

Trends in Catch Data and Estimated Static SPR Values
for Fifteen Species of Reef Fish Landed Along the
Southeastern United States

Jennifer C. Potts
and
Ken Brennan

National Oceanic and Atmospheric Administration
Center for Coastal Fisheries and Habitat Research
Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516-9722

Prepared for:

South Atlantic Fishery Management Council
One Southpark Circle, Suite 306
Charleston, SC 29407

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METHODS

Council staff requested that the NOAA, NMFS, Beaufort Laboratory's Fish Biology Team provide graphical and tabular data reflecting trends in catches of fifteen species: black sea bass, white grunt, gray triggerfish, red porgy, vermillion snapper, red snapper, gag, scamp, red grouper, greater amberjack, black grouper, speckled hind, snowy grouper, yellowedge grouper, and tilefish. Weight of landings (kg), mean fish size, and headboat fishery catch per unit effort are presented for each species compiled for the entire southeastern United States fishing area: North Carolina through the east coast of Florida, including the Florida Keys and Dry Tortugas. Three data bases, each with a landings and fish size (bioprofiles) component, were utilized: Headboat, Commercial, and Marine Recreational Fisheries Statistical Survey (MRFSS).

Following are descriptions of the data and various limitations:

Headboat - Landings were available for the entire region for 1981-1999; restricted to NC and SC for 1972-1975; NC through North Florida for 1976-1977, and partial coverage of South Florida for 1978-1980. Headboat data are part of the "For Hire" recreational data.

Mean weights were obtained from bioprofiles data for 1972-1999 with the same geographic restrictions as the landings.

CPUE was calculated in terms of number of fish caught as well as kilograms of fish caught, all per angler day. CPUE trends were plotted in terms of one data point per year per species. For a given species, CPUE calculation were done only for those areas in which the species was a common and frequent occurrer. This was done to avoid negatively biasing the CPUE calculation (i.e., inclusion of areas of infrequent or rare occurrence would involve including both low landings data and high effort data, resulting in low and inaccurate CPUE values).

Commercial - Landings were available from 1986-1999. 1986 was the first year that most fish were identified to species. Before 1992 greater amberjack were included in an unclassified category only, which contained four *Seriola* species, the majority of which were probably greater amberjack. Since 1992, greater amberjack landings were identified to species in Florida, but still unclassified in NC, SC, and GA. Landings of gray triggerfish and white grunt were lumped into unclassified categories and could not be broken out easily.

Mean weights were generated from intercept (TIP) lengths, which were then applied to weight-length relationships for each species, 1983-1999.

- MRFSS - Landings data were available for 1981-1999, and were recorded as charter boat ("For Hire") landings and other recreational platforms (e.g., private boat, pier, shore, etc.). However, 1981-1985 data provide crude estimates of charter boat landings because they were combined with party boats (headboats) landings for those years. To adjust, we used the intercept data to obtain the proportion of charter boat and party boat samples for each species. We then applied those proportions to the landings data of each species, and discarded the party boat segment because it was already included in the official headboat data. Monroe County, FL landings are not included because county codes are not included in the landings data, and could not be easily broken out.

Mean weights for each species were obtained from the intercept data. For the samples with no weight recorded, the weight-length relationship for each species was used to convert the lengths to weights.

Estimates of SPR - Static spawning potential ratio (SPR) values were estimated for those species that have not had recent VPA analysis done on them: gray triggerfish, tilefish, red grouper, black grouper, snowy grouper, yellowedge grouper, and speckled hind. SPR's for the other species are reported from the full assessments. The models are stochastic in that we used different estimates of natural mortality (M), varying proportion of females and males for the protogynous species, and in one case, different maturity schedules. The most up-to-date studies on age and growth and reproduction for each species were used in the analysis. The percent reduction in fishing mortality (F) and increase in fish minimum length needed to obtain 30% and 40% SPR are included by species. The species are listed in order of confidence that we place in the data used to derive the estimates.

General Comments:

Some of the data points look very questionable. These typically appear as peaks in the landings or mean weights. In some instances sample sizes are very small, such as for the mean weights of commercially caught gray triggerfish in 1983, greater amberjack in 1983, and black grouper in 1983 and 1984. In other instances unusually large landings were reported, such as for white grunt in 1998 commercial catch, and red snapper charter boat landings in 1992. Both we believe to be related to species identification. For white grunt, 1998 was the first year that the species was identified and separated from miscellaneous grunts, thus the unusually large number. And, the large catch of red snapper recorded for charter boat anglers in 1992 probably reflects vermillion snapper misidentified as red snapper.

Management Regulations Impacting Trends:

Since the Snapper Grouper Fishery Management Plan was implemented in 1983, nine

amendments have been made to it through 1999. Many of the regulations impact trends in landings and mean size of the various species in this report. Listed below are gear restrictions that impact all of the species listed in the report. Specific regulations such as size limits, bag limits, seasonal closures, and quotas are listed at the bottom of each species table. In addition, an Emergency Rule closing the red porgy fishery was put in place in September 1999.

1989 - Trawl gear used in directed snapper grouper fishery was prohibited from Cape Hatteras, NC through Cape Canaveral, FL.

1992 - Fish traps were prohibited except black sea bass pots when used north of Cape Canaveral, FL.

Entanglement nets (including trammel and gill) were prohibited.

Longline gear inside 50 fathoms was prohibited when used in the snapper grouper fishery. Powersticks and bangsticks were prohibited in special management zones off the South Carolina coast.

Black sea bass data (landings, mean weights, and CPUE-Wt are in kilograms).

Year	Commercial		Headboat			Charter boat			Other recreational					
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE #	CPUE-Wt	Landings	Mean Wt	N	Landings	Mean Wt	N
72														
73	150904	0.27	1											
74	486815	0.44	592	13.44	5.77									
75	338986	0.37	519	9.96	3.67									
76	287705	0.39	479	5.51	2.45									
77	287646	0.31	1622	8.78	2.45									
78	249028	0.36	1168	3.42	1.77									
79	271717	0.31	822	8.68	2.46									
80	293863	0.26	1197	11.26	2.64									
81	322621	0.27	1510	8.62	2.13									
82	333613	0.29	1849	8.01	2.06									
83	328363	0.28	2895	7.73	1.89									
84	314446	0.32	3073	5.91	1.62									
85	1792	270223	0.27	2984	5.53	1.36								
86	623906	0.41	2398	255335	0.26	3368	5.16	1.19	25455	0.16	152	189919	0.28	275
87	363779	0.44	2068	293254	0.27	3254	4.98	1.25	49840	0.37	134	418843	0.24	519
88	684746	0.39	2545	288132	0.31	2159	4.40	1.24	425111	0.42	196	242583	0.28	344
89	576724	0.39	1090	216831	0.32	3840	3.47	1.00	205022	0.45	90	318751	0.27	444
90	662497	0.37	2227	172171	0.24	6209	3.26	0.85	71489	0.52	172	181540	0.25	301
91	487755	0.41	3011	129836	0.22	5381	2.58	0.66	29316	0.52	56	357748	0.35	334
92	476537	0.39	2958	97920	0.22	5195	1.97	0.50	101038	0.43	296	228647	0.34	412
93	425012	0.65	2326	64875	0.28	3959	1.16	0.35	106048	0.47	138	125861	0.31	255
94	435346	0.44	2697	60074	0.26	4225	1.24	0.36	60776	0.48	199	212779	0.32	198
95	310589	0.50	1038	57889	0.24	3331	1.16	0.35	156969	0.56	177	109424	0.28	211
96	324009	0.42	1177	66471	0.28	3133	1.54	0.48	123224	0.46	226	168628	0.33	169
97	798971	0.41	2313	67015	0.30	3565	1.37	0.44	78358	0.41	129	159599	0.33	238
98	394190	0.45	2147	64639	0.30	4067	1.29	0.42	51696	0.45	301	126349	0.29	128
99	355531	0.45	2552	87348	0.35	4003	1.57	0.61	38856	0.48	326	118852	0.40	219

1983 - 8" TL minimum size limit, all fisheries

1989 - Gear restrictions as listed in text

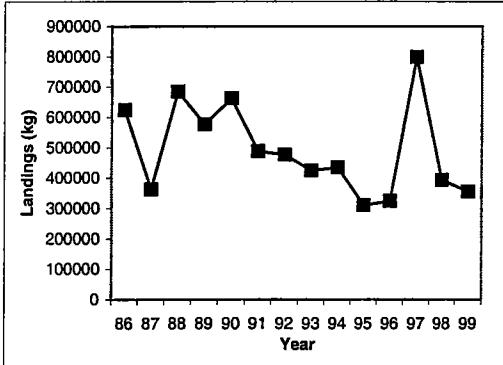
1992 - Gear restrictions as listed in text

1999 - 10" TL minimum size limit, all fisheries

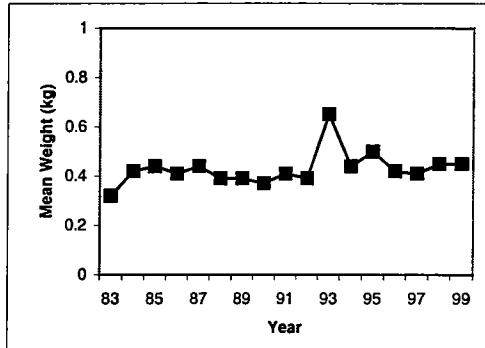
- Recreational bag limit 20 BSB/person/day

