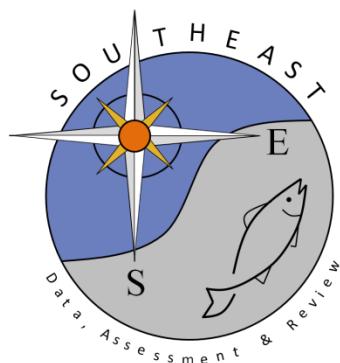


# General Recreational Survey Data for Gag in the South Atlantic

Vivian M. Matter and Matthew A. Nuttall

SEDAR71-WP05

Received: 10/13/2020



*This information is distributed solely for the purpose of pre-dissemination peer review. It does not represent and should not be construed to represent any agency determination or policy.*

Please cite this document as:

Matter, Vivian M. and Matthew A. Nuttall. 2020. General Recreational Survey Data for Gag in the South Atlantic. SEDAR71-WP05. SEDAR, North Charleston, SC. 32 pp.

## **General Recreational Survey Data for Gag in the South Atlantic**

**NOAA Fisheries  
Southeast Fisheries Science Center  
Fisheries Statistics Division  
75 Virginia Beach Drive  
Miami FL 33149**

Vivian M. Matter and Matthew A. Nuttall

10-13-2020

---

General recreational catch estimates for Gag are compiled from the Marine Recreational Information Program (MRIP). Details on MRIP can be found in SEDAR68-DW-13.

---

Parameters for data prepared for SEDAR 71 recreational catch data:

Species: Gag and Black Grouper (north of Florida)

Year Range: 1981 - 2019

Geographic Range: Atlantic states from Maine to eastern Florida, including the Florida Keys.

Fishing Modes: Charter, Private, Shore, Headboat (Virginia to Maine)

Survey Methodology: Fully calibrated estimates that take into account the change in the Fishing Effort Survey, the redesigned Access Point Angler Intercept Survey, and the For Hire Survey

1984 landings estimate: 445,925 fish

Strata: Florida Keys, wave 6, private mode, and ocean less than or equal to 10 miles

Intercept Records:

One trip which harvested 6 gag (not seen by interviewer)

One trip which harvested 1 gag (not seen by interviewer)

---

## Tables

**Table 1.** Annual landings (AB1) and discards (B2) of Gag in numbers of fish by state and year (MRIP).

**Table 2.** Annual landings (AB1) and discards (B2) of Gag in numbers of fish by mode and year (MRIP). MRIP Headboat estimates are included from Virginia to Maine.

**Table 3.** Gag landings in numbers of fish (AB1) with associated coefficients of variation (CV; Dettloff et al. 2020) by mode and year (MRIP). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by MRIP samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Gag. MRIP Headboat estimates are included from Virginia to Maine.

**Table 4.** Gag discards in numbers of fish (B2) with associated coefficients of variation (CV; Dettloff et al. 2020) by mode and year (MRIP). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by MRIP samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Gag. MRIP Headboat estimates are included from Virginia to Maine.

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

**Table 6.** Estimated landings of Gag in pounds whole weight by state and year (MRIP).

**Table 7.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Gag by state and year. Summaries include the number of fish measured by MRIP (Fish), the number of angler trips from which those fish were measured (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish lengths.

**Table 8.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Gag by state and year. Summaries include the number of fish weighed by MRIP (Fish), the number of angler trips from which those fish were weighed (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish weights.

**Table 9.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Gag by mode and year. Summaries include the number of fish measured by MRIP (Fish), the number of angler trips from which those fish were measured (Trp), and

the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish lengths. MRIP Headboat estimates are included from Virginia to Maine.

**Table 10.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Gag by mode and year. Summaries include the number of fish weighed by MRIP (Fish), the number of angler trips from which those fish were weighed (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish weights. MRIP Headboat estimates are included from Virginia to Maine.

**Table 11.** Summary of length (millimeters fork length) and weight measurements (pounds whole weight) from MRIP-intercepted Gag by year. Summaries include the number of fish weighed by MRIP (Fish), the number of angler trips from which those fish were weighed (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish weights.

**Table 12.** Recreational Fishing Effort (in angler trips) for South Atlantic anglers by state and year (MRIP).

**Table 13.** Recreational Fishing Effort (in angler trips) for South Atlantic anglers by mode and year (MRIP). MRIP Headboat estimates are included from Virginia to Maine.

---

## Figures

**Figure 1.** Comparison of charterboat landings (AB1) and discard (B2) estimates (with standard error intervals shown) for Gag from the Coastal Household Telephone Survey (CHTS) and For-Hire Survey (FHS) from the South Atlantic between 1981 to 2003. The charterboat calibration approach is discussed in Dettloff and Matter (2019; SEDAR64-RD-12).

**Figure 2.** MRIP Base (BASE), APAIS Calibrated (ACAL), and Fully Calibrated APAIS and FES (FCAL) catch estimates for Gag in the Atlantic. Landings (AB1) and discard (B2) estimates are in thousands of fish. Estimates in this figure do not include the Florida Keys as that domain is not available from the MRIP online comparison tool (NMFS).

**Figure 3.** Annual Gag landings (AB1) and discards (B2), in thousands of fish, by state from 1981 to 2019 (MRIP).

**Figure 3a.** Percent of Gag landings (AB1) and discards (B2), in numbers of fish, from each state by year (bar graph) and overall (pie chart) between 1981 and 2019 (MRIP).

**Figure 4.** Annual Gag landings (AB1) and discards (B2), in thousands of fish, by mode from 1981 to 2019 (MRIP). MRIP Headboat estimates are included from Virginia to Maine.

**Figure 4a.** Percent of Gag landings (AB1) and discards (B2), in numbers of fish, from each mode by year (bar graph) and overall (pie chart) between 1981 and 2019 (MRIP). MRIP Headboat estimates are included from Virginia to Maine.

**Figure 5.** Estimates of annual landings for Gag in the South Atlantic, as estimated from MRIP: 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 2019).

---

## References

- Dettloff, K and VM Matter. 2019. SEDAR 64-RD-12. Model-estimated conversion factors for calibrating Coastal Household Telephone Survey (CHTS) charterboat catch and effort estimates with For Hire Survey (FHS) estimates in the Atlantic and Gulf of Mexico with application to red grouper and greater amberjack. National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC) Fisheries Statistics Division. Miami, FL.
- Dettloff, K and VM Matter. 2019. SEDAR 67-WP-06. Sample Size Sensitivity Analysis for calculating MRIP Weight Estimates. National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC) Fisheries Statistics Division. Miami, FL.
- Dettloff, K, VM Matter, and MA Nuttall. 2020. SEDAR 68-DW-10. SEFSC Computation of Variance Estimates for Custom Data Aggregations from the Marine Recreational Information Program. National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC) Fisheries Statistics Division. Miami, FL.
- Matter, VM and A Rios. 2013. SEDAR 32-DW-02. MRFSS to MRIP Adjustment Ratios and Weight Estimation Procedures for South Atlantic and Gulf of Mexico Managed Species. National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC) Fisheries Statistics Division. Miami, FL.
- Matter, VM and MA Nuttall. 2020. SEDAR 68-DW-13. Marine Recreational Information Program: Metadata for the Atlantic, Gulf of Mexico, and Caribbean Regions. National Marine Fisheries Service (NMFS) Southeast Fisheries Science Center (SEFSC) Fisheries Statistics Division. Miami, FL.
- Personal Communication from the National Marine Fisheries Service, Office of Science and Technology, Fisheries Statistics Division. February 14, 2020.

**Table 1.** Annual landings (AB1) and discards (B2) of Gag in numbers of fish by state and year (MRIP).

Year	FLKeys		FLE		GA		SC		NC		VA		NJ		Total	
	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2
1981	30,639	11,864	161,235	0	0	0	358	0	23,261	17,894	0	0	0	0	215,493	29,758
1982	95,874	7,780	382	3,595	0	0	0	0	5,282	2,583	0	0	0	0	101,539	13,958
1983	24,495	141,653	17,494	0	838	0	196	1,969	6,824	0	0	0	0	0	49,847	143,622
1984	328,108	100,980	92,174	9,104	0	0	2,161	0	23,482	0	0	0	0	0	445,925	110,085
1985	0	0	54,034	397	3,020	3,025	1,424	211	19,882	15,431	0	0	0	0	78,361	19,064
1986	26,496	328	16,058	30,947	1,844	3,570	15,086	5,625	0	1,302	0	0	0	0	59,484	41,771
1987	21,853	5,619	69,228	101,343	347	0	6,035	2,898	26,055	0	0	0	0	0	123,518	109,860
1988	14,007	2,341	41,829	19,217	311	0	1,362	0	15,262	0	0	0	0	0	72,771	21,558
1989	121,339	0	31,886	105,913	324	0	3,111	0	21,481	12,847	0	0	0	0	178,141	118,760
1990	9,550	2,478	16,115	70,180	0	0	3,090	15,937	49,355	0	0	0	0	0	78,111	88,594
1991	295	11,777	25,486	64,741	1,881	0	24,019	0	24,984	1,489	0	0	0	0	76,664	78,007
1992	1,720	17,838	37,557	43,119	6,696	2,014	3,721	140	11,613	7,444	0	0	0	0	61,308	70,555
1993	2,443	5,199	51,728	35,384	6,095	404	1,025	2,244	19,762	19,968	0	0	0	0	81,054	63,199
1994	2,298	8,847	64,134	124,226	6,607	12,955	695	0	19,437	6,038	0	0	0	0	93,171	152,067
1995	10,857	50,150	32,091	177,574	2,928	3,332	480	158	9,167	11,788	0	0	0	0	55,523	243,002
1996	32,591	34,262	44,923	120,936	7,538	172	2,548	413	4,150	3,531	0	0	0	0	91,750	159,315
1997	3,754	159,352	28,071	101,040	2,851	0	2,518	10,230	10,692	7,740	0	0	0	0	47,886	278,362
1998	24,264	79,386	70,156	63,429	1,070	0	0	1,316	5,736	1,390	0	0	0	0	101,226	145,521
1999	2,095	72,258	71,352	181,289	1,201	515	1,140	728	6,636	2,310	0	0	0	0	82,423	257,100
2000	475	44,976	51,312	395,018	820	2,120	1,107	1,276	4,864	1,284	0	0	0	0	58,579	444,674
2001	858	5,285	94,543	193,875	589	0	725	9,343	9,044	5,570	0	0	0	0	105,760	214,072
2002	8,482	5,602	47,536	351,556	68	0	1,006	2,900	10,628	34,438	0	0	0	0	67,718	394,496
2003	6,711	105,777	65,320	500,781	18	67	3,516	13,256	13,678	8,668	0	0	0	0	89,243	628,550
2004	1,091	81,381	59,111	207,677	1,736	9,122	10,450	2,235	28,327	20,902	0	0	0	0	100,717	321,316
2005	440	17,594	31,111	298,367	4,611	9,913	388	68	19,354	33,837	0	0	0	0	55,904	359,780
2006	9,205	57,398	42,926	331,911	2,781	2,433	434	71	25,243	9,972	0	0	0	0	80,589	401,785
2007	7,785	59,651	42,516	397,839	224	2,401	3,227	10,052	23,966	113,880	0	0	0	0	77,718	583,823
2008	578	30,667	86,134	411,980	3,605	10,812	115	6,799	12,483	45,233	0	0	0	0	102,914	505,490
2009	378	5,052	48,764	362,097	55	46	1,384	7,055	21,879	18,275	0	0	0	0	72,461	392,525
2010	65	16,625	30,248	225,586	2,229	10	2,186	3,676	6,183	39,103	0	0	0	0	40,911	285,001
2011	71	4,866	24,967	163,691	109	5	3,335	0	5,837	33,292	0	0	0	0	34,319	201,853

Year	FLKeys		FLE		GA		SC		NC		VA		NJ		Total	
	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2
2012	257	151,147	22,823	159,161	48	72	372	18,579	13,194	45,047	0	95	0	0	36,695	374,101
2013	22	54,544	14,501	83,431	0	740	278	480	4,703	16,738	32	0	0	0	19,535	155,932
2014	3,525	44,752	28,966	174,048	0	1,575	2,798	26,217	1,484	23,751	0	0	0	0	36,773	270,344
2015	1,223	8,402	14,332	76,953	0	2,697	588	5,112	3,447	73,193	0	1,379	260	260	19,850	167,997
2016	2,240	1,749	18,943	30,619	0	148	331	12,244	3,890	27,599	0	0	0	0	25,405	72,360
2017	0	243	17,065	19,894	5,352	978	2,522	0	3,688	17,832	0	0	0	0	28,626	38,947
2018	40	780	22,760	47,450	1,908	101	34	3,283	171	1,070	0	274	0	0	24,913	52,958
2019	0	359	12,154	11,055	0	0	2,000	3,008	7,569	9,684	0	0	0	0	21,724	24,107

**Table 2.** Annual landings (AB1) and discards (B2) of Gag in numbers of fish by mode and year (MRIP). MRIP Headboat estimates are included from Virginia to Maine.

