



NOAA Technical Memorandum NMFS-SEFSC-675

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Introduction

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. Carlson and Bethea 2007 and references therein, Mathers et al. 2014). There are currently about 500 total directed and incidental shark permits issued in the US Atlantic and Gulf of Mexico, while the number of gillnet fishers changes from year to year. Gillnet effort targeting large coastal (LCS) and small coastal (SCS) sharks, has declined in recent years as a result of Amendments 2 and 3 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan (NMFS 2007, 2010). 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. However, a small amount of shark targeted gillnet effort continues to be observed. 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 from Florida to North Carolina and the Gulf of Mexico year-round.

Herein, we summarize fishing effort and catch and bycatch in these fisheries during January 2014 - December 2014, collectively referred to as '2014'.

Methods

Observer protocol

Vessels were randomly selected on a quarterly basis (January, April, July, and October) from a pool of vessels that had reported fishing with gillnet gear during the same quarter in the previous year in the NMFS Coastal Fisheries Logbook. Selection letters notifying permit holders

of required observer coverage were issued via U.S. Certified mail approximately one month prior to the upcoming selection period. Receipt of selection letters was confirmed via signature upon acceptance by the permit holder or their proxy. Once the permit holder received the selection letter, he or she was required to make contact with the observer coordinator and indicate intent to fish during the upcoming selection period. Contact was usually made by phone, and the observer coordinator gathered information concerning the vessel's name, captain, contact persons and phone numbers, communications and safety equipment available aboard the vessel, and information about the vessel's location, dates, and times of departure and return. Additional information collected included whether the vessel was active in another fishery, under repair, or no longer fishing. Upon notification of the intention to fish, the observer coordinator deployed an observer to the reported port of departure of the permit holder's vessel. Because gillnet trips are generally 24 hours or less (from the time of departure from port to the time of return), the observer remained assigned to the vessel for a minimum of 3 trips.

Observations were made as the net was hauled aboard. The haul target species was determined by the captain and recorded by the observer. The observer remained on the deck of the vessel in a position with an unobstructed view and recorded species and numbers of individuals caught. When species identification was questionable, the crew stopped hauling so that the observer could examine the animal(s) for positive identification. Status (alive or dead when boated) of individuals was recorded, and disposition of individuals brought onboard was recorded as kept, discarded alive, or discarded dead. Fork lengths (cm FL) were estimated for the entire catch. When time permitted after the haulback was complete, observers directly measured a random group of 10 individuals from each species for fork length (FL, measured on a straight line) in cm. Sex (sharks only) was determined when possible. Biological samples (e.g. otoliths,

vertebrae, reproductive organs, stomach), when taken, were removed and placed on ice after collection. Data and samples were submitted to the NMFS Southeast Fisheries Science Center (SEFSC), Panama City staff immediately upon completion of observed trips. The data were entered and proofed by SEFSC staff, examined by NMFS/SEFSC Sustainable Fisheries Division staff, and reviewed with observer contract staff to resolve any questions.

Results

A total of 237 sets comprising various gillnet fisheries were observed in 2014. Set locations ranged from North Carolina to the Florida Keys in the Atlantic Ocean and the Gulf of Mexico (Figures 1-3). Location-specific reports of trips cannot be documented herein due to vessel confidentiality laws, therefore observations are summarized by gear type. Weights for shark and teleost catch referenced herein (Tables 4 and 5) were back-calculated using estimated length (cm FL) measurements and length-weight conversions (Wigley et al. 2003; NMFS, unpublished data).

Drift gillnet fishery

A total of 2 gillnet vessels were observed making 6 drift sets on 6 trips in 2014. Vessels either targeted sharks or Spanish mackerel. In previous years, drift gillnets have been used to target large and small coastal sharks and mackerel species. Drift gillnet effort does still occur to some extent in the fishery, but has been limited by changes to shark regulations (NMFS 2007, 2010). Further presentation of the data was not possible due to violation of vessel confidentiality.

Strike gillnet fishery

A total of 3 gillnet vessels were observed making 11 strike sets on 7 trips in 2014. These vessels targeted king mackerel exclusively. Vessels fished with nets ranging 32.0 – 640.1 m (105 - 2100 ft) long, net depths of 21.3 – 25.3 m (70 – 83 ft) and stretched mesh sizes 11.4 – 12.1 cm (4.5 – 4.75 in). Set duration averaged 0.05 hr (0.04 S.D.). Hauls averaged 10.81 hr (11.65 S.D.). The entire fishing process (time net was first set until time haul back was completed) averaged 18.91 hr (12.91 S.D.). Sets were made in waters averaging 18.3 m (0.5 S.D.) deep. The distribution of observed strike gillnet fishing effort is illustrated in Figure 1.