Black sea bass

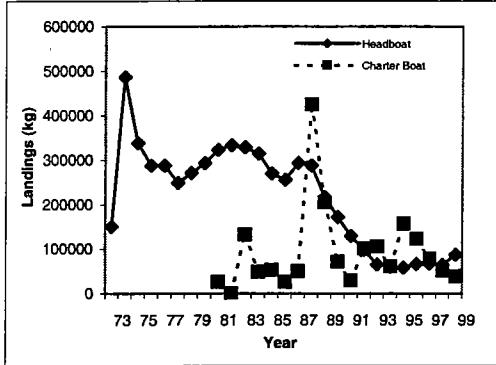
Commercial Landings



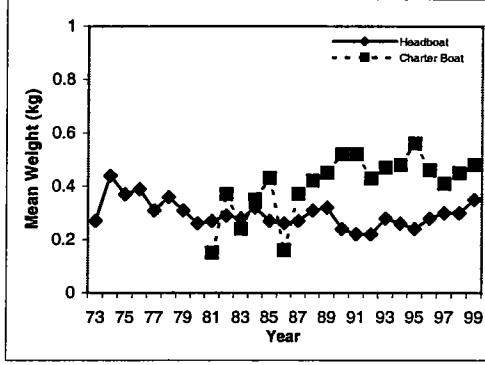
Commercial Mean Weights



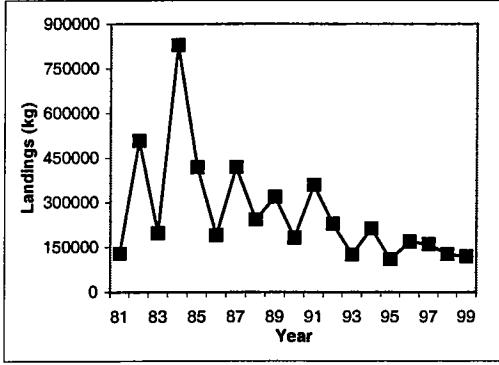
"For Hire" Recreational Landings



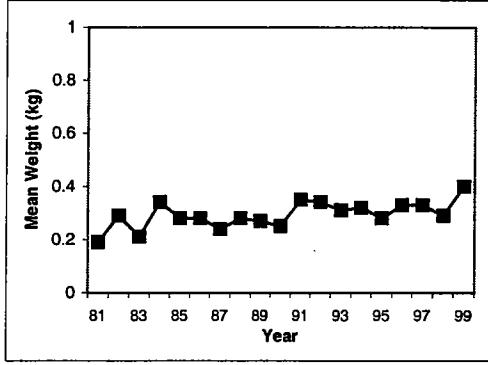
"For Hire" Recreational Mean Weights



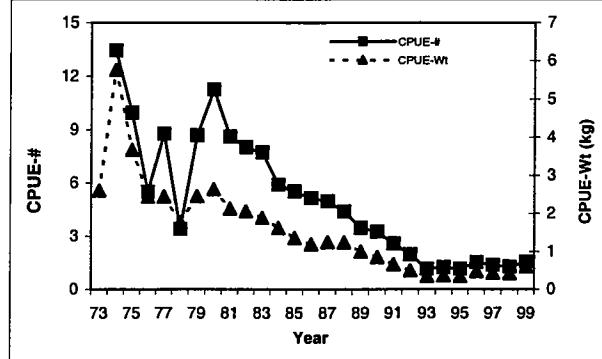
Other Recreational Landings



Other Recreational Mean Weights



Headboat CPUE: North Carolina - North Florida

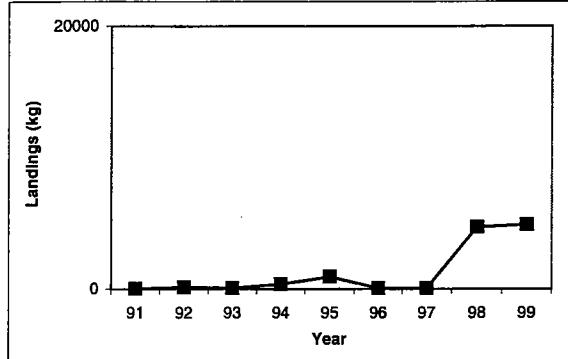
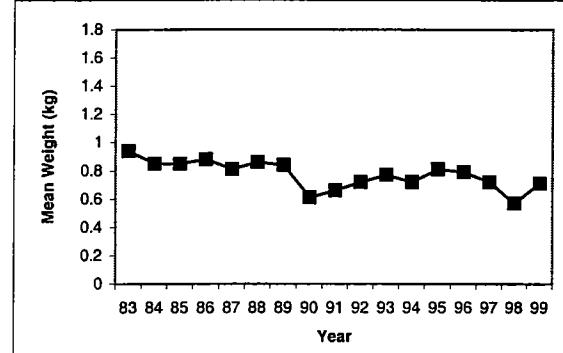
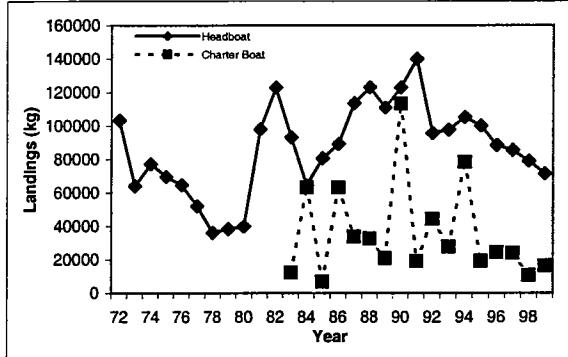
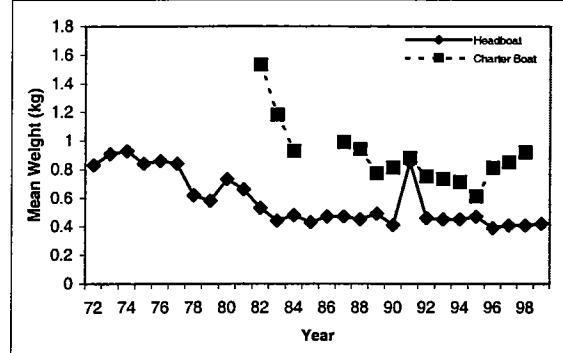
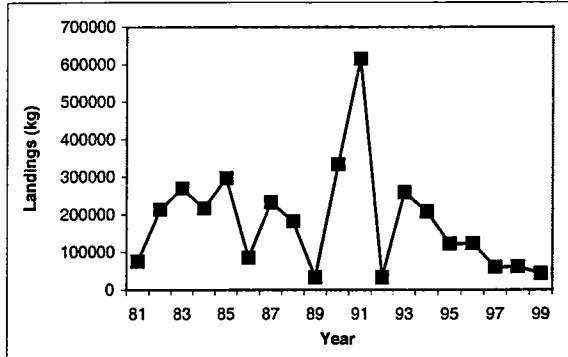
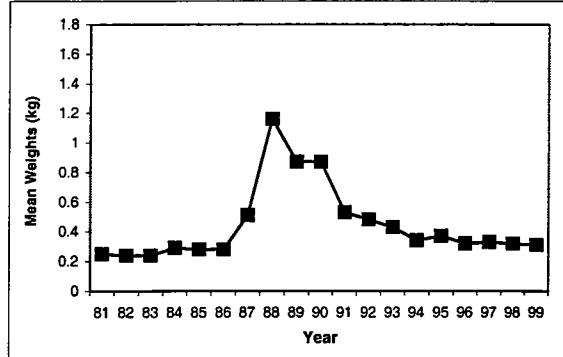
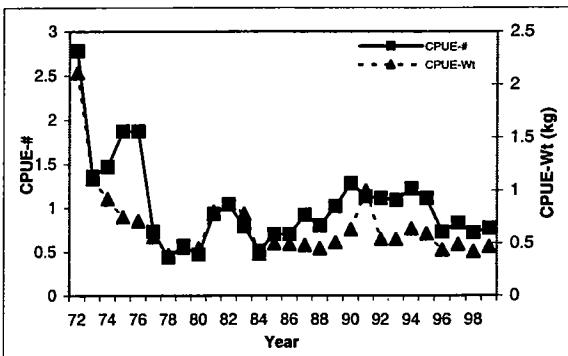
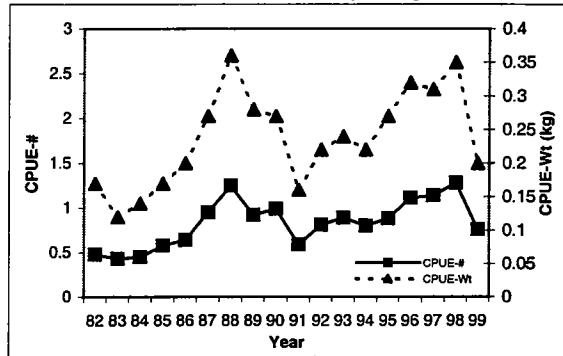


White grunt (landings, mean weights, and CPUE-Wt are in kg. (Commercial landings do not include grunts unclassified.)

Year	Commercial			Headboat			Charter boat			Other Recreational						
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE-#	CPUE-Wt	CPUE-#	CPUE-Wt	Landings	Mean Wt	N	Landings	Mean Wt	N
						NC & SC		SEFL & Keys								
72				103517	0.83	2109	2.78	2.11								
73				64235	0.91	1515	1.36	1.11								
74				77269	0.93	930	1.47	0.92								
75				69665	0.84	1053	1.87	0.75								
76				64852	0.86	1264	1.87	0.71								
77				52217	0.84	704	0.73	0.56								
78				36156	0.62	754	0.44	0.39								
79				38528	0.58	465	0.57	0.46								
80				39913	0.73	744	0.47	0.45								
81				98023	0.66	783	0.93	0.80								
82				123125	0.53	2306	1.04	0.87	0.48	0.17	1.53	1	213881	0.25	69	
83				93426	0.44	3043	0.79	0.78	0.43	0.12	12319	1.18	2	270046	0.24	64
84	0.94	75		64631	0.48	3151	0.51	0.40	0.45	0.14	63395	0.93	14	216549	0.29	63
85	0.85	604		80687	0.43	3397	0.70	0.50	0.58	0.17	6764			296489	0.28	44
86	0.88	310		89248	0.47	2761	0.70	0.49	0.64	0.20	63164			85407	0.28	32
87	0.81	656		113641	0.47	3259	0.92	0.48	0.95	0.27	33904	0.99	4	232106	0.51	63
88	0.86	408		123221	0.45	2611	0.80	0.45	1.25	0.36	32707	0.94	96	181801	1.16	20
89	0.84	359		111116	0.49	2202	1.02	0.51	0.92	0.28	20996	0.77	40	32960	0.87	29
90	0.61	667		122979	0.41	2234	1.28	0.63	0.99	0.27	113438	0.81	57	333243	0.87	13
91	35	0.66	425	140284	0.85	2261	1.13	1.00	0.59	0.16	19174	0.88	68	614548	0.53	43
92	145	0.72	612	95762	0.46	1995	1.11	0.54	0.81	0.22	44329	0.75	75	33128	0.48	80
93	71	0.77	1132	97876	0.45	2608	1.09	0.54	0.89	0.24	27842	0.73	94	259097	0.43	70
94	358	0.72	541	105286	0.45	2512	1.22	0.64	0.80	0.22	78408	0.71	63	207984	0.34	77
95	939	0.81	477	100239	0.47	3398	1.11	0.59	0.88	0.27	19331	0.61	50	122187	0.37	61
96	40	0.79	641	88566	0.39	2633	0.73	0.44	1.11	0.32	24413	0.81	47	123752	0.32	61
97	42	0.72	1278	85599	0.41	2896	0.83	0.49	1.14	0.31	24030	0.85	41	60272	0.33	32
98	4713	0.57	1513	79050	0.41	3206	0.72	0.42	1.28	0.35	10619	0.92	35	61293	0.32	120
99	4896	0.71	1844	71377	0.42	2914	0.77	0.47	0.76	0.20	16360	0.77	59	43711	0.31	200

1989 - Gear restrictions as listed in text

1992 - Gear restrictions as listed in text

White grunt**Commercial Landings****Commercial Mean Weights****"For Hire" Recreational Landings****"For Hire" Recreational Mean Weights****Other Recreational Landings****Other Recreational Mean Weights****Headboat CPUE: North Carolina - South Carolina****Headboat CPUE: Southeast Florida - Dry Tortugas**

Gray triggerfish data (landings, mean weights, and CPUE-Wt) are included because of unclassified category.)

Commercial	Headboat			Charter boat			Other Recreational		
	Year	Landings	Mean Wt	N	CPUE#	CPUE-Wt	Landings	Mean Wt	N
					NC	NC - SEFL			
72			2.18	112					
73		29044	2.32	120	0.22	0.50			
74		52679	2.15	315	0.30	0.62			
75		44811	2.14	394	0.22	0.48			
76		33431	1.94	427	0.17	0.36			
77		37534	1.92	445	0.19	0.41			
78		29515	1.74	587	0.15	0.32			
79		32518	1.82	346	0.16	0.39			
80		26551	1.85	419	0.13	0.30			
81		37158	1.37	447	0.07	0.10			
82		44156	1.56	532	0.08	0.11			
83	10	37638	1.32	975	0.08	0.10	59	1.11	6
84	1.95	39676	1.41	849	0.07	0.10	2304	2.52	14
85	1.87	47437	1.32	961	0.09	0.13	148	0.87	1
86	1.94	36259	1.39	707	0.07	0.09	991	1.55	1
87	1.93	31874	1.41	549	0.07	0.07	317	1.55	2
88	1.70	31670	1.16	424	0.08	0.08	5648	1.61	4
89	1.56	38725	1.10	683	0.09	0.09	2285	1.46	17
90	1.45	52469	0.88	736	0.17	0.12	237811	1.20	14
91	1.33	644	72405	0.86	602	0.22	0.19	8745	1.26
92	1.24	500	77256	0.86	631	0.25	0.21	17557	1.18
93	1.27	1111	109479	0.95	752	0.31	0.32	263193	1.04
94	1.17	1474	86166	0.93	1018	0.26	0.25	340665	1.05
95	1.20	1345	82513	0.87	838	0.31	0.27	22103	0.89
96	1.29	258	74245	0.84	1013	0.31	0.26	28705	0.99
97	1.08	388	87277	0.82	1554	0.39	0.32	39387	0.85
98	1.01	1071	61111	0.86	922	0.26	0.24	11816	0.91
99	1.20	1580	33785	0.88	697	0.13	0.12	25241	1.02

1989 - Gear restrictions as listed in text

1992 Sew restrictions as listed in text
1993 Core restrictions as listed in text

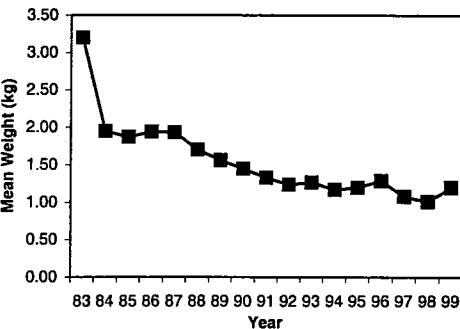
1922 - Great restrictions as listed in text

Gray triggerfish

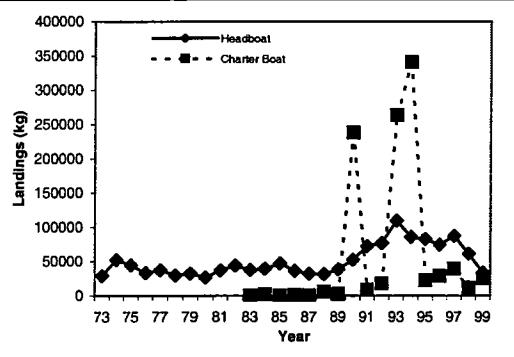
Commercial Landings

No data available

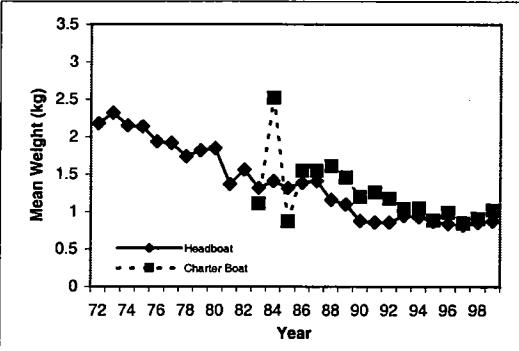
Commercial Mean Weights



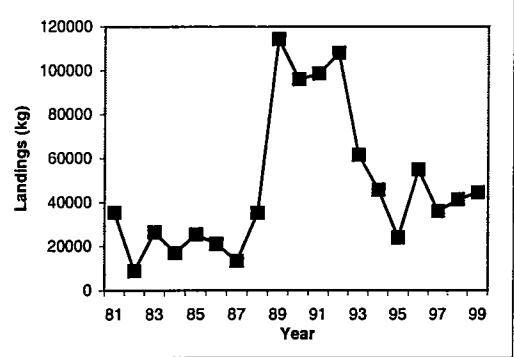
"For Hire" Recreational Landings



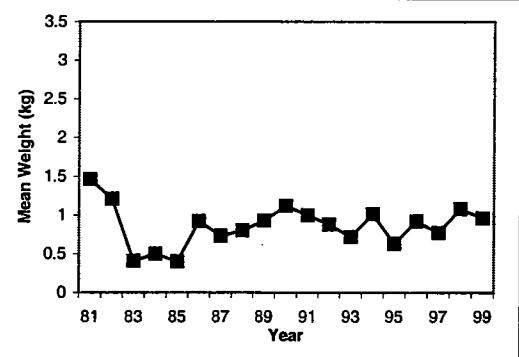
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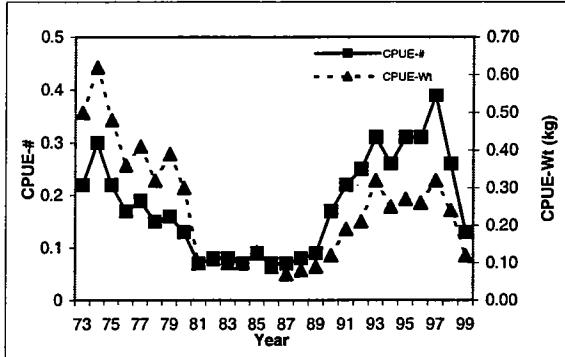
Other Recreational Landings



Other Recreational Mean Weights



Headboat CPUE: North Carolina - Southeast Florida



Red porgy data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial			Headboat			Charter boat			Other Recreational						
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE #	CPUE-Wt	NC - NEFL	Landings	Mean Wt	N	Landings	Mean Wt	N	
72				235351	1.06	2115	4.4	4.8								
73				334125	1.13	2508	5.1	5.8								
74				233116	1.07	1798	2.8	2.8								
75				202542	1.05	1148	2.4	2.2								
76				186310	1.09	1240	2.2	1.9								
77				240348	1.01	1100	2.4	2.5								
78				239757	1.02	843	1.9	2.2								
79				162176	1.05	458	1.5	1.7								
80				161668	0.95	727	1.7	1.7								
81				147625	0.85	575	2.0	1.8	0							
82				195923	0.72	1246	2.8	2.0	0							
83	337	1.05		118592	0.78	1206	1.7	1.3	19158	0.85	19	2487	0.33	4		
84	3347	0.92		98446	0.78	1284	1.3	1.0	43250	0.65	24	4835	0.85	2		
85	3447	0.93		118106	0.66	967	1.7	1.2	35	0.50	1	93437	0.64	31		
86	307283	0.89		100737	1.39	1228	1.4	0.9	1284	0.58	8	7538	0.60	12		
87	260159	0.78		3306	100006	0.58	1203	1.3	0.8	9574	0.69	23	23407	0.57	35	
88	284672	0.74		1721	97764	0.59	811	1.3	0.8	32207	0.53	27	148055	0.60	27	
89	302010	0.72		2035	74865	0.50	1511	1.4	0.7	45587	0.61	51	16277	0.40	29	
90	347227	0.65		2463	56819	0.48	1312	1.0	0.5	7078	0.79	47	14016	0.32	10	
91	256559	0.62		2457	63874	0.48	649	1.1	0.5	50482	0.68	17	14741	0.43	28	
92	134958	0.69		1384	49830	0.49	828	0.8	0.5	32513	0.65	77	20206	0.50	23	
93	133897	0.74		1979	45824	0.54	1011	0.7	0.4	15797	0.65	43	10564	0.92	5	
94	158678	0.74		1745	39721	0.52	780	0.7	0.4	4115	0.58	50	10503	0.51	8	
95	155473	0.68		2260	42198	0.57	851	0.7	0.4	33755	0.60	54	2427	0.58	6	
96	166084	0.65		2679	37294	0.57	868	0.7	0.4	53391	0.70	21	32952	0.98	11	
97	163169	0.66		3208	34155	0.60	635	0.5	0.3	4984	0.67	14	2845	0.76	11	
98	134576	0.61		3559	31417	0.58	793	0.4	0.2	3621	0.60	15	1689			
99	44674	0.73		2961	22070	0.69	264	0.2	0.1	11248	0.85	58	5294	1.02	7	

