CHARACTERIZATION OF THE SHARK AND REEF FISH BOTTOM LONGLINE FISHERIES: 2012

BY
SIMON J.B. GULAK
MICHAEL P. ENZENAUER
AND
JOHN K. CARLSON

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
Panama City Laboratory
3500 Delwood Beach Rd.
Panama City, FL 32408

November 2013

CHARACTERIZATION OF THE SHARK AND REEF FISH BOTTOM LONGLINE FISHERIES: 2012

SIMON J.B. GULAK, MICHAEL P. ENZENAUER, AND JOHN K. CARLSON

National Marine Fisheries Service
Southeast Fisheries Science Center
Panama City Laboratory
3500 Delwood Beach Rd.
Panama City, FL 32408

U. S. DEPARTMENT OF COMMERCE
Penny Pritzker, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Kathryn D. Sullivan, Acting Under Secretary for Oceans and Atmosphere

NATIONAL MARINE FISHERIES SERVICE
Samuel D. Rauch, Acting Assistant Administrator for Fisheries

November 2013

NOTICE

The National Marine Fisheries Service (NMFS) does not approve, recommend or endorse any proprietary product or material mentioned in this publication. No reference shall be made to NMFS or to this publication furnished by NMFS, in any advertising or sales promotion which would imply that NMFS approves, recommends, or endorses any proprietary product or proprietary material mentioned herein which has as its purpose any intent to cause directly or indirectly the advertised product to be used or purchased because of this NMFS publication.

This report will be posted on the SEFSC Panama City Laboratory website at URL:
http://www.sefsc.noaa.gov/labs/panama/ob/bottomlineobserver.htm

Introduction

Observations of the shark-directed bottom longline fishery in the Atlantic Ocean and Gulf of Mexico have been conducted since 1994 (e.g. Hale et al. 2012 and references therein). Currently about 217 U.S. fishers are permitted to target sharks (excluding dogfish) in the Atlantic Ocean and Gulf of Mexico, and an additional 263 fishers are permitted to land sharks incidentally. Amendments to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan implemented a shark research fishery, which allows NMFS to select a limited number of commercial shark vessels on an annual basis to collect life history data and catch data for future stock assessments (NMFS, 2007). Specifically, only commercial shark fishers participating in the research fishery are allowed to land sandbar sharks, *Carcharhinus plumbeus*, and must carry an observer on 100% of all trips (compared to a target coverage level of 4-6% outside the research fishery). Outside the research fishery, fishers are permitted to land 36 non-sandbar large coastal sharks per trip (including blacktip shark, *Carcharhinus limbatus*, bull shark, *Carcharhinus leucas*, lemon shark, *Negaprion brevirostris*, nurse shark, *Ginglymostoma cirratum*, silky shark, *Carcharhinus falciformis*, spinner shark, *Carcharhinus brevipinna*, tiger shark, *Galeocerdo cuvier*, great hammerhead shark, *Sphyrna mokarran*, scalloped hammerhead shark, *Sphyrna lewini*, and smooth hammerhead shark, *Sphyrna zygaena*).

The commercial reef fish fishery is an important fishery in the Gulf of Mexico. It involves 819 permitted vessels that target groupers, snappers, and other reef fish species. There is also a subset of approximately 100 vessels that hold an eastern Gulf reef fish bottom longline endorsement, allowing them to use bottom longline gear deeper than 35 fathoms (64 meters) in the eastern Gulf of Mexico. Of these permitted vessels,

approximately 6% have both reef fish and directed shark permits. Thus, overlap occurs among longline vessels in both shark directed and reef fish fisheries, necessitating observer coverage in both fisheries.

Herein, we report on fishing activities in the bottom longline fishery for the 2012 fishing season, including coverage of the 2012 Shark Research Fishery.

Methods

In October 2011, NMFS announced its request for applications for the Shark Research Fishery from commercial shark fishers with a directed or incidental permit for 2011. Commercial shark fishers submitted applications to the Highly Migratory Species (HMS) Management Division. The HMS Management Division provided a list of qualified applicants to the Panama City Laboratory, and, based on the temporal and spatial needs of the research objectives, the availability of qualified applicants, and the available quota, five (5) qualified applicants were selected for observer coverage. These vessels carried observers on 100% of trips. Outside the research fishery and depending on the time of year and fishing season, vessels that targeted shark or reef fish, possessed current valid directed shark and reef fish permits, and reported fishing with longline gear in the previous year were randomly selected for coverage with a target coverage level of 2-3% for shark directed trips and 8% for reef fish directed trips. The eastern coastline of the USA was split into three fishing regions: North Atlantic, South Atlantic and Gulf of Mexico. References to the "North Atlantic" refer to the coastal waters off the eastern U.S. states from Maine to Virginia, the "South Atlantic" refers to the coastline from North Carolina to Florida, and the "Gulf of Mexico" refers to the coastline from the Florida

2

Keys to Texas (Richards, 1999). Vessels were selected from two fishing regions: South Atlantic and Gulf of Mexico.

Selection letters requiring observer coverage were issued to the permit holder via U.S. Certified mail approximately one month prior to the upcoming fishing season. Once the permit holder receives the selection letter, he or she is required to make contact with the observer coordinator and indicate intent to fish during the upcoming fishing season. If the permit holder intended to fish, the observer coordinator deployed an observer to the port of departure. Vessels were required to pass a Coast Guard Vessel Safety Examination as well as a safety evaluation by the observer prior to departure.

While onboard the vessel, the observer completes three data forms: Longline Gear Log, Longline Haul Log, and Animal Log. The Longline Gear Log is used to record gear characteristics. The Longline Haul Log is used to record the information on set and haulback, as well as environmental information. The Animal Log records all species caught, condition of the catch (e.g. alive, dead, damaged, or unknown), and the final disposition of the catch (e.g. kept, released alive, discarded dead, etc.).

In 2012, HMS Management Division changed the regulations for Shark Research Fishery trips to minimize unnecessary discard of dead sharks. Participants were allowed to harvest all non-prohibited species of sharks, including sandbar sharks only when an authorized sampler was onboard and the fishery was open. Fishers were required to land all catch of shark species that were legal under a directed shark permit (including sandbar shark, which is otherwise prohibited) unless they could be released alive. The amount of catch was limited with gear restrictions and the fishery opened with one set of 150 hooks per trip. This was a reduction from the average number of hooks used in 2011 (230

3

hooks; Hale et al. 2012). To reduce unwanted catch of prohibited dusky shark, the set allowance was revised to two sets per research trip in May: one 75 hook 'feeler' set with a soak time of no more than two hours and one 150 hook set with no soak limit. The number of hooks permitted on board was also increased to account for any lost hooks during a feeler set and provide fishermen flexibility to use different types of hooks while fishing for non-HMS species. In September, there was a further revision and the hook limits were doubled for each set. Observers continued to randomly sample sharks for biological materials for updates to life history studies. Vertebrae were collected from sandbar shark, blacktip shark and other select species to maintain time series of age distribution within the fishery. Observers also obtained trip weighout forms which were compared to shark dealer reports by quota monitoring managers to manage the sandbar shark quota within the research fishery.

Results

From January to December 2012, a total of 110 trips (defined as from the time a vessel leaves the port until the vessel returns to port and lands catch, including multiple hauls therein) on 35 vessels with a total of 730 bottom longline hauls (defined as setting gear, soaking gear for some duration of time, and retrieving gear) were observed (Table 1). Gear characteristics of trips varied by area (Gulf of Mexico or South Atlantic) and target species (grouper/snapper (reef fish), tilefish, non-sandbar large coastal shark, or sandbar shark). The universe of vessels in the Shark Research Fishery was less than three vessels in each area, so the observed data were combined for the Gulf of Mexico and South Atlantic Ocean to protect confidentiality of vessels. The data were grouped by targets into six groups: a) hauls targeting shallow water reef fish in the Gulf of Mexico

(81% of reef fish targeted sets were shallower than 50 fathoms (<91.4 m) depth), b) hauls

targeting deep water reef fish in the Gulf of Mexico (19% of reef fish targeted sets were

deeper than 50 fathoms (>91.4 m) depth), c) hauls targeting tilefish in the Gulf of

Mexico, d) non-sandbar large coastal shark species in the Gulf of Mexico, e) non-sandbar

large coastal shark species in the South Atlantic, and f) hauls targeting sandbar shark in

the Gulf of Mexico and South Atlantic (Figure 1). No trips were observed in the North

Atlantic region.

a) Gulf of Mexico shallow water reef fish targeted trips
       i) Gear and haul characteristics

There were 427 hauls on 17 trips observed targeting reef fish (mainly red grouper,

Epinephelus morio) in the Gulf of Mexico. Trips averaged 11.6 sea days in length. The

mainline length ranged from 1.5 to 13.9 km with an average of 7.7 km. The bottom

depth fished ranged from 29 to 91 m (depth ranges > 91.4 m were defined at deep water

grouper target sets) with an average of 58 m, and the number of hooks ranged from 120

to 750 hooks with an average of 649 hooks fished. Circle hooks sized 13.0 were used

53.4% of the time, while circle hooks sized 14.0 were used 24.8% of the time. There

were 158 hauls (37.0%) that employed two different types of hooks, with 14.0 circle

hooks used most commonly as the second hook (57.6%). The average soak duration (the

time from when the last hook entered the water until the first hook was hauled back) was

0.9 hr.

       ii) Catch and bycatch

There were 34,092 individual animals caught on observed bottom longline hauls

targeting reef fish in the Gulf of Mexico (Table 2). Teleosts comprised 96.4% of the

catch, followed by sharks (3.4%), invertebrates (0.1%), and batoids (0.1%). Red grouper was the most frequently caught species of teleost (80.6%), and Atlantic sharpnose shark, *Rhizoprionodon terraenovae*, was the most frequently caught species of shark (1.5%). Small coastal shark species comprised 59.8% of the shark catch, large coastal shark species (excluding sandbar shark) comprised 19.8%, deep water sharks comprised 5.3%, and sandbar shark represented 10.9%. No prohibited species were observed caught, but 4.3% of shark catch could not unidentified to species. Length frequencies of shark species are presented in Figure 2.

iii) Protected species interactions

Three (3) loggerhead sea turtles, *Caretta caretta*, were observed caught in bottom longline gear targeting shallow water reef fish in the Gulf of Mexico (Table 2). No sawfish, bird, sturgeon or marine mammal interactions were observed.

b) Gulf of Mexico deep water reef fish targeted trips

i) Gear and haul characteristics

There were 100 hauls on 9 trips observed targeting deepwater reef fish (mainly yellowedge grouper, *Epinephelus flavolimbatus*) in the Gulf of Mexico. Trips averaged 12.1 sea days in length. The mainline length ranged from 1.9 to 12.6 km with an average of 7.7 km. The bottom depth fished ranged from 92 to 297 m with an average of 192 m, and the number of hooks ranged from 82 to 750 hooks with an average of 580 hooks fished. Circle hooks sized 13.0 were used 57.0% of the time, while circle hooks sized 15.0 were used 34.0% of the time. There were 48 hauls (48.0%) that employed two different types of hooks, with 16.0 circle hooks used most commonly as the second hook

(62.5%). The average soak duration (the time from when the last hook entered the water until the first hook was hauled back) was 1.9 hr.

ii) Catch and bycatch

There were 5,037 individual animals caught on observed bottom longline hauls targeting deepwater reef fish in the Gulf of Mexico (Table 3). Teleosts comprised 84.3% of the catch, followed by sharks (15.3%), invertebrates (0.4%), and batoids (0.02%). Blueline tilefish, *Caulolatilus microps*, was the most frequently caught species of teleost (28.9%), and smooth dogfish shark, *Mustelus canis*, was the most frequently caught species of shark (6.4%). Deep water sharks comprised 78.9%, small coastal shark species comprised 11.3% of the shark catch, and large coastal shark species (excluding sandbar shark) comprised 0.04%. The sandbar shark represented 1.0% and the prohibited species, night shark, *Carcharhinus signatus*, sevengill shark, *Heptranchias perlo*, sixgill shark, *Hexanchus griseus*, and bigeye sixgill shark, *Hexanchus vitulus*, made up 0.03% of the shark catch. Length frequencies of shark species are presented in Figure 3.

iii) Protected species interactions

No protected species were observed caught in bottom longline gear targeting deepwater reef fish in the Gulf of Mexico.

c) Gulf of Mexico tilefish targeted trips

i) Gear and haul characteristics

There were 33 hauls on 3 trips observed targeting golden tilefish, *Lopholatilus chamaeleonticeps*, in the Gulf of Mexico. Trips averaged 13.3 sea days in length. The mainline length ranged from 2.6 to 14.6 km with an average of 6.1 km. The bottom

depth fished ranged from 311 to 442 m with an average of 360 m, and the number of

hooks ranged from 161 to 798 hooks with an average of 308 hooks fished. Circle hooks

sized 15.0 were used 54.6% of the time, while circle hooks sized 13.0 were used 45.4%

of the time. There were 19 hauls (57.6%) that employed two different types of hooks,

with 16.0 circle hooks used most commonly as the second hook (94.7%). The average

soak duration (the time from when the last hook entered the water until the first hook was

hauled back) was 2.7 hr.

