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THE OCCURRENCE OF LIFE STAGES OF SOME
RECREATIONAL MARINE FISHES IN ESTUARIES
OF THE GULF OF MEXICO

*of Oceanic and Atmospheric Administration.
Marine Fisheries Service*

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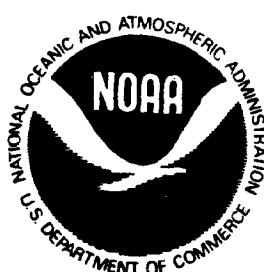
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U.S. National Oceanic Atmospheric Administration
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PREFACE

This report summarizes the results of a project that was conducted in 1974-75. In addition to the information that we sought, our efforts produced an extensive bibliography on fishes in the estuaries of the Gulf of Mexico. Some of our colleagues suggested that we include additional species and that we update the references. The unlikelihood of our doing so becomes more apparent with the passage of time. We therefore present this version of our report with the hope that others may find it useful.

THE OCCURRENCE OF LIFE STAGES OF SOME RECREATIONAL
MARINE FISHES IN ESTUARIES OF THE GULF OF MEXICO

Many recreationally and commercially important marine fishes are dependent upon estuaries at some time in their life cycle. Most of these species have life histories wherein the adults spawn offshore, and the young move into estuaries to feed and grow (Gunter 1961, 1967). The life histories of the commercially important species are sufficiently known to permit estimates of the portion of the catches which are estuarine dependent. A number of authors have made such estimates (Gunter 1967; Lindall 1973; McHugh 1966, 1967; Skud and Wilson 1960; Sykes 1964, 1965, 1968; Sykes and Finucane 1966; Thompson 1968; and others). Estimates as high as 90% have been made for commercial species in the Gulf of Mexico (Skud and Wilson 1960; Thompson 1968). Comparable percentages for recreational species are more difficult to estimate owing to the lack of both adequate catch data and sufficient biological information.

We reviewed what was known of the distribution and occurrence of the various life stages of recreational fishes in estuaries along the U.S. coast of the Gulf of Mexico. We examined various publications and tallied, by species and by life stages, those recreational fishes that had been reported in estuaries. The presence of a species in an estuary does not necessarily imply its dependence upon that habitat; it may be an adventitious visitor (McHugh 1967). But, if the life history is not fully known, we may be in error in identifying adventitious visitors. Therefore, we included all of the selected species of recreational fishes in our tally.

The selection of species as recreational fishes is admittedly subjective. Agreement is difficult to obtain, because a fish may be considered a recreational species in one area, but not in another, and also because a fish may be considered a recreational species by one fisherman, but not by another. We made our selections from the List of Common and Scientific Names of Fishes from the United States and Canada (Bailey 1970). A total of sixty-eight species was selected (Table 1).

Definitions of larva and juvenile were those generally used by biologists, such as by Mansueti and Hardy (1967):

Larva - "Young fish between time of hatching and attainment of adult fin-ray complement."

Juvenile - "Young fish after attainment of full adult counts and before sexual maturation."

Adult is the stage at which sexual maturity is attained. Many references gave sizes of fishes without stating the life stages. In such cases, we determined life stages by referring to other authors who had given both the sizes and life stages.

The literature citations are presented alphabetically and numerically. Numerical references are used in the appendix tables for convenience.

For our purpose the estuarine areas of the U.S. coast of the Gulf of Mexico included all bays, harbors, sounds, lakes, and lagoons which were connected directly to the Gulf of Mexico. The seaward boundary was the imaginary line connecting the points of land marking the entrance or entrances to the embayments. The estuarine areas of the Gulf of Mexico were delimited as follows: The Florida coast was divided into four areas following the demarcations of McNulty et al. (1972); the Alabama coast was considered one area; the Mississippi coast was considered one area; the Louisiana coast was divided into two areas; and the coast of Texas was divided into three areas. The boundaries of the eleven estuarine areas, as illustrated in Figure 1, are as follows:

- I. Rio Grande River through Laguna Madre
- II. Corpus Christi Bay to Freeport
- III. Freeport through Sabine River
- IV. Louisiana coast west of Mississippi River
- V. Louisiana coast east of Mississippi River
- VI. Mississippi coast
- VII. Alabama coast
- VIII. Perdido Bay to Lighthouse Point
- IX. Lighthouse Point through Anclote Key
- X. Anclote River to Cape Romano
- XI. Cape Romano through Florida Bay

The sixty-eight species consisted of eleven sharks and fifty-seven bony fishes (Table 1). The sharks were included, because shark fishing is becoming increasingly popular. All of the eleven sharks give birth to live young, and therefore, they do not have egg and larval stages. Eight of the eleven had their juvenile and adult stages reported in estuaries (Table 1). The nurse shark (Ginglymostoma cirratum) had only its adult stage reported, while the sandbar shark (Carcharhinus milberti) had only its juvenile stage reported; both of these, plus the smooth hammerhead (Sphyrna zygaena), were also reported in estuaries by authors who did not state sizes or life stages. Of the bony fishes, three species had all stages from egg to adult present in estuaries. These three were the two marine catfishes (Arius felis and Bagre marinus), the males of which incubate the eggs in their mouths, and the black drum (Pogonias cromis), which has been found to spawn in the bays and lagoons of Texas. Of the remaining fifty-four, twenty-six species had their larval, juvenile, and adult stages reported in estuaries; twenty-five had their juvenile and adult stages reported. One (the bonefish, Albula vulpes) had its larval and juvenile stages reported in estuaries (one report did not state size or life stage of the bonefish--see appendix tables); two (the greater amberjack, Seriola dumerili, and the guaguanche, Sphyraena guachancho)

had only their juvenile stage reported in estuaries (several references of the guaguanche did not state size of life stage).

In each estuarine area, the number of species was lowest for eggs, second lowest for larvae, third lowest for adults, and highest for juveniles (Table 2). Thus, additional credence is provided to the importance of estuaries as nursery grounds for juvenile recreational fishes (Gunter 1961, 1967). The few reports of eggs and larvae result from several factors: one, some of the species spawn offshore; two, eggs and larvae are difficult to identify; and three, relatively few studies have been conducted on ichthyoplankton in estuaries of the Gulf of Mexico. Those studies that have been made were either lacking in specific identifications, or were limited to larvae of a certain family, or were limited in sampling (Arnold, Wheeler, and Baxter 1960; Gillespie 1971; Jannke 1971; Kelly and Dragovich 1968; Perry and Christmas 1973; Swingle 1971). More systematic studies of ichthyoplankton would yield information on the importance of estuaries as spawning grounds.

