6.0 ECONOMIC EVALUATION

This section assesses the economic impacts of the alternatives presented in this document. Additional economic and social considerations and information are discussed in Chapters 4, 7, 8, and 9 of this document and Chapter 5 of the annual SAFE report.

6.1 NUMBER OF FISHING AND DEALER PERMIT HOLDERS

6.1.1 Number of Commercial Permit Holders and Dealers

The HMS FMP established six different limited access permit types: 1) directed swordfish, 2) incidental swordfish, 3) swordfish handgear, 4) directed shark, 5) incidental shark, and 6) tuna longline. To reduce bycatch concerns in the pelagic longline 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. Swordfish handgear and shark permits are valid without another limited access permit.

As of November 2003, approximately 235 tuna longline vessel permits had been issued. In addition, approximately 203 directed swordfish limited access permits, 100 incidental swordfish limited access permits, 249 directed shark limited access permits, and 357 incidental shark limited access permits had been issued. Excluding swordfish handgear limited access permits, the total number of HMS limited access permits, as of November 2003, are provided in Table 6.1.

Table 6.1 HMS Limited Access Permits as of November, 2003. Source: NOAA Fisheries permit database

Permit	Number Issued
Tuna Longline	235
Swordfish (Directed & Incidental)	303
Shark (Directed & Incidental)	606

Because pelagic longline vessels must possess a Tuna Longline permit, a Swordfish permit (directed or incidental), and a Shark permit (directed or incidental) to be considered valid, the maximum number of vessels potentially affected by this action is 303 (*e.g.* the number of limited access swordfish permits issued). Since 1999, the number of valid limited access Swordfish permits has decreased by approximately 33 percent, the number of Tuna longline permits has declined by approximately 48 percent, and the number of Shark limited access permits has declined by approximately 31 percent. The decrease in the number of permit holders may be attributable to a variety of reasons. For a description of possible reasons, please see Chapter 9 of the 2003 SAFE Report (NOAA Fisheries 2003).

The addresses of limited access swordfish permit holders range from Texas through Maine, with Florida (105), New Jersey (49), Louisiana (42), New York (21), North Carolina (19), Massachusetts (14), and Texas (13) representing the states with the most permitted swordfish limited access vessels, as of October 2003.

Not all valid and permitted HMS longline vessels actually report fishing with pelagic longline gear in the logbooks (considered "active"). In 2002, 148 vessels reported pelagic longline activity in the pelagic logbook. Table 6.2 lists the number of active pelagic longline vessels from 1990 to 2002. The number of active vessels has been decreasing since 1994.

Table 6.2 **The Number of Vessels that Reported Fishing with Pelagic Longline Gear in the Pelagic Logbook.** Source: Pelagic Logbook data.

Year	Number of active vessels	Year	Number of active vessels
1990	416	1997	350
1991	333	1998	268
1992	337	1999	224
1993	434	2000	199
1994	501	2001	161
1995	489	2002	148
1996	367	-	-

In general, the number of vessels reporting fishing in each area has also been decreasing. In 2002, most vessels fished, at least part of the year, in the Gulf of Mexico, the mid-Atlantic Bight, and the South Atlantic Bight (Table 6.3). Since 1997, the number of vessels reporting fishing in the NED has ranged from 22 to 9 vessels, with an average of 14 vessels.

Table 6.3 **The Number of Vessels that Reported Fishing with Pelagic Longline Gear by Area.** Source: Pelagic Logbook data. Note: Vessels that fish in more than one area during the year are counted in both areas. CAR: Caribbean, GOM: Gulf of Mexico, FEC: Florida east coast, SAB: South Atlantic Bight, MAB: mid-Atlantic Bight, NEC: Northeast Coastal, NED: Northeast Distant, SAR: Sargasso, NCA: North Central Atlantic, TUN: tuna north, TUS: tuna south

Area	1997	1998	1999	2000	2001	2002	Total
CAR	45	30	18	18	19	12	142
GOM	118	98	89	79	79	68	531
FEC	73	69	53	52	43	28	318
SAB	67	53	45	46	45	39	295

MAB	81	64	68	59	60	58	390
NEC	57	40	39	36	40	34	246
NED	22	15	10	13	9	15	84
SAR	11	9	4	5	4	9	42
NCA	24	12	9	6	8	6	65
TUN	21	12	9	5	8	7	62
TUS	21	11	8	3	3	5	51
Total	540	413	352	322	318	281	2,226