ii) Catch and bycatch

There were 2,466 individual animals caught on observed bottom longline hauls

targeting tilefish in the Gulf of Mexico (Table 4). Teleosts comprised 94.1% of the catch,

followed by sharks (5.8%), and invertebrates (0.04%). Golden tilefish was the most

frequently caught species of teleost (81.8%), and Cuban dogfish shark, *Squalus cubensis*,

was the most frequently caught species of shark (4.4%). Deep water sharks comprised

98.6% of the shark catch. One (1) bigeye thresher shark, *Alopias superciliosus*, and one

(1) shortfin mako shark, *Isurus oxyrinchus*, was observed. Length frequencies of shark

species are presented in Figure 4.

iii) Protected species interactions

No protected species were observed caught in bottom longline gear targeting

tilefish in the Gulf of Mexico.

d) Gulf of Mexico large coastal shark targeted trips (non-research shark fishery)

i) Gear and haul characteristics

There were 68 hauls on 21 trips observed targeting large coastal shark in the Gulf of Mexico. Trips averaged 1.7 sea days in length. The mainline length ranged from 0.4 to 23.7 km with an average of 2.5 km. The bottom depth fished ranged from 5.0 to 70.0 m with an average of 16.1 m, and the number of hooks ranged from 35 to 713 hooks with an average of 98 hooks fished. The most commonly used hook was the 14.0 J hook (58.8%). There were no hauls (76.9%) that employed more than one type of hook. The second most commonly used hook was the 16.0 circle hook. The average soak duration was 11.7 hr.

ii) Catch and bycatch

There were 865 individual animals caught on observed bottom longline hauls targeting large coastal shark in the Gulf of Mexico (Table 5). Sharks comprised 97.6% of the catch, followed by teleosts (1.9%), and batoids (0.5%). Large coastal shark species (excluding sandbar shark) comprised 88.3% of the shark catch, small coastal shark species comprised 7.8%, sandbar sharks comprised 2.7%, and other prohibited sharks comprised 0.9% of the shark catch. Red drum, *Scianops ocellatus,* was the most frequently caught species of teleost (1.0%) and blacktip shark was the most frequently caught species of shark (59.4%). Length frequencies of shark species are presented in Figure 5.

iii) Protected species interactions

No protected species were observed caught in bottom longline gear targeting large coastal shark in the Gulf of Mexico.

e) South Atlantic large coastal shark targeted trips (non-research shark fishery)

i) Gear and haul characteristics

There were 21 hauls on 15 trips observed targeting large coastal shark in the South Atlantic. Trips averaged 2.0 sea days in length. The mainline length ranged from 2.0 to 13.0 km with an average of 5.8 km. The bottom depth fished ranged from 3.0 to 30.0 m with an average of 15.1 m, and the number of hooks ranged from 70 to 411 hooks with an average of 233 hooks fished. The most commonly used hook was the 18.0 circle hook (57.1%). There were six hauls (28.5%) that employed either another 18.0 circle hook or a 16.0 circle hook as the second hook. The average soak duration was 8.1 hr.

ii) Catch and bycatch

There were 1,212 individual animals caught on observed bottom longline hauls targeting large coastal shark in the South Atlantic (Table 6). Sharks comprised 94.4% of the catch, followed by batoids (3.4%), and teleosts (2.0%). Small coastal shark species comprised 47.8%, large coastal shark species (excluding sandbar shark) comprised 39.4% of the shark catch, sandbar sharks comprised 7.0%, smooth dogfish comprised of 5.2%, and other prohibited sharks comprised 0.2% of the shark catch. Red drum was the most frequently caught species of teleost (0.9%) and Atlantic sharpnose shark was the most frequently caught species of shark (36.6%). Length frequencies of shark species are presented in Figure 6.

iii) Protected species interactions

No protected species were observed caught in bottom longline gear targeting large coastal shark in the South Atlantic.

10

f) Gulf of Mexico and South Atlantic Shark Research Fishery
    i) Gear and haul characteristics

There were 81 hauls on 53 trips observed in the Shark Research Fishery in the

Gulf of Mexico and the South Atlantic. All of the trips targeted sandbar shark. Trips

averaged 2.1 sea days in length. The mainline length ranged from 3.5 to 20.4 km with an

average of 7.8 km. The bottom depth fished ranged from 9 to 212 m with an average of

38.6 m, and the number of hooks ranged from 39 to 300 hooks with an average of 156

hooks fished. The most commonly used hook was the 18.0 circle hook (60.5%) with 12.0

J hooks used in 16.1% of hauls. There were 25 hauls (30.9%) that employed two

different types of hooks, with 12.0 J hooks used most commonly as the second hook.

The average soak duration was 9.2 hr.

    ii) Catch and bycatch

There were 3,057 individual animals caught on observed bottom longline hauls

targeting sandbar shark in the Gulf of Mexico and South Atlantic (Table 7). Sharks

comprised 97.9% of the catch, followed by teleosts (1.6%) and batoids (0.2%). Large

coastal shark species (excluding sandbar) comprised 29.4% of the shark catch, sandbar

shark comprised 48.6%, small coastal shark species comprised 11.8%, and deep water

sharks comprised 0.1%. Prohibited shark species were also caught including the dusky

shark (8.7% of shark catch), the sand tiger shark, *Carcharhias taurus* (1.0%), and the

great white shark, *Carcharodon carcharias* (0.1%). Red grouper was the most frequently

caught species of teleost (0.8%) and sandbar shark was the most frequently caught

species of shark (47.6%). Length frequencies of shark species are presented in Figure 7.

iii) Protected species interactions

Interactions with protected resources were observed for bottom longline vessels fishing in the Gulf of Mexico and South Atlantic (Table 7). One (1) smalltooth sawfish, *Pristis pectinata*, and two (2) loggerhead sea turtles were observed. No sea bird or marine mammal interactions were observed.

Discussion

In 2012, the shark bottom longline observer program covered vessels in the Gulf of Mexico and South Atlantic, with the majority of trips observed targeting sandbar shark in the Shark Research Fishery. Catch data and biological samples collected through the Shark Research Fishery continues to provide much needed life history information for stock assessment. For example, catch and bycatch information was recently incorporated into the Southeast Data Assessment and Review (Carlson and Gulak, 2013; Carlson et al., 2013). The Southeast Reef Fish Catch Shares Project also allowed for increased observer coverage in the bottom longline fishery and permitted the collection of otoliths and gonads for future reef fish stock assessments. Data have been incorporated into the Southeast Data Assessment and Review (Gulak and Carlson, 2013a; 2013b) for gag grouper and greater amberjack.

Several changes were made to the Shark Research Fishery in 2012. The 2012 Shark Research Fishery was designed to help fishermen effectively target sandbar sharks while minimizing bycatch of other sharks, specifically prohibited species. Fishers were required to land all catch of shark species that were legal under a directed shark permit (including sandbar shark, which is otherwise prohibited) unless they could be released

alive. This change to the Shark Research Fishery did result in an overall reduction in discards (22.9% in 2012 from 30.6% in the previous year). Despite these changes, fishermen were catching large amounts of prohibited species, specifically dusky sharks (163 individuals in March) and not catching sharks at the expected rate, hindering data collection for ongoing research. As a result, the 2012 research fishery permits were amended to allow fishermen to conduct an optional "feeler" set to test for available species in order to effectively target sandbar sharks while minimizing bycatch of other sharks, specifically dusky sharks. This resulted in a reduced encounter rate of all dusky shark interactions from the previous incidents in March.

Continued observer funding will permit the Shark Research Fishery to continue to provide data on temporal and spatial catch, release mortality, and bycatch species. These data have proven essential to stock assessments and to provide updates to quota monitoring.

Literature Cited

Carlson, J. and S. Gulak. 2013. Standardized catch rates of Atlantic sharpnose sharks (*Rhizoprionodon terraenovae)* in the U.S. Gulf of Mexico from the Shark Bottom Longline Observer Program, 1994-2011. SEDAR34-WP-01. SEDAR, North Charleston, SC. 22 pp.

Carlson, J., K. McCarthy, and S.J.B. Gulak. 2013. Dead discards of Atlantic sharpnose sharks in the shark bottom longline fishery. SEDAR34-WP-21. SEDAR, North Charleston, SC. 5 pp.

Gulak, S.J.B. and J.K. Carlson. 2013a. Catch and bycatch of gag grouper in the Gulf of Mexico shark and reeffish bottom longline fishery based on observer data. SEDAR33-DW23. SEDAR, North Charleston, SC. 28 pp.

Gulak, S.J.B. and J.K. Carlson. 2013b. Catch and bycatch of greater amberjack in the Gulf of Mexico shark and reeffish bottom longline fishery based on observer data. SEDAR33-DW24. SEDAR, North Charleston, SC. 27 pp.

Hale, L.F., S.J.B. Gulak, A.N. Mathers, and J.K. Carlson. 2012. Characterization of the shark and reeffish bottom longline fishery, 2011. NOAA Technical Memorandum NMFS-SEFSC-634, 37 p.

National Marine Fisheries Service (NMFS). 2007. Amendment 2 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan. NOAA/NMFS, Office of Sustainable Fisheries, Highly Migratory Species Management Division, Silver Spring, MD. 726 p.

Richards, W.J. 1999. Problems with unofficial and inaccurate geographical names in the fisheries literature. Marine Fisheries Review 61(3): 56-57.

Table 1. Number of vessels, trips, hauls, and hook hours observed in the Gulf of Mexico
(GOM) and South Atlantic Ocean (SA) for all target species. The total number of unique
vessels and trips is reported in brackets. Target species include shallow water reef fish
(SW GRP), deep water reef fish (DW GRP), tilefish (TIL), large coastal shark (SHX),
and sandbar shark (SSB).

Area and Target	Vessels Observed	Trips Observed	Hauls Observed	Hook Hours
GOM SW GRP	15	17	427	237545.4
GOM DW GRP	9	9	100	105509.0
GOM TIL	3	3	33	28163.3
GOM SHX	6	21	68	81388.3
SA SHX	6	15	21	39695.3
GOM/SA SSB	5	53	81	133746.8
Total	44 (35)	118 (110)	730	626048.1

Table 2. Number caught (n) and disposition of catch in percentage for all observed hauls targeting shallow water reef fish in the Gulf of Mexico. Disposition of catch is divided into kept (K), discard dead (DD), discard alive (DA), and unknown (U).

Scientific name	Common Name	n	% K	% DD	% DA	% U
Epinephelus morio	Red grouper	27468	58.8	3.2	37.8	0.2
Lutjanus campechanus	Red snapper	2191	35.2	6.4	58.1	0.3
Mycteroperca phenax	Scamp grouper	959	97.0	1.0	2.0	0.0
Mycteroperca microlepis	Gag grouper	654	68.3	4.0	26.9	0.8
Rhizoprionodon terraenovae	Atlantic sharpnose shark	497	1.0	4.8	94.2	0.0
Lutjanus analis	Mutton snapper	417	99.5	0.2	0.0	0.2
Carcharhinus acronotus	Blacknose shark	191	1.0	1.6	97.4	0.0
Calamus bajonado	Jolthead porgy	173	96.0	3.5	0.6	0.0
Carcharhinus plumbeus	Sandbar shark	125	2.4	0.0	96.8	0.8
Epinephelus drummondhayi	Speckled hind	83	73.5	3.6	22.9	0.0
Pagrus pagrus	Red porgy	78	55.1	34.6	10.3	0.0
Seriola sp.	Amberjacks	73	2.7	65.8	31.5	0.0
Galeocerdo cuvier	Tiger shark	69	0.0	4.3	94.2	1.4
Muraenidae	Moray eel family	65	3.1	95.4	1.5	0.0
Ginglymostoma cirratum	Nurse shark	62	3.2	1.6	95.2	0.0
Echeneis naucrates	Sharksucker	56	0.0	42.9	57.1	0.0
Seriola dumerili	Greater amberjack	49	4.1	18.4	77.6	0.0
Lutjanus griseus	Gray snapper	47	89.4	2.1	8.5	0.0
Lutjanus synagris	Lane snapper	46	78.3	2.2	19.6	0.0
Euthynnus alletteratus	Little tunny	45	6.7	93.3	0.0	0.0
Raja eglanteria	Clearnose skate	44	0.0	22.7	77.3	0.0
Opsanus pardus	Leopard toadfish	43	2.3	41.9	53.5	2.3
Carcharhinus falciformis	Silky shark	41	2.4	19.5	78.0	0.0
Sphyraena barracuda	Great barracuda	40	2.5	92.5	5.0	0.0
Seriola zonata	Banded rudderfish	39	5.1	7.7	87.2	0.0
Mustelus canis	Smooth dogfish	38	0.0	10.5	89.5	0.0
Carcharhinidae	Requiem shark family	36	0.0	0.0	91.7	8.3
Rhomboplites aurorubens	Vermillion snapper	33	57.6	21.2	21.2	0.0
Mycteroperca bonaci	Black grouper	31	93.5	3.2	3.2	0.0
Carcharhinus brevipinna	Spinner shark	24	0.0	20.8	79.2	0.0
Triakidae	Houndsharks	23	0.0	0.0	100.0	0.0
Rachycentron canadum	Cobia	21	61.9	4.8	33.3	0.0
Balistes capriscus	Gray triggerfish	20	65.0	5.0	30.0	0.0
Seriola rivoliana	Almaco jack	20	100.0	0.0	0.0	0.0
Muraena retifera	Reticulate moray eel	19	5.3	94.7	0.0	0.0
Gymnothorax moring	Spotted moray eel	16	0.0	93.8	6.3	0.0
Carcharhinus limbatus	Blacktip shark	15	0.0	6.7	93.3	0.0
Seriola fasciata	Lesser amberjack	15	0.0	6.7	93.3	0.0
Elasmobranchii	Sharks	13	0.0	0.0	100.0	0.0
Synodontidae	Lizardfish family	13	0.0	46.2	53.8	0.0
Lutjanidae	Snapper family	12	83.3	0.0	16.7	0.0
Synodus intermedius	Sanddiver lizardfish	11	0.0	100.0	0.0	0.0
Anthozoa	Coral	10	0.0	20.0	20.0	60.0
Carcharhinus leucas	Bull shark	8	0.0	0.0	100.0	0.0
Synodus foetens	Inshore lizardfish	8	0.0	100.0	0.0	0.0