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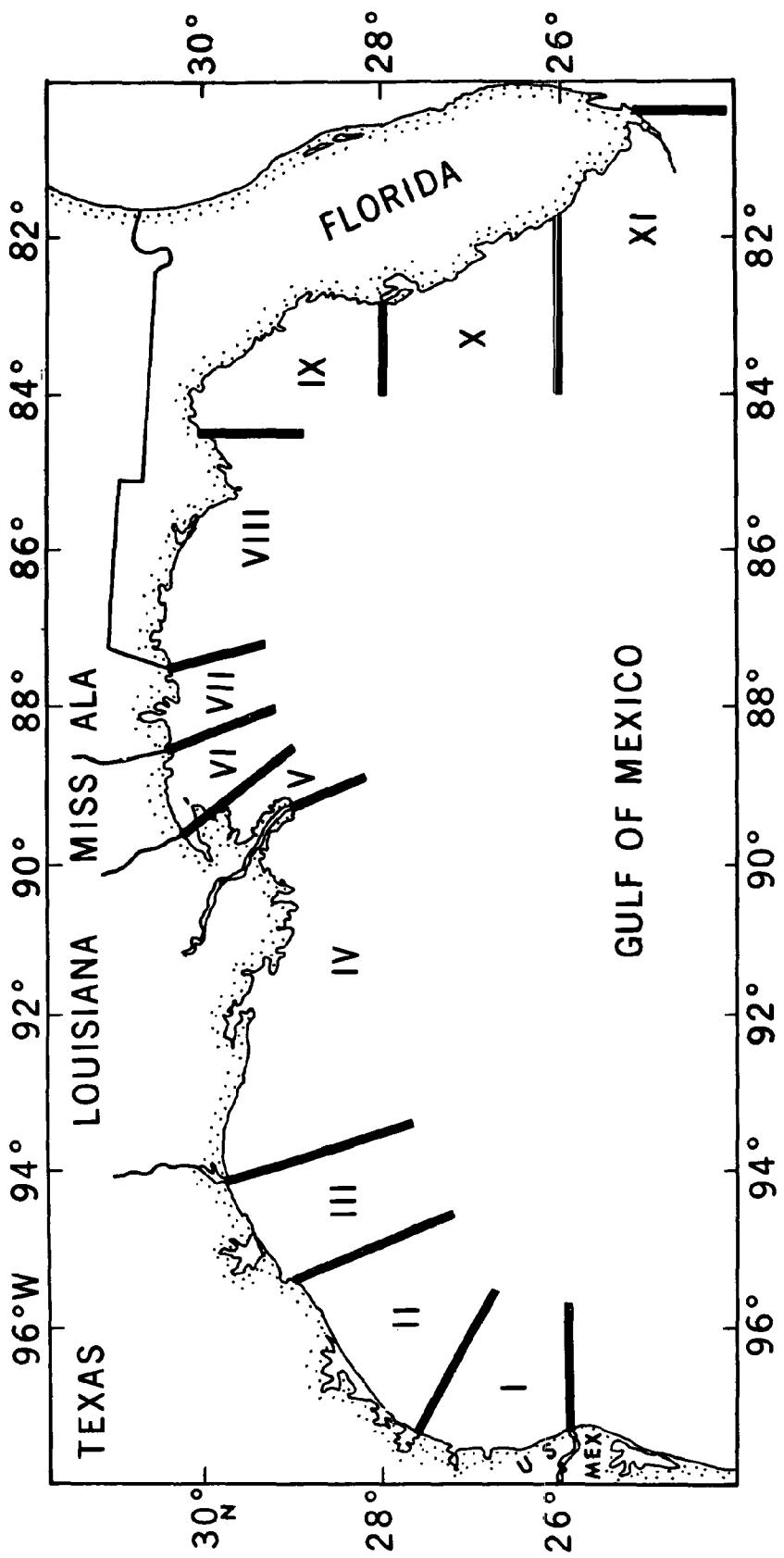


Figure 1.--Estuarine areas of the U.S. coast of the Gulf of Mexico.

Table 1.--Occurrence of life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico. "x" indicates occurrence has been reported in the literature.

Life Stage	Egg	Larva	Juvenile	Adult	Unspecified
Orectolobidae - carpet sharks				x	x
Nurse shark (<u>Ginglymostoma cirratum</u>)				x	x
Carcharhinidae - requiem sharks					
Finetooth shark (<u>Aprionodon isodon</u>)	x	x		x	x
Blacknose shark (<u>Carcharhinus acronotus</u>)	x	x		x	x
Bull shark (<u>Carcharhinus leucas</u>)	x	x	x	x	x
Blacktip shark (<u>Carcharhinus limbatus</u>)	x	x	x	x	x
Sandbar shark (<u>Carcharhinus milberti</u>)	x	x	x	x	x
Atlantic sharpnose shark (<u>Rhizoprionodon terraenovae</u>)	x	x	x	x	x
Sphyrnidae - hammerhead sharks					
Scalloped hammerhead (<u>Sphyraena lewini</u>)	x	x	x	x	x
Great hammerhead (<u>Sphyraena mokarran</u>)	x	x	x	x	x
Bonnethead (<u>Sphyraena tiburo</u>)	x	x	x	x	x
Smooth hammerhead (<u>Sphyraena zygaena</u>)					

Table 1.--Occurrence of life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico. "x" indicates occurrence has been reported in the literature. (cont'd)

Life Stage	Egg	Larvae	Juvenile	Adult	Unspecified
Elopidae - tarpons					
Ladyfish (<u>Ellops saurus</u>)	x	x	x	x	x
Tarpon (<u>Megalops atlantica</u>)	x	x	x	x	x
Bonefish (<u>Albulia vulpes</u>)	x	x	x	x	x
Clupeidae - herrings					
Alabama shad (<u>Alosa alabamae</u>)	x	x	x	x	x
Skipjack herring (<u>Alosa chrysosochloris</u>)	x	x	x	x	x
Ariidae - sea catfishes					
Sea catfish (<u>Arius felis</u>)	x	x	x	x	x
Gafftopsail catfish (<u>Bagre marinus</u>)	x	x	x	x	x
Centropomidae - snooks					
Tarpon snook (<u>Centropomus pectinatus</u>)	x	x	x	x	x
Snook (<u>Centropomus undecimalis</u>)	x	x	x	x	x
Percichthyidae - temperate basses					
Striped bass (<u>Morone saxatilis</u>)	x	x	x	x	x

Table 1.--Occurrence of life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico. "x" indicates occurrence has been reported in the literature. (cont'd)

Life Stage	Egg	Larva	Juvenile	Adult	Unspecified
Serranidae - sea basses					
Southern sea bass (<u>Centropristes melanus</u>)	x	x	x	x	x
Rock sea bass (<u>Centropristes philadelphica</u>)	x	x	x	x	x
Jewfish (<u>Epinephelus itajara</u>)	x	x	x	x	x
Gag (<u>Myxteroperca microlepis</u>)	x	x	x	x	x
Red grouper (<u>Epinephelus morio</u>)	x	x	x	x	x
Pomatomidae - bluefishes					
Bluefish (<u>Pomatomus saltatrix</u>)	x	x	x	x	x
Rachycentridae - cobias					
Cobia (<u>Rachycentron canadum</u>)	x	x	x	x	x
Carangidae - jacks and pompanos					
Blue runner (<u>Caranx cryos</u>)	x	x	x	x	x
Crevalle jack (<u>Caranx hippos</u>)	x	x	x	x	x
Greater amberjack (<u>Seriola dumerilii</u>)	x	x	x	x	x
Florida pompano (<u>Trachinotus carolinus</u>)	x	x	x	x	x
Permit (<u>Trachinotus falcatus</u>)	x	x	x	x	x

Table 1.--Occurrence of life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico. "x" indicates occurrence has been reported in the literature. (cont'd)

Life Stage	Egg	Larva	Juvenile	Adult	Unspecified
Lutjanidae - snappers					
Red snapper (<u>Lutjanus campechanus</u>)		x	x	x	x
Gray snapper (<u>Lutjanus griseus</u>)		x	x	x	x
Lane snapper (<u>Lutjanus synagris</u>)		x	x	x	x
Lobotidae - tripletails					
Tripletail (<u>Lobotes surinamensis</u>)		x	x	x	x
Gerreidae - mojarras					
Striped mojarra (<u>Diplodus plumieri</u>)	x	x	x	x	x
Pomadasysidae - grunts					
Tomtate (<u>Haemulon aurolineatum</u>)		x	x	x	x
White grunt (<u>Haemulon plumieri</u>)		x	x	x	x
Pigfish (<u>Orthopristis chrysoptera</u>)	x	x	x	x	x
Sparidae - porches					
Sheepshead (<u>Archosargus probatocephalus</u>)	x	x	x	x	x
Pinfish (<u>Lagodon rhomboides</u>)	x	x	x	x	x

