A Summary of South Atlantic Red Snapper Discard Length Data Collected from At-Sea Observers in For-Hire Fishery Surveys in Florida 2005-2024

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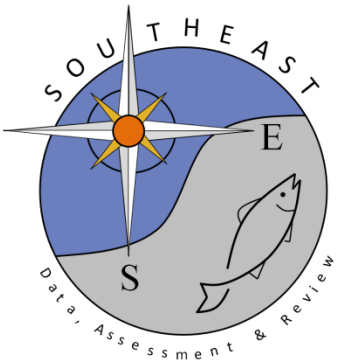

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A Summary of South Atlantic Red Snapper Discard Length Data Collected from At-Sea Observers in For-Hire Fishery Surveys in Florida 2005-2024

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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. For-hire 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 Red Snapper 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.

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, 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/or degrees and minutes latitude and longitude) for each fishing station during each observed trip.

For each fish, 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

Release Condition was coded as:
Good – Fish that were able to submerge and swim away immediately after release
Fair – Fish that re-submerged and swam away with minor difficulty
Bad – Fish released that demonstrated extreme difficulty re-submerging or swimming
Dead – Fish that were released dead, preyed upon by mammals or preyed upon by birds, sharks or other predators

Area fishes was coded as:
For southeast and northeast Florida:
1: 3 miles or less from shore; or
2: more than 3 miles from shore
For Keys, western peninsula, and northwest Florida:
3: 9 miles or less from shore; or
4: more than 9 miles from shore.
**Keys were subset at the US1 line, trips north of US1 were excluded from analysis*

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 3% of 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 reported 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 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 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 three cm midpoint length bin categories (39 cm bin = fish 37.5 cm to 40.5 cm) 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, 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 Red Snapper 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 eastern Florida, headboat observers sampled 1,023 trips positive for Red Snapper, and 1,008 trips for discarded Red Snapper. There were 242 charter trips positive for Red Snapper, and 238 charter trips for discarded Red Snapper from 2013 to 2024. The number of sampled trips by year and region 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 each region of Florida (Table 4). A total of 14,061 discarded fish and 606 harvested fish were measured during headboat at-sea observer trips from 2005 to 2024 in eastern Florida. For Florida charter trips, observers sampled 2,336 discarded fish and 74 harvested fish from 2013 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) Red Snapper by year are presented for southeastern Florida headboats (Figure 1) and southeastern Florida charter boats (Figure 2).

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,C* 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 Red Snapper and for Red Snapper discards by year and region. Sampling in 2020 represents January to March, and sampling in 2021 represents June to December.

	NORTHEAST FLORIDA			SOUTHEAST FLORIDA			FLORIDA KEYS		
YEAR	*Trips Sampled*	*Positive Trips*	*Discard Trips*	*Trips Sampled*	*Positive Trips*	*Discard Trips*	*Trips Sampled*	*Positive Trips*	*Discard Trips*
2005	43	35	32	95	10	9	37	.	.
2006	38	28	26	71	.	.	52	.	.
2007	49	48	48	71	7	7	50	1	0
2008	52	46	44	76	8	8	.	.	.
2009	52	47	45	76	2	2	.	.	.
2010	48	40	40	74	2	2	20	.	.
2011	48	41	41	72	.	.	16	.	.
2012	51	43	42	72	3	2	25	.	.
2013	49	43	42	82	1	1	16	.	.
2014	55	46	46	83	.	.	.	.	.
2015	49	46	46	82	1	1	2	.	.
2016	48	37	37	71	.	.	43	1	1
2017	47	43	42	78	2	2	49	1	1
2018	50	46	46	84	6	6	67	.	.
2019	47	40	40	80	3	3	68	.	.
2020	10	10	10	16	1	1	8	.	.
2021	97	94	94	110	2	2	30	.	.
2022	88	82	82	144	1	1	65	.	.
2023	91	85	85	147	8	8	97	.	.
2024	63	60	60	125	3	3	52	.	.

