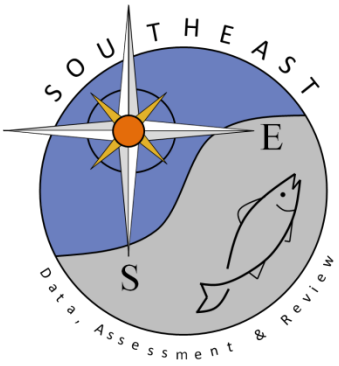
A ratio-based method for calibrating estimates of total landings (numbers and pounds of fish), releases (numbers of fish), and total trips from MRIP-FCAL to SRFS for Red Snapper (*Lutjanus campechanus*) in the South Atlantic

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SEDAR90-DW-19

April 2025
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A ratio-based method for calibrating estimates of total landings (numbers and pounds of fish), releases (numbers of fish), and total trips from MRIP-FES update to SRFS for Red Snapper (*Lutjanus campechanus*) in the South Atlantic.

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In preparation for

SEDAR 90 South Atlantic Red Snapper

April 11, 2025

Updated June 11, 2025

To include final 2024 and effort estimates

Updated September 30, 2026

To include updated MRIP-FES data and final 2025 and effort estimates

Background

In response to the need for more precise estimates of recreational catch for reef fishes, particularly from private boats, the Florida Fish and Wildlife Conservation Commission developed and implemented a new survey that runs side-by-side with the historic Marine Recreational Information Program (MRIP). The MRIP is a general survey of all saltwater recreational fishing in both state and federal waters, whereas the State Reef Fish Survey (SRFS) is a supplemental, more specialized survey that directly targets participants in the reef fish fishery to collect information on effort and catch. The SRFS is the result of a decade of development and testing in Florida, in collaboration with independent statistical consultants and NOAA Fisheries scientists. The survey provides year-round, monthly estimates of fishing effort, landings, and discards for a suite of reef fish species commonly targeted by recreational anglers fishing from private boats in Florida. Initially named the Gulf Reef Fish Survey (GRFS), the methodology was implemented in May 2015 and was only conducted on the west coast of Florida, north of Monroe County (Fig. 1). In 2018, the survey design and estimation methods were peer-reviewed and subsequently certified by NOAA Fisheries as statistically valid and suitable for use (SRFS Certification Memo and design documentation, available online: https://www.fisheries.noaa.gov/recreational-fishing-data/transitioning-new-recreational-fishing-survey-designs).

The SRFS runs concurrently with the MRIP survey in Florida, which has provided vital statistics on recreational fishing effort and catch in the Gulf of America and Atlantic Ocean off the coast of Florida since 1981. The SRFS and MRIP surveys use independent methods to estimate fishing effort (angler trips). However, catch estimates derived from each method are not completely independent. To estimate catch-per-unit-effort (CPUE), MRIP uses data collected in the Access Point Angler Intercept Survey (APAIS), and SRFS uses a combination of data from the APAIS and supplemental reef fish angler intercepts. Assignments for both intercept surveys are drawn together so that sample weights are compatible (Foster, 2018). In August 2026 MRIP released new calibrated estimates that reflect a change made to their effort survey (FES; https://www.fisheries.noaa.gov/recreational-fishing-data/fishing-effort-survey-research-and-improvements). Data provided in this paper were updated in September 2026 to reflect these changes to the MRIP data.

Previous stock assessments of Florida-centric species such as Gag (SEDAR 72) and Red Grouper (SEDAR 88) in the Gulf of America and Southeast Mutton (SEDAR 79) and Yellowtail Snapper (SEDAR 96) have incorporated a time series of MRIP estimates converted to SRFS currency for historic estimates of landings and discards from recreational private boats and SRFS estimates for recent years (Cross et al., 2020a; Ramsay et al., 2024a-c). The method was developed to calibrate historic MRIP estimates to SRFS currency and was peer-reviewed by NOAA Office of Science and Technology (OS&T) statistical consultants and approved for use (Cross et al. 2020a; Ramsay, NOAA OS&T, et al., 2024). The method is used herein to calibrate

MRIP estimates to SRFS currency for South Atlantic Red Snapper, which will facilitate the use of SRFS estimates in this assessment.

Objectives

The objective is to develop conversion factors that may be applied to annual, fully calibrated MRIP estimates, and produce a historic time series in the same currency as the SRFS for Red Snapper (*Lutjanus campechanus*) in the South Atlantic.

Methods

This analysis used private boat mode recreational estimates of total landings (numbers and pounds of fish), releases (numbers), and fishing effort (angler trips) derived from SRFS and MRIP from January 2021 through December 2025. Overlapping estimates from the first six months of SRFS implementation (July-December 2020) were not included in this analysis due to challenges related to the global pandemic, which coincided with the initial expansion of the survey. To our knowledge there are no biases in 2021-2025 data.

We did not apply calibrations at a fine scale back in time (*i.e.,* by month or area fished), as neither survey was designed to generate precise estimates at this scale. Instead, we quantified the overall differences between SRFS and MRIP estimates across the years over which the two surveys overlap. This allowed for a single calibration factor to be applied to MRIP estimates back in time for effort, landings, and releases. Separate conversion factors are provided for effort in angler trips, landings in numbers, landings in pounds, and releases in numbers.

All MRIP-FES update landings and release estimates used in this calibration were generated by the NOAA Southeast Fisheries Science Center for the state of Florida. Variances for use in this calibration process were back calculated using the PSE and estimate values. MRIP effort estimates were directed effort for the same suite of reef fish used for the SRFS Red Snapper estimates (e.g. the original GRFS species suite: Gag [*Mycteroperca microlepis*], Black Grouper [*M. bonaci*], Red Grouper [*Epinephelus morio*], Gray Triggerfish [*Balistes capriscus*], Red Snapper [*Lutjanus campechanus*], Vermilion Snapper [*Rhomboplites aurorubens*], Amberjacks [*Seriola* spp.; greater/lesser and banded rudderfish]). The MRIP effort estimates were calculated using the directed angler trips template SAS program provided by NOAA fisheries and modified for the SRFS species suite.