As of October 2002, there were 321 dealers permitted to buy Atlantic swordfish, 479 dealers permitted to buy Atlantic tunas, and 267 dealers permitted to buy Atlantic sharks. Dealer addresses ranged from Texas through Maine, with Florida, Massachusetts, New York, New Jersey, North Carolina, and Louisiana having the most permitted dealers. Because many dealers possess more than one permit, the number of potentially impacted small entities is expected to be approximately 500, but could range from 479 to as many as 1067 dealers. NOAA Fisheries believes that all permit holders and related businesses (e.g. bait shops, gear manufacturers, gear distributors, processors, exporters) could experience a range of ecological, economic, and social impacts because of the alternatives described in this document. These impacts are described in Chapter 4 of this document. Additional economic information is provided in this section.

6.2 GROSS REVENUES OF PELAGIC LONGLINE VESSELS

Gross revenues of pelagic longline vessels vary greatly depending upon fishing location, target species, species availability, and unique characteristics of a vessel's fishing trips. In recent years, several analyses have been conducted to examine average annual gross revenues of pelagic longline vessels targeting HMS (Porter *et al.*, 2001; NOAA Fisheries, 2000; and, NOAA Fisheries, 2002). These studies indicate average annual vessel gross revenues ranging from $113,173.00 (NOAA Fisheries, 2000) to $250,000.00 (Porter *et al.*, 2001). These studies confirm that annual and trip-specific gross revenues are highly variable among vessels, probably due to the diversity of the pelagic longline fleet. Other factors contributing to the wide variability of average annual gross revenue estimates include changes in the number of permitted vessels and changes in ex-vessel prices. In general, swordfish, yellowfin tuna, and bigeye tuna contribute the most revenue, among HMS species, to pelagic longline vessels. One study also found that sandbar sharks are an important source of revenue (Larkin *et al.*, 2000).

Using numbers of fish landed as reported in 2002 pelagic longline logbooks (Table 6.4) and the average weight per fish (Table 6.5), NOAA Fisheries calculated 2002 landings, by weight (Table 6.6). Then, using 2002 ex-vessel prices for Atlantic HMS (Table 6.7), NOAA Fisheries calculated the annual overall gross revenue of the pelagic longline fleet. The annual gross revenue estimate was then divided by the 148 active vessels reporting landings to derive an

average annual gross revenue per vessel. These calculations indicate an overall 2002 annual gross revenue estimate for the pelagic longline fleet of approximately 26.4 million dollars (Table 6.8). The average pelagic longline vessel is estimated to produce annual gross revenues of approximately $178,618.58 in 2002. This value is a fleet-wide estimate for all Atlantic HMS vessels reporting landings. Please note that updated 2002 ex-vessel prices were utilized in this FSEIS. Because the updated prices were lower than those previously reported in the DSEIS, the average annual gross vessel revenue is lower.

Most HMS revenues were derived from landings of swordfish (11.4 million dollars), yellowfin tuna (10.6 million dollars), and bigeye tuna (3.1 million dollars). Five statistical regions accounted for over 80 percent of HMS landings revenue: the Gulf of Mexico (41.37%); the Mid-Atlantic Bight (14.25%); the Northeast Distant area (10.07%); the Northeast Coastal area (8.33%); and, the South Atlantic Bight (8.24%).

Table 6.4 **2002 PLL Landings (numbers of fish) by Statistical Region.** Source: Pelagic Longline Logbook data maintained by the Southeast Fisheries Science Center. CAR: Caribbean, GOM: Gulf of Mexico, FEC: Florida east coast, SAB: South Atlantic Bight, MAB: mid-Atlantic Bight, NEC: Northeast Coastal, NED: Northeast Distant, SAR: Sargasso, NCA: North Central Atlantic, TUN: tuna north, TUS: tuna south

