6.0 DESCRIPTION OF THE PELAGIC LONGLINE FISHERY FOR ATLANTIC HMS

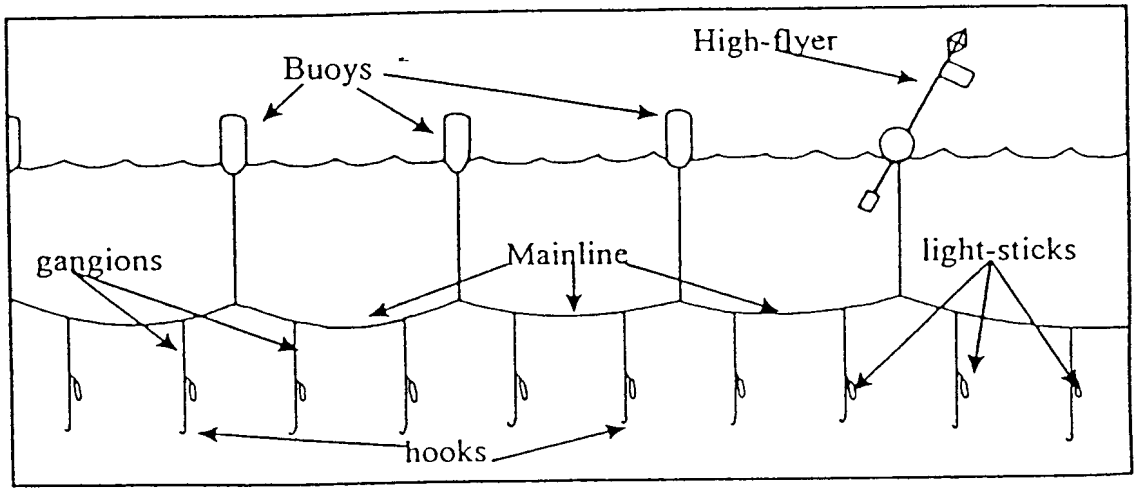
The HMS FMP provides a thorough description of the U.S. fisheries for Atlantic HMS, including sectors of the pelagic longline fishery. Below is specific information regarding the catch of pelagic longline fishermen in the Gulf of Mexico and off the Southeast coast of the United States. For more detailed information on the fishery, please refer to the HMS FMP.

6.1 Pelagic Longline Gear

The U.S. pelagic longline fishery for Atlantic HMS primarily targets swordfish, yellowfin tuna, or bigeye tuna in various areas and seasons. Secondary target species include dolphin, albacore tuna, pelagic sharks including mako, thresher, and porbeagle sharks, as well as several species of large coastal sharks. Although this gear can be modified (i.e., depth of set, hook type, etc.) to target either swordfish, tunas, or sharks, like other hook and line fisheries, it is a multispecies fishery. These fisheries are opportunistic, switching gear style and making subtle changes to the fishing configuration to target the best available economic opportunity of each individual trip. Longline gear sometimes attracts and hooks non-target finfish with no commercial value, as well as species that cannot be retained by commercial fishermen, such as billfish.

Pelagic longline gear is composed of several parts. See Figure 6.1.

Figure 6.1. Typical U.S. pelagic longline gear. Source: Arocha, 1997.



When targeting swordfish, the lines generally are deployed at sunset and hauled in at sunrise to take advantage of the nocturnal near-surface feeding habits of swordfish. In general, longlines targeting tunas are set in the morning, deeper in the water column, and hauled in the evening. Fishing vessels preferentially target swordfish during periods when the moon is full to take advantage of increased densities of pelagic species near the surface, although vessels of the distant water fleet undertake extended trips include other phases of the lunar cycle. The number of hooks

per set varies with line configuration and target catch (Table 6.1).

Table 6.1. Average Number of Hooks per set, 1995 through 1998.

Target Species	1995	1996	1997	1998
Swordfish	500	497	500	485
Bigeye Tuna	831	804	725	732
Yellowfin Tuna	753	750	717	717
Shark	666	662	669	746
Mix	705	724	710	719

6.2 Pelagic Longline Catch and Discard Patterns

The pelagic longline fishery is comprised of five relatively distinct segments/fisheries with different fishing practices and strategies, including the Gulf of Mexico yellowfin tuna fishery, the south Atlantic-Florida east coast to Cape Hatteras swordfish fishery, the mid-Atlantic and New England swordfish and bigeye tuna fishery, the U.S. distant water swordfish fishery, and the Caribbean Islands tuna and swordfish fishery. Each vessel type has different range capabilities due to fuel capacity, hold capacity, size, and construction. In addition to geographical area, segments differ by percentage of various target and non-target species, gear characteristics, bait, and deployment techniques. Some vessels fish in more than one fishery segment during the course of the year. Pelagic longline catch (including bycatch, incidental catch, and target catch) is largely related to these vessel and gear characteristics but is summarized for the whole fishery in Table 6.2, based on information provided through the mandatory pelagic logbooks submitted to the SEFSC.

Table 6.2. Reported total annual catch of species caught by U.S. Atlantic pelagic longlines, in number of fish 1995 through 1998.

