

A Summary of Gulf Gag Grouper Discard Length Data Collected from At-Sea Observers in For-Hire Fishery Surveys in Florida 2005-2024

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A Summary of Gulf Gag Grouper Discard Length Data Collected from At-Sea Observers in For-Hire Fishery Surveys in Florida 2005-2024

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Detailed information on the size and release condition of discarded fish is not collected in traditional dockside surveys of recreational fisheries. At-sea observer surveys provide valuable information on the size and condition of discarded fish, and such surveys have been conducted on for-hire vessels in Florida since 2005. At-sea observer surveys have not been consistently funded in Florida, which has led to short breaks in the time series in some regions. The majority of these observer trips were conducted on headboat vessels, with charter vessels being surveyed intermittently starting in 2009 (Table 1). This report provides a summary of available information on the size and disposition of Gulf Gag Grouper collected by trained observers since 2005 during at-sea surveys on for-hire vessels in southeastern US waters.

At-Sea Observer Survey Coverage

Trip and length information included here were collected from at-sea observer surveys between 2005 and 2024. No sampling occurred between April 2020 and May 2021 due to the COVID-19 pandemic.

Gulf Coast of Florida (NWFL, SWFL)

From 2005-2007, at-sea observer survey coverage on headboats operating from Alabama and the Gulf coast of Florida, from the panhandle through the Keys, was funded by the Gulf Fisheries Information Network (Gulf FIN). There was a gap in funding from January 2008 through May 2009. In June 2009, the state of Florida secured alternative funds to continue at-sea observer coverage in the northwest panhandle and central peninsula, including both the charter and headboat fleet. In 2014, coverage on headboats was limited to a small number of vessels participating in a pilot study for IFQ shares. Thus, data from this year are not considered representative of the fishery as a whole. Since 2015, there has been consistent coverage of both charter and headboats from the panhandle through the Florida Keys.

At-Sea Observer Survey Methods

Florida

West Coast – 2005 to 2007

Headboat vessels from Florida were randomly selected each week. Florida's western central region also had a separate sample quota for multi-day trips that fish in areas farther offshore. Operators from selected vessels were contacted by state biologists and a single trip was arranged in a selected week. Dependent upon the number of customers on board, one or two biologists accompanied passengers during the scheduled trip. The captain and mates cooperated by making

sure fish caught by their anglers were observed by one of the biologists before they were stored in the fish hold or released overboard. Biologists would assist with dehooking fish for data collection but were not permitted to influence the decision to keep or release a fish.

Trip level information collected included the area fished, duration of fishing (to the nearest half hour), number of anglers, and minimum and maximum depths (feet) of the fishing sites. For each fish in this analysis, biologists recorded the species, disposition, size (fork length in mm), and the condition of fish that were released. A brief interview with each angler observed during a trip was also conducted to collect information on primary and secondary target species, angler avidity, and state and county of residence.

Florida

West Coast – 2009 to 2024

Similar to methods described above, charter and headboat vessels were randomly selected each week from a list of participating vessels in each region statewide. Selected vessels are contacted in advance to schedule a single trip during the selected week. Trips are scheduled based on vessel capacity. For example, when 6-pack vessels are selected, a trip is scheduled on a day where the reservation is for a party of 5 or less anglers. If there is no room available on a selected vessel for any reserved trips during the selected week, the next randomly assigned vessel is selected.

Participating vessel operators permit up to two FWC biologists to board during a scheduled trip, and captains and mates actively assist biologists by permitting them to observe and collect data from fish as they are removed from anglers' gear and before fish are released or placed in the fish box. Vessel operators also provide biologists with information on depth and area fished (commercial statistical area and degrees and minutes latitude and longitude) for each fishing station during each observed trip.

For each fish in this analysis, biologists recorded the species, disposition, size (fork length in mm), and the condition of fish that were released in the same manner as 2005-2007/2010. Additionally, a subset of anglers was tracked by the biologist(s) for the entirety of the trip. For these anglers, hook type, hook size and hook location were recorded of the fish that they captured.

