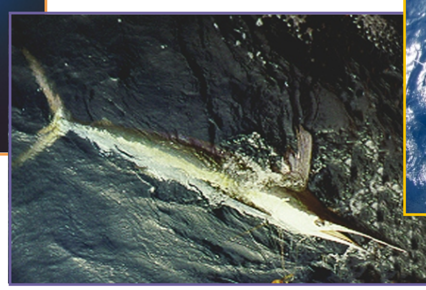
Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan





Volume III

Including:
A Final Environmental Impact Statement,
A Final Regulatory Impact Review,
A Final Regulatory Flexibility Analysis,
A Final Social Impact Assessment,
Framework Actions, and
the 2006 Stock Assessment and Fishery Evaluation Report

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Sustainable Fisheries
Highly Migratory Species Management Division

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A APPENDIX: TIME/AREA CLOSURES: ADDITIONAL ANALYSES AND RESULTS

Introduction

As described in Chapter 4, NMFS evaluated the effectiveness of each of the time/area closure alternatives by determining the percent reduction in bycatch of non-target HMS and protected species for each month and cumulatively for the year based on both POP and HMS logbook data for the combined years 2001-2003. NMFS also analyzed data to determine the impact on catches of retained species such as swordfish, yellowfin, bigeye, and BAYS tunas. Based on the comparison of the POP and HMS logbook data, NMFS initially considered a number of alternatives for time/area closures. However, NMFS chose only a subset of the alternatives for further analysis because of their potential greater ecological benefit in terms of bycatch reduction potential for all species considered. Once a subset of alternatives was chosen for further analysis, social and economic impacts were analyzed along with ecological impacts. The social and economic impacts are not discussed in this Appendix.

This Appendix primarily serves as a summary of the potential benefits and impacts of all the various alternatives considered. Discussion on each of the alternatives that were fully analyzed (alternatives B2(a) – B2(e), B3(a) - B3(b), and B4 - B7) can be found in Chapter 4. A brief discussion of each alternative that was not selected for further analysis (alternatives B2(f) – B2(k) and B3(c) - B3(d)), can be found in Section 2.1.2. An overall summary of the predicted reduction in the number of hooks set (fishing effort) and discards of white marlin, blue marlin, sailfish, spearfish, leatherback sea turtles, loggerhead sea turtles, and bluefin tuna based on the various time/area closure alternatives is given in Table A.1 and Table A.2. Similarly, Table A.3, Table A.4, Table A.5, and Table A.6 summarize the predicted changes to swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, and BAYS tuna kept and discarded under the different alternatives according to 2001 – 2003 pelagic logbook data. Table A.7 and Table A.8 provide a comparison of bycatch reduction based on HMS logbook data and pelagic observer data. Table A.9 through Table A.20 give the temporal catch of bycatch and target species associated with each alternative that was not further analyzed. Similar tables for alternatives that were further analyzed can be found in Section 4.1.2. There are also summaries of bycatch and catch of target species associated with the modification of current time/area closures (*i.e.*, Table A.21 through Table A.27). In addition, Table A.28 – Table A.30 demonstrate how different scenarios of redistributed effort were calculated. Table A.31 - Table A.33 evaluate 2004 data where as Table A.34 and Table A.35 demonstrate the effectiveness of current closures as well as the effect of current closures and circle hooks. Finally, Table A.36 shows results from the fleet mobility analysis described in Chapter 4, and Table A.37 - Table A.41 show the results of the different scenarios of redistributed effort.

A number of figures highlight the different time/area closure alternatives that have been considered (but have not been further analyzed; Figure A.1) as well as swordfish catch and modifications to current time/area closures (Figure A.2,Figure A.3, and Figure A.4). Figure A.5 - Figure A.8 show different aspects of the fleet mobility analysis described in Chapter 4, and Figure A.9 demonstrates the spatial overlap in discards of bluefin tuna, white marlin, and sea turtles in the Gulf of Mexico. Monthly interactions for these different species (*i.e.*, temporal variability) in the Gulf of Mexico were considered in the redistribution of effort analyses and can be seen in Table 4.10 and Table 4.13.

This section also describes the methodology for evaluating the ecological effects of the redistribution of fishing effort model. NMFS used this model to determine the percent change in total reported bycatch of sea turtles, non-target HMS, and retained species inside and outside of the time/area closures in the Atlantic and Gulf of Mexico. NMFS also evaluated several different scenarios based on this model that had different assumptions regarding where effort from a closed area would be redistributed. Examples (loggerhead sea turtles for alternative B2(d) and white marlin for alternative B2(c)) of how the redistribution of effort calculations were made is described in the following paragraphs and presented in Table A.28 – Table A.30. Similar tables were generated for each species under each alternative that was fully analyzed in Section 4.1.2. These individual species tables were not included in this document due to the large number of tables. Instead, summary tables of redistributed fishing effort were included in Section 4.1.2 as well as in this section.

Redistribution of effort analyses

NMFS examined monthly catches (number of each species) and effort (number of hooks) in each of the time/area closures in comparison to all open areas of the Atlantic and Gulf of Mexico, excluding the NED, based on HMS logbook data for the fishery. As explained in Chapter 4, only HMS logbook data were used in the redistribution of effort analysis. The number of each species caught in the open areas outside the considered time/area closures (column E in the example of redistribution of effort table, Table A.28), was calculated by subtracting the number caught in the potential closed area from the reported catch in the combined Atlantic and Gulf of Mexico (column B-column D in Table A.28). The catch-per-unit-effort (CPUE) for the species in the remaining open areas was calculated by dividing the number of each species caught in the open areas (column E) by the number of hooks fished in the open areas (calculated by subtracting the number of hooks in the closed area from those in the Atlantic and Gulf of Mexico; column A-column C in Table A.28). The number of hooks that were used in the closed area were multiplied by the open area CPUE to determine the number of loggerhead sea turtles, in this case, that would be caught in the open fishing areas by the displaced effort (column C*column F). This was then added to the existing open areas' catch (column E+column G) to give a new open area total catch (column I in Table A.28). The estimated total catch (column I) was subtracted from the original total number caught in the Atlantic and Gulf (column B-column H) to estimate the change in number of turtles that would be caught as a result of the relocated effort. Column J shows the cumulative number of turtles avoided by the time/area closure by adding each month's total to the preceding month's total. Columns K and L show the percentage reduction in overall catch by month and cumulatively as a result of the closure, respectively. The total percent reduction in catch was calculated by dividing the sum of column J (cumulative catch avoided by month) by the sum of column B (number of individuals caught in the Atlantic and Gulf of Mexico, excluding the NED). A positive result from the redistribution of effort calculation would indicate a decrease in discards, and a negative result would indicate an increase in discards.

In this example, the redistribution of fishing effort associated with alternative B2(d) would result in an increase in loggerhead sea turtle interactions of 65 percent, or 117 individuals, over three years (Table A.28). This large increase in loggerhead sea turtle interactions may be due to a number of factors. First, alternative B2(d) would be a large closure in an area that represents approximately 90 percent of the fishing effort in the Gulf of Mexico and approximately 50 percent of the total pelagic longline (PLL) fishing effort (Table 4.12 in Section 4.1.2). Therefore, closing such an area in the Gulf of Mexico could displace a large amount of fishing effort to the Atlantic Ocean. Second, and more specific to loggerhead sea turtles, there are fewer loggerhead sea turtles interactions in the Gulf of Mexico compared to the Atlantic Ocean (Table 4.36 in Section 4.1.2); therefore, as effort increases in the Atlantic as a result of a large closure in the Gulf of Mexico, and since loggerhead sea turtle numbers are higher in the Atlantic Ocean compared to the Gulf of Mexico, the number of interactions would be expected to increase. Thus, it is important to consider the ecological impacts of the redistribution of fishing effort when considering time/area closures. Often the effects may be counter-intuitive and may differ for the various species considered.

Finally, it is worth noting how the redistribution of effort was calculated for different time/area closure combinations. When NMFS considered the redistribution of fishing effort associated with the combination of time/area closures (*e.g.*, B2(a) combined with B2(b) or B2(e) combined with B2(d)), the closures were considered to be closed simultaneously. It was assumed that all fishing effort within those areas would be redistributed to open areas (*i.e.*, open areas not including the combination of B2(a) and B2(b) or B2(e) and B2(d)), and the redistribution of fishing effort was calculated according to the description outlined above. Thus, the end result, in terms of resulting bycatch when accounting for the redistribution of fishing effort, was not simply the sum of the bycatch associated with the individual closures. In cases where the time/areas closures were seasonal (*i.e.*, they were not year-round), then the time/area closures were considered to be simultaneously closed during months of overlap (*i.e.*, the month of June for alternative B2(a) and B2(b) combination). Otherwise, they were considered to be single time/area closures, and the redistribution of fishing effort was calculated as outlined above.

Different redistribution of effort scenarios

Based on comments received and OMB peer reviews, NMFS evaluated different scenarios of redistributed effort based on the redistribution of effort model explained above. Each scenario addressed different assumptions regarding where fishing effort could be redistributed into open areas (*i.e.,* instead of assuming all fishing effort from a closed area would be uniformly distributed to all open areas or just redistributed within the open areas of the Gulf of Mexico). NMFS performed a fleet mobility analysis to determine where the PLL fleet has been fishing from 2001-2004 (see Section 4.1.2). The analysis demonstrated that there was limited movement from the eastern seaboard into the Gulf of Mexico, therefore, NMFS redistributed fishing effort only to open areas along the eastern seaboard for B2(b). The mobility analysis also showed that vessels with homeports in the Gulf of Mexico tended to fish in a certain area of the Atlantic (Area 6). Therefore, for B2(a) and B2(c), NMFS redistributed fishing effort in the open areas of the Gulf of Mexico and Area 6. These different scenarios of redistributed effort were used to determine the percent reduction or increase in total reported bycatch of sea turtles, non-target HMS, and target species given particular catch rates in either only open portions of the Atlantic (alternative B2(b)) or open portions of the Gulf of Mexico and Area 6 (alternatives B2(a) and B2(c)). The methods used to calculate percent changes in catch for each species with these different scenarios of redistribution of effort is discussed below. The steps taken for the redistribution of effort analysis for white marlin for alternative B2(c) are presented in separate tables as examples (Table A.29 and Table A.30).

NMFS examined monthly catches (number of each species) and effort (number of hooks) for the closures B2(a), B2(b), and B2(c) in comparison to specific open areas of the Atlantic and Gulf of Mexico, excluding the NED, based on logbook data for the fishery from January 2001 through June 2004. The following example is for the redistribution of white marlin from the B2(c) closure; NMFS considered redistributing effort within the open areas of the Gulf of Mexico and in Area 6 (see Figure A.5). This scenario of redistributed effort would also apply for all species in the B2(a) and B2(c) closures. In this example, the number of white marlin caught from April through June in the open areas of the Gulf of Mexico outside B2(c) (column E in Table A.29) was first calculated by subtracting the number caught in the closed area from the reported catch in the open of the Gulf of Mexico (column B-column D in Table A.29). The CPUE for white marlin in the remaining open areas of the Gulf of Mexico (column F) was calculated by dividing the number of white marlin caught in the open areas (column E) by the number of hooks fished in the open areas (calculated by subtracting the number of hooks in the closure from those in open portion of the Gulf of Mexico; column A-column C in Table A.29). The number of hooks that were used in the closed area was then multiplied by the open area CPUE (column C*column F) to determine the number of white marlin that would be caught in the open fishing areas by the displaced effort (column G in Table A.29). This was then added to the existing open areas' catch (column E+column G) to give a new open area total catch (column I in Table A.29). Note that a positive number from the redistribution of effort calculation indicates a decrease in bycatch whereas a negative amount indicates an increase in bycatch.

Next, NMFS calculated any changes in bycatch associated with redistribution of effort in Area 6. This was done by first calculating the CPUE in Area 6 for white marlin (column F in Table A.30) by dividing the white marlin discards in Area 6 (column B in Table A.30) by the number of hooks fished in Area 6 (column A in Table A.30). The number of discards in Area 6 as a result of displaced effort from B2(c) (column G in Table A.30) was calculated by multiplying CPUE in Area 6 (column F in Table A.30) by the number of hooks displaced out of B2(c) (column C in Table A.30). Again, a positive number indicates a decrease in bycatch whereas a negative amount indicates an increase in bycatch. The total reduction or increase in catch associated with the redistributed effort of the closure (column H in Table A.30) was found by adding up the total number of discards avoided by the closure in the Gulf of Mexico (column I in Table A.29) minus the total number of discards in Area 6 as a result of displaced effort from B2(c) (column G in Table A.30). The total percent reduction in catch was calculated by dividing column H in Table A.30 by the total number of white marlin discarded in all other open areas (number of individuals caught between January 2001 through June 2004 in the Atlantic and Gulf of Mexico, excluding the NED; column I in Table A.30). The scenario of redistributed effort for B2(b) was more straightforward. It only considered redistribution of effort in the open portions of the Atlantic. Therefore, it was calculated according to the example laid out in Table A.28; however, the numbers of hooks and discards were only considered for the Atlantic and not the Atlantic and Gulf of Mexico as shown in Table A.28.

Analyses for the potential modifications to existing closed areas

For the analyses of modifications to existing closed areas, NMFS analyzed PLL logbook and POP data from 1997 – 1999, the period prior to enactment of the closed areas. This time period was selected since the current closures have been in place since 1999, and observer and logbook data provide a record of the bycatch and species that were interacted with during this time. A number of potential modifications to existing closures were examined, including the East Florida Coast (Table A.22), DeSoto Canyon (Table A.23), Charleston Bump (Table 4.29), and Northeastern U.S. closure (Table 4.30). NMFS mapped data from the PLL logbook and POP using GIS and used oceanographic features such as the axis of the Gulf Stream, or natural breaks in areas between high and low bycatch within the existing closure, to establish potential new boundaries for each closed area. NMFS then calculated the total number and percent bycatch of non-target HMS and protected species, as well as catch of target HMS, for the modified closure compared to all other areas of the Atlantic and Gulf of Mexico. These calculations allowed NMFS to determine the potential impact on bycatch species in comparison to all bycatch in the PLL fishery. Only after the analyses indicated that the Charleston Bump and Northeastern U.S. closure modifications would result in minimal or no increase in bycatch of non-target HMS and protected species did NMFS decide to further analyze these two areas. The remaining areas were not further analyzed, but the data for both the East Florida Coast and DeSoto Canyon modifications that resulted in increases in bycatch are presented in this Appendix.

Analyses and the use of 2004 data

Data from 2004 were not available when the analyses for the Draft HMS FMP were completed. However, during the public comment period, NMFS obtained the 2004 POP and PLL data and analyzed a subset of the PLL dataset from 2001 – 2004 (first six months of 2004 only) to determine whether there were any substantial differences from the 2001 -2003 data presented in the Draft HMS FMP. Since the circle hook requirement went into effect on June 30, 2004, in the NED (69 FR 40734), and in all remaining areas on August 6, 2004, NMFS analyzed only the first six months of 2004 data with the 2001 – 2003 data. Therefore, these analyses were all based on J-hook data. Since the second half of 2004 were based on circle hook data, NMFS analyzed these data separately; a discussion of the preliminary findings of the possible effects of circle hooks is given below.

Overall, the inclusion of the additional six months of data from 2004 did not substantially alter any of the data presented in the Draft HMS FMP, or result in any changes to the overall conclusions from the Draft HMS FMP to the Final HMS FMP (Table A.31). A few exceptions can be seen. For alternative B2(b), there could be an overall decrease in bycatch reduction for loggerhead sea turtles regardless of whether the year-round or June only closures is considered with the inclusion of the 2004 data (-20.7 percent vs. -15.5 percent for the year-round closure and -11.2 percent vs. -8.4 percent for the June only closures; Table A.31). For B2(c), in general, there was potential for higher bycatch reduction and less kept targeted catch for all species considered (except loggerhead sea turtles; Table A.31) with the inclusion of 2004 data. This reduction could be due to increased effort seen in the Gulf of Mexico during the first half of 2004 (Table A.35). However, this trend was not seen for B2(d), the larger, year-round closure proposed for the Gulf of Mexico, where less bycatch reduction could be gained for spearfish, but fewer bluefin tuna discards may be seen with the inclusion of 2004 data (Table A.31). There was also a slight decrease in potential bycatch reduction for loggerhead sea turtles, bluefin tuna kept, and bluefin tuna discards with the inclusion of 2004 data for B2(e) (Table A.31). Given the variability in results from the inclusion of this data, NMFS did not change any of the preferred alternatives based on the additional six months of 2004 PLL data.

NMFS also preliminary examined the second half of the 2004 data to investigate the potential effects that circle hooks may be having on bycatch and retained catch. However, because only six months of circle hook data was available when these analyses were completed, no definitive conclusions can be drawn from this analysis. Additionally, because this preliminary investigation only uses six months of circle hook data, the seasonality of catch (catch in January through June versus catch in July through December) cannot be determined for circle hooks. Therefore, for this preliminary investigation, NMFS compared CPUEs as well as absolute catch between the July through December of 2001-2003 PLL data with July through December of 2004 PLL data (Table A.32 and Table A.33). The CPUEs were calculated as the number of animals caught in a particular closure area divided by the number of hooks in that particular closure area. Absolute numbers are shown for 2004, and the yearly averages for 2001-2003 are shown in parentheses in Table A.32 and Table A.33. In general, the number of hooks increased slightly in the Gulf of Mexico in 2004 compared to 2001-2003 and decreased slightly in the Northeast (Table A.35). The analysis showed that the CPUEs increased for all species considered in the Gulf of Mexico in 2004 when compared to 2001-2003 (Table A.32 and Table A.33). The number of HMS kept also increased in 2004 except for yellowfin tuna in the Gulf of Mexico (Table A.33). The number of discards in the Gulf of Mexico increased in 2004 for all species considered, except for yellowfin tuna, swordfish discards, and loggerhead sea turtle interactions in B2(a) (Table A.32 and Table A.33). Leatherback sea turtle interactions decreased in B2(c) and B2(d) in 2004 compared to 2001-2003 (Table A.32). In the Northeast, CPUEs in 2004 were variable across closures and species considered, but in general, the number of discards and the number of species kept decreased (except for blue marlin and sailfish discards in B2(b) and B2(e), LCS discards and yellowfin tuna kept and discarded in B2(e), and bigeye tuna and BAYS discards in B2(b); Table A.32 and Table A.33). Overall, however, the catch associated with circle hooks for July through December is variable across species and closure, making it difficult to draw any definitive conclusions or identify any patterns on the effects of circle hooks. This variability is most likely due to the short time series of data. NMFS will continue to monitor retained catch, discards, and bycatch with circle hooks as that data become available.

