4.0 FISHERY DATA UPDATE

In this section, HMS fishery data, with the exception of some data on Atlantic sharks, are analyzed by gear type; Section 4.8 provides a summary of landings by species. While HMS fishermen generally target particular species, the non-selective nature of most fishing gears warrants analysis and management on a gear-by-gear basis. In addition, issues such as bycatch and safety are generally better addressed by gear type. A summary of bycatch, incidental catch, and protected resource interaction statistics can be found in Section 8.0 of this document.

The revised list of authorized fisheries and fishing gear used in those fisheries became effective December 1, 1999 (64 FR 67511). The rule applies to all U.S. marine fisheries, including Atlantic HMS. As stated in the rule, "no person or vessel may employ fishing gear or participate in a fishery in the exclusive economic zone (EEZ) not included in this List of Fisheries (LOF) without giving 90 days' advance notice to the appropriate Fishery Management Council (Council) or, with respect to Atlantic HMS, the Secretary of Commerce (Secretary)." Authorized gear types include: swordfish handgear fishery – rod and reel, harpoon, handline, bandit gear, buoy gear; pelagic longline fishery – longline; shark drift gillnet fishery – gillnet; shark bottom longline fishery – longline; shark recreational fishery – rod and reel, handline; tuna purse seine fishery – purse seine; tuna recreational fishery– rod and reel, handline, speargun; tuna handgear fishery – rod and reel, harpoon, handline, bandit gear, greenstick; and Atlantic billfish recreational fishery – rod and reel only.

Due to the nature of SCRS data collection, Table 4.1 depicts a summary of U.S. and international HMS catches by species rather than gear type. International catch levels and U.S. reported catches for HMS, other than sharks, are taken from the 2008 Standing Report of the SCRS (SCRS, 2008). The U.S. percentage of regional and total catch of HMS species is presented (Table 4.1) to provide a basis for comparison of the U.S. catch relative to other nations/entities. Catch of billfish includes both recreational landings and dead discards from commercial fisheries; catch for bluefin tuna includes commercial landings and discards and recreational landings; and swordfish include commercial landings and discards. International catch and landings tables are included for the pelagic longline and purse seine fisheries in Sections 4.1 and 4.2 of this document. At this point, data necessary to assess the U.S. regional and total percentage of international catch levels for Atlantic shark species are unavailable.

Table 4.1 **Calendar Year 2007 U.S. vs International Catch of HMS (mt ww) other than sharks.** Source: SCRS, 2008.

Species	Total International Reported Catch	Region of U.S. Involvement	Total Regional Catch	U.S. Catch	U.S. Percentage of Regional Catch	U.S. Percentage of Total Atlantic Catch
Atlantic Swordfish	27,354* (includes N. & S. Atlantic)	North Atlantic	11,938*	2,666	22.33%	9.75%
		South Atlantic	15,416*	0	0%	
Atlantic Bluefin Tuna	34,030**	West Atlantic	1,632	758	46.44%	2.22%
Atlantic Bigeye Tuna	67,172	Total Atlantic	67,172	522	0.78%	0.78%
Atlantic Yellowfin Tuna	96,580	West Atlantic	22,648	5,529	24.41%	5.72%
Atlantic Albacore Tuna	48,127 (includes N. & S. Atlantic and Mediterranean)	North Atlantic	21,549	532	2.46%	1.11%
		South Atlantic	20,032	0	0.00%	
Atlantic Skipjack Tuna	150,848	West Atlantic	25,443	66	0.26%	0.04%
Atlantic Blue Marlin	2,303	North Atlantic	797	48	6.02%	2.08%
Atlantic White Marlin	302	North Atlantic	142	8	5.56%	2.61%
Atlantic Sailfish	1,980	West Atlantic	920	7	<1%	<1%

* Actual catches are likely higher given significant non-compliance with ICCAT reporting requirements.
** Significant non-compliance with ICCAT reporting requirements affects SCRS from estimating aggregate 2007 eastern Atlantic bluefin tuna catches accurately.

4.1 Pelagic Longline Fishery

4.1.1 Domestic History and Current Management

The U.S. PLL fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, and bigeye tuna in various areas and seasons. Secondary target species include dolphin, albacore tuna, and to a lesser degree sharks. Although this gear can be modified (*e.g.*, depth of set, hook type, *etc*.) to target swordfish, tunas, or sharks, it is generally a multi-species fishery. These vessel operators are opportunistic, switching gear style and making subtle changes to target the best available economic opportunity of each individual trip. PLL gear sometimes attracts and hooks non-target finfish with little or no commercial value as well as species that cannot be retained by commercial fishermen due to regulations, such as billfish. Pelagic longlines may also interact with protected species such as marine mammals, sea turtles, and seabirds. Thus, this gear has been classified as a Category I fishery with respect to the MMPA. Any species (or undersized catch of permitted species) that cannot be landed due to fishery regulations is required to be released, regardless of whether the catch is dead or alive.

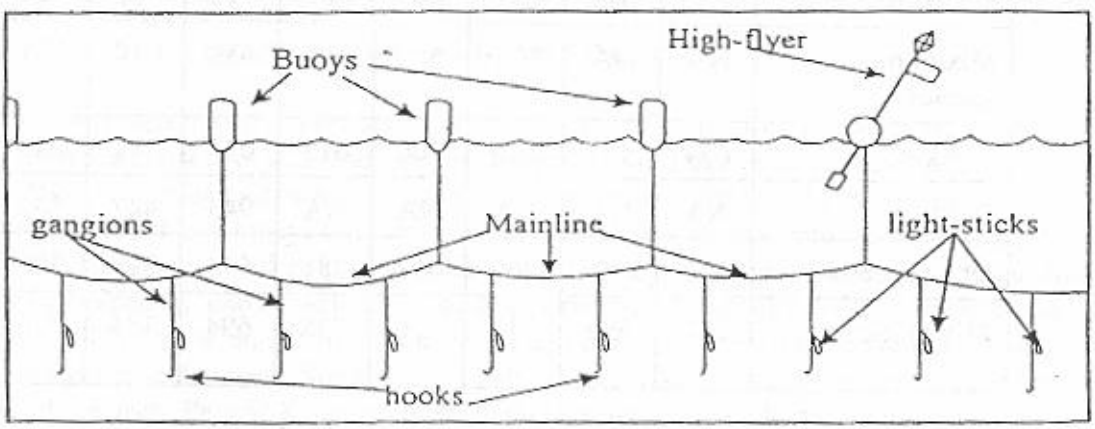


Figure 4.1 Typical U.S. Pelagic Longline Gear. Source: Arocha, 1996.

PLL gear is composed of several parts. The primary fishing line, or mainline of the longline system, can vary from five to 40 miles in length, with approximately 20 to 30 hooks per mile. The depth of the mainline is determined by ocean currents and the length of the floatline, which connects the mainline to several buoys, and periodic markers which can have radar reflectors or radio beacons attached. Each individual hook is connected by a leader, or gangion, to the mainline. Lightsticks, which contain chemicals that emit a glowing light, are often used, particularly when targeting swordfish. When attached to the hook and suspended at a certain depth, lightsticks attract baitfish, which may, in turn, attract pelagic predators (NMFS, 1999).

When targeting swordfish, PLL gear is generally deployed at sunset and hauled at sunrise to take advantage of swordfish nocturnal near-surface feeding habits (NMFS, 1999). In general, longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. Except for vessels of the distant water fleet, which undertake extended trips, fishing

vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface. The number of hooks per set varies with line configuration and target species (Table 4.2) (NMFS, 1999). The PLL gear components may also be deployed as a trolling gear to target surface feeding tunas. Under this configuration, the mainline and gangions are elevated and actively trolled so that the baits fish on or above the water's surface. This style of fishing is often referred to as "green-stick fishing," and reports indicate that it can be extremely efficient compared to conventional fishing techniques. For additional information regarding green-sticks please refer to Section 4.8.

Table 4.2 Average Number of Hooks per PLL Set, 1999-2007. Source: PLL logbook data.

Target Species	1999	2000	2001	2002	2003	2004	2005	2006	2007
Swordfish	521	550	625	695	711	701	747	742	672
Bigeye Tuna	768	454	671	755	967	400	634	754	773
Yellowfin Tuna	741	772	731	715	720	696	691	704	672
Mix of tuna species	NA	638	719	767	765	779	692	676	640
Shark	613	621	571	640	696	717	542	509	494
Dolphin	NA	943	447	542	692	1,033	734	988	789
Other species	781	504	318	300	865	270	889	236	NA
Mix of species	738	694	754	756	747	777	786	777	757

Figure 4.2 illustrates basic differences between swordfish (shallow) sets and tuna (deep) longline sets. Swordfish sets are buoyed to the surface, have few hooks between floats, and are relatively shallow. This same type of gear arrangement is used for mixed target sets. Tuna sets use a different type of float placed much further apart. Compared with swordfish sets, tuna sets have more hooks between the floats and the hooks are set much deeper in the water column. It is believed that because of the difference in fishing depth, tuna sets hook fewer turtles than the swordfish sets. In addition, tuna sets use bait only, while swordfish fishing uses a combination of bait and lightsticks. Compared with vessels targeting swordfish or mixed species, vessels specifically targeting tuna are typically smaller and fish different grounds.

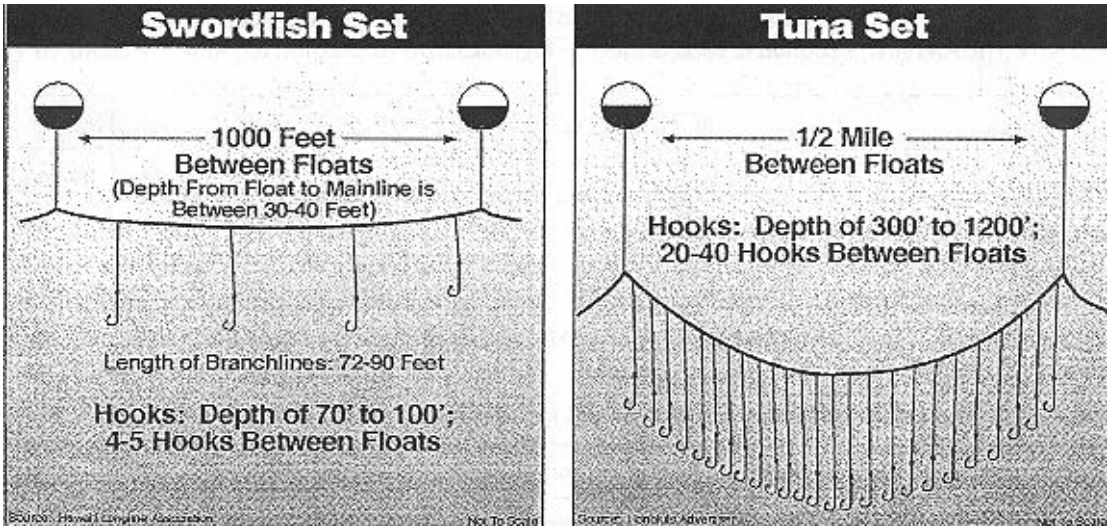


Figure 4.2 Different Pelagic Longline Gear Deployment Techniques. Source: Hawaii Longline Association and Honolulu Advertiser.

NOTE: This figure is only included to show basic differences in pelagic longline gear configuration and to illustrate that this gear may be altered to target different species.

Regional U.S. Pelagic Longline Fisheries Description

The U.S. PLL fishery sector has historically been comprised of five relatively distinct segments with different fishing practices and strategies, including the Gulf of Mexico yellowfin tuna fishery, the South Atlantic-Florida east coast to Cape Hatteras swordfish fishery, the Mid-Atlantic and New England swordfish and bigeye tuna fishery, the U.S. distant water swordfish fishery, and the Caribbean Islands tuna and swordfish fishery. Each vessel type has different range capabilities due to fuel capacity, hold capacity, size, and construction. In addition to geographical area, these segments have historically differed by percentage of various target and non-target species, gear characteristics, and deployment techniques. Some vessels fish in more than one fishery segment during the course of the year (NMFS, 1999). Due to the various changes in the fishery, i.e., regulations, operating costs, market conditions, availability, etc., the fishing practices and strategies of these different segments may change over time.

<u>The Gulf of Mexico Yellowfin Tuna Fishery</u>

Gulf of Mexico vessels primarily target yellowfin tuna year-round; however, a handful of these vessels directly target swordfish, either seasonally or year-round. Longline fishing vessels that target yellowfin tuna in the Gulf of Mexico also catch and sell dolphin, swordfish, other tunas, and sharks. During yellowfin tuna fishing, few swordfish are captured incidentally. Many of these vessels participate in other Gulf of Mexico fisheries (targeting shrimp, shark, and snapper/grouper) during allowed seasons. Home ports for this fishery include Madiera Beach, Florida; Panama City, Florida; Dulac, Louisiana; and Venice, Louisiana (NMFS, 1999).

For catching tuna, the longline gear is configured similarly to swordfish longline gear but is deployed differently. The gear is typically set out at dawn (between two a.m. and noon) and retrieved at sunset (4 p.m. to midnight). The water temperature varies based on the location of

fishing. However, yellowfin tuna are targeted in the western Gulf of Mexico during the summer when water temperatures are high. In the past, fishermen have used live bait, however, NMFS prohibited the use of live bait in the Gulf of Mexico in an effort to decrease bycatch and bycatch mortality of billfish (65 FR 47214, August 1, 2000). This rule also closed the Desoto Canyon area (year-round closure) to pelagic longline gear. In the Gulf of Mexico, and all other areas, except the NED, specific circle hooks (16/0 or larger non-offset and 18/0 or larger with an offset not to exceed 10 degrees) are currently required, as are whole finfish and squid baits.

The South Atlantic – Florida East Coast to Cape Hatteras Swordfish Fishery

Historically, South Atlantic pelagic longline vessels targeted swordfish year-round, although yellowfin tuna and dolphin fish were other important marketable components of the catch. In 2001 (65 FR 47214, August 1, 2000), the Florida East Coast closed area (year-round closure) and the Charleston Bump closed area (February through April closure) became effective.

Prior to these closures, smaller vessels used to fish short trips from the Florida Straits north to the bend in the Gulf Stream off Charleston, South Carolina (Charleston Bump). Mid-sized and larger vessels migrate seasonally on longer trips from the Yucatan Peninsula throughout the West Indies and Caribbean Sea, and some trips range as far north as the Mid-Atlantic coast of the United States to target bigeye tuna and swordfish during the late summer and fall. Home ports (including seasonal ports) for this fishery include Georgetown, South Carolina; Charleston, South Carolina; Fort Pierce, Florida; Pompano Beach, Florida; and Key West, Florida. This sector of the fishery consists of small to mid-size vessels, which typically sell fresh swordfish to local high-quality markets (NMFS, 1999).

The Mid-Atlantic and New England Swordfish and Bigeye Tuna Fishery

Fishing in this area has evolved during recent years to focus almost year-round on directed tuna trips, with substantial numbers of swordfish trips as well. Some vessels participate in directed bigeye/yellowfin tuna fishing during the summer and fall months and then switch to bottom longline and/or shark fishing during the winter when the large coastal shark season is open. In 1999, NMFS closed the Northeastern U.S. area in June to pelagic longline gear to reduce bluefin tuna discards (64 FR 29090, May 28, 1999). During the season, vessels primarily offload in the ports of New Bedford, Massachusetts; Barnegat Light, New Jersey; Ocean City, Maryland; and Wanchese, North Carolina (NMFS, 1999).

The U.S. Atlantic Distant Water Swordfish Fishery

This fishing ground covers virtually the entire span of the western north Atlantic to as far east as the Azores and the Mid-Atlantic Ridge. Approximately 12 large fishing vessels that fish in the distant water operate out of Mid-Atlantic and New England ports during the summer and fall months targeting swordfish and tunas, and then move to Caribbean ports during the winter and spring months. Many of the current distant water operations were among the early participants in the U.S. directed Atlantic commercial swordfish fishery. These larger vessels, with greater ranges and capacities than the coastal fishing vessels, enabled the United States to

become a significant participant in the north Atlantic fishery. In the past, these vessels have also fished for swordfish in the south Atlantic. In recent years, few, if any U.S. vessels, fish for swordfish in the South Atlantic. The distant water vessels traditionally have been larger than their southeast counterparts because of the distances required traveling to the fishing grounds, thus the trips in this particular fishery tend to be longer than in the other longline fisheries. Ports for this fishery range from San Juan, Puerto Rico through Portland, Maine, and include New Bedford, Massachusetts, and Barnegat Light, New Jersey (NMFS, 1999). This segment of the fleet was directly affected by the L-shaped closure in 2000 and the Northeast Distant Statistical Reporting Area (NED) closure implemented in 2001. A number of vessels have recently returned to this fishery when the NED was reopened with the issuance of the July 6, 2004, rule (69 FR 40734) to reduce sea turtle bycatch and bycatch mortality. Unlike in other areas, vessels fishing in the NED are required to use 18/0 or larger circle hooks with an offset not to exceed 10 degrees and whole mackerel or squid baits.

The Caribbean Tuna and Swordfish Fishery

This fleet is similar to the southeast coastal fishing fleet in that both are comprised primarily of smaller vessels that make short trips relatively near-shore, producing high quality fresh product. Both fleets also encounter relatively high numbers of undersized swordfish at certain times of the year. Longline vessels targeting HMS in the Caribbean use fewer hooks per set, on average, fishing deeper in the water column than the distant water fleet off New England, the northeast coastal fleet, and the Gulf of Mexico yellowfin tuna fleet. This fishery is typical of most pelagic fisheries, being truly a multi-species fishery, with swordfish as a substantial portion of the total catch. Yellowfin tuna, dolphin and, to a lesser extent, bigeye tuna, are other important components of the landed catch. Ports for this fishery include St. Croix, U.S. Virgin Islands; and San Juan, Puerto Rico. Many of these high quality fresh fish are sold to local markets to support the tourist trade in the Caribbean (NMFS, 1999).

Management of the U.S. Pelagic Longline Fishery

The U.S. Atlantic PLL fishery is restricted by a swordfish quota, divided between the North and South Atlantic (separated at 5°N. Lat.). Other regulations include minimum sizes for swordfish, yellowfin, bigeye, and bluefin tuna; bluefin tuna target catch requirements; shark quotas; protected species incidental take limits; reporting requirements (including logbooks); gear and bait requirements; limited access vessel permits, and mandatory workshop requirements. Current billfish regulations prohibit the retention of billfish by commercial vessels, or the sale of billfish from the Atlantic Ocean. As a result, all billfish hooked on PLL gear must be discarded, and are considered bycatch. PLL is a heavily managed gear type and, as such, is strictly monitored. Because it is difficult for PLL fishermen to avoid undersized or prohibited fish in some areas, NMFS has closed areas in the Gulf of Mexico and along the east coast. The intent of these closures is to decrease bycatch in the PLL fishery by closing those areas with the highest rates of bycatch. There are also time/area closures for PLL fishermen designed to reduce the incidental catch of bluefin tuna and sea turtles. In order to enforce time/area closures and to monitor the fishery, NMFS requires all PLL vessels to report positions on an approved Vessel Monitoring System (VMS).

In addition to the regulations mentioned above, vessels with PLL gear onboard, at all times, in all areas open to PLL fishing, excluding the NED, must possess onboard and/or use only 16/0 or larger non-offset circle hooks and/or 18/0 or larger circle hooks with an offset not to exceed ten degrees. Only whole finfish and squid baits may be possessed and/or utilized with allowable hooks. All PLL vessels must possess and use sea turtle handling and release gear in compliance with NMFS careful release protocols. Additionally, all PLL vessel owners and operators must be certified in the use of the protected species handling and release gear. Certification must be renewed every three years and can be obtained by attending a workshop. For more information pertaining to the certification, please see Chapter 8.

Permits

The 1999 FMP established six different LAP types: (1) directed swordfish, (2) incidental swordfish, (3) swordfish handgear, (4) directed shark, (5) incidental shark, and (6) tuna longline. To reduce bycatch in the PLL fishery, these permits were designed so that the swordfish directed and incidental permits are valid only if the permit holder also holds both a tuna longline and a shark permit. Similarly, the tuna longline permit is valid only if the permit holder also holds both a swordfish (directed or incidental, not handgear) and a shark permit. This allows limited retention of species that might otherwise have been discarded.

As of May 1, 2008, approximately 241 tuna longline limited access permits had been issued. In addition, approximately 181 directed swordfish limited access permits, 76 incidental swordfish limited access permits, 214 directed shark limited access permits, and 285 incidental shark limited access permits had been issued (see Chapter 9 for more information on permits). Vessels with limited access swordfish and shark permits do not necessarily use pelagic longline gear, but these are the only permits that allow for the use of pelagic longline gear in HMS fisheries.

Monitoring and Reporting

PLL fishermen and the dealers who purchase HMS from them are subject to reporting requirements. NMFS has extended dealer reporting requirements to all swordfish importers as well as dealers who buy domestic swordfish from the Atlantic. These data are used to evaluate the impacts of harvesting on the stock and the impacts of regulations on affected entities.

Commercial HMS fisheries are monitored through a combination of vessel logbooks, dealer reports, port sampling, cooperative agreements with states, and scientific observer coverage. Logbooks contain information on fishing vessel activity, including dates of trips, number of sets, area fished, number of fish, and other marine species caught, released, and retained. In some cases, social and economic data such as volume and cost of fishing inputs are also required.

Pelagic Longline Observer Program

During 2007, NMFS observers recorded 944 PLL sets for an overall fishery coverage of 10.8 percent. (Fairfield and Garrison, 2008) Table 4.3 details the amount of observer coverage

in past years for this fleet. Generally, due to logistical problems, it has not always been possible to place observers on all selected trips. NMFS is working towards improving compliance with observer requirements and facilitating communication between vessel operators and observer program coordinators. In addition, fishermen are reminded of the safety requirements for the placement of observers specified at 50 CFR 600.746, and the need to have all safety equipment on board required by the U.S. Coast Guard.

Table 4.3 **Observer Coverage of the Pelagic Longline Fishery.** Source: Yeung, 2001; Garrison, 2003b; Garrison and Richards, 2004; Garrison, 2005; Walsh and Garrison, 2006.

Year	Number of Sets Observed			Percentage of Total Number of Sets		
1999	420			3.8		
2000	464			4.2		
2001*	Total	Non-NED	NED	Total	Non-NED	NED
	584	398	186	5.4	3.7	100.0
2002*	856	353	503	8.9	3.9	100.0
2003*	1088	552	536	11.5	6.2	100.0
	Total	Non-EXP	EXP	Total	Non-EXP	EXP
2004**	702	642	60	7.3	6.7	100.0
2005**	796	549	247	10.1	7.2	100.0
2006	568	-	-	7.5	-	-
2007	944	-	-	10.8	-	-

*In 2001, 2002, and 2003, 100 percent observer coverage was required in the NED research experiment.
** In 2004 and 2005 there was 100 percent observer coverage in experimental fishing (EXP).

4.1.2 Recent Catch and Landings

U.S. PLL catch (including bycatch, incidental catch, and target catch) is largely related to vessel and gear characteristics, but is summarized for the whole fishery in Table 4.4. From May 1992 through December 2000, the Pelagic Observer Program (POP) recorded a total of 4,612 elasmobranchs (15 percent of the total catch) caught off the southeastern U.S. coast in fisheries targeting tunas and swordfish (Beerkircher *et al.*, 2004). Of the 22 elasmobranch species observed, silky sharks were numerically dominant (31.4 percent of the elasmobranch catch), with silky, dusky, night, blue, tiger, scalloped hammerhead, and unidentified sharks making up the majority (84.6 percent) (Beerkircher *et al.*, 2004).

Table 4.4 **Reported Catch of Species Caught by U.S. Atlantic PLLs, in Number of Fish, for 2000-2007.** Source: PLL Logbook Data.

Species	2000	2001	2002	2003	2004	2005	2006	2007
Swordfish Kept	62,978	47,560	49,320	51,835	46,440	41,139	38,241	45,933
Swordfish Discarded	17,074	13,993	13,035	11,829	10,675	11,134	8,900	11,823

Species	2000	2001	2002	2003	2004	2005	2006	2007
Blue Marlin Discarded	1,443	635	1,175	595	712	567	439	611
White Marlin Discarded	1,261	848	1,438	809	1,053	989	557	744
Sailfish Discarded	1,091	356	379	277	424	367	277	321
Spearfish Discarded	78	137	148	108	172	150	142	147
Bluefin Tuna Kept	235	177	178	273	475	375	261	337
Bluefin Tuna Discarded	737	348	585	881	1,031	765	833	1,345
Bigeye, Albacore, Yellowfin, Skipjack Tunas Kept	94,136	80,466	79,917	63,321	76,962	57,132	73,058	70,390
Pelagic Sharks Kept	3,065	3,460	2,987	3,037	3,440	3,149	2,098	3,504
Pelagic Sharks Discarded	28,046	23,813	22,828	21,705	25,355	21,550	24,113	27,478
Large Coastal Sharks Kept	7,896	6,478	4,077	5,326	2,292	3,362	1,768	546
Large Coastal Sharks Discarded	6,973	4,836	3,815	4,813	5,230	5,877	5,326	7,133
Dolphin Kept	29,125	27,586	30,384	29,372	38,769	25,707	25,658	68,124
Wahoo Kept	4,193	3,068	4,188	3,919	4,633	3,348	3,608	3,073
Turtle Interactions	271	424	465	399	369	152	128	300
Number of Hooks (x 1,000)	*7,976*	*7,564*	*7,150*	*7,008*	*7,276*	*5,911*	*5,662*	*6,291*

Table 4.5 **Reported Landings in the U.S. Atlantic Pelagic Longline Fishery (in mt ww) for 1999-2007.** Source: NMFS 2008.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007
Yellowfin Tuna	3,374	2,901	2,201	2,573	2,164	2,492	1746.2	2009.9	2387.9
Skipjack Tuna	2.0	1.8	4.3	2.5	1.4	0.7	0.6	0.2	0.0
Bigeye Tuna	929.1	531.9	682.4	535.8	283.9	310.1	311.9	520.6	374.5
Bluefin Tuna*	73.5	66.1	37.5	49.9	133.9	275.4	211.5	204.6	164.3
Albacore Tuna	194.5	147.3	193.8	155	107.6	120.4	108.5	102.9	126.1
Swordfish N.*	3,362.4	3,315.8	2,483	2,598.8	2,756.3	2,534.2	2,272.8	1,960.8	2,453
Swordfish S.*	185.2	143.8	43.2	199.9	20.5	15.7	0.0	0.0	0.0

* Includes landings and estimated discards from scientific observer and logbook sampling programs.

Marine Mammals

Of the marine mammals that are hooked by U.S. pelagic longline fishermen, many are released alive, although some animals suffer serious injuries and may die after being released. The observed and estimated marine mammal interactions for 1992 – 2007 are summarized in Table 4.6 and Table 4.7. Marine mammals are caught primarily during the third and fourth quarters in the Mid-Atlantic Bight (MAB) and Northeast Coastal (NEC) areas (Figure 4.3). In 2005, the majority of observed interactions were with pilot whales in the MAB area (Walsh and Garrison, 2006).

