Bycatch estimates of Spanish mackerel in the south Atlantic coastal gillnet fishery

John Carlson, Alyssa Mathers and Kevin McCarthy

SEDAR78-WP06

Received: 10/28/2021

Please cite this document as:

Carlson, John; Alyssa Mathers and Kevin McCarthy. 2021. Bycatch estimates of Spanish mackerel in the south Atlantic coastal gillnet fishery. SEDAR78-WP06. SEDAR, North Charleston, SC. 7 pp.

Bycatch estimates of Spanish mackerel in the south Atlantic coastal gillnet fishery

John Carlson, Alyssa Mathers and Kevin McCarthy

National Marine Fisheries Service
Southeast Fisheries Science Center
3500 Delwood Beach Road
Panama City, FL

National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Dr
Miami, FL

SEDAR78-WP06

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 and small coastal sharks declined as a result of Amendments 2 and 3 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan. Shark targeted gillnet effort has continued to decline in the last five years. Fishers have consequently increased effort targeting fish, including Spanish mackerel *Scomberomorus maculatus*, king mackerel *Scomberomorus cavalla*, and bluefish *Pomatomus saltatrix*, with varying types of gillnet gear. Regardless of target, Spanish mackerel are either kept or discarded as bycatch, depending on the time of the year and opening or closure of the fishery. 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 by the South Atlantic Fisheries Management Council, data were excluded from the Gulf of Mexico. Due to the nature of the data, we followed the approach of Garrison (2007) by employing a simple ratio estimator to represent bycatch rates;

Catch per unit effort (CPUE) = number of Spanish mackerel discarded / number of sets

An estimate of uncertainty in these estimates was derived from bootstrap resampling of the calculated CPUE data set. A sample was drawn from the data (with replacement) and the procedure was repeated 1,000 times to generate a mean distribution for the estimate and the associated standard deviation. Estimates were derived separately for Spanish mackerel discarded dead and discarded alive as reported by the on-board observer. Total bycatch by year for the fishery were estimated by multiplying the derived bootstrap CPUE estimates by the total number of reported sets for the US South Atlantic (Table 1).

Total effort data reflects all 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 and Discussion

Calculated US south Atlantic Spanish mackerel 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. In all the estimates, data was pooled without considering strata due to the sparse nature of the bycatch events and the fact that logbook data is reported by sampling grid (see Figure 1). The distribution of observer effort is in 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.

Table 1. Yearly calculated dead discards of Spanish mackerel from US south Atlantic commercial gillnet fishery. Discards are reported as number of fish.

YEAR	TOTAL LOGBOOK SETS	NUMBER OF OBSERVER SETS	DEAD DISCARD RATE (MACKEREL/SETS)	DISCARD RATE STANDARD DEVIATION	ESTIMATED TOTAL DEAD DISCARDS (NUMBERS)
1998	2403	9	0.00		0.00
1999	1855	54	0.41	0.96	760.55
2000	1945	54	0.15	0.38	291.75
2001	1872	90	0.00		0.00
2002	1874	84	0.01	0.02	18.74
2003	1558	64	0.00		0.00
2004	1547	57	0.00		0.00
2005	1812	152	0.08	0.20	144.96
2006	2379	205	1.00	2.99	2379.00
2007	3658	170	0.13	0.92	475.54
2008	3602	201	0.62	1.65	2233.24
2009	4108	393	0.61	1.34	2505.88
2010	2714	295	0.18	0.51	488.52
2011	3467	398	0.29	0.72	1005.29
2012	3540	300	0.67	1.66	2371.80
2013	1876	209	0.26	0.75	487.76
2014	3354	225	0.31	0.76	1039.74
2015	3125	191	0.23	0.67	718.75
2016	2851	199	0.79	2.41	2252.29
2017	2151	66	0.00		0.00
2018	3063	78	0.58	1.26	1776.54
2019	3370	94	0.09	0.24	303.30
2020	2938	52	0.00		0.00

Table 2. Yearly calculated live discards of Spanish mackerel from US south Atlantic commercial gillnet fishery. Discards are reported as number of fish.