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

	NORTHEAST FLORIDA			SOUTHEAST FLORIDA			FLORIDA KEYS		
YEAR	*Trips Sampled*	*Positive Trips*	*Discard Trips*	*Trips Sampled*	*Positive Trips*	*Discard Trips*	*Trips Sampled*	*Positive Trips*	*Discard Trips*
2013	82	48	46	74	2	2	.	.	.
2014	64	35	35	100	5	4	69	1	1
2015	51	24	24	98	3	2	72	1	1
2017	.	.	.	.	.	.	69	4	4
2018	.	.	.	.	.	.	62	3	3
2019	.	.	.	.	.	.	60	2	2
2021	16	11	11	.	.	.	.	.	.
2022	11	6	6	.	.	.	37	3	3
2023	21	17	17	28	1	1	42	2	2
2024	103	71	71	29	2	2	24	1	1

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

YEAR	NORTHEAST FLORIDA			SOUTHEAST FLORIDA			FLORIDA KEYS			
	Half Day	*Three-Quarter Day*	*Full Day*	*Half Day*	*Three-Quarter Day*	*Full Day*	*Half Day*	*Three-Quarter Day*	*Full Day*	*Multi Day*
2005	1.742	0.002	1.3	0.909	1.293	7.283	0.926	0.6	.	0.734
2006	1.479	0.006	2.566	1.055	0.412	.	0.815	1.409	6.976	.
2007	1.443	0.019	2.178	1.103	0	.	1.125	0.62	.	0.269
2008	1.917	0.144	1.646	1.076	0.24	1.974	.	.	.	.
2009	1.449	0.058	3.371	1.012	0.43	.	.	.	.	.
2010	1.044	0.001	1.865	1.019	0.446	.	0.873	0.558	.	.
2011	1.204	0.268	1.907	1.023	0.455	.	0.963	0.621	2.626	.
2012	1.257	0.354	1.896	1.115	0.228	.	1.386	0.336	.	.
2013	1.148	0.567	1.53	1.043	0.634	0.398	1.051	0.466	.	.
2014	0.702	0.71	1.783	0.96	.	.	.	.	.	.
2015	0.93	0.766	1.269	0.984	2.436	0.866	0.785	.	.	.
2016	0.708	1.213	1.177	0.976	2.945	0.687	1.036	0.722	2.442	.
2017	0.843	0.833	1.256	0.942	1.471	.	0.856	3.846	.	0.311
2018	1.218	0.625	1.236	0.905	.	.	0.805	.	.	0.626
2019	0.626	1.05	1.385	0.975	1.03	2.821	0.806	.	.	0.455
2020	0.762	0.459	2.709	0.904	.	.	0.758	.	.	.
2021	0.743	0.946	1.312	0.89	6.879	.	0.781	.	.	.
2022	1.413	0.952	0.896	0.847	2.646	.	0.861	11.009	0.38	0.201
2023	1.364	1.095	0.866	0.952	2.184	1.195	0.839	15.89	.	0.488
2024	1.259	0.67	1.288	0.693	2.377	4.862	0.68	.	.	0.197