Year	Cbt		Hbt		Priv		Shore		Total	
	AB1	B2	AB1	B2	AB1	B2	AB1	B2	AB1	B2
1981	1,231	0	0	0	173,831	11,864	40,432	17,894	215,493	29,758
1982	678	0	0	0	98,277	11,375	2,583	2,583	101,539	13,958
1983	7,393	0	0	0	42,455	143,622	0	0	49,847	143,622
1984	29,498	387	0	0	409,428	109,697	6,998	0	445,925	110,085
1985	11,452	686	0	0	55,352	2,947	11,557	15,431	78,361	19,064
1986	439	1,493	0	0	32,550	40,279	26,496	0	59,484	41,771
1987	6,563	0	0	0	111,140	30,539	5,815	79,320	123,518	109,860
1988	20,369	2,341	0	0	52,403	19,217	0	0	72,771	21,558
1989	10,332	0	0	0	154,239	118,760	13,570	0	178,141	118,760
1990	22,558	743	0	0	50,256	87,852	5,297	0	78,111	88,594
1991	11,901	5,519	0	0	51,674	60,711	13,090	11,777	76,664	78,007
1992	17,253	14,960	0	0	44,055	55,595	0	0	61,308	70,555
1993	9,437	2,170	0	0	70,740	46,961	877	14,067	81,054	63,199
1994	17,721	9,517	0	0	67,511	102,432	7,939	40,118	93,171	152,067
1995	12,259	9,581	0	0	32,521	125,967	10,744	107,454	55,523	243,002
1996	9,894	5,022	0	0	79,916	133,587	1,940	20,706	91,750	159,315
1997	7,209	2,096	0	0	40,676	267,900	0	8,366	47,886	278,362
1998	6,663	2,334	0	0	94,563	136,055	0	7,131	101,226	145,521
1999	8,037	3,110	0	0	71,871	202,878	2,515	51,111	82,423	257,100
2000	8,297	6,748	0	0	50,282	383,050	0	54,875	58,579	444,674
2001	10,140	6,625	0	0	87,122	195,383	8,498	12,064	105,760	214,072
2002	20,047	14,292	0	0	47,672	343,635	0	36,570	67,718	394,496
2003	10,782	16,177	0	0	78,461	334,378	0	277,995	89,243	628,550
2004	11,564	10,488	0	0	89,153	305,161	0	5,667	100,717	321,316
2005	11,342	16,537	0	0	44,562	230,528	0	112,714	55,904	359,780
2006	15,325	2,143	0	0	65,264	360,220	0	39,422	80,589	401,785
2007	6,878	23,226	0	0	68,908	424,988	1,932	135,610	77,718	583,823
2008	3,275	10,457	0	0	97,999	455,230	1,640	39,803	102,914	505,490
2009	4,980	9,841	0	0	64,890	339,880	2,591	42,804	72,461	392,525
2010	4,371	9,917	0	0	36,540	265,611	0	9,472	40,911	285,001
2011	1,183	7,883	0	0	33,136	114,434	0	79,536	34,319	201,853
2012	3,107	47,209	0	95	33,588	278,662	0	48,136	36,695	374,101
2013	390	7,161	32	0	19,113	137,934	0	10,837	19,535	155,932
2014	6,242	3,358	0	0	30,531	234,119	0	32,867	36,773	270,344
2015	2,866	6,689	260	336	16,724	105,156	0	55,817	19,850	167,997
2016	1,738	1,780	0	0	23,667	70,580	0	0	25,405	72,360
2017	4,545	21	0	0	24,081	37,897	0	1,029	28,626	38,947
2018	1,269	2,656	0	17	23,644	50,285	0	0	24,913	52,958
2019	1,522	138	0	0	20,202	23,081	0	887	21,724	24,107

**Table 3.** Gag landings in numbers of fish (AB1) with associated coefficients of variation (CV; Dettloff et al. 2020) by mode and year (MRIP). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by MRIP samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Gag. MRIP Headboat estimates are included from Virginia to Maine.

Year	Cbt				Hbt				Priv				Shore			
	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp
1981	873	1.00	63 ( 1)	583 ( 1)					173,831	0.79	862 ( 4)	7,141 ( 5)	40,432	0.63	1,098 (4)	6,502 (5)
1982	678	0.71	57 ( 2)	520 ( 2)					98,277	0.63	1,163 ( 7)	23,547 ( 8)	2,583	1.00	1,435 (1)	10,047 (1)
1983	373	0.92	169 ( 2)	1,886 ( 2)					42,455	0.60	1,119 ( 4)	10,422 ( 4)	0	0.00	1,640 (0)	11,648 (0)
1984	29,498	0.36	226 (18)	2,592 (37)					409,428	0.80	859 (10)	7,421 (12)	6,998	1.00	1,331 (1)	10,101 (1)
1985	11,452	0.74	161 ( 9)	1,625 (15)					55,352	0.57	1,410 ( 7)	11,321 (10)	11,557	0.64	1,993 (3)	13,207 (3)
1986	311	0.79	249 ( 3)	2,260 ( 3)					32,550	0.38	2,310 (15)	18,463 (16)	26,496	1.00	1,060 (1)	6,080 (1)
1987	6,563	0.41	396 (16)	3,626 (17)					111,140	0.32	2,245 (26)	19,392 (34)	5,815	1.00	1,241 (1)	7,708 (1)
1988	20,369	0.70	422 (30)	3,560 (37)					52,403	0.36	2,570 (17)	21,216 (20)	0	0.00	1,856 (0)	11,909 (0)
1989	10,271	0.28	447 (42)	4,258 (61)					154,239	0.43	3,226 (28)	40,204 (33)	13,570	0.91	2,289 (2)	15,793 (2)
1990	22,558	0.33	323 (44)	3,440 (50)					50,256	0.37	3,544 (19)	31,626 (20)	5,297	1.00	1,905 (1)	13,545 (1)
1991	11,901	0.46	409 (30)	4,108 (41)					51,674	0.39	3,586 (20)	32,572 (20)	13,090	0.72	2,466 (2)	20,076 (3)
1992	17,253	0.31	561 (41)	5,127 (52)					44,055	0.22	4,089 (31)	36,793 (39)	0	0.00	2,420 (0)	19,845 (0)
1993	9,437	0.32	400 (16)	4,334 (24)					70,740	0.29	3,731 (26)	32,598 (30)	877	1.00	3,074 (1)	24,985 (1)
1994	17,721	0.22	491 (33)	6,263 (46)					67,511	0.30	3,980 (24)	35,419 (28)	7,939	0.73	3,368 (2)	28,279 (2)
1995	12,259	0.32	459 (27)	5,646 (28)					32,521	0.29	3,626 (18)	31,816 (21)	10,744	0.73	3,282 (2)	28,554 (2)
1996	9,883	0.31	640 (25)	8,359 (30)					79,916	0.27	3,630 (23)	33,404 (27)	1,940	1.00	2,763 (1)	25,394 (1)
1997	7,209	0.32	806 (25)	9,062 (26)					40,676	0.31	3,896 (19)	36,120 (22)	0	0.00	3,028 (0)	25,135 (0)
1998	6,663	0.43	912 (26)	23,383 (30)					94,563	0.29	3,816 (24)	35,348 (30)	0	0.00	2,975 (0)	25,343 (0)
1999	6,574	0.24	998 (48)	9,372 (51)					70,223	0.26	3,663 (37)	35,912 (42)	2,515	1.00	3,236 (1)	26,716 (1)
2000	8,297	0.26	1,065 (42)	11,741 (59)					50,282	0.25	3,670 (28)	48,496 (30)	0	0.00	2,934 (0)	23,678 (0)
2001	10,140	0.22	951 (51)	11,686 (63)					87,122	0.26	4,312 (29)	44,776 (34)	8,498	0.73	3,291 (2)	28,011 (2)
2002	20,047	0.24	1,008 (50)	11,144 (57)					47,672	0.26	3,928 (23)	39,800 (24)	0	0.00	3,384 (0)	28,067 (0)
2003	10,782	0.29	890 (52)	10,036 (62)					78,461	0.21	4,301 (39)	38,571 (50)	0	0.00	3,672 (0)	26,963 (0)
2004	11,564	0.31	1,286 (54)	11,747 (64)	0	0.00	875 ( 0)	9,302 ( 0)	89,153	0.22	3,203 (34)	30,653 (39)	0	0.00	2,269 (0)	19,356 (0)
2005	11,316	0.26	1,616 (44)	13,970 (52)	0	0.00	982 ( 0)	24,497 ( 0)	44,562	0.24	2,815 (25)	27,351 (25)	0	0.00	2,090 (0)	17,424 (0)
2006	15,325	0.45	1,460 (36)	11,682 (47)	0	0.00	890 ( 0)	22,154 ( 0)	65,264	0.23	3,213 (35)	32,305 (38)	0	0.00	1,983 (0)	16,522 (0)
2007	6,878	0.29	1,497 (34)	11,903 (35)	0	0.00	642 ( 0)	21,679 ( 0)	68,908	0.20	3,467 (34)	33,387 (35)	1,932	1.00	2,181 (1)	18,999 (1)
2008	3,275	0.52	1,596 (23)	12,485 (29)	0	0.00	677 ( 0)	22,260 ( 0)	97,999	0.31	3,280 (28)	31,832 (33)	1,640	1.00	2,188 (1)	19,024 (1)
2009	4,980	0.33	1,432 (23)	10,213 (24)	0	0.00	656 ( 0)	20,909 ( 0)	64,890	0.31	3,224 (25)	29,728 (26)	2,591	1.00	2,075 (1)	16,538 (1)
2010	2,866	0.35	1,614 (21)	12,481 (24)	0	0.00	676 ( 0)	21,873 ( 0)	36,540	0.36	3,662 (17)	33,617 (18)	0	0.00	2,562 (0)	20,770 (0)

Year	Cbt				Hbt				Priv				Shore			
	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp	AB1	CV	PSU	Trp
2011	1,183	0.38	1,448 (13)	10,884 (13)	0	0.00	626 ( 0)	21,127 ( 0)	33,136	0.34	3,383 (15)	29,880 (19)	0	0.00	2,637 (0)	19,804 (0)
2012	3,107	0.36	1,334 (22)	10,690 (25)	0	0.00	477 ( 0)	19,314 ( 0)	33,588	0.34	3,500 (23)	31,978 (30)	0	0.00	2,810 (0)	20,920 (0)
2013	390	0.72	678 ( 7)	4,402 ( 8)	32	1.00	609 ( 1)	7,729 ( 1)	19,113	0.39	3,466 (14)	28,158 (14)	0	0.00	2,168 (0)	18,407 (0)
2014	6,242	0.39	1,244 (29)	9,045 (34)	0	0.00	546 ( 0)	7,301 ( 0)	30,531	0.38	3,911 (17)	31,566 (19)	0	0.00	1,902 (0)	16,889 (0)
2015	2,866	0.43	1,281 (13)	8,920 (13)	260	1.00	532 ( 1)	7,295 ( 1)	16,724	0.49	4,089 (11)	33,191 (11)	0	0.00	1,964 (0)	16,676 (0)
2016	1,738	0.31	1,397 (19)	9,639 (19)	0	0.00	572 ( 0)	8,638 ( 0)	23,667	0.36	3,968 (13)	29,776 (17)	0	0.00	2,512 (0)	16,344 (0)
2017	4,545	0.66	1,372 ( 7)	9,920 ( 8)	0	0.00	507 ( 0)	7,314 ( 0)	24,081	0.57	4,154 ( 6)	34,288 ( 6)	0	0.00	2,699 (0)	17,528 (0)
2018	1,269	0.56	1,609 (14)	12,782 (15)	0	0.00	512 ( 0)	8,098 ( 0)	23,644	0.46	4,140 ( 8)	34,872 ( 8)	0	0.00	2,745 (0)	19,372 (0)
2019	1,522	0.50	1,622 (13)	11,667 (13)	0	0.00	503 ( 0)	8,567 ( 0)	20,202	0.42	4,201 ( 7)	35,234 ( 9)	0	0.00	2,781 (0)	19,095 (0)

**Table 4.** Gag discards in numbers of fish (B2) with associated coefficients of variation (CV; Dettloff et al. 2020) by mode and year (MRIP). Sample size is provided both as the total number of primary sampling units (PSU) and angler trips (Trp) intercepted by MRIP samplers within a specified strata and, in parentheses, the number of PSUs and angler trips that intercepted Gag. MRIP Headboat estimates are included from Virginia to Maine.

Year	Cbt				Hbt				Priv				Shore			
	B2	CV	PSU	Trp	B2	CV	PSU	Trp	B2	CV	PSU	Trp	B2	CV	PSU	Trp
1981	0	0.00	63 ( 0)	583 ( 0)					11,864	1.00	862 ( 1)	7,141 ( 1)	17,894	1.00	1,098 ( 1)	6,502 ( 1)
1982	0	0.00	57 ( 0)	520 ( 0)					11,375	0.75	1,163 ( 2)	23,547 ( 2)	2,583	1.00	1,435 ( 1)	10,047 ( 1)
1983	0	0.00	169 ( 0)	1,886 ( 0)					143,622	0.99	1,119 ( 2)	10,422 ( 6)	0	0.00	1,640 ( 0)	11,648 ( 0)
1984	387	1.00	226 ( 1)	2,592 ( 1)					109,697	0.66	859 ( 4)	7,421 ( 4)	0	0.00	1,331 ( 0)	10,101 ( 0)
1985	686	0.66	161 ( 3)	1,625 ( 6)					2,947	0.74	1,410 ( 2)	11,321 ( 5)	15,431	1.00	1,993 ( 1)	13,207 ( 2)
1986	1,493	0.53	249 ( 5)	2,260 ( 7)					40,279	0.38	2,310 (11)	18,463 (14)	0	0.00	1,060 ( 0)	6,080 ( 0)
1987	0	0.00	396 ( 0)	3,626 ( 0)					30,539	0.34	2,245 (11)	19,392 (11)	79,320	1.00	1,241 ( 1)	7,708 ( 1)
1988	2,341	1.00	422 ( 1)	3,560 ( 1)					19,217	0.81	2,570 ( 2)	21,216 ( 2)	0	0.00	1,856 ( 0)	11,909 ( 0)
1989	0	0.00	447 ( 0)	4,258 ( 0)					118,760	0.27	3,226 (19)	40,204 (31)	0	0.00	2,289 ( 0)	15,793 ( 0)
1990	743	1.00	323 ( 1)	3,440 ( 2)					87,852	0.56	3,544 ( 9)	31,626 (11)	0	0.00	1,905 ( 0)	13,545 ( 0)

