Estimated Commercial Discards of Cobia (*Rachycentron canadum*) for the Vertical Line Fishery from 1999-2024 Using Limited Observer Data

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SEDAR107-DW-04

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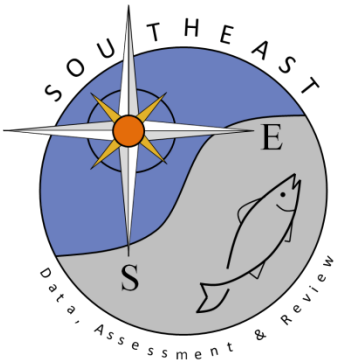

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Introduction

In the South Atlantic, discard logbook data were the main source of data for estimating commercial discards. However, upon an analysis to determine the reliability of discard logbook data, the Southeast Fisheries Science Center (SEFSC) no longer recommends the use of discard logbook data for estimating discards for SEDAR (Alhale et al. 2024). Therefore, alternative methods were explored using commercial observer data.

The general approach for estimating discards for the commercial vertical line fleet in the South Atlantic utilizes a discard rate or discards-per-unit-effort from the reef fish observer program and total fishing effort from the Coastal Fisheries Logbook Program (CFLP). Total discards include fish released alive, released dead, released in unknown condition, and used for bait. This species shows a very low rate of being caught on observer trips in this program, and as such the more robust analytical methods outlined in previous SEDARs in the South Atlantic (Atkinson et al. 2023; McCarthy et al. 2023) could not be applied for this SEDAR. Therefore, alternative, data-limited approaches for calculating discards using the observer and coastal logbook programs were used. These approaches were first introduced for SEDAR 89 (Thompson et al. 2024). The use of observer data for Atlantic Cobia was first proposed and accepted during SEDAR 95 (Atkinson et al. 2024). Since this assessment was halted, the following working paper is an update to SEDAR 95 with an additional year added.

Methods

Data Sources

Vertical line observer data collected by the Gulf and South Atlantic Fisheries Foundation (GSAFF) from 2007-2016 and SEFSC South Atlantic Reef Fish Observer Program (SARF) from 2014-2024 were considered for estimating discards of Cobia (Decossas & Mathers 2023). For both observer programs, scientific observers on commercial fishing vessels record detailed information on catch and effort for a subset of trips. Catch by species was recorded according to the disposition category: kept (landed), released alive, released dead, released undetermined, and used for bait. Length and weight were recorded for a subsample of individual fish.

Total effort was determined from the commercial logbook in which fishers reported basic information on effort and catch by species for every trip (Atkinson et al. 2021). The coastal logbook program began in 1990 for a subset of vessels in the South Atlantic. In 1999, the logbook program was expanded to include vessels targeting coastal migratory pelagic species. For the purpose of estimating discards, all complete calendar years (1999–2024) were analyzed, restricted to trips reporting Cobia landings.

Relevant Management History of Cobia

Cobia have had the same minimum size limit of 33 inches fork length since 1985. Annual catch limits (ACLs) were set in 2012 for the Atlantic Cobia migratory group. This ACL led to closures towards the end of the fishing year in 2014, 2016, and 2017 for as little as 20 days in 2014 and several months (117 days) in 2017. Given the limited observer coverage, these closures were not

considered for the analyses. Since most Cobia are caught as incidental catch of other targeted fisheries, a significant management action relevant to trends in Cobia landings is the South Atlantic Red Snapper moratorium in 2010.

Spatial Boundary

While the geographic range for SEDAR 107 includes all fishing areas north of the Florida and Georgia border, the reef fish observer program did not sample any trips north of the North Carolina and Virginia border. For this reason, discard estimates for the vertical line fishery are limited to fishing areas off the coast of Georgia to North Carolina (Figure 1). This includes statistical areas north of 31° N and south of 37° N. Previous discard estimates provided in SEDAR 28 and SEDAR 58 included areas north of 29° N, which included additional areas off the coast of Florida in error. For this working paper Cobia will be referred to as Cobia (GA-NC) since discard estimation is limited to this spatial extent.

Discard Estimation

Observer sample sizes for this species were low, with only 27 trips recording Cobia off Georgia–North Carolina waters from 2007 to 2024, nine of which reported discards. (Table 1). There were no trips observed in 2024 with Cobia reported. A majority of the observer data with reported Cobia were landed in North Carolina (Table 2). Given the low observation rate of this species, observer mean discard rates had to be calculated straightforwardly. For this data, discard rates were calculated two ways: (1) discards estimated in number where effort is either number of trips or cumulative fishing time and (2) discards estimated in pounds as a trip-level ratio of discarded pounds per kept pounds of Atlantic Cobia. Cumulative fishing time was considered as an alternative effort variable to number of trips based on analysis conducted by Smith et al. (2018). To provide analysts with options and to more fully explore these data-limited observer approaches, these different mean discard rate ($\overline{DR}$) calculations were conducted:

1a) Numbers per trip:

$$\overline{DR} = \frac{1}{n}\sum_i \frac{Discards\ (in\ numbers)_i}{trip_i}$$

1b) Numbers per fishing time:

$$\overline{DR} = \frac{1}{n}\sum_i \frac{Discards\ (in\ numbers)_i}{Fishing\ time_i}$$

2) Pounds per kept pounds:

$$\overline{DR} = \frac{1}{n}\sum_i \frac{Discards\ (in\ pounds)_i}{Kept\ (in\ pounds)_i}$$

where *i* is per trip and *n* is the number of observer trips.

