
Ophichthus gomesii	.	1	.	1
Opisthonema oglinum	.	4	.	4
Opsanus beta	.	9	.	9
Orthopristis chrysoptera	1,161	3,082	.	4,243
Paralichthyidae sp.	.	1	.	1
Paralichthys albigutta	71	207	.	278
Paralichthys lethostigma	75	2	12	89
Paralichthys squamilentus	1	.	.	1
Peprilus burti	4	9	.	13
Peprilus paru	2	26	.	28
Pogonias cromis	37	7	.	44
Pomatomus saltatrix	18	2	.	20
Pomoxis nigromaculatus	.	.	1	1
Porichthys plectrodon	2	6	.	8
Portunus spp.	93	49	.	142
Prionotus rubio	.	1	.	1
Prionotus scitulus	15	49	.	64
Prionotus spp.	1	20	.	21
Prionotus tribulus	30	22	.	52
Rhinoptera bonasus	4	3	.	7
Rimapenaeus constrictus	1	1	.	2
Rimapenaeus similis	5	5	.	10
Rimapenaeus spp.	42	49	.	91
Sciaenidae spp.	5	.	.	5
Sciaenops ocellatus	374	282	4	660
Scorpaena brasiliensis	.	1	.	1
Selene setapinnis	1	.	.	1
Selene vomer	.	4	.	4
Serraniculus pumilio	.	4	.	4
Serranus subligarius	1	3	.	4
Sicyonia laevigata	.	1	.	1
Sphoeroides nephelus	15	33	.	48

Species	Zone			Totals
	A	B	C	
	E=243	E=243	E=108	E=594
Sphoeroides parvus	2	2	.	4
Sphoeroides spengleri	1	.	.	1
Sphoeroides spp.	14	22	.	36
Sphyraena barracuda	.	4	.	4
Sphyraena borealis	1	8	.	9
Sphyrna tiburo	.	6	.	6
Stellifer lanceolatus	18	2	1	21
Stephanolepis hispidus	8	154	.	162
Stomolophus meleagris	1	2	.	3
Strongylura marina	26	114	.	140
Strongylura notata	12	8	.	20
Strongylura spp.	1	2	1	4
Symphurus civitatium	1	.	.	1
Symphurus plagiusa	37	43	.	80
Syngnathus floridae	2	78	.	80
Syngnathus louisianae	19	6	.	25
Syngnathus scovelli	94	51	40	185
Syngnathus springeri	.	1	.	1
Synodus foetens	22	82	.	104
Trachinotus carolinus	2	30	.	32
Trachinotus falcatus	11	45	.	56
Trinectes maculatus	59	30	377	466
Tylosurus crocodilus	.	1	.	1
Urophycis floridana	7	5	.	12
Xiphopenaeus kroyeri	3	3	.	6
Totals	**50,988**	**34,879**	**19,158**	**105,025**

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 JX21-01). 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, 2000). Bottom substrates are typically characterized as mud, sand, and occasional oysters (Solomon et al. 2006). Bottom vegetation is only present in the oligohaline reaches of the St. Johns River upriver of downtown Jacksonville (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 JX21-01). 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 Zones E and F with only 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 2021 in northeast Florida.

Stratified-Random Sampling

A total of 151,471 animals, which included 166 taxa of fishes and 15 taxa of selected invertebrates, were collected from 1,355 northeast Florida SRS samples in 2021 (Table JX21-01, Appendices JX21-01, -02, and -03). *Anchoa mitchilli* (n=38,915) was the most numerous taxon collected, representing 25.7% of the total catch. *Leiostomus xanthurus* (n=25,131) and *Micropogonias undulatus* (n=14,369) were the next most abundant taxa collected, accounting for an additional 26.1% of the total catch. A total of 39 Selected Taxa (n=66,423 animals) composed 43.9% of the total catch. *Leiostomus xanthurus* (n=25,131) was the most abundant Selected Taxon, representing 16.6% of the total catch. *Micropogonias undulatus* (n=14,369), *Litopenaeus setiferus* (n=11,274), *Brevoortia* spp. (n=4,857), and *Mugil cephalus* (n=2,581) were the next most abundant Selected Taxa, comprising 21.8% of the total catch. Collections in 2021 included 3 species new to the JX FIM collection*: Centrarchus macropterus, Chaetodon ocellatus, Gerres cinereus*.

21.3-m River Seines. A total of 92,502 animals were collected in 575 21.3-m river seines, representing 61.1% of the overall SRS catch (Table JX21-01). *Anchoa mitchilli* (n = 22,464) was the most abundant taxon collected, accounting for 24.3% of the 21.3-m river seine catch (Table JX21-02). *Leiostomus xanthurus* (n=20,514) and *Menidia menidia* (n=11,345) were the next most abundant taxa, accounting for an additional 34.4% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines were *Menidia* spp. (42.3% occurrence), *Anchoa mitchilli* (40.7% occurrence), and *Leiostomus xanthurus* (39.8% occurrence).

A total of 35,794 animals from 33 Selected Taxa were collected, representing 38.7% of the entire 21.3-m river seine catch (Table JX21-03). *Leiostomus xanthurus* (n=20,514), and *Litopenaeus setiferus* (n=5,977) were the most abundant Selected Taxa, accounting for 74% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Leiostomus xanthurus* (39.8% occurrence) and *Callinectes sapidus* (24.2% occurrence).

183-m Haul Seines. A total of 4,784 animals were collected in 192 183-m haul seines, representing 3.2% of the overall SRS catch (Table JX21-01). *Mugil curema* (n = 1,139) was the most abundant taxon, accounting for 23.8% of the 183-m haul seine catch (Table JX21-04). The taxa most frequently caught in 183-m haul seines were *Mugil cephalus* (60.9% occurrence), *Mugil curema* (39.6% occurrence), and *Dasyatis sabina* (31.8% occurrence).

A total of 3,328 animals from 30 Selected Taxa were collected, representing 69.6% of the entire 183-m haul seine catch (Table JX21-05). *Mugil curema* (n=1,139) and *Mugil cephalus* (n=1,076) were the most abundant Selected Taxa, accounting for 66.6% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil cephalus* (60.9% occurrence) and *Mugil curema* (39.6% occurrence).

6.1-m River Otter Trawls. A total of 54,185 animals were collected in 588 6.1-m river otter trawls, representing 35.8% of the overall SRS catch (Table JX21-01). *Anchoa mitchilli* (n = 16,451) was the most abundant taxon collected, accounting for 30.4% of the 6.1-m river otter trawl catch (Table JX21-06). The taxa most frequently caught in 6.1-m river otter trawls were *Micropogonias undulatus* (61.1% occurrence), *Anchoa mitchilli* (53.4% occurrence), and *Callinectes sapidus* (48.6% occurrence).

A total of 27,301 animals from 27 Selected Taxa were collected, representing 50.4% of the entire 6.1-m river otter trawl catch (Table JX21-07). *Micropogonias undulatus* (n=13,460), *Litopenaeus setiferus* (n=5,174), and *Leiostomus xanthurus* (n=4,363) were the most abundant Selected Taxa, accounting for 84.2% 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* (61.1% occurrence) and *Callinectes sapidus* (48.6% occurrence).

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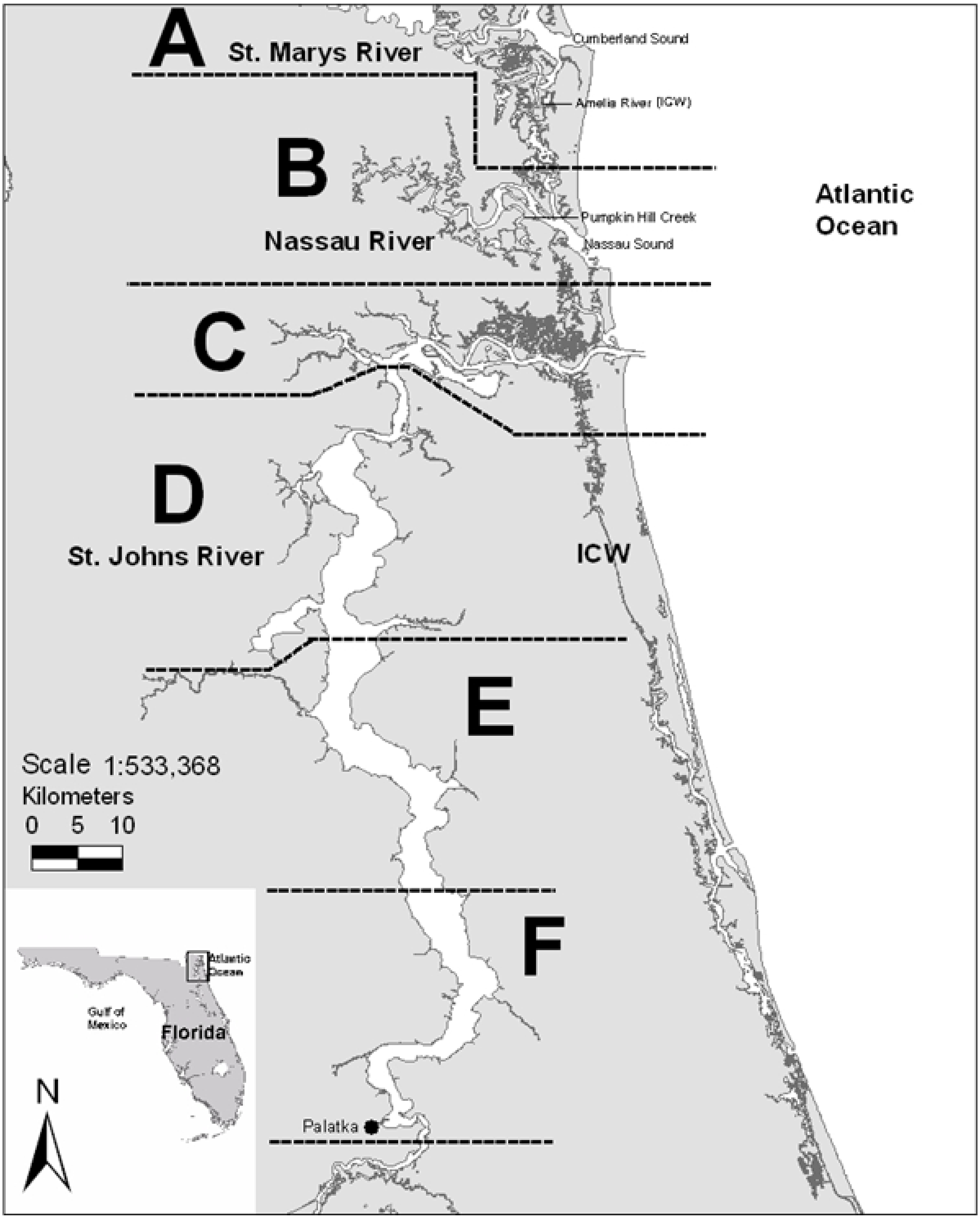

Figure JX21-01. Map of northeast Florida sampling area. Zones are labeled A–F. ICW = Intracoastal Waterway.

Table JX21-01. Summary of catch and effort data for northeast Florida stratified-random sampling, 2021.

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	24,006	84	1,269	36	11,498	84	36,773	204
B	21,882	84	1,172	36	14,367	84	37,421	204
C	21,819	107	1,544	60	5,050	108	28,413	275
D	9,310	108	799	60	9,511	120	19,620	288
E	4,174	96	.	.	6,551	96	10,725	192
F	11,311	96	.	.	7,208	96	18,519	192
Totals	**92,502**	**575**	**4,784**	**192**	**54,185**	**588**	**151,471**	**1,355**

Table JX21-02. Catch statistics for 10 dominant taxa collected in 575 21.3-m river seine samples during northeast Florida stratified-random sampling, 2021. 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	22,464	24.3	40.7	58.47	11.08	450.50	3,807.35	35	0.06	15	73
Leiostomus xanthurus	20,514	22.2	39.8	53.39	9.19	408.94	2,952.94	24	0.09	11	97
Menidia menidia	11,345	12.3	31.0	29.53	9.31	749.18	4,752.94	39	0.11	13	91
Menidia spp.	8,652	9.4	42.3	22.52	3.00	316.16	894.12	33	0.09	13	75
Litopenaeus setiferus	5,977	6.5	20.9	15.56	3.51	535.88	1,111.76	9	0.05	3	28
Brevoortia spp.	4,486	4.8	12.7	11.68	5.11	1,040.37	2,664.71	27	0.10	19	89
Fundulus heteroclitus	1,874	2.0	12.9	4.88	1.91	931.62	757.35	32	0.24	16	76
Eucinostomus spp.	1,784	1.9	25.7	4.64	1.16	593.92	573.53	25	0.19	8	46
Anchoa hepsetus	1,572	1.7	9.7	4.09	1.75	1,014.75	708.82	36	0.31	12	93
Mugil cephalus	1,504	1.6	17.4	3.91	1.22	740.99	550.00	32	0.77	16	295
Subtotals	80,172	86.7	.	.	.	.	.	.	.	3	295
Totals	**92,502**	**100.0**	**.**	**236.58**	**20.28**	**205.50**	**6,614.71**	**.**	**.**	**2**	**869**

Table JX21-03. Catch statistics for Selected Taxa collected in 575 21.3-m river seine samples during northeast Florida stratified-random sampling, 2021. 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	20,514	22.2	39.8	52.47	9.03	412.75	2,952.94	24	0.09	11	97
Litopenaeus setiferus	5,977	6.5	20.9	15.29	3.45	540.75	1,111.76	9	0.05	3	28
Brevoortia spp.	4,486	4.8	12.7	11.47	5.02	1,049.61	2,664.71	27	0.10	19	89
Mugil cephalus	1,504	1.6	17.4	3.85	1.20	747.62	550.00	32	0.77	16	295
Farfantepenaeus spp.	1,121	1.2	19.3	2.87	0.54	451.95	183.82	8	0.08	2	14
Micropogonias undulatus	858	0.9	16.5	2.19	0.54	588.84	170.59	27	0.52	11	148
Callinectes sapidus	285	0.3	24.2	0.73	0.08	269.18	19.12	47	2.42	5	189
Mugil curema	281	0.3	9.0	0.72	0.17	576.35	63.24	57	2.11	17	173
Sciaenops ocellatus	208	0.2	10.4	0.53	0.12	541.54	38.24	49	4.17	16	471
Elops saurus	119	0.1	5.4	0.30	0.17	1,372.97	98.53	41	1.88	24	225
Paralichthys lethostigma	76	0.1	8.0	0.19	0.04	509.15	16.18	104	9.94	14	386
Farfantepenaeus aztecus	67	0.1	3.3	0.17	0.05	726.37	20.59	18	0.33	15	29
Trachinotus carolinus	61	0.1	1.6	0.16	0.09	1,379.03	48.53	37	2.09	11	68
Menticirrhus americanus	46	<0.1	2.4	0.12	0.04	857.81	19.12	45	3.16	20	118
Cynoscion nebulosus	42	<0.1	3.5	0.11	0.03	711.27	11.76	33	3.03	14	98
Caranx hippos	24	<0.1	2.6	0.06	0.02	854.39	10.29	42	2.76	19	77
Paralichthys dentatus	21	<0.1	1.9	0.05	0.02	793.72	5.88	65	6.17	28	123
Lutjanus griseus	18	<0.1	1.7	0.05	0.02	918.32	7.35	48	11.19	12	158
Archosargus probatocephalus	15	<0.1	2.6	0.04	0.01	611.54	1.47	100	26.03	29	398
Lutjanus synagris	15	<0.1	1.0	0.04	0.02	1,286.07	10.29	26	1.12	16	35
Paralichthys albigutta	14	<0.1	1.9	0.04	0.01	760.09	2.94	38	5.90	12	82
Trachinotus falcatus	12	<0.1	1.7	0.03	0.01	842.61	4.41	17	0.90	12	23

Species	Number No.	Number %	% Occur	Density Estimate (animals/100m^2) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Centropristis philadelphica	8	<0.1	0.7	0.02	0.01	1,403.56	5.88	71	4.84	56	102
Cynoscion complex	7	<0.1	1.0	0.02	0.01	1,023.69	2.94	57	19.50	22	170
Centropomus undecimalis	4	<0.1	0.7	0.01	0.01	1,195.82	1.47	175	90.86	69	447
Centropristis striata	2	<0.1	0.2	0.01	0.01	2,397.92	2.94	48	5.50	43	54
Farfantepenaeus duorarum	2	<0.1	0.3	0.01	<0.01	1,694.10	1.47	17	1.00	16	18
Menticirrhus saxatilis	2	<0.1	0.3	0.01	<0.01	1,694.10	1.47	49	13.00	36	62
Albula spp.	1	<0.1	0.2	<0.01	<0.01	2,397.92	1.47	21	.	21	21
Menticirrhus littoralis	1	<0.1	0.2	<0.01	<0.01	2,397.92	1.47	49	.	49	49
Pogonias cromis	1	<0.1	0.2	<0.01	<0.01	2,397.92	1.47	12	.	12	12
Pomatomus saltatrix	1	<0.1	0.2	<0.01	<0.01	2,397.92	1.47	40	.	40	40
Sphyraena barracuda	1	<0.1	0.2	<0.01	<0.01	2,397.92	1.47	61	.	61	61
Totals	**35,794**	**38.7**	**.**	**91.54**	**11.28**	**295.60**	**2,972.06**	**.**	**.**	**2**	**471**

Table JX21-04. Catch statistics for 10 dominant taxa collected in 192 183-m haul seine samples during northeast Florida stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil curema	1,139	23.8	39.6	6.29	1.65	353.57	182	122	0.91	72	255
Mugil cephalus	1,076	22.5	60.9	5.94	1.69	383.58	294	190	1.70	78	404
Bairdiella chrysoura	288	6.0	11.5	1.59	0.66	558.08	104	130	0.95	80	166
Leiostomus xanthurus	254	5.3	21.4	1.40	0.33	316.71	33	116	1.82	53	216
Elops saurus	205	4.3	13.5	1.13	0.77	914.27	138	252	2.64	188	410
Chloroscombrus chrysurus	185	3.9	5.7	1.02	0.40	527.88	48	87	1.12	55	134
Dasyatis sabina	161	3.4	31.8	0.89	0.15	230.37	13	225	2.91	135	308
Stomolophus meleagris	135	2.8	8.3	0.75	0.33	596.28	54	116	1.89	63	181
Lagodon rhomboides	123	2.6	16.1	0.68	0.24	482.28	32	103	1.92	72	241
Litopenaeus setiferus	123	2.6	6.2	0.68	0.39	772.42	67	16	0.34	9	37
Subtotals	3,689	77.2	.	.	.	.	.	.	.	9	410
Totals	**4,784**	**100.0**	**.**	**24.92**	**2.93**	**162.83**	**299**	**.**	**.**	**9**	**1,210**

Table JX21-05. Catch statistics for Selected Taxa collected in 192 183-m haul seine samples during northeast Florida stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil curema	1,139	23.8	39.6	5.93	1.56	364.93	182	122	0.91	72	255
Mugil cephalus	1,076	22.5	60.9	5.60	1.60	395.77	294	190	1.70	78	404
Leiostomus xanthurus	254	5.3	21.4	1.32	0.31	327.08	33	116	1.82	53	216
Elops saurus	205	4.3	13.5	1.07	0.73	941.82	138	252	2.64	188	410
Litopenaeus setiferus	123	2.6	6.2	0.64	0.37	795.80	67	16	0.34	9	37
Brevoortia spp.	105	2.2	5.7	0.55	0.46	1,163.85	88	99	3.24	70	191
Sciaenops ocellatus	83	1.7	13.0	0.43	0.12	398.61	13	313	17.78	63	653
Callinectes sapidus	56	1.2	16.1	0.29	0.07	347.02	11	126	4.42	42	190
Micropogonias undulatus	51	1.1	12.0	0.27	0.07	370.96	9	138	4.80	79	231
Archosargus probatocephalus	49	1.0	13.5	0.26	0.06	311.22	6	290	10.51	95	414
Cynoscion nebulosus	49	1.0	8.9	0.26	0.08	430.45	8	242	9.77	85	351
Paralichthys lethostigma	38	0.8	9.9	0.20	0.05	366.47	5	208	14.75	80	485
Caranx hippos	26	0.5	8.9	0.14	0.04	379.64	4	137	13.07	48	278
Cynoscion complex	11	0.2	2.6	0.06	0.03	740.42	4	290	9.32	240	355
Scomberomorus maculatus	9	0.2	3.1	0.05	0.02	628.51	3	300	12.16	235	358
Trachinotus carolinus	8	0.2	1.6	0.04	0.03	945.86	5	164	33.82	90	331
Paralichthys dentatus	7	0.1	2.6	0.04	0.02	650.56	2	120	20.47	45	200
Menticirrhus americanus	6	0.1	2.1	0.03	0.02	795.80	3	182	20.90	121	240
Pogonias cromis	6	0.1	1.6	0.03	0.02	977.23	4	230	8.76	200	256
Trachinotus falcatus	5	0.1	1.0	0.03	0.02	1,141.22	4	94	10.80	51	107
Paralichthys albigutta	4	0.1	2.1	0.02	0.01	687.36	1	140	26.02	80	198
Pomatomus saltatrix	4	0.1	2.1	0.02	0.01	687.36	1	149	22.59	104	210

Species	Number		% Occur	Density Estimate (animals/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Sphyrna tiburo	4	0.1	2.1	0.02	0.01	687.36	1	752	117.72	425	935
Centropomus undecimalis	2	<0.1	1.0	0.01	0.01	977.23	1	568	32.50	535	600
Lutjanus griseus	2	<0.1	1.0	0.01	0.01	977.23	1	219	27.00	192	246
Lutjanus synagris	2	<0.1	1.0	0.01	0.01	977.23	1	106	16.50	89	122
Centropristis philadelphica	1	<0.1	0.5	0.01	0.01	1,385.64	1	116	.	116	116
Farfantepenaeus aztecus	1	<0.1	0.5	0.01	0.01	1,385.64	1	26	.	26	26
Lobotes surinamensis	1	<0.1	0.5	0.01	0.01	1,385.64	1	239	.	239	239
Negaprion brevirostris	1	<0.1	0.5	0.01	0.01	1,385.64	1	495	.	495	495
Totals	**3,328**	**69.6**	**.**	**17.33**	**2.59**	**206.75**	**298**	**.**	**.**	**9**	**935**

Table JX21-06. Catch statistics for 10 dominant taxa collected in 588 6.1-m river otter trawl samples during northeast Florida stratified-random sampling, 2021. 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	16,451	30.4	53.4	4.11	0.64	376.93	200.76	36	0.09	11	78
Micropogonias undulatus	13,460	24.8	61.1	3.31	0.37	271.22	81.89	37	0.20	5	172
Litopenaeus setiferus	5,174	9.5	42.9	1.24	0.23	439.33	80.20	17	0.07	3	37
Leiostomus xanthurus	4,363	8.1	27.4	1.08	0.30	669.92	127.63	31	0.37	9	218
Stellifer lanceolatus	3,083	5.7	11.7	0.81	0.37	1,092.59	196.47	45	0.34	8	121
Trinectes maculatus	1,417	2.6	39.8	0.34	0.04	278.98	8.39	49	0.53	10	132
Cynoscion complex	1,038	1.9	30.8	0.24	0.04	379.05	16.19	44	1.10	9	248
Callinectes sapidus	1,031	1.9	48.6	0.24	0.02	197.68	5.10	99	1.56	7	208
Farfantepenaeus spp.	895	1.7	20.7	0.21	0.04	422.45	9.89	9	0.10	2	14
Ameiurus catus	710	1.3	28.2	0.17	0.02	344.22	7.29	120	2.70	15	435
Subtotals	47,622	87.9	.	.	.	.	.	.	.	2	435
Totals	**54,185**	**100.0**	**.**	**13.22**	**0.94**	**171.89**	**215.06**	**.**	**.**	**2**	**1,000**

Table JX21-07. Catch statistics for Selected Taxa collected in 588 6.1-m river otter trawl samples during northeast Florida stratified-random sampling, 2021. 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	13,460	24.8	61.1	3.28	0.37	272.54	81.89	37	0.20	5	172
Litopenaeus setiferus	5,174	9.5	42.9	1.23	0.22	441.30	80.20	17	0.07	3	37
Leiostomus xanthurus	4,363	8.1	27.4	1.07	0.30	672.85	127.63	31	0.37	9	218
Cynoscion complex	1,038	1.9	30.8	0.24	0.04	380.78	16.19	44	1.10	9	248
Callinectes sapidus	1,031	1.9	48.6	0.24	0.02	198.74	5.10	99	1.56	7	208
Farfantepenaeus spp.	895	1.7	20.7	0.20	0.04	424.36	9.89	9	0.10	2	14
Elops saurus	300	0.6	8.5	0.08	0.03	787.51	10.46	39	0.29	19	55
Farfantepenaeus aztecus	311	0.6	7.8	0.07	0.02	830.28	12.02	21	0.23	15	30
Brevoortia spp.	266	0.5	4.1	0.07	0.05	1,938.36	31.78	29	1.38	16	255
Menticirrhus americanus	168	0.3	8.8	0.04	0.01	528.26	2.55	36	1.72	7	142
Paralichthys lethostigma	143	0.3	18.4	0.03	<0.01	254.03	1.00	150	6.08	12	423
Archosargus probatocephalus	26	<0.1	2.6	0.01	<0.01	706.85	0.51	213	17.66	98	400
Centropristis philadelphica	21	<0.1	2.9	<0.01	<0.01	610.18	0.30	92	7.76	30	151
Farfantepenaeus duorarum	19	<0.1	2.0	<0.01	<0.01	901.57	0.74	20	0.97	15	30
Paralichthys dentatus	18	<0.1	1.9	<0.01	<0.01	957.64	0.81	94	7.79	46	166
Lutjanus griseus	15	<0.1	1.7	<0.01	<0.01	1,058.39	0.84	138	15.80	13	203
Mugil curema	11	<0.1	0.3	<0.01	<0.01	2,215.05	1.69	53	7.29	40	125
Sciaenops ocellatus	9	<0.1	1.2	<0.01	<0.01	1,014.43	0.37	211	75.78	17	690
Cynoscion nebulosus	6	<0.1	0.9	<0.01	<0.01	1,117.96	0.25	86	32.49	11	206
Menippe spp.	6	<0.1	1.0	<0.01	<0.01	988.59	0.15	61	15.44	20	105
Paralichthys albigutta	6	<0.1	1.0	<0.01	<0.01	990.84	0.17	132	31.78	20	237
Lutjanus synagris	4	<0.1	0.3	<0.01	<0.01	1,916.05	0.40	21	0.63	19	22

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Centropristis striata	3	<0.1	0.5	<0.01	<0.01	1,399.40	0.15	111	12.13	90	132
Cynoscion nothus	3	<0.1	0.3	<0.01	<0.01	1,758.36	0.27	27	13.68	12	54
Menticirrhus saxatilis	2	<0.1	0.3	<0.01	<0.01	1,713.18	0.13	34	21.50	12	55
Pogonias cromis	2	<0.1	0.3	<0.01	<0.01	1,734.48	0.17	282	15.50	267	298
Mugil cephalus	1	<0.1	0.2	<0.01	<0.01	2,424.87	0.17	42	.	42	42
Totals	**27,301**	**50.4**	**.**	**6.60**	**0.54**	**196.87**	**127.63**	**.**	**.**	**2**	**690**

Appendix JX21-01. Monthly summary of taxa collected during northeast Florida stratified-random sampling, 2021. 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=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Abudefduf saxatilis	.	.	.	1	.	.	.	.	.	.	.	.	1
Achirus lineatus	1	2	1	2	1	6	16	12	2	16	1	2	62
Aetobatus narinari	.	.	.	1	.	.	.	.	.	.	.	.	1
Albula sp.	.	.	.	.	.	.	.	1	.	.	.	.	1
Alosa aestivalis	.	.	.	17	49	.	23	.	.	3	.	.	92
Alosa mediocris	.	.	.	6	1	.	.	1	.	.	.	.	8
Alosa sapidissima	1	.	20	6	184	24	1	2	10	.	1	1	250
Ameiurus catus	68	103	53	39	50	42	42	80	37	43	95	96	748
Ameiurus nebulosus	1	.	1	3	.	.	.	.	.	.	1	.	6
Amia calva	.	.	.	1	.	.	.	.	.	1	.	.	2
Anchoa hepsetus	27	2	6	.	385	887	146	27	75	372	8	2	1,937
Anchoa lyolepis	.	.	.	.	59	.	1	.	.	445	.	.	505
Anchoa mitchilli	4,015	4,890	1,818	1,315	1,178	7,475	4,905	2,654	1,750	3,304	4,366	1,245	38,915
Anchoa spp.	.	.	.	.	3	1	.	.	.	.	.	.	4
Ancylopsetta quadrocellata	.	1	8	13	4	.	.	.	.	.	.	.	26
Anguilla rostrata	.	.	1	1	.	.	.	1	.	.	.	1	4
Archosargus probatocephalus	3	5	7	9	5	11	9	10	6	10	5	10	90
Ariopsis felis	5	1	29	4	17	26	17	58	20	33	61	7	278
Astroscopus y-graecum	1	.	4	1	2	1	.	.	.	.	.	1	10
Bagre marinus	.	.	.	.	.	8	6	5	3	1	.	.	23

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Bairdiella chrysoura	70	109	60	44	48	861	38	92	45	15	32	36	1,450
Bathygobius soporator	.	1	1	1	5	28	1	4	7	1	4	5	58
Blenniidae sp.	.	.	.	.	.	1	.	.	.	.	.	.	1
Brevoortia spp.	122	3,280	739	294	112	43	93	15	60	1	9	89	4,857
Callinectes ornatus	.	2	.	1	.	1	.	.	1	.	.	.	5
Callinectes sapidus	73	67	106	101	113	99	194	118	151	73	134	143	1,372
Callinectes similis	13	2	5	46	126	135	98	10	48	52	17	40	592
Caranx hippos	2	.	.	.	1	9	11	2	6	2	17	.	50
Centrarchus macropterus	.	.	1	.	.	.	.	.	.	.	.	.	1
Centropomus undecimalis	.	.	.	1	.	.	.	1	.	.	2	2	6
Centropristis philadelphica	.	.	1	.	4	10	2	3	.	6	.	4	30
Centropristis striata	.	1	.	.	.	3	.	1	.	.	.	.	5
Chaetodipterus faber	.	.	.	4	11	4	10	15	4	.	.	.	48
Chaetodon ocellatus	.	.	.	.	.	.	.	.	1	.	.	.	1
Charybdis hellerii	.	.	.	.	.	1	.	.	.	.	.	.	1
Chasmodes bosquianus	.	.	.	.	.	1	.	.	.	.	.	.	1
Chasmodes saburrae	.	.	.	.	.	1	.	.	.	.	.	.	1
Chilomycterus schoepfii	.	.	.	3	.	5	5	2	2	2	7	1	27
Chloroscombrus chrysurus	.	.	.	.	4	3	11	49	42	68	52	.	229
Citharichthys macrops	.	.	.	.	.	.	.	.	1	1	.	.	2
Citharichthys spilopterus	.	1	3	39	70	108	56	30	25	12	6	2	352
Clupeidae sp.	.	.	.	.	1	.	.	.	.	.	.	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Ctenogobius boleosoma	13	9	4	20	50	34	86	65	33	26	39	26	405
Ctenogobius shufeldti	71	90	50	50	31	27	87	120	171	193	211	259	1,360
Ctenogobius smaragdus	.	.	.	.	4	.	6	9	1	7	17	1	45
Ctenogobius stigmaticus	.	.	.	.	.	2	.	.	1	.	.	.	3
Cynoscion complex	13	7	8	6	285	300	93	94	71	58	85	36	1,056
Cynoscion nebulosus	13	5	6	18	3	3	9	23	5	4	3	5	97
Cynoscion nothus	.	.	.	2	.	.	.	.	1	.	.	.	3
Cyprinodon variegatus	7	.	2	1	3	.	1	.	.	.	.	.	14
Dasyatis sabina	19	18	42	35	31	25	14	37	35	33	30	28	347
Dasyatis say	.	.	.	1	.	.	1	.	4	.	.	.	6
Diapterus auratus	16	2	1	.	8	.	.	.	44	21	20	26	138
Diplodus holbrookii	.	.	.	.	.	.	.	1	.	.	.	.	1
Dormitator maculatus	.	.	.	.	.	.	.	.	.	.	1	.	1
Dorosoma cepedianum	3	5	12	1	1	1	56	3	2	32	2	11	129
Dorosoma petenense	.	.	.	2	2	149	4	103	10	6	2	1	279
Elopiformes spp.	.	.	.	1	1	.	.	.	.	.	.	.	2
Elops saurus	147	33	6	319	50	13	2	34	3	7	1	9	624
Etropus crossotus	13	.	14	7	7	83	35	23	20	69	31	75	377
Etropus sp.	.	1	.	.	.	.	.	.	.	.	.	.	1
Eucinostomus gula	54	.	6	5	1	4	8	6	.	4	7	8	103
Eucinostomus harengulus	26	19	28	14	22	28	85	85	100	161	117	123	808
Eucinostomus spp.	66	8	16	1	3	60	101	96	205	787	342	293	1,978

