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 4.10 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 Chapter 7.0 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;
- Swordfish recreational fishery - rod and reel, handline
- Pelagic longline fishery – longline
- Shark gillnet fishery – gillnet
- Shark bottom longline fishery – longline
- Shark handgear fishery - rod and reel, handline, bandit gear
- Shark recreational fishery – rod and reel, handline
- Tuna purse seine fishery – purse seine
- Tuna recreational fishery– rod and reel, handline, speargun (speargun allowed for tunas other than bluefin)
- Tuna handgear fishery – rod and reel, harpoon, handline, bandit gear, green-stick
- Atlantic billfish recreational fishery – rod and reel only

Due to the nature of the Standing Committee for research and Statistics (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 2009 Standing Report of the SCRS (SCRS, 2009). 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 most Atlantic shark species are unavailable.

Table 4.1 Calendar Year 2008 U.S. vs. International Catch (mt ww) of HMS other than sharks. Source: SCRS, 2009.

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	21,859* (includes N. & S. Atlantic)	North Atlantic	10,752*	2,530	23.53%	11.57%
		South Atlantic	11,108*	0	0%	
Atlantic Bluefin Tuna	25,944*	West Atlantic	2,015	937	46.50%	3.61%
Atlantic Bigeye Tuna	69,821	Total Atlantic	69,821	488	0.69%	0.69%
Atlantic Yellowfin Tuna	107,277	West Atlantic	17,013	2,407	14.15%	2.24%
Atlantic Albacore Tuna	41,847 (includes N. & S. Atlantic and Mediterranean)	North Atlantic	20,359	248	1.22%	0.59%
		South Atlantic	18,902	0	0.00%	
Atlantic Skipjack Tuna	148,872	West Atlantic	22,011	67	0.30%	0.05%
Atlantic Blue Marlin	3,484	North Atlantic	1,269	51	4.02%	1.46%
Atlantic White Marlin	377	North Atlantic	117	2	1.70%	0.53%
Atlantic Sailfish	2,971	West Atlantic	1,263	12	0.95%	0.40%

* Actual catches are likely higher given significant non-compliance with ICCAT reporting requirements by other ICCAT parties.

4.1 Pelagic Longline (PLL) Fishery

4.1.1 Current Management

The 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, hook size, bait, *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. PLL gear 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 Marine Mammal Protection Act (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.

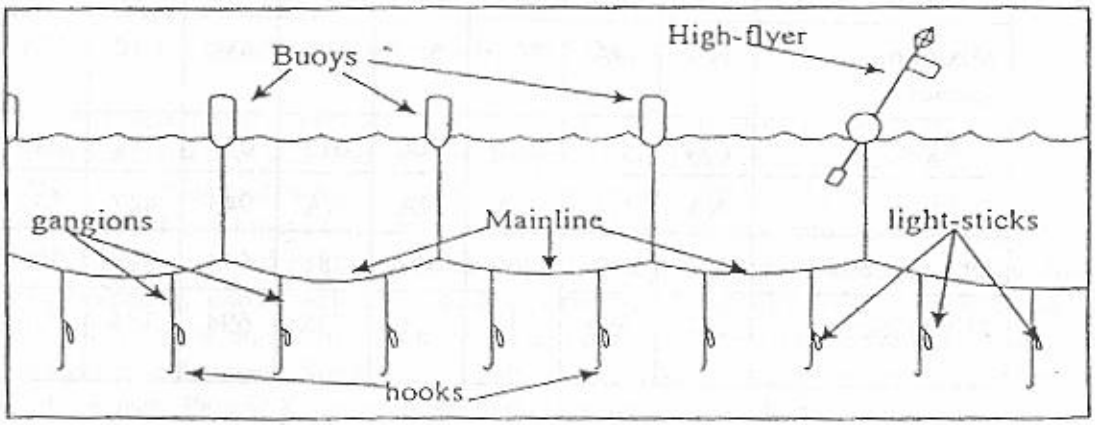

Figure 4.1 Typical U.S. Pelagic Longline Gear. Source: Arocha, 1996.

PLL gear is composed of several parts (Figure 4.1). 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. Based upon observer reports from 1992 – 2004, the shortest length of a mainline set on an observed trip was 4.4 nautical miles (nm) while the longest set during a trip was 46.6 nm (Keene, *et. al*., 2006). 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 light emitting chemicals, 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, fished deeper in the water column, and hauled back 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).

Table 4.2 Average Number of Hooks per PLL Set, 2000 - 2008. Source: PLL logbook data.

Target Species	2000	2001	2002	2003	2004	2005	2006	2007	2008
Swordfish	550	625	695	711	701	747	742	672	708
Bigeye tuna	454	671	755	967	400	634	754	773	751
Yellowfin tuna	772	731	715	720	696	691	704	672	678
Mix of tuna species	638	719	767	765	779	692	676	640	747
Shark	621	571	640	696	717	542	509	494	377
Dolphin	943	447	542	692	1,033	734	988	789	989
Other species	504	318	300	865	270	889	236	NA	NA
Mix of species	694	754	756	747	777	786	777	757	749

Figure 4.2 illustrates basic differences between swordfish (shallow) and tuna (deep) longline sets. Swordfish sets are buoyed to the surface, have fewer hooks between floats, and are relatively shallow. This same type of gear arrangement is used for mixed target species 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 tuna sets hook fewer turtles than the swordfish sets because of the difference in fishing depth. In addition, tuna sets use bait only, while swordfish sets use 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.

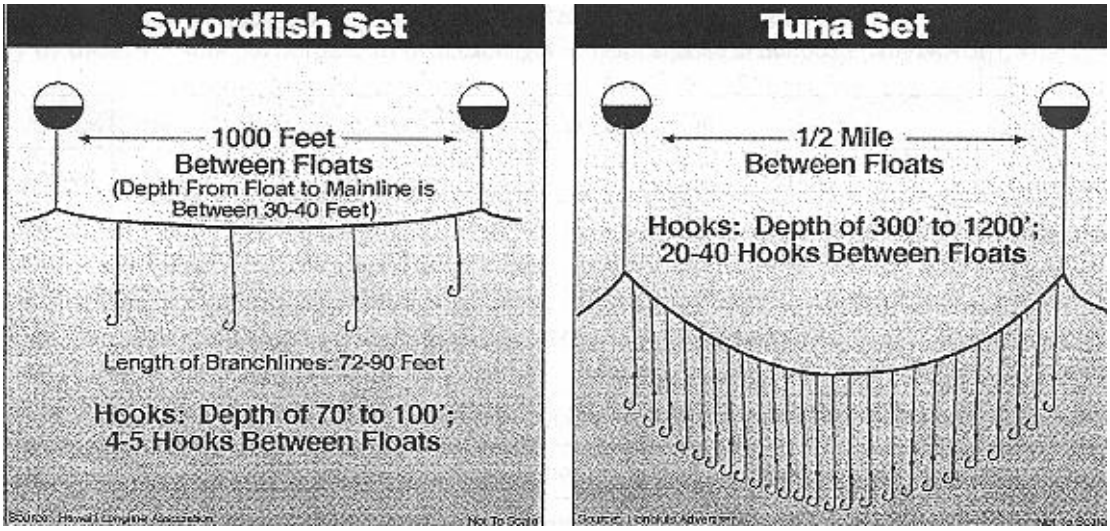

Figure 4.2 Different Pelagic Longline Gear Deployment Techniques. Source: Hawaii Longline Association and Honolulu Advertiser.

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 has historically been comprised of five relatively distinct segments with different fishing practices and strategies. These segments are: 1) the Gulf of Mexico yellowfin tuna fishery; 2) the South Atlantic-Florida east coast to Cape Hatteras swordfish fishery; 3) the Mid-Atlantic and New England swordfish and bigeye tuna fishery; 4) the U.S. distant water swordfish fishery; and, 5) 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 a year (NMFS, 1999). Due to the various changes in the fishery, *i.e.*, regulations, operating costs, market conditions, species 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, but are not limited to, 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 in the morning (between two a.m. and noon) and retrieved in the evening or night (4 p.m. to midnight). Fishing occurs in varying water temperatures; however, yellowfin tuna are generally 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 PLL gear. In the Gulf of Mexico, and all other areas, except the Northeast Distant Waters (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. These PLL closures, implemented to reduce bycatch and bycatch mortality of protected species, non-target species, and undersized fish, effectively shut down a large portion of the PLL fishery in the South Atlantic.

Prior to the PLL closures, smaller vessels made short fishing trips from the Florida Straits north to the bend in the Gulf Stream off Charleston, South Carolina (Charleston Bump). Mid-sized and larger vessels in this segment of the fishery migrate seasonally on longer trips to areas ranging from the Yucatan Peninsula throughout the West Indies and Caribbean Sea. Some trips also 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, but are not limited to, Georgetown, South Carolina; Charleston, South Carolina; Fort Pierce, Florida; Pompano Beach, Florida; and Key West, Florida. This segment 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. 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). 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). Section 7.7 of this document describes changes in discards of bluefin tuna and other species. Additionally, in 2009, NOAA Fisheries published the final Pelagic Longline Take Reduction Plan (PLTRP) (74 FR 23349, May 19, 2009) to protect pilot whales and Risso's dolphins which included, among other measures, a

requirement that PLL vessel operators fishing in the Cape Hatteras Special Research Area contact NOAA Fisheries at least 48 hours prior to a trip, and carry observers if requested.

The U.S. Atlantic Northeast Distant Water (NED) Swordfish Fishery

This fishing ground covers virtually the entire span of the western north Atlantic, from as far east as the Azores and the Mid-Atlantic Ridge. Large fishing vessels that fish in these distant waters 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 coastal fishing vessels, enabled the United States to become a significant participant in the north Atlantic fishery. In the past, some of these vessels have also fished for swordfish in the south Atlantic (*i.e.*, south of 5° N. lat). In recent years however, no U.S. vessels have fished for swordfish in the South Atlantic.

The NED vessels traditionally have been larger than their southeast counterparts because of the greater distances to the fishing grounds. Thus, trips in this 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 NED closure implemented in 2001. A number of these vessels have returned to the NED fishery since the area was reopened pursuant to the issuance of the July 6, 2004, rule to reduce sea turtle bycatch and bycatch mortality (69 FR 40734, July 6, 2004)). Unlike 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 NED is also allocated a 25 mt bluefin tuna quota. In 2009, the 25 mt quota in the NED was attained for the first time. As a result, the bluefin tuna target catch requirements specified for the longline category became applicable in the NED from October 20 - December 31, 2009.

The Caribbean Tuna and Swordfish Fishery

In the past, this fleet has been similar to the southeast coastal fishing fleet in that it consisted primarily of smaller vessels making short, relatively near-shore trips, producing high quality fresh product (NMFS, 1999). The U.S. Caribbean fleet historically landed swordfish and tunas that supported the tourist trade in the Caribbean as well as a tuna canning industry that no longer exists. In recent years, yellowfin tuna have been the primary species of tuna landed using PLL gear, with additional landings of skipjack, bigeye, and albacore tunas. Because no Atlantic Tunas Longline permits are currently held by residents of Puerto Rico or the U.S. Virgin Islands, it can be assumed that these tuna landings were reported by vessels fishing in the Caribbean, but based out of other U.S. ports.

Management of the U.S. Pelagic Longline Fishery

The U.S. Atlantic PLL fishery is guided by a swordfish quota that is divided between the North and South Atlantic (separated at 5° N. Lat.). Other regulations include minimum sizes for

swordfish, yellowfin tuna, bigeye tuna, 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 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 U.S. East Coast. The intent of these closures was to decrease bycatch in the PLL fishery by closing areas with the highest bycatch rates. 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, to protect sea turtles, vessels with PLL gear onboard must, at all times, in all areas open to PLL fishing except the NED, 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 10 degrees. Only whole finfish and squid baits may be possessed and/or utilized with allowable hooks. 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. 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 training workshop. Approximately 18 - 24 workshops are conducted annually, and they are held in areas with significant numbers of PLL permit holders.

In 2009, to protect pilot whales and Risso's dolphins, the PLTRP (74 FR 23349, May 19, 2009) included a requirement that PLL vessel operators fishing in the Cape Hatteras Special Research Area must contact NOAA Fisheries at least 48 hours prior to a trip, and carry observers if requested. The PLTRP also established a 20 nm upper limit on mainline length for all PLL sets in the mid-Atlantic Bight (MAB), and required that an informational placard be displayed in the wheelhouse and on the working deck of all active PLL vessels in the Atlantic fishery.

Permits

The 1999 FMP established six different limited access permit (LAP) types: (1) directed swordfish, (2) incidental swordfish, (3) swordfish handgear, (4) directed shark, (5) incidental shark, and (6) Atlantic tunas 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 October 2009, approximately 259 tuna longline limited access permits had been issued. In addition, approximately 187 directed swordfish limited access permits, 72 incidental

swordfish limited access permits, 223 directed shark limited access permits, and 285 incidental shark limited access permits had been issued (see Chapter 8 for more information on permits). Vessels with limited access swordfish and shark permits do not necessarily use PLL gear, but these are the only permits that allow for the use of PLL gear in HMS fisheries.

The Atlantic tunas longline permit has historically been issued using separate procedures than swordfish and shark limited access permits. In 2010, the procedures for issuing these permits will be made consistent by consolidating all operations with the SERO permits office in St. Petersburg, Florida. This will streamline the PLL permitting process, and be more efficient to administer. Also, NMFS is currently developing Amendment 3 to the Consolidated HMS FMP. In the amendment, an alternative has been proposed to implement a federal permit requirement for smooth dogfish (74 FR 36892, July 24, 2009). NMFS is reviewing comments received on the proposed rule and expects to publish a final rule in mid to late spring of 2010.

Monitoring and Reporting

PLL fishermen and the dealers who purchase Atlantic 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.

PLL Observer Program

During 2008, NMFS observers recorded 1,190 PLL sets for an overall fishery coverage of 13.6 percent (Garrison, Stokes, and Fairfield 2009). Table 4.3 details the amount of observer coverage in past years for this fleet. For a variety of reasons, it has not always been possible to place observers on all selected trips. NMFS is working toward improving compliance with observer requirements and facilitating communication between vessel operators and observer program coordinators. In addition, fishermen have been reminded of the safety requirements for the placement of observers on vessels specified at 50 CFR 600.746, and the need to have all safety equipment on board as required by the U.S. Coast Guard.

