Bycatch of cobia, *Rachycentron canadum*, in the Atlantic coastal gillnet fishery

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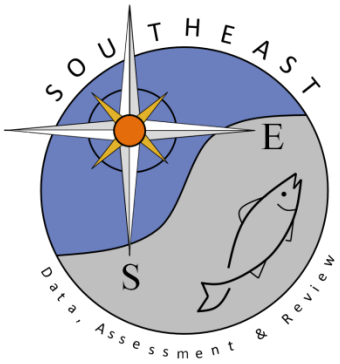

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Bycatch of cobia, *Rachycentron canadum*, in the south Atlantic coastal gillnet fishery

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Overview

The Southeast Gillnet Observer Program has adapted to the changes of the Florida- Georgia shark gillnet fishery since the program began in 1993 (e.g. Mathers et al. 2018 and references therein). The observer program initially focused efforts only on those gillnets vessels targeting shark. However, gillnet effort targeting large coastal (LCS) and small coastal (SCS) sharks declined as a result of Amendments 2 and 3 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan. LCS and SCS targeted gillnet effort has continued to decline in the last five years. Fishers have consequently increased effort targeting finfish, including Spanish mackerel *Scomberomorus maculatus*, king mackerel *Scomberomorus cavalla*, and bluefish *Pomatomus saltatrix*, with varying types of gillnet gear. Regardless of target, cobia, *Rachycentron canadum*, are either kept or discarded as bycatch. The Southeast Gillnet Observer Program, in its continuing efforts to adapt to the fishery, currently covers anchored (sink and stab), strike, or drift gillnet fishing, regardless of target, by vessels that fish year-round from Florida to North Carolina and the Gulf of Mexico.

Methods

Following the definition of the south Atlantic from the cobia stock identification workshop, data were excluded south of the Florida/Georgia border. Due to the nature of the data, we followed the approach of Garrison (2007) by employing a simple ratio estimator to represent bycatch rates;

$$\text{Catch per unit effort (CPUE)} = \frac{\sum x}{\sum y}$$

Where x is the number of observed cobia discarded (live or dead) and y is the number of observed sets (Snedecor and Cochran, 1967). Incidental takes by the fishery were estimated by multiplying the CPUE from the observer database by the total number of reported sets for the US South Atlantic (Table 1).

Total effort data reflects all 1999 through 2017 gillnet trip reports received by the Coastal Fisheries Logbook Program (hereafter Logbook Program) in the southeast United States (Figure 1). Four gillnet types are reported to the Coastal Fisheries Logbook: Strike, Drift, Anchor, and Other. These types are coded and reflected in the summary as follows:
Strike – Gear code: ‘475’ - gear name: ‘GILL NETS, DRIFT, RUNAROUND’
Drift – Gear code: ‘470’ - gear name: ‘GILL NETS, DRIFT, OTHER’
Anchor – Gear code:’480’ gear name: ‘GILL NETS, STAKE’
Other – Gear code: ‘425’ gear name: ‘GILL NETS, OTHER’.
However, given the nature of the data and that most gillnet effort is reported as “OTHER”, bycatch estimates were derived for the gillnet fishery regardless of gillnet type.

Results

Calculated US south Atlantic cobia discards (in numbers of fish, dead or live) from the commercial gillnet fishery are provided in Table 1 and Table 2, respectively. Also included are discard rates, number of observed trips, discard rate standard errors, and number of logbook trips reporting effort. The average size of cobia caught in the gillnet fishery was 71 cm fork length. The average size discarded alive and dead was 84 and 79 cm fork length, respectively (Figure 2).

Literature cited

Garrison, L.P. 2007. Estimated Marine Mammal and Turtle Bycatch in Shark Gillnet Fisheries Along the Southeast U.S. Atlantic Coast: 2000-2006. PRD Contribution: #PRD-04/05- 10,

Mathers, A.N., B.M. Deacy, H.E. Moncrief-Cox, J.K. Carlson. 2018. Catch and Bycatch in U.S. Southeast Gillnet Fisheries, 2017. NOAA Technical Memorandum NMFS-SEFSC-728. 13 p.

Snedecor, G.W. and W.G. Cochran. 1967. Statistical methods, 6th Edition. Iowa State Univ. Press

Table 1. Yearly calculated dead discards of cobia from US south Atlantic commercial gillnet fishery. Discards are reported as number of fish. "Trips (discards)" is the number of trips with observer reported discards. "Trips (total effort)" is the numbers of gillnet trips reporting effort to the coastal logbook program.

YEAR	TOTAL OBSERVER TRIPS	DEAD DISCARD RATE (FISH/SET)	DISCARD RATE STANDARD DEVIATION	TOTAL LOGBOOK EFFORT (SETS)	ESTIMATED TOTAL DEAD DISCARDS (NUMBER OF FISH)
1999	8	0.000		500	0
2000	17	0.000		852	0
2001	7	0.000		838	0
2002	15	0.000		948	0
2003	23	0.000		867	0
2004	11	0.636	2.110	894	569
2005	39	0.026	0.160	886	23
2006	43	0.023	0.153	970	22
2007	128	0.000		1641	0
2008	89	0.034	0.181	2020	69
2009	302	0.172	0.684	2001	344
2010	234	0.072	0.392	1636	118
2011	275	0.040	0.231	2189	88
2012	201	0.059	0.326	1993	118
2013	120	0		879	0
2014	149	0.046	0.292	2180	100
2015	105	0		1865	0
2016	117	0		1904	0
2017	0			1249	

Table 2. Yearly calculated live discards of cobia from US south Atlantic commercial gillnet fishery. Discards are reported as number of fish. "Trips (discards)" is the number of trips with observer reported discards. "Trips (total effort)" is the numbers of gillnet trips reporting effort to the coastal logbook program.