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Evorthodus lyricus	.	.	.	.	.	.	.	.	.	1	.	.	1
Farfantepenaeus aztecus	1	.	.	.	39	144	191	1	1	1	.	1	379
Farfantepenaeus duorarum	1	.	.	1	1	2	1	.	.	.	.	15	21
Farfantepenaeus spp.	2	2	.	122	938	321	64	145	107	124	129	62	2,016
Fundulus chrysotus	.	.	.	.	.	1	.	.	.	.	2	.	3
Fundulus heteroclitus	508	4	59	3	22	66	584	19	211	14	334	50	1,874
Fundulus majalis	.	.	.	1	20	4	16	7	1	7	1	3	60
Fundulus seminolis	2	35	16	48	3	15	38	58	77	15	2	38	347
Gambusia holbrooki	21	21	22	1	3	.	5	8	21	2	.	123	227
Gerres cinereus	.	.	.	.	.	.	.	.	1	.	.	.	1
Gobiesox strumosus	.	.	.	1	.	14	.	1	1	.	.	.	17
Gobioides broussonetii	1	.	14	4	2	6	5	5	42	2	2	7	90
Gobionellus oceanicus	.	1	.	1	3	7	3	3	13	23	2	11	67
Gobiosoma bosc	1	10	5	6	3	1	4	3	1	4	11	21	70
Gobiosoma ginsburgi	.	.	1	.	.	.	.	1	.	.	.	.	2
Gobiosoma spp.	9	18	1	3	.	3	17	22	34	7	54	61	229
Gymnura micrura	.	.	1	.	6	1	1	.	2	1	2	.	14
Harengula jaguana	.	.	.	.	3	28	95	219	626	1	2	.	974
Heterandria formosa	.	.	1	.	.	.	.	.	.	.	.	.	1
Hypleurochilus geminatus	.	.	.	.	.	.	.	1	.	.	.	.	1
Hypsoblennius hentz	.	.	.	.	.	4	.	.	.	.	.	.	4
Hypsoblennius ionthas	.	.	.	1	.	9	.	.	.	.	.	.	10

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Ictalurus punctatus	29	17	21	11	21	19	3	5	21	18	25	49	239
Labidesthes sicculus	4	2	21	.	5	39	12	5	12	90	42	3	235
Lagodon rhomboides	34	17	46	41	56	54	21	64	24	11	14	5	387
Larimus fasciatus	.	.	.	.	.	.	1	1	1	.	1	.	4
Leiostomus xanthurus	1,403	13,842	4,597	2,032	2,159	448	299	109	67	65	32	78	25,131
Lepisosteus osseus	3	.	1	1	3	1	1	18	5	2	10	5	50
Lepisosteus platyrhincus	.	1	3	1	2	9	5	.	2	1	3	2	29
Lepomis auritus	31	14	10	3	5	5	6	13	9	.	3	9	108
Lepomis gulosus	.	.	.	3	.	.	.	.	.	.	.	.	3
Lepomis macrochirus	15	12	92	19	1	9	14	3	18	18	65	67	333
Lepomis microlophus	4	6	3	2	.	4	.	3	2	1	3	4	32
Lepomis spp.	.	.	.	.	.	.	54	6	62	30	4	3	159
Limulus polyphemus	.	.	1	.	.	.	1	.	.	.	.	.	2
Litopenaeus setiferus	976	159	78	28	16	642	2,956	2,164	2,379	789	562	525	11,274
Lobotes surinamensis	.	.	.	.	1	.	.	.	.	.	.	.	1
Lucania goodei	.	.	.	1	.	.	.	.	.	.	.	.	1
Lucania parva	.	.	.	1	1	.	1	.	.	.	27	.	30
Lutjanus griseus	.	.	.	.	.	6	1	10	8	5	2	3	35
Lutjanus synagris	.	.	.	.	.	5	.	4	1	9	2	.	21
Membras martinica	.	.	5	2	18	4	8	12	.	.	.	.	49
Menidia menidia	684	543	237	136	929	3,787	2,358	516	747	853	221	335	11,346
Menidia spp.	621	627	630	226	267	367	531	1,004	636	882	1,096	1,767	8,654

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Menippe spp.	.	.	.	.	1	.	2	1	1	1	.	.	6
Menticirrhus americanus	.	.	2	.	30	36	55	23	32	19	17	6	220
Menticirrhus littoralis	.	.	.	.	.	1	.	.	.	.	.	.	1
Menticirrhus saxatilis	.	.	.	.	.	1	1	.	1	.	.	1	4
Microgobius gulosus	53	34	34	19	9	25	23	108	103	162	292	161	1,023
Microgobius thalassinus	2	.	.	3	.	21	3	1	.	3	.	.	33
Microphis brachyurus	.	.	.	.	.	.	.	.	.	.	1	.	1
Micropogonias undulatus	2,183	2,149	3,128	1,953	1,972	961	405	62	75	80	373	1,028	14,369
Micropterus salmoides	2	1	4	5	5	14	4	1	.	2	1	1	40
Morone saxatilis	.	1	.	.	.	.	.	.	.	.	.	.	1
Morone spp.	.	.	.	.	1	8	.	4	.	.	.	.	13
Mugil cephalus	57	1,306	298	141	62	168	90	79	139	91	71	79	2,581
Mugil curema	294	21	17	75	35	88	62	35	114	329	266	95	1,431
Mugil sp.	.	.	.	.	.	1	.	.	.	.	.	.	1
Myrophis punctatus	2	.	.	.	.	2	.	.	.	.	.	1	5
Negaprion brevirostris	.	.	.	.	.	.	.	.	.	.	.	1	1
Notemigonus crysoleucas	.	.	.	.	2	20	3	.	11	5	.	7	48
Notropis maculatus	.	.	2	5	1	.	.	.	.	3	166	.	177
Ogcocephalus cubifrons	.	.	.	.	.	.	.	.	.	1	.	.	1
Oligoplites saurus	.	.	.	.	.	.	9	9	9	7	6	1	41
Ophidion holbrookii	.	.	.	.	.	3	1	.	.	.	.	.	4
Opisthonema oglinum	.	.	.	.	4	140	28	.	.	1	.	23	196

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Opsanus tau	.	1	2	.	6	2	4	2	1	2	.	.	20
Oreochromis complex	.	2	.	1	.	.	.	.	.	.	.	1	4
Oreochromis/Sarotherodon spp.	.	.	.	.	.	.	2	3	.	.	.	.	5
Orthopristis chrysoptera	.	.	.	1	141	45	20	.	2	.	.	2	211
Paralichthys albigutta	.	4	3	5	4	2	2	2	1	1	.	.	24
Paralichthys dentatus	1	.	3	13	21	4	.	.	.	4	.	.	46
Paralichthys lethostigma	12	21	29	29	33	32	18	19	25	17	11	11	257
Peprilus paru	1	.	1	6	.	1	1	2	2	.	.	.	14
Peprilus triacanthus	.	.	3	15	.	.	.	.	.	.	1	.	19
Poecilia latipinna	.	.	2	1	1	.	.	.	.	1	.	1	6
Pogonias cromis	.	1	.	1	2	1	4	.	.	.	.	.	9
Pomatomus saltatrix	.	.	1	1	2	.	1	.	.	.	.	.	5
Pomoxis nigromaculatus	2	4	9	2	2	1	4	.	.	1	7	2	34
Portunus spp.	.	.	5	1	1	36	1	1	1	2	.	.	48
Prionotus carolinus	.	.	2	.	.	.	.	.	.	.	.	.	2
Prionotus evolans	2	3	17	20	9	21	2	.	.	1	1	2	78
Prionotus rubio	.	.	.	.	.	1	.	.	.	.	.	.	1
Prionotus scitulus	.	.	.	.	3	8	.	.	.	1	.	2	14
Prionotus tribulus	2	.	2	3	7	5	.	.	1	.	3	1	24
Pterygoplichthys spp.	.	.	1	.	.	.	1	.	.	.	.	.	2
Rhinoptera bonasus	.	.	.	1	.	.	1	.	.	.	1	.	3
Rimapenaeus constrictus	.	.	2	.	5	2	.	.	.	.	.	.	9

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Rimapenaeus spp.	96	2	20	.	8	27	89	3	24	25	6	32	332
Sciaenidae sp.	.	.	.	1	.	.	.	.	.	.	.	.	1
Sciaenops ocellatus	4	4	17	14	15	5	4	16	14	25	112	70	300
Scomberomorus maculatus	.	.	.	8	1	.	.	.	.	.	.	.	9
Selene vomer	1	.	.	.	.	.	1	.	2	3	.	1	8
Sphoeroides nephelus	2	1	1	3	12	9	3	.	2	.	2	4	39
Sphoeroides spengleri	.	.	.	.	.	1	.	.	.	.	1	.	2
Sphoeroides spp.	.	.	.	2	.	.	.	.	1	1	.	.	4
Sphyraena barracuda	.	.	.	.	.	.	.	.	.	.	1	.	1
Sphyrna tiburo	.	.	.	.	1	1	.	.	1	.	.	1	4
Stellifer lanceolatus	3	.	31	11	8	457	69	553	1,500	286	143	23	3,084
Stephanolepis hispidus	.	.	.	.	4	3	1	2	4	4	.	2	20
Stomolophus meleagris	67	4	35	79	.	.	.	.	.	.	16	2	203
Strongylura marina	1	.	1	10	4	2	9	7	3	6	1	.	44
Strongylura notata	.	.	.	.	.	.	.	.	.	.	1	.	1
Strongylura spp.	.	.	2	7	6	4	8	7	3	.	.	1	38
Symphurus civitatium	.	.	.	.	6	.	1	1	2	1	.	.	11
Symphurus plagiusa	4	13	9	10	11	39	33	29	56	11	17	21	253
Syngnathus floridae	.	.	.	.	.	.	1	.	.	.	.	.	1
Syngnathus fuscus	.	.	.	.	.	.	1	.	.	.	.	.	1
Syngnathus louisianae	5	2	.	1	9	3	3	1	1	3	8	2	38
Syngnathus scovelli	2	1	1	3	3	2	8	2	.	.	1	2	25

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=113	E=112	E=1,355
Synodus foetens	.	.	.	.	13	10	6	2	1	5	3	1	41
Trachinotus carolinus	.	.	.	6	3	43	11	5	.	.	1	.	69
Trachinotus falcatus	.	.	.	.	.	1	1	.	7	3	.	5	17
Trichiurus lepturus	.	1	1	3	3	5	6	1	.	.	.	.	20
Trinectes maculatus	52	149	89	92	59	89	110	124	289	114	222	91	1,480
Urophycis regia	.	.	13	.	.	.	.	.	.	.	.	.	13
Xiphopenaeus kroyeri	.	.	.	.	.	.	.	1	18	.	.	.	19
Totals	**12,063**	**27,720**	**12,711**	**7,686**	**9,987**	**18,899**	**14,681**	**9,428**	**10,580**	**10,066**	**10,131**	**7,519**	**151,471**

Appendix JX21-02. Summary by gear of taxa collected during northeast Florida stratified-random sampling, 2021. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata			Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	
	E=575	E=192	E=588	E=1,355
Abudefduf saxatilis	1	.	.	1
Achirus lineatus	7	16	39	62
Aetobatus narinari	.	1	.	1
Albula sp.	1	.	.	1
Alosa aestivalis	91	.	1	92
Alosa mediocris	7	.	1	8
Alosa sapidissima	247	1	2	250
Ameiurus catus	10	28	710	748
Ameiurus nebulosus	1	1	4	6
Amia calva	2	.	.	2
Anchoa hepsetus	1,572	.	365	1,937
Anchoa lyolepis	504	.	1	505
Anchoa mitchilli	22,464	.	16,451	38,915
Anchoa spp.	2	.	2	4
Ancylopsetta quadrocellata	1	7	18	26
Anguilla rostrata	.	1	3	4
Archosargus probatocephalus	15	49	26	90
Ariopsis felis	4	22	252	278
Astroscopus y-graecum	3	.	7	10
Bagre marinus	.	2	21	23
Bairdiella chrysoura	979	288	183	1,450
Bathygobius soporator	52	.	6	58
Blenniidae sp.	.	.	1	1
Brevoortia spp.	4,486	105	266	4,857
Callinectes ornatus	1	1	3	5
Callinectes sapidus	285	56	1,031	1,372
Callinectes similis	250	35	307	592
Caranx hippos	24	26	.	50
Centrarchus macropterus	1	.	.	1
Centropomus undecimalis	4	2	.	6
Centropristis philadelphica	8	1	21	30
Centropristis striata	2	.	3	5

Species	Gear and Strata			Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	
	E=575	E=192	E=588	E=1,355
Chaetodipterus faber	2	18	28	48
Chaetodon ocellatus	1	.	.	1
Charybdis hellerii	.	.	1	1
Chasmodes bosquianus	1	.	.	1
Chasmodes saburrae	1	.	.	1
Chilomycterus schoepfii	9	10	8	27
Chloroscombrus chrysurus	6	185	38	229
Citharichthys macrops	.	.	2	2
Citharichthys spilopterus	99	13	240	352
Clupeidae sp.	.	.	1	1
Ctenogobius boleosoma	363	.	42	405
Ctenogobius shufeldti	800	.	560	1,360
Ctenogobius smaragdus	37	.	8	45
Ctenogobius stigmaticus	1	.	2	3
Cynoscion complex	7	11	1,038	1,056
Cynoscion nebulosus	42	49	6	97
Cynoscion nothus	.	.	3	3
Cyprinodon variegatus	14	.	.	14
Dasyatis sabina	20	161	166	347
Dasyatis say	1	3	2	6
Diapterus auratus	52	50	36	138
Diplodus holbrookii	.	1	.	1
Dormitator maculatus	.	.	1	1
Dorosoma cepedianum	61	61	7	129
Dorosoma petenense	262	1	16	279
Elopiformes spp.	.	.	2	2
Elops saurus	119	205	300	624
Etropus crossotus	86	36	255	377
Etropus sp.	1	.	.	1
Eucinostomus gula	36	11	56	103
Eucinostomus harengulus	698	24	86	808
Eucinostomus spp.	1,784	.	194	1,978
Evorthodus lyricus	1	.	.	1
Farfantepenaeus aztecus	67	1	311	379

Species	Gear and Strata			Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	
	E=575	E=192	E=588	E=1,355
Farfantepenaeus duorarum	2	.	19	21
Farfantepenaeus spp.	1,121	.	895	2,016
Fundulus chrysotus	3	.	.	3
Fundulus heteroclitus	1,874	.	.	1,874
Fundulus majalis	60	.	.	60
Fundulus seminolis	346	1	.	347
Gambusia holbrooki	227	.	.	227
Gerres cinereus	.	1	.	1
Gobiesox strumosus	16	.	1	17
Gobioides broussonetii	6	.	84	90
Gobionellus oceanicus	23	.	44	67
Gobiosoma bosc	55	.	15	70
Gobiosoma ginsburgi	1	.	1	2
Gobiosoma spp.	208	.	21	229
Gymnura micrura	.	5	9	14
Harengula jaguana	972	1	1	974
Heterandria formosa	.	.	1	1
Hypleurochilus geminatus	.	.	1	1
Hypsoblennius hentz	4	.	.	4
Hypsoblennius ionthas	10	.	.	10
Ictalurus punctatus	2	39	198	239
Labidesthes sicculus	235	.	.	235
Lagodon rhomboides	246	123	18	387
Larimus fasciatus	.	.	4	4
Leiostomus xanthurus	20,514	254	4,363	25,131
Lepisosteus osseus	5	33	12	50
Lepisosteus platyrhincus	25	4	.	29
Lepomis auritus	92	3	13	108
Lepomis gulosus	.	.	3	3
Lepomis macrochirus	264	24	45	333
Lepomis microlophus	6	5	21	32
Lepomis spp.	159	.	.	159
Limulus polyphemus	.	.	2	2
Litopenaeus setiferus	5,977	123	5,174	11,274

Species	Gear and Strata			Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	
	E=575	E=192	E=588	E=1,355
Lobotes surinamensis	.	1	.	1
Lucania goodei	1	.	.	1
Lucania parva	30	.	.	30
Lutjanus griseus	18	2	15	35
Lutjanus synagris	15	2	4	21
Membras martinica	47	.	2	49
Menidia menidia	11,345	.	1	11,346
Menidia spp.	8,652	.	2	8,654
Menippe spp.	.	.	6	6
Menticirrhus americanus	46	6	168	220
Menticirrhus littoralis	1	.	.	1
Menticirrhus saxatilis	2	.	2	4
Microgobius gulosus	389	.	634	1,023
Microgobius thalassinus	7	.	26	33
Microphis brachyurus	1	.	.	1
Micropogonias undulatus	858	51	13,460	14,369
Micropterus salmoides	35	2	3	40
Morone saxatilis	.	1	.	1
Morone spp.	10	.	3	13
Mugil cephalus	1,504	1,076	1	2,581
Mugil curema	281	1,139	11	1,431
Mugil sp.	.	.	1	1
Myrophis punctatus	1	.	4	5
Negaprion brevirostris	.	1	.	1
Notemigonus crysoleucas	48	.	.	48
Notropis maculatus	2	.	175	177
Ogcocephalus cubifrons	.	.	1	1
Oligoplites saurus	39	2	.	41
Ophidion holbrookii	.	.	4	4
Opisthonema oglinum	165	24	7	196
Opsanus tau	6	1	13	20
Oreochromis complex	.	3	1	4
Oreochromis/Sarotherodon spp.	5	.	.	5
Orthopristis chrysoptera	163	.	48	211

Species	Gear and Strata			Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	
	E=575	E=192	E=588	E=1,355
Paralichthys albigutta	14	4	6	24
Paralichthys dentatus	21	7	18	46
Paralichthys lethostigma	76	38	143	257
Peprilus paru	.	6	8	14
Peprilus triacanthus	.	8	11	19
Poecilia latipinna	6	.	.	6
Pogonias cromis	1	6	2	9
Pomatomus saltatrix	1	4	.	5
Pomoxis nigromaculatus	.	1	33	34
Portunus spp.	26	.	22	48
Prionotus carolinus	.	.	2	2
Prionotus evolans	6	4	68	78
Prionotus rubio	.	.	1	1
Prionotus scitulus	4	.	10	14
Prionotus tribulus	4	3	17	24
Pterygoplichthys spp.	1	.	1	2
Rhinoptera bonasus	.	2	1	3
Rimapenaeus constrictus	1	.	8	9
Rimapenaeus spp.	19	.	313	332
Sciaenidae sp.	.	.	1	1
Sciaenops ocellatus	208	83	9	300
Scomberomorus maculatus	.	9	.	9
Selene vomer	.	3	5	8
Sphoeroides nephelus	15	7	17	39
Sphoeroides spengleri	.	.	2	2
Sphoeroides spp.	3	.	1	4
Sphyraena barracuda	1	.	.	1
Sphyrna tiburo	.	4	.	4
Stellifer lanceolatus	1	.	3,083	3,084
Stephanolepis hispidus	9	.	11	20
Stomolophus meleagris	9	135	59	203
Strongylura marina	24	20	.	44
Strongylura notata	.	1	.	1
Strongylura spp.	38	.	.	38

Species	Gear and Strata			Totals
	21.3-m river seine	183-m haul seine	6.1-m otter trawl	
	E=575	E=192	E=588	E=1,355
Symphurus civitatium	6	.	5	11
Symphurus plagiusa	102	.	151	253
Syngnathus floridae	1	.	.	1
Syngnathus fuscus	.	.	1	1
Syngnathus louisianae	20	.	18	38
Syngnathus scovelli	19	.	6	25
Synodus foetens	22	5	14	41
Trachinotus carolinus	61	8	.	69
Trachinotus falcatus	12	5	.	17
Trichiurus lepturus	.	.	20	20
Trinectes maculatus	51	12	1,417	1,480
Urophycis regia	.	.	13	13
Xiphopenaeus kroyeri	1	.	18	19
Totals	**92,502**	**4,784**	**54,185**	**151,471**

Appendix JX21-03. Summary by zone of taxa collected during northeast Florida stratified-random sampling, 2021. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Zone						Totals
	A	B	C	D	E	F	
	E=204	E=204	E=275	E=288	E=192	E=192	E=1,355
Abudefduf saxatilis	.	.	1	.	.	.	1
Achirus lineatus	22	7	24	7	2	.	62
Aetobatus narinari	.	.	1	.	.	.	1
Albula sp.	.	.	1	.	.	.	1
Alosa aestivalis	.	.	.	.	20	72	92
Alosa mediocris	.	.	.	2	4	2	8
Alosa sapidissima	.	.	.	4	87	159	250
Ameiurus catus	88	96	3	119	139	303	748
Ameiurus nebulosus	.	.	.	2	3	1	6
Amia calva	.	.	.	.	.	2	2
Anchoa hepsetus	604	1,145	150	35	3	.	1,937
Anchoa lyolepis	29	476	.	.	.	.	505
Anchoa mitchilli	17,095	11,473	4,021	3,007	1,919	1,400	38,915
Anchoa spp.	1	3	.	.	.	.	4
Ancylopsetta quadrocellata	16	7	3	.	.	.	26
Anguilla rostrata	.	1	.	2	.	1	4
Archosargus probatocephalus	9	19	49	13	.	.	90
Ariopsis felis	56	44	117	60	1	.	278
Astroscopus y-graecum	5	1	4	.	.	.	10
Bagre marinus	.	23	.	.	.	.	23
Bairdiella chrysoura	389	653	296	105	6	1	1,450
Bathygobius soporator	34	6	17	1	.	.	58
Blenniidae sp.	.	1	.	.	.	.	1
Brevoortia spp.	848	249	585	583	292	2,300	4,857
Callinectes ornatus	2	1	2	.	.	.	5
Callinectes sapidus	195	210	333	221	187	226	1,372
Callinectes similis	283	163	144	2	.	.	592
Caranx hippos	3	19	17	10	1	.	50
Centrarchus macropterus	.	1	.	.	.	.	1
Centropomus undecimalis	.	1	1	4	.	.	6
Centropristis philadelphica	20	.	8	2	.	.	30
Centropristis striata	3	1	1	.	.	.	5
Chaetodipterus faber	19	22	7	.	.	.	48

Species	Zone						Totals
	A	B	C	D	E	F	
	E=204	E=204	E=275	E=288	E=192	E=192	E=1,355
Chaetodon ocellatus	.	1	.	.	.	.	1
Charybdis hellerii	.	.	1	.	.	.	1
Chasmodes bosquianus	1	.	.	.	.	.	1
Chasmodes saburrae	1	.	.	.	.	.	1
Chilomycterus schoepfii	15	7	5	.	.	.	27
Chloroscombrus chrysurus	72	53	66	38	.	.	229
Citharichthys macrops	.	.	2	.	.	.	2
Citharichthys spilopterus	59	47	119	50	53	24	352
Clupeidae sp.	.	.	.	.	1	.	1
Ctenogobius boleosoma	63	66	217	48	11	.	405
Ctenogobius shufeldti	34	23	57	666	265	315	1,360
Ctenogobius smaragdus	.	3	39	3	.	.	45
Ctenogobius stigmaticus	1	.	2	.	.	.	3
Cynoscion complex	95	358	74	255	200	74	1,056
Cynoscion nebulosus	14	39	40	4	.	.	97
Cynoscion nothus	3	.	.	.	.	.	3
Cyprinodon variegatus	1	11	2	.	.	.	14
Dasyatis sabina	54	57	65	85	40	46	347
Dasyatis say	1	3	2	.	.	.	6
Diapterus auratus	13	9	73	41	2	.	138
Diplodus holbrookii	.	.	1	.	.	.	1
Dormitator maculatus	.	.	.	.	.	1	1
Dorosoma cepedianum	.	1	5	63	57	3	129
Dorosoma petenense	.	.	4	10	8	257	279
Elopiformes spp.	1	.	.	1	.	.	2
Elops saurus	26	132	278	166	12	10	624
Etropus crossotus	221	73	81	2	.	.	377
Etropus sp.	.	.	1	.	.	.	1
Eucinostomus gula	9	5	89	.	.	.	103
Eucinostomus harengulus	51	51	343	218	85	60	808
Eucinostomus spp.	121	144	1,102	502	80	29	1,978
Evorthodus lyricus	.	.	.	1	.	.	1
Farfantepenaeus aztecus	219	73	24	53	9	1	379
Farfantepenaeus duorarum	11	3	5	2	.	.	21
Farfantepenaeus spp.	288	532	725	361	110	.	2,016
Fundulus chrysotus	.	.	.	2	1	.	3

Species	Zone						Totals
	A	B	C	D	E	F	
	E=204	E=204	E=275	E=288	E=192	E=192	E=1,355
Fundulus heteroclitus	972	826	74	2	.	.	1,874
Fundulus majalis	5	7	48	.	.	.	60
Fundulus seminolis	.	.	.	2	20	325	347
Gambusia holbrooki	14	16	23	12	6	156	227
Gerres cinereus	.	.	1	.	.	.	1
Gobiesox strumosus	14	2	1	.	.	.	17
Gobioides broussonetii	.	2	1	77	9	1	90
Gobionellus oceanicus	3	13	11	37	3	.	67
Gobiosoma bosc	5	4	13	12	10	26	70
Gobiosoma ginsburgi	1	1	.	.	.	.	2
Gobiosoma spp.	4	.	4	71	52	98	229
Gymnura micrura	6	6	2	.	.	.	14
Harengula jaguana	198	617	158	.	1	.	974
Heterandria formosa	.	.	.	.	1	.	1
Hypleurochilus geminatus	1	.	.	.	.	.	1
Hypsoblennius hentz	4	.	.	.	.	.	4
Hypsoblennius ionthas	10	.	.	.	.	.	10
Ictalurus punctatus	.	1	.	53	90	95	239
Labidesthes sicculus	1	1	.	208	7	18	235
Lagodon rhomboides	138	42	170	29	7	1	387
Larimus fasciatus	1	1	2	.	.	.	4
Leiostomus xanthurus	2,667	7,870	9,850	3,595	815	334	25,131
Lepisosteus osseus	14	22	.	11	2	1	50
Lepisosteus platyrhincus	2	.	.	4	13	10	29
Lepomis auritus	.	1	.	12	9	86	108
Lepomis gulosus	.	.	.	3	.	.	3
Lepomis macrochirus	1	4	.	216	34	78	333
Lepomis microlophus	.	.	.	13	7	12	32
Lepomis spp.	.	1	.	26	33	99	159
Limulus polyphemus	1	1	.	.	.	.	2
Litopenaeus setiferus	3,387	3,446	2,327	1,103	547	464	11,274
Lobotes surinamensis	.	1	.	.	.	.	1
Lucania goodei	.	.	.	.	1	.	1
Lucania parva	.	.	.	27	.	3	30
Lutjanus griseus	7	8	14	5	1	.	35
Lutjanus synagris	11	5	5	.	.	.	21

Species	Zone						Totals
	A	B	C	D	E	F	
	E=204	E=204	E=275	E=288	E=192	E=192	E=1,355
Membras martinica	.	.	.	5	4	40	49
Menidia menidia	5,605	1,966	3,765	10	.	.	11,346
Menidia spp.	15	217	46	1,216	1,598	5,562	8,654
Menippe spp.	1	2	2	1	.	.	6
Menticirrhus americanus	38	116	64	2	.	.	220
Menticirrhus littoralis	1	.	.	.	.	.	1
Menticirrhus saxatilis	3	.	1	.	.	.	4
Microgobius gulosus	.	.	.	313	288	422	1,023
Microgobius thalassinus	4	1	27	1	.	.	33
Microphis brachyurus	1	.	.	.	.	.	1
Micropogonias undulatus	462	1,424	475	4,301	3,006	4,701	14,369
Micropterus salmoides	.	.	.	19	12	9	40
Morone saxatilis	1	.	.	.	.	.	1
Morone spp.	4	.	.	.	2	7	13
Mugil cephalus	521	575	895	421	60	109	2,581
Mugil curema	150	466	596	187	19	13	1,431
Mugil sp.	.	1	.	.	.	.	1
Myrophis punctatus	3	.	.	1	1	.	5
Negaprion brevirostris	.	1	.	.	.	.	1
Notemigonus crysoleucas	.	.	.	.	15	33	48
Notropis maculatus	.	.	.	3	.	174	177
Ogcocephalus cubifrons	1	.	.	.	.	.	1
Oligoplites saurus	14	6	21	.	.	.	41
Ophidion holbrookii	.	4	.	.	.	.	4
Opisthonema oglinum	37	149	10	.	.	.	196
Opsanus tau	3	6	11	.	.	.	20
Oreochromis complex	.	.	1	3	.	.	4
Oreochromis/Sarotherodon spp.	.	.	.	.	1	4	5
Orthopristis chrysoptera	162	25	21	3	.	.	211
Paralichthys albigutta	7	5	12	.	.	.	24
Paralichthys dentatus	30	11	5	.	.	.	46
Paralichthys lethostigma	56	46	40	50	39	26	257
Peprilus paru	7	5	.	2	.	.	14
Peprilus triacanthus	13	6	.	.	.	.	19
Poecilia latipinna	.	4	1	.	.	1	6
Pogonias cromis	4	.	4	1	.	.	9

Species	Zone						Totals
	A	B	C	D	E	F	
	E=204	E=204	E=275	E=288	E=192	E=192	E=1,355
Pomatomus saltatrix	4	.	1	.	.	.	5
Pomoxis nigromaculatus	.	.	.	8	5	21	34
Portunus spp.	38	9	1	.	.	.	48
Prionotus carolinus	.	.	2	.	.	.	2
Prionotus evolans	46	21	10	1	.	.	78
Prionotus rubio	1	.	.	.	.	.	1
Prionotus scitulus	7	4	3	.	.	.	14
Prionotus tribulus	3	8	13	.	.	.	24
Pterygoplichthys spp.	.	.	.	1	.	1	2
Rhinoptera bonasus	1	2	.	.	.	.	3
Rimapenaeus constrictus	9	.	.	.	.	.	9
Rimapenaeus spp.	97	135	100	.	.	.	332
Sciaenidae sp.	1	.	.	.	.	.	1
Sciaenops ocellatus	21	35	79	80	47	38	300
Scomberomorus maculatus	3	4	2	.	.	.	9
Selene vomer	3	.	3	2	.	.	8
Sphoeroides nephelus	12	2	25	.	.	.	39
Sphoeroides spengleri	.	.	2	.	.	.	2
Sphoeroides spp.	.	.	4	.	.	.	4
Sphyraena barracuda	.	.	1	.	.	.	1
Sphyrna tiburo	3	1	.	.	.	.	4
Stellifer lanceolatus	324	2,532	58	170	.	.	3,084
Stephanolepis hispidus	6	6	8	.	.	.	20
Stomolophus meleagris	83	73	47	.	.	.	203
Strongylura marina	1	.	22	5	4	12	44
Strongylura notata	.	.	1	.	.	.	1
Strongylura spp.	1	1	1	7	10	18	38
Symphurus civitatium	1	3	7	.	.	.	11
Symphurus plagiusa	86	97	66	4	.	.	253
Syngnathus floridae	1	.	.	.	.	.	1
Syngnathus fuscus	.	1	.	.	.	.	1
Syngnathus louisianae	18	11	9	.	.	.	38
Syngnathus scovelli	3	8	1	7	2	4	25
Synodus foetens	20	15	5	1	.	.	41
Trachinotus carolinus	24	36	9	.	.	.	69
Trachinotus falcatus	4	4	8	1	.	.	17

Species	Zone						Totals
	A	B	C	D	E	F	
	E=204	E=204	E=275	E=288	E=192	E=192	E=1,355
Trichiurus lepturus	9	7	1	3	.	.	20
Trinectes maculatus	210	157	14	523	346	230	1,480
Urophycis regia	11	1	1	.	.	.	13
Xiphopenaeus kroyeri	17	1	1	.	.	.	19
Totals	**36,773**	**37,421**	**28,413**	**19,620**	**10,725**	**18,519**	**151,471**

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 *Halodule wrightii*, are the dominant vegetative cover in the southern IRL (Sime 2005).

The Fisheries-Independent Monitoring (FIM) program has conducted intensive sampling of fish and selected invertebrates in the southern IRL using 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 TQ21-01). Beginning in 2016, in an effort to expand the collection of juvenile fish data in the region, monthly sampling with 21.3-m seines was initiated in the Loxahatchee and St. Lucie rivers (Zones L and T; Figure TQ21-01). 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.

Loxahatchee River (Zone L; Figure TQ21-01) was also added to the 21.3-m seine sampling universe. The Loxahatchee River covers an ecosystem of approximately 673 km^2 in Martin and Palm Beach County and is one of only two river systems in Florida designated as a “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 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 comprised 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 (*Halodule* spp.) in higher salinity habitats closer to the mouth of the river.

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 2021 in southern Indian River Lagoon.

Stratified-Random Sampling

A total of 74,302 animals, which included 163 taxa of fishes and 12 taxa of selected invertebrates, were collected from 420 southern Indian River Lagoon SRS samples in 2021 (Table TQ21-01, Appendices TQ21-01, -02, and -03). *Anchoa mitchilli* (n=32,487) was the most numerous taxon collected, representing 43.7% of the total catch. *Diapterus auratus* (n=7,041) and *Eucinostomus* spp. (n=5,179) were the next most abundant taxa collected, accounting for an additional 16.4% of the total catch. A total of 44 Selected Taxa (n=14,055 animals) composed 18.9% of the total catch. *Leiostomus xanthurus* (n=3,785) was the most abundant Selected Taxon, representing 5.1% of the total catch. *Brevoortia* spp. (n=3,469), *Mugil curema* (n=1,408), *Farfantepenaeus* spp. (n=1,166), and *Centropomus undecimalis* (n=855) were the next most abundant Selected Taxa, comprising 9.3% of the total catch. Collections in 2021 included 6 species new to the TQ FIM collection*: Corvula sanctaeluciae, Dasyatis centroura, Elassoma evergladei, Etheostoma fusiforme, Jordanella floridae, Rachycentron canadum*.

Bay Sampling

183-m Haul Seines. A total of 14,301 animals were collected in 144 183-m haul seines, representing 19.2% of the overall SRS catch (Table TQ21-01). *Diapterus auratus* (n = 4,619) was the most abundant taxon, accounting for 32.3% of the 183-m haul seine catch (Table TQ21-02). The taxa most frequently caught in 183-m haul seines were *Diapterus auratus* (63.9% occurrence), *Ariopsis felis* (62.5% occurrence), and *Mugil curema* (57.6% occurrence).

A total of 3,071 animals from 37 Selected Taxa were collected, representing 21.5% of the entire 183-m haul seine catch (Table TQ21-03). *Mugil curema* (n=827) and *Mugil cephalus* (n=358) were the most abundant Selected Taxa, accounting for

38.6% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 183-m haul seines were *Mugil curema* (57.6% occurrence) and *Archosargus probatocephalus* (57.6% occurrence).