Year	Cbt				Hbt				Priv				Shore			
	B2	CV	PSU	Trp	B2	CV	PSU	Trp	B2	CV	PSU	Trp	B2	CV	PSU	Trp
1991	5,519	0.90	409 ( 4)	4,108 ( 4)					60,711	0.33	3,586 (18)	32,572 ( 21)	11,777	1.00	2,466 ( 1)	20,076 ( 1)
1992	14,960	0.61	561 (13)	5,127 (19)					55,595	0.30	4,089 (19)	36,793 ( 23)	0	0.00	2,420 ( 0)	19,845 ( 0)
1993	2,170	0.65	400 ( 6)	4,334 ( 8)					46,961	0.35	3,731 (13)	32,598 ( 16)	14,067	0.48	3,074 ( 5)	24,985 ( 5)
1994	9,517	0.75	491 (11)	6,263 (21)					102,432	0.27	3,980 (24)	35,419 ( 33)	40,118	0.80	3,368 ( 4)	28,279 ( 5)
1995	9,581	0.35	459 (17)	5,646 (39)					125,771	0.25	3,626 (30)	31,816 ( 51)	107,454	0.63	3,282 (12)	28,554 (15)
1996	5,022	0.59	640 (11)	8,359 (16)					133,587	0.29	3,630 (36)	33,404 ( 53)	20,706	0.55	2,763 ( 4)	25,394 ( 4)
1997	2,096	0.56	806 ( 6)	9,062 ( 8)					267,900	0.36	3,896 (32)	36,120 ( 56)	8,366	1.00	3,028 ( 1)	25,135 ( 1)
1998	1,241	0.41	912 (11)	23,383 (15)					136,055	0.30	3,816 (33)	35,348 ( 44)	7,131	1.00	2,975 ( 1)	25,343 ( 1)
1999	3,110	0.42	998 (14)	9,372 (24)					201,175	0.23	3,663 (64)	35,912 ( 88)	51,111	0.49	3,236 ( 6)	26,716 ( 7)
2000	6,748	0.31	1,065 (32)	11,741 (54)					383,050	0.40	3,670 (60)	48,496 ( 73)	54,875	0.51	2,934 ( 4)	23,678 ( 4)
2001	6,625	0.47	951 (17)	11,686 (21)					195,383	0.27	4,312 (55)	44,776 ( 84)	12,064	0.64	3,291 ( 3)	28,011 ( 3)
2002	14,292	0.29	1,008 (29)	11,144 (46)					343,635	0.18	3,928 (88)	39,800 (130)	36,570	0.83	3,384 ( 2)	28,067 ( 4)
2003	16,177	0.27	890 (41)	10,036 (90)					334,378	0.16	4,301 (90)	38,571 (147)	277,995	0.47	3,672 (12)	26,963 (19)
2004	10,488	0.23	1,286 (35)	11,747 (64)	0	0.00	875 ( 0)	9,302 ( 0)	304,068	0.26	3,203 (59)	30,653 ( 88)	5,667	0.84	2,269 ( 2)	19,356 ( 2)
2005	16,511	0.47	1,616 (34)	13,970 (54)	0	0.00	982 ( 0)	24,497 ( 0)	230,528	0.30	2,815 (57)	27,351 ( 77)	112,714	0.47	2,090 ( 7)	17,424 (10)
2006	2,143	0.38	1,460 (18)	11,682 (29)	0	0.00	890 ( 0)	22,154 ( 0)	360,220	0.26	3,213 (69)	32,305 (115)	39,422	0.65	1,983 ( 3)	16,522 ( 4)
2007	23,226	0.36	1,497 (35)	11,903 (77)	0	0.00	642 ( 0)	21,679 ( 0)	424,988	0.19	3,467 (82)	33,387 (130)	135,610	0.52	2,181 ( 9)	18,999 (12)
2008	10,457	0.33	1,596 (34)	12,485 (55)	0	0.00	677 ( 0)	22,260 ( 0)	455,230	0.18	3,280 (87)	31,832 (150)	39,803	0.41	2,188 ( 9)	19,024 ( 9)
2009	9,841	0.38	1,432 (19)	10,213 (30)	0	0.00	656 ( 0)	20,909 ( 0)	339,880	0.20	3,224 (69)	29,728 (101)	42,804	0.49	2,075 ( 8)	16,538 ( 9)
2010	9,917	0.57	1,614 (21)	12,481 (49)	0	0.00	676 ( 0)	21,873 ( 0)	264,663	0.19	3,662 (65)	33,617 ( 95)	9,472	0.64	2,562 ( 3)	20,770 ( 3)
2011	7,883	0.43	1,448 (30)	10,884 (59)	0	0.00	626 ( 0)	21,127 ( 0)	114,434	0.21	3,383 (41)	29,880 ( 60)	79,536	0.72	2,637 ( 3)	19,804 ( 4)
2012	47,209	0.71	1,334 (53)	10,690 (90)	95	1.00	477 ( 1)	19,314 ( 1)	278,662	0.29	3,500 (73)	31,978 (101)	48,136	0.57	2,810 ( 7)	20,920 (10)
2013	7,161	0.40	678 (21)	4,402 (38)	0	0.00	609 ( 0)	7,729 ( 0)	137,934	0.25	3,466 (42)	28,158 ( 55)	10,837	0.49	2,168 ( 6)	18,407 ( 6)
2014	3,358	0.30	1,244 (24)	9,045 (39)	0	0.00	546 ( 0)	7,301 ( 0)	234,119	0.41	3,911 (51)	31,566 ( 80)	32,867	0.74	1,902 ( 5)	16,889 ( 6)
2015	6,689	0.50	1,281 (16)	8,920 (22)	336	0.77	532 ( 5)	7,295 ( 9)	105,156	0.27	4,089 (52)	33,191 ( 70)	55,817	0.42	1,964 (10)	16,676 (20)
2016	1,780	0.34	1,397 (15)	9,639 (23)	0	0.00	572 ( 0)	8,638 ( 0)	70,580	0.26	3,968 (31)	29,776 ( 40)	0	0.00	2,512 ( 0)	16,344 ( 0)
2017	21	0.72	1,372 ( 2)	9,920 ( 2)	0	0.00	507 ( 0)	7,314 ( 0)	37,897	0.29	4,154 (28)	34,288 ( 33)	1,029	1.00	2,699 ( 1)	17,528 ( 1)
2018	2,656	0.38	1,609 (12)	12,782 (12)	17	0.79	512 ( 3)	8,098 ( 8)	50,285	0.49	4,140 (13)	34,872 ( 19)	0	0.00	2,745 ( 0)	19,372 ( 0)
2019	138	0.74	1,622 ( 2)	11,667 ( 2)	0	0.00	503 ( 0)	8,567 ( 0)	23,081	0.32	4,201 (19)	35,234 ( 21)	887	1.00	2,781 ( 1)	19,095 ( 1)

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

Year	AB1				B2			
	Total	CV	PSU	Trp	Total	CV	PSU	Trp
1981	215,135	0.65	2,023 ( 9)	14,226 ( 11)	29,758	0.72	2,023 ( 2)	14,226 ( 2)
1982	101,539	0.61	2,655 (10)	34,114 ( 11)	13,958	0.64	2,655 ( 3)	34,114 ( 3)
1983	42,827	0.60	2,928 ( 6)	23,956 ( 6)	143,622	0.99	2,928 ( 2)	23,956 ( 6)
1984	445,925	0.74	2,416 (29)	20,114 ( 50)	110,085	0.66	2,416 ( 5)	20,114 ( 5)
1985	78,361	0.42	3,564 (19)	26,153 ( 28)	19,064	0.82	3,564 ( 6)	26,153 ( 13)
1986	59,357	0.49	3,619 (19)	26,803 ( 20)	41,771	0.37	3,619 ( 16)	26,803 ( 21)
1987	123,518	0.29	3,882 (43)	30,726 ( 52)	109,860	0.73	3,882 ( 12)	30,726 ( 12)
1988	72,771	0.32	4,848 (47)	36,685 ( 57)	21,558	0.73	4,848 ( 3)	36,685 ( 3)
1989	178,080	0.38	5,962 (72)	60,255 ( 96)	118,760	0.27	5,962 ( 19)	60,255 ( 31)
1990	78,111	0.27	5,772 (64)	48,611 ( 71)	88,594	0.56	5,772 ( 10)	48,611 ( 13)
1991	76,664	0.30	6,461 (52)	56,756 ( 64)	78,007	0.31	6,461 ( 23)	56,756 ( 26)
1992	61,308	0.18	7,070 (72)	61,765 ( 91)	70,555	0.27	7,070 ( 32)	61,765 ( 42)
1993	81,054	0.26	7,205 (43)	61,917 ( 55)	63,199	0.28	7,205 ( 24)	61,917 ( 29)
1994	93,171	0.23	7,839 (59)	69,961 ( 76)	152,067	0.28	7,839 ( 39)	69,961 ( 59)
1995	55,523	0.23	7,367 (47)	66,016 ( 51)	242,806	0.31	7,367 ( 59)	66,016 (105)
1996	91,739	0.24	7,033 (49)	67,157 ( 58)	159,315	0.25	7,033 ( 51)	67,157 ( 73)
1997	47,886	0.27	7,730 (44)	70,317 ( 48)	278,362	0.35	7,730 ( 39)	70,317 ( 65)
1998	101,226	0.27	7,703 (50)	84,074 ( 60)	144,427	0.29	7,703 ( 45)	84,074 ( 60)
1999	79,312	0.23	7,897 (86)	72,000 ( 94)	255,397	0.20	7,897 ( 84)	72,000 (119)
2000	58,579	0.22	7,669 (70)	83,915 ( 89)	444,674	0.35	7,669 ( 96)	83,915 (131)
2001	105,760	0.22	8,554 (82)	84,473 ( 99)	214,072	0.25	8,554 ( 75)	84,473 (108)
2002	67,718	0.20	8,320 (73)	79,011 ( 81)	394,496	0.18	8,320 (119)	79,011 (180)
2003	89,243	0.18	8,863 (91)	75,570 (112)	628,550	0.23	8,863 (143)	75,570 (256)
2004	100,717	0.20	7,633 (88)	71,058 (103)	320,223	0.25	7,633 ( 96)	71,058 (154)
2005	55,877	0.20	7,503 (69)	83,242 ( 77)	359,754	0.24	7,503 ( 98)	83,242 (141)
2006	80,589	0.21	7,546 (71)	82,663 ( 85)	401,785	0.24	7,546 ( 90)	82,663 (148)
2007	77,718	0.18	7,787 (69)	85,968 ( 71)	583,823	0.18	7,787 (126)	85,968 (219)
2008	102,914	0.29	7,741 (52)	85,601 ( 63)	505,490	0.17	7,741 (130)	85,601 (214)
2009	72,461	0.28	7,387 (49)	77,388 ( 51)	392,525	0.18	7,387 ( 96)	77,388 (140)
2010	39,406	0.33	8,514 (38)	88,741 ( 42)	284,052	0.18	8,514 ( 89)	88,741 (147)
2011	34,319	0.32	8,094 (28)	81,695 ( 32)	201,853	0.31	8,094 ( 74)	81,695 (123)
2012	36,695	0.31	8,121 (45)	82,902 ( 55)	374,101	0.24	8,121 (134)	82,902 (202)
2013	19,535	0.38	6,921 (22)	58,696 ( 23)	155,932	0.22	6,921 ( 69)	58,696 ( 99)
2014	36,773	0.32	7,603 (46)	64,801 ( 53)	270,344	0.37	7,603 ( 80)	64,801 (125)
2015	19,850	0.42	7,866 (25)	66,082 ( 25)	167,997	0.22	7,866 ( 83)	66,082 (121)
2016	25,405	0.34	8,449 (32)	64,397 ( 36)	72,360	0.25	8,449 ( 46)	64,397 ( 63)
2017	28,626	0.49	8,732 (13)	69,050 ( 14)	38,947	0.28	8,732 ( 31)	69,050 ( 36)
2018	24,913	0.44	9,006 (22)	75,124 ( 23)	52,958	0.46	9,006 ( 28)	75,124 ( 39)
2019	21,724	0.39	9,107 (20)	74,563 ( 22)	24,107	0.31	9,107 ( 22)	74,563 ( 24)

**Table 6.** Estimated landings of Gag in pounds whole weight by state and year (MRIP).

Year	FLKeys	FLE	GA	SC	NC	VA	NJ	Total
1981	151,017	1,814,399	0	4,032	261,758	0	0	2,231,205
1982	414,135	4,302	0	0	59,442	0	0	477,878
1983	130,586	196,865	9,435	2,203	76,796	0	0	415,884
1984	1,202,390	614,684	0	15,370	127,515	0	0	1,959,958
1985	0	213,022	11,907	5,615	78,383	0	0	308,927
1986	172,210	61,399	7,052	68,089	0	0	0	308,750
1987	133,573	777,466	2,560	38,751	163,042	0	0	1,115,392
1988	203,972	228,164	1,699	7,430	83,248	0	0	524,512
1989	956,488	401,038	2,344	23,451	107,273	0	0	1,490,593
1990	82,310	98,751	0	18,934	228,072	0	0	428,067
1991	2,861	193,935	14,314	182,768	186,978	0	0	580,856
1992	10,876	397,288	62,946	37,725	116,146	0	0	624,982
1993	16,434	654,745	72,218	10,348	92,901	0	0	846,646
1994	16,409	645,639	73,169	6,802	120,665	0	0	862,685
1995	53,793	299,192	25,820	4,214	74,429	0	0	457,449
1996	167,827	484,122	70,315	25,701	43,719	0	0	791,684
1997	29,593	298,299	21,406	24,783	117,878	0	0	491,958
1998	158,311	437,865	11,541	0	53,755	0	0	661,473
1999	16,425	908,348	17,030	10,517	66,599	0	0	1,018,920
2000	3,916	741,834	12,148	12,245	27,111	0	0	797,254
2001	7,673	1,659,491	10,832	13,338	91,231	0	0	1,782,566
2002	62,099	749,023	1,146	17,010	132,265	0	0	961,544
2003	49,794	989,054	301	59,973	158,900	0	0	1,258,021
2004	8,841	741,831	27,664	106,662	316,413	0	0	1,201,411
2005	4,001	428,457	64,066	5,109	231,435	0	0	733,069
2006	63,075	479,486	30,832	5,819	374,229	0	0	953,440
2007	59,069	474,891	2,843	40,974	284,729	0	0	862,507
2008	4,683	1,150,267	51,688	1,644	160,465	0	0	1,368,748
2009	2,934	618,762	673	16,783	264,601	0	0	903,752
2010	561	232,521	22,184	21,750	80,853	0	0	357,868
2011	609	257,930	1,161	35,617	60,792	0	0	356,109
2012	2,099	388,612	667	5,174	157,515	0	0	554,067
2013	127	154,138	0	2,952	45,373	271	0	202,861
2014	28,109	488,138	0	42,436	16,535	0	0	575,217
2015	9,763	201,196	0	8,254	39,733	0	2,215	261,161
2016	23,316	352,544	0	4,472	37,970	0	0	418,302
2017	0	238,736	74,869	35,287	51,590	0	0	400,481
2018	427	426,340	28,635	509	2,559	0	0	458,469
2019	0	163,891	0	26,970	87,933	0	0	278,794

**Table 7.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Gag by state and year. Summaries include the number of fish measured by MRIP (Fish), the number of angler trips from which those fish were measured (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish lengths.

