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

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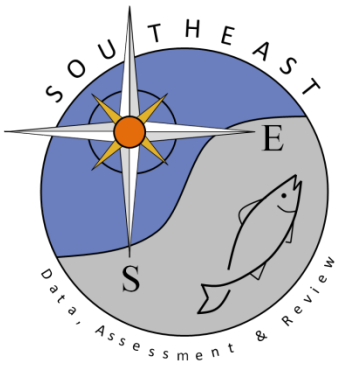

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A Summary of Gulf Gray Triggerfish Discard Length Data Collected from At-Sea Observers in For-Hire Fishery Surveys in Florida 2005-2024

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For: SEDAR 100 Gulf Gray Triggerfish Data Workshop, August 2025.

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 on both coasts of 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 Gray Triggerfish 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, Alabama)

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.

South Atlantic coast of Florida (NEFL, SEFL)

On the South Atlantic coast, at-sea headboat sampling has been conducted continuously since 2005 funded by the Atlantic Coast Cooperative Statistic Program (ACCSP), with this report including data collected between 2005 and 2024. At-sea sampling on Atlantic coast charter boats was funded with a 3-year MARFIN grant from 2013-2015, and there was a gap in funding from January 2016-May 2020. In July 2020, the state of Florida secured funds through the State Reef Fish Survey to expand coverage to east Florida but trips were not observed through this funding until April 2021 due to the COVID-19 pandemic. There has been consistent coverage of charter boats since sampling coverage was re-initiated in April 2021.

Florida Keys (KEYS)
Headboat observer surveys were conducted in the Florida Keys from 2005 to 2007, funded by the Gulf Fisheries Information Network (GulfFIN) along with the Gulf coast. In 2010, headboat sampling coverage in the Florida Keys was re-initiated, along with the initiation of charter boat sampling. In 2014, representative at-sea observer data was only collected from charter vessels in the Florida Keys. Since 2015, there has been consistent coverage of both charter and headboats in the Florida Keys.

At-Sea Observer Survey Methods
Florida
East Coast – 2005 to 2010
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
East Coast – 2011 to 2024
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;
7: EFP Sampled;

Stocks were defined as:
Florida Gulf Coast (hereby referred to as Florida)
FIN-OBS / MRFSS HEADBOAT (2005 – 2007) : headboat area 21, 23
FWRI-OBS (2009 – 2024) : headboat area 21*, 23
**excluding FMFTT zones 002, 001, and 748*

Alabama
FIN-OBS / MRFSS HEADBOAT (2005 – 2007) : FMFTT county codes 003, 097

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 (Table 4). 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 estimated on logbook trip reports for a given trip-type, divided by the total number of headboat trips reported (Table 2). 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 estimated 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 undersampling. No multi-day charter trips were sampled, and weights were not generated for charter samples (Table 3).

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 in a length bin (p_x) was calculated as follows:

$$p_x = \frac{\sum L_H * W_H + \sum L_F * W_F + W_Q * W_Q + W_M * W_M}{\sum(bin = i = 1 \ldots n[\sum L_H * W_H + \sum L_F * W_F + W_Q * W_Q + W_M * W_M]}$$

Where L_H equals the number of fishes in length bin x for a given disposition in each region observed during half-day trips (H); and W_H is the weighting factor for half-day trips in the same region. Q = ¾-day trips, F = full-day trips (including eighteen hour trips), and M = multi-day trips. The denominator is the sum of all numerators for length bin 1 to length bin n. The number of discarded fishes was summed by trip type and multiplied by the weighting factor for each trip-type, by year, to construct the weighted discard length frequency distribution. For charter vessels, the discard length frequency was calculated by summing the raw number of discarded Gray Triggerfish in each length bin and dividing this number by the total number of discarded fishes, by year.

Results

At-Sea Observer Trips

Alabama

From 2005 to 2007, headboat observers sampled 72 trips in Alabama that were positive for Gray Triggerfish and measured 66 harvested fish. Three of those trips included discarded Gray Triggerfish where observers measured one fish per trip. The number of sampled trips by year and state for at-sea observer trips are provided in Table 2 and summary statistics for the length distribution of discarded and harvested fish observed during Alabama headboat trips are provided in Table 5.

Florida

From 2005 to 2024 on the Gulf coast of Florida, headboat observers sampled 1,551 trips positive for Gray Triggerfish. Of the positive trips, 1,264 trips in Florida included discarded Gray Triggerfish. There were 1,149 charter trips positive for Gray Triggerfish, and 1,109 of these trips included discarded Gray Triggerfish from 2009 to 2024. The number of sampled trips by year and state for at-sea observer trips are provided in Tables 2 & 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 Florida (Table 4). A total of 8,724 discarded fish and 1,287 harvested fish were measured during headboat at-sea observer trips from 2005 to 2024 in Florida. For Florida charter trips, observers sampled 10,768 discarded fish and 1,149 harvested fish from 2009 to 2024. Summary statistics for the length distribution of discarded and harvested fish observed during headboat and charter trips are provided in Tables 5 and 6. Length frequency histograms for harvested and released (discarded) Gray Triggerfish by year are presented for Florida headboats (Figure 1) and Florida charter boats (Figure 3). Length frequency histograms for released (discarded) Gray Triggerfish by year are presented for Florida headboats (Figure 2) and Florida charter boats (Figure 4).

Table 1. Sampling coverage for At-sea observer trips in Florida, by region and year. The * indicates partial years of coverage. Sampling occurred from July to December in 2009, from January to March in 2020, and from June to December in 2021. + Indicates sampling occurring only in Tampa Bay area, exclude southern counties of SW FL. *H* indicates data is removed from analysis due to under representation of the fleet sampled.

Headboat Areas	**2005**	**2006**	**2007**	**2008**	**2009***	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020***	**2021***	**2022**	**2023**	**2024**
Northwest Florida	H	H	H		H,C	H,C	H,C	H,C	H,C	*H,*C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C
Southwest Florida	H	H	H		H^+,C^+	H^+,C^+	H^+,C^+	H^+,C^+	H^+,C^+	*H,*C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C
Florida Keys	H	H	H			H,C	H,C	H,C	H,C	C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C	H,C
Southeast Florida	H	H	H	H	H	H	H	H	H,C	H,C	H,C	H	H	H	H	H	H,C	H,C	H,C	H,C
Northeast Florida	H	H	H	H	H	H	H	H	H,C	H,C	H,C	H	H	H	H	H	H,C	H,C	H,C	H,C

Table 2. Florida sampled HEADBOAT at-sea observer trips positive for Gulf Gray Triggerfish, and trips with Gulf Gray Triggerfish discards by year and stock. Sampling in 2020 represents January to March, and sampling in 2021 represents June to December.