Observed strike gillnet fishery catches

Catch composition by number of all king mackerel targeted sets was 99.97 % teleosts and 0.03 % elasmobranchs (Table 1). Catch was almost completely composed of king mackerel, (99.78 %). Other catch by number included little tunny, *Euthynnus alletteratus*, (0.14 %), bonito, *Sarda sarda*, (0.08 %), and red grouper, *Epinephelus morio* (0.01 %). Shark catch by number was made up of blacktip shark, *Carcharhinus limbatus*, (80.00 %), and Requiem shark family, *Carcharhinidae*, (20.00 %). Shark catch by weight (Table 4) was blacktip shark (49.80 %) and Requiem shark family (50.20 %). Catches by weight of commercially important teleosts are given in Table 5.

Average size from strike gillnet sets

Average (S.D.) fork lengths of teleosts caught in king mackerel targeted sets ranged from 52.3 cm (4.7) for bonito to 91.3 cm (13.5) for king mackerel. There were no sharks directly

measured in strike gillnet sets. The average (S.D.) lengths of teleosts ($n \geq 5$) measured in king mackerel targeted sets can be found in Table 7.

Sink gillnet fishery

A total of 48 trips totaling 220 sink net sets on 16 vessels were observed in 2014. Trips were made targeting one or more of the following: Spanish mackerel, mixed teleosts (including Atlantic croaker, *Micropogonias undulatus*, Atlantic cutlassfish, *Trichiurus lepturus*, bluefish, Southern kingfish, *Menticirrhus americanus*, and spot, *Leiostomus xanthurus*), and sharks.

Spanish mackerel targeted sink gillnet

Twenty nine observed trips were made on 10 vessels for a total of 163 sink gillnet sets targeting Spanish mackerel. Vessels fished with nets ranging 91.4 – 731.5 m (300 - 2400 ft) long, net depths of 2.7 – 7.4 m (8.8 – 24.4 ft) and stretched mesh sizes 7.6 – 8.9 cm (3.0 – 3.5 in). Set duration averaged 0.05 hr (0.03 S.D.). Hauls averaged 0.55 hr (1.88 S.D.). The entire fishing process (time net was first set until time haul back was completed) averaged 1.82 hr (1.61 S.D.). Sets were made in waters averaging 8.4 m (3.6 S.D.) deep. Observed Spanish mackerel targeted sink gillnet fishing effort is illustrated in Figure 2. Thirty-five sets were excluded due to vessel confidentiality.

Observed Spanish mackerel targeted sink gillnet catches

Catch composition by number of all Spanish mackerel targeted sets was 96.17 % teleosts, 3.21 % elasmobranchs, 0.53 % batoids, 0.08 % invertebrates, and 0.01 marine mammals. (Table 2). By number, shark catch was made up of Atlantic sharpnose shark, *Rhizoprionodon*

terraenovae, (62.76 %), bonnethead shark, *Sphyrna tiburo*, (18.02 %), and blacktip shark, *Carcharhinus limbatus*, (9.01 %). By weight the shark catch was made up of blacktip shark (54.7 %), followed by bonnethead shark (15.8 %) and blacknose shark, *Carcharhinus acronotus*, (8.6 %). Catches by weight of sharks are given in Table 4. Spanish mackerel made up 62.35 % of the teleost catch by number, followed by Atlantic menhaden, *Brevoortia tyrannus*, (9.72 %), bluefish (6.70 %), and Atlantic bumper, *Chloroscombrus chrysurus* (3.92 %). Catches by weight of commercially important teleosts can be found in Table 5.

Average size from Spanish mackerel targeted sets

Average (S.D.) fork lengths of sharks caught in Spanish mackerel targeted sets ranged from 41.2 cm (13.9) for Atlantic sharpnose shark to 95.7 cm (4.7) for blacktip shark. The average (S.D.) lengths of sharks measured by target can be found in Table 6. Average (S.D.) fork lengths of teleosts caught in Spanish mackerel targeted sets ranged from 13.2 cm (2.7) for spadefish *Chaetodipterus faber*, to 73.9 cm (27.8) for Atlantic cutlassfish. Average (S.D.) lengths of teleosts ($n \geq 5$) measured by target can be found in Table 7.

Protected resources interactions from Spanish mackerel targeted sets

One interaction with protected resources was documented in 163 sets observed targeting Spanish mackerel with sink gillnets in 2014. One bottlenose dolphin, *Tursiops truncatus*, was caught and released dead (0.01 % of the total catch; Table 2).

Mixed teleost and shark targeted sink gillnet

Nineteen observed trips were made on 7 vessels for a total of 57 sink gillnet sets. Vessels fished with nets 274.3 – 1371.6 m (900 – 4500 ft) long, net depths of 1.6 – 58.8 m (5.2 – 193.0 ft) and stretched mesh sizes 6.4 – 14.0 cm (2.5 – 5.5 in). Set duration averaged 0.10 hr (0.03 S.D.). Hauls averaged 0.83 hr (0.38 S.D.). The entire fishing process (time net was first set until time haul back was completed) averaged 6.62 hr (2.91 S.D.). Sets were made in waters averaging 11.8 m (1.14 S.D.) deep. Observed mixed teleost and shark targeted sink gillnet fishing effort is illustrated in Figure 3.

