

**Recreational Landings and Live Releases of  
Red drum (*Sciaenops ocellatus*) in the Southeast US  
using MRFSS-MRIP intercept data, 1981-2013.**

Mike Murphy  
Florida Fish and Wildlife Conservation Commission  
Fish and Wildlife Research Institute  
100 8th Avenue SE, St. Petersburg, FL 33701

October 9, 2014

## Introduction

Estimates of Atlantic coast red drum landings made using data collected during the Marine Recreational Fisheries Statistics Survey (MRFSS 1981-2012) were adjusted to eliminate headboat trips that were only included during 1981-1985 (few?) and to adjust the charterboat fishing mode estimates made before the 2003 change to the For-Hire Survey design (Matter 2012). These adjustments were followed by a re-estimation of the MRFSS time series to reflect the new Marine Recreational Information Program (MRIP 2004-2013) improvements to the survey design (original calibration workshop). No additional adjustments have been made at this time to calibrate for the 2013 data's inclusion of additional weighting on 'off-peak' times of fishing (new calibration paper)

## Methods

The protocol followed for developing consistent, comparable estimates of recreational landings was to retrieve the MRFSS data and make internal consistency corrections before calibrating these data to conform to the new 2004-2013 MRIP survey design.

The MRFSS estimates of catch were initially adjusted to remove headboat landings only included during the early years of the survey. Matter et al. (2012) developed correction factors to remove the headboat landings that were included in the 1981-1985 MRFSS estimates for North Carolina through Florida. The best estimates of headboat landings for this region come from the Southeast Region Headboat Survey. After 1985, the MRFSS/MRIP no longer estimate headboat landings for states south of Virginia but continued to be the sole source of headboat landings for the area north of North Carolina.

The For-Hire Survey was developed as an improvement to the MRFSS estimation of charterboat catches and was used to create official estimates for Atlantic coast catches made after 2002 (Matter 2012). Calibration of the earlier (1981-2002) catch estimates to make them comparable to the estimates made under the new For-Hire survey design used conversion factors estimated by wave and area fished for states from Florida through North Carolina and by wave for more northern states (Matter 2014).

Final adjustments were made to these corrected catches to make estimates made under the MRFSS survey design (1981-2012) conform with the new MRIP survey (2004-2012). Adjustment followed the advice provided in Salt et al. (2012) on the use of ratio estimators and the recalculation of proportional standard errors.

## Results and Discussion

The final MRIP-adjusted estimates for the number of red drum landed (Type A and Type B1 or claimed and harvested) or released alive (Type B2 or release) are provided for each state from Florida through Virginia. North of Virginia the original MRFSS/MRIP combined estimates are presented because the red drum catch data are inadequate to develop the series of adjustments as derived for more southern states.

Differences between the new MRIP adjusted red drum catch estimates and the original MRFSS estimates show relatively small corrections in most instances for state south of North Carolina. The North Carolina differences were more substantial reflecting the larger For-Hire survey correction ratios for inshore waters for the charterboat mode than corrections used for other states and areas fished.

Additional needs include....extrapolating an estimate for wave 1 in 1981 for Florida, MRFSS began in wave 2.

Note that the 2013 estimate is made under a different survey design, using a longer fishing day. Adjustments for this revision are not yet available so we'll need to go with what they provide.

Headboat landings estimates need to be retrieved from the headboat survey...I have data and will look at if I have time before workshop.

## References

- Matter, V. 2021. Recreational survey data for Spanish mackerel and Cobia in the Atlantic and the Gulf of Mexico from the MRFSS and TPWD surveys. SEDAR28-DW14. Revised 29 February 2012.
- Matter, V., N. Cummings, J. Isely, K. Brennan, and K. Fitzpatrick. 2012. Estimated conversion factors for calibrating MRFSS charterboat landings and effort estimates for the South Atlantic and Gulf of Mexico in 1981-1985 with For Hire Survey estimates with application to Spanish mackerel and cobia landings. SEDAR28-DW12.
- Salz, R., T. Miller, E. Williams, J. Walter, K. Drew, G. Bray. 2012. MRFSS/MRIP Calibration Workshop ad-hoc working group report.