To assess overall differences between SRFS and MRIP estimates the estimates ($\hat{E}$) and variances ($\hat{V}$) for each estimation method (*m: SRFS, MRIP*) were summed across years (y), two-month waves (w), and areas fished (a: federal or state waters) for each variable (v: number landed, pounds landed, number released, adjusted effort) [1, 2].

$$\hat{E}_{m,v} = \sum_{m,v} \hat{E}_{y,w,a,m,v} \text{ [1]}$$

$$\hat{V}(\hat{E}_{m,v}) = \sum_{m,v} \hat{V}(\hat{E}_{y,w,a,m,v}) \text{ [2]}$$

This resulted in 4 pairs of SRFS and MRIP sums (4 variables; Table 1). For each of the paired sums, the ratio was calculated as the total SRFS estimate divided by the total MRIP estimate (landings, releases, and effort) [3].

$$\hat{R}_v = \frac{\hat{E}_{SRFS,v}}{\hat{E}_{MRIP,v}} \text{ [3]}$$

Although SRFS and MRIP estimates are derived from survey data that are not completely independent, the strength of correlation between estimates from the two surveys is unknown. To calculate the variance of the ratio above, we assumed a 0% correlation as this is the most conservative approximation of variance if correlation between the two survey estimates is ignored (Cross et al. 2020a). This correlation percentage was recommended by peer review (Stokes et al. 2020). A delta method approximation for the variance of two independent variables was used to calculate the variance of the ratio above ($\hat{V}(\hat{R}_v)$) because this method incorporates error associated with both the numerator (SRFS estimates) and denominator (MRIP estimates). The R statistical software package 'msm' and the function deltamethod (R Core Team 2023; Jackson 2011) were used to carry out these calculations.

Historic estimates from 1981-2011 were converted to SRFS currency by multiplying the annual MRIP estimate for each year and variable type (number landed, pounds landing, number released, and effort in angler trips) [4] with the corresponding ratio [3]:

$$\hat{E}_{SRFS-cal,y,v} = \hat{R}_v \hat{E}_{MRIP,y,v} \text{ [4]}$$

Variance was again approximated using the delta method and, once again, a 0% correlation was assumed.

Starting in 2012, when the mini-seasons started, the same ratios [3] were applied to wave-level MRIP estimates for each year, wave, and variable type (number landed, pounds landed, number released, angler trips) [5]:

$$\hat{E}_{SRFS-cal,y,w,v} = \hat{R}_v \hat{E}_{MRIP,y,w,v} \text{ [5]}$$

The NOAA Southeast Fisheries Science Center does not provide error around the average pounds landed values. For the purposes of data provision, errors for landings in numbers were used as a proxy for errors for landings in pounds. FWC-FWRI, the NOAA Southeast Fisheries Science Center, and the recreational workgroup lead, decided before the MRIP-FES 2026 update

that the average pounds landed with their error could be applied to the calibrated number landed estimates during the assessment process. If this is still recommended by NOAA Southeast Fisheries Science center and the assessment team, FWC-FWRI is still in support of this option.

From 2021-2025, when SRFS estimates could be provided, estimates were provided for number landed, pounds landed, number released, and effort (angler trips) with associated error for each year and month. Since 2012 the MRIP-FES and SRFS estimates were provided at the finest scale available, two-month waves and months respectively, to attempt to separate in-season and out-of-season landings and releases.

Findings and Conclusions

For the years in which the SRFS and MRIP overlap, annual Red Snapper estimates derived from SRFS and updated MRIP-FES and associated variances, observed ratios of summed SRFS to MRIP estimates, and approximate variance for each ratio are provided in Table 1. The annual SRFS and MRIP-FES update estimates, as well as the compared cumulative sums are shown in Figure 2. The Red Snapper ratios were smaller for landings (number of fish = 0.37; lbs of fish = 0.32) than for releases (0.69). The ratios of MRIP-FES update to SRFS release estimates were similar to those seen for other fish species (Cross et al., 2020b; Ramsay et al., 2024a-c) before the MRIP-FES update calibration. The MRIP-FES update calibration brought the release estimates from the two surveys about 20% closer together. The landings estimate ratios are much smaller for Red Snapper in the Atlantic Ocean than for SRFS-MRIP comparisons for other species, suggesting a larger difference between these surveys for this species in this region. These differences are likely due to the short seasons for this fishery and the fact that SRFS and MRIP were not designed to generate estimates for mini-seasons. The MRIP-FES calibration update brought the landings estimates from the two surveys about 10% closer together. The MRIP-FES calibration update, which consistently decreased MRIP effort estimates, brought the effort estimates from SRFS much closer to the MRIP-FES directed effort estimates for the same suite of reef fish as SRFS. SRFS estimates were marginally higher than the MRIP FES-update effort estimates when averaged across 2021-2025 for the same suite of reef fish (ratio: 1.11). Median PSE values for the calibrated landings in numbers, landings in pounds, releases, and effort estimates were 66%, 68%, 63%, and 17%, respectively. The annual MRIP and calibrated estimates are provided from 1981-2011 (Table 2; Fig. 3). PSEs were not included for calibrated estimates where the MRIP-FES update PSEs were 0. MRIP and calibrated estimates are provided by wave from 2012-2020 (Tables 3 & 4; Fig. 4). SRFS estimates are provided by month from 2021-2025 (Table 5).

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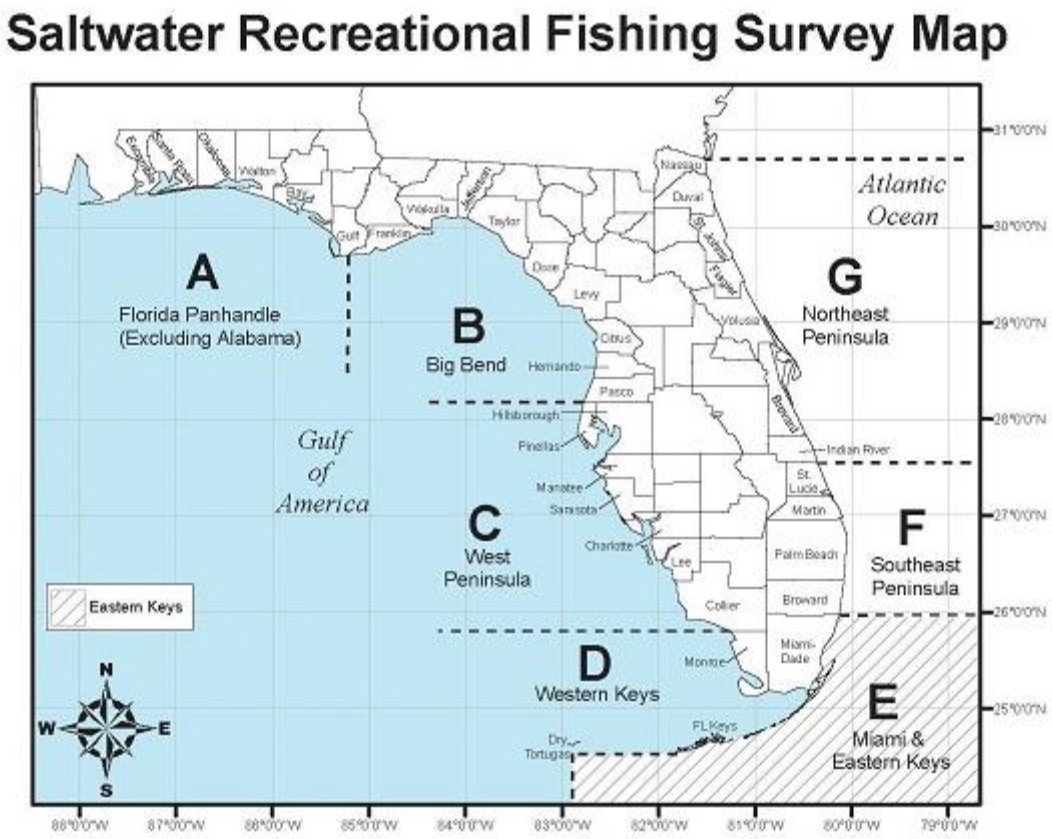