Observed mixed teleost and shark targeted sink gillnet catches

Catch composition by number of all mixed teleost and shark targeted sets was 77.26 % teleosts, 21.47 % elasmobranchs, 1.19 % invertebrates, and 0.08 % batoids (Table 3). By number, shark catch was comprised of spiny dogfish, *Squalus acanthias*, (84.16 %) and Atlantic sharpnose shark (2.77 %). By weight the shark catch was spiny dogfish (97.24 %), Atlantic sharpnose shark (9.41 %), and blacknose shark (2.06 %). (Table 4). Atlantic croaker made up 34.39 % of the teleost catch, by number, followed by Atlantic cutlassfish (24.66 %), and southern kingfish (15.73 %). Catches by weight of commercially important teleosts can be found in Table 5.

Average size from mixed teleost and shark targeted sets

Average (S.D.) fork lengths of sharks caught in mixed teleost and shark targeted sets ranged from 28.0 cm (0.0) for smooth dogfish, *Mustelus canis*, to 99.0 cm (0.0) for common thresher shark, *Alopias vulpinus*. The average (S.D.) lengths of sharks measured by target can be

found in Table 6. Average (S.D.) fork lengths of teleosts caught in mixed teleost and shark targeted sets ranged from 11.3 cm (1.3) for Atlantic butterfish, to 120.3 cm (10.0) for Atlantic cutlassfish (Table 7).

Discussion

The trend of declining effort in the LCS targeted gillnet fishery continued to be observed in 2014. Strike gillnet gear was observed exclusively in teleost (king mackerel) targeted sets. There was a small amount of drift gillnet effort observed, due to a small fleet that still utilizes this gear. The majority of sink gillnet fishers continued to target teleost species. Incidental take of protected species remained a rare occurrence, with one incidental take of a bottlenose dolphin observed in 2014. The SGOP continues to monitor catch and bycatch as the southeast US gillnet fishery continues to adapt to changing regulations.

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Table 1. Total strike gillnet catch from king mackerel targeted sets by species and species disposition in order of decreasing abundance for all observed trips, 2014. Catch disposition is by percent kept (Kept %), percent discarded alive (D.A. %), and percent discarded dead (D.D. %).

Species Caught	Common Name	Total Number Caught	Kept (%)	D.A. (%)	D.D. (%)
<i>Scomberomorus cavalla</i>	King mackerel	14475	63.6	0.0	36.4
<i>Euthynnus alletteratus</i>	Little tunny	20	0.0	0.0	100.0
<i>Sarda sarda</i>	Bonito	11	100.0	0.0	0.0
<i>Carcharhinus limbatus</i>	Blacktip shark	4	0.0	0.0	100.0
<i>Carcharhinidae</i>	Requiem shark family	1	0.0	100.0	0.0
<i>Epinephelus morio</i>	Red grouper	1	0.0	0.0	100.0

Table 2. Total sink gillnet catch from Spanish mackerel targeted sets by species and species disposition in order of decreasing abundance for all observed trips, 2014. Catch disposition is by percent kept (Kept %), percent discarded alive (D.A. %), and percent discarded dead (D.D. %).

Species Caught	Common Name	Total Number Caught	Kept (%)	D.A. (%)	D.D. (%)
<i>Scomberomorus maculatus</i>	Spanish mackerel	6233	79.7	0.0	20.3
<i>Brevoortia tyrannus</i>	Atlantic menhaden	972	54.6	9.1	36.4
<i>Pomatomus saltatrix</i>	Bluefish	670	89.3	1.3	9.3
<i>Chloroscombrus chrysurus</i>	Atlantic bumper	392	15.8	63.2	21.1
<i>Selene setapinnis</i>	Moonfish	353	42.9	42.9	14.3
<i>Trichiurus lepturus</i>	Atlantic cutlassfish	344	100.0	0.0	0.0
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	209	2.9	66.2	30.9
<i>Peprilus alepidotus</i>	Harvestfish	181	90.5	9.5	0.0
<i>Peprilus triacanthus</i>	Atlantic butterflyfish	161	90.6	6.3	3.1
<i>Lagodon rhomboides</i>	Pinfish	111	0.0	100.0	0.0
<i>Auxis thaza</i>	Frigate mackerel	74	100.0	0.0	0.0
<i>Leiostomus xanthurus</i>	Spot	68	90.0	0.0	10.0
<i>Sphyrna tiburo</i>	Bonnethead shark	60	0.0	61.5	38.5
<i>Synodus foetens</i>	Inshore lizardfish	58	0.0	22.2	77.8
<i>Larimus fasciatus</i>	Banded drum	44	9.5	42.9	47.6
<i>Menticirrhus americanus</i>	Southern kingfish	35	94.4	0.0	5.6
<i>Carcharhinus limbatus</i>	Blacktip shark	30	20.0	40.0	40.0
<i>Caranx crysos</i>	Bluerunner jack	29	86.7	6.7	6.7
<i>Chaetodipterus faber</i>	Spadefish	28	0.0	63.6	36.4
<i>Raja eglanteria</i>	Clearnose skate	25	0.0	66.7	33.3
<i>Micropogonias undulatus</i>	Atlantic croaker	22	66.7	26.7	6.7
<i>Opisthonema oglinum</i>	Atlantic thread herring	20	0.0	0.0	100.0
<i>Rhinoptera bonasus</i>	Cownose ray	20	0.0	60.0	40.0
<i>Carcharhinus acronotus</i>	Blacknose shark	19	0.0	88.9	11.1
<i>Euthynnus alletteratus</i>	Little tunny	17	100.0	0.0	0.0
<i>Cynoscion regalis</i>	Weakfish seatrout	15	57.1	0.0	42.9
<i>Tylosurus crocodilus</i>	Houndfish	15	80.0	20.0	0.0
<i>Archosargus probatocephalus</i>	Sheepshead	14	25.0	75.0	0.0
<i>Trachinotus carolinus</i>	Florida pompano	14	37.5	50.0	12.5
<i>Caranx hippos</i>	Crevalle jack	13	77.8	0.0	22.2
<i>Paralichthys dentatus</i>	Summer Flounder	13	10.0	70.0	20.0
<i>Seriola zonata</i>	Banded rudderfish	13	0.0	37.5	62.5
<i>Scomberomorus cavalla</i>	King mackerel	11	88.9	0.0	11.1
<i>Dasyatis americana</i>	Southern stingray	10	0.0	100.0	0.0
<i>Rachycentron canadum</i>	Cobia	10	14.3	14.3	71.4
<i>Brevoortia smithi</i>	Yellowfin menhaden	7	0.0	0.0	100.0
<i>Cynoscion sp.</i>	Seatrouts	6	60.0	0.0	40.0
<i>Menticirrhus saxatilis</i>	Northern kingfish	6	100.0	0.0	0.0
<i>Carcharhius taurus</i>	Sand tiger shark	5	0.0	100.0	0.0
<i>Prionotus sp.</i>	Searobins	5	0.0	100.0	0.0