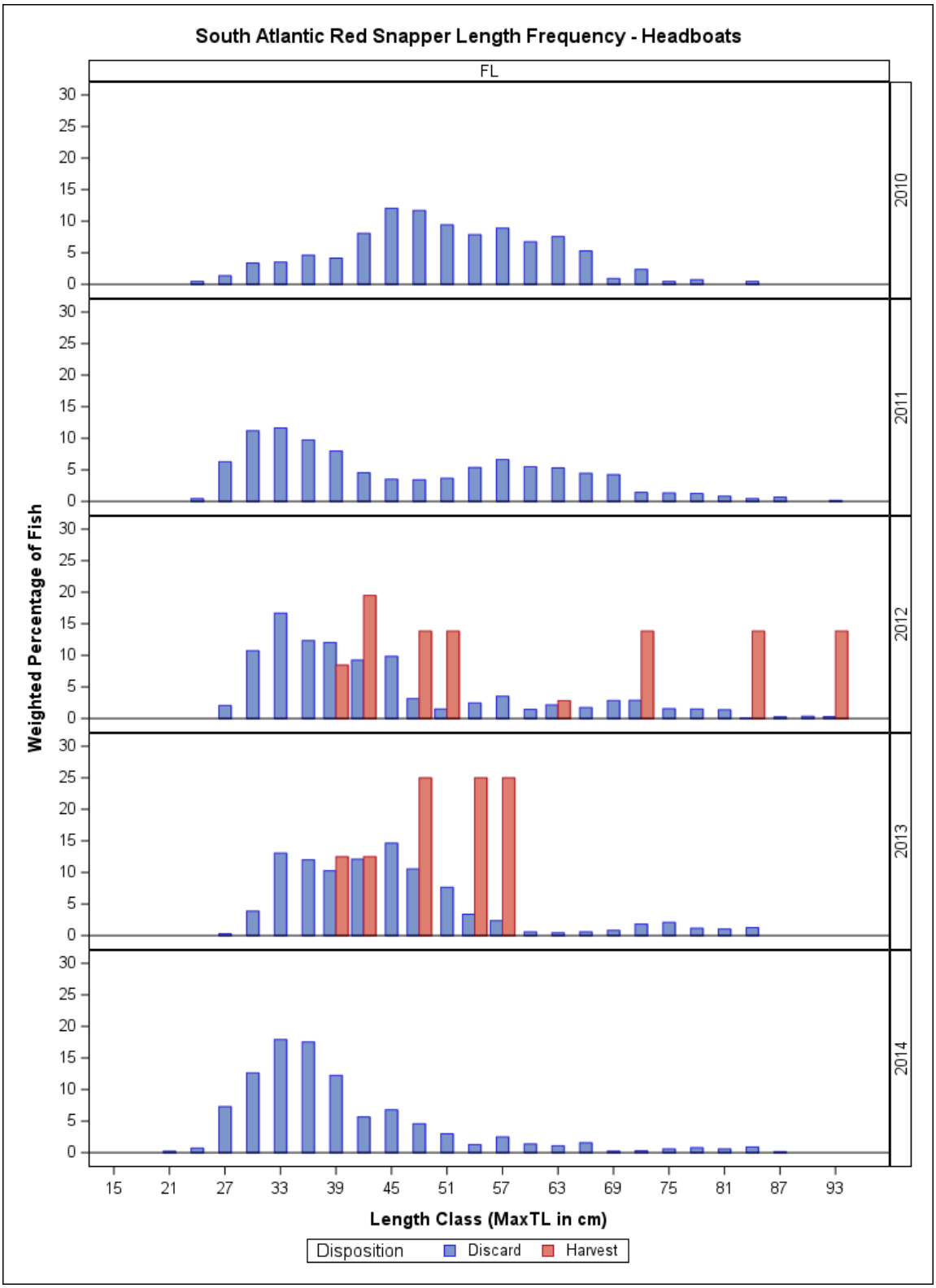
Table 5. Length summaries for discarded and harvested Red Snapper observed on HEADBOAT trips in Florida, by year and region. Sampling in 2020 represents January to March, and sampling in 2021 represents June to December.