Table 2. cont'd

Scientific name	Common Name	n	% K	% DD	% DA	% U
Centropristis ocyurus	Bank seabass	6	0.0	33.3	66.7	0.0
Lutjanus vivanus	Silk snapper	6	100.0	0.0	0.0	0.0
Asteroidea	Sea stars	5	0.0	0.0	60.0	40.0
Calappa flammea	Flame box crab	5	0.0	60.0	40.0	0.0
Decapoda	Crabs	5	0.0	0.0	100.0	0.0
Holocentrus sp.	Squirrelfishes	5	40.0	0.0	60.0	0.0
Porifera	Sponges	5	0.0	40.0	0.0	60.0
Scianops ocellatus	Red drum	5	0.0	0.0	100.0	0.0
Scomberomorus cavalla	King mackerel	5	0.0	80.0	20.0	0.0
Sphyrna sp.	Hammerhead sharks	5	0.0	0.0	80.0	20.0
Unknown animal	Unknown animal	5	0.0	0.0	80.0	20.0
Urophycis cirrata	Gulf hake	5	0.0	100.0	0.0	0.0
Batrachoididae	Toadfish family	4	25.0	0.0	75.0	0.0
Diplectrum formosum	Sand perch	4	0.0	100.0	0.0	0.0
Lagocephalus laevigatus	Smooth puffer	4	75.0	0.0	25.0	0.0
Ophichthus ocellatus	Pale-spotted eel	4	0.0	75.0	25.0	0.0
Sphyrna lewini	Scalloped hammerhead shark	4	0.0	0.0	100.0	0.0
Caretta caretta	Loggerhead sea turtle	3	0.0	33.3	33.3	33.3
Echinodermata	Sea urchins	3	0.0	0.0	100.0	0.0
Epinephelus itajara	Goliath grouper	3	0.0	33.3	66.7	0.0
Malacanthus plumieri	Sand tilefish	3	0.0	0.0	100.0	0.0
Ocyurus chrysurus	Yellowtail snapper	3	100.0	0.0	0.0	0.0
Paralichthys sp.	Flounders	3	33.3	0.0	66.7	0.0
Sparidae	Porgy family	3	100.0	0.0	0.0	0.0
Thunnus sp.	Tunas	3	0.0	100.0	0.0	0.0
Trachinocephalus myops	Snakefish	3	0.0	66.7	33.3	0.0
Caranx hippos	Crevalle jack	2	0.0	100.0	0.0	0.0
Dasyatis americana	Southern stingray	2	0.0	50.0	50.0	0.0
Echeneidae	Remora family	2	0.0	50.0	50.0	0.0
Echeneis neucratoides	Whitefin sharksucker	2	0.0	0.0	100.0	0.0
Epinephelus nigritus	Warsaw grouper	2	100.0	0.0	0.0	0.0
Lutjanus buccanella	Blackfin snapper	2	100.0	0.0	0.0	0.0
Opsanus beta	Gulf toadfish	2	0.0	0.0	100.0	0.0
Pristipomoides aquilonaris	Wenchman snapper	2	100.0	0.0	0.0	0.0
Tetraodontidae	Puffer family	2	0.0	0.0	100.0	0.0
Thunnus albacares	Yellowfin tuna	2	100.0	0.0	0.0	0.0
Antennariidae	Frogfish family	1	0.0	0.0	100.0	0.0
Balistes vetula	Queen triggerfish	1	100.0	0.0	0.0	0.0
Brotula barbata	Bearded brotula	1	100.0	0.0	0.0	0.0
Calamus nodosus	Knobbed porgy	1	100.0	0.0	0.0	0.0
Calamus proridens	Littlehead porgy	1	100.0	0.0	0.0	0.0
Cancer irroratus	Atlantic rock crab	1	0.0	0.0	100.0	0.0
Carangidae	Jack family	1	0.0	0.0	100.0	0.0
Centropristis philadelphica	Rock seabass	1	0.0	100.0	0.0	0.0
Cookeolus japonicus	Bulleye	1	100.0	0.0	0.0	0.0
Dasyatis sp.	Stingrays	1	0.0	0.0	100.0	0.0

Table 2. cont'd

Scientific name	Common Name	n	% K	% DD	% DA	% U
Epinephelus flavolimbatus	Yellowedge grouper	1	100.0	0.0	0.0	0.0
Gymnothorax saxicola	Ocellated moray eel	1	0.0	100.0	0.0	0.0
Haemulon album	Margate grunt	1	100.0	0.0	0.0	0.0
Lagocephalus lagocephalus	Oceanic puffer	1	0.0	0.0	100.0	0.0
Lobotes surinamensis	Tripletail	1	0.0	0.0	100.0	0.0
Lutjanus cyanopterus	Cubera snapper	1	100.0	0.0	0.0	0.0
Lutjanus jocu	Dog snapper	1	100.0	0.0	0.0	0.0
Paguroidea	Hermit crabs	1	0.0	100.0	0.0	0.0
Pterois sp.	Lionfish	1	100.0	0.0	0.0	0.0
Rhinoptera bonasus	Cownose ray	1	0.0	100.0	0.0	0.0
Sphyrna tiburo	Bonnethead shark	1	0.0	0.0	100.0	0.0
Thunnus atlanticus	Blackfin tuna	1	0.0	100.0	0.0	0.0

Table 3. Number caught (n) and disposition of catch in percentage for all observed hauls targeting deep water reef fish in the Gulf of Mexico. Disposition of catch is divided into kept (K), discard dead (DD), discard alive (DA), and unknown (U).

Scientific name	Common Name	n	% K	% DD	% DA	% U
Caulolatilus microps	Blueline tilefish	1455	68.9	22.5	8.1	0.5
Epinephelus flavolimbatus	Yellowedge grouper	1389	99.0	0.9	0.1	0.0
Mustelus canis	Smooth dogfish	323	0.0	10.8	89.2	0.0
Epinephelus niveatus	Snowy grouper	247	98.8	1.2	0.0	0.0
Squalidae	Dogfish family	177	2.9	1.1	96.0	0.0
Lutjanus campechanus	Red snapper	173	81.5	0.6	17.9	0.0
Lopholatilus chamaeleonticeps	Tilefish	134	38.8	35.1	26.1	0.0
Epinephelus drummondhayi	Speckled hind	129	100.0	0.0	0.0	0.0
Muraenidae	Moray eel family	112	0.0	61.6	38.4	0.0
Urophycis cirrata	Gulf hake	94	7.4	76.6	16.0	0.0
Ophichthus rex	King snake eel	93	1.1	89.2	9.7	0.0
Triakidae	Houndsharks	89	2.3	1.1	96.6	0.0
Rhizoprionodon terraenovae	Atlantic sharpnose shark	79	0.0	39.2	60.8	0.0
Mycteroperca phenax	Scamp grouper	72	98.6	0.0	1.4	0.0
Epinephelus morio	Red grouper	60	80.0	6.6	11.7	1.7
Pagrus pagrus	Red porgy	53	96.2	3.8	0.0	0.0
Mycteroperca microlepis	Gag grouper	40	77.5	5.0	17.5	0.0
Urophycis floridana	Southern hake	28	35.7	60.7	3.6	0.0
Seriola sp.	Amberjacks	27	11.2	48.1	40.7	0.0
Muraena retifera	Reticulate moray eel	20	0.0	100.0	0.0	0.0
Carcharhinus limbatus	Blacktip shark	19	0.0	0.0	100.0	0.0
Epinephelus nigritus	Warsaw grouper	18	100.0	0.0	0.0	0.0
Lutjanus vivanus	Silk snapper	17	100.0	0.0	0.0	0.0
Phycidae	Phycid Hakes	17	0.0	100.0	0.0	0.0
Carcharhinus signatus	Night shark	13	0.0	30.8	69.2	0.0
Scorpaenidae	Scorpionfish family	11	100.0	0.0	0.0	0.0
Squalus cubensis	Cuban dogfish	11	0.0	9.1	90.9	0.0
Majidae	Spider crabs	10	0.0	10.0	90.0	0.0
Ophichthus ocellatus	Pale-spotted eel	9	0.0	88.9	11.1	0.0
Carcharhinus acronotus	Blacknose shark	8	0.0	50.0	50.0	0.0
Carcharhinus plumbeus	Sandbar shark	8	0.0	12.5	75.0	12.5
Hexanchus griseus	Sixgill shark	8	0.0	12.5	87.5	0.0
Brotula barbata	Bearded brotula	7	100.0	0.0	0.0	0.0
Carcharhinidae	Requiem shark family	7	0.0	0.0	100.0	0.0
Coryphaena hippurus	Dolphinfish	6	66.7	33.3	0.0	0.0
Gymnothorax kolpos	Blacktail Moray	6	0.0	100.0	0.0	0.0
Scyliorhinus retifer	Chain catshark	6	0.0	0.0	100.0	0.0
Asteroidea	Sea stars	4	0.0	0.0	50.0	50.0
Decapoda	Crabs	4	25.0	0.0	50.0	25.0
Neomerinthe hemingwayi	Spinycheek scorpionfish	4	75.0	25.0	0.0	0.0
Sphyrna lewini	Scalloped hammerhead shark	4	0.0	100.0	0.0	0.0
Echeneis naucrates	Sharksucker	3	33.3	0.0	66.7	0.0
Elasmobranchii	Sharks	3	0.0	33.3	33.4	33.3
Etelis oculatus	Queen snapper	3	100.0	0.0	0.0	0.0
Galeocerdo cuvier	Tiger shark	3	0.0	0.0	100.0	0.0

Table 3. cont'd

Scientific name	Common Name	n	% K	% DD	% DA	% U
Seriola dumerili	Greater amberjack	3	66.7	0.0	33.3	0.0
Anthozoa	Coral	2	0.0	50.0	50.0	0.0
Carcharhinus falciformis	Silky shark	2	0.0	100.0	0.0	0.0
Congridae	Conger eels	2	50.0	0.0	50.0	0.0
Hexanchidae	Cow sharks	2	0.0	0.0	100.0	0.0
Hexanchus vitulus	Bigeye sixgill shark	2	0.0	50.0	50.0	0.0
Pristipomoides aquilonaris	Wenchman snapper	2	0.0	50.0	50.0	0.0
Sphyrna sp.	Hammerhead sharks	2	0.0	0.0	100.0	0.0
Synodus intermedius	Sanddiver lizardfish	2	0.0	100.0	0.0	0.0
Thunnus sp.	Tunas	2	100.0	0.0	0.0	0.0
Carcharhinus leucas	Bull shark	1	0.0	0.0	100.0	0.0
Dasyatis sp.	Stingrays	1	0.0	0.0	100.0	0.0
Gymnothorax funebris	Green moray eel	1	100.0	0.0	0.0	0.0
Gymnothorax saxicola	Ocellated moray eel	1	0.0	100.0	0.0	0.0
Heptranchias perlo	Sevengill shark	1	0.0	0.0	100.0	0.0
Mollusca	Molluscs	1	0.0	0.0	100.0	0.0
Paralichthys sp.	Flounders	1	100.0	0.0	0.0	0.0
Peprilus triacanthus	Atlantic butterfish	1	100.0	0.0	0.0	0.0
Rachycentron canadum	Cobia	1	100.0	0.0	0.0	0.0
Sphyraena barracuda	Great barracuda	1	0.0	100.0	0.0	0.0
Synodontidae	Lizardfish family	1	0.0	100.0	0.0	0.0
Tetraodontidae	Puffer family	1	0.0	100.0	0.0	0.0

Table 4. Number caught (n) and disposition of catch in percentage for all observed hauls targeting tilefish in the Gulf of Mexico. Disposition of catch is divided into kept (K), discard dead (DD), discard alive (DA), and unknown (U).