<i>Callinectes sapidus</i>	Blue crab	4	0.0	66.7	33.3
<i>Decapoda</i>	Crab	4	0.0	100.0	0.0
<i>Alectis ciliaris</i>	African pompano	3	0.0	0.0	100.0
<i>Arius felis</i>	Hardhead catfish	3	0.0	100.0	0.0
<i>Bagre marinus</i>	Gafftopsail catfish	3	0.0	100.0	0.0
<i>Carcharhinus brevipinna</i>	Spinner shark	3	0.0	66.7	33.3
<i>Mustelus canis</i>	Smooth dogfish	3	0.0	33.3	66.7
<i>Cynoscion nothus</i>	Silver seatrout	2	0.0	100.0	0.0
<i>Echeneis naucrates</i>	Sharksucker	2	0.0	0.0	100.0
<i>Elops saurus</i>	Ladyfish	2	0.0	0.0	100.0
<i>Orthopristis chrysoptera</i>	Pigfish	2	0.0	100.0	0.0
<i>Sphyrna lewini</i>	Scalloped hammerhead shark	2	0.0	100.0	0.0
<i>Aluterus monoceros</i>	Unicorn filefish	1	0.0	100.0	0.0
<i>Carcharhinidae</i>	Requiem shark family	1	0.0	100.0	0.0
<i>Carcharhinus plumbeus</i>	Sandbar shark	1	0.0	100.0	0.0
<i>Echeneidae</i>	Remora family	1	0.0	100.0	0.0
<i>Selene vomer</i>	Lookdown	1	0.0	100.0	0.0
<i>Sphyrna barracuda</i>	Great barracuda	1	100.0	0.0	0.0
<i>Synodontidae</i>	Lizardfish family	1	0.0	100.0	0.0
<i>Tursiops truncatus</i>	Bottlenose dolphin	1	0.0	0.0	100.0

Table 3. Total sink gillnet catch from mixed teleost and shark targeted sets by species and species disposition in order of decreasing abundance for all observed trips, 2014. Catch disposition is by percent kept (Kept %), percent discarded alive (D.A. %), and percent discarded dead (D.D. %).