Table 1.--Occurrence of life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico. "X" indicates occurrence has been reported in the literature. (cont'd)

Life Stage	Egg	Larva	Juvenile	Adult	Unspecified
Sciaenidae - drums					
Silver perch (<i>Bairdiella chrysura</i>)	X	X	X	X	X
Sand seatrout (<i>Cynoscion arenarius</i>)	X	X	X	X	X
Spotted seatrout (<i>Cynoscion nebulosus</i>)	X	X	X	X	X
Spot (<i>Leiostomus xanthurus</i>)	X	X	X	X	X
Southern kingfish (<i>Menticirrhus americanus</i>)	X	X	X	X	X
Minkfish (<i>Menticirrhus focaliger</i>)	X	X	X	X	X
Black drum (<i>Pogonias cromis</i>)	X	X	X	X	X
Atlantic croaker (<i>Micropogon undulatus</i>)	X	X	X	X	X
Red drum (<i>Sciaenops ocellatus</i>)	X	X	X	X	X
Ephippidae - spadefishes					
Atlantic spadefish (<i>Chaetodipterus faber</i>)	X	X	X	X	X
Mugilidae - mullets					
Striped mullet (<i>Mugil cephalus</i>)	X	X	X	X	X
White mullet (<i>Mugil curema</i>)	X	X	X	X	X
Fantail mullet (<i>Mugil trichodon</i>)	X	X	X	X	X

Table 1.--Occurrence of life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico. "x" indicates occurrence has been reported in the literature. (cont'd)

Life Stage	Egg	Larva	Juvenile	Adult	Unspecified
Sphyraenidae - barracudas					x
Guaguanche (<u>Sphyraena guachancho</u>)	x	x	x	x	x
Great barracuda (<u>Sphyraena barracuda</u>)	x	x	x	x	x
Northern sennet (<u>Sphyraena borealis</u>)	x	x	x	x	x
Scombridae - mackerels and tunas					x
Little tunny (<u>Euthynnus alletteratus</u>)	x	x	x	x	x
King mackerel (<u>Scomberomorus cavalla</u>)	x	x	x	x	x
Spanish mackerel (<u>Scomberomorus maculatus</u>)	x	x	x	x	x
Bothidae - lefteye flounders					x
Gulf flounder (<u>Paralichthys albigutta</u>)	x	x	x	x	x
Southern flounder (<u>Paralichthys lethostigma</u>)	x	x	x	x	x
Balistidae - triggerfish and filefishes					x
Gray triggerfish (<u>Balistes capriscus</u>)	x	x	x	x	x
Orange filefish (<u>Aluterus schoepfii</u>)	x	x	x	x	x
Tetraodontidae - puffers					x
Southern puffer (<u>Sphoeroides nephelus</u>)	x	x	x	x	x

Table 2. Numbers of selected recreational fishes by life stages reported in estuarine areas of the U.S. coast of the Gulf of Mexico.

State Estuarine Area	TX			LA			MS		AL		FL		
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI		
Egg	2	2	1	1	0	0	0	0	2	0	1	2	
Larva	10	20	15	12	6	1	9	11	8	10	11		
Juvenile	20	43	27	35	24	21	49	54	38	45	41		
Adult	17	24	20	22	17	15	33	46	24	34	32		
Unspecified ^{1/}	13	3	9	5	2	25	1	3	14	7	5		

1/ Number of species reported only as present, size or life stage not specified.

Appendix Table A.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico : Texas. E = egg; L = larvae; J = juvenile; A = adult; U = unspecified.

Family - Species	I Rio Grande River through Laguna Madre					II Corpus Christi Bay to Freeport					III Freeport through Sabine River				
						E	L	J	A	U	E	L	J	A	U
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Croctolobidae - carpet sharks															
Nurse shark (<i>Ginglymostoma cirratum</i>)															
Carcharhinidae - requiem sharks															
Finetooth shark (<i>Aprionodon isodon</i>)						249					106				
											125				
Blacknose shark (<i>Carcharinus acronotus</i>)											125		14		
Bull shark (<i>Carcharhinus leucas</i>)						16					125		16		
											183		124		
											129				
Blacktip shark (<i>Carcharhinus limbatus</i>)						46		16			125	97			
								249							
Sandbar shark (<i>Carcharhinus milberti</i>)															
Atlantic sharpnose shark (<i>Rhizoprionodon terraenovae</i>)											125				
Sphyrnidae - hammerhead sharks															
Scalloped hammerhead (<i>Sphyrna lewini</i> = <i>S. diplana</i>)											125				
Great hammerhead (<i>Sphyrna mokarran</i>)											16				
											125				
Bonnethead (<i>Sphyrna tiburo</i>)						16		16							
						32		97							
								125							
								129							
Other hammerheads (<i>Sphyrna</i> spp.)						16									
						32									
Elopidae - tarpons															
Ladyfish (<i>Elops saurus</i>)	34	34	34	31			123	97	97	68	4	81		20	
	46	46	46	32			125	123		98	69	226		191	
				102				125		99	88			212	
				119				188		183				214	
								217						225	
														227	
Tarpon (<i>Megalops atlantica</i>)						31		14	183	168			14		21
						32		97		251					
						46				257					
						249									
Bonefish (<i>Albula vulpes</i>)							125	125					212		
Clupeidae - herrings															
Alabama shad (<i>Alosa alabamae</i>)															
Skipjack herring (<i>Alosa chrysochloris</i>)															
Ariidae - sea catfishes															
Sea catfish (<i>Arius felis</i>)	31			31	102	68	88	24	25	80	69	59	59	59	20
	32			32	119	97	145	25	88	105	225	69	81	81	54
	46			46	249			68	97	168	229	81	91	88	143
								97	127	183		91	229	91	144
								126	145	251		229	225	212	
								127					229	228	
								145							

Appendix Table A.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Texas. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family - Species	TEXAS													
	I Rio Grande River through Laguna Madre					II Corpus Christi Bay to Freeport				III Freeport through Sabine River				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A
Gafftopsail catfish (<i>Bagre marinus</i>)		46	31			127	25	97	68		59	59	226	54
			32				97		124		81	81	231	69
			80				127		168			226		191
			249						251			231		193
													212	
													213	
													225	
													227	
Centropomidae - snooks														
Tarpon snook (<i>Centropomus pectinatus</i>)														
Snook (<i>Centropomus undecimalis</i>)		46	31				15		257					
			32											
Percichthyidae - temperate basses														
Striped bass (<i>Morone saxatilis</i>)														
Serranidae - sea basses														
Southern sea bass (<i>Centropristes melanota</i>)														
Rock sea bass (<i>Centropristes philadelphica</i>)							125	185	15			212		
							185							
Jewfish (<i>Ephinephelus itajara</i>)			32				183					212		
Gag (<i>Mycteroperca microlepis</i>)												15		
Red grouper (<i>Ephinephelus morio</i>)														
Pomatomidae - bluefishes														
Bluefish (<i>Pomatomus saltatrix</i>)			102				97	183		4	212			
							125	257			226			
							266							
Rachycentridae - cobias														
Cobia (<i>Rachycentron canadum</i>)							15	183		212				
							125	257						
Carangidae - jacks and pompanos														
Blue runner (<i>Caranx cryos</i>)		46	32				168				212			
Crevalle jack (<i>Caranx hippos</i>)		32	32	46			25	68		4	20			
		249	249				97	98		226	69			
							125	168			191			
							217	257			212			
											227			
											229			
Greater amberjack (<i>Seriola dumerili</i>)														
Florida pompano (<i>Trachinotus carolinus</i>)		34	34	32	249		66	99		4	191			
							125	168		176	212			
							183			227	229			
							257							
Permit (<i>Trachinotus falcatus</i>)							15							
							99							
Lutjanidae - snappers														
Red snapper (<i>Lutjanus campechanus</i>)														

