

# General Recreational Survey Data for Spanish Mackerel in the Gulf of Mexico

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## **General Recreational Survey Data for Spanish Mackerel in the Gulf of Mexico**

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General recreational catch estimates for Spanish Mackerel are compiled from the following separate sampling programs:

1. Marine Recreational Information Program (MRIP) (SEDAR68-DW-13)
2. Texas Parks and Wildlife Department (TPWD) (SEDAR70-WP-03)
3. Louisiana Creel survey program (LA Creel; 2014+)

- The Louisiana Biological sampling program (LA BIO) does not prioritize sampling of Spanish Mackerel. Size and age data from Louisiana (2014+) may be limited for this assessment (see Tables 14 and 15).
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Parameters for data prepared for SEDAR 81 recreational catch data:

- Species: Spanish Mackerel
- Year Range: 1981 - 2021
- Geographic Range: Gulf of Mexico states from Texas to western Florida, including the Florida Keys.
- Fishing Modes: Charter, Private, Shore, Headboat (1981-1985 from Texas to western Florida)

- MRIP Survey Methodology: Fully calibrated estimates that take into account the change in the Fishing Effort Survey (FES), the redesigned Access Point Angler Intercept Survey (APAIS), and the For Hire Survey (FHS)
  - MRIP Data Gaps from COVID: Missing 2020 intercepts were imputed from all APAIS data collected in 2018 and 2019 from the same strata as the 2020 data gap, with original sample weights reduced by a factor of two to account for using two years of data (Cody 2021).
  - SEFSC Data QAQC: Size records above an allowable (max size) threshold are excluded from average weight estimation and the summary tables included in this working paper (Tables 8-15). For SEDAR 81 Spanish Mackerel, this includes any weights heavier than 13.6059 pounds.
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#### Catch and Sample Size Information for Particular Domains:

Domains were selected based on strata-level catch estimates (year-state-mode-wave-area) that have a disproportionately large contribution to those total (annual) catch estimates that appear relatively large/small, as compared to adjacent years. Selected domains are more likely to be high catch estimates given the inherent zero-boundary constraint in all catch/effort data ( $\geq 0$ ) that complicates identification of low catch estimates.

- 1986 landings estimate: 6,104,757 fish
- 1986 discard estimate: 4,328,436 fish
  - Strata: western Florida, shore, wave 3, and ocean  $\leq 10$  miles
  - Intercept Records: a total of 38 angler trips that resulted in a landings estimate of 1,059,267 fish and discard estimate of 2,193,004 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	1.97	15
<i>Harvest not seen by interviewer</i>	0	0	1.14	9
<i>Released live fish</i>	0	4	6.39	20

- Strata: western Florida, shore, wave 5, and ocean  $\leq 10$  miles
- Intercept Records: a total of 10 angler trips that resulted in a landings estimate of 1,284,175 fish and discard estimate of 59,598

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	2	4.17	23
<i>Harvest not seen by interviewer</i>	0	1	8.4	46
<i>Released live fish</i>	0	0	0.6	4

- 1990 discard estimate: 10,728,593 fish
  - Strata: western Florida, shore, wave 5, and inshore
  - Intercept Records: a total of 25 angler trips that resulted in a discard estimate of 3,954,332 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	0.64	6
<i>Harvest not seen by interviewer</i>	0	0	1.08	5
<i>Released live fish</i>	0	6	16.72	75

- Strata: western Florida, shore, wave 5, and ocean <= 10 miles
- Intercept Records: a total of 54 angler trips that resulted in a discard estimate of 4,483,681 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	1.12	9
<i>Harvest not seen by interviewer</i>	0	0	0.30	3
<i>Released live fish</i>	0	4	8.74	66

- 2013 landings estimate: 9,000,359 fish
- 2013 discard estimate: 11,857,076 fish
  - Strata: western Florida, shore, wave 4, and ocean <= 10 miles
  - Intercept Records: a total of 83 angler trips that resulted in a landings estimate of 189,845 fish and discard estimate of 2,047,657 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	0.37	6
<i>Harvest not seen by interviewer</i>	0	0	0.24	5
<i>Released live fish</i>	0	2	4.38	30

- Strata: western Florida, shore, wave 6, and ocean <= 10 miles
- Intercept Records: a total of 65 angler trips that resulted in a landings estimate of 1,464,718 fish and discard estimate of 1,843,395 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	2.48	14
<i>Harvest not seen by interviewer</i>	0	0	1.05	10
<i>Released live fish</i>	0	3	3.70	12

- Strata: Alabama, shore, wave 4, and ocean <= 3 miles
- Intercept Records: a total of 45 angler trips that resulted in a landings estimate of 988,994 fish and discard estimate of 1,597,815 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	0.49	18
<i>Harvest not seen by interviewer</i>	0	0	4.22	15
<i>Released live fish</i>	0	2	7.56	50

- 2019 landings estimate: 8,338,969 fish
- 2019 discard estimate: 9,912,619 fish
  - Strata: western Florida, shore, wave 2, and inshore
  - Intercept Records: a total of 64 angler trips that resulted in a landings estimate of 1,160,291 fish and discard estimate of 467,247 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	1.08	15
<i>Harvest not seen by interviewer</i>	0	1	2.38	15
<i>Released live fish</i>	0	0	1.11	15

- Strata: western Florida, shore, wave 5, and ocean <= 10 miles
- Intercept Records: a total of 43 angler trips that resulted in a landings estimate of 537,261 fish and discard estimate of 1,260,037 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	1.56	15
<i>Harvest not seen by interviewer</i>	0	0	0.30	3
<i>Released live fish</i>	0	2	3.12	20

- Strata: Alabama, shore, wave 4, and ocean <= 3 miles
- Intercept Records: a total of 51 angler trips that resulted in a landings estimate of 2,088,549 fish and discard estimate of 2,368,238 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	0.67	15
<i>Harvest not seen by interviewer</i>	0	5	6.18	30
<i>Released live fish</i>	0	2	9.04	55

- Strata: Alabama, shore, wave 5, and ocean <= 3 miles
- Intercept Records: a total of 96 angler trips that resulted in a landings estimate of 840,735 fish and discard estimate of 1,238,030 fish

<i>Catch Observation</i>	<i>Minimum</i>	<i>Median</i>	<i>Mean</i>	<i>Maximum</i>
<i>Harvest seen by interviewer</i>	0	0	0.33	7
<i>Harvest not seen by interviewer</i>	0	1	3.09	20
<i>Released live fish</i>	0	2	4.5	30

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## Tables

**Table 1.** Annual landings (AB1) and discards (B2) of Spanish Mackerel in numbers of fish by state and year (MRIP, LACreel 2014+, TPWD).

**Table 2.** Annual landings (AB1) and discards (B2) of Spanish Mackerel in numbers of fish by mode and year (MRIP, LACreel 2014+, TPWD). Note that catch from the combined private-shore fishing mode in the LA Creel survey is added to the private mode. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Table 3.** Spanish Mackerel landings in numbers of fish (AB1) with associated coefficients of variation (CV; Dettloff et al. 2020) by mode and year (MRIP, LACreel 2014+, TPWD). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by dockside samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Spanish Mackerel. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Table 4.** Spanish Mackerel discards in numbers of fish (B2) with associated coefficients of variation (CV; Dettloff et al. 2020) by mode and year (MRIP, LACreel 2014+, TPWD). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by dockside samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Spanish Mackerel. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Table 5.** Spanish Mackerel landings (AB1) and discards (B2), in numbers of fish, with associated coefficients of variation (CV; Dettloff et al. 2020) by year for all modes combined (MRIP, LACreel 2014+, TPWD). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by dockside samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Spanish Mackerel.

**Table 6.** Estimated landings of Spanish Mackerel in pounds whole weight by state and year (MRIP, LACreel 2014+, TPWD). Average weight estimates are calculated by strata using the following hierarchy: species, region, year, state, mode, wave, and area (Matter and Rios 2013). The minimum number of weights used at each level of substitution is fifteen fish, except for the final species level where the minimum is one fish (Dettloff and Matter 2019b).

**Table 7.** Spanish Mackerel landings in pounds whole weight (LBS) with associated coefficients of variation (CV; Approach 2 described in Nuttall and Dettloff 2022) by year and mode (MRIP, LACreel 2014+, TPWD). MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Table 8.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Spanish Mackerel by state and year. Summaries include the number of fish

measured by MRIP and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths. LA lengths are available from MRIP only until 2013.

**Table 9.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Spanish Mackerel by state and year. Summaries include the number of fish weighed by MRIP and, in parentheses, the number of angler trips from which those fish were weighed (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish weights. LA weights are available from MRIP only until 2013.

**Table 10.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Spanish Mackerel by mode and year. Summaries include the number of fish measured by MRIP and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Table 11.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Spanish Mackerel by mode and year. Summaries include the number of fish weighed by MRIP and, in parentheses, the number of angler trips from which those fish were weighed (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish weights. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Table 12.** Summary of length (millimeters fork length) and weight measurements (pounds whole weight) from MRIP-intercepted Spanish Mackerel by year. Summaries include the number of fish for which size information was collected by MRIP and, in parentheses, the number of angler trips from which those fish were sampled (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths and weights.

**Table 13.** Summary of length measurements (millimeters total length) from TPWD-intercepted Spanish Mackerel by mode and year. Summaries include the number of fish measured by TPWD and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths.

**Table 14.** Summary of length measurements (millimeters fork length) from Spanish Mackerel intercepted by the LA BIO sampling program by mode and year. Summaries include the number of fish measured by LDWF and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths.

**Table 15.** Summary of weight measurements (pounds whole weight) from Spanish Mackerel intercepted by the LA BIO sampling program by mode and year. Summaries include the number of fish weighed by LDWF and, in parentheses, the number of angler

trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish weights.

**Table 16.** Estimated average weights of landed Spanish Mackerel in pounds whole weight (WGT) with associated coefficients of variation (CV; Approach 2 described in Nuttall and Dettloff 2022) by year and mode (MRIP, LACreel 2014+, TPWD). Average weight estimates are calculated from annual estimates (by-mode) of landings-in-weight (Table 7) divided by estimates of landings-in-number (Table 2). Sample size (N) is provided as the total number of angler trips and, in parentheses, number of fish from which weight information was collected (MRIP, LABIO 2014+, TPWD). MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Table 17.** Resolution of landings-in-weight estimates (pounds whole weight) for Gulf of Mexico Spanish Mackerel by year and hierarchy level (MRIP, LACreel 2014+, TPWD), defined by species, region, year, state, mode, wave, and area. Average weight estimates are calculated at the finest strata meeting a minimum sample size threshold (Dettloff and Matter 2019b). Larger sample sizes therefore allow average weights to be calculated at finer stratifications, the finest being at the srysmwa level (Matter and Rios 2013). Annual summaries include the number of fish and angler trips from which weight information was collected (N) and the landings-in-weight estimates (AB1.lbs) by hierarchy level. As an example, (srysmw) summarizes those landings-in-weight estimates originating from cells where average weights are specific to a particular species, region, year, state, mode, and wave (i.e., weight observations collapsed across areas).

**Table 18.** Recreational Fishing Effort (in angler trips) for Gulf of Mexico anglers by state and year (MRIP, LACreel 2014+, TPWD). These effort estimates depict all (general) recreational fishing activity in the Gulf of Mexico and are not specific to Spanish Mackerel.

**Table 19.** Recreational Fishing Effort (in angler trips) for Gulf of Mexico anglers by mode and year (MRIP, LACreel 2014+, TPWD). These effort estimates depict all (general) recreational fishing activity in the Gulf of Mexico and are not specific to Spanish Mackerel. Effort from the combined private-shore fishing mode in the LA Creel survey has been added to the private mode. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

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## Figures

**Figure 1.** Comparison of Charterboat landings (AB1) and discard (B2) estimates (with standard error intervals shown) for Spanish Mackerel from the Coastal Household Telephone Survey (CHTS) and For-Hire Survey (FHS) from the Gulf of Mexico between 1981 and 1999 (MRIP). The Charterboat calibration approach is discussed in Dettloff and Matter (2019a).

**Figure 2.** MRIP Base (BASE), APAIS Calibrated (ACAL), and Fully Calibrated APAIS and FES (FCAL) catch estimates for Spanish Mackerel in the Gulf of Mexico between 1981 and 2017. Landings (AB1) and discard (B2) estimates are in thousands of fish (NMFS).

**Figure 3.** Comparison of total general recreational landings (AB1) and discard estimates (B2) for Gulf of Mexico Spanish Mackerel between SEDAR 81 and SEDAR 28, the terminal years of which are 2021 and 2010 respectively. Differences in catch estimates, which are in thousands of fish, are largely a function of changes in the MRIP survey (e.g., redesigned APAIS in 2013, FES in 2018).

**Figure 4.** Annual Spanish Mackerel landings (AB1) and discards (B2), in thousands of fish, by state from 1981 to 2021 (MRIP, LACreel 2014+, TPWD).

**Figure 4a.** Percent of Spanish Mackerel landings (AB1) and discards (B2), in numbers of fish, from each state by year (bar graph) and overall (pie chart) between 1981 and 2021 (MRIP, LACreel 2014+, TPWD).

**Figure 5.** Annual Spanish Mackerel landings (AB1) and discards (B2), in thousands of fish, by mode from 1981 to 2021 (MRIP, LACreel 2014+, TPWD). Note that catch from the combined Private-Shore fishing mode in the LA Creel survey has been added to the Private mode. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Figure 5a.** Percent of Spanish Mackerel landings (AB1) and discards (B2), in numbers of fish, from each mode by year (bar graph) and overall (pie chart) between 1981 and 2021 (MRIP, LACreel 2014+, TPWD). Note that catch from the combined Private-Shore fishing mode in the LA Creel survey has been added to the Private mode. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

**Figure 6.** Estimates of annual landings for Spanish Mackerel in the Gulf of Mexico (MRIP, LACreel 2014+, TPWD): estimated landings in thousands of fish (top), estimated landings in thousands of pounds whole weight (middle), and average weight of landed fish (estimated lbs/estimated fish) (bottom). Average weight estimates are calculated by strata using the following hierarchy: species, region, year, state, mode, wave, and area (Matter and Rios 2013). The minimum number of weights used at each level of substitution is fifteen fish, except for the final species level where the minimum is one fish (Dettloff and Matter 2019b).

**Figure 7.** Annual landings estimates of Gulf of Mexico Spanish Mackerel in thousands of pounds whole weight by hierarchy level (MRIP, LACreel 2014+, TPWD), defined by species, region, year, state, mode, wave, and area. Landings are grouped by the strata at which average weights were estimated, the finest stratification being at the srysmwa level (Matter and Rios 2013). As an example, (srysmw) summarizes those landings-in-weight estimates originating from cells where average weights are specific to a particular species, region, year, state, mode, and wave (i.e., weight observations collapsed across areas). Landings are provided (A) in absolute pounds and (B) as a percentage of total landings-in-weight, which is summarized by year (stacked bar plot) and across all years (pie chart).

**Figure 8.** COVID data gaps in the MRIP APAIS and associated imputations for (positive) fishing trips that intercepted Gulf of Mexico Spanish Mackerel. No 2020 data were imputed for the FES or FHS. (A) Number of positive intercepts in 2020 from the APAIS (RAW) vs. those imputed from intercepts in adjacent years (IMP). (B) Distribution of APAIS catch observations in years with no imputed catch data (in 2015-2019 and 2021), in raw 2020 APAIS data, and in 2020 imputations. Refer to Cody (2021) for more information on COVID data gaps in MRIP.

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## Appendices

### **Appendix A.** Additional Details of Survey Data and SEFSC Estimation

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**Table 1.** Annual landings (AB1) and discards (B2) of Spanish Mackerel in numbers of fish by state and year (MRIP, LACreel 2014+, TPWD).

Year	TX		LA		MS		AL		FLW		Total	
	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2
1981	4,241	207	19,153	0	458,540	15,168	604,012	1,116	1,723,000	160,719	2,808,946	177,209
1982	4,241	61	236,531	7,760	832,464	11,765	976,329	0	964,504	538,600	3,014,068	558,187
1983	3,758	138	134,279	9,050	610,029	4,620	813,533	3,001	813,992	880,520	2,375,591	897,329
1984	5,571	775	95,486	0	325,477	64,478	678,815	5,860	342,181	41,989	1,447,529	113,101
1985	3,393	203	119,215	39,817	227,500	21,372	400,855	0	1,457,797	728,828	2,208,759	790,221
1986	2,524	1,370	14,227	116	80,230	2,019	473,554	411,362	5,534,222	3,913,569	6,104,757	4,328,436
1987	8,176	1,794	109,059	32,618	160,757	3,890	465,562	36,482	1,856,807	474,864	2,600,361	549,647
1988	1,386	860	66,913	183,481	132,053	17,682	112,593	31,365	1,862,635	1,058,100	2,175,579	1,291,488
1989	2,543	989	201,315	60,726	31,078	29,002	829,611	49,108	1,556,476	779,573	2,621,023	919,398
1990	3,445	2,365	142,971	117,965	34,064	53,883	794,445	436,100	3,542,077	10,118,280	4,517,003	10,728,593
1991	9,983	3,761	101,089	62,456	225,874	18,961	512,023	353,026	3,040,603	2,181,605	3,889,571	2,619,810
1992	2,561	1,281	275,755	121,401	98,799	16,065	500,161	58,524	4,506,953	3,799,610	5,384,229	3,996,881
1993	1,640	791	67,103	29,752	35,964	26,775	301,508	91,977	3,591,242	2,671,322	3,997,458	2,820,617
1994	5,429	2,569	19,646	22,958	37,602	33,713	355,077	97,772	3,722,431	1,723,990	4,140,185	1,881,000
1995	8,485	6,639	41,115	16,323	45,331	8,197	426,736	280,855	1,309,197	881,589	1,830,865	1,193,604
1996	9,249	6,078	38,544	29,874	55,935	4,509	334,293	134,477	1,643,013	1,029,697	2,081,034	1,204,635
1997	5,334	2,540	112,176	36,460	189,927	4,191	297,860	37,546	1,671,700	1,621,674	2,276,998	1,702,412
1998	5,571	3,414	21,202	16,175	37,655	4,475	386,703	49,995	1,974,371	1,575,792	2,425,502	1,649,851
1999	4,625	3,264	66,103	77,837	46,530	9,180	675,377	192,433	4,227,340	4,032,615	5,019,975	4,315,329
2000	5,381	3,892	205,771	207,440	32,791	15,583	624,813	196,312	3,453,184	2,864,930	4,321,940	3,288,157
2001	1,473	1,507	22,560	44,211	19,730	3,464	521,930	193,217	5,430,877	4,841,147	5,996,569	5,083,546
2002	4,580	3,064	41,566	69,511	42,209	13,286	380,109	57,245	4,585,396	4,891,648	5,053,860	5,034,755
2003	4,570	5,721	54,135	21,594	37,234	1,435	310,330	288,895	3,517,670	5,377,331	3,923,939	5,694,975
2004	8,337	12,485	21,611	22,996	21,750	9,011	782,678	461,149	4,830,000	5,441,696	5,664,376	5,947,337
2005	8,155	9,865	53,501	51,317	12,619	3,266	106,454	140,909	2,956,348	3,629,098	3,137,077	3,834,457
2006	10,159	14,861	34,601	38,112	9,057	26,936	149,414	123,294	3,087,484	5,701,943	3,290,715	5,905,146
2007	7,132	7,783	34,317	37,325	15,378	27	295,119	62,680	3,175,369	5,058,148	3,527,315	5,165,962
2008	2,567	1,245	7,159	23,706	29,650	3,124	243,357	81,846	4,481,473	4,771,859	4,764,205	4,881,779
2009	4,976	4,695	17,585	34,168	30,864	12,389	203,515	126,741	3,337,829	3,564,753	3,594,769	3,742,745
2010	11,438	12,794	46,332	27,312	16,736	1,903	630,892	296,874	3,766,798	6,129,916	4,472,196	6,468,798