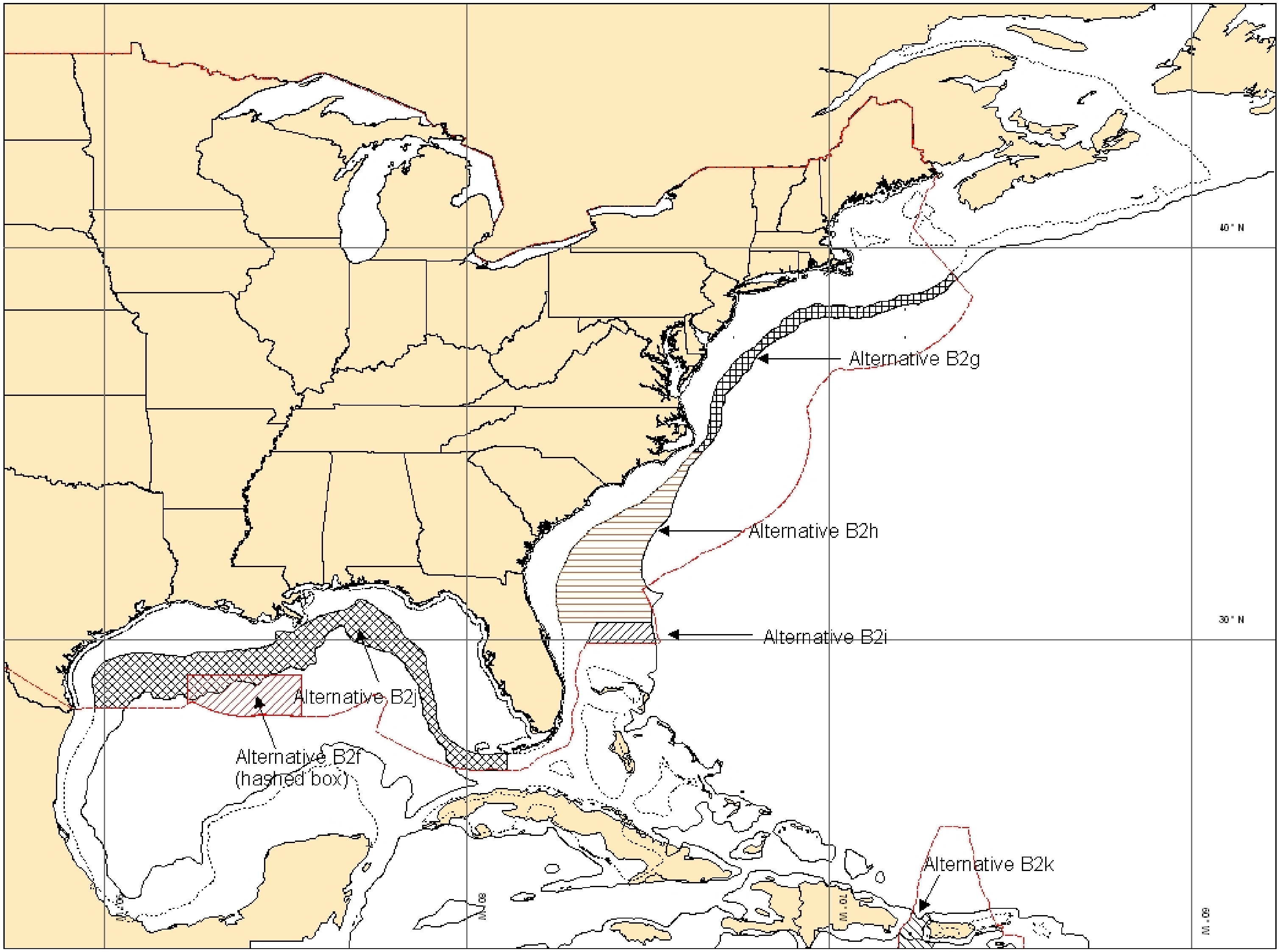

Figure A.1 **Map showing time/area closure alternatives considered but not further analyzed at this time (see Section 2.1.2) to reduce white marlin and other protected species interactions.**

Table A.1 **The decrease (-) or increase (+) in the number of discards of white marlin, blue marlin, sailfish, spearfish, leatherback and loggerhead sea turtles and bluefin tuna based on the various time/area closures**. * excluding NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS logbook data 2001-2003.

Alternative	Number of Hooks Set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Bluefin Tuna discards
WITHOUT REDISTRIBUTION OF EFFORT								
B2(a)								
Year-round	3,810,282	-503	-487	-163	-63	-171	-9	-198
May-Nov	2,347,180	-463	-432	-146	-48	-76	-6	-75
B2(b)								
Year-round	991,205	-124	-22	-1	-2	-28	-37	-461
June only	184,435	-12	-4	0	0	-10	-20	-365
B2(c) (April-June)	2,844,335	-325	-244	-124	-35	-55	-7	-348
B2(d) (Year-round)	10,020,757	-1,487	-1,397	-642	-354	-285	-18	-439
B2(e) (Year-round)	2,127,510	-274	-40	-3	-8	-49	-65	0
B2(f) (May-Nov)	2,998,571	-633	-559	-197	-62	-91	-7	-92
B2(g) (June-October)	2,985,688	-481	-49	-11	-7	-40	-40	-60
B2(h) (March-Nov)	1,179,865	-139	-138	-134	-27	-10	-3	-2
B2(i) (Year-round)	1,175,504	-232	-316	-59	-20	-10	-20	-11
B2(j) (Year-round)	5,182,880	-519	-528	-444	-108	-90	-12	-181
B2(k) (Jan-April)	22,321	-7	-14	0	0	0	0	0
Total From All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	1,617
WITH REDISTRIBUTION OF EFFORT								
B2(a)								
Year-round		27	-98	11	17	-99	27	128

Alternative	Number of Hooks Set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Bluefin Tuna discards
(May-Nov)		-84	-178	-8	-9	-39	14	166
B2(b)								
Year-round		110	164	85	20	-8	-33	-437
June only		33	22	18	3	-7	-19	-354
B2(c) (April-June)		221	50	45	56	-13	42	158
B2(d) (Year-round)		10	-497	-276	-311	-105	117	614
B2(e) (Year-round)		189	360	182	38	-3	-60	-658
B2(f) (May-Nov)		-150	-240	-19	-12	-45	20	219
B2(g) (June-October)		71	494	239	62	29	-26	-360
B2(h) (March-Nov)		52	-7	-73	-6	12	9	154
B2(i) (Year-round)		-118	-224	-27	7	21	-10	104
B2(j) (Year-round)		394	126	-241	-5	38	40	274
B2(k) (Jan-April)		-5	-12	0	0	1	0	2

Table A.2 **Percent reduction (-) or increase (+) in discards of white marlin, blue marlin, sailfish, spearfish, leatherback and loggerhead sea turtles and bluefin tuna based on the various time/area closure alternatives with and without redistribution of effort.** (* = was not analyzed). Source: HMS Logbook data (2001-2003)

Alternative	Number of Hooks Set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Bluefin Tuna discards
WITHOUT REDISTRIBUTION OF EFFORT								
B2(a)								
Year-round	-18.0%	-16.0.%	-19.9%	-15.8%	-14.9%	-34.6%	-5.0%	-12.2%
May-Nov	-11.1%	-14.7%	-17.6%	-14.2%	-11.3%	-15.4%	-3.4%	-4.6%
B2(b)								
Year-round	-4.7%	-3.9%	-0.9%	-0.1%	-0.5%	-5.7%	-20.7%	-28.5%
June only	-0.9%	-0.4%	-0.2%	0.0%	0.0%	-2.0%	-11.2%	-22.6%
B2(c) (April-June)	-13.4%	-10.3%	-10.0%	-12.1%	-8.3%	-11.1%	-3.9%	-21.5%
B2(d) (Year-round)	-47.4%	-47.3%	-57.0%	-62.4%	-83.5%	-57.5%	-10.1%	-27.1%
B2(e) (Year-round)	-10.1%	-8.7%	-1.6%	-0.3%	-1.9%	-9.9%	-36.3%	-43.3%
B2(f) (May-Nov)	-14.2%	-20.1%	-22.8%	-19.1%	-14.6%	-18.4%	-3.9%	-5.7%
B2(g) (June-October)	-14.1%	-15.3%	-2.0%	-1.1%	-1.7%	-8.1%	-22.3%	-37.7%
B2(h) (March-Nov)	-5.6%	-4.4%	-5.6%	-13.0%	-6.4%	-2.0%	-1.7%	-0.12%
B2(i) (Year-round)	-5.6%	-7.4%	-12.9%	-5.7%	-4.7%	-2.0%	-11.2%	-0.7%
B2(j) (Year-round)	-24.5%	-16.5%	-21.6%	-43.1%	-25.5%	-18.2%	-6.7%	-11.1%
B2(k) (Jan-April)	-0.1%	-0.2%	-0.6%	0.0%	0.0%	0.0%	0.0%	0.0%
WITH REDISTRIBUTION OF EFFORT								
B2(a)								
Year-round		0.9%	-4.0%	1.1%	4.0%	-20.0%	15.0%	7.9%
(May-Nov)		-2.7%	-7.3%	-0.8%	-2.1%	-8.0%	7.9%	10.3%

Alternative	Number of Hooks Set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Bluefin Tuna discards
B2(b)								
Year-round		3.5%	6.7%	8.3%	4.8%	-1.7%	-18.5%	-27.0%
June only		1.0%	0.9%	1.7%	0.8%	-1.3%	-10.3%	-21.9%
B2(c) (April-June)		7.0%	2.0%	4.4%	13.2%	-2.6%	23.5%	9.8%
B2(d) (Year-round)		0.3%	-20.3%	-26.8%	-73.3%	-21.3%	65.5%	38%
B2(e) (Year-round)		6.0%	14.7%	17.7%	9.1%	-0.6%	-33.3%	-40.7%
B2(f) (May-Nov)		-4.7%	-9.8%	-1.8%	-2.8%	-9.1%	11.2%	13.5%
B2(g) (June-October)		2.3%	20.2%	23.2%	14.5%	5.9%	-14.5%	-22.3%
B2(h) (March-Nov)		1.7%	-0.29%	-7.1%	-1.4%	2.4%	5.0%	9.5%
B2(i) (Year-round)		-3.8%	-9.2%	-2.6%	1.6%	4.2%	-5.6%	6.4%
B2(j) (Year-round)		12.6%	5.1%	-23.4%	-1.2%	7.7%	22.3%	17%
B2(k) (Jan-April)		-0.2%	-0.5%	0%	0%	0.2%	0%	0.1%

Table A.3 **The decrease (-) or increase (+) in the number of each retained species caught or discarded based on the various time/area closure alternatives without redistribution of effort.** *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Alternative	Number of Hooks Set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
WITHOUT REDISTRIBUTION OF EFFORT											
B2(a)											
Year-round	3,899,124	-8,369	-5,445	-133	-198	-36,897	-1,310	-684	-5	-37,938	-1,586
May-Nov	2,403,012	-3,959	-2,988	-40	-75	-23,846	-952	-400	-2	-24,420	-1,152
B2(b)											
Year-round	991,921	-10,974	-1,997	-34	-461	-7,662	-81	-1,627	-5	-10,713	-97
June only	183851	-1,867	-256	-11	-365	-505	-11	-557	0	-1,337	-15
B2(c) (April-June)	2,844,335	-3,594	-3,621	-174	-348	-33,053	-1,480	-90	-2	-33,176	-1,677
B2(d) (Year-round)	10,020,757	-19,215	-11,579	-321	-439	- 106,941	-3,641	-1,299	-19	-108,923	-4,661
B2(e) (Year-round)	2,127,510	-17,422	-4,054	-74	-700	-12,692	-200	-7,303	-139	-27,141	-748
B2(f) (May-Nov)	2,997,124	-4,792	-3,553	-49	-92	-30,165	-1,141	-480	-3	-30,865	-1,436
B2(g) (June-October)	2,986,428	-21,799	-7,378	-84	-609	-27,023	-544	-10,729	-243	-48,317	-1,623
B2(h) (March-Nov)	1,118,725	-24,297	-4794	-5	-2	-3,508	-124	-427	-18	-4,148	-152
B2(i) (Year-round)	1,175,504	-8,104	-1,704	-35	-11	-3,690	-297	-8,412	-417	-14,631	-725
B2(j) (Year-round)	5,186,190	-13,469	-6,433	-181	-179	-53,854	-1,622	-400	-11	-54,579	-1,913
B2(k) (Jan-April)	22,321	-321	-120	0	0	-4	0	-2	0	-8	0
Total From All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990

Table A.4 **Percent reduction (-) or increase (+) in the retained catch and discards based on the various time/area closure alternatives without redistribution of effort.** Source: HMS Logbook data (2001-2003).

Alternative	Number of Hooks Set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
WITHOUT REDISTRIBUTION OF EFFORT											
B2(a)											
Year-round	-18.4%	-6.6%	-14.8%	-22.2%	-12.2%	-22.1%	-23.9%	-1.8%	-0.5%	-16.8%	-17.6%
(May-Nov)	-11.4%	-3.1%	-8.1%	-6.7%	-4.6%	-14.3%	-17.4%	-1.1%	-0.2%	-10.8%	-12.8%
B2(b)											
Year-round	-4.7%	-8.6%	-5.4%	-5.7%	-28.5%	-4.6%	-1.5%	-4.4%	-0.5%	-4.7%	-1.1%
June only	-0.9%	-1.5%	-0.7%	-1.8%	-22.6%	-0.3%	-0.2%	-1.5%	0.0%	-0.6%	-0.2%
B2(c) (April-June)	-13.4%	-2.8%	-9.9%	-29.0%	-21.5%	-19.8%	-27.0%	-0.2%	-0.2%	-14.7%	-18.7%
B2(d) (Year-round)	-47.4%	-15.1%	-31.5%	-53.6%	-27.1%	-64.0%	-66.4%	-3.5%	-1.9%	-48.2%	-51.8%
B2(e) (Year-round)	-10.1%	-13.7%	-11.0%	-12.4%	-43.3%	-7.6%	-3.6%	-19.7%	-13.8%	-12.0%	-8.3%
B2(f) (May-Nov)	-13.4%	-3.8%	-9.7%	-8.1%	-5.7%	-18.0%	-20.8%	-1.3%	-0.3%	-13.6%	-16.0%
B2(g) (June-October)	-14.1%	-17.1%	-20.1%	-14.0%	-37.7%	-16.2%	-9.9%	-28.9%	-24.2%	-21.4%	-18.1%
B2(h) (March-Nov)	-5.3%	-19.1%	-13.0%	-0.8%	-0.1%	-2.1%	-2.3%	-1.1%	-1.8%	-1.8%	-1.7%
B2(i) (Year-round)	-5.6%	-6.4%	-4.6%	-5.8%	-0.7%	-2.2%	-5.4%	-22.7%	-41.5%	-6.5%	-8.1%
B2(j) (Year-round)	-24.5%	-10.6%	-17.5%	-30.2%	-11.1%	-32.2%	-29.6%	-1.1%	-1.1%	-24.1%	-21.3%
B2(k) (Jan-April)	-0.1%	-0.3%	-0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table A.5 **The decrease (-) or increase (+) in the number of each retained species caught or discarded based on the various time/area closure alternatives with redistribution of effort.** (* = was not calculated). [1] excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003)

Alternative	Number of Hooks Set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
WITH REDISTRIBUTION OF EFFORT											
B2(a)											
Year-round		19,485	2,001	-24	128	-7,615	-381	7,880	210	5,187	126
May-Nov		11,590	1,635	20	166	-1,881	166	4,393	117	5,897	-4
B2(b)											
Year-round		-6,993	-697	-21	-437	2,247	222	-170	57	1,480	407
June only		-1,033	-21	-7	-354	1,516	61	-449	3	859	77
B2(c) (April-June)		26,931	2,218	-110	158	-18,314	-1,001	4,240	18	-12,260	-1,064
B2(d) (Year-round)		79,633	11,718	-72	614	-49,789	-1,955	29,930	853	-1,259	-616
B2(e) (Year-round)		-8,623	-1,061	-45	-658	9,264	455	-4,417	-25	-723	369
B2(f) (May-Nov)		15,552	2,081	25	219	-3,126	-408	5,465	150	6,507	-29
B2(g) (June-October)		*	*	*	-360	*	*	*	*	*	*
B2(h) (March-Nov)		*	*	*	154	*	*	*	*	*	*
B2(i) (Year-round)		*	*	*	104	*	*	*	*	*	*
B2(j) (Year-round)		*	*	*	274	*	*	*	*	*	*
B2(k) (Jan-April)		*	*	*	2	*	*	*	*	*	*
Total From All Areas[1]	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990

Table A.6 **Percent reduction (-) or increase (+) in the retained catch and discards based on the various time/area closure alternatives with redistribution of effort.** (* = was not calculated). Source: HMS Logbook data (2001-2003).

Alternative	Number of Hooks Set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
WITH REDISTRIBUTION OF EFFORT											
B2(a)											
Year-round		15.3%	5.4%	-3.9%	7.9%	-4.6%	-6.9%	21.2%	20.8%	2.3%	1.4%
May-Nov		9.1%	4.4%	3.4%	10.3%	-1.1%	3.0%	2.6%	11.6%	2.6%	-0.04%
B2(b)											
Year-round		-5.5%	-1.9%	-3.5%	-27.0%	1.3%	4.1%	-0.5%	5.6%	0.7%	4.5%
June only		-0.8%	-0.1%	-1.2%	-21.9%	0.9%	1.1%	-1.2%	0.3%	0.4%	0.9%
B2(c) (April-June)		21.1%	6.0%	-18.3%	9.8%	-11.0%	-18.3%	11.4%	1.7%	-5.4%	-11.8%
B2(d) (Year-round)		62.5%	31.9%	-12.1%	38.0%	-29.8%	-35.6%	80.6%	84.8%	-0.6%	-6.9%
B2(e) (Year-round)		-6.8%	-2.9%	-7.6%	-40.7%	5.5%	8.3%	-11.9%	-2.5%	-0.3%	4.1%
B2(f) (May-Nov)		12.2%	5.7%	4.2%	13.6%	-1.9%	-7.4%	14.7%	14.9%	2.9%	-0.3%
B2(g) (June-October)		*	*	*	-22.3%	*	*	*	*	*	*
B2(h) (March-Nov)		*	*	*	9.5%	*	*	*	*	*	*
B2(i) (Year-round)		*	*	*	6.4%	*	*	*	*	*	*
B2(j) (Year-round)		*	*	*	17%	*	*	*	*	*	*
B2(k) (Jan-April)		*	*	*	0.1%	*	*	*	*	*	*

Table A.7 Percent reduction (-) or increase (+) in the number of hooks set; discards of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead, and other sea turtles based on various time/area closure alternatives without redistribution of effort. Source: HMS Logbook data (2001-2003).