Table 1. Calibration for 1981-1985 'Headboats-included' period, the new For-Hire Survey design begun in 2003 and MRIP survey design initiated in 2004. The final basis for the re-estimation is the 2004-2012 MRIP estimates. FLORIDA EAST COAST

Year	MRFSS Adjustments and MRIP Calibration				Effect (Adjustments & Re-estimation minus Web Site)			
	Landings (A+B1)	PSE	Releases (B2)	PSE	Landings (A+B1)	PSE	Releases (B2)	PSE
1981	66,885	43.3	10,006	142.5	-13,568	7.8	336	71.5
1982	212,426	50.0	10,458	124.4	5,961	22.8	-18	56.0
1983	342,716	35.7	57,084	81.1	-6,061	17.0	1,724	41.0
1984	548,085	29.8	49,229	76.6	-8,634	14.2	1,478	38.7
1985	245,078	34.9	202,117	58.6	-24,350	13.3	6,919	29.6
1986	117,682	35.3	104,373	44.2	3,086	15.8	3,062	21.8
1987	54,595	55.0	395,026	42.6	2,923	24.3	13,583	21.7
1988	7,211	81.6	243,685	54.5	-2,566	12.3	6,487	26.9
1989	32,985	39.6	179,873	42.7	-2,274	15.8	5,728	21.5
1990	45,209	38.6	71,680	36.5	441	16.3	2,273	18.4
1991	99,336	24.0	670,400	45.1	-4,809	8.8	13,183	21.6
1992	98,176	18.1	296,862	22.9	-7,833	4.6	8,324	11.8
1993	66,971	18.4	486,498	23.8	484	8.6	16,327	12.5
1994	119,696	16.3	720,918	20.9	-2,771	7.0	20,353	11.0
1995	95,198	18.7	712,927	18.4	-2,991	8.5	20,917	9.8
1996	144,798	29.8	522,494	18.8	-3,907	14.1	16,115	10.1
1997	69,369	21.4	585,029	19.4	-7,735	7.8	16,454	10.3
1998	105,163	17.3	506,364	17.5	-5,981	7.3	11,583	9.4
1999	128,499	14.1	602,572	16.0	-4,603	6.4	13,933	8.9
2000	193,962	13.6	739,877	14.5	-3,266	5.8	15,055	8.2
2001	182,701	14.2	894,528	15.0	698	6.7	24,589	8.3
2002	124,550	15.5	698,270	18.3	3,023	7.6	22,057	10.0
2003	156,213	14.7	772,792	16.9	-7,859	6.9	1,811	9.3
2004	136,728	12.8	1,006,814	14.0	0	0.4	0	-0.3
2005	195,550	17.7	1,405,967	18.1	0	2.7	0	3.1
2006	145,860	13.0	847,269	12.3	0	1.2	0	-0.1
2007	161,427	14.0	758,684	13.8	0	1.6	0	1.0
2008	159,246	16.8	889,550	15.9	0	2.0	0	1.2
2009	79,635	14.6	521,659	10.9	0	0.3	0	-1.3
2010	175,828	14.5	1,414,115	13.2	0	1.1	0	-0.2
2011	180,001	12.8	1,051,143	14.0	0	0.8	0	0.1
2012	238,191	14.9	799,428	10.0	0	1.1	0	-0.2
2013	297,527	12.1	1,541,541	16.2	0	-0.5	0	0.0

Table 2. Calibration for 1981-1985 'Headboats-included' period, the new For-Hire Survey design begun in 2003 and MRIP survey design initiated in 2004. The final basis for the re-estimation is the 2004-2012 MRIP estimates. GEORGIA