Figure 1. The Gulf Reef Fish Survey was only conducted in regions A-C. In July 2020, the survey was expanded to encompass all of Florida and renamed the State Reef Fish Survey (SRFS). The SRFS encompasses regions A-G on this map. The South Atlantic SRFS estimates come from regions E-G.

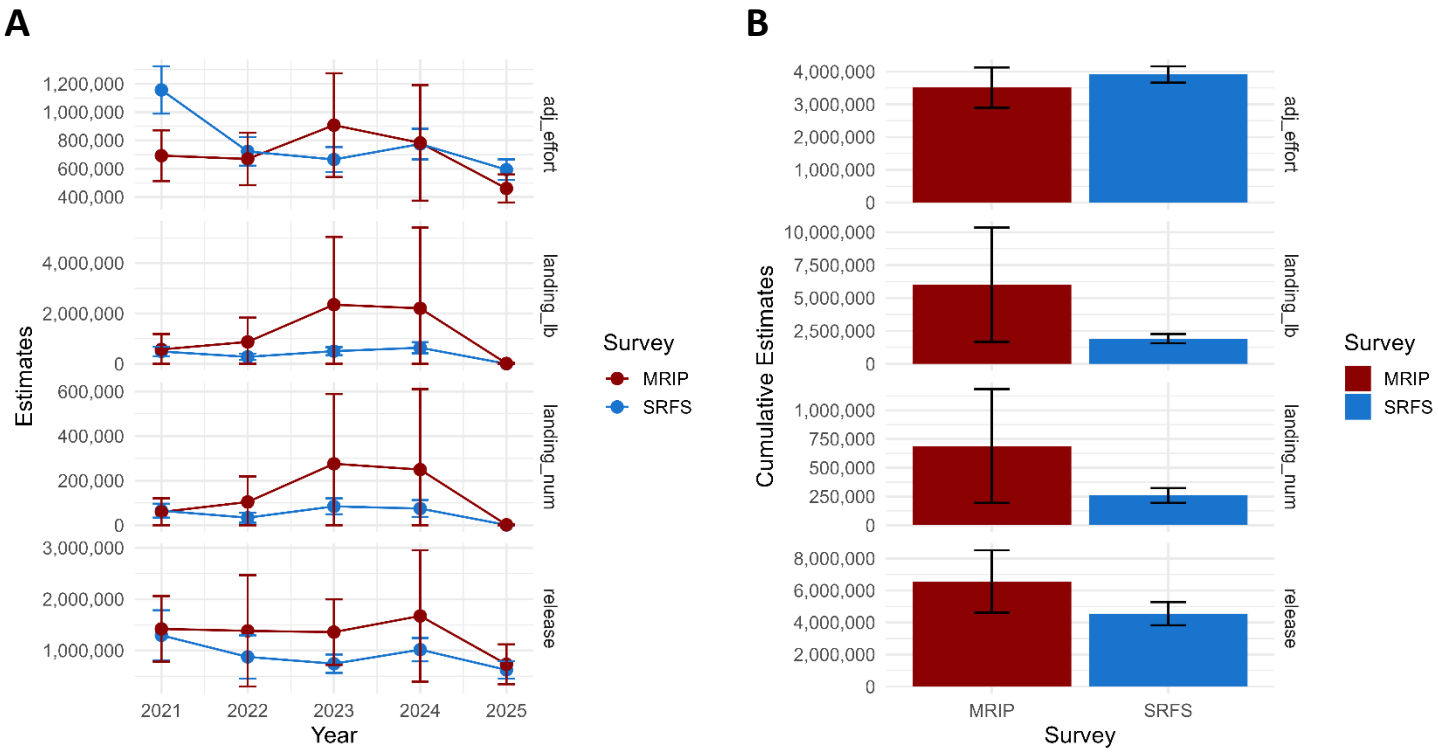


Figure 2. Estimates of effort, landings, and releases of Red Snapper (*Lutjanus campechanus*) across years (**A**) or with all the years combined (**B**; 2021-2025) for the South Atlantic. Estimates generated by SRFS are shown in blue and estimates generated by MRIP are shown in red. Error bars depict 95% confidence limits.

Table 1. Annual and summed SRFS and MRIP estimates (sum), variances, and ratios of MRIP to SRFS estimates are shown for Red Snapper (*Lutjanus campechanus*) in Florida in the South Atlantic.