In the PLTRP (74 FR 23349, May 19, 2009), it was recommended that NMFS increase observer coverage to 12 to 15 percent throughout all Atlantic pelagic longline fisheries that interact with pilot whales and Risso's dolphins to ensure representative sampling of fishing effort. If resources are not available to provide such observer coverage for all fisheries, regions, and seasons, the PLTRT recommended NMFS allocate observer coverage to fisheries, regions, and seasons with the highest observed or reported bycatch rates of pilot whales. The PLTRT

recommended that additional coverage be achieved either by increasing the number of NMFS observers who have been specially trained to collect additional information supporting marine mammal research, or by designating and training special "marine mammal observers'' to supplement traditional observer coverage.

Table 4.3 Observer Coverage of the Pelagic Longline Fishery. Source: Yeung, 2001; Garrison, 2003b; Garrison and Richards, 2004; Garrison, 2005; Fairfield-Walsh and Garrison, 2006; Fairfield-Walsh & Garrison, 2007; Fairfield & Garrison, 2008; Garrison, Stokes & Fairfield, 2009.

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*	1,088	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 %	-	-
2008	1,190	-	101***	13.6 %	-	100.0***

*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).
*** In 2008, 100 percent observer coverage was required in experimental fishing in the FEC, Charleston Bump, and GOM, but these sets are not included in extrapolated bycatch estimates because they are not representative of normal fishing.

4.1.2 Recent Catch and Landings

U.S. PLL catch (including bycatch, incidental catch, and target catch) is largely related to vessel characteristics and gear configuration. The reported catch is summarized for the whole fishery in Table 4.4. Table 4.5 provides a summary of U.S. PLL landings, as reported to the International Commission for the Conservation of Atlantic Tunas (ICCAT). Additional information regarding U.S. landings and discards is available in the 2009 U.S. National Report to ICCAT (NMFS, 2009).

Table 4.4 Reported Catch of Species Caught by U.S. Atlantic PLLs, in Number of Fish, for 2001-2008. Source: PLL Logbook Data.

Species	2001	2002	2003	2004	2005	2006	2007	2008
Swordfish Kept	47,560	49,320	51,835	46,440	41,139	38,241	45,933	42,800
Swordfish Discarded	13,993	13,035	11,829	10,675	11,134	8,900	11,823	11,194
Blue Marlin Discarded	635	1,175	595	712	567	439	611	687
White Marlin Discarded	848	1,438	809	1,053	989	557	744	670
Sailfish Discarded	356	379	277	424	367	277	321	506
Spearfish Discarded	137	148	108	172	150	142	147	197
Bluefin Tuna Kept	177	178	273	475	375	261	337	343
Bluefin Tuna Discarded	348	585	881	1,031	765	833	1,345	1,417
Bigeye, Albacore, Yellowfin, Skipjack Tunas Kept	80,466	79,917	63,321	76,962	57,132	73,058	70,390	50,108
Pelagic Sharks Kept	3,460	2,987	3,037	3,440	3,149	2,098	3,504	3,500
Pelagic Sharks Discarded	23,813	22,828	21,705	25,355	21,550	24,113	27,478	28,786
Large Coastal Sharks Kept	6,478	4,077	5,326	2,292	3,362	1,768	546	115
Large Coastal Sharks Discarded	4,836	3,815	4,813	5,230	5,877	5,326	7,133	6,732
Dolphin Kept	27,586	30,384	29,372	38,769	25,707	25,658	68,124	43,511
Wahoo Kept	3,068	4,188	3,919	4,633	3,348	3,608	3,073	2,571
Turtle Interactions	424	465	399	369	152	128	300	476
Number of Hooks (x 1,000)	*7,564*	*7,150*	*7,008*	*7,276*	*5,911*	*5,662*	*6,291*	*6,498*

Table 4.5 Reported Landings in the U.S. Atlantic Pelagic Longline Fishery (in mt ww) for 2000-2008. Source: NMFS ICCAT National Report 2009.

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008
Yellowfin Tuna	2,901.0	2,201.0	2,573.0	2,164.0	2,492.2	1,746.2	2,009.9	2,394.5	1,324.5
Skipjack Tuna	1.8	4.3	2.5	1.4	0.7	0.6	0.2	0.0	1.5
Bigeye Tuna	531.9	682.4	535.8	283.9	310.1	311.9	520.6	380.7	407.7
Bluefin Tuna*	66.1	37.5	49.9	133.9	180.1	211.5	204.6	164.3	247.8
Albacore Tuna	147.3	193.8	155.0	107.6	120.4	108.5	102.9	126.8	117.9

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008
Swordfish N.*	3,315.8	2,483.0	2,598.8	2,756.3	2,518.5	2,272.8	1,960.8	2,474.0	2,353.6
Swordfish S.*	143.8	43.2	199.9	20.5	15.7	0.0	0.0	0.0	0.0

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

In recent years there has been concern regarding the amount of swordfish that the U.S. has been landing, as it has been well below the ICCAT-recommended quota. To address this concern, NOAA Fisheries has taken a number of steps to modify swordfish management measures as the north Atlantic swordfish stock has rebuilt. In 2007, a final rule was published (72 FR 31688, June 7, 2007) to change PLL vessel upgrading requirements, increase incidental swordfish landing limits, and increase recreational (Angling and Charter/Headboat) landing limits. Additionally, NOAA Fisheries implemented regulations in 2008 (73 FR 38144, July 3, 2008) to allow Atlantic tunas longline permits that had been expired for more than one year to be renewed. This action enabled some PLL fishermen to renew permits which previously could not be renewed for technical reasons, because they did not have a vessel to assign the permit to. Finally, a limited experimental PLL fishery is currently authorized in the Florida East Coast and Charleston Bump PLL closed areas to examine catch and bycatch rates in these areas.

In the U.S. pelagic longline fishery, fish may be 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 limited markets (resulting in low prices) and perishability of the product. Large coastal sharks are discarded 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.

From 1992 through 2004, the Pelagic Observer Program (POP) recorded a total of 86,485 elasmobranchs (29 percent of the total catch) caught by U.S. PLL vessels targeting tunas and swordfish (Keene, *et al*., 2007). Of the 42 elasmobranch species observed, blue sharks were numerically dominant (67.3 percent of the total elasmobranch catch), with blue, silky, dusky, shortfin mako, porbeagle, unidentified sharks, and skates/rays making up the majority (90.5 percent).

At this time, the direct use of observer data with pooling for estimating dead discards in the PLL 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 for a number of years.

Bycatch mortality of marlins, sailfish, 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 PLL fishery, NMFS implemented regulations to close certain areas to this gear type (Figure 4.3) and has banned the use of live bait by PLL vessels in the Gulf of Mexico.

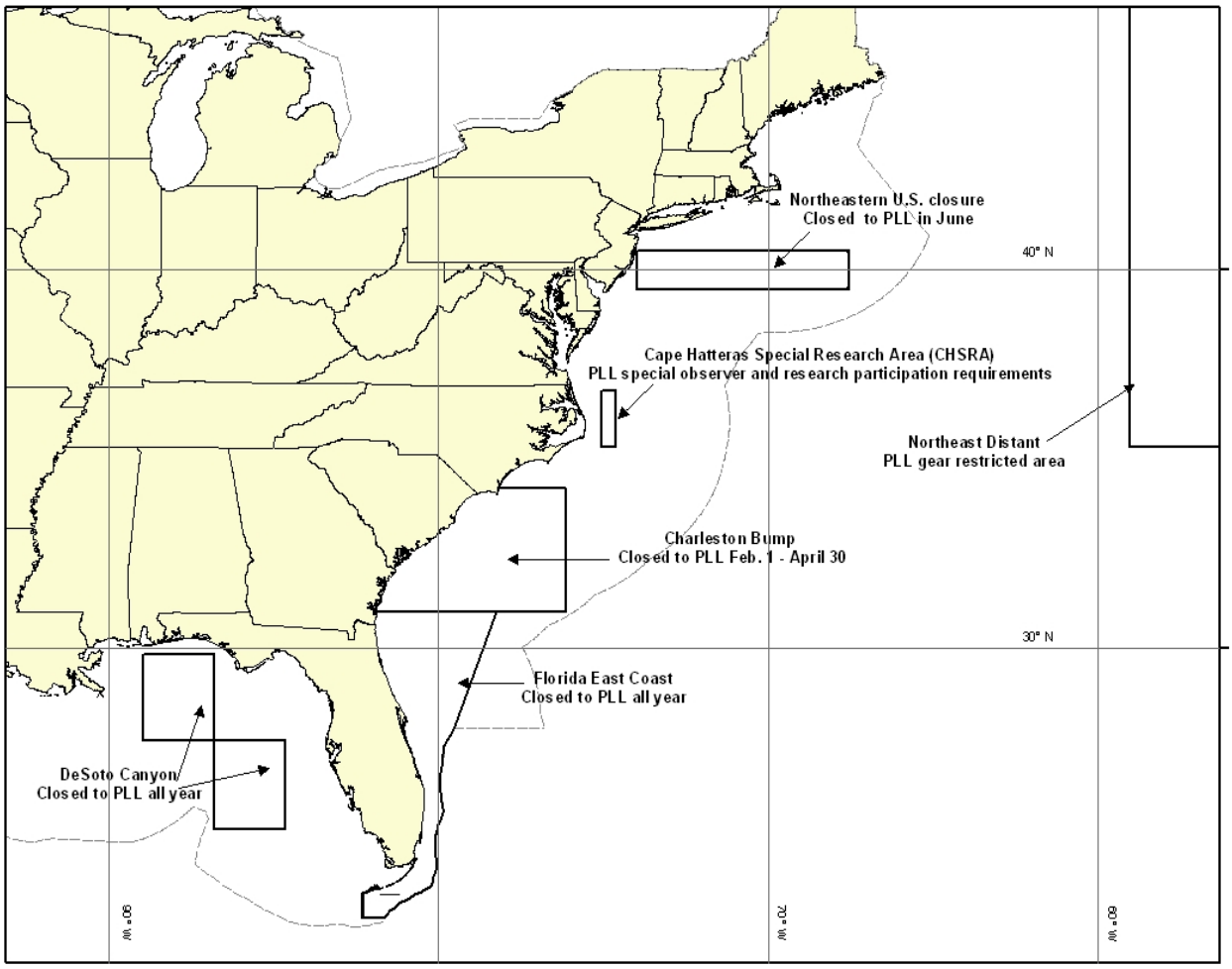

Figure 4.3 Areas Closed to Pelagic Longline Fishing by U.S. Flagged Vessels

4.1.3 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 parties 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 the 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 are 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 4.4 shows the aggregate distribution of hooks from all fishing fleets from 2000-2007. In 2008, international longline landings of HMS in fisheries in which the U.S. participated totaled 94,084 mt, which represented a continuation of the generally decreasing trend since 1999.

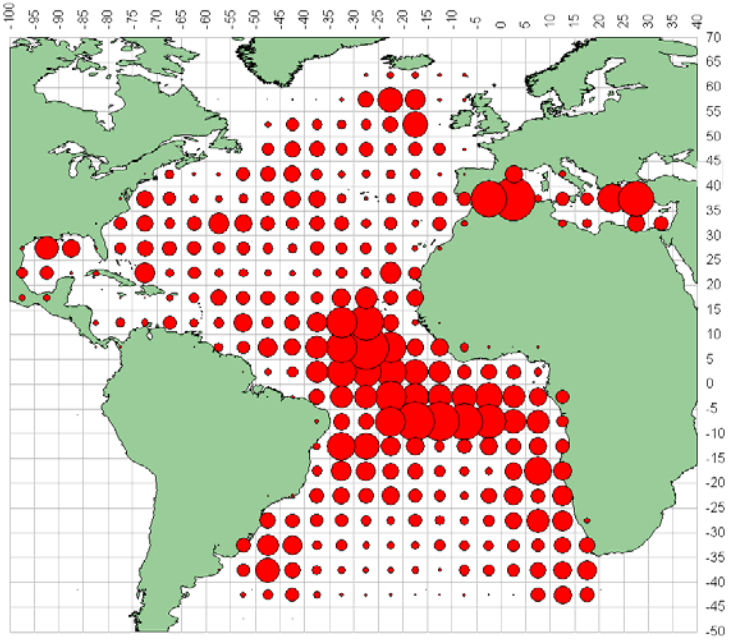

Figure 4.4 Aggregate Distribution of Hooks Deployed by All ICCAT Parties 2000-2006. Source: SCRS, 2008**.**

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. Historically, the U.S. fleet has accounted for less than 0.5 percent of the landings of swordfish and tuna from the Atlantic Ocean south of 5° N. Lat. 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 (2000-2008), U.S. longline landings have averaged 4.8 percent of total Atlantic longline landings, ranging from a high of 5.5 percent in 2002 to a low of 4.3 percent in 2001. Table 4.6 contains aggregate longline landings of HMS, other than sharks, for all countries in the Atlantic for the period 2000-2008.

Table 4.6 Estimated International Longline Landings of HMS, Other than Sharks, for All Countries in the Atlantic: 2000-2008 (mt ww). Source: SCRS, 2009; U.S. ICCAT National Reports 2003 – 2009.

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Swordfish (N. Atl + S. Atl)	25,090	22,727	22,240	21,700	23,878	24,413	24,563	26,457	20,736
Yellowfin Tuna (W. Atl)[2]	15,760	14,872	11,921	10,166	16,019	14,449	14,288	13,292	12,078
Bigeye Tuna	71,193	55,265	46,438	54,466	48,396	38,035	34,182	46,232	41,704
Bluefin Tuna (W. Atl.)[2]	858	610	730	186	644	425	565	420	606
Albacore Tuna (N. Atl + S. Atl)	31,719	35,411	27,851	28,325	21,652	19,888	22,963	18,324	15,785
Skipjack Tuna (W. Atl)[2]	22	60	349	95	206	207	286	52	38

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Blue Marlin (N. Atl. + S. Atl.)[3]	2,694	1,908	1,309	1,679	1,362	1,563	1,212	1,784	1,823
White Marlin (N. Atl. + S. Atl.)[3]	1,202	779	722	590	522	530	318	354	334
Sailfish (W. Atl.)[4]	811	1,002	1,303	883	757	1,083	663	723	979
Total International Longline Landings (from SCRS, 2009)	**149,349**	**132,634**	**112,863**	**118,090**	**113,436**	**100,593**	**99,040**	**107,638**	**94,083**
Total U.S. Longline Landings (from 2003-2009 U.S. Natl. Reports) [5]	**7,254**	**5,695**	**6,194**	**5,509**	**5,638**	**4,652**	**4,799**	**5,540**	**4,453**
U.S. Longline Landings as a Percent of Total International Longline Landings	**4.8 %**	**4.3 %**	**5.5%**	**4.7 %**	**5.0 %**	**4.6 %**	**4.8 %**	**5.1 %**	**4.7 %**

[1]Landings include those classified by the SCRS as longline landings.
[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

Stock assessments and data collection for international shark fisheries have improved in recent years due to increased reporting requirements adopted by ICCAT. Specifically, in 2004, ICCAT adopted Recommendation 04-10, which required ICCAT Contracting Parties (CPCs) to report Task I and Task II data for catches of sharks in accordance with ICCAT data reporting procedures to improve stock assessments. Recommendation 04-10 also banned shark finning, required vessels to fully utilize their entire catches of sharks, and encouraged the release of live sharks caught incidentally and not used for food. Recommendation 06-10 called for ICCAT's Standing Committee for research and Statistics (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. Recommendation 07-06 called for the SCRS to conduct stock assessments and recommend management alternatives for porbeagle sharks, for Contracting Parties to take appropriate measures to reduce fishing mortality on porbeagles and North Atlantic shortfin mako sharks, and to implement research on pelagic shark species to identify 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. The SCRS concluded that blue sharks were not overfished or experiencing overfishing, and that shortfin mako sharks were at or slightly below levels that could support MSY with widely varying estimates of fishing mortality (0.48 to 3.77). At the 2008 meeting, ICCAT adopted Recommendation 08-07, which required the live release of bigeye thresher sharks that are brought to the boat alive, and required reporting bycatch and live releases of bigeye thresher sharks. Additionally, in 2008, ICCAT adopted Resolution 08-08 concerning porbeagle shark. Section 1.2 provides a summary of 2009 ICCAT actions regarding shark species.