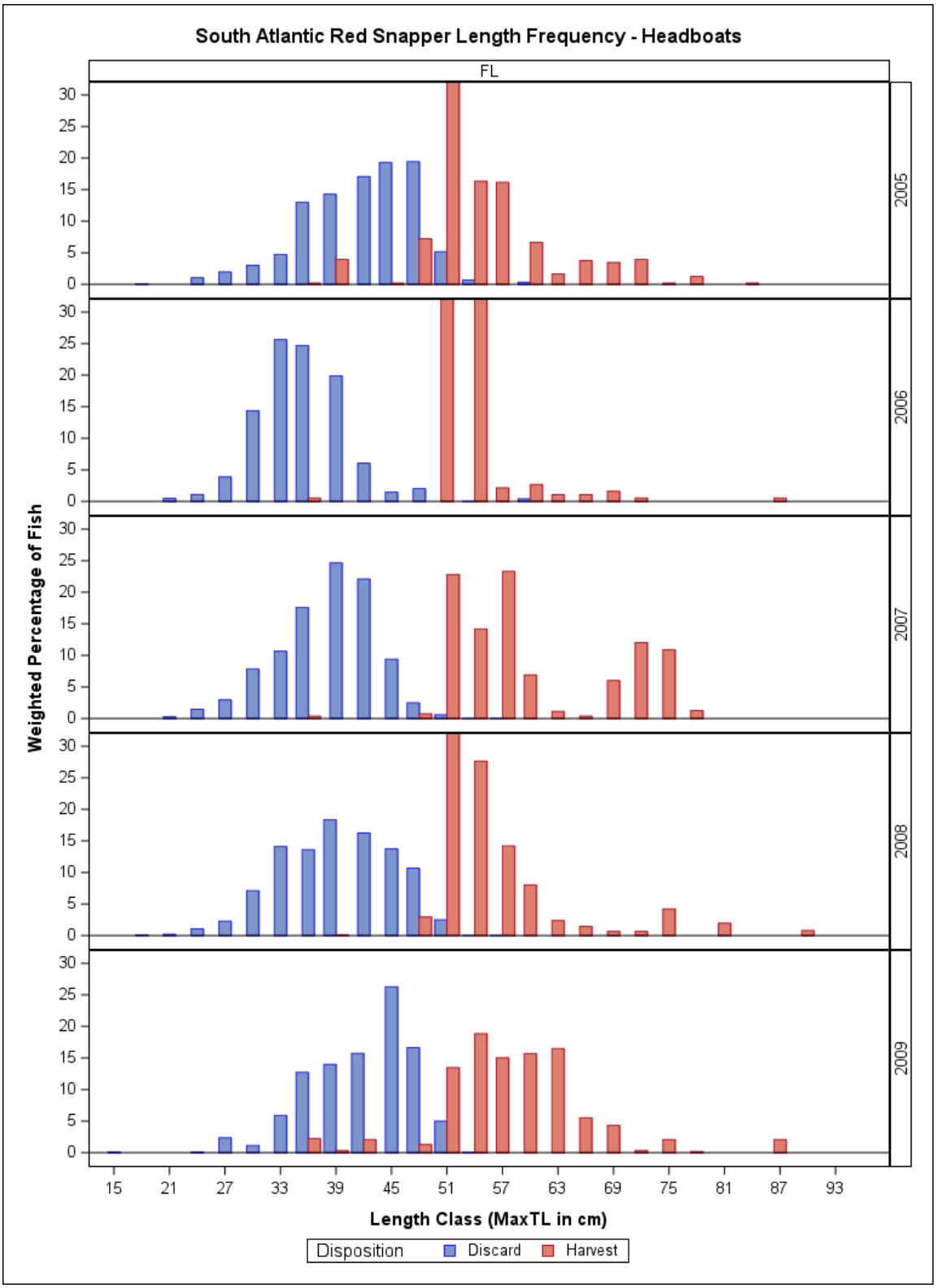
YEAR	DISCARDS				HARVEST			
	N	*Min*	*Mean*	*Max*	*N*	*Min*	*Mean*	*Max*
NORTHEAST FLORIDA								
2005	442	166	413.2	589	126	352	549	839
2006	664	197	350.6	591	44	368	572.8	879
2007	1440	206	386.1	584	59	375	582.1	773
2008	1588	195	388.6	561	212	387	553.9	904
2009	394	154	409.7	546	136	349	569.4	875
2010	309	237	495.1	854	.	.	.	.
2011	299	253	462	935	.	.	.	.
2012	586	258	432.5	945	12	379	541.6	917
2013	429	274	445.3	852	8	400	500.5	567
2014	582	206	396.4	884	.	.	.	.
2015	755	194	400.1	899	.	.	.	.
2016	637	235	423	901	.	.	.	.
2017	570	217	440.5	881	1	489	489	489
2018	615	228	454.6	949	.	.	.	.
2019	837	216	396.4	863	.	.	.	.
2020	220	218	376	804	.	.	.	.
2021	1292	207	425.4	902	.	.	.	.
2022	985	207	456.3	912	.	.	.	.
2023	693	231	448.9	850	1	639	639	639
2024	507	207	449.6	970	.	.	.	.
SOUTHEAST FLORIDA								
2005	48	290	402.3	492	4	509	519.5	537
2007	34	206	307.5	492	.	.	.	.
2008	28	217	379.3	516	1	500	500	500
2009	8	281	329.3	367	.	.	.	.
2010	14	290	420.1	619	.	.	.	.
2012	3	339	347.3	361	.	.	.	.
2013	1	760	760	760	.	.	.	.
2015	1	332	332	332	.	.	.	.
2017	7	243	338.1	563	.	.	.	.
2018	10	257	362.2	491	.	.	.	.

2019	5	232	276.8	350	.	.	.	.
2020	1	325	325	325	.	.	.	.
2021	2	221	276	331	.	.	.	.
2022	1	292	292	292	.	.	.	.
2023	30	156	440.9	763	.	.	.	.
2024	5	283	430.6	643	.	.	.	.
FLORIDA KEYS								
2007	.	.	.	.	2	521	530	539
2016	1	260	260	260	.	.	.	.
2017	18	355	448.8	537	.	.	.	.

Table 6. Length summaries for discarded and harvested Red Snapper observed on CHARTER BOAT trips in Florida, by year and region. Sampling in 2021 represents June to December.