	SWO	BFT	Pel	LCS	BET	YFT	ALB	SKJ
CAR	4084	0	24	1	262	154	66	0
FEC	3344	16	73	29	3259	1550	946	0
GOM	8356	101	112	148	715	44207	239	57
MAB	6064	8	1914	2318	3890	7441	3159	13
NCA	2724	1	38	0	822	386	563	0
NEC	4612	10	417	13	1225	3429	1000	0
NED	8649	34	240	0	1173	19	282	0
OTH	47	0	3	0	1	36	0	0
SAB	8488	1	106	1567	40	1599	42	0
SAR	1236	7	18	1	336	81	229	0
TUN	761	0	37	0	1490	277	220	0
TUS	995	0	15	0	618	249	29	0

Table 6.5 **The 1998 Average Ex-vessel Weight (lb dw) Used to Estimate 2002 Landings by Weight.** Data reported to the Southeast Fisheries Science Center

Species	Avg Weight (lb dw)
Swordfish	71.77
Bluefin Tuna	606.69
Yellowfin Tuna	60.29
Bigeye Tuna	67.64
Other Tunas	31.06
Large Coastal Sharks	40.36
Other Sharks	90.82
Other Fish	24.58

Table 6.6 **2002 PLL Landings (lbs dw) by Statistical Region.** Source: Pelagic Longline Logbook data maintained by the Southeast Fisheries Science Center. CAR: Caribbean, GOM: Gulf of Mexico, FEC: Florida east coast, SAB: South Atlantic Bight, MAB: mid-Atlantic Bight, NEC: Northeast Coastal, NED: Northeast Distant, SAR: Sargasso, NCA: North Central Atlantic, TUN: tuna north, TUS: tuna south

	SWO	**BFT**	**Pelagic Sharks**	**LCS**	**BET**	**YFT**	**ALB**	**SKJ**	**Total**
CAR	293,109	0	2,180	40	17,722	9,285	2,050	0	324,386
FEC	239,999	9,707	6,630	1,170	220,439	93,449	29,383	0	600,777
GOM	599,710	61,276	10,172	5,973	48,363	2,665,240	7,423	1,770	3,399,927
MAB	435,213	4,854	173,829	93,554	263,120	448,618	98,119	404	1,517,711
NCA	195,501	607	3,451	0	55,600	23,272	17,487	0	295,918
NEC	331,003	6067	37,872	525	82,859	206,734	31,060	0	696,120
NED	620,739	20,627	21,797	0	79,342	1,146	8,759	0	752,410
OTH	3,373	0	272	0	68	2,170	0	0	5,883
SAB	609,184	607	9,627	63,244	2,706	96,404	1,305	0	783,077
SAR	88,708	4,247	1,635	40	22,727	4,883	7,113	0	129,353
TUN	54,617	0	3,360	0	100,784	16,700	6,833	0	182,294
TUS	71,411	0	1,362	0	41,801	15,012	901	0	130,487
Total	3,542,567	107,992	272,187	164,546	935,531	3,582,913	210,433	2,174	8,818,343

Table 6.7 **Average Ex-vessel Prices per lb dw for Atlantic HMS in 2002.** Source: NOAA Fisheries, 2004; Dealer weigh-out slips from the Southeast Fisheries Science Center and Northeast Fisheries Science Center, and bluefin tuna dealer reports from the Northeast Regional Office.

Species	Average for Gulf of Mexico only	Average for S. Atlantic region only	Average for Mid-Atlantic region only	Average for N. Atlantic region only
Bigeye tuna	$4.33	$2.45	$3.81	$4.02
Bluefin tuna	$5.56	$3.77	$4.70	$7.30
Yellowfin tuna	$3.23	$1.73	$2.02	$2.90
Other tunas	$0.84	$0.49	$0.73	$1.17
Swordfish	$2.91	$3.14	$3.24	$3.47
Large coastal sharks	$0.35	$1.27	$1.56	$0.79
Pelagic sharks	$1.11	$0.66	$1.17	$1.00
Small coastal sharks	$0.48	$0.53	$0.48	$0.58
Shark fins	$22.64	$17.09	-	-

Table 6.8 **2002 Gross Revenues ($) by Statistical Region.** Source: Landings to derive dollar values are from the Pelagic Longline Logbook data maintained by the Southeast Fisheries Science Center. CAR: Caribbean, GOM: Gulf of Mexico, FEC: Florida east coast, SAB: South Atlantic Bight, MAB: mid-Atlantic Bight, NEC: Northeast Coastal, NED: Northeast Distant, SAR: Sargasso, NCA: North Central Atlantic, TUN: tuna north, TUS: tuna south