In response to Resolution 08-08, an assessment of porbeagle sharks was conducted jointly with the International Council for the Exploration of the Seas (ICES) in 2009. The SCRS attempted to assess the four porbeagle stocks in the Atlantic Ocean: Northwest, Northeast (including the Mediterranean), Southwest and Southeast. In general, data for southern hemisphere porbeagle were too limited to provide a robust indication on the status of the stocks. For the Southwest, the assessment models suggested a potential decline in porbeagle abundance to levels below MSY and fishing mortality rates above those producing MSY, but the data were generally too limited to allow definition of sustainable harvest levels. For the Southeast, the data were too limited to assess their status. Available catch rate patterns suggest stability in the porbeagle stock since the early 1990s in the Southeast, but this trend cannot be viewed in a longer term context and thus are not informative on current levels relative to B_{MSY}.

The Northeast Atlantic porbeagle stock has the longest history of commercial exploitation, but there is considerable uncertainty in identifying the current status relative to virgin biomass. Exploratory assessments indicate that current biomass is below B_{MSY} and that recent fishing mortality is near or above F_{MSY}. Recovery of this stock to B_{MSY} under no fishing mortality is estimated to take 15-34 years. The current European Community (EC) total allowable catch (TAC) of 436 mt in effect for the Northeast Atlantic may allow the stock to remain stable, at its current depleted biomass level, under most credible model scenarios. Catches close to the current TAC (*e.g.* 400 mt) could allow rebuilding to B_{MSY} under some model scenarios, but with a high degree of uncertainty and on a time scale of approximately 60 years.

An update of the Canadian assessment of the Northwest Atlantic porbeagle stock indicated that biomass is depleted to well below B_{MSY}, but recent fishing mortality is below F_{MSY} and recent biomass appears to be increasing. The Canadian assessment projected that with no fishing mortality, the stock could rebuild to B_{MSY} level in approximately 20-60 years, whereas surplus-production based projections indicated 20 years would suffice. Under the Canadian strategy of a four percent exploitation rate, the stock is expected to recover in 30 to 100+ years according to the Canadian projections. Please see Chapter 2.0 for additional information on the status of Atlantic sharks.

The most recent catch totals for blue, shortfin mako, and porbeagle sharks are presented in Table 4.7.

Table 4.7 Estimated International Landings of Pelagic Sharks for All Countries in the Atlantic: 2000-2008 (mt ww)[1].
Source: SCRS, 2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Blue Shark (N. Atl + S. Atl + MED)	37,608	33,436	31,121	34,591	34,687	41,743	39,071	46,014	53,234
Shortfin Mako (N. Atl + S. Atl + MED)	4,671	4,410	5,080	7,189	7,104	6,305	6,022	6,591	5,028
Porbeagle (N. Atl + S. Atl + MED)	1,469	1,000	849	647	745	572	508	515	606
Total International Catches	**43,748**	**38,846**	**37,050**	**42,427**	**42,536**	**48,620**	**45,601**	**53,120**	**58,868**
U.S. Blue Shark Catches[1]	428	148	68	1	72	68	47	55	137
U.S. Shortfin Mako Catches[1]	454	397	415	142	411	187	130	223	193
U.S. Porbeagle Catches[1]	1	1	1	0	1	0	0	0	1
Total U.S. Catches[1]	**883**	**546**	**484**	**143**	**484**	**255**	**177**	**278**	**331**
U.S. Catches[1] as a Percent of Total International Catches	**2.0 %**	**1.4 %**	**1.3 %**	**0.3 %**	**1.1 %**	**0.5 %**	**0.4 %**	**0.5 %**	**0.6 %**

[1] Includes catches and discards

Sea Turtles

Sea turtle bycatch in the U.S. PLL fishery has decreased significantly in the last decade. From 1999 to 2003, the U.S. PLL 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. PLL fleet was estimated to have interacted with 734 loggerhead and 1,359 leatherback sea turtles (Garrison, 2005). In 2005, the U.S. PLL 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. PLL fishery was estimated to have interacted with 542 loggerhead sea turtles and 499 leatherback sea turtles (Fairfield and Garrison, 2008). In 2008, the U.S. PLL fishery was estimated to have interacted with 771 loggerhead sea turtles and 385 leatherback sea turtles (Garrison *et al*., 2009).

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 PLL 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 Food and Agriculture Organization (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
- 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
- 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 sea turtle bycatch reduction in the Pacific Ocean.

4.2 Purse Seine

4.2.1 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 Chapter 5.0 of this report.

A number of purse seine vessels targeted and landed bluefin off the coast of Gloucester, Massachusetts as early as the 1930s and purse seine vessels have participated in the U.S. Atlantic

tuna fishery continuously since the 1950s. In 1958, continued commercial purse seining effort for Atlantic tunas began with a single vessel in Cape Cod Bay, Massachusetts and expanded rapidly into the mid-Atlantic 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 bluefin, yellowfin, and skipjack tuna primarily for the canning industry. North of Cape Cod, purse seining was directed at giant bluefin. High catches of juvenile bluefin 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 bluefin, versus other tunas, due to the valuable international market that developed for giant bluefin in the late 1970s. These fresh caught bluefin 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 bluefin. In 1992, NMFS responded by banning the sale of school, large school, and small medium bluefin (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 bluefin 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 bluefin, more specifically the giant size class (81 inches or larger) and are granted a tolerance limit for large medium size class bluefin (73 to less than 81 inches); *i.e*., large medium catch may not exceed 15 percent by weight of the total amount of giant bluefin 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 exempted fishing permits to this sector of the fishery (to assist in archival tagging of bluefin 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 4.8 shows purse seine landings of Atlantic tunas from 1999 through 2008. Purse seine landings historically have made up approximately 20 percent of the total annual U.S. landings of bluefin (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 yellowfin were often over several hundred mt. Over 4,000 mt ww of yellowfin 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 bluefin.

Table 4.8 Domestic Atlantic Tuna Landings for the Purse Seine Fishery: 1999-2008 (mt ww). Northwest Atlantic Fishing Area. Source: U.S. National Report to ICCAT: 2009.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bluefin Tuna	247.9	275.2	195.9	207.7	265.4	31.8	178.3	3.6	27.9	0
Yellowfin Tuna	0	0	0	0	0	0	0	0	0	0
Skipjack Tuna	0	0	0	0	0	0	0	0	0	0

4.2.3 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 4.9 shows that over the past 10 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 4.9 Estimated International Purse Seine Atlantic Tuna Landings in the Atlantic and Mediterranean: 1999-2008 (mt ww). Source: SCRS, 2009.

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bluefin Tuna	15,884	17,617	17,520	18,748	17,922	19,895	23,524	20,356	22,978	12,641
Yellowfin Tuna	81,783	82,540	108,720	97,538	82,075	62,228	61,410	62,761	52,733	70,047
Skipjack Tuna	103,861	89,799	82,439	68,935	92,347	93,284	89,704	71,215	81,335	73,080
Bigeye Tuna	24,533	18,599	21,556	20,894	22,731	18,417	18,595	16,457	17,553	15,536
Albacore	239	249	289	158	998	724	949	3432	1289	169
Total	**226,300**	**208,804**	**230,524**	**206,273**	**216,073**	**194,548**	**194,182**	**174,221**	**175,888**	**171,473**
U.S. Total	**248**	**275**	**196**	**208**	**265**	**32**	**178**	**4**	**28**	**0**
U.S. Percentage	**0.11%**	**0.13%**	**0.08%**	**0.10%**	**0.12%**	**0.02%**	**0.09%**	**<0.01%**	**0.02%**	**0%**

Since 1999, ICCAT has continued to implement various types of restrictions and closures implemented in the Gulf of Guinea. The fish aggregating device (FAD) 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 Current Management

Commercial handgears, including handline, harpoon, rod and reel, green-stick, 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. Green-stick gear 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. 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 two hundred 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 bluefin 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 bluefin. 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, bandit gear, and green-stick), Harpoon (harpoon only), or Charter/Headboat (rod and reel, handline, bandit gear, and green-stick). These vessels may also need permits from the states they operate from in order to land and sell their catch. All commercial permit holders are encouraged to check with their local state fish/natural resource management agency regarding these requirements. Permitted vessels are required to sell Atlantic tunas only to federally permitted Atlantic tuna dealers. Because 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 bluefin, vessels that possess either of the two permits mentioned above have the ability to retain a daily bag limit of one to three bluefin (depending on the current retention limit authorized), measuring 73 inches or greater curved fork length per vessel per day while the General category bluefin fishery is open. The General category bluefin 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 internet (http://www.hmspermits.gov) or telephone information lines (1-888-872-8862) to verify the bluefin retention limit on any given day. The General category receives approximately 47 percent of the U.S. bluefin quota.

Vessels that are permitted in the Harpoon category fish under the Harpoon category rules and regulations. For instance, regarding bluefin, 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 bluefin that can be retained measuring 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 bluefin 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 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 harpoon. 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 fishery utilizing handgear 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 Sections 4.5 and 4.6. Economic and social aspects of all the domestic handgear fisheries are described later in this document (Chapter 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 4.10 and Table 4.11.

In 2008, bluefin commercial handgear landings accounted for approximately 27 percent of the total U.S. bluefin landings, and almost 77 percent of commercial bluefin landings.

Also in 2008, one percent of the total yellowfin catch, or three percent of the commercial yellowfin catch, was attributable to commercial handgear. Commercial handgear landings of skipjack tuna accounted for approximately 25 percent of total skipjack landings, or about 89 percent of commercial skipjack landings. For albacore, commercial handgear landings accounted for approximately less than one percent of total albacore landings, or about one percent of commercial albacore landings. Commercial handgear landings of bigeye tuna accounted for approximately one percent of total bigeye landings and two percent of total commercial bigeye landings. Updated landings for the commercial handgear fisheries by gear and by area for 1999 – 2008 are presented in the following tables.

Table 4.10 Domestic Atlantic Landings for the Commercial Handgear Fishery, by Species and Gear, for 1999-2008 (mt ww). Source: U.S. National Report to ICCAT: 2009.

Species	Gear	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bluefin Tuna	Rod and Reel	643.6	590.9	889.7	878.5	529.2	353.2	226.6	164.1	120.8	226.6
	Handline	15.5	3.2	9.0	4.5	2.5	1.5	2.3	0.3	0.0	0.6
	Harpoon	115.8	184.2	102.1	55.6	87.9	41.2	31.5	30.3	22.5	30.2
	TOTAL	**774.9**	**778.3**	**1,000.8**	**938.6**	**619.6**	**395.9**	**260.4**	**194.7**	**143.3**	**257.4**
Bigeye Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.8
	Handline	12.3	5.7	33.7	14.4	6.3	3.5	6.3	23.0	16.8	6.9
	TOTAL	**12.3**	**5.7**	**33.7**	**14.4**	**6.3**	**3.5**	**6.3**	**23.0**	**17.7**	**7.7**
Albacore Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
	Handline	4.4	7.9	3.9	6.6	4.3	8.2	4.2	3.1	5.6.	0.6
	TOTAL	**4.4**	**7.9**	**3.9**	**6.6**	4.3	8.2	4.2	3.1	5.8	0.8
Yellowfin Tuna	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	2.4
	Handline	220.0	284.0	300.0	244.0	199.7	248.5	160.3	162.8	148.5	45.0
	TOTAL	**220.0**	**284.0**	**300.0**	**244.0**	199.7	248.5	160.3	162.8	155.4	47.4
Skipjack Tuna	Troll	0.0	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	16.5

Species	Gear	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
	TOTAL	**6.4**	**9.7**	**10.5**	**12.7**	13.1	10.4	11.8	10.2	14.2	16.5
Swordfish	Handline	5.0	8.9	8.9	11.7	20.6	22.7	34.7	32.6	125.4	84.4
	Harpoon	0.0	0.6	7.4	2.8	0.0	0.5	0.0	0.3	0.0	0.0
	TOTAL	**5.0**	**9.5**	**16.3**	**14.5**	**20.6**	**23.2**	**34.7**	**32.9**	**125.4**	**84.4**

Table 4.11 Domestic Landings for the Commercial Handgear Fishery by Species and Region for 1999-2008 (mt ww). Source: U.S. National Report to ICCAT: 2009.