There were a total of 23 observed interactions with marine mammals in the pelagic longline fishery in 2006. The majority of these interactions were with pilot whales in the MAB area. During 2006, the pelagic longline fishery was estimated to have interacted with 275 pilot whales, 27 unidentified dolphins, 13 unidentified marine mammals, two Atlantic spotted dolphins, two beaked whales, and one bottlenose dolphin (Fairfield-Walsh and Garrison, 2007). In 2007, there were a total of 17 observed interactions with marine mammals in the pelagic longline fishery. The majority of these interactions were also with pilot whales. During 2007, the pelagic longline fishery was estimated to have interacted with 87 pilot whales, 20 Risso's dolphins, 13 bottlenose dolphin, two Atlantic spotted dolphin, two beaked whales, 22 unidentified marine mammals, and four unidentified dolphin (Fairfield and Garrison, 2008). NMFS monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for appropriate action, if any, as necessary. In June 2005, NMFS convened the Pelagic Longline Take Reduction Team (PLTRT) to assess and reduce marine mammal takes, specifically pilot whales and Risso's dolphins, by the pelagic longline fishery. The PLTRT drafted a Take Reduction Plan which NMFS published along with a proposed rule to implement the TRP on June 24, 2008 (73 FR35623). The PLTRT recommended a suite of management strategies to reduce mortality and serious injury of pilot whales and Risso's dolphins in the Atlantic pelagic longline fishery. NMFS proposes the following three regulatory measures: (1) Establish a Cape Hatteras Special Research Area (CHSRA), with specific observer and research

participation requirements for fishermen operating in that area; (2) set a 20–nm (37.02–km) upper limit on mainline length for all pelagic longline sets within the MAB; and (3) develop and publish an informational placard that must be displayed in the wheelhouse and the working deck of all active pelagic longline vessels in the Atlantic fishery.

Table 4.6 Summary of Marine Mammal Interactions in the Pelagic Longline Fishery, 1992-1998. Source: Yeung, 1999a; Yeung, 1999b.

Year	Species	Total		Mortality		Alive	
		Obs	Est	Obs	Est	Obs	Est
1992	Risso's Dolphin	3	121	2	74	1	47
	Common Dolphin	1	24			1	24
	Dolphin	1	17			1	17
	Pilot Whale	12	420	3	105	9	319
1993	Risso's Dolphin	3	62	1	36	2	26
	Bottlenose Dolphin	2	29			2	29
	Pilot Whale	16	193	1	15	15	178
	Spotted Dolphin	1	11			1	11
1994	Atlantic Spotted Dolphin	1	17	1	17		
	Pantropical Spotted Dolphin	1	20			1	20
	Killer Whale	1	16	1	16		
	Pilot Whale	14	161	12	137	2	26
	Risso's Dolphin	7	87	7	87		
1995	Risso's Dolphin	5	101	4	85	1	16
	Unidentified Marine Mammal	1	22			1	22
	Pilot Whale	13	252	11	200	2	53
	Shortfin Pilot Whale	2	58	2	58		
1996	Risso's Dolphin	4	99	2	52	2	47
	Unidentified Marine Mammal	1	43			1	43
1997	Pilot Whale	1	29			1	29
	Short-Beaked Spinner Dolphin	1	16			1	16
1998	Beaked Whale	1	88			1	88
	Bottlenose Dolphin	2	46	1	31	1	15
	Risso's Dolphin	2	47	1	23	1	24
	Pilot Whale	1	24			1	24

Table 4.7 Summary of Marine Mammal Interactions in the Pelagic Longline Fishery, 1999-2005. Sources: Yeung, 2001; Garrison, 2003b; Garrison and Richards, 2004; Garrison, 2005; Walsh and Garrison, 2006; Fairfield-Walsh and Garrison, 2007; Fairfield and Garrison, 2008.

Year	Species	Total		Mortality		Serious Injury		Alive	
		Obs	Est	Obs	Est	Obs	Est	Obs	Est
1999	Risso's Dolphin	1	23	-	-	1	23	-	-
	Unidentified Marine Mammal	1	4	-	-	-	-	1	14
	Pilot Whale	5	385	1	94	4	291	-	-
2000	Common Dolphin	1	32	-	-	-	-	1	32
	Risso's Dolphin	3	93	1	41	1	23	1	29
	Pilot Whale	8	231	1	24	4	109	3	98
	Whale	1	19	-	-	1	19	-	-
	Pygmy Sperm Whale	1	28	-	-	1	28	-	-

Year	Species	Total		Mortality		Serious Injury		Alive	
		Obs	Est	Obs	Est	Obs	Est	Obs	Est
2001	Risso's Dolphin	8	83.6	1	24.4	6	48.9	1	14.3
	Pilot Whale	6	92.9	1	19.8	4	50.2	1	22.7
	Striped Dolphin	1	1	-	-	-	-	1	1
	Northern Bottlenose Whale	1	1	-	-	1	1	-	-
2002	Risso's Dolphin	10	87.2	-	-	4	11	6	59.6
	Pilot Whale	10	113.5	-	-	4	49.9	6	67.8
	Common Dolphin	1	1	-	-	-	-	1	1
	Unidentified Dolphin	2	2	-	-	1	1	1	1
	Unidentified Marine Mammal	1	1	-	-	1	1	-	-
2003	Beaked Whale	2	48.8	-	-	1	5.3	1	43.5
	Dolphin	1	16.2	-	-	1	16.2	-	-
	Atlantic Spotted Dolphin	1	29.8	-	-	1	29.8	-	-
	Bottlenose Dolphin	1	2	-	-	-	-	1	2
	Common Dolphin	2	45.6	-	-	-	-	2	45.6
	Risso's Dolphin	14	109.5	1	1	3	40.1	10	68.4
	Striped Dolphin	1	1	-	-	-	-	1	1
	Pilot Whale	4	32.1	-	-	2	21.4	1	11.3
	Baleen Whale	1	1	-	-	-	-	1	1
	Minke Whale	1	22.3	-	-	-	-	1	22.3
2004	Pilot Whale	8	107.5	-	-	6	74.1	2	33.8
	Common Dolphin	1	6.8	-	-	-	-	1	6.8
	Risso's Dolphin	3	49.4	-	-	2	27.5	1	21.9
2005	Pilot Whale	18	294.4	-	-	9	211.5	9	79.5
	Risso's Dolphin	2	42.1	-	-	-	2.9	2	39.2
	Common Dolphin		5.7	-	-	-	-	-	5.7
	Bottlenose Dolphin	1	5.2	-	-	-	-	1	5.2
	Beaked Whale		1	-	-	-	1	-	-
	Atlantic Spotted Dolphin	1	4.3	-	-	-	-	1	4.3
	Unidentified Marine Mammal	1	13.2	-	-	1	13.2	-	-
	Unidentified Whale		3.4	-	-	-	3.4	-	-
	Unidentified Dolphin	1	2.6	-	-	-	-	1	2.6
2006	Atlantic Spotted Dolphin		1.9	-	-	-	-	-	1.9
	Beaked Whale		2.2	-	-	-	-	-	2.2
	Bottlenose Dolphin		0.6	-	-	-	-	-	0.6
	Pilot Whale	20	274.5	1	15.5	12	168.6	7	90.4
	Unidentified Dolphin	2	26.5	-	-	2	26.5	-	-
	Unidentified Marine Mammal	1	12.6	1	12.6	-	-	-	-
2007	Atlantic Spotted Dolphin		1.4	-	-	-	-	-	1.4
	Bottlenose Dolphin	2	12.6	-	-	1	-	1	12.6
	Beaked Whale	1	1.5	-	-	-	-	1	1.5
	Pilot Whale	8	86.6	-	-	5	56.7	3	30.7
	Risso's Dolphin	2	20.3	-	-	1	9.3	1	11.0

Year	Species	Total		Mortality		Serious Injury		Alive	
		Obs	Est	Obs	Est	Obs	Est	Obs	Est
	Unidentified Dolphin	2	3.8	1	1.5	-	-	1	2.3
	Unidentified Marine Mammal	2	22.1	-	-	2	22.1	-	-

Sea Turtles

Historically, sea turtle interactions with pelagic longline gear have occurred throughout the range of the fishery. However, the majority of leatherback interactions have occurred in the Gulf of Mexico while most loggerhead interactions occur in the offshore Atlantic Ocean areas like the NED and NEC (Figure 4.3) Most of the sea turtles are released alive. In the past, the bycatch rates were highest in the third and fourth quarters. In general, sea turtle captures are rare, but takes appear to be clustered (Hoey and Moore, 1999).

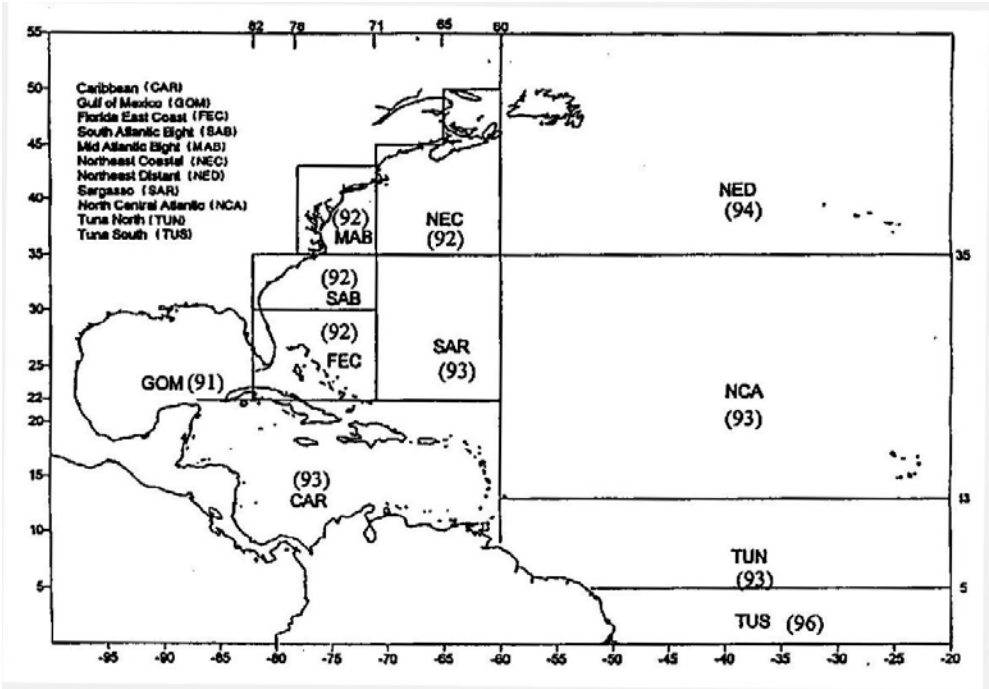


Figure 4.3 **Geographic Areas Used in Summaries of Pelagic Logbook Data.** Source: Cramer and Adams, 2000

The estimated take levels for 2000 were 1,256 loggerhead and 769 leatherback sea turtles (Yeung, 2001). The estimated sea turtle takes for regular fishing and experimental fishing effort for 2001 - 2007 are summarized in Table 4.8. The majority of leatherback interactions have occurred in the Gulf of Mexico. Loggerhead interactions are more widely distributed, however, the NED, and the NEC appear to be areas with high interaction levels each year.

In 2007, the pelagic longline fishery interacted with an estimated 499 leatherback sea turtles and 542 loggerhead sea turtles outside of experimental fishing operations. During 2007, the interactions with leatherback sea turtles were highest in the Gulf of Mexico (212 animals).

The majority of loggerhead sea turtle interactions occurred in the NED, and the MAB areas (Fairfield and Garrison, 2008). NMFS monitors observed interactions with sea turtles and marine mammals on a quarterly basis and reviews data for appropriate action, if any, as necessary.

Table 4.8 **Estimated number of loggerhead sea turtle interactions in the U.S. Atlantic pelagic longline fishery, 2001-2007 by statistical area.** Sources: Walsh and Garrison, 2006; Garrison, 2005; Garrison and Richards, 2004; Garrison 2003; Fairfield-Walsh and Garrison, 2007; Fairfield and Garrison, 2008.

Area	2001	2002	2003	2004	2005	2006	2007
CAR	27	43	36	61	40	16	7
GOM	0	170	135	45	19	17	10
FEC	0	99	137	99	0	40	83
SAB	39	22	52	194	34	18	34
MAB	43	94	18	92	54	70	155
NEC	117	147	241	150	67	135	48
NED	72	0	0	52	20	235	200
SAR	0	0	70	41	38	19	4
NCA	13	0	39	0	3	10	2
TUN	0	0	0	0	0	0	0
TUS	0	0	0	0	0	0	0
Total	312	575	728	734	275	559	543
NED exp'tal fishery (2001-03)	142	100	92	-	-	-	-
Exp'tal fishery (2004-05)	-	-	-	0	8	0	0
Total	454	675	820	734	283	559	543

Table 4.9 **Estimated number of leatherback sea turtle interactions in the U.S. Atlantic pelagic longline fishery, 2001-2007 by statistical area.** Sources: Walsh and Garrison, 2006; Garrison, 2005; Garrison and Richards, 2004; Garrison 2003; Fairfield-Walsh and Garrison, 2007; Fairfield and Garrison, 2008.

Area	2001	2002	2003	2004	2005	2006	2007
CAR	61	0	0	17	2	4	1
GOM	393	695	838	780	179	109	212
FEC	313	100	27	64	62	28	7
SAB	241	93	75	164	7	39	0
MAB	139	70	94	184	11	30	114
NEC	30	5	76	33	6	73	76
NED	32	0	0	98	63	116	84
SAR	0	0	0	18	20	14	5
NCA	1	0	2	0	0	1	0
TUN	0	0	0	0	0	0	0
TUS	0	0	0	0	0	0	0

Total	1208	962	1113	1359	351	415	499
Area	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
NED exp'tal fishery (2001-03)	77	158	79	-	-	-	-
Exp'tal fishery (2004-05)	-	-	-	3	17	-	-
Total	1285	1120	1192	1362	368	415	499

As a result of the increased sea turtle interactions in 2001 and 2002, NMFS reinitiated consultation for the pelagic longline fishery and completed a new BiOp on June 1, 2004. The June 2004 BiOp concluded that long-term continued operation of the Atlantic pelagic longline fishery is not likely to jeopardize the continued existence of loggerhead, green, hawksbill, Kemp's ridley, or olive ridley sea turtles, but is likely to jeopardize the continued existence of leatherback sea turtles. The BiOp included a reasonable and prudent alternative (RPA) and an incidental take statement (ITS) for the combined years 2004 – 2006, and for each subsequent three-year period (NMFS, 2004b).

From 2001 through 2003, NMFS worked with the commercial fishing industry to develop new pelagic longline fishing technology to reduce interaction rates and bycatch mortality of threatened and endangered sea turtles. The cooperative gear technology research investigated line configurations, setting and retrieving procedures, hook types, hook sizes, bait types, and release and disentanglement gears. Ultimately, specific hook designs and bait types were found to be the most effective measures for reducing sea turtle interactions. Large circle hooks and mackerel baits were found to substantially reduce sea turtle interactions over the use of the industry standard "J"-hooks and squid baits. The gears developed to remove hooks and line from hooked and entangled sea turtles are anticipated to reduce post-hooking mortality associated with those interactions not avoided. Since the conclusion of the NED research experiment, NMFS has continued to investigate pelagic longline bycatch mitigation techniques in the Gulf of Mexico, Atlantic Ocean, and the Caribbean Sea. Additionally, NMFS held a series of voluntary workshops for U.S. pelagic longline fishermen providing outreach and training in sea turtle handling and release techniques.

NMFS believes that the transfer of this information to other fishing countries will result in significant reductions in interaction rates and post-release mortalities of threatened and endangered sea turtles throughout their ranges. A final rule published in July 2004 (69 FR 40734) prohibited the possession of "J"-style hooks in the pelagic longline fishery and required the possession and use of specific sea turtle release and disentanglement gears, handling and release protocols, as well as requiring the use of specific circle hooks and baits. The Agency conducts mandatory protected species identification and safe handling workshops for vessel owner-operators and requires proof of certification prior to permit renewal.

Seabirds

Gannets, gulls, greater shearwaters, and storm petrels are occasionally hooked by Atlantic pelagic longlines. These species and all other seabirds are protected under the Migratory Bird Treaty Act. Seabird populations are often slow to recover from excess mortality as a consequence of their low reproductive potential (one egg per year and late sexual maturation).

The majority of longline interactions with seabirds occur as the gear is being set. The birds eat the bait and become hooked on the line. The line then sinks and the birds are subsequently drowned.

The United States has developed a National Plan of Action in response to the Food and Agriculture Organization of the United Nations (FAO) International Plan of Action to reduce the incidental takes of seabirds (www.nmfs.gov.gov/NPOA-S.html). Although Atlantic pelagic longline interactions will be considered in the plan, NMFS has not identified a need to implement gear modifications to reduce seabird takes by Atlantic pelagic longlines. Takes of seabirds have been minimal in the fishery, most likely due to the setting of longlines at night and/or fishing in areas where birds are largely absent.

Observer data from 1992 through 2007 indicate that seabird bycatch is relatively low in the U.S. Atlantic pelagic longline fishery (Table 4.10). Since 1992, a total of 141 seabird interactions have been observed, with 101 observed killed (71.6 percent). In 2007, a total of six seabirds were observed taken.

Observed bycatch has ranged from one to 18 seabirds observed dead per year and zero to 15 seabirds observed released alive per year from 1992 through 2007. More than half of the seabirds observed were not identified to species (n = 81, 57.5%). Gulls represent the largest group of seabirds identified (n = 42), followed by greater shearwaters (n = 28), and northern gannets (n = 8) (Table 4.11). Greater shearwaters experienced the highest mortality (89.3 percent), followed by gulls (76.2 percent), and unidentified seabirds (67.2 percent). Northern gannets had the lowest mortality rate (12.5 percent).

Preliminary estimates of expanded seabird bycatch and bycatch rates from 1995 – 2007, varied by year and species with no apparent pattern (Table 4.13). The estimated number of all seabirds caught and discarded dead ranged from zero to 1,109 per year, averaging about 210 per year. Live discards ranged from zero to 486 per year, averaging 60 per year. Estimates of dead discards of seabirds ranged from zero to 623 per year, averaging 150 per year. The annual bycatch rate of birds discarded dead ranged from zero to 0.015 birds per 1,000 hooks, while the rate of total seabird catch ranged from zero to 0.106 birds per 1,000 hooks.

Table 4.10 **Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery, 1992-2007. Source**: NMFS, 2008; NMFS PLL fishery observer program (POP) data.

Year	Month [1]	Area	Type of Bird	Number observed	Status
1992	10	MAB	GULL	4	dead
1992	10	MAB	SHEARWATER GREATER	2	dead
1993	2	SAB	GANNET NORTHERN	2	alive
1993	2	MAB	GANNET NORTHERN	2	alive
1993	2	MAB	GULL BLACK BACKED	1	alive
1993	2	MAB	GULL BLACK BACKED	3	dead
1993	11	MAB	GULL	1	alive
1994	6	MAB	SHEARWATER GREATER	3	dead
1994	8	MAB	SHEARWATER GREATER	1	dead
1994	11	MAB	GULL	4	dead
1994	12	MAB	GULL HERRING	7	dead
1995	7	MAB	SEA BIRD	5	dead
1995	8	GOM	SEA BIRD	1	dead
1995	10	MAB	STORM PETREL	1	dead
1995	11	NEC	GANNET NORTHERN	2	alive
1995	11	NEC	GULL	1	alive
1997	6	SAB	SEA BIRD	11	dead
1997	7	MAB	SEA BIRD	1	dead
1997	7	NEC	SEA BIRD	15	alive
1997	7	NEC	SEA BIRD	6	dead
1998	2	MAB	SEA BIRD	7	dead
1998	7	NEC	SEA BIRD	1	dead
1999	6	SAB	SEA BIRD	1	dead
2000	6	SAB	GULL LAUGHING	1	alive
2000	11	NEC	GANNET NORTHERN	1	dead
2001	6	NEC	SHEARWATER GREATER	7	dead
2001	7	NEC	SHEARWATER GREATER	1	dead
2002	7	NEC	SEABIRD	1	dead
2002	8	NED	SHEARWATER GREATER	1	dead
2002	8	NED	SEABIRD	1	dead
2002	9	NED	SHEARWATER GREATER	3	dead
2002	9	NED	SEABIRD	3	alive
2002	9	NED	SHEARWATER SPP	1	dead
2002	10	NED	GANNET NORTHERN	1	alive
2002	10	NED	SHEARWATER SPP	1	dead
2002	10	NED	SEABIRD	2	dead
2002	10	MAB	GULL	3	alive

Year	Month [1]	Area	Type of Bird	Number observed	Status
2002	10	MAB	GULL	1	dead
2002	11	MAB	GULL	3	dead
2003	1	GOM	SEABIRD	1	alive
2003	8	NED	SEABIRD	1	dead
2003	9	MAB	SEABIRD	1	dead
2004	1	MAB	GULL	5	dead
2004	3	MAB	GREATER SHEARWATER	1	alive
2004	3	MAB	GREATER SHEARWATER	4	dead
2004	4	NED	SEABIRD	1	dead
2005	1	SAB	HERRING GULL	1	dead
2005	1	SAB	SHEARWATER	1	dead
2005	3 [2]	NEC	GREATER SHEARWATER	1	alive
2005	3 [2]	NEC	GREATER SHEARWATER	1	dead
2006	4	MAB	GREATER SHEARWATER	1	Dead
2006	4	NEC	SHEARWATER	1	Alive
2006	4	NED	GREATER SHEARWATER	1	Dead
2007	1	MAB	GREATER BLACKBACKED GULL	6	dead

[1] Beginning in 2004, reports based on Quarters not month.
[2] Experimental fishery takes.

Table 4.11 **Status of Seabird Bycatch in the U.S. Atlantic Pelagic Longline Fishery, 1992-2007.** Source: NMFS Pelagic longline fishery observer program (POP).

Species	Release Status		Total	Percent Dead
	Dead	Alive		
Greater shearwater	25	3	28	89.29
Cory's shearwater	1		1	100.00
Unidentified shearwater	2	1	3	66.67
Herring gull	8	-	8	100.00
Great black-backed gull	9	1	10	90.00
Laughing gull	1	1	2	50.00
Unidentified gull	14	8	22	63.64
Northern gannet	1	7	8	12.50
Storm petrel	1		1	100.00
Unidentified seabird	39	19	58	67.24
Grand Total	101	40	141	71.63

Table 4.12 Observed seabird bycatch in the U.S. Atlantic pelagic longline fishery, 1992-2007 (excluding the NED experiment of 2001-03). Source: NMFS, 2008.

			Number of seabirds		Catch rate	
Year	**Sets**	**Hooks**	**All**	**Dead**	**Per set**	**Per 1000 hooks**
1992	329	194,706	6	6	0.018	0.031
1993	817	526,501	9	3	0.011	0.017
1994	650	411,996	15	15	0.023	0.036
1995	686	472,105	10	7	0.015	0.021
1996	356	220,223	0	0	0	0
1997	451	311,520	33	18	0.073	0.106
1998	287	175,408	8	8	0.028	0.046
1999	424	285,083	1	1	0.002	0.004
2000	465	312,574	2	1	0.004	0.006
2001	398	284,198	8	8	0.02	0.028
2002	344	260,632	8	2	0.023	0.031
2003	551	427,575	2	1	0.004	0.005
2004	702	524,182	11	10	0.016	0.021
2005	796	577,354	4	3	0.005	0.007
2006	568	419,233	3	2	0.005	0.007
2007	944	734,110	6	6	0.006	0.008
Total	8,768	6,137,400	126	91	0.014	0.021

Table 4.13 **Expanded estimates of seabird bycatch (alive and dead) in the U.S. Atlantic pelagic longline fishery, 1992-2007.** Source: NMFS, 2008.

Taxa	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg.
Gulls	160	84	199	24	-	-	-	-	22	-	248	-	77	8	-	54	55
Gannets	-	83	-	48	-	-	-	-	22	-	-	-	-	-	-	-	10
Seabirds	-	-	-	140	-	1,109	380	28	-	-	36	39	6	-	-	-	109
Shearwaters	80	-	74	-	-	-	-	-	-	283	-	-	75	31	27	-	36
Storm-petrels	-	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	2
All	240	167	273	236	0	1,109	380	28	44	283	284	39	158	39	27	54	210

Table 4.14 **Expanded estimates of dead seabird bycatch in the U.S. Atlantic pelagic longline fishery, 1992-2007.** Source: NMFS, 2008.

Taxa	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Avg.
Gulls	160	50	199	0	-	-	-	-	0	-	36	-	77	8	-	54	37
Gannets	-	0	-	0	-	-	-	-	22	-	-	-	-	-	-	-	1
Seabirds	-	-	-	140	-	623	380	28	-	-	36	20	6	-	-	-	77
Shearwaters	80	-	74	-	-	-	-	-	-	283	-	-	61	19	16	-	33
Storm-petrels	-	-	-	24	-	-	-	-	-	-	-	-	-	-	-	-	2
All	240	50	273	164	0	623	380	28	22	283	72	20	144	27	16	54	150

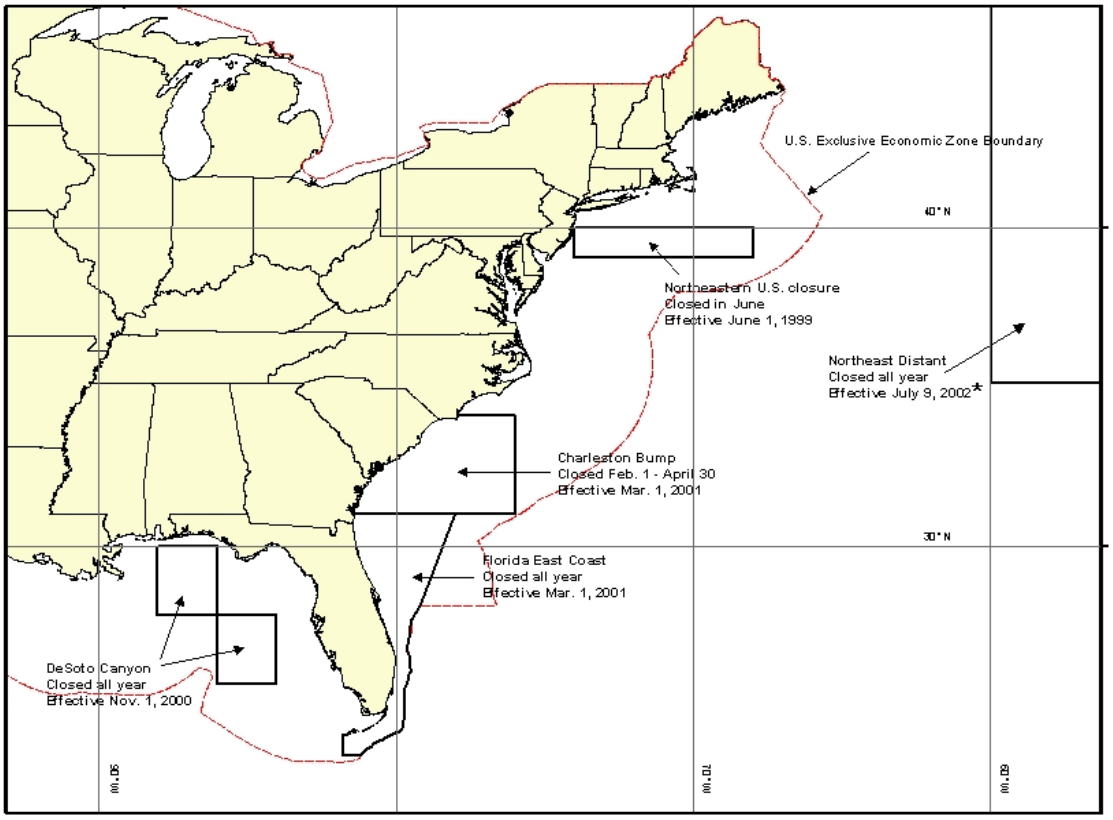
Finfish

In the U.S. pelagic longline fishery, fish are discarded for a variety reasons. Swordfish, yellowfin tuna, and bigeye tuna may be discarded because they are undersized or unmarketable (*e.g*., bitten by sharks). Blue sharks, as well as other species, are discarded because of a limited markets (resulting in low prices) and perishability of the product. Large coastal sharks are discarded during times when the shark season is closed. Bluefin tuna may be discarded because target catch requirements for other species have not been met. Also, all billfish are required to be released. In the past, swordfish have been discarded when the swordfish season was closed.