Species Caught	Common Name	Total Number Caught	Kept (%)	D.A. (%)	D.D. (%)
<i>Micropogonias undulatus</i>	Atlantic croaker	2938	100.0	0.0	0.0
<i>Squalus acanthias</i>	Spiny dogfish	1998	90.1	9.9	0.0
<i>Menticirrhus americanus</i>	Southern kingfish	1344	100.0	0.0	0.0
<i>Leiostomus xanthurus</i>	Spot	1329	100.0	0.0	0.0
<i>Brevoortia tyrannus</i>	Atlantic menhaden	288	89.2	0.0	10.8
<i>Peprilus triacanthus</i>	Atlantic butterfish	268	100.0	0.0	0.0
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	217	73.7	26.3	0.0
<i>Pomatomus saltatrix</i>	Bluefish	104	100.0	0.0	0.0
<i>Scyphozoa</i>	Jellyfish	77	0.0	100.0	0.0
<i>Callinectes sapidus</i>	Blue crab	52	0.0	100.0	0.0
<i>Carcharhinus acronotus</i>	Blacknose shark	49	100.0	0.0	0.0
<i>Sphyrna tiburo</i>	Bonnethead shark	46	66.7	0.0	33.3
<i>Sphyrna lewini</i>	Scalloped hammerhead shark	38	75.0	25.0	0.0
<i>Carcharhinus limbatus</i>	Blacktip shark	20	50.0	50.0	0.0
<i>Cynoscion regalis</i>	Weakfish seatrout	18	100.0	0.0	0.0
<i>Euthynnus alletteratus</i>	Little tunny	8	100.0	0.0	0.0
<i>Hippocampus erectus</i>	Lined seahorse	6	0.0	100.0	0.0
<i>Raja eglanteria</i>	Clearnose skate	6	0.0	100.0	0.0
<i>Scomber scombrus</i>	Atlantic mackerel	6	100.0	0.0	0.0
<i>Decapoda</i>	Shrimp	3	100.0	0.0	0.0
<i>Lophius sp.</i>	Monkfish anglerfish	3	100.0	0.0	0.0
<i>Scomberomorus cavalla</i>	King mackerel	3	100.0	0.0	0.0
<i>Scomberomorus maculatus</i>	Spanish mackerel	2	100.0	0.0	0.0
<i>Mustelus canis</i>	Smooth dogfish	2	0.0	100.0	0.0
<i>Carcharhinus isodon</i>	Finetooth shark	2	100.0	0.0	0.0
<i>Carcharias taurus</i>	Sand tiger shark	1	0.0	100.0	0.0
<i>Synodus foetens</i>	Inshore lizardfish	1	0.0	100.0	0.0
<i>Dasyatis americana</i>	Southern stingray	1	0.0	100.0	0.0
<i>Myliobatis sp.</i>	Eagle rays	1	0.0	100.0	0.0
<i>Rhinoptera bonasus</i>	Cownose ray	1	0.0	100.0	0.0

Table 4. Estimated shark catch by weight (kg), back-calculated from estimated lengths of all sharks observed caught in sink and strike (king mackerel) gillnet gear by target, 2014.

Target Species	Species Caught	Common Name	Total Number Caught	kg	%
King mackerel	<i>Carcharhinus limbatus</i>	Blacktip shark	4	28.23	49.8
	<i>Carcharhinidae</i>	Requiem shark family	1	28.46	50.2
		Total	5	56.69	-
Spanish mackerel	<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	209	14.74	3.9
	<i>Sphyrna tiburo</i>	Bonnethead shark	60	58.37	15.3
	<i>Carcharhinus limbatus</i>	Blacktip shark	30	201.77	52.8
	<i>Carcharhinus acronotus</i>	Blacknose shark	19	31.77	8.3
	<i>Carcharhias taurus</i>	Sand tiger shark	5	20.99	5.5
	<i>Carcharhinus brevipinna</i>	Spinner shark	3	21.50	5.6
	<i>Mustelus canis</i>	Smooth dogfish	3	1.69	0.4
	<i>Sphyrna lewini</i>	Scalloped hammerhead shark	2	13.20	3.5
	<i>Carcharhinidae</i>	Requiem shark family	1	13.55	3.5
	<i>Carcharhinus plumbeus</i>	Sandbar shark	1	4.84	1.3
		Total	333	382.42	-
Mixed teleosts and sharks	<i>Squalus acanthias</i>	Spiny dogfish	1998	2709.80	71.0
	<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	217	587.68	15.4
	<i>Carcharhinus acronotus</i>	Blacknose shark	49	190.95	5.0
	<i>Sphyrna tiburo</i>	Bonnethead shark	46	54.28	1.4
	<i>Sphyrna lewini</i>	Scalloped hammerhead shark	38	99.05	2.6
	<i>Carcharhinus limbatus</i>	Blacktip shark	20	113.38	3.0
	<i>Mustelus canis</i>	Smooth dogfish	2	0.59	0.0
	<i>Carcharhinus isodon</i>	Finetooth shark	2	23.66	0.6
	<i>Alopias vulpinus</i>	Common thresher shark	1	23.21	0.6
	<i>Carcharhias taurus</i>	Sand tiger shark	1	15.14	0.4
		Total	2374	3817.73	-

Table 5. Estimated catch by weight (kg) of commercially important teleosts, back-calculated from estimated lengths of all individuals observed caught in sink and strike (king mackerel) gillnet gear by target, 2014.

