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Introduction

Observations of the catch and bycatch from the Florida-Georgia shark gillnet fishery are required by law, and reports are prepared annually (e.g. Carlson and Bethea 2007 and references therein). Previously, the Atlantic Large Whale Take Reduction Plan and the Biological Opinion issued under Section 7 of the Endangered Species Act mandated 100% observer coverage of the southeast shark drift gillnet fishery during the right whale, *Eubalaena glacialis*, calving season (15 Nov-31 Mar). Outside the right whale calving season (1 Apr-14 Nov), an interim final rule (March 30, 2001; 66 FR 17370) to the Fishery Management Plan for Highly Migratory Species (NMFS, 1999) established a level of observer coverage for these vessels equal to that which would attain a sample size needed to provide estimates of sea turtle or marine mammal interactions with an expected coefficient of variation of 0.3.

In 2005, the shark gillnet observer program was expanded to include all vessels that have an active directed shark permit and fish with sink gillnet gear. These vessels were not previously subject to observer coverage because they either were targeting non-highly migratory species or were not fishing gillnets in a drift or strike fashion. These vessels were selected for observer coverage in an effort to determine their impact on finetooth shark, *Carcharhinus isodon*, landings and their overall fishing impact on shark resources when the gear is not targeting sharks. In 2006, the National Marine Fisheries Service (NMFS) Southeast Regional Office requested further expansion of the scope of the shark gillnet observer program to include all vessels fishing gillnets regardless of target, and for coverage to be extended to cover the full geographic range of gillnet fishing effort in the southeast United States. This was requested because of the need to monitor (at statistically adequate levels) all gillnet fishing effort to assess risks to right whales and other protected species. Further, in 2007 the regulations implementing

the Atlantic Large Whale Take Reduction Plan were amended to include the removal of the mandatory 100% observer coverage for drift gillnet vessels during the right whale calving season and to prohibit all gillnets in an expanded southeast U.S. restricted area from Cape Canaveral, Florida to the North Carolina/South Carolina border during November 15 - April 15. The rule does possess limited exemptions, only in waters south of 29 degrees N latitude, for shark strikenet fishing during this same period and for Spanish mackerel, *Scomberomorus maculatus*, gillnet fishing in the months of December and March. Based on these regulations and on current funding levels, the shark gillnet observer program now covers all anchored (sink, stab, set), strike, or drift gillnet fishing by vessels that fish from Florida to North Carolina and Gulf of Mexico year-round.

Herein, we summarize fishing effort and catch and bycatch in these fisheries during December 2007 - November 2008, collectively referred to as '2008'.

Methods

Observer protocol

Vessels were selected on a seasonal basis (winter, spring, summer, fall) randomly from a pool of vessels that had either a current directed or incidental shark fishing permit and reported fishing with gillnet gear during the previous year. Selection letters notifying permit holders of required observer coverage were issued via U.S. Certified mail approximately one month prior to the upcoming season. 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 season. 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 permit holder's vessel. As trips are generally daily, the observer remained assigned to the vessel for up to 14 days to attain a sufficient level of coverage.

Observations were made as the net was hauled aboard. The observer remained approximately 1-5 m forward of the stern of the vessel in a position with an unobstructed view and recorded species and numbers caught. When species identification was questionable, the crew stopped hauling so that the observer could examine the animal(s) for positive identification. Disposition of each species brought onboard was recorded as kept, discarded alive, or discarded dead. When time permitted after the haulback was complete, observers randomly measured 10 individuals from each species caught while the vessel was returning to port. Fork length (FL, measured on a straight line) in cm and sex (sharks only) were determined when possible. Biological samples (e.g. otoliths, vertebrae, reproductive organs, stomach) were removed and placed on ice after collection. Data were submitted to the NMFS Southeast Fisheries Science Center (SEFSC), Panama City staff on a weekly basis. 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

Observations of various gillnet fisheries were made in 2008 from North Carolina to the Florida Keys (Figures 1-3). On-board observations were also made on vessels fishing in the northern Gulf of Mexico. However, reports of those trips cannot be documented herein due to violation of vessel confidentiality

Drift gillnet fishery

A total of 5 drift gillnet vessels were observed making 68 sets on 9 trips in 2008. Vessels targeted one or more of the following: smooth dogfish *Mustelus canis*, Spanish mackerel, and king mackerel *Scomberomorous cavalla*. Refinement of the data by target species was not possible due to violation of vessel confidentiality. The distribution of observed drift gillnet fishing effort is illustrated in Figure 1. The lengths of the nets on drift net vessels for all targets ranged from 183 – 823 m (600-2700 ft), with net depths of 3.1 – 6.1 m (10 – 20 ft). Mesh sizes ranged from 7.6 – 15.2 cm (3 - 6 in). The average set time was 0.08 hr (0.02 S.D.), and haul time was 0.37 hr (0.24 S.D.). The total process, from the time that the net went in the water until the haul back was completed, averaged 2.70 hr (1.93 S.D.).