Year	FLKeys					FLE					GA					SC					NC				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
1981	6	6	210	390	550	11	2	320	357	380	0	0	0	0	0	0	0	0	0	0	2	2	240	365	490
1982	9	8	260	434	860	1	1	445	445	445	0	0	0	0	0	0	0	0	0	0	2	2	110	140	170
1983	3	3	365	522	725	6	1	420	522	710	2	2	215	608	1,000	0	0	0	0	0	8	1	290	458	650
1984	9	3	290	618	970	19	13	190	537	862	0	0	0	0	0	4	3	575	644	720	11	3	368	545	852
1985	0	0	0	0	0	9	6	440	627	838	13	7	195	281	408	1	1	680	680	680	6	3	210	233	250
1986	2	1	495	528	560	8	7	440	515	625	5	4	190	226	264	17	9	215	431	780	0	0	0	0	0
1987	15	9	320	573	790	30	18	355	643	910	2	2	228	424	620	16	6	119	561	775	56	17	210	494	940
1988	11	1	640	749	840	18	10	2	548	876	1	1	642	642	642	19	12	345	582	840	105	33	288	563	824
1989	9	7	458	595	750	17	12	622	734	876	1	1	452	452	452	41	19	195	584	854	186	58	190	551	860
1990	2	2	601	713	825	8	7	485	644	876	8	2	385	533	720	14	7	345	627	858	216	53	195	513	890
1991	1	1	575	575	575	11	8	488	619	798	9	2	465	613	713	8	6	152	361	545	131	47	189	584	852
1992	2	2	551	681	811	35	28	439	675	941	64	19	422	614	793	25	8	406	664	926	96	34	443	647	877
1993	1	1	620	620	620	28	19	470	736	941	61	14	509	720	910	14	5	571	685	795	40	16	210	563	830
1994	2	2	648	674	700	39	26	511	684	881	70	17	501	704	850	2	2	671	742	812	75	29	396	629	878
1995	6	4	230	531	813	24	18	455	663	881	25	8	484	620	805	9	2	620	783	910	59	19	332	626	835
1996	13	7	475	565	940	27	18	454	677	910	36	15	226	626	787	14	3	226	615	847	33	16	540	688	865
1997	13	9	488	668	910	24	19	309	669	909	32	11	430	604	845	2	1	605	672	740	24	8	525	689	895
1998	30	20	462	572	741	48	27	310	612	1,052	16	5	510	679	842	0	0	0	0	0	12	8	456	674	860
1999	14	12	485	669	849	100	61	375	737	1,227	4	3	510	599	705	38	11	420	593	776	26	8	358	672	870
2000	10	9	504	593	756	90	45	540	795	1,061	6	5	590	722	858	34	23	470	645	861	25	7	358	518	810
2001	25	14	520	668	840	117	62	552	839	1,137	4	4	665	732	820	8	2	510	625	791	34	17	535	677	894
2002	15	13	505	639	841	88	49	330	806	1,115	1	1	754	754	754	3	2	482	605	812	32	16	600	699	894
2003	34	22	524	670	978	101	76	455	792	1,118	1	1	832	832	832	6	2	623	798	1,014	25	11	602	716	873
2004	22	17	537	647	958	67	46	581	747	938	15	10	677	803	899	39	12	515	684	891	45	18	292	703	863
2005	9	9	564	643	774	66	39	399	783	1,050	12	8	586	783	1,050	23	7	640	743	897	43	15	508	730	879
2006	13	10	297	629	931	57	36	534	747	1,050	31	14	498	668	804	10	4	644	772	893	46	21	610	769	1,106
2007	13	11	510	655	835	46	32	547	736	990	4	4	695	755	813	8	3	696	806	998	61	21	585	721	893
2008	11	9	534	671	944	57	30	541	768	1,100	6	5	635	762	874	5	3	720	734	747	27	16	625	745	900
2009	6	5	337	561	670	26	19	508	728	911	6	5	589	733	1,021	7	5	552	688	906	25	17	503	720	937
2010	1	1	638	638	638	26	12	280	586	868	4	3	600	632	695	9	8	552	656	854	42	21	601	725	867
2011	1	1	663	663	663	15	10	511	681	983	1	1	683	683	683	3	3	712	745	784	34	17	511	694	872
2012	3	3	604	673	796	15	10	627	812	1,012	4	4	733	822	943	3	3	640	693	733	48	35	246	745	1,012

Year	FLKeys					FLE					GA					SC					NC				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
2013	1	1	600	600	600	9	6	590	735	832	0	0	0	0	0	1	1	751	751	751	25	14	584	680	810
2014	6	5	580	631	702	46	33	590	806	1,120	0	0	0	0	0	3	2	653	767	980	19	13	615	711	831
2015	3	3	617	692	842	14	12	610	823	1,040	0	0	0	0	0	1	1	668	668	668	16	8	594	727	857
2016	2	2	842	862	881	19	17	682	845	1,000	0	0	0	0	0	3	2	660	745	799	26	15	594	687	819
2017	0	0	0	0	0	10	6	682	827	986	2	2	600	625	650	4	2	650	749	840	7	4	585	705	854
2018	2	2	615	698	781	18	10	619	849	986	4	4	685	750	851	1	1	710	710	710	8	6	556	648	783
2019	0	0	0	0	0	6	5	685	904	1,155	0	0	0	0	0	5	3	556	686	743	23	14	591	703	862

**Table 7 continued.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Gag by state and year.



**Table 8.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Gag by state and year. Summaries include the number of fish weighed by MRIP (Fish), the number of angler trips from which those fish were weighed (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish weights.

Year	FLKeys					FLE					GA					SC					NC				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
1981	6	6	0.4	2.9	6.7	11	2	0.9	2.2	3.8	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	2	2	0.8	2.3	3.8
1982	9	8	0.5	4.5	24.3	1	1	10.9	10.9	10.9	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	2	2	0.2	0.2	0.2
1983	3	3	1.1	4.9	10.6	6	1	1.9	4.9	11.7	2	2	0.2	14.3	28.4	0	0	0.0	0.0	0.0	8	1	1.5	4.3	8.8
1984	9	3	1.0	8.1	27.4	19	13	0.2	7.3	18.3	0	0	0.0	0.0	0.0	4	3	6.6	8.6	11.9	11	3	0.9	5.7	15.4
1985	0	0	0.0	0.0	0.0	9	6	3.1	8.9	17.2	13	7	0.2	0.9	2.6	1	1	13.7	13.7	13.7	6	3	0.2	0.4	0.7
1986	2	1	2.9	3.9	4.9	8	7	2.2	4.7	7.3	5	4	0.2	0.4	0.4	17	9	0.4	4.8	17.9	0	0	0.0	0.0	0.0
1987	15	9	1.5	6.8	15.5	30	18	1.4	11.2	24.1	2	2	0.4	3.6	6.7	16	6	0.2	6.4	16.8	56	17	0.5	5.7	26.0
1988	11	1	8.0	15.1	23.2	7	10	2.2	5.6	17.7	0	1	0.0	0.0	0.0	5	12	2.2	8.2	17.7	9	33	1.1	3.8	6.8
1989	9	7	3.1	7.4	15.7	17	12	6.4	12.5	19.4	1	1	2.9	2.9	2.9	41	19	0.2	7.7	21.0	186	58	0.2	6.7	21.4
1990	2	2	7.2	12.0	16.9	8	7	3.3	9.5	19.4	0	2	0.0	0.0	0.0	8	7	1.6	6.4	16.5	216	53	0.2	6.0	23.8
1991	1	1	6.2	6.2	6.2	11	8	3.6	8.6	16.5	9	2	3.3	7.7	10.4	8	6	0.2	3.8	10.2	131	47	0.2	7.8	21.1
1992	2	2	4.6	10.8	16.9	21	28	3.5	10.6	20.9	64	19	2.8	8.5	15.4	25	8	3.3	10.1	23.2	96	34	2.8	9.7	22.7
1993	1	1	7.1	7.1	7.1	28	19	3.5	12.7	23.3	61	14	4.3	12.0	22.0	14	5	6.9	11.1	15.4	40	16	0.4	5.1	16.2
1994	2	2	10.3	10.8	11.2	39	26	4.0	10.5	19.6	70	17	3.7	11.5	19.8	2	2	9.0	11.0	13.0	75	29	1.6	7.7	21.5
1995	6	4	0.4	5.7	15.0	24	18	3.3	9.5	18.6	25	8	3.3	8.8	20.8	9	2	6.8	14.2	21.7	59	19	1.3	7.6	19.0
1996	13	7	3.2	6.2	24.3	27	18	2.9	11.1	22.5	36	15	0.6	9.1	17.0	14	3	0.6	10.2	23.3	31	16	4.7	10.2	20.0
1997	13	9	5.0	14.9	35.9	24	19	0.8	10.8	23.6	32	11	2.6	8.4	21.4	2	1	6.4	8.4	10.4	24	8	3.2	10.9	23.9
1998	30	20	2.9	7.6	21.2	48	27	3.3	8.8	33.1	16	5	4.4	10.8	17.6	0	0	0.0	0.0	0.0	12	8	4.2	9.6	17.6
1999	14	12	3.5	10.5	18.4	100	61	1.4	17.0	74.3	4	3	4.7	7.9	11.7	38	11	3.1	9.1	17.1	26	8	1.3	11.6	21.2
2000	10	9	3.3	6.8	14.4	90	45	4.9	18.8	66.5	6	5	5.5	13.8	29.1	34	23	4.0	11.1	20.1	25	7	1.4	5.9	17.2
2001	25	14	3.9	9.4	20.1	117	62	4.5	21.4	50.8	4	4	12.0	19.8	32.8	8	2	4.1	9.2	19.1	34	17	4.8	10.0	25.6
2002	15	13	4.1	8.6	17.9	88	49	1.2	18.7	42.5	1	1	19.2	19.2	19.2	3	2	4.0	8.5	16.6	30	16	6.1	12.5	25.9
2003	34	22	4.0	9.3	30.9	101	76	2.4	18.1	52.2	1	1	36.5	36.5	36.5	6	2	6.5	16.9	30.3	25	11	6.3	12.0	21.0
2004	22	17	4.5	8.5	27.2	67	46	5.1	13.3	24.8	15	10	8.6	15.9	20.9	39	12	3.9	10.2	23.6	45	18	0.7	11.1	19.8
2005	9	9	5.3	7.8	11.2	66	39	1.8	15.6	32.0	12	8	6.8	15.7	32.0	23	7	7.5	12.9	23.6	43	15	2.9	11.2	20.5
2006	13	10	1.3	8.1	22.4	57	36	4.6	14.0	35.2	31	14	3.7	10.9	17.9	10	4	7.5	15.2	20.9	46	21	5.8	14.0	41.3
2007	13	11	4.9	8.6	16.3	46	32	4.3	13.1	27.0	4	4	13.0	15.0	19.6	8	3	9.7	16.5	25.7	61	21	5.3	11.7	20.4
2008	11	9	4.5	10.0	23.1	57	30	4.6	15.3	44.6	6	5	6.4	13.8	20.7	5	3	11.0	12.1	12.8	27	16	6.6	12.9	24.3
2009	6	5	1.2	6.0	9.0	26	19	3.7	12.5	25.5	6	5	5.5	13.3	32.5	7	5	4.9	9.7	21.6	25	17	4.1	12.1	23.1
2010	1	1	8.4	8.4	8.4	26	12	0.5	8.1	20.2	4	3	7.1	8.2	10.8	9	8	4.9	9.4	21.6	42	21	6.8	11.3	21.6
2011	1	1	8.3	8.3	8.3	15	10	5.1	10.3	28.8	1	1	11.7	11.7	11.7	3	3	11.2	12.4	14.0	34	17	6.1	10.6	22.5
2012	3	3	6.1	9.7	16.0	15	10	7.8	17.0	30.6	4	4	11.5	17.1	24.7	3	3	7.7	9.6	10.6	48	35	0.4	12.9	30.9

Year	FLKeys					FLE					GA					SC					NC				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
2013	1	1	6.7	6.7	6.7	9	6	6.3	13.0	18.4	0	0	0.0	0.0	0.0	1	1	13.4	13.4	13.4	25	14	4.5	9.6	18.8
2014	6	5	5.2	7.5	10.6	46	33	6.3	16.8	44.2	0	0	0.0	0.0	0.0	3	2	8.6	16.4	31.6	19	13	6.5	11.0	18.2
2015	3	3	7.4	11.3	19.0	14	12	6.8	17.3	33.2	0	0	0.0	0.0	0.0	1	1	9.0	9.0	9.0	16	8	6.4	11.5	18.8
2016	2	2	19.0	19.0	19.0	19	17	9.9	18.6	29.1	0	0	0.0	0.0	0.0	3	2	9.0	13.7	16.1	26	15	6.1	9.7	17.1
2017	0	0	0.0	0.0	0.0	10	6	9.9	17.5	28.0	2	2	6.6	7.9	9.3	4	2	9.2	13.6	18.7	7	4	6.4	10.9	17.9
2018	2	2	6.9	9.3	11.8	18	10	7.1	18.7	28.0	4	4	11.0	13.6	18.2	1	1	10.6	10.6	10.6	8	6	5.5	7.9	11.7
2019	0	0	0.0	0.0	0.0	6	5	11.0	23.8	41.0	0	0	0.0	0.0	0.0	5	3	5.5	9.9	12.3	23	14	6.2	11.6	18.7

**Table 8 continued.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Gag by state and year.

Year	VA					NJ				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
1981	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1982	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1983	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1984	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1985	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1986	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1987	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1988	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1989	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1990	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1991	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1992	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0

Year	VA					NJ				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
1993	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1994	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1995	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1996	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1997	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1998	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
1999	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2000	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2001	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2002	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2003	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2004	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2005	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2006	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2007	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2008	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2009	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2010	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2011	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2012	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2013	2	1	0.3	0.3	0.3	0	0	0.0	0.0	0.0
2014	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0
2015	0	0	0.0	0.0	0.0	1	1	0.3	0.3	0.3
2016	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
2018	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

**Table 9.** Summary of length measurements (millimeters fork length) from MRIP-intercepted Gag by mode and year. Summaries include the number of fish measured by MRIP (Fish), the number of angler trips from which those fish were measured (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish lengths. MRIP Headboat estimates are included from Virginia to Maine.