Scientific name	Common Name	n	% K	% DD	% DA	% U
Lopholatilus chamaeleonticeps	Tilefish	2017	96.4	2.4	1.2	0.0
Phycidae	Phycid Hakes	160	81.9	17.5	0.6	0.0
Urophycis floridana	Southern hake	111	13.5	86.5	0.0	0.0
Squalus cubensis	Cuban dogfish	109	0.0	4.6	95.4	0.0
Squalidae	Dogfish family	23	4.3	8.7	87.0	0.0
Hyperoglyphe perciformis	Barrelfish	11	100.0	0.0	0.0	0.0
Ophichthus rex	King snake eel	9	0.0	88.9	11.1	0.0
Squalus mitsukurii	Shortspine dogfish	5	0.0	60.0	40.0	0.0
Cirrhigaleus asper	Roughskin dogfish	2	0.0	0.0	100.0	0.0
Congridae	Conger eels	2	0.0	100.0	0.0	0.0
Coryphaena hippurus	Dolphinfish	2	0.0	100.0	0.0	0.0
Holocentrus sp.	Squirrelfishes	2	100.0	0.0	0.0	0.0
Polymixia lowei	Beardfish	2	50.0	50.0	0.0	0.0
Scyliorhinus retifer	Chain catshark	2	0.0	0.0	100.0	0.0
Urophycis cirrata	Gulf hake	2	50.0	50.0	0.0	0.0
Alopias superciliosus	Bigeye thresher shark	1	0.0	100.0	0.0	0.0
Anguilliformes	Eels	1	0.0	100.0	0.0	0.0
Decapoda	Crabs	1	0.0	0.0	100.0	0.0
Isurus oxyrinchus	Shortfin mako shark	1	0.0	0.0	100.0	0.0
Scorpaenidae	Scorpionfish family	1	100.0	0.0	0.0	0.0
Triakidae	Houndsharks	1	0.0	0.0	100.0	0.0
Xiphius gladius	Swordfish	1	100.0	0.0	0.0	0.0

Table 5. Number caught (n) and disposition of catch in percentage for all observed hauls targeting large coastal shark in the Gulf of Mexico. Disposition of catch is divided into kept (K), discard dead (DD), discard alive (DA), and unknown (U).

Scientific Name	Common Name	n	% K	% DD	% DA	% U
Carcharhinus limbatus	Blacktip shark	515	95.5	4.3	0.0	0.2
Ginglymostoma cirratum	Nurse shark	107	0.0	0.0	100.0	0.0
Carcharhinus acronotus	Blacknose shark	44	88.6	11.4	0.0	0.0
Galeocerdo cuvier	Tiger shark	30	23.3	6.7	63.3	6.7
Carcharhinus brevipinna	Spinner shark	26	100.0	0.0	0.0	0.0
Carcharhinus plumbeus	Sandbar shark	23	0.0	21.8	73.9	4.3
Negaprion brevirostris	Lemon shark	23	82.6	0.0	0.0	17.4
Carcharhinus leucas	Bull shark	22	100.0	0.0	0.0	0.0
Rhizoprionodon terraenovae	Atlantic sharpnose shark	16	75.0	25.0	0.0	0.0
Sphyrna mokarran	Great hammerhead shark	15	100.0	0.0	0.0	0.0
Scianops ocellatus	Red drum	9	22.2	0.0	77.8	0.0
Carcharhinus obscurus	Dusky shark	8	12.5	12.5	50.0	25.0
Sphyrna lewini	Scalloped hammerhead shark	7	100.0	0.0	0.0	0.0
Carcharhinus isodon	Finetooth shark	6	100.0	0.0	0.0	0.0
Dasyatis sp.	Stingrays	3	0.0	66.7	33.3	0.0
Caranx hippos	Crevalle jack	2	0.0	100.0	0.0	0.0
Carcharhinus falciformis	Silky shark	1	100.0	0.0	0.0	0.0
Dasyatis americana	Southern stingray	1	0.0	0.0	100.0	0.0
Epinephelus itajara	Goliath grouper	1	0.0	0.0	100.0	0.0
Istiophorus platypterus	Sailfish	1	100.0	0.0	0.0	0.0
Lutjanus campechanus	Red snapper	1	0.0	100.0	0.0	0.0
Ophichthus rex	King snake eel	1	0.0	100.0	0.0	0.0
Porifera	Sponges	1	100.0	0.0	0.0	0.0
Prionace glauca	Blue shark	1	100.0	0.0	0.0	0.0
Rachycentron canadum	Cobia	1	100.0	0.0	0.0	0.0

Table 6. Number caught (n) and disposition of catch in percentage for all observed hauls targeting large coastal shark in the South Atlantic. Disposition of catch is divided into kept (K), discard dead (DD), discard alive (DA), and unknown (U).

Scientific Name	Common Name	n	% K	% DD	% DA	% U
Rhizoprionodon terraenovae	Atlantic sharpnose shark	443	95.7	4.1	0.2	0.0
Carcharhinus limbatus	Blacktip shark	347	96.2	3.5	0.0	0.3
Carcharhinus acronotus	Blacknose shark	102	92.2	7.8	0.0	0.0
Carcharhinus plumbeus	Sandbar shark	80	0.0	35.0	65.0	0.0
Mustelus canis	Smooth dogfish	60	95.0	1.7	3.3	0.0
Negaprion brevirostris	Lemon shark	35	91.4	0.0	8.6	0.0
Rajiformes	Skates and rays	28	0.0	96.4	0.0	3.6
Ginglymostoma cirratum	Nurse shark	26	0.0	0.0	100.0	0.0
Carcharhinus leucas	Bull shark	18	100.0	0.0	0.0	0.0
Galeocerdo cuvier	Tiger shark	16	75.0	0.0	25.0	0.0
Gymnura sp.	Butterfly ray	11	0.0	100.0	0.0	0.0
Scianops ocellatus	Red drum	11	0.0	0.0	100.0	0.0
Epinephelus itajara	Goliath grouper	10	0.0	0.0	100.0	0.0
Carcharhinus brevipinna	Spinner shark	6	100.0	0.0	0.0	0.0
Elasmobranchii	Sharks	4	0.0	100.0	0.0	0.0
Carcharhinus isodon	Finetooth shark	2	100.0	0.0	0.0	0.0
Sphyrna lewini	Scalloped hammerhead shark	2	50.0	50.0	0.0	0.0
Asteroidea	Sea stars	1	0.0	0.0	100.0	0.0
Carcharhinus obscurus	Dusky shark	1	0.0	0.0	100.0	0.0
Carcharhinus perezi	Caribbean reef shark	1	100.0	0.0	0.0	0.0
Cephalopoda	Octopus	1	100.0	0.0	0.0	0.0
Dasyatis centroura	Roughtail stingray	1	0.0	0.0	100.0	0.0
Dasyatis sp.	Stingrays	1	0.0	0.0	100.0	0.0
Echeneis naucrates	Sharksucker	1	0.0	0.0	100.0	0.0
Istiophorus platypterus	Sailfish	1	100.0	0.0	0.0	0.0
Majidae	Spider crabs	1	0.0	0.0	100.0	0.0
Rachycentron canadum	Cobia	1	0.0	0.0	100.0	0.0
Sphyrna mokarran	Great hammerhead shark	1	100.0	0.0	0.0	0.0

Table 7. Number caught (n) and disposition of catch in percentage for all observed hauls targeting sandbar shark in the Gulf of Mexico and South Atlantic. Disposition of catch is divided into kept (K), discard dead (DD), discard alive (DA), and unknown (U).

Scientific Name	Common Name	n	% K	% DD	% DA	% U
Carcharhinus plumbeus	Sandbar shark	1411	98.9	0.4	0.3	0.4
Rhizoprionodon terraenovae	Atlantic sharpnose shark	316	81.3	14.9	3.8	0.0
Galeocerdo cuvier	Tiger shark	290	56.9	1.0	39.7	2.4
Carcharhinus obscurus	Dusky shark	252	0.0	83.3	15.9	0.8
Carcharhinus limbatus	Blacktip shark	180	99.4	0.0	0.0	0.6
Carcharhinus leucas	Bull shark	103	94.2	0.0	0.0	5.8
Ginglymostoma cirratum	Nurse shark	97	0.0	0.0	99.0	1.0
Sphyrna lewini	Scalloped hammerhead shark	77	85.7	7.8	6.5	0.0
Sphyrna mokarran	Great hammerhead shark	45	91.1	2.2	6.7	0.0
Carcharhinus brevipinna	Spinner shark	39	89.7	2.6	5.1	2.6
Carcharhias taurus	Sand tiger shark	29	0.0	0.0	100.0	0.0
Carcharhinus acronotus	Blacknose shark	27	81.5	7.4	7.4	3.7
Epinephelus morio	Red grouper	23	39.1	17.4	43.5	0.0
Scianops ocellatus	Red drum	14	0.0	7.1	92.9	0.0
Negaprion brevirostris	Lemon shark	12	100.0	0.0	0.0	0.0
Elasmobranchii	Sharks	8	0.0	62.5	0.0	37.5
Carcharhinus falciformis	Silky shark	7	57.1	28.6	14.3	0.0
Carcharodon carcharias	Great white shark	3	0.0	66.7	33.3	0.0
Dasyatis americana	Southern stingray	3	0.0	0.0	100.0	0.0
Dasyatis centroura	Roughtail stingray	3	0.0	0.0	100.0	0.0
Caretta caretta	Loggerhead sea turtle	2	0.0	0.0	100.0	0.0
Epinephelus itajara	Goliath grouper	2	0.0	50.0	50.0	0.0
Mollusca	Molluscs	2	0.0	0.0	50.0	50.0
Rachycentron canadum	Cobia	2	100.0	0.0	0.0	0.0
Sphyrna sp.	Hammerhead sharks	2	0.0	50.0	0.0	50.0
Carcharhinidae	Requiem shark family	1	0.0	0.0	0.0	100.0
Carcharhinus signatus	Night shark	1	0.0	100.0	0.0	0.0
Epinephelus niveatus	Snowy grouper	1	0.0	100.0	0.0	0.0
Lopholatilus chamaeleonticeps	Tilefish	1	100.0	0.0	0.0	0.0
Lutjanus campechanus	Red snapper	1	0.0	100.0	0.0	0.0
Majidae	Spider crabs	1	0.0	0.0	100.0	0.0
Mustelus canis	Smooth dogfish	1	0.0	0.0	100.0	0.0
Mycteroperca microlepis	Gag grouper	1	0.0	0.0	100.0	0.0
Pristis pectinata	Smalltooth sawfish	1	0.0	100.0	0.0	0.0
Sphyraena barracuda	Great barracuda	1	0.0	100.0	0.0	0.0
Trichiurus lepturus	Atlantic cutlassfish	1	0.0	100.0	0.0	0.0

Figure 1. Distribution of all observed hauls by target in 2012. (a) Frequency of sets targeting shallow water reef fish in the Gulf of Mexico, (b) frequency of sets targeting deep water reef fish in the Gulf of Mexico.