YEAR	TOTAL LOGBOOK SETS	NUMBER OF OBSERVER SETS	DEAD DISCARD RATE (MACKEREL/SETS)	DISCARD RATE STANDARD DEVIATION	ESTIMATED TOTAL DEAD DISCARDS (NUMBERS)
1998	2403	9	0.00		0.00
1999	1855	54	0.00		0.00
2000	1945	54	0.00		0.00
2001	1872	90	0.00		0.00
2002	1874	84	0.00		0.00
2003	1558	64	0.00		0.00
2004	1547	57	0.00		0.00
2005	1812	152	0.01	0.02	18.1
2006	2379	205	0.00		0.00
2007	3658	170	0.00		0.00
2008	3602	201	0.00		0.00
2009	4108	393	0.002	0.01	8.2
2010	2714	295	0.00		0.0
2011	3467	398	0.005	0.01	17.3
2012	3540	300	0.00		0.00
2013	1876	209	0.00		0.00
2014	3354	225	0.00		0.00
2015	3125	191	0.00		0.00
2016	2851	199	0.00		0.00
2017	2151	66	0.00		0.00
2018	3063	78	0.00		0.00
2019	3370	94	0.00		0.00
2020	2938	52	0.00		0.00

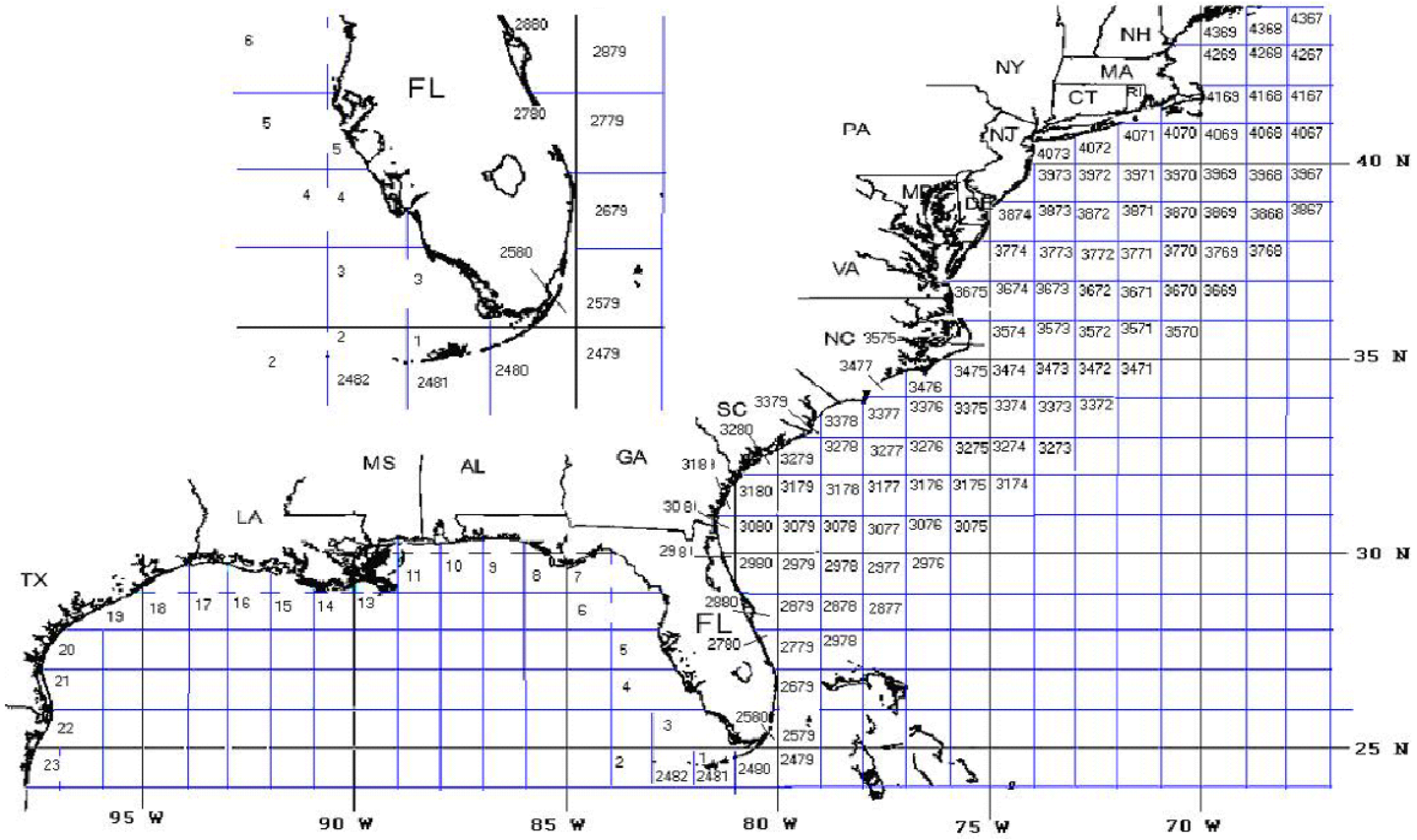

Figure 1. Coastal logbook statistical areas.