	ALABAMA		**FLORIDA**	
YEAR	*Positive Trips*	*Discard Trips*	*Positive Trips*	*Discard Trips*
2005	29	0	70	10
2006	26	3	84	10
2007	17	0	78	11
2009	.	.	25	20
2010	.	.	36	34
2011	.	.	57	52
2012	.	.	52	50
2013	.	.	42	40
2015	.	.	125	103
2016	.	.	129	124
2017	.	.	114	105
2018	.	.	112	101
2019	.	.	125	121
2020	.	.	15	14
2021	.	.	79	79
2022	.	.	131	126
2023	.	.	135	129
2024	.	.	142	135

Table 3. Florida sampled CHARTER BOAT at-sea observer trips positive for Gulf Gray Triggerfish and trips with Gulf Gray Triggerfish discards by year and stock. Sampling in 2020 represents January to March, and sampling in 2021 represents June to December.

FLORIDA		
YEAR	*Positive Trips*	*Discard Trips*
2009	24	20
2010	46	38
2011	67	59
2012	59	57
2013	60	56
2015	95	94
2016	115	115
2017	103	102
2018	114	113
2019	134	133
2020	15	15
2021	67	67
2022	83	78
2023	86	83
2024	81	79

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

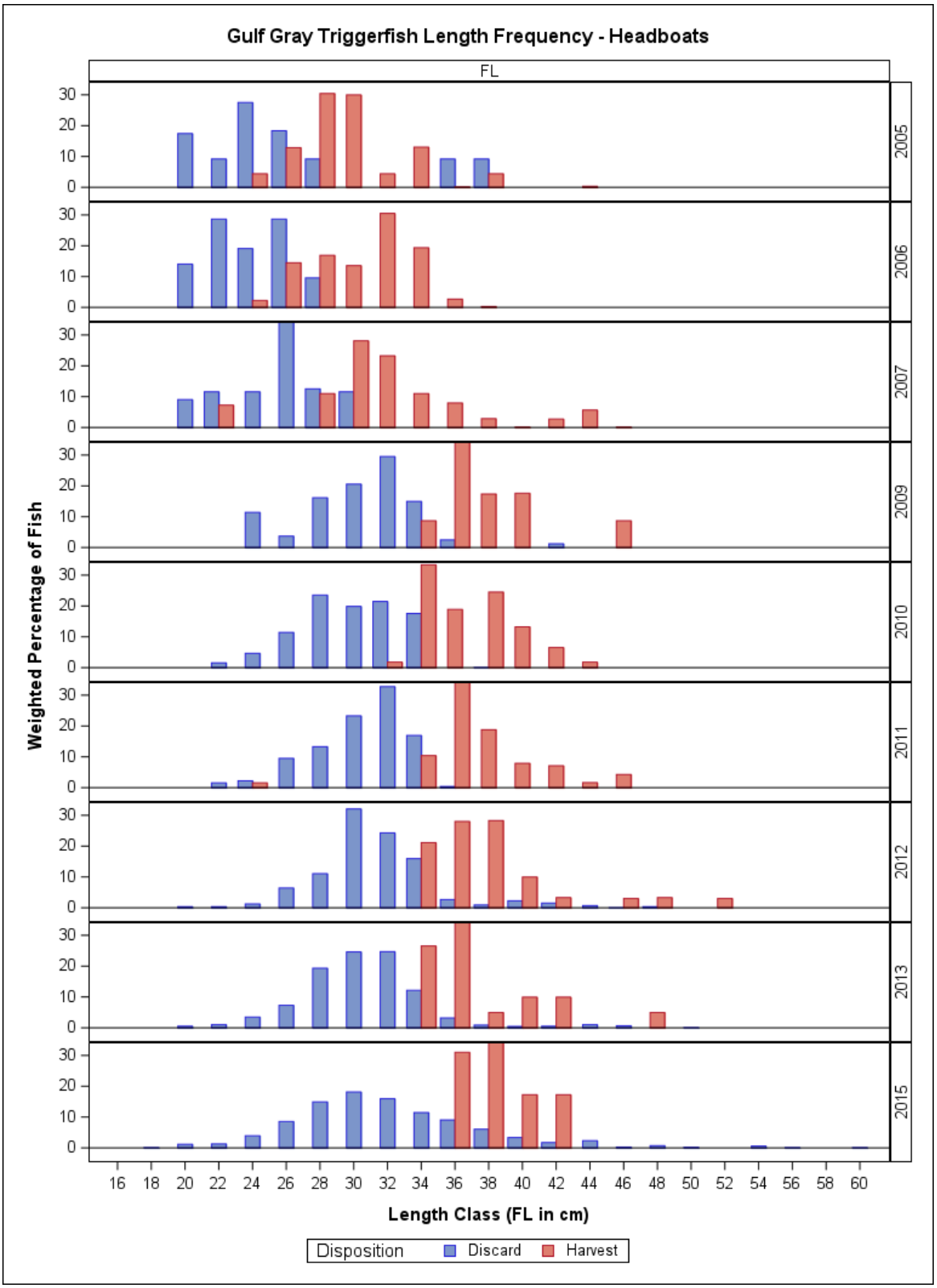
	FLORIDA			
YEAR	*Half Day*	*Three-Quarter Day*	*Full Day*	*Multi Day*
2005	1.358	0.714	1.377	0.027
2006	1.153	0.783	1.161	0.049
2007	1.66	0.599	1.296	0.027
2009	3.648	0.882	0.402	0.026
2010	2.872	0.952	0.353	0.037
2011	1.644	0.952	0.579	0.04
2012	1.275	0.993	1.084	0.059
2013	0.998	1.277	1.095	0.16
2015	1.054	0.636	1.593	0.897
2016	1.107	0.731	1.298	0.548
2017	0.854	0.91	1.584	0.7
2018	1.158	0.878	0.996	0.559
2019	0.986	0.9	1.252	0.56
2020	0.845	0.949	1.288	.
2021	1.205	1.038	0.705	.
2022	1.217	0.971	0.789	1.182
2023	1.41	0.636	1.127	0.78
2024	0.799	0.788	1.555	0.767