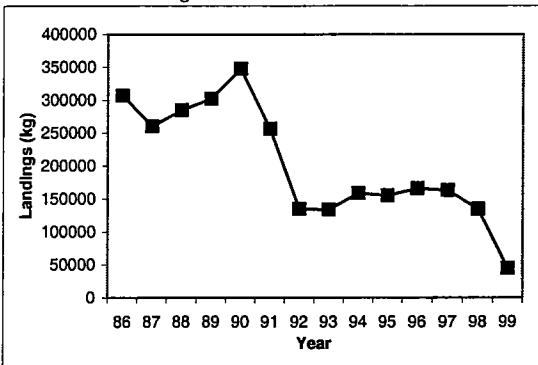
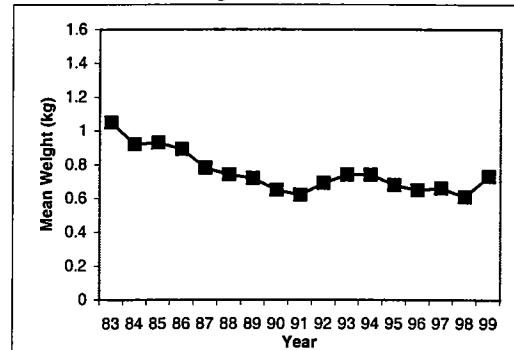
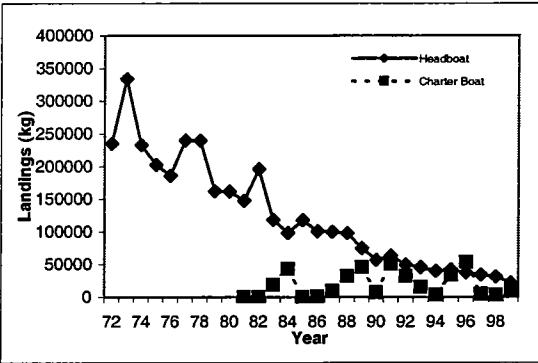
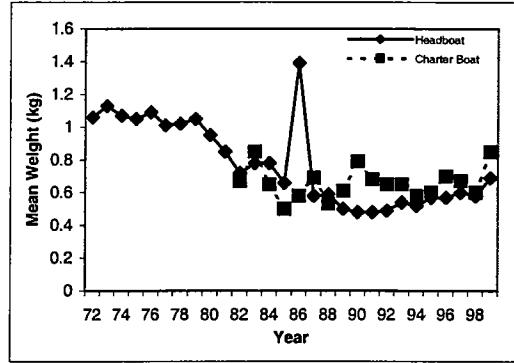
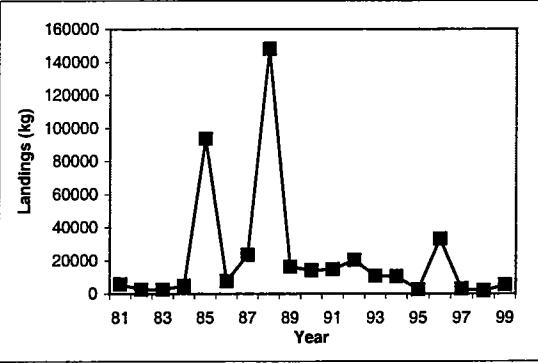
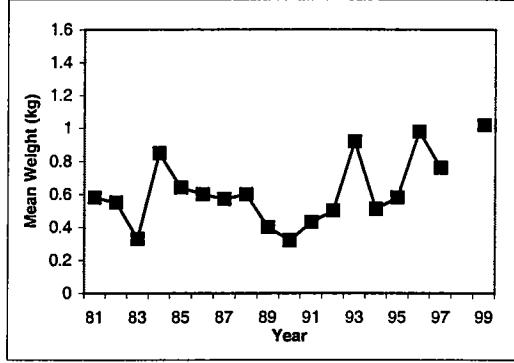
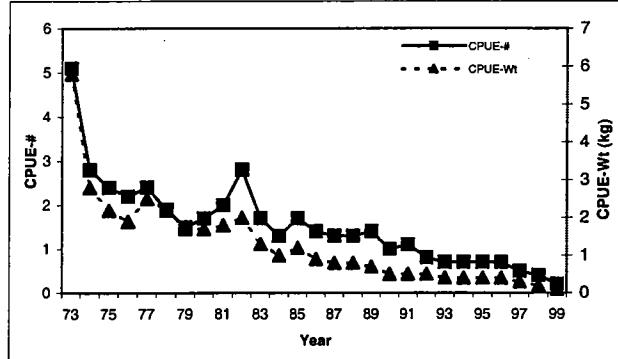
1989 - Gear restrictions as listed in text

1992 - Gear restrictions as listed in text

12" TL minimum size limit, all fisheries

1999 - 14" TL minimum size limit, all fisheries
- March and April commercial sale prohibited

- September, emergency rule, fishery closed to recreational and commercial harvest

Red porgy**Commercial Landings****Commercial Mean Weights****"For Hire" Recreational Landings****"For Hire" Recreational Mean Weights****Other Recreational Landings****Other Recreational Mean Weights****Headboat CPUE: North Carolina - Northeast Florida**

Vermilion snapper data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial		Headboat		Charter boat		Other Recreational		
	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
72				48576	0.51	569	1.7	1.0	
73				67762	0.78	278	1.1	1.2	
74				47679	0.56	672	1.1	0.6	
75				74872	0.62	702	1.4	0.8	
76				115354	0.61	667	0.8	0.5	
77				69538	0.45	514	0.3	0.3	
78				131201	0.44	917	0.4	0.4	
79				97192	0.46	699	0.2	0.3	
80				90025	0.49	677	0.5	0.5	
81				104320	0.38	676	1.6	0.6	
82				154150	0.43	1397	2.0	0.9	
83	0.94	391		133985	0.35	2280	1.8	0.7	0
84	0.85	4921		111114	0.36	2316	1.5	0.5	8639
85	0.82	5996		168814	0.32	2994	2.3	0.7	0.23
86	367342	0.63		158448	0.31	3564	2.1	0.6	0
87	305520	0.56	8022	204999	0.29	3383	2.4	0.7	80523
88	411435	0.54	6266	189892	0.29	2495	2.6	0.7	0.48
89	519911	0.62	5625	157189	0.24	4776	2.3	0.5	13
90	600253	0.59	6007	175439	0.23	5333	2.6	0.7	3466
91	636444	0.61	10525	275691	0.53	4041	2.8	1.4	0.10
92	334510	0.63	6039	113216	0.29	2835	1.5	0.5	1
93	394686	0.70	8230	116665	0.32	3330	1.6	0.6	62931
94	437910	0.72	7545	127754	0.31	5738	2.0	0.7	0.40
95	428182	0.65	9866	123314	0.33	4811	2.0	0.7	0.40
96	346217	0.59	5252	125332	0.35	3563	2.2	0.8	0.48
97	350062	0.66	5223	136039	0.38	4048	2.3	0.9	0.48
98	318615	0.58	6675	124962	0.35	4072	2.2	0.8	0.40
99	408860	0.66	11825	152287	0.39	4233	2.6	1.0	41

1983 - 4" mesh on trawl gear to achieve 12" minimum size on VS

1989 - Gear restrictions as listed in text

1992 - Gear restrictions as listed in text

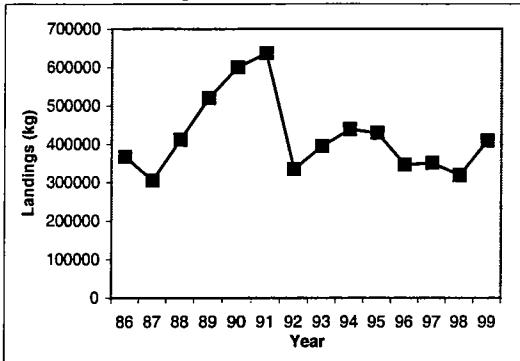
10" TL minimum size limit, all fisheries

Recreational bag limit of 10 VS /person/day

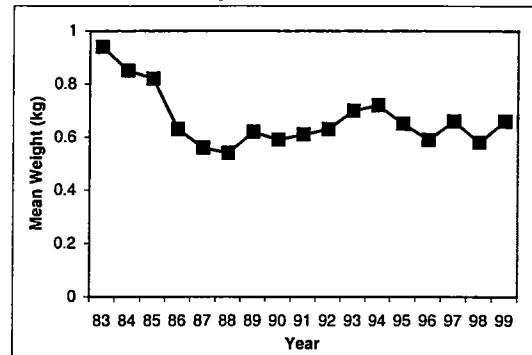
1999 - 11" recreational minimum size limit, 12" commercial minimum size limit

Vermilion snapper

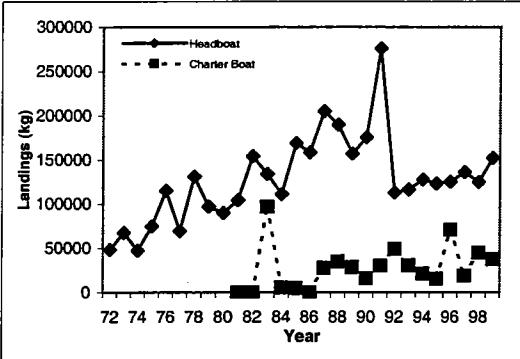
Commercial Landings



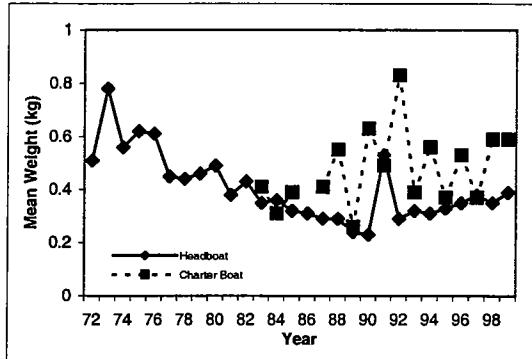
Commercial Mean Weights



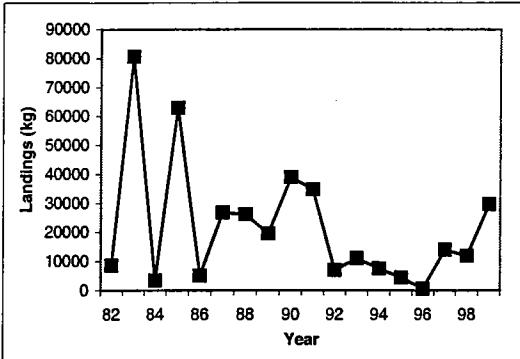
"For Hire" Recreational Landings



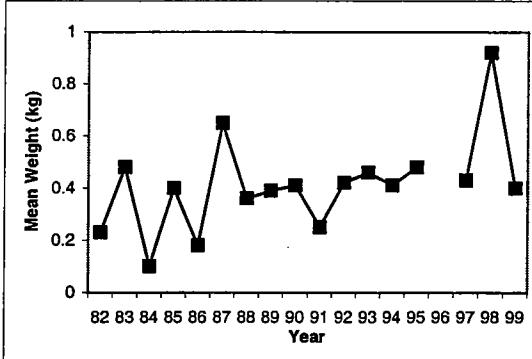
"For Hire" Recreational Mean Weights



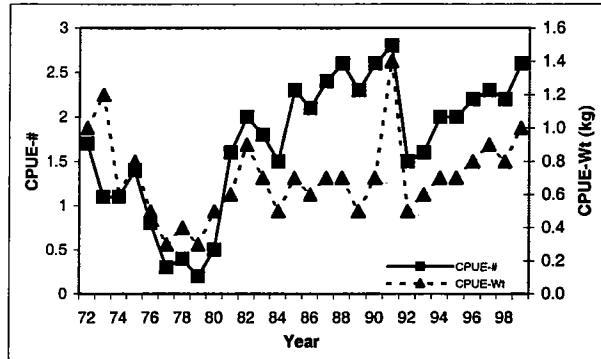
Other Recreational Landings



Other Recreational Mean Weights



Headboat CPUE: North Carolina - Northeast Florida



Red snapper data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial			Headboat			Charter boat			Other Recreational				
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE-#	CPUE-Wt	Landings	Mean Wt	N	Landings	Mean Wt	N
							NC - NEFL							
72				18517	8.00	50	0.04	0.38						
73				26626	8.48	41	0.07	0.46						
74				13770	4.43	95	0.03	0.16						
75				15833	3.45	166	0.05	0.17						
76				102011	2.32	499	0.06	0.26						
77				85973	1.86	718	0.03	0.09						
78				75590	1.71	741	0.03	0.10						
79				81574	2.51	245	0.01	0.08						
80				32177	1.87	259	0.04	0.08						
81				52086	1.50	675	0.24	0.35						
82				44410	2.02	431	0.12	0.27	1018			68563	1.50	28
83	5.54	35		33527	1.23	947	0.17	0.19	1233	2.59	8	40038	1.10	13
84	1.79	1073		36885	1.29	1261	0.16	0.19	32106	0.70	44	111714	0.76	41
85	2.32	871		59840	1.17	1156	0.25	0.30	3830	1.91	5	460543	1.28	36
86	101696	2.42	1124	24636	1.68	419	0.08	0.11	25451	0.18	206	83672	0.53	20
87	88984	2.58	1270	37076	1.39	303	0.11	0.16	28116	1.23	25	40615	0.83	39
88	80358	2.13	777	58928	1.66	196	0.12	0.20	42346	2.05	24	67085	0.50	67
89	117132	2.37	1201	32074	1.32	362	0.11	0.15	28186	1.62	21	93738	0.56	43
90	91254	2.28	847	29759	1.45	311	0.10	0.14	1419	0.61	14	60013	3.72	10
91	62198	2.45	971	32633	1.87	89	0.07	0.17	19954	2.03	14	44558	0.48	4
92	43130	4.15	543	13100	2.71	62	0.03	0.06	135325	2.10	10	145256	1.62	9
93	85352	3.40	1400	19352	2.60	194	0.04	0.10	21467	4.68	15	38857	2.06	8
94	85806	3.03	1191	19488	2.95	108	0.04	0.09	37991	3.43	35	37414	0.70	3
95	75364	3.82	1315	26039	3.09	131	0.05	0.15	24504	1.82	24	7604	4.83	3
96	58913	3.91	812	20972	3.36	78	0.04	0.15	11205	1.72	9	41958	2.22	6
97	51141	4.38	436	23226	3.79	67	0.03	0.15	29910	1.28	20	9616		
98	40151	8.55	521	12178	2.57	136	0.03	0.08	27603	2.34	26	24544	5.02	5
99	42810	3.31	1140	19758	2.82	156	0.04	0.13	40936	1.28	114	34441	2.24	25

