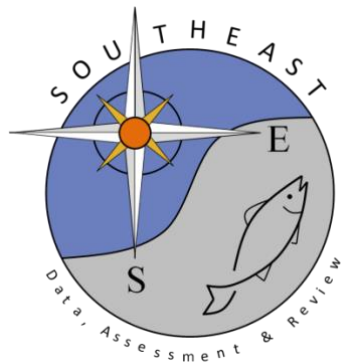


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Calculated discards of Cobia from commercial vertical line fishing vessels in the Gulf of Mexico and Florida East Coast

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Introduction

In August 2001, the Southeast Fisheries Science Center (SEFSC) initiated a program to collect commercial fishing vessel discard data from Gulf of Mexico and South Atlantic fisheries. A reporting form was developed that supplements the existing vessel coastal logbook forms that are currently mandatory for those fisheries (Poffenberger and McCarthy, 2004). Discard data from the SEFSC coastal fisheries discard logbook program were used to calculate the number of Cobia discards from commercial vertical line (handline and electric/hydraulic reel, aka bandit rig) vessels. Approximately 78 percent of reported Cobia discards were from vertical line vessels.

Data collection for the discard logbook program involves, each year, a 20% random sample of vessels with Gulf of Mexico reef fish, South Atlantic snapper-grouper, King Mackerel, Spanish Mackerel, Dolphin/Wahoo, and shark permits selected to report the number of animals discarded by species. To assure that the sample was representative of vessels with those Federal permits fishing in the Gulf of Mexico and South Atlantic, the universe of permitted vessels was stratified by region (Gulf of Mexico and South Atlantic) and gear fished. Fishing gear strata included handline, bandit rig, trolling, longline, fish trap, gillnet, and diving. A random sample was selected, without replacement, from each stratum. The selected fishers were instructed to complete a supplemental discard form for each fishing trip that they made. Trips with no discards were reported as such.

Reported data included the numbers of discards by species, estimated condition of the fish when released, reason for release (due to regulations or unmarketable/unwanted), and the fishing area where the animal was discarded. There are six options for the condition of released fish: all animals are dead, majority of the animals are dead, all animals are alive when released, majority of animals are alive, the fish are kept but not sold, and the condition of the animals is unknown. To calculate species specific discard rates, discard data were matched to the landings and effort data reported (for the appropriate trip) to the coastal logbook program.

Methods

Two methods were used to calculate Cobia discards from commercial fishing vessels. The first technique (the continuity method) followed the methods used in SEDAR 28 (McCarthy, 2012). The second technique followed the methods recommended in SEDAR 32 (the standard method). Both methods used data reported to the discard logbook program to calculate discard rates and used total effort as reported to the coastal logbook program to calculate total discards of Cobia.

SEDAR 28 (continuity) method

Cobia commercial discards were calculated for vessels fishing vertical lines (handline, electric reel/bandit rig), trolling, and gillnets in the Gulf of Mexico and the east coast Florida. Available data included the number of discards and fishing effort from self-reported logbooks for the years 2002-2018 from vessels with federal fishing permits (other than tuna and swordfish permits). Less than 6.4 percent of trips reporting

Cobia discards and 3.6 percent of discarded Cobia for the period 2002-2018 were from trips reporting fishing gear other than vertical lines, trolling, or gillnets. Data from vessels reporting fishing those other gears were not included in the discard calculations.

Cobia discards from the commercial vertical line, trolling, and gillnet fisheries were calculated for the Gulf of Mexico (statistical areas 1-21) and Florida east coast (areas 2300-2900; Figure 1). Cobia discards were calculated as the product of gear-specific discard rates (mean rate among the years 2002-18) and the yearly gear-specific total fishing effort (vertical line or trolling = total hook-hours fished; gillnets = square yard hours fished) reported to the coastal logbook program. Cobia discards were calculated for the years 1993-2018. Those years include the first year of full reporting of fishing effort to the coastal logbook program by federally permitted vessels. Actual effort, however, may have been higher than reported effort prior to 1998 because effort and landings reports from mackerel trips and gillnet trips had not been required prior to that year. Calculated discards would be erroneously low without fully reported effort. Discards from gillnets, therefore, were calculated for the period 1998-2018.