Table 5. Length summaries for discarded and harvested Gulf Gray Triggerfish 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				HARVESTS			
	N	*Min*	*Mean*	*Max*	*N*	*Min*	*Mean*	*Max*
ALABAMA								
2005	.	.	.	.	29	260	342.1	451
2006	3	240	248.3	254	21	259	306.7	403
2007	.	.	.	.	16	261	328	396
FLORIDA								
2005	10	209	275.7	384	22	256	324.5	455
2006	10	218	251.3	291	47	256	322.4	398
2007	11	203	265.5	301	40	235	339.4	465
2009	52	240	314.6	426	14	351	385.4	471
2010	115	220	306.8	392	32	328	381.3	444
2011	249	228	314.1	370	67	256	382	465
2012	292	204	323.1	492	34	355	388.8	530
2013	212	218	319.1	501	21	354	379.7	485
2015	738	196	326.5	608	7	361	387.4	435
2016	1314	210	322.8	560	307	347	390.3	526
2017	914	174	349.9	534	.	.	.	.
2018	719	185	343.2	540	283	352	407.6	510
2019	1091	185	327.8	530	93	356	417.6	515
2020	124	237	341.7	490	3	392	412	445
2021	451	190	324.1	590	14	381	406.7	486
2022	756	192	320.2	520	99	288	420.5	553
2023	911	227	326	551	109	375	419.2	589
2024	755	222	325.1	540	95	296	418.7	535

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

YEAR	DISCARDS				HARVEST			
	N	*Min*	*Mean*	*Max*	*N*	*Min*	*Mean*	*Max*
FLORIDA								
2009	159	222	303.1	404	38	323	392.4	481
2010	201	234	313.2	439	152	280	391	537
2011	540	166	313.4	574	177	350	387.5	510
2012	435	230	320.9	517	62	340	386	490
2013	431	215	316.1	515	62	356	387.8	510
2015	983	136	315.9	580	1	356	356	356
2016	1223	209	317.8	592	123	305	388.2	534
2017	984	157	339.7	518	.	.	.	.
2018	980	166	329.2	541	105	379	414.5	493
2019	1590	163	323.3	555	100	329	419.2	545
2020	83	173	314.5	512	.	.	.	.
2021	716	175	328.9	547	36	368	422.1	565
2022	830	179	323.5	600	133	289	401.3	575
2023	1010	205	320.3	526	79	273	407.5	530
2024	603	193	318.5	520	81	381	420.4	569


Gulf Gray Triggerfish Length Frequency - Headboats
FL
2005
2006
2007
2009
2010
2011
2012
2013
2015
Weighted Percentage of Fish
0
10
20
30
16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Length Class (FL in cm)
Disposition
Discard
Harvest

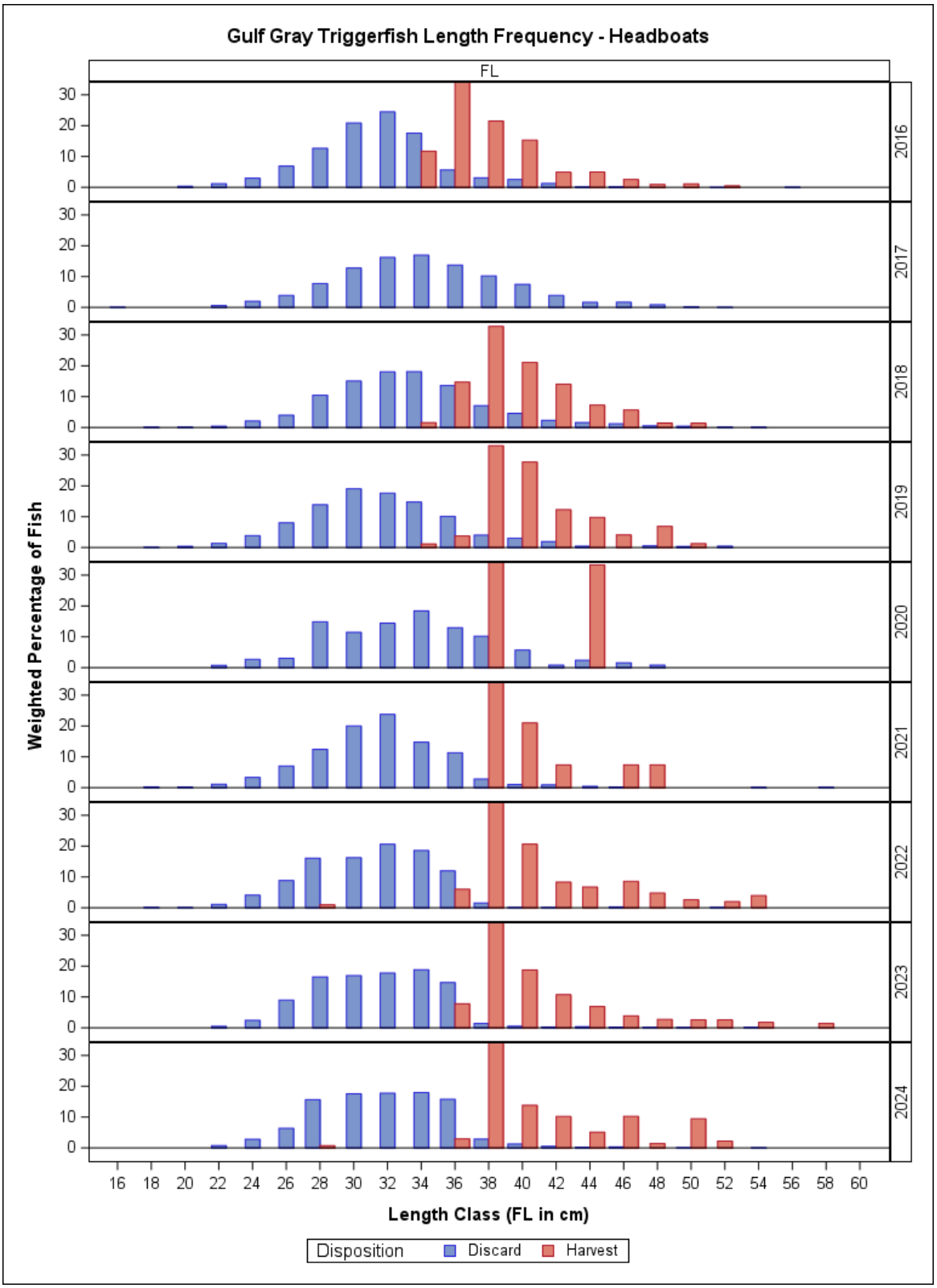
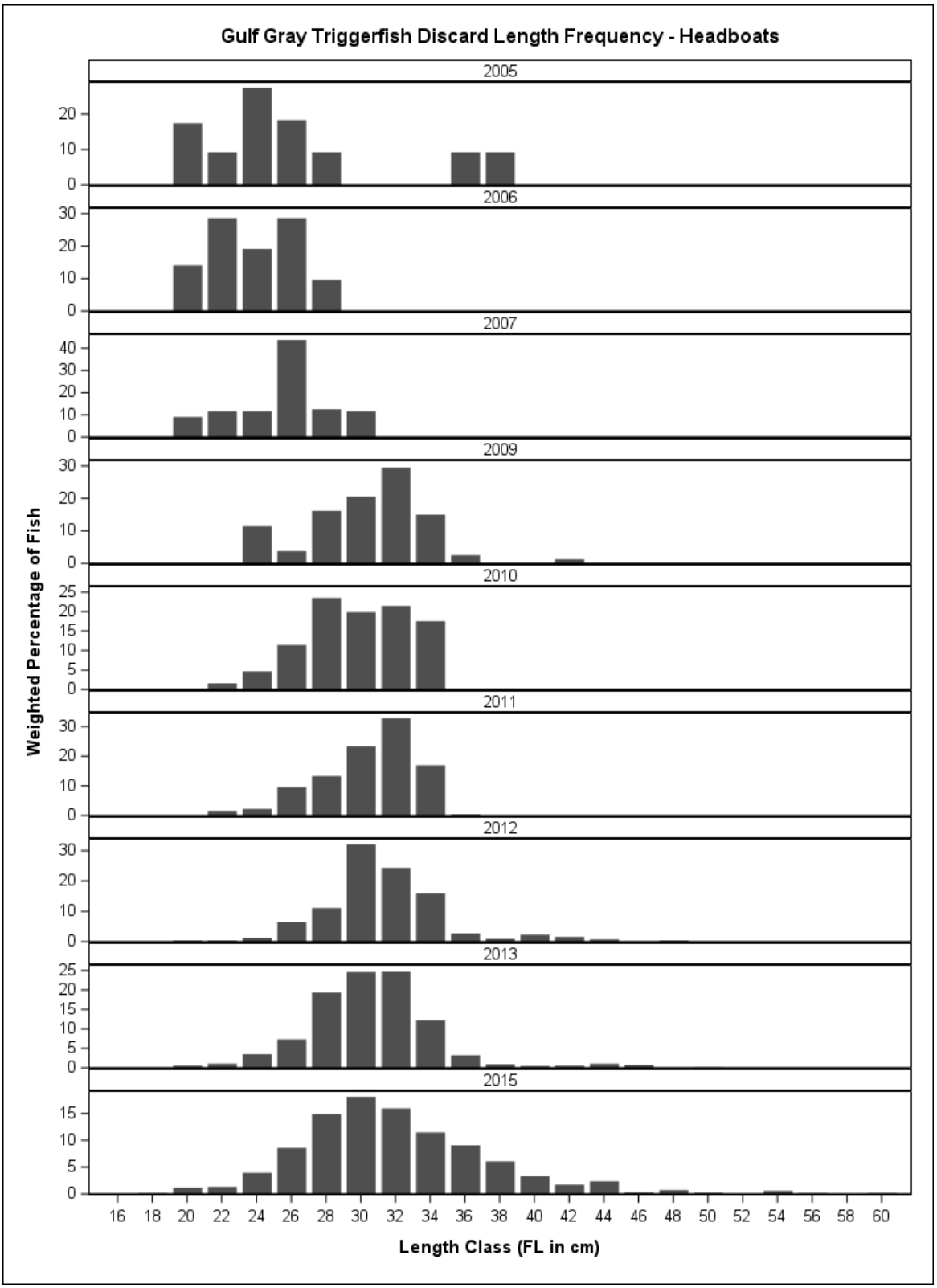