	SWO	BFT	Pelagic Sharks	LCS	BET	YFT	ALB	SKJ	Total
CAR	921,008	0	1,450	50	43,492	16,078	1,011	0	983,089
FEC	754,125	36,624	4,409	1,490	540,985	161,821	14,490	0	1,513,944
GOM	1,746,861	340,811	11,315	2,124	209,647	8,619,240	6,214	873	10,937,086
MAB	1,412,446	22,822	203,333	145,909	1,004,805	905,468	72,014	200	3,766,997
NCA	614,304	2,290	2,296	0	136,450	40,299	8,623	0	804,261
NEC	1,150,159	44,351	37,785	404	333,547	599,813	36,331	0	2,202,360
NED	2,156,925	150,681	21,747	0	319,369	3,324	10,245	0	2,662,292
OTH	10,599	0	181	0	167	3,758	0	0	14,705
SAB	1,914,179	2,290	6,404	80,506	6,640	166,938	643	0	2,177,600

SAR	278,738	16,024	1,087	50	55,775	8,455	3,508	0	363,639
TUN	189,782	0	3,352	0	405,679	48,453	7,993	0	655,259
TUS	224,388	0	906	0	102,585	25,995	444	0	354,318
Total	11,373,514	615,863	294,265	230,533	3,159,141	10,599,643	161,517	1,072	26,435,550

6.3 VARIABLE COSTS AND NET REVENUES OF PELAGIC LONGLINE FISHING

In 2003, NOAA Fisheries initiated mandatory cost earnings reporting for selected vessels to improve the economic data available for all HMS fisheries. Currently, however, there are little additional data or new reports regarding fishing costs and revenues. Most of the studies regarding pelagic longline variable costs and net revenues available to NOAA Fisheries analyze data from 1996 and 1997, which remain the best available estimates on the potential costs of pelagic longline fishing. Where noted, NOAA Fisheries has converted 1996 and 1997 dollars to 2002 dollars using the consumer price index on-line inflation calculator provided by the Bureau of Labor Statistics (http://www.bls.gov/cpi/home.htm).

Larkin *et al.* (2000) examined 1996 logbooks and the 1996 voluntary economic forms and found that net returns to a vessel owner varied substantially depending on the vessel size and the fishing behavior (i.e. sets per trip, fishing location, season, target species). They found that out of 3,255 pelagic longline trips reported in 1996, 642 pelagic longline trips provided the voluntary economic information. Larkin *et al*. (2000) suggest using median values (half of the fleet is less than this value and half is above) instead of mean values (the average of all vessels) given the high degree of skewness to the data. For example, the mean owner's share of a trip is $4,412 while the median is $2,242. Larkin *et al*. (2000) suggest that the median values identify the characteristics of the majority of the fleet better than the mean, which can be influenced by outliers (a few vessels that may not be similar to the rest of the fleet). The mean supply costs per trip for the vessels sampled was $5,959 and median was $3,666 (Table 6.9). This changed depending on area fished with the median ranging from $1,928 in the area between North Carolina and the east coast of Florida (FEC to MAB) and $10,100 in the Caribbean. Vessels in the NED area (Maine to Virginia region in Larkin *et al*. (2000)) had a median supply cost per trip of $2,831 or $3,246 in 2002 dollars. For the entire fleet, Larkin *et al*. (2000) found that the average net revenues per vessel per trip was $7,354 ($8,432 in 2002 dollars). Vessels fishing in the Caribbean and Maine to Virginia areas had the largest average net returns to the vessel owner per trip at $12,188 and $6,672, respectively ($13,975 and $7,650, respectively, in 2002 dollars). Generally, Larkin *et al*. (2000) found that vessels that were between 46 and 64 feet in length, had between 10 and 21 sets per trip, fished in the second quarter, fished in the Caribbean, or had more than 75 percent of their gross revenues from swordfish had the highest net return to the owner (ranging from $3,187 to $13,097 per trip) while vessels that were less than 45 feet in length, had between one and three sets per trip, fished in the first quarter, fished between North Carolina and Miami, FL, or had between 25 and 50 percent of their gross revenues from swordfish had the lowest net return to the owner (ranging from $642 to $1,885 per trip).