A project coordinator conducted quality assurance and quality control checks on all field data as it was collected and submitted. Following data entry, electronic data were proofed against field data sheets.

Data Elements

Disposition was coded as:

Discards

1: thrown back alive, legal

2: thrown back alive, not legal

Harvest

- 3: plan to eat
- 4: used for bait or plan to use for bait
- 5: sold or plan to sell
- 6: thrown back dead or plan to throw away
- Fish in the following disposition codes were dropped from analyses:*
- 7: EFP Sampled
- 8: Predated upon (no lengths available)

Stocks were defined as:

West Florida Shelf – NWFL and SWFL

FIN-OBS / MRFSS HEADBOAT (2005 – 2007) : headboat area 21, 23, 29

FWRI-OBS (2009 – 2024) : headboat area 18*, 21*, 23

**excluding FMFTT subzones south of US1*

Characterization of Trip Duration:

Sampled trips were categorized into the following trip-types based on the duration of the sampled trip:

- Single-Day Trips (<24 hours)
 - Half-Day: < 6 hours
 - Three-Quarter-Day: 6 – 8 hours
 - Full-day: 9 – 24 hours
- Multi-Day Trips (>24 hours)

At-Sea Observer Survey Data Analysis

Proportional Fishing Effort for Headboats

Headboat trips were not sampled proportional to fishing effort. For example, multi-day trips represent less than 2% of reported headboat fishing effort in Florida but were sampled at a much higher rate in at-sea observer surveys. In the northwestern region of Florida, half-day trips were under-sampled with respect to headboat effort. We generated weighting factors for different trip-types using fishing effort data reported on headboat logbook trip reports for the years 2005 through 2024. Headboat effort data were provided by R. Cheshire from NMFS Southeast Fisheries Science Center in Beaufort, NC.

Proportional fishing effort was calculated as the total numbers of trips reported on logbook trip reports for a given trip-type, divided by the total number of headboat trips reported. To obtain the sample weight (W_t):

$$W_t = \frac{N_t/N}{n_t/n}$$

Where N_t/N is the number of trips of type t divided by total trips reported on logbook trip reports, and n_t/n is the number of trips of type t sampled during fishery observer surveys divided by the total number of sampled trips in each year. Trip-types with $W_t < 1$ are down weighted to account for oversampling and trip-types with $W_t > 1$ are inflated to account for under sampling. No multi-day charter trips were sampled, and weights were not generated for charter samples.

Characterization of Discards:

Fish total lengths were assigned to two-cm length bin categories (20 cm bin = fish 20.0 cm to 21.9cm) and the number of lengths in each length bin category were summed by region, trip-type, and disposition (harvested and discarded).

For fish observed from headboats, counts of fish in each length bin were multiplied times the sample weight (W_t) for each trip-type and sample region. The weighted proportion of fish (p) in a given length bin (x) was calculated as follows:

$$p_x = \frac{L_{H,x}W_{H,x} + L_{F,x}W_{F,x} + L_{Q,x}W_{Q,x} + L_{M,x}W_{M,x}}{\left(\sum_{i=1}^n (L_{H,i}W_{H,i} + L_{F,i}W_{F,i} + L_{Q,i}W_{Q,i} + L_{M,i}W_{M,i})\right)}$$

Where $L_{H,x}$ denotes the observed number of fish in length bin x from half-day trips (H), and $W_{H,x}$ denotes the corresponding weighting factor applied to half-day trips. Analogous definitions apply for three-quarter-day (Q), full-day (F), and multi-day (M) trips. The numerator represents the sum of trip-type-specific weighted counts in bin x , and the denominator represents the sum of weighted counts across all length bins ($i = 1$ to n). Calculations were conducted by year to produce annual weighted discard length-frequency distributions. For charter vessels, the discard length frequency was calculated by summing the raw number of discarded Gag in each length bin and dividing this number by the total number of discarded fishes, by year.