The calculated rates and standard deviations above were then used to calculate total discards and associated variance using the logbook data. All logbook trips that reported catch of Atlantic Cobia were used within the geographic area of the assessment (Figure 1). Each discard rate was

applied to the appropriate metric in the logbook data to yield annual discard and variance estimates. Total discards per year (t) and standard error (SE) were estimated as:

1a) Trip Numbers:

$$Discards_t = TotalTrips_t \times \overline{DR}\ ; SE_t = \sqrt{\sum DRsd^2 \times TotalTrips_t{}^2}$$

1b) Fishing Time Numbers:

$$Discards_t = TotalFishingTime_t \times \overline{DR}; SSE_t = \sqrt{\sum DRsd^2 \times TotalFishingTime_t{}^2}$$

2) Pounds per kept pounds:

$$Discards_t = Total\ Catch_t \times \overline{DR}\ ; SE_t = \sqrt{\sum DRsd^2 \times TotalCatch_t{}^2}$$

For the first method that used numbers, estimated discards were converted to weight using the observer data, calculated as the average weight of a discarded fish (*WTav*). Additionally, method two that used pounds, estimated discards will be converted to number using the same *WTav*. This additional source of variation (average weight of discarded fish standard deviation; *WTsd*) was then also incorporated into final estimates, so for example the annual standard error for total estimated discards using method 1b (fishing time in numbers) was:

$$SE = \sqrt{(WTsd^2 \times Discards_t{}^2) + (DRsd^2 \times WTav^2)}$$

These variance estimates were also converted to CVs.

Results and Discussion

The annual number of trips landing Cobia (GA-NC) as well as the average cumulative trip fishing time and annual catch (in pounds) from the logbook data were analyzed for temporal trends in the vertical line fishery (Figure 2-4). There has been a steady decline in both the number of trips and catch of Cobia (GA-NC) from 1999-2024. A change around 2010 is likely due to the large shift in fishing behavior at this time as a result of the Red Snapper moratorium. However, there is not enough observer data to estimate discard rates into separate time periods (pre-moratorium era and severely reduced Red Snapper season). Average discard rates in number per trip and per fishing time were calculated using all available observer data. The second method to calculate a discard rate in pounds per pounds of kept Cobia could not be conducted. This is because most observer trips had either all kept or all discarded Cobia. Upon investigation, discards are often a result of the minimum size limit of 33 inches fork length (944.7mm total length) as seen in Figure 5 and since most catch of Cobia (GA-NC) are incidental, most trips are only catching 1-2 Cobia per trip.

Therefore, only the first method where discards calculated in number using different effort metrics were estimated. The discard rates are provided in Table 3 with high CVs over 1. Annual

estimated discards for each effort metric are shown in Figure 6 and Table 4. Using cumulative fishing time as the effort variable produced higher discard estimates than using number of trips. Cumulative fishing time has been used as the standard measure in previous observer-based assessments (Smith et al. 2018). While number of trips was not evaluated as an effort metric in Smith et al. (2018), cumulative fishing time more accurately reflects fishing activity because it accounts for variation in trip duration, which number of trips does not capture.

Accordingly, discard estimates based on cumulative fishing time (hours) are recommended for SEDAR 107 and are presented in Figure 7, with associated uncertainty reflected in the large error bars.

Comparison to SEDAR 58

The three main differences between SEDAR 58 and SEDAR 107 are (1) the previous assessment provided estimated discards in number of the vertical line fleet using discard logbook data, while the current assessment utilizes commercial observer data and (2) the geographic range between assessment slightly differ in that the previous assessment included some fishing areas off the coast of FL as a part of the South Atlantic stock and (3) the methodology differs in both the effort metric used and the kinds of logbook trips included in the expansion to the entire fleet. Given that the data sources and methods are widely different, a comparison of the two estimates should be cautioned because differences could be due to a multitude of reasons. Nevertheless, the overall magnitude of estimated number of discards of Cobia are similar in some years (Figure 8).