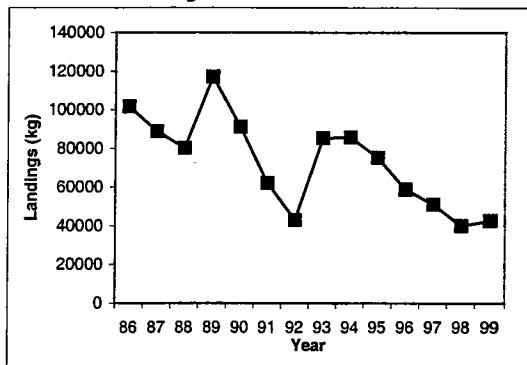
1983 - 12" TL minimum size limit, all fisheries

1989 - Gear restrictions as listed in text
1992 - Gear restrictions as listed in text

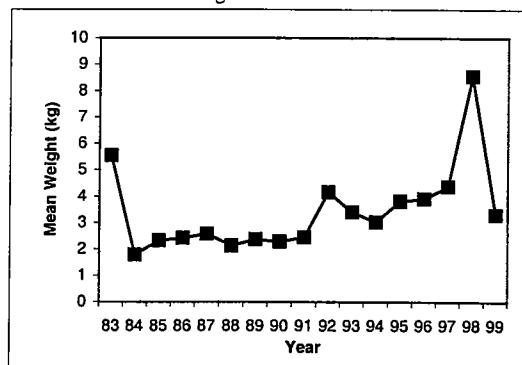
20" TL minimum size limit, all fisheries
Recreational bag limit of 10 snapper/person/day, no more than 2 RS (Excluding VS)

Red snapper

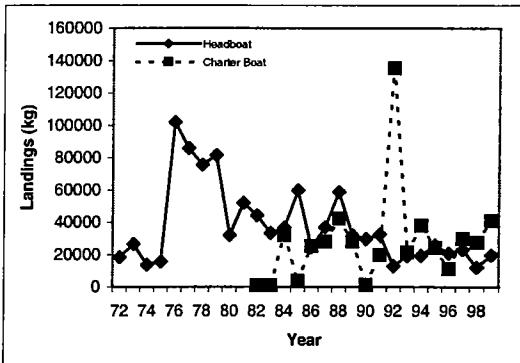
Commercial Landings



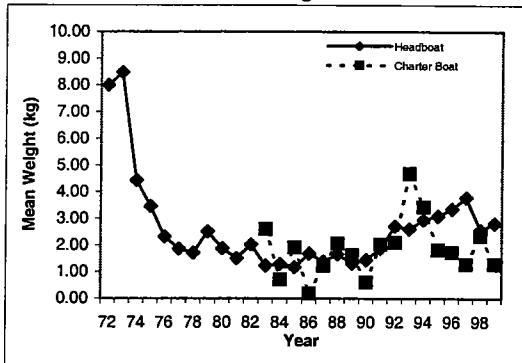
Commercial Mean Weights



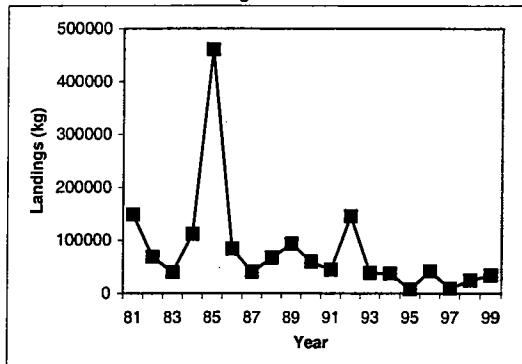
"For Hire" Recreational Landings



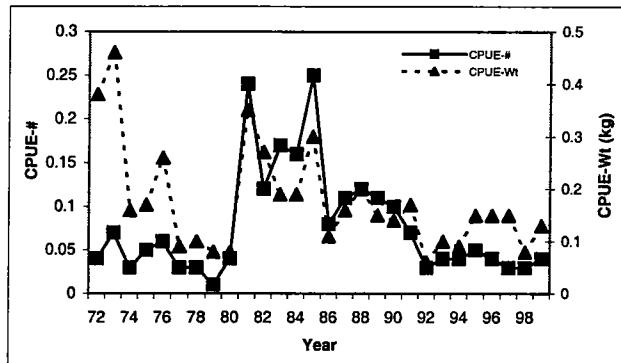
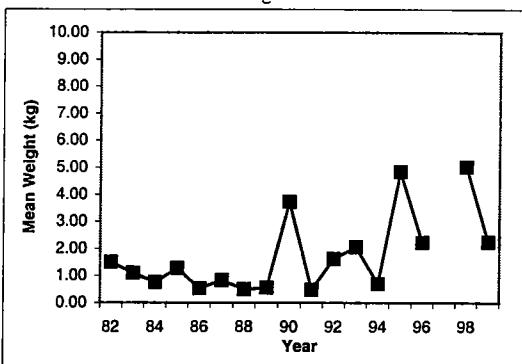
"For Hire" Recreational Mean Weights



Other Recreational Landings



Other Recreational Mean Weights



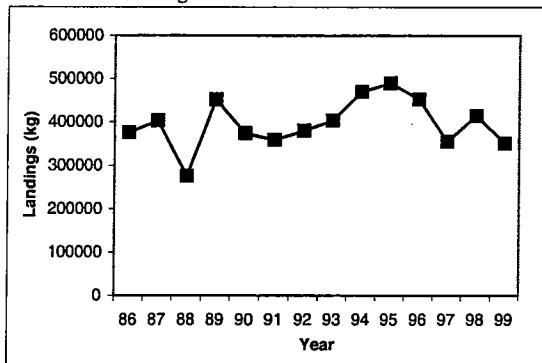
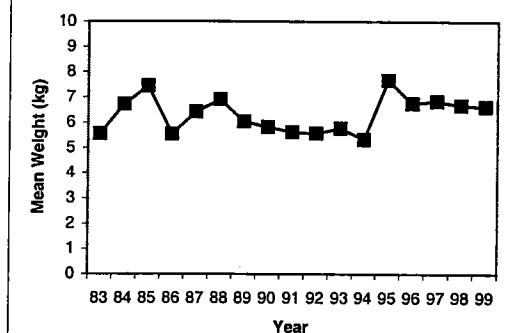
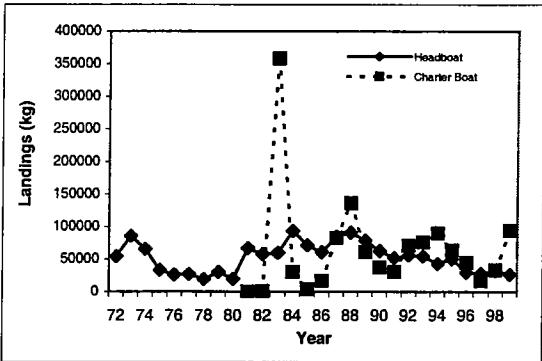
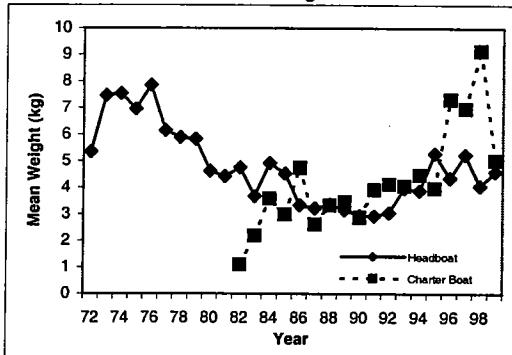
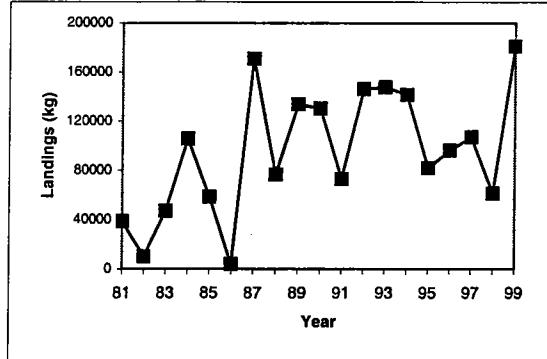
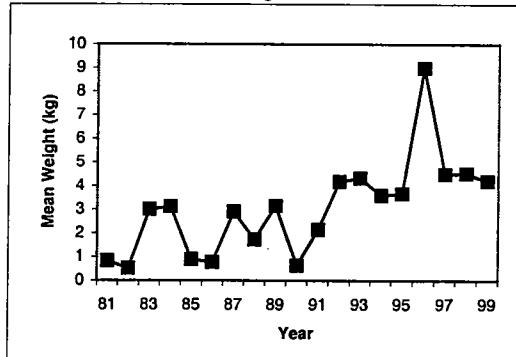
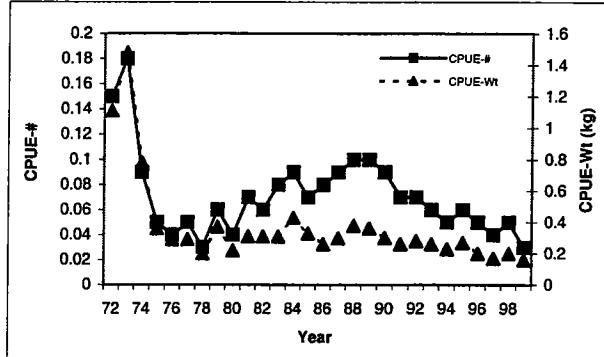
Gag data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial		Headboat		Charter boat		Other Recreational						
	Landings	Mean Wt	N	Landings	Mean Wt	CPUE-#	CPUE-Wt	Landings	N	Landings	Mean Wt	N	
					NC - NEFL								
72				54136	5.35	76	0.15	1.11					
73				85817	7.47	124	0.18	1.48					
74				65830	7.54	88	0.09	0.78					
75				33471	6.96	135	0.05	0.36					
76				26124	7.85	149	0.04	0.29					
77				26813	6.15	183	0.05	0.29					
78				18906	5.89	173	0.03	0.20					
79				30562	5.83	147	0.06	0.37					
80				19543	4.63	175	0.04	0.22					
81				67130	4.42	225	0.07	0.31					
82				58007	4.76	296	0.06	0.31	0	1	38724	0.83	
83	116	5.55		59971	3.68	481	0.08	0.31	1063	1.10	10149	0.52	
84	6.72	3443		93522	4.93	713	0.09	0.43	358219	2.20	2	46920	3.00
85	7.45	3738		71585	4.53	512	0.07	0.33	30118	3.58	17	105841	3.12
86	5.54	375587		60839	3.35	382	0.08	0.26	3739	3.00	5	58482	0.89
87	6.42	403530		84937	3.22	372	0.09	0.30	135881	3.33	33	76638	1.73
88	6.91	275452		91269	3.38	288	0.10	0.38	16611	4.75	2	3835	0.77
89	6.04	452029		1794	78711	3.15	472	0.10	82972	2.63	24	170898	2.91
90	5.82	374401		1329	62911	2.95	366	0.09	135881	3.33	33	133790	3.15
91	5.62	359031		1780	51674	2.94	184	0.07	30385	3.92	21	146148	4.18
92	5.56	380015		2354	56466	3.06	276	0.07	71019	4.13	75	141489	4.33
93	5.77	403785		2430	55053	3.98	282	0.06	61410	3.46	30	133790	3.15
94	5.33	469973		1741	43048	3.89	363	0.05	36969	2.88	65	130351	0.63
95	7.68	489416		379	50439	5.29	2571	0.06	30232	4.47	65	141489	3.59
96	6.76	452498		2097	30092	4.36	220	0.05	63730	3.98	52	82070	3.67
97	6.85	355249		1966	27934	5.24	259	0.04	44465	7.32	29	96272	8.98
98	6.68	415218		2267	32149	4.06	341	0.05	16452	6.97	19	107178	4.48
99	6.63	351144		2739	26465	4.60	259	0.03	33219	9.15	21	61574	4.53
									94133	5.02	54	181091	4.20
													36

1989 - Gear restrictions as listed in text
1992 - Gear restrictions as listed in text

20" TL minimum size limit, all fisheries
Recreational bag limit of 5 grouper/person/day

1999 - 24" TL minimum size limit
- Included in the 5 grouper bag limit; no more than 2 fish may be gag or black grouper individually or combined
- March and April commercial sale prohibited

Gag**Commercial Landings****Commercial Mean Weights****"For Hire" Recreational Landings****"For Hire" Recreational Mean Weights****Other Recreational Landings****Other Recreational Mean Weights****Headboat CPUE: North Carolina - Northeast Florida**

Scamp data (landings, mean weights, and CPUE-Wt are in kg.)