Species	Region	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bluefin Tuna	NW Atl	774.4	778.3	1,000.8	938.3	607.3	395.6	260.4	194.7	143.3	257.3
Bigeye Tuna	NW Atl	11.9	4.1	33.2	13.8	6.0	3.3	6.2	21.5	17.7	7.7
	GOM	0.2	0.1	0.5	0.6	0.3	0.2	0.1	1.5	1.2	0.0
	Caribbean	0.2	1.5	0.0	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	0.4
	GOM	$\leq$ .05	0.0	0.0	0.0	$\leq$ .05	0.0	0.1	0.1	0.2	0.0
	Caribbean	3.8	5.0	2.2	2.7	2.6	2.1	1.1	0.4	0.2	0.4
Yellowfin Tuna	NW Atl	192.0	235.7	242.5	137.0	149.1	213.2	105.1	105.1	120.1	32.5
	GOM	12.7	28.6	43.4	100.0	39.9	28.3	45.5	49.9	26.2	11.2
	Caribbean	14.5	19.4	14.3	7.0	10.7	7.0	9.7	7.8	9.1	3.7
Skipjack Tuna	NW Atl	0.2	0.2	0.2	0.2	0.2	0.6	0.9	0.2	0.3	0.4
	GOM	0.4	0.7	0.0	0.0	0.0	0.2	0.0	0.0	0.2	$\leq$ .05
	Caribbean	5.8	8.8	10.3	12.5	12.9	9.6	12.9	10.0	13.7	16.0
Swordfish	NW Atl	5.0	8.3	16.0	11.6	10.8	19.2	34.4	32.8	125.2	83.2
	GOM	$\leq$ .05	1.2	0.3	2.9	9.8	4.0	0.3	0.1	0.2	1.2

Handgear Trip Estimates

Table 4.12 displays the estimated number of rod and reel and handline trips targeting large pelagic species, from Maine through Virginia, in 2001 through 2008. 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 4.12 Estimated number of vessel trips targeting Atlantic large pelagic species, 2001-2008. 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
2008	3,873	19,157	3,546	7,587	3,099	15,807	3,081	56,150
Charter 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
2008	892	3,295	751	1,525	1,026	4,340	370	12,199

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 Current Management

Atlantic HMS 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 (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. 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 four weeks prior to the commencement of tournament fishing activities. If selected, tournament operators are required to report the results of their tournament to the NMFS Southeast Fisheries Science Center.

Recreational fishing for Atlantic HMS is managed primarily through the use of minimum size limits and retention limits. Recreational tuna fishing regulations are 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 limit, trip-based retention 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 in (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 in (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 (Charter/Headboat) 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 Charter/Headboat 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 Charter/Headboat 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 large coastal sharks, tiger sharks, pelagic sharks, and small coastal sharks. As of July 24, 2008, recreational fishermen have been prohibited from keeping sandbar or silky sharks. In July 2009, NMFS published Draft Amendment 3, which, if finalized, would also prohibit the recreational retention of blacknose sharks. NMFS is currently reviewing comments received on that rule and expects to have a final rule issued in mid to late spring 2010.

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 in (251 cm), 66 in (168 cm), and 63 in (160 cm), respectively. There are no recreational retention limits for Atlantic sailfish, blue marlin, and white marlin. Recreational anglers may not land longbill spearfish.

4.4.2 Recent Catch, Landings and Bycatch

The recreational landings database for Atlantic 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, 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 by phone at (800) 894-5528 or web portal at http://www.hmspermits.gov. 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 4.13 from 2001 through 2008. Recreational landings of swordfish are monitored by the LPS, MRFSS, RBS, and mandatory recreational reporting requirements via 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 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 Committee's report is available at: http://www.nmfs.noaa.gov/sfa/hms/Tuna/2002-2003_Bluefin-Marlin_Report-120304.pdf.

The Marine Recreational Information Program, or MRIP, is a new data collection and analysis initiative being implemented by NMFS to help ensure the long-term sustainability of America's fisheries and the health of our oceans. MRIP represents a management approach based on evaluating entire ecosystems, as opposed to single species of fish, and is evolving hand-in-hand with the latest marine science.

Currently being phased in across the nation, MRIP provides a more comprehensive and detailed picture of the number of trips being taken by recreational anglers, the amount and species of fish they are catching, where and when those fish are being caught, and the economic impact of recreational fishing on local, regional and national economies.

Through more timely and accurate fishing data, MRIP provides policy makers the information they need to make sound decisions based on the best science. As a program built on broad and continuing stakeholder input, MRIP also empowers anglers and other ocean enthusiasts to become a part of the resource management, conservation, and economic decision-making processes that impact their lives.

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

MRIP is a system of coordinated data collection programs designed to address specific regional needs for recreational fishing information. This regional approach based on a nationally consistent standard will ensure that the appropriate, targeted, place-based information is being collected to best meet the needs of managers and stakeholders, and that it is being done in a scientifically rigorous way.

Table 4.13 Updated Domestic Landings for the Atlantic Tunas, Swordfish and Billfish Recreational Rod and Reel Fishery, 2001-2008 (mt ww)*. Sources: NMFS, 2005; NMFS, 2006; NMFS, 2007; NMFS, 2009. (Recreational shark landings are in Table 4)

Species	Region	2001	2002	2003	2004	2005	2006	2007	2008
Bluefin Tuna**	NW Atlantic	249.3	519.3	314.6	370.2	254.4	158.2	398.6	352.2
	GOM	1.7	1.5	0.0	0.0	0.0	0.6	0.0	0.0
	Total	**251.0**	**520.8**	**314.6**	**370.2**	**254.4**	**158.8**	**398.6**	**352.2**
Bigeye tuna**	NW Atlantic	366.2	49.6	188.5	94.6	165.0	422.3	126.8	70.9
	GOM	0.0	0.0	0.0	6	0.0	24.3	0.0	0.0
	Caribbean	0.0	0.0	4.0	<0.1	0.0	0.0	0.0	0.0
	Total	**366.2**	**49.6**	**192.5**	**100.6**	**165.0**	**446.6**	**126.8**	**70.9**
Albacore**	NW Atlantic	122.3	323.0	333.8	500.5	356.0	284.2	393.6	125.2
	GOM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	**122.3**	**323.0**	**333.8**	**500.5**	**356.0**	**284.2**	**393.6**	**125.2**
Yellowfin tuna**	NW Atlantic	3,690.5	2,624.0	4,672.1	3,433.7	3,504.8	4,649.2	2,726.0	657.1
	GOM	494.2	200.0	640.0	247.1	146.9	258.4	227.6	366.3
	Caribbean	0.1	7.2	16.0	0.0	0.0	0.0	12.4	0.0
	Total	**4184.7**	**2,831.2**	**5,328.0**	**3,684.8**	**3,651.7**	**4,907.6**	**2,966.0**	**1,023.4**
Skipjack tuna**	NW Atlantic	32.9	23.3	34.1	27.3	8.1	34.6	27.4	21.0
	GOM	16.1	13.2	11.1	6.3	3.1	6.4	23.9	16.3
	Caribbean	0.0	13.2	15.7	40.4	3.9	7.7	0.2	11.3
	Total	**49.0**	**49.7**	**60.9**	**74.0**	**15.1**	**48.7**	**51.5**	**48.6**

Species	Region	2001	2002	2003	2004	2005	2006	2007	2008
Blue marlin***	NW Atlantic	9.0	-	-	-	-	-	-	-
	GOM	5.1	-	-	-	-	-	-	-
	Caribbean	2.3	-	-	-	-	-	-	-
	Total	**16.4**	**84**	**96**	**110**	**64**	**72**	**46**	**44**
White marlin ***	NW Atlantic	2.8	-	-	-	-	-	-	-
	GOM	0.3	-	-	-	-	-	-	-
	Caribbean	0	-	-	-	-	-	-	-
	Total	**3.1**	**33**	**20**	**25**	**26**	**36**	**31**	**47**
Sailfish***	NW Atlantic	61.2	-	-	-	-	-	-	-
	GOM	0.6	-	-	-	-	-	-	-
	Caribbean	0	-	-	-	-	-	-	-
	Total	**61.8**	**14**	**24**	**9**	**3**	**4**	**1**	**-**
Swordfish	**Total**	**1.5**	**21.5**	**6.1**	**25.2**	**61.2**	**52.7**	**68.2**	**75.7**

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

*** 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 4.14 documents the number of billfish reported to the RBS that were landed in tournaments from 2000 – 2008.

Table 4.14. Preliminary RBS Recreational Billfish Landings in Numbers of Fish 2000-2008. Source: NMFS Recreational Billfish Survey (RBS).

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008
Blue Marlin	117	75	84	96	110	64	72	46	44
White Marlin	8	22	33	20	25	26	36	31	47
Sailfish	18	11	14	24	9	3	4	1	-
Swordfish	-	-	16	48	168	385	207	274	114

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 4.5 and Figure 4.6 below provide standardized catch per unit effort in weight and numbers of fish for white marlin and blue marlin respectively.

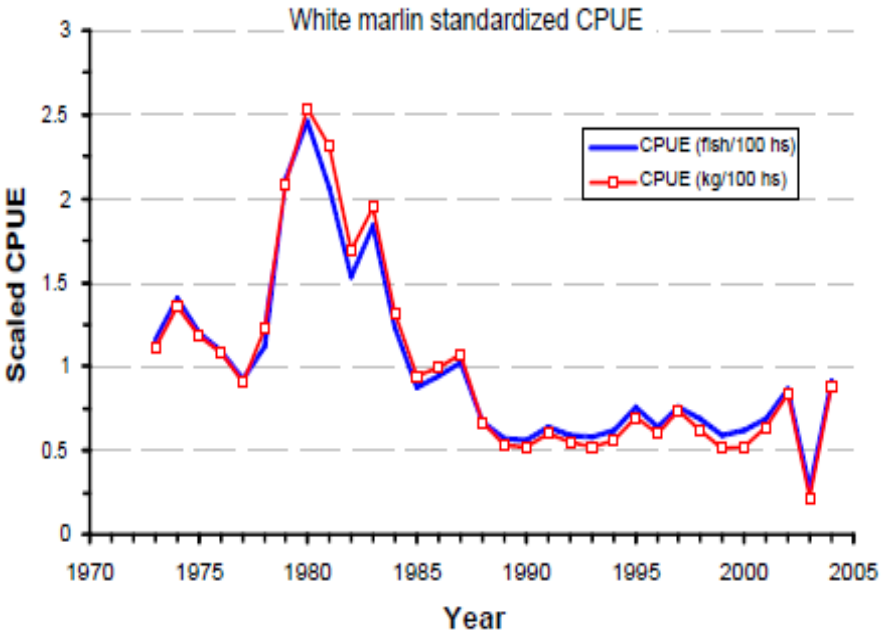

Figure 4.5 Comparison of White Marlin Standardized CPUE in Weight and Number of Fish from 1973 – 2004. Source: Diaz and Ortiz, 2006.

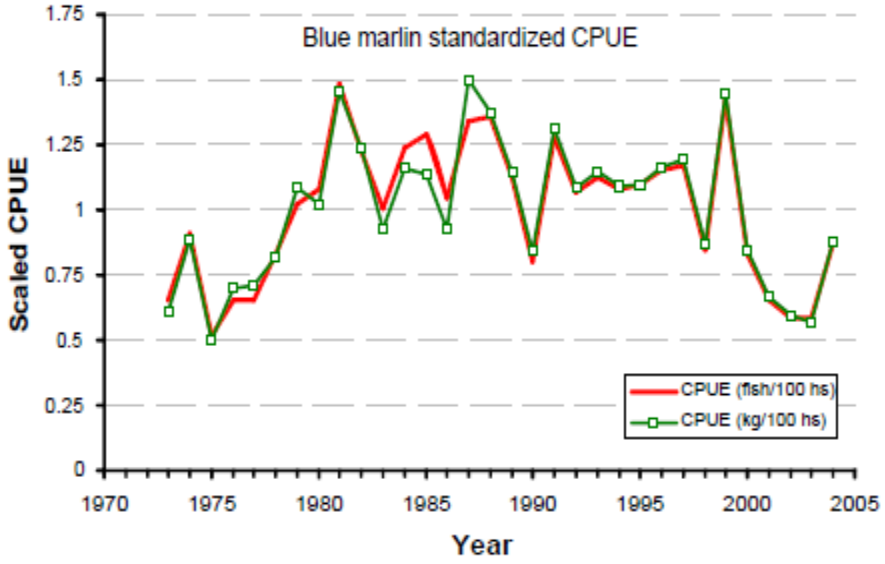

Figure 4.6. Comparison of Blue Marlin Standardized CPUE in Weight and Number of Fish from 1973 – 2004. Source: Diaz and Ortiz, 2006.

All recreational, non-tournament landings of billfish, including swordfish, are required to be reported to NMFS within 24 hours of landing 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 4.15 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 4.15 are considered to be a minimum estimate of non-tournament billfish landings.

Table 4.15. Number of Atlantic billfish reported to NMFS via call-in system by calendar year, 2004-2009. Source: G. Fairclough, pers. comm.

Species	2004	2005	2006	2007	2008	2009*
Blue Marlin	2	4	2	5	7	5
White Marlin	0	1	1	4	4	6
Sailfish	35	61	58	101	143	103
Swordfish	290	388	549	716	369	350

* 2009 landings as of Nov. 20, 2009

Swordfish Recreational Fishery

Table 4.14 shows recreational tournament-caught swordfish landings reported to the RBS from 2000 – 2009. Table 4.15 shows the number of billfish (including swordfish) reported to the NMFS recreational non-tournament reporting system from 2004 – 2009.

The recreational North Atlantic swordfish fishery has declined dramatically from about 1980 through1999, due to decreased stock abundance, but has grown 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 incidentally 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 larger than those captured during nighttime drift fishing. These fishermen use 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. Depending upon the species, sharks can be caught virtually anywhere in salt water. Recreational shark fisheries often occur in nearshore waters accessible to private vessels and charter/headboats; however, shore-based and offshore fishing also occur. 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 will be implemented through an Atlantic States Marine Fisheries Commission (ASMFC) interstate fishery management plan in 2010.

Table 4.16. Estimates of Total Recreational Harvest of Atlantic Sharks: 1999-2008 (numbers of fish in thousands). Source: Cortés and Neer 2005, Cortés, pers. comm. Estimates include prohibited species.

Species Group	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
LCS	82.5	138.2	137.4	80.6	89.0	67.4	85.0	59.1	68.8	45.0
Pelagic	11.1	13.3	3.8	4.7	4.3	5.0	5.4	16.5	9.0	2.8
SCS	114.4	198.4	210.8	152.5	134.3	127.0	118.8	117.2	167.6	107.9
Unclassified	7.3	11.2	24.7	5.4	18.4	28.5	47.6	7.5	23.9	6.1

Table 4.17. Recreational Harvest of Atlantic LCS by Species, in number of fish: 1999-2008. Sources: Cortés and Neer 2005, Cortés, pers. comm.