Year	TX		LA		MS		AL		FLW		Total	
	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2
2011	7,616	10,148	13,221	52,843	41,776	5,815	1,309,469	446,628	3,509,573	5,864,893	4,881,655	6,380,328
2012	4,504	4,342	69,979	89,748	133,713	35,408	1,478,355	477,358	3,795,539	4,013,534	5,482,090	4,620,390
2013	1,734	2,163	53,779	10,610	63,716	5,227	2,921,254	2,495,610	5,959,876	9,343,466	9,000,359	11,857,076
2014	2,324	2,593	11,539	11,802	25,784	9,045	476,570	162,022	3,974,496	5,985,624	4,490,713	6,171,085
2015	2,409	3,128	10,283	11,255	64,438	10,172	2,239,864	1,054,448	3,184,057	3,171,335	5,501,051	4,250,338
2016	4,771	2,588	15,921	7,848	131,820	52,943	1,772,156	354,989	3,676,943	2,354,387	5,601,611	2,772,755
2017	6,394	8,163	8,856	7,009	23,932	113,114	2,528,964	1,233,042	3,809,633	6,589,125	6,377,779	7,950,453
2018	5,859	5,400	10,142	10,947	177,324	71,769	1,601,487	1,362,272	2,963,692	4,719,208	4,758,504	6,169,596
2019	2,262	2,502	17,805	10,241	29,703	119,557	3,752,010	3,984,615	4,537,188	5,795,705	8,338,969	9,912,619
2020	1,336	1,200	11,144	2,486	32,132	21,439	595,507	168,077	3,438,367	5,615,712	4,078,487	5,808,913
2021	341	120	5,708	3,120	17,822	60,079	839,096	235,202	3,441,204	2,606,335	4,304,171	2,904,856

**Table 2.** Annual landings (AB1) and discards (B2) of Spanish Mackerel in numbers of fish by mode and year (MRIP, LACreel 2014+, TPWD). Note that catch from the combined private-shore fishing mode in the LA Creel survey is added to the private mode. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

Year	Cbt		Hbt		Priv		Shore		Total	
	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2
1981	303,102	7,722	53,209	4,825	1,705,867	86,572	746,769	78,090	2,808,946	177,209
1982	427,088	7,714	5,742	0	2,005,638	28,509	575,601	521,963	3,014,068	558,187
1983	276,138	0	23,436	0	1,279,241	59,803	796,776	837,526	2,375,591	897,329
1984	270,747	8,197	34,328	2,328	592,029	84,311	550,425	18,265	1,447,529	113,101
1985	204,042	181	19,212	0	1,160,778	70,423	824,728	719,617	2,208,759	790,221
1986	251,285	46,877			2,454,548	1,360,621	3,398,924	2,920,939	6,104,757	4,328,436
1987	194,426	5,767			1,277,829	293,853	1,128,106	250,027	2,600,361	549,647
1988	154,981	14,855			1,497,123	987,140	523,476	289,493	2,175,579	1,291,488
1989	273,263	108,946			1,235,297	481,166	1,112,463	329,286	2,621,023	919,398
1990	421,979	32,325			1,588,933	1,143,999	2,506,091	9,552,269	4,517,003	10,728,593
1991	154,337	9,953			1,967,344	767,777	1,767,890	1,842,081	3,889,571	2,619,810
1992	198,913	126,075			1,985,528	994,654	3,199,788	2,876,152	5,384,229	3,996,881
1993	93,657	28,295			688,627	352,271	3,215,174	2,440,052	3,997,458	2,820,617
1994	107,260	33,091			931,592	445,960	3,101,334	1,401,950	4,140,185	1,881,000
1995	198,677	39,933			511,720	410,052	1,120,469	743,620	1,830,865	1,193,604
1996	127,024	7,888			820,835	546,277	1,133,175	650,470	2,081,034	1,204,635
1997	95,921	57,581			1,167,146	550,753	1,013,930	1,094,078	2,276,998	1,702,412
1998	98,165	21,076			851,134	526,628	1,476,203	1,102,147	2,425,502	1,649,851
1999	108,232	15,479			1,835,692	1,350,916	3,076,051	2,948,934	5,019,975	4,315,329
2000	182,297	33,560			1,708,558	1,286,747	2,431,085	1,967,851	4,321,940	3,288,157
2001	161,764	41,590			1,515,194	1,557,112	4,319,611	3,484,845	5,996,569	5,083,546
2002	115,679	32,405			1,464,624	1,122,106	3,473,557	3,880,245	5,053,860	5,034,755
2003	166,124	40,236			1,208,487	1,578,473	2,549,327	4,076,266	3,923,939	5,694,975
2004	150,685	56,989			1,975,251	2,982,019	3,538,440	2,908,330	5,664,376	5,947,337
2005	70,342	22,597			1,830,249	2,271,538	1,236,486	1,540,321	3,137,077	3,834,457
2006	260,793	49,606			1,414,945	2,243,313	1,614,977	3,612,227	3,290,715	5,905,146
2007	172,766	55,413			1,384,728	1,617,295	1,969,820	3,493,253	3,527,315	5,165,962
2008	234,758	29,302			2,819,397	1,424,390	1,710,050	3,428,088	4,764,205	4,881,779
2009	220,046	94,297			1,895,900	1,806,382	1,478,822	1,842,066	3,594,769	3,742,745
2010	129,535	127,794			1,867,464	2,107,330	2,475,197	4,233,675	4,472,196	6,468,798
2011	274,081	94,353			1,764,689	2,578,519	2,842,884	3,707,456	4,881,655	6,380,328
2012	278,438	77,228			1,490,783	1,562,546	3,712,868	2,980,616	5,482,090	4,620,390
2013	103,821	78,144			1,712,936	2,155,217	7,183,603	9,623,715	9,000,359	11,857,076
2014	81,687	34,983			1,146,302	1,301,643	3,262,724	4,834,459	4,490,713	6,171,085
2015	235,462	72,691			849,147	1,149,327	4,416,443	3,028,320	5,501,051	4,250,338
2016	223,354	77,131			1,652,403	994,307	3,725,854	1,701,317	5,601,611	2,772,755
2017	209,552	48,785			763,022	1,088,900	5,405,204	6,812,768	6,377,779	7,950,453
2018	326,994	121,697			1,111,398	1,081,769	3,320,113	4,966,130	4,758,504	6,169,596
2019	254,083	85,791			1,493,050	1,779,287	6,591,836	8,047,542	8,338,969	9,912,619
2020	186,933	82,439			1,306,193	1,395,280	2,585,361	4,331,194	4,078,487	5,808,913
2021	235,775	64,590			2,192,657	786,156	1,875,738	2,054,110	4,304,171	2,904,856

**Table 3.** Spanish Mackerel landings in numbers of fish (AB1) with associated coefficients of variation (CV; Dettloff et al. 2020) by mode and year (MRIP, LACreel 2014+, TPWD). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by dockside samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Spanish Mackerel. MRIP Headboat estimates (1981–1985) are included from Texas to western Florida.

Year	Cbt				Hbt				Priv				Shore			
	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp
1981	303,101	0.56	85 (17)	706 (33)	53,208	0.49	76 (17)	691 (33)	1,705,866	0.28	243 (51)	1,973 (90)	746,768	0.31	345 (23)	2,109 (46)
1982	427,088	0.63	88 (19)	673 (43)	5,741	0.70	76 (19)	658 (43)	2,005,638	0.40	509 (77)	4,151 (211)	575,600	0.25	571 (37)	3,971 (70)
1983	276,138	0.46	258 (29)	1,829 (52)	23,436	0.55	123 (24)	1,626 (45)	1,279,240	0.35	758 (85)	7,251 (165)	796,775	0.32	387 (24)	2,739 (60)
1984	270,747	0.30	231 (31)	1,991 (81)	34,327	0.64	116 (28)	1,776 (78)	592,028	0.30	774 (64)	5,711 (100)	550,425	0.55	420 (11)	3,130 (36)
1985	204,041	0.35	217 (21)	1,596 (64)	19,212	0.51	89 (19)	1,354 (62)	1,160,777	0.29	912 (92)	7,707 (180)	824,727	0.50	503 (16)	3,679 (29)
1986	251,284	0.26	455 (86)	2,827 (197)					2,454,548	0.19	1,800 (192)	14,463 (361)	3,398,924	0.43	430 (18)	2,108 (70)
1987	194,425	0.21	433 (94)	2,651 (186)					1,277,828	0.13	1,881 (266)	15,614 (475)	1,128,105	0.28	400 (29)	2,323 (78)
1988	154,980	0.43	429 (75)	2,237 (133)					1,497,123	0.21	1,910 (183)	15,523 (323)	523,475	0.25	627 (27)	3,771 (47)
1989	273,262	0.34	388 (59)	1,857 (109)					1,235,297	0.16	1,446 (162)	11,393 (293)	1,112,463	0.32	438 (29)	3,060 (73)
1990	421,979	0.61	277 (47)	1,370 (116)					1,588,933	0.16	1,227 (161)	8,944 (296)	2,506,090	0.24	417 (45)	2,641 (133)
1991	154,337	0.32	398 (65)	2,106 (124)					1,967,344	0.18	1,349 (202)	10,854 (365)	1,767,890	0.35	488 (33)	3,096 (76)
1992	198,912	0.30	601 (97)	3,739 (176)					1,985,528	0.10	2,066 (344)	20,719 (614)	3,199,787	0.16	919 (95)	6,162 (264)
1993	93,657	0.48	413 (41)	2,294 (60)					688,627	0.15	1,780 (162)	17,469 (269)	3,215,173	0.18	1,080 (97)	8,408 (255)
1994	107,260	0.38	454 (43)	2,411 (73)					931,591	0.21	1,807 (211)	20,187 (359)	3,101,333	0.37	1,020 (112)	9,625 (327)
1995	198,676	0.46	433 (36)	2,285 (70)					511,720	0.26	1,637 (154)	18,192 (325)	1,120,468	0.37	874 (54)	8,768 (123)
1996	127,024	0.34	513 (49)	2,588 (75)					820,834	0.15	1,976 (214)	20,695 (443)	1,133,174	0.30	823 (56)	6,324 (153)
1997	95,921	0.33	761 (98)	3,831 (180)					1,167,146	0.17	1,875 (194)	21,099 (333)	1,013,929	0.22	742 (63)	6,241 (153)
1998	98,164	0.23	1,093 (156)	6,967 (228)					851,134	0.14	1,995 (212)	23,139 (378)	1,476,202	0.24	817 (71)	7,009 (189)
1999	108,232	0.15	1,485 (242)	11,574 (418)					1,835,692	0.13	2,554 (300)	28,837 (519)	3,076,050	0.24	998 (119)	9,162 (294)
2000	182,296	0.21	1,566 (312)	14,430 (520)					1,708,558	0.25	2,306 (279)	24,551 (495)	2,431,085	0.20	867 (94)	7,410 (227)
2001	161,763	0.18	1,299 (203)	12,514 (309)					1,515,194	0.15	2,146 (256)	25,116 (442)	4,319,611	0.29	831 (102)	7,650 (291)
2002	115,678	0.24	1,294 (172)	12,389 (268)					1,464,624	0.13	2,209 (332)	26,203 (537)	3,473,556	0.19	808 (106)	7,648 (280)
2003	166,124	0.24	1,385 (192)	13,199 (329)					1,208,487	0.12	2,382 (261)	26,140 (409)	2,549,326	0.20	949 (73)	8,277 (179)
2004	150,685	0.34	1,320 (210)	13,111 (330)					1,975,250	0.13	2,161 (289)	25,070 (509)	3,538,439	0.20	710 (88)	6,630 (210)
2005	70,342	0.26	1,119 (130)	10,954 (188)					1,830,248	0.28	2,009 (203)	22,880 (412)	1,236,485	0.38	670 (43)	6,526 (120)
2006	260,793	0.38	1,018 (110)	8,960 (153)					1,414,945	0.16	2,320 (292)	25,458 (607)	1,614,976	0.32	730 (74)	6,578 (166)
2007	172,766	0.24	1,103 (157)	9,220 (232)					1,384,727	0.13	2,301 (260)	25,177 (459)	1,969,820	0.22	771 (69)	6,881 (181)
2008	234,758	0.34	1,078 (155)	8,447 (221)					2,819,396	0.38	2,464 (284)	26,025 (495)	1,710,050	0.36	792 (58)	6,877 (160)
2009	220,046	0.49	968 (143)	7,245 (202)					1,895,900	0.28	2,469 (306)	26,938 (484)	1,478,822	0.25	828 (88)	7,405 (189)
2010	129,535	0.20	973 (144)	7,433 (212)					1,867,464	0.22	2,432 (266)	24,848 (440)	2,475,197	0.25	768 (96)	7,328 (261)

Year	Cbt				Hbt				Priv				Shore			
	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp
2011	274,081	0.17	1,158 (194)	9,137 (317)					1,764,689	0.22	2,566 (298)	26,290 (510)	2,842,884	0.25	804 (93)	7,240 (241)
2012	278,437	0.19	1,240 (256)	10,191 (433)					1,490,783	0.13	2,745 (277)	26,968 (493)	3,712,868	0.25	870 (118)	8,155 (322)
2013	103,820	0.22	796 (109)	4,808 (161)					1,712,935	0.14	2,462 (308)	23,963 (494)	7,183,603	0.22	671 (106)	6,625 (307)
2014	81,686	0.14	1,412 (174)	8,238 (280)					1,146,301	0.17	3,546 (348)	31,705 (561)	3,262,724	0.25	802 (66)	5,942 (186)
2015	235,461	0.21	1,553 (203)	8,579 (452)					849,146	0.13	3,672 (331)	31,500 (492)	4,416,443	0.23	784 (65)	5,557 (211)
2016	223,353	0.18	1,588 (222)	7,840 (447)					1,652,403	0.21	3,789 (387)	32,008 (632)	3,725,854	0.31	1,062 (72)	6,013 (178)
2017	209,552	0.20	1,506 (183)	7,860 (342)					763,022	0.16	3,443 (254)	29,674 (381)	5,405,204	0.32	896 (60)	5,431 (170)
2018	326,993	0.24	1,549 (173)	8,649 (326)					1,111,397	0.16	3,341 (235)	25,865 (392)	3,320,112	0.21	911 (78)	5,798 (223)
2019	254,082	0.17	1,611 (166)	8,184 (318)					1,493,049	0.29	3,391 (225)	26,735 (349)	6,591,836	0.31	911 (74)	5,508 (292)
2020	186,932	0.20	1,547 (187)	8,026 (345)					1,306,192	0.21	3,509 (292)	29,942 (448)	2,585,361	0.23	935 (64)	5,622 (193)
2021	235,775	0.36	1,781 (184)	11,014 (334)					2,192,657	0.24	3,312 (194)	22,744 (269)	1,875,737	0.26	1,007 (75)	7,293 (144)

**Table 4.** Spanish Mackerel discards in numbers of fish (B2) with associated coefficients of variation (CV; Dettloff et al. 2020) by mode and year (MRIP, LACreel 2014+, TPWD). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by dockside samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Spanish Mackerel. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

Year	Cbt				Hbt				Priv				Shore			
	B2	CV	PSU	Trp	B2	CV	PSU	Trp	B2	CV	PSU	Trp	B2	CV	PSU	Trp
1981	7,722	1.00	85 (1)	706 (1)	4,824	1.00	76 (1)	691 (1)	86,571	0.64	243 (4)	1,973 (7)	78,089	0.37	345 (9)	2,109 (11)
1982	7,713	0.71	88 (3)	673 (3)	0	0.00	76 (3)	658 (3)	28,509	0.51	509 (6)	4,151 (6)	521,963	0.89	571 (9)	3,971 (20)
1983	0	0.00	258 (0)	1,829 (0)	0	0.00	123 (0)	1,626 (0)	59,803	0.47	758 (6)	7,251 (7)	837,525	0.77	387 (9)	2,739 (16)
1984	8,196	0.57	231 (5)	1,991 (6)	2,328	0.71	116 (5)	1,776 (6)	84,311	0.75	774 (3)	5,711 (3)	18,264	0.50	420 (4)	3,130 (4)
1985	180	1.00	217 (1)	1,596 (1)	0	0.00	89 (1)	1,354 (1)	70,422	0.61	912 (5)	7,707 (10)	719,617	0.68	503 (6)	3,679 (14)
1986	46,876	0.45	455 (23)	2,827 (33)					1,360,620	0.21	1,800 (71)	14,463 (157)	2,920,938	0.56	430 (13)	2,108 (42)
1987	5,767	0.46	433 (15)	2,651 (20)					293,853	0.22	1,881 (63)	15,614 (90)	250,026	0.45	400 (7)	2,323 (18)
1988	14,854	0.69	429 (13)	2,237 (22)					987,140	0.24	1,910 (59)	15,523 (93)	289,493	0.46	627 (14)	3,771 (24)
1989	108,946	0.52	388 (18)	1,857 (42)					481,165	0.26	1,446 (44)	11,393 (68)	329,285	0.47	438 (13)	3,060 (23)
1990	32,325	0.56	277 (18)	1,370 (72)					1,143,998	0.32	1,227 (61)	8,944 (98)	9,552,269	0.44	417 (31)	2,641 (104)
1991	9,952	0.33	398 (18)	2,106 (37)					767,776	0.22	1,349 (75)	10,854 (113)	1,842,080	0.52	488 (21)	3,096 (45)