YEAR	DISCARDS				HARVEST			
	N	*Min*	*Mean*	*Max*	*N*	*Min*	*Mean*	*Max*
NORTHEAST FLORIDA								
2013	402	223	480	945	19	504	668.2	892
2014	304	243	459.2	967	33	366	617.6	816
2015	179	238	471.4	865	3	212	228.7	239
2021	151	184	427.2	842	.	.	.	.
2022	38	323	500.3	734	.	.	.	.
2023	310	239	453.6	965	.	.	.	.
2024	812	219	450.7	933	3	666	765.7	896
SOUTHEAST FLORIDA								
2013	23	279	363.1	533	.	.	.	.
2014	46	319	567.4	757	3	731	766	790
2015	12	323	409.9	612	.	.	.	.
2023	1	350	350	350	.	.	.	.
2024	6	274	488.8	750	.	.	.	.
FLORIDA KEYS								
2014	1	530	530	530	.	.	.	.
2015	19	452	530.7	623	13	548	626	703
2017	10	309	581.1	714	.	.	.	.
2018	5	349	453.2	667	.	.	.	.
2019	2	438	462	486	.	.	.	.
2022	7	355	503.1	880	.	.	.	.
2023	7	420	649.3	970	.	.	.	.
2024	1	384	384	384	.	.	.	.


South Atlantic Red Snapper Length Frequency - Headboats
FL
2010
2011
2012
2013
2014
Weighted Percentage of Fish
0
5
10
15
20
25
30
15
21
27
33
39
45
51
57
63
69
75
81
87
93
Length Class (MaxTL in cm)
Disposition
Discard
Harvest


South Atlantic Red Snapper Length Frequency - Headboats
FL
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2006
2007
2008
2009
Weighted Percentage of Fish
0
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Length Class (MaxTL in cm)
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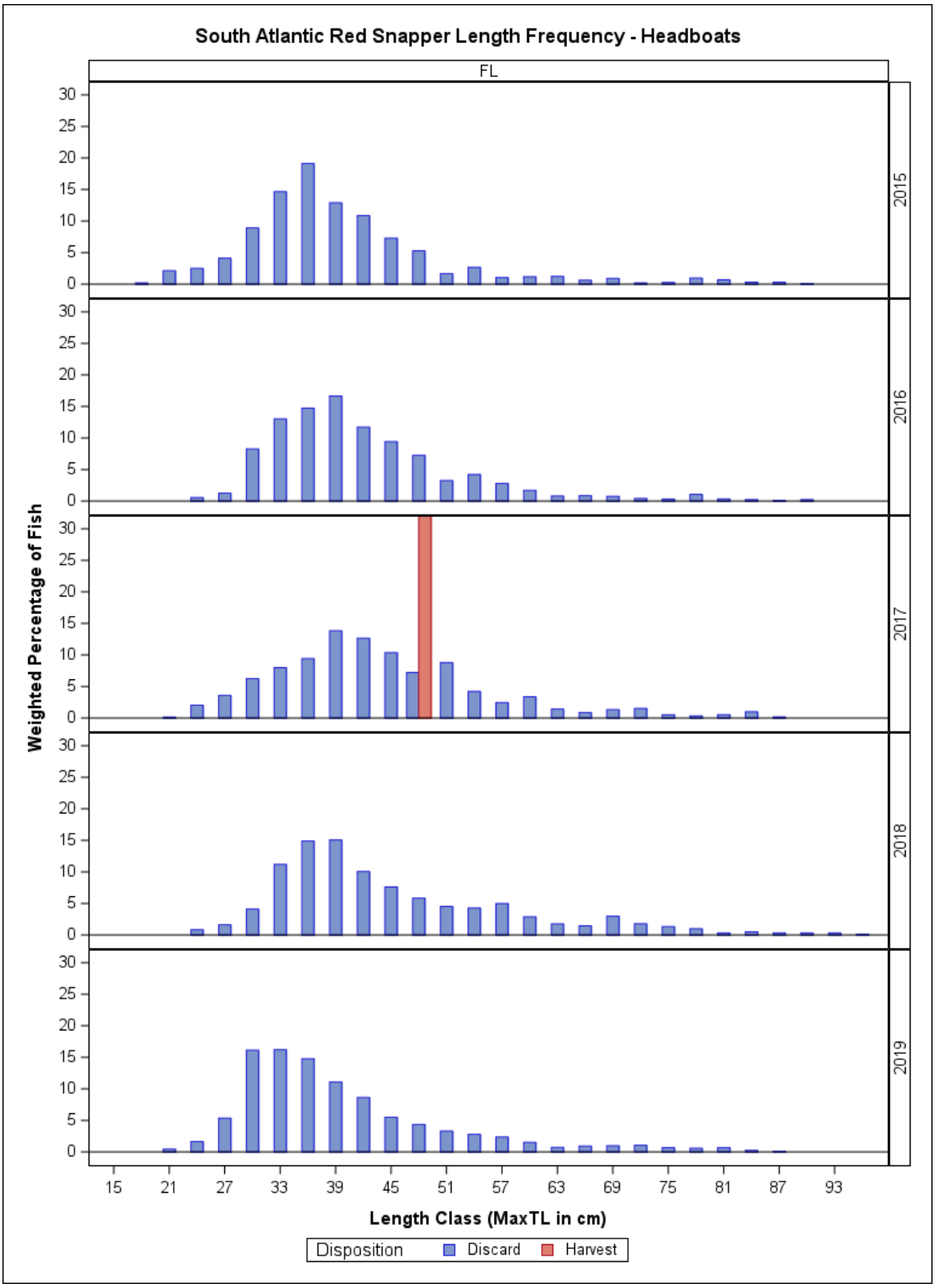
South Atlantic Red Snapper Length Frequency - Headboats
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Length Class (MaxTL in cm)
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Discard
Harvest