Species	1995	1996	1997	1998
Swordfish Kept	72,773	73,169	68,253	67,937
Swordfish Discarded	29,176	23,808	20,483	22,536
Blue Marlin Discarded	2,924	3,280	2,605	1,274
White Marlin Discarded	3,283	2,822	2,776	1,485
Sailfish Discarded	1,124	1,430	1,714	810
Spearfish Discarded	368	549	379	103
Bluefin Tuna Kept	240	208	180	204
Bluefin Tuna Discarded	2,848	1,706	679	1,304
BAYS Kept	119,259	84,977	102,123	74,412
Yellowfin Tuna Kept	82,297	62,869	73,987	48,938
Bigeye Tuna Kept	22,338	17,271	21,328	18,181

Species	1995	1996	1997	1998
Pelagic Sharks Kept	5,871	5,279	5,136	3,607
Pelagic Sharks Discarded	90,193	84,590	82,235	43,998
LCS Kept	58,567	36,047	21,741	11,756
LCS Discarded	11,033	11,486	8,026	5,891
Dolphin Kept	71,541	37,007	63,056	21,678
Wahoo Kept	4,930	3,468	4,569	4,180
Turtles Discarded	1,142	498	267	885
Number of Hooks (X 1,000)	*11,036*	*10,617*	*9,873*	*7,617*

In the United States, sale of billfish from the Atlantic Ocean is prohibited. The relative magnitude and frequency of encounters of billfish with pelagic longline gear (responsible for most of the commercial bycatch of billfish) affect the approach necessary to reduce this bycatch. The percent of the U.S. longline catch comprised of billfish and estimates of subsequent live releases from pelagic longline gear are shown in Table 6.3.

Table 6.3. Annual Proportion of Billfish in the U.S. Pelagic Longline Catch in 1995, by number. Source: Cramer, 1996.

Species	Proportion of Catch (*percent*)	Percent Released Alive
Atlantic blue marlin	0.49	74.4
Atlantic white marlin	0.49	68.8
West Atlantic sailfish	0.20	58.0
Longbill spearfish	0.07	64.7
All species combined	1.26	69.2

6.2.1 U.S. Catch in Relation to International Catch of Atlantic Highly Migratory Species

The United States harvests only a portion of the Atlantic-wide catch of highly migratory species (Table 6.4). In 1998, U.S. fishermen (commercial dead discards and recreational landings) accounted for only 1-3 percent of the Atlantic billfish fishing mortality (depending on species). For tunas, the U. S. fishery accounts for variable proportions of the Atlantic-wide mortality: 47 percent for West Atlantic bluefin tuna, almost 4 percent for yellowfin tuna, and a much smaller proportion of skipjack, bigeye tuna, and albacore tuna mortality. The United States accounted for 25 percent of the north Atlantic swordfish catch. Because curbing U.S. fishing alone would not be effective, the United States seeks to work in the international arena to reduce bycatch and bycatch mortality. In some cases, such as marlins, the mortality by U.S. commercial fishermen has only a small impact on the stocks.

Table 6.4. Percentage of U.S. pelagic longline catches (landings + discards) as a proportion of the total annual reported ICCAT catches. Calculations are based on information provided by the 1999 SCRS report. Source: SCRS, 1999.

Species	Stock	1996	1997	1998
Yellowfin Tuna	Atlantic	2.1	2.7	1.7
Bigeye Tuna	Atlantic	0.6	0.8	0.7
Skipjack Tuna	West Atlantic	0.001	0.01	0.004
Albacore Tuna	North Atlantic	0.4	0.6	0.7
Bluefin Tuna	West Atlantic	5.9	3.9	4.3
Blue Marlin	Atlantic	4.4	3.4	1.6
White Marlin	Atlantic	4.4	7.7	2.9
Sailfish	West Atlantic	7.9	14.2	1.8
Swordfish	North Atlantic	27.2	26.3	28.2

Note: Shark catches are reported as bycatch but are insufficient to determine relative proportions.

6.2.2 Marine Mammals

Of the marine mammals that are hooked by pelagic longline fishermen, many are released alive, although some animals suffer serious injuries and may die after being released. Mammals are caught primarily from June through December in the Mid-Atlantic Bight and Northeast Coastal areas. In the past, the incidental catch rate was highest, on average, in the third quarter (July - September) in the Mid-Atlantic Bight. Incidental catch of pilot whales in pelagic longlines is thought to result from pilot whales preying on tuna that have been caught on the gear.