Results

At-Sea Observer Trips

From 2005 to 2024 in the Gulf, headboat observers sampled 1,256 trips positive for Gag and 1,143 trips with discarded Gag (Table 2). There were 931 charter trips positive for Gag and 832 charter trips with discarded Gag from 2009 to 2024 in the Gulf (Table 3). Sampling weights were used to adjust the number of headboat discards, as a function of under-sampling or over-sampling of different trip durations in each region of Florida (Table 4). A total of 9,188 discarded fish and 1,407 harvested fish were measured during headboat at-sea observer trips from 2005 to 2024 in the Gulf (Table 5A). Among these fish, 56 discarded and 24 harvested Gag were landed in Alabama between 2005 and 2007 (Table 5B). For charter trips, observers sampled 4,783 discarded fish and 924 harvested fish from 2009 to 2024 (Table 6). Length frequency histograms for discarded Gag by year are presented for headboats (Figure 1, weighted) and charter boats (Figure 2). Length frequency histograms for harvested Gag by year are presented for headboats (Figure 3, weighted) and charter boats (Figure 4).

Table 2. Florida sampled HEADBOAT at-sea observer trips for all species, positive for Gag, and for Gag discards by year and region. Sampling in 2020 represents January to March, and sampling in 2021 represents June to December.

YEAR	Northwest Florida			Southwest Florida			Total		
	<i>Trips Sampled</i>	<i>Positive Trips</i>	<i>Discard Trips</i>	<i>Trips Sampled</i>	<i>Positive Trips</i>	<i>Discard Trips</i>	<i>Trips Sampled</i>	<i>Positive Trips</i>	<i>Discard Trips</i>
2005	81	69	63	82	68	63	163	137	126
2006	79	31	22	110	75	65	189	106	87
2007	74	13	6	91	69	62	165	82	68
2008	.	.	.	.	.	.	.	.	.
2009	28	8	7	44	39	34	72	47	41
2010	33	10	10	61	49	48	94	59	58
2011	54	18	17	65	56	54	119	74	71
2012	53	16	16	56	40	36	109	56	52
2013	44	4	4	60	40	37	104	44	41
2014	.	.	.	.	.	.	.	.	.
2015	104	8	1	80	32	26	184	40	27
2016	103	9	8	128	57	55	231	66	63
2017	85	8	4	131	45	43	216	53	47
2018	74	11	5	145	86	84	219	97	89
2019	88	31	25	138	63	63	226	94	88
2020	10	2	2	21	15	15	31	17	17
2021	54	8	6	111	54	53	165	62	59
2022	90	13	11	132	63	59	222	76	70
2023	105	7	5	94	48	45	199	55	50
2024	104	11	10	143	80	79	247	91	89

Table 3. Florida sampled CHARTER BOAT at-sea observer trips for all species, positive for Gag and for Gag discards by year and region. Sampling in 2021 represents June to December.

YEAR	Northwest Florida			Southwest Florida			Total		
	<i>Trips Sampled</i>	<i>Positive Trips</i>	<i>Discard Trips</i>	<i>Trips Sampled</i>	<i>Positive Trips</i>	<i>Discard Trips</i>	<i>Trips Sampled</i>	<i>Positive Trips</i>	<i>Discard Trips</i>
2009	36	16	13	19	18	16	55	34	29
2010	62	33	27	41	37	33	103	70	60
2011	79	30	27	52	43	43	131	73	70
2012	78	49	38	51	43	43	129	92	81
2013	77	24	18	60	36	34	137	60	52
2014	33	5	4	24	14	12	57	19	16
2015	117	15	12	86	42	38	203	57	50
2016	128	15	12	123	57	54	251	72	66
2017	93	14	12	118	54	53	211	68	65
2018	85	14	12	107	66	62	192	80	74
2019	108	32	27	118	67	64	226	99	91
2020	10	5	4	24	14	12	34	19	16
2021	57	9	1	70	32	26	127	41	27
2022	73	10	7	81	39	34	154	49	41
2023	71	3	2	64	34	31	135	37	33
2024	77	13	13	91	48	48	168	61	61

Table 4. Weights generated to correct length frequencies to account for uneven sampling of trips with varying duration, by region, for HEADBOATS only.