Target Species	Species Caught	Common Name	Total Number Caught	kg
King mackerel	<i>Scomberomorus cavalla</i>	King mackerel	14475	75347.12
	<i>Euthynnus alletteratus</i>	Little tunny	20	28.74
Spanish mackerel	<i>Scomberomorus maculatus</i>	Spanish mackerel	6233	5479.21
	<i>Brevoortia tyrannus</i>	Atlantic menhaden	972	78.22
	<i>Pomatomus saltatrix</i>	Bluefish	670	592.59
	<i>Chloroscombrus chrysurus</i>	Atlantic bumper	392	23.51
	<i>Peprilus triacanthus</i>	Atlantic butterfish	161	10.64
	<i>Larimus fasciatus</i>	Banded drum	44	2.12
	<i>Menticirrhus americanus</i>	Southern kingfish	35	15.59
	<i>Chaetodipterus faber</i>	Spadefish	28	3.13
	<i>Micropogonias undulatus</i>	Atlantic croaker	22	2.03
	<i>Euthynnus alletteratus</i>	Little tunny	17	19.85
	<i>Cynoscion regalis</i>	Weakfish seatrout	15	8.71
	<i>Scomberomorus cavalla</i>	King mackerel	11	35.54
	<i>Rachycentron canadum</i>	Cobia	10	47.91
	<i>Cynoscion sp.</i>	Seatrouts	6	4.30
	<i>Prionotus sp.</i>	Searobins	5	0.14
Mixed teleosts and sharks	<i>Micropogonias undulatus</i>	Atlantic croaker	2938	121.53
	<i>Menticirrhus americanus</i>	Southern kingfish	1344	37.83
	<i>Leiostomus xanthurus</i>	Spot	1329	75.47
	<i>Brevoortia tyrannus</i>	Atlantic menhaden	288	17.27
	<i>Peprilus triacanthus</i>	Atlantic butterfish	268	17.70
	<i>Pomatomus saltatrix</i>	Bluefish	104	9.14
	<i>Cynoscion regalis</i>	Weakfish seatrout	18	0.60
	<i>Euthynnus alletteratus</i>	Little tunny	8	8.72
	<i>Lophius sp.</i>	Monkfish anglerfish	3	4.54
	<i>Scomberomorus cavalla</i>	King mackerel	3	12.69
	<i>Scomberomorus maculatus</i>	Spanish mackerel	2	8.27

Table 6. Average size (fork length, FL) and standard deviation (S.D.) of sharks measured for all observed sink and strike (king mackerel) gillnet trips by target, 2014.

Target	Species	Common Name	n	Avg FL (cm)	S.D.
Spanish mackerel	<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	79	41.2	13.9
	<i>Sphyrna tiburo</i>	Bonnethead shark	36	74.1	11.0
	<i>Carcharhinus limbatus</i>	Blacktip shark	7	95.7	4.7
	<i>Carcharhinus acronotus</i>	Blacknose shark	6	79.2	9.0
	<i>Carcharhinus brevipinna</i>	Spinner shark	3	68.3	5.1
	<i>Mustelus canis</i>	Smooth dogfish	2	50.0	1.4
	<i>Sphyrna lewini</i>	Scalloped hammerhead shark	2	77.5	24.8
	<i>Carcharhinus plumbeus</i>	Sandbar shark	1	63.0	0.0
Mixed teleosts and sharks	<i>Squalus acanthias</i>	Spiny dogfish	132	56.9	7.3
	<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	32	61.2	7.9
	<i>Sphyrna lewini</i>	Scalloped hammerhead shark	3	65.3	2.1
	<i>Carcharhinus limbatus</i>	Blacktip shark	2	90.0	24.0
	<i>Mustelus canis</i>	Smooth dogfish	1	28.0	0.0
	<i>Alopias vulpinus</i>	Common thresher shark	1	99.0	0.0

Table 7. Average size (fork length, FL) and standard deviation (S.D.) of non-sharks measured for all observed sink and strike (king mackerel) gillnet trips by target, 2014, where sample size ≥ 5 .