6.2.3 Sea Turtles

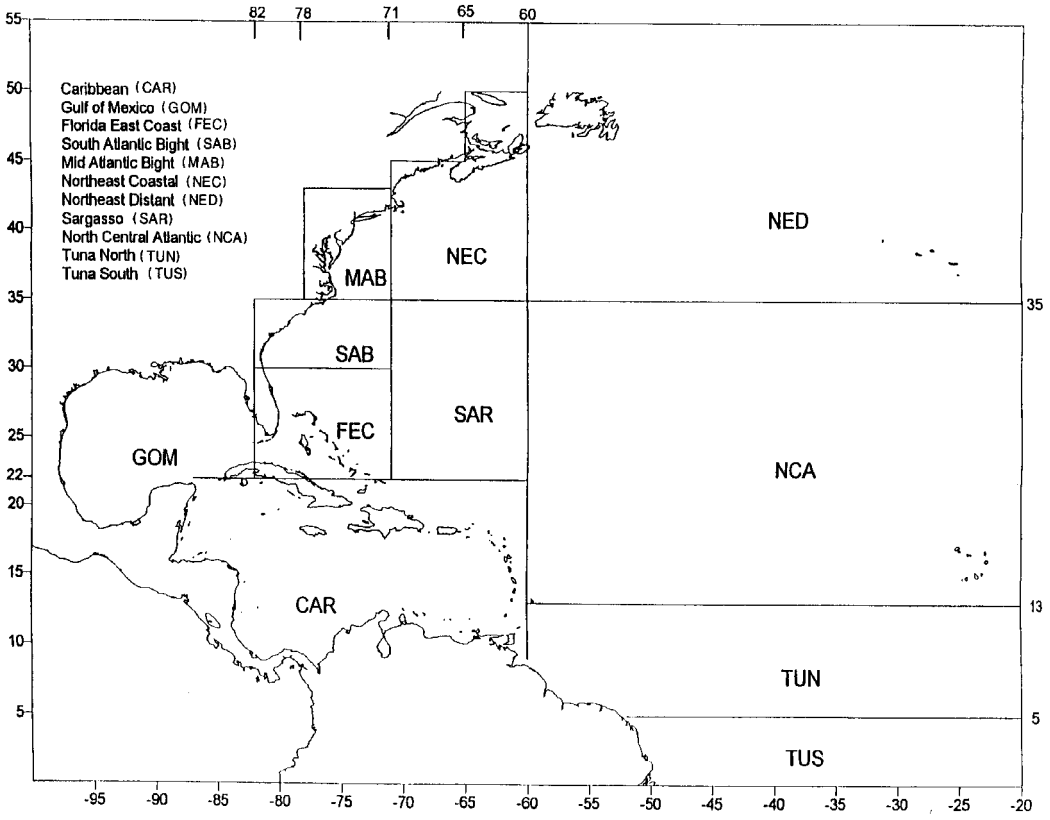
A summary of reported turtle takes from the pelagic logbook from 1995-1998 is provided in Table 6.2. Many of these turtles were taken in the Northeast Coastal (NEC) and Northeast Distant (NED) areas (Figure 6.2) and were released alive. In the past, the bycatch rate was highest in the third and fourth quarters. Loggerhead and leatherback turtles dominate the catch of turtles. In general, sea turtle captures are rare, but takes appear to be clustered (Hoey and Moore, 1999). Further information on sea turtle takes is provided in Section 5.8.

6.3 Regional U.S. Pelagic Longline Fisheries Description

Pelagic longline catch composition varies among the various areas of the operational range of the U.S. commercial fleet in the Atlantic Ocean. Hoey and Moore (1999) summarized historical observer data to describe catch composition of pelagic longline sets made during 1990 to 1997 in the statistical areas shown in Figure 6.2, including: Tropical (TUN, TUS); Caribbean (CAR); Western North Central Atlantic (SAR, NCA); Gulf of Mexico (GOM); Florida East Coast (FEC); South Atlantic Bight (SAB); Mid-Atlantic Bight (MAB); Northeast Coastal (NEC); and

Northeast Distant.

Figure 6.2. **Geographic areas used in summaries of pelagic logbook data from 1992 - 1998.** Source: Cramer and Adams, 2000.



6.3.1 The Gulf of Mexico Yellowfin Tuna Fishery

These vessels primarily target yellowfin tuna year-round; however, each port has one to three vessels that direct on swordfish either seasonally or year-round. Longline fishing vessels that target yellowfin tuna in the Gulf of Mexico also catch and sell dolphin, swordfish, and 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. Major home ports for this fishery include Panama City, FL; Destin, FL; Dulac, LA; and Venice, LA.

6.3.2 The South Atlantic ~ Florida East Coast to Cape Hatteras Swordfish Fishery

These pelagic longline vessels primarily target swordfish year-round. Yellowfin tuna and dolphin are other important marketable components of the catch. Smaller vessels fish shorter trips from

the Florida Straits north to the bend in the Gulf Stream off Charleston, South Carolina (Charleston Bump). Mid-sized and larger vessels migrate seasonally on longer trips from the Yucatan Peninsula throughout the West Indies and Caribbean Sea and some trips range as far north as the mid-Atlantic coast of the United States to target bigeye tuna and swordfish during the late summer and fall. Fishing trips in this fishery average nine sets over 12 days. Major home ports (including seasonal ports) for this fishery include Georgetown, SC; Cherry Point, SC; Charleston, SC; Fort Pierce, FL; Pompano Beach, FL; Dania, FL; and Key West, FL. This sector of the fishery consists of small to mid-size vessels which typically sell fresh swordfish to local high-quality markets.