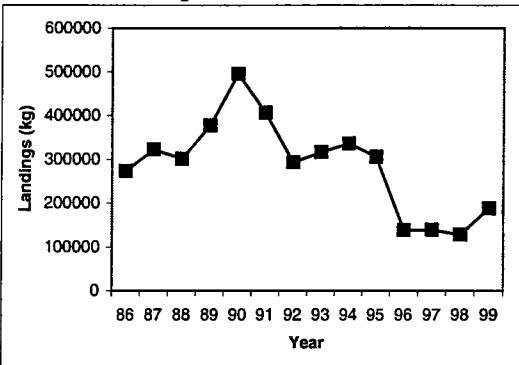
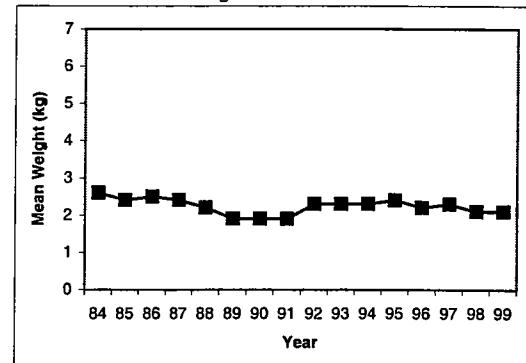
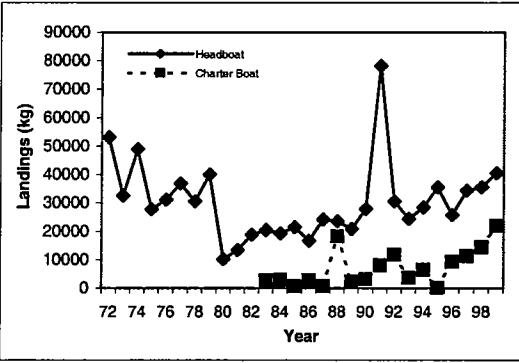
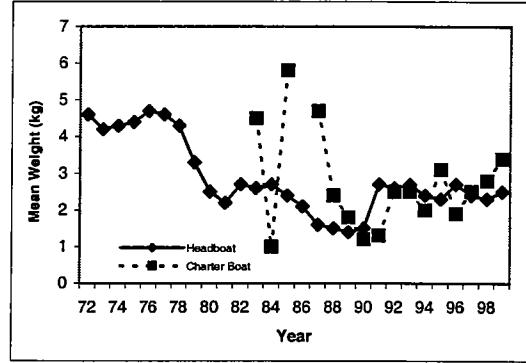
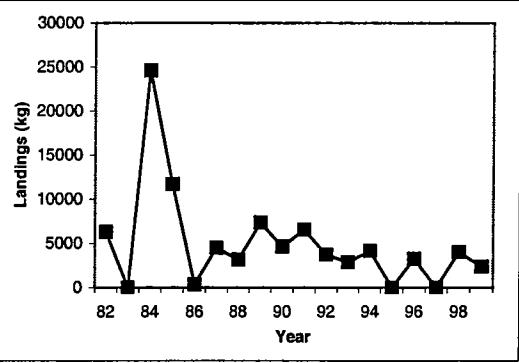
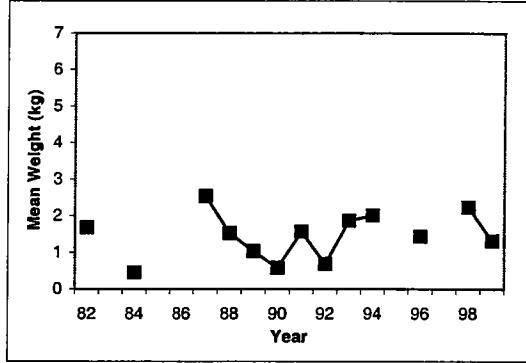
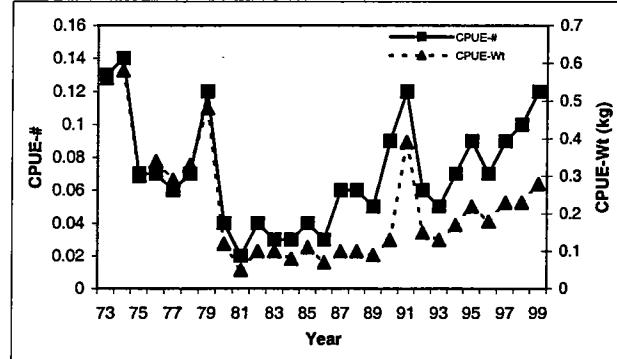
Year	Commercial		Headboat			Charter boat			Other Recreational							
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE #	CPUE-Wt	Landings	Mean Wt	N	Landings	Mean Wt	N		
							NC - NEFL									
72				53140	4.6	375	0.23	1.09								
73				32671	4.2	363	0.13	0.56								
74				48966	4.3	373	0.14	0.58								
75				27807	4.4	483	0.07	0.30								
76				31130	4.7	863	0.07	0.34								
77				36832	4.6	426	0.06	0.29								
78				30622	4.3	302	0.07	0.33								
79				40022	3.3	170	0.12	0.48								
80				10231	2.5	158	0.04	0.12								
81				13485	2.2	109	0.02	0.05								
82				18838	2.7	253	0.04	0.10								
83				20566	2.6	434	0.03	0.10	2678	4.5	11	6290	1.68	2		
84				1275	19240	2.7	454	0.03	0.08	2873	1.0	2	24610	0.45	1	
85				2.4	1722	21515	2.4	433	0.04	0.11	619	5.8	1	11721		
86	273057	2.5	2269	16733	2.1	411	0.03	0.07	2843	4.5	11	356				
87	322152	2.4	4049	24189	1.6	521	0.06	0.10	803	4.7	6	4483	2.53	45		
88	301017	2.2	2887	23590	1.5	446	0.06	0.10	18263	2.4	40	3140	1.52	3		
89	377302	1.9	3462	20836	1.4	340	0.05	0.09	2335	1.8	23	7364	1.03	11		
90	495398	1.9	3424	27920	1.5	317	0.09	0.13	3155	1.2	45	4637	0.58	13		
91	406349	1.9	4142	78234	2.7	388	0.12	0.39	8039	1.3	15	6552	1.56	8		
92	293276	2.3	1798	30622	2.6	228	0.06	0.15	11780	2.5	40	3737	0.68	3		
93	316429	2.3	2409	24421	2.7	322	0.05	0.13	3686	2.5	30	2859	1.86	3		
94	336478	2.3	1957	28457	2.4	332	0.07	0.17	6545	2.0	40	4174	2.01	1		
95	305257	2.4	2990	35522	2.3	364	0.09	0.22	126	3.1	2	0				
96	138231	2.2	2786	25746	2.7	265	0.07	0.18	9350	1.9	8	3254	1.43	1		
97	139241	2.3	2324	34450	2.4	416	0.09	0.23	11365	2.5	3	0				
98	128296	2.1	3256	35673	2.3	382	0.10	0.23	14486	2.8	11	4005	2.23	2		
99	188431	2.1	5625	40581	2.5	338	0.12	0.28	21980	3.4	28	2409	1.31	1		

1989 - Gear restrictions as listed in text

1992 - Gear restrictions as listed in text

20" TL minimum size limit, all fisheries

Recreational bag limit of 5 grouper/person/day

Scamp**Commercial Landings****Commercial Mean Weights****"For Hire" Recreational Landings****"For Hire" Recreational Mean Weights****Other Recreational Landings****Other Recreational Mean Weights****Headboat CPUE: North Carolina - Northeast Florida**

Red grouper data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial			Headboat			Charter boat			Other Recreational						
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE-#	CPUE-Wt	Landings	Mean Wt	N	Landings	Mean Wt	N		
							SEFL									
72				10.4	12							46148	1.33	12		
73				9.98	10							114878	4.76	5		
74				8.39	15							319477	1.08	6		
75				7.13	27							671848	0.92	12		
76				3.51	64							59453	0.54	1		
77				4.91	111											
78				4.01	96											
79				2.51	157											
80				2.45	175											
81				16880	2.60	223	0.03	0.07								
82				14279	2.24	274	0.02	0.05	4061	4.45	1					
83				17648	2.00	389	0.05	0.08	316	8.21	1					
84				18361	1.95	598	0.04	0.08	4258	2.83	2					
85				19627	2.25	583	0.04	0.09	5974	1.37	5					
86				13314	2.08	387	0.03	0.05	359	1.12	1	728030	0.66	13		
87				15702	2.17	283	0.03	0.07	31673			88861	1.17	14		
88				10615	1.90	211	0.01	0.03	122332	1.22	9	54308	2.74	6		
89				8126	2.35	242	0.01	0.03	1264	1.59	15	17263	1.58	3		
90				987	21733	2.72	184	0.02	0.07	173953	2.18	4	10719			
91				713	7777	2.85	64	0.01	0.02	388	2.57	3	17104	1.23	3	
92				322	13294	3.34	79	0.02	0.06	2330	3.74	8	121856	2.30	7	
93				4.51	687	14095	2.93	107	0.02	0.07	60205	3.29	11	102681	2.86	15
94				4.21	500	16099	2.91	133	0.02	0.06	5006	3.09	17	94380	2.63	4
95				4.15	497	16011	3.13	189	0.03	0.08	27249	3.17	7	109384	1.76	6
96				4.59	347	16853	3.05	207	0.03	0.08	21796	2.84	8	140101	2.85	13
97				4.16	596	25235	3.54	399	0.03	0.11	23676	4.39	9	27636	2.80	7
98				3.45	1193	33748	2.93	445	0.06	0.18	8612	2.81	8	64816	3.46	10
99				3.73	1795	26074	3.33	309	0.02	0.06	15391	3.13	43	30932	3.13	21

1983 - 12" TL minimum size limit, all fisheries

1989 - Gear restrictions as listed in text

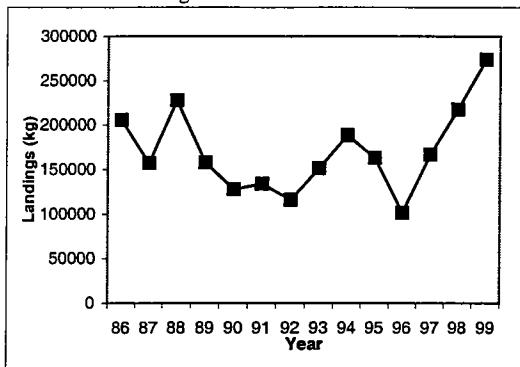
1992 - Gear restrictions as listed in text

20" TL minimum size limit, all fisheries

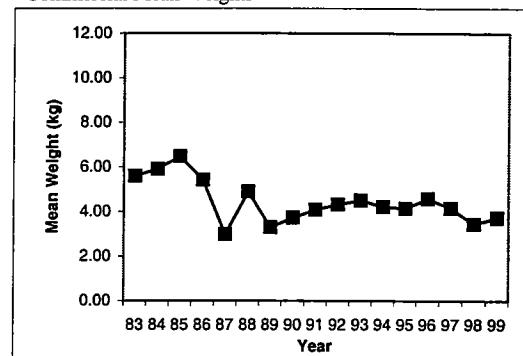
Recreational bag limit of 5 grouper/person/day

Red grouper

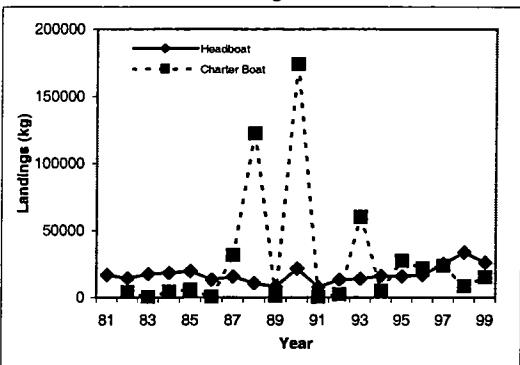
Commercial Landings



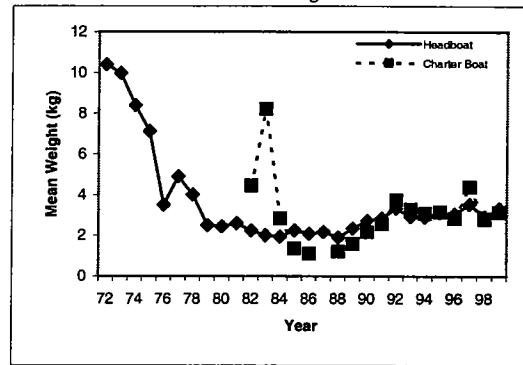
Commercial Mean Weights



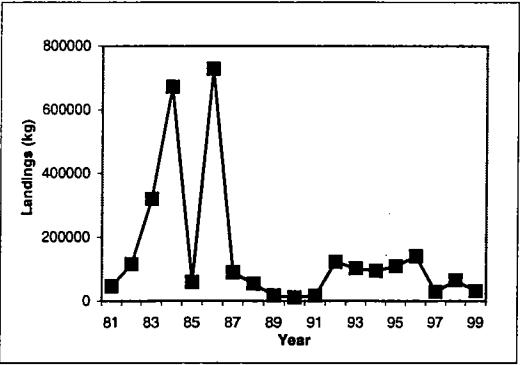
"For Hire" Recreational Landings



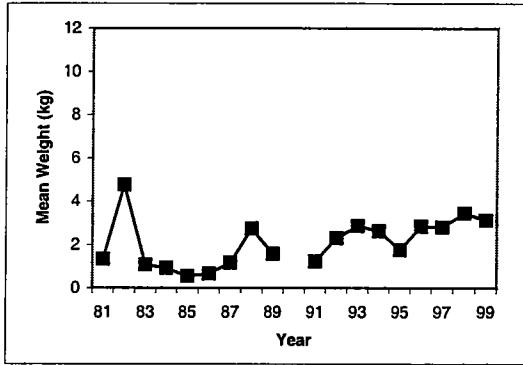
"For Hire" Recreational Mean Weights



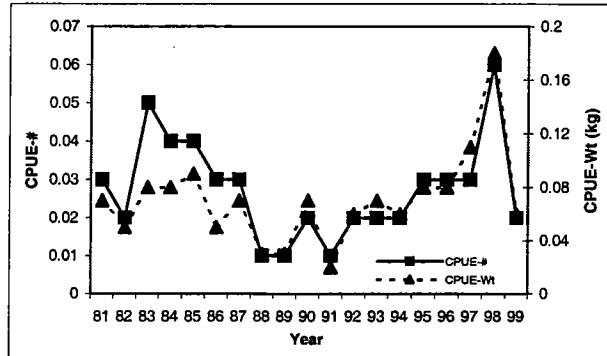
Other Recreational Landings



Other Recreational Mean Weights



Headboat CPUE: North Carolina - Southeast Florida



Greater amberjack data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial			Headboat			Charter boat			Other Recreational							
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE-#	CPUE-Wt	Landings	Mean Wt	N	Landings	Mean Wt	N			
							NC - SEFL										
72					0.77	1											
73					7.96	16											
74					7.13	22											
75					9.58	19											
76					9.67	50											
77					5.21	39											
78					10.42	92											
79					4.97	115											
80					6.81	52											
81					71631	4.46	108	0.05	0.20	148667	15.63	6	459631	7.10	2		
82					118594	5.32	48	0.07	0.31	3914	14.55	2	231962	10.91	13		
83	35.49	1	54213	3.34	161	0.05	0.15	35327	7.91	7	43979	8.70	1				
84	3.90	1	113345	6.45	151	0.05	0.29	181257	11.55	34	154952	14.66	7				
85	5.81	24	51398	3.95	165	0.03	0.14	179373	10.62	16	396966	7.77	12				
86	232878	8.26	22	53728	4.38	168	0.03	0.13	355806	10.97	34	899836	13.31	19			
87	629073	6.35	50	94986	5.01	186	0.04	0.21	307662	12.78	48	224838	12.49	14			
88	577291	6.47	61	76431	7.85	86	0.03	0.18	397668	10.54	30	445690	12.97	21			
89	506944	9.21	29	44158	4.93	191	0.03	0.11	314312	13.20	62	423073	15.27	18			
90	835765	7.28	53	47798	6.26	119	0.02	0.11	206767	8.64	27	282419	6.66	13			
91	1060147	9.51	137	65088	7.13	74	0.02	0.17	413312	10.12	35	153369	4.63	17			
92	1007593	12.31	244	71255	6.32	130	0.02	0.19	229485	10.43	38	315746	7.44	14			
93	863930	12.07	812	71200	8.33	121	0.02	0.21	260519	11.60	59	130720	10.89	26			
94	888360	10.69	412	54693	7.43	124	0.02	0.16	353272	10.24	93	159359	6.29	8			
95	844016	12.91	319	35784	7.65	113	0.02	0.12	311588	11.36	48	83893	10.18	13			
96	691348	10.65	181	42036	8.13	76	0.02	0.14	273664	12.65	67	226450	11.58	34			
97	631670	12.32	506	22823	8.91	72	0.01	0.08	193910	11.87	34	30698	11.59	8			
98	547889	10.83	663	24357	6.63	93	0.01	0.10	134191	10.76	66	59682	12.63	5			
99	496482	13.00	742	31554	6.60	127	0.02	0.11	531231	10.09	313	100068	11.16	12			

