Estimating the age composition of the MRFSS estimated landings for red drum along the Atlantic coast.

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Length composition

The Marine Recreational Fisheries Statistics Survey provides estimates of the number of red drum caught by anglers that were available for inspection (Type A), the numbers that were caught and killed but were not available (Type B1), and the number of red drum that the angler indicated were released alive (Type B2). When feasible, the fish in the Type A category are measured for length (midline or fork length in red drum) and weighed (Table 1). Additional red drum length data from the identifiable catch of red drum were provided by the Georgia carcass recovery program (1999-2007) and the South Carolina sportfishing survey (1991-2007). All lengths were converted to total length using the length-length relations reported in the SEDAR 18 DW report.

The length samples of red drum need to be weighted or expanded to reflect the estimated number of Type A red drum within each strata of the MRFSS survey. Strata included in the sampling design are: state, year, wave (2-month period), and fishing mode (shore-based, partyboat, charterboat, party/charterboat, and private/rental boat). During the angler interview an additional stratum is identified: area fished (inshore, ocean in state waters, ocean in federal waters). These strata were identified for each sample from the South Carolina survey. For the carcass recovery data from Georgia it was assumed that the mode of fishing was private/rental boat and the area fished was inshore. The difficulty encountered in expanding the length data is the sparse sampling for some strata, though often these strata have low estimates of fish caught also. A hierarchical pooling scheme was developed to objectively assign length samples to strata when data pooling was required. As a first step, all individual strata with at least 20 length measurements were expanded to the strata estimate directly. For strata with inadequate length samples, the catch estimate and length frequencies were pooled across boat-based fishing modes (charter boat/partyboat/private/rental boat) while maintaining the other strata identification, i.e., state, year, wave, area fished. Those with pooled length samples of at least 20 were expanded to the strata's estimated catch. This continued using the same criteria to accept the length sample as adequate (at least 20 length measurements) by sequentially adding an additional level of pooling : 1) all ocean strata (ocean in state waters/ocean in federal waters), then 2) collapse waves to seasons (January-June, July-December), then 3) all states within a region as long as the size limit management is the same within that region that year, and then 4) region/management as in (3) but for all data that year, without regard to the collapsed fishing mode, area fished or seasonal strata. To assign lengths to the remaining estimates, data were pooled within a region/ management block across years, or were manual assigned if there were no length data for an estimate after this entire process was conducted. The pooling required in the southern region was mostly through the seasonal sequential pooling steps with much of the catch assigned using unpooled strata-specific length frequencies, especially in Georgia and South

Carolina (Table 2). Regional pooling within each year also contributed to 15% of the 1982-2007 Florida catch assignment. In the northern region, most of the pooling was regional for assigning length frequencies to the Virginia-Delaware catch, with more seasonal pooling in North Carolina.

A standard MRFSS length frequency expansion provides an alternative set of length frequency data for red drum catch. These do not incorporate the additional length data made available by the Georgia carcass recovery program or the South Carolina sportfishing survey. Inspection of the length frequencies for the most recent three years in Florida, Georgia, South Carolina, and North Carolina shows close correspondence between the two expansion methods although the MRFSS expansion appears to consistently indicate a lower portion of the catch below about 18 inches and a larger portion of the catch between 23 and 27 inches when compared to the sequential pooling scheme method (Fig. 1)

Age composition

The length frequencies developed from MRFSS data were converted to ages using age-length keys derived from available age-length data. These data were not exclusively collected from fish sampled from the recreational landings but also included red drum sampled for length and age from scientific surveys and commercial landings (?). Age-length keys had the dimensions of integer inch total length ($5\text{-}50^{+}$) and model age ($1\text{-}10^{+}$). Annual age-length keys were developed by state when their were at least about 300 age-length data pairs available, otherwise within-state keys were developed from data collected across a group of years (Table 3). In the northern region, age-length data were combined across states each year because of the reduced level of estimated catch and age-length sampling north of North Carolina. Besides pooling across years when annual keys were not available, the extremes in the range of lengths were often undersampled for ages so some *ad hoc* across-year pooling was required, especially for fish greater than 35" TL or those less than 10" TL. Many of these fish were in the 10^{+} age group or the age 1 group, respectively.

The estimated age composition for the MRFSS seen catch estimates were assumed to reflect the relative age composition for the unseen harvest (Type B1) also. Therefore these were added proportionately to the seen catch age composition to provide the age composition of the annual red drum landings (Table 4).