Data Limitations for Coastal Migratory Pelagic Species

Given the SEFSC's shift away from the unreliable discard logbook program, the SEFSC has been reliant on utilizing observer data for estimating discards for all finfish species. However, the SEFSC Observer Program selects vessels for coverage in the Gulf and South Atlantic reef-fish fisheries, not the Gulf and South Atlantic coastal migratory pelagic fisheries; thus, coastal migratory pelagic species will always be incidentally observed within the Observer Program (i.e. sample size will always be limited). In order to be selected for observer coverage in the reef fishery, a vessel must have an active Commercial Gulf Reef Fish (RR) permit, South Atlantic Unlimited Snapper Grouper (SG1) permit, or South Atlantic Trip Limit Snapper-Grouper (SG2) permit. In addition to the active permit, the vessels selected for coverage must have reported reef fish landings in the prior three years via the Coastal Logbook Program. Given that Cobia, King Mackerel and Spanish Mackerel are not managed under the Gulf Reef Fish or South Atlantic Snapper-Grouper Fishery Management Plans (FMPs), vessels who primarily target and land these species will not be eligible for coverage in the SEFSC's Observer Program's current setup.

If there is interest for more accurate discard estimates of Coastal Migratory Pelagic species, the SEFSC Observer Program would need to design and implement a new independent observer program dedicated toward estimating discards of this fishery. This would require additional funding. This has been done for other observer programs, such as the Deepwater Horizon Sea Turtle Early Restoration project within the Gulf Shrimp Observer Program, as well as the Gulf of America Enhanced Bluefin Tuna Coverage Observer Program within the Pelagic Observer Program.

Literature Cited

Atkinson, S., M. Judge, and R. Orhun. 2021. Coastal Fisheries Logbook Program Metadata. SEDAR74-DW-3. SEDAR, North Charleston, SC. 17 pp.

Atkinson, S., G. Decossas, E. Fitzpatrick, S. Schiano. 2023. CPUE Expansion Estimation for commercial Discards of South Atlantic Red Grouper. SEDAR82-AW09. SEDAR, North Charleston, SC. 20 pp.

Atkinson, S., K. Thompson, and G. Decossas. 2024. Estimated Commercial Discards of Cobia (*Rachycentron canadum*) for the Vertical Line Fishery Using Limited Observer Data. SEDAR95-DW-05. SEDAR, North Charleston, SC. 13 pp.

Decossas, G. & A. Mathers. 2023. South Atlantic Reef Fish Observer Program Metadata. SEDAR82-AW08. SEDAR, North Charleston, SC. 11 pp.

McCarthy, K. 2012. Calculated discards of Spanish mackerel and cobia from commercial fishing vessels in the Gulf of Mexico and US South Atlantic. SEDAR28-DW04. SEDAR, North Charleston, SC. 19 pp.

McCarthy, K., et al. 2023. Commercial Discard Estimation of South Atlantic Gray Triggerfish. SEDAR82-AW03. SEDAR, North Charleston, SC. 46 pp.

SEDAR. 2013. SEDAR 28 – Gulf of Mexico Cobia Stock Assessment Report. SEDAR, North Charleston SC. 616 pp.

Smith, Steven G., Allison C. Shideler, Kevin J. McCarthy. 2018. Proposed CPUE Expansion Estimation for Total Discards of Gulf of Mexico Red Grouper. SEDAR61-WP-15. SEDAR, North Charleston, SC. 11 pp.

Thompson, K., S. Atkinson, G. Decossas. 2024. Estimated Commercial Discards of South Atlantic Golden Tilefish (*Lopholatilus chamaeleonticeps*) Using Limited Observer Data. SEDAR89-WP-05. SEDAR, North Charleston, SC. 15 pp.

Tables

Table 1. Sample size of total observer trips off GA-NC waters and with reported Cobia catch.

Year	Total Observer Trips	Observer Trips with Landed Cobia	Observer Trips with Discarded Cobia
2007	21	3	0
2008	5	0	0
2009	5	3	0
2010	5	0	0
2011	10	2	0
2014	11	0	0
2015	16	1	0
2016	12	1	0
2018	11	1	1
2019	7	2	0
2020	3	0	0
2021	10	1	0
2022	100	6	3
2023	58	7	5
2024	26	0	0

Table 2. Number of observer trips by landing state and Cobia disposition (kept and discarded). The landing state was only available for observer data collected by the SEFSC from 2014-2024. Trips missing landing state are excluded in this summary.

State Landed	Observer Trips with Landed Cobia	Observer Trips with Discarded Cobia
North Carolina	5	6
South Carolina	4	2
Florida	1	0

Table 3. Calculated observer discard rate, standard deviation, and CV values for each of the methods. Method 1a calculates a discard rate using number of trips as the effort metric and method 1b calculates a discard rate using cumulative fishing time as the effort metric.