U.S. PLL catch (including bycatch, incidental catch, and target catch) is largely related to vessel and gear characteristics, but is summarized for the whole fishery in Table 4.4. From May 1992 through December 2000, the Pelagic Observer Program (POP) recorded a total of 4,612 elasmobranchs (15 percent of the total catch) caught off the southeastern U.S. coast in fisheries targeting tunas and swordfish (Beerkircher et al., 2004). Of the 22 elasmobranch species observed, silky sharks were numerically dominant (31.4 percent of the elasmobranch catch), with silky, dusky, night, blue, tiger, scalloped hammerhead, and unidentified sharks making up the majority (84.6 percent) (Beerkircher et al., 2004). Additional U.S. landings and discard data are available in the 2008 U.S. National Report to ICCAT (NMFS, 2008).

At this time, direct use of observer data with pooling for estimating dead discards in this fishery represents the best scientific information available for use in stock assessments. Direct use of observer data has been employed for a number of years to estimate dead discards in Atlantic and Pacific longline fisheries, including billfish, sharks, and undersized swordfish. Furthermore, the data have been used for scientific analyses by both ICCAT and the Inter-American Tropical Tuna Commission (IATTC) for a number of years.

Bycatch mortality of marlins, swordfish, and bluefin tuna from all fishing nations may significantly reduce the ability of these populations to rebuild, and it remains an important management issue. In order to minimize bycatch and bycatch mortality in the domestic pelagic longline fishery, NMFS implemented regulations to close areas to this gear type (Figure 4.4) and has banned the use of live bait by pelagic longline vessels in the Gulf of Mexico.



* Closed except to vessels complying with specific conditions (see 50 CFR 635 for details).

Figure 4.4 Areas Closed to Pelagic Longline Fishing by U.S. Flagged Vessels

4.1.3 Safety Issues

Like all offshore fisheries, pelagic longlining can be dangerous. Trips are often long, the work is arduous, and the nature of setting and hauling longline gear may result in injury or death. Like all other HMS fisheries, longline fishermen are exposed to unpredictable weather. NMFS does not wish to exacerbate unsafe conditions through the implementation of regulations. Therefore, NMFS considers safety factors when implementing management measures in the PLL fishery. For example, all time/area closures are expected to be closed to fishing, not transiting, in order to allow fishermen to make a direct route to and from fishing grounds. NMFS seeks comments from fishermen on any safety concerns they may have. Fishermen have pointed out that, due to decreasing profit margins, they may fish with less crew or less experienced crew or may not have the time or money to complete necessary maintenance tasks. NMFS encourages fishermen to be responsible in fishing and maintenance activities.

4.1.4 International Issues and Catch

PLL fisheries for Atlantic HMS primarily target swordfish and tunas. Directed PLL fisheries in the Atlantic have been operated by Spain, the United States, and Canada since the

late 1950s or early 1960s. The Japanese PLL tuna fishery started in 1956 and has operated throughout the Atlantic since then (NMFS, 1999). Most of the 46 other ICCAT nations now also operate PLL vessels.

ICCAT generally establishes management recommendations on a species (*e.g.*, swordfish) or issue basis (*e.g.*, data collection) rather than by gear type. For example, ICCAT typically establishes quotas or landing limits by species, not gear type. In terms of data collection, ICCAT may require use of specific collection protocols or specific observer coverage levels in certain fisheries or on vessels of a certain size, but these are usually applicable to all gears, and not specific to any one gear type. However, there are a handful of management recommendations that are specifically applicable to the international PLL fishery. These include, a prohibition on longlining in the Mediterranean Sea in June and July by vessels over 24 meters in length, a prohibition on PLL fishing for bluefin tuna in the Gulf of Mexico, and mandated reductions in Atlantic white and blue marlin landings for PLL and purse seine vessels from specified levels, among others.

Because most ICCAT management recommendations pertain to individual species or issues, as discussed above, it is often difficult to obtain information specific to the international PLL fishery. For example, a discussion of the authorized TAC for specific species in this section of the document would be of limited utility because it is not possible to identify what percentage of quotas are allocated to PLL. Division of quota, by gear type, is typically done by individual countries.

Nevertheless, ICCAT does report landings by gear type. Available data indicate that longline effort produces the second highest volume of catch and effort, and is the most broadly distributed (longitudinally and latitudinally) of the gears used to target ICCAT managed species (SCRS, 2004b). Purse seines produce the highest volume of catch of ICCAT managed species from the Atlantic (SCRS, 2004b). Figure 4.5 shows the aggregate distribution of hooks from all fishing fleets from 2000-2007. In 2007, international longline landings of HMS in fisheries in which the U.S. participated totaled 102,876 mt, which represented a continuation of the generally decreasing trend since 1999.

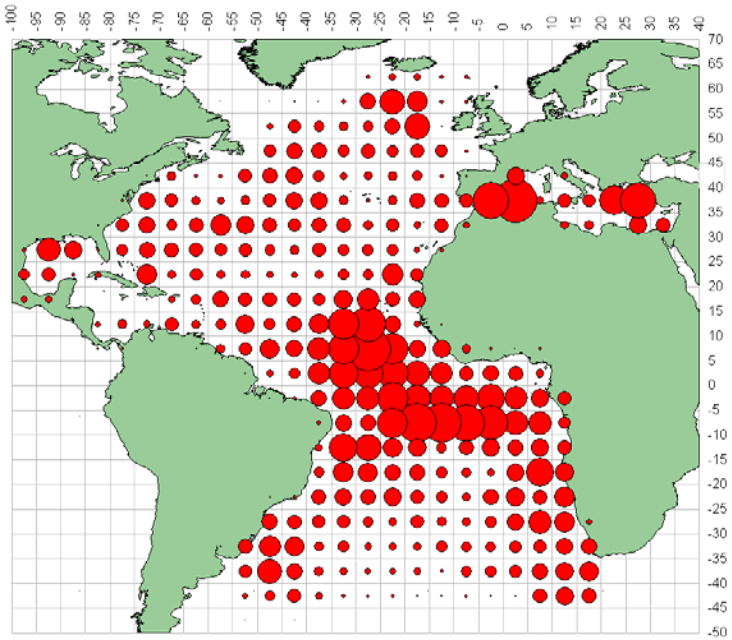


Figure 4.5 **Aggregate Distribution of Hooks Deployed by All ICCAT Parties 2000-2006.** Source: SCRS, 2008.

Scientific observer data are being collected on a range of PLL fleets in the Atlantic and will be increasingly useful in better quantifying total catch, catch composition, and disposition of catch as these observer programs mature. Previous ICCAT observer coverage requirements of five percent for non-purse seine vessels that participated in the bigeye and yellowfin tuna fishery, including PLL (per ICCAT Recommendation 96-01), are no longer in force. There is currently no ICCAT required minimum level of observer coverage specific to PLL fishing. Nevertheless, the United States has implemented a mandatory observer program in the U.S. PLL fishery. Japan is required to have eight percent observer coverage of its vessels fishing for swordfish in the North Atlantic, which are primarily PLL vessels, however, the recommendation is not specific to vessel or gear type. ICCAT recommendation 04-01, a conservation and management recommendation for the bigeye tuna fishery, requires at least five percent observer coverage of PLL vessels over 24 meters participating in that particular fishery.

Highly Migratory Species

The U.S. PLL fleet represents a small fraction of the international PLL fleet that competes on the high seas for catches of tunas and swordfish. In recent years, the proportion of U.S. PLL landings of HMS, for the fisheries in which the United States participates, has remained relatively stable in proportion to international landings. The U.S. fleet accounts for less than 0.5 percent of the landings of swordfish and tuna from the Atlantic Ocean south of 5°N. Latitude and does not operate at all in the Mediterranean Sea. Tuna and swordfish landings by foreign fleets operating in the tropical Atlantic and Mediterranean are greater than the catches from the north Atlantic area where the U.S. fleet operates. Within the area where the U.S. longline fleet operates, U.S. longline landings still represent a limited fraction of total landings. In recent years (1999-2007), the U.S. longline landings have averaged 4.9 percent of total Atlantic longline landings, ranging from a high of 5.5 percent in 1999 to a low of 4.2 percent in

2002. Table 4.15 contains aggregate longline landings of HMS, other than sharks, for all countries in the Atlantic for the period 1999-2007.

Table 4.15 Estimated International Longline Landings of HMS, Other than Sharks, for All Countries in the Atlantic: 1999-2007 (mt ww). Source: SCRS, 2008; U.S. National Reports 2003 – 2008.

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Swordfish (N. Atl + S. Atl)	27,267	27,090	24,728	24,242	23,703	25,882	26,423	26,635	28,085
Yellowfin Tuna (W. Atl)[2]	13,326	15,760	14,872	11,921	10,136	15,953	14,392	14,337	12,031
Bigeye Tuna	76,527	71,193	55,265	46,438	54,464	48,379	38,125	34,887	42,037
Bluefin Tuna (W. Atl.)[2]	914	859	610	730	186	644	425	565	423
Albacore Tuna (N. Atl + S. Atl)	27,330	31,719	35,411	27,851	28,317	21,644	19,815	23,008	17,645
Skipjack Tuna (W. Atl)[2]	58	23	60	349	95	206	207	287	52
Blue Marlin (N. Atl. + S. Atl.)[3]	3,049	2,640	1,907	1,309	1,674	1,362	1,553	1,228	1,707
White Marlin (N. Atl. + S. Atl.)[3]	1,407	1,174	779	722	587	522	529	318	239
Sailfish (W. Atl.)[4]	517	811	1,002	1,303	883	757	1,083	663	656
Total	150,395	151,269	134,634	114,865	120,045	115,349	108,552	101,928	102,876
U.S. Longline Landings (from 2003-2008 U.S. Natl. Reports) [5]	8,331	7,254	5,695	6,194	5,509	5,800	4,713	4,848	5,558
U.S. Longline Landings as a Percent of Total Longline Landings	5.5	4.8	4.2	5.4	4.6	5.0	4.6	4.8	5.4

[1]Landings include those classified by the SCRS as longline landings for all areas
[2]Note that the United States has not reported participation in the E. Atl yellowfin tuna fishery since 1983 and has not participated in the E. Atl bluefin or the E. Atl skipjack tuna fishery since 1982.
[3]Includes U.S. *dead discards and Brazilian live discards.*
[4]Includes U.S. *dead discards.*
[5]Includes swordfish, blue marlin, white marlin, and sailfish longline discards.

Atlantic Sharks

Data collection from international fisheries for Atlantic sharks has improved in recent years due to increasing reporting requirements adopted by ICCAT. At its annual meeting in New Orleans in 2004, ICCAT adopted *Recommendation 04-10 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT.* Recommendation 04-10 required ICCAT CPCs to report task I and task II data for catches of sharks in accordance with ICCAT data reporting procedures to allow for assessment of stocks. Recommendation 04-01 also banned shark finning, requires vessels to fully utilize their entire catches of sharks, and encourages the release of live sharks that are caught incidentally and are not used for food.

At the 2006 ICCAT annual meeting in Dubrovnik, Croatia, ICCAT adopted Recommendation 06-10 which amended Paragraph 7 of *Recommendation 04-10 Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT*. The new paragraph called for SCRS to conduct stock assessments and recommend management alternatives for Atlantic blue sharks and shortfin mako sharks in time for consideration at the 2008 annual ICCAT meeting. It also required a data preparatory meeting to be held in 2007 to review all relevant data on biological parameters, catch, effort, discards, trade, and historical data.

At the 2007 ICCAT annual meeting in Antalya, Turkey, ICCAT adopted a recommendation (07-06) concerning pelagic sharks. That recommendation called for the SCRS to conduct stock assessments and recommend management alternatives for porbeagle sharks (*Lamna nasus*), for Contracting Parties to take appropriate measures to reduce fishing mortality in porbeagles (*Lamna nasus*) and North Atlantic shortfin mako sharks (*Isurus oxyrinchus*), and implement research on pelagic shark species caught in the Convention area in order to identify potential nursery areas. It also required that Contracting Parties, Cooperating non-Contracting Parties, Entities and Fishing Entities submit Task I and II data for sharks in advance of the next SCRS assessment.

In 2008, the SCRS assessed blue sharks, and shortfin mako sharks. SCRS concluded that blue sharks were not overfished or experiencing overfishing. SCRS concluded that shortfin mako sharks were at or slightly below levels that could support MSY and produced widely varying estimates of fishing mortality (0.48 to 3.77). Please see Section 2.5 for additional information on the status of Atlantic sharks. At the 2008 ICCAT annual meeting in Marrakech, Morocco, ICCAT adopted a recommendation requiring the live release of bigeye thresher sharks that are brought to the boat alive as well as reporting bycatch and live releases of bigeye thresher sharks. The most recent catch totals for blue, shortfin mako, and porbeagle sharks are presented in Table 4.16.

Table 4.16 Estimated International Landings of Pelagic Sharks for All Countries in the Atlantic: 1999-2007 (mt ww)[1]. Source: SCRS, 2008

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Blue Shark (N. Atl + S. Atl + MED)	39,413	43,310	37,811	34,908	40,329	40,152	45,671	45,116	45,623
Shortfin Mako (N. Atl + S. Atl + MED)	3,982	4,750	4,618	4,939	7,205	6,956	6,566	6,419	6,452
Porbeagle (N. Atl + S. Atl + MED)	1,403	1,468	1,000	848	636	727	571	503	490
Total International Catches	**44,798**	**49,528**	**43,429**	**40,695**	**48,170**	**47,835**	**52,808**	**52,038**	**52,565**
U.S. Blue Shark Catches[1]	318	428	148	68	1	72	68	47	39
U.S. Shortfin Mako Catches[1]	159	456	395	415	142	411	187	130	215
U.S. Porbeagle Catches[1]	3	1	1	1	0	1	0	0	0
Total U.S. Catches[1]	**480**	**885**	**544**	**484**	**143**	**484**	**255**	**177**	**254**
U.S. Catches[1] as a Percent of Total International Catches	**1.1**	**1.8**	**1.3**	**1.2**	**0.3**	**1.0**	**0.5**	**0.3**	**0.5**

[1] Includes catches and discards

Sea Turtles

Sea turtle bycatch in the U.S. pelagic longline fishery has decreased significantly in the last decade. From 1999 to 2003, the U.S. pelagic longline fleet targeting HMS interacted with an average of 772 loggerhead and 1,013 leatherback sea turtles per year, based on observed takes and total reported effort. In 2004, the U.S. pelagic longline fleet was estimated to have interacted with 734 loggerhead and 1,359 leatherback sea turtles (Garrison, 2005). In 2005, the U.S. pelagic longline fishery was estimated to have interacted with 274 loggerhead and 351 leatherback sea turtles outside of experimental fishing operations (Walsh and Garrison, 2006). During 2006, there were an estimated 561 interactions with loggerhead sea turtles and 415 interactions with leatherback sea turtles (Fairfield-Walsh and Garrison, 2007). In 2007, the U.S. pelagic longline fishery was estimated to have interacted with 542 loggerhead sea turtles and 499 leatherback sea turtles (Fairfield and Garrison, 2008).

Although ICCAT adopted a resolution in 2003 (03-11) encouraging contracting parties, cooperating non-contracting parties, entities, or fishing entities to collect and provide the SCRS with all available information on sea turtle interactions in ICCAT fisheries, an exact assessment of basin-wide incidental catches is not available. However, high numbers of estimated sea turtle catches in foreign fleets have been described in other sources. Lewison, *et al*. (2004) estimated that a total of 210,000 – 280,000 loggerhead and 30,250 – 70,000 leatherback sea turtles were captured by pelagic longline fisheries each year throughout the Atlantic basin, including the Mediterranean Sea. More recently, a report by Lewison and Crowder (2007) indicates that applying bycatch rates to accurately estimate the number of turtles taken internationally by pelagic longline fleets is challenging because high variability in bycatch rates within and among fleets constrains the estimation. The report states that international sea turtle bycatch estimates are important, but given the high level of uncertainty, any precision beyond one or two significant digits is questionable. Given this caveat, Lewison and Crowder (2007) estimated that total annual sea turtle bycatch (all species) for pelagic longlines throughout the Atlantic basin, including the Mediterranean Sea, ranged from 28,180 to 39,080 interactions, which represents a notable decrease from 2004 estimates. The study suggested that pelagic longlines may not be the highest source of fishery-induced mortality but, because the gear interacts with older age classes, efforts to reduce sea turtle bycatch are warranted.

Mortality in the domestic pelagic longline fisheries is just one of several factors affecting sea turtle populations in the Atlantic (National Research Council, 1990). Many sources of anthropogenic mortality are outside of U.S. jurisdiction and control. If the U.S. swordfish quota was relinquished to other fishing nations, the fishing effort now expended by the U.S. fleet would likely be replaced by foreign effort. This could affect future ICCAT discussions and make the implementation of international conservation efforts more difficult. This would also reduce the opportunity for gear-based conservation experimentation to continue with the U.S. longline fleet, thus making it difficult to find bycatch reduction solutions which can be transferred to other nations and effect a greater global reduction in sea turtle takes in pelagic longline fisheries. The United States has, and will continue to make efforts to encourage the adoption of sea turtle conservation measures by international fishing fleets.

In addition to domestic rulemaking in various fisheries, NMFS works to reduce sea turtle bycatch in domestic and international fisheries through collaborative research programs and coordinated education and recovery efforts in partnership with Regional Fishery Management Organizations (RFMOs) and other international bodies, governments, universities, private institutions, and local communities in relevant areas throughout the world. Among these activities, NMFS conducts joint research and holds workshops for fishers and fisheries managers on sea turtle handling, release, and resuscitation methods; sea turtle biology and species identification; and measures to mitigate sea turtle interactions.

The United States introduced the NED sea turtle bycatch mitigation research at the November 2003, ICCAT meeting in Dublin, Ireland. A poster and video describing the NED research experiment and preliminary results were displayed, as well as many of the experimentally tested release gears. At the annual ICCAT meeting in New Orleans in November 2004, NMFS staff conducted a workshop discussing experimental results and the use of circle hooks, the use of dehooking devices, and safe handling and release techniques. In June 2004, NMFS staff gave a presentation promoting cooperative research and the use of circle hooks at a Symposium on Bycatch Reduction hosted by the National Fisheries Research and Development Institute (NFRDI) in Korea.

The first Technical Assistance Workshop on Sea Turtle Bycatch Reduction Experiments in Longline Fisheries was held in April 2005, in Honolulu. This workshop was held to provide technical assistance for participants from the FAO Technical Consultation Group to design programs for the development and testing of turtle bycatch reducing technology appropriate to the longline fisheries of participating nations.

At the Third International Fishers Forum (IFF) held in Yokahama, Japan in July 2005, and the Fourth IFF held in Coast Rica in 2007, the United States presented research results on sea turtle bycatch avoidance methods. In 2005, the United States assisted in designing experiments to evaluate sea turtle mitigation techniques and provided technical assistance for the following countries: Australia; Brazil; Costa Rica; Ecuador; Iceland; Italy; Japan; Korea; Taiwan; Mexico; Peru; Philippines; Spain; Uraquay; and, Vietnam.

From 2006 through 2008, NMFS funded and/or held numerous training and other cooperative programs regarding the protection and conservation of sea turtles in the Atlantic, including:

- A 2006 leatherback turtle research program in the Dominican Republic;
- Provision of laminated cards with sea turtle ID and handling guidelines and a sea turtle safe handling video to numerous countries, including Brazil, Spain, Mexico, Uruguay, Italy, Costa Rica, and Indonesia (the guidelines have been translated into Spanish and Vietnamese);
- Cooperative research with Spain concerning loggerhead turtles hooked with longline hooks in the Azores;
- Participation in a European technical meeting in June 2008 concerning bycatch in fisheries in the Canary Islands;

- Work with Spanish field trials assisting with tests of bait type with regard to sea turtle capture rates, including planned future work to test circle hooks in a Spanish swordfish fishery;
- Workshops on the use of circle hooks, dehookers and line cutters in artisanal and industrial longline fisheries in Morocco, in cooperation with the Universite Abdelmalek Essaadi, Department of Biology. Because Morocco's drift gill net fishery is changing to pelagic longline fishing, these were designed to teach techniques with sea turtle mitigation gear and circle hooks to ensure both the viability of the new fishery as well as protection for endangered and threatened sea turtles;
- Assistance for research to reduce sea turtle bycatch in longline fisheries, coordinating field trials in Brazil, Uruguay, and Italy, including provision of satellite tags to Brazilian and Uruguayan longline observers to investigate the post-hooking survivorship of turtles after their release from fishing gear;
- Training for Korean and Japanese representatives in sea turtle handling protocols used by NOAA Fisheries observers;
- Work with Korean fisheries scientists on statistical analysis of data gained from bycatch reduction experiments; and,
- Collaboration with World Wildlife Fund to test the use of circle hooks in both tuna and swordfish-directed fisheries in Italy.

Working with the Department of State, NMFS has also conducted several programs involving technology transfer and training for the protection and conservation of Atlantic sea turtles, including:

- Transfer of sea turtle mitigation technology to Spain, Canada, Mexico, Italy, Uruguay, and Venezuela; and,
- Provision of hooks designed to reduce sea turtle bycatch throughout Latin America.

Many other outreach, education, and research projects have been conducted and/or funded by NMFS regarding se turtle bycatch reduction in the Pacific Ocean.

4.2 Purse Seine

4.2.1 Domestic History and Current Management

Purse seine gear consists of a floated and weighted encircling net that is closed by means of a drawstring; known as a purseline, threaded through rings attached to the bottom of the net. The efficiency of this gear can be enhanced by the assistance of spotter planes used to locate schools of tuna. Once a school is spotted, the vessel, with the aid of a smaller skiff, intercepts and uses the large net to encircle it. Once encircled, the purseline is pulled, closing the bottom of the net and preventing escape. The net is hauled back onboard using a powerblock, and the tunas are removed and placed onboard the larger vessel. Economic and social aspects of the fisheries are described in Section 5.0 of this document.

Vessels using purse seine nets have participated in the U.S. Atlantic tuna fishery continuously since the 1950s; although a number of purse seine vessels did target and land BFT off the coast of Gloucester, MA as early as the 1930s. In 1958, continued commercial purse seining effort for Atlantic tunas began with a single vessel in Cape Cod Bay and expanded rapidly into the region between Cape Hatteras and Cape Cod during the early 1960s. The purse seine fishery between Cape Hatteras and Cape Cod was directed mainly at small and medium BFT, YFT, and at skipjack tuna, primarily for the canning industry. North of Cape Cod, purse seining was directed at giant BFT. High catches of juvenile BFT were sustained throughout the 1960s and into the early 1970s. These high catch rates by U.S. purse seine vessels are believed to have played a role in the decline in abundance during subsequent years. Currently these purse seine vessels focus their effort on giant BFT, versus other tunas, due to the international market that developed for giant BFT in the late 1970s. These fresh caught BFT are primarily flown directly to Japan for processing into sushi or sashimi. By the late 1980s, high ex-vessel prices and the increased importance of the Japanese market had increased effort on all size classes of BFT. In 1992, NMFS responded by banning the sale of school, large school, and small medium BFT (27 inches to less than 73 inches curved fork length).

A limited entry system with non-transferable individual vessel quotas (IVQs) for purse seining was established in 1982, effectively excluding any new entrants into this category. Equal baseline quotas of BFT are assigned to individual vessels by regulation; the IVQ system is possible given the small pool of ownership in this sector of the fishery, i.e., five qualified participants. In 1996 the quotas were made transferable among the five entities provided they notified NMFS in writing.

Vessels participating in the Atlantic tunas purse seine fishery are required to target the larger size class BFT, more specifically the giant size class (81 inches or larger) and are granted a tolerance limit for large medium size class BFT (73 to less than 81 inches), i.e., large medium catch may not exceed 15 percent by weight of the total amount of giant BFT landed during a season. These vessels may commence fishing starting on July 15 of each year and may continue through December 31, provided the vessel has not fully attained its IVQ. Over the last few years, the Purse seine category has not fully harvested its allocated quota. This can be attributed to a number of different reasons outside of the industry's or NMFS' control, such as lack of

availability, schools of mixed size classes, high operating costs, vessel sales, etc. NMFS has issued several EFPs to this sector of the fishery (to assist in archival tagging of BFT and other research projects) and will continue to assess current regulations and their impact on providing reasonable opportunities to harvest available quota.

4.2.2 Recent Catch and Landings

Table 4.17 shows purse seine landings of Atlantic tunas from 1999 through 2007. Purse seine landings historically have made up approximately 20 percent of the total annual U.S. landings of BFT (about 25 percent of total commercial landings), but recently only account for a small percentage. In the 1980s and early 1990s, purse seine landings of YFT were often over several hundred metric tons. Over 4,000 mt ww of YFT were recorded landed in 1985. In recent years, via informal agreements with other sectors of the tuna industry, the purse seine fleet has opted not to direct any effort on HMS other than BFT.

Table 4.17 Domestic Atlantic Tuna Landings for the Purse Seine Fishery: 1999-2007 (mt ww). Northwest Atlantic Fishing Area. Source: U.S. National Report to ICCAT: 2008.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bluefin Tuna	247.9	275.2	195.9	207.7	265.4	31.8	178.3	3.6	27.9
Yellowfin Tuna	0	0	0	0	0	0	0	0	0
Skipjack Tuna	0	0	0	0	0	0	0	0	0

4.2.3 Safety Issues

Accidents that can occur on purse seine vessels include general injuries caused by handling fish (*e.g.*, poisoning from being stuck by fin spines), as well as accidents related to the vessels fishing operations themselves, such as, deploying the skiff or using cables and winches to move giant BFT from the net to the hold.

4.2.4 International Issues and Catch

The U.S. purse seine fleet has historically accounted for a small percentage of the total international Atlantic tuna landings. Table 4.18 shows that over the past nine years, the U.S. purse seine fishery has contributed to less than 0.15 percent of the total purse seine landings reported to ICCAT.

Table 4.18 Estimated International Purse Seine Atlantic Tuna Landings in the Atlantic and Mediterranean: 1999-2007 (mt ww). Source: SCRS, 2008.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bluefin Tuna	16,760	18,462	18,973	20,575	19,055	21,002	24,270	21,357	22,053
Yellowfin Tuna	81,783	82,540	108,720	97,538	82,075	62,228	61,410	62,761	52,485
Skipjack Tuna	103,861	89,799	82,439	68,935	92,347	93,284	89,704	71,215	88,323
Bigeye Tuna	24,533	18,599	21,556	20,894	22,731	18,417	18,595	16,457	13,150
Albacore	239	242	289	158	998	708	915	3432	1276
Total	**227,176**	**209,642**	**231,977**	**208,100**	**217,206**	**195,639**	**194,894**	**175,222**	**177,287**
U.S. Total	**248**	**275**	**196**	**208**	**265**	**32**	**178**	**4**	**28**
U.S. Percentage	**0.11%**	**0.13%**	**0.08%**	**0.10%**	**0.12%**	**0.02%**	**0.09%**	**<0.01%**	**0.02%**

Since 1999, ICCAT has continued to implement a Fish Aggregation Device (FAD) closed area in the Gulf of Guinea. The closure (which became mandatory in mid-1999) was in response to concern over catches of juvenile and undersize tunas by non-U.S. internationally flagged purse seiners relying on FADs. At the 2004 ICCAT meeting, ICCAT adopted a revised recommendation that removed the minimum size measure for bigeye tuna and significantly changed the time area closure. This measure reduced the size of the closed area. The temporal coverage had also been reduced from three months to one month and instead of banning fishing on FADs, the measure established a complete fishing moratorium in the area by the surface fishery (bait boats and purse seines). The recommendation did not require that FADs be removed from the closed area during the month that surface fishing is not permitted.