Table 6.9 **The Cost-earnings Characteristics of 1996 Pelagic Longline Trips.** Source: Larkin *et al*. 2000. Note: Numbers in the table are in 1996 dollars and denote the median not the mean, unless otherwise noted.

Variable	All trips	Region			
		ME to VA	NC to FL	TX to FL	Caribbean
Number of trips	642	86	189	319	47
Number of crew	4	3	2	4	4
Total Gross Revenues	$8,916	$7,060	$4,826	$9,387	$26,227
Fuel costs	$1,031	$753	$410	$1,266	$1,970
Bait costs	$960	$965	$590	$1,000	$2,705
Ice costs	$256	$185	$150	$330	$300
Light sticks	$360	$94	$198	$597	$1,295
Miscellaneous costs	$305	$171	$42	$821	$1,560
Total costs	$3,666	$2,831	$1,928	$5,230	$10,100
Net return to owner	$2,242	$2,671	$1,740	$2,022	$8,020
Mean net return to owner	$4,412	$6,672	$3,679	$3,099	$12,188

Porter *et al*. (2001) conducted a survey of 147 vessels along the Atlantic and Gulf of Mexico (110 surveys were completed) in 1998 regarding 1997 operations. Survey information was combined with trip tickets and logbook data. They found that on average, vessels received approximately $250,000 annual gross revenues, annual variable costs were approximately $190,000, and annual fixed costs were approximately $50,000. Thus, vessels were left with approximately $8,000 to cover depreciation on the vessel and the vessel owner lost approximately $3,500 per year. On a per trip level, gross revenues averaged $22,000 and trip expenses, including labor, were $16,000. Labor cost the owner the most (43 percent), followed by gear. Generally trip returns were divided so the vessel owner received 43 percent and the captain and crew 57%. Porter *et al*. (2001) noted that 1997 was probably a financially poor year due to a reduction in swordfish quota and a subsequent closure of the fishery (this fishery has not been closed since). Similar to Larkin *et al*. (2000), Porter *et al*. (2001) noted differences between region, vessel size, and target species. While all vessels had an average net return per trip of $5,556 ($6,228 in 2002 dollars), vessels that fished in the New England or Caribbean regions had much higher net returns per trip at $20,772 and $18,940, respectively ($23,283 and $21,229, respectively in 2002 dollars) (Table 6.10).

Table 6.10 **Cost-earnings Characteristics of an Average 1997 Pelagic Longline Trip.** Source: Porter *et al*., 2001. Note: Numbers in the table are in 1997 dollars and denote the mean.

Variable	All vessels	Region				
		New England	Mid-Atlantic	South Atlantic	Gulf of Mexico	Caribbean
Length of trip	13	36	12	8	14	28
Gross revenues	$22,364	$81,569	$20,151	$11,242	$16,437	$67,440
Fuel costs	$2,071	$9,209	$2,154	$717	$1,703	$5,601
Ice costs	$297	$378	$252	$191	$469	$372
Bait costs	$1,559	$4,779	$1,488	$882	$1,406	$3,771
Light sticks	$738	$3,129	$635	$392	$490	$2,164
Food costs	$897	$2,943	$817	$438	$881	$2,270
Gear costs	$2,336	$6,800	$2,147	$1,381	$2,067	$5,808
Other costs	$442	$1,687	$414	$206	$342	$1,293
Total variable costs (not labor)	$9,634	$34,725	$8,839	$5,007	$7,867	$25,880
Total labor costs	$7,173	$26,071	$6,558	$3,670	$4,727	$22,620
Net return	$5,556	$20,772	$4,753	$2,565	$3,843	$18,940

In general, both Larkin *et al*. (2000) and Porter *et al*. (2001) found that the average net return to a vessel is fairly low after all variable costs including labor were accounted for. This was true even of vessels fishing in the northeast region or Caribbean (i.e., regions with relatively high gross revenues). This corresponds with the results of Ward and Hanson (1999) who found that fifty percent of the fleet earns $10,000 or less annually and that each year 20 percent of the fleet actually has a loss. Additionally, as suggested by Larkin *et al*. (2000) in their discussion of mean versus median values, Ward and Hanson (1999) found there were a number of vessels that earned much higher net revenues than the average vessel with 19 percent of the fleet earning $50,000 or more annually and 7 percent earning more than $100,000 annually.