1989 - Gear restrictions as listed in text
1992 - Gear restrictions as listed in text

28" FL recreational minimum size limit

36" FL commercial minimum size limit (28" FL minimum for cored fish)

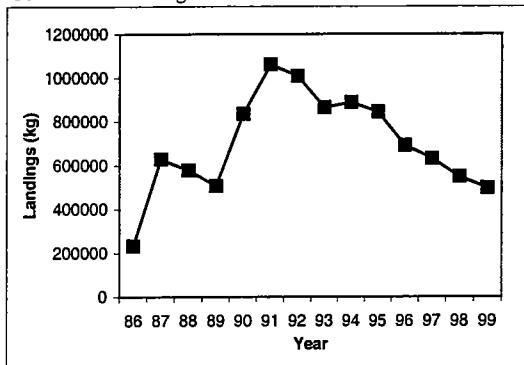
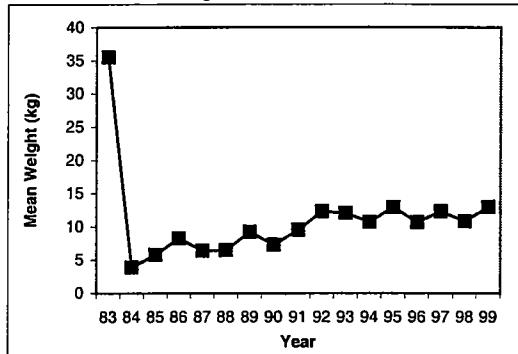
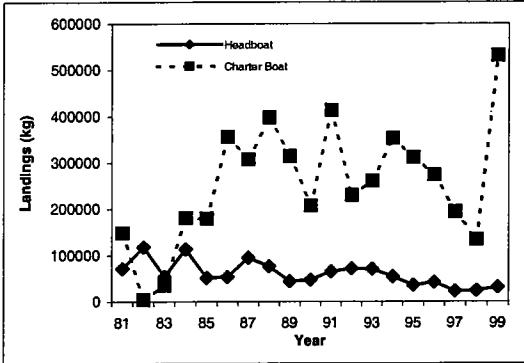
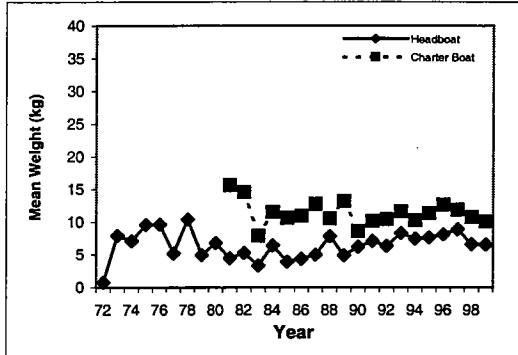
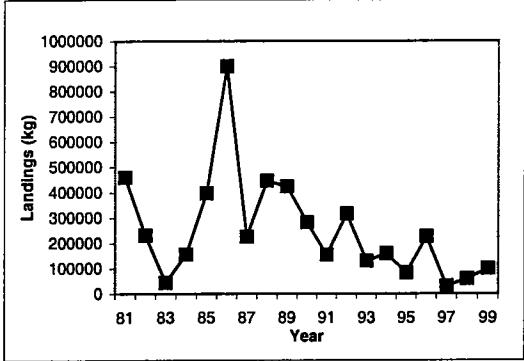
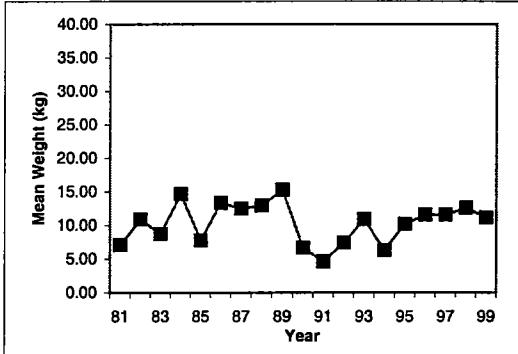
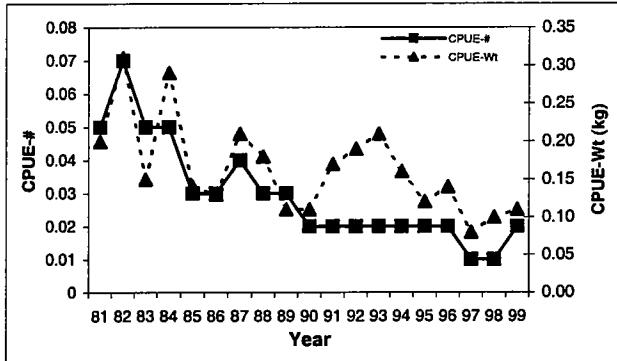
Recreational bag limit of 3 GAJ/person/day

Commercial harvest and/or landing of GAJ in excess of bag limit is prohibited in April off Cape Canaveral, FL

1998 - Commercial quota of 1,169,931 lb gutted weight, season starts May 1

1999 - Recreational bag limit of 1 GAJ/person/day

During April closure, commercial and recreational bag limit 1/person/day and sale prohibited

Greater amberjack**Commercial Landings****Commercial Mean Weight****"For Hire" Recreational Landings****"For Hire" Recreational Mean Weights****Other Recreational Landings****Other Recreational Mean Weights****Headboat CPUE: North Carolina - Southeast Florida**

Black grouper data (landings , mean weights, and CPUE-Wt. are in kg.)

Year	Commercial			Headboat			Charter Boat			Other Recreational		
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE-#	CPUE-Wt	SEFL	Landings	Mean Wt	N
72												
73												
74												
75												
76												
77												
78												
79												
80												
81												
82												
83												
84												
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	96											
	97											
	98											
	99											

1989 - Gear restrictions as listed in text

1992 - Gear restrictions as listed in text

20" TL minimum size limit, all fisheries

Recreational bag limit of 5 grouper/person/day

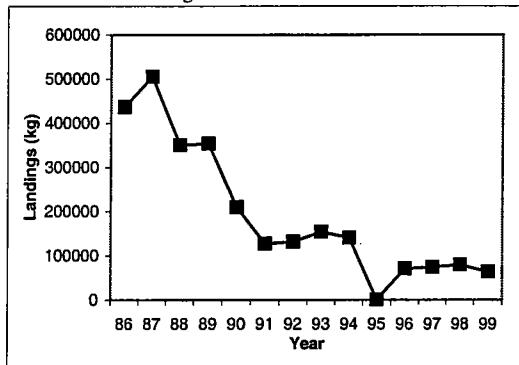
1999 - 24" TL minimum size limit

- Included in the 5 fish grouper bag limit, no more than 2 fish may be gag or black grouper individually or combined

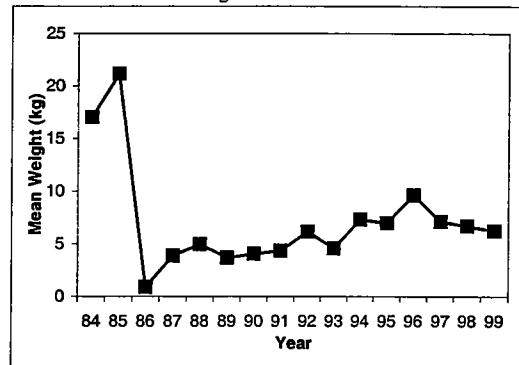
- March and April commercial sale prohibited

Black grouper

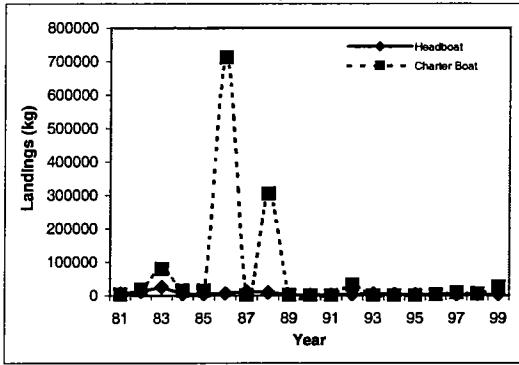
Commercial Landings



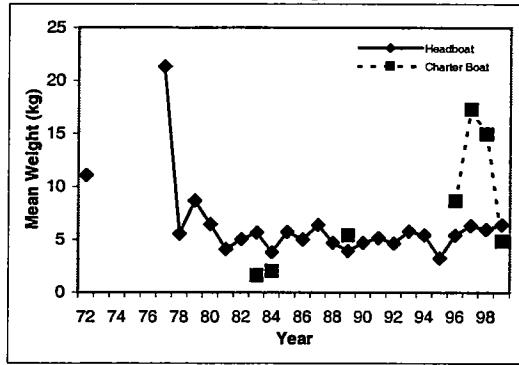
Commercial Mean Weights



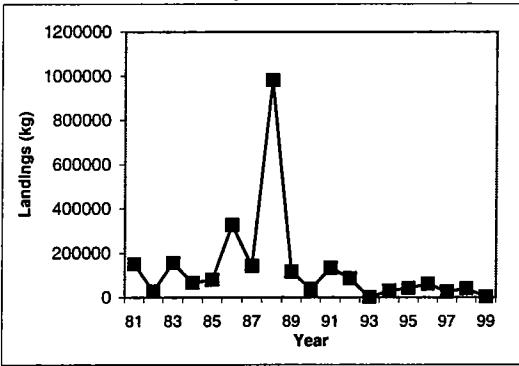
"For Hire" Recreational Landings



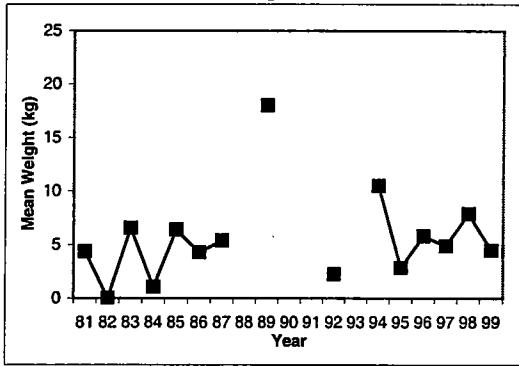
"For Hire" Recreational Mean Weights



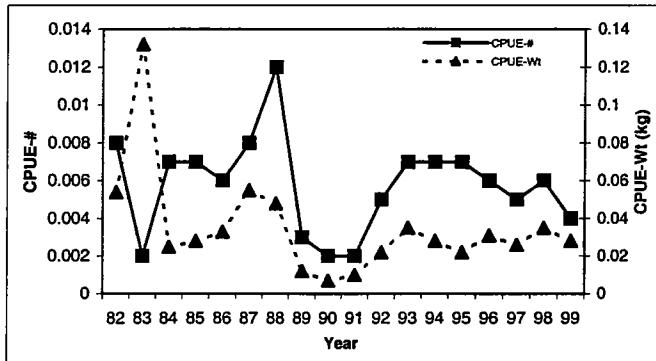
Other Recreational Landings



Other Recreational Mean Weights



Headboat CPUE: Southeast Florida



Speckled hind data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial			Headboat			Charter boat			Other Recreational				
	Landings	Mean Wt	N	Landings	Mean Wt	N	CPUE-#	CPUE-Wt	Landings	Mean Wt	N	Landings	Mean Wt	N
							NC - SC							
72				18330	4.28	141	0.090	0.374						
73				27618	3.59	271	0.141	0.477						
74				17980	3.78	183	0.058	0.213						
75				12022	3.60	199	0.033	0.130						
76				11195	4.10	111	0.028	0.122						
77				6722	2.69	149	0.027	0.073						
78				4104	2.34	125	0.019	0.044						
79				5843	2.77	28	0.020	0.070						
80				3099	2.61	30	0.012	0.035						
81				1265	1.49	14	0.006	0.010						
82				4963	2.07	41	0.022	0.049						
83				3820	1.87	84	0.024	0.042						
84				1660	1.05	108	0.014	0.016						
85				4342	1.40	82	0.027	0.044						
86	35890	1.6	996	3312	1.20	75	0.024	0.030	341	1.09	1			
87	25674	1.7	1212	3088	1.31	48	0.017	0.026	101	2.77	1	3779		
88	20342	2.1	980	3761	1.79	48	0.014	0.026	49	0	0			
89	22638	1.9	986	1475	1.67	30	0.012	0.014	67	1.27	1			
90	21814	1.8	578	520	0.80	12	0.006	0.005	0		0	1037		
91	17384	2.0	481	735	0.50	7	0.003	0.006	0		0			
92	20385	2.0	350	570	0.87	7	0.003	0.005	0		0			
93	20272	3.2	248	254	0.75	11	0.002	0.002	0		0			
94	10042	1.9	157	226	0.95	12	0.002	0.002	0		0			
95	1691	2.0	15	406	1.92	14	0.002	0.004	0		0			
96	1417	1.8	10	182	0.97	12	0.001	0.001	2335	1.57	1	474	1.65	1
97	4159	2.5	11	141	0.89	22	0.001	0.001	1062	0.64	2	0	0	
98	2304	2.0	8	1022	1.30	22	0.006	0.010	327			159		
99	2304	2.1	33	383	0.60	15	0.006	0.004	670	1.93	1	0	0.50	2

1992 - Gear restrictions as listed in text

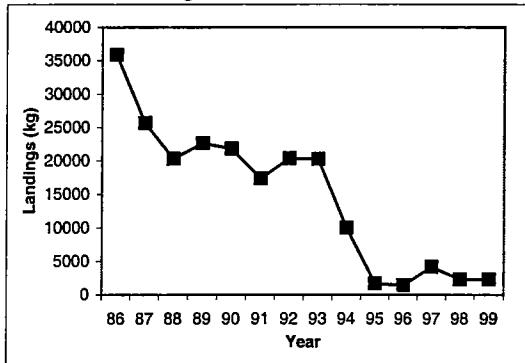
Recreational bag limit of 5 grouper/person/day