Method	Discard Rate	Standard Deviation	CV
1a) Trip Numbers	0.42308	0.64331	1.52055
1b) Fishing time Numbers	0.09074	0.24091	2.65486

Table 4. Estimated commercial discards for Cobia (GA-NC) in number using each of the effort variables (number of trips and cumulative fishing time in hours)

	Trip Numbers				Fishing Time Number			
Year	Discard Rate	Total Trips	Estimated Discards	Standard Error	Discard Rate	Total Fishing Time	Estimated Discards	Standard Error
1999	0.42308	142	60	91	0.09074	5,822	528	1,403
2000	0.42308	130	55	84	0.09074	5,555	504	1,338
2001	0.42308	213	90	137	0.09074	9,806	890	2,362
2002	0.42308	257	109	165	0.09074	12,361	1122	2,978
2003	0.42308	224	95	144	0.09074	10l705	971	2,579
2004	0.42308	169	72	109	0.09074	7,467	678	1,799
2005	0.42308	224	95	144	0.09074	9,267	841	2,232
2006	0.42308	186	79	120	0.09074	10,195	925	2,456
2007	0.42308	234	99	151	0.09074	12,432	1128	2,995
2008	0.42308	245	104	158	0.09074	11,670	1059	2,811
2009	0.42308	170	72	109	0.09074	8,555	776	2,061
2010	0.42308	141	60	91	0.09074	5,900	535	1,421
2011	0.42308	144	61	93	0.09074	5,753	522	1,386
2012	0.42308	134	57	86	0.09074	4,509	409	1,086
2013	0.42308	165	70	106	0.09074	5,683	516	1,369
2014	0.42308	171	72	110	0.09074	5,857	531	1,411
2015	0.42308	154	65	99	0.09074	4,952	449	1,193
2016	0.42308	144	61	93	0.09074	3,773	342	909
2017	0.42308	94	40	60	0.09074	2,683	243	646
2018	0.42308	117	50	75	0.09074	3,382	307	815
2019	0.42308	114	48	73	0.09074	2,394	217	577
2020	0.42308	127	54	82	0.09074	3,372	306	812
2021	0.42308	112	47	72	0.09074	3,896	354	939
2022	0.42308	97	41	62	0.09074	3,252	295	783
2023	0.42308	167	71	107	0.09074	4,345	394	1,047
2024	0.42308	116	49	75	0.09074	2,266	206	546

Figures

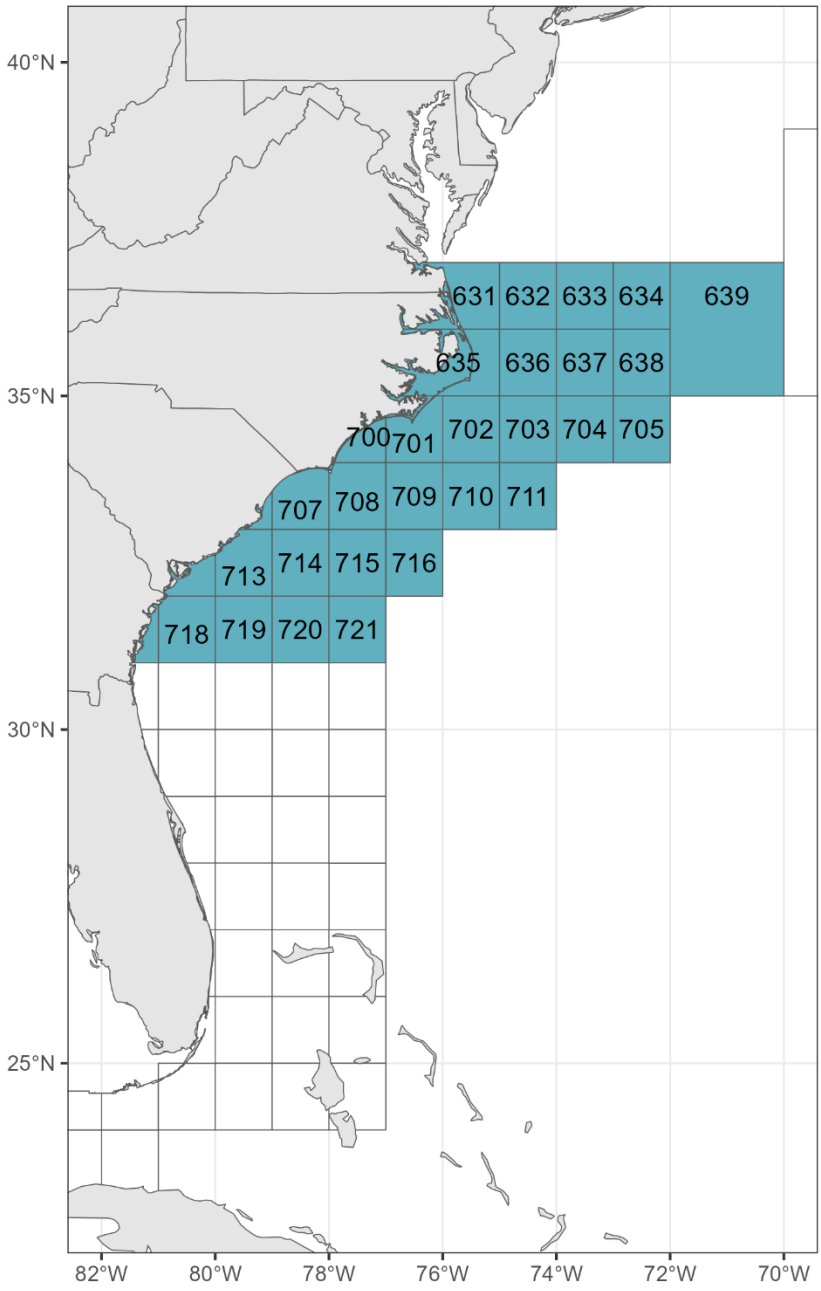

Figure 1. Spatial boundary for estimating discards of Cobia (GA-NC).