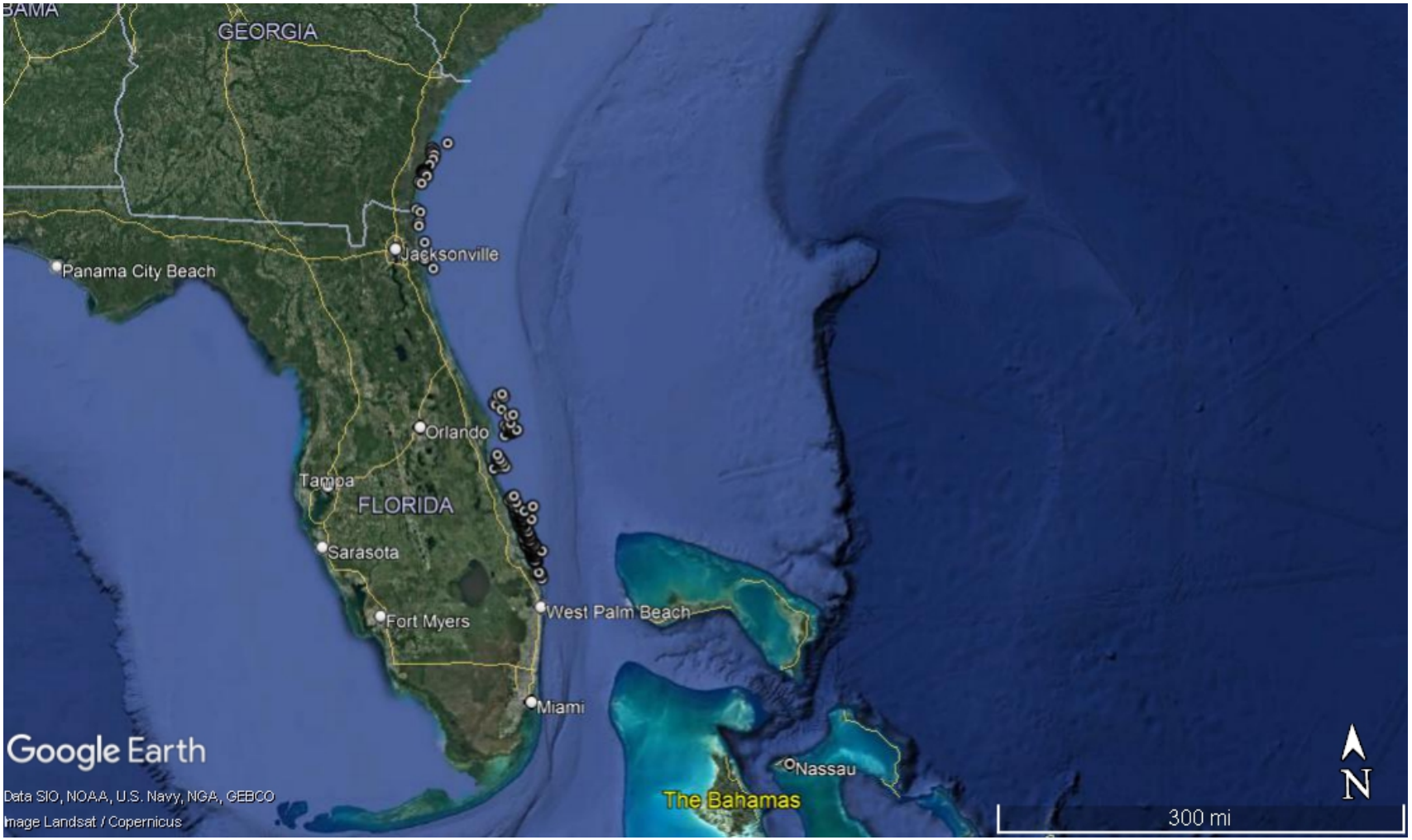

Figure 2. Distribution of observer effort.