1994 - One SH/vessel/trip commercial or recreational

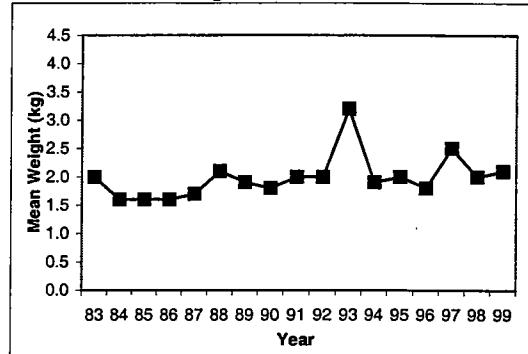
No sale of SH

Speckled hind

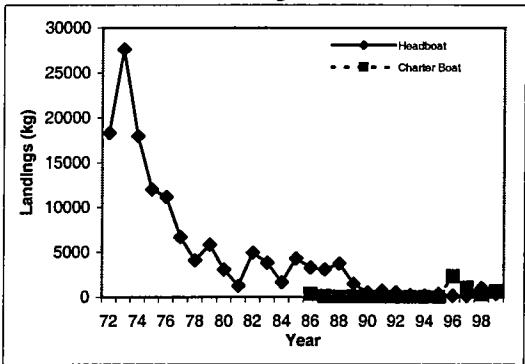
Commercial Landings



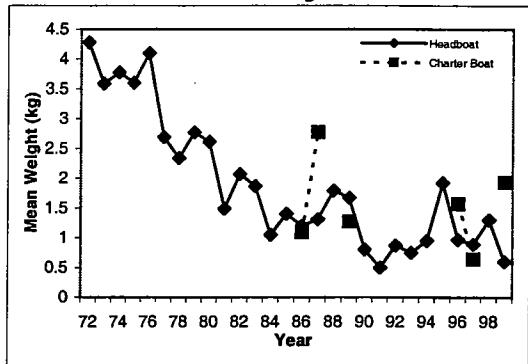
Commercial Mean Weights



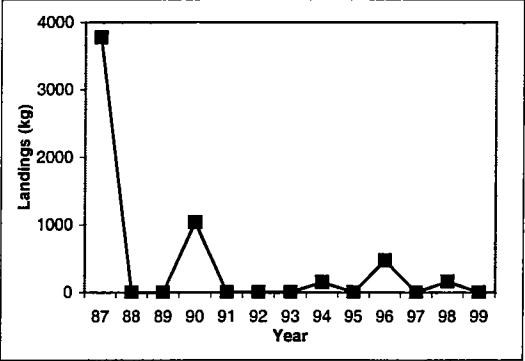
"For Hire" Recreational Landings



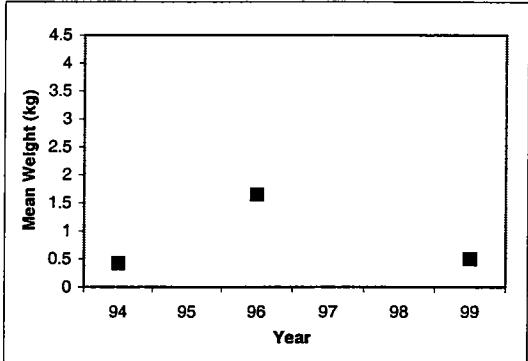
"For Hire" Recreational Mean Weights



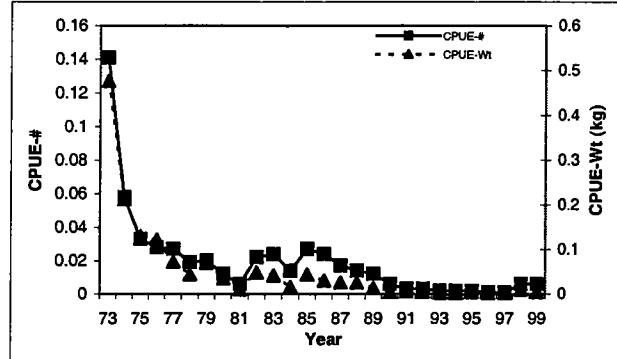
Other Recreational Landings



Other Recreational Mean Weights



Headboat CPUE: North Carolina - South Carolina



Snowy grouper data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial		Headboat		Charter boat		Other Recreational		
	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
						NC - SEFL			
72				4.47	38	0.021	0.104		
73				4.14	27				
74				4.09	116				
75				3.81	104	0.011	0.066		
76				3.20	115	0.027	0.122		
77				2.46	62	0.012	0.038		
78				1.24	25	0.008	0.049		
79				3.24	25	0.014	0.054		
80				3.28	29	0.030	0.102		
81				7647	1.79	32	0.008	0.020	
82				7520	3.05	11	0.006	0.019	0
83				29147	2.37	33	0.024	0.080	18711
84				1100	1.79	6	0.001	0.003	824
85				1962	1.49	38	0.003	0.005	0
86	213755	2.84	2863	1919	1.39	46	0.003	0.005	0
87	177876	2.78	1807	2002	1.47	20	0.003	0.005	1048
88	151069	1.77	1209	1487	1.27	23	0.002	0.004	1623
89	234473	2.26	1605	1827	2.21	51	0.003	0.004	0
90	276645	2.48	2394	1291	0.99	6	0.002	0.003	130
91	224907	2.99	2715	991	1.46	3	0.001	0.003	0.50
92	259678	3.47	4628	397	0.18	2	0.001	0.001	1
93	210905	3.01	7110	493	0.50	7	0.001	0.001	36142
94	144504	2.32	2689	331	0.69	16	0.001	0.001	4.70
95	177039	1.59	5558	330	0.81	11	0.001	0.001	0
96	146572	2.19	2050	1552	1.09	18	0.002	0.005	5378
97	251163	2.35	2352	1002	2.11	130	0.001	0.004	1.17
98	148748	2.10	2131	589	1.21	10	0.001	0.002	6
99	212679	2.85	3437	233	0.44	1	0.001	0.001	0
							6474	2.18	32
								298	1.65
									1

1992 - Gear restrictions as listed in text

Recreational bag limit of 5 grouper/person/day

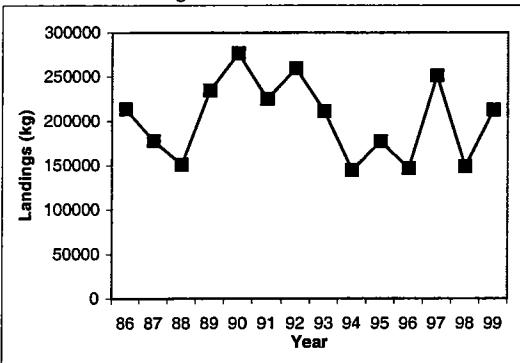
1994 - Commercial quota of 344,508 lb gutted weight

Commercial trip limit of 2,500 lb while season is open

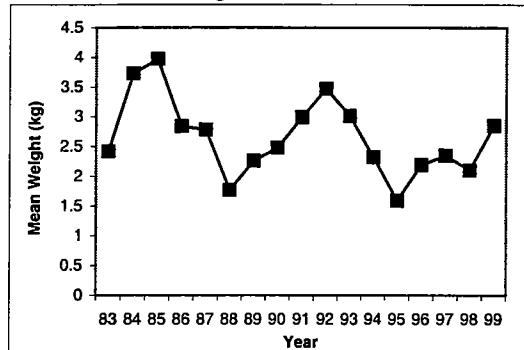
Commercial trip limit of 300 lb in closed season

Snowy grouper

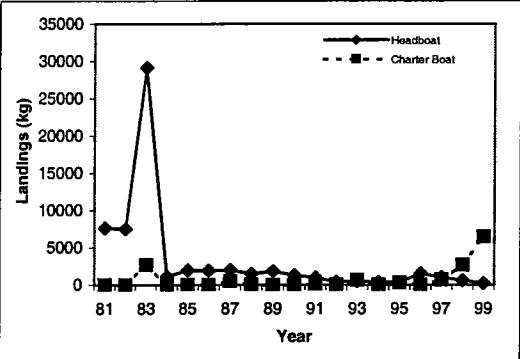
Commercial Landings



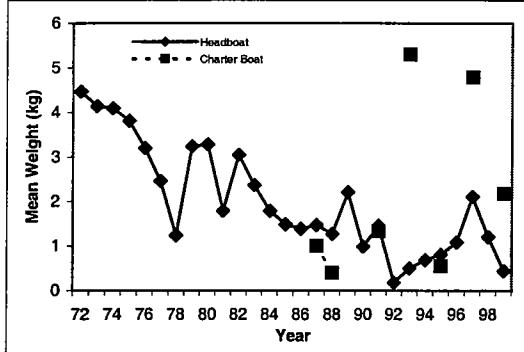
Commercial Mean Weights



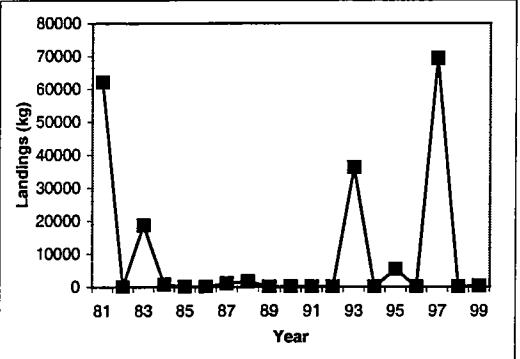
"For Hire" Recreational Landings



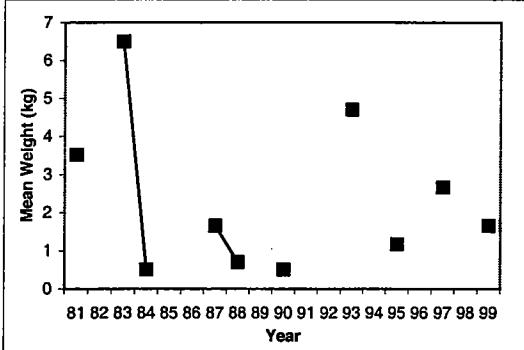
"For Hire" Recreational Mean Weights



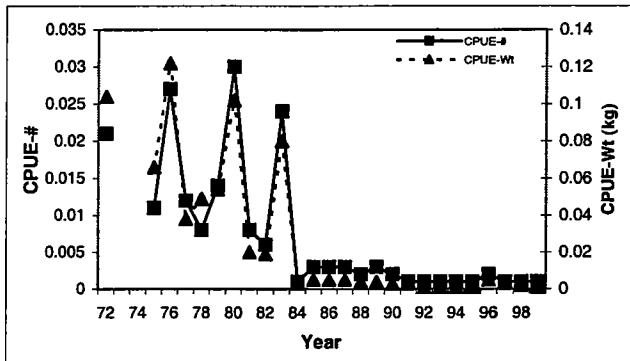
Other Recreational Landings



Other Recreational Mean Weights



Headboat CPUE: North Carolina - Southeast Florida



Yellowedge grouper data (landings, mean weights, and CPUE-Wt are in kg.)

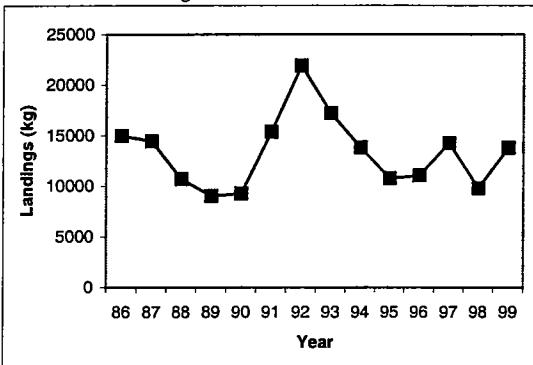
Year	Commercial			Headboat			Charter boat			Other Recreational		
	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
72				7.89	7							
73				4.99	2							
74				7.08	5							
75				4.14	17							
76				1.95	18							
77				2.71	3							
78				7.95	3							
79				8.63	5							
80				3.08	2							
81	957	0.75	3	0								
82	599	1.75	1	0								
83	1381	3.11	5	0								
84	47	282	1.02	5	0							
85	3.51	102	12	0								
86	14982	5.34	387	43	0							
87	14461	5.10	102	436	4.50	1	0	6.30	1	0	0	
88	10707	3.79	97	16	1.20	1	0					
89	9028	3.86	43	43	3.34	2	0					
90	9287	3.34	107	37			0					
91	15379	4.03	192	42			0	5.80	1	0	0	
92	21920	4.09	787	19			0			0	0	
93	17190	4.59	756	52			0			0	0	
94	13806	3.45	135	118			0			0	0	
95	10775	3.49	94	113	1.29	1	0			0	0	
96	11045	2.90	98	233			0			0	0	
97	14247	3.70	248	11	2.45	15	41	0.53	1	0	0	
98	9777	2.65	60	115			0			0	0	
99	13789	2.85	189	0	3.9	1	0	5.73	1	0	0	

1992 - Gear restrictions as listed in text

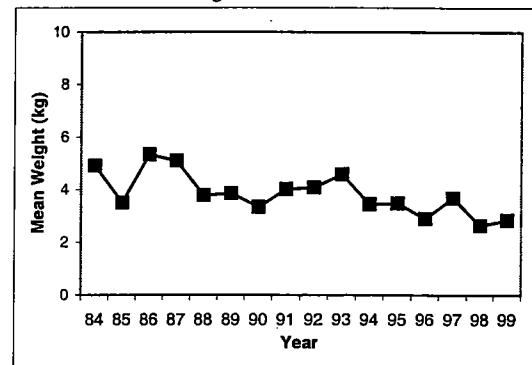
Recreational bag limit of 5 grouper/person/day

Yellowedge grouper

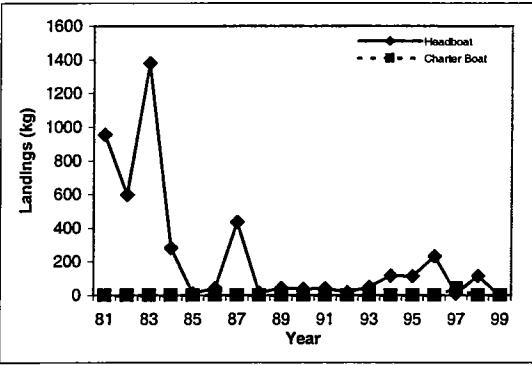
Commercial Landings



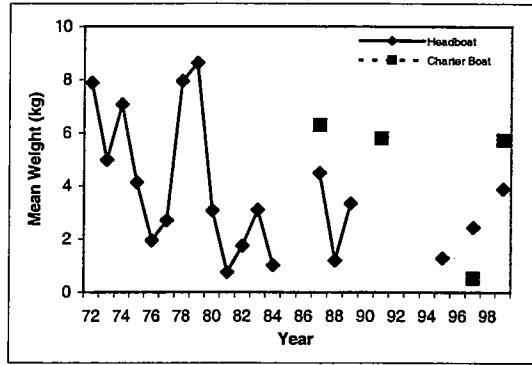
Commercial Mean Weights



"For Hire" Recreational Landings



"For Hire" Recreational Mean Weights



Other Recreational Landings

No data available

Other recreational Mean Weights

No data available

Headboat CPUE

No data available

Tilefish data (landings, mean weights, and CPUE-Wt are in kg.)