LCS Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Basking**	0	0	0	0	0	0	0	0	0	0
Bignose*	0	0	0	0	0	17	0	0	55	0
Bigeye sand tiger**	0	0	0	0	0	0	0	0	0	0
Blacktip	30,861	71,548	48,871	39,126	40,044	30,885	43,408	31,038	28,864	13,318
Bull	3,417	6,227	4,158	1,916	3,743	5,186	1,561	4,262	5,849	1,735
Caribbean reef*	3	59	268	741	0	652	5	47	0	0
Dusky*	5,337	2,955	5,993	1,047	2,777	36	3,040	194	112	2,391
Galapagos*	0	0	0	0	0	0	0	0	0	0
Hammerhead, great	434	925	3,422	4	47	9	55	98	786	13
Hammerhead, scalloped	606	3,623	1,373	996	2,921	879	5,021	458	1,726	119
Hammerhead, smooth	1	2	703	2	1	0	0	2	0	0
Hammerhead, unclassified	0	3,693	0	5,247	0	0	2,676	1,099	807	0
Lemon	82	5,434	5,853	4,921	4,916	5,578	510	1,145	3	818
Night*	50	24	0	0	0	0	15	1	2	0
Nurse	1,429	2,214	4,934	2,562	563	3,463	2,341	1,553	334	268
Sandbar***	20,266	10,920	36,094	8,301	5,151	3,724	2,798	821	7,060	5,801
Sand tiger**	0	0	604	0	0	0	0	1,040	0	0
Silky***	390	5,827	4,015	1,795	1,870	399	3,576	2,108	1,973	1,226
Spinner	6,175	5,571	4,118	3,997	4,864	4,041	3,269	2,281	6,547	3,824
Tiger	7	1,480	732	126	110	1	1,321	1,309	1,815	1,418
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	13,425	17,688	16,273	9,815	22,020	12,488	15,423	11,652	12,837	11,519
Total:	82,483	138,190	137,411	80,596	89,027	67,359	85,019	59,108	68,770	45,010

*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 4.18. Recreational Harvest of Atlantic Pelagic Sharks by Species, in number of fish: 1999-2008. Sources: Cortés and Neer 2005, Cortés, pers. comm.

Pelagic Shark Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bigeye thresher*	0	0	0	65	0	0	0	42	0	0
Bigeye sixgill*	0	0	0	0	0	0	0	0	0	0
Blue Shark	5,218	7,011	950	0	376	0	31	980	1,622	117
Mako, longfin*	0	0	0	0	0	0	0	0	0	0
Mako, shortfin	1,383	5,813	2,827	3,206	3,906	5,052	3,857	3,352	2,556	1,904
Mako, unclassified	9	0	0	0	0	0	0	0	0	0
Oceanic whitetip	0	0	0	0	0	0	0	0	0	0

Pelagic Shark Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Porbeagle	0	0	0	0	0	0	0	0	0	0
Sevengill*	0	0	0	0	0	0	0	0	0	0
Sixgill*	0	0	0	0	0	0	0	0	0	0
Thresher	4,512	529	0	1,467	0	0	1,504	12,171	4,822	755
Total:	11,122	13,353	3,777	4,673	4,282	5,052	5,392	16,503	9,000	2,776

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

Table 4.19. Recreational Harvest of Atlantic SCS by Species, in number of fish: 1999-2008. Sources: Cortés and Neer 2005, Cortés, pers. comm.

SCS Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Atlantic angel*	0	0	0	0	0	0	0	0	0	0
Blacknose	6,049	10,340	14,885	11,390	6,615	15,101	7,101	9,914	9,177	3,718
Bonnethead	38,982	57,708	60,094	51,667	41,314	42,429	32,227	24,885	42,444	22,973
Finetooth	78	1,562	6,628	3,159	1,788	366	3,129	572	4,048	2,308
Sharpnose, Atlantic	69,275	128,68	129,213	86,259	84,626	69,067	76,347	81,817	111,967	78,885
Sharpnose, Caribbean*	0	0	0	0	0	0	0	0	0	0
Smalltail*	4	957	45	0	0	67	71	0	0	0
Total:	114,38	198,36	210,820	152,475	134,343	126,963	118,804	117,188	167,636	107,884

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

Bycatch Issues

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 or undersized. In these and similar cases, rod and reel catch may be discarded and the fish may be live or dead. The Magnuson-Stevens Act (16 USC 1802 MSA § 3 (2)) specifies that fish released under a recreational catch-and-release program are not considered bycatch.

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 – 2008 is presented in Table 4.20.

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. 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 Atlantic, Gulf of Mexico, and U.S. Caribbean billfish tournaments was published in May 2007 (72 FR 26735, May 11, 2007) and became effective on January 1, 2008. As of publication of this report, NMFS has distributed over 9,000 copies of the circle hook DVDs.

Table 4.20. Observed or reported number of HMS kept in the rod and reel fishery, Maine through Virginia, 2000-2008. Source: Large Pelagic Survey (LPS) Data.

	Number of Fish Kept [1]								
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
White marlin [2]	2	5	8	12	6	5	8	4	13
Blue marlin[2]	0	1	0	4	5	3	2	2	3
Sailfish[2]	6	0	0	0	0	1	0	1	0
Swordfish	14	1	5	9	9	22	27	42	30
Giant bluefin tuna [3]	34	20	176	58	50	48	15	15	20
Large medium bluefin tuna[3]	3	7	11	11	13	12	1	5	11
Small medium bluefin tuna	30	87	62	83	30	22	48	69	48
Large school bluefin tuna	95	457	391	287	291	179	171	298	398
School bluefin	151	338	556	509	927	638	84	314	228
Young school bluefin	4	0	7	4	16	25	0	3	4
Bigeye tuna	16	9	32	21	46	32	35	59	55
Yellowfin tuna	2,366	2,423	2,595	3,216	3,858	3,700	3,572	2,988	1,029
Skipjack tuna	32	100	117	681	197	79	104	34	64
Albacore	513	302	534	546	1,458	835	542	934	168
Thresher shark	2	5	20	24	58	45	34	62	59

	Number of Fish Kept [1]								
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Mako shark	49	27	72	141	216	99	111	143	169
Sandbar shark	1	2	0	9	7	1	1	9	1
Dusky shark	0	0	1	1	0	0	3	6	1
Tiger shark	0	1	1	0	0	1	0	1	1
Porbeagle	0	0	1	0	1	1	1	0	0
Blacktip shark	0	1	0	1	0	1	1	0	-
Atlantic sharpnose shark	0	0	0	0	0	0	0	0	-
Blue shark	12	2	36	65	74	67	61	109	43
Hammerhead shark	1	2	0	0	1	0	0	0	1
Wahoo	41	34	49	68	110	112	85	190	172
Dolphin	955	1,294	2,509	4,209	3,050	6,366	3,921	2,536	5,739
King mackerel	289	19	36	66	11	376	170	82	67
Atlantic bonito	194	77	704	315	410	96	262	283	51
Little tunny	139	48	240	121	231	181	90	195	93
Amberjack	6	19	7	44	0	2	1	5	31
Spanish mackerel	13	3	5	35	9	4	1	2	67

[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.

Table 4.21. Observed or reported number of HMS released in the rod and reel fishery, Maine through Virginia, 2000-2008. Source: Large Pelagic Survey (LPS) Data.

	Number of Fish Released Alive [1]								
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
White marlin [2]	59	118	215	160	378	397	160	359	454
Blue marlin[2]	17	14	30	39	80	52	42	69	69
Sailfish[2]	0	2	6	6	2	6	3	1	6
Swordfish	5	10	6	21	22	23	52	40	45
Giant bluefin tuna [3]	0	0	8	0	3	0	3	0	0
Large medium bluefin tuna[3]	3	6	2	0	36	4	1	3	11
Small medium bluefin tuna	37	5	8	13	21	30	18	32	23
Large school bluefin tuna	22	128	47	40	107	141	85	99	286

	Number of Fish Released Alive [1]								
Species	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
School bluefin	159	58	200	174	1,297	1,917	290	347	358
Young school bluefin	23	40	182	10	1,885	282	117	83	55
Bigeye tuna	0	8	1	3	2	2	2	1	0
Yellowfin tuna	97	74	328	200	1,093	502	351	171	411
Skipjack tuna	69	130	250	526	362	105	129	17	217
Albacore	17	52	95	31	66	67	41	40	14
Thresher shark	1	0	5	8	27	9	15	24	35
Mako shark	114	65	120	208	350	142	177	190	242
Sandbar shark	4	10	17	26	68	37	158	168	222
Dusky shark	32	8	9	44	60	49	73	87	128
Tiger shark	3	2	3	12	0	6	7	11	20
Porbeagle	0	0	14	3	1	6	8	2	2
Blacktip shark	0	0	6	0	1	19	9	31	-
Atlantic sharpnose shark	0	0	0	0	0	11	0	0	-
Blue shark	374	141	505	2,060	2,242	920	884	1,978	2,735
Hammerhead shark	0	1	6	38	2	5	0	0	0
Wahoo	0	13	6	3	5	7	6	9	4
Dolphin	48	108	111	677	192	375	394	227	372
King mackerel	24	10	5	5	1	7	20	3	5
Atlantic bonito	27	49	176	282	389	231	114	60	36
Little tunny	118	118	585	443	1,130	505	102	387	614
Amberjack	20	14	57	111	1	2	13	33	145
Spanish mackerel	0	0	0	1	0	0	0	2	37

[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.

4.4.3 International Issues and Catch

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, United Kingdom, 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 (99-07) 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.

The first meeting of the Working Group on Sport and Recreational Fishing occurred on Friday, November 6, 2009. The United States was the only party to provide information detailing its recreational fisheries as required by the Recommendation that established the Working Group. Discussions of the Recreational Working Group centered around two issues: the need to improve recreational monitoring, data collection, and reporting; and, the development of a common understanding/definition of recreational and sport fishing. There was consensus within the working group regarding the need to improve recreational monitoring, data collection, and reporting. Regarding development of a common definition, the majority of CPCs that commented expressed general agreement that it would be appropriate to include the concept of non-commercial activities as a key component of a definition. There was not consensus on this point, as some CPCs indicated that there are instances where recreationally caught fish may legitimately enter the stream of commerce. The Working Group agreed that CPCs should submit information similar to that provided by the United States to the ICCAT Secretariat, continue

discussions intercessionally, seek to define common methodologies for data collection, and that the Commission should work to decide whether it would be helpful to develop a common definition of sport and recreational fisheries related to the non-commercial nature of these fisheries.

4.5 Bottom Longline (BLL)

4.5.1 Current Management

The majority of commercially caught sharks are caught using BLL 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. This 1993 FMP established the basis for all subsequent shark management. However, the shark regulations have changed many times since the original 1993 FMP. Some of the more recent amendments started in 2003. At that time, NMFS amended the measures based on the 2002 LCS and SCS stock assessments, litigation, and public comments (December 24, 2003, 68 FR 74746). Management measures enacted in that amendment included: modifying the 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, imposing gear restrictions to reduce bycatch, and a time/area closure off the coast of North Carolina effective January 1, 2005. The overall annual landings quota for LCS in 2004 was established at 1,017 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.

Based on 2005 and 2006 stock assessments, NMFS further revised shark management measures and rebuilding periods in the final rule for Amendment 2 to the 2006 Consolidated HMS FMP published on June 24, 2008 (73 FR 35778; corrected 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).

Until Amendment 2 was implemented, the Atlantic BLL fishery targeted both LCS and SCS. Currently, BLL is still the primary commercial gear employed in the LCS and SCS fisheries in all regions although the trip limits implemented in Amendment 2 were designed, in part, to discourage fishermen from targeting LCS. 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, Landings, and Discards

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 that time, NMFS selected approximately 40 - 50 vessels for observer coverage during each season. Vessels were randomly selected if they have a directed shark limited access permit, 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.

From 2003 through 2007, approximately 217 trips were observed and 31,170 animals were caught. In 2003, LCS comprised 68.4 percent of the total catch, and sandbar sharks were 30.6 percent of total LCS catch. In 2004, LCS comprised 66.7 percent of the total catch, and sandbar sharks were 26.6 percent of the catch. Blacktip sharks comprised 13.9 percent of total observed catch and 20.3 percent of the large coastal catch (Burgess and Morgan, 2002). In 2005, the total observed catch composition (percent of numbers caught) was 77.9 percent for sharks in the South Atlantic, and 83.1 percent of sharks caught in the Gulf of Mexico. In 2006, the level of observer coverage of the total fishing effort in each fishing area and during each fishing season decreased from 5 to 3.9 percent. The total observed catch composition in 2006 was 96.9 percent for sharks in the Atlantic Ocean and 6.5 percent for sharks in the Gulf of Mexico. In 2007, LCS comprised the greatest amount of shark catch in The Gulf of Mexico at 69.5 percent and SCS comprised of 30.3 percent. In the South Atlantic, LCS species comprised 78.7 percent of the shark catch while SCS species comprised 19.2 percent of the shark catch (Hale *et al.*, 2007).

Relatively few protected species are caught on BLL intended for sharks. Four loggerhead sea turtles were observed caught in BLL gear targeting sharks in the Gulf of Mexico. Of these, two were released alive, and two were released dead. No loggerhead sea turtles were observed caught in BLL gear targeting sharks in the Atlantic. However, three smalltooth sawfish were observed caught, with two being released alive and one released dead. For more information on

bycatch see Section 7.4. Additional information on shark stock assessments can be found in Chapter 2.0 and shark landings in Section 4.10.

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, the shark BLL observer program covered a total of 50 trips on 17 vessels with a total of 214 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*., 2009). There were no grouper/snapper or grouper/tilefish 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 147 hauls and 7 trips targeting snapper/grouper or grouper/tilefish in the Gulf of Mexico. There were 41 hauls on 27 trips observed targeting sharks in the Gulf of Mexico. In the U.S. Atlantic Ocean, 26 hauls on 16 trips were observed targeting sharks.

In 2008 on the trips targeting shark in the Gulf of Mexico, 2,540 individual animals were caught. This consisted of 90.8 percent sharks, 7.7 percent teleosts, 0.8 percent invertebrates, and 0.6 percent batoids. LCS comprised the greatest amount of shark catch, at 75.3 percent, and SCS comprised 22.3 percent (Table 4.22). The prohibited dusky shark, Caribbean reef shark, night shark, and white shark were also caught (1.0 percent) (Table 4.22). Sandbar sharks were the most commonly caught shark (16.6 percent) (Hale *et al*., 2009).

In 2008, on the trips targeting grouper/snapper or grouper/tilefish in the Gulf of Mexico, 10,253 individual animals were caught. This consisted of 86.1 percent teleosts, 12.0 percent sharks, 1.8 percent invertebrates, and 0.04 percent batoids. Deep water shark species comprised the majority of the shark catch at 52.0 percent, followed by small coastal sharks (29.5 percent), large coastal sharks (10.4 percent) and pelagic sharks (0.1 percent). Smooth dogfish were the most caught shark (Hale *et al*., 2009).

On the trips targeting shark in the South Atlantic in 2008, 1,836 individual animals were caught. This consisted of 99.1 percent sharks, 0.4 percent teleosts 0.4 percent batoids, and 0.1 percent invertebrates. Large coastal shark species comprised 83.8 percent of the shark catch while SCS species comprised 16.1 percent and deep water sharks comprised 0.1 percent of the shark catch (Table 4.23). Tiger sharks were the most commonly caught shark (50.5 percent) (Hale *et al.*, 2009).

