

South Carolina Department of Natural Resources State Finfish Survey (SFS)

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Addendum added



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**South Carolina Department of Natural Resources State Finfish Survey (SFS)**

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**Abstract:**

The State Finfish Survey (SFS) collects finfish intercept data in South Carolina through a non-random intercept survey at public boat landings along the SC coast. The SFS focuses on known productive sample sites and targets primarily private boat mode. The survey is conducted year-round (January- December) using a questionnaire and interview procedure similar to those of MRFSS. This report is a summary of the catch, disposition, and size information collected through this survey from 1988 – 2010.

**Background:**

Implemented in 1988, the State Finfish Survey (SFS) was designed to address specific data gaps, within the MRFSS, as identified by SCDNR staff. These data gaps included the lack of length data from species of concern to the SCDNR and the lack of seasonal and area-specific catch frequencies. Another concern was the lack of catch and effort data from private boat anglers, which make up a majority of the angling trips in South Carolina coastal waters. These data gaps were initially addressed by interviewing inshore anglers targeting red drum and spotted seatrout at specific sample locations. Since 2002, more emphasis has been placed on acquiring length data from all finfish retained by anglers, canvassing at additional sampling locations, and interviewing all private fishing boats within all SC coastal areas. Broadening the scope of the survey may decrease some of the bias associated with the previous SFS protocol.

**SFS Protocol and Design:**

Sampling is conducted at public and selected private (with owner's permission) boat landings from January through December using a questionnaire and interview protocols similar to those of the MRFSS. However, the SFS questionnaire focuses on vessel surveys rather than individual angler surveys and primarily targets private boats. Interviews are obtained from cooperative anglers at each sampling site. If an angler is unwilling to participate; they can decline to be interviewed. Assigned Creel Clerks interview as many anglers as time allows at any given site.

The sampling schedule is determined by "needs assessments" of the SCDNR Marine Resources Division and creel clerks. Individual Creel Clerks are assigned to a sampling region and will determine their daily sampling schedules based on local conditions (i.e. weather, landing closures, or events), additional job duties, and research and management initiatives. Attempts are made to assess all sampling sites equally, and individual creel clerks randomly rotate between all sampling locations within their region. Creel clerks will remain at landings with fishing activity. If landings have little or no fishing activity creel clerks will move on to alternative sampling locations in close proximity.

Data collected for the SFS questionnaire include:

- 1) Mode fished (i.e. private, charter, shore)
- 2) Specific body of water fished
- 3) Area fished (inshore, 0-3 miles, > 3 miles)
- 4) Utilization of artificial reef/reef name
- 5) Resident county of boat owner
- 6) Species targeted
- 7) Number of anglers participating on the vessel
- 8) Amount of time spent fishing for the trip
- 9) Expense of the trip (all anglers)
- 10) Angling trips the previous year, average of all anglers participating
- 11) Catch and disposition by species (includes both landed and released fish)
- 12) Length measurements obtained, with anglers permission, for retained species;  
1988 – March 2009: length measurements mid-line length (ML)  
April 2009 – 2011: length measurements total length (TL)

Intercept data are coded and key entered into an existing Access database. Queries are used to look for and correct anomalous data and a component of the database records are checked against the raw intercept forms.

**Cobia Data Summary:**

SFS creel clerks conduct interviews primarily at public boat landings and typically intercept anglers targeting inshore species. Prior to any analyses, all interviews of fishing parties participating in cobia fishing tournaments (or fishing parties assumed to be participating in cobia fishing tournaments) were removed to account for any biases. (From 2008, 2009, and 2011 a total of 33 interviews with 48 length measurements were removed from the dataset). From 1988-2011 a total of 452 fishing parties were interviewed where cobia were caught, representing between 0.06% - 3.09% of the total number of interviews in each year. A total of 700 cobia were caught by fishing parties interviewed through the SFS survey from 1988-2011. Of those fish, a total of 423 were harvested and 363 length measurements were obtained. All length measurements taken in 2009 – 2011 were total length measurements. These measurements were converted to fork length measurements using the following equation derived from data collected by SCDNR staff:

$$FL = 10.784 + 0.8778TL \quad (N = 1402, R^2 = 0.98)$$

Table 1. Annual number of SCDNR State Finfish Survey interviews, number of interviews with cobia catch by mode, and percentage of total interviews with cobia catch.