(a)
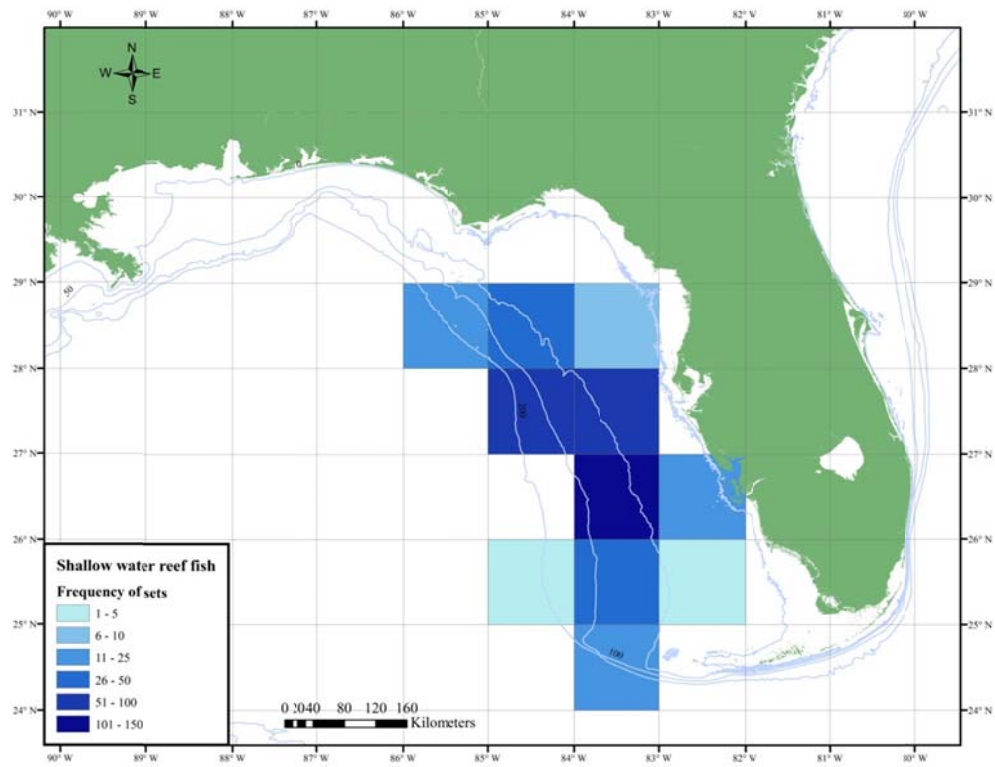
(b)
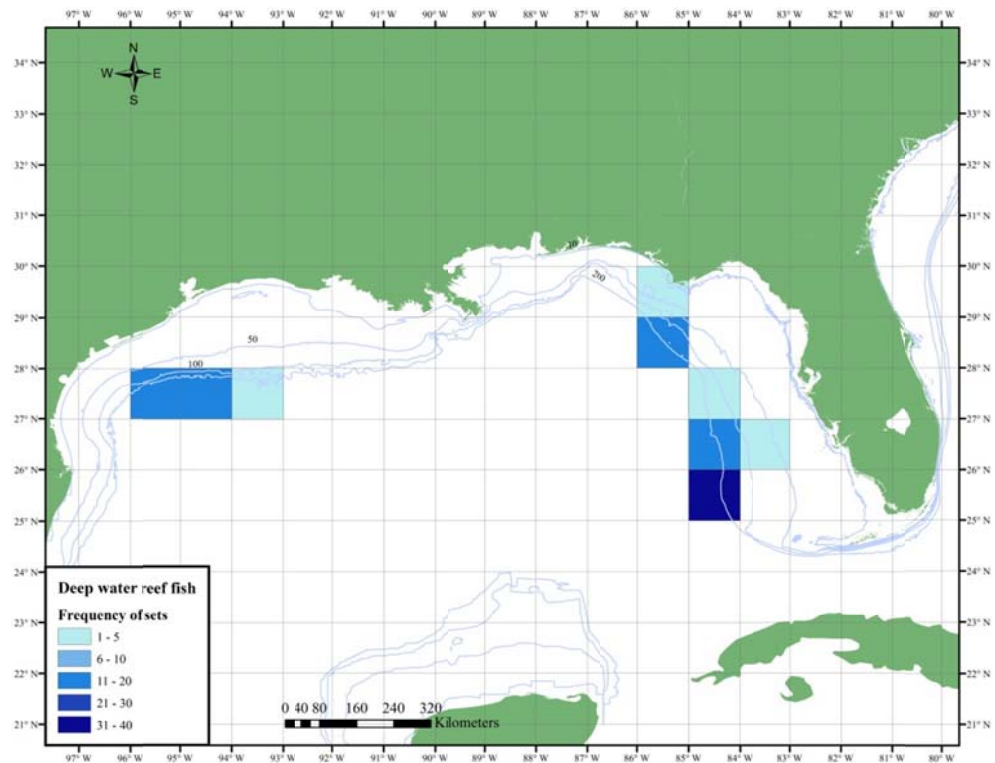
Figure 1 cont'd. Distribution of all observed hauls by target in 2012. (c) Distribution of effort targeting tilefish in the Gulf of Mexico, (d) distribution of effort targeting large coastal sharks in the Gulf of Mexico.

(b)
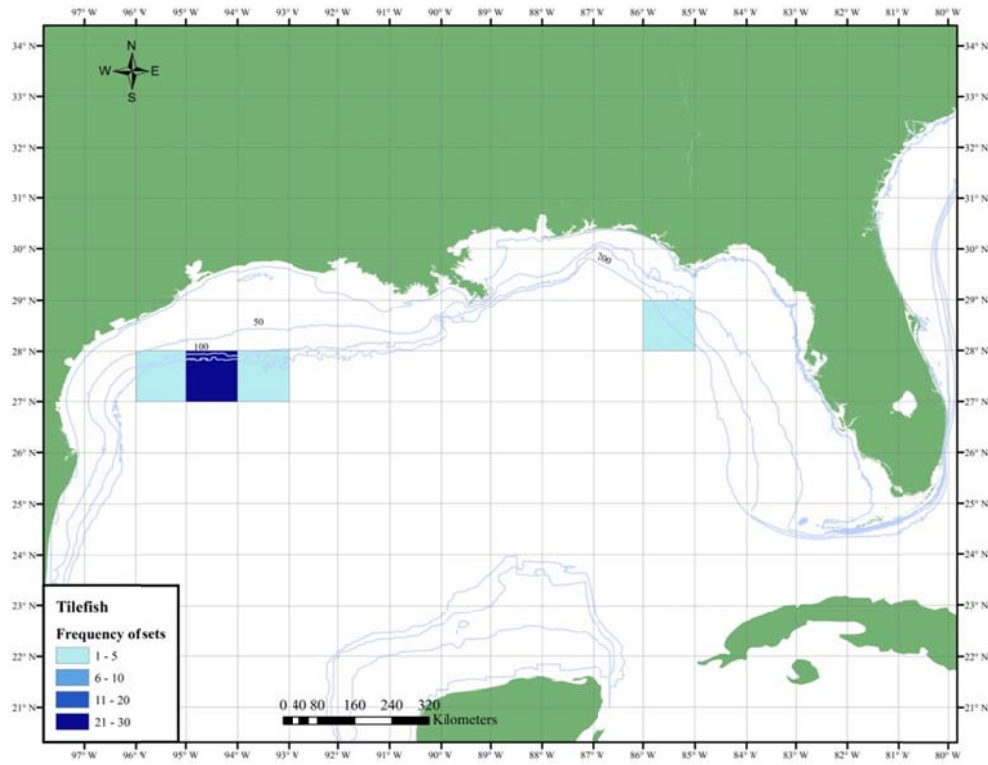
(c)
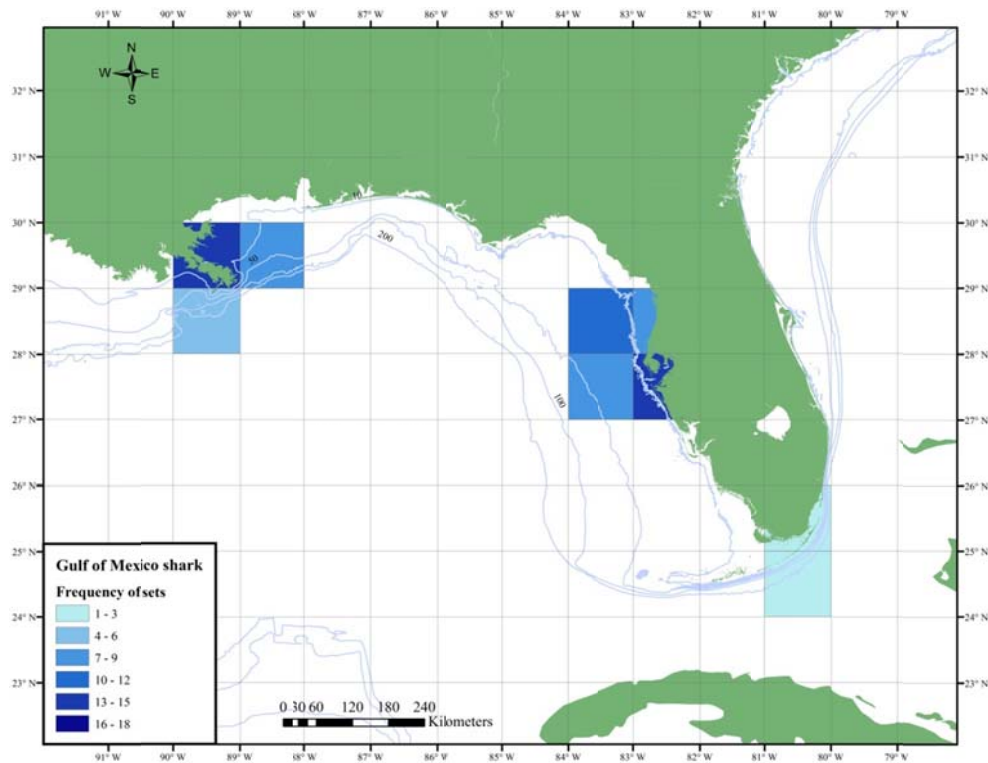
Figure 1 cont'd. Distribution of all observed hauls by target in 2012. (e) Distribution of effort targeting large coastal sharks in the South Atlantic, (f) distribution of effort targeting sandbar sharks in the Gulf of Mexico and South Atlantic.