Estimate Type	Year	SRFS Sum	SRFS Variance	MRIP Sum	MRIP Variance	Ratio
Adjusted Effort (no. trips)	2021	1,156,499	7,277,257,886.9	692,142	8,350,978,894	1.1136
	2022	722,222	2,670,205,440.8	669,097	8,946,433,340	
	2023	665,020	2,047,095,430.0	907,827	34,994,476,322	
	2024	774,423	3,016,689,586.6	782,806	43,515,768,080	
	2025	593,228	1,366,651,926.2	460,395	2,564,279,832	
	Total	3,911,392	16,377,900,270.5	3,512,266	98,371,936,468	
Landings (lb)	2021	490,062	9,163,516,267.3	573,014	96,203,968,720	0.3186
	2022	277,587	3,930,978,311.6	870,070	242,350,201,406	
	2023	503,082	6,777,653,310.4	2,347,912	1,882,362,469,75	
	2024	640,663	12,578,744,885.0	2,203,524	2,668,075,434,83	
	2025	3,551	4,764,182.7	16,032	256,967,103	
	Total	1,914,945	32,455,656,957.2	6,010,554	4,889,249,041,81	
Landings (no. fish)	2021	64,850	253,265,240.1	59,232	985,517,938	0.3747
	2022	33,623	125,710,265.3	104,156	3,402,080,925	
	2023	84,453	332,760,015.8	275,560	25,543,966,695	
	2024	74,644	370,092,636.9	249,506	34,089,876,434	
	2025	1,053	586,963.3	1,721	2,961,841	
	Total	258,623	1,082,415,121.3	690,176	64,024,403,832	
Releases (no. fish)	2021	1,295,587	61,910,902,758.1	1,421,241	106,854,084,346	0.6933
	2022	875,469	46,437,991,819.2	1,382,494	305,806,345,606	
	2023	743,050	8,333,785,830.5	1,358,363	106,280,642,291	
	2024	1,016,674	13,289,450,702.1	1,673,242	425,840,270,045	
	2025	622,616	7,532,398,582.1	732,149	39,077,473,333	
	Total	4,553,396	137,504,529,692.	6,567,488	983,858,815,620	

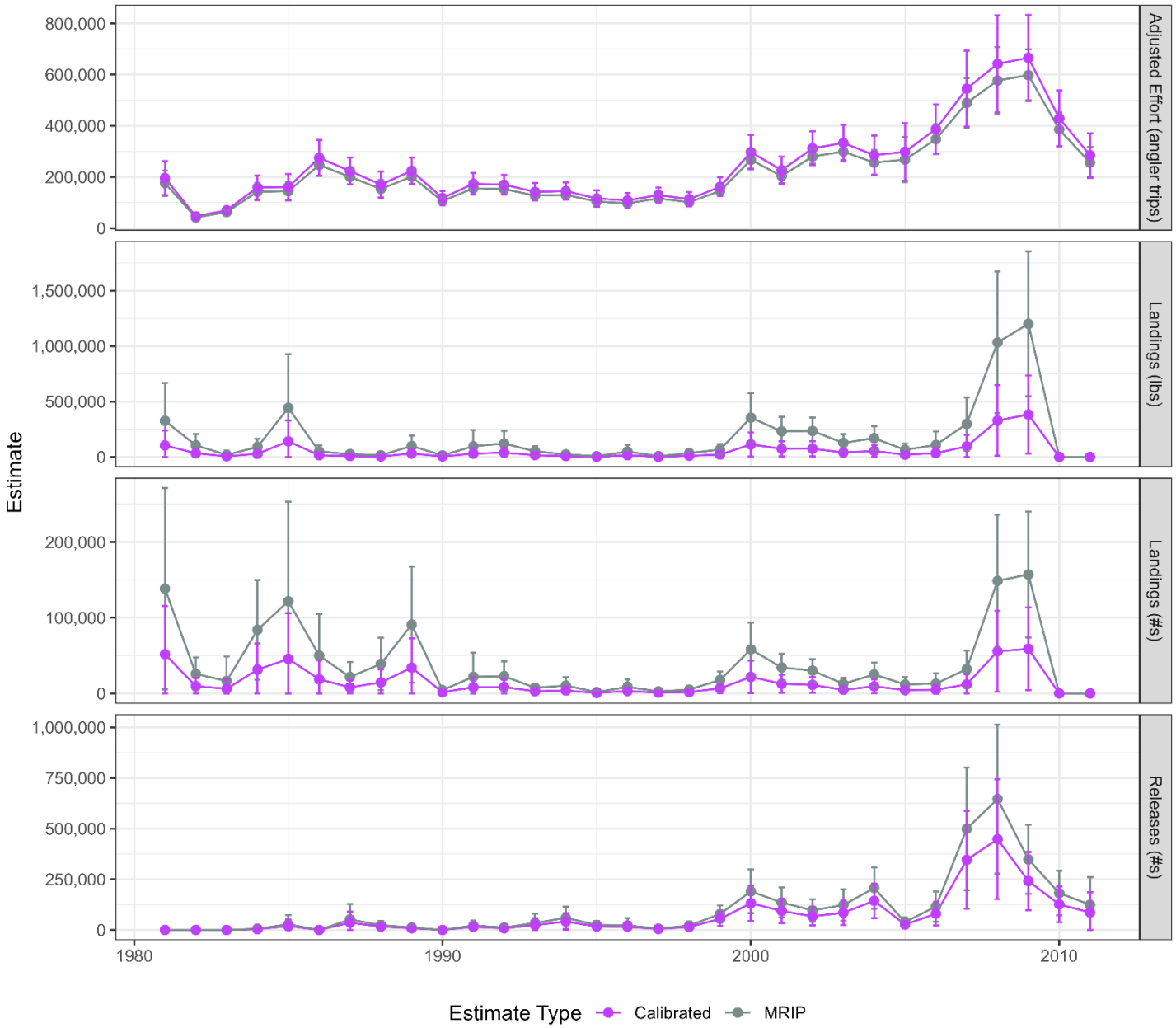


Figure 3. Red Snapper (*Lutjanus campechanus*) annual estimates in the Atlantic Ocean, including original MRIP-FES update time-series (MRIP) and the MRIP-FES update time-series calibrated to SRFS currency (Calibrated). Estimates are shown from 1981-2011, before the start of the mini-seasons. Adjusted effort estimates (angler trips), landings in pounds, landings in numbers of fish, and releases in numbers of fish are shown. Error bars are 95% confidence limits.

Table 2. Original and calibrated MRIP-FES update annual estimates for Red Snapper (*Lutjanus campechanus*) landing, release, and effort estimates in Florida from 1981-2011. The recreational fishery was closed in 2010 & 2011. 2012 was the start of the Red Snapper mini-seasons in the South Atlantic.