SEDAR 32 (standard) method

The number of Cobia discarded from commercial fishing vessels was also calculated using methods developed during SEDAR 32. Those methods have become the standard approach for commercial fishery discard calculation in cases where observer reported data are insufficient for discard calculation. The available data set included all trips from commercial vessels that reported discards between January 1, 2002 and December 31, 2018. Commercial fishery Cobia discards calculated using SEDAR 28 methods were primarily (97.8%) from vertical line vessels, therefore, only data from vertical line vessels were included in the updated analysis (standard method).

Data filtering followed the methods recommended during SEDARs 32 and 41 (McCarthy, 2013 and 2015). Data were filtered to exclude trips landing only mackerel because it was generally believed by the SEDAR 32 and 41 panels that for trips targeting mackerel only, the likelihood of catching species other than mackerel was extremely low. To avoid removing data from mixed effort trips, however, only trips with 100% mackerel landings were excluded.

A final data filter designed to address possible underreporting of commercial discards was included in this analysis following the recommendation of SEDARs 32 and 41. Fishers remain in reporting compliance by submitting discard logbooks with reports of “no discards”. The percentage of discard reports submitted with “no discards” from vertical line trips has increased from 27.4 to 73.8 percent in the Gulf of Mexico and the Florida east coast over the period 2002-2018. During the SEDAR32 data workshop the issue of possible underreporting of commercial discards was discussed at length. The working group recommended that data be filtered to remove records from vessels that never reported discards of any species during a year. The SEDAR32 working group acknowledged that some commercial fishing trips may not have had discards of any species and discussed the likely maximum number of trips by a vessel without a report of discards. Following the SEDAR 32 and 41 commercial working groups’ recommendations, data were excluded from vertical line vessels that reported more than 15 trips without reporting discards of any species (the mean number of trips prior to the first trip with reported discards plus two standard deviations above that mean).

Yearly discard rates of vertical line vessels were calculated as the mean rate (discards per hook hour fished) for each year during the period 2002-2018. Yearly total effort (hook hours) of all trips by vertical line vessels was multiplied by the yearly discard rate to calculate total discards of Cobia by vertical line vessels. Cobia discards were calculated as:

$$\text{Calculated discards per year} = \text{yearly Cobia discard rate} * \text{total effort per year}$$

†total effort does not include effort from trips that landed only mackerel

For years prior to 2002 (the first year of discard data), the mean discard rate for the years 2002-2006 was used to calculate discards for the years 1993-2001 when only effort data were available.

Results and Discussion

Continuity method

Cobia yearly total gear-specific calculated discards (in number of fish) are provided in Table 1. Calculated discards were highest for the vertical line fishery, but were fewer than 10,500 fish per year. The trolling fishery had fewer than 300 fish per year and the gillnet fishery had fewer than 100 fish discarded per year except for 103 fish in 2002. The number of trips reporting Cobia discards was small and uncertainty around those totals is high. An additional concern was the possible under reporting of commercial discards due to the high percentage of fishers returning discard logbooks with reports of “no discards”. Results should be used with caution and discards calculated here may represent the minimum number of discards from the commercial fishery.

SEDAR 32 (standard) methods

During the years 2002-2018, discard forms were submitted for 86,540 vertical line trips. Of those trips, discards were reported on 34,439 trips and 52,101 trips reported no animals were discarded. Discards of Cobia were reported on 720 vertical line trips or 0.83% of the submitted discard logbooks. By way of comparison, there were 363,850 vertical line trips reported to the coastal logbook program by vessels that had been issued a Federal permit to fish in the Gulf of Mexico and the east coast Florida during 2002-2018. Cobia landings were reported for 18,091 trips or about 5% of vertical line trips.

Calculated total discards in numbers of Cobia for each year from vertical line vessels are provided in Table 2. Calculated discards using the standard method are much more variable among years than were the discards calculated using the continuity method. The high variability was due to the use of year specific discard rates for the standard method for the period 2002-2018. The continuity method used a single mean discard rate to calculate discards for all years resulting in much less variability among years.