Year	Commercial			Headboat			Charter boat			Other Recreational		
	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N	Landings	Mean Wt	N
72												
73												
74												
75												
76												
77												
78												
79												
80												
81	187	1.99	1									
82	8											
83		0										
84	291	0										
85	8.86	109	0									
86	593073	6.19	4053	0								
87	166697	7.35	542	36								
88	296643	5.07	1060	0								
89	446986	4.67	834	6	0.77	17	0					
90	458372	5.95	755	3	0.23	14	62	1.30	1	0		
91	451465	4.72	6344	0			81	1.25	2	0		
92	359937	4.98	11667	12	0.22	1	0					
93	427224	4.29	29265	0			0			0		
94	326257	3.97	9536	5			6998	2.83	3	0		
95	269377	4.64	9604	0			0			0		
96	170572	2.78	2317	0			0			0		
97	125740	2.80	2787	439	2.37	111	917	1.96	1	6326	2.40	13
98	178910	2.41	1805	0			1023			0		
99	230631	2.68	3829	4	1.45	2	2004	1.86	2	0		

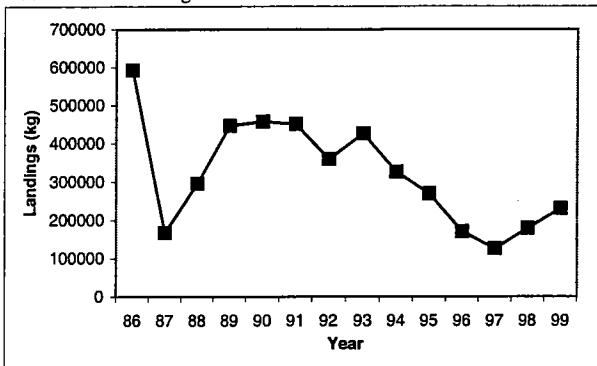
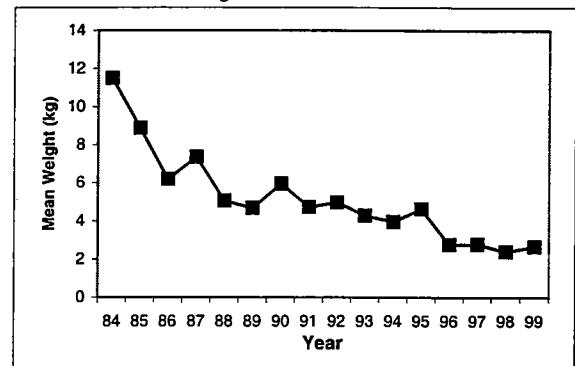
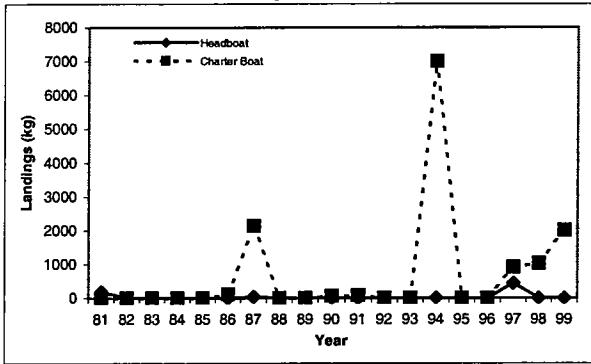
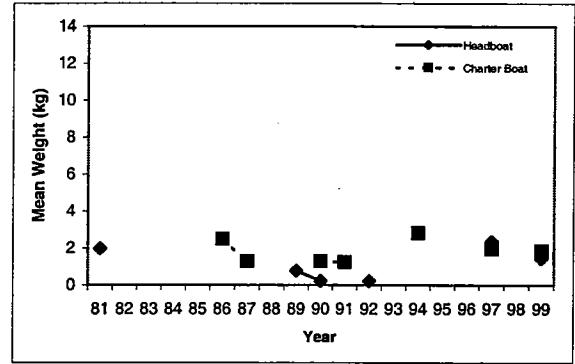
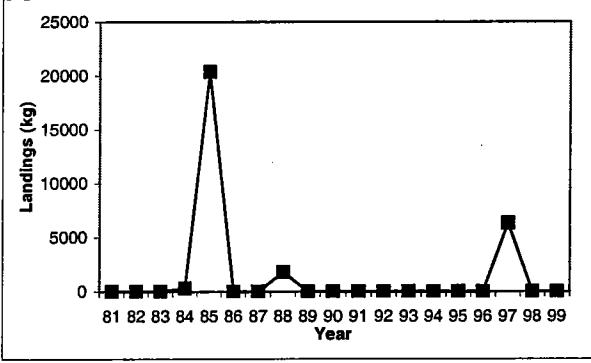
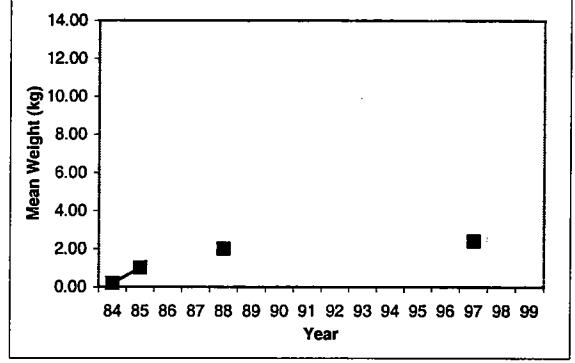
1992 - Gear restrictions as listed in text

Recreational bag limit of 5 grouper/person/day

1994 - Commercial quota of 1,000,633 lb gutted weight

Commercial trip limit of 5,000 lb while season is open

Commercial trip limit of 300 lb in closed season

Tilefish**Commercial Landings****Commercial Mean Weights****"For Hire" Recreational Landings****"For Hire" Recreational Mean Weights****Other Recreational Landings****Other Recreational Mean Weights****Headboat CPUE**

No data available

Table 16. Population status for 15 species of reef fish from the southeastern United States. Blocked = Most appropriate range of M; Bold = most appropriate M. SPRs are based on total mature biomass. SPR values in () indicate values for male and female biomass specifically for protogynous species. If SPRs were above 30% and/or 40%, then no analysis of reduction in F or minimum size was required.

Species	M	Full F	Most Recent Static SPR	Analysis Type	F to obtain 30% SPR	F to obtain 40% SPR	Minimum size for 30% SPR	Minimum size for 40% SPR
Vermilion	0.20	0.61	12%	VPA	0.24 (-60%)	0.18 (-70%)	14"	16"
Snapper	0.25	0.55	16%		0.25 (-55%)	0.21 (-68%)	13"	14"
0.30	0.51	21%			0.35 (-31%)	0.25 (-51%)	13"	14"
0.35	0.46	27%			0.41 (-11%)	0.28 (-39%)	11"	13"
Red	0.15	0.69	11%	VPA	0.23 (-67%)	0.14 (-80%)	26"	28"
Snapper	0.20	0.63	11%		0.24 (-63%)	0.20 (-68%)	23"	26"
0.25	0.57	24%			0.40 (-30%)	0.26 (-55%)	20"	23"
0.30	0.50	32%			0.34 (-33%)		21"	
Scamp	0.10	0.24	22%	VPA	0.17 (-30%)	0.11 (-55%)	22"	25"
0.15	0.18	35%			0.14 (-20%)		21"	
0.20	0.13	52%						
0.25	0.07	69%						
Black Sea	0.20	1.03	15%	VPA				
Bass	0.30	0.96	26%	Data were not available for reduction in F and minimum size analysis				
0.40	0.89	39%						

Species	M	Full F	Most Recent Static SPR	Analysis Type	F to obtain 30% SPR	F to obtain 40% SPR	Minimum size for 30% SPR	Minimum size for 40% SPR
Red Gorgy	0.20	0.70	15% (7-30)	VPA				
	0.28	0.64	24% (13-42)		0.51 (-20%)	0.26 (-59%)		
	0.35	0.59	34% (20-52)					
Gray Triggerfish	0.20	0.89	46%	Catch Curve				
	0.25	0.84	55%					
	0.30	0.80	62%					
	0.35	0.76	69%					
Red Grouper	0.15	0.61	11% (6-15)	Catch Curve	0.21 (-65%)	0.15 (-75%)	26"	28"
	0.20	0.56	16% (10-20)		0.28 (-50%)	0.17 (-76%)	24"	26"
	0.25	0.50	22% (15-27)		0.35 (-30%)	0.23 (-55%)	22"	24"
	0.30	0.45	29% (21-35)		0.43 (- 5%)	0.27 (-40%)	17"	22"
Black Grouper	0.10	0.65	5% (0.25-11)	Catch Curve	0.13 (-80%)	?	39"	42"
	0.15	0.60	10% (0.58-15)		0.18 (-70%)	0.12 (-80%)	33"	36"
	0.20	0.54	15% (1-20)		0.25 (-53%)	0.17 (-68%)	28"	32"
	0.25	0.49	21% (3-26)		0.29 (-40%)	0.20 (-60%)	24"	28"

Species	M	Full F	Most Recent Static SPR	Analysis Type	F to obtain 30% SPR	F to obtain 40% SPR	Minimum size for 30% SPR	Minimum size for 40% SPR
Snowy Grouper	0.10 0.15 0.20 0.25	0.40 0.33 10% (2-17) 19% (6-26) 0.19	5% (1-11) 0.48 32% (13-38)	Catch Curve 0.13 (-60%) 0.17 (-35%) 0.14 (-24%)	0.11 (-72%) 0.10 (-70%) 0.12 (-53%) 0.14 (-24%)	0.07 (-82%) 0.10 (-80%) 0.13 (-70%) 0.14 (-65%)	32" 28" 24" 22"	35" 31" 26" 22"
Speckled Hind	0.10 0.15 0.20 0.25	0.52 0.48 5% (2-13) 9% (3-18) 13% (6-22)	3% (1-10) 0.43 32% (18-41)	Catch Curve 0.14 (-70%) 0.17 (-60%) 0.20 (-50%)	0.13 (-75%) 0.10 (-80%) 0.13 (-70%) 0.14 (-65%)	?	27" 24" 22" 19"	29" 26" 24" 22"
Yellowedge Grouper	0.10 0.15 0.20 0.25	0.25 0.20 48% (30-58) 64% (44-72) 0.11	32% (18-41) 0.15 78% (60-83)	Catch Curve 0.17 (-33%)	0.17 (-33%)		26"	
Tilefish			100% mature Age-4 (Age-8)					
	0.10 0.15	0.29 0.22	27% (20%) 43% (34%)	Catch Curve 0.23 (-20%) [0.17 (-40%)]	0.15 (-50%) [0.12 (-60%)]	20" [22"]	23" [24"]	[20"]
	0.20 0.25	0.16 0.11	61% (51%) 76% (67%)		[0.18 (-20%)]			

Vermilion Snapper:

Manooch, C.S., III, J.C. Potts, D.S. Vaughan, and M.L. Burton 1998. Population assessment of the vermilion snapper, *Rhomboipterus aurorubens*, from the southeastern United States. NOAA Technical Memorandum NMFS-SEFSC-411, 59p.

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Manooch, C.S., III, J.C. Potts, D.S. Vaughan, and M.L. Burton 1998. Population assessment of the red snapper from the southeastern United States. Fisheries Research 38:19-32.

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Manooch, C.S., III, J.C. Potts, M.L. Burton, and P.J. Harris. 1998. Population assessment of the scamp, *Mycteroperca phenax*, from the southeastern United States. NOAA Technical Memeorandum NMFS-SEFSC-410, 57p.

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Vaughan, D.S., M.R. Collins, B. Zhao, and H.S. Meister. 1996. Population characteristics of the black sea bass *Centropristes striata* from the U.S. southern Atlantic coast. Report to the South Atlantic Fishery Management Council, October 29, 1996.

Gag:

Potts, J. C., and C. S. Manooch, III. 1998. Population assessment of the gag, *Mycteroperca microlepis*, from the southeastern United States. Report to the South Atlantic Fishery Management Council, November 1998, 73p.

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Potts, J. C. 2000. Population assessment of two stocks of white grunt, *Haemulon plumieri*, from the southeastern coast of the United States. NOAA Technical Memorandum NMFS-SEFSC-442, 67p.

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Legault, C. M., and S. C. Turner. 1999. Stock assessment analyses on Atlantic greater amberjack. Report to the South Atlantic Fishery Management Council, July 1999, 32p.

Red Porgy:

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Hood, P.B., and A.K. Johnson. 1997. A study of the age structure, growth, maturity schedules and fecundity of gray triggerfish (*Balistes capriscus*), red porgy (*Pagrus pagrus*), and vermilion snapper (*Rhomboplites aurorubens*) from the eastern Gulf of Mexico. MARFIN Final Report FO499-95-F, September 24, 1997.

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Wyanski, D.M., D.B. White, and C.A. Barans. 2000. Growth, population age structure, maturity, and spawning of snowy grouper, *Epinephelus niveatus*, off the Carolinas, USA. Fishery Bulletin 98(1):199-218.

Red Grouper:

Stiles, T.C., and M.L. Burton. 1994. Age, growth, and mortality of red grouper, *Epinephelus morio*, from the southeastern U.S. Proceedings of the 43rd Gulf and Caribbean Fisheries Institute, 123-137.

Moe, M.A. 1969. Biology of the red grouper, *Epinephelus morio*, from the eastern Gulf of Mexico. Fla. Dept. Natur. Resour. Mar. Res. Lab. Prof. Pap. Ser. 10. 95p.

Vaughan, D.S., and M.L. Burton. 1994. Estimation of von Bertalanffy growth parameters in the presence of size-selective mortality: a simulated example with red grouper. Transaction of the American Fisheries Society, 123:1-8.

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Crabtree, R. E., and L. H. Bullock. 1998. Age, growth, and reproduction of black grouper, *Mycteroperca bonaci*, in Florida waters. Fishery Bulletin 96(4):735-753.

Speckled Hind:

- Matheson, R.H., and G.R. Huntsman. 1984. Growth, mortality, and yield-per-recruit models for speckled hind and snowy grouper from the United States South Atlantic Bight. *Transactions of the American Fisheries Society*, 113:607-616.
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- Brule T., T. Colas-Marrufo, A. Tuz-Sulub, and C. Deniel. 2000. Evidence for protogynous hermaphroditism in the serranid fish *Epinephelus flavolimbatus* (Perciformes: Serranidae) from the Campeche Bank in the southern Gulf of Mexico. 66(2):513-521.
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- Bullock, L. H., M. F. Godcharles, and R. E. Crabtree. 1996. Reproduction of yellowedge grouper, *Epinephelus flavolimbatus*, from the eastern Gulf of Mexico. *Bulletin of Marine Science* 59(1):216-224.
- Keener, P. Undated. Age, growth, and reproductive biology of the yellowedge grouper, *Epinephelus flavolimbatus* (Pisces: Serranidae), off the southeastern coast of the United States. Unpublished SCDNR Report.

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- Harris, M. J., and G. D. Grossman. 1985. Growth, mortality, and age composition of a lightly exploited tilefish substock off Georgia. *Transactions of the American Fisheries Society* 114:837-846.
- Erickson, D. L., and G. D. Grossman. 1986. Reproductive demography of tilefish from the South Atlantic Bight with a test for the presence of protogynous hermaphroditism. *Transactions of the American Fisheries Society* 115:279-285.
- Grimes, C. B., C. F. Idelberger, K. W. Able, and S. C. Turner. 1988. The reproductive biology of tilefish, *Lopholatilus chamaeleonticeps* Goode and Bean, from the United States Mid-Atlantic Bight, and the effects of fishing on the breeding system. *Fishery Bulletin* 86(4):745-761.