Year	MRIP-FES update		SRFS-MRIP Calibration		MRIP-FES update		SRFS-MRIP Calibration	
	Landings (no. fish)	PSE	Landings (no. fish)	PSE	Landings (pounds)	PSE	Landings (pounds)	PSE
1981	138,440	49.0	51,877	62.5	326,554	53.4	104,039	65.5
1982	25,849	43.0	9,686	57.9	105,119	49.9	33,491	62.7
1983	16,452	100.0	6,165	107.3	18,816	100.0	5,995	107.0
1984	84,032	40.0	31,489	55.7	90,522	41.5	28,840	56.2
1985	121,803	55.0	45,642	67.3	443,027	55.9	141,147	67.5
1986	50,086	56.0	18,768	68.1	49,432	57.7	15,749	69.1
1987	21,739	47.0	8,146	61.0	26,439	48.5	8,424	61.6
1988	39,018	45.0	14,621	59.4	15,837	48.5	5,046	61.6
1989	90,915	43.0	34,068	57.9	98,635	48.3	31,425	61.4
1990	4,462	53.0	1,672	65.7	14,397	62.6	4,587	73.2
1991	22,056	74.0	8,265	83.6	96,675	76.9	30,800	85.7
1992	22,789	44.0	8,540	58.7	121,188	48.0	38,610	61.2
1993	7,583	39.0	2,842	55.0	51,048	44.6	16,264	58.6
1994	10,368	55.0	3,885	67.3	23,849	63.6	7,598	74.0
1995	1,825	59.0	684	70.6	6,485	60.9	2,066	71.8
1996	8,719	57.0	3,267	69.0	49,618	59.2	15,808	70.3
1997	2,675	67.0	1,003	77.4	7,388	68.0	2,354	77.9
1998	5,098	41.0	1,910	56.5	34,743	48.3	11,069	61.5
1999	17,891	31.0	6,704	49.7	67,403	36.3	21,475	52.6
2000	58,296	31.0	21,845	49.7	354,197	31.8	112,846	49.5
2001	34,286	27.0	12,848	47.3	231,439	28.7	73,736	47.6
2002	30,135	26.0	11,292	46.7	234,533	26.5	74,721	46.3
2003	12,820	30.0	4,804	49.0	126,702	31.7	40,367	49.5
2004	25,102	32.0	9,406	50.3	169,353	32.4	53,955	49.9
2005	11,919	41.0	4,466	56.5	64,147	44.4	20,437	58.4
2006	12,988	54.0	4,867	66.5	108,668	56.7	34,621	68.3
2007	32,217	39.0	12,072	55.0	298,718	41.0	95,171	55.9
2008	148,730	30.0	55,732	49.1	1,032,972	31.5	329,102	49.4
2009	157,183	27.0	58,900	47.3	1,200,472	27.7	382,467	47.0
2010	0	NA	0	NA	0	NA	0	NA
2011	0	NA	0	NA	0	NA	0	NA

Table 2 cont.

Year	MRIP-FES Update		SRFS-MRIP Calibration		MRIP-FES Update		SRFS-MRIP Calibration	
	Releases (no. fish)	PSE	Releases (no. fish)	PSE	Effort (no. trips)	PSE	Effort (no. trips)	PSE
1981	0	NA	0	NA	175,991	14.4	195,990	17.3
1982	0	NA	0	NA	41,558	14.0	46,281	16.9
1983	0	NA	0	NA	62,851	4.9	69,993	10.7
1984	5,831	100.0	4,043	101.5	142,634	11.8	158,843	15.2
1985	27,655	85.0	19,174	86.7	144,444	13.0	160,859	16.1
1986	0	NA	0	NA	246,847	8.7	274,898	12.9
1987	52,154	74.0	36,159	76.0	200,691	7.3	223,497	12.0
1988	23,959	46.0	16,611	49.1	153,196	11.9	170,605	15.2
1989	12,045	51.0	8,351	53.8	201,263	7.1	224,134	11.8
1990	0	NA	0	NA	105,716	7.3	117,730	12.0
1991	22,081	56.0	15,309	58.6	155,982	7.6	173,708	12.2
1992	12,040	47.0	8,348	50.0	152,548	6.7	169,883	11.7
1993	34,730	68.0	24,079	70.1	127,497	7.7	141,986	12.2
1994	59,804	47.0	41,463	50.0	130,028	7.0	144,804	11.8
1995	25,136	37.0	17,427	40.8	104,194	10.0	116,034	13.8
1996	22,414	84.0	15,540	85.7	97,233	10.2	108,282	13.9
1997	6,516	46.0	4,517	49.1	116,395	6.1	129,621	11.3
1998	21,708	49.0	15,051	51.9	101,612	8.4	113,159	12.7
1999	78,878	27.0	54,688	32.0	145,223	6.6	161,725	11.6
2000	190,494	29.0	132,074	33.7	266,958	6.4	297,294	11.5
2001	135,477	28.0	93,929	32.8	203,669	7.0	226,813	11.8
2002	96,955	29.0	67,221	33.7	280,171	5.2	312,009	10.8
2003	122,932	32.0	85,232	36.3	299,266	5.5	333,274	11.0
2004	207,305	25.0	143,729	30.3	256,114	9.8	285,218	13.6
2005	39,000	30.0	27,040	34.6	267,952	16.7	298,402	19.2
2006	115,614	33.0	80,158	37.2	347,895	8.5	387,429	12.8
2007	498,961	31.0	345,942	35.4	489,474	10.1	545,097	13.9
2008	646,583	29.0	448,291	33.7	576,890	11.6	642,447	15.0
2009	348,333	25.0	241,508	30.3	598,059	8.6	666,021	12.8
2010	182,095	31.0	126,251	35.4	385,813	8.7	429,656	12.9
2011	124,736	56.0	86,482	58.6	256,036	12.1	285,132	15.4