Appendix Table A.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Texas. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family - Species	I Rio Grande River through Laguna Madre					II Corpus Christi Bay to Freeport					III Freeport through Sabine River				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Gray snapper (<u>Lutjanus</u> <u>griseus</u>)						88		13							13
						97		15							212
						168		105							
						188									
Lane snapper (<u>Lutjanus</u> <u>synagris</u>)						88						4			212
Lobidae - tripletails															
Tripletail (<u>Lobotes</u> <u>surinamensis</u>)						11		15	97	11					226
						249									11
															212
															227
															229
Gerridae - mojarras															
Striped mojarra (<u>Diapterus</u> <u>plumieri</u>)															
Pomadasysidae - grunts															
Tomtate (<u>Haemulon</u> <u>aurolineatum</u>)															
White grunt (<u>Haemulon</u> <u>plumieri</u>)															
Pigfish (<u>Orthopristis</u> <u>chrysoptera</u>)	25	25	31			65	24	97	35			4	176		20
	34	34	32			125	25		68			176			35
	35	35	249			88			80			226			69
	37	37				97			124						88
	38	39				119		125	128						191
	39	40						129	168						212
	40	41							197						214
	41	42							251						228
	42	43													
Sparidae - porgies															
Sheepshead (<u>Archosargus</u> <u>probatocephalus</u>)	32	25	33			35	25	32				4	35	4	20
	34	34	116			38	35	68				37	35		69
	35	35	249			40	37	80				38	37		144
	37	37				41	40	105				40	38		193
	38	39				42	41	116				41	40		212
	39	40				97	42	124				42	41		
	40	41				125	97	128				191	42		
	41	42				151	145	168				192	192		
	42	113				152	151	183				214	259		
	46	114				178	178	257				259	261		
	113	115				180	179	260				261			
	259	259				188	180								
						196	196								
						197	245								
						245	246								
						246	247								
						247	259								
						259									
Pinfish (<u>Lagodon</u> <u>rhombooides</u>)	65	25	34	24		65	24	35				4	81	176	35
	34	249	31			66	25	51				128		225	51
	65		32			25	97	68				176			54
	119		35			52	125	80				191			69
	249		46			57	154	98				214			143
			51			65	296	99				226			144
			102			66	298	105							212
			114			97		124							227
			142			125		145							
						129		168							
						154		179							
						296		197							
						298		245							
								246							
								251							
								297							

Appendix Table A.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Texas. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family - Species	TEXAS													
	I Rio Grande River through Laguna Madre					II Corpus Christi Bay to Freeport				III Freeport through Sabine River				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A
Sciaenidae - drums														
Silver perch <i>(Bairdiella chrysura)</i>	25	32	24			125	25	24	68		4	81	176	69
	32	34	46			97	25	80			231	226	143	
	34		119			125	88	98			231	191		
			249			145	97	105				212		
						217	145	124				214		
						232		128				227		
								168				228		
								244						
								251						
Sand seatrout <i>(Cynoscion arenarius)</i>	34	31				24	25	68			4	59	91	20
	46	32				25	80	124			81	229	54	
	33		80			97	168				91	55		
			249			97	145	244			191	69		
						125	251	260			226	193		
						127					227	212		
						145					229	214		
						151					231	225		
						251								
Spotted seatrout <i>(Cynoscion nebulosus)</i>	217	32	31	33		152	26	35	33		4	35	4	54
	34	32	102			217	35	37	68			37	35	69
	35	34	116			37	38	80				38	37	116
	36	35	118			38	40	98				40	40	193
	37	36	244			40	41	105				41	41	212
	38	37	274			41	42	116				42	42	214
	39	38				42	56	124				81	143	225
	40	39				56	57	155				143	144	227
	41	40				57	58	168				144	192	229
	42	41				58	97	244				191	233	274
	46	42				97	151	257				192	259	
	113	46				125	178	260				226	261	
	114	113				151	179	274				259		
	115	114				152	180					261		
	119	115				178	183							
	217	119				179	196							
	249	249				180	245							
	259	259				183	246							
						188	247							
						196	251							
						197	259							
						217								
						245								
						246								
						247								
						251								
						259								
Spot (<i>Leiostomus xanthurus</i>)	34	25	32	24		65	24	97	68		4	54	59	20
	217	31	34	114		80	25	98			59	59	91	55
	34	46	244			217	57	105			91	69	147	119
	46	119				80	124				213	81	176	143
	119	249				88	168					88	213	144
	217					97	179					91	226	212
	249					125	244					147		214
						127						176		
						128						191		
						145						213		
						151						225		
						155						226		
						217						227		
												229		
												230		
												287		
Southern kingfish <i>(Menticirrhus americanus)</i>						125	97	97	80			88		20
						125		99				214		69
								124				227		116
								168					191	
								183					212	
								244					229	

Appendix Table A.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Texas. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family - Species	TEXAS														
	I Rio Grande River through Laguna Madre					II Corpus Christi Bay to Freeport					III Freeport through Sabine River				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Minkfish <i>(Menticirrhus focaliger)</i>															
Black drum <i>(Pogonias cromis)</i>	250	32	32	35	31	250	65	35	35	80	4	35	35	54	
	34	34	36	33		125	37	37	98		37	37	37	69	
	65	36	37	102		152	38	38	105		38	40	40	116	
	217	37	38	116		217	40	40	116		40	41	41	193	
	38	39	118			41	41	244			41	42	42	212	
	39	40	240			42	42	251			42	176	176	225	
	40	41	244			56	56	257			81	192	192	227	
	41	42				57	58	260			143	259	259	229	
	42	113				58	97				144	261	261		
	46	114				97	151				176				
	113	115				151	178				191				
	115	119				152	179				192				
	249	259				178	183				214				
	250					179	188				226				
	259					180	196				259				
						183	217				261				
						188	245								
						196	246								
						197	247								
						217	259								
						245									
						246									
						247									
						259									
Atlantic croaker <i>(Micropogon undulatus)</i>															
	34	25	25	24		65	24	24	56		4	20	4	55	
	65	31	32	33		66	25	25	68		59	54	35	143	
	32	35	102			125	57	35	98		69	59	54	144	
	34	46	113			217	65	57	105		91	69	69	193	
	46	259	114			251	66	80	124		147	81	79	212	
	65	119				80	97	151			191	88	81		
		244				97	129	168			213	91	91		
		249				127	145	179			147	147	147		
						129	178	188			176	176	176		
						145	257	196			191	191	191		
						155	259	197			213	192	192		
						217	244				225	226	226		
						251	245				226	227	227		
						245					227	229	229		
						246					229	231	231		
						257					230	259	259		
						260					231	261	261		
											233				
											287				
Red drum <i>(Sciaenops ocellatus)</i>															
	36	31	31	102		65	35	35	98		4	35	4	54	
	217	32	32	116		125	37	37	99		37	35	35	116	
	34	33	118			152	38	38	116		38	37	37	193	
	35	35				178	40	40	128		40	38	38	212	
	36	36				217	41	41	155		41	40	40	214	
	37	37				42	42	257			42	41	41	227	
	38	38				56	56	260			81	42	42	229	
	39	39				57	58				143	144	144		
	40	40				58	58				144	192	192		
	41	41				97	97				191	226	226		
	42	42				125	151				192	259	259		
	46	113				152	178				226	261	261		
	65	114				178	179				231				
	113	115				180	183				259				
	114	119				183	245				261				
	115	142				188	246								
	119	249				196	247								
	217	250				197	250								
	249	259				217	251								
	250	293				245	259								
	259					246									
						247									
						250									
						251									
						259									