River Sampling

21.3-m River Seines. A total of 60,001 animals were collected in 276 21.3-m river seines, representing 80.8% of the overall SRS catch (Table TQ21-01). *Anchoa mitchilli* (n = 32,487) was the most abundant taxon collected, accounting for 54.1% of the 21.3-m river seine catch (Table TQ21-04). *Eucinostomus* spp. (n=5,179) and *Leiostomus xanthurus* (n=3,777) were the next most abundant taxa, accounting for an additional 14.9% of the 21.3-m river seine catch. The taxa most frequently caught in 21.3-m river seines were *Eucinostomus* spp. (67.4% occurrence), *Farfantepenaeus* spp. (55.4% occurrence), and *Diapterus auratus* (54.0% occurrence).

A total of 10,984 animals from 31 Selected Taxa were collected, representing 18.3% of the entire 21.3-m river seine catch (Table TQ21-09). *Leiostomus xanthurus* (n=3,777), and *Brevoortia* spp. (n=3,467) were the most abundant Selected Taxa, accounting for 66% of the Selected Taxa collected by this gear. The Selected Taxa most frequently caught in 21.3-m river seines were *Farfantepenaeus* spp. (55.4% occurrence) and *Centropomus undecimalis* (46.0% occurrence).

References

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

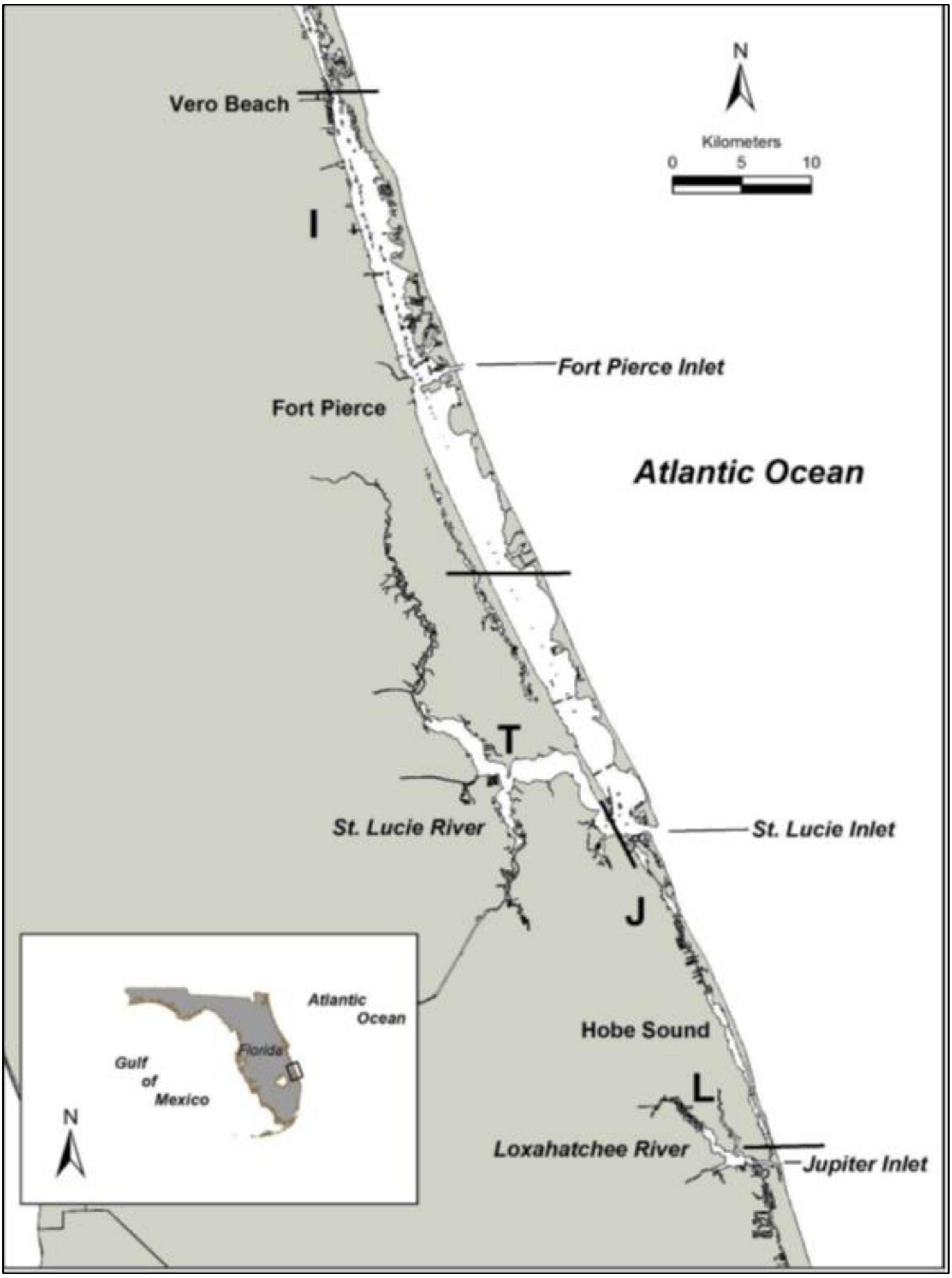

Figure TQ21-01. Map of Southern Indian River Lagoon sampling area, separated into four geographic zones: I, J, L, and T.

Table TQ21-01. Summary of catch and effort data for southern Indian River Lagoon stratified-random sampling, 2021.

Zone	21.3-m river seine		183-m haul seine		Totals	
	Animals	**Hauls**	**Animals**	**Hauls**	**Animals**	**Hauls**
I	.	.	6,878	48	6,878	48
J	.	.	5,386	48	5,386	48
L	8,634	60	.	.	8,634	60
T	51,367	216	2,037	48	53,404	264
Totals	**60,001**	**276**	**14,301**	**144**	**74,302**	**420**

Table TQ21-02. Catch statistics for 10 dominant taxa collected in 144 183-m haul seine samples during southern Indian River Lagoon stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Diapterus auratus	4,619	32.3	63.9	32.30	5.77	213.48	442	146	0.49	55	367
Eucinostomus gula	1,257	8.8	24.3	8.79	3.18	432.15	296	84	0.24	41	123
Ariopsis felis	871	6.1	62.5	6.09	0.89	175.31	66	234	1.60	125	469
Lagodon rhomboides	859	6.0	20.1	6.01	2.65	526.97	270	94	0.77	43	198
Mugil curema	827	5.8	57.6	5.78	1.26	261.47	120	198	1.46	97	375
Archosargus rhomboidalis	648	4.5	24.3	4.53	2.20	580.81	307	160	2.41	66	289
Eucinostomus harengulus	568	4.0	30.6	3.97	1.16	348.30	100	95	0.43	46	132
Opisthonema oglinum	524	3.7	5.6	3.66	3.14	1,023.11	445	110	0.52	60	173
Sphoeroides testudineus	381	2.7	42.4	2.66	0.69	309.12	77	105	1.64	50	210
Mugil cephalus	358	2.5	35.4	2.50	0.80	379.86	102	263	2.60	135	474
Subtotals	10,912	76.4	.	.	.	.	.	.	.	41	474
Totals	**14,301**	**100.0**	**.**	**99.31**	**12.80**	**154.61**	**1,407**	**.**	**.**	**38**	**1,310**

Table TQ21-03. Catch statistics for Selected Taxa collected in 144 183-m haul seine samples during southern Indian River Lagoon stratified-random sampling, 2021. 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/set)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Mugil curema	827	5.8	57.6	5.74	1.26	262.51	120	198	1.46	97	375
Mugil cephalus	358	2.5	35.4	2.49	0.79	381.27	102	263	2.60	135	474
Archosargus probatocephalus	354	2.5	57.6	2.46	0.41	200.26	41	271	2.56	70	395
Micropogonias undulatus	339	2.4	18.1	2.35	1.16	588.92	155	253	2.42	128	356
Centropomus undecimalis	312	2.2	52.1	2.17	0.38	212.17	35	453	8.79	118	878
Sphyraena barracuda	204	1.4	36.1	1.42	0.23	191.55	16	326	9.52	92	926
Elops saurus	146	1.0	18.8	1.01	0.25	299.66	15	286	4.19	150	455
Caranx hippos	95	0.7	31.2	0.66	0.11	203.73	9	240	11.12	75	610
Lutjanus analis	81	0.6	16.7	0.56	0.16	351.00	18	143	4.38	94	256
Lutjanus griseus	72	0.5	10.4	0.50	0.26	628.91	33	182	4.97	96	354
Lutjanus synagris	72	0.5	11.8	0.50	0.20	482.42	23	111	2.48	85	171
Trachinotus falcatus	47	0.3	5.6	0.33	0.23	834.81	32	142	7.31	41	235
Haemulon aurolineatum	27	0.2	1.4	0.19	0.15	939.71	20	85	3.11	61	125
Trachinotus carolinus	21	0.1	2.1	0.15	0.10	810.82	11	223	17.49	131	355
Albula spp.	20	0.1	6.2	0.14	0.06	478.74	5	209	10.75	140	351
Callinectes sapidus	20	0.1	7.6	0.14	0.05	471.11	6	121	11.02	39	255
Caranx crysos	10	0.1	4.9	0.07	0.03	500.94	3	218	19.40	126	334
Haemulon parra	10	0.1	2.8	0.07	0.04	773.92	6	94	2.84	86	112
Leiostomus xanthurus	8	0.1	3.5	0.06	0.03	593.67	3	97	9.61	78	161
Paralichthys lethostigma	6	<0.1	4.2	0.04	0.02	481.26	1	329	51.73	162	495
Megalops atlanticus	5	<0.1	0.7	0.03	0.03	1,200.00	5	633	76.10	351	760

Species	Number No.	Number %	% Occur	Density Estimate (animals/set) Mean	Stderr	CV	Max	Standard Length (mm) Mean	Stderr	Min	Max
Pogonias cromis	5	<0.1	2.1	0.03	0.02	792.44	3	416	31.07	321	489
Sciaenops ocellatus	5	<0.1	2.8	0.03	0.02	629.25	2	489	12.71	454	519
Scomberomorus maculatus	4	<0.1	2.8	0.03	0.01	593.67	1	322	56.04	256	490
Carcharhinus leucas	3	<0.1	2.1	0.02	0.01	687.96	1	774	102.10	664	978
Epinephelus itajara	3	<0.1	1.4	0.02	0.02	891.92	2	196	34.87	140	260
Paralichthys albigutta	3	<0.1	2.1	0.02	0.01	687.96	1	152	23.84	104	176
Scomberomorus regalis	3	<0.1	1.4	0.02	0.02	891.92	2	259	14.86	243	289
Brevoortia spp.	2	<0.1	1.4	0.01	0.01	845.56	1	106	43.00	63	149
Panulirus argus	2	<0.1	1.4	0.01	0.01	845.56	1	73	12.00	61	85
Centropomus parallelus	1	<0.1	0.7	0.01	0.01	1,200.00	1	378	.	378	378
Cynoscion nebulosus	1	<0.1	0.7	0.01	0.01	1,200.00	1	448	.	448	448
Lobotes surinamensis	1	<0.1	0.7	0.01	0.01	1,200.00	1	270	.	270	270
Menticirrhus americanus	1	<0.1	0.7	0.01	0.01	1,200.00	1	141	.	141	141
Mugil rubrioculus	1	<0.1	0.7	0.01	0.01	1,200.00	1	111	.	111	111
Ocyurus chrysurus	1	<0.1	0.7	0.01	0.01	1,200.00	1	96	.	96	96
Rachycentron canadum	1	<0.1	0.7	0.01	0.01	1,200.00	1	195	.	195	195
Totals	**3,071**	**21.5**	**.**	**21.33**	**2.30**	**129.50**	**176**	**.**	**.**	**39**	**978**

Table TQ21-04. Catch statistics for 10 dominant taxa collected in 276 21.3-m river seine samples during southern Indian River Lagoon stratified-random sampling, 2021. 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	32,487	54.1	30.8	173.10	58.06	557.26	11,505.88	36	0.05	17	69
Eucinostomus spp.	5,179	8.6	67.4	27.59	4.19	252.24	677.94	25	0.11	7	57
Leiostomus xanthurus	3,777	6.3	6.5	20.12	17.82	1,470.87	4,913.24	17	0.14	10	76
Brevoortia spp.	3,467	5.8	15.6	18.47	7.90	710.62	1,573.53	31	0.14	20	72
Diapterus auratus	2,422	4.0	54.0	12.90	2.04	262.60	370.59	38	0.37	10	173
Menidia spp.	1,722	2.9	40.6	9.18	1.84	333.09	383.82	32	0.18	11	58
Gambusia holbrooki	1,256	2.1	23.9	6.69	2.37	587.96	592.65	24	0.16	10	44
Farfantepenaeus spp.	1,166	1.9	55.4	6.21	0.72	192.33	76.47	6	0.07	2	15
Eucinostomus harengulus	818	1.4	45.3	4.36	0.90	341.47	213.24	55	0.44	40	98
Eugerres plumieri	817	1.4	34.4	4.35	1.09	414.88	213.24	50	1.39	9	229
Subtotals	53,111	88.5	.	.	.	.	.	.	.	2	229
Totals	**60,001**	**100.0**	**.**	**319.70**	**63.06**	**327.68**	**11,780.88**	**.**	**.**	**2**	**824**

Table TQ21-05. Catch statistics for Selected Taxa collected in 276 21.3-m river seine samples during southern Indian River Lagoon stratified-random sampling, 2021. 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	3,777	6.3	6.5	20.12	17.82	1,470.87	4,913.24	17	0.14	10	76
Brevoortia spp.	3,467	5.8	15.6	18.47	7.90	710.62	1,573.53	31	0.14	20	72
Farfantepenaeus spp.	1,166	1.9	55.4	6.21	0.72	192.33	76.47	6	0.07	2	15
Mugil curema	581	1.0	13.4	3.10	1.41	758.66	364.71	50	1.23	17	296
Centropomus undecimalis	543	0.9	46.0	2.89	0.38	215.53	64.71	81	4.56	12	774
Callinectes sapidus	397	0.7	39.9	2.12	0.36	285.20	67.65	15	0.82	3	166
Micropogonias undulatus	377	0.6	13.8	2.01	0.53	438.46	83.82	32	0.60	11	88
Mugil cephalus	207	0.3	12.3	1.10	0.45	681.57	102.94	74	6.54	16	405
Litopenaeus setiferus	138	0.2	6.9	0.74	0.40	914.29	107.35	5	0.21	3	16
Mugil rubrioculus	57	0.1	3.3	0.30	0.16	868.75	32.35	25	1.36	17	57
Trachinotus falcatus	56	0.1	2.9	0.30	0.17	935.43	39.71	28	1.05	12	41
Archosargus probatocephalus	51	0.1	11.6	0.27	0.05	332.13	7.35	74	13.30	12	369
Sphyraena barracuda	40	0.1	8.7	0.21	0.05	386.32	7.35	98	14.56	24	503
Lutjanus griseus	25	<0.1	7.2	0.13	0.03	403.50	4.41	88	13.48	13	205
Centropomus parallelus	18	<0.1	2.9	0.10	0.04	778.16	10.29	83	17.41	27	278
Lutjanus synagris	18	<0.1	1.4	0.10	0.07	1,236.48	19.12	33	4.31	17	97
Elops saurus	14	<0.1	2.5	0.07	0.04	899.82	10.29	43	3.29	32	75
Albula spp.	10	<0.1	1.1	0.05	0.04	1,124.36	8.82	51	4.50	28	75
Megalops atlanticus	10	<0.1	0.7	0.05	0.05	1,503.79	13.24	53	23.32	26	263
Trachinotus carolinus	6	<0.1	0.4	0.03	0.03	1,661.32	8.82	37	2.14	32	47
Farfantepenaeus aztecus	5	<0.1	1.4	0.03	0.01	874.97	2.94	17	1.24	15	22
Cynoscion complex	4	<0.1	0.7	0.02	0.02	1,311.96	4.41	25	1.47	22	29

Species	Number		% Occur	Density Estimate (animals/100m^2)				Standard Length (mm)			
	No.	%		Mean	Stderr	CV	Max	Mean	Stderr	Min	Max
Caranx hippos	3	<0.1	1.1	0.02	0.01	955.67	1.47	102	40.34	27	165
Centropomus pectinatus	3	<0.1	1.1	0.02	0.01	955.67	1.47	73	31.88	33	136
Lobotes surinamensis	3	<0.1	0.4	0.02	0.02	1,661.32	4.41	14	2.33	10	18
Sciaenops ocellatus	3	<0.1	1.1	0.02	0.01	955.67	1.47	34	7.22	21	46
Centropomus ensiferus	1	<0.1	0.4	0.01	0.01	1,661.32	1.47	60	.	60	60
Haemulon parra	1	<0.1	0.4	0.01	0.01	1,661.32	1.47	58	.	58	58
Lutjanus analis	1	<0.1	0.4	0.01	0.01	1,661.32	1.47	23	.	23	23
Lutjanus jocu	1	<0.1	0.4	0.01	0.01	1,661.32	1.47	90	.	90	90
Paralichthys albigutta	1	<0.1	0.4	0.01	0.01	1,661.32	1.47	31	.	31	31
Totals	**10,984**	**18.3**	**.**	**58.53**	**19.73**	**559.97**	**4,957.35**	**.**	**.**	**2**	**774**

Appendix TQ21-01. Monthly summary of taxa collected during southern Indian River Lagoon stratified-random sampling, 2021. 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=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Abudefduf saxatilis	.	.	1	.	.	.	.	.	.	.	.	.	1
Acanthostracion quadricornis	.	.	1	.	.	.	.	.	2	.	.	.	3
Achirus lineatus	20	8	19	14	7	3	11	3	20	6	1	2	114
Albula spp.	5	.	.	6	3	7	.	2	5	1	.	1	30
Amia calva	.	.	.	.	.	.	.	.	1	.	.	.	1
Anchoa hepsetus	.	.	4	18	2	.	1	.	6	.	.	.	31
Anchoa lyolepis	3	.	9	3	.	.	.	.	12	.	.	.	27
Anchoa mitchilli	9,440	14,853	3,434	242	322	1,873	145	8	185	34	469	1,482	32,487
Anchoa spp.	.	.	.	.	1	2	1	.	.	.	.	.	4
Anchoviella perfasciata	1	.	.	.	.	.	.	.	.	.	.	.	1
Anguilla rostrata	.	.	.	1	.	.	.	.	.	.	.	.	1
Antennarius striatus	.	.	.	.	.	1	.	.	.	.	.	.	1
Archosargus probatocephalus	16	18	55	40	30	14	57	31	13	80	30	21	405
Archosargus rhomboidalis	8	50	9	38	5	5	49	370	2	39	11	62	648
Archosargus spp.	.	.	.	1	.	.	.	3	.	1	.	.	5
Ariopsis felis	12	34	31	126	117	108	127	88	68	149	12	14	886
Bagre marinus	.	.	.	.	.	.	1	.	.	3	1	.	5
Bairdiella chrysoura	.	1	1	5	4	.	10	.	4	.	2	.	27
Bathygobius soporator	.	3	.	.	4	5	.	1	2	1	.	2	18
Brevoortia spp.	139	551	1,342	1,118	315	3	.	1	.	.	.	.	3,469

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Callinectes bocourti	.	.	.	1	.	.	.	.	.	.	1	.	2
Callinectes ornatus	1	2	.	3	4	.	2	1	2	.	4	8	27
Callinectes sapidus	31	19	20	23	19	16	13	8	91	22	69	86	417
Callinectes similis	.	5	2	5	11	13	9	4	13	.	6	4	72
Callinectes spp.	3	3	4	12	2	2	.	1	.	.	.	1	28
Caranx crysos	.	.	.	1	1	.	.	5	.	2	.	1	10
Caranx hippos	7	3	13	12	7	8	2	3	2	10	14	17	98
Caranx latus	.	4	4	4	.	.	.	.	1	.	1	.	14
Carcharhinus leucas	.	.	1	.	.	.	1	.	.	1	.	.	3
Centropomus ensiferus	.	.	.	.	1	.	.	.	.	.	.	.	1
Centropomus parallelus	.	.	1	8	2	6	.	.	1	1	.	.	19
Centropomus pectinatus	.	1	.	1	.	.	.	.	.	.	1	.	3
Centropomus sp.	.	.	.	.	.	.	.	.	.	.	1	.	1
Centropomus undecimalis	64	86	95	100	62	49	43	103	41	57	56	99	855
Chaetodipterus faber	.	.	.	.	.	2	2	2	.	40	1	.	47
Chilomycterus schoepfii	1	4	.	1	4	1	2	8	.	1	.	1	23
Chloroscombrus chrysurus	.	.	6	.	.	.	.	.	.	2	.	.	8
Cichlasoma urophthalmus	3	.	5	2	2	1	3	20	3	1	.	4	44
Citharichthys spilopterus	2	26	32	56	31	15	3	4	20	4	2	6	201
Clupeidae spp.	.	.	2	3	.	.	.	.	.	.	.	.	5
Corvula sanctaeluciae	.	.	.	.	.	.	.	.	.	.	.	3	3
Ctenogobius boleosoma	5	2	3	7	6	5	.	.	.	9	2	6	45

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Ctenogobius pseudofasciatus	.	.	1	.	.	.	.	.	1	.	.	.	2
Ctenogobius saepepallens	1	.	.	.	.	.	.	.	.	.	.	.	1
Ctenogobius shufeldti	1	.	.	.	.	1	.	.	3	1	.	.	6
Ctenogobius smaragdus	1	11	.	.	.	.	.	.	.	.	.	10	22
Ctenogobius spp.	1	1	.	.	.	3	.	.	.	.	.	.	5
Cynoscion complex	.	.	.	.	.	.	.	.	3	.	1	.	4
Cynoscion nebulosus	.	.	.	.	.	1	.	.	.	.	.	.	1
Dasyatis americana	.	.	.	.	.	.	.	1	.	.	.	.	1
Dasyatis centroura	.	.	.	.	.	.	.	.	1	.	.	.	1
Dasyatis sabina	3	9	8	12	8	32	5	5	21	1	4	4	112
Dasyatis say	4	1	4	10	7	5	2	19	13	9	14	17	105
Diapterus auratus	796	717	690	818	336	381	642	366	394	503	846	552	7,041
Diapterus rhombeus	2	.	.	.	.	.	2	.	.	7	58	3	72
Diplodus holbrookii	.	.	5	.	.	.	.	.	.	.	.	.	5
Dormitator maculatus	.	.	11	3	.	4	3	7	1	.	4	1	34
Dorosoma petenense	.	1	.	.	.	.	.	.	.	.	.	.	1
Echeneis naucrates	.	.	.	.	.	.	3	.	.	.	.	.	3
Elassoma evergladei	1	.	.	.	.	.	.	.	.	.	.	.	1
Eleotris amblyopsis	1	.	5	4	1	.	.	2	.	.	.	.	13
Elops saurus	2	40	24	32	16	6	2	.	1	9	24	4	160
Epinephelus itajara	.	.	.	.	1	.	.	.	.	.	.	2	3
Etheostoma fusiforme	1	.	.	.	.	.	.	.	.	.	.	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Eucinostomus argenteus	.	.	.	.	.	.	.	.	.	.	.	2	2
Eucinostomus gula	16	.	.	71	6	53	80	641	516	98	85	223	1,789
Eucinostomus harengulus	10	25	37	82	169	244	105	325	118	82	44	145	1,386
Eucinostomus jonesii	.	.	34	1	4	13	.	12	.	.	.	224	288
Eucinostomus melanopterus	.	.	.	6	5	4	3	3	1	.	.	6	28
Eucinostomus spp.	179	176	309	295	283	632	695	521	516	243	388	942	5,179
Eugerres plumieri	18	22	16	46	174	137	165	185	35	15	10	8	831
Evorthodus lyricus	1	1	2	3	2	1	4	2	34	1	1	6	58
Farfantepenaeus aztecus	.	.	2	.	.	2	.	.	.	1	.	.	5
Farfantepenaeus spp.	40	105	178	281	219	45	125	34	37	31	58	13	1,166
Fundulus chrysotus	1	.	.	.	.	.	.	.	.	.	.	.	1
Gambusia holbrooki	661	16	89	256	29	2	51	26	25	34	46	21	1,256
Gerreidae sp.	.	.	.	.	.	.	1	.	.	.	.	.	1
Gerres cinereus	18	56	13	26	3	18	27	22	42	20	.	16	261
Gobiomorus dormitor	3	.	5	6	2	2	2	2	.	2	.	2	26
Gobionellus oceanicus	19	4	35	10	12	2	.	4	9	20	1	9	125
Gobiosoma bosc	13	11	6	5	3	2	2	12	2	2	.	4	62
Gobiosoma robustum	2	1	.	.	.	.	.	.	.	.	.	1	4
Gobiosoma spp.	20	2	1	13	11	7	33	64	17	7	15	3	193
Gymnura micrura	.	.	1	1	2	.	.	.	.	.	.	1	5
Haemulon aurolineatum	.	.	.	.	.	.	.	20	7	.	.	.	27
Haemulon parra	.	.	.	.	.	.	.	2	2	.	.	7	11

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Harengula humeralis	1	.	.	.	.	25	1	.	.	.	.	1	28
Harengula jaguana	67	8	.	17	113	85	358	4	176	17	29	6	880
Heterandria formosa	.	.	.	.	.	.	.	5	.	.	.	.	5
Jordanella floridae	.	.	1	.	.	.	.	.	.	.	.	.	1
Labidesthes sicculus	16	1	23	40	1	3	6	17	6	6	.	2	121
Lactophrys trigonus	.	.	1	.	.	1	.	.	.	4	.	.	6
Lagodon rhomboides	19	8	20	72	102	14	223	429	17	38	38	5	985
Leiostomus xanthurus	.	.	3,530	151	101	2	.	.	.	.	.	1	3,785
Lepisosteus osseus	.	.	.	.	.	.	.	.	.	.	1	.	1
Lepisosteus platyrhincus	.	.	2	1	.	.	1	5	.	1	1	2	13
Lepomis macrochirus	33	4	1	7	.	.	.	5	2	4	6	13	75
Lepomis microlophus	.	.	.	.	.	.	1	.	.	.	.	.	1
Lepomis spp.	1	.	.	.	.	.	.	20	1	4	.	.	26
Litopenaeus setiferus	.	.	.	13	19	1	.	.	88	5	1	11	138
Lobotes surinamensis	.	.	.	.	.	.	.	.	.	3	1	.	4
Lophogobius cyprinoides	11	17	2	13	19	60	40	8	39	11	5	.	225
Lucania goodei	.	.	1	.	.	.	.	3	.	.	.	.	4
Lutjanus analis	1	1	.	3	.	9	1	13	5	16	8	25	82
Lutjanus griseus	2	5	4	4	3	.	1	28	5	40	4	1	97
Lutjanus jocu	.	.	.	.	.	.	.	.	1	.	.	.	1
Lutjanus synagris	3	1	.	.	.	4	8	27	1	26	14	6	90
Megalops atlanticus	.	.	.	1	.	.	9	.	5	.	.	.	15

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Menidia spp.	127	99	90	76	72	181	26	220	146	357	250	78	1,722
Menticirrhus americanus	.	.	.	.	.	.	.	1	.	.	.	.	1
Microgobius gulosus	33	16	17	12	16	20	37	110	60	78	78	37	514
Microgobius microlepis	.	.	.	.	.	.	.	.	.	.	1	.	1
Microgobius thalassinus	.	.	1	.	1	2	.	.	.	.	.	.	4
Microphis brachyurus	4	4	2	7	.	1	.	.	.	1	.	2	21
Micropogonias undulatus	228	63	60	41	33	9	5	2	71	172	15	17	716
Micropterus salmoides	.	.	.	3	.	.	.	.	.	.	.	.	3
Mugil cephalus	44	46	68	103	38	12	.	18	16	39	145	36	565
Mugil curema	190	20	215	148	172	292	26	46	74	97	45	83	1,408
Mugil rubrioculus	.	.	.	2	.	2	19	1	6	27	.	1	58
Mugil spp.	.	.	.	.	.	.	.	.	4	.	.	.	4
Myliobatis freminvillii	.	1	.	.	.	.	.	.	.	.	.	.	1
Narcine bancroftii	.	.	.	.	.	.	.	.	1	.	.	1	2
Ocyurus chrysurus	.	.	.	.	.	.	.	1	.	.	.	.	1
Oligoplites saurus	1	9	.	2	3	6	4	3	10	29	2	11	80
Opisthonema oglinum	1	8	4	86	2	.	1	445	2	.	58	2	609
Opsanus tau	.	.	.	2	.	.	.	.	1	.	.	.	3
Oreochromis complex	.	.	7	4	7	1	1	3	.	.	.	.	23
Oreochromis/Sarotherodon spp.	.	.	3	.	.	3	1	2	1	1	.	.	11
Orthopristis chrysoptera	.	.	2	4	7	.	55	12	.	3	.	.	83
Panulirus argus	.	.	.	1	.	.	.	.	.	1	.	.	2

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Paralichthys albigutta	.	.	.	1	1	.	.	2	.	.	.	.	4
Paralichthys lethostigma	.	.	1	.	.	2	2	.	.	.	1	.	6
Penaeus monodon	.	.	.	2	.	1	.	.	.	.	.	.	3
Peprilus paru	.	.	.	.	.	.	.	.	.	.	1	.	1
Poecilia latipinna	13	.	.	.	.	.	.	.	.	.	.	.	13
Pogonias cromis	.	.	1	.	.	.	.	.	.	3	.	1	5
Portunus sp.	.	.	.	.	.	1	.	.	.	.	.	.	1
Prionotus rubio	1	.	.	.	.	.	.	.	.	.	.	.	1
Prionotus scitulus	.	.	.	2	.	1	.	.	1	.	.	.	4
Prionotus sp.	.	.	.	1	.	.	.	.	.	.	.	.	1
Prionotus tribulus	.	1	1	.	.	.	.	1	.	.	.	2	5
Pristis pectinata	.	.	.	1	.	.	2	.	.	.	.	.	3
Pterygoplichthys spp.	2	1	.	.	.	.	.	.	.	.	1	.	4
Rachycentron canadum	.	.	.	.	.	.	.	.	.	.	.	1	1
Rhinoptera bonasus	.	.	.	1	.	.	.	.	.	.	.	.	1
Rimapenaeus sp.	.	.	.	.	.	1	.	.	.	.	.	.	1
Sardinella aurita	.	.	.	.	.	.	.	.	.	1	.	.	1
Sarotherodon melanotheron	.	1	.	.	.	.	.	.	1	.	.	.	2
Sciaenops ocellatus	2	1	.	3	.	.	1	.	.	.	.	1	8
Scomberomorus maculatus	.	1	1	2	.	.	.	.	.	.	.	.	4
Scomberomorus regalis	.	1	.	.	.	.	.	2	.	.	.	.	3
Scorpaena grandicornis	.	.	.	2	.	2	.	.	1	.	2	.	7

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Scorpaena plumieri	1	.	.	.	.	1	.	1	.	.	.	.	3
Scorpaena sp.	.	.	1	.	.	.	.	.	.	.	.	.	1
Selene vomer	49	32	2	21	7	16	7	3	13	16	17	11	194
Sphoeroides nephelus	2	1	3	1	4	1	.	2	1	2	2	2	21
Sphoeroides spengleri	.	.	1	.	1	.	.	.	.	1	1	2	6
Sphoeroides testudineus	21	36	25	18	26	67	44	154	45	32	65	37	570
Sphyraena barracuda	20	12	3	12	17	20	20	23	28	37	15	37	244
Stephanolepis hispidus	.	.	.	.	1	.	.	.	.	1	.	.	2
Strongylura marina	2	.	.	.	.	1	.	.	15	.	.	.	18
Strongylura notata	2	1	1	1	1	.	1	2	6	2	5	6	28
Strongylura spp.	.	.	.	2	1	.	.	.	.	.	.	.	3
Strongylura timucu	.	2	.	.	.	.	.	5	1	.	.	.	8
Symphurus plagiusa	.	.	.	.	1	2	.	.	1	.	.	.	4
Syngnathus louisianae	.	.	.	1	.	.	.	.	.	.	1	1	3
Syngnathus scovelli	.	.	.	1	.	1	.	.	.	.	.	.	2
Synodus foetens	5	1	.	4	3	2	.	.	.	.	1	2	18
Tilapia mariae	.	4	.	.	.	.	1	.	.	.	.	.	5
Trachinotus carolinus	.	1	9	.	.	6	.	.	.	.	.	11	27
Trachinotus falcatus	.	.	.	7	4	36	1	16	1	32	3	3	103
Trinectes maculatus	35	30	29	5	9	3	4	1	1	5	2	26	150
Tylosurus crocodilus	.	.	.	.	.	.	1	.	.	5	.	.	6
Tylosurus sp.	.	.	.	.	.	.	.	.	1	.	.	.	1

Species	Month												Totals
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=35	E=420
Xiphophorus spp.	1	.	.	2	.	.	.	.	.	.	.	.	3
Totals	**12,514**	**17,309**	**10,702**	**4,735**	**3,040**	**4,633**	**3,342**	**4,581**	**3,147**	**2,667**	**3,102**	**4,530**	**74,302**

Appendix TQ21-02. Summary by gear and stratum of taxa collected during southern Indian River Lagoon stratified-random sampling, 2021. Sampling with 183-m haul seines and 21.3-m river seines was post-stratified by the presence or absence of overhanging vegetation ('Over' or 'Nonover'). Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	Gear and Strata				Totals
	21.3-m river seine		183-m haul seine		
	Over	Nonover	Over	Nonover	
	E=188	E=88	E=105	E=39	E=420
Abudefduf saxatilis	.	1	.	.	1
Acanthostracion quadricornis	.	.	3	.	3
Achirus lineatus	86	11	13	4	114
Albula spp.	9	1	18	2	30
Amia calva	.	1	.	.	1
Anchoa hepsetus	20	11	.	.	31
Anchoa lyolepis	2	25	.	.	27
Anchoa mitchilli	26,171	6,316	.	.	32,487
Anchoa spp.	3	1	.	.	4
Anchoviella perfasciata	.	1	.	.	1
Anguilla rostrata	1	.	.	.	1
Antennarius striatus	.	.	.	1	1
Archosargus probatocephalus	42	9	276	78	405
Archosargus rhomboidalis	.	.	643	5	648
Archosargus spp.	.	.	5	.	5
Ariopsis felis	8	7	695	176	886
Bagre marinus	.	.	4	1	5
Bairdiella chrysoura	2	14	11	.	27
Bathygobius soporator	12	6	.	.	18
Brevoortia spp.	2,915	552	2	.	3,469
Callinectes bocourti	1	.	.	1	2
Callinectes ornatus	9	3	11	4	27
Callinectes sapidus	349	48	19	1	417
Callinectes similis	29	17	22	4	72
Callinectes spp.	10	17	1	.	28
Caranx crysos	.	.	8	2	10
Caranx hippos	2	1	74	21	98
Caranx latus	2	.	12	.	14
Carcharhinus leucas	.	.	3	.	3
Centropomus ensiferus	1	.	.	.	1
Centropomus parallelus	15	3	1	.	19