Year	Adjustments and Re-Estimation				Effect (Adjustments & Re-estimation minus Web Site)			
	Landings (A+B1)	PSE	Releases (B2)	PSE	Landings (A+B1)	PSE	Releases (B2)	PSE
1981	61,676	44.5	9,378	142.3	-13,568	7.8	336	71.5
1982	210,362	50.3	10,154	122.9	5,961	22.8	-18	56.0
1983	338,452	36.1	56,447	81.2	-6,061	17.0	1,724	41.0
1984	540,747	30.3	48,674	76.8	-8,634	14.2	1,478	38.7
1985	240,835	35.5	200,318	58.7	-24,350	13.3	6,919	29.6
1986	116,526	35.6	103,157	44.2	3,086	15.8	3,062	21.8
1987	54,148	55.2	391,542	42.8	2,923	24.3	13,583	21.7
1988	6,976	84.9	240,475	54.5	-2,566	12.3	6,487	26.9
1989	32,474	40.1	178,031	42.8	-2,274	15.8	5,728	21.5
1990	44,721	39.0	70,940	36.7	441	16.3	2,273	18.4
1991	97,918	24.5	658,956	44.9	-4,809	8.8	13,183	21.6
1992	96,432	18.7	293,217	23.3	-7,833	4.6	8,324	11.8
1993	65,624	19.1	481,983	24.3	484	8.6	16,327	12.5
1994	118,167	16.9	711,614	21.4	-2,771	7.0	20,353	11.0
1995	93,936	19.2	704,623	18.9	-2,991	8.5	20,917	9.8
1996	142,916	30.2	516,489	19.4	-3,907	14.1	16,115	10.1
1997	67,500	21.9	577,013	20.0	-7,735	7.8	16,454	10.3
1998	102,001	17.6	492,592	18.1	-5,981	7.3	11,583	9.4
1999	121,577	14.2	579,914	16.9	-4,603	6.4	13,933	8.9
2000	187,804	14.2	708,207	15.5	-3,266	5.8	15,055	8.2
2001	178,331	14.9	874,633	15.8	698	6.7	24,589	8.3
2002	122,033	16.3	685,936	19.1	3,023	7.6	22,057	10.0
2003	151,472	15.4	750,576	17.7	-7,859	6.9	1,811	9.3
2004	136,728	12.7	1,006,814	14.0	0	0.4	0	-0.3
2005	195,550	18.1	1,405,967	18.1	0	2.7	0	3.1
2006	145,860	13.0	847,269	12.3	0	1.2	0	-0.1
2007	161,427	14.0	758,684	13.8	0	1.6	0	1.0
2008	159,246	16.8	889,550	15.9	0	2.0	0	1.2
2009	79,635	14.6	521,659	11.0	0	0.3	0	-1.3
2010	175,828	14.5	1,414,115	13.2	0	1.1	0	-0.2
2011	180,001	13.4	1,051,143	14.0	0	0.8	0	0.1
2012	238,191	14.9	799,428	10.0	0	1.1	0	-0.2
2013	297,527	12.1	1,541,541	16.2	0	-0.5	0	0.0

Table 3. Calibration for 1981-1985 'Headboats-included' period, the new For-Hire Survey design begun in 2003 and MRIP survey design initiated in 2004. The final basis for the re-estimation is the 2004-2012 MRIP estimates. SOUTH CAROLINA

Year	Adjustments and Re-Estimation				Effect (Adjustments & Re-estimation minus Web Site)			
	Landings (A+B1)	PSE	Releases (B2)	PSE	Landings (A+B1)	PSE	Releases (B2)	PSE
1981	25,653	58.9	428	115.9	-1,666	13.2	11	15.9
1982	142,666	23.9	2,310	115.4	-18,094	5.7	-186	35.2
1983	94,354	50.6	6,176	81.2	-10,452	12.8	-575	18.2
1984	114,825	41.9	0		-14,722	11.2	0	
1985	367,289	23.5	14,946	46.4	-162,821	-7.1	-1,742	15.1
1986	182,163	25.8	23,870	40.5	-11,025	6.0	-148	8.1
1987	474,462	22.9	84,472	31.3	-47,958	5.2	1,877	4.7
1988	269,781	25.9	273,657	28.0	-18,135	5.7	4,481	4.4
1989	119,302	27.0	43,710	47.7	-8,190	6.2	886	6.9
1990	112,940	39.2	103,923	47.4	-5,726	16.8	1,312	8.2
1991	111,939	31.4	102,175	53.3	-13,894	8.8	2,207	11.3
1992	102,445	20.4	46,547	33.1	-10,089	4.8	278	5.6
1993	112,737	33.9	148,079	68.8	-6,452	17.0	1,755	41.8
1994	118,645	55.2	330,226	22.3	-10,870	33.7	5,520	5.1
1995	181,236	74.5	364,094	26.4	-21,194	49.1	1,250	11.5
1996	124,202	32.3	196,457	31.1	-6,447	17.4	19,940	15.2
1997	125,010	23.2	191,658	30.1	-4,012	10.5	15,886	5.1
1998	45,688	21.7	85,115	20.6	-821	5.8	841	6.0
1999	42,952	31.4	92,900	22.0	-1,117	13.1	5,124	7.1
2000	35,337	29.8	98,940	22.0	-1,880	6.5	4,890	3.4
2001	59,052	34.7	225,192	22.1	-2,368	7.9	4,147	3.6
2002	39,648	27.7	154,361	22.9	-1,542	6.1	11,430	4.3
2003	153,811	29.8	440,377	20.8	-8,673	6.7	10,325	3.3
2004	107,803	19.7	438,173	18.2	0	-1.5	0	-2.8
2005	130,655	21.7	493,595	12.2	0	-3.2	0	-3.4
2006	48,703	28.2	539,936	17.1	0	-5.8	0	-0.4
2007	72,261	22.2	436,797	15.5	0	-2.3	0	-1.4
2008	119,471	24.1	552,217	17.5	0	0.3	0	-2.9
2009	70,326	20.2	751,123	16.5	0	2.1	0	0.9
2010	172,708	17.2	786,452	13.3	0	1.1	0	-0.8
2011	161,503	18.2	664,291	10.8	0	1.5	0	-0.8
2012	121,068	24.3	543,618	10.2	0	-2.9	0	-4.1
2013	97,386	18.3	673,377	12.0	0	1.0	0	-1.5