Observed drift gillnet catches

Total observed catch composition for all drift sets was 74.9 % shark, 22.2 % teleosts, 1.8 % non-shark elasmobranchs, and 0.0 % protected resources (i.e. marine mammals, sea turtles, smalltooth sawfish) (Table 1). Two species of sharks made up 99.1 % (by number) of the total observed shark catch: smooth dogfish (87.2 %), and spiny dogfish, *Squalus acanthias* (11.8 %). Composition of shark catch by weight was similar, composed of smooth dogfish (87.7 %),

followed by spiny dogfish (10.2 %), and Atlantic sharpnose shark, *Rhizoprionodon terraenovae* (0.6 %). Five species of teleosts made up approximately 94 % by number of the overall teleost catch. These species were bluefish, *Pomatomus saltatrix* (43.0 %), Spanish mackerel (33.9 %), butterfish, *Peprilus triacanthus* (7.5 %), menhaden (*Brevoortia* sp., 4.9%), and king mackerel (4.3%).

Strike gillnet fishery

No vessels that targeted sharks were observed fishing gillnets in a strike fashion in 2008. This was likely due to the fishery closure for large coastal sharks from January 1, 2008 – July 24, 2008, in order to correct for overages in landings that occurred during the 2007 season. Historically, strike netting for sharks occurs predominately in winter when the vessels target schools of blacktip sharks, *Carcharhinus limbatus*, off the east coast of Florida (Carlson and Bethea, 2007 and references therein).

A total of 4 trips and 5 sets were observed aboard vessels strike netting for king and Spanish mackerel in 2008. The distribution of observed strike effort is illustrated in Figure 2. Nets used for striking ranged in length from 15.2 – 823 m (50 – 2700 ft) with net depths of 6.7 – 36.6 m (22 – 120 ft) and mesh sizes of 8.9 – 12.7 cm (3.5 – 5 in). Average set time was 0.13 hr (0.08 S.D.) and average haul time was 0.80 hr (0.49 S.D.). Total time for the entire process, from start of set to end of haulback, averaged 3.08 hr (2.18 S.D.).

Net lengths $\leq 91.4\text{m}$ (300 ft) generally indicate use of a “stab” type set in which only a portion of the gear is deployed and then retrieved quickly. These sets may also be referred to as “feeler sets”. Feeler sets accounted for 1 of 5 (20%) strike sets in 2008.

Observed strike gillnet catches

Total observed catch composition for all strike sets was 99.9 % teleosts, 0.1 % sharks, and 0.0 % protected resources. Three species of teleosts made up 99.7 % (by number) of the observed teleost catch: king mackerel (50.5 %), bluefish (48.0 %), and Spanish mackerel (1.2 %) (Table 2). Shark catch was small and was made up of Atlantic sharpnose shark (75%) and scalloped hammerhead shark, *Sphyrna lewini* (25 %) by number. By weight, scalloped hammerhead shark made up 91.3 % of the shark catch, while Atlantic sharpnose shark made up 8.7 %.

Sink gillnet fishery

A total of 41 trips making 134 sink net sets on 14 vessels were observed in 2008. Trips were made targeting one or more of the following: shark, Spanish mackerel, king mackerel, Southern kingfish, *Menticirrhus americanus*, and goosefish (monkfish), *Lophius americanus*. Refinement of the data by target species was not possible due to violation of vessel confidentiality. Observed sink gillnet fishing effort is illustrated in Figure 3.

For all targets, sink gillnet vessels fished with nets ranging 45.7 - 1646 m (150 - 5400 ft) long, net depths of 1.2 – 7.6 m (4 – 25 ft) and stretched mesh sizes 7 - 30.5 cm (2.75 - 12 in). Set duration averaged 0.09 hr (0.04 S.D.). Hauls averaged 0.64 hr (1.10 S.D.). The entire fishing process (time net was first set until time haul back was completed) averaged 2.36 hr (3.80 S.D.). Sets were made in waters averaging 10.5 m (4.6 S.D.) deep.

