Scamp Length Frequency Distributions from At-Sea Headboat Surveys in the South Atlantic, 2005 to 2017

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Scamp Length Frequency Distributions from At-Sea Headboat Surveys in the South Atlantic, 2005 to 2017.

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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 have been implemented to fill this data gap, providing valuable information on the size and condition of discarded fish. These surveys have been conducted on headboat vessels in the south Atlantic Ocean since 2004, with data for this report including data collected between 2005 and 2017. In this region, most headboat trips engage in bottom fishing for reef fish species and other bottom dwelling fish. At-sea coverage was expanded to include charter vessels on the east coast of Florida from 2013-2015. This report provides a summary of available information on the size and disposition of scamp collected on headboats and charter boats along the south Atlantic coast from North Carolina to Florida. Mis-identification concerns regarding meristic similarities between scamp and yellowmouth grouper has necessitated that data from both species be aggregated for this assessment. The term "scamp" used in this report refers to an aggregate of fish identified as both scamp (*Mycteroperca phenax*) and yellowmouth grouper (*Mycteroperca interstitialis*).

Sample Methods

Cooperative vessels were randomly selected each month from six sample regions: The Florida Keys (Monroe County – South of US 1), southeast Florida (Dade to Indian River County), northeast Florida (Nassau to Brevard County), Georgia, South Carolina, and North Carolina. Operators from selected vessels were contacted by state biologists and were scheduled to sample a single trip 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. For

each fish, biologists recorded the species, disposition, size (fork length in mm), and the condition of fish that were released (Florida only), depth (Florida only).

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.

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

Trip level information for each trip included the area fished, duration of fishing (to the nearest half hour), number of anglers, and depths (meters) of the fishing sites. Site specific fishing depths have been recorded beginning in 2010 for the state of Florida.

Area fished for North Carolina, South Carolina, southeast and northeast Florida, and Florida Keys was coded as:
1: 3 miles or less from shore; or
2: more than 3 miles from shore

Characterization of Trips duration:
o Half-Day (H): < 6 hours
o Three-Quarter-Day (Q): 6 to 8.5 hours
o Full-Day (F): 9 or more hours

Disposition codes are recorded for all fish and represent the final fate (e.g. kept or discarded) of each observed fish.

Disposition was coded as:
1: thrown back alive, legal;
2: thrown back alive, not legal;
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.

Historically, released condition is an observation of immediate mortality. Fish coded as "Good" swam down from the surface of the water immediately and fish coded as "Fair" swam down in a disoriented fashion. Other release conditions have been considered immediate mortality. Release conditions are only summarized for discarded fish observed in Florida.

Release Condition was coded as:
1: Good
2: Fair
3: Bad

4: Dead
5: Eaten
9: Unobserved

Length Frequencies

Sample Weighting:
Headboat vessels report fishing effort in logbook trip reports, and effort data were provided by the NMFS Southeast Fisheries Science Center in Beaufort, NC. These data were weighted to account for the difference in sampling effort between states. Low sample numbers and need for confidentiality for regions with low headboat participation necessitate grouping discards into two regions: North Carolina/South Carolina (NC-SC) and Georgia/FL (GA-FL). To generate the sample weights (Wa) for each region, proportional fishing effort for the south Atlantic was divided by the proportional sampling effort in each region.

$$W_a = \frac{N_a/N}{n_a/n}$$

Wa values <1 are down weighted to account for oversampling, and those with values >1 are inflated to account for undersampling.