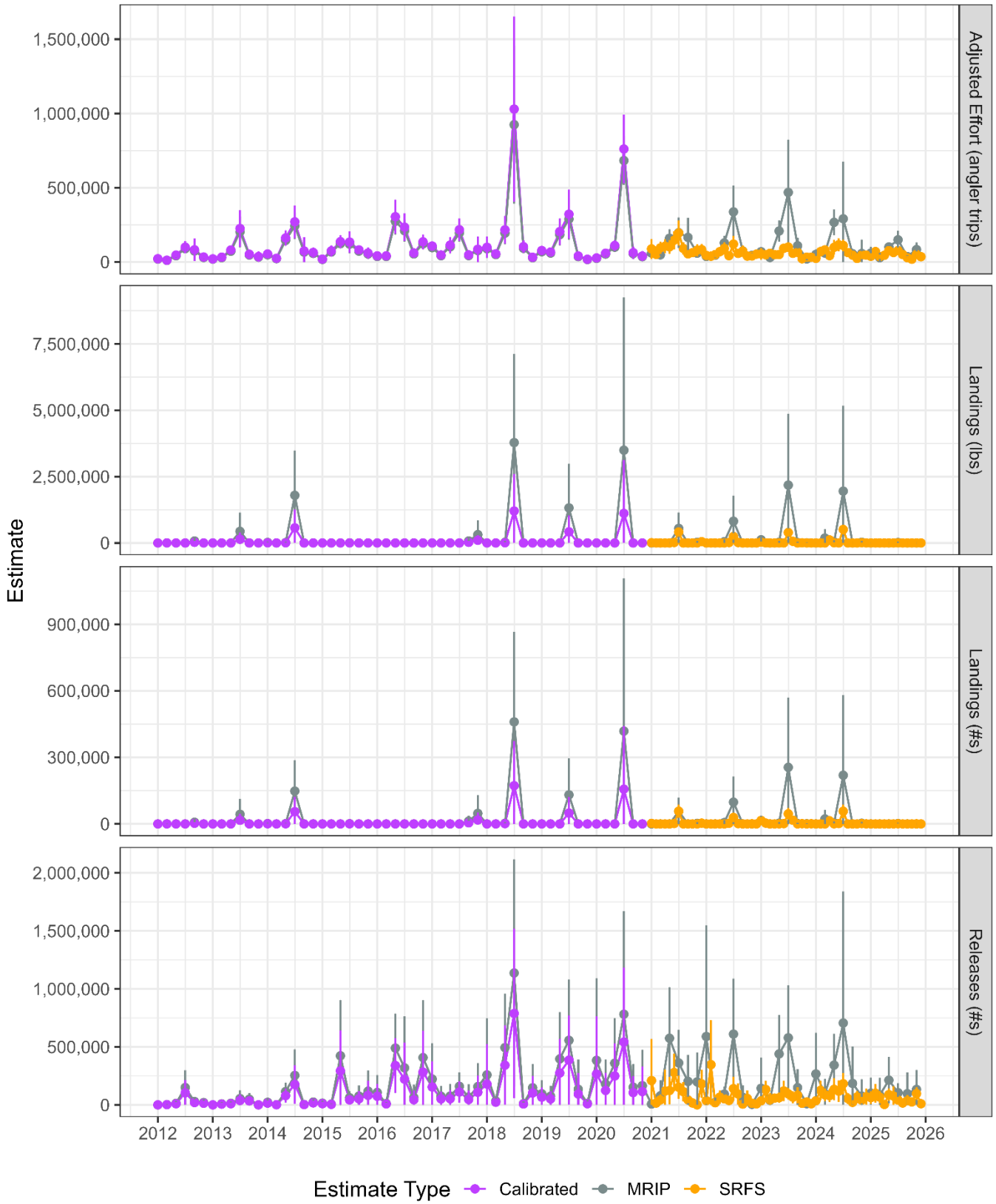


Figure 4. Red Snapper (*Lutjanus campechanus*) estimates in the Atlantic Ocean, including: original SRFS estimates by month (SRFS), original MRIP-FES update time-series estimates by wave (MRIP), and the MRIP-FES update time-series calibrated to SRFS currency by wave (calibrated). Estimates are shown from 2012-2025 at the finest time scale possible to account for differences between in-season and out-of-season landings while the mini-seasons were in place. Adjusted effort (angler trips), landings in pounds, landings in numbers of fish, and releases in numbers of fish are shown. Error bars are 95% confidence limits.

Table 3. Original and calibrated MRIP-FES update estimates for Red Snapper (*Lutjanus campechanus*) landings (in numbers of fish and pounds) in Florida from 2012-2020 by two-month wave. Wave estimates allow for differentiation of landings and releases that occurred outside of the mini-season.

Year	Wave	MRIP-FES update		SRFS-MRIP Calibration		MRIP-FES update		SRFS-MRIP Calibration	
		Landings (no. fish)	PSE	Landings (no. fish)	PSE	Landings (pounds)	PSE	Landings (pounds)	PSE
2012	1	0	NA	0	NA	0	NA	0	NA
2012	2	271	100.0	102	107.3	2,730	100.0	870	107.0
2012	3	0	NA	0	NA	0	NA	0	NA
2012	4	0	NA	0	NA	0	NA	0	NA
2012	5	7,308	100.0	2,738	107.3	73,629	100.0	23,458	107.0
2012	6	0	NA	0	NA	0	NA	0	NA
2013	1	0	NA	0	NA	0	NA	0	NA
2013	2	0	NA	0	NA	0	NA	0	NA
2013	3	0	NA	0	NA	0	NA	0	NA
2013	4	43,463	82.0	16,286	90.7	436,455	82.0	139,053	90.4
2013	5	0	NA	0	NA	0	NA	0	NA
2013	6	0	NA	0	NA	0	NA	0	NA
2014	1	1,556	100.0	583	107.3	18,708	100.0	5,960	107.0
2014	2	0	NA	0	NA	0	NA	0	NA
2014	3	1,250	100.0	468	107.3	15,026	100.0	4,787	107.0
2014	4	148,014	48.0	55,464	61.7	1,794,819	48.0	571,824	61.2
2014	5	0	NA	0	NA	0	NA	0	NA
2014	6	192	100.0	72	107.3	2,307	100.0	735	107.0
2015	1	0	NA	0	NA	0	NA	0	NA
2015	2	0	NA	0	NA	0	NA	0	NA
2015	3	0	NA	0	NA	0	NA	0	NA
2015	4	899	100.0	337	107.3	5,057	100.0	1,611	107.0
2015	5	0	NA	0	NA	0	NA	0	NA
2015	6	0	NA	0	NA	0	NA	0	NA
2016	1	0	NA	0	NA	0	NA	0	NA
2016	2	0	NA	0	NA	0	NA	0	NA
2016	3	0	NA	0	NA	0	NA	0	NA
2016	4	0	NA	0	NA	0	NA	0	NA
2016	5	0	NA	0	NA	0	NA	0	NA
2016	6	0	NA	0	NA	0	NA	0	NA
2017	1	0	NA	0	NA	0	NA	0	NA
2017	2	0	NA	0	NA	0	NA	0	NA
2017	3	0	NA	0	NA	0	NA	0	NA
2017	4	0	NA	0	NA	0	NA	0	NA
2017	5	12,616	100.0	4,727	107.3	75,007	100.0	23,897	107.0
2017	6	47,411	88.0	17,766	96.2	314,557	88.0	100,217	95.8
2018	1	0	NA	0	NA	0	NA	0	NA
2018	2	0	NA	0	NA	0	NA	0	NA