Year	Cbt					Hbt					Priv					Shore				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
1981	0	0	0	0	0	0	0	0	0	0	14	5	320	380	550	5	5	210	335	490
1982	2	2	445	652	860	0	0	0	0	0	9	8	110	350	510	1	1	170	170	170
1983	10	3	215	460	725	0	0	0	0	0	9	4	365	552	1,000	0	0	0	0	0
1984	20	9	368	634	970	0	0	0	0	0	22	12	270	521	838	1	1	190	190	190
1985	5	4	278	532	814	0	0	0	0	0	18	10	195	407	838	6	3	210	233	250
1986	8	4	215	615	780	0	0	0	0	0	22	16	190	348	625	2	1	495	528	560
1987	57	17	280	514	940	0	0	0	0	0	61	34	210	590	910	1	1	119	119	119
1988	117	37	340	593	840	0	0	0	0	0	37	20	2	528	876	0	0	0	0	0
1989	182	62	260	585	860	0	0	0	0	0	70	33	190	533	876	2	2	365	412	458
1990	198	50	260	546	890	0	0	0	0	0	48	20	195	448	876	2	1	360	385	410
1991	118	41	338	605	852	0	0	0	0	0	39	20	195	524	820	3	3	152	194	241
1992	161	52	406	643	926	0	0	0	0	0	61	39	422	648	941	0	0	0	0	0
1993	93	24	509	693	910	0	0	0	0	0	50	30	234	651	941	1	1	210	210	210
1994	131	46	396	684	881	0	0	0	0	0	55	28	488	636	824	2	2	615	712	810
1995	89	28	465	649	910	0	0	0	0	0	30	21	332	632	865	4	2	230	470	552
1996	79	31	450	660	876	0	0	0	0	0	43	27	226	630	940	1	1	226	226	226
1997	61	26	430	650	910	0	0	0	0	0	34	22	309	655	909	0	0	0	0	0
1998	55	30	456	662	1,052	0	0	0	0	0	51	30	310	571	860	0	0	0	0	0
1999	108	51	358	679	1,227	0	0	0	0	0	73	43	375	705	1,069	1	1	627	627	627
2000	124	59	358	700	1,061	0	0	0	0	0	41	30	540	728	1,005	0	0	0	0	0
2001	117	63	510	771	1,130	0	0	0	0	0	69	34	552	778	1,137	2	2	806	934	1,061
2002	102	57	330	773	1,115	0	0	0	0	0	37	24	405	720	1,030	0	0	0	0	0
2003	100	62	524	749	1,085	0	0	0	0	0	67	50	455	768	1,118	0	0	0	0	0
2004	120	64	515	714	958	0	0	0	0	0	68	39	292	719	938	0	0	0	0	0
2005	101	53	508	756	1,050	0	0	0	0	0	52	25	399	750	1,050	0	0	0	0	0
2006	101	47	297	729	1,050	0	0	0	0	0	56	38	534	731	1,106	0	0	0	0	0
2007	73	35	547	743	990	0	0	0	0	0	58	35	510	707	998	1	1	635	635	635
2008	46	29	534	777	1,100	0	0	0	0	0	59	33	541	732	986	1	1	569	569	569
2009	34	24	337	673	1,021	0	0	0	0	0	35	26	508	742	937	1	1	637	637	637
2010	48	27	280	672	840	0	0	0	0	0	34	18	280	661	868	0	0	0	0	0
2011	25	13	511	676	983	0	0	0	0	0	29	19	511	707	872	0	0	0	0	0
2012	30	25	600	775	1,012	0	0	0	0	0	43	30	246	746	1,012	0	0	0	0	0
2013	15	8	584	675	810	2	1	210	214	218	21	14	590	706	832	0	0	0	0	0
2014	52	34	586	774	1,120	0	0	0	0	0	22	19	580	748	986	0	0	0	0	0
2015	19	13	631	765	857	1	1	215	215	215	15	11	594	757	1,040	0	0	0	0	0
2016	29	19	610	743	1,000	0	0	0	0	0	21	17	594	778	920	0	0	0	0	0
2017	12	8	585	720	862	0	0	0	0	0	11	6	600	801	986	0	0	0	0	0
2018	21	15	556	731	954	0	0	0	0	0	12	8	619	851	986	0	0	0	0	0
2019	19	13	591	745	1,155	0	0	0	0	0	15	9	556	724	1,155	0	0	0	0	0

**Table 10.** Summary of weight measurements (pounds whole weight) from MRIP-intercepted Gag by mode and year. Summaries include the number of fish weighed by MRIP (Fish), the number of angler trips from which those fish were weighed (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish weights. MRIP Headboat estimates are included from Virginia to Maine.

Year	Cbt					Hbt					Priv					Shore				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
1981	0	0	0.0	0.0	0.0	0	0	0.0	0.0	0.0	14	5	0.9	2.6	6.7	5	5	0.4	2.0	4.4
1982	2	2	10.9	17.6	24.3	0	0	0.0	0.0	0.0	9	8	0.2	1.8	4.0	1	1	0.2	0.2	0.2
1983	10	3	0.2	4.5	10.6	0	0	0.0	0.0	0.0	9	4	1.1	6.8	28.4	0	0	0.0	0.0	0.0
1984	20	9	0.9	9.2	27.4	0	0	0.0	0.0	0.0	22	12	0.7	5.7	17.4	1	1	0.2	0.2	0.2
1985	5	4	0.9	6.7	14.5	0	0	0.0	0.0	0.0	18	10	0.2	4.0	17.2	6	3	0.2	0.4	0.7
1986	8	4	0.4	9.3	17.9	0	0	0.0	0.0	0.0	22	16	0.2	2.1	7.3	2	1	2.9	3.9	4.9
1987	57	17	0.9	5.8	26.0	0	0	0.0	0.0	0.0	61	34	0.4	8.8	24.1	1	1	0.2	0.2	0.2
1988	17	37	2.2	12.5	23.2	0	0	0.0	0.0	0.0	15	20	1.1	4.6	17.7	0	0	0.0	0.0	0.0
1989	182	62	0.5	7.8	21.4	0	0	0.0	0.0	0.0	70	33	0.2	6.0	21.0	2	2	1.2	2.1	3.1
1990	184	50	0.5	6.7	23.8	0	0	0.0	0.0	0.0	48	20	0.2	4.5	19.4	2	1	2.0	2.2	2.5
1991	118	41	1.8	8.3	21.1	0	0	0.0	0.0	0.0	39	20	0.2	6.0	16.5	3	3	0.2	0.3	0.5
1992	156	52	3.3	9.4	23.2	0	0	0.0	0.0	0.0	52	39	2.8	9.6	21.6	0	0	0.0	0.0	0.0
1993	93	24	3.4	10.7	22.0	0	0	0.0	0.0	0.0	50	30	0.4	9.1	23.3	1	1	0.4	0.4	0.4
1994	131	46	1.6	10.4	21.5	0	0	0.0	0.0	0.0	55	28	3.1	8.1	18.7	2	2	5.5	12.6	19.6
1995	89	28	2.8	9.0	21.7	0	0	0.0	0.0	0.0	30	21	1.3	8.3	18.6	4	2	0.4	4.3	6.2
1996	77	31	3.3	10.2	23.3	0	0	0.0	0.0	0.0	43	27	0.6	8.9	24.3	1	1	0.6	0.6	0.6
1997	61	26	2.6	10.7	35.9	0	0	0.0	0.0	0.0	34	22	0.8	10.2	23.9	0	0	0.0	0.0	0.0
1998	55	30	4.4	11.0	33.1	0	0	0.0	0.0	0.0	51	30	2.9	6.6	18.2	0	0	0.0	0.0	0.0
1999	108	51	1.3	14.6	74.3	0	0	0.0	0.0	0.0	73	43	1.4	12.9	38.9	1	1	6.9	6.9	6.9
2000	124	59	1.4	14.7	66.5	0	0	0.0	0.0	0.0	41	30	4.9	13.3	33.4	0	0	0.0	0.0	0.0
2001	117	63	3.9	17.8	50.8	0	0	0.0	0.0	0.0	69	34	4.5	16.0	46.5	2	2	16.6	25.2	33.9
2002	100	57	1.2	17.1	42.5	0	0	0.0	0.0	0.0	37	24	2.0	13.0	34.6	0	0	0.0	0.0	0.0
2003	100	62	4.0	15.5	52.2	0	0	0.0	0.0	0.0	67	50	2.4	15.4	39.9	0	0	0.0	0.0	0.0
2004	120	64	3.9	11.7	27.2	0	0	0.0	0.0	0.0	68	39	0.7	12.0	24.8	0	0	0.0	0.0	0.0
2005	101	53	2.9	13.8	32.0	0	0	0.0	0.0	0.0	52	25	1.8	12.9	32.0	0	0	0.0	0.0	0.0
2006	101	47	1.3	13.0	35.2	0	0	0.0	0.0	0.0	56	38	4.6	12.9	41.3	0	0	0.0	0.0	0.0
2007	73	35	4.3	13.1	27.0	0	0	0.0	0.0	0.0	58	35	4.3	11.4	27.0	1	1	7.1	7.1	7.1
2008	46	29	4.5	15.5	44.6	0	0	0.0	0.0	0.0	59	33	4.6	12.8	28.5	1	1	5.5	5.5	5.5
2009	34	24	1.2	10.0	32.5	0	0	0.0	0.0	0.0	35	26	3.7	13.3	25.5	1	1	6.9	6.9	6.9
2010	48	27	0.5	9.2	15.7	0	0	0.0	0.0	0.0	34	18	0.5	10.8	21.6	0	0	0.0	0.0	0.0
2011	25	13	6.1	9.6	28.8	0	0	0.0	0.0	0.0	29	19	5.1	11.5	22.5	0	0	0.0	0.0	0.0
2012	30	25	5.5	14.6	30.9	0	0	0.0	0.0	0.0	43	30	0.4	13.1	30.6	0	0	0.0	0.0	0.0
2013	15	8	6.4	9.7	17.2	2	1	0.3	0.3	0.3	21	14	4.5	11.1	18.8	0	0	0.0	0.0	0.0
2014	52	34	6.2	14.8	44.2	0	0	0.0	0.0	0.0	22	19	5.2	13.8	31.6	0	0	0.0	0.0	0.0
2015	19	13	7.1	13.7	20.4	1	1	0.3	0.3	0.3	15	11	6.4	13.9	33.2	0	0	0.0	0.0	0.0
2016	29	19	6.1	12.6	29.1	0	0	0.0	0.0	0.0	21	17	6.4	15.3	26.0	0	0	0.0	0.0	0.0
2017	12	8	6.4	11.9	19.0	0	0	0.0	0.0	0.0	11	6	6.6	16.3	28.0	0	0	0.0	0.0	0.0
2018	21	15	5.5	12.2	24.3	0	0	0.0	0.0	0.0	12	8	7.1	18.9	28.0	0	0	0.0	0.0	0.0
2019	19	13	6.2	13.8	41.0	0	0	0.0	0.0	0.0	15	9	5.5	13.1	41.0	0	0	0.0	0.0	0.0

**Table 11.** Summary of length (millimeters fork length) and weight measurements (pounds whole weight) from MRIP-intercepted Gag by year. Summaries include the number of fish weighed by MRIP (Fish), the number of angler trips from which those fish were weighed (Trp), and the minimum (Min), geometric mean (Avg), and maximum (Max) size of fish weights.

Year	Length					Weight				
	Fish	Trp	Min	Avg	Max	Fish	Trp	Min	Avg	Max
1981	19	10	210	368	550	19	10	0.4	2.5	6.7
1982	12	11	110	386	860	12	11	0.2	4.3	24.3
1983	19	7	215	504	1,000	19	7	0.2	5.6	28.4
1984	43	22	190	566	970	43	22	0.2	7.2	27.4
1985	29	17	195	392	838	29	17	0.2	3.7	17.2
1986	32	21	190	426	780	32	21	0.2	4.0	17.9
1987	119	52	119	550	940	119	52	0.2	7.3	26.0
1988	154	57	2	577	876	32	57	1.1	8.8	23.2
1989	254	97	190	569	876	254	97	0.2	7.3	21.4
1990	248	71	195	526	890	234	71	0.2	6.2	23.8
1991	160	64	152	577	852	160	64	0.2	7.6	21.1
1992	222	91	406	644	941	208	91	2.8	9.5	23.2
1993	144	55	210	675	941	144	55	0.4	10.1	23.3
1994	188	76	396	670	881	188	76	1.6	9.8	21.5
1995	123	51	230	639	910	123	51	0.4	8.6	21.7
1996	123	59	226	646	940	121	59	0.6	9.6	24.3
1997	95	48	309	652	910	95	48	0.8	10.5	35.9
1998	106	60	310	618	1,052	106	60	2.9	8.9	33.1
1999	182	95	358	689	1,227	182	95	1.3	13.9	74.3
2000	165	89	358	707	1,061	165	89	1.4	14.3	66.5
2001	188	99	510	775	1,137	188	99	3.9	17.2	50.8
2002	139	81	330	759	1,115	137	81	1.2	16.0	42.5
2003	167	112	455	757	1,118	167	112	2.4	15.5	52.2
2004	188	103	292	716	958	188	103	0.7	11.8	27.2
2005	153	78	399	754	1,050	153	78	1.8	13.5	32.0
2006	157	85	297	730	1,106	157	85	1.3	13.0	41.3
2007	132	71	510	726	998	132	71	4.3	12.3	27.0
2008	106	63	534	750	1,100	106	63	4.5	13.9	44.6
2009	70	51	337	707	1,021	70	51	1.2	11.6	32.5
2010	82	45	280	667	868	82	45	0.5	9.9	21.6
2011	54	32	511	692	983	54	32	5.1	10.6	28.8
2012	73	55	246	758	1,012	73	55	0.4	13.7	30.9
2013	38	23	210	668	832	38	23	0.3	10.0	18.8
2014	74	53	580	766	1,120	74	53	5.2	14.5	44.2
2015	35	25	215	746	1,040	35	25	0.3	13.4	33.2
2016	50	36	594	758	1,000	50	36	6.1	13.7	29.1
2017	23	14	585	759	986	23	14	6.4	14.0	28.0
2018	33	23	556	775	986	33	23	5.5	14.7	28.0
2019	34	22	556	736	1,155	34	22	5.5	13.5	41.0