Characterization of Discards:
Fish mid-line lengths (in mm) were placed in one cm length bin categories (100 cm bin = fish 99.51cm to 100.50 cm). The raw length frequencies for grouped regions (NC-SC and GA-FL) were multiplied by regional weights calculated based on the number of trips by region and year. Regional groupings: NC-SC (North Carolina and South Carolina) and GA-FL (Georgia and Florida) were grouped to accommodate low sample size and confidentiality. The proportion of fish in each length bin (p_x) was calculated as follows:

$$p_x = \frac{\sum L_{NC-SC} * W_{NC-SC} + L_{GA-FL} * W_{GA-FL}}{\sum bin = i = 1..n[\sum L_{NC-SC} * W_{NC-SC} + L_{GA-FL} * L_{GA-FL}}$$

Where L_a equals the number of fish in the length bin for a discarded fish in regional groups; W_a is the weighting factor for each regional group. The low sample size and need for confidentiality for regions with low headboat participation necessitated grouping discards into two regions: North Carolina and South Carolina (NC-SC) and Georgia and Florida (GA-FL). The discard length frequency for headboat vessels were calculated by summing the raw number of discarded fish in each 1 cm length bin and multiplying each raw sum by a regional weighting factor that accounts for sampling differences within each regional group. The weighted sums were then divided by the total number of fish in each year. A weighted length frequency distribution was generated for the southeast region (North Carolina through the Florida Keys south of US 1), for each year with available data.

No length frequency distribution was created for scamp length data collected from the Florida charterboat fleet, due to low sample size for the first few years of data (N=9 fish).

Summaries of release condition by fleet were created by summing the number of discarded fishes in each of four release conditions: Good, Fair, Bad, or Dead.

Results

A total of 230 discarded fish and 181 harvested were measured during headboat At-sea observer trips between 2005 and 2017 in the South Atlantic. Length frequency distributions for scamp during at sea sampling trips were weighted by regional groupings (NC-SC and GA-FL) then aggregated to account for the entire southeast region, with individual histograms provided for each year (Figure 1). The aggregated state sampled trip totals are included in Table 1, with weights used to correct the raw length frequency distributions provided in Table 2. Summarized station level depths recorded for individual recreational headboat trips that caught scamp on the east coast of Florida, from 2011 to 2017, were summarized in Table 4.

The release condition for 105 scamp were recorded for discarded fish observed during trips on the east coast of Florida (Table 5). Of the discarded fish, 9.62% represent immediate mortality based on surface observations, conditions coded as “Bad” or “Dead”.

Table 1. Headboat At-Sea observer trips sampled by region and year.

Year	NC-SC	GA-FL	Total
2005	155	181	336
2006	133	168	301
2007	143	178	321
2008	117	131	248
2009	103	137	240
2010	109	145	254
2011	101	139	240
2012	114	159	273
2013	96	158	254
2014	111	12	123
2015	84	143	227
2016	104	169	273
2017	102	183	285

Table 2. Sample weights applied to South Atlantic scamp discards by region.

Year	NC-SC	GA-FL
2005	0.818	1.156
2006	0.905	1.075
2007	0.920	1.064
2008	0.597	1.360
2009	0.611	1.293
2010	0.646	1.266
2011	0.711	1.210
2012	0.667	1.239
2013	0.594	1.247
2014	0.215	8.262
2015	0.499	1.294
2016	0.603	1.244
2017	0.731	1.150

Table 3. Summary statistics for estimated scamp fork lengths (in millimeters) sampled on At-sea headboat observer trips, all states combined.