Alternative	Number of Hooks Set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Bluefin Tuna discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
Alternative B2(a)	-18.0%	-16.0%	-19.9%	-15.8%	-14.9%	-12.2%	-34.6%	-5.0%	-45.5%
Alternative B2(a) (May-Nov)	-11.4%	-14.7%	-17.6%	-14.2%	-11.3%	-4.6%	-15.4%	-3.4%	0.0%
Alternative B2(b)	-4.7%	-3.9%	-0.9%	-0.1%	-0.5%	-28.5%	-5.7%	-20.7%	0.0%
Alternative B2(b) (June only)	-0.9%	-0.4%	-0.2%	0.0%	0.0%	-22.6%	-2.0%	-11.2%	0.0%
Alternative B2(c)	-13.4%	-10.3%	-10.0%	-12.1%	-8.3%	-21.5%	-11.1%	-3.9%	-18.2%
Alternative B2(d)	-47.4%	-47.3%	-57.0%	-62.4%	-83.5%	-27.1%	-57.5%	-10.1%	-45.5%
Alternative B2(e)	-10.1%	-8.7%	-1.6%	-0.3%	-1.9%	-43.3%	-9.9%	-36.3%	0.0%
Alternative B2(f)	-22.8%	-21.7%	-25.3%	-21.5%	-20.3%	-38.3%	-5.6%	-45.5%	-21.7%
Alternative B2(g)	-14.1%	-15.3%	-2.0%	-1.1%	-1.7%	-37.7%	-8.1%	-22.3%	0.0%
Alternative B2(h)	-5.6%	-4.4%	-5.6%	-13.0%	-6.4%	-2.0%	-1.7%	-5.6%	0.0%
Alternative B2(i)	-5.6%	-7.4%	-12.9%	-5.7%	-4.7%	-0.7%	-2.0%	-11.2%	0.0%
Alternative B2(j)	-24.5%	-16.5%	-21.6%	-43.1%	-25.5%	-11.1%	-18.2%	-6.7%	-9.1%
Alternative B2(k)	-0.1%	-0.2%	-0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table A.8 **Percent reduction (-) or increase (+) in discards of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead, and other sea turtles, and bluefin tuna kept and discards combined, based on various time/area closure alternatives without redistribution of effort.** Source: Pelagic Observer Program data (2001-2003).

Alternative	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Bluefin Tuna	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
Alternative B2(a) (year-round)	-14.6%	-11.1%	-20.9%	-4.5%	-12.2%	-18.9%	-7.0%	-25.0%
Alternative B2(a) (May-Nov)	-13.2%	-9.3%	-19.6%	-4.5%	-7.0%	-11.3%	-4.0%	0.0%
Alternative B2(b) (year-round)	-1.4%	-0.7%	0.0%	0.0%	-16.2%	-0.6%	-9.0%	0.0%
Alternative B2(b) (June only)	0.0%	0.0%	0.0%	0.0%	-15.4%	0.0%	-6.0%	0.0%
Alternative B2(c) (April-June)	-8.4%	-11.1%	-14.2%	-2.3%	-18.4%	-15.1%	-7.0%	-25.0%
Alternative B2(d) (year-round)	-38.8%	-26.8%	-52.0%	-15.9%	-24.3%	-52.8%	-14.0%	-75.0%
Alternative B2(e) (year-round)	-3.3%	-1.1%	0.0%	-2.3%	-44.3%	-6.9%	-16.0%	0.0%
Alternative B2(f)	-19.6%	-17.1%	-25.7%	-4.5%	-17.6%	-25.8%	-8.0%	-25.0%
Alternative B2(g)	-12.7%	-1.8%	-0.0%	-2.3%	-49.5%	-10.1%	-20.0%	-25.0%
Alternative B2(h)	-3.3%	-9.3%	-24.3%	-2.3%	-0.3%	-10.7%	-4.0%	0.0%
Alternative B2(i)	-16.0%	-34.3%	-8.8%	-45.5%	-1.1%	-6.9%	-17.0%	0.0%
Alternative B2(j)	-20.3%	-8.2%	-33.1%	-2.3%	-10.8%	-29.6%	-9.0%	-50.0%
Alternative B2(k)	-0.7%	-3.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table A.9 **Alternative B2(f). Temporal variation in effectiveness of Gulf of Mexico time/area closure in terms of percent reduction (-) or increase (+) of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead, and bluefin tuna discards.** A negative sign indicates an increase in bycatch. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Bluefin tuna discards
1	464,535	14	17	9	9	10	1	2
2	248,436	3	4	2	0	11	0	3
3	310,044	6	8	3	4	17	1	60
4	391,152	8	16	6	5	17	0	97
5	579,566	50	36	22	7	10	5	84
6	459,183	151	104	29	14	12	0	5
7	393,868	216	202	57	15	15	1	0
8	452,158	86	77	30	7	13	0	0
9	319,796	55	59	29	4	8	1	1
10	400,189	43	55	15	11	19	0	1
11	393,811	32	26	15	4	14	0	1
12	414,240	18	16	4	6	43	1	1
Total	4,826,978	682	620	221	86	189	10	255
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	1,617
% Decrease **without** redistribution of effort	-22.8%	-21.7%	-25.3%	-21.5%	-20.3%	-38.3%	-5.6%	-15.8%
No. discards with redistribution of effort		-3	-122	4	14	-96	39	153
% Decrease **with** redistribution of effort		-0.1%	-5.0%	0.4%	3.3%	-19.4%	21.8%	9.4%

Table A.10 Alternative B2(g). Temporal variation in effectiveness of the Northeast time/area closure from June through October in terms of percent reduction (-) or increase (+) of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead, and other sea turtle discards. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	**Number of hooks set**	**White Marlin discards**	**Blue Marlin discards**	**Sailfish discards**	**Spearfish discards**	**Leatherback Sea Turtles**	**Loggerhead Sea Turtles**	**Other Sea Turtles**
1	94,685	0	1	0	0	0	1	0
2	63,028	0	0	0	0	0	3	0
3	70,714	0	1	1	0	0	1	0
4	83,255	2	2	0	0	0	0	0
5	143,876	9	2	0	1	0	0	0
6	295,480	23	4	4	0	9	14	0
7	524,941	101	5	1	3	7	9	0
8	594,372	215	22	2	0	11	6	0
9	595,391	119	16	2	1	3	3	0
10	554,844	17	1	2	1	5	5	0
11	420,660	6	1	0	2	5	3	0
12	197,429	1	0	0	0	1	1	0
Total	3,638,675	493	55	12	8	41	46	0
June-Oct	2,985,688	481	49	11	7	40	40	0
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% Decrease **without** redistribution of effort	-14.1%	-15.3%	-2.0%	-1.1%	-1.7%	-8.1%	-22.3%	-0.0%
No. discards with redistribution of effort		71	494	239	62	29	-26	1
% Decrease **with** redistribution of effort		2.3%	20.2%	23.2%	14.5%	5.9%	-14.8%	12.5%

Table A.11 Alternative B2(h). Temporal variation in effectiveness of the Southeast time/area closure closure in terms of percent reduction (-) or increase (+) of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead, and other sea turtle discards. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
1	125,740	2	9	7	0	4	0	0
2	110,101	10	3	3	0	3	2	0
3	72,215	10	6	0	3	0	0	0
4	66,124	12	11	0	1	2	0	0
5	418,879	66	44	29	12	5	2	0
6	263,124	48	19	31	6	1	0	0
7	98,264	2	26	20	1	1	0	0
8	82,603	0	20	41	3	0	0	0
9	55,952	0	7	5	0	0	0	0
10	58,866	1	2	4	0	0	1	0
11	63,838	0	3	4	1	1	0	0
12	68,986	6	3	1	2	1	1	0
Total	1,484,692	157	153	145	29	18	6	0
March-Nov	1,179,865	139	138	134	27	10	3	0
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% Decrease **without** redistribution of effort	-5.6%	-4.4%	-5.6%	-13.0%	-6.4%	-2.0%	-1.7%	-0.0%
No. discards with redistribution of effort		54	-6	-73	-5	12	7	1
% Decrease **with** redistribution of effort		1.7%	-0.24%	-7.1%	-1.2%	2.4%	4.0%	5.4%

Table A.12 Alternative B2(i). Temporal variation in effectiveness of the closure on the east coast of Florida in terms of percent reduction (-) or increase (+) of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead, and other sea turtle discards. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
1	112,722	35	21	4	2	2	3	0
2	156,047	12	24	4	5	0	2	0
3	330,536	74	104	10	4	4	12	0
4	296,975	92	69	10	6	2	2	0
5	16,112	7	6	1	0	0	0	0
6	33,315	8	17	6	0	0	0	0
7	40,765	0	16	7	1	0	0	0
8	52,825	3	34	14	1	1	0	0
9	43,461	1	19	3	1	0	0	0
10	38,108	0	4	0	0	0	0	0
11	26,115	0	1	0	0	0	0	0
12	28,523	0	1	0	0	1	1	0
Total	1,175,504	232	316	59	20	10	20	0
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% Decrease **without** redistribution of effort	-5.6%	-7.4%	-12.9%	-5.7%	-4.7%	-2.0%	-11.2%	0.0%
No. discards with redistribution of effort		-118	-224	-27	7	21	-10	1
% Decrease **with** redistribution of effort		-3.8%	-9.2%	-2.6%	1.6%	4.2%	-5.4%	9.5%

Table A.13 Alternative B2(j). Temporal variation in effectiveness of the Gulf of Mexico time/area closure in terms of percent reduction (-) or increase (+) of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead, and other sea turtle discards. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
1	345,996	11	13	6	2	2	1	0
2	264,179	5	2	4	0	1	0	0
3	270,055	1	2	0	2	3	0	0
4	480,977	13	13	9	2	2	0	1
5	585,789	31	19	29	6	6	3	0
6	514,852	64	50	92	10	7	1	0
7	653,844	191	192	145	38	17	2	0
8	642,913	121	108	75	15	8	1	0
9	437,233	42	75	55	17	7	0	0
10	343,804	17	26	13	8	1	0	0
11	317,848	10	12	13	4	4	1	0
12	325,390	13	16	3	4	32	3	0
Total	5,182,880	519	528	444	108	90	12	1
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% Decrease **without** redistribution of effort	-24.5%	-16.5%	-21.6%	-43.1%	-25.5%	-18.2%	-6.7%	-9.1%
No. discards with redistribution of effort		394	126	-241	-5	38	40	2
% Decrease **with** redistribution of effort		12.6%	5.1%	-23.4%	-1.2%	7.7%	22.1%	17.0%

Table A.14 Alternative B2(k). Temporal variation in effectiveness of the Caribbean time/area closure in terms of percent reduction (-) or increase (+) of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead, and other sea turtle discards. Landings were only reported for the four months listed. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
1	6,160	3	11	0	0	0	0	0
2	826	0	0	0	0	0	0	0
3	13,735	3	2	0	0	0	0	0
4	1,600	1	1	0	0	0	0	0
Total	22,321	7	14	0	0	0	0	0
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% Reduction **without** redistribution of effort	-0.1%	-0.2%	-0.6%	0.0%	0.0%	0.0%	0.0%	0.0%
% Reduction **with** redistribution of effort		-0.7%	-1.8%	0.3%	0.3%	0.3%	0.3%	0.3%

Table A.15 **Alternative B2(f). Temporal variation in effectiveness of the Gulf of Mexico time/area closure in terms of percent reduction (-) in discards and retained catch.** *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kepts	BAYS discards
1	464,535	1,495	678	15	2	4,613	121	153	3	4,820	128
2	247,536	1,062	433	16	3	1,174	48	54	2	1,244	50
3	310,044	852	588	38	60	2,097	49	17	0	2,119	61
4	392,186	590	665	37	97	4,022	127	11	0	4,035	136
5	577,866	677	1,077	37	84	5,831	386	9	0	5,856	403
6	456,786	721	616	10	5	5,499	272	40	0	5,539	307
7	394,518	573	413	0	0	5,042	118	45	0	5,094	156
8	454,358	786	360	0	0	4,277	105	53	0	4,350	147
9	319,796	530	325	0	1	2,855	47	47	0	2,907	97
10	399,389	704	421	0	1	3,532	149	134	2	3,724	183
11	394,411	801	341	2	1	3,129	64	152	1	3,395	143
12	415,190	1,269	584	11	1	3,873	130	144	1	4,182	195
Total	4,826,615	10,060	6,501	166	255	45,944	1,616	859	9	47,265	2,006
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction **without** redistribution of effort	-22.8%	-7.9%	-17.7%	-27.7%	-15.8%	-27.5%	-29.5%	-2.3%	-0.9%	-20.9%	-22.3%

Table A.16 Alternative B2(g). Temporal variation in effectiveness of the Northeast time/area closure from June through October closure in terms of percent reduction (-) in discards and retained catch. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
1	94,685	1,156	790	0	2	126	25	14	0	164	31
2	63,028	734	369	1	0	31	0	6	0	40	0
3	70,714	561	212	0	79	148	4	11	0	164	13
4	83,255	576	219	0	40	912	52	61	1	977	55
5	143,876	615	134	1	18	2,084	41	185	3	2,270	44
6	294,380	1,617	284	12	233	2,814	20	486	3	3,461	29
7	525,481	3,711	654	16	66	3,089	63	549	5	4,033	80
8	596,472	3,613	963	5	8	4,252	79	1,270	60	6,543	165
9	596,671	4,788	1,360	2	46	6,364	190	2,651	76	10,530	308
10	551,664	4,489	2,244	16	61	6,388	110	2,894	71	13,721	415
11	421,760	3,581	1,873	33	195	4,116	82	2,879	28	10,029	626
12	197,429	1,773	847	3	14	1,029	20	1,368	6	3,532	227
Total	3,639,415	27,214	9,949	89	762	31,353	686	12,374	253	55,464	1,993
June-Oct	2,986,428	21,799	7,378	84	609	27,023	544	10,729	243	48,317	1,623
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction **without** redistribution of Effort: June-Oct.	-14.1%	-17.1%	-20.1%	-14.0%	-37.7%	-16.2%	-9.9%	-28.9%	-24.2%	-21.4%	-18.1%

Table A.17 **Alternative B2(h). Temporal variation in effectiveness of the time/area closure from March through November closure in terms of percent reduction (-) in discards and retained catch.** *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
1	125,740	1,762	480	0	0	502	30	12	1	516	31
2	110,101	1,115	329	0	1	619	29	96	3	823	32
3	72,215	471	65	1	0	278	18	214	0	638	18
4	65,324	547	78	1	0	161	11	59	3	268	16
5	418,879	9,016	2,073	1	1	561	24	8	0	574	25
6	263,124	4,128	778	2	1	401	11	8	1	413	14
7	97,924	1,941	321	0	0	434	24	37	8	471	33
8	82,603	1,977	475	0	0	367	9	36	0	405	10
9	55,952	1,833	314	0	0	283	6	28	3	313	9
10	58,866	2,165	296	0	0	613	9	16	0	632	9
11	63,838	2,219	394	0	0	410	12	21	3	434	18
12	68,986	1,355	283	0	0	283	7	19	1	305	8
Total	1,483,552	28,529	5,886	5	3	4,912	190	554	23	5,792	223
March-Nov	1,118,725	24,297	4794	5	2	3,508	124	427	18	4,148	152
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction **without** redistribution of effort	-7.0%	-22.4%	-16.0%	-0.8%	-0.2%	-2.9%	-3.5%	-1.5%	-2.3%	-2.6%	-2.5%
% Reduction **without** redistribution of Effort: March-Nov	-5.3%	-19.1%	-13.0%	-0.8%	-0.1%	-2.1%	-2.3%	-1.1%	-1.8%	-1.8%	-1.7%

Table A.18 Alternative B2(i). Temporal variation in effectiveness of the closure of the east Florida in terms of percent reduction (-) in discards and retained catch. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
1	112,722	726	213	1	1	345	11	930	35	1,606	46
2	156,047	1,132	263	1	0	235	9	1,165	33	1,924	44
3	330,536	1,862	329	6	2	515	26	2,610	62	4,188	89
4	296,975	1,592	174	26	4	986	28	1,457	17	2,825	45
5	16,112	106	19	0	1	32	0	40	0	87	0
6	33,315	232	20	1	3	149	1	113	0	280	1
7	40,765	379	120	0	0	300	74	205	111	516	185
8	52,825	636	234	0	0	278	125	476	114	778	241
9	43,461	383	152	0	0	152	0	413	20	606	20
10	38,108	486	101	0	0	288	7	393	7	712	16
11	26,115	316	54	0	0	162	3	382	3	582	7
12	28,523	254	25	0	0	248	13	228	15	527	31
Total	1,175,504	8,104	1,704	35	11	3,690	297	8,412	417	14,631	725
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction **without** redistribution of effort	-5.6%	-6.4%	-4.6%	-5.8%	-0.7%	-2.2%	-5.4%	-22.7%	-41.5%	-6.5%	-8.1%

Table A.19 Alternative B2(j). Temporal variation in effectiveness of the time/area closure in the Gulf of Mexico in terms of percent reduction (-) in discards and retained catch. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
1	346,896	1,302	571	14	0	3,765	79	76	3	3,914	97
2	264,179	2,226	765	15	1	1,072	29	23	1	1,104	34
3	270,055	1,989	749	18	7	1,454	73	3	0	1,464	74
4	482,677	1,615	689	52	92	4,114	236	15	0	4,131	237
5	587,439	1,305	892	47	69	5,807	187	9	0	5,819	220
6	512,512	885	588	7	4	7,171	170	12	1	7,183	207
7	653,044	754	436	3	0	9,096	261	26	0	9,129	294
8	643,863	793	462	0	5	7,948	191	23	1	7,991	213
9	437,233	536	316	19	1	4,550	101	28	0	4,600	118
10	344,604	747	340	0	0	3,295	108	49	5	3,375	134
11	318,248	608	283	1	0	2,441	78	86	0	2,588	122
12	325,440	709	342	5	0	3,141	109	50	0	3,281	163
Total	5,186,190	13,469	6,433	181	179	53,854	1,622	400	11	54,579	1,913
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction **without** redistribution of effort	-24.5%	-10.6%	-17.5%	-30.2%	-11.1%	-32.2%	-29.6%	-1.1%	-1.1%	-24.1%	-21.3%