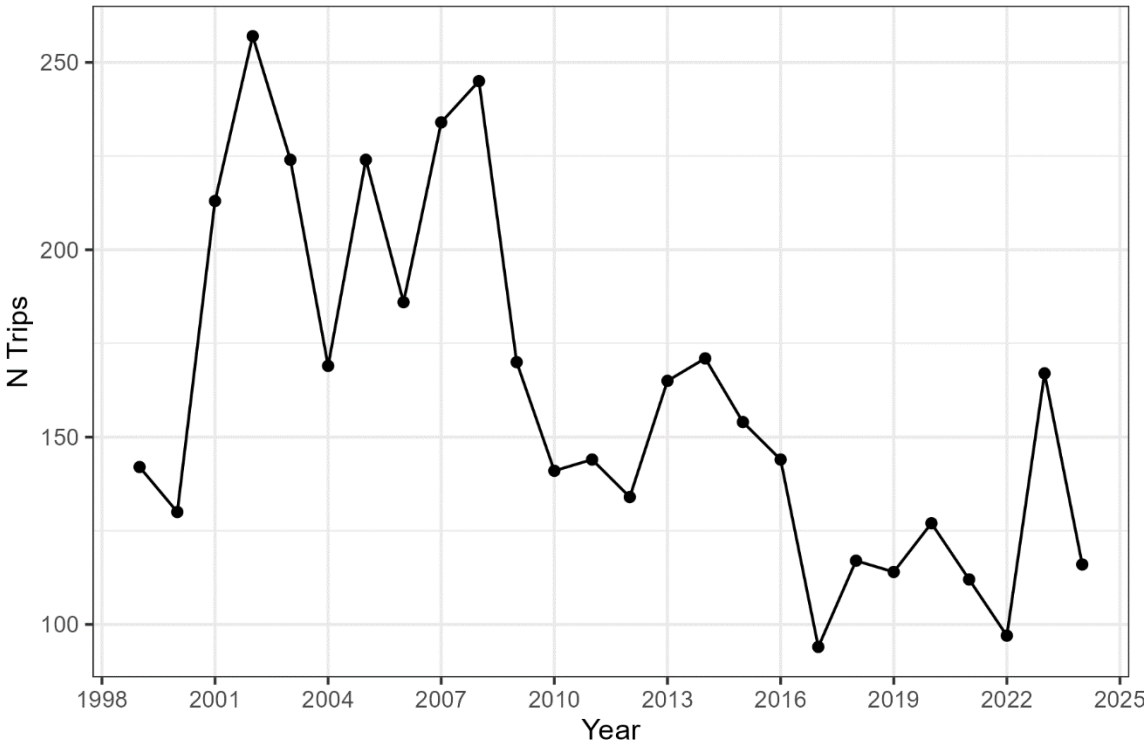

Figure 2. Total number of vertical line trips landing Cobia (GA-NC) from 1999-2024.