4.3 Commercial Handgear

4.3.1 Domestic History and Current Management

Commercial handgears, including handline, harpoon, rod and reel, buoy gear and bandit gear are often used to fish for Atlantic HMS by fishermen on private vessels, charter vessels, and headboat vessels. Rod and reel gear may be deployed from a vessel that is at anchor, drifting, or underway (*i.e.*, trolling). In general, trolling consists of dragging baits or lures through, on top of, or even above the water's surface. While trolling, vessels often use outriggers to assist in spreading out or elevating baits or lures and to prevent fishing lines from tangling. Operations, frequency and duration of trips, and distance ventured offshore vary widely. Most of the vessels are greater than seven meters in length and are privately owned by individual fishermen.

The handgear fisheries are typically most active during the summer and fall, although in the South Atlantic and Gulf of Mexico fishing occurs during the winter months. Fishing usually takes place between eight and 200 km from shore and for those vessels using bait, the baitfish typically includes herring, mackerel, whiting, mullet, menhaden, ballyhoo, butterfish, and squid. The commercial handgear fishery for BFT occurs mainly in New England, and more recently off the coast of southern Atlantic states, such as Virginia, North Carolina and South Carolina, with vessels targeting large medium and giant BFT. The majority of U.S. commercial handgear fishing activities for bigeye, albacore, yellowfin, and skipjack tunas take place in the northwest Atlantic. Beyond these general patterns, the availability of Atlantic tunas at a specific location and time is highly dependent on environmental variables that fluctuate from year to year.

Currently the U.S. Atlantic tuna commercial handgear fisheries are managed through an open access vessel permit program. Vessels that wish to sell their Atlantic tunas must obtain a permit in one of the following categories: General (handgears include rod and reel, harpoon, handline, and bandit gear), Harpoon (harpoon only), or Charter/Headboat (rod and reel and handline). These vessels may also need permits from the states they operate out of in order to land and sell their catch. All commercial permit holders are encouraged to check with their local state fish/natural resource management office regarding these requirements. Permitted vessels are also required to sell their Atlantic tunas to federally permitted Atlantic tuna dealers. As the Atlantic tunas dealer permits are issued by the Northeast Region Permit Office, vessel owner/operators are encouraged to contact the permitting office directly, either by phone at (978) 281-9438 or via the web at http://www.nero.noaa.gov/ro/doc/vesdata1.htm, to obtain a list of permitted dealers in their area.

Vessels that are permitted in the General and Charter/Headboat categories commercially fish under the General category rules and regulations. For instance, regarding BFT, vessels that possess either of the two permits mentioned above have the ability to retain a daily bag limit of zero to three BFT, measuring 73 inches or greater curved fork length per vessel per day while the General category BFT fishery is open. The General category BFT fishery opens on January 1 of each year and remains open until January 31. The fishery reopens on June 1 and remains open until December 31, or until the quota is filled. Vessel owner/operators should check with the agency via websites (www.hmspermits.gov) or telephone information lines (1-888-872-8862) to

verify the BFT retention limit on any given day. The General category BFT quota receives approximately 47 percent of the U.S. quota.

Vessels that are permitted in the Harpoon category fish under the Harpoon category rules and regulations. For instance, regarding BFT, vessels have the ability to keep two bluefin measuring 73 inches to less than 81 inches curved fork length per vessel trip per day while the fishery is open. There is no limit on the number of BFT that measure longer than 81 inches curved fork length, as long as the Harpoon category season is open. The Harpoon category season also opens on June 1 of each year and remains open until November 15, or until the quota is filled. The Harpoon category BFT quota is approximately 3.9 percent of the U.S. quota.

U.S. commercial swordfish fishing in the Atlantic Ocean is reported to have begun in the early 1800s as a harpoon fishery off the coast of New England. This fishery traditionally consisted of harpoon vessels operating out of Rhode Island and Massachusetts where they took extended trips for swordfish north and east of the Hudson Canyon and particularly off Georges Bank, and could land as many as 20 to 25 large swordfish over a ten-day period. These fish primarily consisted of large fish that finned on the surface and were available to the harpoon gear, some weighing as much as 600 lbs dw, but averaging about 225 to 300 lbs dw at the turn of the century. Because of the limited effort directed towards large fish, the stock was sufficient to support a sustainable seasonal swordfish fishery for more than 150 years. Most swordfish caught in the United States in the early 1900s were harvested with harpoons; harpoon landings declined from the 1940s through the 1960s. Due to a decreased availability of the large swordfish in the northeast this fishery has essentially ceased to exist. However, in recent years, a new commercial swordfish handgear fishery has developed off the east coast of Florida.

For information regarding the commercial buoy gear fishery, refer to Section 4.7.

The shark commercial handgear fishery plays a very minor role in contributing to the overall shark landing statistics. For further information regarding the shark fishery refer to Section 2.5. Economic and social aspects of all the domestic handgear fisheries are described later in this document (Section 5.0).

4.3.2 Recent Catch and Landings

The proportion of domestic HMS landings harvested with handgear varies by species, with Atlantic tunas comprising the majority of commercial landings. Commercial handgear landings of all Atlantic HMS (other than sharks) in the United States are shown in Table 4.19 and Table 4.20.

In 2007, BFT commercial handgear landings accounted for approximately 16 percent of the total U.S. BFT landings, and almost 69 percent of commercial BFT landings.

Also in 2007, three percent of the total yellowfin catch, or six percent of the commercial yellowfin catch, was attributable to commercial handgear. Commercial handgear landings of skipjack tuna accounted for approximately 21 percent of total skipjack landings, or about 100 percent of commercial skipjack landings. For albacore, commercial handgear landings

accounted for approximately one percent of total albacore landings, or about four percent of commercial albacore landings. Commercial handgear landings of bigeye tuna accounted for approximately four percent of total bigeye landings and five percent of total commercial bigeye landings.

Updated landings for the commercial handgear fisheries by gear and by area for 1999 – 2007 are presented in the following tables.

Table 4.19 Domestic Landings for the Commercial Handgear Fishery, by Species and Gear, for 1999-2007 (mt ww). Source: U.S. National Report to ICCAT: 2008.

Species	Gear	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bluefin Tuna	Rod and Reel	643.6	590.9	889.7	878.5	529.2	353.2	226.6	164.1	120.8
	Handline	15.5	3.2	9.0	4.5	2.5	1.5	2.3	0.3	0.0
	Harpoon	115.8	184.2	102.1	55.6	87.9	41.2	31.5	30.3	22.5
	TOTAL	**774.9**	**778.3**	**1,000.8**	**938.6**	**619.6**	**395.9**	**260.4**	**194.7**	**143.3**
Bigeye Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	12.3	5.7	33.7	14.4	6.3	3.5	6.3	23.0	19.0
	TOTAL	**12.3**	**5.7**	**33.7**	**14.4**	**6.3**	**3.5**	**6.3**	**23.0**	**19.0**
Albacore Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	4.4	7.9	3.9	6.6	4.3	8.2	4.2	3.1	6.0
	TOTAL	**4.4**	**7.9**	**3.9**	**6.6**	4.3	8.2	4.2	3.1	6.0
Yellowfin Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	220.0	284.0	300.0	244.0	199.7	248.5	160.3	162.8	161.5
	TOTAL	**220.0**	**284.0**	**300.0**	**244.0**	199.7	248.5	160.3	162.8	161.5
Skipjack Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	6.4	9.7	10.5	12.7	13.1	10.4	11.8	10.2	14.2
	TOTAL	**6.4**	**9.7**	**10.5**	**12.7**	13.1	10.4	11.8	10.2	14.2
Swordfish	Handline	5.0	8.9	8.9	11.7	20.6	22.7	34.7	32.6	129.1
	Harpoon	0.0	0.6	7.4	2.8	0.0	0.5	0.0	0.3	0.0
	TOTAL	**5.0**	**9.5**	**16.3**	**14.5**	**20.6**	**23.2**	**34.7**	**32.9**	**129.1**

Table 4.20 **Domestic Landings for the Commercial Handgear Fishery by Species and Region for 1999-2007 (mt ww).** Source: U.S. National Report to ICCAT: 2008.

Species	Region	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bluefin Tuna	NW Atl	774.4	778.3	1,000.8	938.3	607.3	395.6	260.4	194.7	143.3
Bigeye Tuna	NW Atl	11.9	4.1	33.2	13.8	6.0	3.3	6.2	21.5	17.8
	GOM	0.2	0.1	0.5	0.6	0.3	0.2	0.1	1.5	1.2
	Caribbean	0.2	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Albacore Tuna	NW Atl	0.6	2.9	1.7	3.9	1.7	6.1	3.0	2.6	5.6
	GOM	≤ .05	0.0	0.0	0.0	≤ .05	0.0	0.1	0.1	0.2
	Caribbean	3.8	5.0	2.2	2.7	2.6	2.1	1.1	0.4	0.2
Yellowfin Tuna	NW Atl	192.0	235.7	242.5	137.0	149.1	213.2	105.1	105.1	118.1
	GOM	12.7	28.6	43.4	100.0	39.9	28.3	45.5	49.9	34.3
	Caribbean	14.5	19.4	14.3	7.0	10.7	7.0	9.7	7.8	9.1
Skipjack Tuna	NW Atl	0.2	0.2	0.2	0.2	0.2	0.6	0.9	0.2	0.3
	GOM	0.4	0.7	0.0	0.0	0.0	0.2	0.0	0.0	0.2
	Caribbean	5.8	8.8	10.3	12.5	12.9	9.6	12.9	10.0	13.7
Swordfish	NW Atl	5.0	8.3	16.0	11.6	10.8	19.2	34.4	32.8	126.0
	GOM	≤ .05	1.2	0.3	2.9	9.8	4.0	0.3	0.1	3.1

Handgear Trip Estimates

Table 4.21 displays the estimated number of rod and reel and handline trips targeting large pelagic species in 2001 through 2007. The trips include commercial and recreational trips, and are not specific to any particular species. It should be noted that these estimates are still preliminary and subject to change.

Table 4.21 **Estimated number of vessel trips targeting large pelagic species, 2001-2007.** Source: Large Pelagics Survey database.

Year	AREA							Total
	NH/ME	MA	CT/RI	NY	NJ (north)	NJ (south) + MD/DE	VA	
Private Vessels								
2001	1,944	3,641	497	2,039	3,040	2,675	910	14,746
2002	5,090	15,180	2,558	7,692	2,762	22,757	6,524	62,563
2003	4,501	13,411	2,869	12,466	3,214	21,619	5,067	63,147
2004	2,025	10,033	3,491	11,525	3,632	22,433	4,406	57,545
2005	4,607	12,052	7,603	8,051	2,446	19,759	4,631	59,148
2006	3,303	24,951	5,430	11,114	3,043	19,187	5,274	72,302
2007	5,929	25,139	6,020	6,809	5,875	17,712	5,012	72,496
Charter								

Year	AREA							Total
	NH/ME	MA	CT/RI	NY	NJ (north)	NJ (south) + MD/DE	VA	
Vessels								
2001	133	567	203	280	660	655	307	2,805
2002	1,132	3,357	937	1,686	1,331	6,300	1,510	16,253
2003	221	2,561	1,246	2,035	1,331	5,201	546	13,141
2004	312	2,021	1,564	2,285	1,094	5,080	1,579	13,935
2005	329	2,397	551	2,033	1,024	3,476	763	10,573
2006	96	1,294	677	1,057	891	3,452	828	8,296
2007	789	4,073	1,141	1,445	1,420	4,579	610	14,057

4.3.3 Safety Issues

The U.S. Coast Guard (USCG) conducts routine vessel safety inspections at sea on a variety of vessels throughout the year. During the busy General category BFT season, the USCG has been known to concentrate patrol activities on General category BFT boats. Boarding officers indicate that the majority of the commercial handgear vessels have the necessary safety equipment; however, many part-time fishermen operating smaller vessels do not meet the necessary safety standards. There have been several cases of vessels participating in the commercial handgear fishery that have capsized due to weight while attempting to boat commercial-sized BFT (measuring 73 inches or greater and weighing several hundred pounds).

Over the last few years, the USCG focused boardings on small vessels, especially those owned by "part-time" commercial handgear fishermen, and terminated several dozen trips due to the lack of safety equipment on board. If a vessel is boarded at sea and found to be lacking major survival equipment, the USCG will terminate the trip and escort the vessels back to port.

Currently, NMFS does not require proof of proper safety equipment as a condition to obtain a commercial handgear permit. Instead, NMFS informs permit applicants that commercial vessels are subject to the Fishing Vessel Safety Act of 1988 and advises them to contact their local USCG office for further information. The USCG District Boston office reports receiving 50 to 75 calls a week during the peak fishing season; officers speak with all callers to answer vessel questions. Since NMFS regulations do not require USCG inspection or safety equipment in order to obtain a commercial handgear permit, NMFS cannot be certain that all participants in the commercial handgear fisheries are adequately prepared for the conditions they may encounter. NMFS is concerned about the safety of all vessels participating in the commercial handgear fisheries and continues to work with the USCG to improve communication of vessel safety requirements to commercial handgear vessel operators.

It is unlawful for Atlantic tuna vessels to engage in fishing unless the vessel travels to and from the area where it will be fishing under its own power and the person operating that vessel brings any BFT under control (secured to the catching vessel or on board) with no assistance from another vessel, except when shown by the operator that the safety of the vessel or its crew was jeopardized or other circumstances existed that were beyond the control of the operator (50 CFR Part 635.71 (b)(1)). NMFS Enforcement and USCG boarding officers have recently encountered vessels participating in the BFT fishery that are unable to transit to and from the

fishing grounds due to their limited fuel capacity. Occasionally these smaller vessels will work in cooperation with a larger documented vessel to catch a BFT; others have been observed leaving lifesaving equipment at the dock to make room for extra fuel, bait, and staples. NMFS is concerned that use of such inadequately equipped vessels jeopardizes crew in that the vessel may not be able to safely return to shore without assistance of the larger vessel due to insufficient fuel or to adverse weather conditions.

Over the last couple of years, NMFS has received a number of vessel permit applications from kayak owner/operators. In addition to the requirement mentioned above, NMFS only issues permits to vessels that possess a USCG Documentation number, a state registration number, or a foreign registration number (recreational permit only). As kayaks typically do not require such documentation, NMFS has denied all applications for a kayak to date.

NMFS also has concerns regarding individuals embarking on HMS trips by themselves. Recently there have been a few incidents of fishermen either severely injuring themselves or dying while pursing HMS by themselves. Certain hazardous situations could be mitigated by having an additional person onboard the vessel while conducting a trip targeting large pelagic species. NMFS encourages vessel owner/operators to practice safe fishing techniques.

NMFS will consider all safety comments and information, including those from the USCG and NMFS Enforcement, when planning future General category effort control schedules and will discuss these issues in future meetings with the AP.

4.3.4 International Issues and Catch

SCRS data do not lend themselves to organize international landings into a commercial handgear category. While some countries report rod and reel landings, these numbers may include both commercial and recreational landings. International catches of all Atlantic HMS are summarized in Section 0.

4.4 Recreational Handgear

The following section describes the recreational portion of the handgear fishery, and is primarily focused upon rod and reel fishing.

4.4.1 Domestic History and Current Management

Atlantic tunas, swordfish, sharks, and billfish are managed under the 2006 Consolidated HMS FMP, as amended. These species are all targeted by domestic recreational fishermen using rod and reel gear. Since March 1, 2003, an HMS Angling category permit has been required to fish recreationally for any HMS-managed species (Atlantic tunas, sharks, swordfish, and billfish) (67 FR 77434, December 18, 2002). Prior to March 1, 2003, the regulations only required vessels fishing recreationally for Atlantic tunas to possess an Atlantic Tunas Angling category permit. Also, on January 7, 2003, a final rule establishing a mandatory reporting system for all non-tournament recreational landings of Atlantic marlins, sailfish, and swordfish was published in the Federal Register (68 FR 711). The reporting requirement became effective in March 2003. All HMS fishing tournaments are required to register with NMFS at least 4 weeks prior to the commencement of tournament fishing activities. If selected, tournament operators are required to report the results of their tournament to the SEFSC.

Recreational fishing for Atlantic HMS is managed primarily through the use of minimum size limits and bag limits. Recreational tuna fishing regulations are the most complex and include a combination of minimum sizes, bag limits, limited season-based quota allotment for bluefin tuna, and reporting requirements (depending upon the particular species and vessel type).

The recreational swordfish fishery is managed through the use of a minimum size requirement, trip limits, and landing requirements (swordfish may be headed and gutted but may not be cut into smaller pieces). For whole (head on) North Atlantic swordfish, the minimum size is 47” (119 cm) lower jaw fork length (LJFL). If the head or tail of the swordfish has been removed prior to landing, a minimum size of 29” (73 cm) from cleithrum to caudal keel, or a 33 lb (15 kg) minimum dressed weight shall be applied in all cases. Recreational anglers may not land South Atlantic swordfish (south of 5° N latitude). Effective July 9, 2007 (72 FR 31688, June 7, 2007) recreational swordfish retention limits were modified for HMS Angling and Charter/Headboat (CHB) permit holders. Vessel owners issued an HMS Angling category permit may retain one swordfish per person, up to four swordfish per vessel/trip. Vessel owners operating a charter vessel and issued a HMS CHB permit may retain one swordfish per paying passenger and up to six swordfish per vessel/trip. Vessel owners operating a headboat vessel and issued a HMS CHB permit may retain one swordfish per paying passenger and up to fifteen swordfish per vessel/trip.

The recreational shark fishery is managed using bag limits, minimum size requirements, and landing requirements (sharks must be landed with head and fins naturally attached). Additionally, the possession of 21 species of sharks is prohibited. Recreational fishermen are

allowed to keep non-ridgeback LCS, tiger sharks, pelagic sharks, and SCS. As of July 24, 2008, recreational fishermen may no longer keep sandbar or silky sharks.

Atlantic blue and white marlin have a combined annual landings limit (*i.e.*, a maximum of 250 fish that can be landed per year); however, the primary management strategy for the recreational billfish fishery is through the use of minimum size limits. For blue marlin, white marlin, and sailfish, the LJFL minimum sizes are 99" (251 cm), 66" (168 cm), and 63" (160 cm), respectively. There are no recreational retention limits for Atlantic sailfish, blue marlin, and white marlin. Recreational anglers may not land longbill spearfish.

ICCAT has made several recommendations to recover billfish resources throughout the Atlantic Ocean that are discussed in detail in Section 2.4.

4.4.2 Recent Catch and Landings

The recreational landings database for HMS consists of information obtained through surveys including the Marine Recreational Fishery Statistics Survey (MRFSS), Large Pelagic Survey (LPS), Southeast Headboat Survey (HBS), Texas Headboat Survey, and Recreational Billfish Survey (RBS) tournament data, and the Recreational non-tournament swordfish and billfish landings database. Descriptions of these surveys, the geographic areas they include, and their limitations, were discussed in Section 2.6.2 of the 1999 FMP and Section 2.3.2 of the 1999 Billfish Amendment.

Historically, fishery survey strategies (including the MRFSS, LPS, and RBS) have not captured all landings of recreationally-caught swordfish. Although some swordfish handgear fishermen have commercial permits[1], many others land swordfish strictly for personal consumption. Therefore, NMFS has implemented regulations to improve recreational swordfish and billfish monitoring and conservation. These regulations stipulate that all non-tournament recreational landings of swordfish and billfish must be reported using either a toll-free call-in system (which became operational in 2003), or an Internet-based reporting portal (which became operational in 2008). Accordingly, all reported recreational swordfish landings are counted against the incidental swordfish quota.

Reported domestic landings of Atlantic bluefin tuna (1983 through 1998) and BAYS tuna (1995 through 1997) were presented in Section 2.2.3 of the 1999 FMP. Updated landings for all recreational rod and reel fisheries are presented below in Table 4.22 from 2000 through 2007. Recreational landings of swordfish are monitored by the LPS, MRFSS, RBS, and mandatory recreational reporting requirements (http://www.hmspermits.gov).

An ad hoc committee of NMFS scientists reviewed the methodology and data used to estimate recreational landings of Atlantic HMS during 2004. The Committee was charged with reviewing the 2002 estimates of U.S. recreational landings of bluefin tuna, white marlin and blue marlin reported by NMFS to ICCAT. The committee was also charged with recommending

[1] Access to the commercial swordfish fishery is limited; hand gear fishermen however may purchase permits from other permitted fishermen because the permits are transferable.

methods to be used for the estimation of 2003 recreational fishery landings of bluefin tuna and marlin. Although the Committee discovered and corrected a few problems with the raw data from the LPS and the estimation program used to produce the estimates, the Committee concluded that the estimation methods for producing the 2002 estimates were consistent with methods used in previous years. The report of the Committee is available at: http://www.nmfs.noaa.gov/sfa/hms/Tuna/2002-2003_Bluefin-Marlin_Report-120304.pdf.

Table 4.22 Updated Domestic Landings for the Atlantic Tunas, Swordfish and Billfish Recreational Rod and Reel Fishery, 2000-2007 (mt ww)*. Sources: NMFS, 2004; NMFS, 2005; NMFS, 2006; NMFS, 2007. (Rec. shark landings are in Table 4.25)

Species	Region	2000	2001	2002	2003	2004	2005	2006	2007
Bluefin Tuna**	NW Atlantic	449.5	242.9	519.4	314.6	329	254.4	158.2	398.6
	GOM	0.9	1.7	1.5	0	0	0.0	0.6	0.0
	Total	**450.4**	**244.6**	**520.9**	**314.6**	**329**	**254.4**	**158.8**	**398.6**
Bigeye tuna**	NW Atlantic	34.4	366.2	49.6	188.5	94.6	165.0	422.0	126.8
	GOM	0	0	0	0	6	0	24.0	0
	Caribbean		0	0	4.0	0	0	0	0
	Total	**34.4**	**366.2**	**49.6**	**192.5**	**100.6**	**165.0**	**446.0**	**126.8**
Albacore**	NW Atlantic	250.75	122.3	323.0	333.8	500.5	356.0	284.0	393.6
	GOM	0	0	0	0	0	0	0	0
	Total	**250.75**	**122.3**	**323.0**	**333.8**	**500.5**	**356.0**	**284.0**	**393.6**
Yellowfin tuna**	NW Atlantic	3,809.5	3,690.5	2,624	4,672	3,434	3,504.0	4,649.0	2,756
	GOM	52.3	494.2	200	640	247	147.0	258.0	227.6
	Caribbean	0	0.1	7.2	16	0	0	0	12.4
	Total	**3,861.8**	**4184.7**	**2,831.2**	**5,328**	**3,681**	3,651.0	**4,907.0**	**2,996**
Skipjack tuna**	NW Atlantic	13.1	32.9	23.3	34.0	27.3	8.0	35.0	27.4
	GOM	16.7	16.1	13.2	11.0	6.3	3.1	6.4	23.9
	Caribbean	0	0	13.2	15.7	40.4	4.0	8.0	0.2
	Total	**29.8**	**49.0**	**49.7**	**60.7**	**74.0**	**15.1**	**49.4**	**51.5**

Species	Region	2000	2001	2002	2003	2004	2005	2006	2007
Blue marlin***	NW Atlantic	13.8	9.0	-	-	-	-	-	-
	GOM	4.7	5.1	-	-	-	-	-	-
	Caribbean	5.7	2.3	-	-	-	-	-	-
	Total	**24.2**	**16.4**	**5.6**	**19**	**24**	**15**	**17**	**10**
White marlin ***	NW Atlantic	0.23	2.8	-	-	-	-	-	-
	GOM	0	0.3	-	-	-	-	-	-
	Caribbean	0	0	-	-	-	-	-	-
	Total	**0.23**	**3.1**	**5.6**	**0.6**	**0.8**	**0.8**	**1.1**	**0.9**
Sailfish***	NW Atlantic	1.75	61.2	-	-	-	-	-	-
	GOM	0.24	0.6	-	-	-	-	-	-
	Caribbean	0.06	0	-	-	-	-	-	-
	Total	**2.05**	**61.8**	**103**	**53**	**33**	**0.08**	**0.08**	**0.03**
Swordfish	**Total**	**15.6**	**1.5**	**21.5**	**6.1**	**25.2**	**53.1**	**52.7**	**68.2**

* Rod and reel catches and landings for Atlantic tunas represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.

** Rod and reel catch and landings estimates of bluefin tuna less than 73" curved fork length (CFL) based on statistical surveys of the U.S. recreational harvesting sector. Rod and reel catch of bluefin > 73" CFL are commercial and may also include a few metric tons of "trophy" bluefin (recreational bluefin 73").

*** Blue marlin, white marlin, and sailfish landings are based on prior U.S. National Reports to ICCAT and consist primarily of reported tournament landings.

Atlantic Billfish Recreational Fishery

Due to the rare nature of billfish encounters and the difficulty of monitoring landings outside of tournament events, reports of recreational billfish landings are sparse. However, the RBS provides a preliminary source for analyzing recreational billfish tournament landings. Table 4.23 below documents the number of billfish reported to the RBS that were landed in tournaments from 2000 – 2007.

Table 4.23 **Preliminary RBS Recreational Billfish Landings in Numbers of Fish (calendar year).** Source: NMFS Recreational Billfish Survey (RBS).

Species	2000	2001	2002	2003	2004	2005	2006	2007
Blue Marlin	117	75	84	96	110	64	72	46
White Marlin	8	22	33	20	25	26	36	31
Sailfish	18	11	14	24	9	3	4	1
Swordfish	-	-	16	48	168	385	207	274

In support of the most recent sailfish assessment conducted at the 2001 SCRS billfish species group meeting, document SCRS/01/106 developed indices of abundance of sailfish from the U.S. recreational billfish tournament fishery for the period 1973 – 2000. The index of weight per 100 hours fishing was estimated from numbers of sailfish caught and reported in the logbooks submitted by tournament coordinators and NMFS observers under the RBS, as well as available size information. Document SCRS/01/138 estimated U.S. sailfish catch estimates from various recreational fishery surveys.

In support of the most recent white and blue marlin stock assessments conducted at the 2006 SCRS billfish species group meeting, document SCRS/05/030 (Diaz & Ortiz, 2006) provided updated catch rates for these species from the U.S. recreational tournament fishery, as reported to the RBS. Figure 4.6 and Figure 4.7 below provide standardized catch per unit effort in weight and numbers of fish for white marlin and blue marlin respectively.