Appendix Table A.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Texas. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family - Species	TEXAS											
	I Rio Grande River through Laguna Madre				II Corpus Christi Bay to Freeport				III Freeport through Sabine River			
	E	L	J	A	E	L	J	A	E	L	J	A
Ephippidae - spadefishes												
Atlantic spadefish <i>(Chaetodipterus faber)</i>	65		32		125	24	65	68	4	4	20	
					97	88	80		69		191	
					125	97	168		81		212	
									88		227	
									226			
									231			
Mugilidae - mullets												
Striped mullet <i>(Mugil cephalus)</i>	97	31	31	32	26	25	145	68	4	4	20	
	97	46	102		65	97	243	80	88	226	54	
	119	97	105		97	98		99	91		69	
		119	114		98	120		105	214		143	
			190		125	126		124	225		144	
			249		273	128		168	226		191	
							145	190			212	
							217	251			227	
							232				246	
							273					
White mullet <i>(Mugil curema)</i>	97	97	97	32	26	97		98	226	176		54
				46	97	125		99	228	225		212
				249	125	232		168		226		
								190		227		
									228			
Fantail mullet <i>(Mugil trichodon)</i>												
Sphyraenidae - barracudas												
Guaguanche <i>(Sphyraena guachancho)</i>					15		97		106			
							125					
Great barracuda <i>(Sphyraena barracuda)</i>						125						
Northern sennet <i>(Sphyraena borealis)</i>							125					
Scombridae - mackerels and tunas												
Little tunny <i>(Euthynnus alletteratus)</i>												
King mackerel <i>(Scomberomorus cavalla)</i>					32			257				
Spanish mackerel <i>(Scomberomorus maculatus)</i>	34		32		125	125	97	68		227		212
	46		102		125	125	168				229	
			249				183					
							257					
Bothidae - lefteye flounders												
Gulf flounders <i>(Paralichthys albigutta)</i>					32		125	251	97	14		69
					119		125	151			212	
					249							

Appendix Table A.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Texas. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family - Species	TEXAS													
	I Rio Grande River through Laguna Madre				II Corpus Christi Bay to Freeport				III Freeport through Sabine River					
	E	L	J	A	U	E	L	J	A	U	E	L	J	A
Southern flounder (<i>Paralichthys lethostigma</i>)	25	31	102			125	24	35	14		59	4	4	14
	31	34	119				35	42	68		191	35	35	69
	32	35	249				37	56	80			37	42	193
	34	36					38	57	98			38	59	212
	35	39					40	58	124			40	192	214
	37	42					41	97	128			41	259	225
	38	46					42	151	168			42	261	227
	39	113					56	178	183			59		231
	40	115					57	179				81		
	41	142					58	188				88		
	42	259					97	196				143		
	46						145	245				144		
	113						151	246				191		
	115						178	247				192		
	259						179	251				259		
							180	259				261		
							188							
							196							
							197							
							245							
							246							
							247							
							251							
							259							
Balistidae - triggerfishes and filefishes														
Gray triggerfish (<i>Balistes capriacus</i>)														
Orange filefish (<i>Aluterus schoepfii</i>)				249					125					
Tetraodontidae - puffers														
Southern puffer (<i>Sphoeroides</i> <i>nephelus</i>)					119		24		15		226		20	
					249		25		68		229		69	
							125		124				143	
							217		127				191	
									251				212	
													214	
													225	
													227	

Appendix Table B.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Louisiana, Mississippi, and Alabama. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	LOUISIANA					MISSISSIPPI					ALABAMA					VII					
	West of Mississippi River					East of Mississippi River					Mississippi Coast					Alabama Coast					
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	
Orectolobidae - carpet sharks																					
Nurse shark (<i>Ginglymostoma cirratum</i>)																					
Carcharhinidae - requiem sharks																					
Finetooth shark (<i>Aprionodon isodon</i>)																60			266	295	
Blacknose shark (<i>Carcharhinus acronotus</i>)																60		266	295		
Bull shark (<i>Carcharhinus leucas</i>)	49 74	74	202			75		87								60		295			
Blacktip shark (<i>Carcharhinus limbatus</i>)																60		295		266	
Sandbar shark (<i>Carcharhinus milberti</i>)																					
Atlantic sharpnose shark (<i>Rhizoprionodon terraenovae</i>)																		295	295		
Sphyrnidae - hammerhead sharks																					
Scalloped hammerhead (<i>Sphyrna lewini</i> = <i>S. diplane</i>)																60		295			
Great hammerhead (<i>Sphyrna mokarran</i>)																		295			
Bonnethead (<i>Sphyrna tiburo</i>)																90	60		295	266	
Other hammerheads (<i>Sphyrna</i> spp.)																60					
Elopidae - tarpons																					
Ladyfish (<i>Elops saurus</i>)	121 202	220 248				78 89 107 294		121 74 75 220 248							90 158	60		267 295	266 267	295	
Tarpon (<i>Megalops atlantica</i>)						202									90 210	60		266	295		
Bonefish (<i>Albula vulpes</i>)																					
Clupeidae - herrings																					
Alabama shad (<i>Alosa alabamae</i>)						89													295		
Skipjack herring (<i>Alosa chrysochloris</i>)	82 220	219 220	218												87 121				295		
Ariidae - sea catfishes																					
Sea catfish (<i>Arius felis</i>)	82 219 220	82 219 220	82 219 220	78 89 121 218 282 283		220	74 75 75 121	74 75 75 121	87						90 90 60	194 194 266 266 267 267 295 295	194 194 266 266 267 267 295	223 268			

Appendix Table B.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Louisiana, Mississippi, and Alabama. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	LOUISIANA					MISSISSIPPI					ALABAMA					VII				
	IV West of Mississippi River					V East of Mississippi River					VI Mississippi Coast					Alabama Coast				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Gafftopsail catfish <i>(Bagre marinus)</i>	96 220	219 96 219 220	82 202 107 121 218 282 283 294	96 89	78	220	220	74	87	220	158	60	267	194 266 267 295	266 267 295	268				
Centropomidae - snooks																				
Tarpon snook <i>(Centropomus pectinatus)</i>																				
Snook <i>(Centropomus undecimalis)</i>																				
Percichthyidae - temperate basses																				
Striped bass <i>(Morone saxatilis)</i>														60 172		266 295				
Serranidae - sea basses																				
Southern sea bass <i>(Centropristes melana)</i>																				
Rock sea bass <i>(Centropristes philadelphica)</i>	82 185	185 220	283			185	185 220				90	158	60		266 295	266 295				
Jewfish <i>(Epinephelus ita-Jara)</i>																				
Gag <i>(Mycteroperca microlepis)</i>																		295	295	
Red grouper <i>(Epinephelus morio)</i>																				
Pomatomidae - bluefishes																				
Bluefish <i>(Pomatomus saltatrix)</i>	82 220	220						89					60			295	295	266		
Rachycentridae - cobias																				
Cobia <i>(Rachycentron canadum)</i>		82											60			266	266			
Carangidae - jacks and pompanos																				
Blue runner <i>(Caranx crysos)</i>	220		89										90	60		266				
Crevalle jack <i>(Caranx hippos)</i>	96 219 220		78 89 121 202 218 283 294		74 75 121		87 121				90	60		266 267 295						
Greater amberjack <i>(Seriola dumerili)</i>																				

Appendix Table B.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Louisiana, Mississippi, and Alabama. E = egg; L = larva; J = juvenile; A = larva; U = unspecified.