6.4 EXPECTED ECONOMIC IMPACTS OF THE ALTERNATIVES

6.4.1. Expected Economic Impacts of Bycatch and Bycatch Mitigation Measures

NOAA Fisheries analyzed 13 alternatives to reduce bycatch and bycatch mortality of Atlantic

sea turtles in the pelagic longline fishery.

Alternative A1 (no action), would maintain existing hook and bait restrictions and time/area closures in the Atlantic pelagic longline fishery; current possession and use requirements for bycatch mitigation gear (dipnets and line clippers), as well as sea turtle handling and release guidelines as currently specified by NOAA Fisheries; and current hook and bait restrictions, including a live bait prohibition in the western Gulf of Mexico. As such, no significant economic impacts would be expected relative to the status quo of the fishery. However, the NED experiment provided positive economic benefits to vessels and shore-side businesses during its three year span that helped to offset the adverse economic impacts of the NED closure. With termination of the experiment on Dec. 15, 2003, the full economic effect of the NED closure will be felt. While not the status quo under a strict interpretation of the term, if the loss of income derived from the NED experiment over the past three years is factored in, vessels and dependent shore-side businesses would likely experience a moderate adverse economic impact. Also, significant, unquantifiable adverse economic impacts could result if no action is taken to address sea turtle bycatch consistent with the ESA.

Alternatives A2 through A5 (b) identify allowable hook and bait combinations in the pelagic longline fishery in all areas outside of the NED. The estimated economic impacts of the hook and bait alternatives can be seen in Table 6.11. These alternatives may result in a range of impacts from substantial positive or negative economic impacts, depending on the hook and bait combination and target species selected by fishermen. Specifically, fishermen may see substantial additional revenues from increased swordfish and tuna catches, by weight, or substantial losses to gross vessel revenues stemming from decreased swordfish and tuna catches, by weight.

Alternatives A7 through A10 (b) re-open the NED to fishing if certain hook and bait combinations are used in this area. The estimated economic impacts of the hook and bait alternatives can be seen in Table 6.11. These alternatives would likely result in increased positive economic impacts, as the NED is currently closed to all pelagic longline fishing. Further, alternatives A7 - A10 (b) would likely result in additional positive economic impacts when viewed from an historical perspective, as these hook and bait combinations have been demonstrated to increase swordfish catches and fishermen typically target swordfish in this area. As discussed in Section 4.1, under alternatives A7, A9, A10 (a), and A10 (b), additional revenues from increased swordfish catches by weight in the NED are projected to more than off-set revenue losses from decreased weight of tuna catches. While alternative A8 would likely be associated with increased swordfish revenues, these increases are not projected to offset lost tuna revenues.

All of the hook and bait alternatives (A2 through A10 (b)) would likely have an initial adverse economic impact as most fishermen may have to purchase new hooks to comply with new regulations; however, these costs would likely be offset in the long run because circle hooks tend to be less expensive than traditional “J”-hooks. Fishermen may also be positively or negatively affected by new bait requirements, depending on fluctuations in bait prices. There may also be a

small short-term unquantifiable lost opportunity cost as fishermen learn to maximize efficiency with the new hook and bait types. Please refer to section 4.1 for additional detail on economic impacts of these alternatives.

Alternative A13 would prohibit the use of pelagic longline gear by U.S. flagged vessels targeting HMS in the EEZ in a portion of the central Gulf of Mexico, and would likely have negative economic impacts on most commercial fishermen, communities, buyers, and dealers. Analyses indicate that with redistribution of effort, swordfish and bigeye tuna catches may increase by as much as 17 and 32 percent, respectively, in terms of numbers of fish. Yellowfin tuna catches would likely decrease by approximately 2 percent.

Alternative A14 would prohibit the use of pelagic longline pelagic longline gear in HMS fisheries in portions of the central GOM and the NEC areas year-round, and would likely have substantial negative economic impact on most commercial fishermen who fish in these areas, fishing communities, buyers, and dealers. Analyses indicate that with redistribution of effort, swordfish and bigeye tuna catches may increase by as much as 18 and 33 percent, respectively, in terms of numbers of fish. Yellowfin tuna catches would likely decrease by approximately 2 percent.