Less than 1.1% of Cobia were reported as dead or the majority of discarded fish were dead when released. Fishers reported that more than 47% of discarded Cobia were alive or that most of the released fish were alive for both gears. An additional 3.7% were reported as kept but not sold and were either consumed or used as bait. The condition of 48% of discarded Cobia were reported as “unable to determine”. The primary reason reported for discarding Cobia was due to regulatory restrictions (not legal size, out of season, other regulations; 95.7% of discards). Market conditions were reported as the reason for discarding Cobia for fewer than two percent of discards. No reason for discarding was provided for approximately 2.5% of discarded Cobia.

Approximately 0.8% of vertical line trips reported Cobia discards. Cobia accounted for 0.1% of the reported vertical line discarded fish in the region. Stratification of the available data was limited because of those small sample sizes and, therefore, likely does not capture much of the variation in numbers of discards within the Cobia vertical line fishery. How that may affect the number of calculated discards (over or under estimate) is unknown.

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Table 1. Calculated yearly total discards of Cobia from vertical line vessels using SEDAR 28 (continuity) methods. Discards are reported as number of fish.

Year	Vertical line calculated discards	Trolling calculated discards	Gillnet calculated discards
1993	6,967	48	n/a
1994	8,215	49	n/a
1995	7,964	51	n/a
1996	8,512	74	n/a
1997	9,658	69	n/a
1998	9,280	285	45
1999	10,361	290	96
2000	9,678	276	49
2001	9,343	246	65
2002	9,459	208	103
2003	10,090	199	34
2004	9,093	148	26
2005	8,020	118	37
2006	8,417	147	31
2007	8,104	163	36
2008	7,195	166	36
2009	8,938	176	47
2010	7,121	154	26
2011	8,122	139	39
2012	9,230	137	44
2013	7,346	119	22
2014	7,666	130	25
2015	6,829	132	25
2016	6,886	151	13
2017	6,364	153	14
2018	5,005	121	15

Table 2. Calculated yearly total discards of Cobia from vertical line vessels for each year using SEDAR 32 (standard) methods. Discards are reported as number of fish. Trips reporting discards includes the number of vertical line trips for which a discard logbook form was submitted. Trips reporting effort includes the number of vertical line trips for which a coastal logbook form was submitted.

Year	Trips Reporting Discards	Trips Reporting Effort	Discard Rate	Discard Rate CV	Total Effort in Hook Hours	Calculated Discards
1993	10,875	19,347	0.000836	16.35	6,543,122	5,468
1994	10,875	21,786	0.000836	16.35	7,282,723	6,086
1995	10,875	21,942	0.000836	16.35	7,064,388	5,903
1996	10,875	22,915	0.000836	16.35	7,742,489	6,470
1997	10,875	25,361	0.000836	16.35	8,752,236	7,314
1998	10,875	23,932	0.000836	16.35	7,547,908	6,308
1999	10,875	23,755	0.000836	16.35	8,203,080	6,855
2000	10,875	22,888	0.000836	16.35	7,819,173	6,534
2001	10,875	23,023	0.000836	16.35	8,118,896	6,785
2002	1,758	23,601	0.002201	11.50	9,208,819	20,266
2003	2,956	23,620	0.000962	13.12	10,126,035	9,736
2004	2,362	22,425	0.000352	18.58	9,417,368	3,318
2005	2,224	19,167	0.000570	20.58	8,128,017	4,634
2006	1,575	18,345	0.000176	20.94	8,380,117	1,471
2007	2,591	16,537	0.001468	20.68	8,342,407	12,243
2008	4,176	16,738	0.000885	13.15	7,436,477	6,585
2009	2,564	18,721	0.001711	29.22	9,082,199	15,541
2010	3,419	15,473	0.000634	19.07	6,888,531	4,365
2011	4,030	16,780	0.001622	28.28	8,510,105	13,804
2012	4,216	16,374	0.001129	26.89	9,735,609	10,988
2013	3,459	15,461	0.000951	16.98	7,732,064	7,353
2014	3,752	18,093	0.000617	13.68	8,049,085	4,968
2015	3,730	16,892	0.000298	14.58	7,193,059	2,145
2016	3,744	17,400	0.001217	19.57	7,260,119	8,839
2017	3,015	16,773	0.000241	15.97	6,680,885	1,613
2018	2,576	15,112	0.000641	13.40	5,229,205	3,351

Figure 1. Coastal logbook statistical areas.