Year	Wave	MRIP-FES update		SRFS-MRIP Calibration		MRIP-FES update		SRFS-MRIP Calibration	
		Landings (no. fish)	PSE	Landings (no. fish)	PSE	Landings (pounds)	PSE	Landings (pounds)	PSE
2018	3	2,868	100.0	1,075	107.3	23,692	100.0	7,548	107.0
2018	4	460,099	45.0	172,409	59.4	3,781,363	45.0	1,204,731	58.9
2018	5	0	NA	0	NA	0	NA	0	NA
2018	6	0	NA	0	NA	0	NA	0	NA
2019	1	0	NA	0	NA	0	NA	0	NA
2019	2	0	NA	0	NA	0	NA	0	NA
2019	3	0	NA	0	NA	0	NA	0	NA
2019	4	131,139	64.0	49,141	74.8	1,322,402	64.0	421,314	74.4
2019	5	0	NA	0	NA	0	NA	0	NA
2019	6	0	NA	0	NA	0	NA	0	NA
2020	1	0	NA	0	NA	0	NA	0	NA
2020	2	0	NA	0	NA	0	NA	0	NA
2020	3	0	NA	0	NA	0	NA	0	NA
2020	4	418,401	84.0	156,784	92.5	3,495,922	84.0	1,113,791	92.2
2020	5	0	NA	0	NA	0	NA	0	NA
2020	6	0	NA	0	NA	0	NA	0	NA

Table 4. Original and calibrated MRIP-FES update estimates for Red Snapper (*Lutjanus campechanus*) releases and effort estimates (angler trips) in Florida from 2012-2020 by two-month wave. Wave estimates allow for differentiation of landings and releases that occurred outside of the mini-season.

Year	Wave	MRIP-FES update		SRFS-MRIP Calibration		MRIP-FES update		SRFS-MRIP Calibration	
		Releases (no. fish)	PSE	Releases (no. fish)	PSE	Effort (no. trips)	PSE	Effort (no. trips)	PSE
2012	1	0	NA	0	NA	19,783	19.7	22,032	21.9
2012	2	2,478	74.0	1,718	76.0	11,061	14.5	12,318	17.3
2012	3	13,436	73.0	9,315	75.0	42,067	14.8	46,847	17.6
2012	4	149,405	51.0	103,586	53.8	89,791	18.1	99,994	20.5
2012	5	28,560	71.0	19,801	73.0	74,309	45.5	82,753	46.5
2012	6	19,930	75.0	13,818	76.9	30,419	15.8	33,876	18.5
2013	1	0	NA	0	NA	19,164	19.2	21,342	21.4
2013	2	8,770	92.0	6,080	93.6	29,290	4.4	32,619	10.5
2013	3	13,628	61.0	9,449	63.4	72,854	12.7	81,133	15.9
2013	4	54,135	68.0	37,533	70.1	202,819	26.0	225,866	27.7
2013	5	48,885	56.0	33,893	58.6	47,122	15.3	52,477	18.1
2013	6	0	NA	0	NA	32,750	49.2	36,472	50.1
2014	1	21,659	76.0	15,017	77.9	48,577	26.3	54,097	28.0
2014	2	1,208	100.0	838	101.5	22,665	40.2	25,240	41.3
2014	3	114,760	34.0	79,566	38.1	145,674	12.7	162,228	15.9
2014	4	253,726	45.0	175,914	48.2	242,948	18.4	270,556	20.7
2014	5	3,136	63.0	2,174	65.3	67,057	62.8	74,677	63.5
2014	6	24,247	54.0	16,811	56.7	57,880	25.5	64,458	27.2
2015	1	14,582	81.0	10,110	82.8	17,468	23.4	19,454	25.2
2015	2	5,996	69.0	4,157	71.1	67,301	23.5	74,949	25.4
2015	3	422,958	58.0	293,247	60.5	123,295	12.6	137,306	15.8
2015	4	61,666	46.0	42,755	49.1	120,705	25.9	134,421	27.6
2015	5	75,365	62.0	52,252	64.3	73,322	15.2	81,654	17.9
2015	6	117,832	77.0	81,696	78.9	54,200	30.8	60,359	32.2
2016	1	106,848	71.0	74,080	73.0	37,295	27.2	41,534	28.8
2016	2	11,163	66.0	7,740	68.2	37,355	6.4	41,600	11.5
2016	3	489,107	31.0	339,110	35.4	273,895	16.5	305,020	19.0
2016	4	318,995	71.0	221,167	73.0	210,774	17.7	234,726	20.1
2016	5	63,308	91.0	43,893	92.6	54,376	25.0	60,555	26.7
2016	6	407,504	62.0	282,532	64.3	122,169	15.9	136,052	18.6
2017	1	222,478	71.0	154,249	73.0	96,700	11.7	107,689	15.1
2017	2	74,040	61.0	51,334	63.4	42,499	24.9	47,328	26.7
2017	3	76,016	70.0	52,704	72.1	102,270	22.4	113,892	24.3
2017	4	159,549	39.0	110,619	42.6	195,132	15.4	217,306	18.1
2017	5	67,138	84.0	46,548	85.7	43,122	16.7	48,023	19.2
2017	6	157,103	66.0	108,923	68.2	77,291	50.4	86,074	51.3
2018	1	258,820	96.0	179,446	97.5	89,253	35.6	99,395	36.9
2018	2	32,660	68.0	22,644	70.1	49,886	9.8	55,555	13.7