(e)
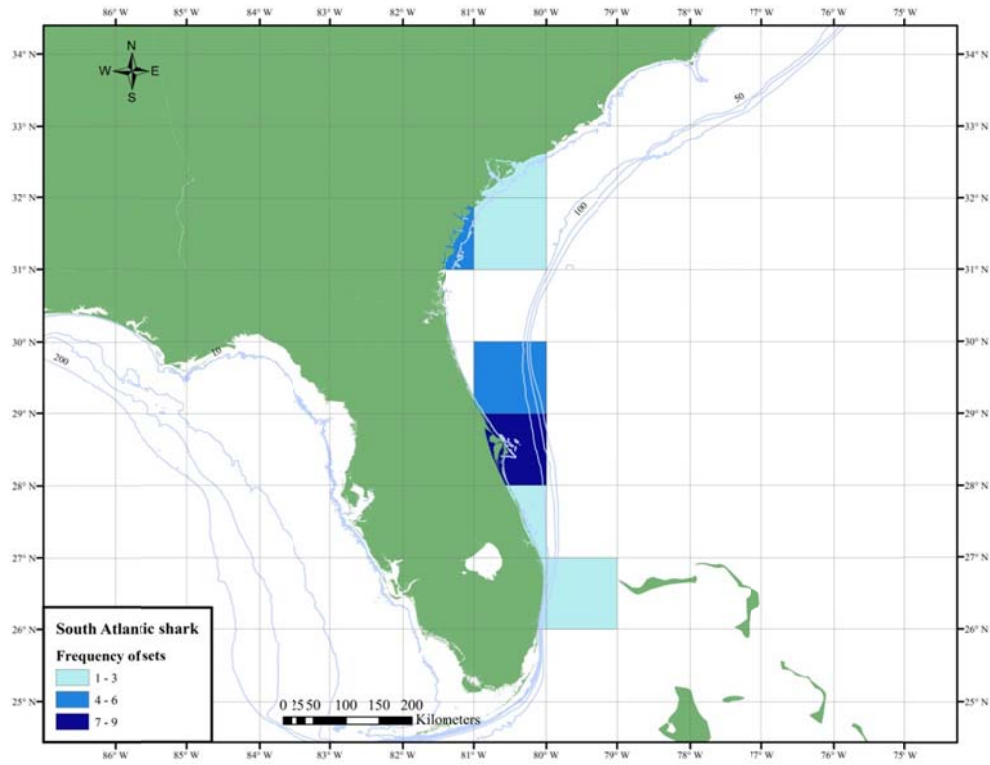
(f)
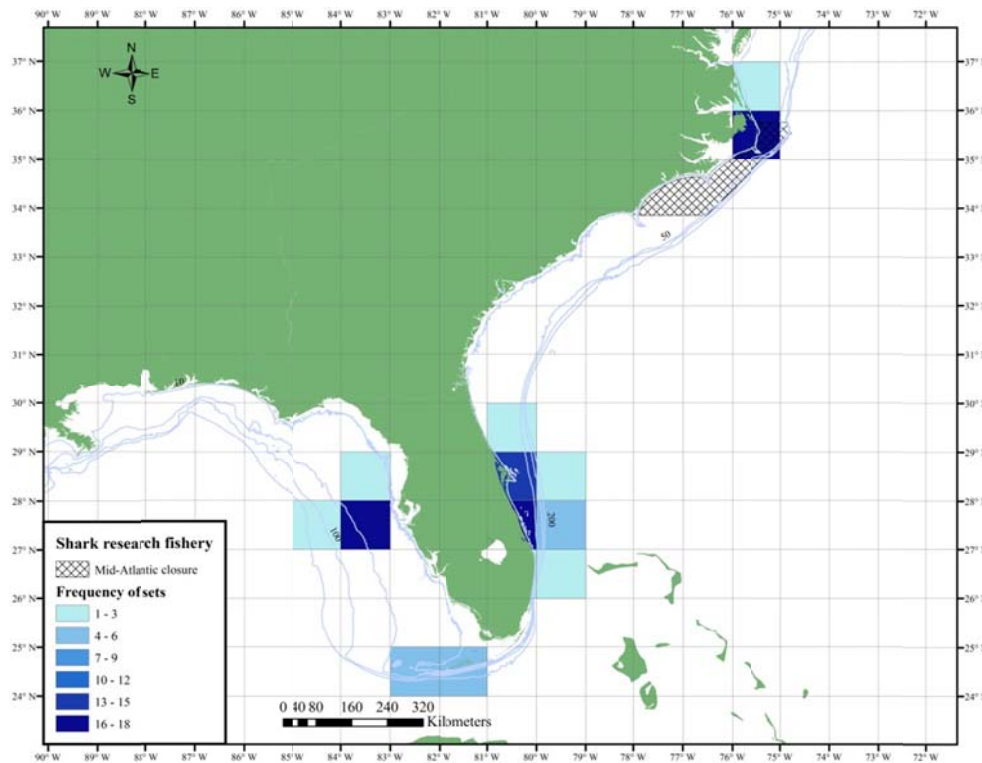
Figure 2. Length frequency (cm fork length) of (a) silky (FAL), nurse (NUR), blacktip (SBK), spinner (SSP) and tiger (TIG) sharks, (b) small coastal sharks including Atlantic sharpnose (SAS), blacknose (SBN) and bonnethead (BHH) sharks observed caught on bottom longline sets targeting shallow water reef fish in the Gulf of Mexico.
(a)
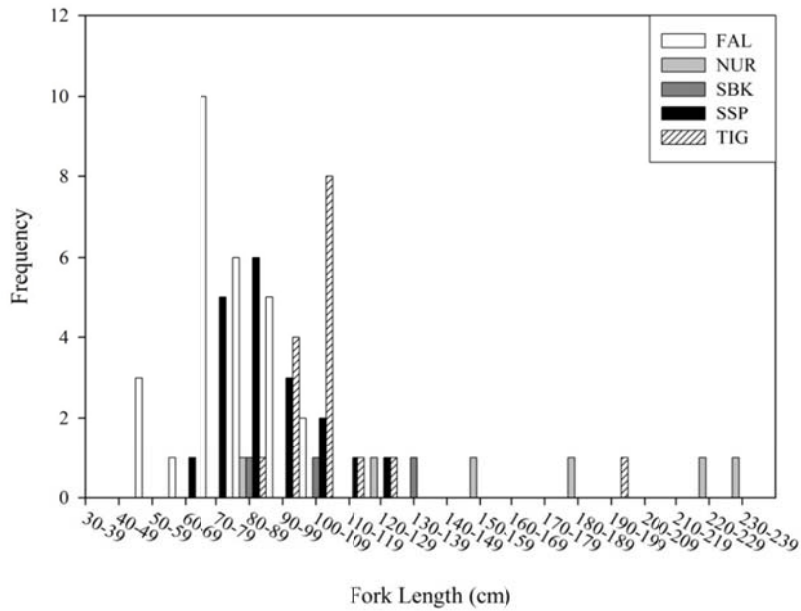
(b)
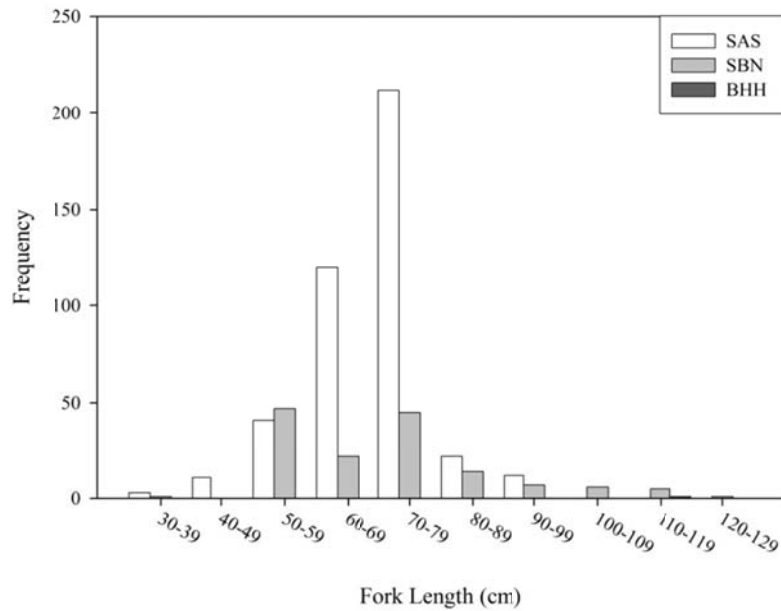
Figure 2 cont'd. Length frequency (cm fork length) of (c) smooth dogfish (DGS) and sandbar (SSB) sharks observed caught on bottom longline sets targeting shallow water reef fish in the Gulf of Mexico.