Year	Total # of Interviews	Total # Interviews With Cobia Catch	# of Charter Interviews With Cobia Catch	# of Private Boat Interviews With Cobia Catch	# of Shore Interviews With Cobia Catch	% Interviews with Cobia Catch
1988	165	4	1	3	0	2.42%
1989	151	0	0	0	0	0.00%
1990	284	0	0	0	0	0.00%
1991	706	1	0	1	0	0.14%
1992	568	3	0	3	0	0.53%
1993	2369	3	0	3	0	0.13%
1994	548	0	0	0	0	0.00%
1995	552	0	0	0	0	0.00%
1996	1712	1	0	1	0	0.06%
1997	1080	5	0	5	0	0.46%
1998	1669	14	0	13	1	0.84%
1999	2303	26	0	26	0	1.13%
2000	1968	10	0	10	0	0.51%
2001	1983	9	0	9	0	0.45%
2002	2246	27	0	27	0	1.20%
2003	2829	29	2	27	0	1.03%
2004	2995	31	1	29	1	1.04%
2005	2297	39	0	39	0	1.70%
2006	2377	35	0	35	0	1.47%
2007	2286	55	0	55	0	2.41%
2008	2391	74	0	74	0	3.09%
2009	1995	45	0	45	0	2.26%
2010	1876	15	0	15	0	0.80%
Total	37350	426	4	420	2	1.14%

Table 2. Annual number of cobia caught by disposition from fishing parties interviewed through the SCDNR State Finfish Survey, all modes combined.

<b>Year</b>	<b>Total Cobia Caught</b>	<b>Cobia Caught and Released (illegal)</b>	<b>Cobia Caught and Released (legal)</b>	<b>Cobia Kept to Eat</b>
1988	4	0	1	3
1989	0	0	0	0
1990	0	0	0	0
1991	1	0	1	0
1992	4	0	0	4
1993	3	1	0	2
1994	0	0	0	0
1995	0	0	0	0
1996	2	0	0	2
1997	5	1	1	3
1998	17	5	1	11
1999	54	9	14	31
2000	11	7	0	4
2001	9	0	1	8
2002	32	7	2	23
2003	31	9	4	18
2004	43	24	3	16
2005	48	27	0	21
2006	41	21	1	19
2007	116	36	0	80
2008	151	45	6	100
2009	69	22	1	46
2010	18	8	0	10
<b>Total</b>	<b>659</b>	<b>222</b>	<b>36</b>	<b>401</b>

Table 3. SCDNR State Finfish Survey number of cobia measured (total and by mode), mean length, standard deviation of length, and minimum and maximum size range (all modes combined). No length measurements were recorded during 1997. \*All ML data from 2009 and 2010 were calculated from TL using the equation:  $FL = 10.784 + 0.8778TL$  where FL is assumed to be equal to ML.

Year	Number of Cobia Measured	Number of fish measured by mode			Mean Mid-Line Length (mm)	SD Mid-Line Length (mm)	Minimum Mid-Line Length (mm)	Maximum Mid-Line Length (mm)
		Charter	Private	Shore				
1988	3		3		916.7	76.9	865	1005
1989	0							
1990	0							
1991	0							
1992	4		4		1122.5	146.5	986	1305
1993	2		2		600.5	340.1	360	841
1994	0							
1995	0							
1996	2		2		1496.0	33.9	1472	1520
1997	0							
1998	11		10	1	994.2	220.9	463	1260
1999	31		31		1002.6	85.9	912	1418
2000	4		4		917.3	52.7	878	995
2001	8		8		1010.3	59.8	935	1135
2002	22		22		1048.1	126.3	865	1255
2003	14	1	13		926.4	167.6	580	1349
2004	16	1	15		968.3	188.8	835	1452
2005	21		21		908.7	42.1	830	1000
2006	18		18		982.0	163.6	845	1502
2007	80		80		909.2	50.3	810	1060
2008	64		64		957.7	129.5	410	1350
2009*	33		33		905.7	138.9	717	1332
2010*	10		10		834.8	72.7	757	972
Total	343	2	340	1				