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

This fishery has evolved during recent years to become an almost year-round fishery based on directed tuna trips, with substantial numbers of swordfish trips as well. Some vessels participate in the directed bigeye/yellowfin tuna fishery during the summer and fall months and then switch to bottom longline fisheries and/or shark fishing during the winter when the large coastal shark season is open. Fishing trips in this fishery sector average 12 sets over 18 days. During the season, vessels primarily offload in the major ports of Fairhaven, MA; Montauk, NY; Barnegat Light, NJ; Ocean City, MD; and Wanchese, NC. Some of these vessels follow the swordfish along the mid-Atlantic coast, then fish off the coast of the southeast United States during the winter months.

6.3.4 The U.S. Atlantic Distant Water Swordfish Fishery

This fleet's fishing grounds range virtually the entire span of the western North Atlantic to as far east as the Azores and the mid-Atlantic Ridge. About ten larger vessels operate out of mid-Atlantic and New England ports during the summer and fall months, and move to Caribbean ports during the winter and spring months. Many of the current distant water operations were among the early participants in the U.S. directed Atlantic commercial swordfish fishery. These larger vessels, with greater ranges and capacities than the coastal fishing vessels, enabled the United States to become a significant player in the north Atlantic fishery. They also fish for swordfish in the south Atlantic. The distant water vessels traditionally have been larger than their Southeast counterparts because of the distances required to travel to the fishing grounds. Fishing trips in this fishery tend to be longer than in other fisheries, averaging 30 days and 16 sets. Principal ports for this fishery range from San Juan, Puerto Rico through Portland, ME, and include Fairhaven, MA, and Barnegat Light, NJ.

6.3.5 The Caribbean Tuna and Swordfish Fishery

This fleet is similar to the southeast coastal fishing fleet in that both are comprised primarily of smaller vessels that make short trips relatively near-shore, producing high quality fresh product. Both fleets also encounter relatively high numbers of undersized swordfish at certain times of the year. Longline vessels targeting HMS in the Caribbean set fewer hooks per set, on average,

fishing deeper in the water column than the distant water fleet off New England, the northeast coastal fleet, and the Gulf of Mexico yellowfin tuna fleet. This fishery is typical of most pelagic fisheries, being truly a multispecies fishery, with swordfish as a substantial portion of the total catch. Yellowfin tuna, dolphin and, to a lesser extent, bigeye tuna, are other important components of the landed catch. Principal ports are St. Croix, U.S. Virgin Island; and San Juan, Puerto Rico. Many of these high quality fresh fish are sold to local markets to support the tourist trade in the Caribbean.

6.3.6 Regional Pelagic Longline Catches

As expected, swordfish dominates the catch in weight along the southeast coast and northeast areas (Table 6.5). Tuna catch dominates in the Gulf of Mexico and in the Mid-Atlantic Bight (Table 6.6). Blue marlin and sailfish are taken most frequently in the Caribbean and Gulf of Mexico; white marlin are also taken in these areas, as well as the northeast coastal area (Tables 6.7 and 6.8). Pelagic sharks and LCS (Table 6.9) are taken most frequently along the Atlantic coast. Further information on the distributional patterns of these species is provided in the HMS FMP and Billfish FMP Amendment.

Table 6.5. Regional Swordfish Pelagic Longline Catch: 1997 and 1998 (reported in pelagic longline ; areas defined as shown in Figure 6.2). Source: Cramer and Adams, 2000.

Area	Number Swordfish Caught	Percent Kept	Percent Discarded Dead	Percent Discarded Alive	Number Swordfish Caught	Percent Kept	Percent Discarded Dead	Percent Discarded Alive
	1997				1998			
CAR	8,029	84	7	7	5114	81	11	7
GOM	16,260	68	18	13	11306	74	13	11
FEC	13,200	66	20	13	13954	65	19	14
SAB	11,438	72	16	10	20008	71	15	12
MAB	4,240	53	24	21	7894	62	17	19
NEC	5,360	69	15	14	5877	68	16	14
NED	14,200	88	7	4	15621	84	7	7
SAR	336	91	4	4	25	100	0	0
NCA	2,931	94	2	3	4381	93	3	3
TUN	1,519	85	7	7	1117	79	11	9
TUS	9,114	92	4	3	4410	91	4	3
Total	**86,627**	**76**	**13**	**10**	**89707**	**75**	**13**	**11**

Table 6.6. Regional Pelagic longline catches of tunas (mt whole weight), by year and area, by U.S. pelagic longline fleet. Source: NMFS, 1999c.