Observed sink gillnet catches

Catch composition of all sets for all targets was 86.0 % teleosts, 12.0 % shark, 1.7 % non-shark elasmobranchs, and 0.0 % protected resources (Table 3). By number, shark catch was primarily Atlantic sharpnose shark (45.3 %), bonnethead shark, *Sphyrna tiburo* (34.0 %), blacknose shark, *Carcharhinus acronotus*, (8.0 %), and spinner shark, *Carcharhinus brevipinna*, (6.7 %). By weight the shark catch was similar and made up mostly of Atlantic sharpnose shark (35.4 %), followed by bonnethead shark (26.6 %), blacknose shark (13.0 %), and spinner shark (6.6 %). Spanish mackerel made up 45.7 % of the teleost catch by number, followed by bluefish (15.3%), blue runner, *Caranx chrysos* (8.6%), Atlantic bumper, *Chloroscombrus chrysurus*, (8.1 %) and spot, *Leiostomus xanthurus* (5.1 %). Winter skate, *Leucoraja ocellata*, (92.6 %) and cownose ray, *Rhinoptera bonasus*, (3.5 %) made up the majority of the non-shark elasmobranch catch.

Average size

The average (S.D.) lengths of sharks measured by gear type can be found in Table 4. Average (S.D.) fork lengths of sharks caught in the drift gillnet fishery ranged from 43.0 cm (0.0) for dusky sharks, *Carcharhinus plumbeus*, to 157.2 cm (19.0) for thresher sharks, *Alopias vulpinus*. Observed strike sets resulted in measurement of only 1 shark, a 67.0 cm Atlantic sharpnose shark. Average (S.D.) fork lengths of sharks caught in the sink gillnet fishery ranged from 65.0 cm (0.0) for finetooth sharks to 102.8 cm (30.3) for blacktip sharks.

Average (S.D.) lengths of teleosts ($n > 5$) measured by gear type can be found in Table 5. Average (S.D.) fork lengths of teleosts caught in the drift gillnet fishery ranged from 17.2 cm (1.9) for butterfish to 74.9 cm (12.1 S.D.) for king mackerel. King mackerel were also the only

species measured in the strike gillnet fishery, with average fork length of 79.8 cm (12.7). Average (S.D.) fork lengths of teleosts caught in the sink gillnet fishery ranged from 16.7 cm (1.1) for butterfish to 74.8 cm (7.5) for monkfish.

Protected resources interactions

Interactions with protected resources were not observed in 2008.

Discussion

The NMFS HMS Division closed the fishery for large coastal sharks (LCS) from January 1, 2008 – July 24, 2008, in order to correct for overages in landings occurring during the 2007 large coastal shark season. This had a large impact on the gillnet fishery, as many vessels usually strike net for blacktip sharks during the months of January through March. As a result of the closure, many vessels switched to sink gillnet gear and targeted mackerel or small coastal shark, while others either did not fish or used gear other than gillnets to target other species (e.g. cast netting for Spanish mackerel). These changes are reflected in the relatively small number of gillnet trips observed targeting sharks in 2008.

Recent amendments to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan based on updated stock assessments may well eliminate the major directed shark fishery in the U.S. Atlantic. The amendments implement a shark research fishery, which allows the National Marine Fisheries Service (NMFS) to select a limited number of commercial shark vessels on an annual basis to collect life history data, and data for future stock assessments. Furthermore, the revised measures affect quotas, drastically reduce retention limits, and modify the authorized species in commercial shark fisheries. Specifically, commercial shark fishermen

not participating in the research fishery are no longer allowed to land sandbar sharks, *Carcharhinus plumbeus*, which have been the main target species for most fishermen in the past. Additionally, commercial fishermen are required to maintain shark fins naturally attached to the shark carcass through landing. While most gillnet fishers that have historically been observed do not target sandbar sharks, Amendment 2 also institutes a trip limit of 33 non-sandbar large coastal sharks for directed permit holders and 3 non-sandbar LCS for incidental permit holders. Changes to the shark gillnet fishery have occurred as a result of the newly instituted trip limits. Coupled with high fuel prices in the summer and early fall, the lower trip limits for large coastal sharks resulted in fewer trips observed targeting large coastal sharks with gillnet gear.