Year	Cbt				Hbt				Priv				Shore			
	B2	CV	PSU	Trp	B2	CV	PSU	Trp	B2	CV	PSU	Trp	B2	CV	PSU	Trp
1992	126,075	0.52	601 (22)	3,739 (50)					994,654	0.13	2,066 (156)	20,719 (292)	2,876,152	0.22	919 (78)	6,162 (186)
1993	28,294	0.91	413 (7)	2,294 (14)					352,270	0.22	1,780 (54)	17,469 (83)	2,440,051	0.28	1,080 (67)	8,408 (170)
1994	33,091	0.91	454 (9)	2,411 (12)					445,959	0.18	1,807 (84)	20,187 (125)	1,401,949	0.39	1,020 (77)	9,625 (162)
1995	39,932	0.55	433 (12)	2,285 (41)					410,052	0.42	1,637 (46)	18,192 (63)	743,619	0.32	874 (43)	8,768 (72)
1996	7,887	0.46	513 (8)	2,588 (16)					546,276	0.22	1,976 (88)	20,695 (149)	650,470	0.29	823 (42)	6,324 (77)
1997	57,581	0.60	761 (23)	3,831 (37)					550,752	0.22	1,875 (81)	21,099 (125)	1,094,078	0.29	742 (47)	6,241 (92)
1998	21,075	0.30	1,093 (39)	6,967 (82)					526,628	0.17	1,995 (93)	23,139 (164)	1,102,147	0.28	817 (63)	7,009 (158)
1999	15,479	0.27	1,485 (54)	11,574 (120)					1,350,916	0.15	2,554 (227)	28,837 (400)	2,948,933	0.17	998 (136)	9,162 (366)
2000	33,560	0.30	1,566 (55)	14,430 (103)					1,286,746	0.35	2,306 (151)	24,551 (228)	1,967,850	0.20	867 (74)	7,410 (151)
2001	41,590	0.50	1,299 (40)	12,514 (80)					1,557,111	0.21	2,146 (172)	25,116 (325)	3,484,844	0.27	831 (92)	7,650 (262)
2002	32,404	0.39	1,294 (55)	12,389 (108)					1,122,105	0.14	2,209 (191)	26,203 (375)	3,880,244	0.26	808 (95)	7,648 (266)
2003	40,235	0.21	1,385 (77)	13,199 (173)					1,578,473	0.19	2,382 (202)	26,140 (396)	4,076,266	0.22	949 (83)	8,277 (239)
2004	56,988	0.24	1,320 (69)	13,111 (142)					2,982,018	0.19	2,161 (202)	25,070 (463)	2,908,329	0.16	710 (88)	6,630 (255)
2005	22,597	0.22	1,119 (41)	10,954 (105)					2,271,538	0.35	2,009 (142)	22,880 (279)	1,540,321	0.27	670 (50)	6,526 (148)
2006	49,605	0.34	1,018 (24)	8,960 (58)					2,243,313	0.16	2,320 (214)	25,458 (435)	3,612,226	0.35	730 (68)	6,578 (212)
2007	55,413	0.28	1,103 (46)	9,220 (83)					1,617,295	0.15	2,301 (191)	25,177 (363)	3,493,253	0.27	771 (86)	6,881 (224)
2008	29,301	0.30	1,078 (37)	8,447 (83)					1,424,389	0.17	2,464 (178)	26,025 (354)	3,428,088	0.28	792 (72)	6,877 (254)
2009	94,297	0.44	968 (38)	7,245 (93)					1,806,381	0.15	2,469 (232)	26,938 (490)	1,842,066	0.18	828 (102)	7,405 (289)
2010	127,793	0.40	973 (57)	7,433 (140)					2,107,329	0.16	2,432 (227)	24,848 (523)	4,233,674	0.22	768 (109)	7,328 (363)
2011	94,352	0.28	1,158 (66)	9,137 (184)					2,578,519	0.19	2,566 (239)	26,290 (519)	3,707,455	0.33	804 (110)	7,240 (331)
2012	77,228	0.19	1,240 (101)	10,191 (295)					1,562,545	0.15	2,745 (193)	26,968 (379)	2,980,616	0.15	870 (114)	8,155 (342)
2013	78,144	0.49	796 (44)	4,808 (92)					2,155,217	0.16	2,462 (199)	23,963 (403)	9,623,714	0.22	671 (121)	6,625 (438)
2014	34,982	0.35	1,412 (54)	8,238 (98)					1,301,643	0.17	3,546 (213)	31,705 (377)	4,834,459	0.38	802 (76)	5,942 (240)
2015	72,691	0.24	1,553 (61)	8,579 (125)					1,149,327	0.26	3,672 (196)	31,500 (373)	3,028,319	0.23	784 (71)	5,557 (203)
2016	77,131	0.24	1,588 (64)	7,840 (173)					994,307	0.23	3,789 (235)	32,008 (365)	1,701,316	0.23	1,062 (69)	6,013 (143)
2017	48,785	0.22	1,506 (63)	7,860 (150)					1,088,899	0.19	3,443 (176)	29,674 (277)	6,812,768	0.38	896 (66)	5,431 (177)
2018	121,697	0.34	1,549 (59)	8,649 (155)					1,081,768	0.19	3,341 (148)	25,865 (295)	4,966,129	0.32	911 (65)	5,798 (197)
2019	85,790	0.31	1,611 (59)	8,184 (185)					1,779,286	0.24	3,391 (131)	26,735 (251)	8,047,541	0.28	911 (82)	5,508 (301)
2020	82,439	0.39	1,547 (61)	8,026 (168)					1,395,280	0.23	3,509 (184)	29,942 (327)	4,331,194	0.29	935 (70)	5,622 (158)
2021	64,589	0.32	1,781 (55)	11,014 (149)					786,156	0.17	3,312 (120)	22,744 (213)	2,054,110	0.24	1,007 (83)	7,293 (180)

**Table 5.** Spanish Mackerel landings (AB1) and discards (B2), in numbers of fish, with associated coefficients of variation (CV; Dettloff et al. 2020) by year for all modes combined (MRIP, LACreel 2014+, TPWD). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by dockside samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Spanish Mackerel.

Year	AB1				B2			
	Total	CV	PSU	Trp	Total	CV	PSU	Trp
1981	2,808,945	0.19	673 (91)	4,788 (169)	177,209	0.36	673 (14)	4,788 (19)
1982	3,014,068	0.29	1,168 (133)	8,795 (324)	558,186	0.83	1,168 (18)	8,795 (29)
1983	2,375,590	0.22	1,302 (134)	11,819 (277)	897,329	0.71	1,302 (15)	11,819 (23)
1984	1,447,528	0.23	1,359 (106)	10,832 (217)	113,101	0.57	1,359 (12)	10,832 (13)
1985	2,208,759	0.24	1,532 (129)	12,982 (273)	790,220	0.58	1,532 (12)	12,982 (25)
1986	6,104,757	0.24	2,573 (295)	19,398 (628)	4,328,436	0.35	2,573 (107)	19,398 (232)
1987	2,600,360	0.13	2,588 (387)	20,588 (739)	549,647	0.23	2,588 (85)	20,588 (128)
1988	2,175,579	0.16	2,839 (284)	21,531 (503)	1,291,488	0.21	2,839 (86)	21,531 (139)
1989	2,621,023	0.16	2,133 (248)	16,310 (475)	919,397	0.22	2,133 (75)	16,310 (133)
1990	4,517,002	0.15	1,816 (252)	12,955 (545)	10,728,592	0.37	1,816 (110)	12,955 (274)
1991	3,889,571	0.18	2,090 (296)	16,056 (565)	2,619,809	0.37	2,090 (114)	16,056 (195)
1992	5,384,228	0.10	3,426 (536)	30,620 (1,054)	3,996,881	0.16	3,426 (256)	30,620 (528)
1993	3,997,458	0.14	3,118 (299)	28,171 (584)	2,820,617	0.25	3,118 (128)	28,171 (267)
1994	4,140,185	0.28	3,092 (364)	32,223 (759)	1,881,000	0.29	3,092 (170)	32,223 (299)
1995	1,830,865	0.24	2,760 (243)	29,245 (518)	1,193,604	0.24	2,760 (101)	29,245 (176)
1996	2,081,033	0.17	3,093 (318)	29,607 (671)	1,204,634	0.18	3,093 (138)	29,607 (242)
1997	2,276,997	0.13	3,155 (350)	31,171 (666)	1,702,412	0.20	3,155 (151)	31,171 (254)
1998	2,425,502	0.15	3,667 (438)	37,115 (795)	1,649,851	0.19	3,667 (195)	37,115 (404)
1999	5,019,975	0.15	4,748 (660)	49,573 (1,231)	4,315,329	0.13	4,748 (417)	49,573 (886)
2000	4,321,940	0.15	4,448 (683)	46,384 (1,242)	3,288,157	0.18	4,448 (280)	46,384 (482)
2001	5,996,569	0.21	3,984 (559)	45,280 (1,042)	5,083,546	0.19	3,984 (304)	45,280 (667)
2002	5,053,859	0.13	4,045 (608)	46,240 (1,085)	5,034,755	0.20	4,045 (341)	46,240 (749)
2003	3,923,938	0.13	4,439 (524)	47,616 (917)	5,694,975	0.16	4,439 (362)	47,616 (808)
2004	5,664,375	0.13	3,896 (581)	44,811 (1,049)	5,947,337	0.12	3,896 (359)	44,811 (860)
2005	3,137,076	0.22	3,507 (374)	40,360 (720)	3,834,456	0.23	3,507 (233)	40,360 (532)
2006	3,290,715	0.17	3,734 (466)	40,996 (926)	5,905,146	0.21	3,734 (306)	40,996 (705)
2007	3,527,314	0.13	3,855 (478)	41,278 (872)	5,165,962	0.18	3,855 (323)	41,278 (670)
2008	4,764,205	0.26	4,025 (489)	41,349 (876)	4,881,779	0.20	4,025 (287)	41,349 (691)
2009	3,594,769	0.18	3,965 (535)	41,588 (875)	3,742,745	0.11	3,965 (372)	41,588 (872)
2010	4,472,196	0.16	3,863 (501)	39,609 (913)	6,468,798	0.15	3,863 (393)	39,609 (1,026)
2011	4,881,655	0.17	4,193 (572)	42,667 (1,068)	6,380,327	0.20	4,193 (415)	42,667 (1,034)
2012	5,482,089	0.17	4,510 (645)	45,314 (1,248)	4,620,390	0.11	4,510 (408)	45,314 (1,016)
2013	9,000,359	0.17	3,615 (519)	35,396 (962)	11,857,075	0.17	3,615 (364)	35,396 (933)
2014	4,490,712	0.18	4,828 (575)	45,885 (1,027)	6,171,085	0.30	4,828 (343)	45,885 (715)
2015	5,501,051	0.17	5,087 (591)	45,636 (1,155)	4,250,337	0.16	5,087 (328)	45,636 (701)
2016	5,601,611	0.21	5,498 (668)	45,861 (1,257)	2,772,755	0.16	5,498 (368)	45,861 (681)
2017	6,377,778	0.27	4,890 (493)	42,965 (893)	7,950,453	0.32	4,890 (304)	42,965 (604)
2018	4,758,504	0.15	4,816 (478)	40,312 (941)	6,169,595	0.26	4,816 (270)	40,312 (647)

Year	AB1				B2			
	Total	CV	PSU	Trp	Total	CV	PSU	Trp
2019	8,338,969	0.25	4,888 (458)	40,427 (959)	9,912,619	0.23	4,888 (272)	40,427 (737)
2020	4,078,487	0.15	5,057 (532)	43,590 (986)	5,808,913	0.22	5,057 (314)	43,590 (653)
2021	4,304,170	0.15	5,163 (447)	41,051 (747)	2,904,856	0.17	5,163 (258)	41,051 (542)

**Table 6.** Estimated landings of Spanish Mackerel in pounds whole weight by state and year (MRIP, LACreel 2014+, TPWD). Average weight estimates are calculated by strata using the following hierarchy: species, region, year, state, mode, wave, and area (Matter and Rios 2013). The minimum number of weights used at each level of substitution is fifteen fish, except for the final species level where the minimum is one fish (Dettloff and Matter 2019b).

Year	TX	LA	MS	AL	FLW	Total
1981	9,052	30,066	1,011,350	722,135	2,206,305	3,978,908
1982	9,052	372,430	930,330	1,090,794	1,827,999	4,230,605
1983	8,195	211,247	1,186,893	846,345	1,039,131	3,291,812
1984	11,216	135,014	585,884	689,645	465,887	1,887,645
1985	7,746	156,424	334,980	486,973	2,168,035	3,154,157
1986	5,547	40,454	163,203	581,960	6,155,081	6,946,245
1987	14,973	262,319	249,077	755,821	3,263,005	4,545,196
1988	2,904	100,375	179,070	121,492	2,552,000	2,955,841
1989	4,325	498,305	53,049	565,765	2,282,785	3,404,229
1990	6,507	408,134	51,744	1,024,772	5,199,449	6,690,607
1991	24,176	299,732	391,318	495,851	4,393,135	5,604,212
1992	7,597	593,141	118,808	940,235	6,338,510	7,998,291
1993	3,203	248,416	66,023	666,572	4,215,278	5,199,492
1994	12,842	49,323	78,444	594,648	4,371,071	5,106,328
1995	24,809	111,121	85,448	733,377	1,769,994	2,724,749
1996	25,072	47,569	87,354	491,839	2,165,285	2,817,119
1997	12,079	316,251	302,221	843,044	2,419,833	3,893,427
1998	14,105	50,923	79,771	629,728	3,398,164	4,172,691
1999	12,281	195,732	119,049	1,266,452	6,120,701	7,714,215
2000	14,142	522,359	54,016	981,431	6,035,902	7,607,851
2001	2,927	34,843	29,650	710,701	7,757,195	8,535,317
2002	10,000	72,049	67,329	732,230	7,438,238	8,319,846
2003	11,781	80,319	46,845	598,631	5,921,602	6,659,176
2004	18,995	50,026	37,869	917,546	6,439,963	7,464,399
2005	19,290	131,633	16,033	152,285	3,852,857	4,172,098
2006	24,405	48,399	12,631	224,987	4,135,414	4,445,836
2007	17,268	40,993	19,327	484,968	4,563,861	5,126,417
2008	6,139	11,902	42,954	358,180	7,017,743	7,436,918
2009	12,074	25,346	51,992	330,383	4,734,120	5,153,915
2010	22,805	76,148	26,044	1,214,651	5,459,259	6,798,907
2011	16,194	19,248	79,582	1,734,085	4,857,850	6,706,959
2012	10,516	119,518	250,787	2,249,701	5,512,971	8,143,493
2013	3,195	117,568	171,962	4,166,000	7,150,857	11,609,582
2014	6,008	23,670	29,829	590,672	4,568,774	5,218,953
2015	5,352	17,185	101,601	2,474,553	3,861,728	6,460,418
2016	11,947	26,351	213,671	2,194,039	4,621,724	7,067,732
2017	14,934	15,294	37,893	3,319,670	4,271,204	7,658,994
2018	14,165	15,811	301,407	1,333,482	3,995,073	5,659,938
2019	4,988	27,512	51,803	3,692,671	6,961,069	10,738,044
2020	2,664	19,187	50,088	805,541	5,320,482	6,197,962
2021	654	8,777	26,942	907,631	5,871,176	6,815,180

**Table 7.** Spanish Mackerel landings in pounds whole weight (LBS) with associated coefficients of variation (CV; Approach 2 described in Nuttall and Dettloff 2022) by year and mode (MRIP, LACreel 2014+, TPWD). MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

Year	Cbt		Hbt		Priv		Shore		Total	
	LBS	CV	LBS	CV	LBS	CV	LBS	CV	LBS	CV
1981	650,713	0.56	67,675	0.49	2,534,774	0.32	725,746	0.58	3,978,908	0.30
1982	433,401	0.70	7,686	0.73	2,999,782	0.43	789,737	0.28	4,230,605	0.35
1983	462,666	0.46	32,285	0.55	1,868,024	0.37	928,837	0.34	3,291,812	0.24
1984	422,882	0.30	22,628	0.64	849,450	0.36	592,685	0.56	1,887,645	0.27
1985	310,690	0.37	24,704	0.51	1,697,101	0.33	1,121,662	0.51	3,154,157	0.29
1986	450,193	0.30			2,812,763	0.25	3,683,289	0.43	6,946,245	0.29
1987	383,509	0.24			2,480,232	0.19	1,681,455	0.31	4,545,196	0.19
1988	402,029	0.45			1,962,329	0.25	591,482	0.31	2,955,841	0.22
1989	673,212	0.37			1,927,414	0.25	803,602	0.35	3,404,229	0.24
1990	1,065,121	0.62			2,926,295	0.24	2,699,190	0.28	6,690,607	0.22
1991	415,606	0.35			3,114,413	0.24	2,074,193	0.37	5,604,212	0.23
1992	430,486	0.33			3,217,565	0.20	4,350,241	0.19	7,998,291	0.19
1993	237,060	0.49			1,629,417	0.22	3,333,015	0.22	5,199,492	0.21
1994	278,515	0.41			1,340,863	0.26	3,486,949	0.38	5,106,328	0.32
1995	333,144	0.49			1,000,150	0.29	1,391,455	0.40	2,724,749	0.28
1996	275,643	0.37			1,333,580	0.19	1,207,896	0.34	2,817,119	0.21
1997	297,289	0.35			2,536,086	0.24	1,060,052	0.26	3,893,427	0.20
1998	232,981	0.27			1,803,983	0.20	2,135,726	0.26	4,172,691	0.21
1999	285,430	0.19			3,521,103	0.19	3,907,682	0.27	7,714,215	0.20
2000	366,513	0.24			3,366,564	0.29	3,874,774	0.22	7,607,851	0.19
2001	285,526	0.23			2,796,781	0.19	5,453,009	0.31	8,535,317	0.25
2002	240,950	0.27			3,274,583	0.18	4,804,313	0.22	8,319,846	0.18
2003	312,011	0.27			2,443,613	0.19	3,903,552	0.23	6,659,176	0.19
2004	210,104	0.36			3,037,269	0.23	4,217,026	0.23	7,464,399	0.21
2005	117,712	0.32			2,716,256	0.31	1,338,131	0.40	4,172,098	0.27
2006	476,045	0.42			2,400,627	0.19	1,569,163	0.35	4,445,836	0.21
2007	281,182	0.30			2,349,797	0.18	2,495,438	0.25	5,126,417	0.19
2008	389,240	0.37			5,445,894	0.40	1,601,784	0.37	7,436,918	0.30
2009	307,613	0.51			3,013,355	0.31	1,832,947	0.28	5,153,915	0.23
2010	235,519	0.24			2,924,853	0.26	3,638,535	0.27	6,798,907	0.21
2011	418,215	0.24			2,644,095	0.25	3,644,650	0.26	6,706,959	0.22
2012	419,825	0.22			2,441,163	0.21	5,282,506	0.27	8,143,493	0.22
2013	155,257	0.29			2,690,812	0.20	8,763,513	0.24	11,609,582	0.22
2014	137,479	0.18			1,580,755	0.22	3,500,719	0.27	5,218,953	0.22
2015	408,079	0.25			1,296,717	0.23	4,755,623	0.25	6,460,418	0.23
2016	414,411	0.21			2,477,088	0.25	4,176,232	0.34	7,067,732	0.25
2017	394,432	0.23			1,230,747	0.21	6,033,815	0.34	7,658,994	0.30
2018	502,537	0.27			1,627,250	0.20	3,530,151	0.24	5,659,938	0.20
2019	431,042	0.20			3,296,064	0.32	7,010,938	0.33	10,738,044	0.28
2020	353,647	0.23			2,778,277	0.24	3,066,038	0.25	6,197,962	0.20
2021	309,175	0.38			4,540,411	0.32	1,965,595	0.28	6,815,180	0.24

**Table 8.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Spanish Mackerel by state and year. Summaries include the number of fish measured by MRIP and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths. LA lengths are available from MRIP only until 2013.