Species	Gear and Strata				Totals
	21.3-m river seine		183-m haul seine		
	Over	Nonover	Over	Nonover	
	E=188	E=88	E=105	E=39	E=420
Centropomus pectinatus	3	.	.	.	3
Centropomus sp.	.	1	.	.	1
Centropomus undecimalis	412	131	211	101	855
Chaetodipterus faber	.	3	43	1	47
Chilomycterus schoepfii	1	.	20	2	23
Chloroscombrus chrysurus	.	.	8	.	8
Cichlasoma urophthalmus	23	21	.	.	44
Citharichthys spilopterus	133	40	21	7	201
Clupeidae spp.	.	5	.	.	5
Corvula sanctaeluciae	.	.	3	.	3
Ctenogobius boleosoma	21	24	.	.	45
Ctenogobius pseudofasciatus	2	.	.	.	2
Ctenogobius saepepallens	.	1	.	.	1
Ctenogobius shufeldti	6	.	.	.	6
Ctenogobius smaragdus	22	.	.	.	22
Ctenogobius spp.	5	.	.	.	5
Cynoscion complex	1	3	.	.	4
Cynoscion nebulosus	.	.	1	.	1
Dasyatis americana	.	.	1	.	1
Dasyatis centroura	.	.	1	.	1
Dasyatis sabina	2	1	80	29	112
Dasyatis say	.	.	83	22	105
Diapterus auratus	1,631	791	3,711	908	7,041
Diapterus rhombeus	5	6	61	.	72
Diplodus holbrookii	.	5	.	.	5
Dormitator maculatus	23	11	.	.	34
Dorosoma petenense	.	1	.	.	1
Echeneis naucrates	.	.	.	3	3
Elassoma evergladei	1	.	.	.	1
Eleotris amblyopsis	13	.	.	.	13
Elops saurus	11	3	111	35	160
Epinephelus itajara	.	.	3	.	3
Etheostoma fusiforme	1	.	.	.	1
Eucinostomus argenteus	2	.	.	.	2
Eucinostomus gula	416	116	993	264	1,789

Species	Gear and Strata				Totals
	21.3-m river seine		183-m haul seine		
	Over	Nonover	Over	Nonover	
	E=188	E=88	E=105	E=39	E=420
Eucinostomus harengulus	605	213	494	74	1,386
Eucinostomus jonesii	69	57	162	.	288
Eucinostomus melanopterus	.	1	17	10	28
Eucinostomus spp.	2,751	2,428	.	.	5,179
Eugerres plumieri	722	95	3	11	831
Evorthodus lyricus	42	16	.	.	58
Farfantepenaeus aztecus	1	4	.	.	5
Farfantepenaeus spp.	799	367	.	.	1,166
Fundulus chrysotus	1	.	.	.	1
Gambusia holbrooki	1,124	132	.	.	1,256
Gerreidae sp.	.	1	.	.	1
Gerres cinereus	152	7	86	16	261
Gobiomorus dormitor	21	5	.	.	26
Gobionellus oceanicus	113	12	.	.	125
Gobiosoma bosc	56	6	.	.	62
Gobiosoma robustum	3	1	.	.	4
Gobiosoma spp.	144	49	.	.	193
Gymnura micrura	.	.	2	3	5
Haemulon aurolineatum	.	.	27	.	27
Haemulon parra	1	.	10	.	11
Harengula humeralis	26	2	.	.	28
Harengula jaguana	11	597	250	22	880
Heterandria formosa	.	5	.	.	5
Jordanella floridae	1	.	.	.	1
Labidesthes sicculus	103	18	.	.	121
Lactophrys trigonus	.	.	5	1	6
Lagodon rhomboides	106	20	832	27	985
Leiostomus xanthurus	161	3,616	3	5	3,785
Lepisosteus osseus	1	.	.	.	1
Lepisosteus platyrhincus	9	4	.	.	13
Lepomis macrochirus	51	24	.	.	75
Lepomis microlophus	.	1	.	.	1
Lepomis spp.	20	6	.	.	26
Litopenaeus setiferus	50	88	.	.	138
Lobotes surinamensis	3	.	1	.	4

Species	Gear and Strata				Totals
	21.3-m river seine		183-m haul seine		
	Over	Nonover	Over	Nonover	
	E=188	E=88	E=105	E=39	E=420
Lophogobius cyprinoides	205	20	.	.	225
Lucania goodei	1	3	.	.	4
Lutjanus analis	1	.	81	.	82
Lutjanus griseus	14	11	68	4	97
Lutjanus jocu	1	.	.	.	1
Lutjanus synagris	13	5	70	2	90
Megalops atlanticus	1	9	5	.	15
Menidia spp.	1,249	473	.	.	1,722
Menticirrhus americanus	.	.	1	.	1
Microgobius gulosus	335	179	.	.	514
Microgobius microlepis	.	1	.	.	1
Microgobius thalassinus	2	2	.	.	4
Microphis brachyurus	16	5	.	.	21
Micropogonias undulatus	276	101	284	55	716
Micropterus salmoides	3	.	.	.	3
Mugil cephalus	133	74	160	198	565
Mugil curema	404	177	501	326	1,408
Mugil rubrioculus	1	56	1	.	58
Mugil spp.	.	4	.	.	4
Myliobatis freminvillii	.	.	.	1	1
Narcine bancroftii	.	.	1	1	2
Ocyurus chrysurus	.	.	1	.	1
Oligoplites saurus	9	1	65	5	80
Opisthonema oglinum	83	2	523	1	609
Opsanus tau	.	.	3	.	3
Oreochromis complex	18	2	3	.	23
Oreochromis/Sarotherodon spp.	9	2	.	.	11
Orthopristis chrysoptera	3	3	77	.	83
Panulirus argus	.	.	2	.	2
Paralichthys albigutta	1	.	2	1	4
Paralichthys lethostigma	.	.	5	1	6
Penaeus monodon	3	.	.	.	3
Peprilus paru	.	.	1	.	1
Poecilia latipinna	13	.	.	.	13
Pogonias cromis	.	.	4	1	5

Species	Gear and Strata				Totals
	21.3-m river seine		183-m haul seine		
	Over	Nonover	Over	Nonover	
	E=188	E=88	E=105	E=39	E=420
Portunus sp.	.	1	.	.	1
Prionotus rubio	.	.	1	.	1
Prionotus scitulus	1	1	2	.	4
Prionotus sp.	.	.	1	.	1
Prionotus tribulus	2	.	3	.	5
Pristis pectinata	.	.	.	3	3
Pterygoplichthys spp.	3	1	.	.	4
Rachycentron canadum	.	.	1	.	1
Rhinoptera bonasus	.	.	.	1	1
Rimapenaeus sp.	.	1	.	.	1
Sardinella aurita	.	.	1	.	1
Sarotherodon melanotheron	2	.	.	.	2
Sciaenops ocellatus	2	1	5	.	8
Scomberomorus maculatus	.	.	3	1	4
Scomberomorus regalis	.	.	3	.	3
Scorpaena grandicornis	2	.	3	2	7
Scorpaena plumieri	.	.	3	.	3
Scorpaena sp.	.	1	.	.	1
Selene vomer	1	1	171	21	194
Sphoeroides nephelus	8	2	11	.	21
Sphoeroides spengleri	1	.	4	1	6
Sphoeroides testudineus	140	49	241	140	570
Sphyraena barracuda	32	8	157	47	244
Stephanolepis hispidus	1	1	.	.	2
Strongylura marina	2	.	2	14	18
Strongylura notata	8	.	19	1	28
Strongylura spp.	1	2	.	.	3
Strongylura timucu	8	.	.	.	8
Symphurus plagiusa	1	3	.	.	4
Syngnathus louisianae	2	1	.	.	3
Syngnathus scovelli	1	1	.	.	2
Synodus foetens	4	8	6	.	18
Tilapia mariae	4	1	.	.	5
Trachinotus carolinus	.	6	12	9	27
Trachinotus falcatus	28	28	36	11	103

Species	Gear and Strata				Totals
	21.3-m river seine		183-m haul seine		
	Over	Nonover	Over	Nonover	
	E=188	E=88	E=105	E=39	E=420
Trinectes maculatus	126	24	.	.	150
Tylosurus crocodilus	.	1	5	.	6
Tylosurus sp.	.	.	1	.	1
Xiphophorus spp.	1	2	.	.	3
Totals	**42,744**	**17,257**	**11,613**	**2,688**	**74,302**

Appendix TQ21-03. Summary by zone of taxa collected during southern Indian River Lagoon stratified-random sampling, 2021. Zones I and J were located in the Indian River, and Zone L and T encompassed the St. Lucie and Loxahatchee Rivers. Effort, or the total number of hauls, is labeled 'E'. Taxa are arranged alphabetically.

Species	**Zone**				**Totals**
	I	**J**	**L**	**T**	
	E=48	**E=48**	**E=60**	**E=264**	**E=420**
Abudefduf saxatilis	.	.	.	1	1
Acanthostracion quadricornis	1	2	.	.	3
Achirus lineatus	2	3	10	99	114
Albula spp.	.	17	10	3	30
Amia calva	.	.	.	1	1
Anchoa hepsetus	.	.	.	31	31
Anchoa lyolepis	.	.	2	25	27
Anchoa mitchilli	.	.	1,628	30,859	32,487
Anchoa spp.	.	.	1	3	4
Anchoviella perfasciata	.	.	.	1	1
Anguilla rostrata	.	.	.	1	1
Antennarius striatus	.	1	.	.	1
Archosargus probatocephalus	163	70	7	165	405
Archosargus rhomboidalis	525	123	.	.	648
Archosargus spp.	4	1	.	.	5
Ariopsis felis	337	360	1	188	886
Bagre marinus	2	2	.	1	5
Bairdiella chrysoura	4	7	.	16	27
Bathygobius soporator	.	.	8	10	18
Brevoortia spp.	2	.	37	3,430	3,469
Callinectes bocourti	.	1	.	1	2
Callinectes ornatus	2	13	11	1	27
Callinectes sapidus	3	8	45	361	417
Callinectes similis	10	5	16	41	72
Callinectes spp.	1	.	8	19	28
Caranx crysos	3	3	.	4	10
Caranx hippos	40	32	2	24	98
Caranx latus	5	7	1	1	14
Carcharhinus leucas	2	.	.	1	3
Centropomus ensiferus	.	.	.	1	1
Centropomus parallelus	.	.	.	19	19
Centropomus pectinatus	.	.	.	3	3
Centropomus sp.	.	.	.	1	1

Species	Zone				Totals
	I	J	L	T	
	E=48	E=48	E=60	E=264	E=420
Centropomus undecimalis	163	53	27	612	855
Chaetodipterus faber	43	1	.	3	47
Chilomycterus schoepfii	8	11	1	3	23
Chloroscombrus chrysurus	.	8	.	.	8
Cichlasoma urophthalmus	.	.	.	44	44
Citharichthys spilopterus	6	10	57	128	201
Clupeidae spp.	.	.	.	5	5
Corvula sanctaeluciae	.	3	.	.	3
Ctenogobius boleosoma	.	.	16	29	45
Ctenogobius pseudofasciatus	.	.	1	1	2
Ctenogobius saepepallens	.	.	1	.	1
Ctenogobius shufeldti	.	.	.	6	6
Ctenogobius smaragdus	.	.	14	8	22
Ctenogobius spp.	.	.	4	1	5
Cynoscion complex	.	.	.	4	4
Cynoscion nebulosus	1	.	.	.	1
Dasyatis americana	1	.	.	.	1
Dasyatis centroura	.	1	.	.	1
Dasyatis sabina	44	20	1	47	112
Dasyatis say	66	25	.	14	105
Diapterus auratus	1,457	2,304	241	3,039	7,041
Diapterus rhombeus	4	57	2	9	72
Diplodus holbrookii	.	.	.	5	5
Dormitator maculatus	.	.	.	34	34
Dorosoma petenense	.	.	.	1	1
Echeneis naucrates	.	.	.	3	3
Elassoma evergladei	.	.	.	1	1
Eleotris amblyopsis	.	.	.	13	13
Elops saurus	43	92	1	24	160
Epinephelus itajara	1	2	.	.	3
Etheostoma fusiforme	.	.	.	1	1
Eucinostomus argenteus	.	.	2	.	2
Eucinostomus gula	806	436	450	97	1,789
Eucinostomus harengulus	307	154	329	596	1,386
Eucinostomus jonesii	.	162	84	42	288
Eucinostomus melanopterus	4	12	.	12	28

Species	Zone				Totals
	I	J	L	T	
	E=48	E=48	E=60	E=264	E=420
Eucinostomus spp.	.	.	2,603	2,576	5,179
Eugerres plumieri	.	11	327	493	831
Evorthodus lyricus	.	.	19	39	58
Farfantepenaeus aztecus	.	.	.	5	5
Farfantepenaeus spp.	.	.	220	946	1,166
Fundulus chrysotus	.	.	.	1	1
Gambusia holbrooki	.	.	47	1,209	1,256
Gerreidae sp.	.	.	.	1	1
Gerres cinereus	30	66	64	101	261
Gobiomorus dormitor	.	.	.	26	26
Gobionellus oceanicus	.	.	24	101	125
Gobiosoma bosc	.	.	8	54	62
Gobiosoma robustum	.	.	.	4	4
Gobiosoma spp.	.	.	14	179	193
Gymnura micrura	1	4	.	.	5
Haemulon aurolineatum	20	7	.	.	27
Haemulon parra	1	9	.	1	11
Harengula humeralis	.	.	25	3	28
Harengula jaguana	234	33	493	120	880
Heterandria formosa	.	.	.	5	5
Jordanella floridae	.	.	1	.	1
Labidesthes sicculus	.	.	1	120	121
Lactophrys trigonus	1	5	.	.	6
Lagodon rhomboides	819	38	46	82	985
Leiostomus xanthurus	4	3	124	3,654	3,785
Lepisosteus osseus	.	.	.	1	1
Lepisosteus platyrhincus	.	.	1	12	13
Lepomis macrochirus	.	.	.	75	75
Lepomis microlophus	.	.	.	1	1
Lepomis spp.	.	.	.	26	26
Litopenaeus setiferus	.	.	2	136	138
Lobotes surinamensis	.	.	.	4	4
Lophogobius cyprinoides	.	.	136	89	225
Lucania goodei	.	.	1	3	4
Lutjanus analis	35	42	.	5	82
Lutjanus griseus	63	4	12	18	97

Species	Zone				Totals
	I	J	L	T	
	E=48	E=48	E=60	E=264	E=420
Lutjanus jocu	.	.	1	.	1
Lutjanus synagris	32	40	2	16	90
Megalops atlanticus	5	.	1	9	15
Menidia spp.	.	.	686	1,036	1,722
Menticirrhus americanus	1	.	.	.	1
Microgobius gulosus	.	.	64	450	514
Microgobius microlepis	.	.	1	.	1
Microgobius thalassinus	.	.	1	3	4
Microphis brachyurus	.	.	2	19	21
Micropogonias undulatus	20	218	54	424	716
Micropterus salmoides	.	.	.	3	3
Mugil cephalus	86	150	14	315	565
Mugil curema	342	374	260	432	1,408
Mugil rubrioculus	.	1	.	57	58
Mugil spp.	.	.	.	4	4
Myliobatis freminvillii	1	.	.	.	1
Narcine bancroftii	.	2	.	.	2
Ocyurus chrysurus	1	.	.	.	1
Oligoplites saurus	24	39	3	14	80
Opisthonema oglinum	512	11	83	3	609
Opsanus tau	2	.	.	1	3
Oreochromis complex	.	.	3	20	23
Oreochromis/Sarotherodon spp.	.	.	3	8	11
Orthopristis chrysoptera	74	3	3	3	83
Panulirus argus	.	2	.	.	2
Paralichthys albigutta	3	.	1	.	4
Paralichthys lethostigma	4	.	.	2	6
Penaeus monodon	.	.	2	1	3
Peprilus paru	1	.	.	.	1
Poecilia latipinna	.	.	.	13	13
Pogonias cromis	4	.	.	1	5
Portunus sp.	.	.	.	1	1
Prionotus rubio	1	.	.	.	1
Prionotus scitulus	2	.	1	1	4
Prionotus sp.	.	1	.	.	1
Prionotus tribulus	2	.	1	2	5

Species	Zone				Totals
	I	J	L	T	
	E=48	E=48	E=60	E=264	E=420
Pristis pectinata	.	.	.	3	3
Pterygoplichthys spp.	.	.	.	4	4
Rachycentron canadum	.	.	.	1	1
Rhinoptera bonasus	.	.	.	1	1
Rimapenaeus sp.	.	.	.	1	1
Sardinella aurita	1	.	.	.	1
Sarotherodon melanotheron	.	.	1	1	2
Sciaenops ocellatus	4	1	.	3	8
Scomberomorus maculatus	1	2	.	1	4
Scomberomorus regalis	3	.	.	.	3
Scorpaena grandicornis	2	3	2	.	7
Scorpaena plumieri	2	1	.	.	3
Scorpaena sp.	.	.	.	1	1
Selene vomer	119	52	.	23	194
Sphoeroides nephelus	9	2	4	6	21
Sphoeroides spengleri	1	4	1	.	6
Sphoeroides testudineus	210	110	161	89	570
Sphyraena barracuda	83	104	22	35	244
Stephanolepis hispidus	.	.	1	1	2
Strongylura marina	1	15	.	2	18
Strongylura notata	19	1	7	1	28
Strongylura spp.	.	.	.	3	3
Strongylura timucu	.	.	8	.	8
Symphurus plagiusa	.	.	.	4	4
Syngnathus louisianae	.	.	1	2	3
Syngnathus scovelli	.	.	2	.	2
Synodus foetens	3	3	4	8	18
Tilapia mariae	.	.	4	1	5
Trachinotus carolinus	1	11	.	15	27
Trachinotus falcatus	34	3	28	38	103
Trinectes maculatus	.	.	15	135	150
Tylosurus crocodilus	.	4	1	1	6
Tylosurus sp.	.	1	.	.	1
Xiphophorus spp.	.	.	.	3	3
Totals	**6,878**	**5,386**	**8,634**	**53,404**	**74,302**

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 2021 (Figure FIM21-01).

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 199,142 fish (≥ 75 mm SL) and selected invertebrates that were collected statewide during 2021 FIM SRS, 1,103 (42 taxa, 0.6%) were observed to have a GEA (Table FH21-01). The northern Indian River Lagoon had the highest incidence of specimens with GEAs (2.2%). Cedar Key (0.2%), Apalachicola Bay (0.2%), Tampa Bay (<0.1%), northeast Florida (<0.1%), southern Indian River Lagoon (<0.1%) and Charlotte Harbor (<0.1%), all had very low incidences of specimens with observed GEAs. Statewide, all nine categories of GEAs were observed in 2021. The most often identified GEA was parasitic infection (P; n=881; Table FH21-02) accounting for 80% of all GEA's observed from all estuaries. The next most common GEA observed was red or bloody areas (B; n=94). Six of the top 10 taxa observed to have a GEA were of recreational or commercial importance (i.e., Selected Taxa). *Ariopsis felis* (n=904) was the most affected taxa. The majority of the GEA's for that species were parasitic infestation (P, n=799). *Chelonia mydas* was the only reptile collected with a GEA during routine monitoring in 2021. It was collected in southern Indian River Lagoon and had a GEA of tumor (T).

Incidence by Lab

Apalachicola Bay: Apalachicola Bay staff examined 24,843 specimens for GEAs. Forty-three individuals (0.2%) from 13 taxa, six of which were Selected Taxa, had a GEA (Table FH21-03). Parasitic infestation (P; n=13) and fin rot (F; n=13) were the most common GEAs observed and accounted for 60% of the affected specimens within Apalachicola Bay.

Cedar Key: Cedar Key staff examined 19,596 specimens for GEAs. Forty individuals (<0.1%) from 11 taxa, three of which were Selected Taxa, had a GEA (Table FH21-04). Parasitic infection (P; n=22) was the most common GEA observed and accounted for 55% of the affected specimens within Cedar Key.

Charlotte Harbor: Charlotte Harbor staff examined 48,269 specimens for GEAs. Fifteen individuals (<0.1%) from four taxa, two of which were Selected Taxa, had a GEA (Table FH21-05). Of those, 12 specimens (80%) were dead prior to collection (D). Eleven of those were *Myrophis punctatus.*

Northern Indian River Lagoon: Northern Indian River Lagoon staff examined 44,750 specimens for GEAs and had the highest occurrence of specimens with GEAs.

Nine hundred and sixty-one individuals (2.2%) from 16 taxa, seven of which were Selected Taxa, had a GEA (Table FH21-06). Parasitic infestation (P; n= 834) accounted for 87% of the affected specimens within the northern Indian River Lagoon system and was primarily observed on *Ariopsis felis* (n=789).

Northeast Florida: Northeast Florida staff examined 10,167 specimens for GEAs. Only seven individuals (<0.1%) from five taxa, two of which were Selected Taxa, had a GEA (Table FH21-07). Parasitic infection (P; n=3) was the most common GEA observed in northeast Florida.

Tampa Bay: Tampa Bay staff examined 37,077 specimens for GEAs. Twenty-eight individuals (<0.1%) from 16 taxa, four of which were Selected Taxa, had a GEA (Table FH21-08). Dead prior to collection (D; n=13) was the most common GEA observed and comprised 46% of the GEAs observed in Tampa Bay.

Southern Indian River Lagoon: Southern Indian River Lagoon staff examined 14,440 specimens for GEAs. Nine individuals (<0.1%) from three taxa, one of which was Selected Taxa, had a GEA (Table FH21-09). Parasitic infection (P; n=7) was the most common GEA observed and comprised 78% of the GEAs observed in the southern Indian River Lagoon.

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Table FH21-01. Incidence of external abnormalities in fish and selected invertebrates collected during stratified-random sampling at each FIM field lab during 2021. 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	24,843	43	0.2
Cedar Key	19,596	40	0.2
Charlotte Harbor	48,269	15	<0.1
Northern Indian River Lagoon	44,750	961	2.2
Northeast Florida	10,167	7	<0.1
Tampa Bay	37,077	28	<0.1
Southern Indian River Lagoon	14,440	9	<0.1
Totals	**199,142**	**1,103**	**0.6**

Table FH21-02. 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, 2021. 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)**	**(≥ 75 mm)**	**P**	**B**	**F**	**U**	**E**	**S**	**T**	**O**	**D**	**Affected**
Myrophis punctatus	35	11	.	.	.	.	.	.	.	.	11	31.4
Ariopsis felis	6,931	904	799	86	3	2	.	.	1	13	.	13.0
Sciaenops ocellatus	1,009	16	1	.	.	12	.	1	.	2	.	1.6
Mugil curema	3,365	46	38	.	8	.	.	.	.	.	.	1.4
Brevoortia spp.	1,711	21	21	.	.	.	.	.	.	.	.	1.2
Archosargus probatocephalus	859	7	.	.	2	4	1	.	.	.	.	0.8
Mugil cephalus	3,571	11	5	2	2	1	.	.	.	1	.	0.3
Centropomus undecimalis	3,200	9	.	2	3	2	.	.	1	1	.	0.3
Leiostomus xanthurus	2,819	6	1	.	5	.	.	.	.	.	.	0.2
Lagodon rhomboides	18,360	11	2	.	.	.	.	3	.	.	6	<0.1
Subtotals (top 10 taxa with GEAs)	**41,860**	**1,042**	**867**	**90**	**23**	**21**	**1**	**4**	**2**	**17**	**17**	**2.5**
Totals (all taxa)	**199,142**	**1,103**	**881**	**94**	**30**	**31**	**2**	**16**	**4**	**20**	**25**	**0.6**

[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 FH21-03. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in Apalachicola Bay during stratified-random sampling, 2021. 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	
Gymnura micrura	24	4	4	.	.	.	.	.	.	.	.	16.7
Archosargus probatocephalus	95	5	.	.	1	3	1	.	.	.	.	5.3
Ictalurus punctatus	29	1	1	.	.	.	.	.	.	.	.	3.5
Sciaenops ocellatus	496	8	1	.	.	4	.	1	.	2	.	1.6
Dasyatis say	98	1	.	.	.	.	1	.	.	.	.	1.0
Ariopsis felis	560	5	3	.	1	.	.	.	1	.	.	0.9
Mugil curema	336	2	.	.	2	.	.	.	.	.	.	0.6
Orthopristis chrysoptera	831	2	.	.	1	.	.	1	.	.	.	0.2
Leiostomus xanthurus	2,819	6	1	.	5	.	.	.	.	.	.	0.2
Mugil cephalus	1,934	4	1	.	1	1	.	.	.	1	.	0.2
Bairdiella chrysoura	3,264	3	2	.	1	.	.	.	.	.	.	<0.1
Dasyatis sabina	1,357	1	.	.	.	.	.	.	.	1	.	<0.1
Micropogonias undulatus	2,086	1	.	.	1	.	.	.	.	.	.	<0.1
Totals (all taxa)	**24,843**	**43**	**13**	**.**	**13**	**8**	**2**	**2**	**1**	**4**	**.**	**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 FH21-04. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in Cedar Key during stratified-random sampling, 2021. 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	
Micropterus salmoides	4	1	.	.	.	.	.	1	.	.	.	25
Ameiurus catus	6	1	.	.	.	1	.	.	.	.	.	16.7
Strongylura spp.	7	1	.	.	.	.	.	1	.	.	.	14.3
Lepisosteus osseus	34	1	1	.	.	.	.	.	.	.	.	2.9
Cynoscion arenarius	119	2	.	.	2	.	.	.	.	.	.	1.7
Sciaenops ocellatus	513	8	.	.	.	8	.	.	.	.	.	1.6
Brevoortia spp.	1,684	20	20	.	.	.	.	.	.	.	.	1.2
Centropomus undecimalis	429	2	.	.	.	1	.	.	.	1	.	0.5
Ariopsis felis	2,063	2	.	.	.	2	.	.	.	.	.	0.1
Dasyatis sabina	1,987	1	1	.	.	.	.	.	.	.	.	<0.1
Lagodon rhomboides	2,413	1	.	.	.	.	.	1	.	.	.	<0.1
Totals (all taxa)	**19,596**	**40**	**22**	**.**	**2**	**12**	**.**	**3**	**.**	**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 FH21-05. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in Charlotte Harbor during stratified-random sampling, 2021. 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**
Myrophis punctatus	35	11	.	.	.	.	.	.	.	.	11	31.4
Mugil trichodon	412	1	.	.	.	1	.	.	.	.	.	0.2
Centropomus undecimalis	1,340	2	.	.	2	.	.	.	.	.	.	0.2
Bairdiella chrysoura	1,058	1	.	.	.	.	.	.	.	.	1	<0.1
Totals (all taxa)	**48,269**	**15**	**.**	**.**	**2**	**1**	**.**	**.**	**.**	**.**	**12**	**<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 FH21-06. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in northern Indian River Lagoon during stratified-random sampling, 2021. 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**
Negaprion brevirostris	1	1	1	.	.	.	.	.	.	.	.	100
Ariopsis felis	3,432	890	789	86	2	.	.	.	.	13	.	25.9
Megalops atlanticus	41	2	.	2	.	.	.	.	.	.	.	4.9
Mugil curema	3,029	44	38	.	6	.	.	.	.	.	.	1.5
Strongylura notata	107	1	.	.	.	.	.	.	1	.	.	0.9
Pogonias cromis	451	4	.	.	.	2	.	2	.	.	.	0.9
Bagre marinus	234	2	.	.	1	1	.	.	.	.	.	0.9
Centropomus undecimalis	260	2	.	2	.	.	.	.	.	.	.	0.8
Mugil cephalus	1,232	6	4	1	1	.	.	.	.	.	.	0.5
Sphoeroides nephelus	414	2	.	2	.	.	.	.	.	.	.	0.5
Dasyatis say	307	1	.	.	.	.	.	1	.	.	.	0.3
Diapterus rhombeus	551	1	1	.	.	.	.	.	.	.	.	0.2
Micropogonias undulatus	674	1	.	.	1	.	.	.	.	.	.	0.2
Elops saurus	849	1	.	.	.	.	.	1	.	.	.	0.1
Dasyatis sabina	1,405	1	.	.	.	.	.	.	.	1	.	<0.1
Lagodon rhomboides	4,846	2	1	.	.	.	.	1	.	.	.	<0.1
Totals (all taxa)	**44,750**	**961**	**834**	**93**	**11**	**3**	**.**	**5**	**1**	**14**	**.**	**2.2**

[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 FH21-07. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in northeast Florida during stratified-random sampling, 2021. 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	
Ictalurus punctatus	188	3	3	.	.	.	.	.	.	.	.	1.6
Cynoscion complex	149	1	.	.	.	1	.	.	.	.	.	0.7
Bairdiella chrysoura	474	1	.	.	.	.	.	1	.	.	.	0.2
Ameiurus catus	552	1	.	.	.	.	.	1	.	.	.	0.2
Micropogonias undulatus	890	1	.	.	.	1	.	.	.	.	.	0.1
Totals (all taxa)	**10,167**	**7**	**3**	**.**	**.**	**2**	**.**	**2**	**.**	**.**	**.**	**<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 FH21-08. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in Tampa Bay during stratified-random sampling, 2021. 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	2	1	.	.	.	1	.	.	.	.	.	50
Pterygoplichthys spp.	2	1	.	.	.	.	.	.	.	1	.	50
Ogcocephalus cubifrons	5	1	.	.	.	.	.	.	.	.	1	20
Limulus polyphemus	13	1	.	.	.	.	.	.	.	.	1	7.7
Sphyrna tiburo	19	1	.	.	.	1	.	.	.	.	.	5.3
Brevoortia spp.	27	1	1	.	.	.	.	.	.	.	.	3.7
Opsanus beta	42	1	.	.	.	.	.	.	.	.	1	2.4
Strongylura marina	105	1	.	.	.	1	.	.	.	.	.	1.0
Cynoscion nebulosus	263	2	.	.	.	.	.	.	.	.	2	0.8
Mugil trichodon	157	1	.	.	.	.	.	1	.	.	.	0.6
Dasyatis sabina	657	2	.	.	.	.	.	2	.	.	.	0.3
Centropomus undecimalis	1,171	3	.	.	1	1	.	.	1	.	.	0.3
Archosargus probatocephalus	764	2	.	.	1	1	.	.	.	.	.	0.3
Orthopristis chrysoptera	389	1	.	.	.	.	.	.	.	.	1	0.3
Lagodon rhomboides	11,101	8	1	.	.	.	.	1	.	.	6	<0.1
Harengula jaguana	2,130	1	.	.	.	.	.	.	.	.	1	<0.1
Totals (all taxa)	**37,077**	**28**	**2**	**.**	**2**	**5**	**.**	**4**	**1**	**1**	**13**	**<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 FH21-09. List of taxa, sorted by Percent Affected, having gross external abnormalities collected in southern Indian River Lagoon during stratified-random sampling, 2021. 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	
Chelonia mydas	31	1	.	.	.	.	.	.	1	.	.	3.2
Ariopsis felis	876	7	7	.	.	.	.	.	.	.	.	0.8
Mugil cephalus	405	1	.	1	.	.	.	.	.	.	.	0.3
Totals (all taxa)	**14,440**	**9**	**7**	**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.

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).

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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 Redfish fishery was closed in state waters of Pasco County south to Gordon Pass (Collier County) through Executive Order (FWC Executive Order No. EO 18-45, "Temporary Modification of Regulations for Red Drum and Snook in Southwest Florida") in August 2018. This EO was subsequently modified in 2019 to include Spotted Seatrout (EO 19-06), and extended through additional Executive Orders (EO 19-14, EO 20-05, “Temporary Modification to Regulations for Red Drum, Snook, and Spotted Seatrout in Southwest Florida) through May 2021. Based on indicators and stakeholder feedback suggesting that fisheries in the Tampa Bay area had improved since the prolonged 2017-2019 red tide bloom, the Redfish fishery was reopened from Pinellas County south to State Road 64 in Manatee County in October 2021 (EO 21-16, Amendment 1, “Temporary Modification of Regulations for Snook, Red Drum, and Spotted Seatrout in Tampa Bay”). The Redfish fishery remains closed south of State Road 64 (Manatee County) south through Gordon Pass and will expire at the end of August 2022 (EO 21-07, EO 22-14), until new Redfish regulations are implemented.

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 inches 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 2021, therefore, only included data from September through December 2021. 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) each displayed different trends over time (Figure SP21-01). Young-of-the-year IOAs in Apalachicola Bay indicated strong year classes in 1998 and 2002 followed by consistently low recruitment through 2021. The IOAs for legal-size Red Drum in Apalachicola Bay has remained stable 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) displayed similar trends over time (Figure SP21-02). 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. In Tampa Bay, annual IOAs for YOY Red Drum in bay habitats show relatively low and stable abundance through the timeseries with the exception of a five year period from 2013 through 2017 with generally higher catch rates. Annual IOAs for legal-size fish in Tampa Bay have varied without trend, with peaks in abundance in 2008, 2012, 2013, and 2021. The highest abundance on record was observed in 2021. 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 and 2014-2015. 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, 2020, and 2021. As in Tampa Bay, 2021 was the highest abundance on record for legal-size Red Drum in Charlotte Harbor.

Red Drum IOAs varied substantially between estuaries on Florida's Atlantic coast (Figure SP21-03). Indices of abundance for YOY Red Drum in northeast Florida estuaries varied without trend from 2001 through 2021 with stronger year classes in 2003, 2012, and 2021. 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 2021. 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, 2015, and 2021. 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 time period of 2017-2020, where abundances reached record lows for that portion of the estuary.