It is likely the dynamics of the Atlantic shark fishery will continue to change. There is some indication that vessels may attempt to strike net for large coastal sharks in early 2009 (A. Santiago, personal observation). However, vessels that target sharks utilizing strike net gear may find the practice to be cost prohibitive since catch limits have been implemented. Nevertheless, continued observer coverage of these fisheries will contribute to a better understanding of the changing dynamics of this fishery and its impact on all marine resources.

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Table 1. Total drift gillnet catch by species and species disposition in order of decreasing abundance for all observed trips, 2008. Catch disposition is by percent kept (Kept %), percent discarded alive (D.A. %), and percent discarded dead (D.D. %).

Species	Common Name	Total Number Caught	Kept (%)	D.A. (%)	D.D. (%)
<i>Mustelus canis</i>	Smooth dogfish	2331	79.1	20.9	0.0
<i>Pomatomus saltatrix</i>	Bluefish	340	74.1	11.5	14.4
<i>Squalus acanthias</i>	Spiny dogfish	316	0.0	100.0	0.0
<i>Scomberomorus maculatus</i>	Spanish mackerel	268	93.3	0.0	6.7
<i>Peprilus triacanthus</i>	Butterfish	59	98.3	0.0	1.7
<i>Raja eglanteria</i>	Clearnose skate	56	0.0	100.0	0.0
<i>Brevoortia sp</i>	Menhaden	39	0.0	7.7	92.3
<i>Scomberomorus cavalla</i>	King mackerel	34	97.1	0.0	2.9
<i>Scyphozoa</i>	Jellyfishes	34	0.0	100.0	0.0
<i>Micropogonias undulatus</i>	Atlantic croaker	22	0.0	31.8	68.2
<i>Callinectes sapidus</i>	Blue crab	8	0.0	100.0	0.0
<i>Paralichthys sp.</i>	Flounders	8	0.0	100.0	0.0
<i>Rachycentron canadum</i>	Cobia	7	42.9	28.6	28.6
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	7	28.6	71.4	0.0
<i>Alopias vulpinus</i>	Thresher shark	6	100.0	0.0	0.0
<i>Dasyatidae</i>	Stingrays	5	0.0	100.0	0.0
<i>Remora remora</i>	Remora	4	0.0	100.0	0.0
<i>Rhinoptera bonasus</i>	Cownose ray	3	0.0	100.0	0.0
<i>Selene vomer</i>	Lookdown	3	0.0	66.7	33.3
<i>Carcharias taurus</i>	Sand tiger shark	3	0.0	100.0	0.0
<i>Elops saurus</i>	Ladyfish	2	0.0	0.0	100.0
<i>Carcharhinus limbatus</i>	Blacktip shark	2	50.0	50.0	0.0
<i>Carcharhinus plumbeus</i>	Sandbar shark	2	0.0	100.0	0.0
<i>Squatina dumeril</i>	Angel shark	2	0.0	100.0	0.0
<i>Paralichthys sp.</i>	Flounders	2	100.0	0.0	0.0
<i>Chaetodipturus faber</i>	Spadefish	1	0.0	100.0	0.0
<i>Sarda sarda</i>	Atlantic bonito	1	100.0	0.0	0.0
<i>Sciaenops ocellatus</i>	Red drum	1	0.0	100.0	0.0
<i>Carcharhinus acronotus</i>	Blacknose shark	1	0.0	0.0	100.0
<i>Carcharhinus brevipinna</i>	Spinner shark	1	0.0	100.0	0.0
<i>Sphyrna mokarran</i>	Great hammerhead shark	1	0.0	100.0	0.0

Table 2. Total strike gillnet catch by species and species disposition in order of decreasing abundance for all observed trips, 2008. Catch disposition is by percent kept (Kept %), percent discarded alive (D.A. %), and percent discarded dead (D.D. %).