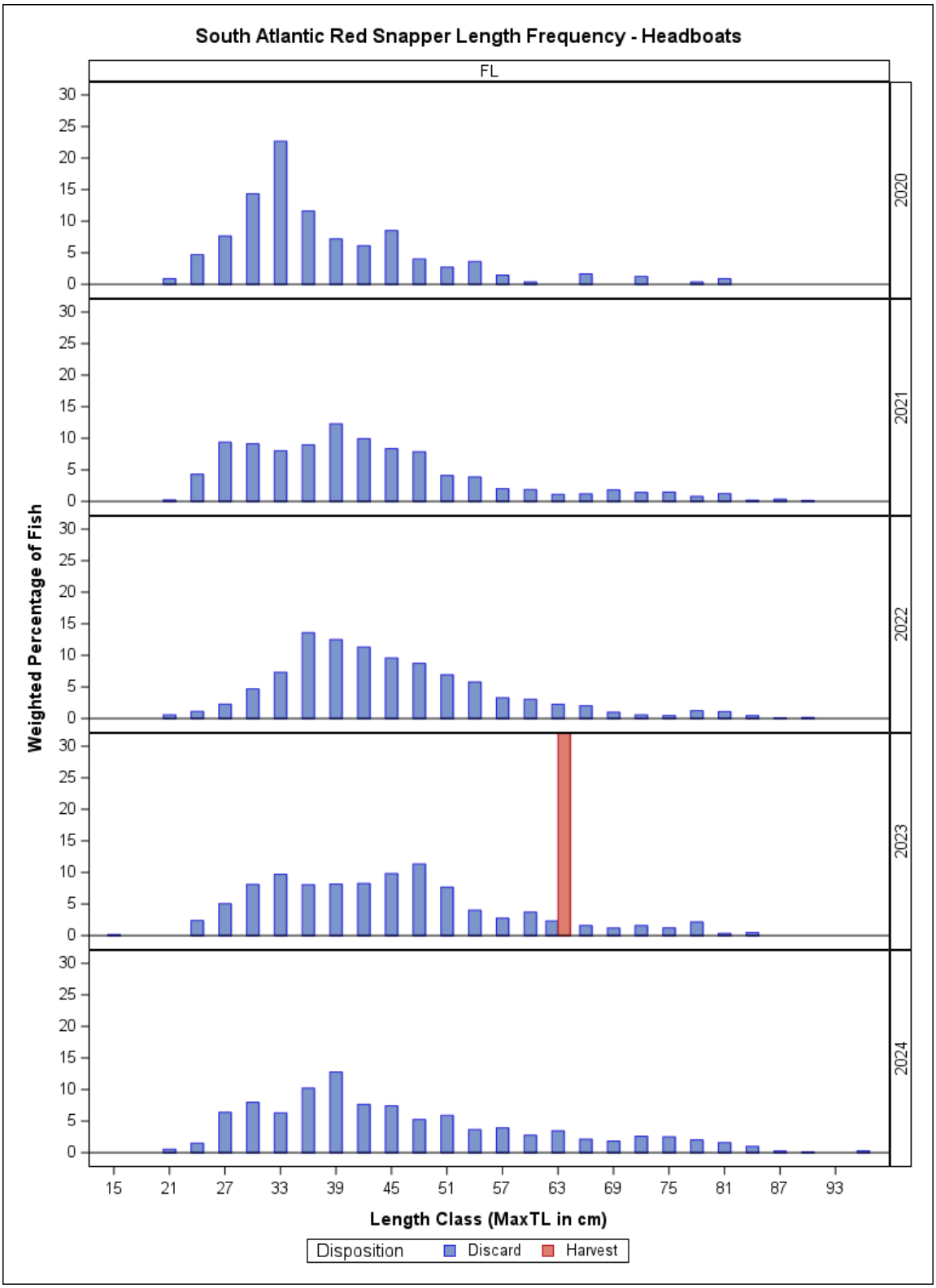