**Table 12.** Recreational Fishing Effort (in angler trips) for South Atlantic anglers by state and year (MRIP).

Year	FLKeys	FLE	GA	SC	NC	VA	MD	DE	NJ	NY	Total
1981	4,087,356	31,660,427	1,140,686	3,499,698	6,836,050	4,688,618	4,549,773	1,071,797	10,444,221	8,906,444	90,414,541
1982	4,126,072	42,352,017	1,330,594	3,855,423	6,903,669	5,087,629	5,131,719	1,117,581	10,219,219	9,267,451	104,385,646
1983	4,536,545	40,631,469	1,393,987	4,392,586	10,203,830	3,728,378	5,112,083	1,227,016	10,484,657	9,302,121	104,921,773
1984	6,597,179	40,625,068	1,459,467	4,321,818	9,389,910	4,229,606	5,257,368	1,142,085	10,179,264	8,985,779	105,645,482
1985	3,344,156	39,643,873	1,684,391	4,285,327	8,876,360	4,319,051	4,611,188	1,068,797	11,863,455	8,487,182	102,294,800
1986	2,045,161	42,317,136	1,766,834	4,217,620	9,249,981	4,581,112	5,174,215	1,365,119	11,247,339	8,536,072	104,007,580
1987	4,818,584	44,172,997	1,773,450	4,119,771	9,122,728	4,698,205	4,798,420	1,282,065	10,536,884	8,631,274	106,998,494
1988	3,428,017	39,146,830	1,683,851	3,987,476	10,576,270	4,552,697	5,367,873	1,482,817	9,804,983	8,638,487	102,229,179
1989	4,735,258	39,253,969	1,801,763	4,321,550	10,754,246	4,238,727	4,989,597	1,311,046	10,445,872	8,443,049	104,239,601
1990	4,190,519	39,258,351	1,834,320	4,571,431	12,207,378	4,672,294	5,501,702	1,304,131	10,786,888	8,676,378	108,164,859
1991	9,796,902	41,678,398	1,804,463	4,904,800	11,315,841	5,406,775	5,510,387	1,324,881	11,153,812	8,865,604	117,105,452
1992	5,372,429	42,875,507	1,753,767	4,830,569	11,965,169	5,119,940	5,761,255	1,442,484	10,875,782	8,771,443	114,204,048
1993	6,237,753	41,980,014	1,769,651	4,977,833	10,933,941	5,670,076	5,987,611	1,637,833	11,453,674	9,561,922	116,141,361
1994	5,114,358	41,906,013	1,800,943	4,890,627	10,545,102	6,018,445	6,041,965	1,587,894	11,664,779	9,422,521	115,724,956
1995	5,719,470	38,928,615	1,743,589	4,643,418	10,020,835	6,204,090	6,779,568	1,909,148	11,984,418	8,865,924	113,619,767
1996	6,595,290	41,111,552	1,792,198	4,740,103	10,413,771	6,529,084	6,816,287	1,766,382	12,366,286	9,145,226	118,407,770
1997	5,027,584	42,185,109	1,794,338	5,117,321	11,109,149	6,991,128	6,997,416	1,785,252	13,293,978	9,659,354	122,279,381
1998	4,075,040	41,282,599	1,897,330	5,062,297	11,115,182	7,053,436	7,063,743	2,003,360	12,813,743	9,095,417	120,403,246
1999	3,661,112	39,870,443	2,061,785	5,368,897	12,669,214	6,720,342	7,484,466	2,305,379	14,510,272	10,583,737	125,032,092
2000	2,940,339	43,809,306	2,365,941	5,969,116	15,358,914	7,097,045	7,628,605	2,465,117	15,697,511	11,502,123	135,288,072
2001	3,250,891	43,765,525	2,312,729	6,070,604	15,144,269	7,827,638	7,469,154	2,441,331	16,580,861	11,874,473	138,710,770
2002	2,004,492	44,866,670	2,323,023	6,491,172	15,146,182	7,900,100	7,374,243	2,256,127	15,331,059	12,109,849	137,949,745
2003	2,827,229	45,044,832	2,500,555	6,499,483	15,539,344	7,696,312	7,760,416	2,406,709	17,044,364	13,258,029	142,528,199
2004	4,687,327	42,936,332	2,551,027	6,973,606	17,400,870	8,190,341	7,882,066	2,627,772	16,084,727	13,484,450	145,290,552
2005	2,394,525	47,794,997	2,717,106	7,156,559	17,150,375	8,437,457	8,129,476	2,663,907	16,879,986	14,150,509	149,818,639
2006	2,112,327	49,056,377	2,643,209	7,462,121	19,614,943	7,818,271	7,850,750	2,613,204	17,364,972	13,721,918	152,961,063
2007	3,262,066	48,447,259	2,823,131	7,364,699	18,146,146	7,907,638	8,123,248	2,889,179	17,349,411	14,201,001	152,515,513
2008	4,563,931	45,921,204	2,855,466	8,062,558	19,328,098	8,497,653	8,115,170	2,665,701	17,744,685	13,791,345	154,648,003
2009	2,251,195	49,009,618	2,692,566	7,557,887	19,345,187	8,410,827	8,843,232	2,949,624	17,659,358	13,658,548	156,252,151
2010	1,922,802	48,952,258	2,707,465	8,027,939	20,173,323	8,744,763	9,861,682	3,096,595	18,684,666	14,166,605	161,193,108
2011	2,339,547	45,795,256	2,902,422	8,507,040	19,468,850	8,876,086	9,721,166	2,878,341	17,532,381	14,206,022	155,498,580
2012	3,450,091	39,677,797	2,989,846	8,110,949	18,555,348	8,287,084	9,539,266	2,516,422	18,153,443	14,632,547	148,450,781

<b>Year</b>	<b>FLKeys</b>	<b>FLE</b>	<b>GA</b>	<b>SC</b>	<b>NC</b>	<b>VA</b>	<b>MD</b>	<b>DE</b>	<b>NJ</b>	<b>NY</b>	<b>Total</b>
2013	3,797,787	37,306,011	3,319,694	9,751,329	18,085,862	8,006,784	9,709,712	2,435,144	15,766,890	15,209,054	143,137,665
2014	3,544,628	43,967,506	3,736,954	8,745,715	18,926,498	7,409,713	9,394,453	2,491,369	17,012,498	15,401,849	149,361,058
2015	3,280,973	42,395,466	4,108,912	8,962,210	20,322,840	6,727,321	9,129,467	2,070,558	14,484,669	15,271,283	143,699,177
2016	2,705,262	38,695,081	3,880,485	9,335,002	21,158,845	7,247,361	9,364,384	2,129,937	13,851,906	15,765,211	141,615,392
2017	2,501,323	40,403,524	4,624,303	9,388,908	22,452,276	6,748,740	8,342,835	1,990,769	12,288,340	16,633,982	142,124,842
2018	2,729,023	43,986,704	4,592,649	9,897,323	16,624,306	6,386,006	6,761,984	2,147,069	12,493,094	11,242,165	131,964,013
2019	2,389,337	35,930,004	4,020,594	11,838,556	17,539,840	7,237,925	6,836,036	2,107,651	13,380,242	13,411,743	131,903,400

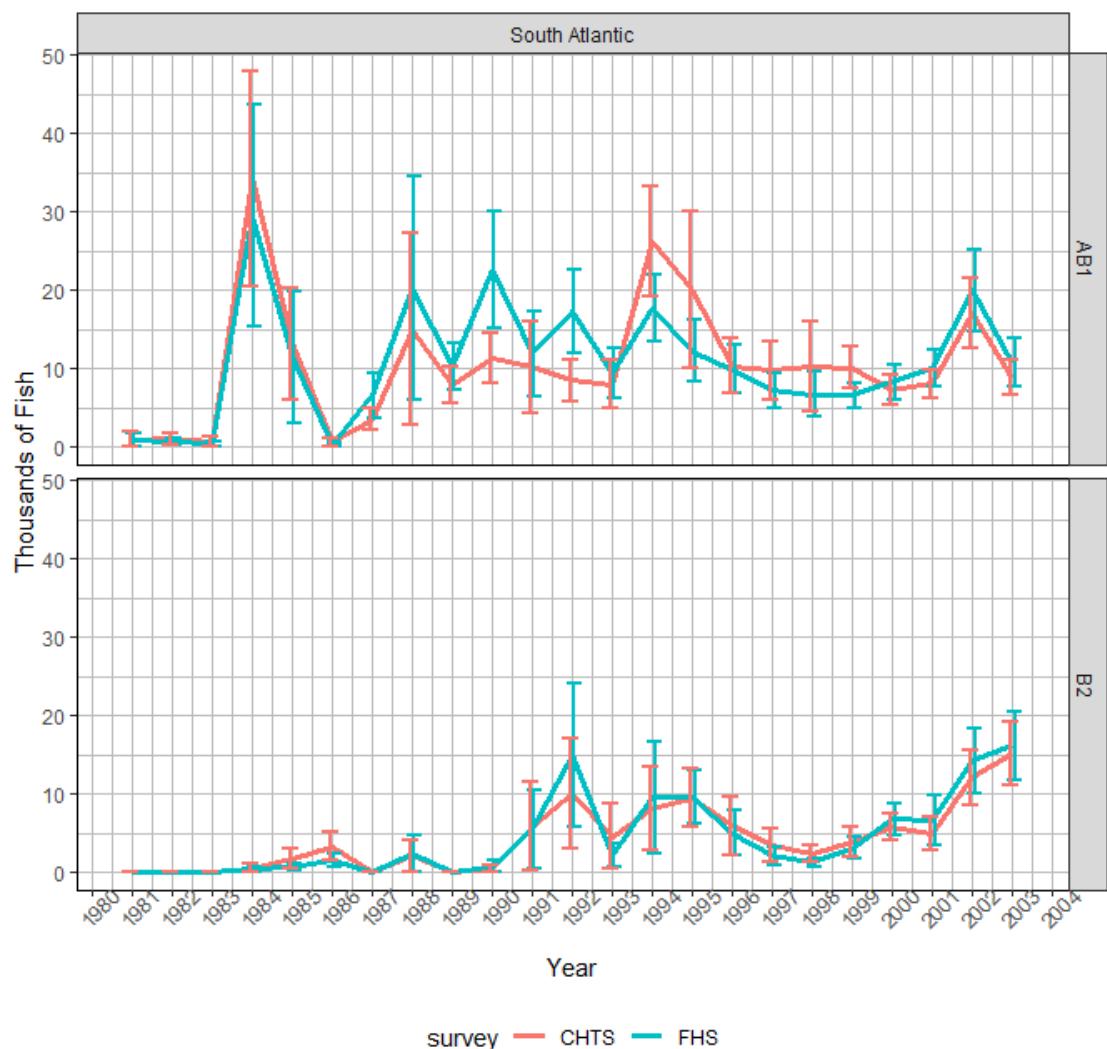
**Table 12 continued.** Recreational Fishing Effort (in angler trips) for Atlantic anglers by state and year.

<b>Year</b>	<b>CT</b>	<b>RI</b>	<b>MA</b>	<b>NH</b>	<b>ME</b>	<b>Total</b>
1981	2,954,427	2,300,146	7,178,372	265,333	831,193	90,414,541
1982	3,624,545	2,376,742	7,739,640	398,632	854,713	104,385,646
1983	2,854,642	2,402,982	7,605,994	297,865	747,618	104,921,773
1984	2,861,108	2,277,784	7,174,314	326,974	817,758	105,645,482
1985	2,868,047	2,680,446	7,483,184	166,322	913,021	102,294,800
1986	2,783,825	2,339,860	7,141,469	360,638	881,199	104,007,580
1987	2,842,968	2,523,175	6,410,706	343,612	923,655	106,998,494
1988	2,995,841	2,403,935	6,726,787	393,777	1,039,538	102,229,179
1989	3,066,939	2,660,656	6,670,771	445,789	1,100,369	104,239,601
1990	3,015,176	2,881,911	7,680,583	406,677	1,177,120	108,164,859