Table A.20 Alternative B2(k). Temporal variation in effectiveness of the time/area closure in the Caribbean in terms of percent reduction (-) in discards and retained catch. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (2001-2003).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kept	BAYS discards
1	6,160	76	47	0	0	0	0	0	0	0	0
2	826	16	0	0	0	0	0	0	0	0	0
3	13,735	211	69	0	0	4	0	2	0	8	0
4	1,600	18	4	0	0	0	0	0	0	0	0
Total	22,321	321	120	0	0	4	0	2	0	8	0
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction **without** redistribution of effort	-0.1%	-0.3%	-0.3%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%	-0.0%

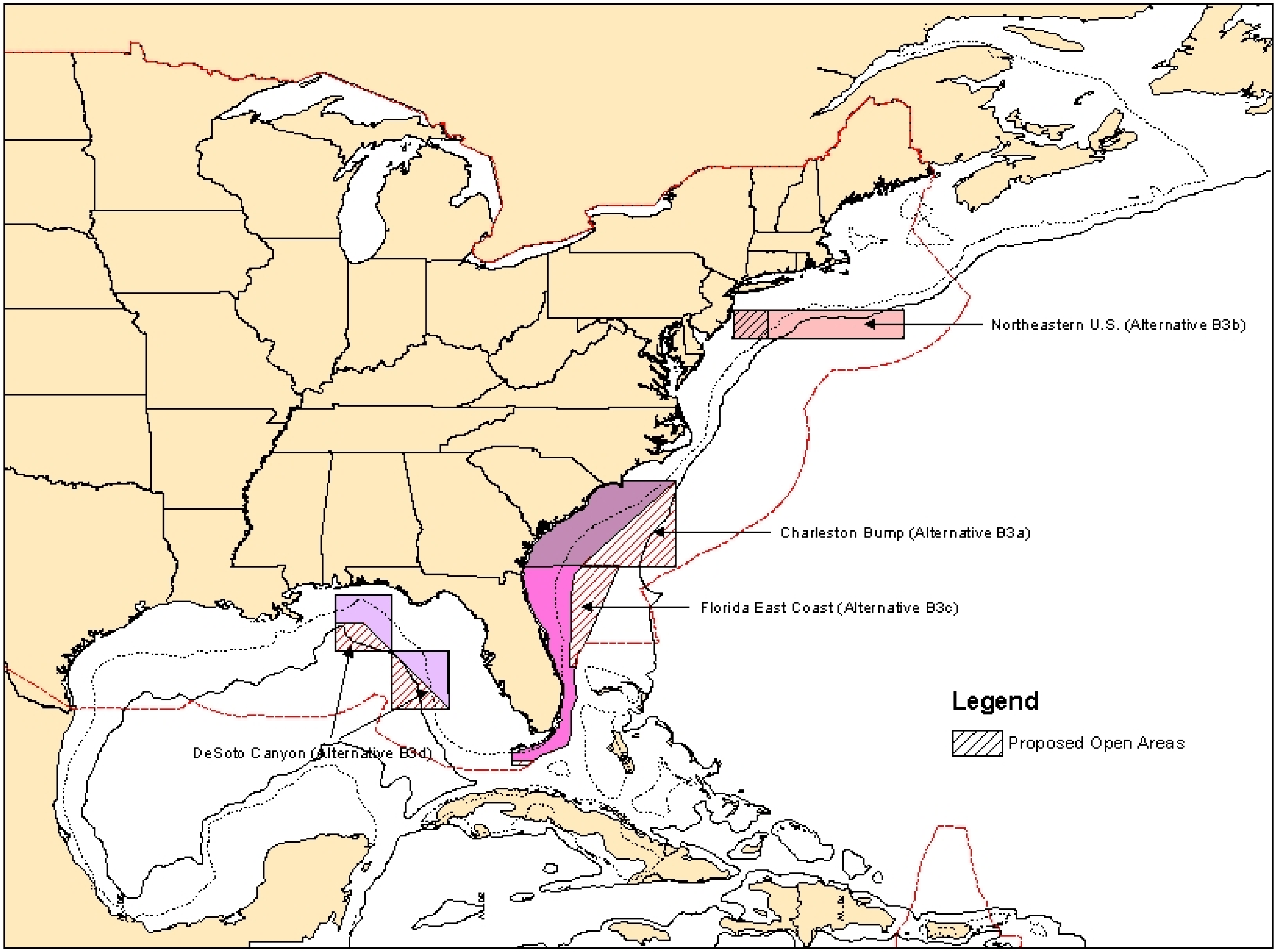

Figure A.2 **Map showing areas considered for modifications to existing closures. Note: only alternatives B3(a) and (b) were further analyzed.**

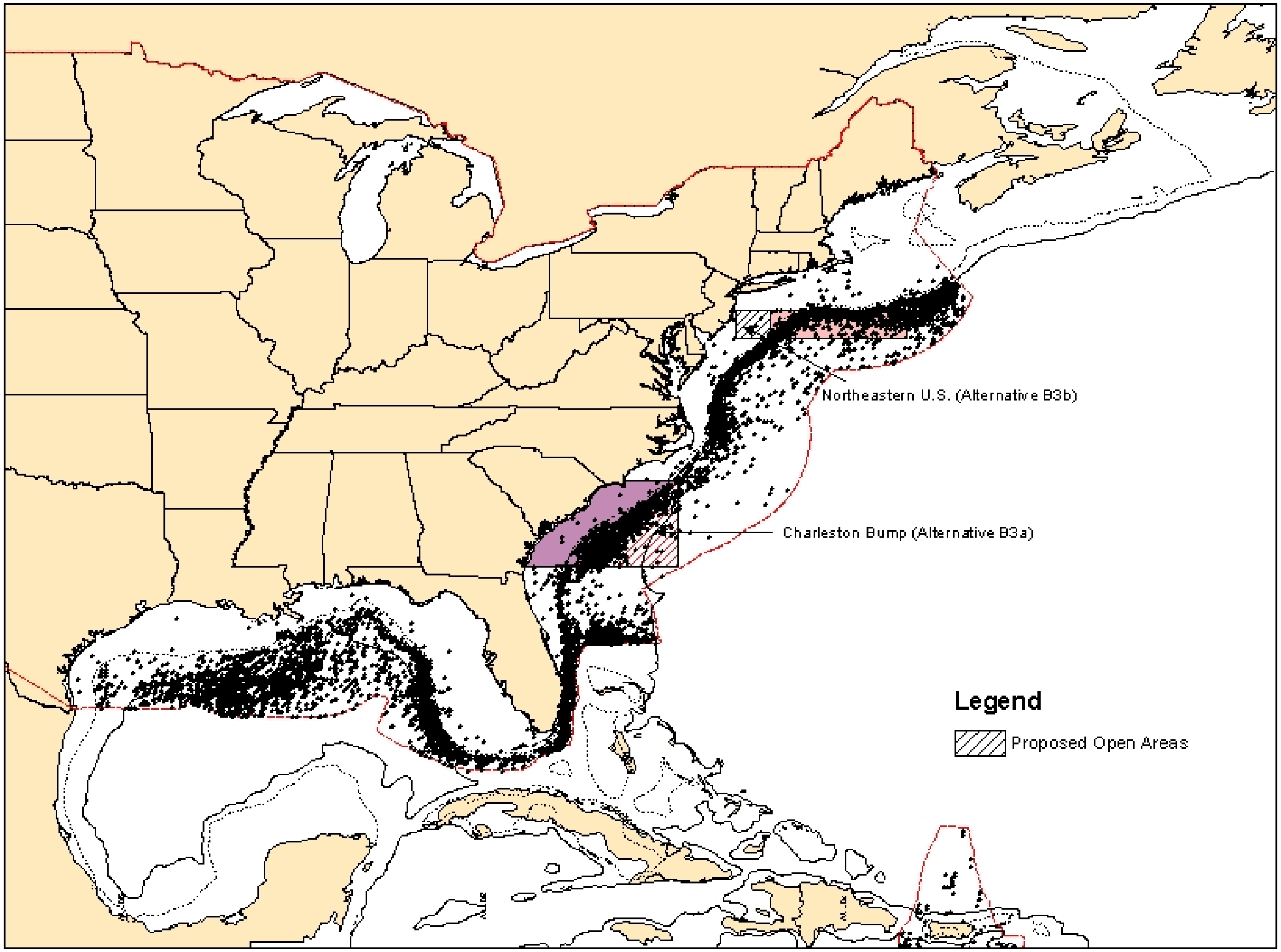

Figure A.3 Map showing areas considered for modifications to existing closures and juvenile swordfish data (<180 cm LJFL). The minimum size limit for swordfish is 119 cm LJFL. Note: only alternatives B3(a) and (b) were further analyzed. Source Pelagic Observer Program 1997-1999.

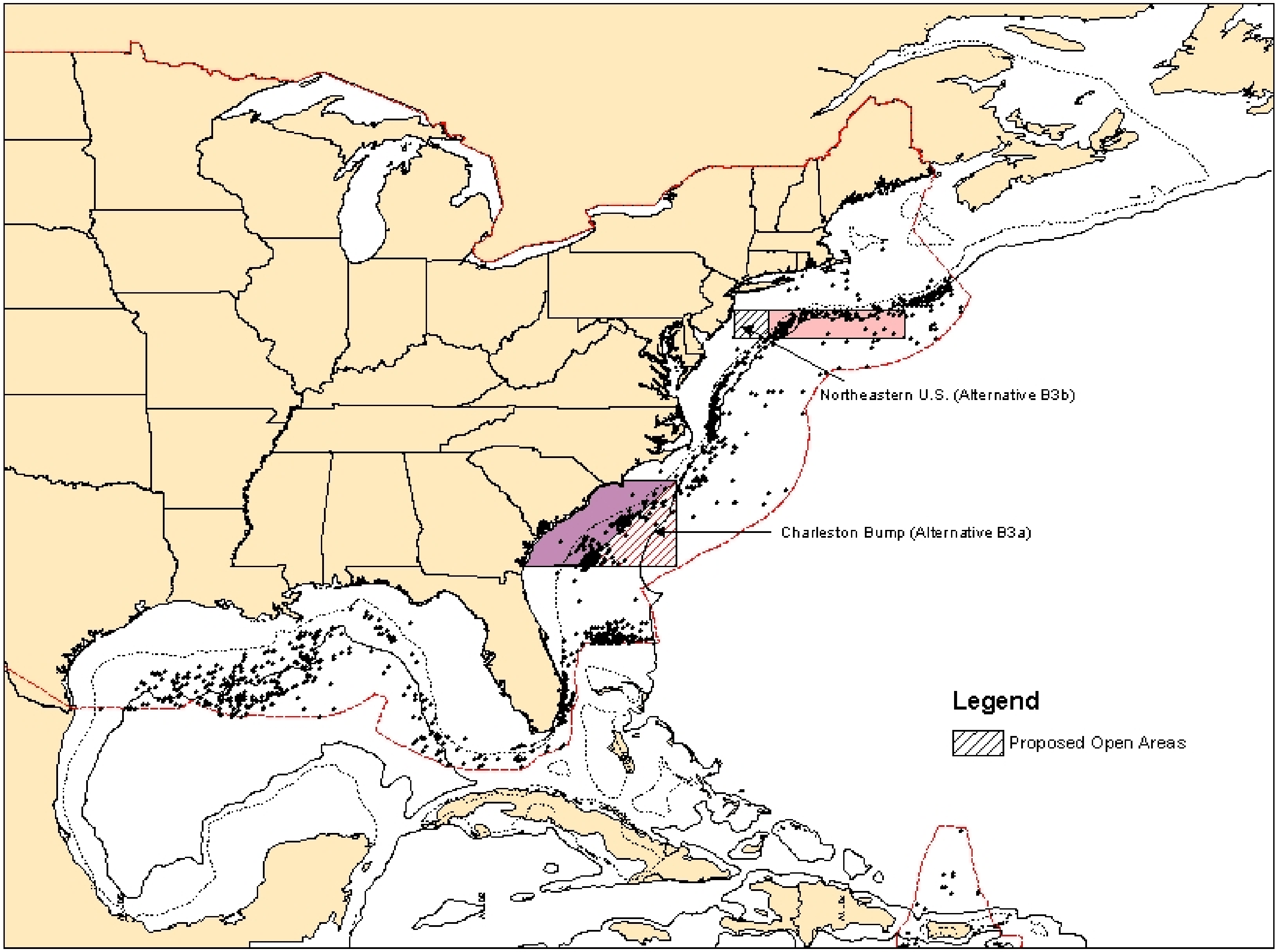

Figure A.4 **Map showing areas considered for modifications to existing closures and adult swordfish data from the Pelagic Observer Program.** Note: only alternatives B2(a) and (b) were further analyzed. Source Pelagic Observer Program 1997-1999.

Table A.21 Swordfish lengths (cm lower jaw fork length; LJFL) in the portion of the areas to remain closed and the portion of the areas considered for reopening. The minimum size limit for swordfish is 119 cm LJFL. The mature size is > 180 cm LJFL. Significant differences are shaded. Source: Pelagic Observer Program 1992-1999.

Closed Area	Portion Considered for Reopening	Sample Size	Portion to Remain Closed	Sample Size	*t*-test
	1992-1999				
B3(a) Charleston Bump	124	3,374	125	1,664	*P* = 0.37
B3(b) Northeastern U.S.	96	1695	71	2	*P* = 0.34
B3(c) East Florida Coast	119	2,744	124	679	*P* < 0.0001
B3(d) DeSoto Canyon	106	634	101	314	*P* = 0.50
	1997-1999				
B3(a) Charleston Bump	125	2,067	126	455	*P* = 0.10
B3(b) Northeastern U.S.	112	409	71	2	*P* = 0.05
B3(c) East Florida Coast	120	1,094	125	527	*P* < 0.0001
B3(d) DeSoto Canyon	116	152	108	55	*P* = 0.03

Table A.22 **Alternative B3(c) Florida East Coast modification. Discards of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead and other sea turtles in the portion of the area to remain closed and the portion of the area considered for reopening.** *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook 1997-1999.

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
	PORTION OF AREA TO REMAIN CLOSED							
1	81,708	4	20	16	1	1	1	0
2	68,328	4	12	11	4	0	0	0
3	107,962	5	14	41	0	1	0	0
4	134,487	16	12	24	0	0	1	0
5	161,558	34	41	129	2	1	0	0
6	100,117	4	13	61	2	0	0	0
7	100,942	9	16	62	1	1	1	0
8	74,005	7	16	41	3	0	0	0
9	43,040	4	7	15	3	1	0	0
10	62,900	3	4	8	1	0	0	0
11	79,128	5	8	16	2	0	0	0
12	101,843	21	23	33	1	0	0	0
Total	1,116,018	116	186	457	20	5	3	0
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% of All Areas	5.3%	3.7%	7.6%	44.4%	4.7%	1.0%	1.7%	0.0%
	PORTION OF AREA CONSIDERED FOR REOPENING							
1	16,421	1	11	1	2	0	0	0
2	14,664	4	4	1	0	0	0	0
3	15,385	0	4	0	0	0	0	0
4	23,746	7	3	1	1	0	0	0
5	30,905	8	5	9	0	0	0	0
6	48,306	8	10	21	1	0	0	0
7	38,439	1	8	14	0	0	0	0
8	24,495	1	13	23	3	0	0	0
9	38,590	2	16	14	1	0	0	0
10	34,168	0	7	4	0	0	2	0
11	22,008	9	8	7	1	0	0	0
12	22,560	7	9	4	0	0	0	0
Total	329,687	48	98	99	9	0	2	0
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% of All Areas	1.6%	1.5%	4.0%	9.6%	2.1%	0.0%	1.1%	0.0%

Table A.23 **Alternative B3(d) Desoto Canyon modification. Discards of white marlin, blue marlin, sailfish, spearfish, leatherback, loggerhead and other sea turtles in the portion of the area to remain closed and in the portion of the area considered for reopening.** Source HMS Logbook 1997-1999. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three.

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
	PORTION OF AREA TO REMAIN CLOSED							
1	20,270	3	2	0	0	0	0	0
2	18,321	0	2	0	0	0	0	0
3	41,625	3	4	1	0	0	0	0
4	7,592	3	3	2	0	0	0	0
5	15,324	0	0	0	0	0	1	1
6	25,752	3	7	6	0	0	0	0
7	22,582	8	6	3	0	0	0	0
8	10,235	3	0	3	0	0	0	0
9	8,860	2	0	0	0	0	0	0
10	18,185	12	2	3	0	0	0	0
11	8,040	1	0	1	0	0	0	0
12	10,290	2	0	0	0	0	0	0
Total	207,076	40	26	19	0	0	1	1
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% of All Areas	1.0%	1.3%	1.1%	1.8%	0.0%	0.0%	0.6%	9.1%
	PORTION OF AREA CONSIDERED FOR REOPENING							
1	30,678	1	0	0	0	1	0	0
2	17,681	1	1	1	0	0	0	0
3	4,703	0	0	0	0	0	0	0
4	23,053	1	1	2	0	1	0	0
5	81,097	10	3	1	1	0	0	0
6	92,064	7	14	20	2	0	0	0
7	86,779	12	21	107	1	0	0	0
8	61,128	6	14	5	0	0	0	0
9	50,612	3	3	1	0	0	0	0
10	45,009	6	8	8	0	0	0	0
11	11,768	1	0	0	0	0	0	0
12	4,496	0	0	0	0	0	0	0
Total	509,068	48	65	145	4	2	0	0
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
% of All Areas	2.4%	1.5%	2.7%	14.1%	0.9%	0.4%	0.0%	0.0%

Table A.24 Comparison of discards of white marlin, blue marlin, sailfish, spearfish, leatherback and loggerhead sea turtles in the portion of the areas considered for reopening. - = decrease + = increase. *excluding the NED. Four year totals are shown; one year averages can be obtained by dividing the four year total by four. Source: HMS Logbook 1997-2000.

Area	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles
	PORTION OF AREAS CONSIDERED FOR REOPENING							
B3(a) Charleston Bump (Feb-Apr)	108,403	19	17	10	4	0	1	0
B3(b) Northeastern U.S. (June)	2,400	0	0	0	0	0	0	0
B3(c) East Florida Coast	329,687	48	98	99	9	0	2	0
B3(d) Desoto Canyon	509,068	48	65	145	4	2	0	0
All Areas*	21,148,706	3,143	2,449	1,029	424	494	179	11
	% of All Areas							
B3(a) Charleston Bump (Feb-Apr)	0.3%	0.6%	0.7%	1.0%	0.9%	0.0%	0.6%	0.0%
B3(b) Northeastern U.S.	0.01%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
B3(c) East Florida Coast	1.6%	1.5%	4.0%	9.6%	2.1%	0.0%	1.1%	0.0%
B3(d) Desoto Canyon	2.4%	1.5%	2.7%	14.1%	0.9%	0.4%	0.0%	0.0%

Table A.25 Comparison of catch of swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, and BAYS in the portion of the areas considered for reopening. *excluding the NED. Four year totals are shown; one year averages can be obtained by dividing the four year total by four. Source: HMS Logbook 1997-2000.