**Spanish Mackerel Data Summary:**

SFS creel clerks conduct interviews primarily at public boat landings and typically intercept anglers targeting inshore species. From 1988-2011 a total of 742 fishing parties were interviewed where Spanish Mackerel were caught, representing between 0.18% - 11.52% of the total number of interviews in each year. A total of 3,684 Spanish Mackerel were caught by fishing parties interviewed through the SFS survey from 1988-2011. Of those fish, a total of 2,411 were harvested (plus 46 harvested for use as bait) and 1,414 length measurements were obtained.

Table 1. Annual number of SCDNR State Finfish Survey interviews, number of interviews with Spanish Mackerel catch by mode, and percentage of total interviews with Spanish Mackerel catch.

Year	Total # of Interviews	Total # Interviews With S. Mackerel Catch	# of Charter Interviews With S. Mackerel Catch	# of Private Boat Interviews With S. Mackerel Catch	# of Shore Interviews With S. Mackerel Catch	% Interviews With S Mackerel Catch
1988	165	19	14	5	0	11.52%
1989	151	10	7	3	0	6.62%
1990	284	2	0	1	1	0.70%
1991	706	20	0	19	1	2.83%
1992	568	3	0	3	0	0.53%
1993	2369	45	1	44	0	1.90%
1994	548	3	0	3	0	0.55%
1995	552	1	0	1	0	0.18%
1996	1712	25	0	25	0	1.46%
1997	1080	22	1	21	0	2.04%
1998	1669	35	1	34	0	2.10%
1999	2303	64	16	48	0	2.78%
2000	1968	66	8	58	0	3.35%
2001	1983	33	1	32	0	1.66%
2002	2246	44	1	43	0	1.96%
2003	2829	44	1	42	1	1.56%
2004	2995	49	0	49	0	1.64%
2005	2297	32	1	31	0	1.39%
2006	2377	35	4	31	0	1.47%
2007	2286	27	1	26	0	1.18%
2008	2391	52	1	51	0	2.17%
2009	1995	53	0	53	0	2.66%
2010	1876	41	0	41	0	2.19%
Total	37350	725	58	664	3	1.94%

Table 2. Annual number of Spanish Mackerel caught by disposition from fishing parties interviewed through the SCDNR State Finfish Survey, all modes combined.

<b>Year</b>	<b>Total S Mackerel Caught</b>	<b>S Mackerel Caught and Released (legal)</b>	<b>S Mackerel Caught and Released (illegal)</b>	<b>S Mackerel Kept To Eat</b>	<b>S Mackerel Kept For Bait</b>	<b>S Mackerel Thrown Back Dead</b>
1988	67	3	0	63	0	1
1989	93	1	0	92	0	0
1990	2	1	0	1	0	0
1991	71	0	0	71	0	0
1992	10	0	0	10	0	0
1993	159	0	16	143	0	0
1994	11	0	1	10	0	0
1995	4	0	0	4	0	0
1996	225	19	65	141	0	0
1997	173	0	11	162	0	0
1998	121	18	22	81	0	0
1999	494	191	38	261	4	0
2000	337	58	73	198	8	0
2001	256	3	43	210	0	0
2002	321	95	35	176	15	0
2003	158	24	26	108	0	0
2004	270	33	51	171	15	0
2005	115	14	25	72	4	0
2006	77	21	5	51	0	0
2007	55	17	5	33	0	0
2008	191	57	25	109	0	0
2009	226	11	100	115	0	0
2010	218	0	99	119	0	0
<b>Total</b>	<b>3654</b>	<b>566</b>	<b>640</b>	<b>2401</b>	<b>46</b>	<b>1</b>



Table 3. SCDNR State Finfish Survey number of Spanish Mackerel measured (total and by mode), mean length, standard deviation of length, and minimum and maximum size range (all modes combined). No length measurements were recorded during 1997. In April 2009 SCDNR staff began measuring total length (TL) as opposed to mid-line length (ML). No Spanish Mackerel were measured in 2009 prior to April, so there was no need to split that year's measurement summary by length type.