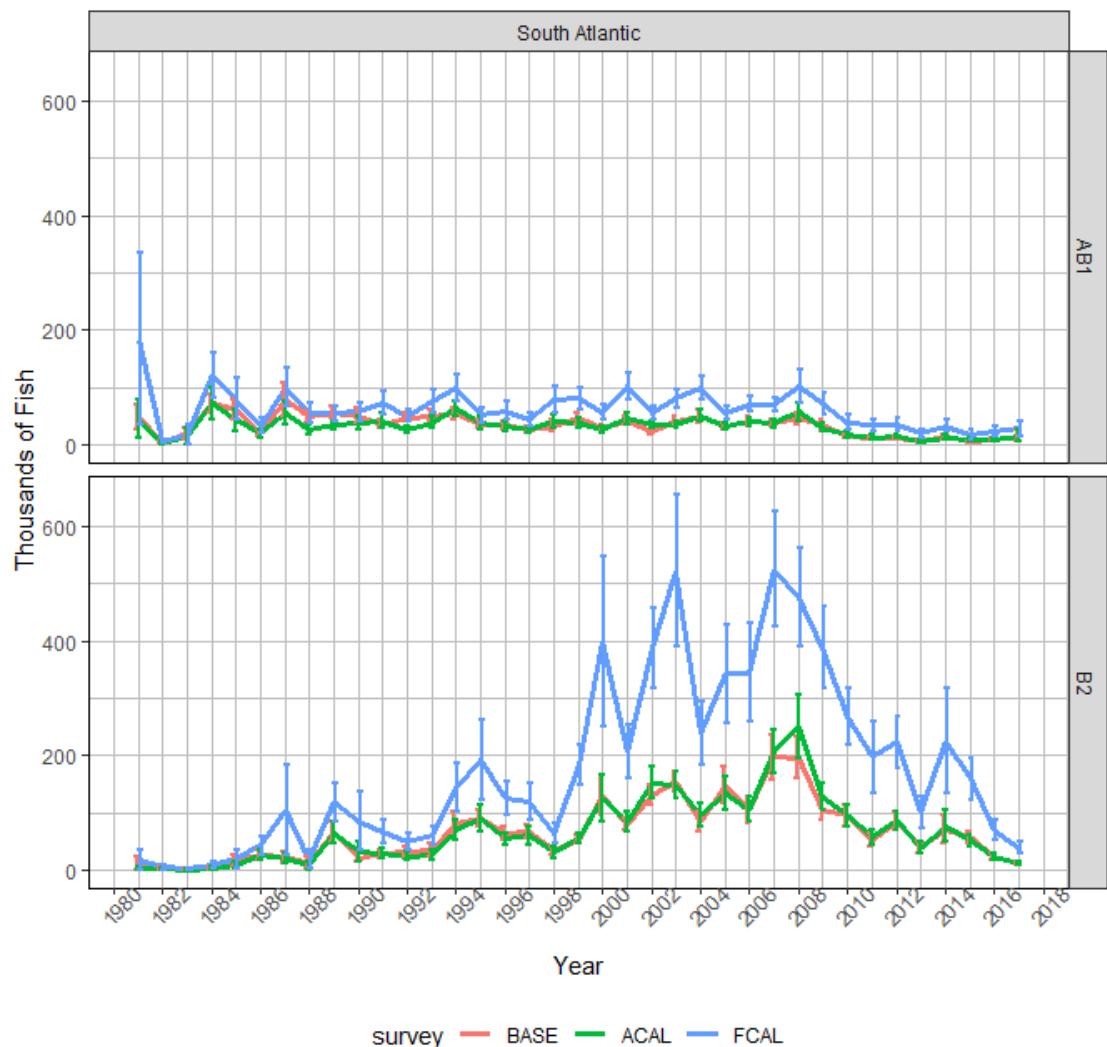
<b>Year</b>	<b>CT</b>	<b>RI</b>	<b>MA</b>	<b>NH</b>	<b>ME</b>	<b>Total</b>
1991	3,056,585	2,682,671	7,867,719	390,620	1,345,994	117,105,452
1992	2,934,464	2,666,256	8,265,920	356,025	1,213,038	114,204,048
1993	2,779,149	2,549,680	8,766,087	456,370	1,379,767	116,141,361
1994	2,763,578	2,642,026	9,393,081	597,307	1,336,317	115,724,956
1995	2,754,332	2,883,069	9,214,765	555,159	1,413,367	113,619,767
1996	2,909,421	2,797,720	9,476,761	586,679	1,361,010	118,407,770
1997	2,947,626	3,379,408	9,914,061	584,294	1,493,363	122,279,381
1998	3,093,446	3,789,827	10,026,868	624,017	1,406,941	120,403,246
1999	3,264,797	4,376,655	10,043,973	612,300	1,498,720	125,032,092
2000	3,152,493	4,326,027	10,652,619	647,212	1,675,704	135,288,072
2001	3,315,755	4,834,180	11,504,708	655,208	1,663,444	138,710,770
2002	3,342,254	4,636,125	11,483,210	843,967	1,841,272	137,949,745
2003	3,260,306	4,636,615	11,084,074	851,155	2,118,776	142,528,199
2004	3,181,184	4,666,310	11,746,505	869,049	2,008,986	145,290,552
2005	3,246,157	4,187,656	11,638,548	947,950	2,323,431	149,818,639
2006	3,162,606	4,282,997	12,005,419	882,560	2,369,389	152,961,063
2007	3,309,176	3,579,651	12,197,090	863,489	2,052,329	152,515,513
2008	3,568,590	3,658,000	12,605,363	865,157	2,405,082	154,648,003
2009	3,387,779	4,062,597	12,951,528	834,862	2,637,343	156,252,151
2010	3,696,314	4,154,975	14,157,846	787,908	2,057,967	161,193,108
2011	3,478,843	3,749,950	13,461,841	809,873	1,770,962	155,498,580
2012	3,734,050	3,956,500	12,221,447	857,582	1,768,409	148,450,781
2013	3,506,048	3,315,911	10,125,392	906,394	1,895,653	143,137,665
2014	3,640,810	3,350,834	8,807,604	954,392	1,976,235	149,361,058
2015	3,843,978	3,133,628	7,282,289	980,936	1,704,647	143,699,177
2016	4,229,759	2,998,761	7,244,235	1,060,766	1,948,397	141,615,392
2017	3,937,262	2,317,766	7,774,866	972,380	1,747,568	142,124,842
2018	3,542,791	2,553,265	6,705,398	676,086	1,626,150	131,964,013
2019	3,766,030	3,739,018	7,422,488	609,003	1,674,933	131,903,400

**Table 13.** Recreational Fishing Effort (in angler trips) for South Atlantic anglers by mode and year (MRIP). MRIP Headboat estimates are included from Virginia to Maine.

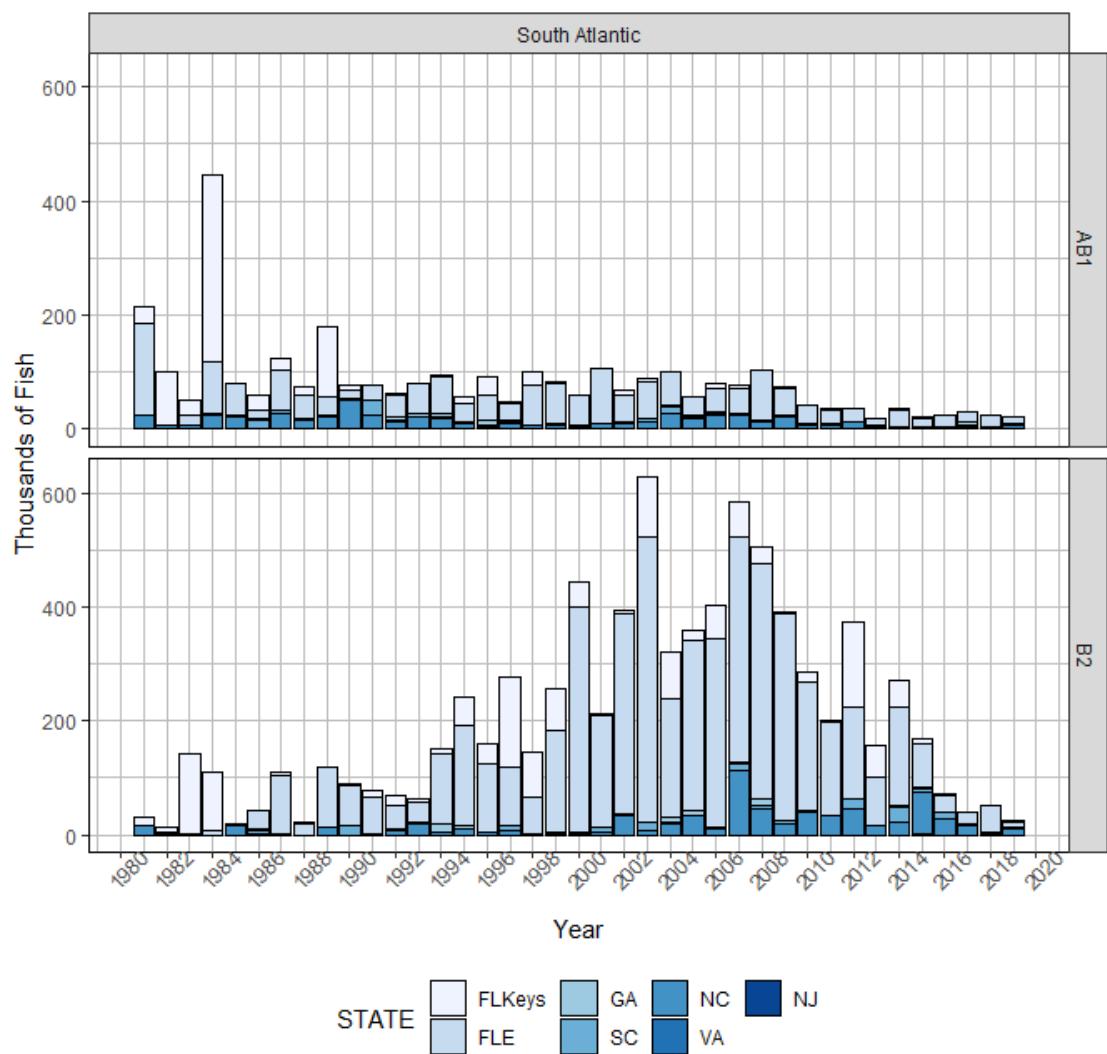
Year	Cbt	Hbt	Priv	Shore	Cbt/Hbt	Total
1981	443,445		26,243,346	61,051,974	2,675,775	90,414,540
1982	543,344		28,814,670	71,079,552	3,948,081	104,385,647
1983	549,886		28,359,367	72,925,742	3,086,778	104,921,773
1984	631,740		32,550,446	70,268,700	2,194,594	105,645,480
1985	647,288		32,813,013	66,635,354	2,199,145	102,294,800
1986	734,582		33,714,334	67,003,400	2,555,264	104,007,580
1987	684,175		33,995,973	70,569,249	1,749,097	106,998,494
1988	574,659		31,172,800	68,682,483	1,799,234	102,229,176
1989	703,403		33,035,097	68,901,320	1,599,779	104,239,599
1990	594,310		33,031,502	72,854,735	1,684,311	108,164,858
1991	615,933		35,195,540	79,437,858	1,856,123	117,105,454
1992	574,093		35,351,776	76,711,530	1,566,647	114,204,046
1993	617,079		37,064,297	76,264,706	2,195,281	116,141,363
1994	632,200		37,251,603	75,985,191	1,855,960	115,724,954
1995	647,404		36,404,884	74,594,344	1,973,135	113,619,767
1996	632,194		38,414,584	77,708,431	1,652,562	118,407,771
1997	574,241		40,634,525	79,337,393	1,733,223	122,279,382
1998	618,206		40,307,829	77,995,218	1,481,991	120,403,244
1999	555,961		42,159,862	80,863,789	1,452,480	125,032,092
2000	514,365		47,327,712	85,915,626	1,530,369	135,288,072
2001	600,971		47,066,544	89,441,326	1,601,931	138,710,772
2002	693,754		48,316,477	87,503,283	1,436,232	137,949,746
2003	658,098		50,746,742	89,543,460	1,579,900	142,528,200
2004	1,393,761	674,260	51,084,719	92,137,812		145,290,552
2005	1,574,278	767,540	52,105,095	95,371,726		149,818,639
2006	1,340,345	649,374	54,519,616	96,451,728		152,961,063
2007	1,818,780	971,084	56,050,865	93,674,785		152,515,514
2008	1,362,263	871,784	54,684,210	97,729,745		154,648,002
2009	1,365,822	790,333	56,034,342	98,061,652		156,252,149
2010	1,097,737	580,114	60,092,042	99,423,215		161,193,108
2011	1,319,030	600,817	55,943,541	97,635,193		155,498,581
2012	1,266,240	628,596	53,645,542	92,910,405		148,450,783
2013	1,426,349	968,396	52,164,168	88,578,752		143,137,665
2014	1,484,941	831,745	52,707,034	94,337,336		149,361,056
2015	1,644,964	696,087	49,242,699	92,115,428		143,699,178
2016	1,171,084	470,309	48,278,000	91,695,999		141,615,392
2017	1,185,535	596,982	47,882,656	92,459,668		142,124,841
2018	1,234,904	535,555	44,545,369	85,648,186		131,964,014
2019	1,561,034	598,715	44,517,675	85,225,976		131,903,400



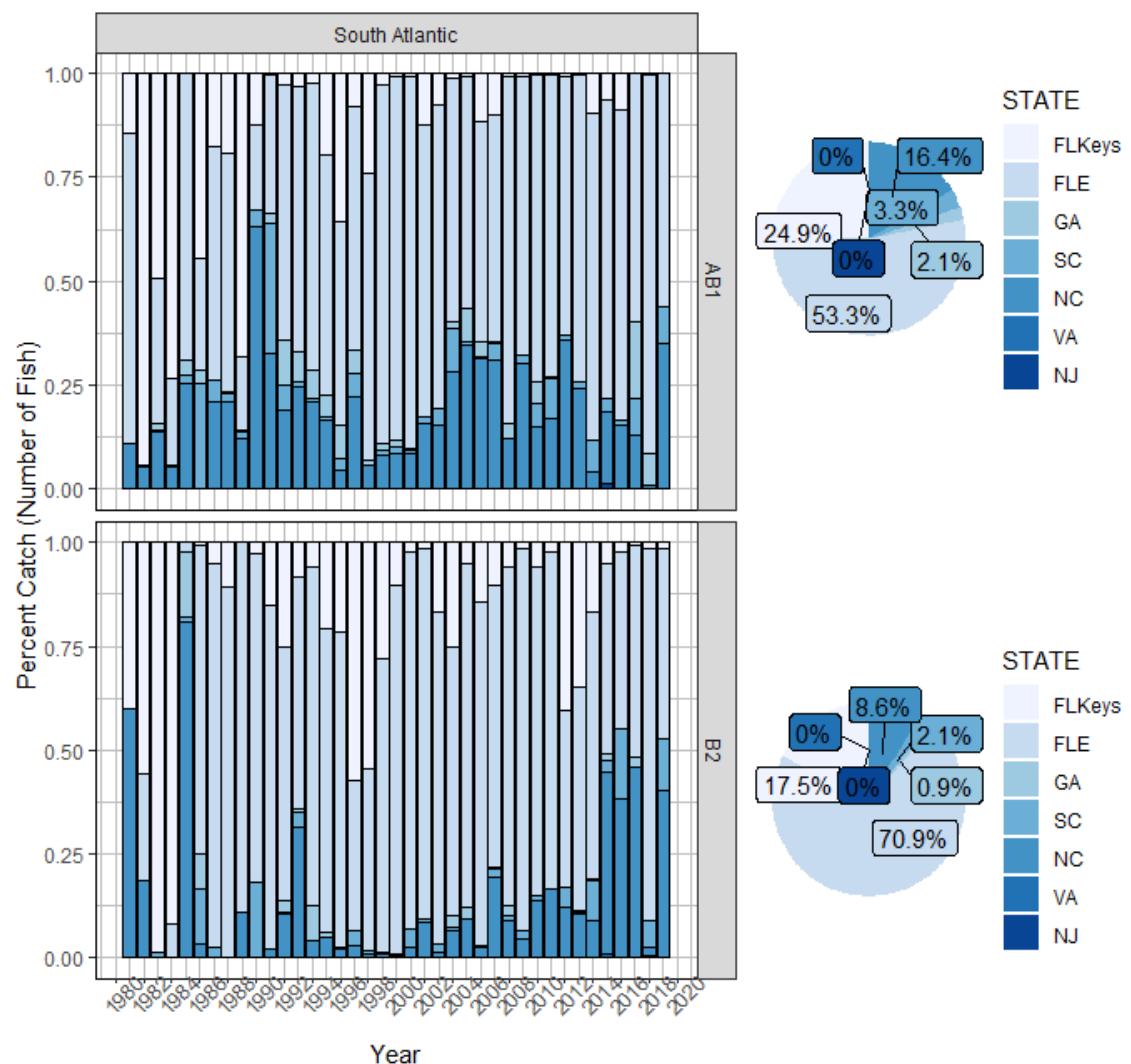
**Figure 1.** Comparison of charterboat landings (AB1) and discard (B2) estimates (with standard error intervals shown) for Gag from the Coastal Household Telephone Survey (CHTS) and For-Hire Survey (FHS) from the South Atlantic between 1981 to 2003. The charterboat calibration approach is discussed in Dettloff and Matter (2019; SEDAR64-RD-12).