Year	LA					MS					AL					FLW				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
1981	7 (5)	275	348	70	469	183 (34)	240	391	63	560	174 (48)	260	366	104	766	241 (82)	280	385	62	548
1982	74 (25)	205	409	95	720	417 (78)	119	384	75	610	490 (140)	170	374	106	825	195 (81)	160	387	107	612
1983	18 (10)	210	387	81	520	348 (39)	200	412	68	610	272 (72)	320	383	36	545	145 (51)	200	392	88	660
1984	21 (5)	275	414	73	580	545 (65)	280	387	56	590	168 (58)	320	365	35	510	77 (35)	200	412	80	660
1985	31 (9)	275	369	95	580	276 (43)	320	393	60	570	145 (51)	335	380	34	505	164 (63)	235	398	66	627
1986	26 (14)	370	501	76	620	652 (81)	230	406	71	661	389 (104)	310	365	47	591	1,301 (390)	245	374	66	624
1987	58 (16)	331	469	67	570	579 (85)	295	414	78	662	473 (140)	255	394	77	718	1,059 (389)	230	439	81	770
1988	50 (22)	333	458	70	625	480 (82)	271	407	74	692	139 (51)	294	402	63	569	678 (288)	150	432	72	665
1989	76 (29)	368	477	72	694	403 (66)	272	383	56	610	386 (93)	222	331	53	674	535 (197)	254	419	71	640
1990	59 (22)	280	466	73	600	470 (77)	271	369	50	615	395 (100)	205	375	70	580	584 (235)	227	424	82	692
1991	88 (38)	322	484	70	632	467 (71)	275	402	72	610	340 (80)	240	365	81	800	538 (222)	280	428	91	736
1992	217 (70)	320	464	74	615	824 (154)	250	381	58	681	396 (98)	250	413	82	700	1,792 (634)	220	404	74	858
1993	52 (21)	248	472	76	618	79 (23)	311	419	84	575	182 (53)	268	407	97	625	1,097 (376)	208	392	75	711
1994	23 (18)	329	461	59	611	138 (30)	300	443	88	613	189 (73)	272	423	94	680	1,249 (495)	117	397	73	690
1995	46 (23)	360	467	61	621	118 (29)	309	445	68	624	201 (59)	251	415	116	665	632 (200)	285	404	74	621
1996	31 (9)	361	440	56	560	162 (36)	307	392	60	615	270 (67)	253	410	86	665	875 (345)	150	408	77	680
1997	73 (32)	320	484	75	670	247 (63)	190	430	115	921	156 (55)	309	474	96	619	1,092 (373)	110	439	87	773
1998	17 (10)	350	485	86	630	424 (81)	305	407	79	921	320 (85)	231	385	84	622	1,480 (509)	225	435	86	786
1999	43 (14)	287	502	81	735	738 (115)	280	426	80	700	1,065 (201)	230	394	92	716	2,280 (784)	219	433	84	690
2000	104 (33)	271	492	117	735	512 (75)	270	407	72	687	678 (171)	280	422	81	682	2,708 (804)	192	435	83	728
2001	14 (7)	375	556	114	735	411 (57)	255	388	72	690	583 (118)	225	378	74	670	3,589 (798)	152	408	73	727
2002	30 (16)	338	486	106	721	272 (39)	161	412	78	652	208 (72)	295	450	81	657	2,741 (848)	266	443	83	735
2003	30 (13)	338	427	43	499	270 (46)	251	389	82	701	200 (52)	251	406	89	685	2,411 (698)	211	450	85	795
2004	26 (16)	330	471	99	835	235 (35)	297	384	67	701	329 (82)	255	366	80	687	2,500 (772)	270	434	80	685
2005	45 (20)	341	485	73	835	90 (20)	272	394	59	544	163 (47)	224	403	93	665	1,317 (445)	262	420	79	821
2006	48 (26)	335	424	71	634	100 (20)	312	413	59	563	164 (59)	242	404	89	661	1,647 (498)	274	420	77	750
2007	27 (13)	335	425	79	634	180 (35)	221	394	71	625	219 (62)	297	411	71	627	1,773 (611)	232	431	74	673
2008	14 (9)	361	415	56	541	288 (43)	251	405	70	633	307 (59)	286	400	68	635	1,872 (589)	209	425	85	851
2009	37 (18)	353	444	56	560	270 (47)	268	421	83	635	189 (71)	304	436	71	650	1,605 (561)	268	418	74	785
2010	9 (3)	318	432	92	567	148 (20)	261	416	64	570	344 (84)	248	415	88	630	2,172 (684)	255	422	79	751
2011	12 (9)	322	434	103	650	320 (41)	272	392	79	598	481 (93)	244	375	62	620	2,588 (700)	276	409	75	679

Year	LA					MS					AL					FLW				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
2012	74 (34)	317	465	105	668	297 (55)	294	460	77	645	487 (145)	237	442	79	728	3,333 (834)	231	414	73	688
2013	38 (14)	317	467	60	650	133 (26)	242	443	87	611	378 (108)	190	386	87	650	2,131 (684)	273	414	72	682
2014						221 (57)	227	385	76	616	423 (127)	240	380	85	670	1,580 (590)	269	420	76	635
2015						349 (137)	227	414	79	685	812 (228)	236	403	78	842	2,434 (628)	267	433	75	751
2016						636 (169)	225	407	84	650	586 (196)	221	394	87	631	1,971 (618)	237	437	80	780
2017						321 (75)	260	417	73	572	479 (152)	229	409	73	635	1,927 (463)	192	436	79	693
2018						292 (84)	265	422	83	670	608 (160)	245	357	62	642	1,752 (378)	268	437	70	673
2019						222 (68)	265	379	74	670	841 (207)	190	362	51	604	2,306 (470)	196	436	75	774
2020						240 (75)	283	421	54	542	815 (192)	227	414	73	665	1,772 (386)	300	449	77	672
2021						74 (32)	297	422	59	542	606 (209)	297	397	69	610	1,549 (418)	274	433	81	670

**Table 9.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Spanish Mackerel by state and year. Summaries include the number of fish weighed by MRIP and, in parentheses, the number of angler trips from which those fish were weighed (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish weights. LA weights are available from MRIP only until 2013.

Year	LA					MS					AL					FLW				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
1981	7 (5)	0.7	1.1	0.5	1.8	179 (33)	0.4	2.2	1.4	7.1	169 (47)	0.2	1.2	0.9	6.0	241 (82)	0.6	1.3	0.7	3.3
1982	74 (25)	0.3	1.7	0.9	5.1	417 (78)	0.2	1.3	0.9	4.5	490 (140)	0.2	1.2	1.0	5.7	195 (81)	0.2	1.7	1.3	5.7
1983	18 (10)	0.4	1.6	0.8	2.8	348 (39)	0.5	2.1	1.4	9.9	272 (72)	0.4	1.1	0.5	2.9	145 (51)	0.2	1.5	0.8	4.0
1984	21 (5)	0.4	1.9	1.8	7.4	545 (65)	0.6	1.8	0.8	5.9	168 (58)	0.4	1.0	0.5	3.3	77 (35)	0.2	1.6	0.8	4.6
1985	31 (9)	0.6	1.8	1.2	5.6	276 (43)	0.9	1.5	0.7	4.4	145 (51)	0.4	1.2	0.5	3.3	164 (63)	0.2	1.4	0.7	4.4
1986	26 (14)	1.1	2.9	1.4	5.7	537 (72)	0.3	2.1	1.5	9.5	389 (104)	0.7	1.2	0.6	5.6	1,301 (390)	0.2	1.3	0.9	6.4
1987	58 (16)	0.7	2.3	0.8	3.6	532 (77)	0.2	1.9	1.4	11.8	473 (140)	0.7	1.5	0.8	6.0	1,059 (389)	0.4	1.9	1.1	8.8
1988	7 (5)	0.7	2.1	1.0	3.1	195 (30)	0.4	1.5	0.8	6.5	36 (13)	0.4	1.1	0.6	3.5	377 (145)	0.4	1.4	0.7	5.1
1989	76 (29)	0.9	2.5	1.1	5.9	320 (54)	0.4	1.6	1.0	7.1	386 (93)	0.2	0.8	0.6	6.6	535 (197)	0.4	1.7	1.1	9.1
1990	59 (22)	0.5	2.9	1.3	6.0	432 (65)	0.5	1.5	0.7	6.0	395 (100)	0.2	1.3	0.9	5.7	584 (235)	0.4	1.7	1.1	6.4
1991	88 (38)	0.7	3.1	1.5	6.6	467 (71)	0.4	1.9	1.2	6.8	340 (80)	0.2	1.3	1.0	11.8	538 (222)	0.4	1.8	1.3	7.8
1992	208 (66)	0.4	2.2	1.1	5.7	539 (108)	0.4	1.3	0.6	5.6	396 (98)	0.3	1.7	1.2	7.4	1,704 (597)	0.2	1.5	1.0	8.4

Year	LA					MS					AL					FLW				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
1993	52 (21)	0.2	3.2	1.6	7.4	79 (23)	0.7	1.9	1.0	3.7	182 (53)	0.4	2.1	2.0	9.1	1,097 (376)	0.2	1.5	1.2	10.3
1994	23 (18)	1.1	2.5	1.1	5.8	138 (30)	0.6	2.3	1.5	6.4	189 (73)	0.4	1.7	1.3	6.6	1,249 (495)	0.0	1.3	0.9	6.3
1995	46 (23)	0.7	2.5	1.0	4.9	118 (29)	0.6	2.0	0.9	5.1	201 (59)	0.3	1.9	1.5	6.9	632 (200)	0.4	1.5	0.8	5.4
1996	31 (9)	0.9	2.0	1.2	5.2	162 (36)	0.6	1.6	1.0	5.2	270 (67)	0.3	1.5	1.0	5.4	875 (345)	0.1	1.5	1.0	6.0
1997	73 (32)	0.7	2.5	1.4	6.6	247 (63)	0.2	2.3	2.3	13.6	156 (55)	0.7	2.8	1.7	8.9	1,092 (373)	0.1	2.9	2.5	12.5
1998	17 (10)	0.9	2.4	1.2	5.1	424 (81)	0.4	2.4	1.8	13.2	320 (85)	0.4	1.6	1.1	6.4	1,480 (509)	0.1	2.1	1.4	10.7
1999	43 (14)	0.5	2.9	1.0	5.1	738 (115)	0.4	2.2	1.3	9.2	1,065 (201)	0.3	2.3	1.7	11.7	2,280 (784)	0.1	1.8	1.2	7.0
2000	104 (33)	0.1	2.4	1.5	6.5	511 (74)	0.5	1.7	1.0	6.9	678 (171)	0.4	2.3	1.5	10.3	2,669 (799)	0.1	1.8	1.1	7.4
2001	14 (7)	0.8	2.8	1.4	5.0	411 (57)	0.4	1.7	1.0	6.1	583 (118)	0.3	1.6	1.1	8.9	3,589 (798)	0.1	1.5	0.9	6.5
2002	30 (16)	0.8	2.4	1.2	4.8	272 (39)	0.3	1.7	1.0	5.6	208 (72)	0.5	2.3	1.3	7.2	2,741 (848)	0.4	1.9	1.1	8.0
2003	30 (13)	0.8	1.6	0.5	2.5	270 (46)	0.4	1.3	0.9	5.2	200 (52)	0.5	1.8	1.3	9.3	2,411 (698)	0.2	2.0	1.1	7.7
2004	26 (16)	0.7	2.3	1.7	9.9	235 (35)	0.5	1.2	0.6	4.3	329 (82)	0.3	1.1	0.9	7.1	2,500 (772)	0.4	1.7	1.0	6.3
2005	45 (20)	0.6	2.4	1.3	9.9	90 (20)	0.4	1.3	0.6	3.5	163 (47)	0.2	1.5	1.2	5.5	1,317 (445)	0.4	1.6	1.0	10.7
2006	48 (26)	0.6	1.5	0.9	5.6	100 (20)	0.6	1.5	0.6	3.3	164 (59)	0.4	1.5	0.9	5.5	1,647 (498)	0.4	1.6	0.9	7.7
2007	27 (13)	0.7	1.6	1.1	5.6	177 (34)	0.1	1.3	0.7	4.8	219 (62)	0.4	1.4	0.9	4.9	1,773 (611)	0.2	1.6	0.9	6.1
2008	14 (9)	0.8	1.3	0.6	2.9	288 (43)	0.3	1.4	0.8	4.6	307 (59)	0.4	1.4	0.8	6.6	1,872 (589)	0.2	1.6	1.1	11.3
2009	37 (18)	0.8	1.6	0.6	3.2	270 (47)	0.4	1.5	1.0	5.4	189 (71)	0.4	1.7	0.9	4.6	1,605 (561)	0.3	1.5	0.9	7.3
2010	9 (3)	0.6	1.8	1.2	4.0	148 (20)	0.4	1.6	0.7	3.7	344 (84)	0.3	1.7	1.0	5.1	2,172 (684)	0.4	1.6	0.9	6.7
2011	12 (9)	0.7	1.6	0.9	3.6	320 (41)	0.4	1.3	0.8	3.9	481 (93)	0.2	1.2	0.6	4.9	2,588 (700)	0.4	1.4	0.9	5.9
2012	74 (34)	0.7	1.9	1.0	3.7	297 (55)	0.5	1.9	1.0	5.0	487 (145)	0.3	1.7	1.0	6.6	3,333 (834)	0.3	1.5	0.9	6.1
2013	38 (14)	0.7	2.2	0.8	3.6	133 (26)	0.3	2.0	1.1	5.2	378 (108)	0.1	1.3	0.9	5.1	2,131 (684)	0.4	1.5	0.9	6.5
2014						179 (50)	0.4	1.1	0.8	4.5	423 (127)	0.3	1.3	0.9	5.7	1,580 (590)	0.3	1.5	1.0	6.1
2015						337 (134)	0.2	1.5	1.1	7.6	812 (228)	0.2	1.5	0.8	10.4	2,434 (628)	0.4	1.7	1.0	7.3
2016						636 (169)	0.3	1.4	0.9	4.7	586 (196)	0.2	1.4	0.9	5.5	1,971 (618)	0.4	1.8	1.0	7.7
2017						288 (63)	0.4	1.6	0.7	3.2	479 (152)	0.3	1.5	0.8	4.4	1,927 (463)	0.2	1.7	0.9	5.5
2018						292 (84)	0.3	1.4	1.0	4.0	608 (160)	0.3	1.0	0.6	4.2	1,752 (378)	0.4	1.7	0.9	6.3
2019						222 (68)	0.4	1.2	0.7	4.0	841 (207)	0.2	1.0	0.5	4.4	2,306 (470)	0.1	1.7	0.9	7.6
2020						240 (75)	0.5	1.5	0.6	3.0	815 (192)	0.2	1.5	0.8	5.7	1,772 (386)	0.4	1.9	1.0	6.3
2021						74 (32)	0.5	1.5	0.6	3.0	606 (209)	0.4	1.3	0.7	4.4	1,549 (418)	0.4	1.6	1.0	6.2

**Table 10.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Spanish Mackerel by mode and year. Summaries include the number of fish measured by MRIP and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

Year	Cbt					Hbt					Priv					Shore				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
1981	198 (33)	240	369	47	520	0 (0)	0	0	0	0	306 (90)	260	398	90	620	101 (46)	275	354	72	766
1982	226 (37)	150	378	82	610	53 (6)	290	387	37	460	729 (211)	170	389	103	825	168 (70)	119	352	87	570
1983	391 (45)	200	414	69	660	0 (0)	0	0	0	0	184 (67)	270	389	42	570	208 (60)	200	376	68	640
1984	550 (66)	280	384	52	590	54 (11)	275	391	67	660	115 (50)	310	407	73	592	92 (36)	200	366	52	510
1985	325 (62)	275	392	59	570	0 (0)	0	0	0	0	212 (75)	290	388	62	627	79 (29)	235	391	55	505
1986	1,146 (195)	230	404	72	661						967 (324)	245	365	61	620	255 (70)	273	356	35	460
1987	958 (179)	230	423	81	662						991 (373)	283	427	83	770	220 (78)	255	409	75	665
1988	584 (130)	271	417	76	662						655 (266)	295	431	69	692	108 (47)	150	383	67	578
1989	625 (106)	272	399	69	640						532 (206)	289	405	73	694	243 (73)	222	322	56	475
1990	597 (109)	271	391	68	615						530 (192)	205	417	90	692	381 (133)	249	374	54	580
1991	581 (113)	275	425	93	736						635 (222)	249	407	83	800	217 (76)	240	366	63	528
1992	894 (173)	275	396	75	858						1,545 (519)	220	413	74	700	790 (264)	252	391	71	656
1993	215 (57)	272	459	92	711						369 (161)	248	437	85	661	826 (255)	208	366	55	668
1994	258 (68)	272	448	91	690						475 (221)	117	409	81	680	866 (327)	231	389	67	665
1995	402 (68)	290	427	70	634						263 (120)	292	430	96	623	332 (123)	251	384	83	665
1996	292 (69)	279	419	73	634						612 (235)	150	424	83	680	434 (153)	226	375	58	570
1997	615 (167)	190	474	89	800						514 (203)	210	463	93	921	439 (153)	110	376	63	560
1998	1,026 (225)	225	424	93	723						664 (271)	231	444	87	921	551 (189)	227	394	61	578
1999	2,056 (412)	248	434	92	700						1,206 (408)	230	428	88	735	864 (294)	219	389	64	660
2000	2,539 (517)	192	426	82	728						785 (339)	300	456	93	735	678 (227)	271	417	73	679
2001	2,622 (304)	243	400	73	727						1,055 (385)	225	424	83	735	920 (291)	152	387	63	614
2002	1,369 (260)	161	449	88	735						1,029 (435)	287	458	81	700	853 (280)	266	406	68	616
2003	1,593 (321)	211	446	89	795						753 (309)	251	451	89	759	565 (179)	227	414	75	610
2004	1,440 (319)	255	441	86	835						949 (376)	255	421	83	701	701 (210)	276	389	64	610

Year	Cbt					Hbt					Priv					Shore				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
2005	713 (181)	272	434	86	835						544 (231)	280	428	75	665	358 (120)	224	376	57	598
2006	690 (133)	299	436	76	750						801 (304)	242	432	77	665	468 (166)	274	369	57	635
2007	939 (215)	221	430	78	673						691 (325)	232	441	69	670	569 (181)	296	400	67	642
2008	1,072 (204)	251	426	79	721						858 (336)	292	446	84	851	551 (160)	209	366	55	602
2009	835 (192)	268	427	79	785						737 (316)	282	435	74	681	529 (189)	268	390	60	620
2010	1,051 (202)	261	435	80	751						865 (328)	248	426	78	669	757 (261)	255	395	76	610
2011	1,867 (294)	244	404	77	650						797 (308)	255	414	78	679	737 (241)	250	385	62	588
2012	2,478 (420)	231	425	79	688						764 (326)	240	430	75	728	949 (322)	264	406	66	650
2013	879 (146)	190	434	85	682						808 (379)	295	426	67	650	993 (307)	270	382	64	650
2014	906 (250)	227	431	82	670						743 (340)	240	410	78	635	575 (184)	269	374	66	601
2015	2,118 (430)	227	443	75	751						842 (352)	236	416	73	842	635 (211)	251	376	68	587
2016	1,743 (398)	225	439	87	780						987 (409)	221	423	74	675	463 (176)	229	364	65	551
2017	1,752 (309)	260	444	76	693						467 (211)	280	431	77	690	508 (170)	192	376	61	580
2018	1,498 (260)	245	436	77	673						542 (185)	295	417	70	670	612 (177)	265	369	61	558
2019	1,774 (282)	190	431	74	665						605 (201)	295	440	80	774	990 (262)	196	366	58	579
2020	1,539 (274)	227	446	72	672						778 (245)	277	451	81	665	510 (134)	290	387	52	570
2021	1,308 (310)	296	423	72	670						547 (205)	274	454	95	669	374 (144)	297	379	54	496

**Table 11.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Spanish Mackerel by mode and year. Summaries include the number of fish weighed by MRIP and, in parentheses, the number of angler trips from which those fish were weighed (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish weights. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

Year	Cbt					Hbt					Priv					Shore				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
1981	189 (31)	0.4	2.0	1.4	7.1	0 (0)	0.0	0.0	0.0	0.0	306 (90)	0.2	1.5	0.8	3.7	101 (46)	0.7	1.0	0.8	6.0
1982	226 (37)	0.2	1.1	0.8	5.4	53 (6)	0.4	2.1	1.2	4.4	729 (211)	0.2	1.3	1.0	5.7	168 (70)	0.2	1.4	1.0	4.4
1983	391 (45)	0.4	2.0	1.4	9.9	0 (0)	0.0	0.0	0.0	0.0	184 (67)	0.5	1.3	0.7	3.5	208 (60)	0.2	1.3	0.6	4.0
1984	550 (66)	0.4	1.8	0.8	7.4	54 (11)	0.4	1.2	0.7	3.7	115 (50)	0.4	1.5	1.0	5.0	92 (36)	0.2	1.0	0.5	2.9
1985	325 (62)	0.4	1.5	0.8	5.6	0 (0)	0.0	0.0	0.0	0.0	212 (75)	0.2	1.4	0.8	5.1	79 (29)	0.2	1.2	0.4	2.2
1986	1,031 (186)	0.2	1.9	1.3	9.5						967 (324)	0.2	1.2	0.8	5.7	255 (70)	0.4	1.1	0.3	2.0
1987	911 (171)	0.2	2.0	1.3	11.8						991 (373)	0.5	1.7	1.0	7.5	220 (78)	0.4	1.4	0.7	5.0
1988	192 (34)	0.4	1.6	1.0	6.5						372 (136)	0.4	1.4	0.6	3.3	51 (23)	0.4	1.1	0.6	3.5
1989	542 (94)	0.4	1.8	1.2	9.1						532 (206)	0.4	1.5	1.0	6.6	243 (73)	0.2	0.7	0.4	2.0
1990	559 (97)	0.5	1.7	1.0	6.4						530 (192)	0.2	1.8	1.2	5.9	381 (133)	0.2	1.1	0.6	4.4