YEAR	Northwest Florida				Southwest Florida			
	<i>Half Day</i>	<i>Three-Quarter Day</i>	<i>Full Day</i>	<i>Multi Day</i>	<i>Half Day</i>	<i>Three-Quarter Day</i>	<i>Full Day</i>	<i>Multi Day</i>
2005	1.76	0.84	1.20	.	1.93	0.86	2.55	0.00
2006	1.83	0.76	1.61	.	1.58	1.31	0.71	0.01
2007	2.04	0.68	2.18	.	2.41	0.97	0.95	0.00
2008	.	.	.	.	.	.	.	.
2009	2.38	0.64	.	.	4.96	1.20	0.17	0.04
2010	1.63	1.06	0.49	.	3.53	0.99	0.14	0.05
2011	1.36	0.84	1.99	.	1.79	1.16	0.20	0.04
2012	0.83	0.98	2.22	.	1.48	1.15	0.48	0.04
2013	0.82	0.84	1.81	.	1.07	12.15	0.87	0.11
2014	.	.	.	.	.	.	.	.
2015	1.18	0.61	2.12	.	0.80	2.04	1.23	0.49
2016	1.22	0.64	1.95	.	0.97	1.36	1.01	0.39
2017	0.83	0.75	2.58	.	0.83	1.51	1.25	0.55
2018	1.21	0.60	5.23	.	1.17	1.79	0.69	0.48
2019	0.66	0.88	3.99	.	1.16	1.03	0.87	0.52
2020	0.54	0.84	.	.	1.04	0.98	0.84	.
2021	1.05	0.66	6.35	.	1.28	2.06	0.51	.
2022	0.84	0.86	2.08	.	1.43	1.55	0.57	1.05
2023	1.58	0.69	1.65	.	1.17	1.22	0.84	0.51
2024	0.76	0.72	2.13	.	0.80	1.07	1.29	0.72

Table 5A. Length summaries for discarded and harvested Gag observed on HEADBOAT trips in Florida, by year and region. Sampling in 2020 represents January to March, and sampling in 2021 represents June to December.

YEAR	NORTHWEST FLORIDA								SOUTHWEST FLORIDA							
	DISCARD				HARVEST				DISCARD				HARVEST			
	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>
2005	351	241	444	946	41	469	622	838	864	182	417	577	225	521	644	1172
2006	38	230	409	540	8	547	606	704	669	168	364	580	157	486	661	1100
2007	6	237	431	686	2	562	576	590	991	126	394	974	149	452	626	866
2009	7	321	408	497	1	675	675	675	413	276	437	596	84	471	617	902
2010	18	294	403	501	1	604	604	604	659	230	442	800	174	505	634	882
2011	25	400	555	830	2	525	551	576	624	232	522	984	32	541	611	890
2012	24	350	540	740	.	.	.	.	333	272	530	940	23	545	640	782
2013	5	421	571	730	.	.	.	.	236	151	518	840	20	535	620	760
2015	1	276	276	276	4	640	790	980	124	235	400	860	30	528	638	750
2016	8	324	567	788	1	822	822	822	383	203	442	965	30	575	651	810
2017	5	391	471	658	2	748	895	1042	284	191	439	1018	44	577	657	850
2018	5	410	606	808	5	660	732	790	684	209	428	900	62	586	674	920
2019	51	341	478	619	6	590	676	902	570	225	466	809	94	583	683	937
2020	2	324	372	420	.	.	.	.	134	270	465	693	.	.	.	.
2021	8	330	419	740	2	751	762	773	357	226	457	680	72	580	658	875
2022	20	276	470	675	6	600	616	635	479	230	454	688	117	579	678	939
2023	8	306	667	902	4	730	824	873	285	220	476	950	6	700	780	866
2024	10	315	650	812	.	.	.	.	507	160	501	1152	3	611	735	828

Table 5B. Length summaries for discarded and harvested Gag observed on HEADBOAT trips, by year and state. Sampling in 2020 represents January to March, and sampling in 2021 represents June to December.