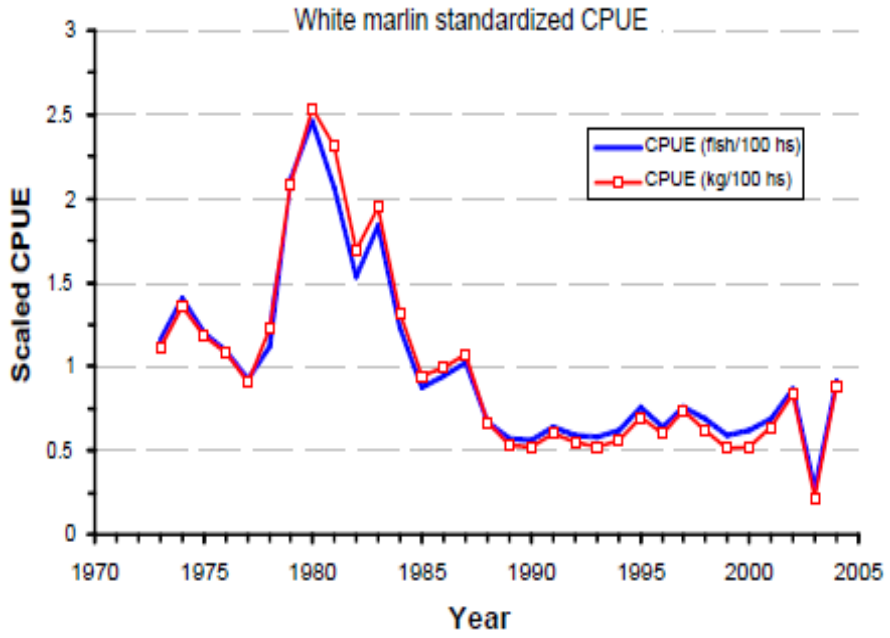


Figure 4.6 **Comparison of White Marlin Standardized CPUE in Weight and Number of Fish from 1973 – 2004.** Source: Diaz and Ortiz, 2006.

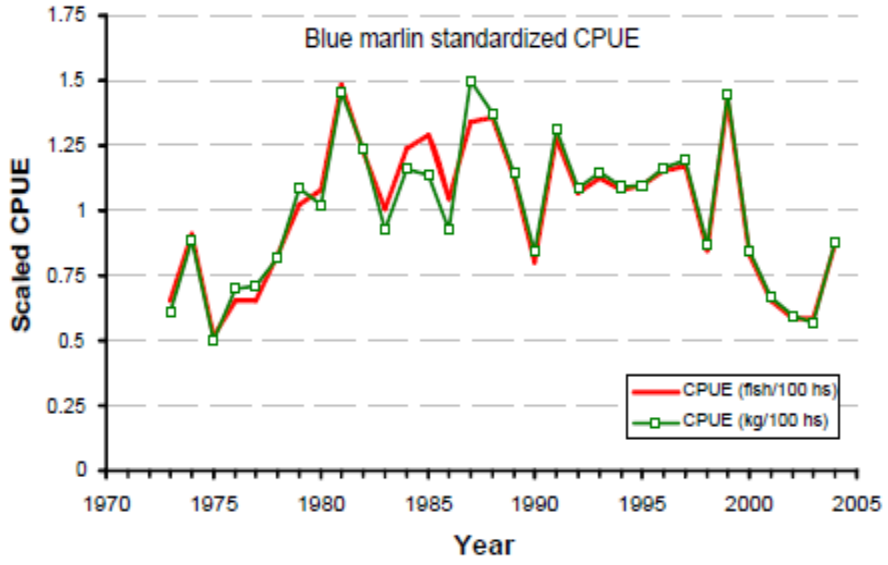


Figure 4.7 **Comparison of Blue Marlin Standardized CPUE in Weight and Number of Fish from 1973 – 2004.** Source: Diaz and Ortiz, 2006.

All recreational, non-tournament landings of billfish, including swordfish, must be reported within 24 hours of landing to NMFS by the permitted owner of the vessel landing the fish. This requirement is applicable to all permit holders, both private and charter/headboat vessels, not fishing in a tournament. In Maryland and North Carolina, vessel owners are required to report their billfish landings at state-operated landings stations. A landed fish means a fish that is kept and brought to shore. Table 4.24 provides a summary of non-tournament billfish

landings since 2004. However, due to potential large-scale non-compliance with the non-tournament reporting requirement, the landings in Table 4.24 are considered to be a minimum estimate of non-tournament billfish landings.

Table 4.24 Number of billfish reported to NMFS via call-in system by calendar year, 2004-2008.
Source: G. Fairclough, pers. comm.

Species	2004	2005	2006	2007	2008*
Blue Marlin	2	4	2	5	7
White Marlin	0	1	1	4	4
Sailfish	35	61	58	101	113
Swordfish	290	388	549	716	253

* 2008 landings as of Oct. 8, 2008

Swordfish Recreational Fishery

Table 4.23 above shows recreational tournament-caught swordfish landings reported to the RBS from 2000 – 2007. Table 4.24 above shows the number of billfish (including swordfish) reported to the NMFS recreational non-tournament reporting system from 2004 – 2008.

The recreational North Atlantic swordfish fishery had declined dramatically over the past twenty years, but has grown quite rapidly since 2003 as stock abundance has increased off the east coast of Florida and in the Mid-Atlantic Bight. In the past, the New York recreational swordfish fishery occurred incidental to overnight yellowfin tuna trips. During the day, fishermen targeted tunas, while at night they fished deeper for swordfish. This appears to have evolved into a year-round directed swordfish fishery off the east coast of Florida and a summer fishery off the coasts of New Jersey and New York. Fish have also occasionally been reported from Maryland, Virginia, Texas, Louisiana, South Carolina, and Rhode Island.

The Florida fishery has primarily occurred at night with fishermen targeting swordfish while drift fishing live or dead bait and using additional attractants such as lightsticks, LED lights, and light bars suspended under the boat. Notably, Florida recreational fishermen have recently begun targeting swordfish by fishing on the ocean bottom during the daytime in depths exceeding 1,600 ft. In general, swordfish captured using this method are much larger than those captured during nighttime drift fishing. These fishermen use highly specialized gear including braided lines, high capacity reels (with electric or manual retrieve), breakaway weights, and heavy duty rods.

Shark Recreational Fishery

Recreational landings of sharks are an important component of HMS fisheries. Recreational shark fishing with rod and reel is a popular sport at all social and economic levels, largely because the resource is accessible. Sharks can be caught virtually anywhere in salt water, depending upon the species. Recreational shark fisheries often occur in nearshore waters by private vessels and charter/headboats. However, there is also some shore-based fishing and

some offshore fishing. The following tables provide a summary of landings for each of the three species groups. Since 2003, the recreational fishery has been limited to rod and reel and handline gear only. Similar state regulations along the Atlantic seaboard are expected to be implemented through an ASMFC interstate fishery management plan in January 2009.

Table 4.25 **Estimates of Total Recreational Harvest of Atlantic Sharks: 1998-2007 (numbers of fish in thousands).** Source: Cortés and Neer 2005, Cortés, pers. comm. Estimates include prohibited species.

Species Group	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
LCS	169.6	92.3	140.0	137.2	82.8	88.8	66.6	86.2	59.4	68.7
Pelagic	11.8	11.1	13.3	3.8	4.7	4.3	5.0	5.4	16.5	9.0
SCS	175.1	125.7	199.9	212.5	153.8	133.7	126.0	119.1	119.5	172.4
Unclassified	8.0	6.9	10.9	24.5	5.4	18.1	27.9	47.4	7.3	23.8

Table 4.26 **Recreational Harvest of Atlantic LCS by Species, in number of fish: 1998-2007.** Sources: Cortés and Neer 2005, Cortés, pers. comm.

LCS Species	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Basking**	0	0	0	0	0	0	0	0	0	0
Bignose*	0	0	0	0	0	0	17	0	0	55
Bigeye sand tiger**	0	0	0	0	0	0	0	0	0	0
Blacktip	83,045	31,778	73,998	49,488	39,756	40,402	30,872	44,831	31,641	28,883
Bull	1,663	2,775	6,075	4,117	1,823	3,455	4,883	1,377	4,284	5,983
Caribbean Reef*	74	3	59	268	741	0	652	5	47	0
Dusky*	4,499	5,337	3,116	5,993	1,047	2,806	142	3,050	191	130
Galapagos*	0	0	0	0	0	0	0	0	0	0
Hammerhead, Great	476	555	925	3,446	4	47	9	162	139	813
Hammerhead, Scalloped	2,052	614	3,781	1,494	1,358	2,956	930	5,212	537	1,840
Hammerhead, Smooth	375	1	2	703	2	1	0	0	2	0
Hammerhead, Unclassified	390	0	3,691	0	5,247	0	0	2,676	1,099	807
Lemon	2,161	122	5,434	5,884	4,921	4,876	5,578	506	1,145	3
Night*	133	50	24	0	0	0	0	15	1	2
Nurse	2,455	1,429	2,214	4,934	2,562	563	3,463	2,341	1,553	334
Sandbar***	35,766	20,228	10,965	36,094	8,530	5,151	3,853	2,795	848	7,110
Sand tiger**	0	0	0	604	0	0	0	0	1,040	0
Silky***	5,376	361	6,233	3,928	1,741	1,943	399	3,589	2,042	1,980
Spinner	10,805	6,075	4,810	3,384	3,732	4,483	3,435	3,055	2,022	6,217
Tiger	1,380	7	1,480	732	126	110	1	1,321	1,309	1,815
Whale**	0	0	0	0	0	0	0	0	0	0
White**	0	0	0	0	0	0	0	0	0	0
Requiem shark unclassified	18,979	12,813	17,164	16,136	11,173	21,990	12,388	15,319	11,511	12,730
Total:	169,629	82,148	139,971	137,205	82,763	88,783	66,622	86,254	59,411	68,702

*indicates species that were prohibited in the recreational fishery as of July 1, 1999.
** indicates species that were prohibited as of April 1997.
*** indicates species that were prohibited as of July 2008.

Table 4.27 **Recreational Harvest of Atlantic Pelagic Sharks by Species, in number of fish: 1998-2007.** Sources: Cortés and Neer 2005, Cortés, pers. comm.

Pelagic Shark Species	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bigeye thresher*	0	0	0	0	65	0	0	0	42	0
Bigeye sixgill*	0	0	0	0	0	0	0	0	0	0
Blue Shark	6,085	5,218	7,011	950	0	376	0	31	980	1,622
Mako, Longfin*	0	0	0	0	0	0	0	0	0	0
Mako, Shortfin	5,633	1,383	5,813	2,827	3,206	3,922	4,964	3,857	3,352	2,556
Mako, Unclassified	8	9	0	0	0	0	0	0	0	0
Oceanic whitetip	0	0	0	0	0	0	0	0	0	0
Porbeagle	0	0	0	0	0	0	0	0	0	0

Pelagic Shark Species	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sevengill*	0	0	0	0	0	0	0	0	0	0
Sixgill*	0	0	0	0	0	0	0	0	0	0
Thresher	36	4,512	529	0	1,467	0	0	1,504	12,171	4,813
Total:	11,762	11,122	13,353	3,777	4,738	4,298	4,964	5,392	16,503	8,991

* indicates species that were prohibited in the recreational fishery as of July 1, 1999.

Table 4.28 **Recreational Harvest of Atlantic SCS by Species, in number of fish: 1998-2007.** Sources: Cortés and Neer 2005, Cortés, pers. comm.

SCS Species	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Atlantic Angel*	110	0	0	0	0	0	0	0	0	0
Blacknose	10,523	6,139	10,410	14,885	11,438	6,615	15,215	7,110	9,947	9,168
Bonnethead	29,147	37,341	56,436	59,017	51,048	40,066	42,050	31,369	24,234	43,006
Finetooth	139	78	1,390	6,628	3,027	1,758	286	2,847	268	3,935
Sharpnose, Atlantic	135,13	69,153	130,727	131,912	88,297	85,299	68,421	77,712	85,055	116,263
Sharpnose, Caribbean*	0	0	0	0	0	0	0	0	0	0
Smalltail*	0	4	973	70	0	0	71	35	0	0
Total:	175,05	112,71	199,936	212,512	153,810	133,738	126,043	119,073	119,504	172,372

*indicates species that were prohibited in the recreational fishery as of July 1, 1999.

4.4.3 Bycatch Issues and Data Associated with the Fishery

Bycatch in the recreational rod and reel fishery is difficult to quantify because many fishermen simply value the experience of fishing and may not be targeting a particular pelagic species. Recreational "marlin" or "tuna" trips may yield dolphin, tunas, wahoo, and other species, both undersized and legal sized. Bluefin tuna trips may yield undersized bluefin, or a seasonal closure may prevent landing of a bluefin tuna above a minimum or maximum size. Sharks may be discarded because they are a prohibited species. In some cases, therefore, rod and reel catch may be discarded. The Magnuson-Stevens Act (16 USC 1802 (2)) stipulates that bycatch does not include fish under recreational catch-and-release.

The 1999 Billfish Amendment established a catch-and-release fishery management program for the recreational Atlantic billfish fishery. As a result of this program, all Atlantic billfish that are released alive, regardless of size, are not considered bycatch. NMFS believes that establishing a catch-and-release fishery in this situation solidifies the existing catch-and-release ethic of recreational billfish fishermen, and thereby increases release rates of billfish caught in this fishery. Current billfish release rates range from 89 to 99 percent. The recreational white shark fishery is by regulation a catch-and-release fishery only, and white sharks are not considered bycatch.

Bycatch can result in death or injury to discarded fish. Therefore, bycatch mortality is incorporated into fish stock assessments, and into the evaluation of management measures. Rod and reel discard estimates from Virginia to Maine during June – October could be monitored

through the expansion of survey data derived from the LPS (dockside and telephone surveys). However, the actual numbers of fish discarded for many species are so low that presenting the data by area could be misleading, particularly if the estimates are expanded for unreported effort in the future. The number of kept and released fish reported or observed through the LPS dockside intercepts for 2000 – 2007 is presented in Table 4.29.

An outreach program to address bycatch and to educate anglers on the benefits of circle hooks has been implemented by NMFS. One of the key elements of the outreach program is to provide information that leads to an improvement in post-release survival from recreational gear by encouraging recreational anglers to use circle hooks. The initial implementation of this outreach program began in 2007 with the distribution of DVDs to tournament operators showing the proper rigging and deployment of circle hooks with natural baits. This outreach program is anticipated to be expanded by NMFS in future years. Also, a final rule to require the mandatory use of circle hooks when fishing with natural baits in billfish tournaments was published in May 2007 (72 FR 26735, May 11, 2007) and became effective on January 1, 2008.

Table 4.29 **Observed or reported number of HMS kept 1 and released in the rod and reel fishery, Maine through Virginia, 2000-2007.** Source: Large Pelagic Survey (LPS) Preliminary Data.

	Number of Fish Kept [1]								Number of Fish Released Alive							
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
White Marlin [2]	2	5	8	12	6	5	8	4	59	118	215	160	378	397	160	359
Blue Marlin[2]	0	1	0	4	5	3	2	2	17	14	30	39	80	52	42	69
Sailfish[2]	6	0	0	0	0	1	0	1	0	2	6	6	2	6	3	1
Swordfish	14	1	5	9	9	22	27	42	5	10	6	21	22	23	52	40
Giant Bluefin Tuna [3]	34	20	176	58	50	48	15	15	0	0	8	0	3	0	3	0
Large Medium Bluefin Tuna[3]	3	7	11	11	13	12	1	5	3	6	2	0	36	4	1	3
Small Medium Bluefin Tuna	30	87	62	83	30	22	48	69	37	5	8	13	21	30	18	32
Large School Bluefin Tuna	95	457	391	287	291	179	171	298	22	128	47	40	107	141	85	99
School Bluefin	151	338	556	509	927	638	84	314	159	58	200	174	1,297	1,917	290	347
Young School Bluefin	4	0	7	4	16	25	0	3	23	40	182	10	1,885	282	117	83
Bigeye Tuna	16	9	32	21	46	32	35	59	0	8	1	3	2	2	2	1
Yellowfin Tuna	2,366	2,423	2,595	3,216	3,858	3,700	3,572	2,988	97	74	328	200	1,093	502	351	171
Skipjack Tuna	32	100	117	681	197	79	104	34	69	130	250	526	362	105	129	17
Albacore	513	302	534	546	1,458	835	542	934	17	52	95	31	66	67	41	40
Thresher Shark	2	5	20	24	58	45	34	62	1	0	5	8	27	9	15	24
Mako Shark	49	27	72	141	216	99	111	143	114	65	120	208	350	142	177	190
Sandbar Shark	1	2	0	9	7	1	1	9	4	10	17	26	68	37	158	168
Dusky Shark	0	0	1	1	0	0	3	6	32	8	9	44	60	49	73	87
Tiger Shark	0	1	1	0	0	1	0	1	3	2	3	12	0	6	7	11

	Number of Fish Kept [1]								Number of Fish Released Alive							
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Porbeagle	0	0	1	0	1	1	1	0	0	0	14	3	1	6	8	2
Blacktip Shark	0	1	0	1	0	1	1	0	0	0	6	0	1	19	9	31
Atlantic Sharpnose Shark	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0
Blue Shark	12	2	36	65	74	67	61	109	374	141	505	2,060	2,242	920	884	1,978
Hammerhead Shark	1	2	0	0	1	0	0	0	0	1	6	38	2	5	0	0
Wahoo	41	34	49	68	110	112	85	190	0	13	6	3	5	7	6	9
Dolphin	955	1,294	2,509	4,209	3,050	6,366	3,921	2,536	48	108	111	677	192	375	394	227
King Mackerel	289	19	36	66	11	376	170	82	24	10	5	5	1	7	20	3
Atlantic Bonito	194	77	704	315	410	96	262	283	27	49	176	282	389	231	114	60
Little Tunny	139	48	240	121	231	181	90	195	118	118	585	443	1,130	505	102	387
Amberjack	6	19	7	44	0	2	1	5	20	14	57	111	1	2	13	33
Spanish Mackerel	13	3	5	35	9	4	1	2	0	0	0	1	0	0	0	2

[1] NMFS typically expands these "raw" data to report discards of bluefin tuna by the rod and reel fishery to ICCAT. If sample sizes are large enough to make reasonable estimates for other species, NMFS may produce estimates for other species in future SAFE reports.
[2] Amendment One to the Atlantic Billfish FMP established billfish released in the recreational fishery as a "catch-and-release" program, thereby exempting these fish from bycatch considerations.
[3] Includes some commercial handgear landings.

4.4.4 Safety Issues

The USCG does not maintain statistics on boating accidents, rescue, or casualty data specifically pertaining to particular recreational fisheries as it does for the commercial industry. As a result, this document contains only minimal information regarding safety in recreational HMS fisheries. However, the USCG does compile statistics on the total number of recreational boating accidents and casualties, independent of the activity or fishery in which they are engaged (Table 4.30). Three common situations often place HMS recreational HMS anglers in potential danger. Individuals in small vessels often venture out farther than their vessels are designed to travel without proper navigational equipment, and may encounter rougher water than their boats are designed to withstand. Since fishermen targeting HMS species, particularly marlin, often travel 75 to 100 miles offshore, having a properly equipped, well-maintained vessel of adequate size is very important for the safety of recreational HMS constituents. Additionally, as the recreational swordfish fishery off the southeastern coast of Florida occurs at night and usually in small boats ranging from 23 to 40 feet in length, it presents other unique risks. Shipping traffic regularly transits through areas utilized by the recreational swordfish fleet, which can lead to collisions if someone is not on watch at all times. Finally, another frequent safety concern of the Coast Guard is the potential for someone to fall overboard when on the flying bridge.

Table 4.30 **Total 2007 Reported Boating Accident Types.** Source: USCG Boating Statistics, 2007. http://www.uscgboating.org/statistics/Boating_Statistics_2007.pdf

Accident Type	# Accidents	# of Fatalities	# of Injuries	Total Property Damage
Capsizing	398	204	284	$1,762,802
Carbon Monoxide	14	7	40	$0
Collision with Fixed Object	558	35	389	$9,206,067
Collision with Floating Object	143	4	97	$2,663,282
Vessel Collision	1,329	66	953	$11,498,216
Departed Vessel	69	33	35	$161,900
Ejected from Vessel	120	25	107	$483,410
Falls within Boat	211	1	229	$69,878
Falls on Vessel	10	0	10	$85,000
Fall Overboard	485	208	312	$257,181
Fire/Explosion (fuel)	113	3	63	$2,962,406
Fire/Explosion (other than fuel)	93	0	19	$7,164,222
Flooding or Swamping	285	35	71	$3,479,039
Grounding	324	4	228	$4,618,245
Other Casualty	111	15	98	$9,204,743

Accident Type	# Accidents	# of Fatalities	# of Injuries	Total Property Damage
Sinking	84	7	9	$863,903
Skier Mishap	492	11	502	$9,915
Struck by Boat	83	9	78	$41,540
Struck by Motor	80	7	75	$8,950
Struck Submerged Object	157	4	58	$6,893,544
Total	**5,159**	**678**	**3,657**	**$61,434,245.23**

Personal floatation devices (PFDs) can reduce the risk of death or serious injury when they are accessible and used properly. Table 4.31 provides information regarding boating accidents and the presence of PFDs onboard vessels.

Table 4.31 **Boating Accidents and Personal Floatation Device Usage in 2007.** Source: USCG Boating Statistics, 2007. http://www.uscgboating.org/statistics/Boating_Statistics_2007.pdf

		Vessels Involved	Deaths
Life Jackets on Vessels	**Approved, Accessible**	**2,760**	**229**
	Approved, Not Accessible	**5**	**4**
	Approved, Not Known if Accessible	**420**	**22**
	Not Onboard	**3,697**	**421**
	Unknown	**50**	**9**
Cause of Death and Life Jacket Usage Among Cause of Death Categories	**Cause of Death**	**PFD Worn**	
		Yes	**No**
	Carbon Monoxide Poisoning	0	6
	Drowning	49	427
	Hypothermia	7	11
	Trauma	52	85
	Other	8	3
	Unknown	6	31
	Totals	**122**	**563**

4.4.5 International Issues and Catch

Important directed recreational fisheries for HMS occur in the United States, Venezuela, the Bahamas, and Brazil. Many other countries and entities in the Caribbean and the west coast of Africa are also responsible for significant HMS recreational landings. Directed recreational fisheries for sailfish occur in the Western Atlantic and include the United States, Venezuela, the Bahamas, Brazil, Dominican Republic, Mexico, and other Caribbean nations. However, of these countries, the United States is the only country that currently reports recreational landings to

ICCAT. Therefore, a comparison of the percentage of U.S. landings relative to recreational fisheries in other countries is not possible. Further, because total landings data (including recreational landings) are incomplete, HMS stock assessments are often hampered.

As part of a 1997 SCRS survey, 12 ICCAT member countries as well as Chinese Taipei and Senegal provided information on the existence of, and level of data collection for, recreational and artisanal fisheries. The survey results indicated that Brazil, Canada, France, Italy, Morocco, UK, Bermuda, and the United States have recreational fisheries in the ICCAT area of concern. Levels of data collection have varied widely from country to country, making any comparison of catch levels difficult and potentially inaccurate. The wide range of recreational catches across nations and species continues to warrant further exploration of potential data sources and the feasibility of increased recreational monitoring. At this time only limited information is available regarding international HMS recreational catches.

At the 1999 ICCAT meeting in Rio de Janeiro, Brazil, the Commission adopted a resolution (99-7) to improve the quantity and quality of recreational data collection. Recreational fisheries were to be discussed and assessed in each country's National Report beginning in the year 2000. In addition, the SCRS was called upon to examine the impact of recreational fishing on tuna and tuna-like species.

At the 2004 ICCAT meeting in New Orleans, the Commission adopted a recommendation concerning prohibited gear in the sport and recreational fisheries in the Mediterranean Sea (04-12). Prohibited gear includes towed and encircling nets, seine sliding, dredgers, gill nets, trammel net and longline to fish for tuna and tuna-like species. The recommendation also prohibits the sale of sport and recreational tuna and tuna-like species and stipulates that data on these fisheries be collected and transmitted to the SCRS. At the 2005 ICCAT meeting, the Commission adopted a resolution (05-8) calling for research and exchange of information pertaining to circle hooks and their use in recreational and commercial fisheries. In 2006, the Commission passed a resolution (06-17) to form a recreational fisheries working group which would meet in 2007 and 2008 to discuss data and landings for recreational fisheries, management approaches, and the biological impacts of recreational fisheries on managed species. There were no resolutions or recommendations specific to recreational fisheries adopted at the 2007 or 2008 meetings. However, there was a decision to conduct an ICCAT Recreational Fisheries Working Group meeting in November 2009. This group is to report the results of their deliberations to ICCAT and, as appropriate, propose recommendations for the next steps to manage recreational and sport fishing activities in the ICCAT convention area.

4.5 Bottom Longline

4.5.1 Domestic History and Current Management

The majority of commercially caught sharks are caught using bottom longline gear. However, the regulations for the shark fishery as discussed in this section apply to all gear types. In 1993, NMFS implemented the FMP for Sharks of the Atlantic Ocean, which established three management units: large coastal sharks (LCS), small coastal sharks (SCS), and pelagic sharks. At that time, NMFS identified LCS as overfished, and implemented commercial quotas for LCS and established recreational harvest limits for all sharks. In 2003, NMFS amended the measures enacted in the 1999 FMP based on the 2002 LCS and SCS stock assessments, litigation, and public comments. Implementing regulations for Amendment 1 to the 1999 FMP were published on December 24, 2003 (68 FR 74746). Management measures enacted in the amendment included: re-aggregating the large coastal shark complex, using maximum sustainable yield (MSY) as a basis for setting commercial quotas, eliminating the commercial minimum size restrictions, establishing three regional commercial quotas (Gulf of Mexico, South Atlantic, and North Atlantic) for LCS and SCS management units, implementing trimester commercial fishing seasons effective January 1, 2005, imposing gear restrictions to reduce bycatch, and a time/area closure off the coast of North Carolina effective January 1, 2005. As a result of using MSY to establish quotas, and implementing a new rebuilding plan, the overall annual landings quota for LCS in 2004 was established at 1,017 metric tons (mt) dressed weight (dw). The overall annual landings quota for SCS was established at 454 mt dw and the pelagic, blue, and porbeagle shark quotas were established at 488 mt dw, 273 mt dw, and 92 mt dw, respectively.

The regional quotas which were established in Amendment 1 to the 1999 HMS FMP for LCS and SCS were intended to improve overall management of the stocks by tailoring quotas to specific regions based on landings information. These quotas were based upon average historical landings (1999 – 2001) from the canvass and quota monitoring databases. The canvass database provides a near-census of the landings at major dealers in the southeast United States (including state landings) and the quota monitoring database collects information from dealers in the South Atlantic and Gulf of Mexico.

On November 30, 2004, NMFS issued a final rule (69 FR 69537), which established, among other things, new regional quotas based on updated landings information from 1999 – 2003. This final rule did not change the overall quotas for LCS, SCS, and pelagic sharks established in Amendment 1 to the 1999 HMS FMP, but did revise the percentages allocated to each of the regions. The updated information was based on several different databases, including the canvass and quota monitoring databases, the Northeast Commercial Fisheries Database (CFDBS), and the snapper grouper logbook. The new regional quotas and trimester seasons for the commercial Atlantic shark fishery became effective January 1, 2005.