Table 1. Annual length-frequency (inches total length) samples for red drum measured during the MRFSS, the South Carolina sport fishing survey (1991-2007), and the Georgia carcass recovery program (1999-2007).

Florida

"TL	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	1	1	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	3	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	4	2	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	2	13	15	8	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
12	6	29	23	11	0	0	0	1	1	0	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0
13	16	26	35	8	5	2	0	2	0	0	7	2	2	1	1	4	0	0	0	1	0	0	0	0	0	1
14	16	6	18	16	6	6	1	0	1	1	0	1	10	0	22	7	1	0	0	0	1	0	0	3	0	0
15	9	11	16	4	6	0	0	0	0	0	0	0	0	0	2	0	1	1	0	0	0	0	0	2	0	0
16	15	24	17	4	2	1	0	0	0	0	1	0	1	0	1	0	0	1	0	2	0	0	2	2	0	1
17	1	14	9	1	0	0	0	0	0	1	0	1	0	0	1	0	2	4	3	3	2	0	1	4	1	4
18	3	2	7	2	3	1	0	0	0	0	2	4	3	3	6	0	7	12	16	8	8	6	7	7	9	10
19	2	0	5	1	7	1	0	1	0	4	1	7	6	4	3	1	9	16	15	14	19	18	18	20	18	16
20	4	1	1	0	4	0	0	1	0	3	2	5	7	4	4	4	9	26	18	35	12	19	23	22	28	16
21	1	3	0	0	8	2	0	4	0	6	8	6	8	10	8	6	14	21	29	26	20	23	26	25	33	33
22	0	1	0	2	1	0	0	0	2	2	7	6	8	9	11	6	15	22	36	33	26	20	23	30	24	23
23	0	3	3	0	6	1	0	2	0	2	4	5	6	8	9	6	12	45	45	40	23	25	18	21	22	28
24	3	1	0	0	2	1	0	0	4	3	4	7	11	6	7	5	10	32	39	30	20	34	20	33	26	23
25	2	2	1	0	3	2	0	1	0	4	1	2	4	9	10	0	13	26	24	33	25	29	18	23	22	20
26	0	1	0	1	2	1	0	0	1	6	6	5	8	8	8	7	11	19	27	27	26	21	15	10	17	20
27	0	2	0	0	3	1	0	1	8	7	4	5	13	9	13	1	7	3	13	21	16	15	10	10	9	6
28	1	2	7	2	3	0	0	1	1	8	2	5	7	7	8	3	6	1	2	5	4	0	1	2	4	1
29	1	3	1	0	2	1	0	0	0	0	1	3	1	1	0	4	1	1	0	1	1	1	0	0	1	1
30+	6	4	7	1	1	2	0	1	0	0	3	2	3	2	0	5	0	0	0	0	0	0	0	0	0	0
Tot	102	151	178	65	64	22	2	15	18	47	56	67	100	81	114	59	119	230	267	279	203	211	182	215	214	203

Table 1 (con't). Annual length-frequency (inches total length) samples for red drum measured during the MRFSS, the South Carolina sport fishing survey (1991-2007), and the Georgia carcass recovery program (1999-2007).