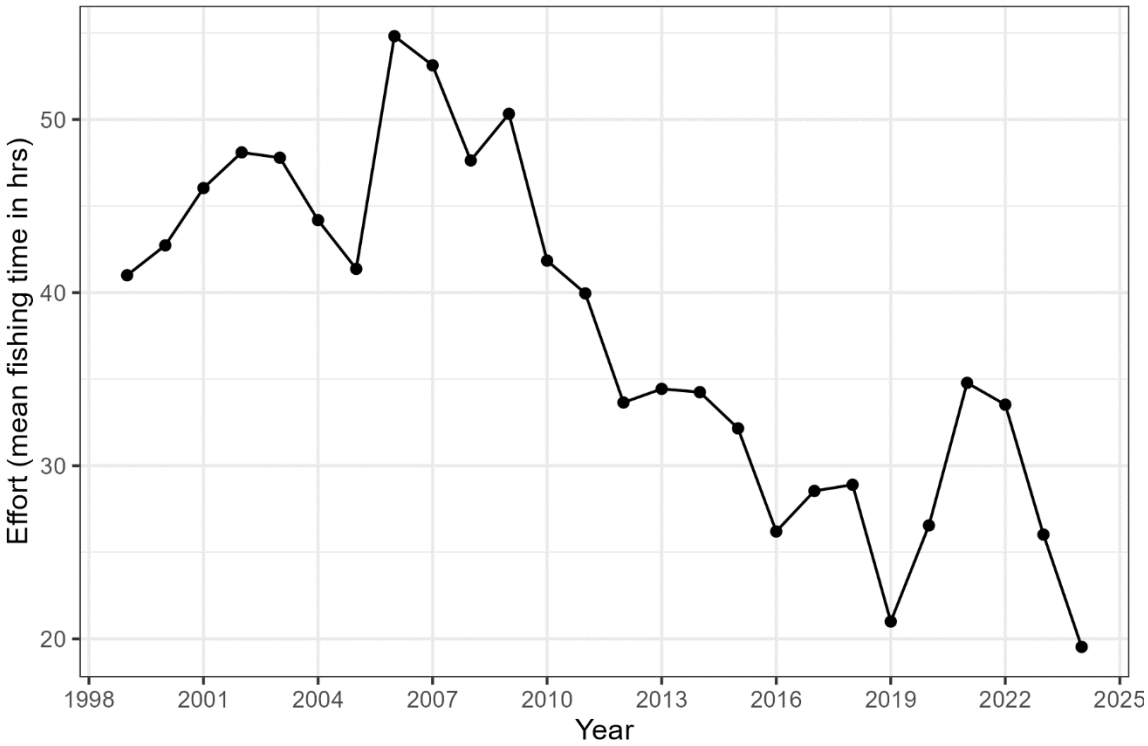

Figure 3. Average cumulative fishing time (in hours) per trip that landed Cobia (GA-NC) from 1999-2024.

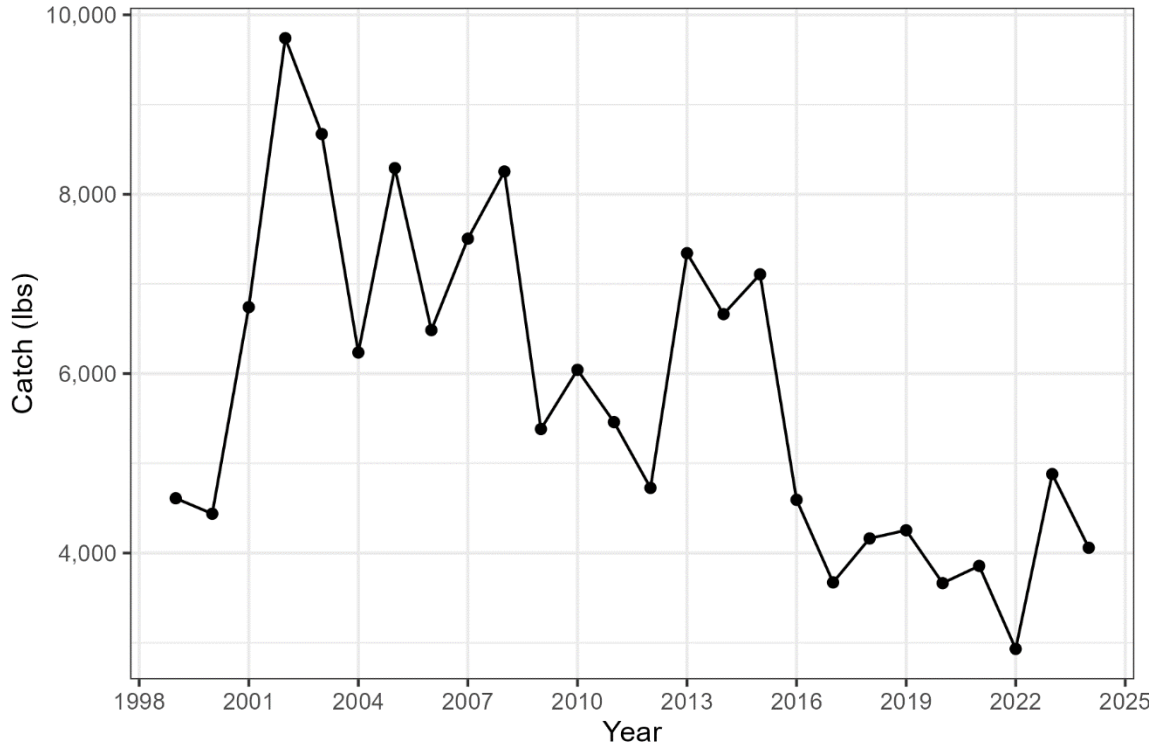

Figure 4. Logbook catch (in whole pounds) of landed Cobia (GA-NC) from 1999-2024.