The final rule for Amendment 2 to the 2006 Consolidated HMS FMP published on June 24, 2008 (73 FR 35778) with a correction published on July 15, 2008 (73 FR 40658). The final rule became effective on July 24, 2008. In the final rule, NMFS removed sandbar sharks from the LCS complex and established a non-sandbar LCS complex. In addition, NMFS established

two regions for the non-sandbar LCS: an Atlantic and Gulf of Mexico region. NMFS also implemented new annual adjusted quotas for sandbar sharks (87.9 mt dw), non-sandbar LCS (Atlantic: 187.7 mt dw; Gulf of Mexico: 390.5 mt dw), and a porbeagle shark commercial quota (1.7 mt dw). The sandbar shark and non-sandbar LCS quotas would increase to their annual base quotas of 116.6 mt dw for sandbar sharks, 188.3 mt dw for non-sandbar LCS in the Atlantic region, and 439.5 mt dw for non-sandbar LCS in the Gulf of Mexico region as of January 1, 2013, depending on overharvests. NMFS maintained the annual SCS quota (454 mt dw), pelagic sharks quota (273 mt dw for blue sharks), and quota for pelagic sharks other than porbeagle and blue sharks (488 mt dw).

Commercial shark fishing effort is generally concentrated in the southeastern United States and Gulf of Mexico (Cortés and Neer, 2002). During 1997 – 2003, 92 – 98 percent of LCS, 38 – 49 percent of pelagic sharks, and nearly all SCS (80 – 100 percent) came from the southeast region (Cortés, pers. comm.). McHugh and Murray (1997) found in a survey of shark fishery participants that the largest concentration of BLL fishing vessels is found along the central Gulf coast of Florida, with the John's Pass - Madeira Beach area considered the center of directed shark fishing activities. Consistent with other HMS fisheries, some shark fishery participants move from their homeports to other fishing areas as the seasons change and fish stocks move.

The Atlantic BLL fishery targets both LCS and SCS. BLL is the primary commercial gear employed in the LCS and SCS fisheries in all regions. Gear characteristics vary by region, but in general, an approximately ten-mile long BLL, containing about 600 hooks is fished overnight. Skates, sharks, or various fin fishes are used as bait. The gear typically consists of a heavy monofilament mainline with lighter weight monofilament gangions. Some fishermen may occasionally use a flexible 1/16 inch wire rope as gangion material or as a short leader above the hook.

4.5.2 Recent Catch and Landings Data

The following section provides information on shark landings as reported in the shark BLL observer program. In January 2002, the observer coverage requirements in the shark BLL fishery changed from voluntary to mandatory participation if selected. At this time, NMFS selected approximately 40 - 50 vessels for observer coverage during each season. Vessels were randomly selected if they have a directed shark LAP, have reported landings from sharks during the previous year, and have not been selected for observer coverage during each of the three previous seasons.

The U.S. Atlantic commercial shark BLL fishery was monitored by the University of Florida and Florida Museum of Natural History, Commercial Shark Fishery Observer Program (CSFOP) from 1994 through the first season of 2005. In June 2005, responsibility for the observer program was transferred to the SEFSC's Panama City Laboratory. The observer program trains and places the observers aboard vessels in the directed shark BLL fishery in the Atlantic and Gulf of Mexico to collect data on the commercial shark fishery and thus improve overall management strategies for the fishery. Observers provide baseline characterization

information, by region, on catch rates, species composition, catch disposition, relative abundance, and size composition within species for the LCS and SCS BLL fisheries.

During 2003, six observers logged 263 sea days on shark fishing trips aboard 20 vessels in the Atlantic from North Carolina to Florida and in the eastern Gulf of Mexico off Florida. The number of trips taken on each vessel ranged from one to five, and the number of sea days each observer logged ranged from nine to 35. Observers documented the catches and fishing effort on approximately 150 longline sets that fished 103,351 hooks. During 2003, LCS comprised 68.4 percent of the total catch, and sandbar sharks were 30.6 percent of total LCS catch.

During 2004, five observers logged 196 sea days on 56 shark fishing trips aboard 11 vessels. Observers documented the catches and fishing effort during 120 longline sets that fished 90,980 hooks. In 2004 LCS comprised 66.7 percent of the total catch, and sandbar sharks were 26.6 percent of the catch. Regional differences in sandbar shark abundance were evident. For example, in the Carolina region, sandbar sharks comprised 67.4 percent of the total catch and 77.2 percent of the LCS catch. In the Florida Gulf region, sandbar sharks comprised 62.0 percent of the total catch and 66.5 percent of the LCS catch, whereas in the Florida East Coast region, sandbar sharks comprised only 17.2 percent of the total observed catch, and 37.1 percent of the LCS catch (Burgess and Morgan, 2003). Blacktip sharks comprised 13.9 percent of total observed catch and 20.3 percent of the large coastal catch (Burgess and Morgan, 2002). Tiger sharks comprised 7.5 percent of the total observed catch and 11.0 percent of the LCS catch. A majority of tiger sharks (71.7 percent) and nurse sharks (98.8 percent) were tagged and released.

From July 2005 through December 2006, five observers logged 89 trips on 37 vessels with a total of 211 hauls for the second and third seasons in the Atlantic from North Carolina to Florida and in the eastern Gulf of Mexico off Florida (Hale and Carlson, 2007). Observers documented the catches and fishing effort on 34 hauls on four trips targeting grouper/snapper or grouper/shark in the Gulf of Mexico, 82 hauls on 31 trips targeting shark in the Gulf of Mexico, 77 hauls on 50 trips targeting ships in the South Atlantic, and 18 hauls on four trips observed targeting tilefish in the South Atlantic.

From January to November 2007, the shark BLL observer program covered a total of 42 trips on 25 vessels with a total of 264 hauls. Gear characteristics of trips varied by area (Gulf of Mexico or the U.S. Atlantic Ocean) and target species (grouper/snapper or grouper/tilefish, shark or tilefish) (for more details, see Hale *et al*., 2007). There were no grouper/snapper-targeted trips observed in the U.S. Atlantic Ocean. No trips were observed in the northern U.S. Atlantic Ocean. Observers documented the catches and fishing effort on 179 hauls and 10 trips targeting snapper/grouper or grouper/tilefish in the Gulf of Mexico. There were 24 hauls on 7 trips observed targeting sharks in the Gulf of Mexico. In the U.S. Atlantic Ocean, 39 hauls on 21 trips were observed targeting shark, and 22 hauls on three trips were observed targeting tilefish.

In 2007 on the trips targeting shark in the Gulf of Mexico, 1,302 individual animals were caught. This consisted of 94.9 percent sharks, 4.1 percent teleosts, 0.5 percent invertebrates, and 0.2 percent batoids. LCS comprised the greatest amount of shark catch, at 69.5 percent, and SCS comprised 30.3 percent (Table 4.32). The prohibited dusky shark was also caught (0.1 percent)

(Table 4.32). Red grouper was the most caught teleost, while blacktip sharks were the most commonly caught shark (Hale *et al*., 2007).

In 2007 on the trips targeting grouper/snapper or grouper/tilefish in the Gulf of Mexico, 8,980 individual animals were caught. This consisted of 87.3 percent teleosts, 11.6 percent sharks, 0.2 percent batoids, and 0.8 percent invertebrates. Large coastal shark species comprised 16.5 percent of the shark catch, while SCS comprised the majority of the shark catch at 73.7 percent. Red grouper was the most caught teleost, and Atlantic sharpnose were the most caught sharks (Hale *et al*., 2007).

On the trips targeting sharks in the South Atlantic in 2007, 2,735 individual animals were caught. This consisted of 95.7 percent sharks, 2.5 percent teleosts, 1.2 percent batoids, and 0.4 percent invertebrates. Large coastal shark species comprised 78.7 percent of the shark catch while SCS species comprised 19.2 percent of the shark catch. Sandbar sharks and tiger sharks were the most commonly caught LCS (Table 4.33). Other shark species caught were dusky sharks, sand tiger sharks, night sharks, and sixgill sharks (Table 4.33). Great amberjack, almaco jack, and great barracuda were the most commonly caughts teleosts (Hale *et al.*, 2007).

On the trips targeting tilefish in the South Atlantic in 2007, 1,293 individual animals were caught. This consisted of 97.2 percent teleosts, 2.5 percent sharks, and 0.2 percent invertebrates. Large coastal sharks comprised 9.4 percent of the shark catch, while no SCS species were caught. Other shark species caught included the sevengill shark, shortfin mako shark, smooth dogfish and spiny dogfish (87.5 percent). Spiny dogfish was the most commonly caught shark species (75 percent) while tilefish was the most caught teleost at 97.5 percent (Hale *et al*., 2007).

BLL for sharks has relatively low observed bycatch rates. For vessels targeting sharks in the Gulf of Mexico in 2007, four loggerhead turtles were observed caught in BLL gear. Of these, two were released alive, and two were released dead. For vessels targeting shark in the Atlantic, no loggerhead turtles were observed caught in BLL gear. However, three smalltooth sawfish were observed caught, with two being released alive and one released dead. For more information on bycatch see Section 0. More information on commercial shark landings can be found in Section 0.

The final rule for Amendment 2 to the Consolidated HMS FMP (73 FR 35778, June 24, 2008, corrected at 73 FR 40658, July 15, 2008) established, among other things, a shark research fishery to maintain time series data for future stock assessments. The shark research fishery also allows selected commercial fishermen the opportunity to earn revenue from selling more sharks, including sandbar sharks, than fishermen operating outside the research fishery. Only the commercial shark fishermen selected to participate in the shark research fishery are authorized to land/harvest sandbars subject to the sandbar quota available each year. The selected shark research fishery permittees also have access to the non-sandbar LCS, SCS, and pelagic shark quotas. Commercial fishermen not participating in the shark research fishery may land non-sandbar LCS, SCS, and pelagic sharks subject to retention limits and quotas per 50 CFR 635.24 and 635.27, respectively.

In 2008, selected vessels were allowed a trip limit of 2,750 lbs dw, of which no more than 2,000 lbs dw were allowed to be sandbar sharks. As of October 2008, vessels participating in the shark research fishery fished an average of 2 trips per month.

4.5.3 Bottom Longline Bycatch

Under MMPA (16 U.S.C. 1361 *et seq.*) the Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities), and the shark BLL as Category III (remote likelihood or no known serious injuries or mortalities) (June 28, 2007; 72 FR 35393). The Southeast Regional Office of Protected Resources Division prepared a new BiOp regarding the actions implemented under the final rule for Amendment 2 to the Consolidated HMS FMP on May 20, 2008. The Biological Opinion (BiOp) concluded, based on the best available scientific information, that Amendment 2 to the HMS FMP was not likely to jeopardize the continued existence of endangered green, leatherback, and Kemp's ridley sea turtles; the endangered smalltooth sawfish; or the threatened loggerhead sea turtle. The actions implemented under Amendment 2 were not expected to increase endangered species or marine mammal interaction rates. Furthermore, the BiOp concluded that the actions implemented under Amendment 2 were not likely to adversely affect any listed species of marine mammals, invertebrates (*i.e.*, listed species of coral) or other listed species of fishes (*i.e.*, Gulf sturgeon and Atlantic salmon) in the action area.

The BiOp analyzed the effects of the commercial and recreational shark fisheries under Amendment 2 on sea turtle and smalltooth sawfish. These analyses recognized that the actions implemented under Amendment 2 would reduce shark fishing effort as a result of reduced quotas and retention limits (compared to 2004-2007 levels). These measures were expected to reduce the number of participants targeting sharks and should reduce impacts of BLL gear on endangered or threatened sea turtles. It also recognized that smalltooth sawfish interactions with bottom longline gear may also decline; however, since nearly all individuals are expected to survive interaction with this gear, the BiOp concludes that the actions implemented under Amendment 2 would have little effect on smalltooth sawfish mortality. Furthermore, the BiOp recognized that changes in shark strikenet effort under Amendment 2 were not likely to adversely affect sea turtle or smalltooth sawfish takes because very few takes occur as a result of gillnet practices prior to Amendment 2. The BiOp also stated that drift or sink gillnet sea turtle and smalltooth sawfish takes were more frequent compared to the strikenet fishery, but were still minimal compared to BLL fishing.

The BiOp recognized that implementing 100 percent observer coverage in the shark research fishery would allow observer reports to be used to monitor interactions of directed shark fishing in near real-time, which would improve monitoring and increase the sample size available for evaluating important sea turtle and smalltooth sawfish interaction characteristics (*e.g.*, average life stage and genetic origin data). This would improve data acquisition and monitoring of protected resource interactions in the shark BLL fishery. Maintaining current levels of observer coverage outside the shark research fishery would continue to allow NMFS to observe the non-research bottom longline and gillnet fishing activities by vessels with directed and incidental shark permits at a level that would allow for statistically reliable monitoring. This would provide a better understanding of the changing dynamics of this fishery and its impacts on all marine resources. Time/area closures being implemented consistent with the South Atlantic

Fishery Management Council could provide additional protection for sea turtles and smalltooth sawfish within the marine protected areas; however, they were not likely to reduce the overall interactions between the fishery and protected species.

The BiOp indicated that the impacts of changes to seasons and regions on sea turtle and smalltooth sawfish interactions were unknown. The research fishery would likely create a more uniform distribution of effort. Thus, shark fishing effort might also occur at different times of the year. The quota and retention limit reductions would likely reduce interactions with protected species, regardless of any anticipated changes in effort patterns. Recreational measures were not expected to have any effect on sea turtles and smalltooth sawfish as there were no documented takes to indicate adverse effects on sea turtles, and only one documented take of a smalltooth sawfish using rod-and-reel to target sharks in federal waters prior to the implementation of Amendment 2.

The BiOp included a revised Incidental Take Statement (ITS) consistent with the modifications to the fishery implemented under Amendment 2. The Atlantic shark fishery had been managed under a 5-year ITS previously, but was modified to three years. A 3-year ITS was provided because the 5-year time period is too long for meaningful monitoring given the frequency of changes in management and the uncertainty of how effort by gear type will shift in response to the proposed action. The BiOp's 3-year approach would reduce the likelihood of requiring re-initiation unnecessarily because of inherent variability in take levels, but would still allow for an accurate assessment of how the fishery is performing. There were three Reasonable and Prudent Measures (RPMs) that have been implemented to minimize the impacts of the actions implemented under Amendment 2 on protected resources and Terms and Conditions for implementing the RPMs. The Agency has implemented the RPMs and adheres to the terms and conditions of the ITS to ensure compliance with the ESA.

Overall, the BiOp concluded in its evaluation of the effects of the actions implemented under Amendment 2 that the fishery's impacts on both sea turtles and smalltooth sawfish would decrease. Take of these species would continue but at a reduced level in the future because of reductions in fishing effort.

Loggerhead Sea Turtles

In the BLL fishery, a total of 79 sea turtles were observed caught from 1994 through 2007 (Figure 4.8 and Table 4.35). Seasonal variation indicates that most of the sea turtles were caught early in the year. Of the 79 observed sea turtles, 64 were loggerhead sea turtles, of which 33 were released alive. Another 14 loggerheads were released in an unknown condition and 17 were released dead. Based on extrapolation of observer data 784.3 loggerhead interactions with BLL gear occurred between 2004 and 2006. An additional 17.4 unidentified sea turtles were estimated to have been taken for this time period (NMFS, 2007b; Richards, 2007). No extrapolation has been conducted for 2007 or 2008.

Leatherback Sea Turtles

Of the 79 observed sea turtle interactions in the BLL fishery from 1994 – 2007, six were leatherback sea turtles of which one was dead and five were released with its condition unknown

(Figure 4.8 and Table 4.35). Based on extrapolated takes from observer data, it was estimated that 83.2 leatherback sea turtles were taken in the shark BLL fishery from 2004 through 2006 (NMFS, 2007b; Richards, 2007). Given the large number of turtles released in an unknown condition, these estimated take numbers do not discriminate between live and dead releases. However, leatherback mortality is usually low because it is known that leatherbacks rarely ingest or bite hooks, but are usually foul hooked on their flippers or carapaces, reducing the likelihood of post-hooking release mortality. However, leatherback-specific data for this fishery is not available. No extrapolation has been conducted for 2007 or 2008.

Smalltooth Sawfish

As of April 1, 2003, NMFS listed smalltooth sawfish as an endangered species (68 FR 15674) under the ESA. After reviewing the best scientific and commercial information, the status review team determined that the continued existence of the U.S. Distinct Population Segment of smalltooth sawfish was in danger of extinction throughout all or a significant portion of its range from a combination of the following four listing factors: the present or threatened destruction, modification, or curtailment of habitat or range; over-utilization for commercial, recreational, scientific, or educational purposes; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence. NMFS is in the process of designating critical habitat for smalltooth sawfish. A proposed rule regarding designation of critical habitat published on November 20, 2008 (73 FR 70290).

From 1994 through 2006, 12 smalltooth sawfish interactions have been observed (11 released alive, and one released in unknown condition) in shark BLL fisheries (Morgan pers. comm.; Burgess and Morgan, 2004; Hale and Carlson, 2007; Hale *et al*., 2007). In 2007, there were three observed smalltooth sawfish interactions with shark BLL gear (Hale *et al*., 2007). Two were released alive, and one was released dead. All three interactions occurred in the South Atlantic region. Based on extrapolated takes for 2004 through 2006, 60 smalltooth sawfish have been taken in the BLL fisheries (NMFS, 2007b; Richards, 2007). No mortalities were extrapolated based on the overall extrapolated takes from 2004 to 2006; however, one known mortality occurred in 2007. NMFS has not calculated the extrapolated takes since the mortality occurred.

Marine Mammals

Four delphinids have been observed caught and released alive between 1994 and 2007, and one bottlenose dolphin was observed dead in 2003 (G. Burgess, pers. comm.; Hale and Carlson, 2007; Hale *et al*., 2007). Based on this one dead encounter in 2003 (no interactions with marine mammals and BLL were observed in 2004 through 2007), NMFS extrapolated that a total of 100 bottlenose dolphin interactions could have occurred with BLL gear during 2003-2007 (Richards, 2007).

Seabirds

Bycatch of seabirds in the shark BLL fishery has been virtually non-existent. A single pelican has been observed killed from 1994 through 2007. The pelican was caught in January 1995 off the Florida Gulf Coast (between 25° 18.68 N, 81° 35.47 W and 25° 19.11 N, 81° 23.83

W) (G. Burgess, University of Florida, pers. com.). No expanded estimates of seabird bycatch or catch rates are available for the BLL fishery.

Table 4.32 Species composition of observed BLL catch during 2007 for BLL trips targeting sharks in the Gulf of Mexico. Source: Hale *et al*., 2007

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive
Blacktip shark	428	33.0	95.6	3.7	0.7
Blacknose shark	199	15.3	74.9	20.6	4.5
Atlantic sharpnose shark	174	13.4	57.5	42.5	0.0
Sandbar shark	160	12.3	98.8	0.0	0.0
Nurse shark	95	7.3	0.0	0.0	100
Spinner shark	56	4.3	96.4	0.0	1.8
Tiger shark	34	2.6	8.8	8.8	82.4
Lemon shark	32	2.5	84.4	3.1	0
Bull shark	29	2.2	96.6	0.0	0.0
Great hammerhead shark	21	1.6	61.9	0.0	38.1
Sharks	2	0.2	0.0	100	0.0
Scalloped Hammerhead shark	2	0.2	100	0.0	0.0
Dusky shark	1	0.1	0.0	0.0	100
Finetooth shark	1	0.1	100	0.0	0.0
Silky shark	1	0.1	0.0	100	0.0
Total	1235	95.1			

Table 4.33 **Species composition of observed BLL catch during 2007 for BLL trips targeting sharks in the South Atlantic.** Source: Hale *et al*., 2007

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive
Sandbar shark	827	30.3	98.9	0.1	0.1
Tiger shark	779	28.5	23.2	19.4	56.9
Atlantic Sharpnose shark	352	12.9	91.5	7.7	0.6
Blacktip shark	243	8.9	98.8	0.8	0.0
Blacknose shark	148	5.4	98	2	0.0
Nurse Shark	83	3.0	0.0	0.0	100
Scalloped hammerhead shark	37	1.4	91.9	2.7	2.7
Great hammerhead shark	29	1.1	100	0.0	0.0
Bull shark	21	0.8	90.5	4.8	0
Spinner shark	17	0.6	100.0	0.0	0.0
Silky shark	15	0.5	73.3	20.0	6.7
Smooth dogfish	14	0.5	71.4	0.0	28.6
Dusky shark	13	0.5	0.0	84.6	15.4
Sand tiger shark	10	0.4	0.0	0.0	100
Sharks	10	0.4	0.0	100	0.0
Lemon shark	9	0.3	100.0	0.0	0.0
Sixgill shark	7	0.3	0.0	0.0	100
Bonnethead shark	3	0.1	100	0.0	0.0
Night shark	1	0.0	0	100	0.0
Requim sharks	1	0.0	0	0	0
Total	2619	95.8			

Table 4.34 **Total Number of Observed Sea Turtle Interactions by Species by Month for Years 1994-2007 in the Shark BLL Fishery.** Source: Shark BLL Observer Program.

Month	Leatherback Sea Turtle	Loggerhead Sea Turtle	Other Sea Turtles	Total
Jan	1	16	1	18
Feb	3	10	6	19
Mar	-	7	-	9
Apr	-	4	-	4
May	1	-	-	1
Jun	-	-	-	-

Month	Leatherback Sea Turtle	Loggerhead Sea Turtle	Other Sea Turtles	Total
July	-	18	-	18
Aug	-	4	-	4
Sept	1	3	1	5
Oct	-	2	1	3
Nov	-	-	-	-
Dec	-	-	-	-
Total	6	64	9	79

Table 4.35 **Total number of Observed Sea Turtle Interactions by Year for Years 1994-2007 in the Shark BLL Fishery.** Source: Shark BLL Observer Program. Letters in parentheses indicate whether the sea turtle was released alive (A), dead (D), or in an unknown (U) condition.

Year	Leatherback Sea Turtle	Loggerhead Sea Turtle	Other Sea Turtle	Total
1994	1 (1U)	5 (5U)	6 (6U)	12
1995	-	4 (3A, 1D)	-	4
1996	1 (1U)	6 (3A, 2D, 1U)	-	7
1997	1 (1U)	5 (3A, 2U)	-	6
1998	-	2 (1A, 1D)	1 (1A)	3
1999	-	2 (2A)	-	2
2001	1 (1D)	2 (2A)	-	3
2002	-	5 (3A, 1D, 1U)	-	5
2003	-	7 (6A, 1D)	1 (1U)	8
2004	-	5 (3A, 2D)	-	5
2005	2 (1A, 1D)	4 (1A, 3D)	1 (1U)	7
2006	-	12 (3A, 4D, 5U),	-	12
2007	-	5 (3A, 2D)	-	5
Total	6	64	9	79

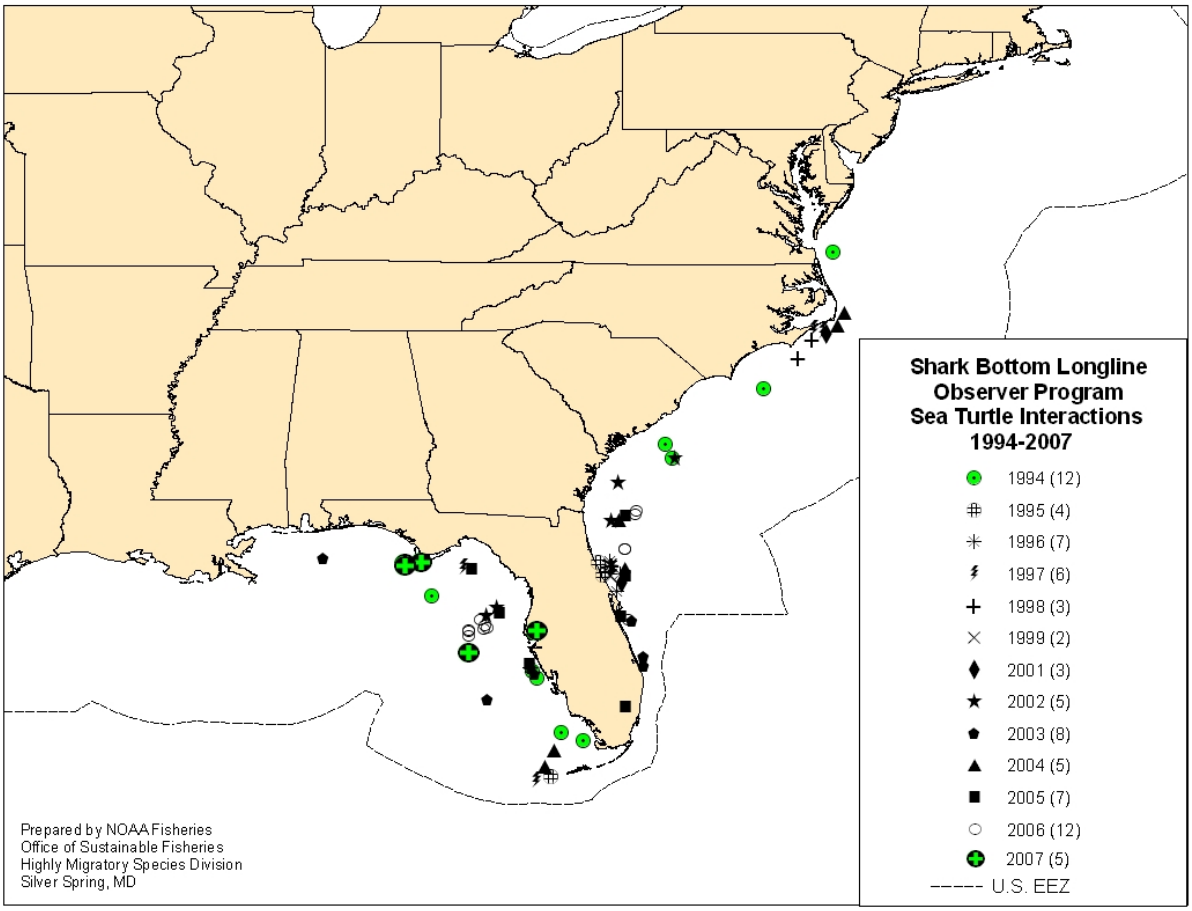


Figure 4.8 **Observed sea turtle interactions in the shark BLL fishery from 1994-2007.** Source: Commercial Shark Fishery Observer Program data (1994-1st season of 2005) and NMFS' Shark Observer Program data (2nd season 2005-2007).