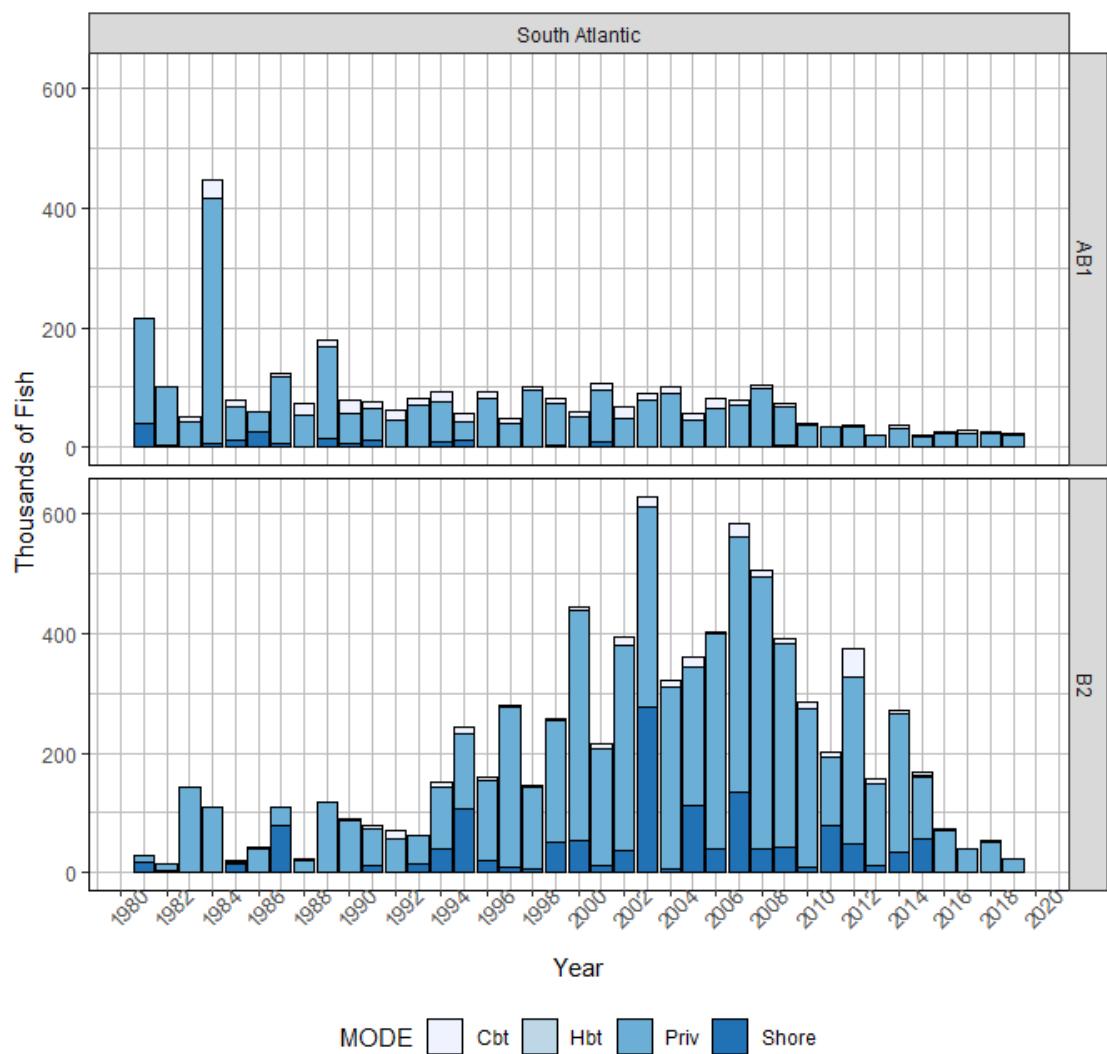
**Figure 2.** MRIP Base (BASE), APAIS Calibrated (ACAL), and Fully Calibrated APAIS and FES (FCAL) catch estimates for Gag in the Atlantic. Landings (AB1) and discard (B2) estimates are in thousands of fish. Estimates in this figure do not include the Florida Keys as that domain is not available from the MRIP online comparison tool (NMFS).



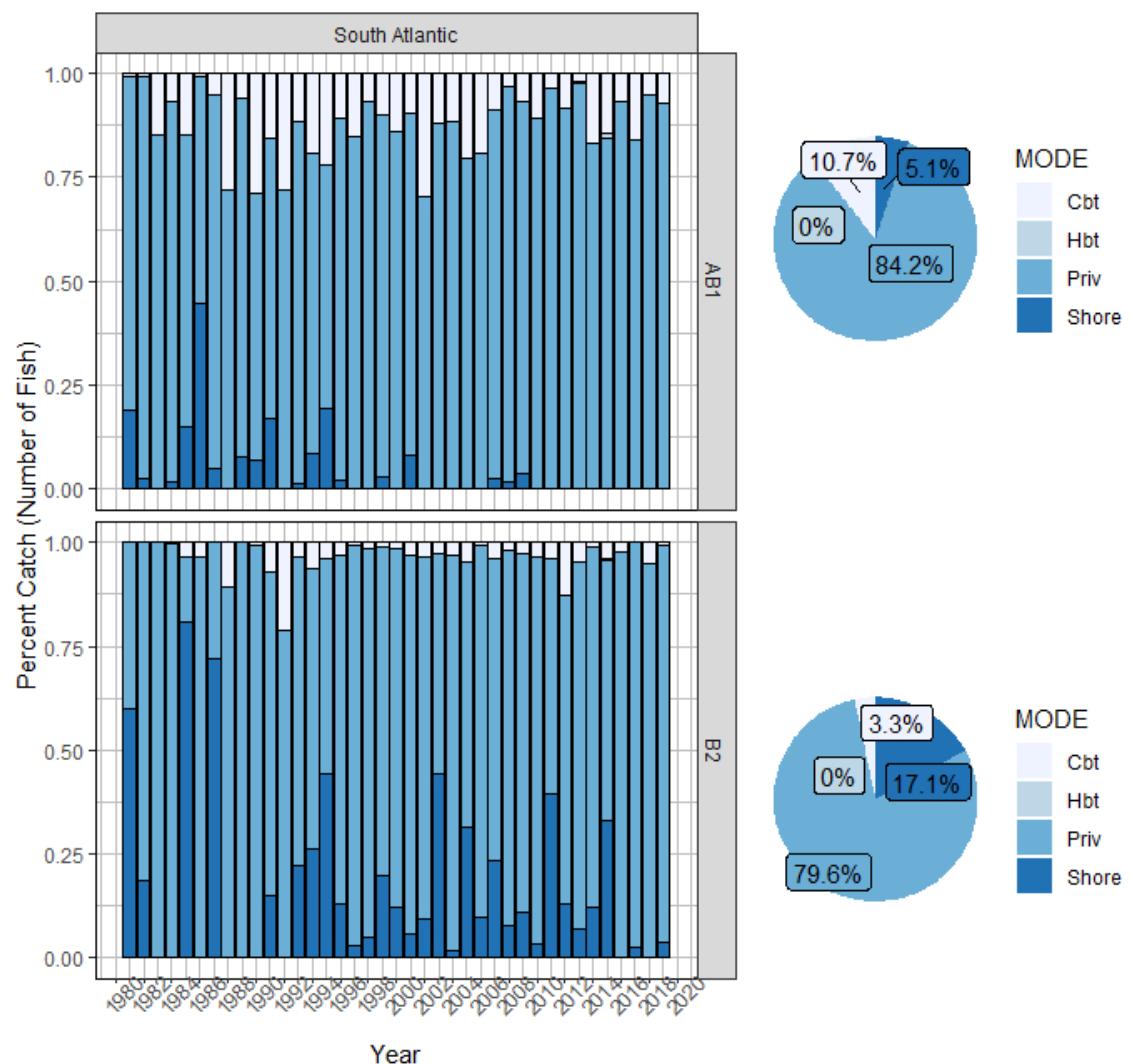
**Figure 3.** Annual Gag landings (AB1) and discards (B2), in thousands of fish, by state from 1981 to 2019 (MRIP).



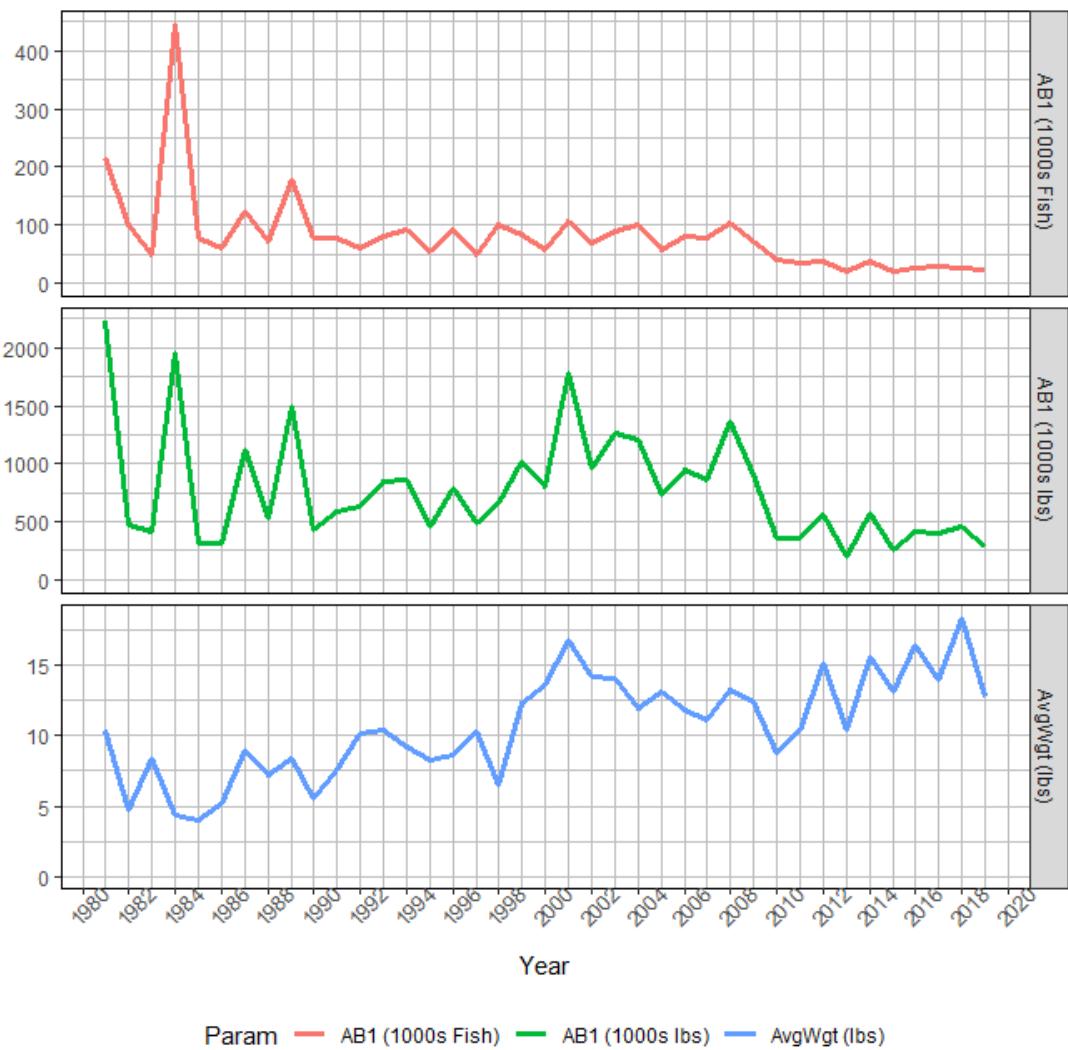
**Figure 3a.** Percent of Gag landings (AB1) and discards (B2), in numbers of fish, from each state by year (bar graph) and overall (pie chart) between 1981 and 2019 (MRIP).



**Figure 4.** Annual Gag landings (AB1) and discards (B2), in thousands of fish, by mode from 1981 to 2019 (MRIP). MRIP Headboat estimates are included from Virginia to Maine.



**Figure 4a.** Percent of Gag landings (AB1) and discards (B2), in numbers of fish, from each mode by year (bar graph) and overall (pie chart) between 1981 and 2019 (MRIP). MRIP Headboat estimates are included from Virginia to Maine.



**Figure 5.** Estimates of annual landings for Gag in the South Atlantic, as estimated from MRIP: 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 2019).