Table 4. Calibration for 1981-1985 'Headboats-included' period, the new For-Hire Survey design begun in 2003 and MRIP survey design initiated in 2004. The final basis for the re-estimation is the 2004-2012 MRIP estimates. NORTH CAROLINA

Year	Adjustments and Re-Estimation				Effect (Adjustments & Re-estimation minus Web Site)			
	Landings (A+B1)	PSE	Releases (B2)	PSE	Landings (A+B1)	PSE	Releases (B2)	PSE
1981	9,758	88.1	1,144	355.0	-5,296	49.4	-1,086	255.0
1982	9,191	92.7	0		-7,254	58.0	0	
1983	75,211	94.6	2,078	146.6	-6,317	39.0	212	46.6
1984	21,529	76.0	7,430	383.5	-87,258	8.2	4,499	283.5
1985	18,285	51.8	0		-3,792	19.1	0	
1986	47,492	105.5	0		29,991	39.8	0	
1987	112,794	40.1	40,857	83.0	51,694	20.2	22,358	46.3
1988	270,245	44.3	36,748	104.4	127,619	26.0	11,874	46.6
1989	94,983	25.1	11,003	71.4	32,624	8.8	3,437	37.4
1990	43,484	34.4	38,691	137.9	10,335	6.2	26,239	99.7
1991	49,432	24.8	201,824	45.9	10,774	9.5	80,646	31.5
1992	32,424	26.5	84,410	34.3	8,831	7.2	24,180	16.4
1993	80,772	23.4	477,908	65.8	31,279	11.4	295,607	45.7
1994	38,173	28.6	201,228	55.9	9,220	12.2	93,566	41.6
1995	123,975	21.7	298,858	34.2	35,382	9.4	134,338	23.7
1996	54,016	22.7	49,639	37.8	17,270	7.7	13,887	19.9
1997	10,679	38.6	586,914	39.4	1,930	12.9	327,344	28.8
1998	144,807	19.1	339,277	23.5	30,169	7.0	139,576	12.2
1999	83,835	19.1	339,249	22.7	19,096	4.6	92,103	12.4
2000	79,821	17.4	272,651	21.9	18,203	4.5	68,684	7.7
2001	28,265	21.7	313,370	24.3	5,123	5.8	74,818	10.6
2002	76,742	24.0	1,199,105	34.5	34,201	8.6	558,248	23.8
2003	23,922	21.4	84,149	24.7	-1,559	4.9	8,588	9.7
2004	30,017	24.5	181,252	12.7	0	-0.4	0	-0.7
2005	51,807	21.3	378,541	23.3	0	0.0	0	-0.7
2006	55,714	16.0	510,264	15.4	0	0.1	0	-0.4
2007	66,789	29.3	416,352	16.1	0	16.2	0	3.2
2008	50,809	16.5	658,887	12.3	0	-0.2	0	-0.2
2009	57,543	16.4	429,776	15.2	0	1.6	0	0.1
2010	64,024	10.8	635,876	10.2	0	0.1	0	-0.8
2011	45,143	15.4	207,697	12.7	0	0.4	0	-1.6
2012	52,948	12.5	1,533,010	10.4	0	-0.1	0	-0.7
2013	164,218	11.2	654,030	12.4	0	0.3	0	0.5



Table 5. Calibration for 1981-1985 'Headboats-included' period, the new For-Hire Survey design begun in 2003 and MRIP survey design initiated in 2004. The final basis for the re-estimation is the 2004-2012 MRIP estimates. VIRGINIA