Length-frequency data for Red Drum that were collected with 183-m haul seines provides valuable information on larger juveniles and adults (Figures SP21-04, SP21-05). In all the estuaries multiple cohorts were observed in the length-frequency distributions. Apalachicola Bay, Tampa Bay, and Charlotte Harbor show one cohort between ~100-200 mm SL (large YOY), a second cohort from ~300-400 mm SL (~age-1), and possibly a third from ~450-600 mm SL (~age-2 –3). In Tampa Bay, Charlotte Harbor (Figure SP21-04), and the northern IRL (Figure SP21-05) the abundance of individuals within the legal slot-limit were roughly equivalent to the abundance of individuals approaching the minimum slot-limit length. In contrast, in northeast Florida and southern IRL (Figure SP21-05), the abundance of Red Drum within the slot-limit dropped off sharply from the abundance of individuals approaching the legal harvestable size range. A similar pattern is observed in Apalachicola Bay and Cedar Key (Figure SP21-04), however, the numbers of Red Drum drop off considerably before the slot-limit (approx. 325 mm SL) in these two estuaries. In addition, the length-frequency distributions in all the estuaries drop off sharply after the upper slot limit. Large Red Drum (age-4 and older) at these sizes are becoming sexually mature, and will leave the estuaries to move to coastal areas to join schools of other reproductively mature individuals, with the exception of a portion of the population in the northern IRL that resides and spawns within the estuary (Johnson and Funicelli 1991, Reyier et al. 2011).

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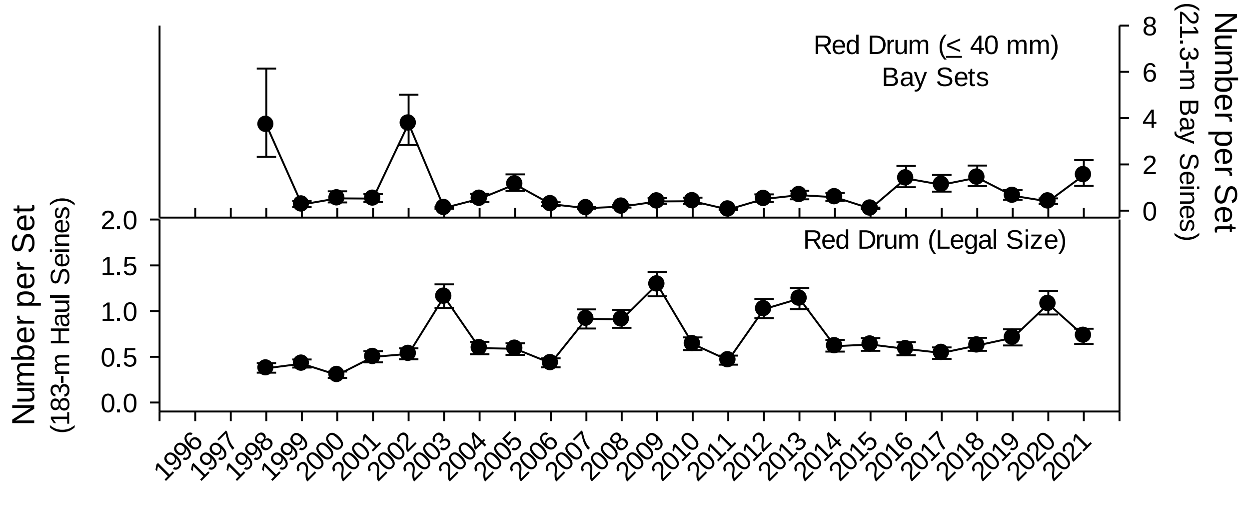
Apalachicola Bay



Cedar Key

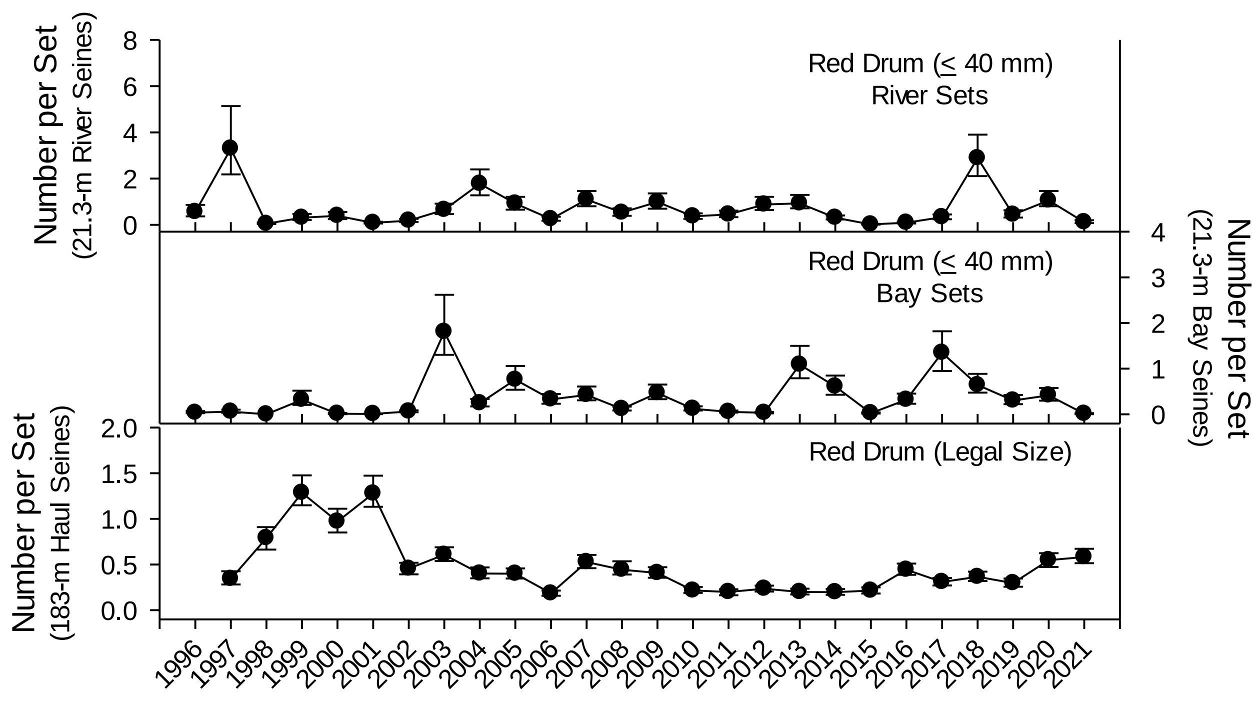
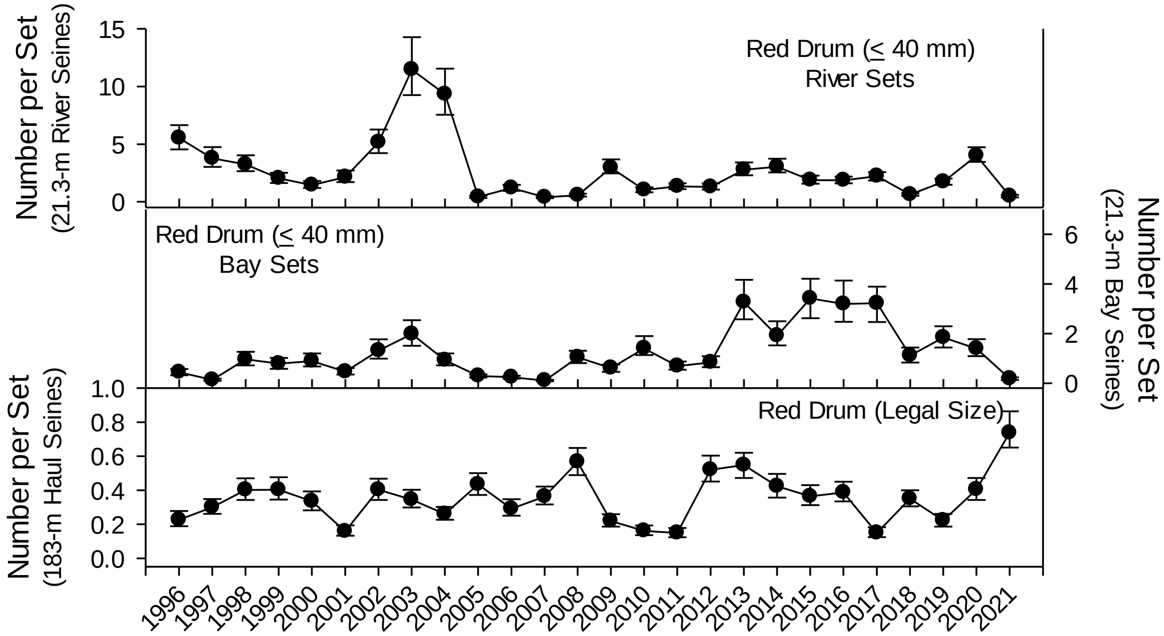


Figure SP21-01. Relative abundance of young-of-the-year Red Drum (≤ 40 mm SL) collected in 21.3-m seines and of legal-size Red Drum (374-565 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Apalachicola Bay and Cedar Key. In Cedar Key, where sufficient 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

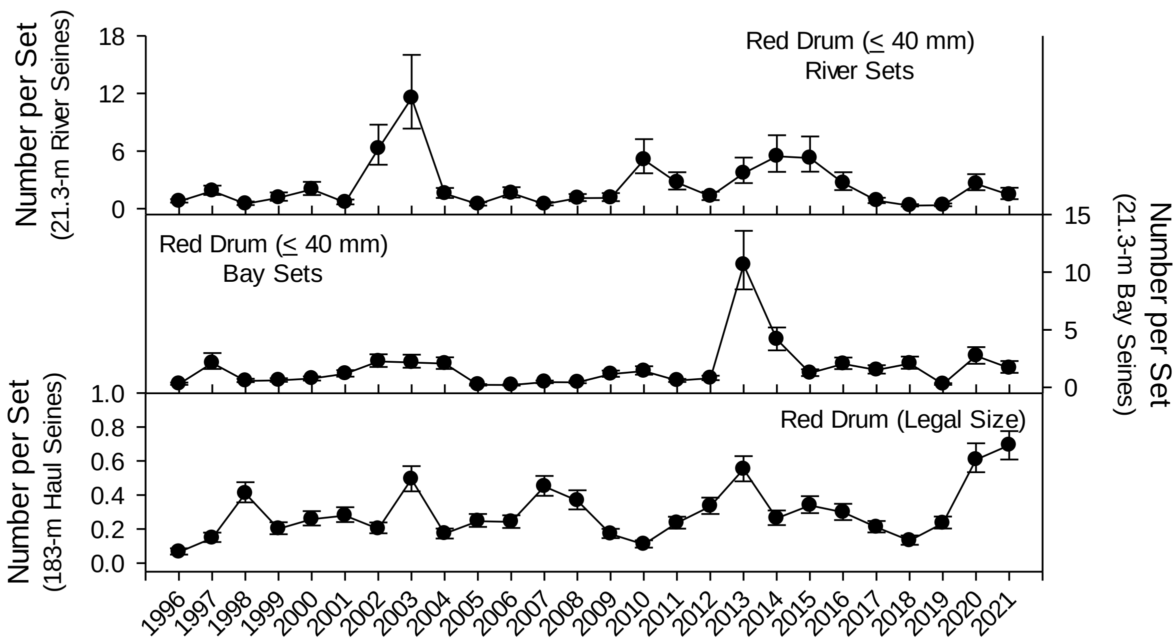
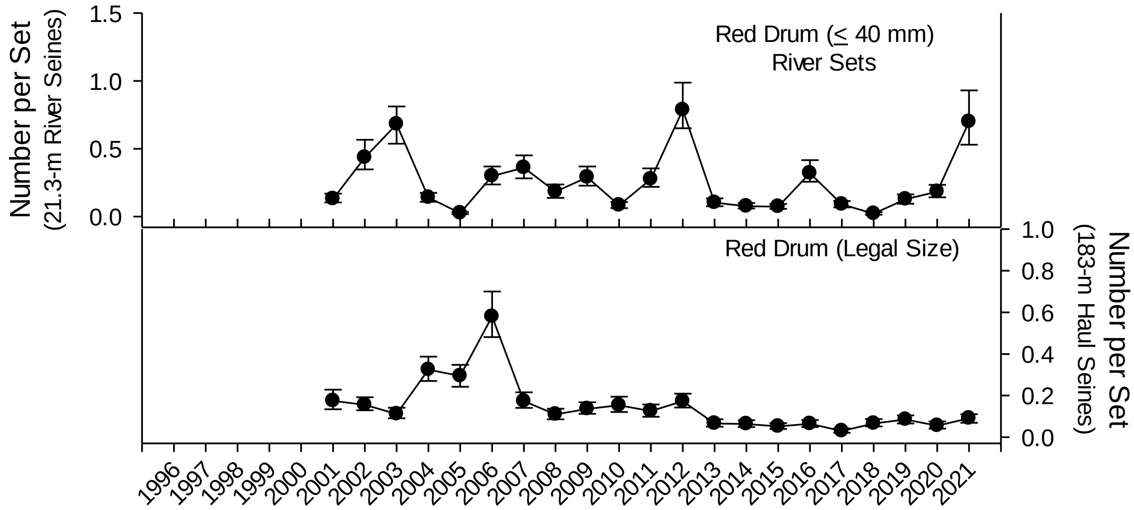


Figure SP21-02. Relative abundance of young-of-the-year Red Drum (≤ 40 mm SL) collected in 21.3-m seines and of legal-size Red Drum (374-565 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Separate plots for river and 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

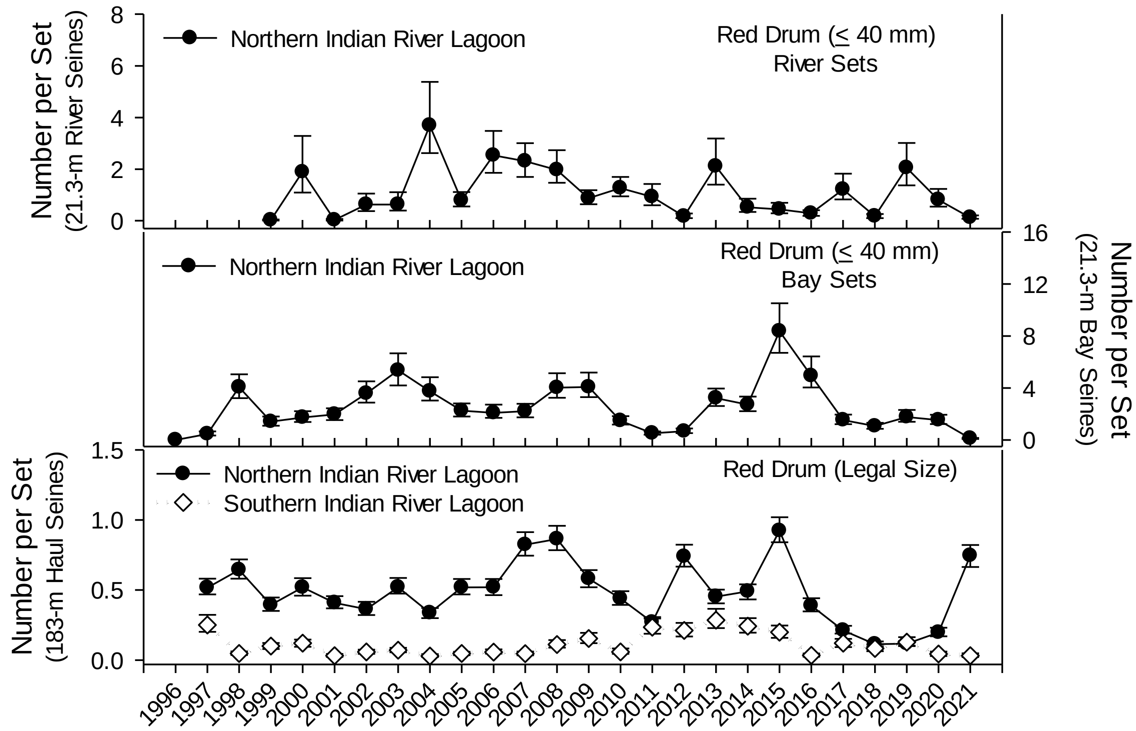


Figure SP21-03. Relative abundance of young-of-the-year Red Drum (≤ 40 mm SL) collected in 21.3-m seines and of legal-size Red Drum (374-565 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Northeast Florida and Indian River Lagoon. In the northern Indian 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.

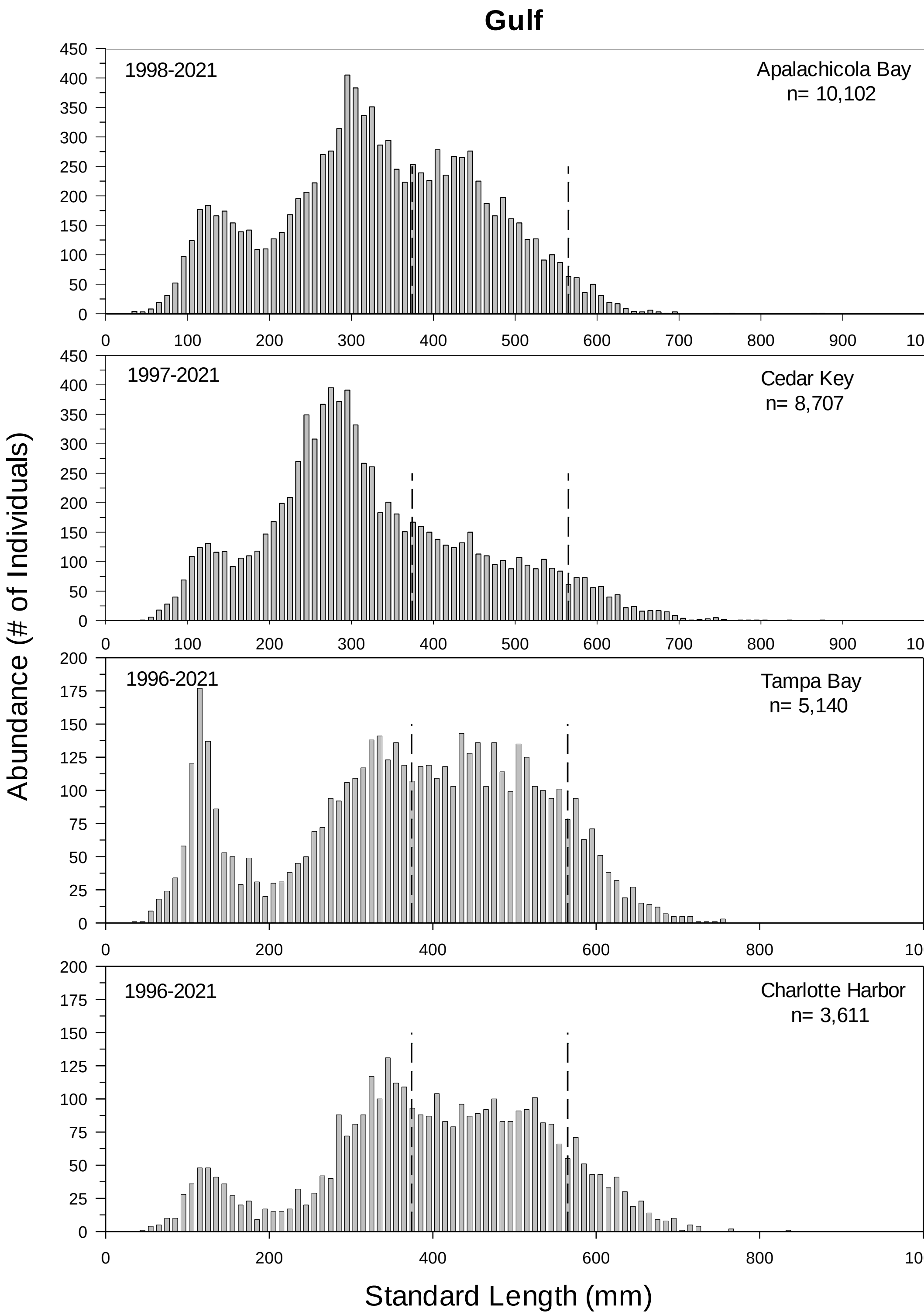


Figure SP21-04. Length frequency diagrams of Red Drum collected in 183-m haul seines from four Florida Gulf coast estuarine systems. Area between dashed lines (- - -) indicates permitted recreational harvest size range (374-565 mm SL). All lengths are standard length (SL). Note different scales and years of collection among plots.

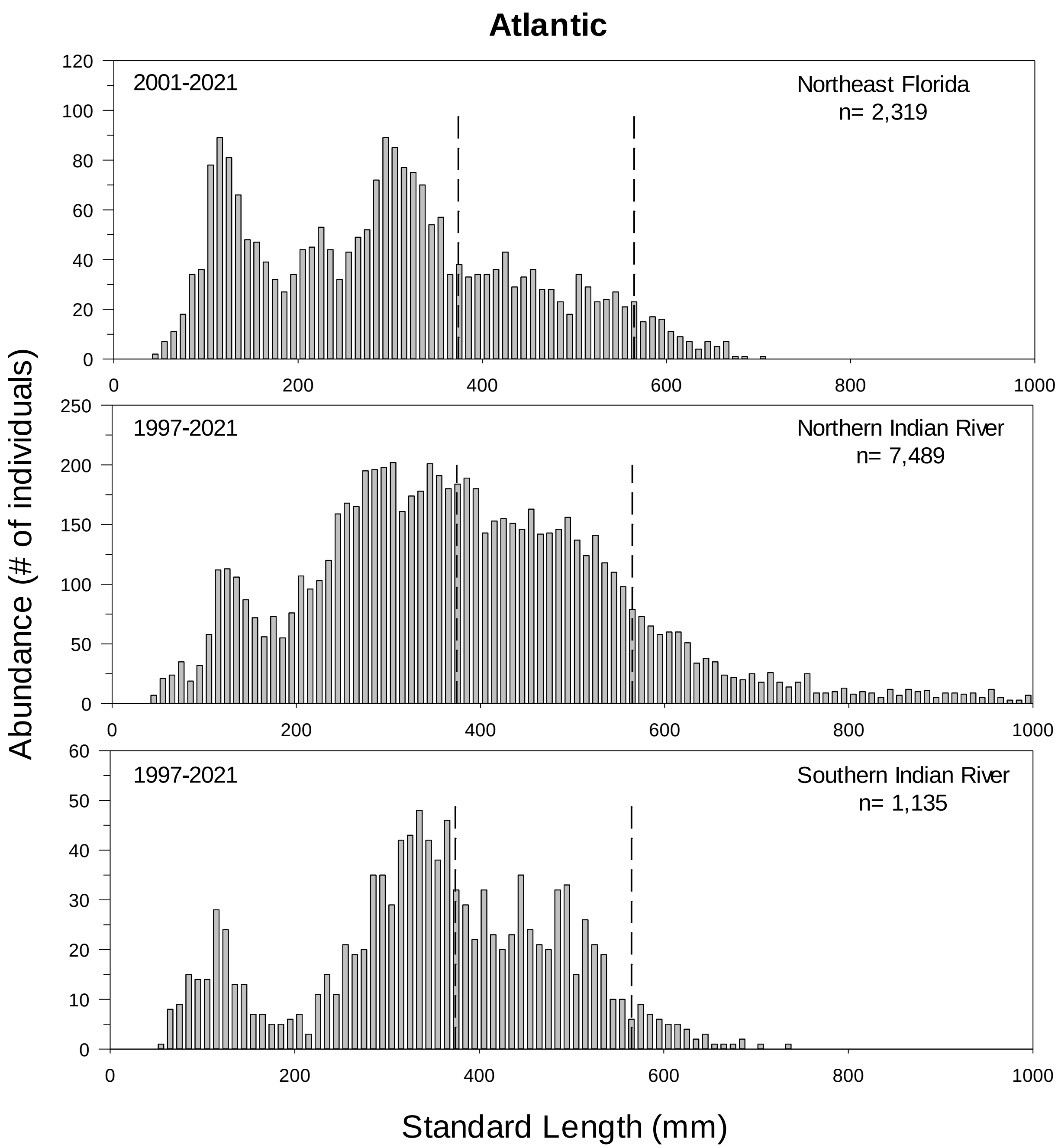


Figure SP21-05. Length frequency diagrams of Red Drum collected in 183-m haul seines from three Florida Atlantic coast estuarine systems. Area between dashed lines (- - -) indicates permitted recreational harvest size range (374-565 mm SL). All lengths are standard length (SL). Note different scales 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. In addition, current Florida regulations allow anglers to keep one fish greater than the maximum slot limit size.

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 2021.

Indices of abundance for YOY Spotted Seatrout on Florida's northwest coast have been variable, but relatively stable since 1998 (Figure SP21-06). 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 SP21-06). 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 eight of the ten 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 2021. 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 2021 (Figure SP21-06).

Trends in relative abundance of juvenile Spotted Seatrout in Tampa Bay have remained relatively stable since the mid-1990s (Figure SP21-07). 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 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 2021. 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 2021 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 SP21-07). 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 SP21-08). In northeast Florida, IOAs for YOY Spotted Seatrout varied without trend, with peak abundances observed in 2007 and 2011. In the northern IRL, 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 IRL have generally fluctuated without trend with the exception of increased abundance in 2010-2011, 2016, and 2018. In the southern IRL, 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 SP21-09 and SP21-10). 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 IRL. In all sampling areas, abundance dropped off sharply as the minimum recreational harvest size (325 mm SL) was reached.

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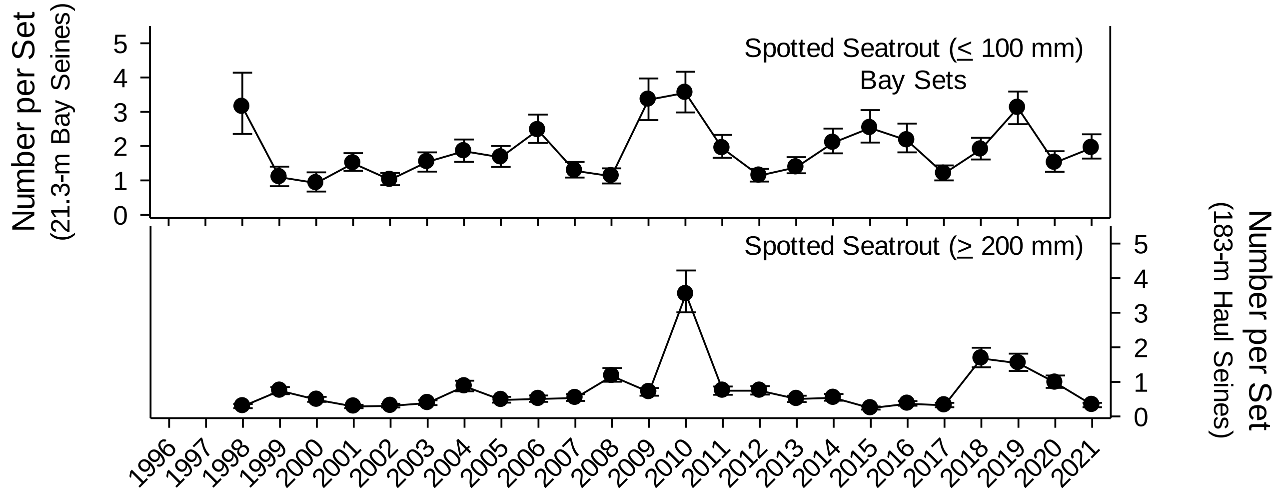
Apalachicola Bay



Cedar Key

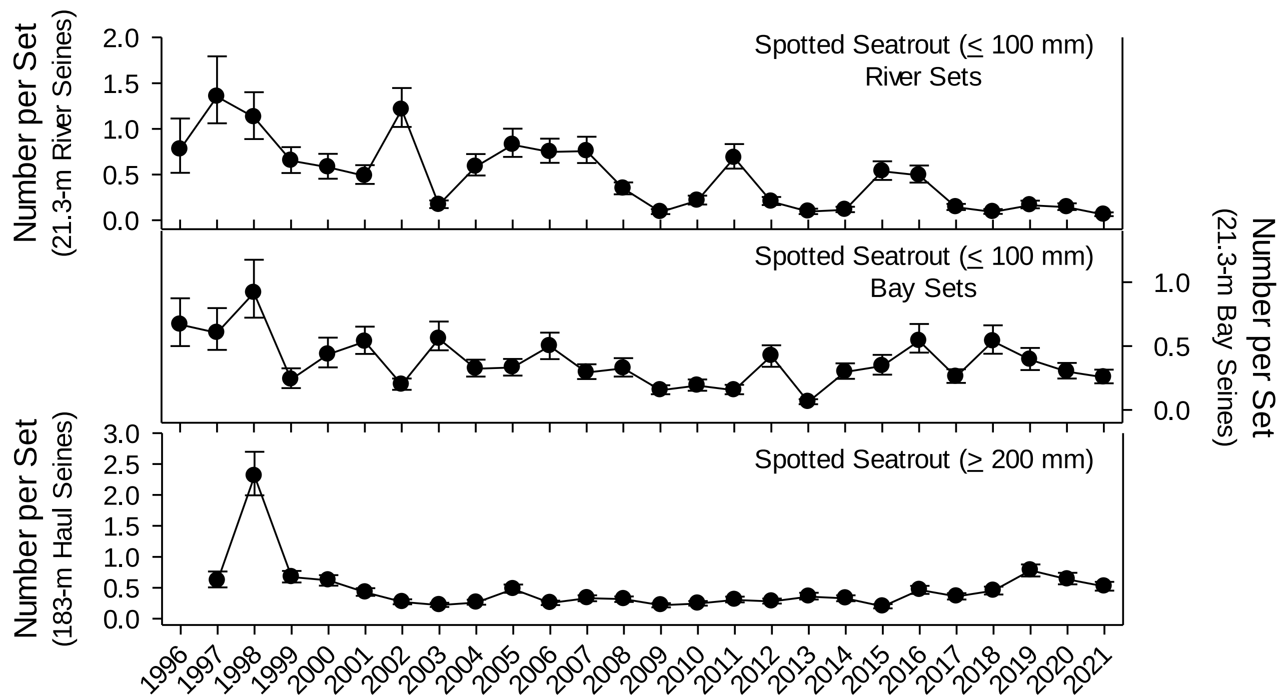
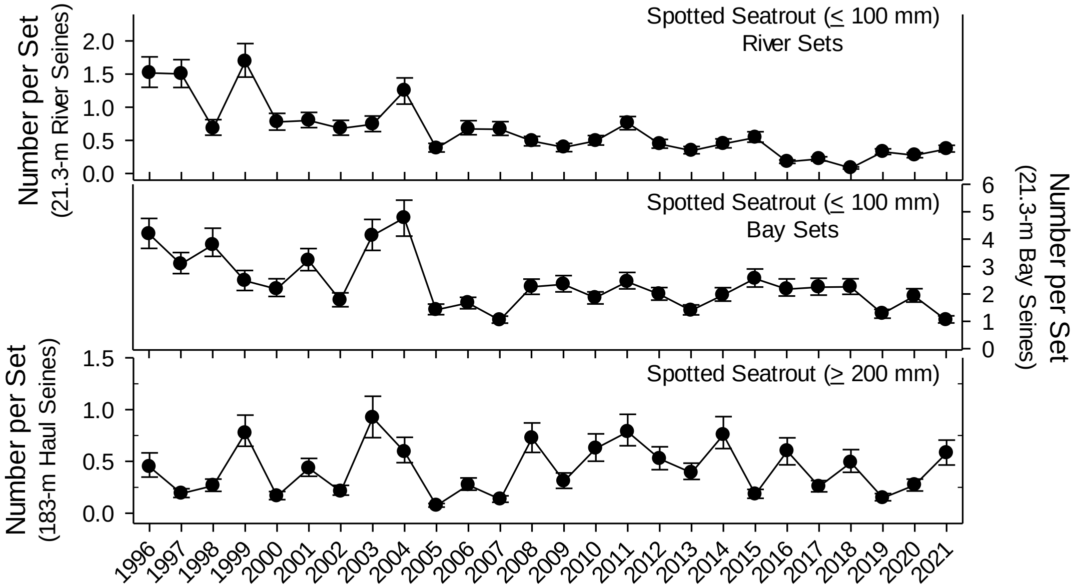


Figure SP21-06. Relative abundance of young-of-the-year Spotted Seatrout (≤ 100 mm SL) collected in 21.3-m seines and of reproductively mature Spotted Seatrout (≥ 200 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling of Apalachicola Bay and Cedar Key. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales in some cases for estimates from 21.3-m and 183-m seines.