Target	Species	Common Name	n	Avg FL (cm)	S.D.
King mackerel	<i>Scomberomorus cavalla</i>	King mackerel	70	91.3	13.5
	<i>Sarda sarda</i>	Bonito	8	52.3	4.7
Spanish mackerel	<i>Scomberomorus maculatus</i>	Spanish mackerel	745	41.5	6.4
	<i>Pomatomus saltatrix</i>	Bluefish	290	34.0	5.5
	<i>Brevoortia tyranus</i>	Atlantic menhaden	116	22.4	4.9
	<i>Trichiurus lepturus</i>	Atlantic cutlassfish	74	73.9	27.8
	<i>Peprilus alepidotus</i>	Harvestfish	60	16.9	5.3
	<i>Peprilus triacanthus</i>	Atlantic butterfish	39	16.9	2.8
	<i>Menticirrhus americanus</i>	Southern kingfish	34	27.3	4.3
	<i>Leiostomus xanthurus</i>	Spot	32	21.3	3.5
	<i>Caranx crysos</i>	Bluerunner jack	25	28.5	2.3
	<i>Chloroscombrus chrysurus</i>	Atlantic bumper	25	17.5	2.1
	<i>Auxis thaza</i>	Frigate mackerel	20	22.6	2.8
	<i>Larimus fasciatus</i>	Banded drum	17	21.7	3.3
	<i>Euthynnus alletteratus</i>	Little tunny	16	37.6	16.6
	<i>Cynoscion regalis</i>	Weakfish seatrout	14	30.4	4.0
	<i>Micropogonias undulatus</i>	Atlantic croaker	14	20.8	5.9
	<i>Selene setapinnis</i>	Moonfish	14	19.1	1.4
	<i>Tylosurus crocodilus</i>	Houndfish	14	57.8	5.8
	<i>Caranx hippos</i>	Crevalle jack	11	24.8	4.3
	<i>Rachycentron canadum</i>	Cobia	10	69.6	14.9
	<i>Scomberomorus cavalla</i>	King mackerel	10	67.7	4.5
	<i>Paralichthys dentatus</i>	Summer Flounder	9	29.9	5.0
	<i>Synodus foetens</i>	Inshore lizardfish	9	32.9	6.4
	<i>Rhinoptera bonasus</i>	Cownose ray	8	73.6	5.4
	<i>Cynoscion sp.</i>	Seatrouts	6	33.8	4.4
<i>Chaetodipterus faber</i>	Spadefish	5	13.2	2.7	
<i>Menticirrhus saxatilis</i>	Northern kingfish	5	33.6	3.1	
Mixed teleosts and sharks	<i>Micropogonias undulatus</i>	Atlantic croaker	149	22.2	2.2
	<i>Menticirrhus americanus</i>	Southern kingfish	121	20.8	1.9
	<i>Leiostomus xanthurus</i>	Spot	106	15.6	2.0
	<i>Brevoortia tyranus</i>	Atlantic menhaden	79	21.1	2.5
	<i>Pomatomus saltatrix</i>	Bluefish	69	26.4	4.1
	<i>Trichiurus lepturus</i>	Atlantic cutlassfish	65	120.3	10.0
	<i>Peprilus triacanthus</i>	Atlantic butterfish	40	11.3	1.3
	<i>Caranx crysos</i>	Bluerunner jack	27	24.5	3.0
	<i>Cynoscion regalis</i>	Weakfish seatrout	18	24.1	1.5
	<i>Euthynnus alletteratus</i>	Little tunny	8	30.9	1.6
	<i>Scomber scombrus</i>	Atlantic mackerel	6	22.7	1.6

Figure 1. Distribution of observed strike gillnet sets targeting king mackerel, *Scomberomorus cavalla*, 2014 (n=11 sets).