Family-Species	LOUISIANA					MISSISSIPPI					ALABAMA					ALABAMA				
	West of Mississippi River					East of Mississippi River					Mississippi Coast					Alabama Coast				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Florida pompano <i>(Trachinotus carolinus)</i>		21	78				220		87						60		266			295
		82	89																	
		220	202																	
Permit <i>(Trachinotus falcatus)</i>			89												60		266			295
Lutjanidae - snappers																				
Red snapper <i>(Lutjanus campechanus)</i>															60		266	295	295	
Gray snapper <i>(Lutjanus griseus)</i>		220	283				220							158	60		266	267	295	
Lane snapper <i>(Lutjanus synagris)</i>		82												60		266			295	
		220																		
Lobotidae - tripletails																				
Tripletail <i>(Lobotes surinamensis)</i>		220		11										11		295	295	11		
			12											60						
		89																		
		202																		
Gerreidae - mojarras																				
Striped mojarra <i>(Diapterus plumieri)</i>																				
Pomadasyidae - grunts																				
Tomtate (<i>Haemulon aurolineatum</i>)																		266		
White grunt <i>(Haemulon plumieri)</i>																				
Pigfish <i>(Orthopristis chrysoptera)</i>		82	82											90	60		295		266	
		220																		
Sparidae - porgies																				
Sheepshead <i>(Archosargus probatocephalus)</i>		82	82	78				87	75	116				90	60		266	267	268	
		219	219	89				87	87	121				158			267	295		
			116					241												
			121																	
			202																	
			218																	
			294																	
Pinfish <i>(Lagodon rhomboides)</i>		202	82	82	51			74	74	51				90	90	51		267	267	51
		219	219	78				75	75	87				158	60		295	295	136	
		220	220	82				220	220	121				209					223	
			121					241											266	
			218																	
			294																	

Appendix Table B.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Louisiana, Mississippi, and Alabama. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	LOUISIANA										MISSISSIPPI						ALABAMA			
	West of Mississippi River					East of Mississippi River					Mississippi Coast			Alabama Coast			VII			
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Sciaenidae - drums																				
Silver perch <i>(Bairdiella chrysura)</i>	202	82	82	78			74	74	87		90	159	60			266	267	267		
	96	96	89				75	75	121		159		209			295	295			
	202	220	121				220	220	167											
	219	218							241											
	220	283																		
		294																		
Sand seatrout <i>(Cynoscion arenarius)</i>	202	82	82	78			74	74	87		61	61	60			266	267	267		
	96	218	89				75	75	116		158	158				267	267	295		
	218	219	107				220	220	121											
	219	220	116						167											
	220		121																	
		282																		
		283																		
		294																		
Spotted seatrout <i>(Cynoscion nebulosus)</i>		74	74	78			87	87	116		90	158	60			266	295	116		
		75	75	89			220	220	121		158		116			267	267	268		
		82	82	116			264	167					210			295	295	274		
		88	96	121									274							
		96	187	218																
		219	202	274																
		220	220	282																
		239	283																	
Spot <i>(Leiostomus xanthurus)</i>	121	82	96	78			73	73	74	87	90	90	60		267	136	201	223		
	202	88	121	89			213	74	75	167	158	158	205		209	201	266	268		
	96	218	107					75	121	241						266	267	289		
	121	219	282					121	213							267	295			
	202	220	283					213	220							295				
	218	294						220	263											
	219							263												
	220																			
Southern kingfish <i>(Menticirrhus americanus)</i>	202	82	82	78			220	220	87		90	158	60			266	266			
	219	220	89						116		158		116			295	295			
	220		89						167				206							
		96							241											
		116																		
		218																		
		283																		
Minkfish <i>(Menticirrhus focaliger)</i>		82		218				87	87					60			266			
														295						
Black drum <i>(Pogonias cromis)</i>		75	202	89				74	74	116				60			267	295	266	
		219	220	107				220	220	121							201	266	223	
		220		116					121								267	267	289	
			282																	
			283																	
			294																	
Atlantic croaker <i>(Micropogon undulatus)</i>		96	5	82	89			73	73	75	167			61	61	60		201	201	136
		121	78	121	107			74	74	87	241			108	90	209		266	266	223
		156	82	218	283			75	75	121				208	208			267	267	289
		202	88	219	294			121	87	213				211				295	295	
		282	96	220				213	121	220										
		121						265	213	265										
		156							220											
		202							265											
		218																		
		219																		
		220																		
		282																		

Appendix Table B.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico:
Louisiana, Mississippi, and Alabama. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	LOUISIANA					MISSISSIPPI					ALABAMA				
	IV West of Mississippi River					V East of Mississippi River					VI Mississippi Coast				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Red drum <i>(Sciaenops ocellatus)</i>		74 75 220	74 202 294	116 283 294			22 87 220 87 238	22 23 167 238	116 167 238		90 158 238	238 116		266	268
Ephippidae - spadefishes															
Atlantic spadefish <i>(Chaetodipterus faber)</i>		82 219 220	82 220 121 202 218 282	78 89 121 219 218 294			220 121 241	220 121 220 220 241	87 121 241		60 209		266 267 295	267 295	
Mugilidae - mullets															
Striped mullet <i>(Mugil cephalus)</i>		121 220	75 88	75 121	78 89		121 220	74 121	74 121	87 116	90 158 210	90 108 210	60 116 207 209	267 267 295	266 267 289
White mullet <i>(Mugil curema)</i>											90 210	90 209	60 209	267 267	266 295
Fantail mullet <i>(Mugil trichodon)</i>															
Sphyraenidae - barracudas															
Guaguanche <i>(Sphyraena guachancho)</i>						220					60		266		
Great barracuda <i>(Sphyraena barracuda)</i>			82 220								60		90 266	295	
Northern sennet <i>(Sphyraena borealis)</i>						89					60		266	295	
Scombridae - mackerels and tunas															
Little tunny <i>(Euthynnus alletteratus)</i>														295	
King mackerel <i>(Scomberomorus cavalla)</i>						220					60		266 295	295	
Spanish mackerel <i>(Scomberomorus maculatus)</i>		82 219 220	82 202 218	89 121 218			220		87 241		60		266 295		
Bothidae - lefteye flounders															
Gulf flounder <i>(Paralichthys albigutta)</i>			220	220	89 282						90	60		266 295	
Southern flounder <i>(Paralichthys lethostigma)</i>		202 219 220	82 202 219 220	82 96 121 218 282 294	78 96 121 218 282 294		74 75 220	74 75 220	87 121 241		76 76 209	76 60		267 295	267 295

Appendix Table B.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Louisiana, Mississippi, and Alabama. E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	LOUISIANA					MISSISSIPPI					ALABAMA									
	IV West of Mississippi River					V East of Mississippi River					VI Mississippi Coast					VII Alabama Coast				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Balistidae - triggerfishes and filefishes																				
Gray triggerfish (<i>Balistes capricornis</i>)																60			295	
Orange filefish (<i>Aluterus schoepfii</i>)																60		266	295	
Tetraodontidae - puffers																				
Southern puffer (<i>Sphoeroides nephelus</i>)	219		89			220		87								60		266	295	
	220		202																	
		218																		
		282																		