Tampa Bay



Charlotte Harbor

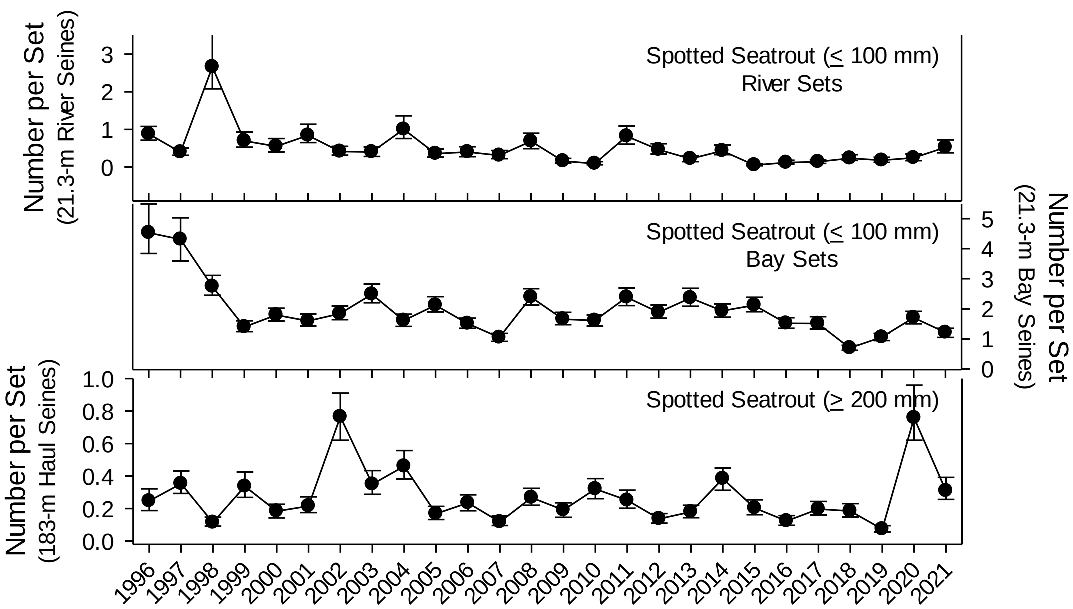
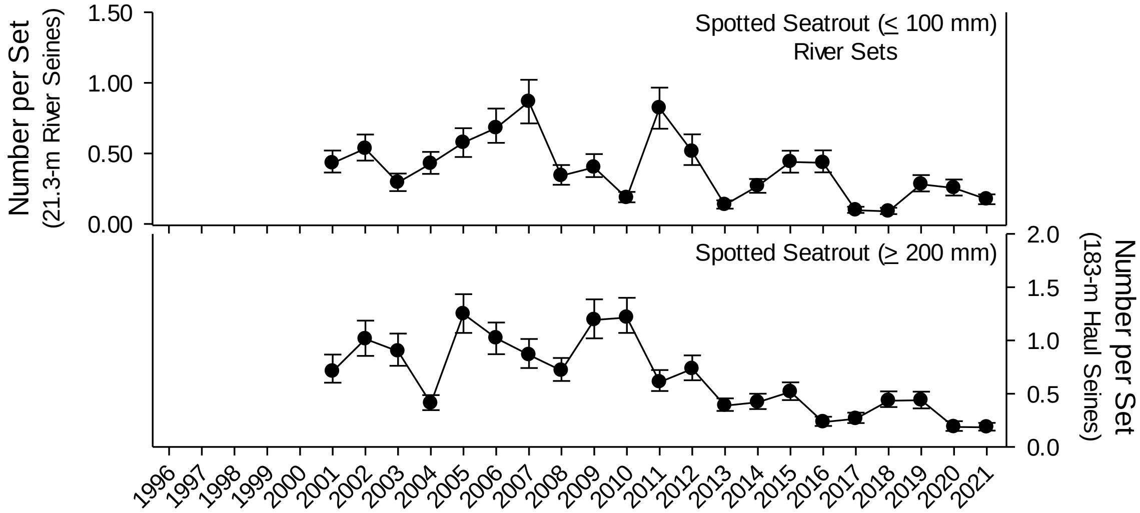


Figure SP21-07. Relative abundance of young-of-the-year Spotted Seatrout (≤ 100 mm SL) collected in 21.3-m seines and of reproductively mature Spotted Seatrout (≥ 200 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Points 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

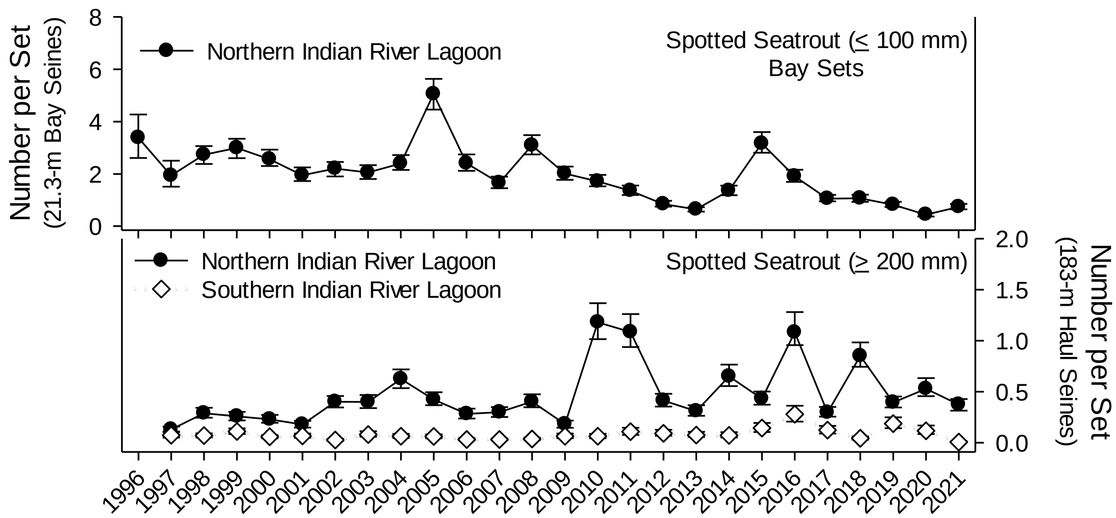


Figure SP21-08. Relative abundance of young-of-the-year Spotted Seatrout (≤ 100 mm SL) collected in 21.3-m seines and of reproductively mature Spotted Seatrout (≥ 200 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Northeast Florida and the Indian River 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.

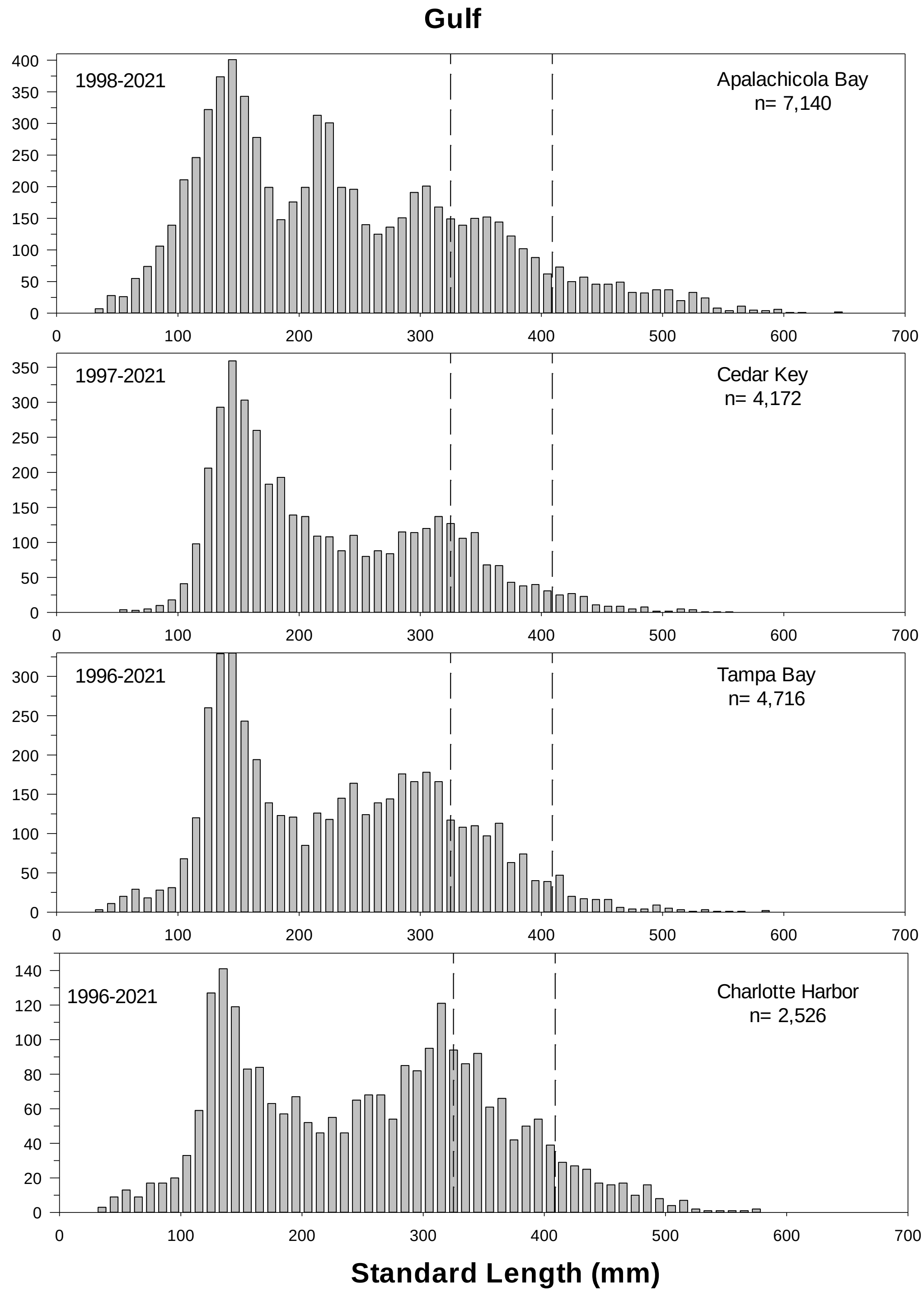


Figure SP21-09. Length frequency diagrams of Spotted Seatrout collected in 183-m haul seines from four Florida Gulf coast estuarine systems. Area between dashed lines (- - -) indicates permitted 2021 recreational harvest size range (325 to 410 mm SL). Current Florida regulations allow anglers to keep one fish greater than the maximum slot limit size. All lengths are standard length (SL). Note different scales and years of collection among plots.

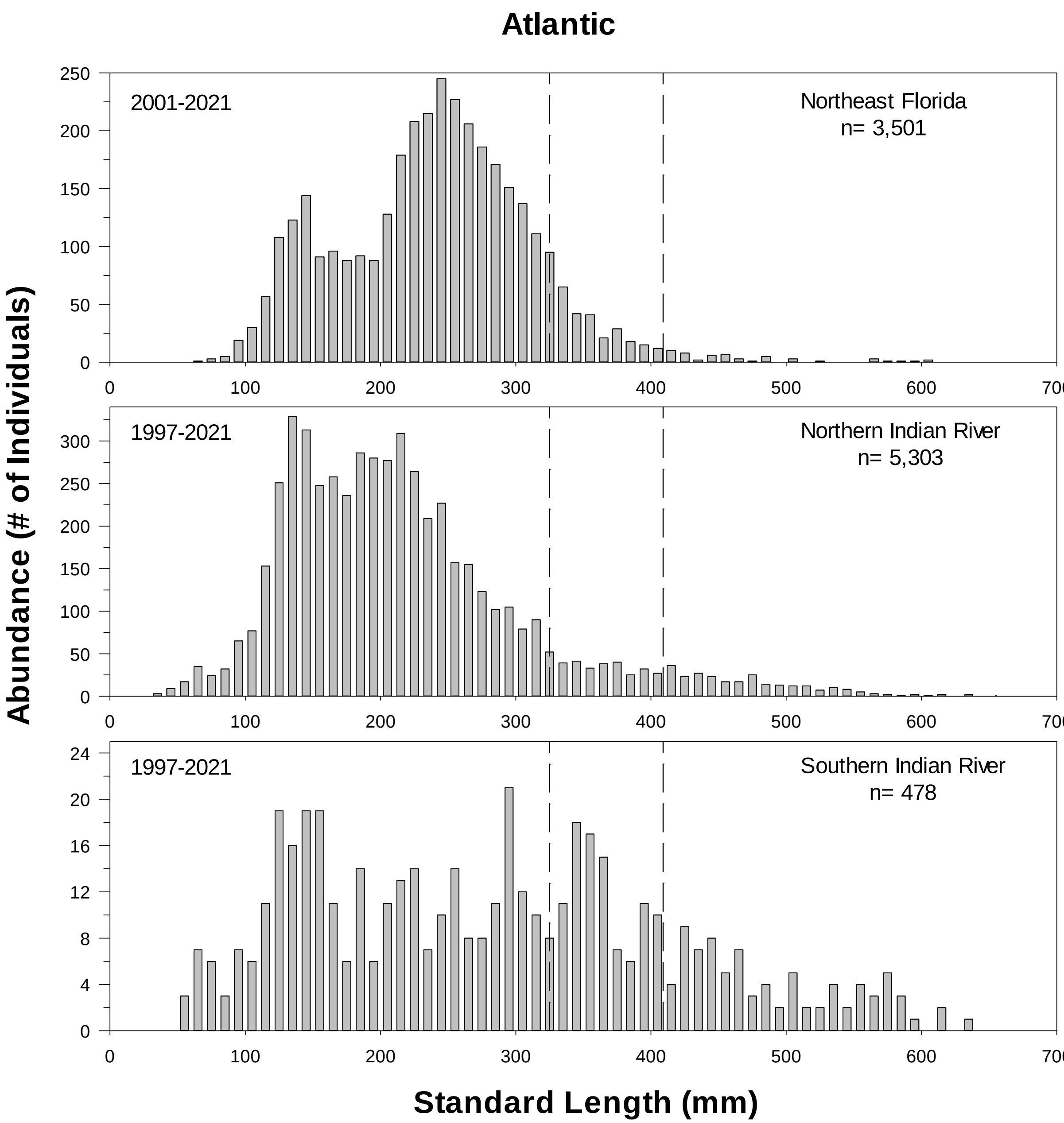


Figure SP21-10. Length frequency diagrams of Spotted Seatrout collected in 183-m haul seines from three Florida estuarine systems. Area between dashed lines (- - -) indicates permitted 2021 recreational harvest size range (325 to 410 mm SL). Current Florida regulations allow anglers to keep one fish 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*) occur from Nova Scotia (Gilhen et al., 1976) to Brazil (Caldwell, 1965) and are common in coastal waters from the Chesapeake Bay to Texas in the United States (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 [TL]; 12 inches TL) and a bag limit (8 fish/day/person). 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 reproductive season for adult Sheepshead is February through April in Florida waters and the newly recruited young-of-the-year (YOY) are most abundant in shallow estuarine areas between April and June. Regression analyses conducted by the FIM program 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 (≤40 mm SL) collected in stratified-random 21.3-m seines were examined to assess recruitment in three Florida estuaries: (in order of FIM program inception) 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 legal-size Sheepshead, which measure ≥242 mm SL (≥12 inches TL) and are permitted for recreational harvest 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.

Annual IOAs were only calculated for legal-size Sheepshead in the two northwest Florida estuaries of Apalachicola Bay and Cedar Key (Figure SP21-11). 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 2021. 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 observed since 1997 occurred in 2017 and abundance levels have remained relatively consistent 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 SP21-12). In Tampa Bay, stronger year classes occurred in 2008, 2014 and 2016 in the bay habitats, with abundance peaks in 2009 and 2014 in the river habitats. In 2021, YOY Sheepshead abundance in Tampa Bay increased in both river and bay habitats, with the highest abundance on record occurring in 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 2021. Annual IOAs of legal-size Sheepshead in Tampa Bay have remained relatively stable from 1996 through 2021 with slight peaks in 1999, 2004, 2010 and 2016. Abundance of legal-size Sheepshead in Charlotte Harbor varied only slightly from 1996 through 2021, 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 2019 through 2021.

Young-of-the-year IOAs for northern IRL riverine habitats were quite variable with strong year classes evident in 2001 and 2004 (Figure SP21-13). Extremely low abundances were seen in 1999, 2002, 2003, and 2014 through 2021. Young-of-the-year IOAs in northern IRL bay habitats were stable at low abundances from 1998-2021 with peaks in abundance occurring in 2004 and 2007. More recently, abundance estimates for YOY Sheepshead in the northern IRL bay habitats were stable at low levels with a slight peak in 2019; however, in 2020 and 2021 there was a steep decline. Abundance estimates for legal-size Sheepshead in northeast Florida increased from 2001-2004, followed by a slight decrease through 2006 and have remained relatively stable since; however, from 2016 to 2021 the lowest sheepshead abundance in the past 20 years was observed (Figure SP21-13). Annual IOAs of legal-size Sheepshead in the northern IRL were relatively stable at low abundances from 1997-2016, with the lowest abundance of the past 24-years occurring in 2019 and levels remaining low in 2020 and 2021. Southern IRL IOAs of legal-size Sheepshead were higher than the Northern IRL. Abundance estimates of legal-size Sheepshead in the southern IRL have been relatively stable between 1997 and 2021, with peaks in 1998, 2004, and 2015 through 2017.

Length-frequency data collected with 183-m haul seines provides valuable information on multiple life stages of Sheepshead (Figure SP21-14 and SP21-15). 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 southerly estuaries (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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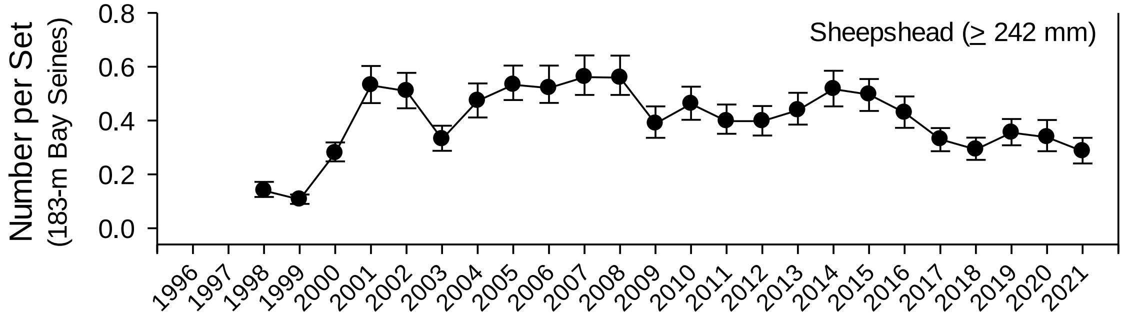
Apalachicola Bay



Cedar Key

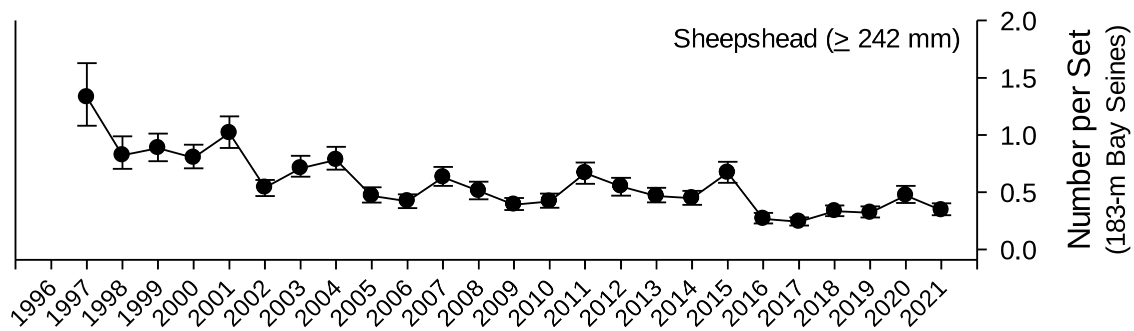
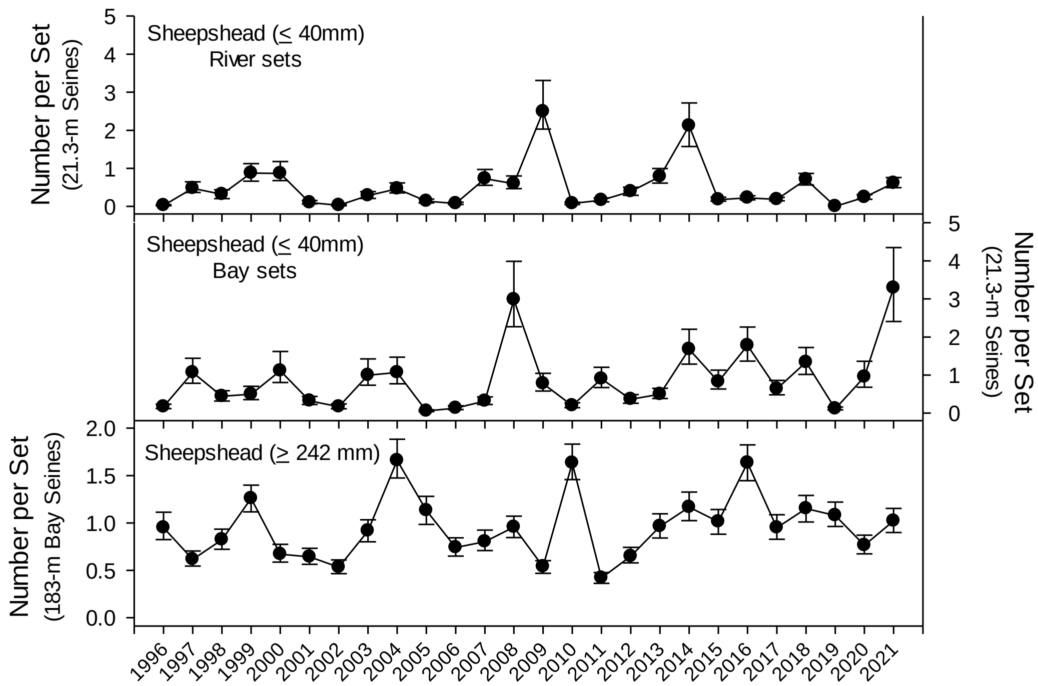


Figure SP21-11. Relative abundance of fully-recruited Sheepshead ($\geq$ 242 mm SL) collected in 183-m haul seines between 1997 and 2021 during stratified-random sampling in the Apalachicola Bay and Cedar Key estuarine systems. Points represent the median estimate while the vertical bars represent the 25^{th} – 75^{th} percentiles. Note different scales of abundance among plots for different gears and estuaries.

Tampa Bay



Charlotte Harbor

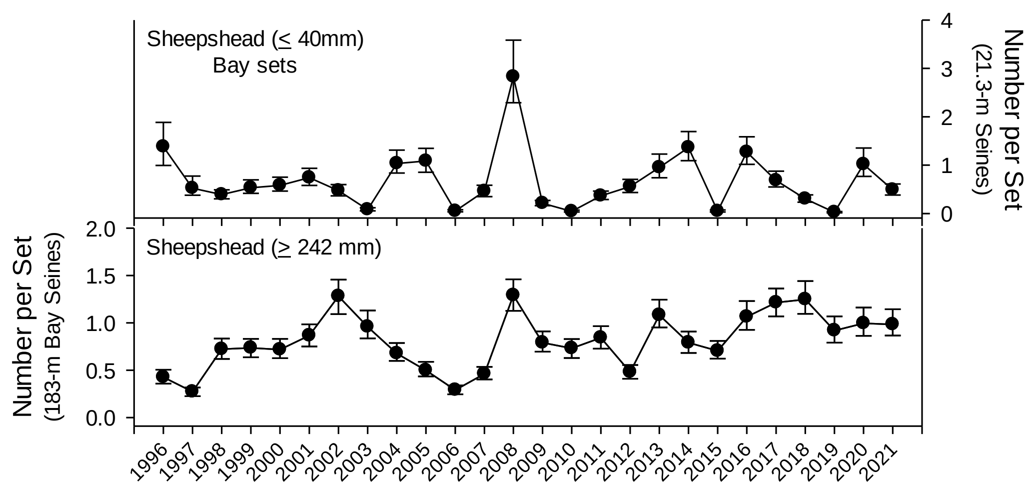
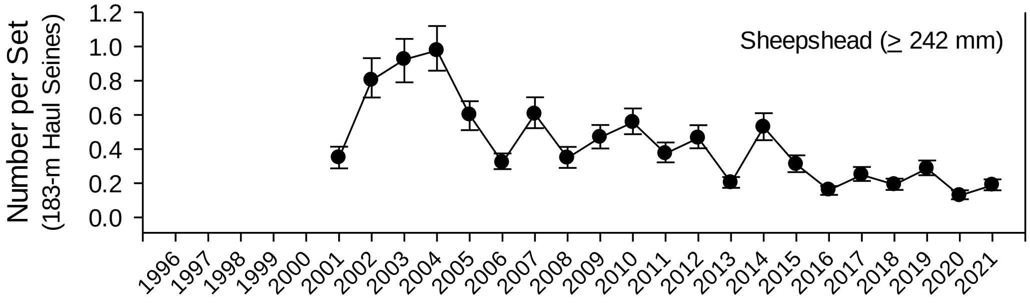


Figure SP21-12. Relative abundance of young-of-the-year Sheepshead (≤ 40 mm SL) collected in 21.3-m seines between 1996 and 2021 and fully-recruited Sheepshead (≥ 242 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Tampa Bay and Charlotte Harbor estuarine 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.

Northeast Florida



Indian River Lagoon

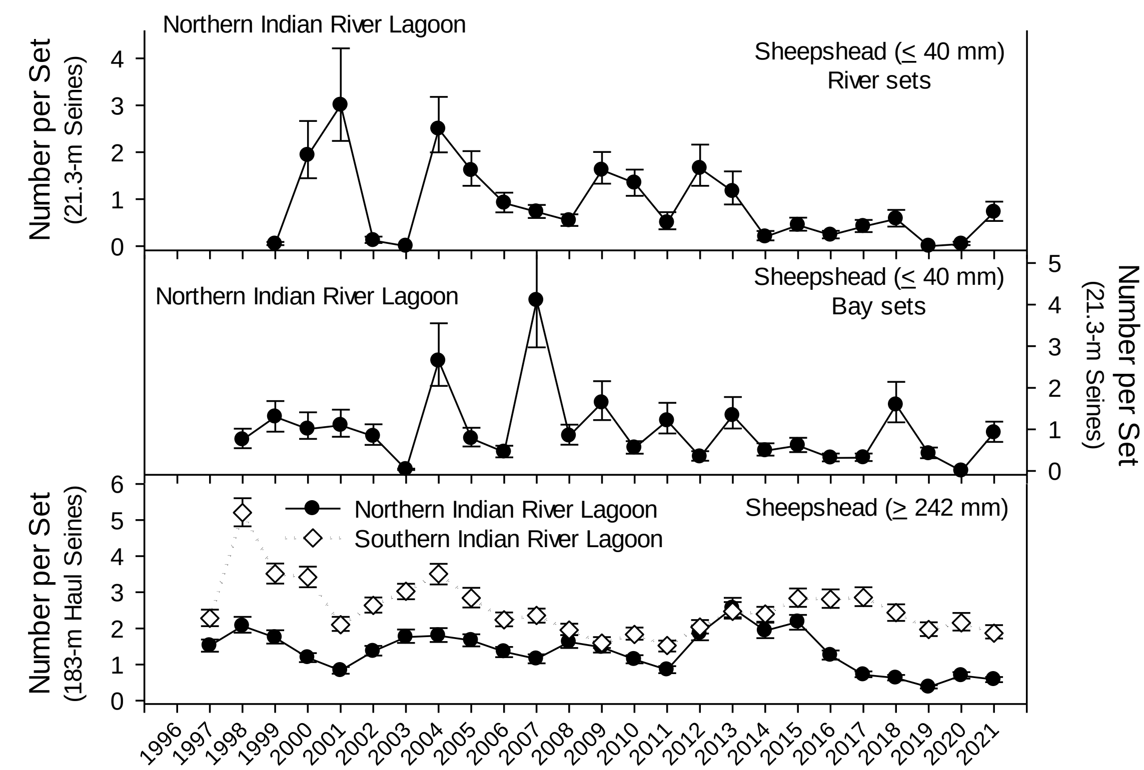


Figure SP21-13. Relative abundance of young-of-the-year Sheepshead (≤ 40 mm SL) collected in 21.3-m seines between 1998 and 2021 and fully-recruited Sheepshead (≥ 242 mm SL) collected in 183-m haul seines between 1997 and 2021 during stratified-random sampling from Northeast Florida, Northern and Southern Indian River Lagoon estuarine systems. Points represent the median estimate while the vertical bars represent the 25th – 75th percentiles. Note different scales of abundance among plots for different gears and estuaries.

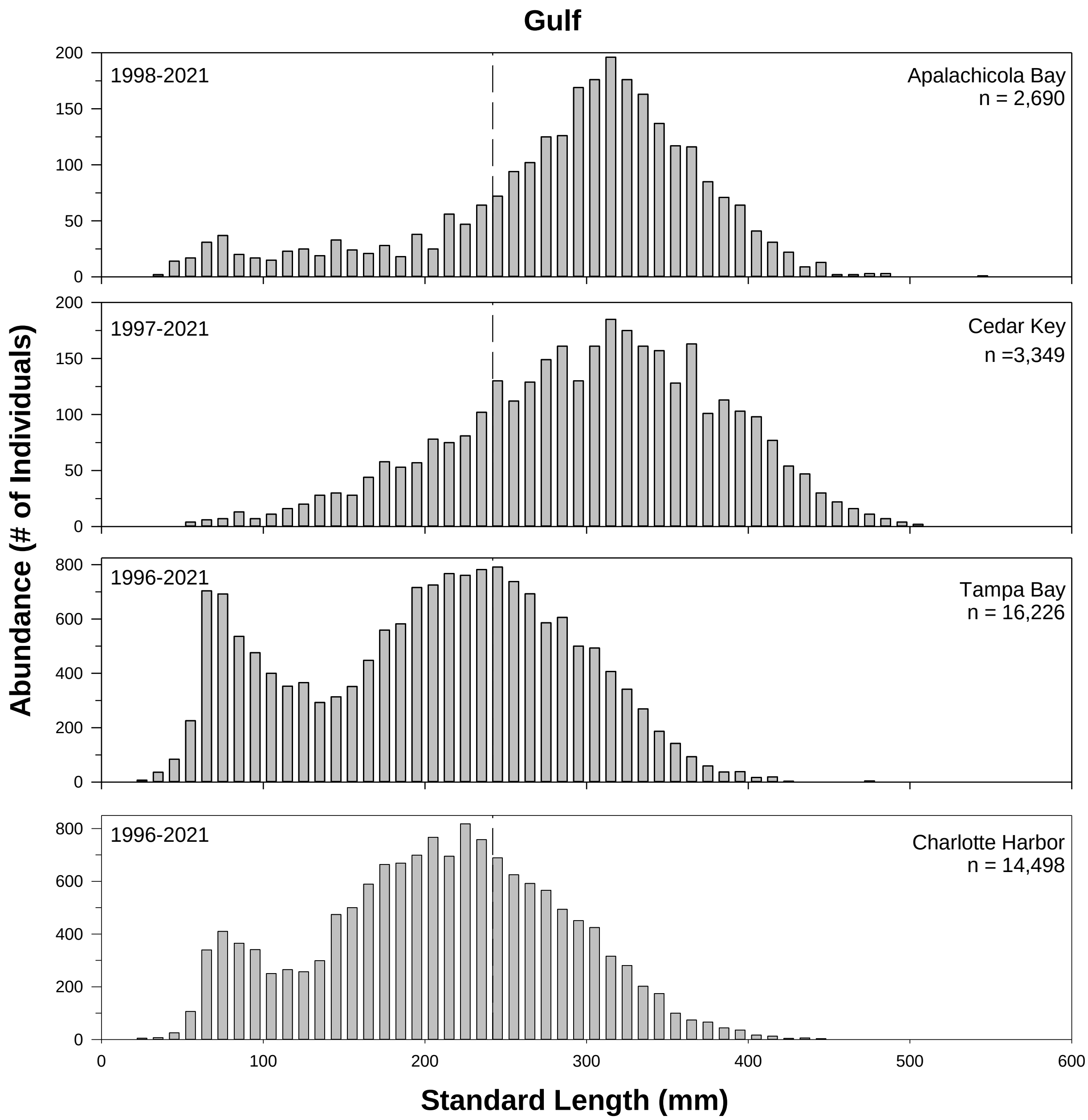


Figure SP21-14. Length frequency diagrams of Sheepshead collected in 183-m haul seines from Gulf coast Florida estuarine systems. Area after dashed line (- - -) indicates permitted recreational minimum harvest length (242 mm SL). All lengths are standard length (SL). Note different scales and years of collection among plots.

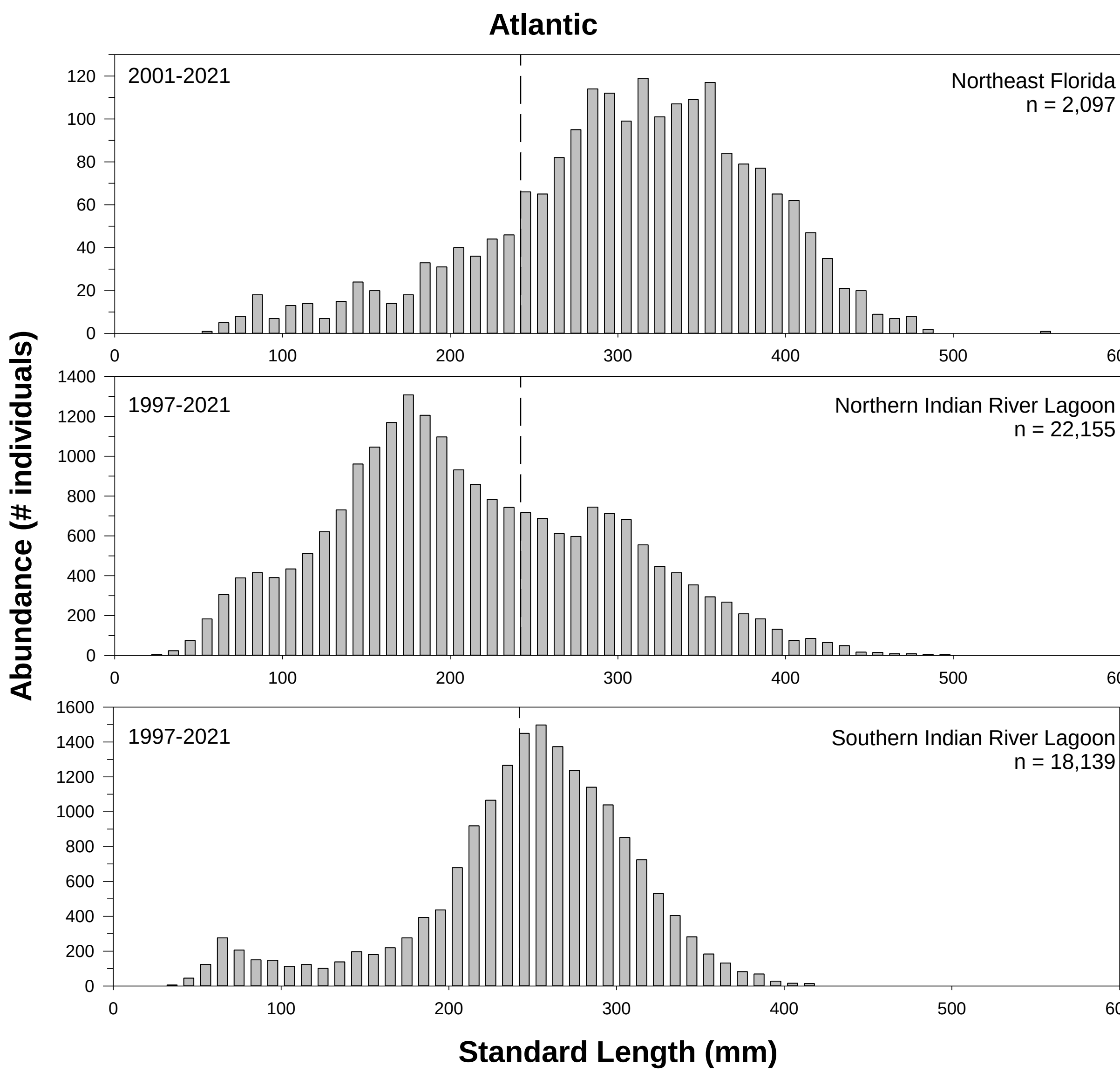


Figure SP21-15. Length frequency diagrams of Sheepshead collected in 183-m haul seines from Atlantic coast Florida estuarine systems. Area after dashed line (- - -) indicates permitted recreational minimum harvest length (242 mm SL). All lengths are standard length (SL). Note different scales and years of collection among plots.