Smalltooth sawfish are rarely caught on BLL and more detailed information can be found in Section 7.6.4. No other protected species interactions were observed in the Gulf of Mexico directed shark BLL fishery. For vessels targeting shark in the Atlantic, one loggerhead turtle was observed caught in BLL gear and ultimately released alive. No other protected species interactions were observed in the South Atlantic directed shark BLL fishery (Hale *et al.*, 2009).

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 2009, vessels participating in the shark research fishery fished an average of 2 trips per month.

4.5.3 Bottom Longline Bycatch

Under the MMPA (16 U.S.C. 1361 *et seq*.) the Atlantic shark BLL is classified as Category III (remote likelihood or no known serious injuries or mortalities) (December 1, 2008; 73 FR 73032). As required by the Endangered Species Act (ESA), the NMFS Southeast Regional Office's Protected Resources Division prepared aBiological Opinion (BiOp) regarding the actions proposed under Amendment 2 to the 2006 Consolidated HMS FMP on May 20, 2008. The 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 jeopardize the continued existence of any endangered or threatened species. 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. For more information on the BiOp see the 2008 SAFE report.

Table 4.22 Shark species composition of observed BLL catch during 2008 for BLL trips targeting sharks in the Gulf of Mexico. Source: Hale *et al*., 2009.

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive	% Unknown
Sandbar shark	382	15.1	98.4	0.3	1	0.3
Atlantic sharpnose shark	327	12.9	83.2	15	0.6	1.2
Tiger shark	324	12.8	38.6	4.3	55.9	1.2
Bull shark	320	12.6	92.5	0.3	4.7	2.5
Blacktip shark	270	10.6	85.2	11.5	3	0.4
Nurse shark	241	9.5	10	0.8	89.2	0
Blacknose shark	177	7	83.1	15.3	1.7	0
Great hammerhead shark	69	2.7	94.2	1.4	2.9	1.4
Lemon shark	65	2.6	98.5	0	0	1.5

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive	% Unknown
Scalloped hammerhead shark	38	1.5	92.1	2.6	2.6	2.6
Shortspine dogfish	28	1.1	32.1	17.9	50	0
Silky shark	19	0.7	89.5	5.3	5.3	0
Dusky shark	16	0.6	0	100	0	0
Bonnethead shark	7	0.3	57.1	42.9	0	0
Caribbean reef shark	7	0.3	71.4	28.6	0	0
Shortfin mako shark	3	0.1	100	0	0	0
Spinner shark	3	0.1	66.7	0	33.3	0
Night shark	2	0.1	0	50	50	0
Requiem shark family	2	0.1	0	100	0	0
Finetooth shark	1	0	0	100	0	0
Great white shark	1	0	0	100	0	0
Sharks	1	0	0	0	0	100
Smooth dogfish	1	0	0	100	0	0
Smooth hammerhead shark	1	0	100	0	0	0
Spiny dogfish	1	0	0	0	100	0
Total	**2414**					

Table 4.23 Shark species composition of observed BLL catch during 2008 for BLL trips targeting sharks in the South Atlantic. Source: Hale *et al*., 2009.

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive	% Unknown
Tiger shark	920	50.1	12.2	10.2	76.8	0.8
Sandbar shark	383	20.9	85.9	1.3	11.7	1
Atlantic sharpnose shark	290	15.8	94.1	5.5	0	0.3

Species	Total Number Caught	% Total Catch	% Kept	% Discarded Dead	% Discarded Alive	% Unknown
Blacktip shark	148	8.1	80.4	15.5	3.4	0.7
Great hammerhead shark	34	1.9	88.2	8.8	0	2.9
Bull shark	23	1.3	73.9	4.3	21.7	0
Nurse shark	13	0.7	0	0	100	0
Clearnose skate	5	0.3	100	0	0	0
Blacknose shark	4	0.2	100	0	0	0
Lemon shark	3	0.2	66.7	0	33.3	0
Sharks	1	0.1	0	100	0	0
Smooth dogfish	1	0.1	100	0	0	0
Total	**1825**					

4.6 Gillnet Fishery

4.6.1 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 m long and 30.4 m 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 that fishermen 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 aVMS 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, Landings and Discards

Under the MMPA (16 U.S.C. 1361 *et seq*.) the Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities) (December 1, 2008; 73 FR 73032). The following section provides information on shark landings as reported in the shark gillnet observer program. The "Catch and Bycatch in U.S. Southeast Gillnet Fisheries, 2008" report described the gear and soak time deployed by drift gillnet, strike gillnet, and sink gillnet fishermen (Passerotti and Carlson, 2009).

4.6.2.1 Gillnet Landings and Bycatch

Strikenets - NMFS published a final rule (72 FR 34632, June 25, 2007) to reduce bycatch of right whales. It prohibits gillnet fishing or gillnet possession during periods associated with the right whale 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. In this area, only gillnets used in a strikenet fashion can operate during day time when right whales are present. Operation in this area at that time requires VMS and observer coverage, if selected. Vessels fishing in a strikenet fashion used nets 364.8 m long, 30.4 m deep, and with mesh size 22.9 cm.

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 4.24). There were no strike gillnet trips observed in 2007, potentially due a first trimester closure of the large coastal shark fishery. This closure was required because of 2006 landings in excess of the quota (Baremore *et al.*, 2007). Similarly, in 2008, no vessels were observed using strikenets to target sharks. This is likely due to the large coastal shark fishery closure in place during the first half of 2008, correcting for overages from the 2007 harvest (Passerotti and Carlson, 2009).

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 strike net catch by number and weight (Carlson and Bethea, 2007).

Drift Gillnets – In 2007, a total of five driftnet gillnet vessels were observed on 11 trips. The total observed catch composition for sets targeting sharks was 86.7 percent shark, 13.3 percent teleosts, zero percent non-shark elasmobranches, 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 (Baremore *et al.*, 2007).

In 2008, a total of five driftnet gillnet vessels were observed making 68 sets on 9 trips. The total observed catch composition for sets targeting sharks was 74.9 percent shark, 22.2 percent teleosts, 1.8 percent non-shark elasmobranches, and zero percent protected resources. Two species of sharks made up 99.1 percent of the observed shark catch by number: smooth dogfish (87.2 percent) and spiny dogfish (11.8 percent) (Table 4.25) (Passerotti and Carlson, 2009).

Sink Gillnets - Sinknet landings and bycatch vary by target species. A total of 29 trips making 112 sink net sets on six vessels were observed in 2007. Of those, 17 trips targeted sharks, 3 trips targeted Spanish mackerel, 4 trips targeted Atlantic croaker, and 6 trips targeted other teleosts. Sink gillnets that targeted sharks caught 97.8 percent shark, 1.4 percent teleosts, 0.7 percent non-shark elasmobranches, and 0.1 percent protected resources. By number, the shark catch was primarily bonnethead shark, finetooth shark, Atlantic sharpnose shark, and blacknose shark (Baremore *et al*., 2007).

Catch of vessels targeting Spanish mackerel was 99.4 teleosts and 0.6 percent shark. Shark catches were mostly Atlantic sharpnose by number, and blacktip and bonnethead sharks (Baremore *et al*., 2007).

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

A total of 41 trips making 134 sink net sets on 14 vessels were observed in 2008. Target species included shark, Spanish mackerel, Southern kingfish, and goosefish (monkfish). Specific proportion breakdown of target species by trip was not possible in the 2008 data due to vessel confidentiality restrictions. Sink gillnets, regardless of target species, caught 86.0 percent teleosts, 12.0 percent sharks, 1.7 percent non-shark elasmobranchs and zero percent protected resources. By number, the shark catch was primarily Atlantic sharpnose shark (45.3 percent), bonnethead shark (34.0 percent), blacknose shark (8.0 percent) and spinner shark (6.7 percent) (Table 4.26). By weight the shark catch was made up of mostly Atlantic sharpnose shark, followed by bonnethead shark, blacknose shark and spinner shark, finetooth shark (Passerotti and Carlson, 2009). Smalltooth sawfish are uncommonly caught in gillnet gear. More detailed information can be found in Section 7.6.4.

Table 4.24 Total Strike gillnet Shark Catch 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
Bonnethead shark	3	100	0	0
Bull shark	2	100	0	0
Nurse shark	1	100	0	0
Total	**13,207**			

Table 4.25 Total Shark Catch by Species and Species Disposition in Order of Decreasing Abundance for all Observed Drift gillnet Sets 2008. Source: Passerotti and Carlson, 2009

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead
Smooth dogfish	2331	79.1	20.9	0
Spiny dogfish	316	0	100	0
Atlantic sharpnose shark	7	28.6	71.4	0
Thresher shark	6	100	0	0
Sand tiger shark	3	0	100	0
Blacktip shark	2	50	50	0
Sandbar shark	2	0	100	0
Angel shark	2	0	100	0
Blacknose shark	1	0	0	100
Spinner shark	1	0	100	0
Great hammerhead shark	1	0	100	0
Total	**2,672**			

Table 4.26 Total Sink gillnet Shark Catch by Species in order of Decreasing Abundance for allObserved Trips, 2008. Source: Passerotti and Carlson, 2009.

Species	Total Number Caught	Kept (%)	Discarded Alive (%)	Discarded Dead
Atlantic sharpnose shark	853	73.4	11.4	15.2
Bonnethead	609	86.4	3.9	9.7
Blacknose shark	143	98.6	1.4	0
Spinner shark	120	55	10.8	34.2
Blacktip shark	73	24.7	63	12.3
Scalloped hammerhead shark	16	12.5	75	12.5
Spiny dogfish	9	0	22.2	77.8
Finetooth shark	4	25	75	0
Dusky shark	3	0	0	100
Smooth dogfish	2	0	100	0
Sand tiger shark	2	0	100	0
Atlantic guitarfish	1	0	100	0
Total	**1,835**			

4.7 Buoy Gear

4.7.1 Domestic History and Current Management

In recent years, a commercial swordfish 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 Swordfish Directed and Handgear permit holders. Swordfish Directed permit holders may retain swordfish only if they have also been issued a Shark Directed or Incidental limited access permit and an Atlantic Tunas Longline permit. Swordfish Handgear permit holders are not required to be issued other permits to retain swordfish. HMS Charter/Headboat, Angling, and Swordfish 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, Landings, and Discards

Buoy gear effort and catch data are available for 2007 and 2008 (Table 4.27, Table 4.28**,** and Table 4.29). Prior to 2007, buoy gear catch data were included in handline catch data.

Table 4.27 Buoy gear effort. Source: NMFS Pelagic Logbook Program

	2007	2008
Number of Vessels	42	44
Number of Trips	745	598
Avg. Buoy Gears Deployed per Trip	11.0	11.2
Total Number of Hooks Set	11,742	8,922
Avg. Number Hooks per Gear	1.4	1.3

Table 4.28 Buoy gear landings in pounds dressed weight. Source: NMFS Pelagic Logbook Program

	2007	2008
Swordfish	183,982	122,700
Dolphin	966	1,031
Oilfish	346	414
Shortfin mako shark	308	797
Wahoo	63	227
Bigeye tuna	150	0
Blacktip shark	9	0
King mackerel	0	194

Table 4.29 Buoy gear catches and discards in numbers of fish. Source: NMFS Pelagic Logbook Program

	2007	2008
Kept		
Swordfish	2,849	1,843
Dolphin	63	103
Oilfish	7	10
Bigeye tuna	5	0

	2007	2008
Blackfin tuna	3	7
Wahoo	2	6
Bonito	0	7
King mackerel	0	53
Shortfin mako	3	4
Hammerhead shark	1	0
Blacktip shark	1	0
Silky shark	0	1
Released Alive		
Swordfish	1,559	1,018
Blue marlin	1	0
White marlin	0	3
Sailfish	2	1
Hammerhead shark	14	7
Blue shark	0	2
Thresher shark	0	1
Dusky shark	4	0
Night shark	16	1
Oceanic whitetip shark	0	1
Bigeye thresher shark	4	0
Tiger shark	1	2
Sandbar shark	1	0
Longfin mako shark	4	3
Shortfin mako shark	0	1
Discarded Dead		
Swordfish	129	80
Silky shark	9	0
Hammerhead shark	1	0

4.8 Green-Stick Gear

4.8.1 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 4.7) 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 this section or as described at §635.21(c) or §635.21(d), respectively." Green-stick gear may be used to harvest bigeye, northern albacore, yellowfin, and skipjack tunas (collectively referred to as BAYS tunas) and bluefin tuna aboard Atlantic Tunas General, HMS Charter/Headboat, and Atlantic Tunas Longline permitted vessels.

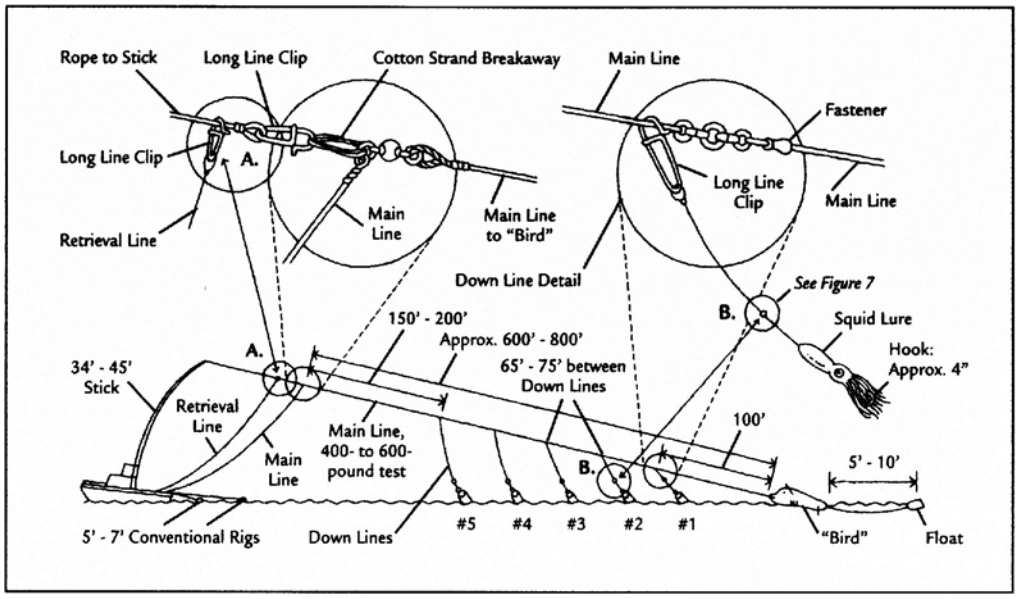

Figure 4.7 A diagram of green-stick fishing gear. Source: Wescott (1996).

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 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.