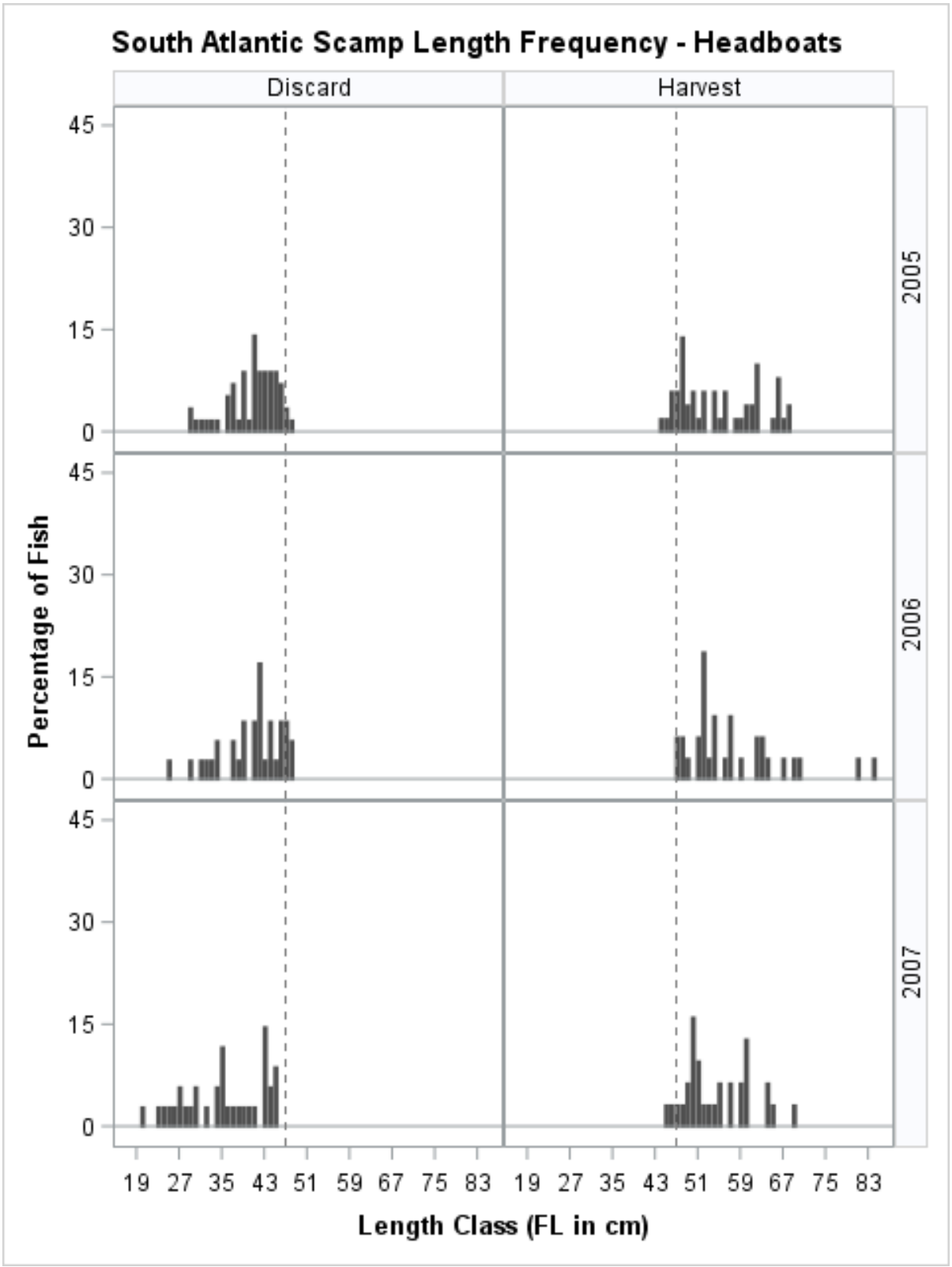
Year	DISCARD				HARVEST			
	N	Min	Mean	Max	N	Min	Mean	Max
2005	56	290	408.5	483	50	447	552.3	683
2006	35	253	408.8	484	32	470	578.2	845
2007	34	205	356.3	457	31	457	548.9	690
2008	31	212	385.3	505	18	469	528.1	853
2009	14	237	375.1	442	11	460	606.5	835
2010	16	290	404.9	550	7	430	504.9	655
2011	11	336	424.4	535	17	470	549.1	738
2012	11	190	490.4	657	5	555	680.0	838
2013	3	361	400.3	449	1	520	520.0	520
2014	3	368	410.3	454	1	556	556.0	556
2015	2	327	339.5	352	1	620	620.0	620
2016	3	394	416.3	430	5	460	559.4	796
2017	11	230	301.7	367	2	637	645.5	654