Area	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kepts	BAYS discards
	PORTION OF AREAS CONSIDERED FOR REOPENING										
B3(a) Charleston Bump (Feb-Apr)	108,403	1,371	548	0	0	275	19	8	1	297	21
B3(b) Northeastern U.S. (June)	2,400	3	0	0	1	1	0	0	0	1	0
B3(c) East Florida Coast	329,687	5,313	2,150	0	3	1,247	60	405	25	1,676	89
B3(d) DeSoto Canyon	509,068	985	647	12	22	8,091	206	45	1	8,170	287
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
	% of All Areas										
B3(a) Charleston Bump (Feb-Apr)	0.51%	1.1%	1.5%	0.0%	0.0%	0.16%	0.35%	0.02%	0.1%	0.13%	0.23%
B3(b) Northeastern U.S. (June)	0.01%	0.002%	0.0%	0.0%	0.06%	0.001%	0.0%	0.0%	0.0%	0.0004%	0.0%
B3(c) East Florida Coast	1.6%	4.2%	5.9%	0.0%	0.19%	0.75%	1.1%	1.1%	2.5%	0.75%	0.01%
B3(d)Desoto Canyon	2.4%	0.8%	1.8%	2.0%	0.06%	4.8%	3.8%	0.12%	0.1%	3.6%	3.2%

Table A.26 **Alternative B3(c) modification of East Florida Coast time/area closure. Catch and discards of various species in the portion of the area to remain closed and in the portion of the area considered for reopening.** *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (1997-1999).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kepts	BAYS discards
	PORTION OF AREA TO REMAIN CLOSED										
1	81,708	1,535	922	1	0	14	0	1	0	15	1
2	68,328	1,222	801	0	0	7	0	3	1	10	1
3	107,962	1,870	1,188	0	0	37	1	10	5	55	8
4	134,487	1,802	979	1	0	32	4	46	0	91	6
5	161,558	2,485	976	5	18	157	6	60	0	229	6
6	100,117	2,096	740	4	1	150	1	19	1	172	3
7	100,942	1,833	823	0	0	106	1	23	0	129	1
8	74,005	1,561	777	0	0	68	0	24	0	92	0
9	43,040	1,305	666	0	0	33	0	19	0	52	0
10	62,900	1,776	936	0	0	54	2	6	0	60	2
11	79,128	2,245	819	0	0	52	2	11	0	63	3
12	101,843	2,340	1,052	0	0	38	1	9	2	47	3
Total	1,116,018	22,070	10,679	11	19	748	18	231	9	1,015	34
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction	5.3%	17.3%	29.1%	1.8%	1.2%	0.4%	0.3%	0.6%	0.9%	0.4%	0.4%
	PORTION OF AREA CONSIDERED FOR REOPENING										
1	16,421	184	190	0	0	35	5	9	2	44	7
2	14,664	72	37	0	0	29	2	9	3	38	5
3	15,385	187	87	0	0	8	0	10	0	18	0
4	23,746	237	98	0	0	36	2	19	3	56	5
5	30,905	213	52	0	0	43	4	15	0	60	4
6	48,306	632	163	0	3	94	0	43	0	142	4
7	38,439	603	177	0	0	107	3	83	1	195	4
8	24,495	442	158	0	0	102	7	105	0	212	7
9	38,590	798	301	0	0	391	23	51	3	445	26
10	34,168	1,094	400	0	0	201	2	9	0	213	2
11	22,008	527	284	0	0	135	11	34	9	169	20
12	22,560	324	203	0	0	66	1	18	4	84	5
Total	329,687	5,313	2,150	0	3	1,247	60	405	25	1,676	89
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction	1.6%	4.2%	5.9%	0.0%	0.2%	0.7%	1.1%	1.1%	2.5%	0.7%	1.0%

Table A.27 Alternative B3(d) modification of the DeSoto Canyon time/area closure. Catch and discards of various species in the portion of the area to remain closed and in the portion of the area considered for reopening. *excluding the NED. Three year totals are shown; one year averages can be obtained by dividing the three year total by three. Source: HMS Logbook data (1997-1999).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kepts	BAYS discards
	PORTION OF AREA TO REMAIN CLOSED										
1	20270	278	63	0	0	2	0	0	0	4	2
2	16515	348	254	0	0	0	0	0	0	0	0
3	38760	497	216	0	0	10	0	0	0	10	0
4	6611	77	42	0	3	17	0	0	0	17	0
5	15324	165	123	1	0	372	16	1	0	373	16
6	25752	368	169	0	1	343	6	0	0	343	10
7	19832	189	107	0	0	75	5	1	0	76	5
8	10235	222	83	0	0	54	4	0	0	54	4
9	8860	40	35	0	0	118	0	0	0	118	4
10	18185	309	133	0	0	115	0	0	0	119	2
11	7415	101	36	0	0	28	0	0	0	28	0
12	10290	259	149	0	0	2	0	0	0	2	0
Total	198,049	2,853	1,410	1	4	1,136	31	2	0	1,144	43
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction	0.9%	2.2%	3.8%	0.2%	0.2%	0.7%	0.6%	0.005%	0.0%	0.5%	0.5%
	PORTION OF AREA CONSIDERED FOR REOPENING										
1	30,678	122	57	1	0	351	0	13	0	364	0
2	17,681	183	37	1	0	191	0	9	0	200	1
3	4,703	25	59	2	0	74	0	0	0	74	0
4	23,053	94	77	1	7	317	4	0	0	317	13
5	81,097	56	13	5	11	1,529	47	7	0	1,542	61
6	92,064	195	175	2	4	1,766	67	2	1	1,768	87
7	86,779	149	99	0	0	1,285	21	4	0	1,294	22
8	61,128	99	91	0	0	601	2	2	0	608	8
9	50,612	17	9	0	0	1,179	38	3	0	1,199	45
10	45,009	22	18	0	0	649	27	3	0	652	47
11	11,768	4	5	0	0	59	0	2	0	61	3
12	4,496	19	7	0	0	90	0	0	0	91	0
Total	509,068	985	647	12	22	8,091	206	45	1	8,170	287
All Areas*	21,148,706	127,500	36,748	599	1,617	167,203	5,486	37,133	1,006	226,156	8,990
% Reduction	2.4%	0.8%	1.8%	2.0%	1.4%	4.8%	3.8%	0.1%	0.01%	3.6%	3.2%

Table A.28 . **An example of the calculations for the redistribution of fishing effort model.** This example calculates the number of discards of loggerhead sea turtles considering the redistribution of fishing effort for alternative B2(d). A negative sign indicates an increase in discards.

	A	B	C	D	E	F	G	H	I	J	K	L
Month	**Number of hooks in the Atlantic & Gulf of Mexico**	**Number of discards in Atl.& Gulf of Mexico**	**Number of hooks in the time/area closure**	**Number of discards in the potential time/area closure**	**Number of discards in open Atl. & GOM (B-D)**	**CPUE in the open Atl. & Gulf of Mexico (E/(A-C))**	**Number of additional dicards in open Atl. & GOM by displaced effort (C*F)**	**Discards from open Atl. & GOM with displaced fishing effort (E+G)**	**Number of dicards avoided by area closure (B-H)**	**Cumulative discards avoided by month (Cumulative sum of I)**	**Percent of total discards by month (I/Sum of Column B)**	**Cumulative percent of total discards avoided by closure (J/Sum of Column B)**
1	1,647,194	9	739,191	1	8	8.81E-06	6.5	15	-6	-6	-3.1%	-3.1%
2	1,265,512	30	488,238	0	30	3.86E-05	18.8	49	-19	-24	-10.5%	-13.6%
3	1,632,848	21	546,944	1	20	1.84E-05	10.1	30	-9	-33	-5.1%	-18.7%
4	1,865,601	11	825,627	0	11	1.06E-05	8.7	20	-9	-42	-4.9%	-23.6%
5	2,000,083	15	1,085,255	6	9	9.84E-06	10.7	20	-5	-47	-2.6%	-26.2%
6	2,035,950	35	978,848	1	34	3.22E-05	31.5	65	-30	-77	-17.0%	-43.2%
7	2,253,513	13	1,136,250	3	10	8.95E-06	10.2	20	-7	-84	-4.0%	-47.2%
8	2,256,917	9	1,125,483	1	8	7.07E-06	8.0	16	-7	-91	-3.9%	-51.1%
9	1,707,630	7	820,167	1	6	6.76E-06	5.5	12	-5	-96	-2.5%	-53.6%
10	1,670,686	10	828,954	0	10	1.19E-05	9.8	20	-10	-106	-5.5%	-59.1%
11	1,528,728	11	725,772	1	10	1.25E-05	9.0	19	-8	-114	-4.5%	-63.6%
12	1,284,044	8	720,028	3	5	8.86E-06	6.4	11	-3	-117	-1.9%	-65.5%
Total	21,148,706	179	10,020,757	18	161	1.74E-04	135	296	-117			

Table A.29 **An example of how the modified redistribution of fishing effort was calculated.** This example calculates the number of discards of white marlin considering the redistribution of fishing effort in the Gulf of Mexico and area 6 only for alternative B2(c) from April through June. A negative sign indicates an increase in discards, and a positive value indicates a decrease in discards.

	A	B	C	D	E	F	G	H	I
Month	**Number of hooks in the Gulf of Mexico**	**Number of discards in Gulf of Mexico**	**Number of hooks in the time/area closure**	**Number of discards in the time/area closure**	**Number of discards in open GOM (B-D)**	**CPUE in the open Gulf of Mexico (E/(A-C))**	**Number of additional dicards in open GOM by displaced effort (C*F)**	**Discards from open GOM with displaced fishing effort (E+G)**	**Number of dicards avoided by area closure (B-H)**
4	1,285,615	111	1,139,144	102	9	6.14E-05	70.0	79	32
5	1,644,111	223	1,454,636	201	22	1.16E-04	168.9	191	32
6	1,499,224	329	1,308,060	293	36	1.88E-04	246.3	282	47
Total	4,428,950	663	3,901,840	596	67	3.66E-04	485	552	111

Table A.30 **An example of how the modified redistribution of fishing effort was calculated.** This example calculates the number of discards of white marlin considering the redistribution of fishing effort in the Gulf of Mexico and area 6 only for alternative B2(c) from April through June. A negative sign indicates an increase in discards, and a positive value indicates a decrease in discards.

	A	B	C	F	G	H	I
Month	**Number of hooks in Areas 6**	**Number of discards in Areas 6**	**Number of hooks displaced out of Gulf**	**CPUE in the Area 6**	**Number of discards in Area 6 as a result of displaced effort (C*F)**	**Total number of discards avoided by the area closure**	**Cumulative percent of total discards avoided by closure**
4	311,464	56	28,198	1.80E-04	5.1	111-13=**98**	98/3747=**2.6%**
5	109,736	49	14,615	4.47E-04	6.5		
6	77,284	35	2,600	4.53E-04	1.2		
Total	498,484	140	45,413	1.08E-03	13		

Table A.31 Comparison between the percent change of bycatch for different closures for 2001-2003 data (used in the draft Consolidated FMP) and 2001-2004 (first six months of 2004 included) without redistribution of effort. A negative (-) sign indicates a reduction in bycatch. Source: HMS Logbook data 2001-2004 (first six months of 2004).

Alternative	Number of Hooks Set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leather back	Logger head	Bluefin Tuna Kept	Bluefin Tuna discards	Pelagic Shark discards	LCS discards
WITHOUT REDISTRIBUTION OF EFFORT											
2001-2003											
B2(a)											
2001-2003: Year-round	-18.0%	-16.0%	-19.9%	-15.8%	-14.9%	-34.6%	-5.0%	-22.2%	-12.2%	-0.6%	-2.5%
2001-2004: Year-round	**-20.4%**	**-17.1%**	**-20.1%**	**-16.5%**	**-15.1%**	**-32.8%**	**-3.8%**	**-22.0%**	**-11.9%**	**-2.0%**	**-3.8%**
2001-2003: May-Nov	-11.1%	-14.7%	-17.6%	-14.2%	-11.3%	-15.4%	-3.4%	-6.7%	-4.6%	-0.3%	-1.3%
2001-2004: May-Nov	**-12.4%**	**-14.8%**	**-16.5%**	**-12.9%**	**-10.5%**	**-14.0%**	**-2.5%**	**-5.8%**	**-4.8%**	**-0.6%**	**-2.0%**
B2(b)											
2001-2003: Year-round	-4.7%	-3.9%	-0.9%	-0.1%	-0.5%	-5.7%	-20.7%	-5.7%	-28.5%	-14.9%	-2.5%
2001-2004: Year-round	**-4.2%**	**-3.4%**	**-0.8%**	**-0.7%**	**-0.8%**	**-4.8%**	**-15.5**	**-4.1%**	**-21.0%**	**-13.7%**	**-2.1%**
2001-2003: June only	-0.9%	-0.4%	-0.2%	0.0%	0.0%	-2.0%	-11.2%	-1.8%	-22.6%	-3.8%	-0.0%
2001-2004: June only	**-0.8%**	**-0.3%**	**-0.2%**	**-0.2%**	**-0.6%**	**-1.7%**	**-8.4%**	**-1.2%**	**-16.6%**	**-13.7%**	**-2.1%**
B2(c) (April-June)											
2001-2003	-13.4%	-10.3%	-10.0%	-12.1%	-8.3%	-11.1%	-3.9%	-29.0%	-21.5%	-0.8%	-3.7%
2001-2004	**-15.7%**	**-15.9%**	**-14.6%**	**-19.2%**	**-12.0%**	**-14.7%**	**-2.9%**	**-51.4%**	**-35.8%**	**-3.8%**	**-8.4%**
B2(d) (Year-round)											
2001-2003	-47.4%	-47.3%	-57.0%	-62.4%	-83.5%	-57.5%	-10.1%	-53.6%	-27.1%	-2.2%	-12.9%
2001-2004	**-47.7%**	**-49.2%**	**-58.1%**	**-62.3%**	**-48.0%**	**-57.2%**	**-7.6%**	**-51.7%**	**-35.8%**	**-6.5%**	**-18.3%**
B2(e) (Year-round)											
2001-2003	-10.1%	-8.7%	-1.6%	-0.3%	-1.9%	-9.9%	-36.3%	-12.4%	-43.3%	-31.6%	-2.5%
2001-2004	**-9.1%**	**-7.8%**	**-1.6%**	**-1.1%**	**-1.9%**	**-9.9%**	**-28.2%**	**-8.8%**	**-33.8%**	**-29.1%**	**-4.2%**

Table A.32 Comparison in the number of hooks, discards, and CPUEs (# discards/# hooks in a particular area) between July through December of 2001-2003 and 2004 data. The yearly averages for the 6 months in 2001-2003 for CPUEs, hooks, and discards are shown in parentheses. Data source: HMS Logbook data July through December 2001-2003 and 2004.

Alternative	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Pelagic Shark discards	Large Coastal Shark discards
B2(a) (Gulf of Mexico)								
2001-2003: Mean CPUE	(0.00034)	(0.00037)	(0.00012)	(0.000041)	(0.00010)	(0.000002)	(0.000081)	(0.00017)
2004: CPUE	0.00075	0.00045	0.00023	0.00012	0.000061	0.0	0.00012	0.0004
2001-2003: Mean # discards	(105.3)	(113.3)	(36.8)	(13)	(31.7)	(0.67)	(26.3)	(54)
2004: # discards	72	48	27	12	9	0.0	14	43
Number of hooks								
2001-2003: (646,380)								
2004: 627,527								
B2(b) (Northeast)								
2001-2003: Mean CPUE	(0.00017)	(0.000031)	(0.000001)	(0.000003)	(0.00037)	(0.00025)	(0.019)	(0.00056)
2004: CPUE	0.00079	0.00069	0.000089	0.0	0.0	0.0	0.0083	0.0016
2001-2003: Mean # discards	(37.3)	(6)	(0.33)	(0.67)	(6)	(5.67)	(1,249.3)	(112.3)
2004: # discards	28	23	3	0.0	0.0	0.0	125	55
Number of hooks								
2001-2003: (268,707)								
2004: 160,461								
B2(c) (Gulf of Mexico)								
2001-2003: Mean CPUE	(0.00038)	(0.00036)	(0.00013)	(0.000048)	(0.000090)	(0.000003)	(0.00011)	(0.00030)
2004: CPUE	0.00061	0.00044	0.00019	0.000091	0.000033	0.000008	0.00037	0.00074
2001-2003: Mean # discards	(370.3)	(350)	(123)	(45)	(77.7)	(3)	(95.7)	(248.3)
2004: # discards	189	123	59	33	12	3	75	231
Number of hooks								
2001-2003: (1,753,421)								
2004: 1,773,489								

Alternative	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Pelagic Shark discards	Large Coastal Shark discards
B2(d) (Gulf of Mexico)								
2001-2003: Mean CPUE	(0.0003)	(0.00036)	(0.00015)	(0.000088)	(0.000076)	(0.000003)	(0.00011)	(0.00038)
2004: CPUE	0.00061	0.00044	0.00091	0.000090	0.000033	0.000008	0.00034	0.00079
2001-2003: Mean # discards	(376.7)	(365.7)	(153.3)	(86.7)	(64.7)	(3)	(97)	(342.3)
2004: # discards	189	123	60	33	12	3	79	248
Number of hooks								
2001-2003: (1,786,085)								
2004: 1,779,789								
B2(e) (Northeast)								
2001-2003: Mean CPUE	(0.00020)	(0.000029)	(0.000002)	(0.000005)	(0.000064)	(0.000045)	(0.012)	(0.00057)
2004: CPUE	0.00053	0.00035	0.000074	0.000012	0.000016	0.000089	0.020	0.0049
2001-2003: Mean # discards	(86)	(11.7)	(1)	(2.3)	(12.3)	(11.3)	(2,863.3)	(228.3)
2004: # discards	51	36	6	1	1	7	851	391
Number of hooks								
2001-2003: (616,743)								
2004: 370,990								

Table A.33 Comparison of the number of hooks, discards, species kept, and CPUEs (#discards/#hooks or #kept/#hooks in a particular area) between July through Dec. of 2001-2003 and 2004 data. The yearly averages for the 6 months in 2001-2003 for CPUEs, hooks, discards, and species kept are shown in parentheses. . Data source: HMS Logbook data July through December 2001-2003 and 2004.