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, Cedar Key, Apalachicola Bay, northeast Florida and the northern and the southern Indian River Lagoon (IRL). 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 2021 for bay habitats (Figure SP21-16). In Cedar Key, IOAs for YOY Striped Mullet reveal strong year classes in 2006, 2011, and 2020 for riverine habitats and 2006, 2008, 2010, 2013 through 2019, and 2021 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, with a gradual increasing trend from 2017 to 2021 (Figure SP21-17). 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 SP21-18). 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 two strong years classes (2001 and

2010) and 4 minor peaks (1998, 2000, 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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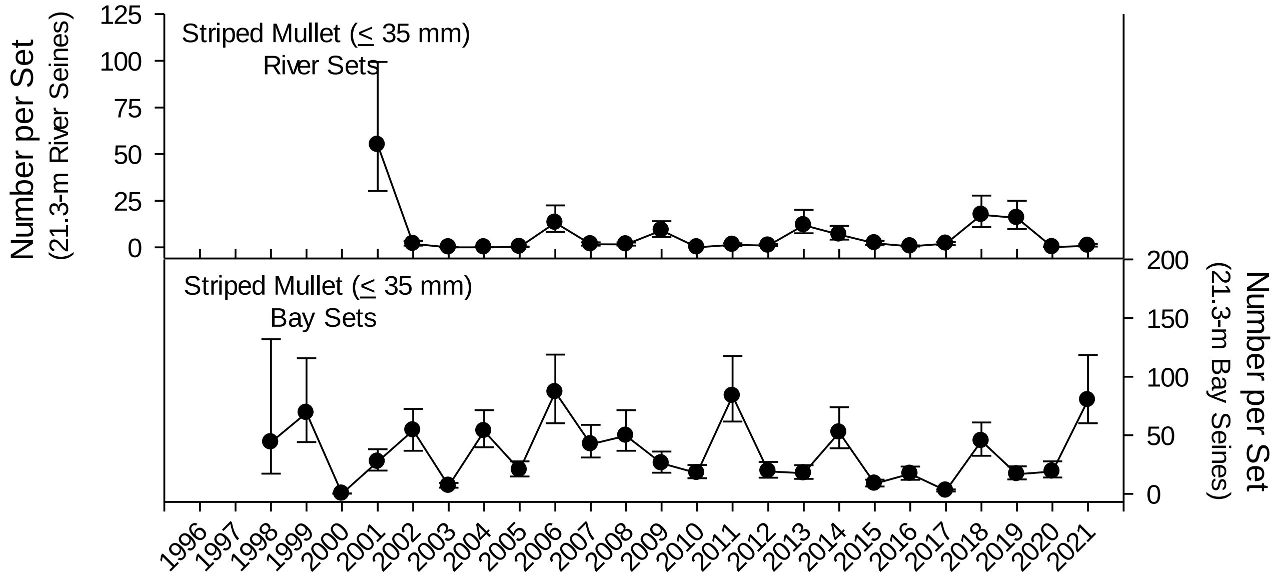
Apalachicola Bay



Cedar Key

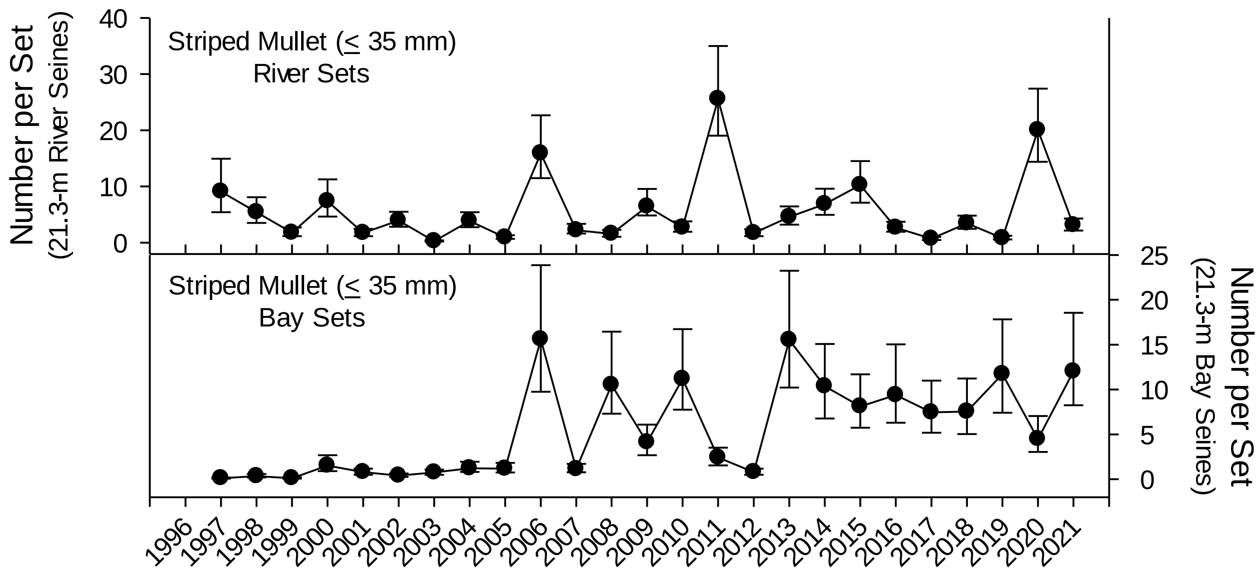
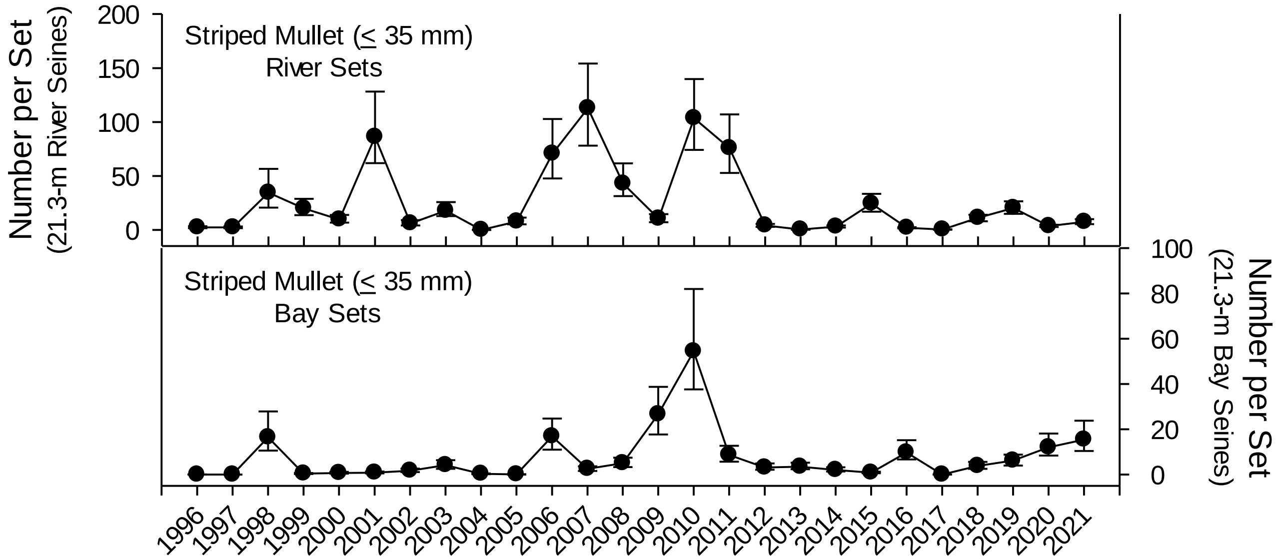


Figure SP21-16. Relative abundance of young-of-the-year Striped Mullet (≤ 35 mm SL) collected in 21.3-m seines between 1997 and 2021 during stratified-random sampling from Apalachicola Bay and Cedar Key. Separate plots for river and bay sets were created to examine differences in recruitment between 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

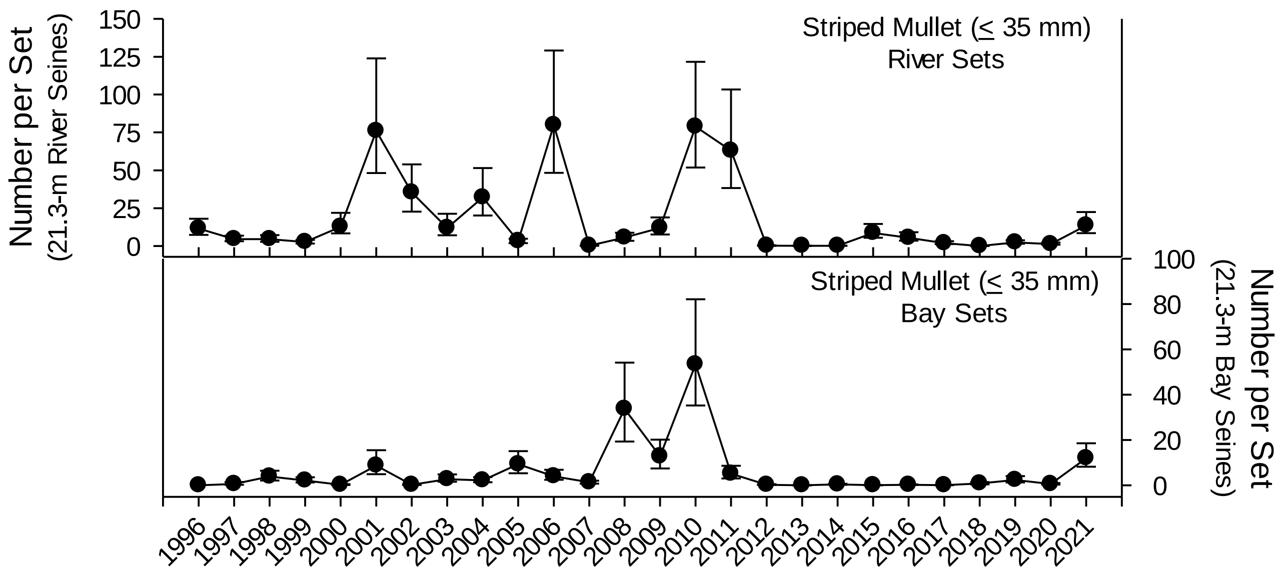
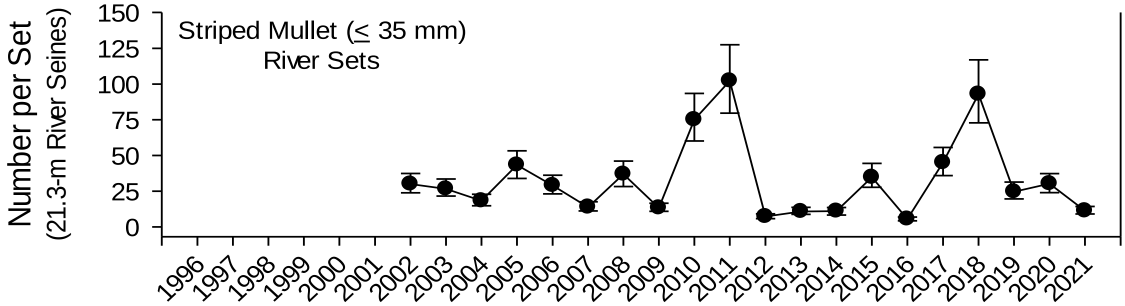
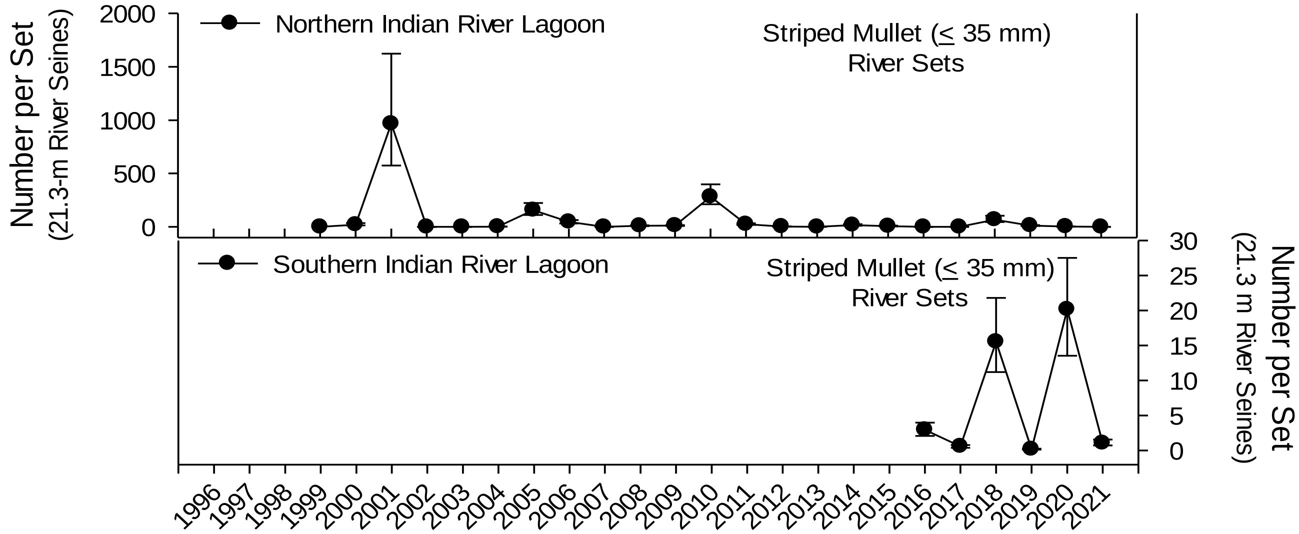


Figure SP21-17. Relative abundance of young-of-the-year Striped Mullet (≤ 35 mm SL) collected in 21.3-m seines between 1996 and 2021 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Separate plots for river and bay sets were created to examine differences in recruitment between 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



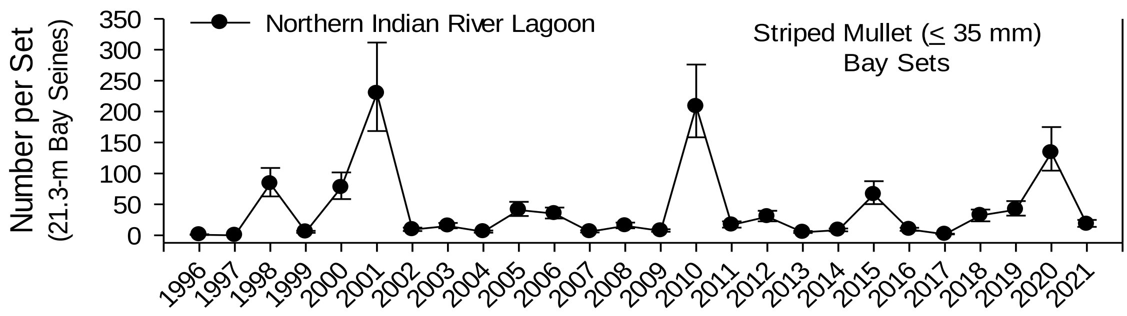


Figure SP21-18. Relative abundance of young-of-the-year Striped Mullet (≤ 35 mm SL) collected in 21.3-m seines between 1996 and 2021 during stratified-random sampling from Northeast Florida and both the northern and southern Indian River Lagoon. Separate plots for river and bay sets were created to examine 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.

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 (*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 YOY Pinfish in Apalachicola Bay and Cedar Key varied with no distinct trends (Figure SP21-19). 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 increasing again in 2020 and 2021. 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, 2019 and 2021. 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 2021.

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 (SP21-20) 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. The IOAs for sub-adult and adult Pinfish have remained high in Tampa Bay until 2021 when they dropped to pre-2008 levels. 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 was a large increase in Pinfish abundance in 2019 and 2020, and then a sharp decrease again in 2021. The abundance estimate for sub-adult and adult Pinfish in Charlotte Harbor in 2020 was the highest on record for the time series and is nearly double that of any other year.

Annual IOAs for Pinfish in estuaries on the east coast of Florida suggest a possible link between recruitment and sub-adult and adult abundance (Figure SP21-21). 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 in sub-adult and adult abundances were observed corresponding to the 2013 and 2019 YOY recruitment 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 and now track with the southern IRL's level of abundance, which had been drastically lower pre-2013.

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 SP21-22). 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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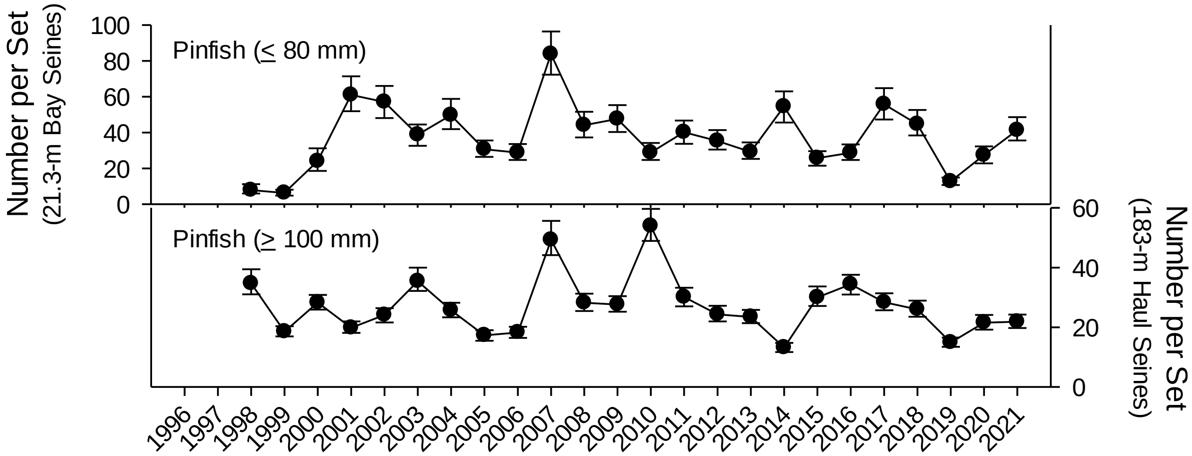
Apalachicola Bay



Cedar Key

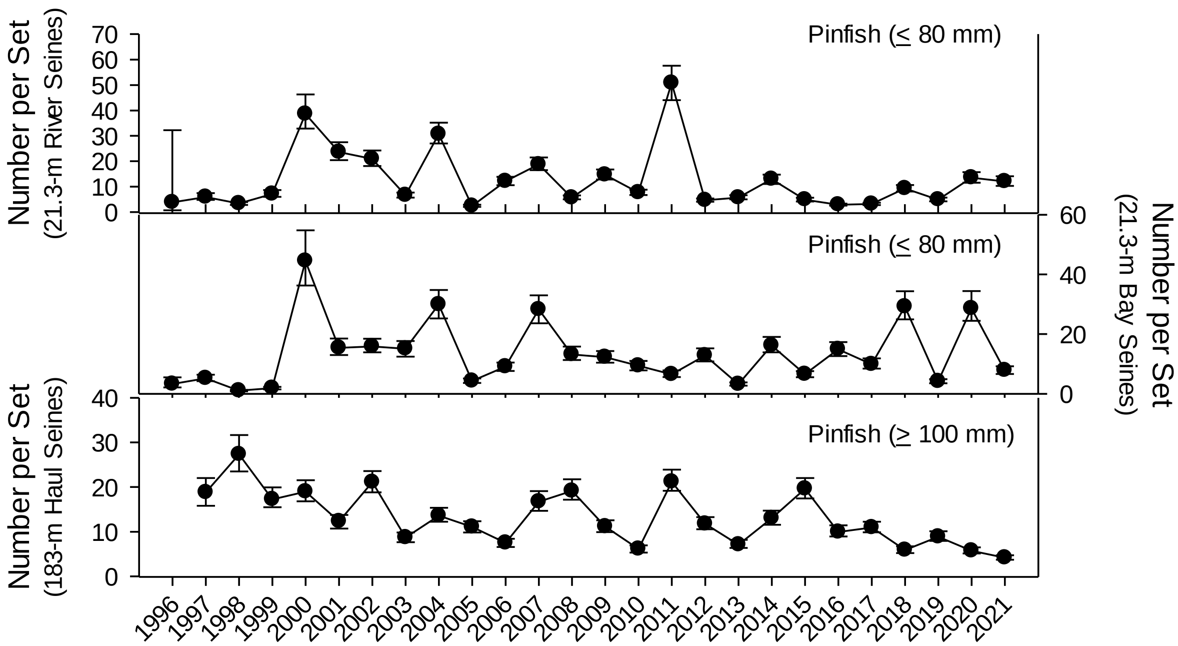
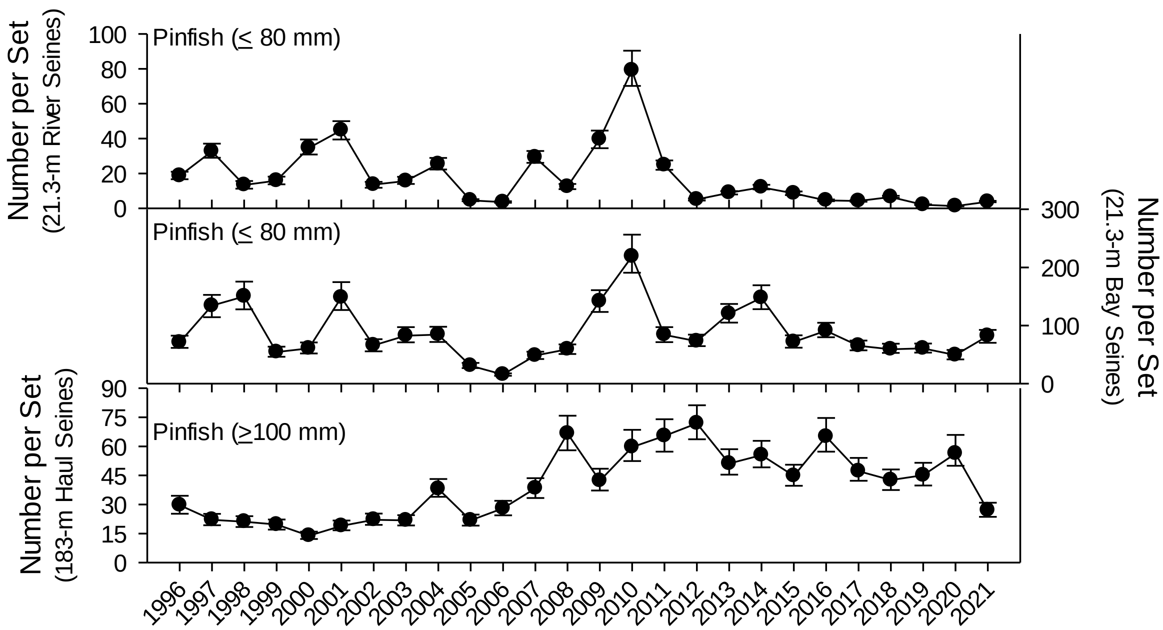


Figure SP21-19. Relative abundance of young-of-the-year Pinfish (≤ 80 mm SL) collected in 21.3-m seines and of reproductively mature Pinfish (≥ 100 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling of Apalachicola Bay and Cedar Key. Points represent the median 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

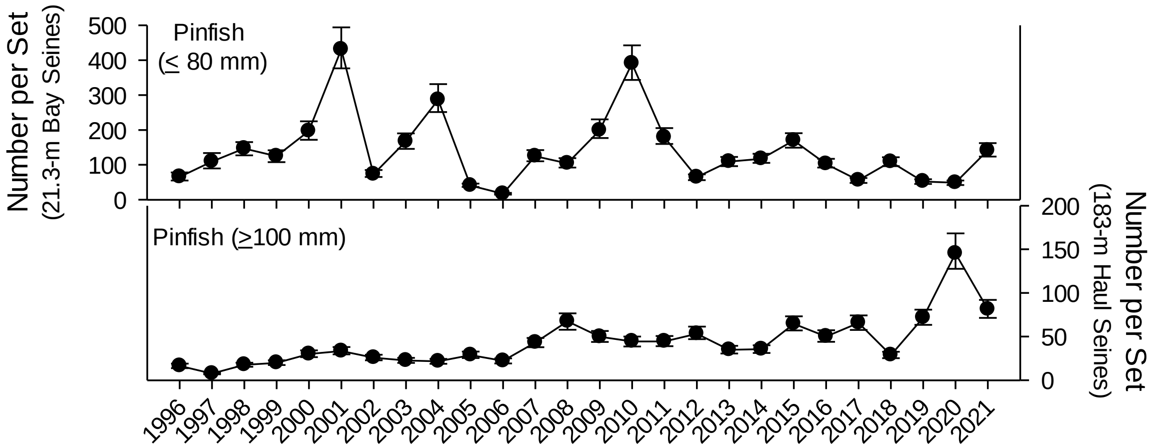
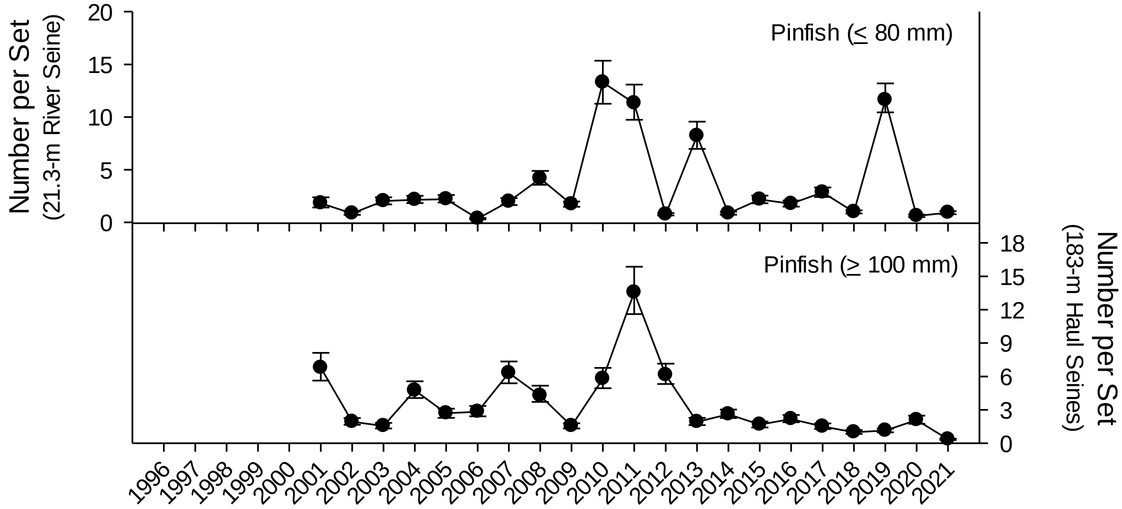


Figure SP21-20. Relative abundance of young-of-the-year Pinfish (≤ 80 mm SL) collected in 21.3-m seines and of reproductively mature Pinfish (≥ 100 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Points represent the median 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

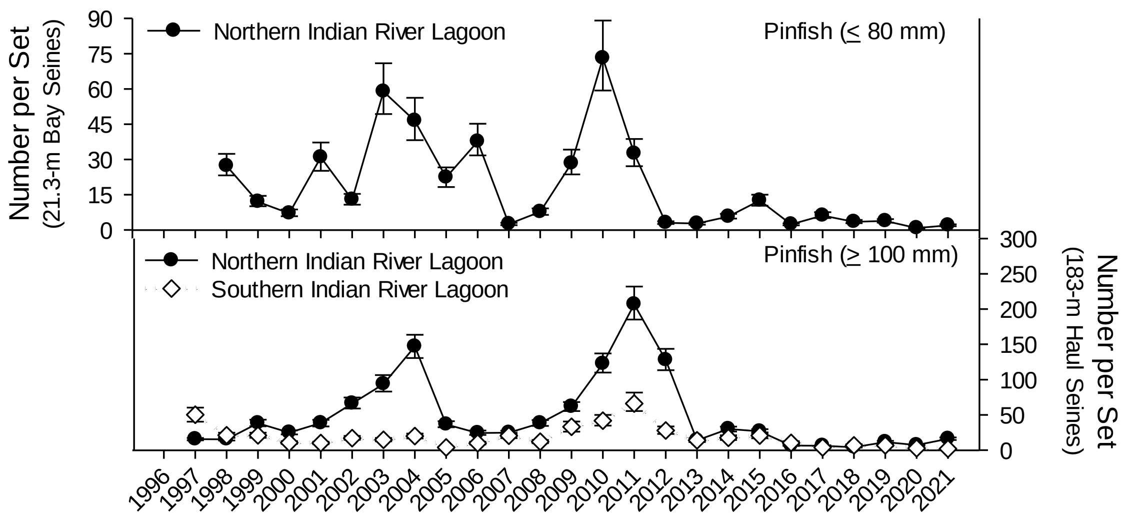


Figure SP21-21. Relative abundance of young-of-the-year Pinfish (≤ 80 mm SL) collected in 21.3-m seines and of reproductively mature Pinfish (≥ 100 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Northeast Florida and the Indian River Lagoon. Points 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.

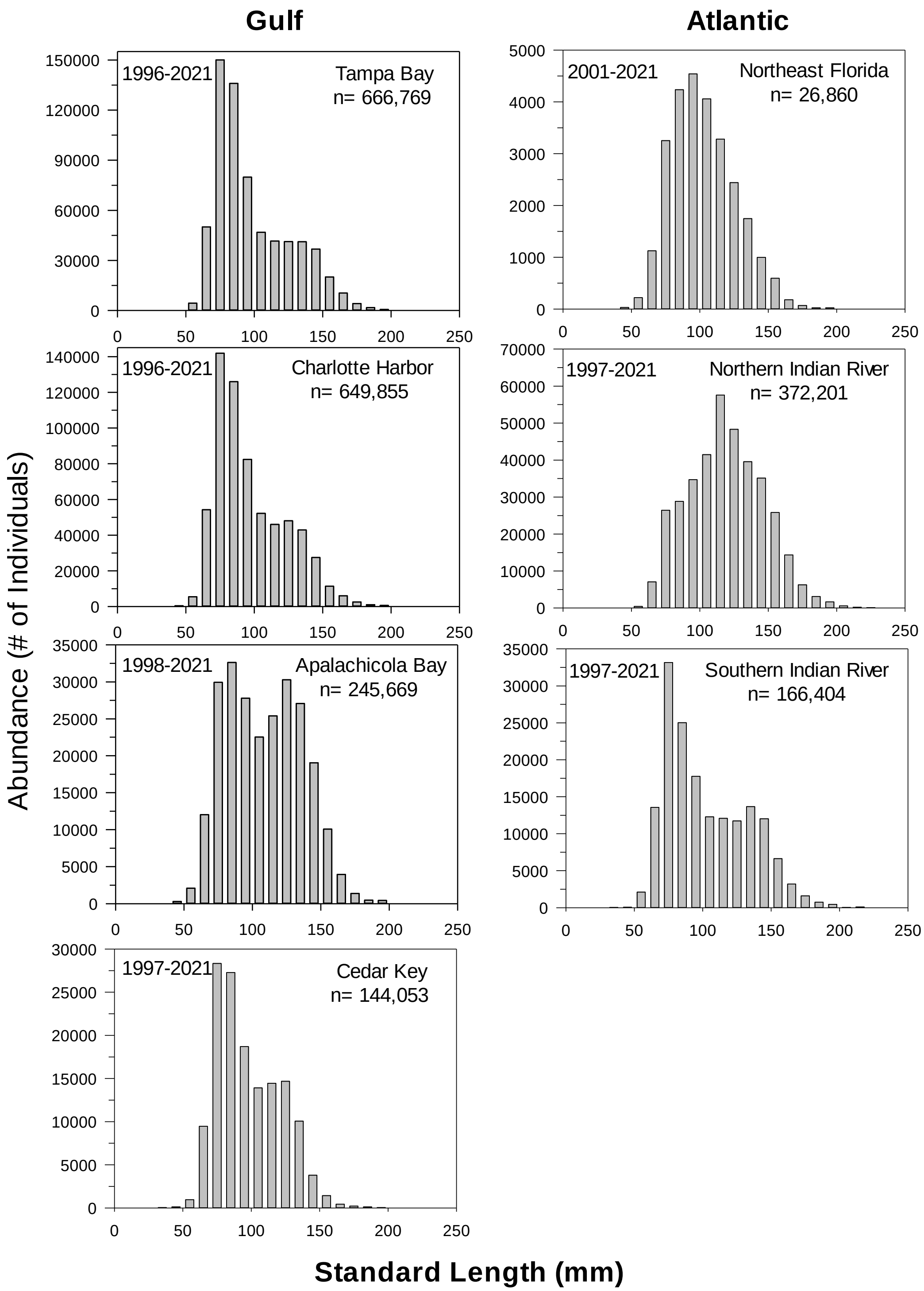


Figure SP21-22. Length frequency diagrams of Pinfish collected in 183-m haul seines. All lengths are standard length (SL). Note different scales and years of collection.