YEAR	DISCARDS			HARVEST				
	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>
ALABAMA								
2005	50	291	467	946	20	540	575	621
2006	4	274	379	512	4	547	603	704
2007	2	352	360	368	.	.	.	.
FLORIDA								
2005	1165	182	423	577	246	469	646	1172
2006	703	168	366	580	161	486	660	1100
2007	995	126	394	974	151	452	625	866
2009	420	276	436	596	85	471	618	902
2010	677	230	441	800	175	505	634	882
2011	649	232	523	984	34	525	607	890
2012	357	272	530	940	23	545	640	782
2013	241	151	519	840	20	535	620	760
2015	125	235	399	860	34	528	656	980
2016	391	203	445	965	31	575	656	822
2017	289	191	440	1018	46	577	668	1042
2018	689	209	429	900	67	586	678	920
2019	621	225	467	809	100	583	683	937
2020	136	270	463	693	.	.	.	.
2021	365	226	456	740	74	580	660	875
2022	499	230	455	688	123	579	675	939
2023	293	220	482	950	10	700	797	873
2024	517	160	504	1152	3	611	735	828

Table 6. Length summaries for discarded and harvested Gag observed on CHARTER BOAT trips in Florida, by year and region. Sampling in 2020 represents January to March, and sampling in 2021 represents June to December.

YEAR	NORTHWEST FLORIDA								SOUTHWEST FLORIDA							
	DISCARD			HARVEST			DISCARD			HARVEST						
	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>	<i>N</i>	<i>Min</i>	<i>Mean</i>	<i>Max</i>
2009	28	275	434	530	3	544	702	831	179	290	453	685	60	514	621	814
2010	76	314	447	805	35	466	665	1190	443	261	466	736	124	534	623	1032
2011	77	320	567	847	11	546	671	850	511	285	511	895	16	540	594	632
2012	93	290	562	830	50	538	655	897	327	328	508	725	27	542	619	726
2013	26	470	585	690	10	555	672	760	289	260	525	850	16	555	612	680
2014	11	434	611	775	1	539	539	539	25	300	553	790	25	541	631	715
2015	25	350	520	819	5	572	778	1028	109	280	504	872	21	535	663	871
2016	20	232	513	830	8	562	664	790	248	280	466	730	67	586	653	795
2017	20	271	527	1010	8	680	784	898	314	195	437	772	85	582	674	955
2018	17	371	523	985	12	614	726	904	524	220	452	818	122	589	682	978
2019	75	340	499	740	13	580	674	1050	446	270	466	873	62	593	653	820
2020	4	296	542	736	3	605	652	725	84	210	466	737	4	598	645	759
2021	1	385	385	385	8	611	719	835	196	260	476	610	61	595	686	1000
2022	13	350	545	890	8	589	734	884	223	275	483	813	49	582	653	810
2023	2	492	543	594	1	653	653	653	130	205	461	845	9	603	702	940
2024	16	535	729	988	.	.	.	.	231	225	435	811	.	.	.	.