Alternative	Swordfish Kept	Swordfish Discards	Bluefin Tuna Kept	Bluefin Tuna Discards	YFT Kept	YFT Discards	BET Kept	BET Discards	BAYS Kept	BAYS Discards
B2(a) (Gulf of Mexico)										
2001-2003: Mean CPUE	(0.0040)	(0.0020)	(0.000011)	(0.0000021)	(0.020)	(0.00053)	(0.00051)	(0.0000030)	(0.021)	(0.00077)
2004: CPUE	0.031	0.0049	0.00016	0.00019	0.056	0.00070	0.0071	0.00012	0.068	0.0015
2001-2003: Mean # discards/kept	(1,311.3)	(646)	(3.6)	(0.67)	(6,319.7)	(172.7)	(170.3)	(1)	(6,588)	(249.7)
2004: # discards/kept	3,161	529	16	27	6,174	75	916	13	7,706	180
Number of hooks										
2001-2003: (646,380)										
2004: 513,188										
B2(b) (Northeast)										
2001-2003: Mean CPUE	(0.024)	(0.0087)	(0.00013)	(0.00030)	(0.015)	(0.00011)	(0.0080)	(0.0000070)	(0.028)	(0.00016)
2004: CPUE	0.029	0.0053	0.00023	0.000030	0.056	0.00060	0.0079	0.000056	0.068	0.00094
2001-2003: Mean # discards/kept	(3,033.3)	(580.3)	(7.7)	(32)	(2,385.7)	(23.3)	(356.7)	(1.67)	(3,125.3)	(27.3)
2004: # discards/kept	1,022	202	8	1	1,958	24	244	3	2,344	180
Number of hooks										
2001-2003: (268,707)										
2004: 160,462										

Alternative	Swordfish Kept	Swordfish Discards	Bluefin Tuna Kept	Bluefin Tuna Discards	YFT Kept	YFT Discards	BET Kept	BET Discards	BAYS Kept	BAYS Discards
B2(c) (Gulf of Mexico)										
2001-2003: Mean CPUE	(0.0030)	(0.0018)	(0.000016)	(0.000005)	(0.021)	(0.00059)	(0.00038)	(0.000003)	(0.022)	(0.00088)
2004: CPUE	0.034	0.0084	0.00019	0.00049	0.058	0.0013	0.011	0.0012	0.076	0.0039
2001-2003: Mean # discards/kept	(2,591)	(1,543)	(12.7)	(4)	(19,304)	(535.7)	(299.3)	(2.67)	(19,776)	(789.7)
2004: # discards/kept	9,042	2,081	63	165	16,764	380	2,991	346	21,548	1,184
Number of hooks										
2001-2003: (1,753,421)										
2004: 1,773,489										
B2(d) (Gulf of Mexico)										
2001-2003: Mean CPUE	(0.0031)	(0.0018)	(0.000016)	(0.000005)	(0.021)	(0.00059)	(0.00037)	(0.000003)	(0.022)	(0.00088)
2004: CPUE	0.035	0.0085	0.00019	0.00048	0.059	0.0013	0.011	0.0012	0.076	0.0039
2001-2003: Mean # discards/kept	(2,633.3)	(1,552)	(13)	(4)	(19,641)	(542.3)	(300.3)	(2.67)	(20,114)	(799.3)
2004: # discards/kept	9,157	2,105	63	165	16,830	380	3,002	348	21,625	1,184
Number of hooks										
2001-2003: (1,786,085)										
2004: 1,779,789										
B2(e) (Northeast)										
2001-2003: Mean CPUE	(0.015)	(0.0041)	(0.000088)	(0.00037)	(0.012)	(0.00019)	(0.011)	(0.00016)	(0.034)	(0.0017)
2004: CPUE	0.024	0.0062	0.00013	0.00026	0.048	0.0011	0.0086	0.000063	0.063	0.0014
2001-2003: Mean # discards/kept	(4,987.7)	(1,219.7)	(20.3)	(85.3)	(3,975.7)	(61)	(2,165)	(46)	(8,354.7)	(241.7)
2004: # discards/kept	2,035	511	16	17	4,060	97	539	6	4,948	122
Number of hooks										
2001-2003: (616,743)										
2004: 370,990										

Table A.34 Percent change in reported landings by area from July through December where: a) 2001-03 vs. 1997-99; b) 2004 vs. 2001-03; and c) 2004 vs. 1997-99 (1997-99 and 2001-03 are mean reported landings). Source: HMS Logbook data.

Area	Year	Pelagic Sharks Kept	Pelagic Sharks Discarded	Large Coastal Sharks Kept	Large Coastal Sharks Discarded	Dolphin Kept	Dolphin Discarded	Wahoo Kept	Wahoo Discarded	Blue Marlin Discarded	White Marlin Discarded	Sailfish Discarded	Spearfish Discarded	Sea Turtle Interactions
CAR	1997-99	14.3	132.3	1.3	18.3	130.7	3.7	45	1.7	29.3	11.3	49	1.7	1
	2001-03	1.3	39	0.3	11.3	158.7	0	15.3	0.3	19	14.7	9	0.3	1.7
	2004	3	12	0	6	12	0	0	0	2	0	0	3	0
% Change	a	-90.7	-70.5	-75.0	-38.2	21.4	-100.0	-65.9	-80.0	-35.2	29.4	-81.6	-80.0	66.7
	b	125.0	-69.2	-100.0	-47.1	-92.4	---	-100.0	-100.0	-89.5	-100.0	-100.0	800.0	-100.0
	c	-79.1	-90.9	-100.0	-67.3	-90.8	-100.0	-100.0	-100.0	-93.2	-100.0	-100.0	80.0	-100.0
GOM	1997-99	108.7	163.3	173.7	597.3	3545.3	74	2514	67.7	297.7	279.3	347.7	26.3	1
	2001-03	51	111.3	37	299	2920.7	64.7	2276.7	20.7	387.3	399.7	162	44	68.3
	2004	134	59	76	757	3054	56	3050	21	242	267	118	56	23
% Change	a	-53.1	-31.8	-78.7	-49.9	-17.6	-12.6	-9.4	-69.5	30.1	43.1	-53.4	67.1	6733.3
	b	162.7	-47.0	105.4	153.2	4.6	-13.4	34.0	1.6	-37.5	-33.2	-27.2	27.3	-66.3
	c	23.3	-63.9	-56.2	26.7	-13.9	-24.3	21.3	-69.0	-18.7	-4.4	-66.1	112.7	2200.0
FEC	1997-99	60.7	209.7	137	469.3	383	14.3	69.3	1	76	36.3	86	9	1.7
	2001-03	23	30.7	37.7	84.3	216	1.3	17	1	27.3	1.7	8.7	1	1
	2004	4	11	4	144	51	0	10	0	11	0	8	5	0
% Change	a	-62.1	-85.4	-72.5	-82.0	-43.6	-90.7	-75.5	0.0	-64.0	-95.4	-89.9	-88.9	-40.0
	b	-82.6	-64.1	-89.4	70.8	-76.4	-100.0	-41.2	-100.0	-59.8	-100.0	-7.7	400.0	-100.0
	c	-93.4	-94.8	-97.1	-69.3	-86.7	-100.0	-85.6	-100.0	-85.5	-100.0	-90.7	-44.4	-100.0
SAB	1997-99	58.3	213.3	287	898.7	398.3	9.3	95.7	1	69.7	19.7	79.3	5.3	3
	2001-03	23	80.7	148.7	422	297	40	22.7	0.3	20	2.3	24.3	2.3	2
	2004	17	86	180	274	244	32	44	2	39	28	21	1	2
% Change	a	-60.6	-62.2	-48.2	-53.0	-25.4	328.6	-76.3	-66.7	-71.3	-88.1	-69.3	-56.3	-33.3
	b	-26.1	6.6	21.1	-35.1	-17.8	-20.0	94.1	500.0	95.0	1100.0	-13.7	-57.1	0.0
	c	-70.9	-59.7	-37.3	-69.5	-38.7	242.9	-54.0	100.0	-44.0	42.4	-73.5	-81.3	-33.3
MAB	1997-99	773.3	11114.3	1560.3	504.7	2348.3	29.3	51.3	1	31.7	246.7	4.3	2.7	20.7
	2001-03	823.3	2957.3	2693.3	625.3	1370	6.3	37.3	12.3	13.7	115	2	2	8
	2004	1050	3803	654	710	1588	14	90	0	19	124	0	0	25
% Change	a	6.5	-73.4	72.6	23.9	-41.7	-78.4	-27.3	1133.3	-56.8	-53.4	-53.8	-25.0	-61.3
	b	27.5	28.6	-75.7	13.5	15.9	121.1	141.1	-100.0	39.0	7.8	-100.0	-100.0	212.5
	c	35.8	-65.8	-58.1	40.7	-32.4	-52.3	75.3	-100.0	-40.0	-49.7	-100.0	-100.0	21.0

Area	Year	Pelagic Sharks Kept	Pelagic Sharks Discarded	Large Coastal Sharks Kept	Large Coastal Sharks Discarded	Dolphin Kept	Dolphin Discarded	Wahoo Kept	Wahoo Discarded	Blue Marlin Discarded	White Marlin Discarded	Sailfish Discarded	Spearfish Discarded	Sea Turtle Interactions
NEC	1997-99	334.3	11597.3	42.3	67.3	2621.7	42.3	22	0.3	48	287.3	2.3	3.7	57.7
	2001-03	371.3	2317	43.7	192.7	1458	37.3	18	0.3	9.7	63.7	1	1	19.7
	2004	411	1497	24	388	304	2	21	0	11	26	0	1	10
% Change	a	11.1	-80.0	3.1	186.1	-44.4	-11.8	-18.2	0.0	-79.9	-77.8	-57.1	-72.7	-65.9
	b	10.7	-35.4	-45.0	101.4	-79.1	-94.6	16.7	-100.0	13.8	-59.2	-100.0	0.0	-49.2
	c	22.9	-87.1	-43.3	476.2	-88.4	-95.3	-4.5	-100.0	-77.1	-91.0	-100.0	-72.7	-82.7
NED	1997-99	462.7	12300.7	0	0.7	85	2.3	0.3	0.7	2	7.7	0.3	0.3	417
	2001-03	230.3	10497	0	0.7	57.3	11.3	0	0	1.3	4	0	1	200.7
	2004	596	16454	0	0	2	3	2	0	1	2	0	1	137
% Change	a	-50.2	-14.7	---	0.0	-32.5	385.7	-100.0	-100.0	-33.3	-47.8	-100.0	200.0	-51.9
	b	158.8	56.7	---	-100.0	-96.5	-73.5	---	---	-25.0	-50.0	---	0.0	-31.7
	c	28.8	33.8	---	-100.0	-97.6	28.6	500.0	-100.0	-50.0	-73.9	-100.0	200.0	-67.1
SAR	1997-99	0	10.7	0	0.7	12.3	0.7	1.7	0	0	3.7	0	0.3	0.3
	2001-03	4.3	17.7	0.3	6.3	69	0	0.7	0	0.7	0	0	2	0
	2004	3	40	0	6	6	0	1	0	0	0	0	11	1
% Change	a	---	65.6	---	850.0	459.5	-100.0	-60.0	---	---	-100.0	---	500.0	-100.0
	b	-30.8	126.4	-100.0	-5.3	-91.3	---	50.0	---	-100.0	---	---	450.0	---
	c	---	275.0	---	800.0	-51.4	-100.0	-40.0	---	---	-100.0	---	3200.0	200.0
NCA	1997-99	16.7	118.3	0.7	0	45	3.7	3.7	0.7	6.3	11.7	0.7	2.7	2.7
	2001-03	15.3	1144.7	0	40.3	13.7	2	1.7	0	1.7	0	0.3	3	1.7
	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
% Change	a	-8.0	867.3	-100.0	---	-69.6	-45.5	-54.5	-100.0	-73.7	-100.0	-50.0	12.5	-37.5
	b	-100.0	-100.0	---	-100.0	-100.0	-100.0	-100.0	---	-100.0	---	-100.0	-100.0	-100.0
	c	-100.0	-100.0	-100.0	---	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0
SAT	1997-99	81.3	364	12.7	8.7	142.7	3.7	42	2	28	15.7	7	5	4.7
	2001-03	28.7	7.7	0	0	1.3	0	0	0	0	0	0	0	6.3
	2004	0	0	0	0	0	0	0	0	0	0	0	0	0
% Change	a	-64.8	-97.9	-100.0	-100.0	-99.1	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	35.7
	b	-100.0	-100.0	---	---	-100.0	---	---	---	---	---	---	---	-100.0
	c	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0

Table A.35 Percent change in reported landings by area from July through December where: a) 2001-03 vs. 1997-99; b) 2004 vs. 2001-03; and c) 2004 vs. 1997-99 (1997-99 and 2001-03 are mean reported landings). Source: HMS Logbook data.

Area	Year	Hooks Set	Swordfish Kept	Swordfish Discarded	Bluefin Tuna Kept	Bluefin Tuna Discarded	Yellowfin Tuna Kept	Yellowfin Tuna Discarded	Bigeye Tuna Kept	Bigeye Tuna Discarded	BAYS Kept	BAYS Discarded
CAR	1997-99	70440	929	219	0.7	0.3	400.3	22.7	109.3	15.3	523.3	40
	2001-03	43263	872.3	137.7	0	0	51.7	1	70	3	127	5
	2004	11061	141	17	0	0	16	0	4	0	24	0
% Change	a	-38.6	-6.1	-37.1	-100.0	-100.0	-87.1	-95.6	-36.0	-80.4	-75.7	-87.5
	b	-74.4	-83.8	-87.7	---	---	-69.0	-100.0	-94.3	-100.0	-81.1	-100
	c	-84.3	-84.8	-92.2	-100.0	-100.0	-96.0	-100.0	-96.3	-100.0	-95.4	-100.0
GOM	1997-99	1616703	3889	1315.3	15.3	2	22656.7	605.3	214.3	3	22980.7	762.7
	2001-03	1866738	3283.3	1655.3	12	4	20562.7	578.7	313	2.7	21039.7	893.7
	2004	1870880	2964	1561	10	13	16841	335	273	3	17347	829
% Change	a	15.5	-15.6	25.8	-21.7	100	-9.2	-4.4	46.0	-11.1	-8.4	17.2
	b	0.2	-9.7	-5.7	-16.7	225	-18.1	-42.1	-12.8	12.5	-17.6	-7.2
	c	15.7	-23.8	18.7	-34.8	550.0	-25.7	-44.7	27.4	0.0	-24.5	8.7
FEC	1997-99	259498.7	4943.7	2236.7	1.3	0.3	686	38.3	1033.3	53.7	1807.7	94
	2001-03	90403.3	929.3	263	0	0	523.7	78.3	793	94	1389.7	176
	2004	58013	577	143	0	0	523	3	546	1	1117	4
% Change	a	-65.2	-81.2	-88.2	-100.0	-100.0	-23.7	104.3	-23.3	75.2	-23.1	87.2
	b	-35.8	-37.9	-45.6	---	---	-0.1	-96.2	-31.1	-98.9	-19.6	-97.7
	c	-77.6	-88.3	-93.6	-100.0	-100.0	-23.8	-92.2	-47.2	-98.1	-38.2	-95.7
SAB	1997-99	214421	6015.7	2162.7	1	0.7	1108.3	66.7	48.7	5	1172	73
	2001-03	140263.7	3782.3	704.3	0.3	0	822.3	19	31.3	3	866.3	22.7
	2004	128637	3179	532	2	0	716	1	34	0	765	2
% Change	a	-34.6	-37.1	-67.4	-66.7	-100.0	-25.8	-71.5	-35.6	-40.0	-26.1	-68.9
	b	-8.3	-16.0	-24.5	500.0	---	-12.9	-94.7	8.5	-100.0	-11.7	-91.2
	c	-40.0	-47.2	-75.4	100.0	-100.0	-35.4	-98.5	-30.1	-100.0	-34.7	-97.3
MAB	1997-99	1028022	3429	2244.7	33.7	92	8820.7	317.3	7013.3	357	19335.3	792
	2001-03	680704.3	3839	1970.3	23.7	76.7	5985	138	3653.7	82.3	12802.3	547.3
	2004	669797	3665	1728	58	241	11930	465	5000	381	20601	1096
% Change	a	-33.8	12.0	-12.2	-29.7	-16.7	-32.1	-56.5	-47.9	-76.9	-33.8	-30.9
	b	-1.6	-4.5	-12.3	145.1	214.3	99.3	237.0	36.8	362.8	60.9	100.2
	c	-34.8	6.9	-23.0	72.3	162.0	35.3	46.5	-28.7	6.7	6.5	38.4