Alternative A15 would prohibit the use of pelagic longline gear in HMS fisheries in portions of the central Gulf of Mexico and the Northeast Coastal statistical reporting areas annually from May through October (inclusive), and would likely have negative economic impacts on most commercial fishermen who fish in these areas, fishing communities, buyers, and dealers. Analyses indicate that with redistribution of effort swordfish, yellowfin tuna, and bigeye tuna catches would likely increase by 5, 3, and 17 percent, respectively, in terms of numbers of fish.

As the size of fish caught within and outside the above discussed closures were not known at the time of this rulemaking, it is unclear if the increases in swordfish and tuna catches under alternatives A13 - A15 would result in positive or negative economic impacts. Displaced fishermen may have increased fuel, bait, ice, and crew costs under these alternatives if trips were extended to reach other open fishing grounds. Displacing fishermen to new fishing grounds may also result in a shift of ports selected for off-loading. This shift would have negative economic impacts for those ports and communities that lost business as a result of new port selection, but these adverse impacts would likely be mitigated by positive impacts in communities that may gain business. Please refer to Section 4.1 for additional discussion on the economic impacts of these time and area closure alternatives.

Alternative A16 would require the possession and use of certain bycatch mortality mitigation gear and would likely have an initial slight adverse economic impact, due to the purchase of required equipment. This minor initial impact may be magnified if removal of fishing gear from incidentally caught animals slows fishing operations. Alternatively, this minor initial impact may be mitigated if an increase in efficiency results from the use of dehooking and disentanglement gears. Please refer to section 4.1 for additional detail on economic impacts of this alternative.

6.4.2 Expected Economic Impact of the Preferred Alternatives

The economic impacts of the preferred bycatch and bycatch mortality reduction alternatives (A5 (b), A10 (b), and A16) when combined could result in either positive or negative economic impacts to the fishery as a whole, many of which could be substantial for small entities/vessel owners. This is especially true of alternatives A5 (b) and A10 (b), depending on the hook and bait combination and target species selected by fishermen. Although negative economic impacts could result, NOAA Fisheries anticipates that fishermen will select and utilize hook and bait combinations that will maximize their economic returns. As compared to other alternatives considered, including multiple large-scale time and area closures, alternatives A5 (b) and A10 (b) mitigate undesirable or greater economic impacts by providing fishermen with the ability to continue fishing year-round. The preferred alternatives further attempt to mitigate possible economic impacts by providing flexibility to select, possess, and employ specific hooks and baits, effective at capturing a variety of target species (depending upon availability or market conditions) during a trip. As previously stated, alternative A16 would have relatively minor short-term adverse economic impacts stemming from equipment purchases. Adverse economic impacts stemming from the initial compliance costs would likely be mitigated by potential long-term gains in hook retention and increases operating efficiency. However, if fishing efficiency is lost due to a slowing of fishing operations, potential gains may be smaller than anticipated or not realized.

Table 6.11 Estimated Economic Impacts of Hook and Bait Alternatives.

Alternative	Base Line 2002 Estimated Mean Gross Vessel Revenues (GVR)	Estimated Change in GVR Resulting From Estimated Changes in Revenues Attributable to SWO Landings	Estimated Change in GVR Resulting From Estimated Changes in Revenues Attributable to TUNA Landings	Estimated Change in GVR Resulting From Estimated Changes in Revenues Attributable to SWO and TUNA landings for Vessels Embarking on Mixed SWO/TUNA Target Trips
A1	$178,619	–	–	–
A2	$178,619	+3.57% to +11.72% (+$6,384 to +$20,941)	-47.93% to -51.74% (-$85,610 to $-92,422)	-36.20% to -48.17% ($-64,668 to -$86,037)
A3 Option i	$178,619	+3.57% to +11.72% (+$6,384 to +$20,941)	-47.93% to -51.74% (-$85,610 to $-92,422)	-36.20% to -48.17% ($-64,668 to -$86,037)
Option ii	$178,619	-11.06% to -12.63% ($-19,764 to -$22,561)	+11.95% to +17.25% (+$21,344 to +$30,814)	-0.68% to +6.19% (-$1,217 to +$11,050)
A4 Option i	$178,619	+3.57% to +13.01% (+$6,384 to +$20,941)	-47.93% to -51.74% (-$85,610 to $-92,422)	-36.20% to -48.17% ($-64,668 to -$86,037)
Option ii	$178,619	-11.06% to -12.63% ($-19,764 to -$22,561)	+11.95% to +17.25% (+$21,344 to +$30,814)	-0.68% to +6.19% (-$1,217 to +$11,050)
Option iii	$178,619	+24.58% (+$43,905)	-53.28% (-$95,164)	-28.70% (-$51,259)
A5 (a)	$178,619	-3.88 to -7.75% (-$6,925 to -$13,850)	No Change	-3.87 to -7.75% (-$6,925 to -$13,850)
A5 (b)	$178,619	-3.88 to -7.75% (-$6,925 to -$13,850)	No Change	-3.87 to -7.75% (-$6,925 to -$13,850)
A7	$178,619	+8.13% to +26.65% (+$14,515 to +$47,608)	-9.15% to -9.88% (-$16,342 to -$17,642)	-1.75% to +17.50% (-$3,127 to +$31,266)
A8	$178,619	+5.11% (+$9,131)	-10.47% (-$18,701)	-5.36% (-$9,569)
A9 Option i	$178,619	+55.88 (+$99,814)	-10.17% (-$18,166)	+45.71% (+$81,648)