(c)
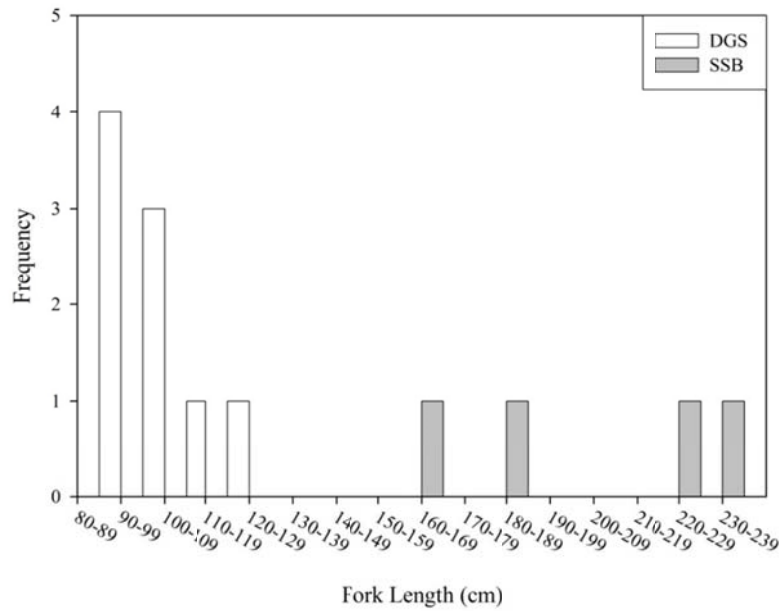
Figure 3. Length frequency (cm fork length) of (a) silky (FAL), blacktip (SBK), scalloped hammerhead (SPL) and tiger (TIG) sharks observed caught on bottom longline sets targeting deep water reef fish in the Gulf of Mexico.
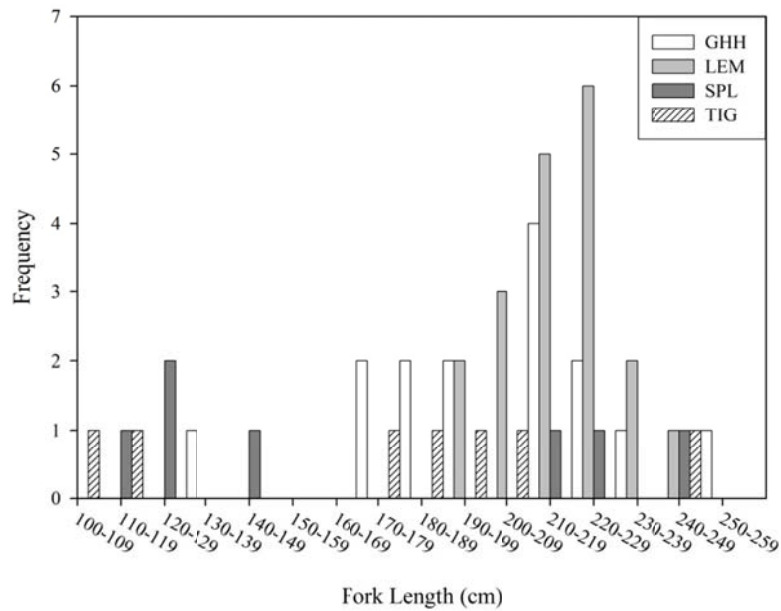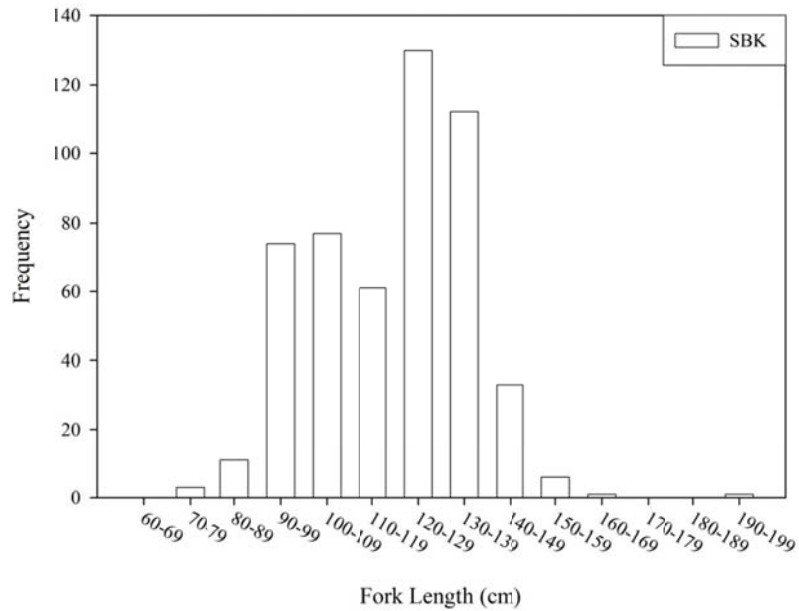
(a)
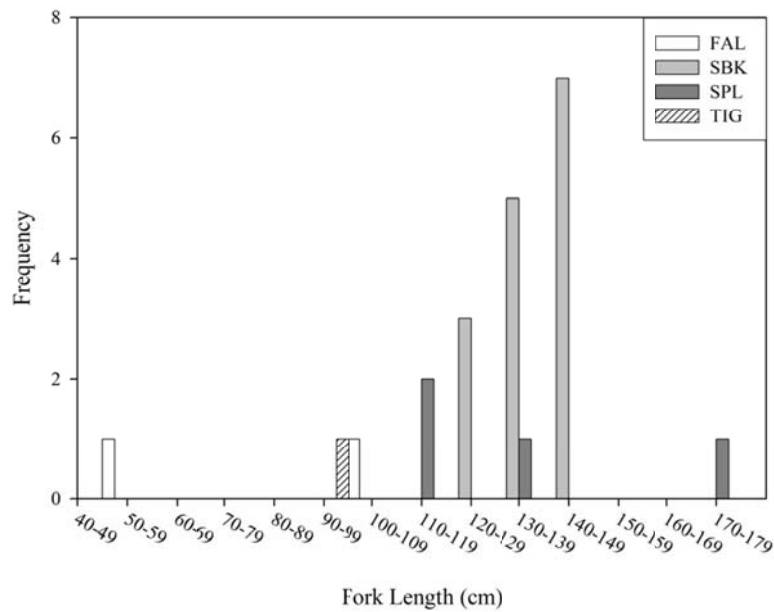
Figure 3 cont'd. Length frequency (cm fork length) of (b) small coastal sharks including Atlantic sharpnose (SAS) and blacknose (SBN) sharks, (c) deep water sharks including cuban dogfish (DCU), chain catshark (DGC) and smooth dogfish (DGS) sharks, observed caught on bottom longline sets targeting deep water reef fish in the Gulf of Mexico.
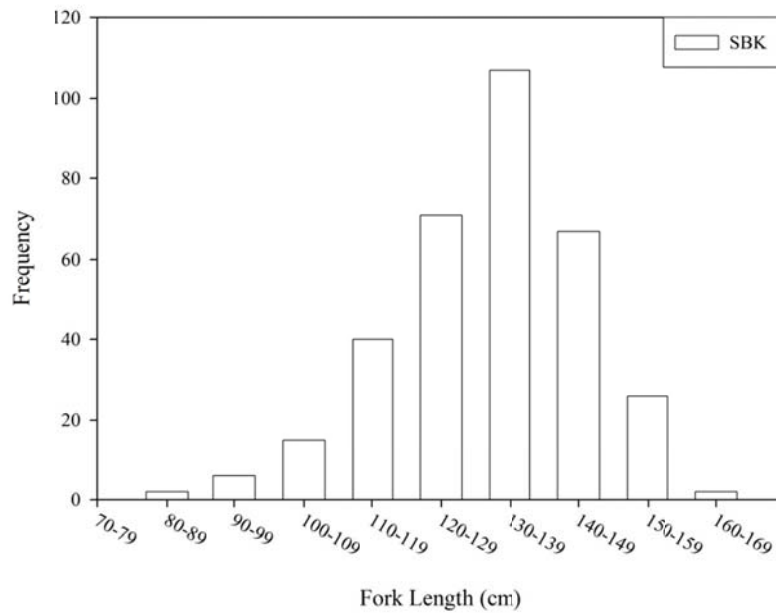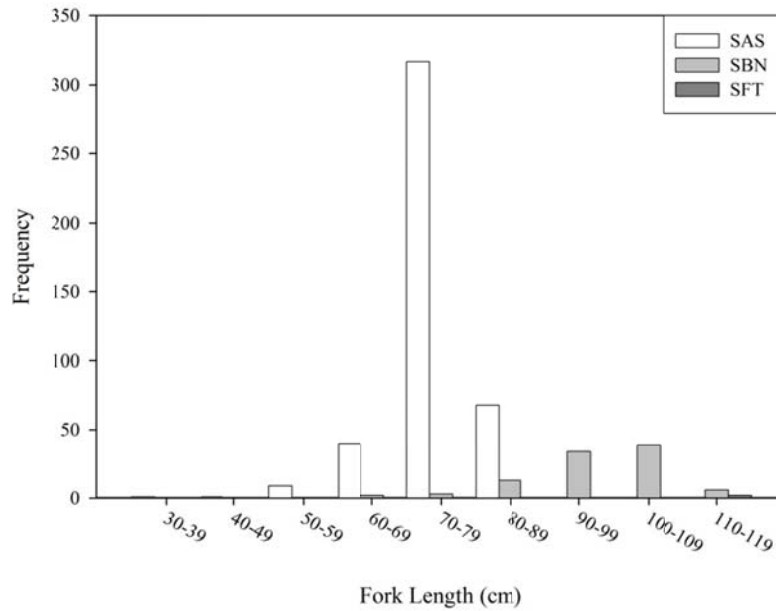
(b)
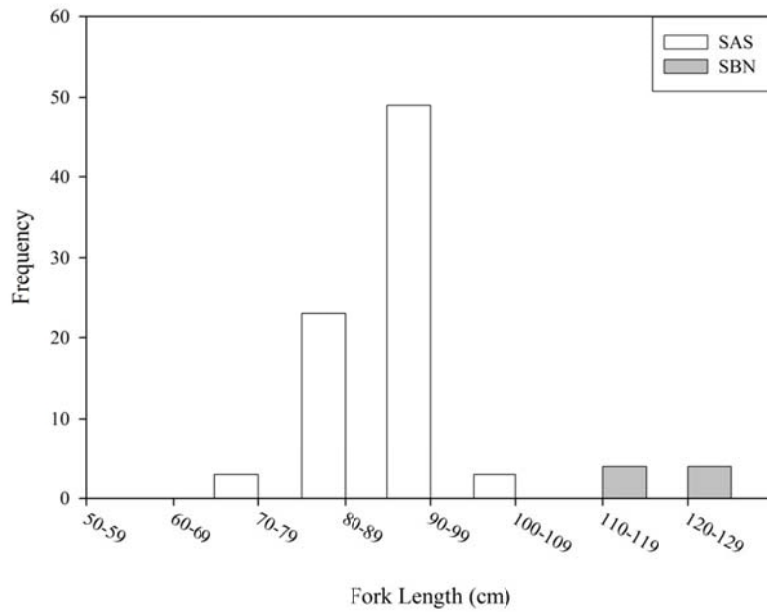
(c)
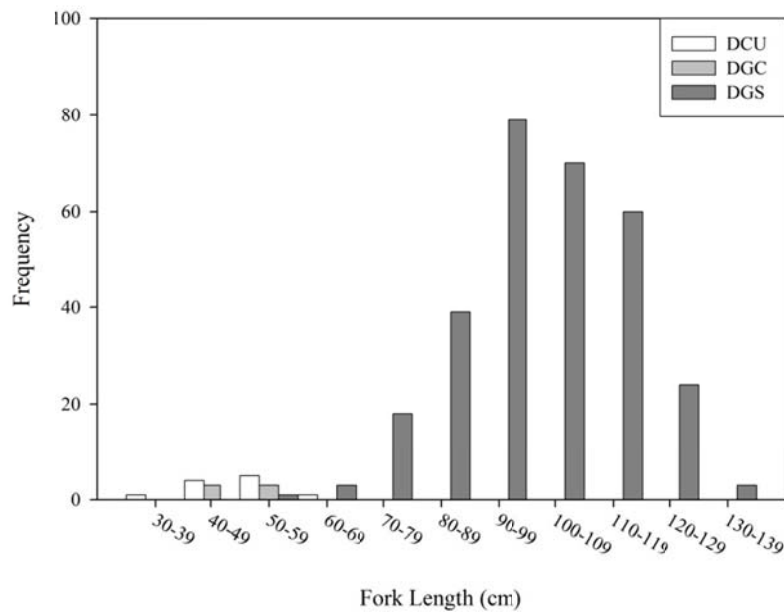
Figure 3 cont'd. Length frequency (cm fork length) of (b) prohibited sharks including bigeye sixgill (BSX), sixgill (SIX), night (SNI) and sandbar (SSB) sharks observed caught on bottom longline sets targeting deep water reef fish in the Gulf of Mexico. (d)
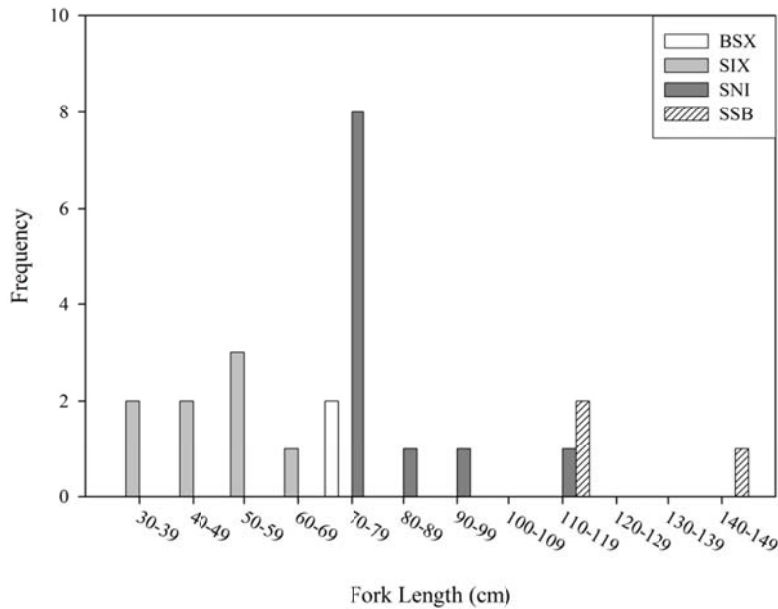
Figure 4. Length frequency (cm fork length) of deep water sharks including Cuban dogfish (DCU), chain catshark (DGC), shortspine dogfish (DGM) and roughskin dogfish (DGR) sharks observed caught on bottom longline sets targeting tilefish in the Gulf of Mexico.

31
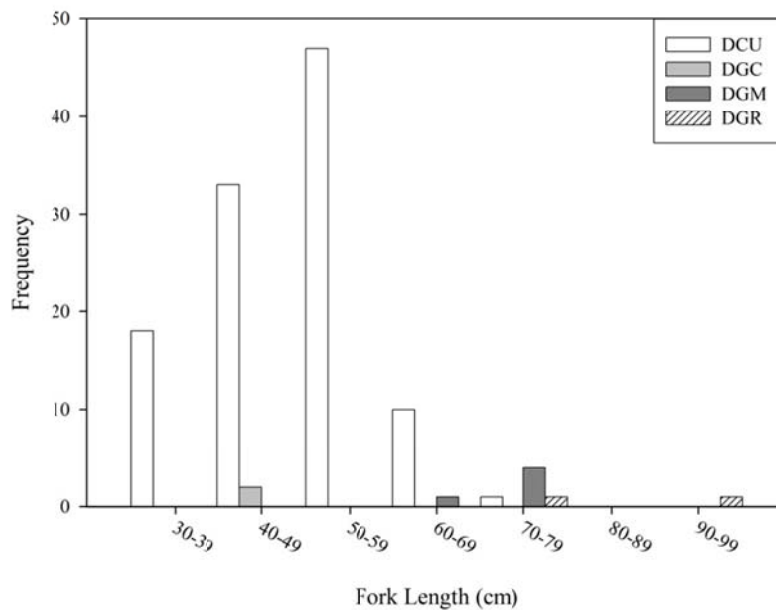
Figure 5. Length frequency (cm fork length) of (a) silky (FAL), bull (SBU), spinner (SSP) and sandbar (SSB) sharks, (b) great hammerhead (GHH), lemon (LEM), scalloped hammerhead (SPL) and tiger (TIG) sharks observed caught on bottom longline sets targeting large coastal shark in the Gulf of Mexico.

(a)
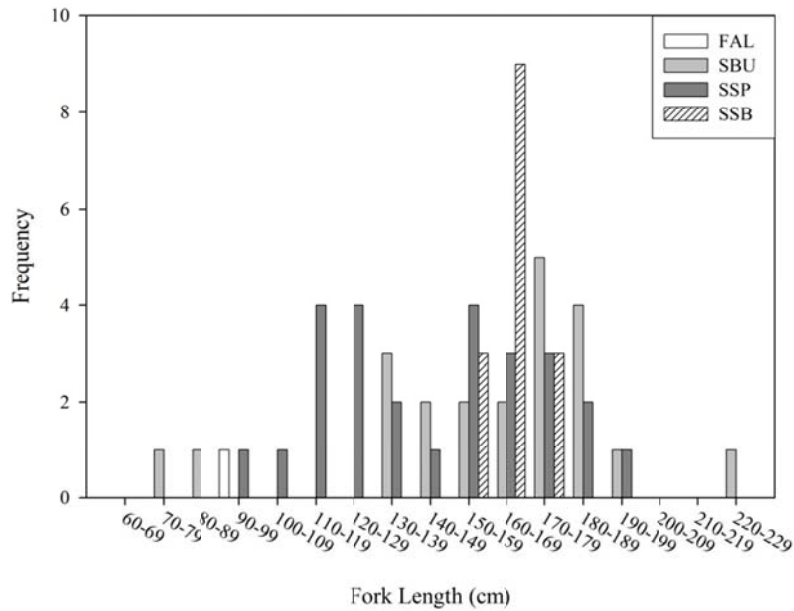
(b)

Figure 5 cont'd. Length frequency (cm fork length) of (c) blacktip (SBK) sharks, (d) small coastal sharks including Atlantic sharpnose (SAS), blacknose (SBN) and finetooth (SFT) sharks observed caught on bottom longline sets targeting large coastal shark in the Gulf of Mexico.

(c)

(d)
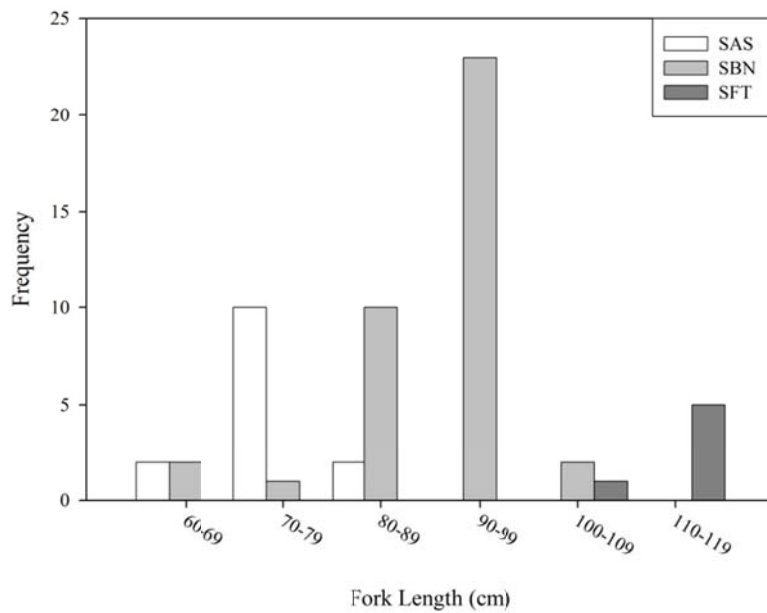
Figure 6. Length frequency (cm fork length) of (a) lemon (LEM), bull (SBU), spinner (SSP) and tiger (TIG) sharks, (b) blacktip (SBK) sharks observed caught on bottom longline sets targeting large coastal shark in the South Atlantic.