Area	Tuna Species	1995	1996	1997	1998
NW Atlantic (areas MAB, NEC, FEC, NED)	Yellowfin	1277.6	728.3	838.9	464.9
	Skipjack	0.1	0.1	1.0	0.7
	Bigeye	669.4	333.0	476.3	544.3
	Bluefin	171.9	101.9	56.7	85.3
	Albacore	240.0	63.6	140.0	155.4
Gulf of Mexico (area GOM)	Yellowfin	1934.4	2164.8	2571.3	1864.5
	Skipjack	0.6	0.2	1.3	0.6
	Bigeye	71.4	30.9	33.9	25.6
	Bluefin	42.3	39.5	30.2	25.7
	Albacore	10.3	5.7	16.9	3.9
Caribbean (Areas SAR, NCA, CAR, TUN)	Yellowfin	351	34.2	135.4	58.6
	Skipjack	0.1	0	1.2	0
	Bigeye	109.4	32.8	50.0	48.5
	Bluefin	0	0	0	0
	Albacore	80.3	6.6	16.1	17.8
NC Area 94a	Yellowfin	18.6	319.3	6.1	4.6
	Skipjack	0	0	0	0
	Bigeye	135.3	228.9	91.8	48.4
	Bluefin	0	0	0	1.7
	Albacore	6.2	32.4	11.4	1.6
SW Atlantic (area TUS)	Yellowfin	0	38.4	221.9	55.3
	Skipjack	0	0	0	0
	Bigeye	0	34.9	142.8	28.5
	Bluefin	0	0	0	0
	Albacore	0	1.1	4.7	1.4

Table 6.7. **Number of blue marlin, white marlin and sailfish discarded (dead and alive), by area, from U.S. commercial longline vessels, based on pelagic logbook reports .** Source: Cramer and Adams, 2000.

Area	Blue Marlin Discards			White Marlin Discards			Sailfish Discards		
	96	97	98	96	97	98	96	97	98
CAR	463	295	156	171	154	118	44	40	38
GOM	646	512	558	490	392	418	586	623	434
FEC	204	171	246	109	100	210	303	192	183
SAB	386	156	130	290	142	126	248	121	108
MAB	53	38	25	315	224	166	20	3	8
NEC	262	54	44	459	419	146	10	3	4
NED	3	3	33	12	8	18	0	1	1
SAR	6	1	0	33	16	0	2	0	0
NCA	137	70	46	160	105	112	21	7	3
TUN	819	605	58	423	251	138	188	222	30
TUS	120	398	29	37	589	42	44	550	26
Total	3,099	2,303	1,295	2,501	2,450	1,494	1,466	1,762	835

Table 6.8. **U.S. commercial dead discards (mt ww) and recreational landing estimates (mt) of Atlantic Marlins for 1994, 1995 and 1996.** Source: NMFS, 1999c.

	1996	1997	1998	1996	1997	1998	1996	1997	1998
	Atlantic Blue Marlin			**Atlantic White Marlin**			**Atlantic Sailfish**		
Northwest Atlantic									
Longline Discards	37.3	18.7	23.3	25.3	11.2	15.3	19.2	9.2	6.4
Rod & Reel	18	25	34.1	2.7	0.9	2.4	0.2	0	0.1
Unclassified			0.62			0.7			0.06
Gulf of Mexico									
Longline Discards	24.7	51	18.5	11.6	15.4	11.8	42.1	13.3	17.0
Rod & Reel	8.3	11.5	4.5	0.6	0.9	0.2	0.8	0.4	1.0
Caribbean									
Longline Discards	124.7	24.6	2.3	26.6	6.6	1.3	8.2	3.3	0.2
Rod & Reel	9.6	8.6	10.6	0	0	0.02	0.2	0.2	0.05
Other	0	0	0	0	0	0	0	0	0
Unknown									
Longline Discards	8.6	2.3	6.1	3.9	0.5	2.8	1.9	0	0.8
Southwest Atlantic									
Longline Discards	1.24	41.5	1.6	0.2	37.1	0.9	0.2	31.9	2.7
All Gear Totals	231.4	183.2	101.6	70.9	72.6	35.4	72.8	58.3	28.3
Rod & Reel Totals	34.9	45.1	49.2	3.3	1.8	2.6	1.2	0.6	1.15
Percent U.S. Reported Mortality Attributed to Pelagic longline gear	84.9	75.4	51.6	95.3	97.5	92.7	98.3	99.0	95.9

Table 6.9. **Regional U.S. Atlantic Pelagic Longline Catches of Sharks in 1998.** Source:(Task I data submitted to ICCAT, 1999, not a complete set of shark landings)

Region	**Pelagic Sharks**			
	Dead Discards (number of fish)	**Landings (number of fish)**	**Dead Discards (number of fish)**	
Gulf of Mexico	288	393	458	653
Atlantic Coast	3259	2832	2604	6203
Caribbean	129	58	5	0
Atlantic-Distant	2651	662	1	5
South Atlantic	113	17	49	0

6.3.7 Pelagic Longline Vessel Characteristics

An important component to consider in the evaluation of possible impacts of various management alternatives (Section 7) are the physical characteristics of the U.S. pelagic longline fleet, including where vessels are homeported (Figure 6.3). The size of the vessel limits the range within which a pelagic longline vessel can safely operate (distance from home port and from shore). In a recent study of the pelagic longline fleet, Larkin *et al.* (1998) found that the average length of Atlantic pelagic longline vessels in 1996 was 57 feet (range 30-95 feet). The distribution of pelagic longline vessel lengths (by increments of 10 feet) with either a directed or incidental permit that would allow landings of swordfish, tuna and/or sharks are shown in Figure 6.4. Pelagic longline vessels were divided into three groups: vessels with home ports north of 36° N. latitude, those south of 36° N. latitude, and vessels homeported in the Gulf of Mexico. Vessels fishing out of the east coast of Florida to North Carolina are smaller than other areas, with lengths generally 50 feet or less. This is indicative of vessels that make short trips to the swordfish and tuna fishing grounds along the southeastern U.S. coast that are relatively close to shore. Vessels homeported out of the northeastern United States are larger (most over 50 feet), reflecting the distance these vessels must travel to the productive fishing areas. The vessels in the Gulf of Mexico are intermediate in size relative to those along the U.S. Atlantic coast, with the modal group in the 60 foot range.