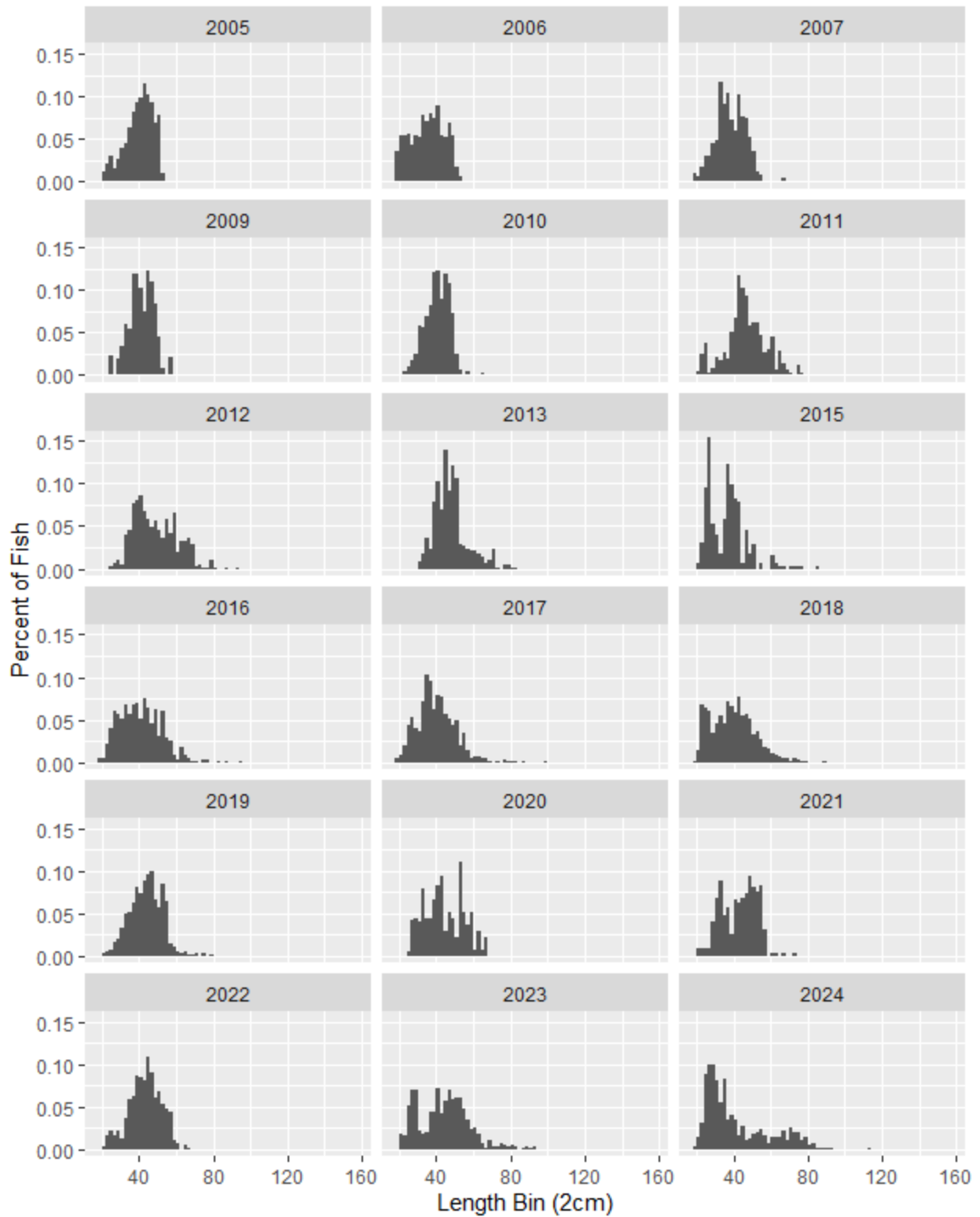


Figure 1. Weighted Gag discard length frequency by year observed from Florida HEADBOAT trips.



Figure 2. Gag discard length frequency by year observed from Florida CHARTER BOAT trips.