Area	Year	Hooks Set	Swordfish Kept	Swordfish Discarded	Bluefin Tuna Kept	Bluefin Tuna Discarded	Yellowfin Tuna Kept	Yellowfin Tuna Discarded	Bigeye Tuna Kept	Bigeye Tuna Discarded	BAYS Kept	BAYS Discarded
NEC	1997-99	791638.3	3301	1445.7	17.3	86.3	7140.3	257.3	4888	135.3	13774.3	417.7
	2001-03	504159	4363.3	927	11.7	68	3539.3	43	1363.7	15	6132.7	69.7
	2004	363358	3162	339	29	113	8093	30	451	2	8832	33
% Change	a	-36.3	32.2	-35.9	-32.7	-21.2	-50.4	-83.3	-72.1	-88.9	-55.5	-83.3
	b	-27.9	-27.5	-63.4	148.6	66.2	128.7	-30.2	-66.9	-86.7	44.0	-52.6
	c	-54.1	-4.2	-76.6	67.3	30.9	13.3	-88.3	-90.8	-98.5	-35.9	-92.1
NED	1997-99	435483	11651.3	1762.7	13.7	3.7	28.3	3.3	1468.3	254	1763.3	372.3
	2001-03	405723.3	7948.7	923.3	28	69.7	60	1.7	852	46.3	1142.7	107.3
	2004	455862	8015	719	51	26	2	0	133	4	157	29
% Change	a	-6.8	-31.8	-47.6	104.9	1800.0	111.8	-50.0	-42.0	-81.8	-35.2	-71.2
	b	12.4	0.8	-22.1	82.1	-62.7	-96.7	-100.0	-84.4	-91.4	-86.3	-73.0
	c	4.7	-31.2	-59.2	273.2	609.1	-92.9	-100.0	-90.9	-98.4	-91.1	-92.2
SAR	1997-99	7330	119.3	9.3	0.3	0	61	0	17	2.3	90.7	2.3
	2001-03	18061.3	206.7	12.3	1.3	0.3	11	0	43	0	88.7	0
	2004	28464	327	22	6	1	42	10	83	11	198	22
% Change	a	146.4	73.2	32.1	300.0	---	-82.0	---	152.9	-100.0	-2.2	-100.0
	b	57.6	58.2	78.4	350.0	200.0	281.8	---	93.0	---	123.3	---
	c	288.3	174.0	135.7	1700.0	---	-31.1	---	388.2	371.4	118.4	842.9
NCA	1997-99	56764.3	1010.7	74.3	1.7	0	77.7	2	75	7.3	209.3	9.7
	2001-03	36240	433	18.7	0	0	66.3	0	136.3	0	353.3	0
	2004	0	0	0	0	0	0	0	0	0	0	0
% Change	a	-36.2	-57.2	-74.9	-100.0	---	-14.6	-100.0	81.8	-100.0	68.8	-100.0
	b	-100.0	-100.0	-100.0	---	---	-100.0	---	-100.0	---	-100.0	---
	c	-100.0	-100.0	-100.0	-100.0	---	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0
SAT	1997-99	78901.7	731.3	144	0.3	0.3	623.7	19.7	254.3	12.7	945	34.3
	2001-03	22783.3	119.3	23.7	0	0	50	0	277.7	0	361	0
	2004	1200	0	0	0	0	35	0	0	0	35	0
% Change	a	-71.1	-83.7	-83.6	-100.0	-100.0	-92.0	-100.0	9.2	-100.0	-61.8	-100.0
	b	-94.7	-100.0	-100.0	---	---	-30.0	---	-100.0	---	-90.3	---
	c	-98.5	-100.0	-100.0	-100.0	-100.0	-94.4	-100.0	-100.0	-100.0	-96.3	-100.0

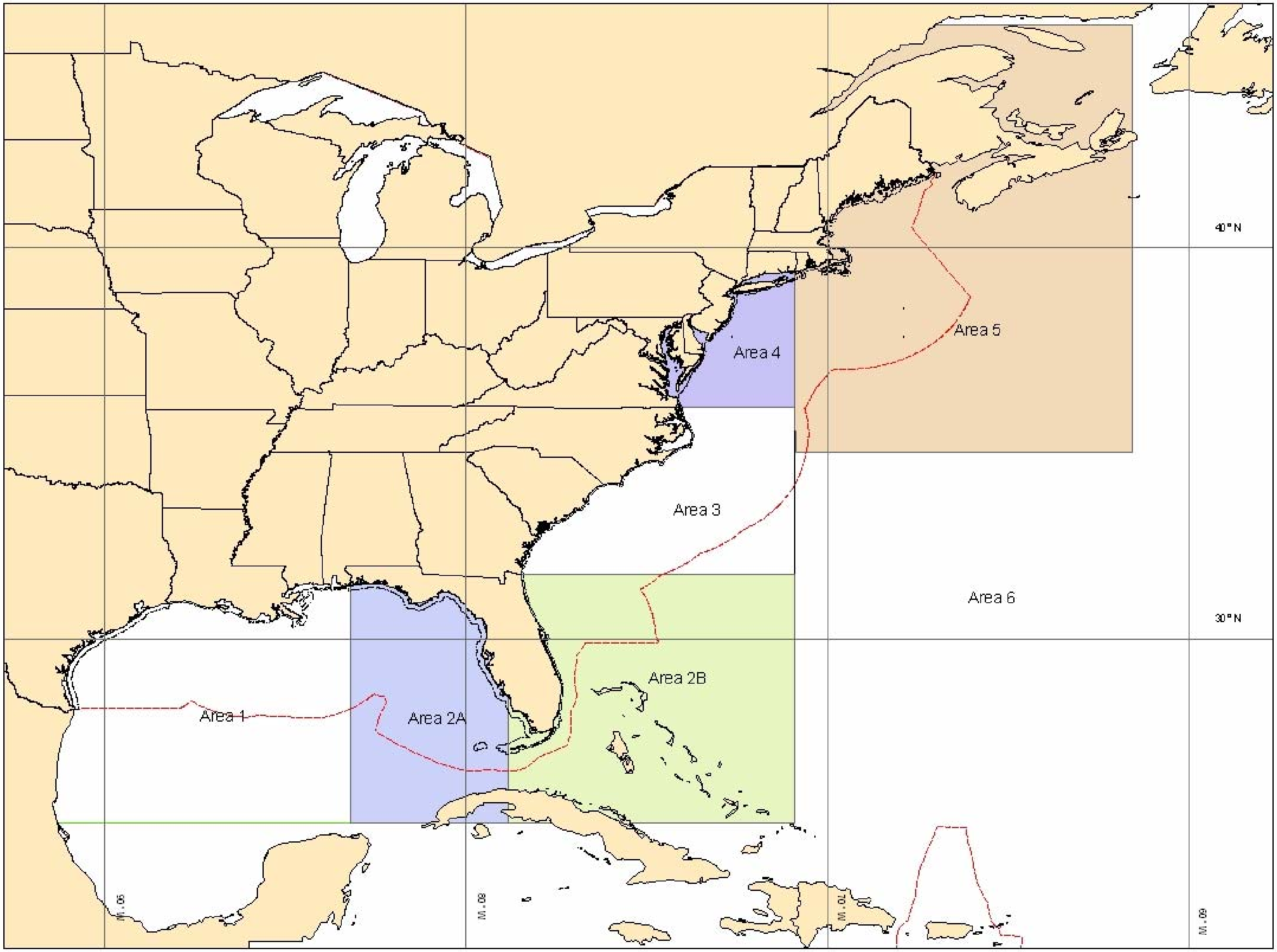

Figure A.5 Map showing the different areas that were used in the fleet mobility analysis.

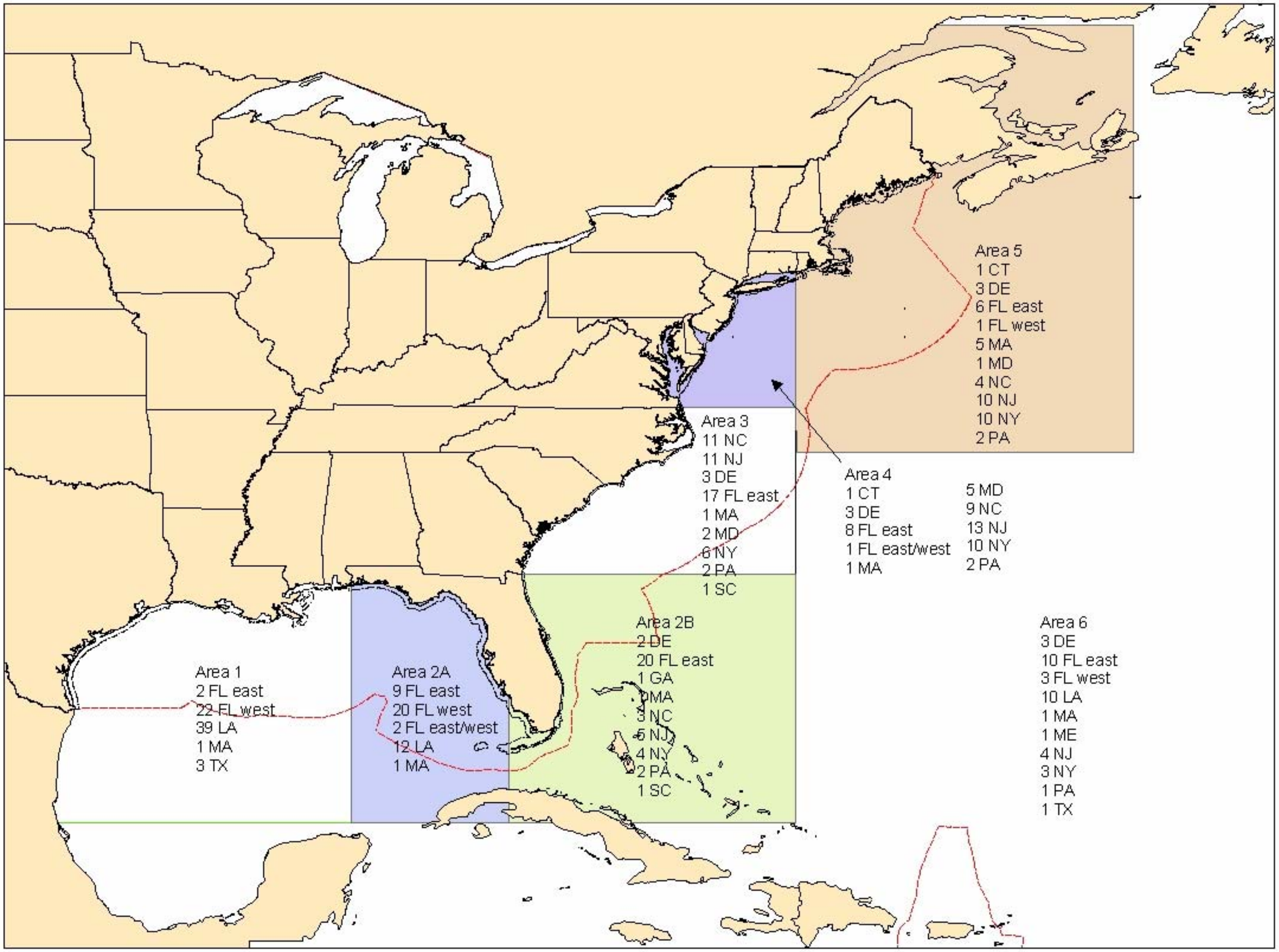

Figure A.6 **Map showing the number of vessels fishing in different areas with their respective homeports listed.** "FL east" signifies that a vessel's homeport was in the east coast of Florida. "FL west" signifies that a vessel's homeport was in the west coast of FL, and "FL east/west" signifies that the vessel's homeport was in the Florida Keys.

Figure A.7 **Map showing vessels originating from the Gulf of Mexico and fishing in Atlantic Areas 2B through 6.** The percentage of hooks represents the percentage of hooks that moved out of the Gulf of Mexcio and into Areas 2B, 3, 4, 5, and 6.

Table A.36 Characteristics of vessels fishing in the Gulf of Mexico and vessels moving out of Gulf of Mexico.

a) Horsepower					
	Mean	Standard error	Range	*n*	*P*
Boats fishing in Gulf of Mexico	372.2	20.3	0-1200	92	0.66
Boats moving out of Gulf of Mexico	395.7	41.1	170-800	14	
b) Vessel Length					
	Mean (ft)	Standard error	Range (ft)	*n*	*P*
Boats fishing in Gulf of Mexico	61.65	1.26	32-88	92	
Boats moving out of Gulf of Mexico	64.79	2.38	45-78	14	0.35

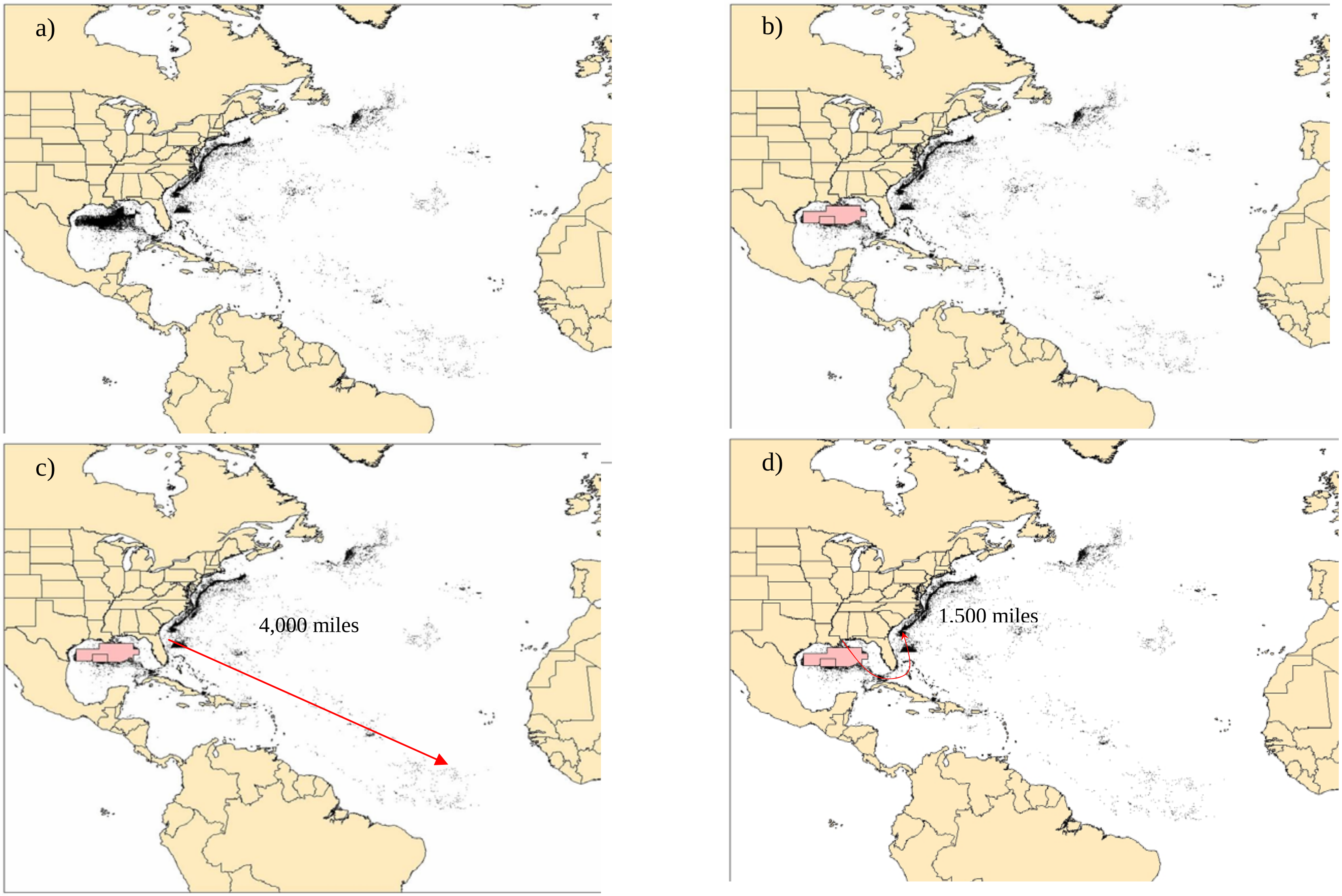

Figure A.8 **Map of pelagic longline sets within and outside of the U. S. EEZ. a) extent of pelagic longline sets inside and outside U.S. EEZ, b) inset shows the size of B2(a) and B2(c) relative to the scope of pelagic longline sets inside and outside of U. S. EEZ, c) the distance pelagic longline vessels have made relative to the U. S. coastline, d) the distance it would take a vessel to travel from the Gulf of Mexico to the Mid-Atlantic Bight area.** Source: HMS logbook data from January 2001 to June 2004.

Table A.37 Alternative B2(a) May through November. Cumulative number kept and discarded (over 3 1/2 years) with and without redistribution of effort in the Gulf of Mexico and Area 6 combined. Minus sign indicates a decrease. *excluding the NED. Three and one half year totals are shown; one year averages can be obtained by dividing the totals by 3.5. Data source: HMS Logbook data 2001-2004 (first six months of 2004)**.**

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kepts	BAYS discards
1	485,204	2,187	794	14	3	4,109	112	178	1	4,376	124
2	323,489	1,936	542	31	7	1,486	31	205	16	1,852	50
3	365,398	1,606	692	37	57	2,528	88	104	0	2,683	99
4	453,515	1,004	752	58	88	4,607	149	34	0	4,657	168
5	510,446	1,189	1,214	38	76	4,385	350	22	0	4,437	365
6	425,506	842	617	13	29	5,245	207	34	1	5,318	243
7	304,242	414	241	0	0	3,978	103	33	0	4,017	120
8	351,376	602	239	0	0	3,184	85	46	0	3,249	96
9	281,104	452	262	0	1	2,515	45	34	0	2,553	80
10	337,578	635	396	0	0	3,053	139	121	2	3,226	166
11	351,773	733	316	2	0	2,860	69	147	0	3,097	147
12	356,739	1,098	484	9	1	3,369	77	130	1	3,622	140
Total	4,546,370	12,698	6,549	202	262	41,319	1,455	1,088	21	43,087	1,798
Total May-Nov	2,562,025	4,867	3,285	53	106	25,220	998	437	3	25,897	1,217
All Areas*	24,811,867	151,756	42,325	917	2,210	192,252	6,351	38,589	1,069	253,842	10,379
May-Nov decrease **without** redistribution of effort	-10.3%	-3.2%	-7.8%	-5.8%	-4.8%	-13.1%	-15.7%	-1.1%	-0.3%	-10.2%	-11.7%
May-Nov decrease **with** redistribution of effort		0.1%	-1.8%	-0.3%	1.6%	1.7%	-1.9%	-1.7%	0.0%	0.9%	0.7%
No. reduced **with** redist. of effort		105	-767	-2	35	3,297	-123	-664	0	2,284	70

Table A.38 Alternative B2(b) June only. Cumulative number of discards (over 3 1/2 years) with and without redistribution of effort in the Atlantic only. Minus signs indicate a decrease. *excluding the NED. Three and one half year totals are shown; one year averages can be obtained by dividing the totals by 3.5. Data source: HMS Logbook data 2001-2004 (first six months of 2004).