Green-stick gear is used in Atlantic tuna fisheries. These 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 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 and South Carolina with some use also occurring off the New England states. A limited number of 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 Charter/Headboat, 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. Atlantic tunas dealer permits are issued by the Northeast Region Permit Office and 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 bluefin tuna, vessels that possess either the Atlantic Tunas General or HMS Charter/Headboat permits have the ability to retain a daily bag limit of zero to three bluefin tuna, measuring 73 inches or greater curved fork length per vessel per day while the General category BFT fishery is open. Each year the General category bluefin tuna fishery season is open January 1-31 or until the quota (or subquota) is filled and is again open June 1 – 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 bluefin tuna retention limit on any given day.

In order to characterize the catch and bycatch of green-stick gear, NMFS began a study in 2009 off of North Carolina in partnership with the North Carolina Division of Marine Fisheries and with funding from the Bycatch Reduction Engineering Program. The purpose of the study is to investigate the potential feasibility of green-stick gear as an alternative to tuna fishing gear in some areas where bycatch is problematic for other gears. Preliminary information after four observed trips of 1-3 days in length showed that the catch included yellowfin tuna, skipjack tuna, blackfin tuna, and dolphin. Bycatch during the 4 trips included one undersized bluefin tuna and one sailfish both of which were released alive and in good condition. The study is expected to be completed in 2010 and a final report produced.

4.8.2 Recent Catch and Landings

Green-stick gear has been used in the Atlantic commercial and recreational BAYS tuna and bluefin fisheries since the mid-1990s, but it was not originally included on the list of authorized HMS fishery gears (May 28, 1999; 64 FR 29090). Nevertheless, commercial landings of BAYS and bluefin tuna with green-stick gear continued in Atlantic Tunas General, Atlantic Tunas Longline, and HMS CharterHeadboat permit 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 catches are presented earlier in Chapter 4 (See Table 4.1). 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 and were presented in the 2008 SAFE Report (NMFS 2008). Data on landings specific to green-stick gear are expected to 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. NMFS has also encouraged states to utilize the green-stick gear code in their trip ticket programs with some success. In 2009, the states of South Carolina and Florida have indicated that they will add a green-stick gear code to their trip ticket program.

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 Charter/Headboat, or Atlantic Tunas Longline category fishermen also hold a NMFS Southeast Region fishing permit that requires logbook reporting. Some green-stick gear landings from 1999-2007 that were designated by hand writing "green-stick gear" as an "other" gear in the Southeast Region's Coastal Logbook were reported in the 2008 SAFE Report (NMFS 2008). Also, commercial green-stick gear catches that were reported in the PLL Logbook Program from 1999 – 2002 were reported in the 2008 SAFE Report (NMFS 2008). From 1999 - 2002, the PLL logbook format included a green-stick gear data field; however, this data field was eliminated beginning in 2003 probably because green-stick gear was not an authorized gear at the time.

Neither the Southeast Region's Coastal Logbook nor the PLL Logbook currently have a green-stick gear data field on the forms; although, green-stick gear landings are sometimes recorded on the Coastal Logbook form with "green-stick gear" hand written as an "other" gear. These data that are recorded with "green-stick gear" hand written as an "other" gear are very difficult to query in the logbook database. As a result, NMFS is unable to fully characterize the existing green-stick gear fishery with the data collection capability provided by the logbook program as it currently exists. NMFS is working to improve green-stick gear data collection in the future.

4.9 Safety Issues

The following section describes safety issues by fishery and gear type. More specific information regarding safety issues and statistics may be obtained from the following two U.S. Coast Guard (USCG) documents.

- "Analysis of Fishing Vessel Casualties – A Review of Lost Fishing Vessels and Crew Fatalities 1992-2007": http://www.offsoundings.com/WEB%20PDF/FV_Casualty_Study_92-07.pdf
- "Recreational Boating Statistics 2008": http://www.uscgboating.org/assets/1/Publications/Boating_Statistics_2008.pdf

The following are key findings from Analysis of Fishing Vessel Casualties 1992-2007. Page numbers indicate the pages where the details of the findings are described in the report.

- During this period 1,903 fishing vessels were lost. Of those vessels, 1,543 (just over 81 percent) had Certificates of Documentation, rather than state registration, (pg. 5).
- Overall, the majority of vessel losses occurred in the 17th, 8th, and 1st Coast Guard Districts (p. 6).
- There was a statistically significant drop in vessel losses for 2006 and 2007. Given the lack of regulations and the complexity of the industry, the drop is most likely due to a combination of economic, environmental, fisheries management and other regulatory factors (pp. 7-9).
- A comparison of vessel losses and safety exams indicate limited correlation (about 34 percent). Current regulations do not focus on preventing vessel loss (pg 10).
- When shown as a rate (losses/1000 vessels), losses occurred more frequently with longer vessels (pg 11).

- Fishing vessels between 11 and 30 years of age, with a valid Certificate of Documentation, sustained the greatest loss. Also, most vessels lost were constructed of wood (48 percent), steel (25 percent), or fiber reinforced plastic (FRP) (24 percent) (pg 12).
- Most fishing vessel losses (62 percent) occurred while engaged in non-fishing operations, (pg. 13).
- Together, flooding and fire were the initiating events in 56 percent the fishing vessel losses (pg. 13).
- In the 16 year period of this study there were 934 crewmember fatalities, or an average of 58 per year. For the most recent 5 years there were 197 fatalities, or an average of 39 per year (pg. 16).
- The U.S. fishing industry suffered its worst casualty in 50 years with the loss of the *ARCTIC ROSE*. The vessel disappeared in the Bering Sea the night of 1 April 2001, resulting in 1 deceased and 14 missing crewmembers (pg 16).
- Overall, the majority of deaths (58 percent) occurred in the 17th, 8th, and 1st Coast Guard Districts (pg. 16).
- Most incidents (91 percent) result in either one or two fatalities, indicating that multiple-fatality incidents are relatively rare. Thus, it would be necessary to address a relatively large number of incidents in order to reduce the fatality counts significantly (pg. 16).
- Examination of the events leading to death confirmed that water exposure was the most significant factor – 78 percent of all fatalities (pg. 16).
- Deaths from water exposure were higher along the West and Northeast coasts than in any other region because of more severe environmental conditions (pg. 18).
- Vessel-related fatalities tend to be higher in the months of October through January (pp. 19).
- When presented as a rate (fatalities per vessel lost), vessel-related fatalities were the lowest in the warmer waters of the Gulf of Mexico and along the Southeast U.S. coast (pp. 20 - 21).
- At least 2 fatalities resulted from inadequate training (pg. 20).
- Forty three percent of all vessel-related fatalities occurred on steel hulled vessels. Population data indicates that steel vessels are generally larger than vessels of other hull materials. Consequently, they are able to operate farther offshore, with larger crews. Given the higher risk factors of crew size and distance from shore, it may be appropriate to focus preventive efforts on steel vessels (pg. 22).
- Beginning in calendar year 2000, there was a significant downward shift in the number of fatalities per year. However, the trend has leveled off. To reduce the fatality rate further may require additional improvements in safety (pg. 23).
- Overall, the correlation between vessel losses and fatalities was found to be quite low. Again, current regulations focus more on preventing fatalities than preventing vessel loss (pg. 24).
- In cold waters, fishermen survive more than twice as often when lifesaving equipment is used (pg. 25).
- Loss of lives was much lower on those vessels that received a safety decal. When deaths did occur, the vessel was lost suddenly with little time to respond (pg. 26).
- A significant number of crewmember fatalities may have been prevented because Good Samaritan vessels were present for nearly 30 percent of vessels lost. Because of quick rescue, as many as 1,084 fatalities may have been prevented. Given that such vessels have

- With 23 percent of the total deaths (217 of 934), falls overboard were the second largest group of fatalities. Personal floatation device (PFD)/survival suit usage was reported with only two of those fatalities (pg. 29).
- The highest number of falls overboard fatalities occurred in the 8th District, accounting for 35 percent of their total (77 of 217). Given that the 8th District has the warmest waters and, thus, the longest survival times, it is likely that many of the fatalities were preventable with PFD's. This appears to be a region where continued emphasis on safety equipment, drills and training would be beneficial (pg. 29).
- To eliminate some fatalities, such as those that occur while the crew is asleep, it will be necessary to prevent vessel losses (various).

The following are key findings from the Recreational Boating Statistics 2008:

- In 2008, the USCG counted 4,789 accidents that involved 709 deaths, 3331 injuries and approximately $54 million dollars of damage to property as a result of recreational boating accidents.
- Over two-thirds of all fatal boating accident victims drowned, and of those, ninety (90) percent were not wearing a life jacket.
- Only ten percent of deaths occurred on boats where the operator had received boating safety instruction.
- Seven out of every ten boaters who drowned were using boats less than 21 feet in length.
- Careless/reckless operation, operator inattention, no proper lookout, operator inexperience and passenger/skier behavior rank as the top five primary contributing factors in accidents.
- Alcohol use is the leading contributing factor in fatal boating accidents; it was listed as the leading factor in 17 percent of the deaths.
- Eleven children under age thirteen lost their lives while boating in 2008. Sixty-three percent of the children who died in 2008 died from drowning.
- The most common types of vessels involved in reported accidents were open motorboats (43 percent), personal watercraft (23 percent), and cabin motorboats (15 percent).
- The 12,692,892 boats registered by the states in 2008 represent a 1.4 percent decrease from last year when 12,875,568 boats were registered.

Pelagic and Bottom Longline

Like all offshore fisheries, pelagic longlining can be dangerous. Although frequently closer to shore, bottom longline fishing can be equally 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 and BLL fishery. For example, all time/area closures are expected to be closed to fishing, but not transiting, in order to allow fishermen to take a more 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 fewer, possibly less

experienced crew members or may not have the time or money to complete necessary maintenance tasks. NMFS encourages fishermen to be responsible in fishing and maintenance activities.

Purse Seine

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 bluefin tuna from the net to the hold.

Commercial Handgear

The USCG conducts routine vessel safety inspections at sea on a variety of vessels throughout the year. During the General category bluefin tuna season, the USCG has been known to concentrate patrol activities on General category bluefin tuna 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 bluefin tuna (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. 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 bluefin tuna 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 bluefin tuna 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 bluefin tuna. 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 permit for kayaks 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 HMS Advisory Panel.

Recreational Handgear

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 USCG is the potential for someone to fall overboard when on the flying bridge.

Table 4.30 Total 2008 Reported Recreational Boating Accident Types. Source: USCG Boating Statistics, 2008.

2008 Primary Accident Type	# Accidents	# Deaths	# Injuries	Total Property Damage
Total	4789	709	3331	$54,282,587
Capsizing	348	189	227	$1,426,526
Carbon Monoxide Exposure	18	11	40	$0
Collision with Fixed Object	446	53	328	$4,696,802
Collision with Floating Object	59	5	30	$769,231
Collision with Another Vessel	1237	60	856	$8,584,700
Departed Vessel	87	37	41	$67,315
Ejected from Vessel	123	17	105	$514,877
Electrocution	0	0	0	$0
Fall in Vessel	140	2	148	$65,270
Fall on Vessel	62	1	66	$7,500
Falls Overboard	431	188	257	$502,615
Fire/Explosion (fuel)	136	1	89	$4,542,417
Fire/Explosion (non-fuel)	78	2	12	$3,183,410
Fire/Explosion (unknown origin)	25	2	10	$15,980,500
Flooding/Swamping	475	89	179	$5,743,606
Grounding	322	13	241	$3,433,256
Sinking	16	2	3	$471,184
Skier Mishap	383	10	397	$4,826
Struck by Vessel	37	2	41	$2,400
Struck by Propeller	83	5	80	$600
Struck Submerged Object	154	5	70	$4,077,332
Other	123	9	111	$207,720
Unknown	6	6	0	$500

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

Table 4.31 Boating Accidents and Personal Floatation Device Usage in 2008. Source: USCG Boating Statistics, 2008.

Life Jackets on Vessels	Approved, Accessible	4548	405	
	Approved, Not Accessible	86	21	
	Approved, Not known if accessible	469	40	
	Not Onboard	223	131	
	Unknown	1021	112	
Life Jacket Usage Among Cause of Death Categories	**Cause of Death**	**Worn**	**Not Worn**	**Unknown if Worn**
	Carbon Monoxide	0	11	0
	Cardiac arrest	1	6	0
	Drowning	46	459	5
	Hypothermia	7	5	0
	Trauma	33	90	1
	Other	1	7	0
	Unknown	2	32	3
	Totals	90	610	9

Buoy Gear and Greenstick Gear

At this time, other than the general concerns listed above, NMFS is not aware of any specific safety issues associated with this fishery. 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.

4.10 Fishery Data: Landings by Species

The following tables of Atlantic HMS landings are taken from the 2009 National Report of the United States to ICCAT (ANN-043) (NMFS, 2009). The purpose of this section is to provide a summary of recent domestic landings of HMS by gear and species allowing for interannual comparisons. Landings for sharks were compiled from the most recent stock assessment documents and updates provided from the SEFSC.

Table 4.32 U.S. Landings (mt) of Atlantic Bluefin Tuna by Gear and Area, 2001-2008. Source: NMFS, 2009.

Area	Gear	2001	2002	2003	2004	2005	2006	2007	2008
NW Atlantic	Longline**	17.7	7.8	36.1	63.6	72.7	104.4	70.7	124.7
	Handline	9.0	4.5	2.5	1.5	2.3	0.3	0.0	0.6
	Purse seine	195.9	207.7	265.4	31.8	178.3	3.6	27.9	0.0
	Harpoon	101.9	55.5	87.9	41.2	31.5	30.3	22.5	30.2
	*Rod and reel (>145 cm LJFL)	993.4	1,008.4	676.4	348.0	170.4	217.2	235.4	305.7
	*Rod and reel (<145 cm LJFL)	249.3	519.3	314.6	370.2	254.4	158.2	398.6	352.2
	Unclassified	0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.3
Gulf of Mexico	Longline	19.8	32.8	80.0	102.8	118.5	88.1	81.2	111.6
	*Rod and reel	1.7	1.5	0.0	0.0	0.0	0.6	0.0	0.0
NC Area 94a	Longline	0.0	9.3	17.8	13.7	20.3	12.1	12.4	11.5
All Areas	**All Gears**	**1,582.8**	**1,846.8**	**1,480.7**	**973.0**	**848.4**	**614.8**	**848.7**	**936.7**

* 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 2003-2008, this includes landings and estimated discards from scientific observer and logbook sampling programs.

Table 4.33 U.S. Landings (mt) of Atlantic Yellowfin Tuna by Gear and Area, 2001-2008. Source: NMFS, 2009.