Alternative	Base Line 2002 Estimated Mean Gross Vessel Revenues (GVR)	Estimated Change in GVR Resulting From Estimated Changes in Revenues Attributable to SWO Landings	Estimated Change in GVR Resulting From Estimated Changes in Revenues Attributable to TUNA Landings	Estimated Change in GVR Resulting From Estimated Changes in Revenues Attributable to SWO and TUNA landings for Vessels Embarking on Mixed SWO/TUNA Target Trips
Option ii	$178,619	+8.13% to +26.65% (+$14,515 to +$47,608)	-9.15% to -9.88% (-$16,342 to -$17,642)	-1.75% to +17.50% (-$3,127 to +$31,266)
A10 (a)Option i	$178,619	+8.13% to +26.65% (+$14,515 to +$47,608)	-9.15% to -9.88% (-$16,342 to -$17,642)	-1.75% to +17.50% (-$3,127 to +$31,266)
Option ii	$178,619	-25.16% to -28.72% (-$44,932 to -$51,292)	+2.23% to +3.29% (+$4,074 to +$5,882)	-21.86% to -26.44% (-$39,050 to -$47,217)
A10 (b)	$178,619	- 28.72% to +26.65% (-$51,292 to +$47,608)	-9.88% to +3.29% (-$17,642 to +$5,882)	-38.59% to +29.95% (-$68,935 to +$53,490)

* All calculations based on fleet wide gross vessel revenues and changes in revenues based on changes in catches of target species (by weight) as identified in the NED experiment.

** Rounding errors are responsible for estimated percent changes in GRV not matching estimated dollar changes exactly.

N/A = Not able to be calculated with information currently available.

References Cited in Chapter 6

Larkin, S. L., C. M. Adams, D. J. Lee. 2000. Reported trip costs, gross revenues, and net returns for U.S. Atlantic pelagic longline vessels. Marine Fisheries Review 62(2): 49-60.

NOAA Fisheries. 2000. Regulatory Amendment 1 to the Atlantic Tunas, Swordfish and Sharks Fishery Management Plan. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document.

NOAA Fisheries. 2002. Regulatory Adjustment 2 to the Atlantic Tunas, Swordfish, and Sharks Fishery Management Plan. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document. 161 pp.

NOAA Fisheries. 2003. 2003 Stock assessment and fishery evaluation report for Atlantic highly migratory species. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document. 264 pp.

NOAA Fisheries. 2004. 2004 Stock assessment and fishery evaluation report for Atlantic highly migratory species. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Highly Migratory Species Management Division, Silver Spring, MD. Public Document. 67 pp.

Porter, R. M., M. Wendt, M. D. Travis, I. Strand. 2001. Cost-earnings study of the Atlantic-based U.S. pelagic longline fleet. Pelagic Fisheries Research Program. SOEST 01-02; JIMAR contribution 01-337. 102 pp.

Ward, J. and E. Hanson. 1999. The regulatory flexibility act and HMS management data needs. Presentation at the American Fisheries Society Annual Meeting. Charlotte, North Carolina.