Year	Cbt					Hbt					Priv					Shore				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
1991	581 (113)	0.4	2.2	1.5	7.7						635 (222)	0.4	1.7	1.1	11.8	217 (76)	0.2	1.1	0.6	3.1
1992	595 (120)	0.4	1.6	1.1	8.4						1,523 (507)	0.2	1.6	1.0	7.4	729 (242)	0.4	1.4	0.9	5.7
1993	215 (57)	0.4	2.9	1.8	10.3						369 (161)	0.2	2.2	1.7	9.1	826 (255)	0.2	1.1	0.6	5.0
1994	258 (68)	0.4	2.3	1.5	6.4						475 (221)	0.0	1.5	1.1	6.3	866 (327)	0.2	1.2	0.8	6.6
1995	402 (68)	0.5	1.9	0.9	5.7						263 (120)	0.4	1.9	1.3	5.4	332 (123)	0.3	1.3	0.9	6.9
1996	292 (69)	0.2	1.9	1.2	5.6						612 (235)	0.1	1.7	1.1	6.0	434 (153)	0.2	1.1	0.6	4.2
1997	615 (167)	0.2	4.3	2.9	13.6						514 (203)	0.2	2.3	1.5	13.4	439 (153)	0.1	1.1	0.6	4.2
1998	1,026 (225)	0.4	2.4	1.7	10.6						664 (271)	0.1	2.1	1.3	13.2	551 (189)	0.2	1.4	0.7	4.2
1999	2,056 (412)	0.4	2.4	1.5	11.7						1,206 (408)	0.3	1.9	1.2	8.0	864 (294)	0.1	1.2	0.7	4.7
2000	2,499 (511)	0.1	1.9	1.2	10.3						785 (339)	0.5	2.2	1.4	8.3	678 (227)	0.1	1.5	0.8	6.2
2001	2,622 (304)	0.4	1.5	1.0	8.9						1,055 (385)	0.3	1.8	1.0	6.6	920 (291)	0.1	1.3	0.7	5.7
2002	1,369 (260)	0.3	2.1	1.2	8.0						1,029 (435)	0.5	2.1	1.2	7.2	853 (280)	0.4	1.4	0.8	4.7
2003	1,593 (321)	0.3	2.0	1.2	7.7						753 (309)	0.2	2.0	1.2	9.3	565 (179)	0.3	1.5	0.8	4.7
2004	1,440 (319)	0.3	1.8	1.1	9.9						949 (376)	0.3	1.6	1.0	7.1	701 (210)	0.4	1.2	0.7	4.8
2005	713 (181)	0.4	1.8	1.2	10.7						544 (231)	0.4	1.7	1.0	5.5	358 (120)	0.2	1.1	0.6	4.5
2006	690 (133)	0.5	1.7	0.9	7.7						801 (304)	0.4	1.7	0.9	5.8	468 (166)	0.4	1.1	0.5	4.1
2007	936 (214)	0.1	1.6	1.0	6.1						691 (325)	0.2	1.7	0.9	5.9	569 (181)	0.4	1.3	0.8	5.7
2008	1,072 (204)	0.3	1.6	1.0	6.2						858 (336)	0.5	1.9	1.1	11.3	551 (160)	0.2	1.0	0.5	5.1
2009	835 (192)	0.4	1.6	1.0	7.3						737 (316)	0.4	1.7	0.9	5.6	529 (189)	0.3	1.2	0.6	4.0
2010	1,051 (202)	0.4	1.8	1.0	6.7						865 (328)	0.3	1.7	1.0	6.2	757 (261)	0.4	1.4	0.8	5.1
2011	1,867 (294)	0.2	1.4	0.9	5.8						797 (308)	0.4	1.5	1.0	5.9	737 (241)	0.4	1.2	0.6	4.1
2012	2,478 (420)	0.3	1.6	1.0	6.1						764 (326)	0.4	1.6	1.0	6.6	949 (322)	0.3	1.4	0.8	5.6
2013	879 (146)	0.1	1.8	1.0	6.5						808 (379)	0.4	1.6	0.9	5.2	993 (307)	0.4	1.2	0.7	5.1
2014	864 (243)	0.4	1.7	1.1	6.1						743 (340)	0.3	1.4	0.9	5.1	575 (184)	0.3	1.1	0.6	3.9
2015	2,106 (427)	0.2	1.9	1.0	7.6						842 (352)	0.3	1.5	0.9	10.4	635 (211)	0.3	1.2	0.6	3.8
2016	1,743 (398)	0.3	1.8	1.0	7.7						987 (409)	0.2	1.6	0.9	5.6	463 (176)	0.3	1.1	0.5	3.0
2017	1,719 (297)	0.4	1.8	0.9	5.5						467 (211)	0.4	1.7	0.9	5.1	508 (170)	0.2	1.1	0.5	3.3
2018	1,498 (260)	0.3	1.7	0.9	6.3						542 (185)	0.4	1.5	0.8	4.9	612 (177)	0.3	1.0	0.5	3.0
2019	1,774 (282)	0.2	1.7	0.9	6.0						605 (201)	0.4	1.8	1.0	7.6	990 (262)	0.1	1.0	0.5	3.5
2020	1,539 (274)	0.2	1.8	0.9	6.3						778 (245)	0.4	1.9	1.0	5.7	510 (134)	0.4	1.1	0.5	3.3
2021	1,308 (310)	0.4	1.5	0.8	6.2						547 (205)	0.4	2.0	1.2	5.2	374 (144)	0.4	1.1	0.5	2.4

**Table 12.** Summary of length (millimeters fork length) and weight measurements (pounds whole weight) from MRIP-intercepted Spanish Mackerel by year. Summaries include the number of fish for which size information was collected by MRIP and, in parentheses, the number of angler trips from which those fish were sampled (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths and weights.

Year	Length					Weight				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
1981	605 (169)	240	381	77	766	596 (167)	0.2	1.6	1.1	7.1
1982	1,176 (324)	119	382	96	825	1,176 (324)	0.2	1.3	1.0	5.7
1983	783 (172)	200	398	65	660	783 (172)	0.2	1.6	1.1	9.9
1984	811 (163)	200	386	57	660	811 (163)	0.2	1.6	0.8	7.4
1985	616 (166)	235	390	59	627	616 (166)	0.2	1.4	0.7	5.6
1986	2,368 (589)	230	383	68	661	2,253 (580)	0.2	1.5	1.1	9.5
1987	2,169 (630)	230	423	82	770	2,122 (622)	0.2	1.8	1.1	11.8
1988	1,347 (443)	150	421	73	692	615 (193)	0.4	1.4	0.7	6.5
1989	1,400 (385)	222	388	75	694	1,317 (373)	0.2	1.4	1.1	9.1
1990	1,508 (434)	205	396	75	692	1,470 (422)	0.2	1.6	1.0	6.4
1991	1,433 (411)	240	408	87	800	1,433 (411)	0.2	1.8	1.3	11.8
1992	3,229 (956)	220	403	74	858	2,847 (869)	0.2	1.5	1.0	8.4
1993	1,410 (473)	208	399	80	711	1,410 (473)	0.2	1.6	1.4	10.3
1994	1,599 (616)	117	405	78	690	1,599 (616)	0.0	1.5	1.1	6.6
1995	997 (311)	251	414	85	665	997 (311)	0.3	1.7	1.1	6.9
1996	1,338 (457)	150	407	77	680	1,338 (457)	0.1	1.5	1.0	6.0
1997	1,568 (523)	110	443	94	921	1,568 (523)	0.1	2.8	2.4	13.6
1998	2,241 (685)	225	423	86	921	2,241 (685)	0.1	2.1	1.5	13.2
1999	4,126 (1,114)	219	423	87	735	4,126 (1,114)	0.1	2.0	1.4	11.7
2000	4,002 (1,083)	192	430	84	735	3,962 (1,077)	0.1	1.9	1.2	10.3
2001	4,597 (980)	152	403	74	735	4,597 (980)	0.1	1.5	1.0	8.9
2002	3,251 (975)	161	441	83	735	3,251 (975)	0.3	1.9	1.1	8.0
2003	2,911 (809)	211	441	87	795	2,911 (809)	0.2	1.9	1.1	9.3
2004	3,090 (905)	255	423	83	835	3,090 (905)	0.3	1.6	1.0	9.9
2005	1,615 (532)	224	419	80	835	1,615 (532)	0.2	1.6	1.0	10.7
2006	1,959 (603)	242	419	78	750	1,959 (603)	0.4	1.6	0.9	7.7
2007	2,199 (721)	221	426	74	673	2,196 (720)	0.1	1.5	0.9	6.1
2008	2,481 (700)	209	419	82	851	2,481 (700)	0.2	1.6	1.0	11.3
2009	2,101 (697)	268	421	75	785	2,101 (697)	0.3	1.5	0.9	7.3
2010	2,673 (791)	248	420	80	751	2,673 (791)	0.3	1.6	0.9	6.7
2011	3,401 (843)	244	402	75	679	3,401 (843)	0.2	1.4	0.8	5.9
2012	4,191 (1,068)	231	422	76	728	4,191 (1,068)	0.3	1.5	0.9	6.6
2013	2,680 (832)	190	412	76	682	2,680 (832)	0.1	1.5	0.9	6.5
2014	2,224 (774)	227	409	80	670	2,182 (767)	0.3	1.5	0.9	6.1
2015	3,595 (993)	227	425	77	842	3,583 (990)	0.2	1.7	1.0	10.4
2016	3,193 (983)	221	423	84	780	3,193 (983)	0.2	1.6	1.0	7.7
2017	2,727 (690)	192	429	78	693	2,694 (678)	0.2	1.7	0.9	5.5
2018	2,652 (622)	245	417	77	673	2,652 (622)	0.3	1.5	0.9	6.3
2019	3,369 (745)	190	414	77	774	3,369 (745)	0.1	1.5	0.9	7.6

Year	Length					Weight				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
2020	2,827 (653)	227	437	76	672	2,827 (653)	0.2	1.7	0.9	6.3
2021	2,229 (659)	274	423	79	670	2,229 (659)	0.4	1.5	0.9	6.2

**Table 13.** Summary of length measurements (millimeters total length) from TPWD-intercepted Spanish Mackerel by mode and year. Summaries include the number of fish measured by TPWD and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths.

Year	Cbt					Priv					Total				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
1983	8 (6)	516	612	55	688	120 (75)	321	522	95	730	128 (81)	321	527	95	730
1984	1 (1)	588	588	0	588	86 (43)	235	490	102	739	87 (44)	235	491	102	739
1985	2 (2)	664	671	10	678	159 (91)	314	518	111	950	161 (93)	314	520	111	950
1986	1 (1)	416	416	0	416	43 (30)	341	532	100	732	44 (31)	341	529	100	732
1987	13 (6)	350	516	108	743	228 (99)	304	495	94	830	241 (105)	304	496	95	830
1988	4 (3)	555	640	92	750	120 (54)	332	513	88	872	124 (57)	332	517	90	872
1989	3 (2)	486	532	56	594	218 (84)	295	473	90	902	221 (86)	295	473	89	902
1990	13 (7)	439	493	52	628	211 (101)	250	500	98	775	224 (108)	250	500	96	775
1991	22 (11)	453	587	73	732	287 (135)	261	530	85	854	309 (146)	261	534	85	854
1992	6 (3)	512	596	75	685	152 (90)	374	569	90	853	158 (93)	374	570	90	853
1993	8 (3)	422	530	98	687	176 (98)	303	525	98	909	184 (101)	303	525	98	909
1994	13 (5)	347	457	112	641	274 (134)	357	532	82	816	287 (139)	347	529	84	816
1995	2 (2)	574	674	141	774	402 (199)	330	585	107	935	404 (201)	330	585	107	935
1996	8 (6)	510	583	55	700	463 (204)	362	557	89	917	471 (210)	362	558	89	917
1997	13 (9)	486	568	55	670	239 (122)	282	530	98	907	252 (131)	282	532	96	907
1998	3 (3)	393	564	152	683	212 (101)	344	567	91	892	215 (104)	344	567	92	892
1999	4 (4)	477	598	122	741	166 (106)	351	559	99	841	170 (110)	351	559	99	841
2000	8 (3)	461	555	79	660	312 (151)	251	553	89	930	320 (154)	251	553	89	930
2001	4 (4)	364	550	134	664	108 (57)	330	532	77	723	112 (61)	330	533	79	723
2002	22 (8)	409	571	79	725	161 (99)	210	538	85	785	183 (107)	210	542	85	785
2003	7 (7)	527	613	74	701	191 (97)	376	566	95	810	198 (104)	376	567	95	810
2004	20 (10)	420	514	71	652	283 (132)	340	540	91	847	303 (142)	340	538	90	847
2005	12 (7)	435	570	99	715	438 (177)	359	554	89	870	450 (184)	359	554	89	870
2006	44 (18)	387	577	110	903	627 (292)	325	542	85	886	671 (310)	325	545	88	903
2007	34 (17)	412	621	142	931	304 (129)	300	557	92	847	338 (146)	300	563	100	931
2008	41 (17)	396	525	98	811	329 (155)	252	548	90	858	370 (172)	252	546	91	858
2009	14 (10)	365	507	109	804	321 (165)	363	548	95	905	335 (175)	363	547	96	905
2010	32 (10)	414	501	80	696	254 (109)	275	516	87	840	286 (119)	275	514	86	840
2011	53 (23)	368	507	83	939	469 (199)	341	520	81	927	522 (222)	341	518	82	939
2012	19 (12)	383	522	138	928	448 (164)	364	525	78	892	467 (176)	364	525	81	928
2013	37 (15)	393	517	77	703	228 (111)	273	520	90	828	265 (126)	273	520	88	828
2014	36 (18)	370	492	63	608	321 (150)	337	515	90	760	357 (168)	337	513	88	760
2015	27 (15)	383	524	138	903	160 (74)	328	531	87	802	187 (89)	328	530	95	903
2016	73 (35)	406	551	80	785	382 (165)	289	519	85	843	455 (200)	289	524	85	843
2017	36 (18)	375	594	87	715	275 (121)	294	545	83	893	311 (139)	294	550	84	893
2018	26 (17)	318	530	106	748	307 (129)	298	543	89	848	333 (146)	298	542	91	848
2019	41 (21)	385	488	65	678	225 (91)	331	515	93	836	266 (112)	331	511	90	836
2020	29 (17)	339	518	89	719	165 (89)	153	510	88	763	194 (106)	153	511	88	763
2021	11 (9)	396	493	69	664	57 (36)	252	512	103	888	68 (45)	252	509	98	888

**Table 14.** Summary of length measurements (millimeters fork length) from Spanish Mackerel intercepted by the LA BIO sampling program by mode and year. Summaries include the number of fish measured by LDWF and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish lengths.

Year	Cbt					Priv					Shore					Total				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
2014	5 (2)	463	495	26	519	18 (8)	366	454	94	683	6 (1)	290	318	26	365	29 (11)	290	433	97	683
2015	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0
2016	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0
2017	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0
2018	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0
2019	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0
2020	4 (1)	366	428	75	516	0 (0)	0	0	0	0	0 (0)	0	0	0	0	4 (1)	366	428	75	516
2021	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0	0 (0)	0	0	0	0

**Table 15.** Summary of weight measurements (pounds whole weight) from Spanish Mackerel intercepted by the LA BIO sampling program by mode and year. Summaries include the number of fish weighed by LDWF and, in parentheses, the number of angler trips from which those fish were measured (N), and the minimum (Min), arithmetic mean (Avg), standard deviation (SD), and maximum (Max) size of fish weights.

Year	Cbt					Priv					Total				
	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max	N	Min	Avg	SD	Max
2014	6 (3)	1.9	2.6	0.4	3.0	16 (6)	0.7	1.9	1.2	5.1	22 (9)	0.7	2.1	1.1	5.1
2015	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	0.0	0.0
2016	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	0.0	0.0
2017	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	0.0	0.0
2018	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	0.0	0.0
2019	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	0.0	0.0
2020	4 (1)	0.9	1.7	0.9	2.7	0 (0)	0.0	0.0	0.0	0.0	4 (1)	0.9	1.7	0.9	2.7
2021	0 (0)	0.0	0.0	0.0	0.0	5 (1)	0.7	0.9	0.2	1.1	5 (1)	0.7	0.9	0.2	1.1

**Table 16.** Estimated average weights of landed Spanish Mackerel in pounds whole weight (WGT) with associated coefficients of variation (CV; Approach 2 described in Nuttall and Dettloff 2022) by year and mode (MRIP, LACreel 2014+, TPWD). Average weight estimates are calculated from annual estimates (by-mode) of landings-in-weight (Table 7) divided by estimates of landings-in-number (Table 2). Sample size (N) is provided as the total number of angler trips and, in parentheses, number of fish from which weight information was collected (MRIP, LABIO 2014+, TPWD). MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

Year	Cbt			Hbt			Priv			Shore			Total		
	WGT	CV	N	WGT	CV	N	WGT	CV	N	WGT	CV	N	WGT	CV	N
1981	2.15	0.09	31 (189)	1.27	0.00	0	1.49	0.16	90 (306)	0.97	0.52	46 (101)	1.42	0.24	167 (596)
1982	1.01	0.39	37 (226)	1.34	0.27	6 (53)	1.50	0.18	211 (729)	1.37	0.12	70 (168)	1.40	0.21	324 (1,176)
1983	1.68	0.07	51 (399)	1.38	0.00	0	1.46	0.12	142 (304)	1.17	0.12	60 (208)	1.39	0.11	253 (911)
1984	1.56	0.05	67 (551)	0.66	0.10	11 (54)	1.43	0.20	93 (201)	1.08	0.13	36 (92)	1.30	0.16	207 (898)
1985	1.52	0.12	64 (327)	1.29	0.00	0	1.46	0.17	166 (371)	1.36	0.14	29 (79)	1.43	0.16	259 (777)
1986	1.79	0.16	187 (1,032)				1.15	0.16	354 (1,010)	1.08	0.05	70 (255)	1.14	0.16	611 (2,297)
1987	1.97	0.13	177 (924)				1.94	0.14	472 (1,219)	1.49	0.13	78 (220)	1.75	0.13	727 (2,363)
1988	2.59	0.16	37 (196)				1.31	0.14	190 (492)	1.13	0.20	23 (51)	1.36	0.15	250 (739)
1989	2.46	0.16	96 (545)				1.56	0.19	290 (750)	0.72	0.14	73 (243)	1.30	0.18	459 (1,538)
1990	2.52	0.15	104 (572)				1.84	0.18	293 (741)	1.08	0.14	133 (381)	1.48	0.17	530 (1,694)
1991	2.69	0.14	124 (603)				1.58	0.16	357 (922)	1.17	0.14	76 (217)	1.44	0.15	557 (1,742)
1992	2.16	0.14	123 (601)				1.62	0.17	597 (1,675)	1.36	0.11	242 (729)	1.49	0.16	962 (3,005)
1993	2.53	0.13	60 (223)				2.37	0.17	259 (545)	1.04	0.13	255 (826)	1.30	0.16	574 (1,594)
1994	2.60	0.17	73 (271)				1.44	0.16	355 (749)	1.12	0.11	327 (866)	1.23	0.15	755 (1,886)
1995	1.68	0.19	70 (404)				1.95	0.13	319 (665)	1.24	0.16	123 (332)	1.49	0.15	512 (1,401)
1996	2.17	0.16	75 (300)				1.62	0.12	439 (1,075)	1.07	0.17	153 (434)	1.35	0.13	667 (1,809)
1997	3.10	0.12	176 (628)				2.17	0.17	325 (753)	1.05	0.14	153 (439)	1.71	0.15	654 (1,820)
1998	2.37	0.15	228 (1,029)				2.12	0.15	372 (876)	1.45	0.11	189 (551)	1.72	0.15	789 (2,456)
1999	2.64	0.12	416 (2,060)				1.92	0.13	514 (1,372)	1.27	0.13	294 (864)	1.54	0.13	1,224 (4,296)
2000	2.01	0.11	514 (2,507)				1.97	0.14	490 (1,097)	1.59	0.10	227 (678)	1.76	0.13	1,231 (4,282)
2001	1.77	0.14	308 (2,626)				1.85	0.12	442 (1,163)	1.26	0.12	291 (920)	1.42	0.13	1,041 (4,709)
2002	2.08	0.14	268 (1,391)				2.24	0.12	534 (1,190)	1.38	0.11	280 (853)	1.65	0.13	1,082 (3,434)
2003	1.88	0.12	328 (1,600)				2.02	0.15	406 (944)	1.53	0.11	179 (565)	1.70	0.13	913 (3,109)
2004	1.39	0.14	329 (1,460)				1.54	0.19	508 (1,232)	1.19	0.11	210 (701)	1.32	0.17	1,047 (3,393)
2005	1.67	0.20	188 (725)				1.48	0.14	408 (982)	1.08	0.14	120 (358)	1.33	0.17	716 (2,065)
2006	1.83	0.21	151 (734)				1.70	0.10	596 (1,428)	0.97	0.15	166 (468)	1.35	0.13	913 (2,630)
2007	1.63	0.19	231 (970)				1.70	0.12	454 (995)	1.27	0.12	181 (569)	1.45	0.14	866 (2,534)
2008	1.66	0.17	221 (1,113)				1.93	0.15	491 (1,187)	0.94	0.10	160 (551)	1.56	0.15	872 (2,851)