Appendix Table C.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Florida.
 E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	FLORIDA																				
	VIII Perdido Bay to Lighthouse Point				IX Lighthouse Point to Anclote Key				X Anclote Key to Cape Romano				XI Cape Romano to Florida Bay								
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	
Orectolobidae - carpet sharks																					
Nurse shark (<i>Ginglymostoma cirratum</i>)						288										258					131 278
Carcharhinidae - requiem sharks																					
Finetooth shark (<i>Aprionodon isodon</i>)	146 288	181 182									181 182					62					
Blacknose shark (<i>Carcharhinus acronotus</i>)	181 288	181 182					50 181	181	182							7					
Bull shark (<i>Carcharhinus leucas</i>)		288	181							181				258	258					203 204	
Blacktip shark (<i>Carcharhinus limbatus</i>)	146 288	146 288	181 182							181 182						7 258				236 275 278	237
Sandbar shark (<i>Carcharhinus milberti</i>)	146 288		181							181											
Atlantic sharpnose shark (<i>Rhizoprionodon terraenovae</i>)		146 288	181 182							181 182						7					
Sphyrnidae - hammerhead sharks																					
Scalloped hammerhead (<i>Sphyraena lewini</i> = <i>S. dipiana</i>)	146 288		181				224	181 182						256							
Great hammerhead (<i>Sphyraena mokarran</i>)															16	7					
Bonnethead (<i>Sphyraena tiburo</i>)	224	224	216				195	181 182						88 292		7 93 258			163	131	
Other hammerheads (<i>Sphyraena</i> spp.)	146 288		181				224	181													
Elopidae - tarpons																					
Ladyfish (<i>Elops saurus</i>)	281 288	146 116 181 182	288 112 195 302			149 195 302	94 181 182		83 292	8 84 88 104 222 224 258 292		7 30 45 162 173 262		203 204 236 203 204 278 237 278	117	236 163 203 204 204 237 278	63 131 150 242 274				
Tarpon (<i>Megalops atlantica</i>)	280 281	146 181 182 288					153 181 182 215		88 258		45 262 279		278 203 204 236 275 278	117 203 204 236 275 278	275 131 134 237 242						
Bonefish (<i>Albula vulpes</i>)			288																236		

Appendix Table C.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Florida.
 E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	FLORIDA																			
	VIII Perdido Bay to Lighthouse Point					IX Lighthouse Point to Anclote Key					X Anclote Key to Cape Romano					XI Cape Romano to Florida Bay				
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Clupeidae - herrings																				
Alabama shad (<i>Alosa alabamae</i>)		157	157	165		186	186													
Skipjack herring (<i>Alosa chrysochloris</i>)																				
Ariidae - sea catfishes																				
Sea catfish (<i>Arius felis</i>)	281	281	2	112	70		195	195	195	95	292	292	8	8	7	236	163	163	63	
	288	146	146	137			173			84	30		85			173	173	131		
		281	281	165			181			104	84		88			203	203	237		
		288	288	181			182			292	104		93			236	204	236		
				182						292	162									
											164									
											173									
Gafftopsail catfish (<i>Bagre marinus</i>)	281	281	146	112	137		195	195	195	94		258	104	88	7	203	236	203	117	
	288	281	146	181			215			95		292	258	93			237	204	275	
		288	281	184			224	181				292	262				237	277	278	
			288	216																
Centropomidae - snooks																				
Tarpon snook (<i>Centropomus pectinatus</i>)																			204	
Snook (<i>Centropomus undecimalis</i>)	288	67	181				153						8	8	7		117	163	131	
		182											84	84	19		163	177	204	
		299											88	104	30		177	236	237	
													104	235	45		236	242		
													177	285	85		278	278	275	
													234	292	173		290	290	277	
													258		198					
													290		262					
													292		279					
Percichthyidae - temperate basses																				
Striped bass (<i>Morone saxatilis</i>)			10					10												
Serranidae - sea basses																				
Southern sea bass (<i>Centropristes melanota</i>)	112	112	181				173	173	181			258	285	7			161	163		
	299		199				195	195	182			292	292	173						
		200					224	224	302											
Rock sea bass (<i>Centropristes philadelphica</i>)			165													2	2			
																112				
Jewfish (<i>Epinephelus itajara</i>)	112						50						99	99	162		203	278	117	
													292		258		236	131		
														262		278		134		
																		204		
																		237		
																		253		
																		275		
Gag (<i>Mycteroperca microlepis</i>)	2	2	182				195						169		7		163	131		
	112						224						273		173			150		
	299												292					278		
Red grouper (<i>Epinephelus morio</i>)	2	112	181				181						273		262			216		
		182					182						292							

Appendix Table C.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Florida.
 E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	FLORIDA																				
	VIII Perdido Bay to Lighthouse Point					IX Lighthouse Point to Anclote Key			X Anclote Key to Cape Romano			XI Cape Romano to Florida Bay									
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	
Pomatomidae - bluefishes																					
Bluefish (<u>Pomatomus</u> <u>saltatrix</u>)	184	146	112			195		94			3	3	7								
		288	116					181			258		116								
			137					182			292		262								
			153					224													
			181																		
			182																		
			200																		
Rachycentridae- cobias																					
Cobia (<u>Rachycentron</u> <u>canadum</u>)	77	112	181			195	224	181			8		7			236		131			
	112		182					182			84						237				
	146																278				
Carangidae-jacks and pompanos																					
Blue runner (<u>Caranx</u> <u>crysos</u>)	2	17	112					181					7			163		131			
	146	116						182					255				278				
	288	181											258								
		182											262								
		199																			
		200																			
		216																			
Crevalle jack (<u>Caranx</u> <u>hippos</u>)																					
	2	112	70			195	224	94			8		7			163	203	117			
	146	116				224		95			88		85			203	236	131			
	281	137						181			104		116			204	277	134			
		165						182			234		253			236		173			
		181									258		255					237			
		182									273		262					275			
		199									292		279								
		200																			
		288																			
Greater amberjack (<u>Seriola</u> <u>dumerilii</u>)																					
	112																				
Florida pompano (<u>Trachinotus</u> <u>carolinus</u>)																					
	2		137			195	195		181		104	86	7						278		
	112		181					182		273		18									
	146		182							262											
Permit (<u>Trachinotus</u> <u>falcatus</u>)																					
	165							53			7	86	234				88		173		
			149							28	173	262				163		236			
		173								86											
		195								88											
										104											
										173											
										273											
										292											
Lutjanidae-snappers																					
Red snapper (<u>Lutjanus</u> <u>campechanus</u>)																					
	2		137																		
	112																				
	288																				
Gray snapper (<u>Lutjanus</u> <u>griseus</u>)																					
	2	112	70			149	195	173			8	8	7			71	71	48			
	112		137			195		182			84	84	30			163	163	63			
	146		165			224		285			88	292	17			203	203	64			
	281										104		116			204	204	117			
	288										258		173			236	236	131			
											292		262			278	278	134			
													279					150			
																		173			
																		237			
																		242			
																		275			
																		277			

Appendix Table C.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Florida.
 E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	FLORIDA																			
	VIII Perdido Bay to Lighthouse Point					IX Lighthouse Point to Anclote Key				X Anclote Key to Cape Romano			XI Cape Romano to Florida Bay							
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Lane snapper <i>(Lutjanus synagris)</i>		2				224					104	292	7			163	278	63		
											234		88			236		64		
											258		93			275		131		
											292		132			278		173		
												173				237				
												262				276				
Lobidae-- tripletails																				
Tripletail <i>(Lobotes surinamensis)</i>		112		11		195		11			292	11				236				
				97							258					278				
				299																
Gerreidae-- mojarras																				
Striped mojarra <i>(Diapterus plumieri)</i>		112									30	8	7			203	163	173		
											104	30	45			204	203	237		
											244	84	162			236	204	278		
											258	104				236	291			
											273	244								
											292	258								
												273								
												292								
Pomadasysidae-- grunts																				
Tomtate <i>(Haemulon auriclineatum)</i>		112	112			224					292					163	163			
											278									
White grunt <i>(Haemulon plumieri)</i>		2	2	165		53		94			258	7				163	163	237		
		112	181	182	216	195		95			292	262				236	278			
						224		181			279									
Pigfish <i>(Orthopristis chrysoptera)</i>	281	112	112	137		53	173	51			8	8	7			63	163	64		
		146	165	184	215	94	181	95			84	84	47			163	278	131		
		184	181	182	215	149	182	302			88	173	85			236	173			
		281	199	200	281	173	195	222			104	292	93			278	237			
						195	224	182			173	162				275				
											222	164								
											258	262								
											292									
Sparidae--porgies																				
Sheepshead <i>(Archosargus probatocephalus)</i>		112	112	2		149	19	17			30	8	7			117	117	63		
		146	137			195	149	94			104	17	47			203	236	64		
		288	165	181	182	195	181				258	84	85			236	278	131		
						224	182				273	88	93			278		173		
											292	273	116					204		
												162				237				
												164				242				
												173				277				
												198								
												253								
												255								
												262								
												279								
												285								