Year	Wave	MRIP-FES update		SRFS-MRIP Calibration		MRIP-FES update		SRFS-MRIP Calibration	
		Releases (no. fish)	PSE	Releases (no. fish)	PSE	Effort (no. trips)	PSE	Effort (no. trips)	PSE
2018	3	493,507	48.0	342,160	51.0	194,568	19.5	216,679	21.7
2018	4	1,136,819	44.0	788,184	47.2	924,481	29.4	1,029,537	30.9
2018	5	10,884	81.0	7,546	82.8	92,842	18.4	103,392	20.7
2018	6	147,727	71.0	102,423	73.0	28,659	15.5	31,916	18.2
2019	1	95,241	62.0	66,033	64.3	69,522	18.0	77,422	20.4
2019	2	74,396	62.0	51,581	64.3	60,430	11.0	67,297	14.5
2019	3	396,154	52.0	274,663	54.8	183,858	19.9	204,752	22.1
2019	4	556,371	48.0	385,745	51.0	288,941	24.4	321,776	26.2
2019	5	134,242	98.0	93,073	99.5	36,269	0.0	40,391	9.5
2019	6	13,550	100.0	9,395	101.5	16,657	26.3	18,550	28.0
2020	1	383,515	94.0	265,900	95.6	24,566	16.9	27,358	19.4
2020	2	179,310	60.0	124,320	62.4	53,216	13.6	59,264	16.6
2020	3	359,405	55.0	249,184	57.6	99,866	13.7	111,214	16.7
2020	4	781,135	58.0	541,580	60.5	683,244	12.3	760,886	15.5
2020	5	152,179	67.0	105,509	69.2	56,508	32.1	62,930	33.5
2020	6	165,513	95.0	114,754	96.5	36,030	41.7	40,124	42.8

Table 5. SRFS estimates for Red Snapper (*Lutjanus campechanus*) landing, release, and effort estimates in Florida from 2021-2025 by month. Month estimates allow for differentiation of landings, releases, and effort that occurred outside of the mini-season.

Year	Month	Landings (no. fish)	PSE	Landings (pounds)	PSE	Releases (no. fish)	PSE	Effort (no. trips)	PSE
2021	1	2,245	94.1	9,800	63.3	209,502	87.2	88,286	38.6
2021	2	0	NA	0	NA	15,669	60.7	51,485	22.2
2021	3	0	NA	0	NA	43,253	53.8	95,261	22.8
2021	4	0	NA	0	NA	118,825	79.7	106,115	22.4
2021	5	0	NA	0	NA	123,238	49.1	102,058	22.9
2021	6	1,701	98.3	17,271	66.2	278,716	29.7	146,821	21.2
2021	7	57,360	26.9	414,547	21.9	151,997	33.7	195,143	21.9
2021	8	0	NA	0	NA	113,480	37.0	91,219	23.4
2021	9	0	NA	0	NA	42,901	33.1	54,897	23.6
2021	10	0	NA	0	NA	16,302	40.7	62,927	20.3
2021	11	0	NA	0	NA	0		78,989	26.6
2021	12	3,545	83.2	48,444	56.1	181,705	34.1	83,298	23.3
2022	1	0	NA	0	NA	36,522	42.8	44,135	26.5
2022	2	0	NA	0	NA	346,728	56.5	39,064	19.7
2022	3	0	NA	0	NA	17,978	53.1	49,654	19.2
2022	4	0	NA	0	NA	66,433	43.8	69,679	18.4
2022	5	0	NA	0	NA	52,081	35.0	91,907	22.6
2022	6	2,933	64.2	16,166	40.1	38,019	39.0	42,585	25.0
2022	7	29,070	37.8	245,339	25.1	139,703	37.9	120,644	22.9
2022	8	1,226	91.5	15,125	66.3	93,403	49.9	58,166	23.0
2022	9	0	NA	0	NA	6,390	64.2	72,892	26.9
2022	10	0	NA	0	NA	55,455	61.8	39,852	23.6
2022	11	395	108.9	957	73.3	14,062	101.4	40,654	25.2
2022	12	0	NA	0	NA	8,694	40.9	52,990	23.2
2023	1	15,504	55.6	33,711	39.4	34,631	56.2	54,716	36.1
2023	2	3,593	27.1	3,644	18.2	132,519	28.4	48,564	17.7
2023	3	0	NA	0	NA	43,589	68.8	58,586	23.6
2023	4	0	NA	0	NA	58,653	30.9	49,630	19.6
2023	5	250	91.1	1,249	55.9	61,383	36.8	50,419	29.2
2023	6	1,252	92.5	1,270	62.3	120,410	37.2	92,311	17.6
2023	7	45,528	30.1	394,965	19.6	94,648	26.8	100,368	16.6
2023	8	16,685	49.3	60,843	38.9	65,800	39.5	58,559	26.1
2023	9	0	NA	0	NA	82,689	42.3	65,376	20.2
2023	10	986	91.3	6,881	63.2	14,052	68.4	22,030	26.3
2023	11	0	NA	0	NA	25,387	44.3	32,595	21.5
2023	12	655	40.3	520	27.2	9,289	56.1	31,866	22.5
2024	1	0	NA	0	NA	35,550	51.9	24,744	31.3
2024	2	0	NA	0	NA	125,128	34.3	69,805	24.9
2024	3	0	NA	0	NA	86,689	32.2	81,736	18.8
2024	4	13,670	81.7	112,710	54.7	79,312	36.0	43,136	25.0

Year	Month	Landings (no. fish)	PSE	Landings (pounds)	PSE	Releases (no. fish)	PSE	Effort (no. trips)	PSE
2024	5	525	100.1	8,199	67.4	133,964	36.3	99,009	25.5
2024	6	1,683	87.9	1,039	59.2	118,397	39.6	116,144	19.4
2024	7	57,103	27.3	507,274	18.4	182,161	25.7	111,485	18.4
2024	8	0	NA	0	NA	54,446	42.5	63,842	22.6
2024	9	0	NA	0	NA	21,533	40.9	46,511	27.3
2024	10	0	NA	0	NA	68,047	39.6	24,404	34.7
2024	11	1,443	41.7	10,284	28.1	40,500	35.3	46,993	28.6
2024	12	219	105.0	1,158	70.7	70,948	49.1	46,614	22.9
2025	1	0	NA	0	NA	62,221	44.8	38,736	25.6
2025	2	0	NA	0	NA	100,103	41.2	70,187	22.7
2025	3	0	NA	0	NA	66,468	40.4	36,195	20.5
2025	4	0	NA	0	NA	3,572	33.8	45,046	23.7
2025	5	0	NA	0	NA	88,271	31.2	76,932	19.8
2025	6	0	NA	0	NA	75,679	57.1	63,881	20.8
2025	7	654	101.6	3,172	68.4	41,943	32.9	76,991	14.6
2025	8	0	NA	0	NA	15,884	41.2	50,254	18.9
2025	9	0	NA	0	NA	35,905	69.8	28,938	21.4
2025	10	0	NA	0	NA	25,556	32.4	19,009	25.5
2025	11	354	106.8	305	71.9	97,110	28.3	51,350	19.1
2025	12	45	98.7	75	66.5	9,905	47.3	35,709	22.3