Figure 1. Weighted length frequencies of harvested and released Gulf Gray Triggerfish measured by at-sea observers on HEADBOATS in west Florida from 2005-2024. Some plots are truncated to improve resolution. Harvest includes fish that were released dead.


Gulf Gray Triggerfish Discard Length Frequency - Headboats
2005
2006
2007
2009
2010
2011
2012
2013
2015
Weighted Percentage of Fish
Length Class (FL in cm)
16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60

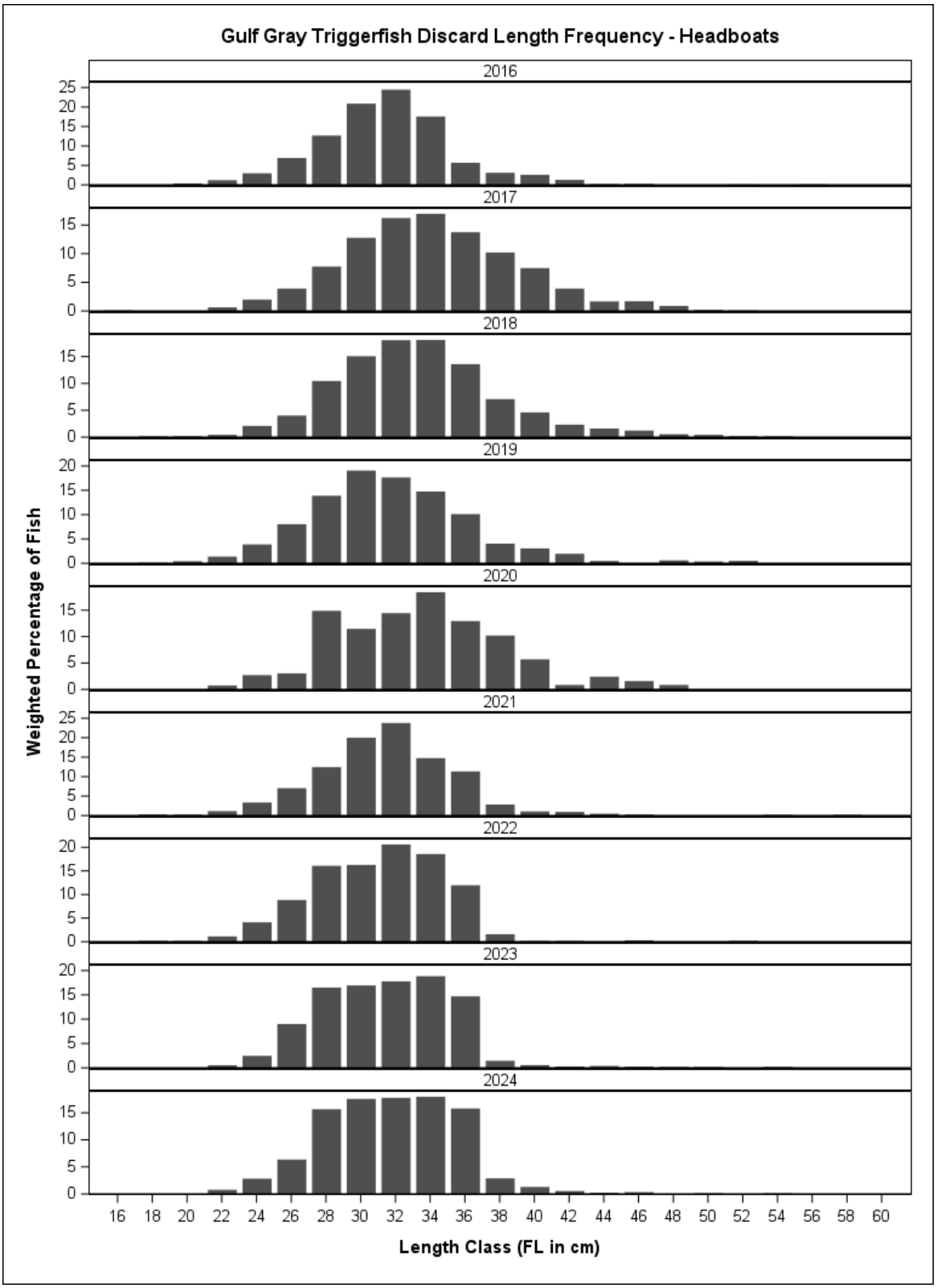
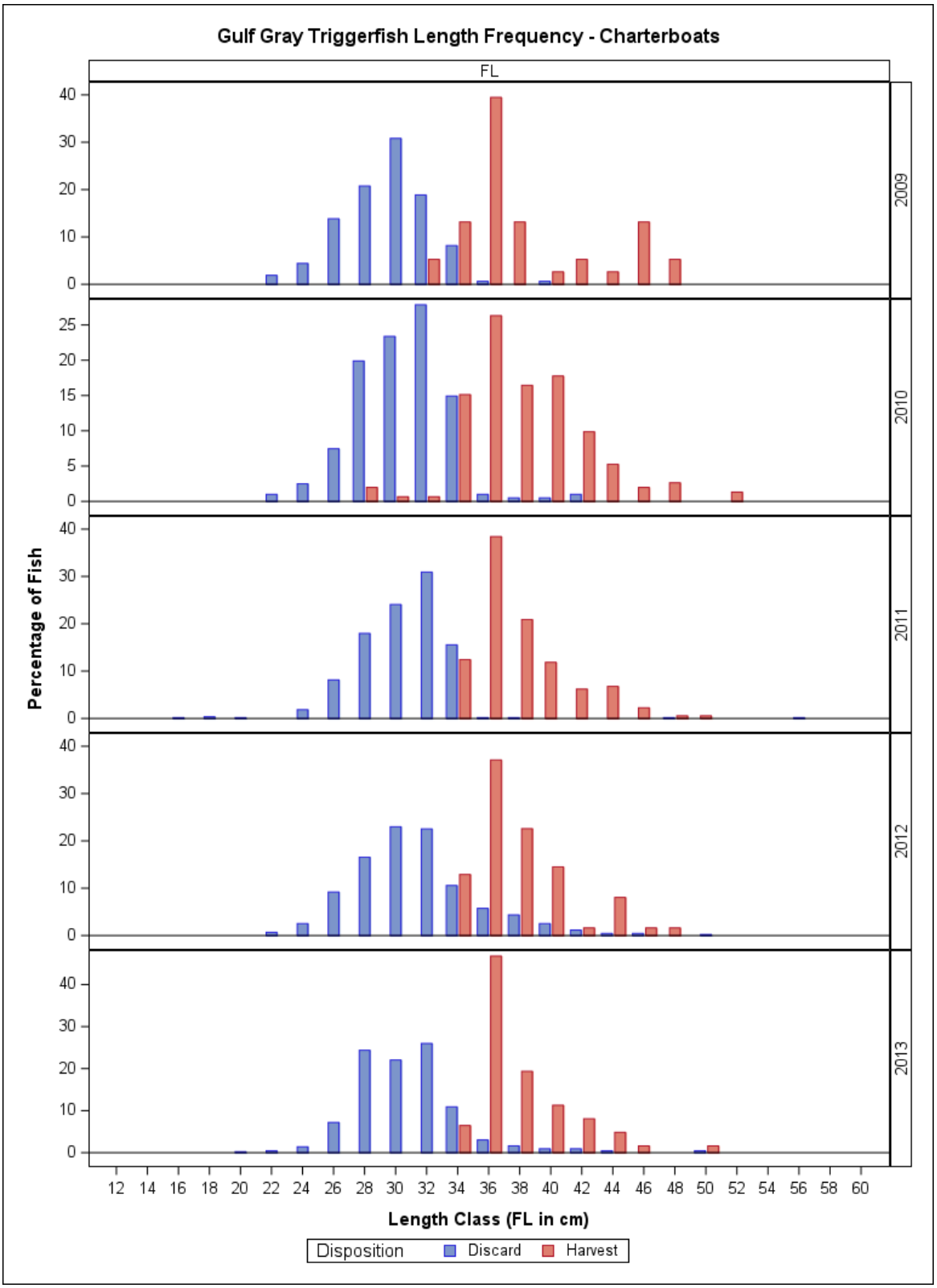
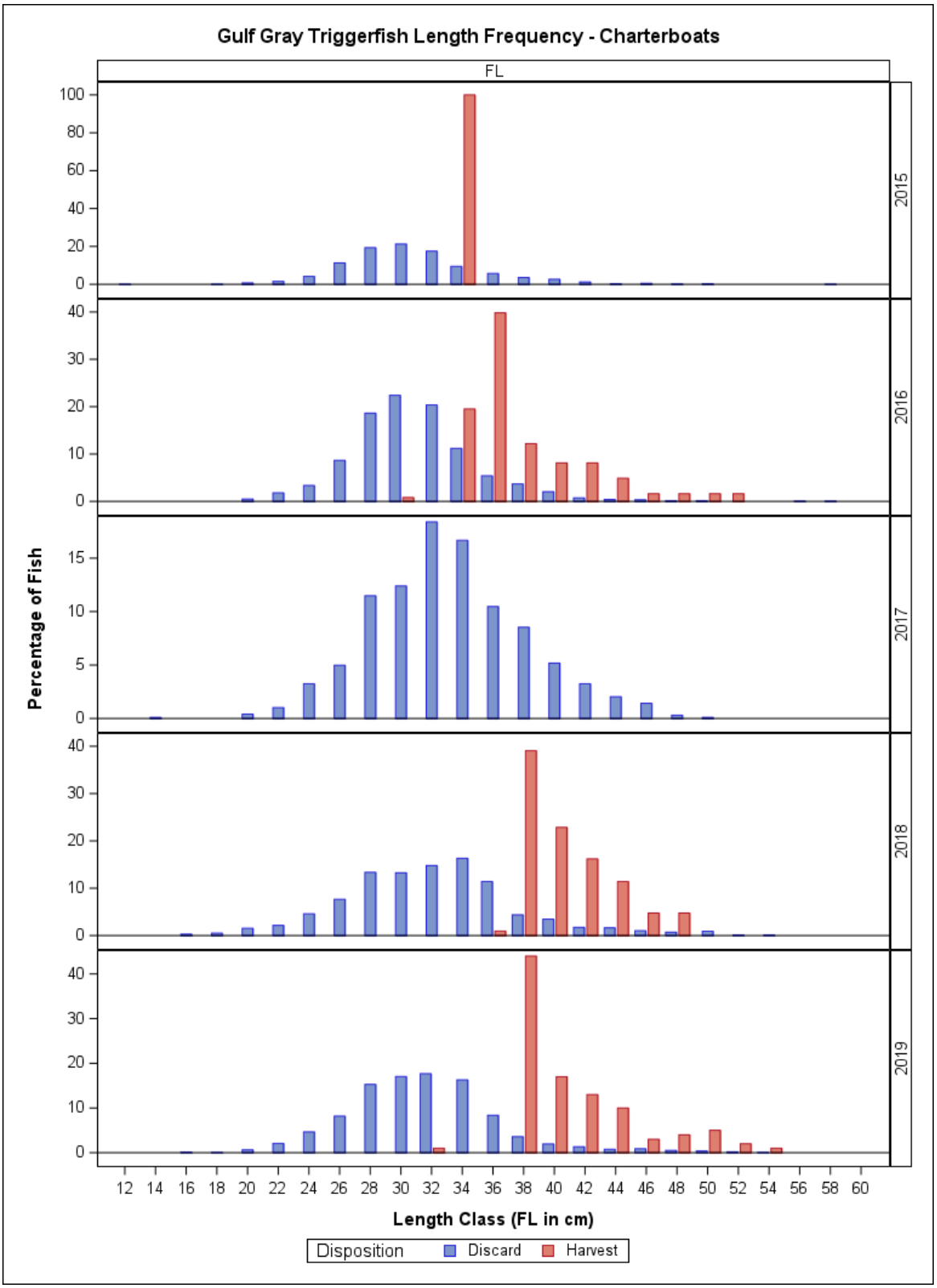