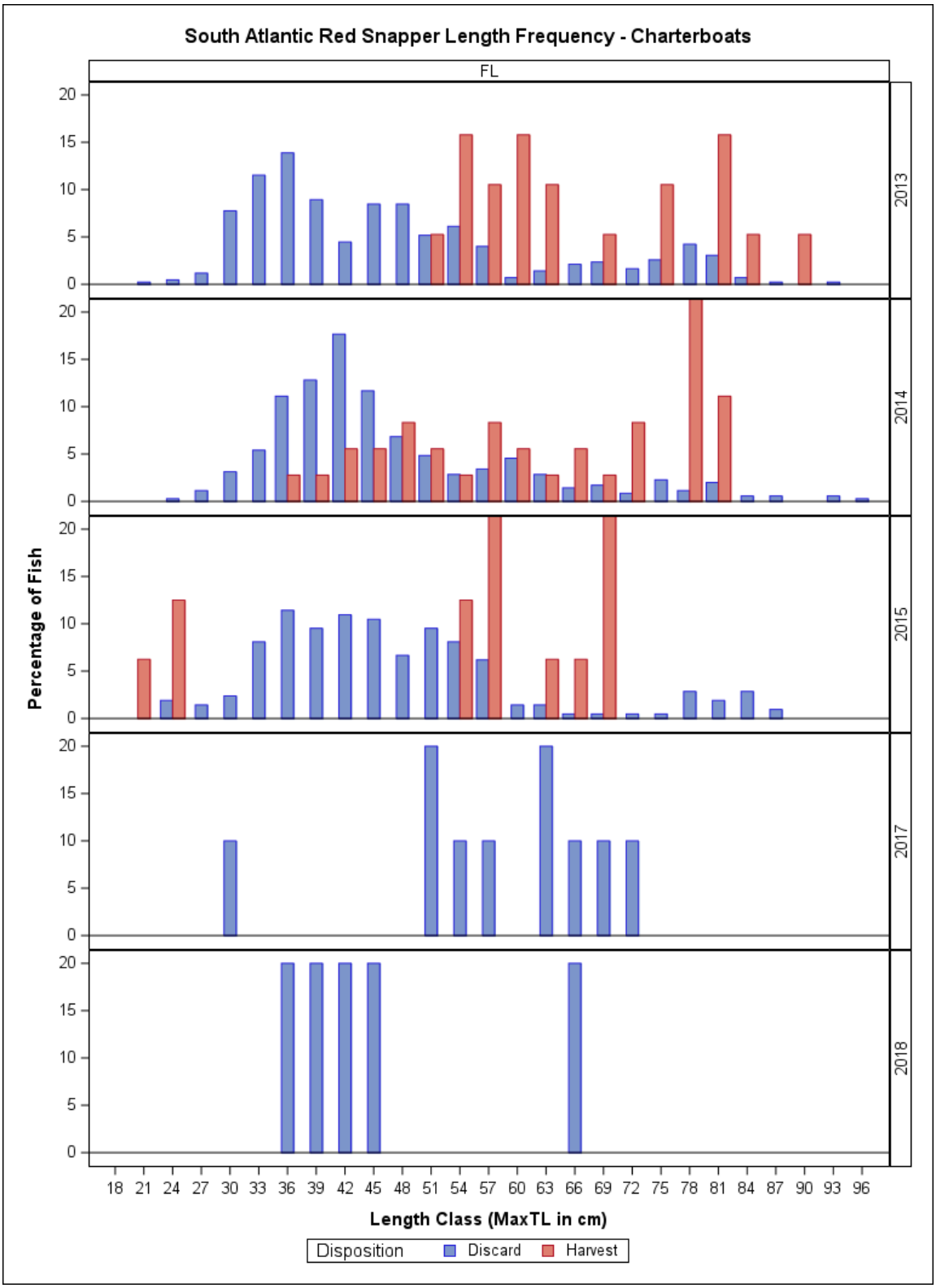