Figure 6.3. Frequency distribution, by homeport state, of pelagic longline vessels with directed or incidental limited access HMS permits. Source: NMFS permit database, October 1999.

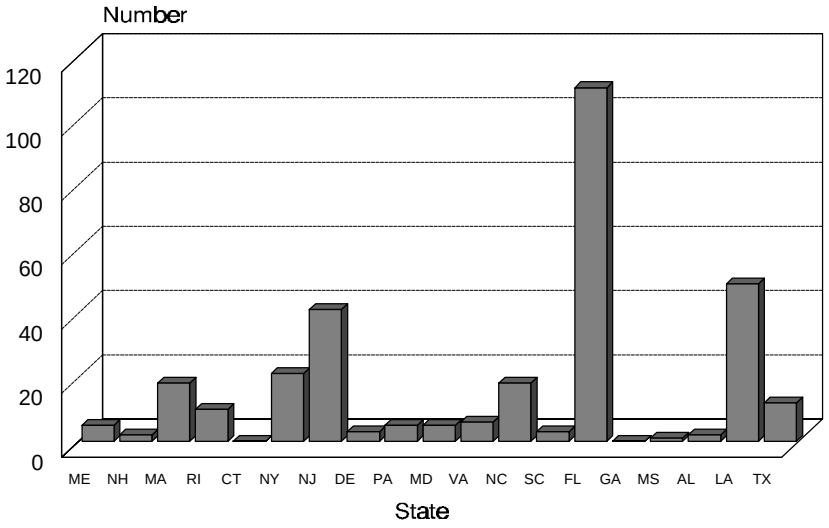
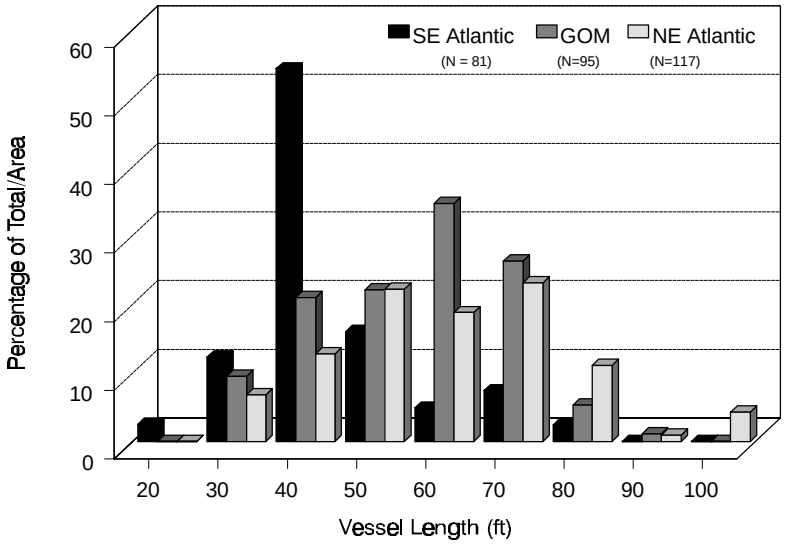


Figure 6.4. **Distribution of vessel lengths with home ports from the Gulf of Mexico, the southeastern U.S. Atlantic coast (south of 36^{0} N latitude) and northeastern U.S. Atlantic coast (north of 36^{0} N latitude).** Source: NMFS Permit database, October 1999.



6.4 Economics of Pelagic Longline Fishing

6.4.1 Costs

The average cost of a pelagic longline trip was estimated from a description of the voluntary 1996 trip summary report data (Larkin *et al.*, 1998). The data requested on the trip summary forms include cost data for fuel, bait, groceries, light sticks, and miscellaneous expenses (including docking and unloading fees). In addition, the form requested the amounts paid to the crew, captain, and vessel owner per trip. The average costs per trip are summarized in Table 6.10, based on reports from 95 vessels that submitted the voluntary economic information for 488 trips taken during 1996. Ward and Hanson (1999) also examined the pelagic logbook voluntary form. They used data from 1996 through 1998 and found the total average cost per pelagic longline trip to be $5,284 with a standard deviation of $6,406 (1,932 trips); these average cost estimates are somewhat lower than the Larkin *et al.* (1998) study that examined only 488 trip (vs 1,932 trips) from 1996 (vs 1996 to 1998 average). They also found in 1996 and 1997 (Table 6.11) that the average trip cost was $2,965 with a standard deviation of $4277 (1,583 trips), not including payments to the captain and crew. Additional data may reduce some of the variability found in the database.