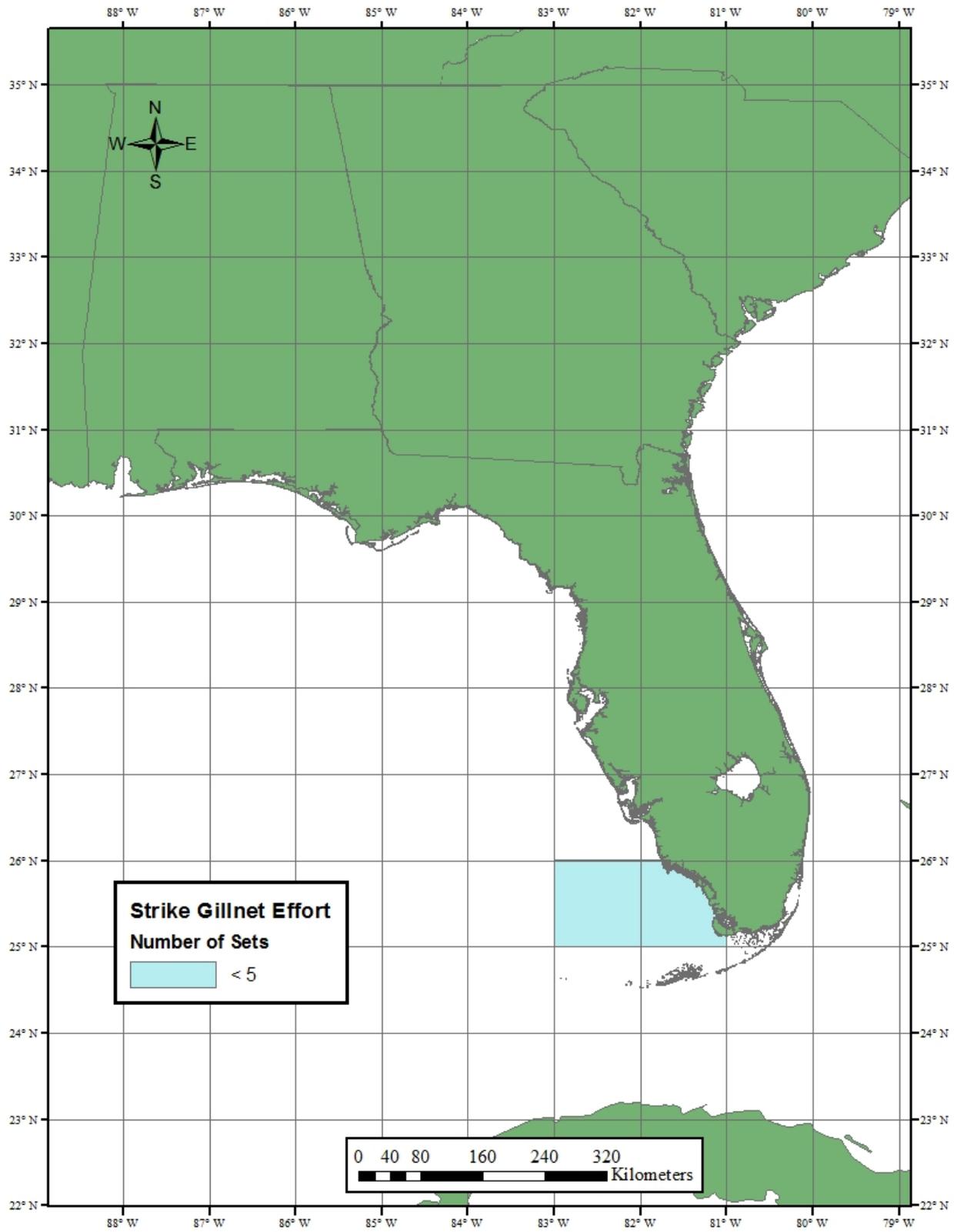


Figure 2. Distribution of observed sink gillnet sets targeting Spanish mackerel, *Scomberomorus maculatus*, 2014 (n=129 sets).

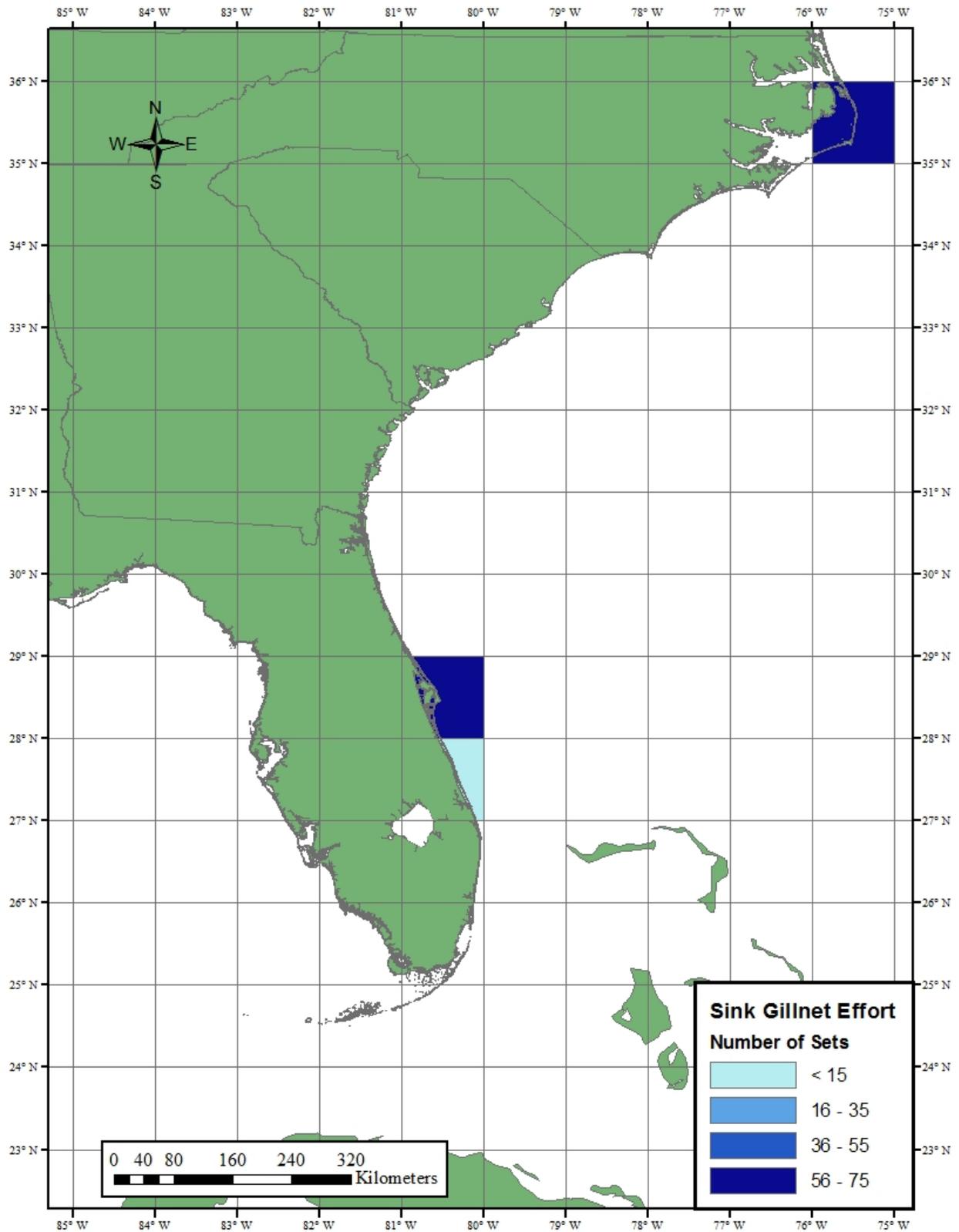


Figure 3. Distribution of observed sink gillnet sets targeting mixed teleost and shark, 2014 (n=57 sets).