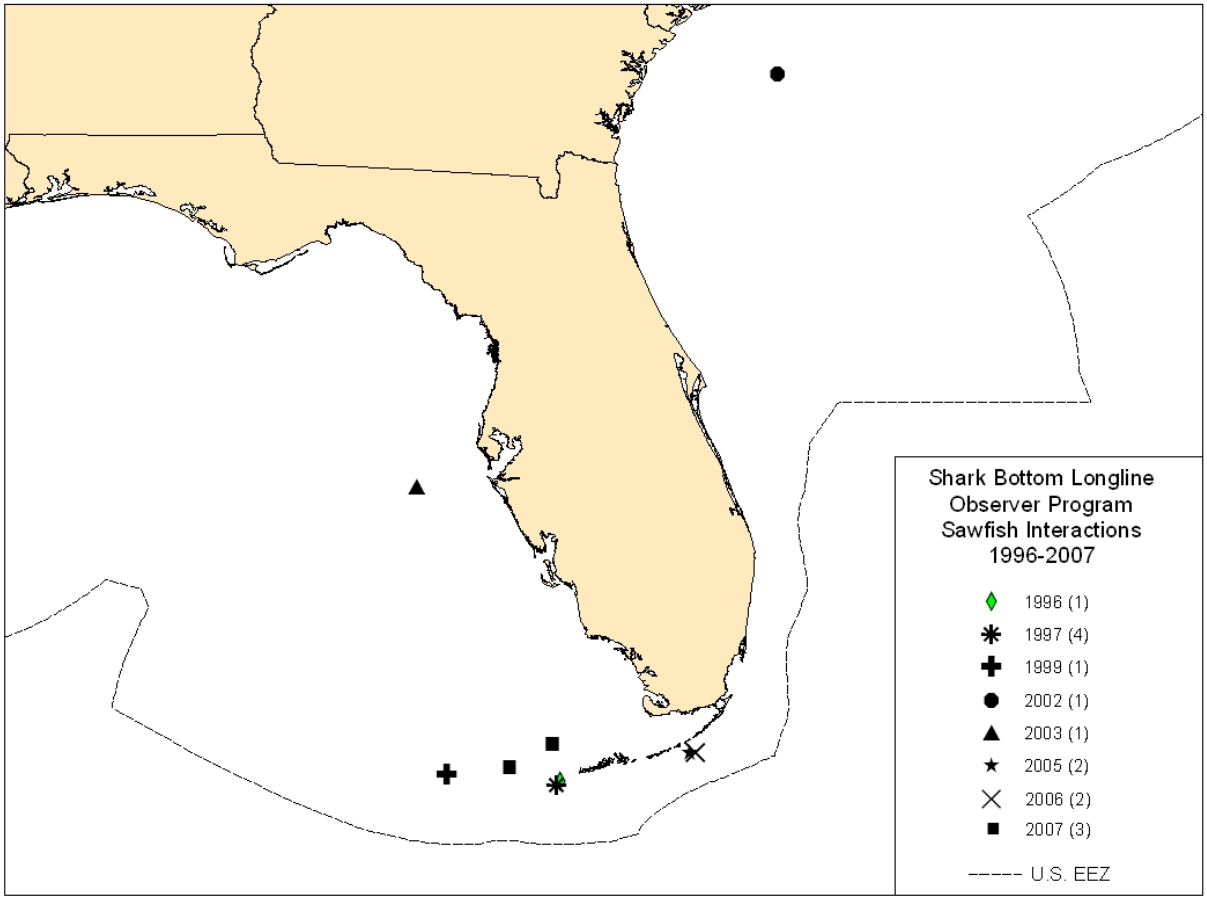


Figure 4.9 **Observed sawfish interactions and observed sets (smaller grey circles) in the shark BLL fishery from 1994-2007.** Source: Commercial Shark Fishery Observer Program data (1994-1st season of 2005) and NMFS' Shark Observer Program data (2nd season 2005-2007).

4.6 Gillnet Fishery

4.6.1 Domestic History and Current Management

The southeast shark gillnet fishery is comprised of several vessels based primarily out of ports in northern Florida (South Atlantic Region). These vessels use drift gillnet, strike gillnet, and sink gillnet gear. Set duration is generally 0.3 hours in depths averaging 20.9 m, and haulback averages 3.3 hours. The average time from setting the net through completion of haulback is 10.2 hours. Stretched mesh sizes measures from 12.7-25.4 cm (5 – 10 in). Strikenetters use the largest mesh size (22.9-30.4 cm; 9 – 12 in), and the set times are 3.2 hours, with nets approximately 364.8 meters long and 30.4 meters deep. Sink gillnets that are used to target sharks generally have a 7.3-20.3 cm (2.9 – 8 in) mesh size, and the process lasts for approximately 6.1 hours. This gear has also been observed while deployed to target non-HMS (teleosts). In those cases, sink gillnets use a stretched mesh size of 6.4-12.7 cm (2.5 – 5 in), and the entire process takes approximately 2.3 hours (Carlson and Bethea, 2007).

In 2001, NMFS established a requirement to conduct net checks every two hours to look for and remove any protected species. In 2007 the regulations implementing the Atlantic Large Whale Take Reduction Plan were amended, thus removing the requirement for 100 percent observer coverage for drift gillnet vessels during the right whale calving season and prohibiting 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 has limited exemptions, which allows shark strikenet fishing only in waters south of 29° N. latitude during this same period and for Spanish mackerel, *Scomberomorus maculates,* gillnet fishing in the months of December to March. Operations in this area during this time period require VMS and observer coverage, if selected. Based on these regulations, and on current funding levels, the shark gillnet observer program now covers all anchored (sink, stab, set), strike, or drift gillnets fishing by vessels that fish from Florida to North Carolina, year-round.

4.6.2 Recent Catch and Landings

The following section provides information on shark landings as reported in the shark gillnet observer program. For recent catch and landings data for the shark fishery as a whole, which includes landings from gillnet, BLL, and other gears combined, please refer to Section 0.

Gillnet Landings and Bycatch

<u>Strikenets</u> - The total observed strike gillnet catch consisted of eight species of sharks from 2005-2006. Finetooth and blacktip sharks made up the greatest percentage of catch in terms of total number caught in strike gillnets from 2005-2006 (Table 4.36). There were no strike gillnet trips observed in 2007.

In the strikenet fishery from 2005-2006, 99.7 percent of the observed catch were sharks with only 0.15 percent teleosts, and 0.07 percent non-shark elasmobranchs. Blacktip, finetooth,

and spinner shark comprised over 94 percent of the observed shark strikenet catch by number and weight. Tarpon and little tunny were the teleosts encountered most frequently (Carlson and Bethea, 2007).

Drift Gillnets - In 2005 and 2006, observed drift gillnet catches by number were 88.7 percent shark, 10.8 percent teleosts, 0.5 percent non-shark elasmobranchs, and 0.03 percent protected resources. Three species of sharks made up 91.3 percent of the observed drift gillnet catch: Atlantic sharpnose, blacktip, and bonnethead sharks. Two species of teleosts made up the majority of the catch, including little tunny and king mackerel (Carlson and Bethea, 2007).

In 2007, a total of five driftnet gillnet vessels were observed making 84 sets on 11 trips. Of those trips, there were 3 vessels observed that targeted sharks for a total of 4 trips and 4 hauls. The total observed catch composition for sets targeting sharks was 86.7 percent shark, 13.3 percent teleosts, zero percent non-shark elasmobranchs, and zero percent protected resources. Two species of sharks made up 98.1 percent of the observed shark catch: Atlantic sharpnose shark and blacknose shark (Table 4.37). By weight, the shark catch was composed of Atlantic sharpnose, followed by scalloped hammerhead shark, blacknose shark, and blacktip shark. Three species of teleosts made up approximately 97 percent by number of the overall non-shark species. These species were little tunny, king mackerel, and barracudas (Table 4.38) (Baremore *et al.*, 2007).

Total observed catch composition for sets targeting Spanish mackerel was 84.5 percent Spanish mackerel, 15.3 percent sharks, 0.1 percent non-shark elasmobranchs, and 0.05 protected resources. Three species of teleosts made up 96.6 percent of the total teleost catch: Spanish mackerel, bluefish, and menhaden. Shark catch was dominated by Atlantic sharpnose shark followed by bonnethead shark (Baremore *et al.*, 2007).

Sink Gillnets - Sinknet landings and bycatch vary by target species. Four main groups were targeted on observed sink gillnet trips in 2005 and 2006, including: shark, Spanish mackerel, kingfish, and various teleosts. Vessels targeting sharks with this gear caught 79.3 percent sharks, 17.6 percent teleosts, and 3.1 percent non-shark elasmobranchs. Vessels targeting Spanish mackerel caught 89.5 percent teleosts, 10.4 percent sharks, and 0.02 non-shark elasmobranchs. Vessels targeting kingfish caught 90.5 percent teleosts, 3.9 percent sharks, and 6.1 percent non-shark elasmobranchs. When targeting various teleosts with sink gillnet gear, vessels caught 98 percent teleosts and 2 percent shark (Carlson and Bethea, 2007).

There were 41 species of teleosts, four species of rays, and no marine mammal species observed caught during the sink gillnet season from 2005-2006 (Carlson and Bethea, 2007). The species of teleosts making up the largest percentage by number of the overall non-shark species in observed strikenet catches were southern kingfish, gulf flounder, whitebone porgy, and crevalle jack (Carlson and Bethea, 2007).

A total of 29 trips making 112 sink net sets on six vessels were observed in 2007. Of those, 17 trips making 60 sets targeted sharks, 3 trips making 27 sets targeted Spanish mackerel,

and 4 trips making 9 sets targeted Atlantic croaker, and 6 trips making 16 sets targeted other teleosts. Sink gillnets that targeted sharks caught 97.8 percent shark, 1.4 percent teleosts, 0.7 percent non-shark elasmobranchs, and 0.1 percent protected resources. By number, the shark catch was primarily bonnethead shark, finetooth shark, Atlantic sharpnose shark, and blacknose shark (Table 4.39). By weight the shark catch was made up mostly of finetooth shark, followed by bonnethead shark, blacknose shark, and spinner shark. Cobia made up 25.8 percent of the teleost catch, followed by Gulf kingfish and banded drum. Cownose ray and Atlantic guitarfish and other stingrays made up 100 percent of the non-shark elasmobranch catch (Baremore *et al*., 2007).

Catch of vessels targeting Spanish mackerel was 99.4 percent teleosts and 0.6 percent shark. Shark catches were mostly Atlantic sharpnose by number, and blacktip and bonnethead sharks. By weight, spiny dogfish were the predominant catch, followed by smooth dogfish, blacktip shark, and bonnethead shark. Spanish mackerel, butterfish, and bluefish made up the majority of the catch (Baremore *et al*., 2007).

Sink gillnet vessels targeting croaker caught 3.2 percent sharks, 96.7 percent teleosts, an 0.01 percent non-shark elasmobranchs. Sink gillnet vessels that targeted species other than sharks, Spanish mackerel, and Atlantic croaker caught mostly bluefish and Atlantic croaker (Baremore *et al*., 2007).

Loggerhead Sea Turtles

Loggerhead sea turtles are rarely caught in the shark gillnet fishery. No loggerheads were observed caught with strikenets during the 2000 – 2002 right whale calving seasons (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a). However, three loggerhead sea turtles were observed caught with drift gillnets during right whale calving season, one each year from 2000 to 2002 (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a; Garrison, 2003a).

No loggerhead sea turtles were caught outside of the right whale calving season in 2002 (Carlson and Baremore, 2002b), and no loggerhead turtles were observed caught during or after the right whale calving season in 2003 or 2004 in the directed shark gillnet fishery (Carlson and Baremore, 2003; Carlson, pers. comm). In 2005, five loggerheads were observed caught, and in 2006, three loggerheads were observed caught (Table 4.40) (Carlson and Bethea, 2007). In 2007, 4 loggerhead sea turtles were observed, three were released alive, and one was released in an unknown condition (Baremore *et al*., 2007).

Leatherback Sea Turtles

In the shark gillnet fishery, leatherback sea turtles are sporadically caught. No leatherback sea turtles were observed caught with strikenets during the 2000 – 2002 right whale calving seasons (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a). Leatherback sea turtles have been observed caught in shark drift gillnets, including 14 in 2001 and two in 2002 (Carlson, 2000; Carlson and Baremore, 2001; Carlson and Baremore, 2002a; Garrison, 2003a). NMFS temporarily closed the shark gillnet fishery (strikenetting was allowed)

from March 9 to April 9, 2001, due to the increased number of leatherback interactions that year (66 FR 15045, March 15, 2001).

From 2003 – 2004, no leatherback sea turtles were observed caught in gillnets fished in strikenet or driftnet methods (Carlson and Baremore, 2003; Carlson, pers. comm.). In 2005, one leatherback turtle was caught and released alive (Table 4.40) (Carlson and Bethea, 2007). In 2006 and 2007, no leatherbacks were observed caught in gillnets (Carlson and Bethea, 2007; Baremore *et al*., 2007; Table 4.40).

Smalltooth Sawfish

To date there has been only one observed catch of a smalltooth sawfish in shark gillnet fisheries. The sawfish was taken on June 25, 2003, in a gillnet off the west coast of Florida and was released alive (Carlson and Baremore, 2003). The sawfish was cut from the net and released alive with no visible injuries. This indicates that smalltooth sawfish can be removed safely if entangled gear is sacrificed. The set was characteristic of a typical drift gillnet set, with gear extending 30 to 40 feet deep in 50 to 60 feet of water. Prior to this event it was speculated that the depth at which drift gillnets are set above the sea floor may preclude smalltooth sawfish from being caught. From 2004-2007, there were no observed catches of smalltooth sawfish in shark gillnet fisheries (Table 4.41).

Although sometimes described as a lethargic demersal species, smalltooth sawfish feed mostly on schooling fish, thus they would occur higher in the water column during feeding activity. In fact, smalltooth sawfish and Atlantic sharks may be attracted to the same schools of fish, potentially making smalltooth sawfish quite vulnerable if present in the area fished. The previous absence of smalltooth sawfish incidental capture records is more likely attributed to the relatively low effort in this fishery and the rarity of smalltooth sawfish, especially in Federal waters. These factors may result in little overlap of the species with the gear.

Given the high rate of observer coverage in the shark gillnet fishery, NMFS believes that smalltooth sawfish takes in this fishery are very rare. The fact that there were no smalltooth sawfish caught during 2001 when 100 percent of the fishing effort was observed indicates that smalltooth sawfish takes (observed or total) most likely do not occur on an annual basis. Based on this information, the 2008 BiOp permitted one incidental take of smalltooth sawfish (released alive) from 2008 through 2011 as a result of the use of all gillnets in this fishery (NMFS, 2008).

Marine Mammals

Observed takes of marine mammals in the Southeast Atlantic shark gillnet fishery during 1999 – 2007, totaled 12 bottlenose dolphins and four spotted dolphins. Extrapolated observations from 2004-2006 suggest 1.4 interactions with bottlenose dolphin and zero Atlantic spotted dolphin outside the right whale season. During the right whale season, there was one interaction with bottlenose dolphins and zero interactions with Atlantic spotted dolphins in the shark gillnet fishery from 2004 through 2006 (Garrison, 2007).

On January 22, 2006, a dead right whale was spotted offshore of Jacksonville Beach, Florida. The survey team identified the whale as a right whale calf, and photos indicated the calf as having one large wound along the midline and smaller lesions around the base of its tail. The right whale calf was located at 30°14.4' N. Lat., 81° 4.2'′ W. Long., which was approximately 1 nautical mile outside of the designated right whale critical habitat, but within the Southeast U.S. Restricted Area. NMFS determined that both the entanglement and death of the whale occurred within the Southeast U.S. Restricted Area, and all available evidence suggested the entanglement and injury of the whale by gillnet gear ultimately led to the death of the animal.

On February 16, 2006, NMFS published a temporary rule (71 FR 8223) to prohibit, through March 31, 2006, any vessel from fishing with any gillnet gear in the Atlantic Ocean waters between 32°00' N. Lat. (near Savannah, GA) and 27°51' N. Lat. (near Sebastian Inlet, FL) and extending from the shore eastward out to 80°00' W. long under the authority of the ALWTRP (50 CFR 229.32 (g)) and ESA. NMFS took this action based on its determination that a right whale mortality was the result of an entanglement by gillnet gear within the Southeast U.S. Restricted Area.

NMFS implemented the final rule on June 25, 2007 (72 FR 34632), that prohibits gillnet fishing, including shark gillnet fishing, from November 15 to April 15, between the NC/SC border and 29° 00' N. The action was taken to prevent the significant risk to the wellbeing of endangered right whales from entanglement in gillnet gear in the core right whale calving area during calving season. Limited exemptions to the fishing prohibitions are provided for gillnet fishing for sharks and for Spanish mackerel south of 29°00' N. lat. Shark gillnet vessels fishing between 29° 00' N and 26° 46.5' N have certain requirements as outlined 50 CFR § 229.32 from December 1 through March 31 of each year. These include vessel operators contacting the SEFSC Panama City Laboratory at least 48 hours prior to departure of a fishing trip in order to arrange for an observer.

In addition, a recent rule (October 5, 2007, 72 FR 57104) amends gillnet restrictions in the Southeast U.S. Monitoring Area from December 1 through March 31. In that area no person may fish with or possess gillnet gear for sharks with webbing of 5 inches or greater stretched mesh unless the operator of the vessel is in compliance with the VMS requirements found in 50 CFR 635.69. The Southeast U.S. Monitoring Area is from 27°51' N. (near Sebastian Inlet, FL) south to 26°46.5' N. (near West Palm Beach, FL), extending from the shoreline or exemption line eastward to 80°00' W. In addition, NMFS may select any shark gillnet vessel regulated under the ALWTRP to carry an observer. When selected, the vessels are required to take observers on a mandatory basis in compliance with the requirements for at-sea observer coverage found in 50 CFR 229.7. Any vessel that fails to carry an observer once selected is prohibited from fishing pursuant to 50 CFR § 635. There are additional gear marking requirements that can be found at 50 CFR § 229.32.

Table 4.36 Total Strike gillnet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2005-2006. Source: Carlson and Bethea, 2007.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Blacktip shark	9,831	89.5	0.2	10.3
Finetooth	1,687	100	0	0
Spinner Shark	1,108	100	0	0
Blacknose shark	541	100	0	0
Dusky shark	20	0	25	75
Atlantic sharpnose	7	100	0	0
Scalloped Hammerhead	7	71.4	0	28.6
Tarpon	5	0	0	100
Blackfin tuna	5	100	0	0
Manta ray	4	0	100	0
Bonnethead shark	3	100	0	0
Cobia	3	100	0	0
Cownose ray	3	0	33.3	66.7
Red drum	2	0	50	50
Bull shark	2	100	0	0
Spotted eagle ray	2	0	100	0
Nurse shark	1	100	0	0
Crevalle jack	1	100	0	0
Southern flounder	1	100	0	0
Barracudas	1	0	0	100
Remoras	1	100	0	0
Ocellated flounder	1	0	0	100
Total	**13,236**	**-**	**-**	**-**

Table 4.37 **Total Shark Catch by Species and Species Disposition in Order of Decreasing Abundance for all Observed Drift gillnet Sets in 2007.** Source: Baremore *et al*., 2007.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Atlantic sharpnose	1643	99.5	0.3	0.2
Blacknose	20	100	0.0	0.0
Scalloped Hammerhead	12	100	0.0	0.0
Bonnethead	8	100	0.0	0.0
Blacktip	7	85.7	14.3	0.0
Spinner	5	80.0	20.0	0.0
Total	**1,695**	**-**	**-**	**-**

Table 4.38 **Total bycatch in NMFS observed drift gillnet sets in order of decreasing abundance and species disposition for all observed trips, 2007.** Source: Baremore *et al*., 2007.

Species	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)
Little tunny	210	99.0	0.0	1.0
King mackerel	37	81.1	0.0	18.9
Barracuda	8	100	0	0
Moonfish	4	0.0	0.0	100
Remora family	2	0.0	50.0	50.0

Table 4.39 **Total Sink gillnet Shark Catch and Bycatch by Species in order of Decreasing Abundance for all Observed Trips, 2007.** Source: Baremore et al., 2007.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Bonnethead shark	1223	99.7	0.2	0.2
Finetooth	371	99.7	0.3	0.0
Atlantic Sharpnose	256	99.6	0.0	0.4
Blacknose	240	100	0.0	0.0
Spinner	40	60.0	10	30
Blacktip	26	38.5	26.9	34.6
Scalloped hammerhead	7	14.3	14.3	71.4
Nurse	1	100	0.0	0.0
Bull	1	100	0.0	0.0
Tiger	1	0.0	100	0.0
Cownose ray	10	0.0	0.0	100
Cobia	8	50	50	0.0

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead (%)
Gulf kingfish	5	100	0.0	0.0
Stingray family	4	0.0	100	0.0
Banded drum	2	0.0	0.0	100
Southern kingfish	4	100	0.0	0.0
Silver seatrout	3	0.0	0.0	100
Bluefish	2	50	0.0	50
Spanish Mackerel	2	50	0.0	50
Moonfish	2	0.0	0.0	100
Toadfish family	1	0.0	100	0.0
Southern flounder	1	100	0.0	0.0
Atlantic guitarfish	1	0.0	100	0.0
Red drum	1	0.0	100	0.0

Table 4.40 **Total number of Observed Sea Turtle Interactions by Year from 2000-2007 in the Shark Gillnet Fishery.** Source: Directed Shark Gillnet Observer Program. Letters in parentheses indicate whether the sea turtle was released alive (A), dead (D), or unknown (U).

Year	Leatherback Sea Turtle	Loggerhead Sea Turtle	Total
2000	-	1 (U)	1
2001	-	1 (U)	1
2002	-	1 (U)	1
2003	-	-	0
2004	-	-	0
2005	1(A)	5 (4A, 1D)	6
2006	-	3 (2A, 1D)	3
2007	-	4 (3A, 1U)	4
Total	1	15	16

Table 4.41 Observed Interactions of Protected Species with the Shark Gillnet Fishery from 2004-2007. Source: Directed Shark Gillnet Observer Program.

Observed Total Takes (2004-2007)				
Species	**Drift Gillnet**	**Strikenet**	**Sink Gillnet**	**Total Observed Takes/5 yr ITS (total takes)**
Loggerhead Sea Turtle	3	3	4	10/10
Leatherback Sea Turtle	1	0	0	1/22
Smalltooth Sawfish	0	0	0	0/1
Observed Dead Takes (2004-2007)				
Species	**Drift Gillnet**	**Strikenet**	**Sink Gillnet**	**Total Observed Takes/5 yr ITS (total takes)**
Loggerhead Sea Turtle	1	1	1	3/1
Leatherback Sea Turtle	0	0	0	0/3
Smalltooth Sawfish	0	0	0	0/0

*The 5 yr ITS was established for the drift gillnet fishery only under the 2003 BiOp. However, one dead loggerhead was encountered in the drift and sink gillnet and strikenet fisheries.

4.7 Buoy Gear

4.7.1 Domestic History and Current Management

In recent years, a commercial swordfish (SWO) handgear fishery has developed off the east coast of Florida and a detailed history of this fishery may be found in the 2006 Consolidated HMS FMP. Commercial buoy gear was authorized in 2006 for SWO Directed and Handgear permit holders. SWO Directed permit holders may retain SWO only if they have also been issued a Shark Directed or Incidental limited access permit and an Atlantic Tunas Longline permit. SWO Handgear permit holders are not required to be issued other permits to retain SWO. HMS CHB, Angling, and SWO Incidental permit holders may not fish with buoy gear.

Buoy gear means a fishing gear consisting of one or more floatation devices supporting a single mainline to which no more than two hooks or gangions are attached. The buoy gear fishery is usually prosecuted at night. Authorized permit holders may not possess or deploy more than 35 floatation devices, and may not deploy more than 35 individual buoy gears per vessel. Buoy gear must be constructed and deployed so that the hooks and/or gangions are attached to the vertical portion of the mainline. Floatation devices may be attached to one but not both ends of the mainline, and no hooks or gangions may be attached to any floatation device or horizontal portion of the mainline. If more than one floatation device is attached to a buoy gear, no hook or gangion may be attached to the mainline between them. Individual buoy gears may not be linked, clipped, or connected together in any way. Buoy gears must be released and retrieved by hand. All deployed buoy gear must have some type of monitoring equipment affixed to it including, but not limited to, radar reflectors, beeper devices, lights, or reflective tape. If only reflective tape is affixed, the vessel deploying the buoy gear must possess on board an operable spotlight capable of illuminating deployed floatation devices. If a gear monitoring device is positively buoyant, and rigged to be attached to a fishing gear, it is included in the 35 floatation device vessel limit and must be marked appropriately.

4.7.2 Recent Catch and Landings

Buoy gear effort and catch data are available for 2007 and through early October 2008 (Table 4.42 and Table 4.43). Prior to 2007, buoy gear catch data were included in handline catch data.

Table 4.42 **Buoy gear effort. For number of vessels and trips, the data for 2008 only includes January – October. For average number of buoy gears deployed per trip and average number of hooks deployed per gear, the data are combined for 2007 and 2008.** Source: NMFS Pelagic Logbook Program.

	2007	2008 (Jan.-Oct.)
Number of Vessels	42	39
Number of Trips	705	357
Avg. Buoy Gears Deployed per Trip	11	
Avg. Number Hooks per Gear	1.5	

Table 4.43 **Buoy gear catches in pounds dressed weight. Data for 2008 only includes January - October** (Source: NMFS Pelagic Logbook Program).

	2007	2008 (Jan.-Oct.)
Swordfish	190,649	74,401
Dolphin	707	375
Oilfish	389	132
Shortfin Mako Shark	313	117
Wahoo	63	142
Bigeye Tuna	207	0
Blacktip Shark	9	0
King Mackerel	0	10

4.7.3 Safety Issues

NMFS does not require proof of proper safety equipment as a condition to obtain a commercial permit. Instead, NMFS informs permit applicants that commercial vessels are subject to the Fishing Vessel Safety Act of 1988 and advises them to contact their local USCG office for further information. At this time, NMFS is not aware of any safety issues associated with this fishery.

4.7.4 International Issues and Catch

NMFS is not aware of international issues related specifically to the use of buoy gear as it is used in the U.S. fishery. International catches of all Atlantic HMS are summarized in Section 0.

4.8 Green-Stick Gear

4.8.1 Domestic History and Current Management

Effective October 23, 2008, Green-stick gear was specifically defined and authorized for the harvest of Atlantic tunas on Atlantic tunas General, HMS Charter/Headboat (CHB), and Atlantic tunas Longline permitted vessels (73 FR 54721, September 23, 2008). Green-stick gear (Figure 4.10) is defined as "an actively trolled mainline attached to a vessel and elevated or suspended above the surface of the water with no more than 10 hooks or gangions attached to the mainline. The suspended line, attached gangions and/or hooks, and catch may be retrieved collectively by hand or mechanical means. Green-stick does not constitute a pelagic longline or a bottom longline as defined in the EA or as described at § 635.21(c) or § 635.21(d), respectively." Green-stick gear may be used to harvest bigeye (BET), northern albacore (ALB), yellowfin (YFT), and skipjack tunas (SKJ)(collectively referred to as BAYS tunas) and bluefin tuna (BFT) aboard Atlantic Tunas General, HMS CHB, and Atlantic Tunas Longline permitted vessels.

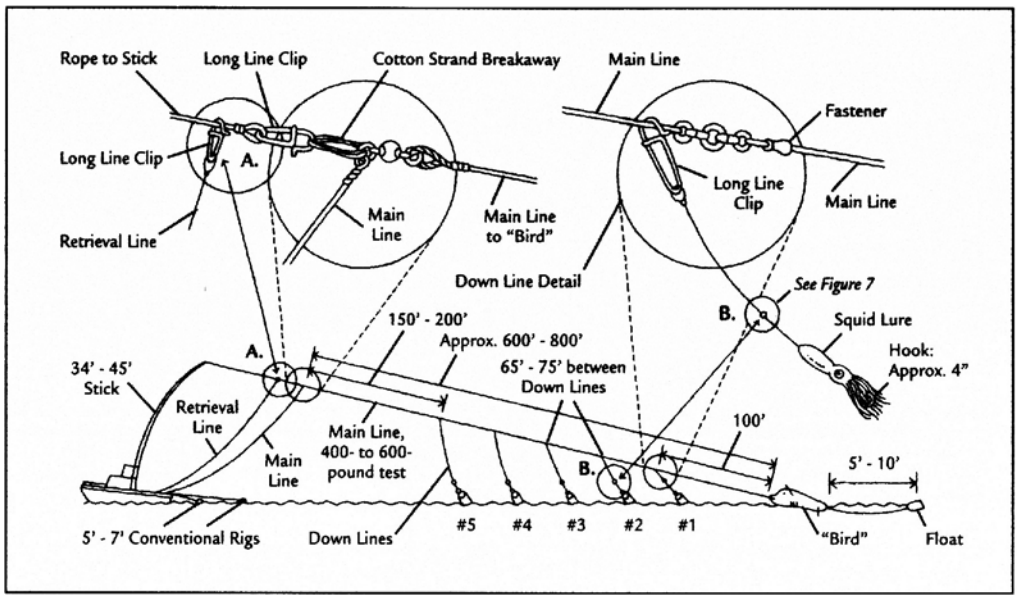


Figure 4.10 **A diagram of green-stick fishing gear.** Source: Wescott (1996).