Strand and Mistiean (1999) found that Gulf of Mexico vessels use more fuel and light sticks per set, and capture more tuna and swordfish per set than Atlantic vessels (Table 6.12). Note that this study did not consider the distant water fleet in their calculations because they do not represent the majority of the vessels fishing in the Atlantic. Fuel costs are considerably lower in the Gulf but the seasonal economics of the longline fishery (in both the Atlantic and the Gulf) may be largely dependent on the migrations of tunas and swordfish. Large variation in costs, up to $200 per set, were found to exist depending on the time of year and the area of operation.

Table 6.10. **Average variable cost per pelagic longline trip for 1996.** Source: Larkin *et al.*, 1998.

Cost Category	Average Cost
Light Sticks	$801
Fuel	$1,400
Bait	$1,506
Ice	$384
Groceries	$617
Miscellaneous	$2,623
TOTAL	**$7,331**

Table 6.11. **Average percent and value of the cost components of pelagic longline trips: 1996-1997.** Source: Ward and Hanson, 1999.

Cost Category	**Average Cost**
Fuel	$876
Bait	$646
Ice	$350
Freight/Handling	$350
Groceries	$441
Light Sticks	$302
Total	**$2,965**

Table 6.12. **Average characteristics of trips and sets, by region and season.** Source: Strand and Mistiean, 1999.

Characteristics	**Sample of Atlantic Vessels**		**Sample of Gulf of Mexico Vessels**		**Entire Sample**
	January-March	April-December	January-March	April-December	January-December
Fuel/trip (gals)	451	715	1660	1684	990
Number of Lightsticks/trip	726	577	1749	755	929

Characteristics	Sample of Atlantic Vessels		Sample of Gulf of Mexico Vessels		Entire Sample
Price of fuel ($/gal)	1.02	0.99	0.74	0.77	0.91
Price of light sticks ($/light stick)	0.50	0.52	0.51	0.53	0.52
Swordfish Harvest/set	8.9	11.8	32.8	13.1	14.1
Tuna harvest/set	2.9	13.4	14.0	18.9	13.3
Sets per trip	2.9	3.5	6.0	5.7	4.2

6.4.2 Revenues

Many consumers consider swordfish to be a premier seafood product. Swordfish that bring $3.00 per pound to the vessel may sell in some restaurants at prices of over $20.00 for a six-ounce steak. Swordfish prices are affected by a number of demand and supply factors, including the method of harvest, either by distant-water or inshore vessels, and by gear type (harpoon vs. pelagic longline). Generally, prices for fresh swordfish can be expected to vary during the month due to the heavier fishing effort around the period of the full moon. Swordfish prices also vary by size and quality, with prices first increasing with size, up to about 250 lbs, then decreasing due to higher handling costs for larger fish. "Marker" swordfish weighing 100 to 275 lbs are preferred by restaurants because uniform-sized dinner portions can be cut with a minimum of waste. "Pups" weighing 50 to 99 lbs dw are less expensive than markers but the yield of uniformly sized portions is smaller. "Rats" (33 to 49 lbs dw) are the least expensive but are generally not used by food service or retail buyers who require large portions of uniform size. Larger tunas are also more desirable than smaller ones with prices for tunas ranging from $1.00-1.50 for 0-29 pound yellowfin tuna to $1.50-3.00 for 50+ pound yellowfin tuna (Strand and Mistiean, 1999). Size of fish harvested can be a substantial factor in management because regulations might have the effect of reducing catch but might raise the average size per fish caught and therefore, raise the price.

However, just as costs can vary seasonally and depending on region, prices also might exhibit patterns at different ports and during different times of the year. Demand for swordfish was shown to be stronger during the second and third quarters of the year (Thunberg and Seale, 1992), reflecting the popularity of swordfish steaks during the barbecue and seaside tourist seasons. There is evidence of regional differences in price. The eastern Gulf of Mexico, for example, receives relatively low prices for swordfish and near average prices for tuna (Strand and Mistiean, 1999).

ICCAT quotas for Atlantic swordfish have decreased. Although studies (Gauvin 1990; Thunberg and Seale, 1992) demonstrate that ex-vessel gross revenues may rise as supply decreases and as U.S. consumer income rises, U.S. prices have declined over the past four years (Table 6.13). The combination of decreased prices and decreased quota indicates that total gross revenues for the

fleet as a whole have probably declined as well. Declining prices for swordfish may be the result of substitution with imports which occur during critical months of the year; imports of swordfish have increased dramatically in recent years. The relatively strong U.S. dollar and weak Japanese Yen may be drawing fish that were formerly marketed in Asia to the domestic market, including swordfish and steak-grade tuna that compete with U.S. domestic swordfish.

Table 6.13. Index of ex-vessel prices for swordfish and tunas, 1989 - 1998. Base year is 1982. Source: NMFS, 1999a.