Species	Common Name	Total Number Caught	Kept (%)	D.A. (%)	D.D. (%)
<i>Scomberomorus cavalla</i>	King mackerel	1821	100.0	0.0	0.0
<i>Pomatomus saltatrix</i>	Bluefish	1729	100.0	0.0	0
<i>Scomberomorus maculatus</i>	Spanish mackerel	43	100.0	0.0	0.0
<i>Epinephelus morio</i>	Red grouper	4	25.0	50.0	25.0
<i>Caranx chrysos</i>	Blue Runner	3	100.0	0.0	0.0
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	3	0.0	66.7	33.3
<i>Echeneidae</i>	Remoras	1	0.0	100.0	0
<i>Rachycentron canadum</i>	Cobia	1	0.0	100.0	0
<i>Sarda sarda</i>	Atlantic bonito	1	0.0	0.0	100.0
<i>Spyrna lewini</i>	Scalloped hammerhead shark	1	0.0	0.0	100.0

Table 3. Total sink gillnet catch by species and species disposition in order of decreasing abundance for all observed trips, 2008. Catch disposition is by percent kept (Kept %), percent discard alive (D.A. %), and percent discard dead (D.D. %).

Species	Common Name	Total Number Caught	Kept (%)	D.A. (%)	D.D. (%)
<i>Scomberomorus maculatus</i>	Spanish mackerel	5875	98.3	0.0	1.7
<i>Pomatomus saltatrix</i>	Bluefish	1969	97.1	1.2	1.7
<i>Caranx chrysos</i>	Blue runner	1105	99.3	0.0	0.7
<i>Chloroscombrus chrysurus</i>	Atlantic bumper	1040	86.8	6.6	6.5
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	853	73.4	11.4	15.2
<i>Leiostomus xanthurus</i>	Spot	657	87.5	5.9	6.5
<i>Sphyrna tiburo</i>	Bonnethead	609	86.4	3.9	9.7
<i>Lophius sp.</i>	Goosefish family	414	76.6	1.2	22.2
<i>Brevoortia smithi</i>	Yellowfin menhaden	393	60.8	5.1	34.1
<i>Umbrina coroides</i>	Sand drum	340	0.0	25.0	75.0
<i>Menticirrhus americanus</i>	Southern kingfish	281	98.2	0.0	1.8
<i>Leucoraja ocellata</i>	Winter skate	238	50.0	6.3	43.7
<i>Carcharhinus acronotus</i>	Blacknose shark	143	98.6	1.4	0.0
<i>Carcharhinus brevipinna</i>	Spinner shark	120	55.0	10.8	34.2
<i>Selene setapinnis</i>	Atlantic moonfish	115	59.1	18.3	22.6
<i>Scomberomorus cavalla</i>	King mackerel	115	21.7	2.6	75.7
<i>Micropogonias undulatus</i>	Atlantic croaker	79	78.5	2.5	19.0
<i>Larimus fasciatus</i>	Banded drum	79	16.5	13.9	69.6
<i>Carcharhinus limbatus</i>	Blacktip shark	73	24.7	63.0	12.3
<i>Peprilus triacanthus</i>	Butterfish	57	96.5	3.5	0.0
<i>Paralichthys sp.</i>	Flounder family	49	85.7	8.2	6.1
<i>Caranx hippos</i>	Crevalle jack	34	100.0	0.0	0.0
<i>Trachinotus carolinus</i>	Florida pompano	25	68.0	32.0	0.0
<i>Rachycentron canadum</i>	Cobia	25	28.0	32.0	40.0
<i>Cynoscion regalis</i>	Weakfish	25	84.0	0.0	16.0
<i>Limulus polyphemus</i>	Horseshoe crab	19	0.0	100.0	0.0
<i>Trichiurus lepturus</i>	Atlantic cutlassfish	18	94.4	0.0	5.6
<i>Bairdiella chrysoura</i>	Silver perch	18	77.8	0.0	22.2
<i>Bagre marinus</i>	Gafftopsail catfish	17	0.0	11.8	88.2
<i>Sphyrna lewini</i>	Scalloped hammerhead shark	16	12.5	75.0	12.5
<i>Cynoscion sp.</i>	Seatrout family	15	93.3	0.0	6.7
<i>Scyphozoa</i>	Jellyfish family	14	0.0	0.0	100.0
<i>Menticirrhus littoralis</i>	Gulf kingfish	14	100.0	0.0	0.0
<i>Peprilus alepidotus</i>	Gulf butterfish	12	83.3	0.0	16.7
<i>Brevoortia sp.</i>	Menhaden	10	0.0	0.0	100.0
<i>Rhinoptera bonasus</i>	Cownose ray	9	0.0	100.0	0.0
<i>Prionotus sp.</i>	Sea robins	9	0.0	88.9	11.1
<i>Clupeidae</i>	Herring	9	0.0	22.2	77.8