Onboard Atlantic Tunas Longline permitted vessels, up to 20 J-hooks may be possessed for use with green-stick gear and no more than 10 J-hooks may be used with a single green-stick gear. J-hooks may not be used with pelagic longline (PLL) gear and no J-hooks may be possessed onboard a PLL vessel unless green-stick gear is also onboard. J-hooks possessed and used onboard PLL vessels may be no smaller than 1.5 inch (38.1 mm) when measured in a straight line over the longest distance from the eye to any other part of the hook.

Atlantic tuna fisheries, where green-stick gear is employed, are typically most active during the summer and fall, although in the South Atlantic and Gulf of Mexico fishing occurs

during the winter months. Fishing usually takes place between eight and two hundred km from shore. Baits used with green-stick gear may be artificial or natural with the most common bait being artificial squid. The use of green-stick gear is most common off the mid and south Atlantic states of North Carolina, South Carolina, and Georgia with some use also occurring off the New England states. A few vessels use green-stick gear in the northern Gulf of Mexico as well.

Commercial Atlantic tunas permits authorized to use green-stick gear are Atlantic tunas General, HMS CHB, and Atlantic tunas Longline. Atlantic tunas General and HMS CHB are open access. The Atlantic tunas Longline permit is limited access and, in order to be valid, a vessel must also hold a shark and swordfish limited access permit. These vessels may also need permits from the states they operate out of in order to land and sell their catch. All commercial permit holders are encouraged to check with their local state fish/natural resource management office regarding these requirements. Permitted vessels are also required to sell their Atlantic tunas to federally permitted Atlantic tuna dealers. As the Atlantic tunas dealer permits are issued by the Northeast Region Permit Office, vessel owner/operators are encouraged to contact the permitting office directly, either by phone at (978) 281-9438 or via the web at http://www.nero.noaa.gov/ro/doc/vesdata1.htm, to obtain a list of permitted dealers in their area.

Vessels that are permitted in the General and Charter/Headboat categories commercially fish under the General category rules and regulations. For instance, regarding BFT, vessels that possess either of the two permits mentioned above have the ability to retain a daily bag limit of zero to three BFT, measuring 73 inches or greater curved fork length per vessel per day while the General category BFT fishery is open. The General category BFT fishery opens on June 1 of each year and remains open until January 31 of the subsequent year, or until the quota is filled. Vessel owner/operators should check with the agency via websites (www.hmspermits.gov) or telephone information lines (1-888-872-8862) to verify the BFT retention limit on any given day.

4.8.2 Recent Catch and Landings

Green-stick gear has been used in the Atlantic commercial and recreational BET, ALB, YFT, SKJ, and BFT fisheries since the mid-1990s, but it was not originally added to the list of authorized HMS fishery gears (May 28, 1999; 64 FR 29090). Nevertheless, commercial landings of BAYS and BFT with green-stick gear continued in Atlantic Tunas General, Atlantic Tunas Longline, and HMS CHB categories. In the Consolidated HMS FMP (October 2, 2006; 71 FR 58058), NMFS clarified the allowable uses of green-stick gear, at that time, under certain configurations that met the definition of handgear or longline which are authorized for Atlantic tunas. The allowable use of green-stick gear changed most recently with authorization of green-stick gear in 2008, as described earlier in this section.

Recent Atlantic tuna landings are presented earlier in Sectoion 4. An unknown portion of these landings were made with green-stick gear as the gear has been used in the Atlantic tuna fisheries since the mid-1990s. Reporting mechanisms that are in place do not enable the number of vessels using green-stick gear to be quantified; although, limited data allow the catch to be characterized as discussed below. In the future, data on landings specific to green-stick gear may

improve because a green-stick gear code was designated for use in dealer reporting systems such as trip tickets in the southeast and electronic reporting programs in the northeast.

A portion, but not all, of green-stick gear landings has been reported via the NMFS Southeast Region's Coastal Logbook when Atlantic Tunas General, HMS CHB, or Atlantic Tunas Longline category fishermen also hold a NMFS Southeast Region fishing permit that requires logbook reporting. NMFS is unable to fully characterize the existing green-stick gear fishery with this information; however, the limited amount of self-reported data provides some useful insight on target catches and bycatch. Table 4.44 shows this information from 98 fishing trips from 1999-2007 in which green-sticks were used. Landings were dominated by YFT (82.9%), followed by BET (9.8%), BFT (2.3%), and little tunny (*Euthynnus alletteratus*) (2.0%) by weight. All of the landings were reported from the area off the mid-Atlantic states.

Table 4.44 Atlantic Commercial green-stick gear catch reported via NMFS coastal logbooks, 1999-2007 (number of trips = 98).

Species	Total Weight (lbs)	%
Yellowfin Tuna	66,325	82.9
Bigeye Tuna	7,833	9.8
Bluefin Tuna (unclassified)	1,838	2.3
Little Tunny	1,610	2.0
Dolphin	720	0.9
Blackfin Tuna	551	0.7
Mako Shark (unclassified)	410	0.5
Atlantic Bonito	232	0.3
King Mackerel	183	0.2
Wahoo	120	0.1
Skipjack Tuna	73	0.1
Blue Runner	38	<0.1
Lesser Amberjack	17	<0.1
Albacore Tuna	16	<0.1
Finfishes (Unclassified for Food)	15	<0.1
Cobia	10	<0.1
Total	79,990	100.0

Commercial green-stick gear catches reported in the PLL Logbook Program for 1999 – 2002 can be seen in Table 4.45. From 1999 - 2002, the PLL logbook format included a green-stick gear data field; however, this data field was eliminated beginning in 2003. Of the 45,712 PLL sets reported during this timeframe, 54 of these sets were reported as green-stick gear. Of the 54 green-stick gear sets reported, 53 of those were reported from the Mid-Atlantic Bight Statistical Area and one set was reported from the Northeast Coastal Statistical Area. Landings from this dataset were dominated by YFT (81.9%), followed by dolphin (6.9%) and other BAYS tunas (6.5%) by number. Several other species were reported including 4 BFT.

Table 4.45 Atlantic commercial green-stick gear catch reported via NMFS PLL logbooks, 1999-2002, in numbers of fish (number of sets = 54).

Species	1999	2000	2001	2002	Total	%
Yellowfin Tuna	0	344	232	102	678	81.9
Dolphin	0	8	2	47	57	6.9
Other BAYS Tunas	0	26	28	0	54	6.5
Pelagic Sharks	0	1	8	2	11	1.3
Swordfish	0	9	0	0	9	1.1
Wahoo	0	0	0	8	8	1
Bluefin Tuna	0	2	0	2	4	<0.1
Bigeye Tuna	0	2	2	0	4	<0.1
Large Coastal Sharks	0	0	3	0	3	<0.1

4.8.3 Safety Issues

NMFS does not require proof of proper safety equipment as a condition to obtain a commercial permit. Instead, NMFS informs permit applicants that commercial vessels are subject to the Fishing Vessel Safety Act of 1988 and advises them to contact their local USCG office for further information. At this time, NMFS is not aware of any safety issues associated with this fishery.

4.8.4 International Issues and Catch

SCRS data do not lend themselves to organize international landings into a green-stick gear specific category. International catches of all Atlantic HMS through 2007 are summarized in Section 0.

4.9 Fishery Data: Landings by Species

The following tables of HMS landings are taken from the 2008 National Report of the United States to ICCAT (ANN-043) (NMFS, 2008). The purpose of this section is to provide a summary of recent landings of HMS by gears and on a species by species basis for interannual comparisons. Landings for sharks were compiled from the most recent stock assessment documents.

Table 4.46 U.S. Landings (mt) of Bluefin Tuna by Gear and Area, 2000-2007. Source: NMFS, 2008.

Area	Gear	2000	2001	2002	2003	2004	2005	2006	2007
NW Atlantic	Longline**	22.8	17.7	7.8	36.1	106.2	72.7	104.4	70.7
	Handline	3.2	9.0	4.5	2.5	1.5	2.3	0.3	0.0
	Purse Seine	275.2	195.9	207.7	265.4	31.8	178.3	3.6	27.9
	Harpoon	184.2	101.9	55.5	87.9	41.2	31.5	30.3	22.5
	*Rod and reel (>145 cm LJFL)	632.8	993.4	1,008.4	676.4	387.4	170.4	217.2	235.4
	*Rod and reel (<145 cm LJFL)	49.5	249.3	519.3	314.6	329	254.4	158.2	398.6
	Unclassified	0.2	0.5	0.0	0.0	0.2	0.0	0.0	0.0
Gulf of Mexico	Longline	43.3	19.8	32.8	80.0	151.5	118.5	88.1	81.2
	*Rod and reel	0.9	1.7	1.5	0.0	0.0	0.0	0.6	0.0
NC Area 94a	Longline	0.0	0.0	9.3	17.8	17.7	20.3	12.1	12.4
All Areas	All Gears	**1,212.1**	**1,582.8**	**1,846.8**	**1,480.7**	**1,066.5**	**848.4**	**614.8**	**848.7**

* Rod and Reel catches and landings represent estimates of landings and dead discards when available based on statistical surveys of the U.S. recreational harvesting sector.
**from 2003-2007, this includes landings and estimated discards from scientific observer and logbook sampling programs.

Table 4.47 U.S. Landings (mt) of Yellowfin Tuna by Gear and Area, 2000-2007. Source: NMFS, 2008.

Area	Gear	2000	2001	2002	2003	2004	2005	2006	2007
NW Atlantic	Longline	734.5	631.8	400	275.3	658.5	394.2	701.7	752.8
	Rod and reel*	3,809.5	3,690.5	2,624	4,672.1	3,433.7	3,504.8	4,649.2	2,756.0
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Purse seine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gillnet	0.2	7.6	5	0.9	3.2	0.1	4.7	4.2
	Trawl	1.8	2.7	0	2.2	1.6	0.2	0.7	2.4
	Harpoon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	235.7	242.5	137	149.1	213.2	105.1	105.1	118.1
	Trap	0.5	0.1	0.0	0.3	0	0.01	0.0	0.0
	Unclassified	1.3	6.8	**	0.1	10.6	3.9	3.9	7.0
Gulf of Mexico	Longline	2,133	1,505.5	2,109	1,835.8	1,811.9	1,210.9	1,128.5	1,377.7
	Rod and reel*	52.3	494.2	200	640	247.1	146.9	258.4	227.6
	Handline	28.6	43.4	100	39.9	28.3	45.5	49.9	34.3
	Gillnet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Caribbean	Longline	11.8	23.1	12	5.6	4.5	140.6	179.7	255.6
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	19.4	14.3	7	9	7	9.7	7.8	9.1
	Gillnet	0.1	0.3	0.0	0.02	0.06	0.0003	0.0	0.0
	Trap	0.3	0.3	0.0	0.2	0.1	0.001	0.4	0.0
NC Area 94a	Longline	2.1	3.5	0.0	5.2	0.08	0.5	0.0	1.8
SW Atlantic	Longline	19.8	36.2	52	42	16.8	0.0	0.0	0.0
All Areas	**All Gears**	**7,050.9**	**6,702.8**	**5,646**	**7,677.7**	**6,436.6**	**5,562.7**	**7,090.0**	**5,546.6**

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
** $\leq$ 0.05 mt

Table 4.48 U.S. Landings (mt) of Skipjack Tuna by Gear and Area, 2000-2008. Source: NMFS, 2008.

Area	Gear	2000	2001	2002	2003	2004	2005	2006	2007
NW Atlantic	Longline	0.0	0.1	**	0.9	0.1	0.05	0.04	0.0
	Rod and reel*	13.1	32.9	23.3	34.1	27.3	8.1	34.6	27.4
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Purse seine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gillnet	1.9	3.6	**	0.9	16.7	2.2	0.2	0.05
	Trawl	0.0	0.2	**	0.5	0.2	0.07	0.7	0.005
	Handline	0.2	0.2	0.2	0.2	0.6	0.9	0.2	0.3
	Trap	0.0	0.0	**	1.5	0.006	0.0	0.3	0.0
	Pound Net	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.002
	Unclassified	0.0	0.0	0.0	0.1	0.2	0.01	0.06	0.6
Gulf of Mexico	Longline	0.2	0.2	**	0.05	0.3	0.3	0.0	0.0
	Rod and reel*	16.7	16.1	13.2	11.1	6.3	3.1	6.4	23.9
	Handline	0.7	0.0	0.0	0.04	0.2	0.02	0.0	0.2
	Trap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Caribbean	Longline	1.6	4.0	2.5	0.4	0.3	0.2	0.2	0.002
	Gillnet	0.6	1.6	0.6	0.4	0.3	0.06	0.02	0.0
	Rod and Reel*	NA	NA	NA	15.7	40.4	3.9	7.7	0.2
	Harpoon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	8.8	10.3	12.5	12.9	9.6	10.9	10.0	13.7
	Trap	0.3	0.4	0.7	0.2	0.02	0.1	0.05	0.0
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW Atlantic	Unclassified	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Areas	Longline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Gears	**44.1**	**69.6**	**53.0**	**79.1**	**102.5**	**29.9**	**61.0**	**66.4**

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
** $\leq$= 0.05 mt

Table 4.49 U.S. Landings (mt) of Bigeye Tuna by Area and Gear, 2000-2007. Source: NMFS, 2008.

Area	Gear	2000	2001	2002	2003	2004	2005	2006	2007
NW Atlantic	Longline	333.2	506.1	328.6	169.2	267	272.9	469.4	325.7
	Rod and reel*	34.4	366.2	49.6	188.5	94.6	165.0	422.3	126.8
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gillnet	0.0	0.2	0.0	0.07	0.0	0.0	0.2	1.0
	Handline	4.1	33.2	13.8	6.0	3.3	6.2	21.5	17.8
	Trawl	1.7	0.4	0.5	0.03	0.9	0.6	0.0	0.4
	Unclassified	0.0	1.8	0.0	0.0	0.5	0.6	0.8	0.9
Gulf of Mexico	Longline	44.5	15.3	41.0	26.2	20.2	25.2	37.7	37.0
	Rod and reel*	0.0	0.0	0.0	0.0	6.0	0.0	24.3	0.0
	Handline	0.1	0.5	0.6	0.3	0.2	0.1	1.5	1.2
Caribbean	Longline	13.7	31.9	29.7	7.0	3.5	6.9	10.5	3.4
	Handline	1.5	0.0	0.0	0.0	0.0	0.04	0.0	0.0
NC Area 94a	Longline	63.1	61.0	45.2	36.9	5.0	6.9	3.0	8.4
SW Atlantic	Longline	77.4	68.2	91.3	44.6	14.4	0.0	0.0	0.0
All Areas	All Gears	**573.7**	**1,084.8**	**600.3**	**478.8**	**415.6**	**484.4**	**991.2**	**522.6**

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
** $\leq$ 0.05

Table 4.50 U.S. Landings (mt) of Albacore Tuna by Gear and Area, 2000-2007. Source: NMFS, 2008.

Area	Gear	2000	2001	2002	2003	2004	2005	2006	2007
NW Atlantic	Longline	130.5	171.7	124.0	95.7	106.6	88.9	84.8	109.4
	Gillnet	0.8	3.3	2.6	0.1	4.9	6.0	2.1	1.0
	Handline	2.9	1.7	3.9	1.7	6.1	3.0	2.6	5.6
	Trawl	0.0	0.0	0.3	0.02	2.7	1.7	1.1	0.3
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Rod and reel*	250.8	122.3	323.0	333.8	500.5	356.0	284.2	393.6
	Pound Net	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unclassified	0.1	0.1	0.0	0.0	3.6	9.9	5.6	4.2
Gulf of Mexico	Longline	4.1	4.9	9.5	4.4	9.9	6.9	7.6	15.2
	Rod and reel*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	0.0	0.01	0.0	0.1	0.07	0.2
Caribbean	Longline	9.2	8.7	8.4	3.9	3.2	12.1	10.5	1.2
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Gillnet	0.1	0.5	**	0.04	0.005	0.002	0.0	0.0
	Trap	0.2	0.3	0.6	0.2	0.0	0.0	0.0	0.0
	Handline	5.0	2.2	2.7	2.6	2.1	1.1	0.4	0.2
NC Area 94a	Longline	2.6	6.1	4.8	1.6	0.2	0.6	0.03	0.3
SW Atlantic	Longline	0.9	2.4	8.3	2.0	0.5	0.0	0.0	0.0
All Areas	All Gears	**407.2**	**324.2**	**488.1**	**446.1**	**640.3**	**486.3**	**399.0**	**531.2**

* Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.
** $\leq$ 0.05 mt

Table 4.51 **U.S. Catches and Landings (mt) of Swordfish by Gear and Area, 2000-2007.** Source: NMFS, 2008.

Area	Gear	2000	2001	2002	2003	2004	2005	2006	2007
NW Atlantic	*Longline	1,547.6	1,220.8	1,132.8	1,341.3	1,169.7	1,096.2	1,165.2	1,630.8
	Gillnet	0.0	0.0	0.1	0.0	0.05	0.0	0.0	0.2
	Pair Trawl	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	7.7	8.6	8.8	10.8	18.7	34.4	32.5	126.0
	Trawl	10.9	2.5	3.9	5.6	8.3	8.2	3.5	6.5
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	*Unclassified	1.4	1.8	0.1	1.6	3.9	4.7	5.3	2.5
	Harpoon	0.6	7.4	2.8	0.0	0.5	0.0	0.3	0.0
	***Rod and Reel	15.6	1.5	21.5	5.9	24.3	53.1	50.6	65.9
	Trap	0.0	0.0	**	0.06	0.0	0.0	0.0	0.0
Gulf of Mexico	*Longline	631.7	494.6	549.1	507.6	453	480.9	328.1	455.7
	Handline	1.2	0.3	2.9	9.8	4.0	0.3	0.1	3.1
	Rod and Reel				0.03	0.5	1.5	2.1	2.3
	*Unclassified				3.4	0.03	4.1	2.7	5.4
Caribbean	*Longline	331.9	347.0	329.0	274.5	295.9	143.5	88.9	27.7
	Trap	0.3	**	0.1	0.0	0.0	0.0	0.0	0.0
	Rod and Reel				0.0	0.4	6.6	0.0	0.0
	Handline				0.02	0.006	0.0	0.0	0.0
	Unclassified				0.2	0.08	0.7	0.0	0.0
NC Atlantic	*Longline	804.6	420.6	587.9	632.8	599.9	552.2	378.6	338.8
SW Atlantic	*Longline	143.8	43.2	199.9	20.5	15.7	0.0	0.0	0.0
All Areas	All Gears	**3,497.3**	**2,548.3**	**2,838.9**	**2,814.13**	**2,594.9**	**2,386.4**	**2,057.9**	**2,665.9**

* Includes landings and estimated dead discards from scientific observer and logbook sampling programs.
** $\leq$ = 0.5 mt
*** Rod and Reel catches and landings represent estimates of landings and dead discards based on statistical surveys of the U.S. recreational harvesting sector.

Table 4.52 Commercial landings of LCS in lb dw: 1999-2007. Sources: Cortés 2003; Cortés and Neer 2002, 2005; Cortés pers. comm.

Large Coastal Sharks	1999	2000	2001	2002	2003	2004	2005	2006	2007
Basking**	0	0	0	0	0	0	0	0	0
Bignose*	9,050	672	1,442	0	318	0	98	61	0
Bigeye sand tiger**	0	0	0	0	0	0	0	0	0
Blacktip	1,259,016	1,633,919	1,135,199	1,099,194	1,474,362	1,092,600	993,380	1,311,257	1,089,199
Bull	28,603	24,980	27,037	40,463	93,816	49,556	133,265	173,125	157,890
Caribbean Reef*	0	0	1	0	0	0	0	0	0
Dusky*	110,942	205,746	1,973	8,779	23,288	1,025	874	4,209	1,907
Galapagos*	0	0	0	0	0	0	0	0	0
Hammerhead, Great	0	0	0	0	0	0	0	0	0
Hammerhead, Scalloped	0	0	0	0	0	0	0	0	0
Hammerhead, Smooth	0	0	0	0	0	92	54	150	0
Hammerhead, Unclassified	53,393	35,060	69,356	108,160	150,368	116,546	197,067	153,854	65,255
Large Coastal, Unclassified	67,197	16,575	172,494	147,359	51,433	0	0	0	0
Lemon	25,298	45,269	24,453	56,921	80,688	67,810	71,805	62,738	72,583
Narrowtooth*	0	0	0	0	0	0	0	0	0
Night*	4,287	0	0	0	20	0	0	0	0
Nurse	1,176	429	387	69	70	317	97	2,258	15

Large Coastal Sharks	1999	2000	2001	2002	2003	2004	2005	2006	2007
Sandbar	1,320,239	1,491,908	1,407,550	1,863,420	1,425,628	1,223,241	1,282,477	1,580,142	669,525
Sand Tiger**	6,401	6,554	1,248	409	624	1,832	5,167	4,321	210
Silky	9,961	31,959	14,197	30,731	51,588	11,808	17,646	16,173	16,496
Spinner	629	14,473	6,970	8,447	12,133	14,806	44,150	96,259	17,888
Tiger	30,779	24,443	26,973	16,115	18,536	30,976	33,477	53,706	17,500
Whale**	0	0	0	0	0	0	0	0	0
White**	82	1,201	26	0	1,454	58	0	122	88
Unclassified, assigned to large coastal	821,648	92,117	525,661	771,450	908,077	603,229	527,026	393,749	199,550
Unclassified, fins	116,570	87,820	23,988	142,565	181,431	137,375	110,613	146,037	102,615
Total (excluding fins)	**3,865,271 (1,753 mt dw)**	**3,713,125 (1,684 mt dw)**	**3,414,967 (1,549 mt dw)**	**4,151,594 (1,883 mt dw)**	**4,292,403 (1,947 mt dw)**	**3,213,896 (1,458 mt dw)**	**3,306,583 (1,500 mt dw)**	**3,852,124 (1,747 mt dw)**	**2,308,018 (1,047 mt dw)**

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.
** indicates species that were prohibited as of April 1997.

Table 4.53 **Commercial landings of small coastal sharks in lb dw: 1999-2007. Source: Cortés and Neer, 2002, 2005; Cortés, 2003; Cortés pers. comm.**

Small coastal sharks	1999	2000	2001	2002	2003	2004	2005	2006	2007
Atlantic Angel*	0	97	0	495	1,397	818	3,587	500	29
Blacknose	137,619	178,083	160,990	144,615	131,511	68,108	120,320	187,907	91,438
Bonnethead	58,150	69,411	63,461	36,553	38,614	29,402	33,295	33,911	53,638
Finetooth	285,230	202,572	303,184	185,120	163,407	121,036	107,327	80,536	171,099
Sharpnose, Atlantic	244,356	142,511	196,441	213,301	190,960	230,880	375,881	520,028	334,421
Sharpnose, Atlantic, fins	0	0	209	0	0	0	0	0	0
Sharpnose, Caribbean*	2,039	353	205	0	0	0	0	0	0
Unclassified Small Coastal	336	0	51	35,831	8,634	1,407	9,792	471	3,474
Total (excluding fins)	**727,730 (330 mt dw)**	**593,027 (269 mt dw)**	**724,332 (329 mt dw)**	**615,915 (279 mt dw)**	**534,523 (242 mt dw)**	**451,651 (205 mt dw)**	**650,202 (295 mt dw)**	**823,353 (373 mt dw)**	**654,099 (297 mt dw)**

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

Table 4.54 Commercial landings of pelagic sharks in lb dw: 1999-2007. Sources: Cortés and Neer 2002, 2005; Cortés 2003; Cortés pers. comm.

Pelagic Sharks	1999	2000	2001	2002	2003	2004	2005	2006	2007
Bigeye thresher*	18,683	4,376	330	0	0	719	267	68	0
Bigeye sixgill*	0	0	0	0	0	0	0	0	0
Blue shark	886	3,508	65	137	6,324	423	0	588	0
Mako, longfin*	3,394	6,560	9,453	3,008	1,831	1,827	403	2,198	2,039
Mako, shortfin	150,073	129,088	171,888	159,840	151,428	217,171	154,187	102,901	165,120
Mako, Unclassified	56,625	74,690	73,556	58,392	33,203	50,978	35,241	28,557	38,170
Oceanic whitetip	1,480	657	922	1,590	2,559	1,082	713	338	787
Porbeagle	5,650	5,272	1,152	2,690	1,738	5,832	2,452	3,810	3,370
Sevengill*	0	0	0	0	0	0	0	0	0
Sixgill*	0	0	0	0	0	0	0	0	0
Thresher	96,266	81,624	56,893	53,077	46,502	44,915	24,280	33,299	49,257
Unclassified, pelagic	0	233	0	5,965	79,439	0	0	571	0
Unclassified, assigned to pelagic	41,006	40,951	31,636	182,983	314,300	356,522	18,057	12,936	5,022
Unclassified, pelagic, fins	2,408	3,746	12,239	0	0	41	0	0	0
Total (excluding fins)	**376,471 (171 mt dw)**	**350,705 (159 mt dw)**	**345,895 (157 mt dw)**	**467,682 (212 mt dw)**	**637,324 (289 mt dw)**	**679,469 (308 mt dw)**	**235,600 (107 mt dw)**	**185,266 (84 mt dw)**	**263,765 (120 mt dw)**

* indicates species that were prohibited in the commercial fishery as of June 21, 2000.

Section 4 References

Diaz, G.A., M. Ortiz, and E. Prince. 2007. Updated white marlin (*Tetrapturas albidus*) and blue marlin (*Maikaira nigricans*) catch rates from the U.S. recreational tournament fishery in the northwest Atlantic, U.S. Gulf of Mexico, Bahamas, and U.S. Caribbean 1973 – 2005. Col. Vol. Sci. Pap. ICCAT 60(5):1678 - 1695.

Fairfield, C.P. and L.P. Garrison. 2008. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2007. National Oceanic and Atmospheric Administration Technical Memorandum. NMFS-SEFSC-572. 62 pp.

Fairfield-Walsh, C. and L. Garrison. 2007. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2006. National Oceanic and Atmospheric Administration Technical Memorandum. NMFS-SEFSC-560. 54 pp.

Garrison, L.P. 2005. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2004. National Oceanic and Atmospheric Administration Technical Memorandum. NMFS-SEFSC-531. 52 pp.

Lewison, R.L., S.A. Freeman, and L.B. Crowder. 2004. Quantifying the effects of fisheries on threatened species: the impact of pelagic longlines on loggerhead and leatherback sea turtles. Ecological Letters 7:221-231.

Lewison, R.L. and L.B. Crowder. 2007. Putting longline bycatch of sea turtles into perspective. Conservation Biology. Vol. 21. 1:79-86.

Walsh, C.F. and L.P. Garrison. 2006. Estimated bycatch of marine mammals and turtles in the U.S. Atlantic pelagic longline fleet during 2005. National Oceanic and Atmospheric Administration Technical Memorandum. NMFS-SEFSC-539. 51 pp.

Wescott, W. 1996. The Wanchese green-stick tuna rig. North Carolina Sea Grant. UNC-SG-96-04.