Year	Cbt			Hbt			Priv			Shore			Total		
	WGT	CV	N	WGT	CV	N	WGT	CV	N	WGT	CV	N	WGT	CV	N
2009	1.40	0.15	202 (849)				1.59	0.15	481 (1,058)	1.24	0.12	189 (529)	1.43	0.15	872 (2,436)
2010	1.82	0.13	212 (1,083)				1.57	0.14	437 (1,119)	1.47	0.10	261 (757)	1.52	0.13	910 (2,959)
2011	1.53	0.17	317 (1,920)				1.50	0.12	507 (1,266)	1.28	0.08	241 (737)	1.37	0.13	1,065 (3,923)
2012	1.51	0.11	432 (2,497)				1.64	0.16	490 (1,212)	1.42	0.12	322 (949)	1.49	0.14	1,244 (4,658)
2013	1.50	0.19	161 (916)				1.57	0.14	490 (1,036)	1.22	0.09	307 (993)	1.29	0.14	958 (2,945)
2014	1.68	0.12	264 (906)				1.38	0.14	496 (1,080)	1.07	0.10	184 (575)	1.16	0.13	944 (2,561)
2015	1.73	0.14	442 (2,133)				1.53	0.19	426 (1,002)	1.08	0.10	211 (635)	1.17	0.16	1,079 (3,770)
2016	1.86	0.11	433 (1,816)				1.50	0.14	574 (1,369)	1.12	0.15	176 (463)	1.26	0.13	1,183 (3,648)
2017	1.88	0.11	315 (1,755)				1.61	0.13	332 (742)	1.12	0.13	170 (508)	1.20	0.13	817 (3,005)
2018	1.54	0.14	305 (1,524)				1.46	0.13	345 (849)	1.06	0.11	219 (612)	1.19	0.13	869 (2,985)
2019	1.70	0.11	314 (1,815)				2.21	0.14	303 (830)	1.06	0.10	290 (990)	1.29	0.13	907 (3,635)
2020	1.89	0.12	331 (1,572)				2.13	0.13	379 (943)	1.19	0.11	192 (510)	1.52	0.13	902 (3,025)
2021	1.31	0.13	319 (1,319)				2.07	0.23	242 (609)	1.05	0.10	144 (374)	1.58	0.18	705 (2,302)

**Table 17.** Resolution of landings-in-weight estimates (pounds whole weight) for Gulf of Mexico Spanish Mackerel by year and hierarchy level (MRIP, LACreel 2014+, TPWD), defined by species, region, year, state, mode, wave, and area. Average weight estimates are calculated at the finest strata meeting a minimum sample size threshold (Dettloff and Matter 2019b). Larger sample sizes therefore allow average weights to be calculated at finer stratifications, the finest being at the srysmwa level (Matter and Rios 2013). Annual summaries include the number of fish and angler trips from which weight information was collected (N) and the landings-in-weight estimates (AB1.lbs) by hierarchy level. As an example, (srysmw) summarizes those landings-in-weight estimates originating from cells where average weights are specific to a particular species, region, year, state, mode, and wave (i.e., weight observations collapsed across areas).

Year	N	AB1.lbs				
		sry	srys	srysm	srysmw	srysmwa
1981	596 (167)	30,066	272,004	713,993	893,226	1,990,214
1982	1,176 (324)	0	19,210	520,284	128,153	3,553,905
1983	911 (253)	0	246,452	865,257	476,768	1,703,305
1984	898 (207)	0	475,651	465,071	7,076	939,847
1985	777 (259)	0	69,006	773,216	514,004	1,797,931
1986	2,297 (611)	0	57,424	254,071	360,845	6,273,905
1987	2,363 (727)	0	7,369	240,457	295,697	4,001,674
1988	739 (250)	100,375	891	1,116,228	242,472	1,495,875
1989	1,538 (459)	0	15,071	293,863	996,683	2,098,611
1990	1,694 (530)	0	12,700	467,432	1,107,091	5,103,384
1991	1,742 (557)	0	2,187	549,671	1,109,603	3,942,751
1992	3,005 (962)	0	38,295	665,181	652,894	6,641,921
1993	1,594 (574)	0	80,616	303,932	330,945	4,483,999
1994	1,886 (755)	0	49,508	201,534	328,625	4,526,661
1995	1,401 (512)	0	42,301	383,929	476,859	1,821,660
1996	1,809 (667)	0	53,450	282,117	311,179	2,170,372
1997	1,820 (654)	0	28,163	483,340	833,200	2,548,724
1998	2,456 (789)	0	50,986	149,290	315,358	3,657,057
1999	4,296 (1,224)	0	31,119	267,543	421,182	6,994,371
2000	4,282 (1,231)	0	3,299	259,315	432,664	6,912,573
2001	4,709 (1,041)	34,843	6,729	67,769	287,014	8,138,961
2002	3,434 (1,082)	0	36,872	430,155	147,219	7,705,600
2003	3,109 (913)	0	18,912	334,413	332,755	5,973,097
2004	3,393 (1,047)	0	50,026	49,878	727,917	6,636,578
2005	2,065 (716)	0	39,024	100,468	302,410	3,730,196
2006	2,630 (913)	0	14,356	143,038	501,599	3,786,843
2007	2,534 (866)	0	4,000	394,330	124,479	4,603,608
2008	2,851 (872)	11,902	6,620	7,681	479,198	6,931,517
2009	2,436 (872)	0	53,749	72,541	429,582	4,598,043
2010	2,959 (910)	76,148	23,478	289,171	292,849	6,117,262
2011	3,923 (1,065)	19,248	13,884	117,887	219,277	6,336,664
2012	4,658 (1,244)	0	15,961	235,899	443,063	7,448,570
2013	2,945 (958)	0	0	913,800	239,647	10,456,135
2014	2,561 (957)	0	29,853	40,191	238,341	4,910,568
2015	3,770 (1,079)	17,185	41,983	54,791	266,030	6,080,429
2016	3,648 (1,183)	26,351	15,990	709,094	295,188	6,021,109
2017	3,005 (817)	15,294	17,444	92,442	641,370	6,892,445

Year	N	AB1.lbs				
		sry	srys	srysm	srysmw	srysmwa
2018	2,985 (768)	15,811	142,017	211,829	821,504	4,468,778
2019	3,635 (857)	27,512	0	38,123	794,334	9,878,076
2020	3,025 (763)	19,187	17,999	432,263	948,442	4,780,071
2021	2,302 (709)	8,777	48	275,340	322,562	6,208,453

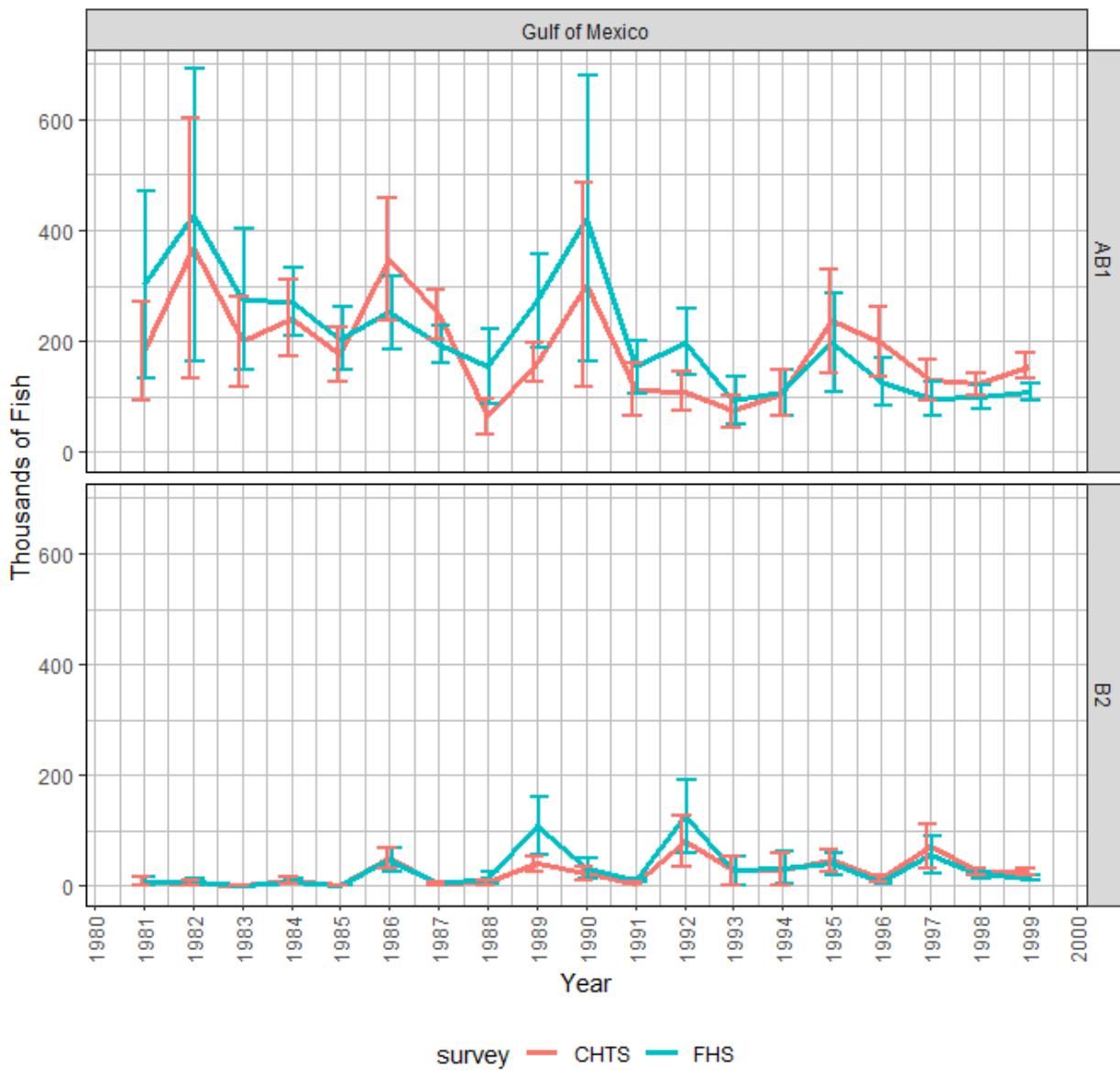
**Table 18.** Recreational Fishing Effort (in angler trips) for Gulf of Mexico anglers by state and year (MRIP, LACreel 2014+, TPWD). These effort estimates depict all (general) recreational fishing activity in the Gulf of Mexico and are not specific to Spanish Mackerel.

Year	TX	LA	MS	AL	FLW	Total
1981		5,443,324	1,500,488	1,961,664	17,542,861	26,448,337
1982		6,258,398	1,886,936	2,018,892	22,317,804	32,482,030
1983	555,681	6,727,736	2,065,413	2,034,552	27,384,677	38,768,059
1984	643,796	6,504,247	1,964,113	1,965,413	29,340,428	40,417,997
1985	710,725	6,572,069	1,946,516	2,051,290	28,503,697	39,784,297
1986	704,809	6,124,846	1,969,197	2,094,987	23,871,605	34,765,444
1987	889,371	5,858,078	1,917,560	2,007,343	24,860,626	35,532,978
1988	857,643	5,923,422	2,074,776	2,030,477	29,767,330	40,653,648
1989	791,653	5,959,837	2,176,386	2,050,077	31,638,372	42,616,325
1990	760,711	6,522,225	2,614,859	2,189,778	29,175,885	41,263,458
1991	775,674	6,551,479	2,830,732	2,496,457	36,274,793	48,929,135
1992	865,301	6,811,348	2,652,416	2,534,167	29,967,800	42,831,032
1993	897,527	7,200,313	2,683,955	2,580,832	34,255,631	47,618,258
1994	997,059	7,261,962	2,708,473	2,790,868	33,459,971	47,218,333
1995	982,649	7,272,037	2,720,561	2,811,817	31,249,275	45,036,339
1996	979,300	7,832,054	2,842,940	2,873,857	29,972,391	44,500,542
1997	894,328	8,129,630	3,125,302	3,201,557	30,078,541	45,429,358
1998	924,659	8,272,438	3,272,402	3,242,880	32,302,803	48,015,182
1999	1,098,251	8,751,059	3,568,584	3,418,511	37,211,088	54,047,493
2000	1,119,611	9,835,541	3,791,218	3,744,313	38,312,644	56,803,327
2001	943,350	10,047,817	3,904,563	4,018,024	40,356,323	59,270,077
2002	935,055	9,366,820	3,743,348	4,109,359	36,897,038	55,051,620
2003	968,522	9,770,130	3,760,258	4,397,398	40,094,000	58,990,308
2004	988,042	9,111,752	3,718,305	4,742,003	48,059,682	66,619,784
2005	898,897	8,548,931	3,259,936	4,376,978	41,879,648	58,964,390
2006	1,005,097	8,029,154	3,857,950	5,110,383	37,528,052	55,530,636
2007	887,696	8,952,616	4,031,282	5,219,235	40,137,729	59,228,558
2008	873,237	9,805,845	4,353,513	4,977,530	40,894,492	60,904,617
2009	925,446	10,515,738	4,573,165	5,441,596	36,207,467	57,663,412
2010	870,541	11,222,564	4,509,351	5,329,293	39,446,328	61,378,077
2011	989,955	11,453,646	4,503,301	5,737,821	40,063,360	62,748,083
2012	1,000,270	10,889,486	4,492,747	6,150,613	44,997,654	67,530,770
2013	997,827	10,770,452	4,341,700	6,768,525	46,293,290	69,171,794
2014	963,087	2,226,868	4,311,510	6,481,789	38,625,282	52,608,536
2015	920,172	2,425,434	4,593,570	6,829,718	35,730,006	50,498,900
2016	1,071,428	2,241,734	4,717,914	7,319,601	38,936,416	54,287,093
2017	1,002,941	2,308,352	4,847,581	8,493,459	41,840,176	58,492,509
2018	1,120,640	2,275,932	4,554,960	6,680,646	40,996,400	55,628,578
2019	1,227,588	2,108,454	4,226,768	6,676,884	35,644,843	49,884,537
2020	1,117,929	2,501,305	4,297,896	6,623,029	42,197,504	56,737,663
2021	969,227	1,887,859	4,774,808	6,815,020	37,553,580	52,000,494

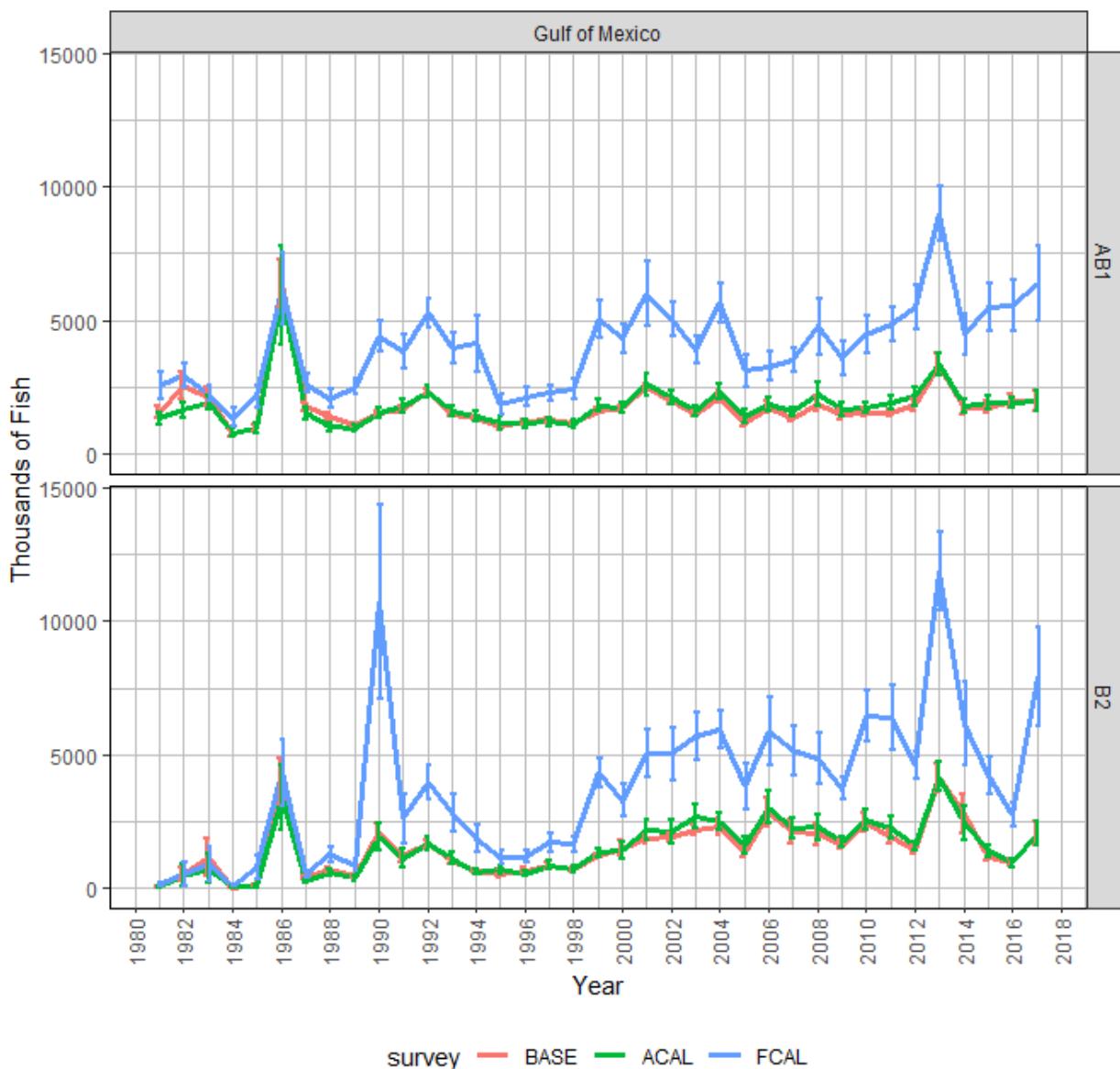
**Table 19.** Recreational Fishing Effort (in angler trips) for Gulf of Mexico anglers by mode and year (MRIP, LACreel 2014+, TPWD). These effort estimates depict all (general) recreational fishing activity in the Gulf of Mexico and are not specific to Spanish Mackerel. Effort from the combined private-shore fishing mode in the LA Creel survey has been added to the private mode. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.