<i>Squalus acanthias</i>	Spiny dogfish	9	0.0	22.2	77.8
<i>Bramidae</i>	Pomfrets	7	0.0	0.0	100.0
<i>Opisthonema oglinum</i>	Atlantic thread herring	6	16.7	33.3	50.0
<i>Chaetodipturus faber</i>	Spadefish	6	0.0	16.7	83.3
	Unknown teleost-eaten/damaged	6	0.0	0.0	100.0
<i>Selene vomer</i>	Lookdown	5	0.0	0.0	100.0
<i>Elops saurus</i>	Ladyfish	5	80.0	20.0	0.0
<i>Echeneididae</i>	Remoras	6	0.0	100.0	0.0
<i>Carcharhinus isodon</i>	Finetooth shark	4	25.0	75.0	0.0
<i>Rajiformes</i>	Rays	3	0.0	100.0	0.0
<i>Euthynnus alletteratus</i>	Little tunny	3	100.0	0.0	0.0
<i>Carcharhinus obscurus</i>	Dusky shark	3	0.0	0.0	100.0
<i>Tylosurus crocodilus</i>	Houndfish	2	100.0	0.0	0.0
<i>Synodus foetens</i>	Inshore lizardfish	2	0.0	0.0	100.0
<i>Portunidae</i>	Swimming crabs	2	0.0	50.0	50.0
<i>Mobula hypostoma</i>	Devil ray	2	0.0	50.0	50.0
<i>Aetobatis narinari</i>	Spotted eagle ray	2	0.0	100.0	0.0
<i>Mustelus canis</i>	Smooth dogfish	2	0.0	100.0	0.0
<i>Carcharias taurus</i>	Sand tiger shark	2	0.0	100.0	0.0
<i>Rhinobatos lentiginosus</i>	Atlantic guitarfish	1	0.0	100.0	0.0
<i>Paralichthys lethostigma</i>	Southern flounder	1	100.0	0.0	0.0
<i>Orthopristis chrysoptera</i>	Pigfish	1	100.0	0.0	0.0
<i>Myliobatis freminvillei</i>	Bullnose ray	1	0.0	100.0	0.0
<i>Manta birostris</i>	Manta ray	1	0.0	100.0	0.0
<i>Cynoscion nothus</i>	Silver seatrout	1	0.0	0.0	100.0
<i>Conodon nobilis</i>	Barred grunt	1	0.0	100.0	0.0
<i>Aluterus monoceros</i>	Unicorn filefish	1	100.0	0.0	0.0

Table 4. Average size (fork length, FL) and standard deviation (S.D.) of sharks measured for all observed trips by gear type, 2008.

Gear	Species	n	Average FL	
			(cm)	S.D.
Drift gillnet	<i>Alopias vulpinus</i>	6	157.2	19.0
	<i>Carcharhinus acronotus</i>	1	113.0	0.0
	<i>Carcharhinus brevipinna</i>	1	82.0	0.0
	<i>Carcharhinus limbatus</i>	1	93.0	0.0
	<i>Carcharhinus plumbeus</i>	1	43.0	0.0
	<i>Mustelus canis</i>	160	85.3	7.5
	<i>Rhizoprionodon terraenovae</i>	4	75.8	22.4
	<i>Sphyrna lewini</i>	2	80.6	0.0
	<i>Squalus acanthias</i>	43	82.4	8.3
Strike gillnet	<i>Rhizoprionodon terraenovae</i>	1	67.0	0.0
Sink gillnet	<i>Carcharhinus acronotus</i>	9	90.8	6.5
	<i>Carcharhinus brevipinna</i>	26	65.1	7.8
	<i>Carcharhinus isodon</i>	1	65.0	0.0
	<i>Carcharhinus limbatus</i>	5	102.8	30.3
	<i>Carcharhinus obscurus</i>	3	88.3	2.3
	<i>Rhizoprionodon terraenovae</i>	72	77.8	5.5

Table 5. Average size (fork length, FL) and standard deviation (S.D.) of non-sharks measured for all observed trips by gear type, where sample size is great than 5.