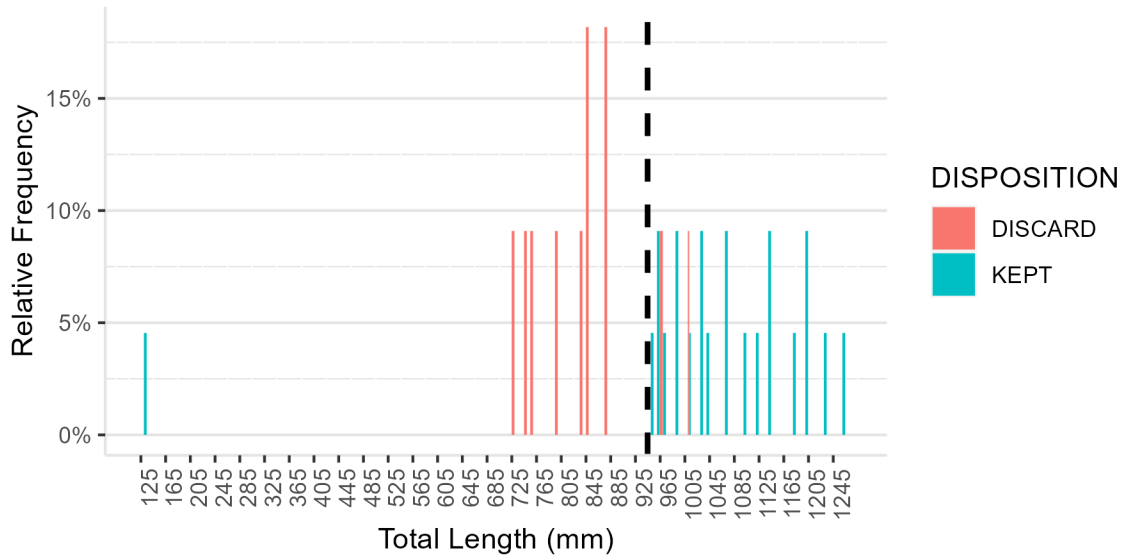

Figure 5. Length frequency of kept and discarded Cobia (GA-NC) from observer data. The dashed line indicates the minimum size limit (944.7 mm total length).

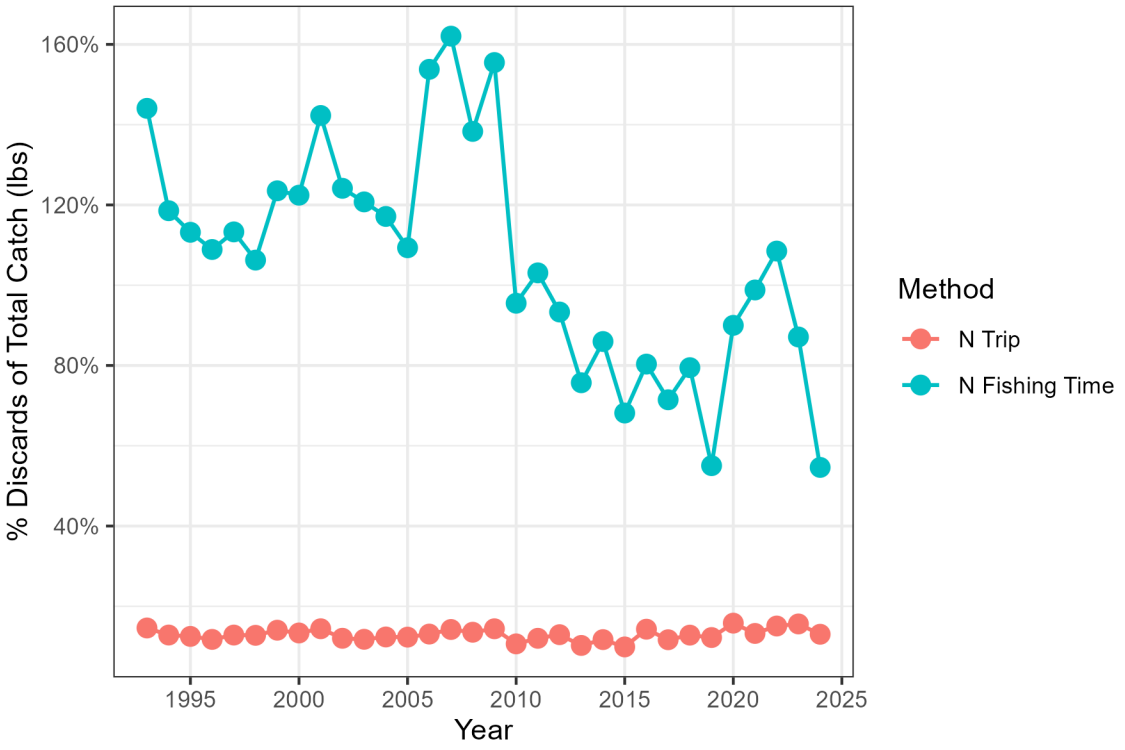

Figure 6. Estimated commercial discards of Cobia (GA-NC) in number. “N trip” discards were estimated using a discard rate where number of trips was the effort variable and “N fishing time” had cumulative fishing time in hours as the effort metric.