(a)
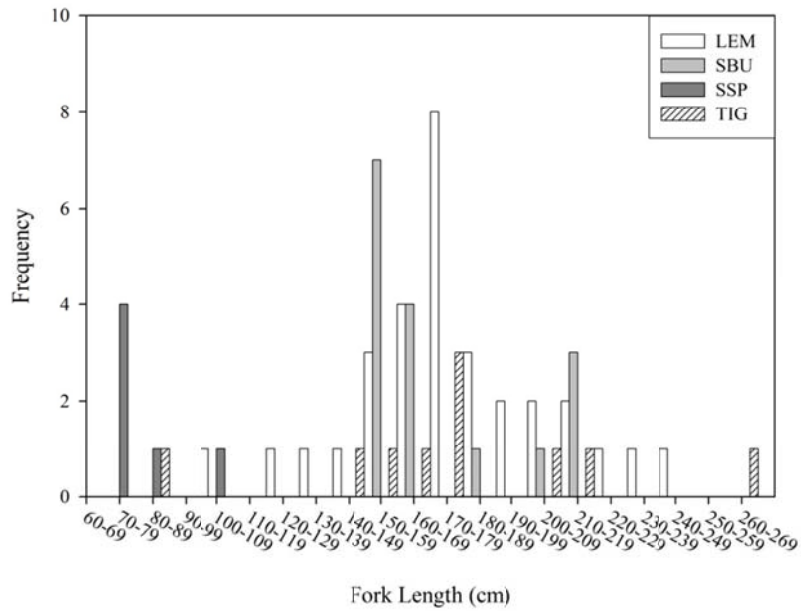
(b)

Figure 6 cont'd. Length frequency (cm fork length) of (c) small coastal sharks including Atlantic sharpnose (SAS), blacknose (SBN) and finetooth (SFT) sharks, (d) smooth dogfish (DGS) sharks observed caught on bottom longline sets targeting large coastal shark in the South Atlantic.

(c)

(d)
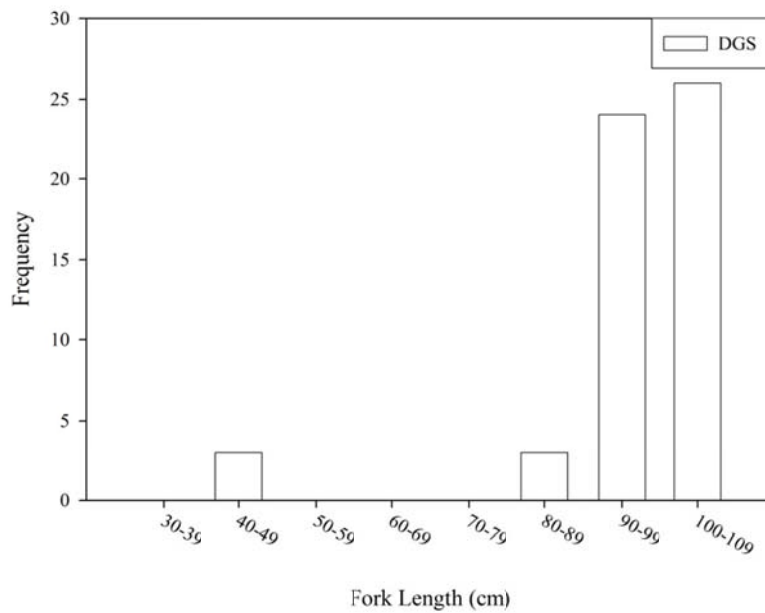
Figure 6 cont'd. Length frequency (cm fork length) of (e) prohibited sharks including Caribbean reef (SRF) and sandbar (SSB) sharks observed caught on bottom longline sets targeting large coastal shark in the South Atlantic.
(e)
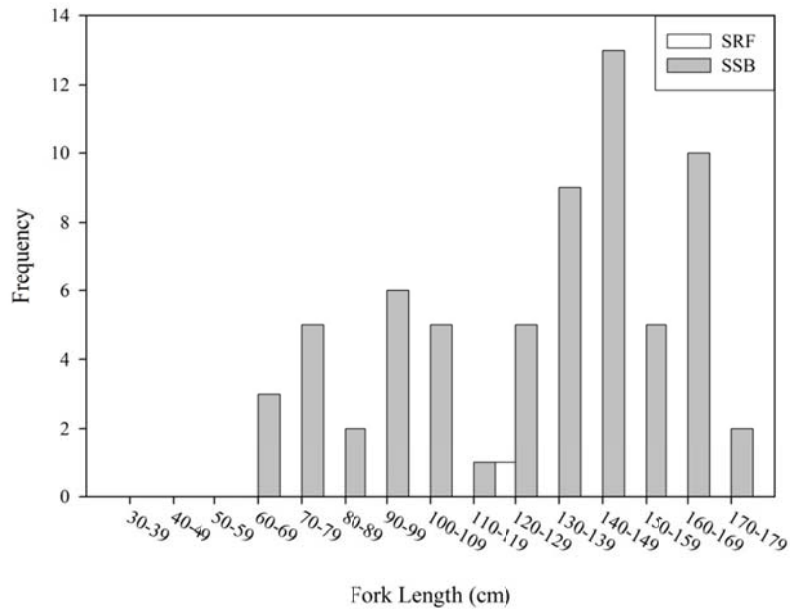
Figure 7. Length frequency (cm fork length) of (a) sandbar (SSB) sharks observed caught on bottom longline sets targeting sandbar shark in the Gulf of Mexico and South Atlantic.
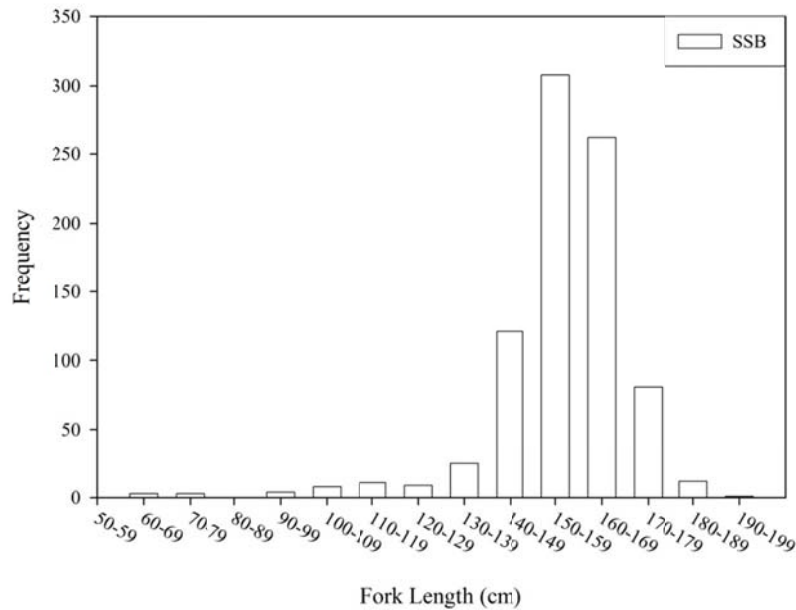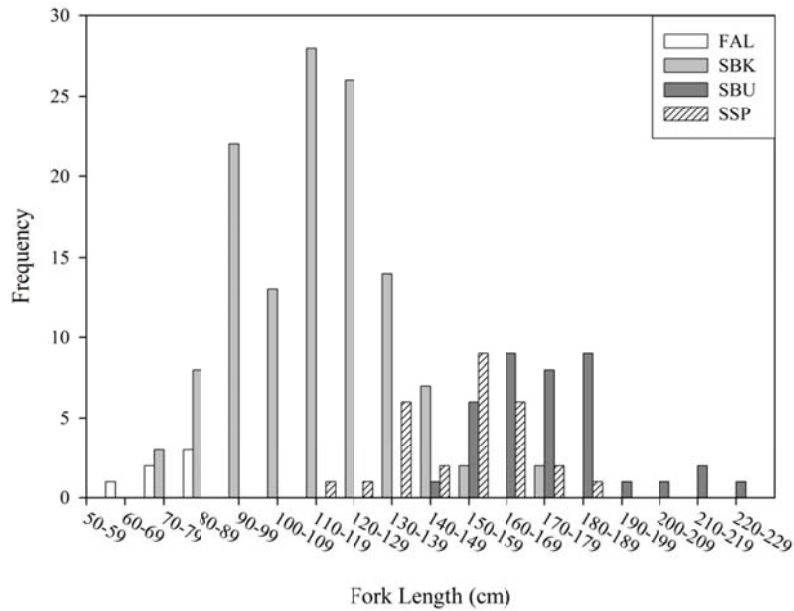(a)

Figure 7 cont'd. Length frequency (cm fork length) of (b) silky (FAL), blacktip (SBK) bull (SBU) and spinner (SSP) sharks, (c) great hammerhead (GHH), lemon (LEM), scalloped hammerhead (SPL) and tiger (TIG) sharks observed caught on bottom longline sets targeting sandbar shark in the Gulf of Mexico and South Atlantic.
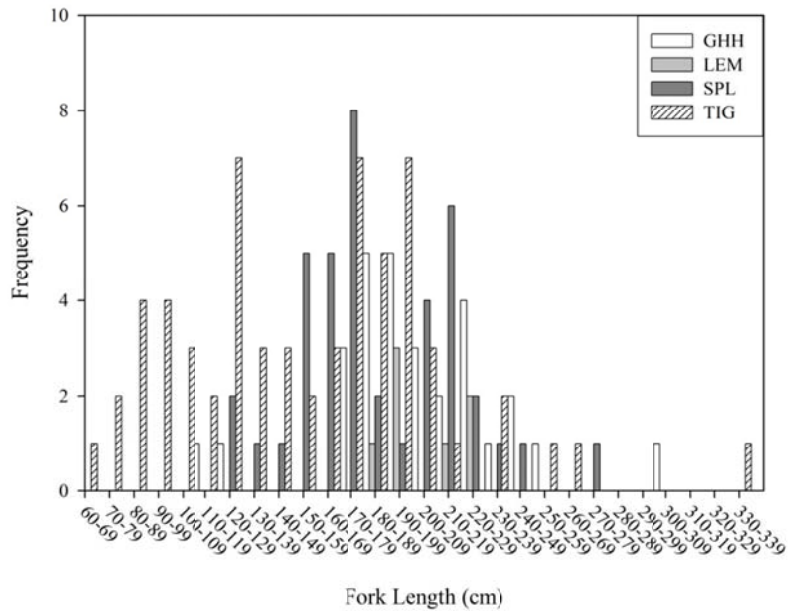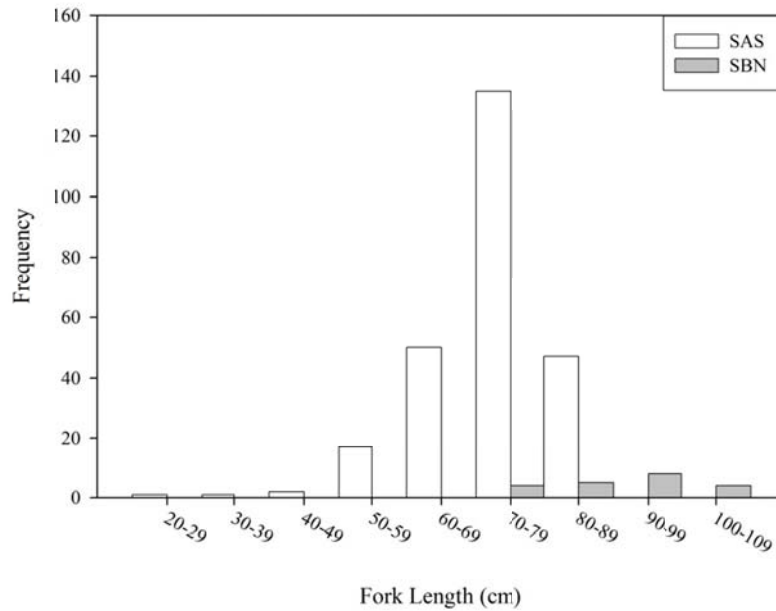
(b)

(c)

Figure 7 cont'd. Length frequency (cm fork length) of (d) small coastal sharks including Atlantic sharpnose (SAS) and blacknose (SBN) sharks, (e) prohibited sharks including dusky (DUS), white (GWS) and night (SNI) sharks observed caught on bottom longline sets targeting sandbar shark in the Gulf of Mexico and South Atlantic.

(d)

(e)