Year	Number of Spanish Mackerel Measured	Number of fish measured by mode			Length Measured	Mean Length (mm)	SD Length (mm)	Minimum Length (mm)	Maximum Length (mm)
		Charter	Private	Shore					
1988	44	42	2		ML	409.5	57.0	315	575
1989	57	56	1		ML	406.4	66.8	270	595
1990	1			1	ML	310.0		310	310
1991	66		66		ML	456.8	113.3	317	721
1992	10		10		ML	438.8	118.7	320	702
1993	103	8	95		ML	445.5	99.5	239	805
1994	10		10		ML	342.2	11.6	324	363
1995	4		4		ML	410.0	23.6	380	433
1996	132		132		ML	425.4	48.2	333	622
1997					ML				
1998	63	24	39		ML	426.5	87.8	278	635
1999	183	61	122		ML	385.9	81.9	285	781
2000	140	11	129		ML	399.5	72.1	307	628
2001	66		66		ML	413.6	65.0	307	530
2002	80		80		ML	439.9	62.0	332	610
2003	36	1	33	2	ML	430.7	96.2	315	765
2004	32		32		ML	466.4	125.8	325	700
2005	24		24		ML	431.6	85.1	325	624
2006	25		25		ML	399.9	72.0	330	570
2007	33		33		ML	411.7	51.0	307	567
2008	70		70		ML	408.8	72.1	285	624
2009	115		115		TL	406.9	83.8	306	650
2010	109		109		TL	401.3	77.3	283	682
Total	1403	203	1197	3					

## South Carolina Department of Natural Resources State Finfish Survey (SFS)

ADDENDUM: 2/23/2012

The SFS length data has been updated to include 2011 data. Additionally total length to fork length equations were developed for cobia and Spanish mackerel at the SEDAR 28 data workshop. SFS length data from 2009-2011 for Spanish mackerel and cobia were converted from TL to FL using these equations. (See text below for the detailed conversion equations.)

### **Cobia Data Summary:**

SFS creel clerks conduct interviews primarily at public boat landings and typically intercept anglers targeting inshore species. Prior to any analyses, all interviews of fishing parties participating in cobia fishing tournaments (or fishing parties assumed to be participating in cobia fishing tournaments) were removed to account for any biases. (From 2008, 2009, and 2011 a total of 33 interviews with 48 length measurements were removed from the dataset). From 1988-2011 a total of 452 fishing parties were interviewed where cobia were caught, representing between 0.06% - 3.09% of the total number of interviews in each year. A total of 700 cobia were caught by fishing parties interviewed through the SFS survey from 1988-2011. Of those fish, a total of 423 were harvested and 360 length measurements were obtained. All length measurements taken in 2009 – 2011 were total length measurements. These measurements were converted to fork length measurements using the following conversion equation derived for the South Atlantic stock from the SEDAR 28 data workshop:

$$FL = 13.52399 + 0.87867TL \text{ (N = 4635, } R^2 = 0.9855\text{)}$$

Table 3. SCDNR State Finfish Survey number of cobia measured (total and by mode), mean length, standard deviation of length, and minimum and maximum size range (all modes combined). No length measurements were recorded during 1997. Total length measurements from 2009-2011 were converted to fork length using the following equation developed for the South Atlantic stock from the SEDAR 28 data workshop:  $FL = 13.52399 + 0.87867TL$  ( $N = 4635$ ,  $R^2 = 0.9855$ )