Figure 2. Length frequency of released Gulf Gray Triggerfish measured by at-sea observers on headboats in west Florida from 2005-2024.


Gulf Gray Triggerfish Length Frequency - Charterboats
FL
2009
2010
2011
2012
2013
Percentage of Fish
Length Class (FL in cm)
Disposition
Discard
Harvest


Gulf Gray Triggerfish Length Frequency - Charterboats
FL
2015
2016
2017
2018
2019
Percentage of Fish
Length Class (FL in cm)
Disposition
Discard
Harvest

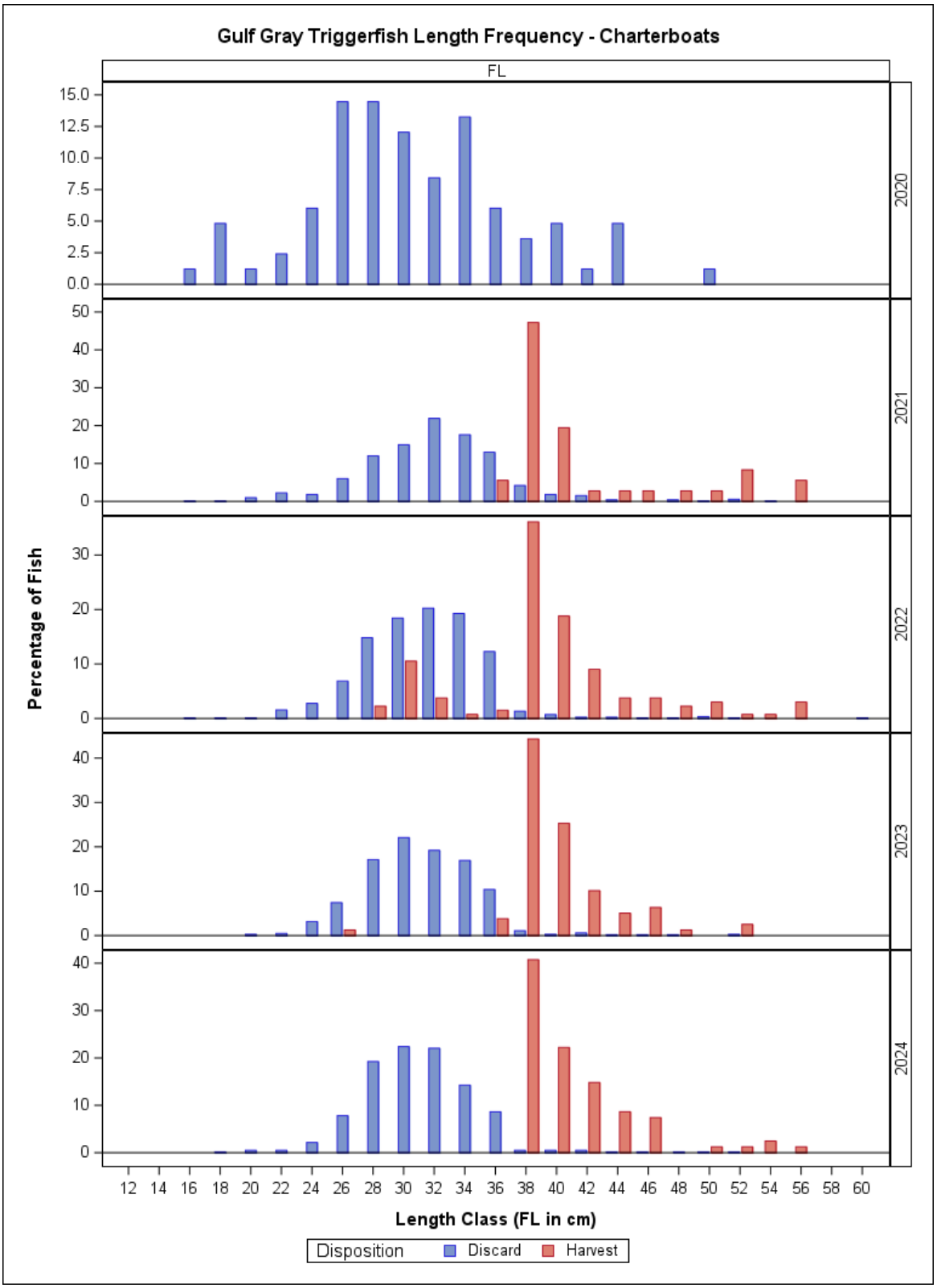
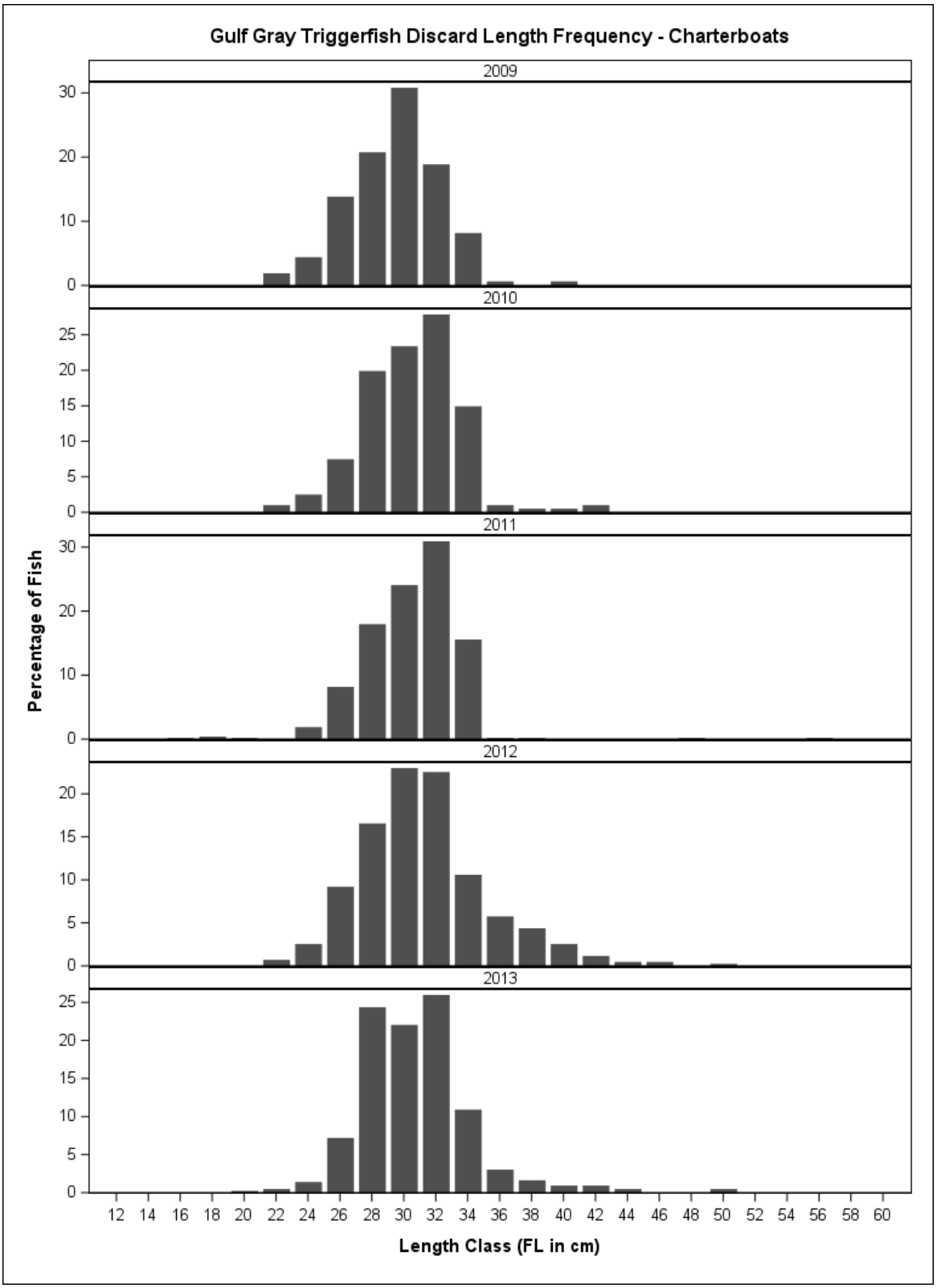
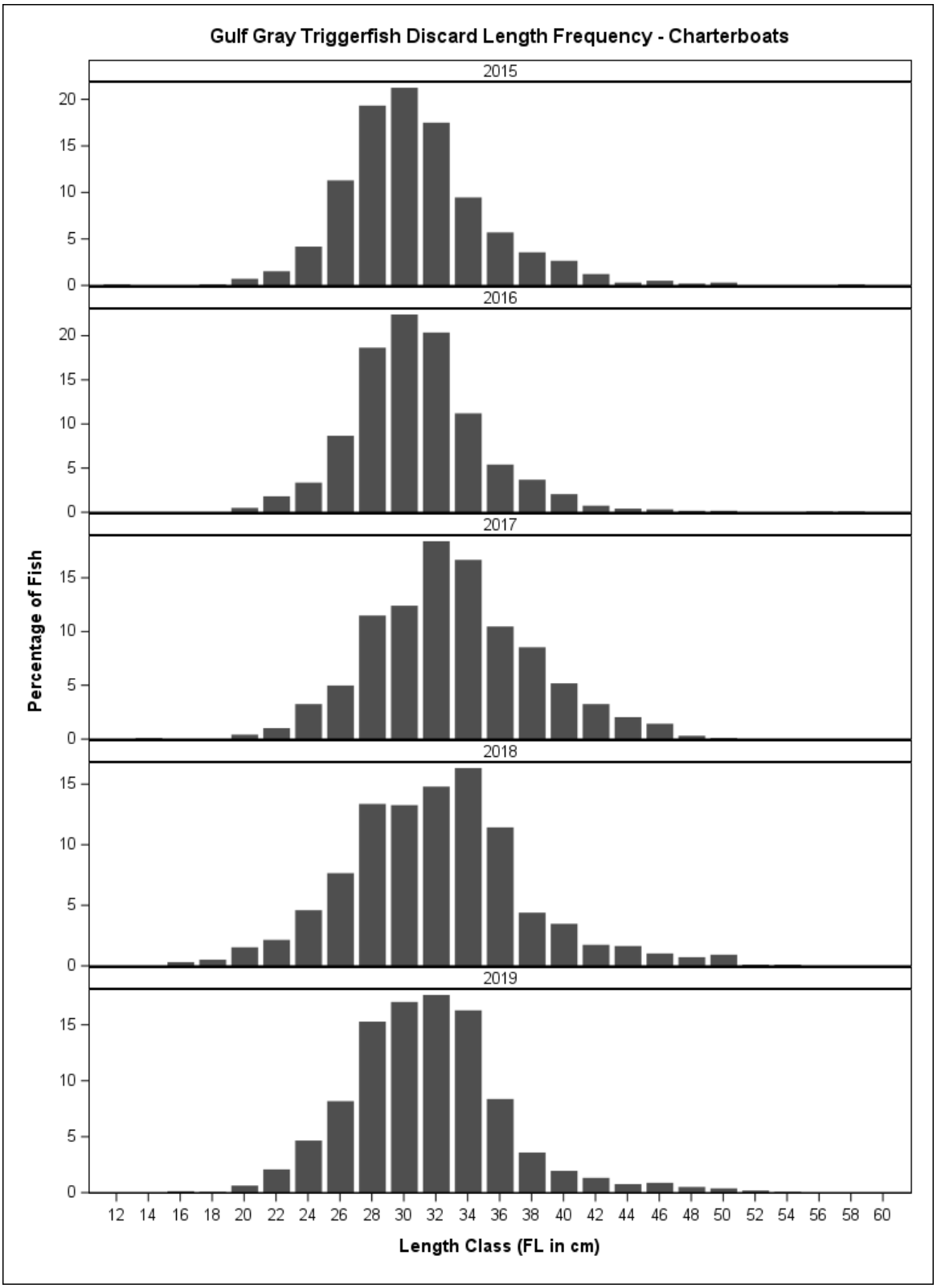