Year	Adjustments and Re-Estimation				Effect (Adjustments & Re-estimation minus Web Site)			
	Landings (A+B1)	PSE	Releases (B2)	PSE	Landings (A+B1)	PSE	Releases (B2)	PSE
1981	33,460	55.8	0		-16,170	-4.4	0	0.0
1982			0		0	0.0	0	0.0
1983	26,210	71.7	0		-6,730	23.5	0	0.0
1984	1,523	153.8	0		66	53.8	0	0.0
1985	0		1,566	126.5	0	0.0	451	53.2
1986	22,425	36.4	7,222	80.4	-5,714	14.0	-373	12.3
1987	2,052	90.6	0		-134	31.8	0	0.0
1988	4,506	109.5	4,741	124.5	195	38.8	783	53.5
1989	9,908	43.9	6,692	67.7	-2,099	11.7	-346	10.4
1990	0		888	117.9	0	0.0	-46	17.9
1991	12,889	50.6	20,310	132.6	-4,230	11.2	5,849	56.5
1992	8,950	35.8	14,628	51.6	-4,325	-2.5	-755	8.1
1993	11,394	78.4	66,859	67.9	-2,611	28.4	16,425	23.9
1994	929	56.3	10,159	41.4	-449	-4.4	-525	6.7
1995	2,471	49.7	35,437	52.3	-1,194	-3.9	1,877	11.9
1996	598	152.6	2,824	77.1	26	53.4	400	30.8
1997	1,649	97.0	130,354	52.9	-271	34.7	20,600	16.8
1998	9,938	37.1	100,173	23.5	-3,132	6.9	6,513	1.2
1999	8,744	38.4	232,633	35.9	-3,681	-0.3	-260	4.5
2000	16,557	29.1	189,046	42.1	-6,046	1.3	-7,495	6.4
2001	4,697	37.2	34,965	46.0	-2,270	-2.6	4,600	14.9
2002	47,592	39.0	1,038,719	46.4	-2,203	16.2	237,480	31.7
2003	10,295	41.1	42,270	47.3	-3,312	3.0	-1,109	7.2
2004	5,005	86.1	33,777	33.2	0	1.4	0	-0.2
2005	2,766	100.0	28,351	46.0	0	-1.6	0	1.1
2006	12,665	62.7	185,859	37.5	0	-0.1	0	-4.1
2007	46,405	28.2	110,566	28.2	0	-0.6	0	-0.7
2008	20,847	32.6	236,787	18.1	0	3.6	0	-0.4
2009	38,670	27.4	178,396	43.7	0	0.2	0	-0.4
2010	11,076	31.5	28,580	30.2	0	-0.8	0	-2.0
2011	0		61,330	59.0	0		0	-2.8
2012	28,159	62.2	2,503,456	28.1	0	6.1	0	7.2
2013	124,156	34.1	220,305	34.9	0	2.2	0	2.5

Table 6. Annual landings (numbers of fish) and releases retrieved from <http://www.st.nmfs.noaa.gov/st1/recreational/queries/>. No landings or live releases were reported on the website for New York.

## MARYLAND – NEW JERSEY

Year	Maryland		Delaware		New Jersey		Maryland		Delaware		New Jersey	
	Landings	PSE	Landings	PSE	Landings	PSE	Releases	PSE	Releases	PSE	Releases	PSE
1981	601	48.0					0					
1982												
1983	2,413	51.8					0					
1984												
1985												
1986	12,804	67.4					0					
1987												
1988												
1989	1,014	90.9					2,918	75.5				
1990	1,279	100.0					0					
1991	2,745	51.5					4,432	66.6				
1992					0						301	100.0
1993												
1994												
1995												
1996												
1997			0						2,571	80.6		
1998	0						2,768	79.6				
1999	0						2,148	73.5				
2000	0						1,458	100.0				
2001			275	100.0					0			
2002	5,521	71.2	275	100.0			18,412	36.7	1,388	45.8		
2003	0		0				2,935	75.2	731	100.0		
2004												
2005												
2006	6,362	101.4	468	110.0			12,357	70.9	875	79.0		
2007												
2008	0		0				217	91.9	75	87.3		
2009	0						14,754	66.1				
2010	0						2,182	99.2				
2011					955	96.3					0	
2012	17,869	101.0	296	91.9			280,171	47.7	5,876	48.4		
2013	2,134	45.3	1,686	47.1			2,207	71.5	407	92.2		