Year	Number of Cobia Measured	Number of fish measured by mode			Mean Fork Length (mm)	SD Fork Length (mm)	Minimum Fork Length (mm)	Maximum Fork Length (mm)
		Charter	Private	Shore				
1988	3		3		916.7	76.9	865	1005
1989	0							
1990	0							
1991	0							
1992	4		4		1122.5	146.5	986	1305
1993	2		2		600.5	340.1	360	841
1994	0							
1995	0							
1996	2		2		1496.0	33.9	1472	1520
1997	0							
1998	11		10	1	994.2	220.9	463	1260
1999	31		31		1002.6	85.9	912	1418
2000	4		4		917.3	52.7	878	995
2001	8		8		1010.3	59.8	935	1135
2002	22		22		1048.1	126.3	865	1255
2003	14	1	13		926.4	167.6	580	1349
2004	16	1	15		968.3	188.8	835	1452
2005	21		21		908.7	42.1	830	1000
2006	18		18		982.0	163.6	845	1502
2007	80		80		909.2	50.3	810	1060
2008	64		64		957.7	129.5	410	1350
2009	33		33		909.2	139.0	720	1336
2010	10		10		838.3	72.7	760	976
2011	17	1	16		814.5	33.9	770	886
Total	360	3	356	1				

**Spanish Mackerel Data Summary:**

SFS creel clerks conduct interviews primarily at public boat landings and typically intercept anglers targeting inshore species. From 1988-2011 a total of 742 fishing parties were interviewed where Spanish Mackerel were caught, representing between 0.18% - 11.52% of the total number of interviews in each year. A total of 3,684 Spanish Mackerel were caught by fishing parties interviewed through the SFS survey from 1988-2011. Of those fish, a total of 2,411 were harvested (plus 46 harvested for use as bait) and 1,413 length measurements were obtained. All length measurements taken in 2009 – 2011 were total length measurements. These measurements were converted to fork length measurements using the following equation derived for the combined South Atlantic and Gulf stocks from the SEDAR 28 data workshop:

$$FL = -11.8218 + 0.8816TL \text{ (} N = 20288, R^2 = 0.9886 \text{)}$$

Table 6. SCDNR State Finfish Survey number of Spanish Mackerel measured (total and by mode), mean length, standard deviation of length, and minimum and maximum size range (all modes combined). No length measurements were recorded during 1997. Total length measurements from 2009-2011 were converted to fork length using the following equation developed for the combined South Atlantic and Gulf stocks at the SEDAR 28 data workshop:  $FL = -11.8218 + 0.8816TL$  ( $N = 20288$ ,  $R^2 = 0.9886$ ).

Year	Number of Spanish Mackerel Measured	Number of fish measured by mode			Mean Fork Length (mm)	SD Fork Length (mm)	Minimum Fork Length (mm)	Maximum Fork Length (mm)
		Charter	Private	Shore				
1988	44	42	2		409.5	57.0	315	575
1989	57	56	1		406.4	66.8	270	595
1990	1			1	310.0		310	310
1991	66		66		456.8	113.3	317	721
1992	10		10		438.8	118.7	320	702
1993	103	8	95		445.5	99.5	239	805
1994	10		10		342.2	11.6	324	363
1995	4		4		410.0	23.6	380	433
1996	132		132		425.4	48.2	333	622
1997								
1998	63	24	39		426.5	87.8	278	635
1999	183	61	122		385.9	81.9	285	781
2000	140	11	129		399.5	72.1	307	628
2001	66		66		413.6	65.0	307	530
2002	80		80		439.9	62.0	332	610
2003	36	1	33	2	430.7	96.2	315	765
2004	32		32		466.4	125.8	325	700
2005	24		24		431.6	85.1	325	624
2006	25		25		399.9	72.0	330	570
2007	33		33		411.7	51.0	307	567
2008	70		70		408.8	72.1	285	624
2009	115		115		346.8	73.8	258	561
2010	109		109		341.9	68.2	238	589
2011	10		10		342.1	84.3	291	573
Total	1413	203	1207	3				