Georgia

"TL	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1	2	3	16	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
10	1	4	17	80	5	9	1	0	1	1	0	0	0	1	0	2	0	0	0	0	0	2	0	0	1	0
11	0	14	41	145	13	8	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
12	1	9	72	137	14	33	1	3	4	0	1	0	1	0	0	2	2	1	0	1	0	0	2	1	0	0
13	5	15	40	119	21	39	4	8	4	0	1	3	0	14	4	8	6	4	2	4	5	2	7	6	4	8
14	4	20	10	61	38	96	20	10	3	11	31	22	35	17	12	36	65	48	22	42	16	43	18	96	32	127
15	4	28	5	51	43	129	65	34	15	15	49	29	36	39	12	55	64	78	24	52	54	72	40	138	78	166
16	4	9	7	43	41	61	50	32	26	25	28	17	44	24	25	41	81	62	52	57	94	114	110	134	97	131
17	1	3	3	36	35	27	26	28	5	0	27	6	12	10	9	29	54	52	58	37	103	111	116	77	58	66
18	1	1	5	34	30	14	18	11	3	5	6	5	4	9	4	8	27	30	29	16	61	102	53	30	30	24
19	0	0	6	16	11	9	8	5	1	3	0	4	2	1	1	2	16	11	7	5	31	59	32	19	10	18
20	0	0	3	7	12	12	6	3	2	5	2	1	3	2	1	6	13	14	11	3	26	33	26	14	12	7
21	1	0	1	6	4	8	4	6	0	0	4	1	4	0	0	3	12	9	8	6	24	37	32	17	6	9
22	0	0	1	3	3	7	5	2	0	0	5	5	5	3	4	10	5	6	5	6	10	39	35	14	6	8
23	0	0	1	2	5	10	2	6	1	0	5	1	4	3	2	8	4	10	7	9	9	29	9	7	6	4
24	0	1	1	5	3	5	3	5	0	0	6	2	4	2	2	4	9	4	18	4	5	9	5	0	3	2
25	0	0	0	1	1	6	2	1	0	1	2	1	1	3	1	6	9	1	8	6	3	1	0	0	1	1
26	0	0	0	2	3	3	2	1	1	0	4	4	3	1	0	7	3	0	5	8	1	1	0	0	0	0
27	0	1	2	0	1	2	1	0	2	1	0	2	0	1	0	8	0	0	7	5	0	1	1	0	0	0
28	0	0	0	2	0	4	1	1	3	0	1	3	1	1	0	4	2	1	4	1	0	0	0	0	0	0
29	0	0	0	0	0	2	2	0	2	0	2	2	0	1	1	3	0	0	0	0	3	0	0	0	0	0
30+	1	0	0	2	0	3	1	1	3	0	2	2	0	0	0	4	0	0	0	1	0	0	0	0	0	0
Tot	24	108	218	769	284	488	222	159	76	68	176	110	160	132	78	246	372	332	267	263	445	655	486	553	344	572

Table 1 (con't). Annual length-frequency (inches total length) samples for red drum measured during the MRFSS, the South Carolina sport fishing survey (1991-2007), and the Georgia carcass recovery program (1999-2007).

South Carolina

"TL	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
7	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	2	2	0	0	0	2	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	1	1
9	7	0	2	1	1	0	1	0	1	2	1	2	0	0	0	0	5	0	0	0	0	0	0	0	3	0
10	9	0	1	2	1	3	1	0	0	2	1	0	0	0	0	1	3	0	1	0	0	1	0	1	5	0
11	9	1	3	20	3	7	1	2	0	7	1	0	3	1	0	1	0	1	0	0	0	1	0	0	2	0
12	13	2	4	8	4	34	4	2	3	20	9	14	0	0	1	2	1	0	1	0	3	2	2	0	0	0
13	12	8	7	13	9	61	10	9	1	43	21	22	6	7	9	11	16	20	3	2	5	0	4	2	1	2
14	10	7	7	17	7	59	26	29	5	36	108	88	50	66	109	136	92	102	75	36	35	11	13	8	15	13
15	6	4	0	8	11	47	41	23	11	61	163	115	93	110	239	184	131	156	84	134	86	108	92	55	44	72
16	2	3	9	12	11	27	40	21	18	60	122	85	42	59	214	111	87	141	45	96	113	80	106	66	52	64
17	0	1	8	5	10	6	22	11	15	10	30	44	16	34	114	47	61	69	34	45	114	56	72	73	37	41
18	2	0	10	7	4	4	8	17	3	15	25	43	20	24	167	69	54	32	38	25	103	56	74	51	27	41
19	1	0	1	6	0	1	4	15	6	17	22	48	19	20	149	44	38	40	33	16	76	48	59	45	46	36
20	1	1	1	3	2	5	3	6	7	13	19	46	10	6	106	27	49	28	31	11	49	54	54	22	25	17
21	0	4	0	1	7	6	7	6	5	8	19	11	11	6	43	20	31	16	16	10	28	57	43	19	31	31
22	0	2	0	1	0	1	6	3	2	4	13	33	11	8	51	22	32	25	23	15	37	45	64	38	44	22
23	0	1	0	1	1	7	7	10	4	5	15	23	3	13	23	10	27	19	15	5	30	50	44	32	43	10
24	0	0	0	2	1	4	4	10	8	4	11	19	4	13	14	10	29	18	17	6	3	8	31	12	9	0
25	0	2	0	0	2	5	4	6	3	3	6	18	5	7	13	4	21	12	16	3	0	3	4	2	1	0
26	0	0	0	2	2	6	1	6	5	1	8	8	8	5	5	4	24	5	5	5	0	1	3	0	0	0
27	0	0	0	3	1	1	2	4	0	3	9	10	2	6	8	6	6	1	1	1	0	0	2	1	0	0
28	0	1	0	2	0	0	1	1	2	1	2	7	1	3	2	1	0	0	1	1	0	0	0	0	0	0
29	0	0	0	0	0	3	0	5	1	1	4	2	0	1	2	0	0	0	1	0	0	0	0	0	0	0
30+	3	0	0	0	1	0	4	5	1	4	9	18	0	0	2	2	1	0	0	0	0	0	0	0	1	0
Tot	75	37	57	116	78	287	197	193	101	320	618	657	305	392	1271	712	708	685	440	411	682	581	668	427	387	350

Table 1 (con't). Annual length-frequency (inches total length) samples for red drum measured during the MRFSS, the South Carolina sport fishing survey (1991-2007), and the Georgia carcass recovery program (1999-2007).