Year	Cbt	Hbt	Priv	Shore	Total
1981	421,104	184,590	12,186,947	13,655,697	26,448,338
1982	628,429	260,912	13,959,437	17,633,253	32,482,031
1983	637,248	256,493	16,100,466	21,773,853	38,768,060
1984	601,741	242,211	18,000,839	21,573,205	40,417,996
1985	650,994	277,516	16,401,453	22,454,336	39,784,299
1986	635,401		15,830,087	18,299,956	34,765,444
1987	694,259		16,854,478	17,984,240	35,532,977
1988	561,286		18,245,612	21,846,750	40,653,648
1989	715,802		18,929,169	22,971,354	42,616,325
1990	670,487		19,531,087	21,061,884	41,263,458
1991	737,662		20,786,015	27,405,457	48,929,134
1992	683,733		20,545,567	21,601,733	42,831,033
1993	784,728		21,727,500	25,106,032	47,618,260
1994	826,869		21,573,409	24,818,057	47,218,335
1995	941,440		22,347,428	21,747,470	45,036,338
1996	882,976		22,485,061	21,132,504	44,500,541
1997	868,221		23,850,996	20,710,142	45,429,359
1998	910,489		24,357,759	22,746,934	48,015,182
1999	876,478		26,440,425	26,730,589	54,047,492
2000	874,539		26,097,662	29,831,126	56,803,327
2001	919,223		28,203,344	30,147,509	59,270,076
2002	925,995		26,992,624	27,133,001	55,051,620
2003	860,599		28,252,451	29,877,258	58,990,308
2004	956,168		32,081,597	33,582,018	66,619,783
2005	818,973		29,922,907	28,222,510	58,964,390
2006	958,119		28,453,143	26,119,374	55,530,636
2007	1,014,728		29,239,206	28,974,624	59,228,558
2008	963,971		32,125,714	27,814,931	60,904,616
2009	929,263		30,276,890	26,457,258	57,663,411
2010	733,320		31,309,204	29,335,553	61,378,077
2011	902,984		31,352,669	30,492,429	62,748,082
2012	1,111,425		33,576,329	32,843,015	67,530,769
2013	1,055,300		31,633,629	36,482,865	69,171,794
2014	1,067,151		25,302,755	26,238,629	52,608,535
2015	1,211,008		23,465,065	25,822,827	50,498,900
2016	1,269,811		24,602,878	28,414,402	54,287,091
2017	1,248,715		25,115,957	32,127,838	58,492,510
2018	1,427,375		23,594,435	30,606,767	55,628,577
2019	1,687,526		21,205,828	26,991,183	49,884,537
2020	1,382,600		23,842,855	31,512,207	56,737,662
2021	1,570,793		22,481,346	27,948,354	52,000,493

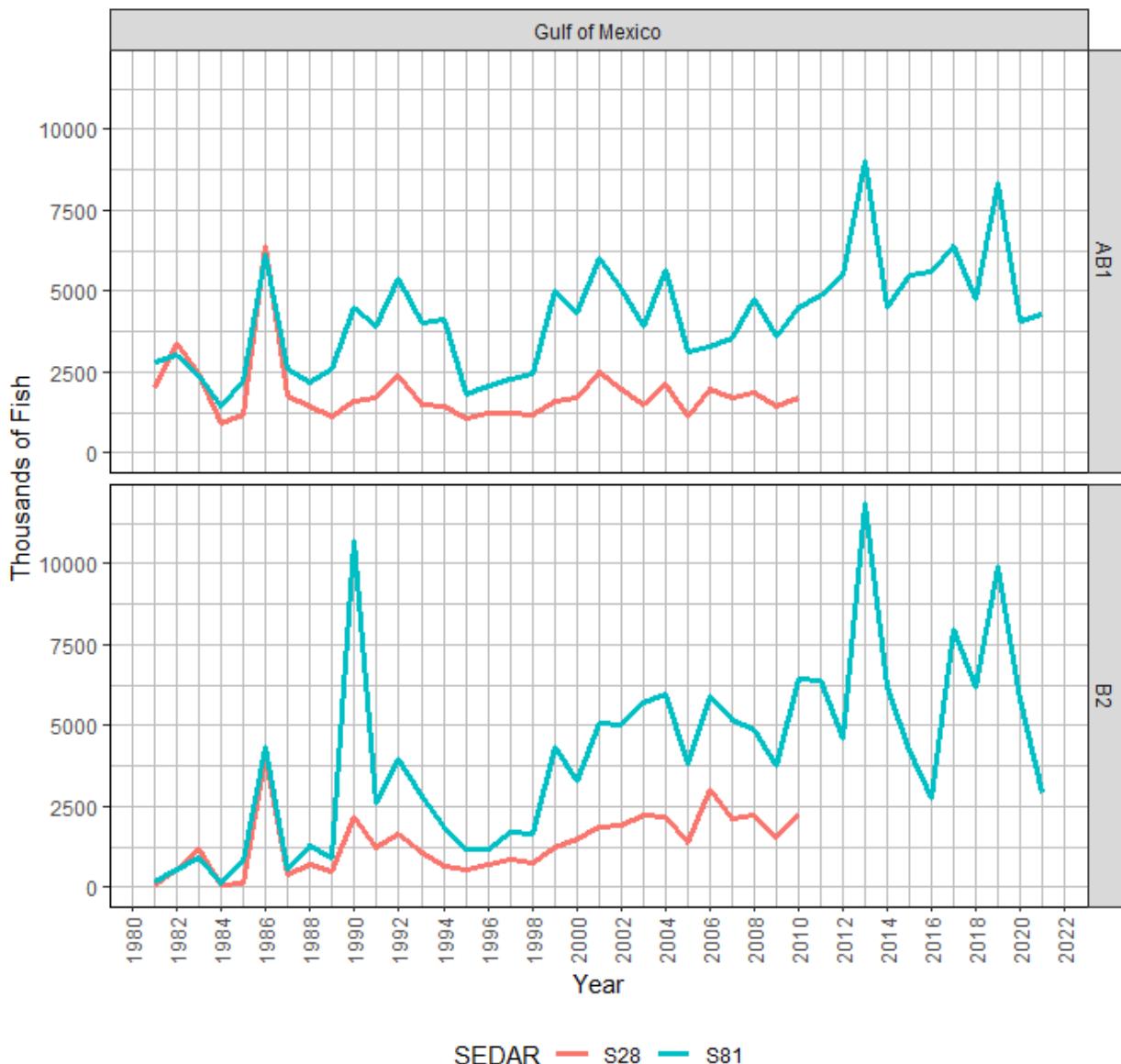




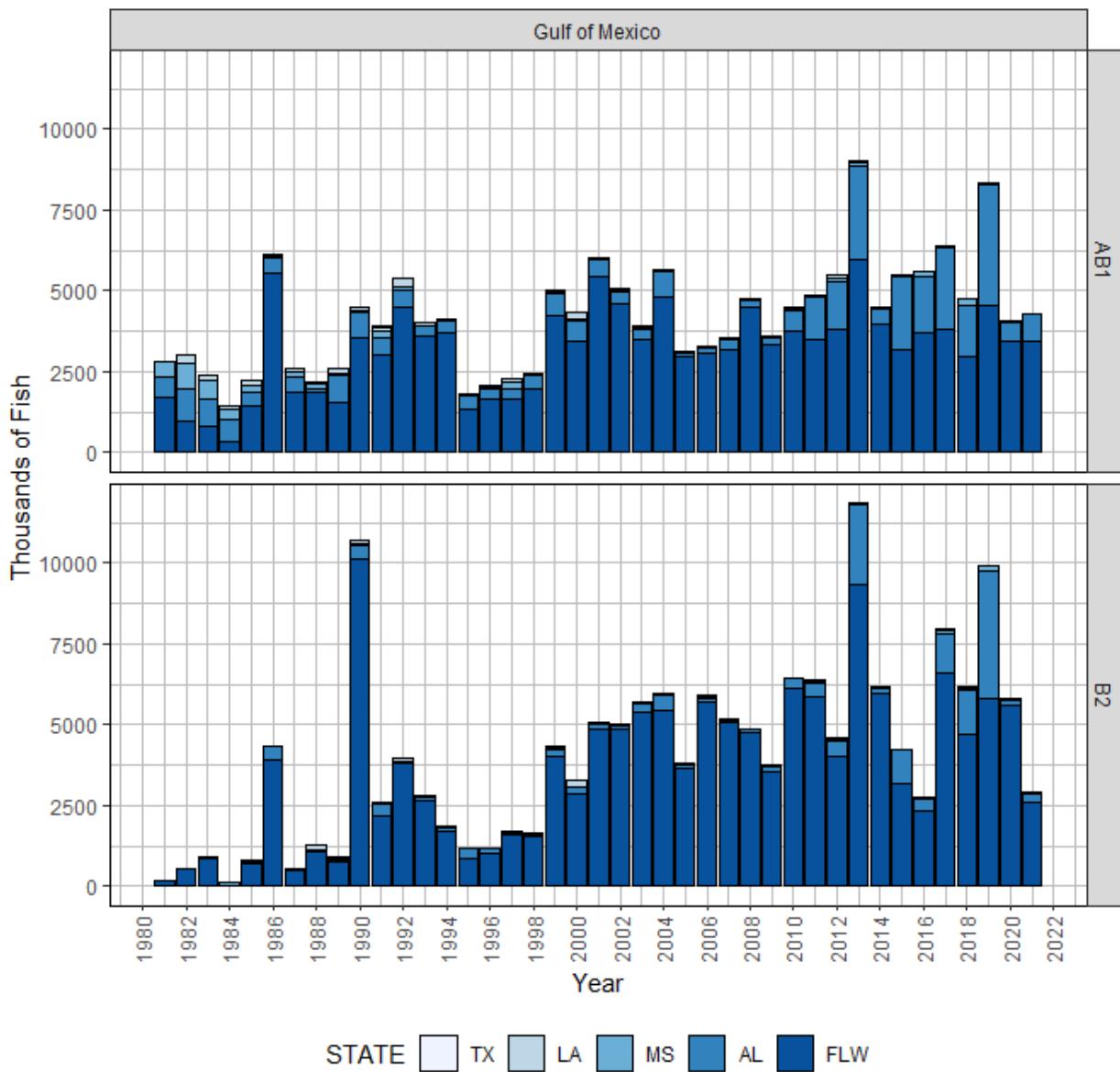
**Figure 1.** Comparison of Charterboat landings (AB1) and discard (B2) estimates (with standard error intervals shown) for Spanish Mackerel from the Coastal Household Telephone Survey (CHTS) and For-Hire Survey (FHS) from the Gulf of Mexico between 1981 and 1999 (MRIP). The Charterboat calibration approach is discussed in Dettloff and Matter (2019a).



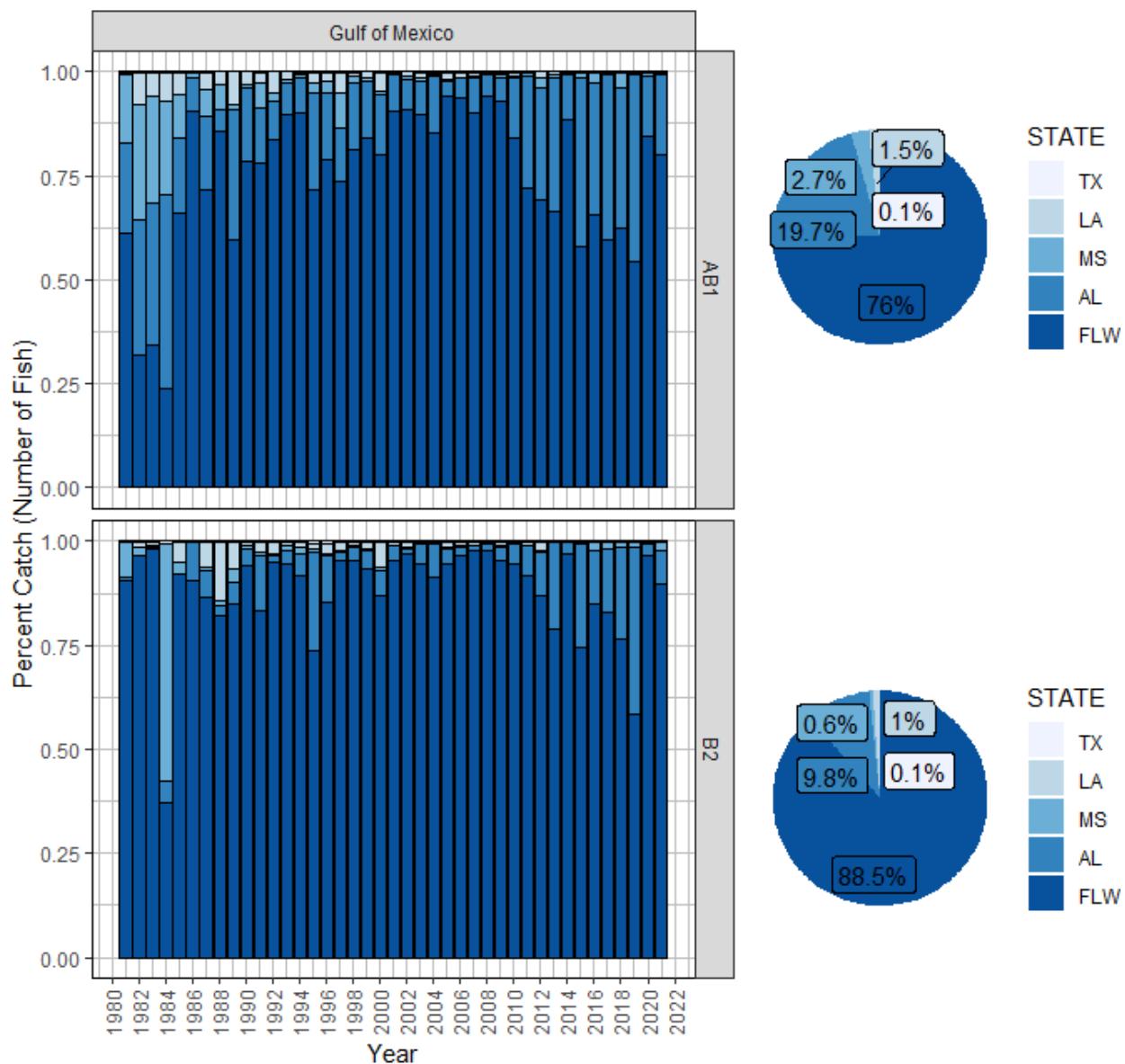
**Figure 2.** MRIP Base (BASE), APAIS Calibrated (ACAL), and Fully Calibrated APAIS and FES (FCAL) catch estimates for Spanish Mackerel in the Gulf of Mexico between 1981 and 2017. Landings (AB1) and discard (B2) estimates are in thousands of fish (NMFS).



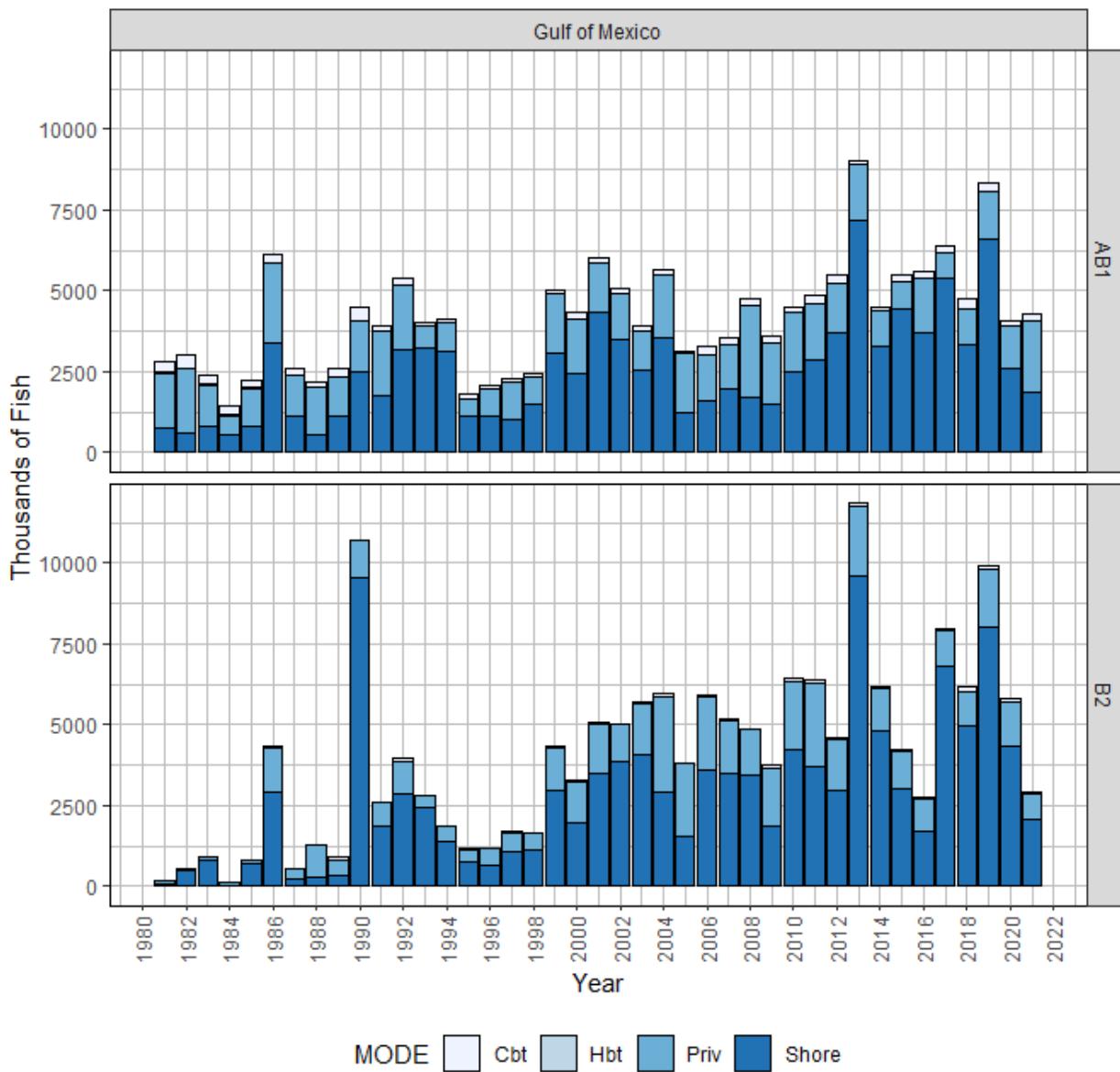
**Figure 3.** Comparison of total general recreational landings (AB1) and discard estimates (B2) for Gulf of Mexico Spanish Mackerel between SEDAR 81 and SEDAR 28, the terminal years of which are 2021 and 2010 respectively. Differences in catch estimates, which are in thousands of fish, are largely a function of changes in the MRIP survey (e.g., redesigned APAIS in 2013, FES in 2018).