YEAR	TOTAL OBSERVER TRIPS	LIVE DISCARD RATE (FISH/SET)	DISCARD RATE STANDARD DEVIATION	TOTAL LOGBOOK EFFORT (SETS)	ESTIMATED TOTAL LIVE DISCARDS (NUMBER OF FISH)
1999	8	0.00		500	0
2000	17	0.00		852	0
2001	7	0.00		838	0
2002	15	0.200	0.774	948	190
2003	23	0.00		867	0
2004	11	0.00		894	0
2005	39	0.025	0.160	886	22
2006	43	0.00		970	0
2007	128	0.109	0.401	1641	179
2008	89	0.044	0.208	2020	89
2009	302	0.231	0.802	2001	462
2010	234	0.106	0.629	1636	173
2011	275	0.084	0.431	2189	184
2012	201	0.209	0.945	1993	417
2013	120	0.083	0.740	879	73
2014	149	0.00		2180	0
2015	105	0.285	0.217	1865	532
2016	117	0.017	0.130	1904	32
2017	0			1249	

Figure 1. Coastal logbook statistical areas.

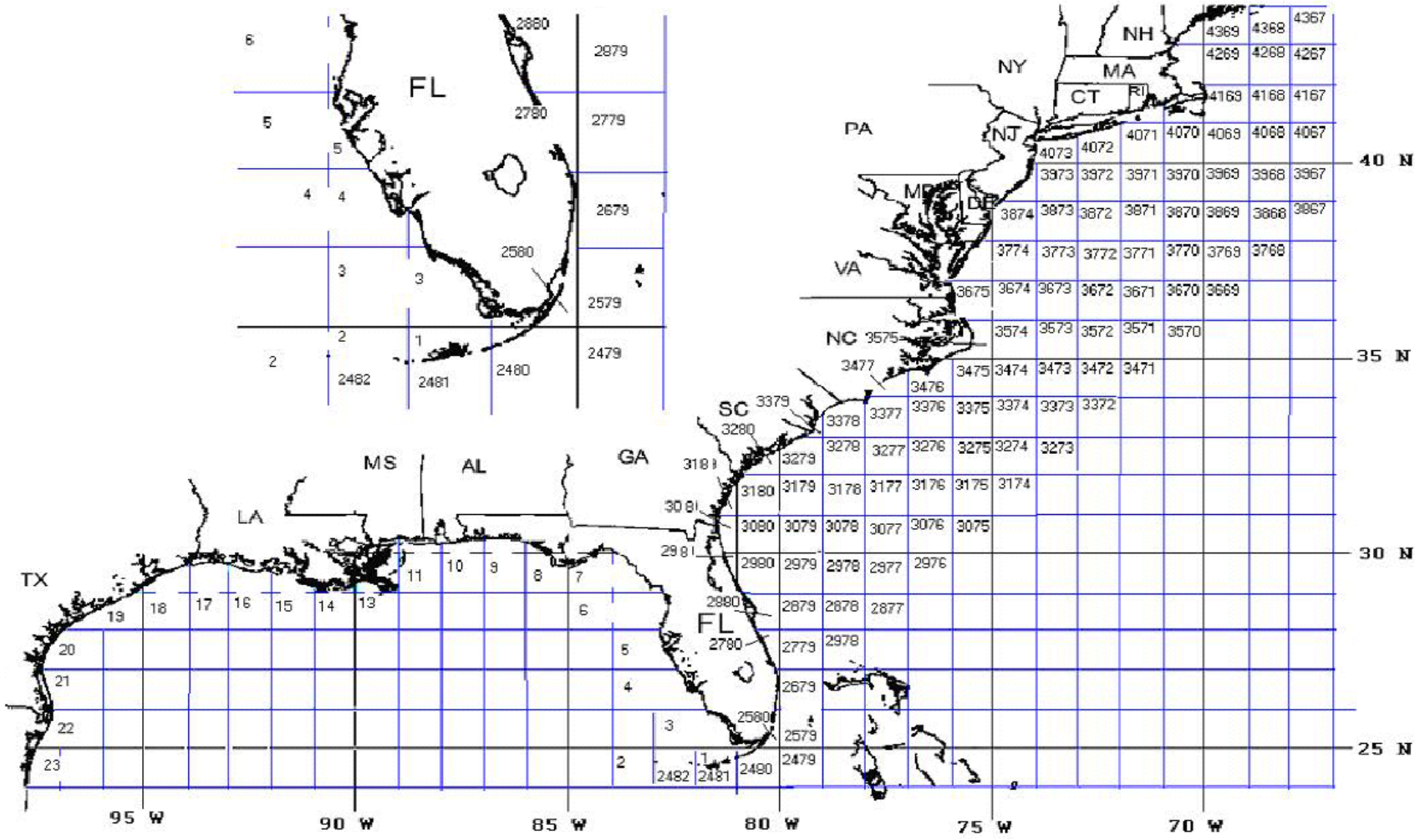

Figure 2. Length frequency of cobia caught in the south Atlantic gillnet fishery.