North Carolina

"TL	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	5	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	1	0	0	1	8	0	0	0	0	0	0	2	0	2	1	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	3	1	0	0	0	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0
10	0	0	1	0	0	0	1	1	0	2	0	1	0	0	0	1	2	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	2	0	2	2	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
12	0	1	2	0	0	2	2	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
13	2	2	1	2	0	1	5	5	2	2	1	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0
14	2	1	0	0	1	4	8	16	9	3	0	3	1	3	3	1	0	2	0	0	0	0	1	0	1	0
15	2	3	0	0	1	8	9	9	11	6	1	1	0	0	6	1	0	2	0	0	0	0	0	0	2	0
16	0	0	3	1	1	10	12	5	9	9	1	5	2	3	1	0	0	2	2	1	1	0	1	0	0	0
17	0	0	1	2	0	4	7	12	9	8	3	5	3	4	5	4	1	3	1	2	1	0	0	0	0	1
18	0	0	0	1	0	2	4	4	7	33	1	9	2	23	17	2	10	11	3	8	12	4	5	3	3	1
19	1	0	0	2	1	2	3	3	3	9	0	2	5	21	9	2	25	15	10	2	25	7	6	6	10	5
20	0	0	0	0	0	1	3	4	0	5	3	4	4	18	5	0	27	14	5	1	11	6	5	5	12	6
21	0	0	0	0	0	0	2	2	1	3	2	4	7	19	5	2	65	17	7	2	2	2	4	3	5	5
22	0	0	0	0	0	1	2	3	0	1	3	13	3	16	0	2	107	14	11	4	5	8	4	7	8	2
23	0	0	0	0	0	2	1	6	1	1	8	19	4	31	7	0	104	24	11	6	5	5	1	2	10	4
24	0	0	0	0	0	0	0	10	0	1	3	13	7	40	6	1	98	28	15	13	9	3	3	14	8	10
25	0	0	0	1	0	1	5	5	1	0	8	8	12	26	8	2	41	21	21	13	6	5	5	3	4	12
26	0	1	0	0	0	0	4	5	0	2	5	6	6	7	15	0	20	25	26	8	1	9	2	3	9	15
27	1	0	0	1	0	1	1	3	1	4	1	10	7	7	8	0	9	11	12	5	2	1	2	2	2	8
28	0	0	0	1	0	0	0	1	1	1	0	2	2	7	6	3	1	8	5	6	2	1	1	0	1	2
29	0	0	0	0	0	0	1	1	1	0	0	0	1	2	2	1	0	1	1	1	0	0	0	0	3	0
30+	0	1	4	0	0	3	13	2	15	8	2	11	20	8	8	4	22	1	0	1	4	1	0	0	1	0
Tot	8	9	13	11	4	50	97	101	73	101	42	117	90	240	114	30	534	199	130	73	86	52	40	48	79	71

Table 1 (con't). Annual length-frequency (inches total length) samples for red drum measured during the MRFSS, the South Carolina sport fishing survey (1991-2007), and the Georgia carcass recovery program (1999-2007).

Virginia, Maryland, Delaware, New Jersey

"TL	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	3	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	1	1	0	4	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
13	0	3	0	0	2	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
14	0	3	0	0	2	0	0	1	0	2	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	0
15	0	1	0	0	1	0	1	3	0	4	0	0	0	1	0	1	1	0	0	0	1	0	0	0	3	0
16	0	0	0	0	4	0	0	4	0	1	1	0	0	1	0	0	0	1	2	0	2	0	0	0	5	0
17	0	0	0	0	12	0	0	3	1	2	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1
18	0	0	0	0	6	0	0	2	1	1	9	1	0	0	1	0	2	2	4	1	16	2	0	1	2	8
19	0	0	0	0	3	0	0	1	0	3	3	0	1	0	0	1	3	2	2	0	9	6	0	1	0	5
20	0	1	0	0	2	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	3	1	0	1	0	9
21	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	7
22	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	16
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	12
24	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	3	0	0	2	2	0	0	13
25	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2	2	1	0	2	0	0	0	9
26	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	1	3	1	4	0	1	0	0	4
27	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
28	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
30+	0	0	0	0	17	1	0	0	0	0	0	0	0	2	0	0	0	1	1	3	1	0	1	0	0	0
Tot	0	12	1	0	70	2	1	18	2	17	22	6	2	4	1	2	12	11	21	6	42	16	4	3	11	86