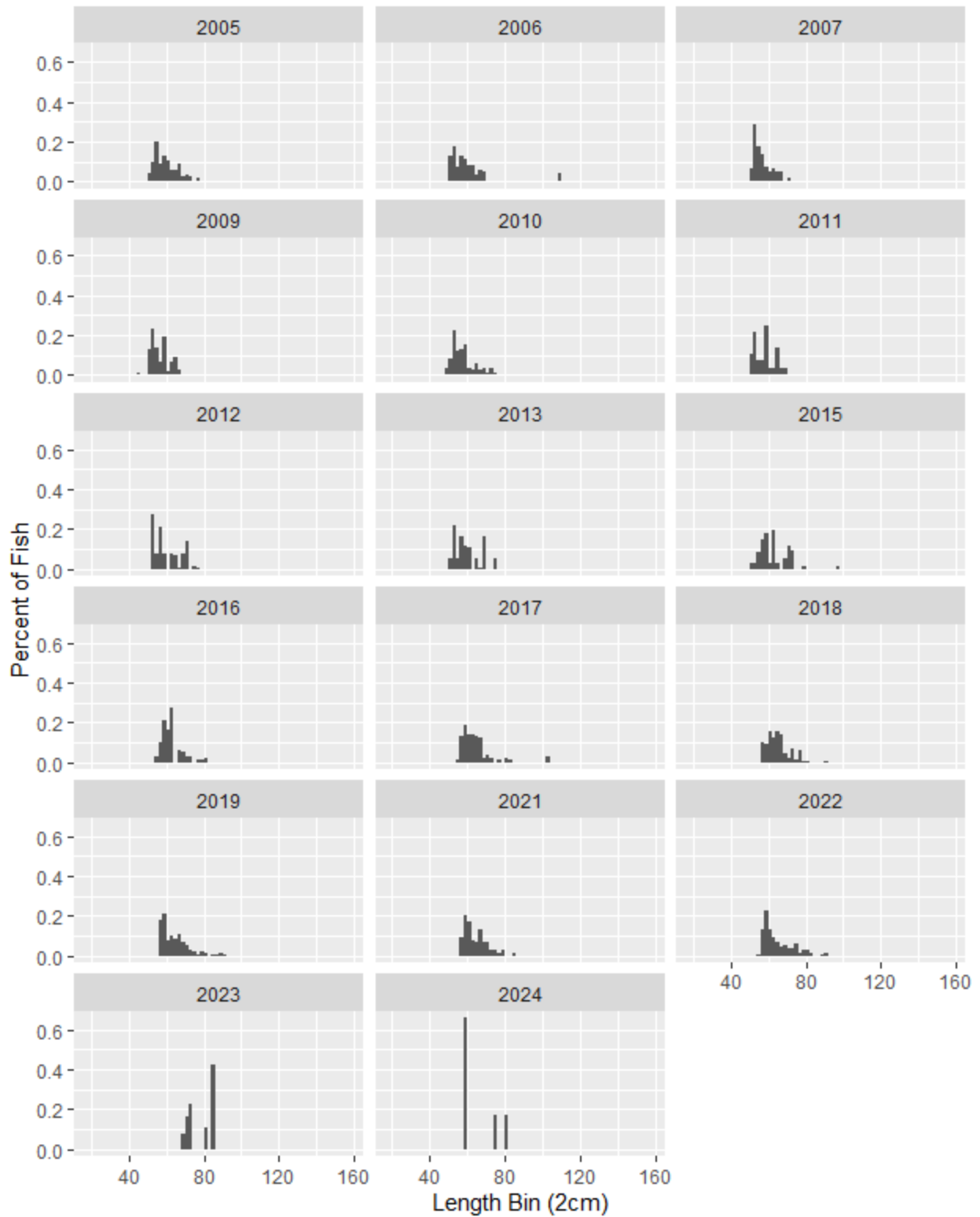


Figure 3. Weighted Gag harvest length frequency by year observed from Florida HEADBOAT trips.