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 (Muller and Taylor 2006). 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 near the 40% objective on the Atlantic coast and far exceeded the objective (~ 50%) 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 in southwest Florida (2017-2019), that area of the fishery was closed in August 2018.

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 relative indices of 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 analyses since this size range would include 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 subadult and adult 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 – 2021.

Annual IOAs of YOY Common Snook in Tampa Bay have been stable, albeit low, between 1996 and 2021 with the exception of strong year classes evident in 1999, 2012, and 2013 (Figure SP21-23). 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. 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 SP21-23). 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. After 2011, adult Common Snook relative abundance in Tampa Bay increased each year, with the highest abundance in 20 years reported from 2016 through 2020. In 2021, relative abundance of Common Snook declined, coinciding with a red tide event which occurred during the summer in Tampa Bay. 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 SP21-23). In 2021, relative abundance of Common Snook declined, coinciding with a red tide event which occurred during the summer in Charlotte Harbor. In the Cedar Key estuary, adult Common Snook catches were zero or near-zero between 1997 and 2016 (Figure SP21-23). 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 temperature mild 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 SP21-23).

Annual IOAs of YOY Common Snook in northern IRL have fluctuated substantially beginning in 1999 (Figure SP21-24). 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. YOY recruitment increased after 2004 through 2007. In 2009 and 2010 there was another decline followed by increasing abundance from 2011 through 2013. Young-of-the-year recruitment in the northern IRL decreased markedly in 2014 to a more historically average level and has increased slightly in subsequent years. 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, before a sharp decline in 2021. 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, remained low for five years, increased in 2015 and decreased slightly through 2017, and remained stable from 2018 to 2021. 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 (e.g., cold kill event). Relative abundance remained low through 2012, and increased through 2014, followed by seven years of decline from 2015 through 2021 (Figure SP21-24).

Length-frequency data collected with 183-m haul seines indicate that this gear provides valuable information on larger juvenile and adult Common Snook (Figure SP21-25). Length-frequency distributions for Tampa Bay, Charlotte Harbor, Northern and Southern Indian River Lagoon were unimodal with a peak in distribution at 380 – 500 mm SL. However, length-frequency distributions for Cedar Key were bimodal with a second peak in distribution at 600 – 700 mm SL. 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 609 – 677 mm SL on the Atlantic coast).

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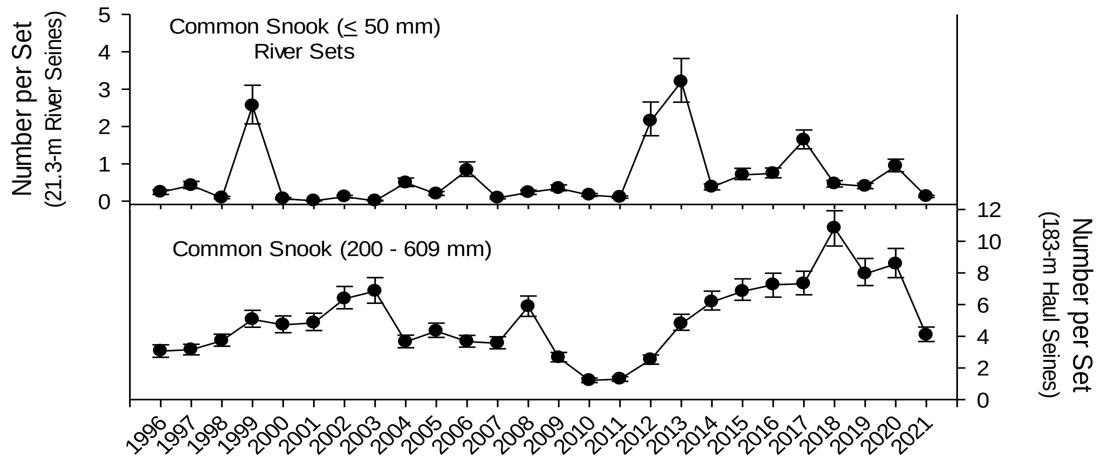
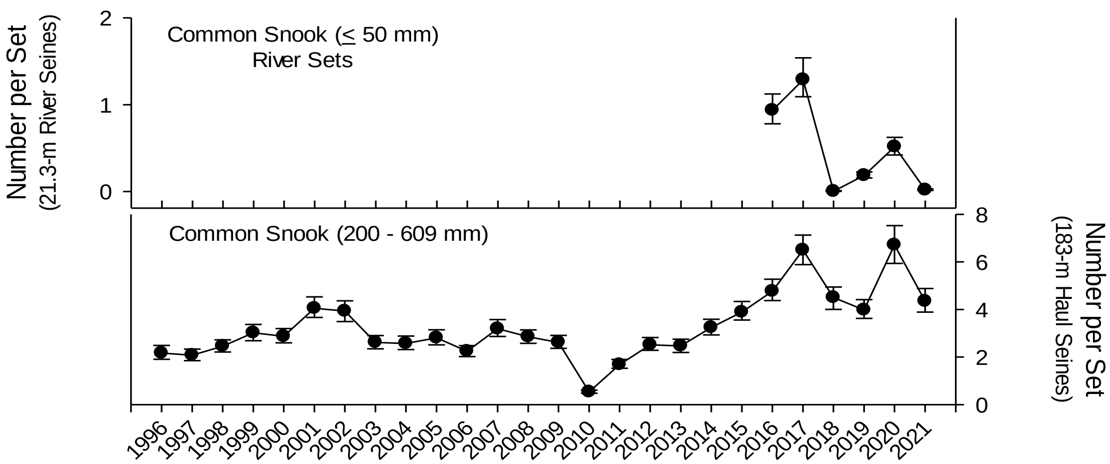
Tampa Bay



Charlotte Harbor



Cedar Key

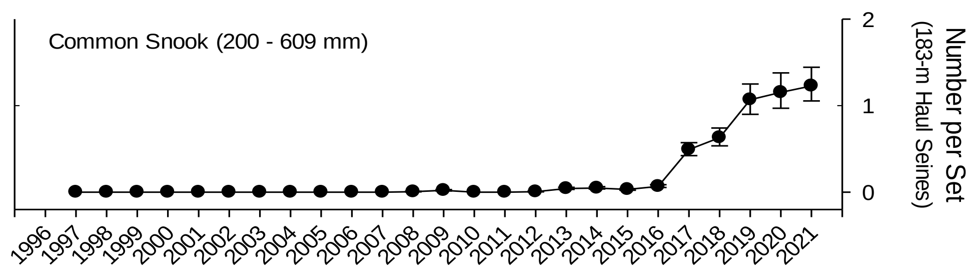
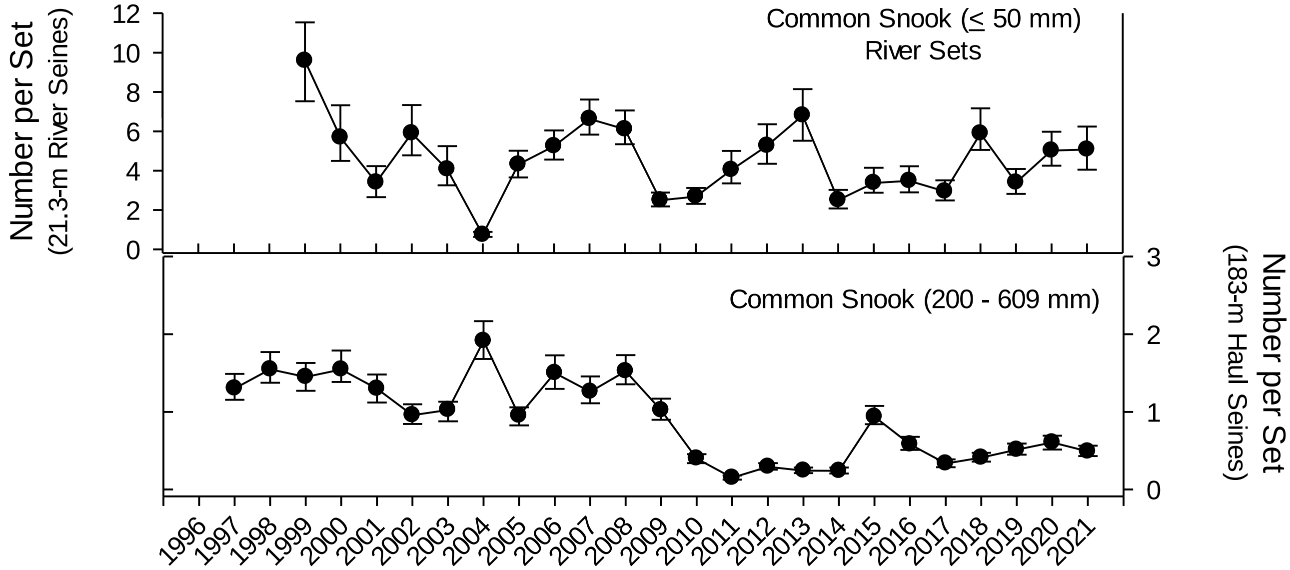


Figure SP21-23. Relative abundance of young-of-the-year Common Snook (≤ 50 mm SL) collected in 21.3-m seines and pre-fishery adult Common Snook (200 - 609 mm SL) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from three Florida estuarine systems. Points represent 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

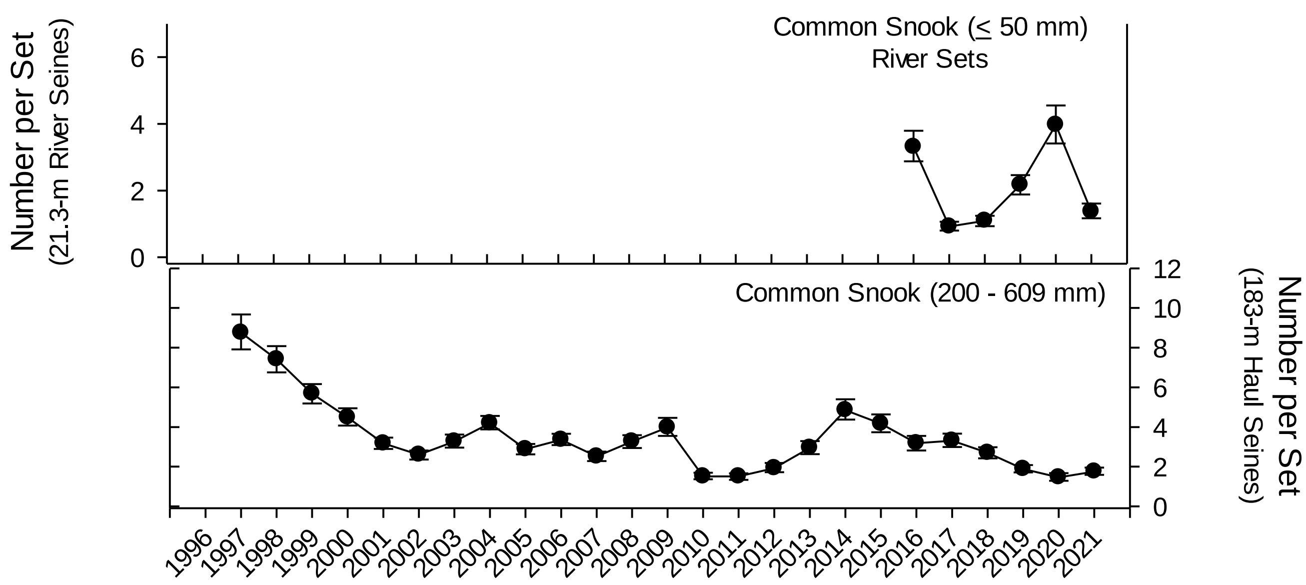


Figure SP21-24. Relative abundance of young-of-the-year Common Snook (≤ 50 mm SL) collected in 21.3-m seines and pre-fishery adult Common Snook (200 - 609 mm SL) collected in 183-m haul seines between 1997 and 2021 during stratified-random sampling from the Indian River Lagoon system. Points represent the median estimate while the vertical bars represent the 25th – 75th percentiles. Note different scales of abundance among plots for different gears and estuaries.

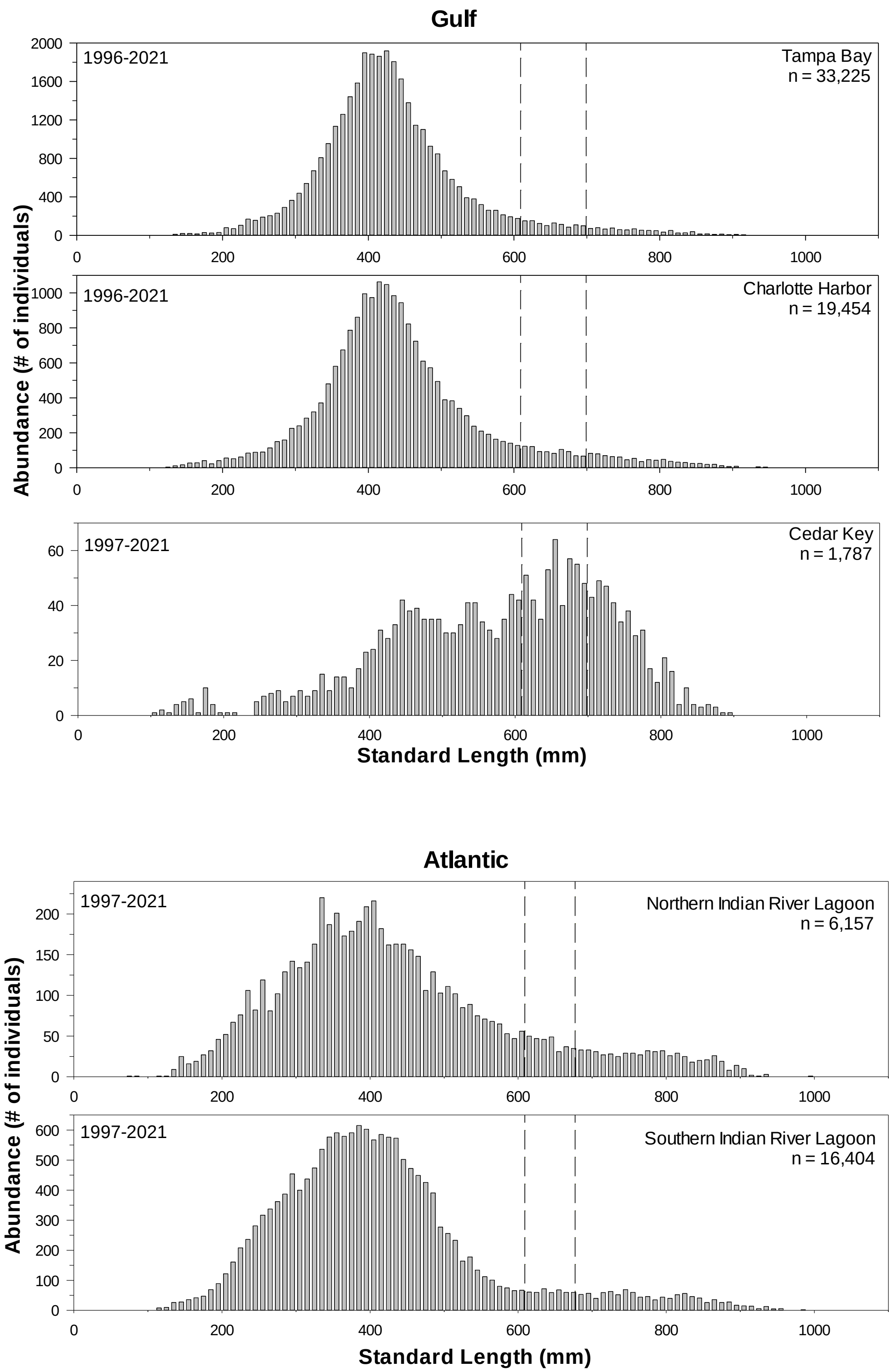


Figure SP21-25. Length frequency diagrams of sub-adult and adult Common Snook collected in 183-m haul seines. All lengths are standard length (SL). Area between dashed lines denote the recreational slot limit for this species (609 to 699 mm SL on the Gulf coast and 609 to 677 mm SL on the Atlantic coast). Note different scales and years of collection.

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 2021 therefore only included data from August through December 2021. 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 SP21-26). 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, followed by a return to lower stable levels in 2021. 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 SP21-27). Adult Blue Crab abundances in Tampa Bay peaked in 1996 and 1998 and varied without trend from 1999-2021. 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 SP21-28). Annual IOAs of YOY Blue Crab in northeast Florida peaked in 2003 and has varied without trend since then. Adult Blue Crab abundances in northeast Florida have been variable since 2001. There was a peak in abundance in 2007 that was followed by lower abundances in 2010, 2014-2015, and 2019. 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 2012-2021. 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 stable levels in 2019 and 2020. Highest abundances of YOY blue crab in bay habitats was observed in 2021. 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 SP21-29).

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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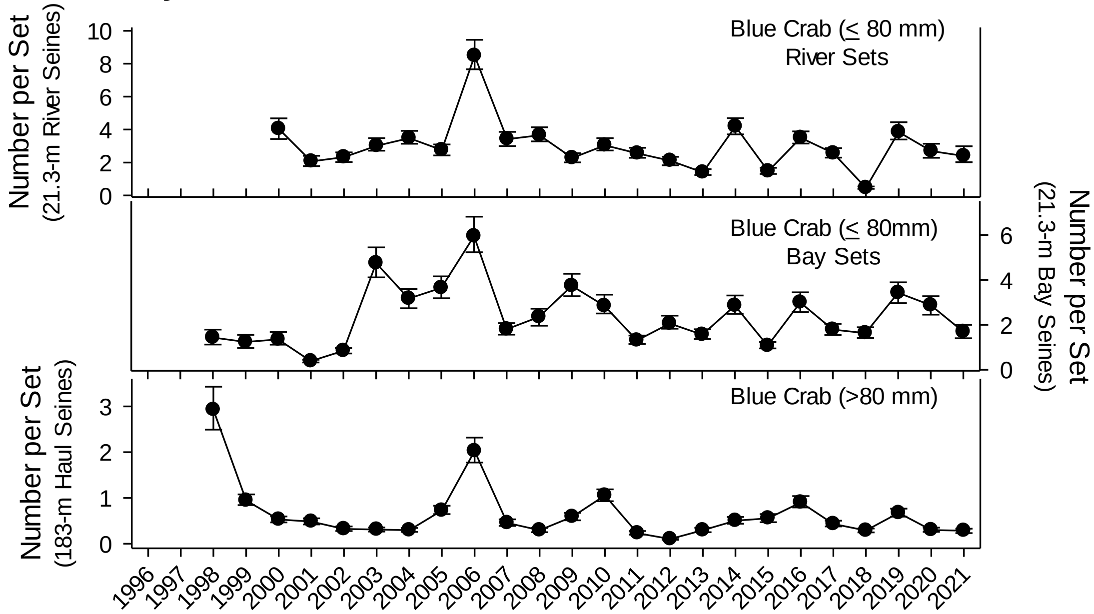
Apalachicola Bay



Cedar Key

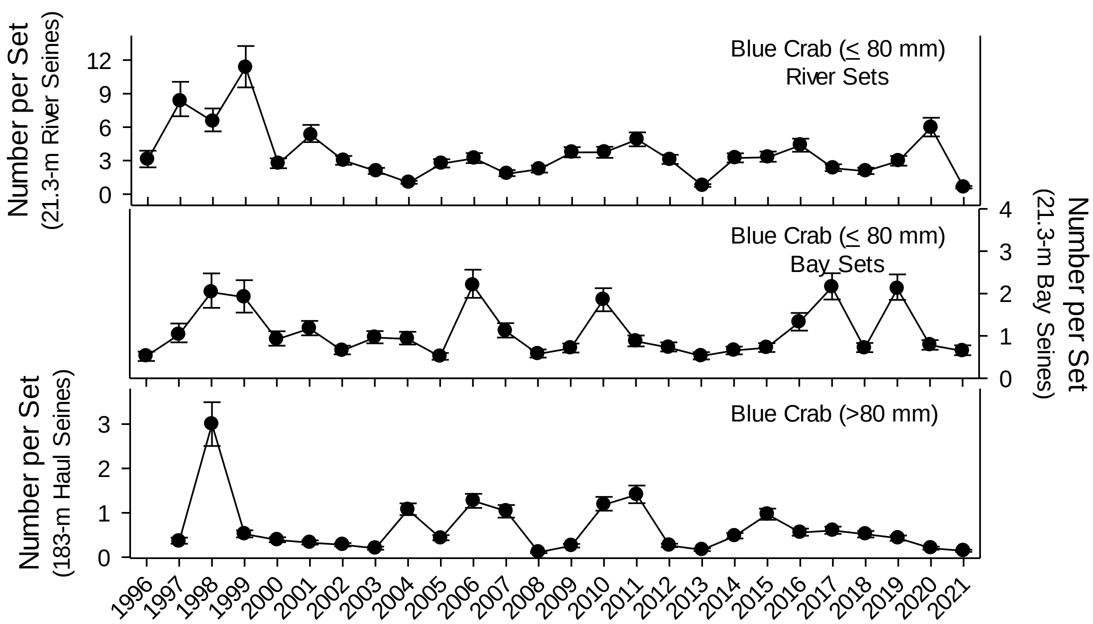
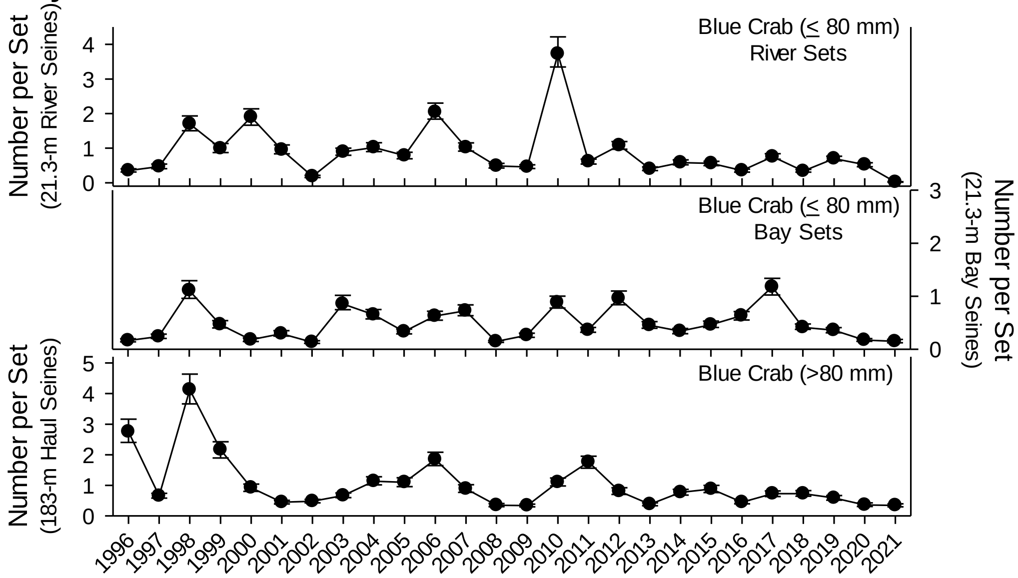


Figure SP21-26. Relative abundance of young-of-the-year Blue Crab (≤ 80 mm CW) collected in 21.3-m seines and of adult Blue Crab (> 80 mm CW) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling of Apalachicola Bay and Cedar Key. Points represent the median estimate 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

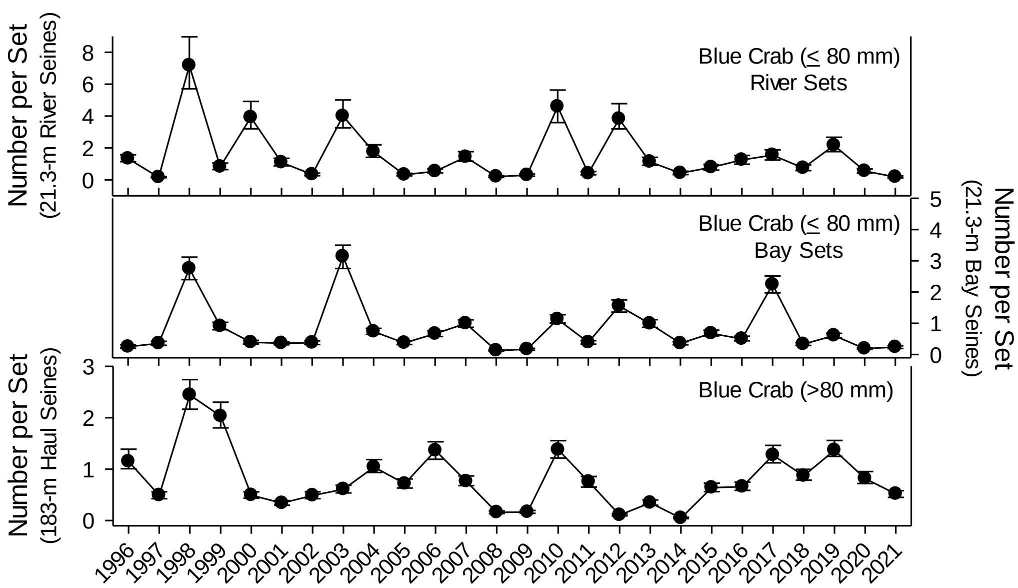
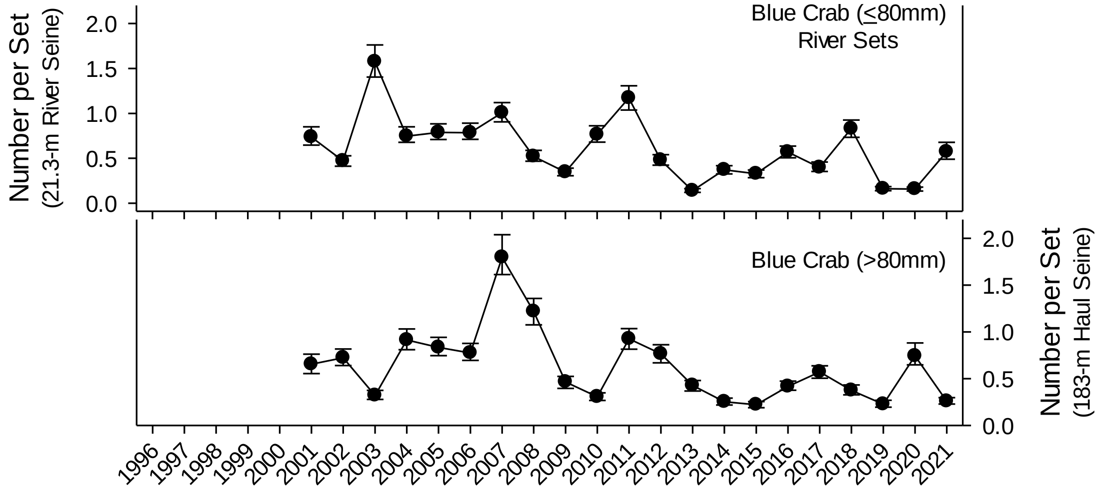


Figure SP21-27. Relative abundance of young-of-the-year Blue Crab (≤ 80 mm CW) collected in 21.3-m seines and of adult Blue Crab (> 80 mm CW) collected in 183-m haul seines between 1996 and 2021 during stratified-random sampling from Tampa Bay and Charlotte Harbor. Points represent the median estimate 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

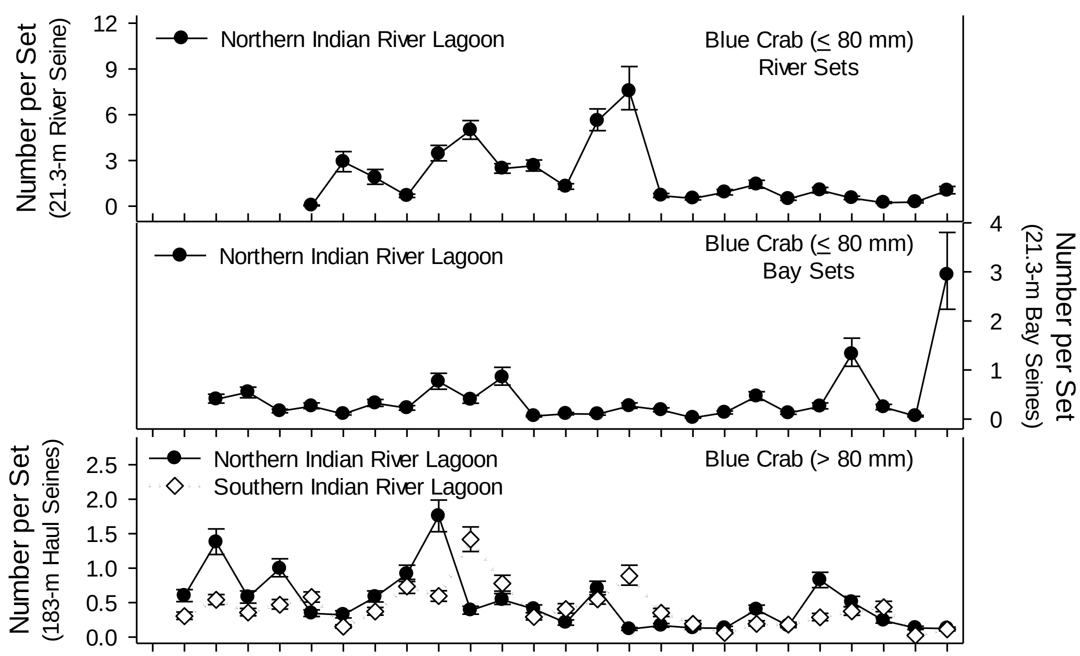


Figure SP21-28. Relative abundance of young-of-the-year Blue Crab (≤ 80 mm CW) collected in 21.3-m seines and of adult Blue Crab (> 80 mm CW) collected in 183-m haul seines between 1997 and 2021 during stratified-random sampling from Northeast Florida and the Indian River Lagoon. Points represent the median estimate while the vertical bars represent the 25th-75th percentiles. Note different scales for estimates from 21.3-m and 183-m seines.

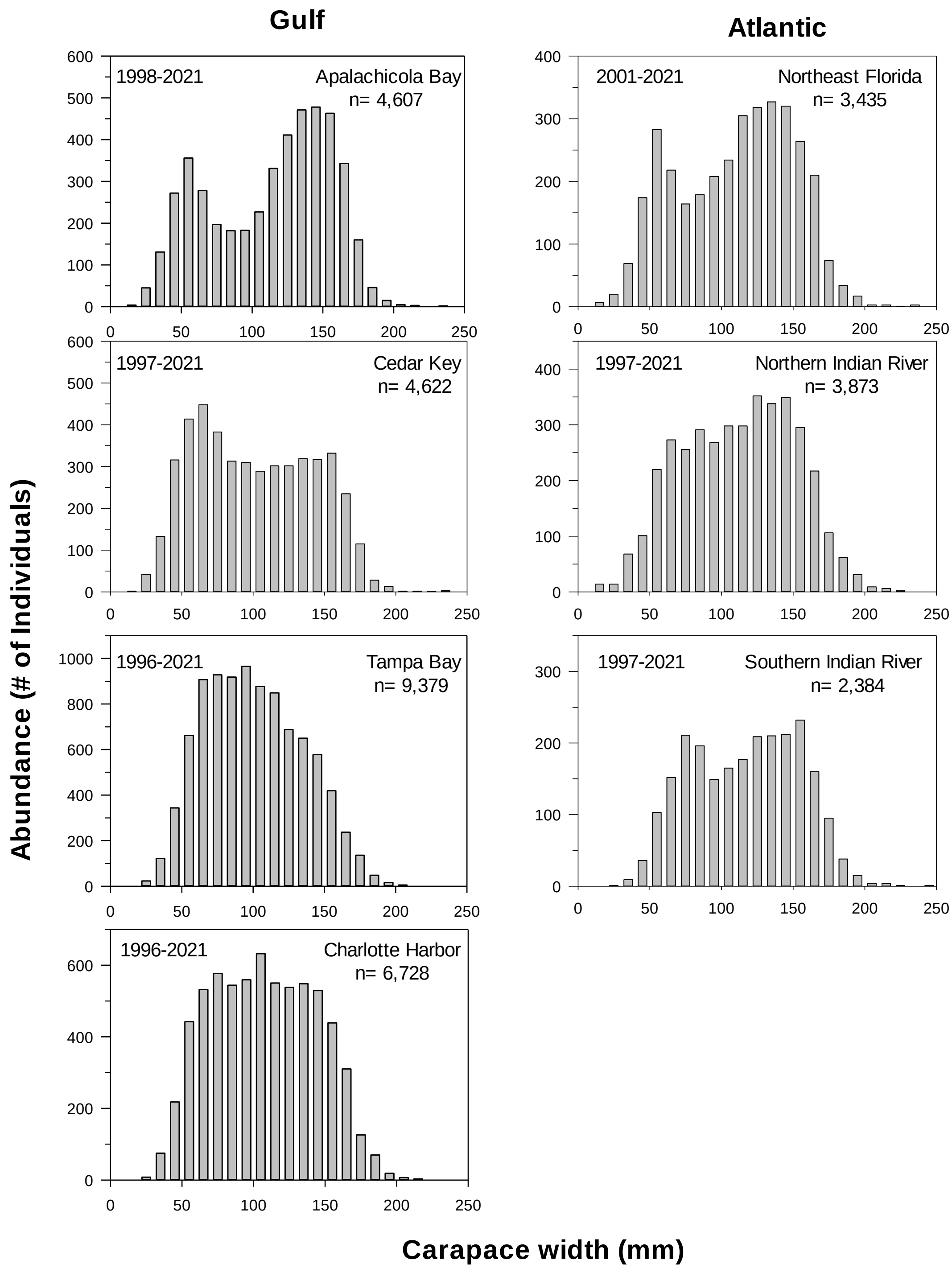


Figure SP21-29. Length frequency diagrams of Blue Crab collected in 183-m haul seines. All lengths are carapace width (CW). Note different scales and years of collection.