Table 2. Proportion of the 1982-2007 claimed catch (Type A) of red drum that was expanded by samples length frequencies as generated under the sequential pooling scenarios: Level 1 – lengths from state, year, wave, mode fishing, area fished strata (no pooling needed); Level 2 – lengths from state, year, wave, boat vs. shore fishing mode, area fished pooled strata; Level 3 - lengths from state, year, wave, boat vs. shore fishing mode, ocean vs. inshore area fished pooled strata, Level 4 - lengths from state, year, two-season, boat vs. shore fishing mode, ocean vs. inshore area fished pooled strata; Level 5 - lengths from across region (if size limits the same), year, two-season, boat vs. shore fishing mode, ocean vs. inshore area fished pooled strata; Level 6 - lengths from across region (if size limits the same) and year pooled strata; Level 7 - lengths from across region and across years with the same size limits pooled; and Manual – manually borrow length frequency generated for another state in the region that year.

	Florida	Georgia	South Carolina	North Carolina	Virginia	Maryland	Delaware
Level 1	45.7%	68.4%	67.7%	13.5%	3.6%	0.0%	0.0%
Level 2	5.6%	11.1%	7.8%	16.2%	1.3%	0.0%	0.0%
Level 3	4.6%	2.1%	7.1%	6.0%	0.8%	0.0%	0.0%
Level 4	21.5%	12.5%	8.3%	29.8%	20.2%	0.0%	0.0%
Level 5	7.6%	3.4%	3.6%	0.9%	30.3%	80.9%	23.4%
Level 6	15.0%	2.5%	5.6%	20.0%	34.6%	13.9%	76.6%
Level 7	0.0%	0.0%	0.0%	13.5%	3.3%	0.0%	0.0%
Manual	0.0%	0.0%	0.0%	0.3%	5.9%	5.1%	0.0%