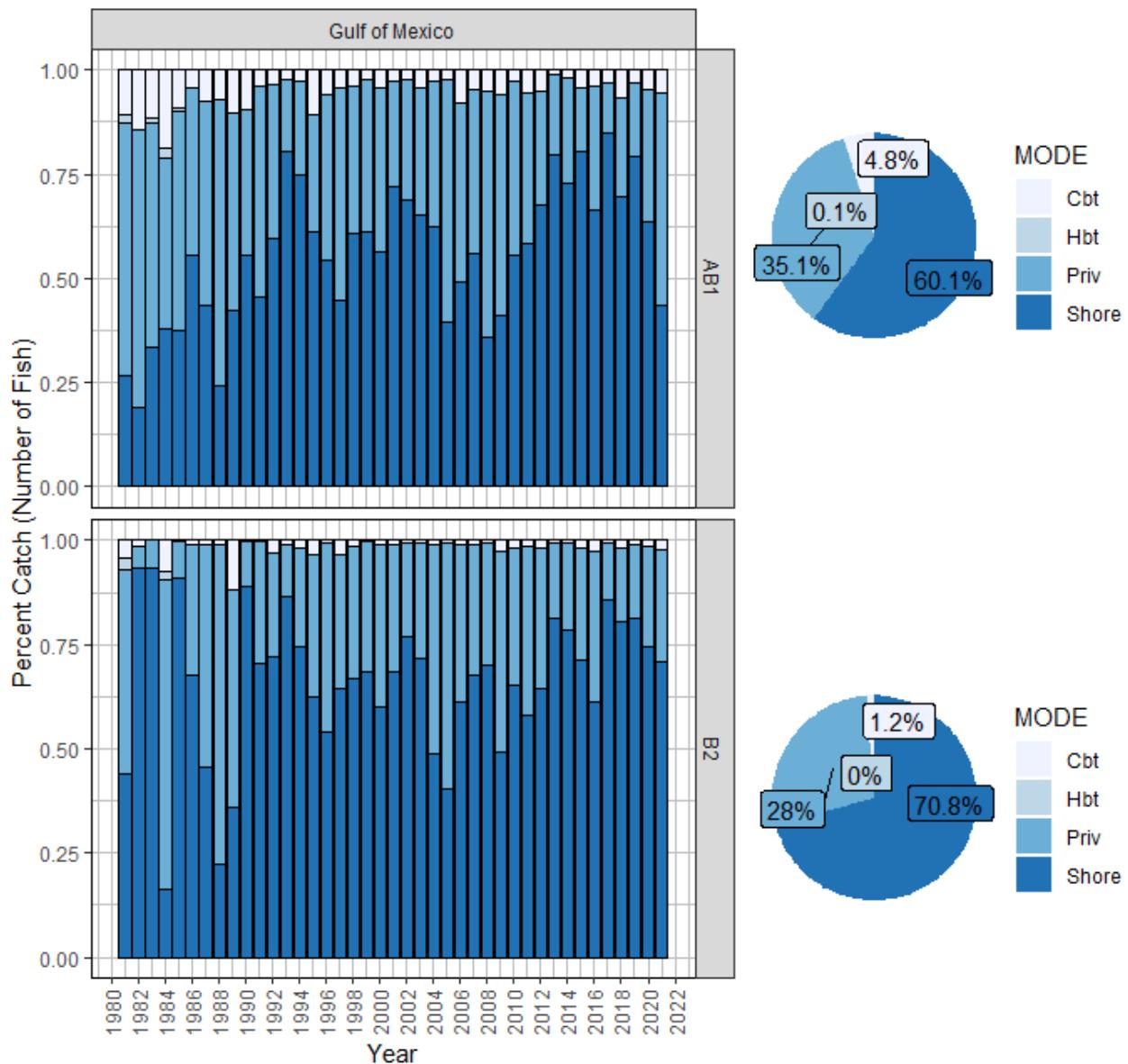
**Figure 4.** Annual Spanish Mackerel landings (AB1) and discards (B2), in thousands of fish, by state from 1981 to 2021 (MRIP, LACreel 2014+, TPWD).



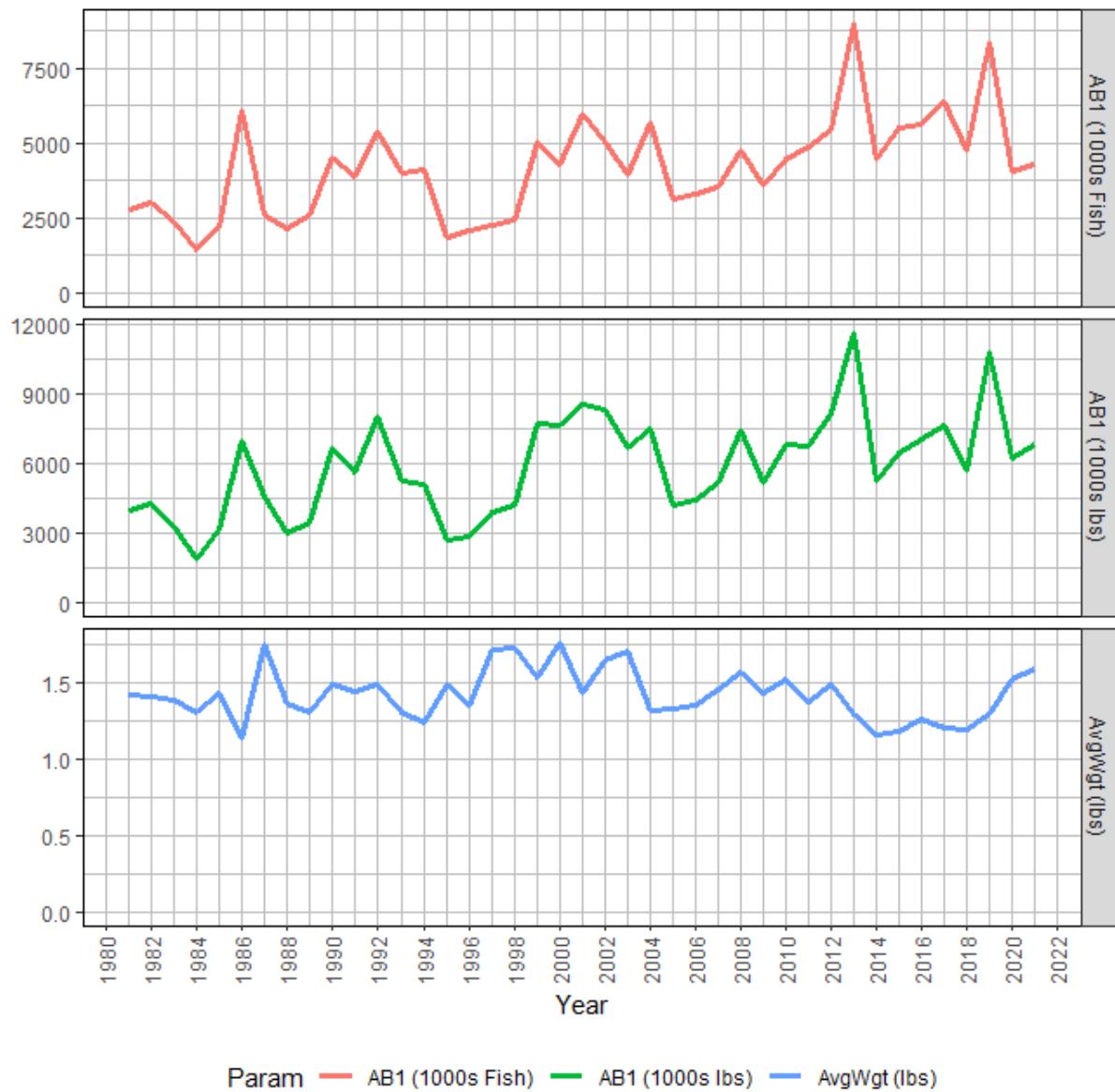
**Figure 4a.** Percent of Spanish Mackerel landings (AB1) and discards (B2), in numbers of fish, from each state by year (bar graph) and overall (pie chart) between 1981 and 2021 (MRIP, LACreel 2014+, TPWD).



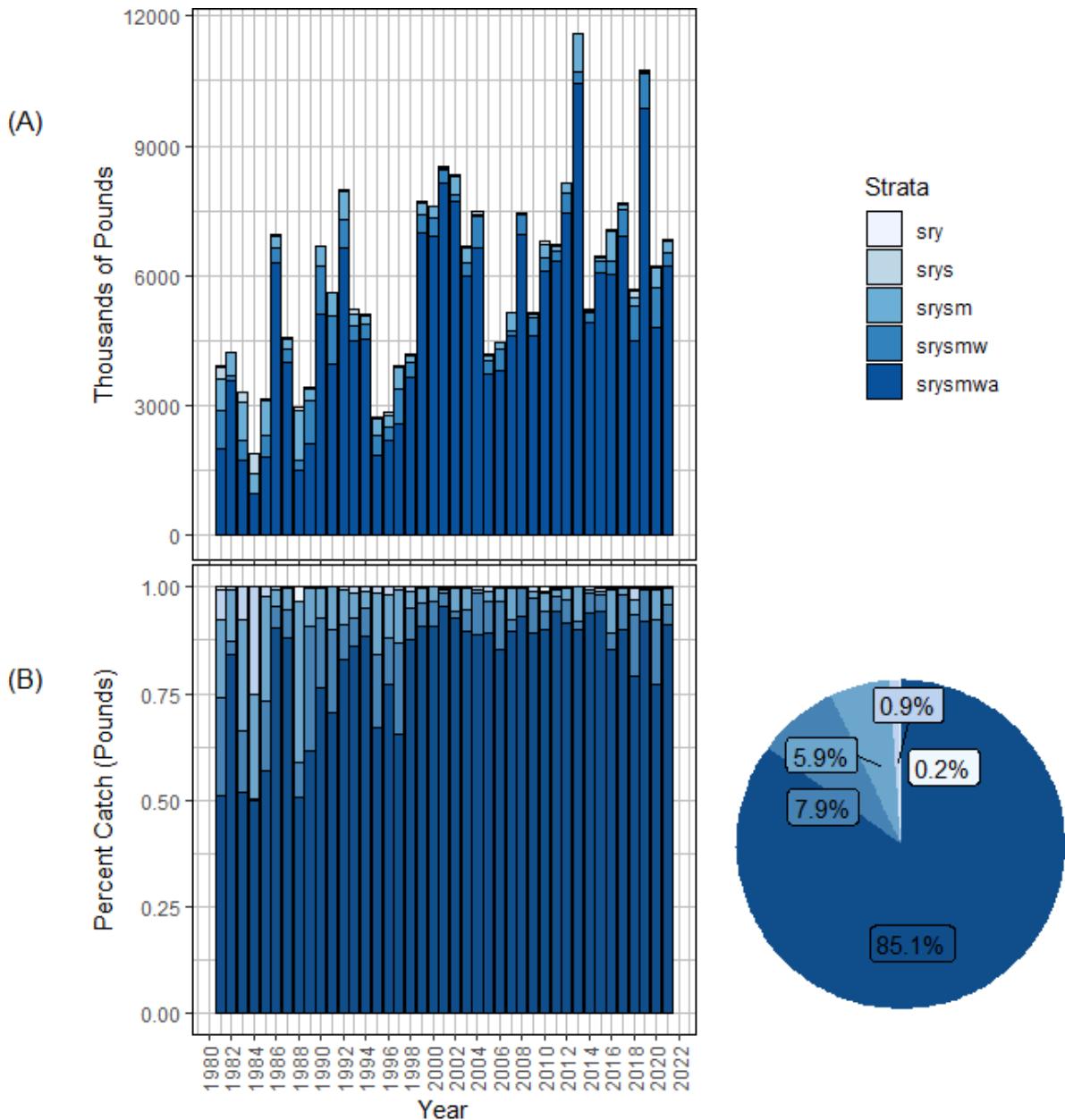
**Figure 5.** Annual Spanish Mackerel landings (AB1) and discards (B2), in thousands of fish, by mode from 1981 to 2021 (MRIP, LACreel 2014+, TPWD). Note that catch from the combined Private-Shore fishing mode in the LA Creel survey has been added to the Private mode. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.



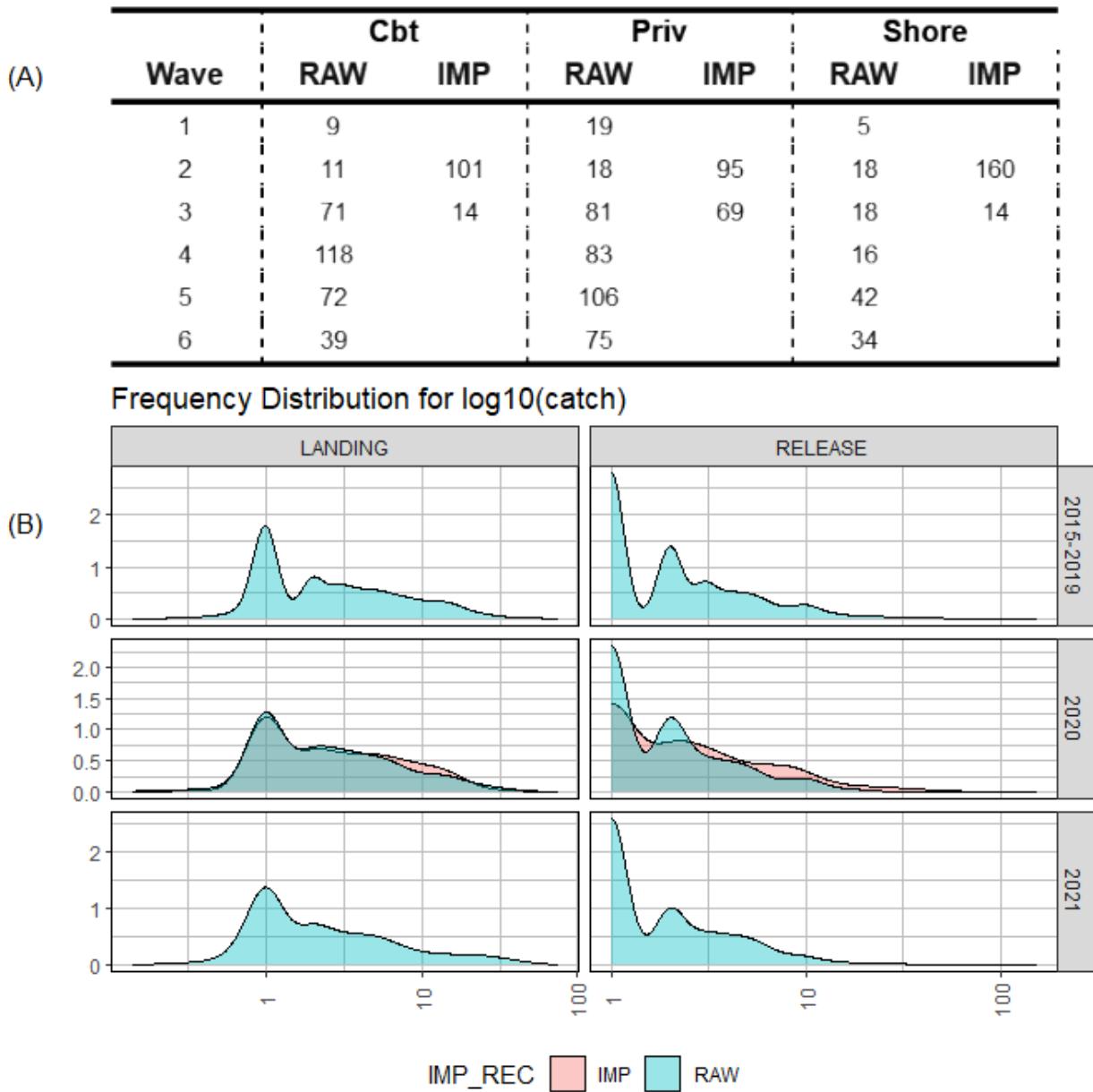
**Figure 5a.** Percent of Spanish Mackerel landings (AB1) and discards (B2), in numbers of fish, from each mode by year (bar graph) and overall (pie chart) between 1981 and 2021 (MRIP, LACreel 2014+, TPWD). Note that catch from the combined Private-Shore fishing mode in the LA Creel survey has been added to the Private mode. MRIP Headboat estimates (1981-1985) are included from Texas to western Florida.



**Figure 6.** Estimates of annual landings for Spanish Mackerel in the Gulf of Mexico (MRIP, LACreel 2014+, TPWD): estimated landings in thousands of fish (top), estimated landings in thousands of pounds whole weight (middle), and average weight of landed fish (estimated lbs/estimated fish) (bottom). Average weight estimates are calculated by strata using the following hierarchy: species, region, year, state, mode, wave, and area (Matter and Rios 2013). The minimum number of weights used at each level of substitution is fifteen fish, except for the final species level where the minimum is one fish (Dettloff and Matter 2019b).



**Figure 7.** Annual landings estimates of Gulf of Mexico Spanish Mackerel in thousands of pounds whole weight by hierarchy level (MRIP, LACreel 2014+, TPWD), defined by **species**, **region**, **year**, **state**, **mode**, **wave**, and **area**. Landings are grouped by the strata at which average weights were estimated, the finest stratification being at the srystmwa level (Matter and Rios 2013). As an example, (srystmw) summarizes those landings-in-weight estimates originating from cells where average weights are specific to a particular species, region, year, state, mode, and wave (i.e., weight observations collapsed across areas). Landings are provided (A) in absolute pounds and (B) as a percentage of total landings-in-weight, which is summarized by year (stacked bar plot) and across all years (pie chart).



**Figure 8.** COVID data gaps in the MRIP APAIS and associated imputations for (positive) fishing trips that intercepted Gulf of Mexico Spanish Mackerel. No 2020 data were imputed for the FES or FHS. (A) Number of positive intercepts in 2020 from the APAIS (RAW) vs. those imputed from intercepts in adjacent years (IMP). (B) Distribution of APAIS catch observations in years with no imputed catch data (in 2015-2019 and 2021), in raw 2020 APAIS data, and in 2020 imputations. Refer to Cody (2021) for more information on COVID data gaps in MRIP.

## Appendix A

### Additional Details of Survey Data and SEFSC Estimation

- **MRIP Survey Methodology:** Fully calibrated estimates that take into account the change in the Fishing Effort Survey (FES; 2018), the redesigned Access Point Angler Intercept Survey (APAIS; 2013), and the For Hire Survey (FHS; 2000 for all Gulf of Mexico states).
  - Papacostas and Foster (2021) provide descriptions of the approaches used by the Office of Science and Technology to calibrate MRIP (1) effort estimates derived from the legacy Coastal Household Telephone Survey (CHTS) into FES units for the private and shore modes and (2) catch rate estimates between the original and redesigned APAIS for all modes.
  - SEFSC calibrations of catch and effort estimates between CHTS and FHS units are calculated for the For-Hire mode by year, region, state, wave, and area fished according to Dettloff and Matter (2019a). Figure 1 summarizes the resultant scaling of CHTS catch estimates under the FHS calibration ratios.
- **MRIP Data Gap from COVID:** Missing 2020 intercepts were imputed from all APAIS data collected in 2018 and 2019 from the same strata as the 2020 data gap, with original sample weights reduced by a factor of two to account for using two years of data (Cody 2021).
- **SEFSC Weight Estimation:** Average (fish) weight estimates are calculated by strata using the following hierarchy: species, region, year, state, mode, wave, and area (Matter and Rios 2013). The minimum number of weights used at each level of substitution is fifteen fish, except for the final species level where the minimum is one fish (Dettloff and Matter 2019b). Size records above an allowable (max size) threshold are excluded from weight estimation and the summary tables included in this working paper (Tables 8-15). For SEDAR 81 Spanish Mackerel, this includes any weights heavier than 13.6059 pounds.
- **SEFSC Estimates derived using SEDAR best practices (SEDAR-PW-07):**
  - The MRFSS survey began in wave2 of 1981. To fill-in this (1981 wave1) MRIP data gap, the proportion of wave1 catch to that from other waves (2-6) in years 1982-1984 (by fishing mode and area) was multiplied by the total catch from waves 2-6 in 1981.
  - Landings estimates from the TPWD survey are available starting in May (wave3) 1983. The average catch (by mode and wave) from waves 1-2 in 1984-1985 and average catch from waves 3-6 in years 1983-1985 were used to fill-in these (1981-1983) data gaps in Texas recreational landings.
  - The TPWD survey does not estimate discards. As a proxy for recreational discards from Texas private and charterboat anglers, discard:landings ratios (B2:AB1) are calculated (by year and mode) from Gulf-wide catch estimates and multiplied by TPWD landings estimates.

- To ensure sampling can support MRIP estimates at finer stratifications than for which the survey was designed, (sub-state) domain estimates are only generated for established geographic domains. For Florida, this includes the sub-state domains of Florida in the FHS (0 = 0, 1 = Florida panhandle, Escambia to Dixie; 2 = western Florida, Levy to Collier; 3 = Florida Keys).
- Between 1981 and 1985 in the Gulf of Mexico, MRIP charter and headboat modes were combined into a single (for-hire) mode for estimation purposes. Since the NMFS Southeast Region Headboat Survey (SRHS) began in 1986 in the Gulf, the MRIP combined for-hire mode must be split to provide estimates of headboat landings in these early years. Estimates for the MRIP for-hire mode (1981-1985) were split using a ratio of SRHS headboat angler trip estimates to MRIP charterboat angler trip estimates for 1986-1990, calculated by state (or state equivalent to match SRHS areas to MRIP states).
- The LA Creel survey replaced MRIP sampling of Louisiana anglers in Jan 2014, but has only collected discard information for Spanish Mackerel since 2016. As a proxy for LA discards between 2014-2015, LA Creel landings estimates for 2014-2015 were multiplied by the mean ratio of Gulf-wide discards:landings (by mode) between 2011-2013 (MRIP) and 2016-2018 (MRIP + LA Creel).