Figure 3. Length frequency of harvested and released Gulf Gray Triggerfish measured by at-sea observers on CHARTER BOATS in Florida from 2009-2024. Harvest includes fish that were released dead.


Gulf Gray Triggerfish Discard Length Frequency - Charterboats
2009
2010
2011
2012
2013
Percentage of Fish
Length Class (FL in cm)
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60


Gulf Gray Triggerfish Discard Length Frequency - Charterboats
2015
2016
2017
2018
2019
Percentage of Fish
0
5
10
15
20
12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Length Class (FL in cm)

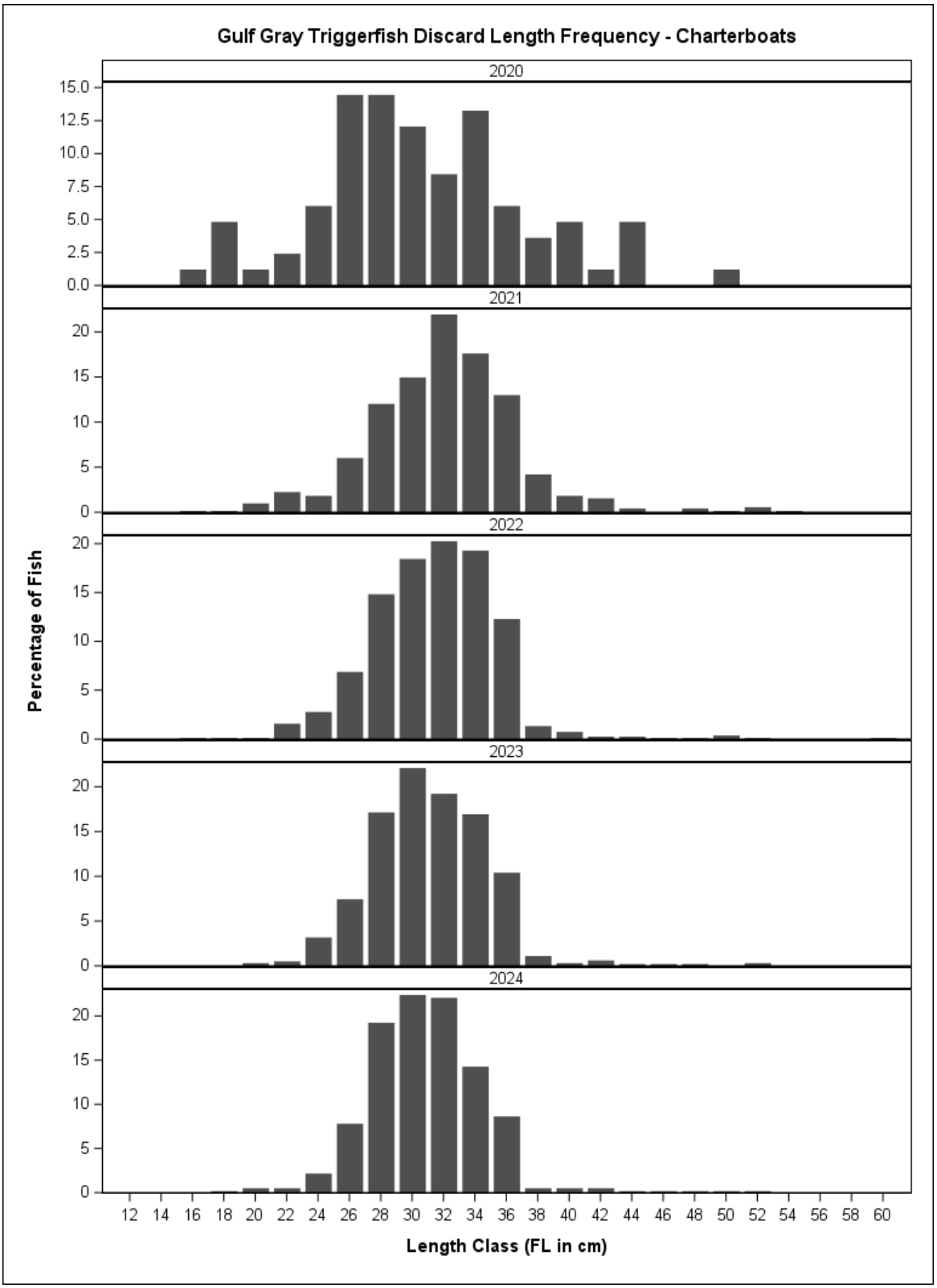


Figure 4. Length frequency of released Gulf Gray Triggerfish measured by at-sea observers on charter boats in west Florida from 2009-2024.