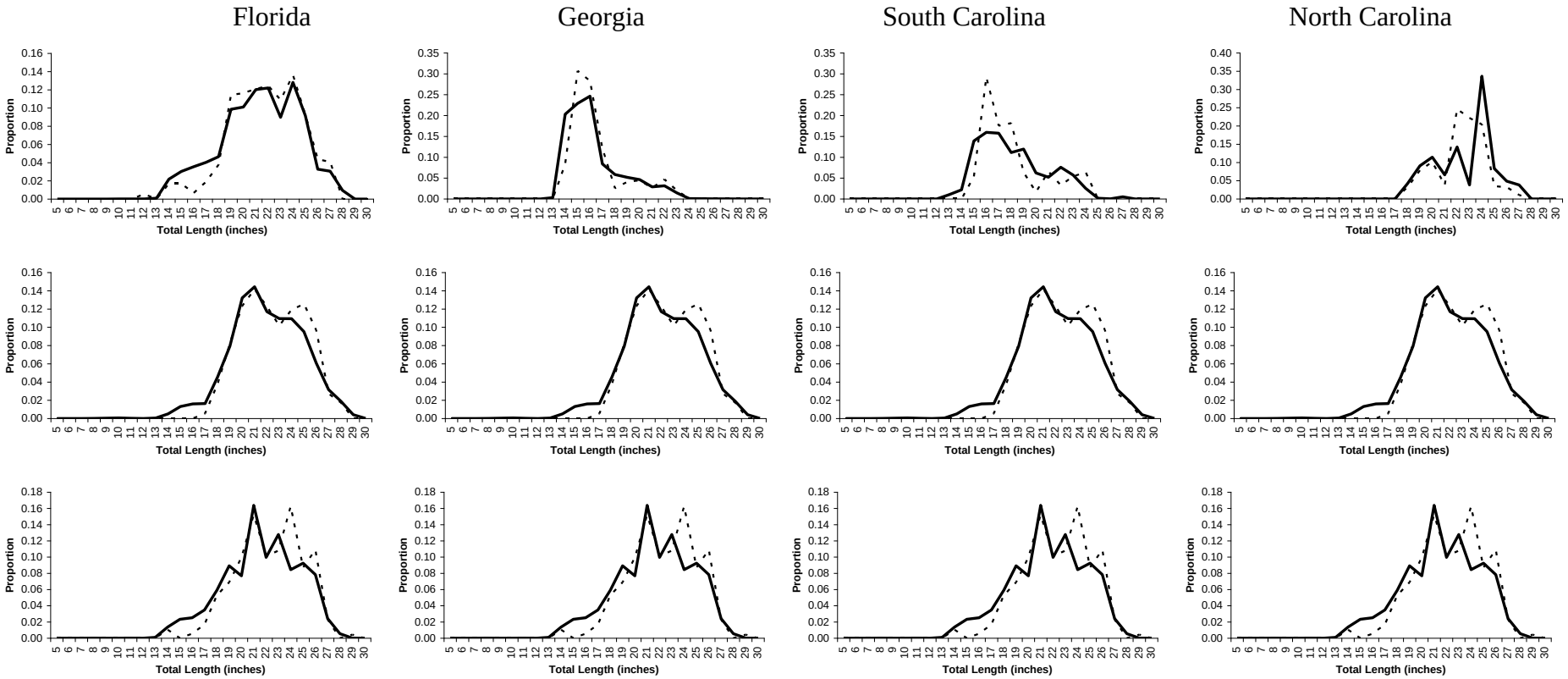

Figure 1. Comparison of the estimated length frequencies of the seen catch in the 2005 (top), 2006 (middle), and 2007 (bottom) MRFSS survey as weighted by the catch estimates through a devised sequential pooling scheme (heavy line) or through the standard MRFSS length frequency expansion program. In addition to the different expansion schemes the sequential estimates included length data from the Georgia carcass survey and the South Carolina sportfishing survey.

Table 3. The years that age and total length data were drawn from for developing the age-length keys applied to the recreational catch length frequencies in Florida, Georgia, South Carolina and the northern region (North Carolina, Virginia, Maryland, and Delaware) to estimate the age composition of the catch during 1982-2007.

	Florida	Georgia	South Carolina	Northern region
1982	1981-1986	1997-1998	1991-1993	1982-1982
1983	""	""	""	1982-1983
1984	""	""	""	1982-1984
1985	""	""	""	1982-1985
1986	""	""	""	1982-1986
1987	""	""	""	1982-1987
1988	""	""	""	1982-1988
1989	""	""	""	1989
1990	""	""	""	1990
1991	""	""	1991	1991
1992	""	""	1992	1992
1993	""	""	1993	1993
1994	""	""	1994	1994
1995	""	""	1995	1995
1996	""	""	1996	1996
1997	""	""	1997	1997
1998	""	1998	1998	1998
1999	1999-2003	1999	1999	1999
2000	""	2000	2000	2000
2001	""	2001	2001	2001
2002	""	2002	2002	2002
2003	""	2003	2003	2003
2004	2004-2005	2004	2004	2004
2005	""	2005	2005	2005
2006	2006-2007	2006-2007	2006	2006
2007	""	""	2007	2007

Table 4. Estimated landings (MRFSS Type A+B1) –at-age for red drum in Florida, Georgia, South Carolina , and the northern region (North Carolina through Delaware) during 1982-2007. The unseen harvest (Type B1) is assumed to be distributed across ages the same as the seen harvest (Type A).