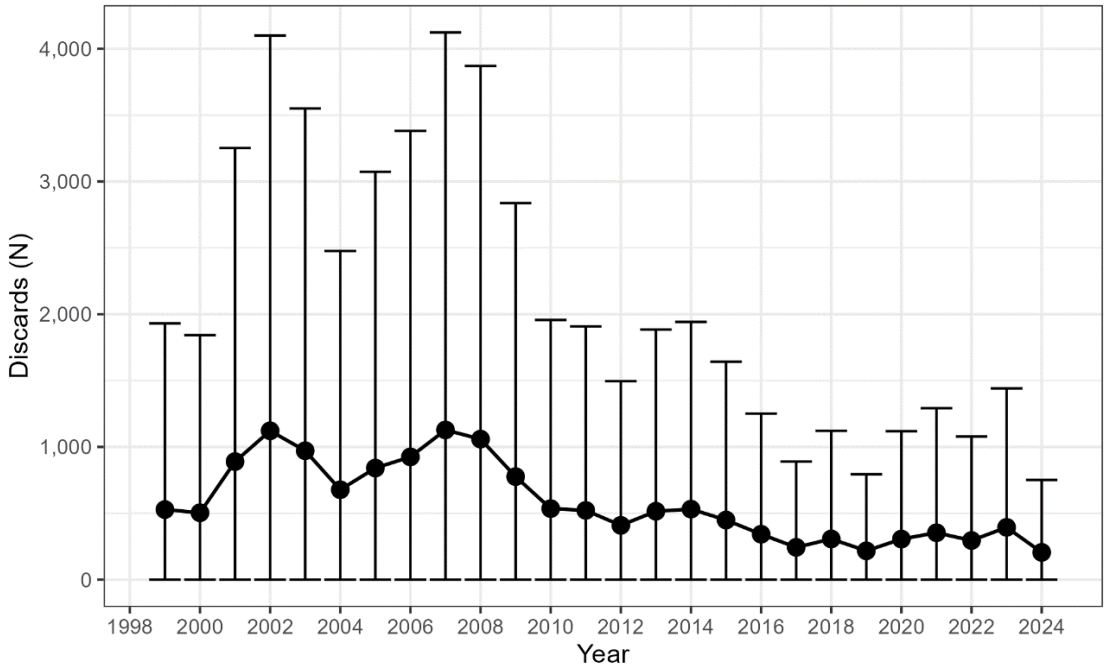

Figure 7. Commercial discards for Cobia (GA-NC) from 1999-2024 with standard error bars.

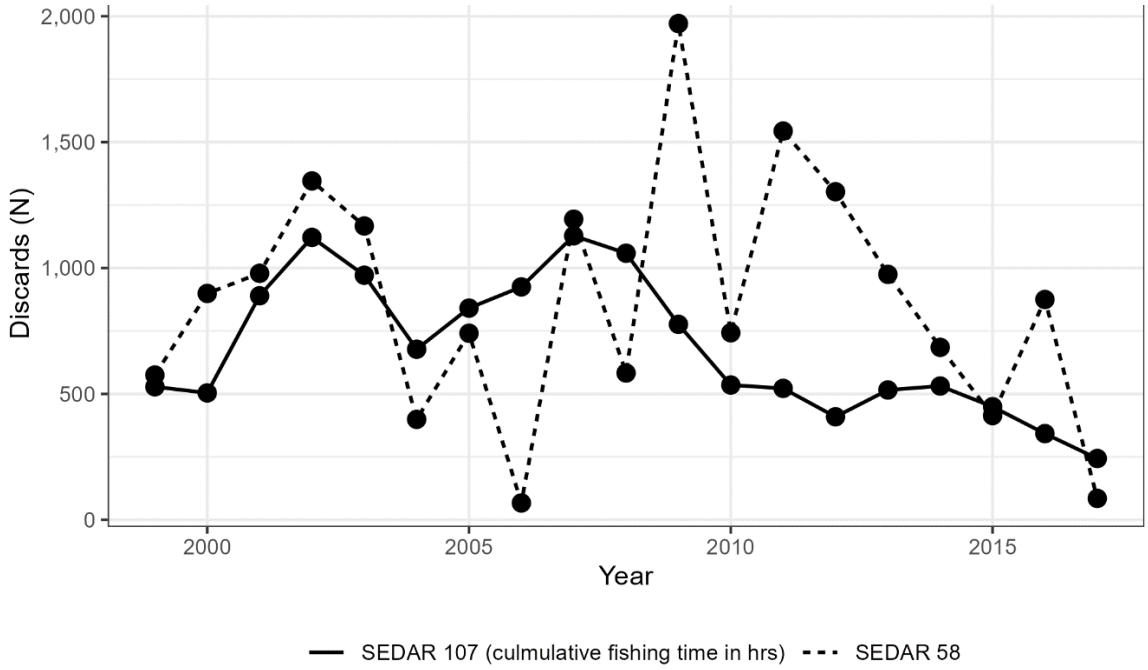

Figure 8. Comparison of commercial discard estimates for Cobia (GA-NC) from the vertical line fishery between the current assessment (SEDAR 107) using cumulative fishing time (in hrs.) and the previous assessment (SEDAR 58).