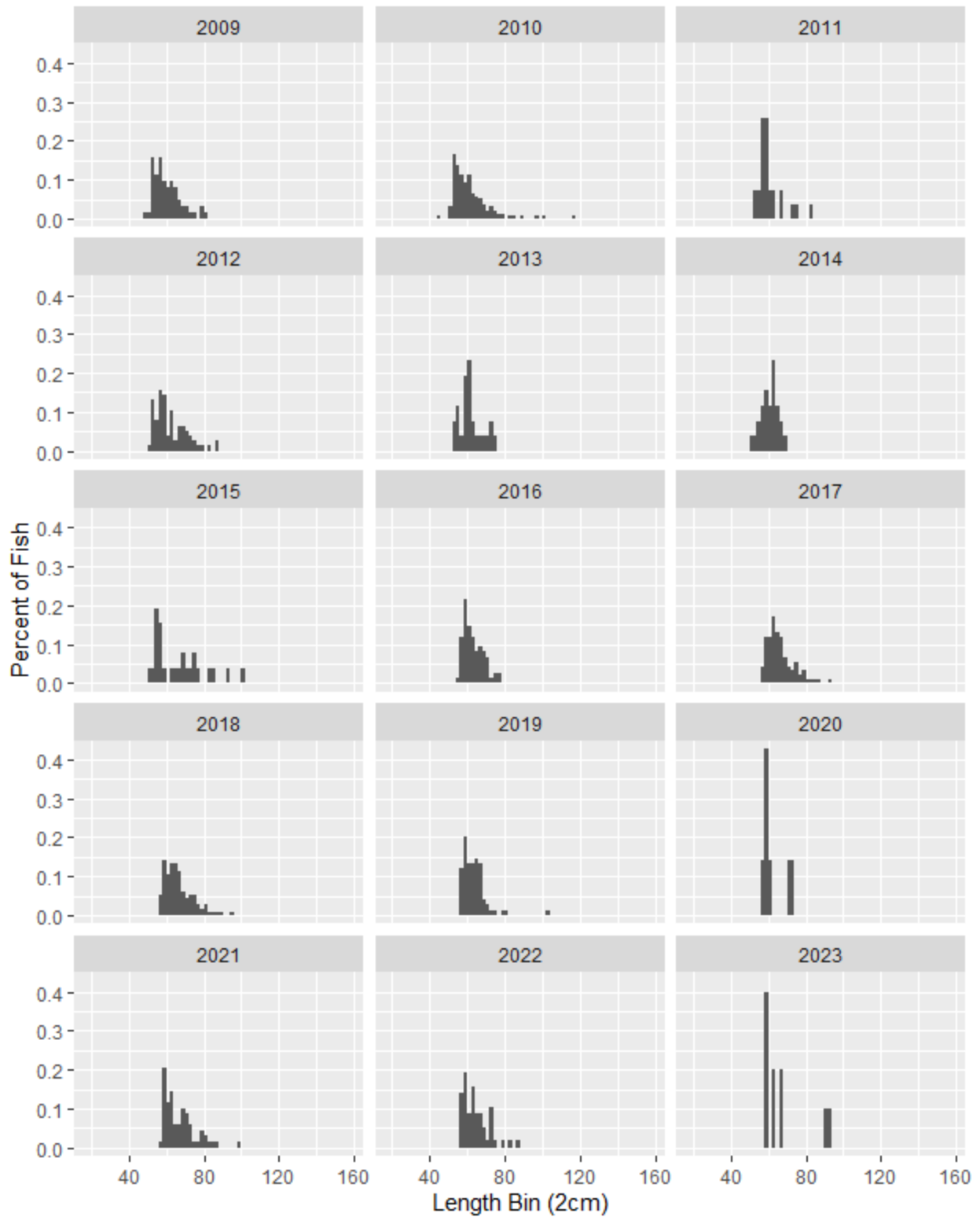


Figure 4. Gag harvest length frequency by year observed from Florida CHARTER BOAT trips.