Florida

	1	2	3	4	5	6	7	8	9	10+	Total
1982	145,344	54,714	1,544	900	1,115	340	43	14	14	373	204,400
1983	262,486	66,773	11,753	3,248	255	0	0	0	0	0	344,514
1984	417,109	90,176	22,810	5,497	1,344	673	0	5,887	0	5,887	549,382
1985	233,161	28,077	3,241	467	48	0	63	0	32	97	265,186
1986	37,551	49,127	21,682	2,005	456	0	524	0	524	1,571	113,439
1987	22,286	19,554	4,820	3,489	578	227	179	5	0	85	51,224
1988	3,531	4,829	757	311	33	22	11	12	0	36	9,544
1989	10,942	16,696	4,290	2,148	272	240	102	28	0	29	34,747
1990	10,671	20,993	7,084	3,744	615	626	272	0	23	251	44,279
1991	17,158	30,590	27,209	23,017	3,253	676	731	0	37	58	102,727
1992	32,245	32,962	20,530	15,094	1,422	795	607	366	10	95	104,125
1993	7,246	24,393	19,910	11,786	1,685	995	490	41	13	127	66,685
1994	21,713	38,202	36,320	21,696	1,519	611	753	106	6	13	120,938
1995	11,343	29,832	32,939	18,340	2,173	618	386	162	0	1,136	96,928
1996	32,317	49,634	38,378	22,754	2,626	549	560	4	0	0	146,822
1997	14,007	22,018	18,601	15,435	2,039	1,560	695	739	0	0	75,094
1998	11,695	39,378	37,988	16,190	1,980	846	360	4	0	0	108,440
1999	5,046	69,844	46,078	7,369	2,881	0	0	0	0	0	131,219
2000	4,676	99,458	70,136	13,967	6,440	0	0	0	0	0	194,677
2001	4,495	86,306	66,303	16,003	7,949	0	2	2	2	17	181,079
2002	1,215	57,527	45,217	11,457	5,223	0	0	0	0	0	120,640
2003	3,396	89,172	61,787	10,904	6,107	0	0	0	0	0	171,365
2004	2,554	72,736	57,369	30,121	1,391	0	0	0	0	0	164,171
2005	5,631	86,322	71,942	30,171	2,170	0	0	0	0	0	196,236
2006	2,537	56,600	67,088	21,135	2,380	5	0	0	5	7	149,756
2007	5,932	77,766	85,538	27,305	2,618	0	0	0	0	0	199,159

Table 4 (con't.). Estimated landings (MRFSS Type A+B1) –at-age for red drum in Florida, Georgia, South Carolina , and the northern region (North Carolina through Delaware) during 1982-2007. The unseen harvest (Type B1) is assumed to be distributed across ages the same as the seen harvest (Type A).

Georgia

	1	2	3	4	5	6	7	8	9	10+	Total
1982	25,866	3,239	638	128	10	50	46	10	19	751	30,757
1983	51,439	5,134	256	25	0	0	0	0	0	0	56,853
1984	237,256	15,739	4,665	293	0	78	78	0	0	78	258,188
1985	162,945	19,281	1,537	76	0	0	0	0	0	2	183,840
1986	72,441	28,612	2,566	370	13	0	0	0	0	13	104,015
1987	106,274	26,187	3,802	596	0	0	0	0	0	451	137,310
1988	84,998	45,773	4,800	883	24	0	0	0	0	806	137,284
1989	30,130	18,281	2,681	141	1	0	0	0	0	1	51,235
1990	45,492	20,020	6,755	1,123	27	286	286	27	27	2,571	76,612
1991	120,316	38,546	3,043	1,228	0	0	0	0	0	0	163,133
1992	60,963	21,097	2,680	342	87	95	178	166	166	99	85,875
1993	68,000	29,544	8,108	2,004	256	44	44	1	1	188	108,189
1994	96,309	38,070	4,606	275	0	0	0	0	0	0	139,260
1995	100,680	35,658	5,120	211	2	0	0	0	0	2	141,673
1996	43,516	17,897	1,511	220	4	1	1	0	0	1	63,151
1997	20,747	15,021	2,949	531	113	0	0	0	0	0	39,361
1998	14,037	11,732	1,528	303	0	0	0	0	0	0	27,600
1999	41,945	23,485	3,581	0	0	0	0	0	0	0	69,011
2000	53,312	29,444	10,218	1,455	0	0	0	0	0	0	94,429
2001	67,601	20,842	1,608	343	0	0	0	0	0	1	90,395
2002	58,445	32,518	2,073	269	0	0	0	0	0	0	93,305
2003	80,870	37,255	5,318	0	0	0	0	0	0	0	123,443
2004	40,047	81,912	11,035	409	0	0	0	0	0	0	133,402
2005	68,586	36,374	3,002	7	0	0	0	0	0	0	107,970
2006	37,033	43,681	1,341	210	0	0	0	0	0	4	82,269
2007	57,278	44,655	1,262	190	0	0	0	0	0	0	103,385

Table 4 (con't.). Estimated landings (MRFSS Type A+B1) –at-age for red drum in Florida, Georgia, South Carolina , and the northern region (North Carolina through Delaware) during 1982-2007. The unseen harvest (Type B1) is assumed to be distributed across ages the same as the seen harvest (Type A).