Gear	Species	n	Average FL (cm)	S.D.
Drift gillnet	<i>Peprilus triacanthus</i>	41	17.2	1.9
	<i>Pomatomus saltatrix</i>	46	40.6	4.5
	<i>Scomberomorus cavalla</i>	27	74.9	12.1
	<i>Scomberomorus maculatus</i>	157	49.3	4.7
Strike gillnet	<i>Scomberomorus cavalla</i>	28	79.8	12.7
Sink gillnet	<i>Brevoortia smithi</i>	19	22.9	3.3
	<i>Caranx chrysos</i>	54	26.3	2.1
	<i>Leiostomus xanthurus</i>	13	22.2	1.0
	<i>Leucoraja ocellata</i>	40	72.1	17.5
	<i>Lophius sp.</i>	40	74.8	7.5
	<i>Menticirrhus americanus</i>	23	33.3	3.3
	<i>Peprilus triacanthus</i>	33	16.7	1.1
	<i>Pomatomus saltatrix</i>	125	32.9	2.1
	<i>Scomberomorus cavalla</i>	12	69.2	9.4
	<i>Scomberomorus maculatus</i>	191	43.9	7.4

Figure 1. Distribution of observed drift gillnets sets, 2007.

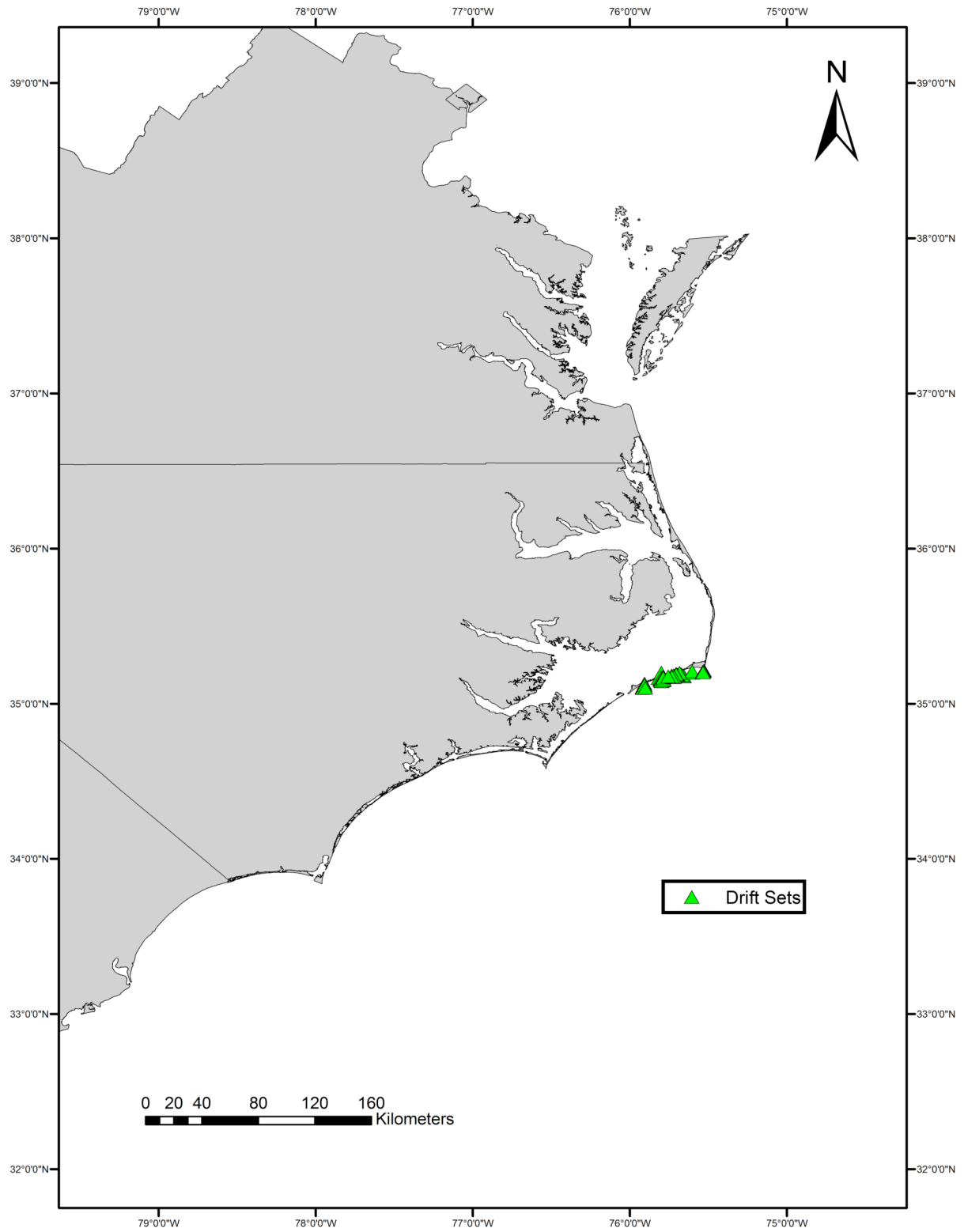


Figure 2. Distribution of observed strike gillnets sets, 2008.