Appendix Table C.—References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Florida.
 E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	FLORIDA														
	VIII Perdido Bay to Lighthouse Point					IX Lighthouse Point to Anclote Key				X Anclote Key to Cape Romano			XI Cape Romano to Florida Bay		
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Pinfish <i>(Lagodon rhomboides)</i>	51	111	2			1	1	1	181		8	8	7		
	111	112	70				51	51	182		28	28	93	63	163
	112	184	137				53	94	209		29	84	145	109	173
	146	288	145				94	95			30	104	162	163	236
	281	165					95	149			51	173	164	173	275
	288	181					149	173			84	258	198	203	237
		182					173	195			85	292	253	236	301
		199					195	302			88		255	278	
		200					215				104		262		
		216					224				173		276		
							302					222			
												258			
												292			
Sciaenidae—drums															
Silver perch <i>(Bairdiella chrysura)</i>	2	2	70			1	1	1	51		8	8	7	141	163
	146	112	165			53	53	53	153		84	30	93	203	173
	281	146	184				94	94	302		88	84	162	204	203
	281	199					95	95			104	88	164	236	236
		200					149	149			173	104	254	237	237
		216					173	173			222	173	255	278	278
							195	195			258	292	279		
							215	215				292			
							224	224							
Sand seatrout <i>(Cynoscion arenarius)</i>	2	281	112			149		94			103	104	7	141	163
	281	288	146			195		95			104	273	116	236	236
			165			215		166			222	292	162		
			166			224		181			258		164		
			181					182			273		173		
			182					200			292				
Spotted seatrout <i>(Cynoscion nebulosus)</i>	2	2	70			1	17	94			8	8	7	141	117
	112	112	116			53	18	95			30	17	93	236	139
	146	187	137			149	19	116			84	18	116	163	173
	184	281	165			153	153	166			104	19	122	173	203
	281	288	166			173	173	181			173	84	162	203	204
	288	181				187	187	182			187	138	164	204	278
		199				189	189	274			258	173	198	236	274
		200				195	195	285			273	187	255	278	275
						224		302			292	273	262		277
											292	274			285
Spot (<i>Leiostomus xanthurus</i>)	112	2	2	116		95	51	95	94		30	8	7	141	278
	281	72	112	165			95	173	116		148	26	84	163	
		112	184	181			149	195	153		258	30	104	278	
	184	281	182				173	302	181		273	84	173		
	281	288	199				195		182		85	273	164		
	288	200					215				88				
		223					224				104				
							302				173				
											222				
											258				
											273				
											292				
Southern kingfish <i>(Menticirrhus americanus)</i>	2	146	116			195	195	95			104	104	7	141	163
	146		165			215	224	173			258	222	88	163	163
		181				224		181			292	292	162		
		182						182					164		
		184										173			
		199													
		200													

Appendix Table C.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Florida.
 E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	FLORIDA														
	VIII Perdido Bay to Lighthouse Point					IX Lighthouse Point to Anclote Key				X Anclote Key to Cape Romano			XI Cape Romano to Florida Bay		
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Minkfish <i>(Menticirrhus focaliger)</i>	112	112		181				181			222		7		
	146			182				182			258		28		
	281			200									104		
Black drum <i>(Pogonias cromis)</i>	146	112	70			149		181			8	273	7		
		137						182			84	292	85		
		181									104		162		
		182									258		164		
		250									273		198		
											292				
Atlantic croaker <i>(Micropogon undulatus)</i>	281	110	2	137		195	195	153			104	88	88	7	
	111	111		165		215	215	181			104		164		
	146	112		181				182			222				
	184	146		182				302			258				
	281	281		199							292				
	288	288		200											
				223											
Red drum <i>(Sciaenops ocellata)</i>	146	112	70			149		94			30	8	17	7	
	281	288	116			195		95			17	88	28		
	288		137					116			19	273	47		
		165						153			30		85		
		181						181			84		116		
		182						182			88		162		
		200						215			104		164		
								301			222		173		
											258		198		
											273		262		
											292		279		
Ephippidae- spadefishes															
Atlantic spadefish <i>(Chaeodipterus faber)</i>	2	2	165			149	195	94			258	8	17	7	
	112	112	181			195		95			104	258	84		
	146	288	182			215		173			258	292	86		
	281	184				224		181			292		88		
	288	200						182					93		
		216											162		
													164		
													173		
													234		
													262		
Mugilidae- mullets															
Striped mullet <i>(Mugil cephalus)</i>	72	2	2	70		95	43	43	94		84	8	8	7	
	112	9	43	116		149	44	44	116		104	28	27	30	
	146	43	44	119		224	95	133	135		222	84	29	45	
	281	44	72	135			133	173	181		258	104	84	47	
	72	112	137			149	195	182			273	133	85	116	
	112	133	181			173	286				173	133	122		
	133	281	182			195					258	173	135		
	215	288	200								273	273	164		
	281	216									292	286	262		
	288										292	272			
												279			
White mullet <i>(Mugil curema)</i>	146	2	2	70		149	149		181		88	8	258	7	
	281	146	112	181		195		182			104	28	30		
	281			182								84	116		
		216										88	262		
		288										104	272		
												258			
												273			
												292			

Appendix Table C.--References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Florida.
 E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

Family-Species	FLORIDA														
	VIII Perdido Bay to Lighthouse Point					IX Lighthouse Point to Anclote Key				X Anclote Key to Cape Romano			XI Cape Romano to Florida Bay		
	E	L	J	A	U	E	L	J	A	U	E	L	J	A	U
Fantail mullet <i>(Mugil trichodon)</i>		2				149		173			258	8	8	7	
											84	84	272		
											173	173			
											234	258			
											258				
											273				
Sphyraenidae--barracudas											163	163			
Guaguanche <i>(Sphyraena guachancho)</i>											173	173			
Great barracuda <i>(Sphyraena barracuda)</i>	112	112	2	288		149		153			258				
						224									
											18				
											203				
											204				
											237				
											236				
											275				
											278				
Northern sennet <i>(Sphyraena borealis)</i>	2	112	182								258				
	112										292				
	281														
	299														
Scombridae--mackerels and tunas															
Little tunny <i>(Euthynnus alletteratus)</i>	112	112						173							
King mackerel <i>(Scomberomorus cavalla)</i>	112		181					153			116				
			182					181			258				
			216					182							
			288												
Spanish mackerel <i>(Scomberomorus maculatus)</i>	146	112	116			195	195	94			258	273	7		
	281	288	137					153			273	116			
			181					173			292	262			
			182					181							
								182							
								200							
								224							
Bothidae--lefteye flounders															
Gulf flounder <i>(Paralichthys alboguttatus)</i>	112	2	2	137		95	195	94			8	8	7		
	112	112	146			199	173				28	84	42		
	288	288	165			195	181				84	104	47		
			181			215	182				88	130	85		
			182			224					222	222	93		
			200								258	258	164		
			216								292	292	173		
											198				
											254				
											279				
Southern flounder <i>(Paralichthys lethostigma)</i>	2	2	165					181			88				
	112	112	181					182			104				
	281	146	182					215							
	288	288	216					302							

Appendix Table C.—References to life stages of selected recreational fishes in estuarine areas of the U.S. coast of the Gulf of Mexico: Florida.
 E = egg; L = larva; J = juvenile; A = adult; U = unspecified.

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