Area	Gear	2001	2002	2003	2004	2005	2006	2007	2008
NW Atlantic	Longline	631.8	400.0	275.3	658.9	394.2	701.7	752.8	460.5
	Rod and reel*	3,690.5	2,624	4,672.1	3,433.7	3,504.8	4,649.2	2,756.0	657.1
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
	Gillnet	7.6	5.0	0.9	3.2	0.1	4.7	4.2	0.6
	Trawl	2.7	0.0	2.2	1.6	0.2	0.7	2.4	0.0
	Handline	242.5	137.0	149.1	213.2	105.1	105.1	118.1	30.1
	Trap	0.1	0.0	0.3	0.0	0.01	0.0	0.0	0.05
	Unclassified	6.8	**	0.1	10.6	3.8	3.9	7.0	1.4
Gulf of Mexico	Longline	1,505.5	2,109.0	1,835.8	1,811.9	1,210.9	1,128.5	1,377.7	756.5
	Rod and reel*	494.2	200.0	640.0	247.1	146.9	258.4	227.6	366.3
	Handline	43.4	100.0	39.9	28.3	45.5	49.9	34.3	11.2
	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	0.3	0.0	0.0	0.0
Caribbean	Longline	23.1	12.0	5.6	4.5	140.6	179.7	255.6	107.1
	Handline	14.3	7.0	9.0	7.0	9.7	7.8	9.1	3.7
	Gillnet	0.3	0.0	0.02	0.06	**	0.0	0.0	0.04
	Trap	0.3	0.0	0.2	0.1	**	0.4	0.0	0.0
NC Area 94a	Longline	3.5	0.0	5.2	0.08	0.5	0.0	1.8	0.4
SW Atlantic	Longline	36.2	52.0	42.0	16.8	0.0	0.0	0.0	0.0
All Areas	**All Gears**	**6,702.8**	**5,646.0**	**7,677.7**	**6,515.7**	**5,568.1**	**7,090.0**	**5,529.5**	**2,407.2**

* 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 4.34 U.S. Landings (mt) of Atlantic Skipjack Tuna by Gear and Area, 2001-2008. Source: NMFS, 2009.

Area	Gear	2001	2002	2003	2004	2005	2006	2007	2008
NW Atlantic	Longline	0.1	**	0.9	0.1	0.05	0.04	0.0	0.1
	Rod and reel*	32.9	23.3	34.1	27.3	8.1	34.6	27.4	21.0
	Gillnet	3.6	**	0.9	16.7	2.2	0.2	0.05	0.04
	Trawl	0.2	**	0.5	0.2	0.07	0.7	0.005	0.003
	Handline	0.2	0.2	0.2	0.6	0.9	0.2	0.3	0.4
	Trap	0.0	**	1.5	0.006	0.0	0.3	0.0	0.0
	Pound net	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0
	Unclassified	0.0	0.0	0.1	0.2	0.01	0.06	0.6	0.5
Gulf of Mexico	Longline	0.2	**	0.05	0.3	0.3	0.0	0.0	0.05
	Rod and reel*	16.1	13.2	11.1	6.3	3.1	6.4	23.9	16.3
	Handline	0.0	0.0	0.04	0.2	0.02	0.0	0.2	0.06
Caribbean	Longline	4.0	2.5	0.4	0.3	0.2	0.2	0.02	1.3
	Gillnet	1.6	0.6	0.4	0.3	0.06	0.02	0.0	0.01
	Rod and reel*	NA	NA	15.7	40.4	3.9	7.7	0.2	11.3
	Handline	10.3	12.5	12.9	9.6	10.9	10.0	13.7	16.0
	Trap	0.4	0.7	0.2	0.02	0.1	0.05	0.0	0.0
All Areas	**All Gears**	**69.6**	**53.0**	**79.1**	**102.5**	**29.9**	**61.0**	**66.5**	**67.1**

* 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 4.35 U.S. Landings (mt) of Atlantic Bigeye Tuna by Area and Gear, 2001-2008. Source: NMFS, 2009.

Area	Gear	2001	2002	2003	2004	2005	2006	2007	2008
NW Atlantic	Longline	506.1	328.6	169.2	267.0	272.9	469.4	331.9	380.2
	Rod and reel*	366.2	49.6	188.5	94.6	165.0	422.3	126.8	70.9
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.8
	Gillnet	0.2	0.0	0.07	0.0	0.0	0.2	1.0	0.04
	Handline	33.2	13.8	6.0	3.3	6.2	21.5	16.8	6.9
	Trawl	0.4	0.5	0.03	0.9	0.6	0.0	0.4	0.0
	Unclassified	1.8	0.0	0.0	0.5	0.6	0.8	0.9	2.1
Gulf of Mexico	Longline	15.3	41.0	26.2	20.2	25.2	37.7	37.0	14.0
	Rod and reel*	0.0	0.0	0.0	6.0	0.0	24.3	0.0	0.0
	Handline	0.5	0.6	0.3	0.2	0.1	1.5	0.01	0.0
Caribbean	Longline	31.9	29.7	7.0	3.5	6.9	10.5	3.4	8.9
	Handline	0.0	0.0	0.0	0.0	0.04	0.0	0.0	0.0
NC Area 94a	Longline	61.0	45.2	36.9	5.0	6.9	3.0	8.4	4.6
SW Atlantic	Longline	68.2	91.3	44.6	14.4	0.0	0.0	0.0	0.0
All Areas	**All Gears**	**1,084.8**	**600.3**	**478.8**	**416.0**	**484.4**	**991.4**	**527.3**	**488.5**

* 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 4.36 U.S. Landings (mt) of Atlantic Albacore Tuna by Gear and Area, 2001-2008. Source: NMFS, 2009.

Area	Gear	2001	2002	2003	2004	2005	2006	2007	2008
NW Atlantic	Longline	171.7	124.0	95.7	106.6	88.9	84.8	109.9	107.2
	Gillnet	3.3	2.6	0.1	4.9	6.0	2.1	1.0	2.1
	Handline	1.7	3.9	1.7	6.1	3.0	2.6	5.4	0.2
	Trawl	0.0	0.3	0.02	2.7	1.7	1.1	0.3	0.01
	Troll	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
	Rod and reel*	122.3	323.0	333.8	500.5	356.0	284.2	393.6	125.2
	Unclassified	0.1	0.0	0.0	3.6	9.9	5.6	4.2	2.0
Gulf of Mexico	Longline	4.9	9.5	4.4	9.9	6.9	7.6	15.4	10.2
	Rod and reel*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Handline	0.0	0.0	0.01	0.0	0.1	0.07	0.0	0.0
Caribbean	Longline	8.7	8.4	3.9	3.2	12.1	10.5	1.2	0.4
	Gillnet	0.5	**	0.04	0.005	0.002	0.0	0.0	0.0
	Trap	0.3	0.6	0.2	0.0	0.0	0.0	0.0	0.0
	Handline	2.2	2.7	2.6	2.1	1.1	0.4	0.2	0.4
NC Area 94a	Longline	6.1	4.8	1.6	0.2	0.6	0.03	0.3	0.8
SW Atlantic	Longline	2.4	8.3	2.0	0.5	0.0	0.0	0.0	0.0
All Areas	**All Gears**	**324.2**	**488.1**	**446.1**	**646.6**	**488.0**	**399.0**	**532.1**	**248.1**

* 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 4.37 U.S. Catches and Landings (mt) of Atlantic Swordfish by Gear and Area, 2001-2008. Source: NMFS, 2009.

Area	Gear	2001	2002	2003	2004	2005	2006	2007	2008
NW Atlantic	*Longline	1,220.8	1,132.8	1,341.3	1,169.7	1,096.2	1,165.2	1,649.6	1,622.5
	Gillnet	0.0	0.1	0.0	0.05	0.0	0.0	0.2	0.0
	Handline	8.6	8.8	10.8	18.7	34.4	32.5	125.2	83.2
	Trawl	2.5	3.9	5.6	8.3	8.2	3.5	6.5	7.6
	Unclassified	1.8	0.1	1.6	0.0	0.5	0.2	0.2	0.2
	Unclassified discards				3.9	4.2	5.1	5.5	4.1
	Harpoon	7.4	2.8	0.0	0.5	0.0	0.3	0.0	0.0
	***Rod and reel	1.5	21.5	5.9	24.3	53.1	50.6	65.9	56.7
	Trap	0.0	**	0.06	0.0	0.0	0.0	0.0	0.0
Gulf of Mexico	*Longline	494.6	549.1	507.6	453.0	480.9	328.1	457.7	361.6
	Handline	0.3	2.9	9.8	4.0	0.3	0.1	0.2	1.2
	Rod and reel			0.03	0.5	1.5	2.1	2.3	19.0
	Unclassified			3.4	0.0	0.2	0.0	0.0	0.0
	Unclassified discards				0.03	3.9	2.7	5.5	4.6
Caribbean	*Longline	347.0	329.0	274.5	295.9	143.5	88.9	27.8	57.9
	Trap	**	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	Rod and reel			0.0	0.4	6.6	0.0	0.0	0.0
	Handline			0.02	0.006	0.0	0.0	0.0	0.0
	Unclassified discards			0.2	0.08	0.7	0.0	0.0	0.0
NC Atlantic	*Longline	420.6	587.9	632.8	599.9	552.2	378.6	338.9	311.6
SW Atlantic	*Longline	43.2	199.9	20.5	15.7	0.0	0.0	0.0	0.0
All Areas	**All Gears**	**2,548.3**	**2,838.9**	**2,814.13**	**2,595.1**	**2,387.6**	**2,057.9**	**2,682.8**	**2,530.3**

* 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 4.38 Commercial landings of Atlantic Large Coastal Sharks in lb dw: 1999-2008. Sources: Cortés 2003; Cortés and Neer 2002, 2005; Cortés pers. comm.

Large Coastal Sharks	2000	2001	2002	2003	2004	2005	2006	2007	2008
Basking**	0	0	0	0	0	0	0	0	0
Bignose*	672	1,442	0	318	0	98	46	0	104
Bigeye sand tiger**	0	0	0	0	0	0	0	0	0
Blacktip	1,633,919	1,135,199	1,099,194	1,474,362	1,092,600	894,768	1,255,255	1,091,502	573,723
Bull	24,980	27,037	40,463	93,816	49,556	118,364	173,375	154,945	186,882
Caribbean reef*	0	1	0	0	0	0	0	0	0
Dusky*	205,746	1,973	8,779	23,288	1,025	874	4,209	2,064	0
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	92	54	150	0	358
Hammerhead, unclassified	35,060	69,356	108,160	150,368	116,546	182,387	141,068	65,232	55,907
Large coastal, unclassified	16,575	172,494	147,359	51,433	0	0	0	0	0
Lemon	45,269	24,453	56,921	80,688	67,810	74,436	65,097	72,583	53,427
Narrowtooth*	0	0	0	0	0	0	0	0	0
Night*	0	0	0	20	0	0	0	0	0

Large Coastal Sharks	2000	2001	2002	2003	2004	2005	2006	2007	2008
Nurse	429	387	69	70	317	152	2,258	15	58
Sandbar	1,491,908	1,407,550	1,863,420	1,425,628	1,223,241	1,246,966	1,501,277	691,928	86,640
Sand tiger**	6,554	1,248	409	624	1,832	4,149	3,555	210	0
Silky	31,959	14,197	30,731	51,588	11,808	18,237	16,173	16,496	4,794
Spinner	14,473	6,970	8,447	12,133	14,806	47,670	96,259	17,888	123,660
Tiger	24,443	26,973	16,115	18,536	30,976	39,387	50,749	34,169	29,712
Whale**	0	0	0	0	0	0	0	0	0
White**	1,201	26	0	1,454	58	0	122	0	0
Unclassified, assigned to large coastal	92,117	525,661	771,450	908,077	603,229	519,654	499,069	182,240	247,639
Unclassified, fins	87,820	23,988	142,565	181,431	137,375	135,774	152,111	98,010	55,482
Total (excluding fins)	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)	3,147,196 (1,428 mt dw)	3,808,662 (1,728 mt dw)	2,329,272 (1,057 mt dw)	1,362,904 (618 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 4.39 Commercial landings of Atlantic Small Coastal Sharks in lb dw: 1999-2008. Sources: Cortés and Neer, 2002, 2005; Cortés, 2003; Cortés pers. comm.

Small coastal sharks	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Atlantic angel*	0	97	0	495	1,397	818	3,587	500	29	91
Blacknose	137,619	178,083	160,990	144,615	131,511	68,108	120,320	187,907	91,438	134,255
Bonnethead	58,150	69,411	63,461	36,553	38,614	29,402	33,295	33,911	53,638	60,970
Finetooth	285,230	202,572	303,184	185,120	163,407	121,036	107,327	80,536	171,099	80,833
Sharpnose, Atlantic	244,356	142,511	196,441	213,301	190,960	230,880	375,881	520,028	334,421	324,622
Sharpnose, Atlantic, fins	0	0	209	0	0	0	0	0	0	0
Sharpnose, Caribbean*	2,039	353	205	0	0	0	0	0	0	0
Unclassified small coastal	336	0	51	35,831	8,634	1,407	9,792	471	3,474	23,077
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)	623,848 (283 mt dw)

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

Table 4.40 Commercial landings of Atlantic Pelagic Sharks in lb dw: 1999-2008. Sources: Cortés and Neer 2002, 2005; Cortés 2003; Cortés pers. comm**.**

Pelagic Sharks	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bigeye thresher*	18,683	4,376	330	0	0	719	267	68	0	0
Bigeye sixgill*	0	0	0	0	0	0	0	0	0	0
Blue shark	886	3,508	65	137	6,324	423	0	588	0	3,229
Mako, longfin*	3,394	6,560	9,453	3,008	1,831	1,827	403	2,198	2,039	1,896
Mako, shortfin	150,073	129,088	171,888	159,840	151,428	217,171	154,187	102,901	165,120	120,255
Mako, unclassified	56,625	74,690	73,556	58,392	33,203	50,978	35,241	28,557	38,170	39,661
Oceanic whitetip	1,480	657	922	1,590	2,559	1,082	713	338	787	1,899
Porbeagle	5,650	5,272	1,152	2,690	1,738	5,832	2,452	3,810	3,370	5,259
Sevengill*	0	0	0	0	0	0	0	0	0	0
Sixgill*	0	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	47,528
Unclassified, pelagic	0	233	0	5,965	79,439	0	0	571	0	0
Unclassified, assigned to pelagic	41,006	40,951	31,636	182,983	314,300	356,522	18,057	12,936	5,022	14,819
Unclassified, pelagic, fins	2,408	3,746	12,239	0	0	41	0	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)	234,546 (106 mt dw)

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

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