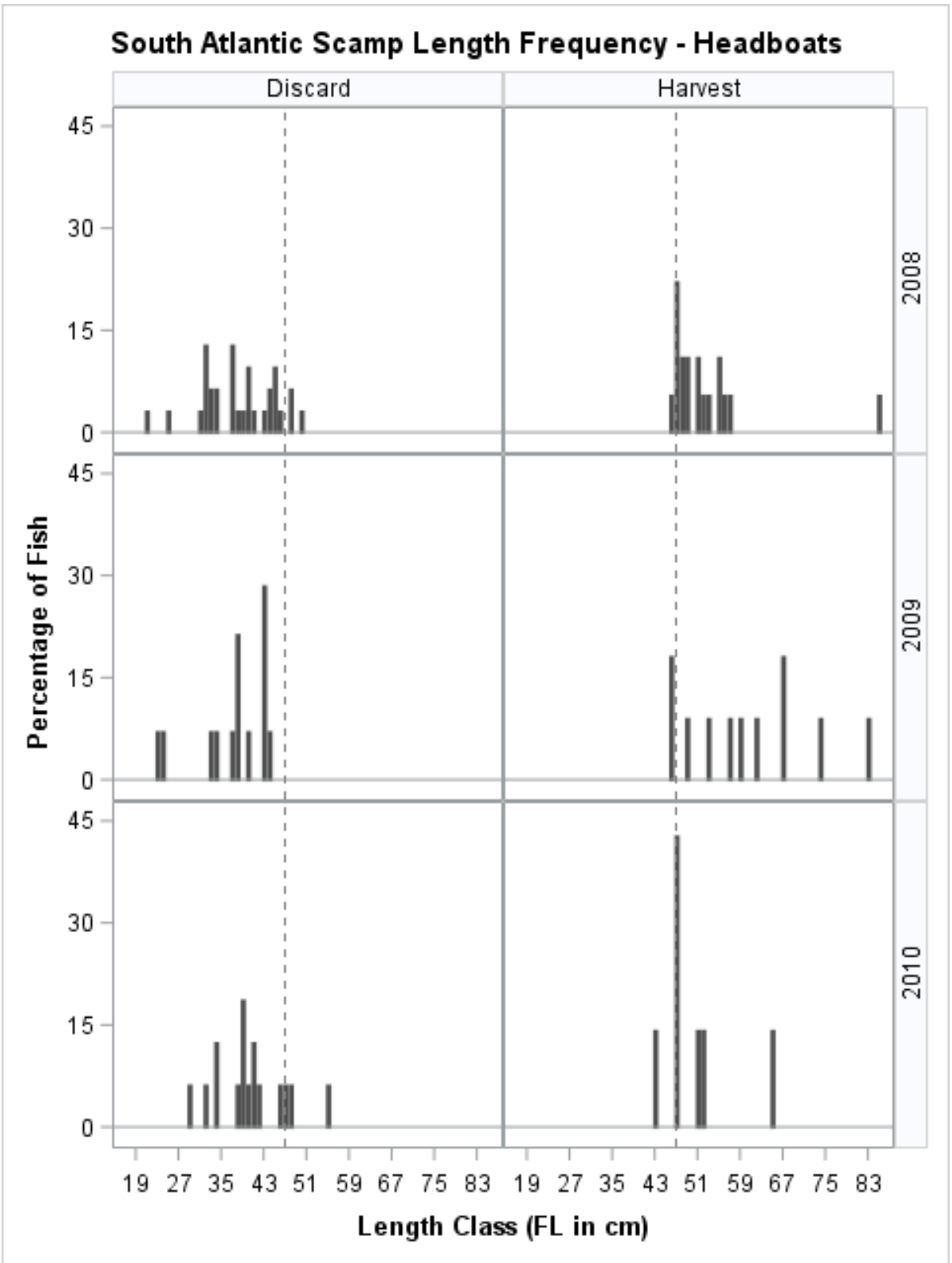
Table 4. Summary statistics of station level depths (in meters) for headboat trips that caught scamp on the east coast of Florida, from 2011 to 2017.