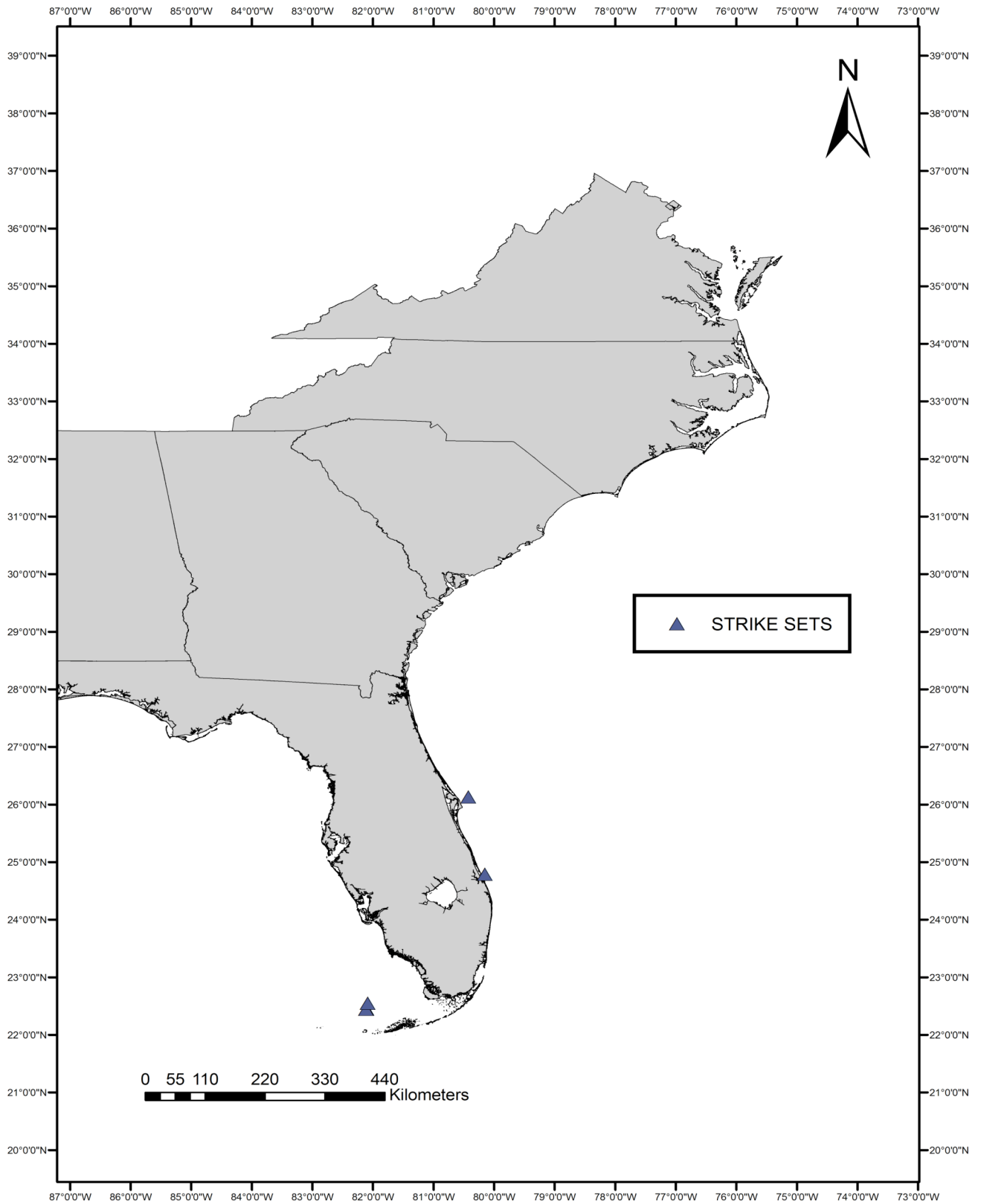


Figure 3. Distribution of observed sink gillnets sets, 2008.