Figure 1. Weighted length frequencies of harvested and released Red Snapper measured by at-sea observers on HEADBOATS in east Florida (FL) from 2005-2024. Some harvest plots are truncated to improve resolution of discard plots. Harvest includes fish that were released dead.


South Atlantic Red Snapper Length Frequency - Charterboats
FL
2013
2014
2015
2017
2018
Percentage of Fish
0
5
10
15
20
18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96
Length Class (MaxTL in cm)
Disposition
Discard
Harvest

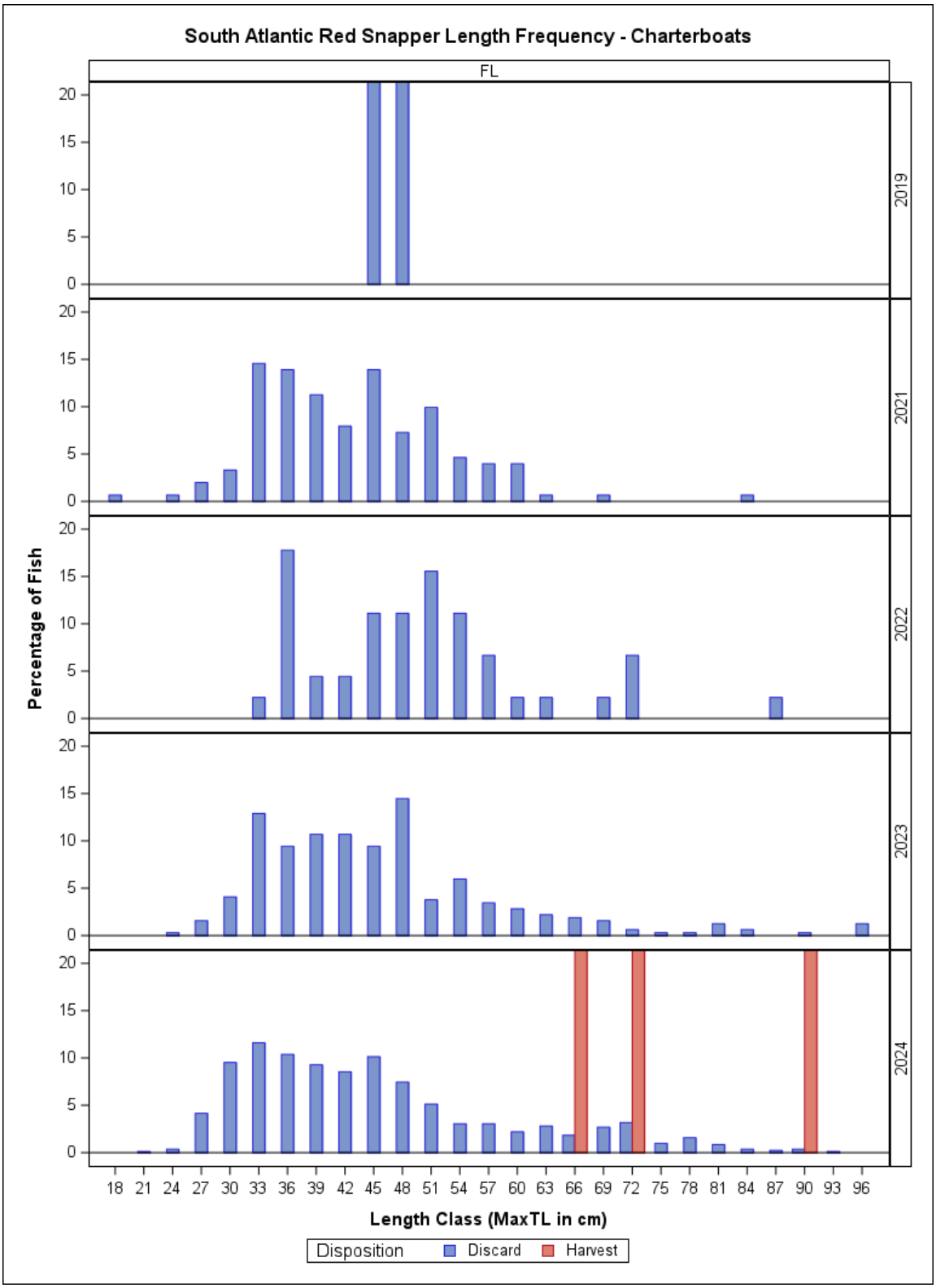


Figure 2. Length frequency of harvested and released Red Snapper measured by at-sea observers on CHARTER BOATS in east Florida (FL) from 2013-2024. Some plots are truncated to improve overall resolution. Harvest includes fish that were released dead.