South Carolina

	1	2	3	4	5	6	7	8	9	10+	Total
1982	127,340	21,405	929	2,359	2,141	149	226	78	0	6,136	160,762
1983	77,182	22,444	4,186	979	12	0	0	0	0	0	104,803
1984	88,867	39,148	1,088	432	12	0	0	0	0	3	129,550
1985	369,762	124,774	30,846	4,726	0	0	0	0	0	0	530,108
1986	103,738	77,202	11,393	1,563	64	0	66	0	0	0	194,026
1987	391,860	114,970	13,552	1,610	45	0	0	0	0	6	522,044
1988	142,867	129,946	14,298	1,139	40	1	1	0	0	129	288,421
1989	59,660	51,798	13,650	2,591	94	2	0	0	0	31	127,826
1990	47,411	57,413	6,992	1,316	54	0	0	0	0	4	113,191
1991	88,404	36,305	2,420	120	49	12	4	1	1	105	127,421
1992	55,095	52,551	5,421	487	466	0	0	0	0	757	114,778
1993	48,425	61,023	10,226	2,248	171	0	0	1	0	46	122,141
1994	41,414	65,048	11,057	1,518	44	3	0	0	0	0	119,083
1995	110,033	55,633	8,460	2,569	368	0	0	0	0	8	177,072
1996	37,848	80,694	5,852	1,311	126	4	0	0	0	0	125,835
1997	112,215	12,150	4,198	3,058	152	53	9	0	0	0	131,834
1998	15,241	25,698	4,502	1,983	189	3	0	0	0	0	47,617
1999	22,236	19,441	3,585	530	34	0	0	0	0	0	45,826
2000	17,688	15,523	3,491	610	48	0	0	0	0	0	37,360
2001	38,822	16,805	4,430	953	35	0	0	0	0	1	61,046
2002	12,794	27,241	1,301	130	4	0	0	0	0	0	41,471
2003	40,913	99,119	14,406	7,500	750	7	0	0	0	0	162,695
2004	23,378	89,438	14,904	4,071	276	8	0	0	0	0	132,075
2005	49,074	71,256	18,561	2,072	59	0	0	0	0	0	141,023
2006	28,260	38,013	5,204	584	38	9	19	9	0	350	72,487
2007	42,724	45,001	490	5	0	0	0	0	0	0	88,220

Table 4 (con't.). Estimated landings (MRFSS Type A+B1) –at-age for red drum in Florida, Georgia, South Carolina , and the northern region (North Carolina through Delaware) during 1982-2007. The unseen harvest (Type B1) is assumed to be distributed across ages the same as the seen harvest (Type A).

Northern region

	1	2	3	4	5	6	7	8	9	10+	Total
1982	11,462	3,205	915	263	0	0	116	36	18	432	16,446
1983	82,027	27,235	3,940	1,788	0	0	480	143	101	1,168	116,882
1984	79,686	20,560	5,192	1,930	0	0	672	202	131	1,873	110,247
1985	15,445	4,807	1,514	144	0	0	21	6	4	134	22,075
1986	47,299	7,905	0	0	0	0	0	0	0	3,239	58,443
1987	48,172	10,374	974	2,899	0	0	0	0	0	867	63,286
1988	110,318	27,974	4,900	503	0	0	85	38	0	3,159	146,977
1989	27,052	41,592	5,424	0	0	0	466	155	311	381	75,381
1990	31,338	866	1,755	69	0	0	0	6	4	459	34,497
1991	47,331	9,481	289	875	0	0	0	0	0	701	58,678
1992	1,639	32,778	2,250	13	63	0	19	0	0	108	36,869
1993	4,557	43,835	14,687	40	37	0	38	0	0	729	63,923
1994	1,762	11,614	11,728	1,959	85	0	475	85	526	2,368	30,603
1995	12,439	70,790	7,611	994	880	0	0	0	0	208	92,921
1996	12,997	14,830	7,548	1,104	453	0	0	0	0	538	37,470
1997	4,919	2,888	1,787	491	208	0	65	0	0	355	10,714
1998	2,450	122,742	5,285	712	544	132	27	133	0	739	132,765
1999	5,876	54,286	18,419	158	0	0	0	0	0	24	78,764
2000	1,134	37,909	44,151	1,067	0	0	0	0	0	0	84,262
2001	1,249	8,157	17,858	2,599	126	14	2	14	0	381	30,400
2002	19,085	76,491	2,678	1,410	154	189	334	70	0	70	100,481
2003	307	26,997	13,673	365	18	0	0	0	0	0	41,360
2004	7,108	12,398	15,148	686	0	0	0	0	0	0	35,340
2005	591	54,005	1,296	0	0	0	0	0	0	0	55,892
2006	5,533	49,441	17,889	1,735	0	0	0	0	0	0	74,598
2007	2,575	88,351	44,728	524	0	0	0	0	0	0	136,178