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Swordfish	119	108	102	111	92	107	104	103	91	70
Tunas	108	112	126	97	117	181	212	105	118	96

6.4.3 Imports

NMFS has identified 69 swordfish importers who have imported swordfish since the swordfish import permitting, reporting and small fish restrictions were implemented in June 1999. Recent import data collected from the importer activity reports (part of dealer bi-weekly reports) and the Certificates of Eligibility are summarized in Table 6.14. These data are limited because the program was not implemented until mid-year 1999.

Dealers submit reports to NMFS on swordfish sales that include the weight and price of the fish. The processing and wholesale sectors are an integral part of the U.S. swordfish industry and are described in detail in the HMS FMP. The sector that might be most affected by this rulemaking is the primary processing sector, notably those firms that purchase the raw product from fishermen or importers and transform it into a consumer product. Secondary processors provide restaurants and food service distributors with loins or “wheels” (large bone-in sections cut through the body).

Other participants involved in the commercial trade sector of the Atlantic swordfish fishery include brokers, freight forwarders, carriers (primarily commercial airlines), and consignees. Brokers are private individuals or companies who are hired by importers and exporters to help move their merchandise through U.S. Customs with the proper paperwork and payments. The broker must possess thorough knowledge of tariff schedules and U.S. Customs regulations and keep abreast of changes in the law and administrative regulations. Freight forwarders often arrange for land transportation and storage facilities for the incoming shipment. The nominal or an ultimate consignee is the person who “owns” the shipment of swordfish.

Table 6.14. Swordfish Import Data Collected under the Swordfish Import Monitoring Program (lbs). June - September 1999 totals. Based on data received through November 15, 1999.

Flag Country of Vessel	Ocean of Harvest				Total
	Atlantic	Pacific	Indian	Unknown	
Australia	0	394060.3	72900.7	6938.8	473899.8
Brazil	796966.8	0	0	0	796966.8
Canada	565248	0	0	0	565248
Chile	0	901326.5	0	0	901326.5
Columbia	0	192.5	0	0	192.5
Costa Rica	0	257504.3	0	0	257504.3
Ecuador	0	52658.3	0	0	52658.3
El Salvador	0	8768	0	0	8768
Fiji Islands	0	52017.6	0	0	52017.6
Grenada	2607	0	0	0	2607
Guam	0	1905	0	0	1905
Indonesia	0	0	74854.3	0	74854.3
Japan	0	163100	0	0	163100
Mexico	0	101845.4	0	0	101845.4
Micronesia	0	542	0	0	542
Namibia	0	0	0	0	0
Netherlands	1597	0	0	0	1597
New Zealand	0	177731.9	0	0	177731.9
Panama	0	243.9	0	0	243.9
Peru	929.4	2374	0	0	3303.4
Philippines	0	30568	0	0	30568
Samoa	0	1204	0	0	1204
South Africa	1262258	0	0	0	1262258
Taiwan	100348	29400	2537219	0	2666967
Trinidad	837	0	0	0	837
Uruguay	156845.1	0	0	0	156845.1
Vietnam	0	5044.1	0	0	5044.1
Unknown	0	0	0	332113.7	332113.7
Totals	2887636.2	2180485.8	2684974.1	339052.5	8092148.6

6.5 Management of the U.S. Atlantic Pelagic Longline Fishery

The U.S. Atlantic pelagic longline fishery is subject to numerous management measures designed to meet conservation goals, as well as provide scientific information for optimal management of these resources. The pelagic longline fishery is restricted to catching a limited swordfish quota, divided between the North and South Atlantic (separated at 5° N. latitude). Other regulations include minimum sizes for swordfish, yellowfin, bigeye, and bluefin tuna, limited access permitting, reporting requirements (including logbooks and vessel monitoring systems), and gear requirements (temporary restrictions on length of line). The pelagic longline fishery is subject to a high level of management, and as such, is strictly monitored to avoid overharvest of the swordfish quota and to monitor bycatch.

Pelagic longline fishermen and the dealers who purchase highly migratory species from them are also subject to reporting requirements. NMFS has extended dealer permitting and 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.

Current billfish regulations prohibit the retention of billfish by commercial longline vessels, and the sale of billfish from the Atlantic Ocean. As a result, all billfish hooked on longlines must be released, and are considered bycatch.

Pelagic longlines were not historically part of the bluefin tuna fishery in the United States. For this reason, their catch is considered incidental and NMFS has implemented regulations to discourage longline fishermen from targeting bluefin tuna and to limit the incidental catch of this species. As a result of these regulations, bluefin tuna are often discarded.

In 1997, NMFS convened the Longline Advisory Panel which investigated strategies for comprehensive management of this fishery, because of its multispecies nature. The meetings of that group with NMFS staff resulted in a report to Congress which outlined possible changes in management to address fishermen's concerns. NMFS will continue to use this document to guide management in an effort to move towards ecosystem management of Federal fisheries. That report supported limited access, which is currently in place for pelagic longline fishermen targeting Atlantic highly migratory species. Limited access imparts a greater vested interest in the future of the fishery, and provides incentive for stock rebuilding and bycatch reduction. Further, the HMS and Atlantic Billfish APs have considered numerous pelagic longline issues in the development of the HMS FMP, Billfish FMP Amendment, and this final rule.