Year	No. of Stations	Min	Mean	Max
2011	4	22	30	40
2012	1	50	50	50
2013	2	34	43	51
2014	-	-	-	-
2015	2	23	43	63
2016	1	45	45	45
2017	12	10	26	43

Table 5. Proportions of observed post-release condition for discarded scamp on the east coast of Florida.

Condition	N	Proportion
Good	78	0.750
Fair	16	0.154
Bad	7	0.067
Dead	3	0.029


South Atlantic Scamp Length Frequency - Headboats
Discard
Harvest
2005
2006
2007
Percentage of Fish
0
15
30
45
19 27 35 43 51 59 67 75 83
Length Class (FL in cm)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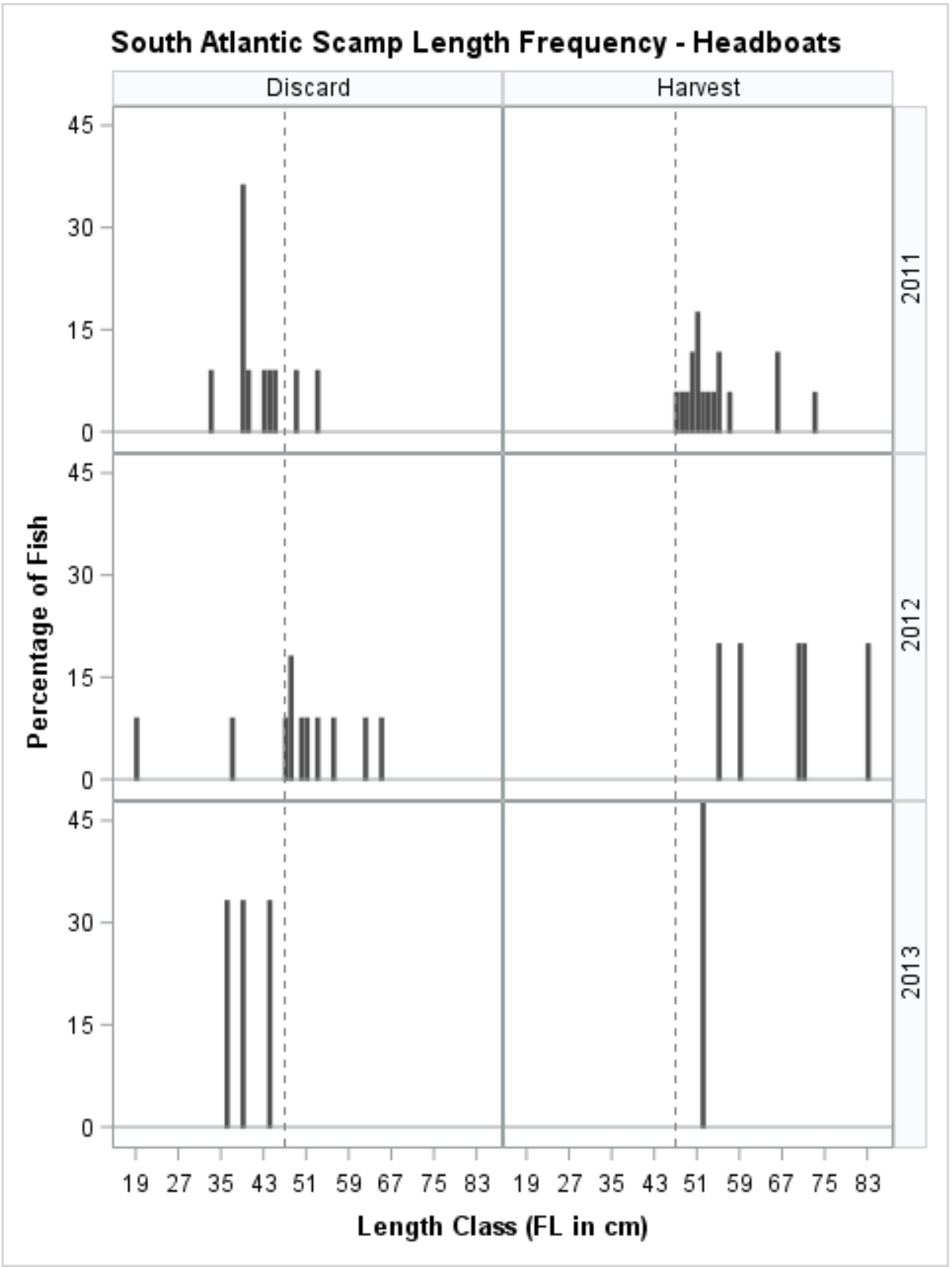
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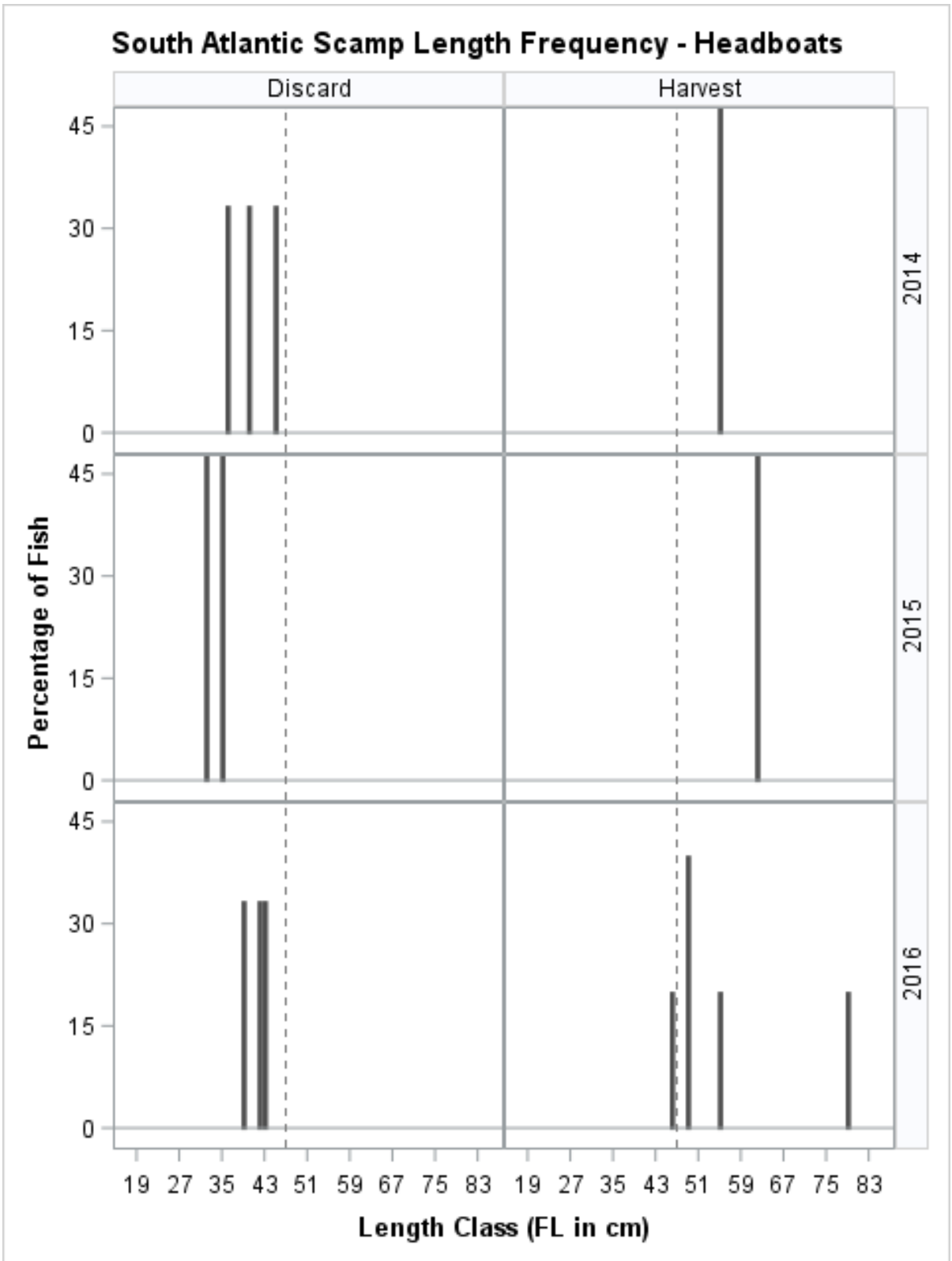
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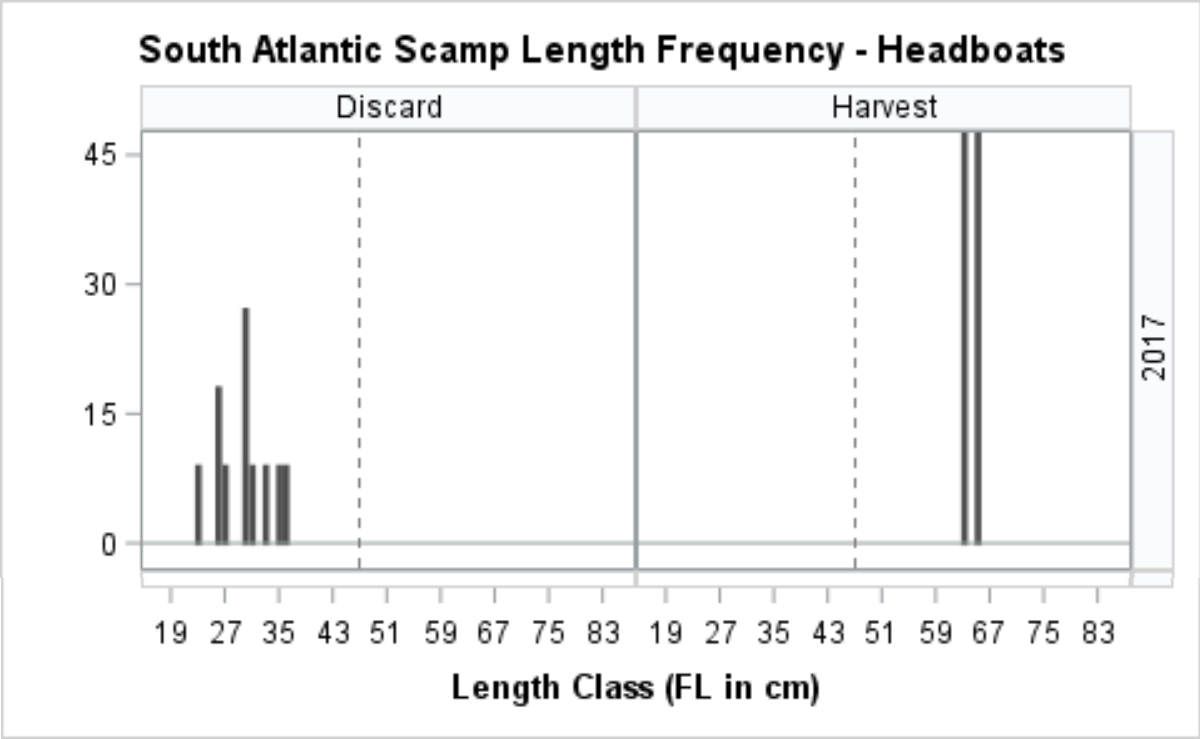

Figure 1. Weighted discard length frequency distributions from headboats observed from North Carolina to Florida, by year. In years where a single bar is displayed, the percentage of fish are all in one bin, though the y-axis is limited to 50%. Dotted lines reference the minimum sizes limit for the species, 20 inches in total length, in the South Atlantic.