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles	Pelagic Shark discards	Large Coastal Shark discards
5	485,204	4	0	5	0	0	0	0	36	54
6	323,489	12	5	3	3	10	20	0	1,315	7
7	365,398	31	3	0	0	7	9	0	1,720	196
8	453,515	49	6	0	0	5	3	0	645	85
9	510,446	26	7	1	1	1	3	0	603	41
10	425,506	6	2	0	0	0	1	0	457	13
11	304,242	0	0	0	0	4	0	0	310	2
12	351,376	0	0	0	0	1	1	0	13	0
Total	3,219,176	128	23	9	4	28	37	0	5,099	398
June	323,489	12	5	3	3	10	20	0	1,315	7
All Areas*	24,811,867	3,747	2,831	1,303	516	586	238	13	37,244	19,116
June % Decrease **without** redistribution of effort	-1.3%	-0.3%	-0.2%	-0.2%	-0.6%	-1.7%	-8.4%	0.0%	-3.5%	0.0%
June % Decrease **with** redistribution of effort		2.0%	0.9%	1.6%	0.5%	-0.8%	-5.9%	0.0%	-1.1%	3.3%
No. reduced **with** redist. of effort		73	26	21	3	-4	-14	0	-419	634

Table A.39 Alternative B2(b) June only. Cumulative number kept and discarded (over 3 1/2 years) with and without redistribution of effort in the Atlantic only. Minus signs indicate a decrease. *excluding the NED. Three and one half year totals are shown; one year averages can be obtained by dividing the totals by 3.5. Data source: HMS Logbook data 2001-2004 (first six months of 2004).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kepts	BAYS discards
5	29,318	228	36	4	2	148	30	3	0	151	30
6	196,341	1,888	275	11	367	641	12	559	0	1,476	16
7	256,598	2,712	394	14	43	552	5	197	0	929	8
8	235,512	2,327	499	3	2	2,625	12	157	2	3,019	16
9	225,096	2,875	509	2	48	3,407	51	373	3	4,167	54
10	78,630	1,076	207	1	0	524	2	180	0	980	3
11	10,086	85	124	3	3	39	0	159	0	266	1
12	1,500	25	8	0	0	10	0	4	0	15	0
Total	1,033,081	11,216	2,052	38	465	7,946	112	1,632	5	11,003	128
June	196,341	1,888	275	11	367	641	12	559	0	1,476	16
All Areas*	24,811,867	151,756	42,325	917	2,210	192,252	6,351	38,589	1,069	253,842	10,379
% Reduction **without** redistribution of effort	0.8%	1.2%	0.6%	1.2%	16.6%	0.3%	0.2%	1.4%	0.0%	0.6%	0.2%
% Reduction **with** redistribution of effort		-0.3%	-0.03%	-0.2%	-15.1%	0.3%	0.2%	-1.0%	0.5%	-0.1%	0.2%
No. reduced **with** redist. of effort		-474	-11	-2	-333	662	14	-367	5	-147	25

Table A.40 **Alternative B2(c) BFT Petition April through June. Cumulative number of discards (over 3 1/2 years) with and without redistribution of effort in the Gulf of Mexico and Area 6 combined. Minus signs indicate a decrease.** *excluding the NED. Three and one half year totals are shown; one year averages can be obtained by dividing the totals by 3.5. Data source: HMS Logbook data 2001 - 2004 (first six months of 2004).

Month	Number of hooks set	White Marlin discards	Blue Marlin discards	Sailfish discards	Spearfish discards	Leatherback Sea Turtles	Loggerhead Sea Turtles	Other Sea Turtles	Pelagic Shark discards	Large Coastal Shark discards
1	963,895	43	53	32	28	15	1	0	273	244
2	717,192	41	30	13	7	15	0	0	166	206
3	810,044	31	39	22	13	25	1	0	255	317
4	1,139,144	102	76	57	9	33	0	2	193	275
5	1,454,636	201	118	77	24	29	6	0	563	817
6	1,308,060	293	218	116	29	24	1	0	665	506
7	1,102,300	545	548	178	59	47	3	0	58	123
8	1,101,773	248	187	110	23	21	1	0	52	102
9	807,867	111	146	71	26	14	1	0	41	96
10	818,964	120	92	42	13	26	0	0	60	132
11	715,282	54	45	20	7	19	1	0	30	228
12	714,878	37	35	5	9	67	3	3	46	64
Total	11,654,035	1,826	1,587	743	247	335	18	5	2,402	3,110
Total April-June	3,901,840	596	412	250	62	86	7	2	1,421	1,598
All Areas*	24,811,867	3,747	2,831	1,303	516	586	238	13	37,244	19,116
April-June % Decrease **without** redistribution of effort	-15.7%	-15.9%	-14.%	-19.2%	-12.0%	-14.7%	-2.9%	-15.4%	-3.8%	-8.4%
April-June % Decrease **with** redistribution of effort		-2.6%	0.7%	21.7%	2.0%	-1.3%	0.0%	-15.4%	-1.4%	12.8%
No. reduced **with** redist. of effort		-98	20	283	10	-8	0	-2	-535	2,454

Table A.41 Alternative B2(c) BFT Petition April through June. Cumulative number of kept and discarded (over 3 1/2 years) species with and without redistribution of effort in the Gulf of Mexico and Area 6 combined. Minus sign indicates a decrease. *excluding the NED. Three and one half year totals are shown; one year averages can be obtained by dividing the totals by 3.5. Data source: HMS Logbook data 2001-2004 (first six months of 2004).

Month	Number of hooks set	Swordfish kept	Swordfish discards	Bluefin tuna kept	Bluefin tuna discards	Yellowfin tuna kept	Yellowfin tuna discards	Bigeye tuna kept	Bigeye tuna discards	BAYS kepts	BAYS discards
1	963,895	4,519	1,600	35	6	9,367	308	392	20	9,950	355
2	717,192	4,366	1,226	59	14	3,635	137	310	21	4,316	184
3	810,044	3,596	1,508	68	106	5,574	206	188	5	5,854	232
4	1,139,144	3,133	1,702	141	239	10,156	417	107	2	10,301	449
5	1,454,636	3,993	2,317	91	193	14,429	697	52	0	14,552	794
6	1,308,060	2,583	1,294	39	222	16,743	704	110	4	16,902	891
7	1,102,300	1,294	994	3	0	15,432	528	84	0	15,545	714
8	1,101,773	1,412	752	0	5	13,612	300	76	1	13,716	436
9	807,867	1,002	663	20	1	8,615	147	77	0	8,715	254
10	818,964	1,132	726	0	1	7,728	234	198	5	7,992	340
11	715,282	1,186	600	2	4	5,745	163	264	1	6,166	281
12	714,878	1,747	894	13	1	6,780	235	199	1	7,194	344
Total	11,654,035	29,963	14,276	471	792	117,816	4,076	2,057	60	121,203	5,274
Total Apr-Jun	3,901,840	9,709	5,313	271	654	41,328	1,818	269	6	41,755	2,134
All Areas*	24,811,867	151,756	42,325	917	2,210	192,252	6,351	38,589	1,069	253,842	10,379
April-June % Decrease **without** redistribution of effort	-15.7%	-6.4%	-12.6%	-29.6%	-29.6%	-21.5%	-28.6%	-0.7%	-0.6%	-16.4%	-20.6%
April-June % Decrease **with** redistribution of effort		12.5%	5.0%	-8.9%	-19.3%	-4.7%	-9.1%	0.3%	0.6%	-3.6%	-5.2%
No. reduced **with** redist. of effort		18,940	2,109	-81	-426	-9,105	-578	112	7	-9,160	-540

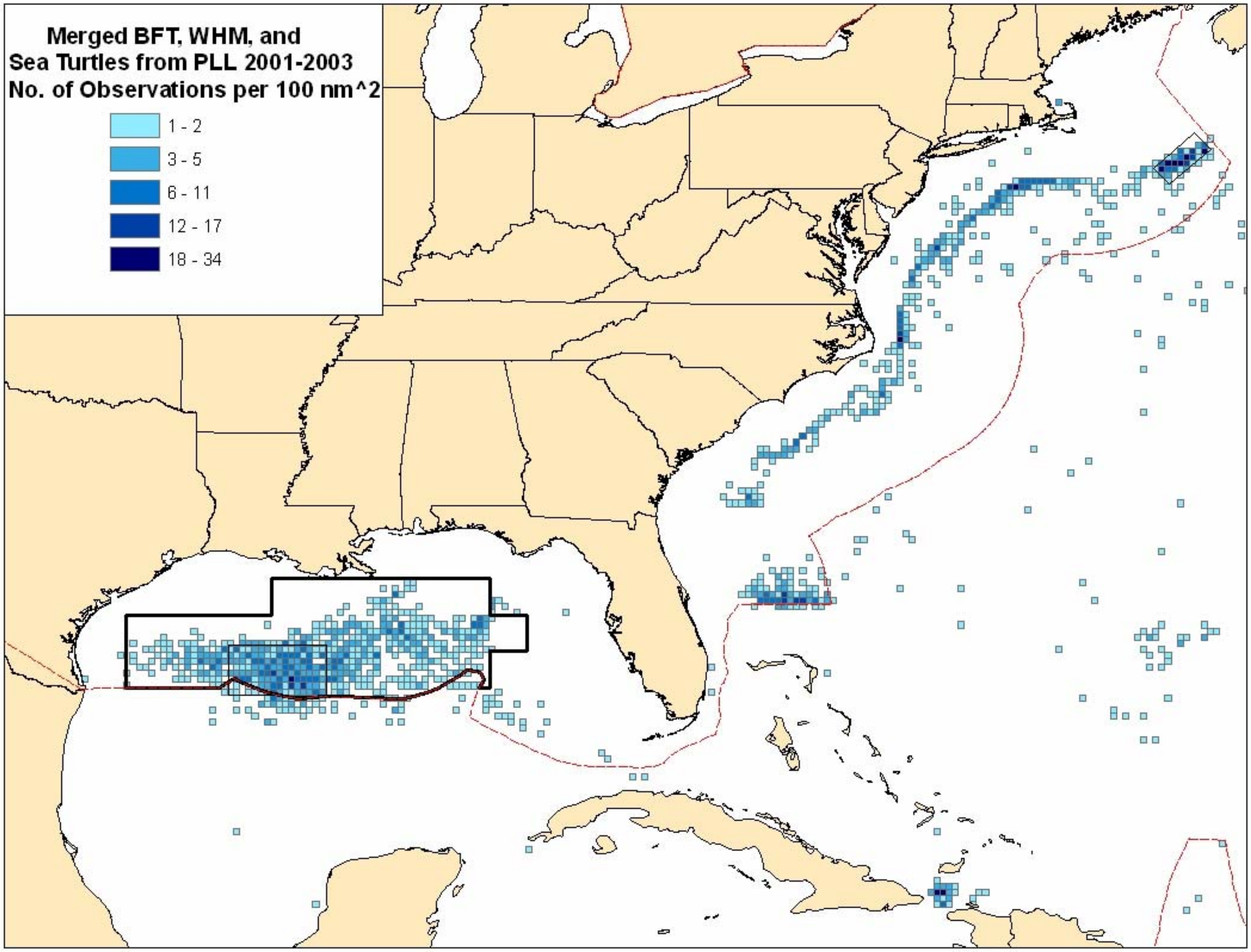

Figure A.9 **Map showing the overlap of bluefin tuna discards, white marlin discards, and sea turtle interactions for pelagic longline sets from 2001 to 2003.** Source: HMS Logbook data 2001-2003.

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B APPENDIX: ESSENTIAL FISH HABITAT

B.1 Life History Accounts and Essential Fish Habitat Descriptions

B.1.1 Tuna

B.1.1.1 Atlantic Albacore Tuna

Atlantic Albacore (*Thunnus alalunga*) Albacore tuna is a circumglobal species. In the west, Atlantic albacore range from 40 to 45°N to 40°S. It is an epipelagic, oceanic species generally found in surface waters with temperatures between 15.6° and 19.4°C, although larger individuals have a wider depth and temperature range (13.5° to 25.2°C). Albacore may dive into cold water (9.5°C) for short periods and can be found at depths up to 600 m in the Atlantic. However, they do not tolerate oxygen levels lower than two milliliter/liter (ml/l). Albacore undergo extensive horizontal movements. Aggregations are composed of similarly sized individuals with groups comprised of the largest individuals making the longest journeys. Aggregations of albacore may include other tuna species such as skipjack, yellowfin and bluefin tuna. North Atlantic and south Atlantic stocks are considered separate, with no evidence of mixing between the two (ICCAT, 1997; Collette and Nauen, 1983).

Predator-prey relationships: A wide variety of fishes and invertebrates have been found in the few stomachs of albacore tuna that have been examined. As with other tuna, albacore probably exhibit opportunistic feeding behavior, with little reliance on specific prey items (Dragovich, 1969; Matthews *et al.*, 1977).

Life history: Albacore spawn in the spring and summer in the western tropical Atlantic (ICCAT, 1997). Larvae are also taken in the Mediterranean Sea and historically in the Black Sea (Vodyanitsky and Kazanova, 1954).

Fisheries: For assessment purposes, three stocks of albacore are assumed: north and south Atlantic stocks (separated at 5°N) and a Mediterranean stock (SCRS, 1997). In the north Atlantic albacore are taken by surface and longline fisheries. Surface fisheries target juveniles at 50 to 90 cm fork length (FL), and longlines catch sub-adult and adult fish at 60 to120 cm FL. **U.S. Fishery Status**: North Atlantic albacore is overfished with overfishing occurring; South Atlantic albacore is not overfished and overfishing is not occurring.

Growth and mortality: The maximum size of albacore has been reported at 127 cm FL (Collette and Nauen, 1983). For both sexes sexual maturity is reached at five years at 90 to 94 cm FL (Collette and Nauen, 1983; ICCAT, 1997). Mortality is higher for females (Collette and Nauen, 1983).

Essential Fish Habitat for Albacore Tuna:

- **Spawning, eggs, and larvae:** At this time, available information is insufficient for the identification of EFH for this life stage within the U.S. EEZ (Figure B.1).

- **Juveniles (<90 cm FL):** In surface waters with temperatures between 15.6° and 19.4°C, offshore the U.S. east coast in the Mid-Atlantic Bight from the 50 m isobath to the 2,000 m isobath with 71°W as the northeast boundary and 38°N as the southwest boundary (Figure B.2).

- **Adults (≥90 cm FL):** In surface waters with temperatures between 13.5° and 25.2°C, offshore the U.S. eastern seaboard between the 100 and 2,000 m isobaths from southeastern Georges Bank at 41.25°N, south to 36.5°N, offshore the Virginia/North Carolina border; also, in the Blake Plateau and Spur region, from 79°W east to the EEZ boundary and 29°N south to the EEZ boundary (Figure B.3).

B.1.1.2 Atlantic Bigeye Tuna

Atlantic Bigeye Tuna (*Thunnus obesus*) Scientific knowledge of Atlantic bigeye tuna is limited. Its range is almost the entire Atlantic from 50°N to 45°S. It is rarely taken in the Gulf of Mexico, and some of the points currently included in the EFH maps may require further validation (J. Lamkin, pers. comm.). Although its distribution with depth in the water column varies, it is regularly found in deeper waters than are other tuna, descending to 300–500 m and then returning regularly to the surface layer (Musyl *et al*., 2003). Smaller fish are probably restricted to the tropics, while larger individuals migrate to temperate waters. There is probably one population in the Atlantic (ICCAT, 1997). Young bigeye tuna form schools near the sea surface, mixing with other tuna such as yellowfin and skipjack tuna (Collette and Nauen, 1983).

Predator-prey relationships: The diet of bigeye tuna includes fishes, cephalopods and crustaceans (Dragovich, 1969; Matthews *et al.*, 1977). Predators include large billfishes and toothed whales (Collette and Nauen, 1983).

Life history: Bigeye tuna probably spawn between 15°N and 15°S. A nursery area is known to exist in the Gulf of Guinea (Richards, 1967) off the coast of Africa where larvae have been collected below the 25°C isotherm (Richards and Simmons, 1971). Peak spawning here occurs in January and February, whereas in the northwestern tropical Atlantic spawning occurs in June and July (SCRS, 1978, 1979). The collection of larvae in U.S. waters has not been confirmed.

Fisheries: The bigeye tuna stock has been exploited by three major gear types - longline, baitboat, and purse seine - and by many countries throughout its range of distribution. ICCAT currently recognizes one stock for management purposes, based on time/area distribution of fish and movements of tagged fish. However, other possibilities such as distinct northern and southern stocks should not be disregarded (SCRS, 1997). **U.S. Fishery Status:** Overfished and overfishing is occurring.

Growth and mortality: Growth rate for bigeye tuna is believed to be rapid. Sexual maturity is attained in the fourth year, at approximately 100 cm FL (SCRS, 1997).

Habitat associations: Juvenile bigeye form schools near the surface, mostly mixed with other tuna such as yellowfin and skipjack. These schools often associate with floating objects, whale sharks and sea mounts (SCRS, 1997).

Essential Fish Habitat for Bigeye Tuna:

- **Spawning, eggs and larvae:** Information is insufficient for the identification of EFH for this life stage within the U.S. EEZ; although it can not be identified as EFH under the Magnuson-Stevens Act because it is located outside the U.S. EEZ, the Gulf of Guinea, off the coast of Africa, is identified as important habitat for spawning adults, eggs and larvae (Figure B.4).

- **Juveniles (<100 cm FL):** In surface waters from southeastern Georges Bank to the boundary of the EEZ to Cape Hatteras, NC at 35°N from the 200 m isobath to the EEZ boundary; also, in the Blake Plateau region off Cape Canaveral, FL, from 29°N south to the EEZ boundary (28.25°N) and from 79°W east to the EEZ boundary (approximately 76.75°W) (Figure B.5).

- **Adults (≥100 cm FL):** In pelagic waters from the surface to a depth of 250 m; from southeastern Georges Bank at the EEZ boundary to offshore Delaware Bay at 38°N, from the 100 m isobath to the EEZ boundary; from offshore Delaware Bay south to Cape Lookout, NC (approximately the region off Cape Canaveral, FL), from 29°N south to the EEZ boundary (28.25°N), and from 79° W east to the EEZ boundary (76.75° W) (Figure B.6).

B.1.1.3 Atlantic Bluefin Tuna

Atlantic Bluefin Tuna (*Thunnus thynnus*) In the western north Atlantic, bluefin tuna range from 45°N to 0° (Collette and Nauen, 1983). However, they have recently been found up to 55° N in the West Atlantic (Vinnichenko, 1996). Bluefin tuna move seasonally from spring (April to June) spawning grounds in the Gulf of Mexico through the Straits of Florida to feeding grounds off the northeast U.S. coast (Mather *et al.*, 1995; Block *et al*., 2005). It is believed that there is a single stock which ranges from Labrador and Newfoundland south into the Gulf of Mexico and the Caribbean, and also off Venezuela and Brazil. The Labrador Current may separate this western stock from that found in the east Atlantic (Tiews, 1963; Mather *et al.*, 1995; ICCAT, 1997).

From November to January bluefin tuna are concentrated into two separate groups, one in the northwest and the other in the north central Atlantic. In February, the central Atlantic aggregation breaks up, with some fish moving southeast to the Azores and some moving southwest (Suda, 1994). Southerly movements from the feeding grounds off the northern United States and wintering areas are not well understood. A three-way movement between spawning, feeding, and wintering areas is assumed for mature fish and a shorter, two-way feeding-to-wintering movement for juveniles (Mather *et al.*, 1995).

Bluefin tuna distributions are probably constrained by the 12°C isotherm, although individuals can dive to 6° to 8°C waters to feed (Tiews, 1963). Year-to-year variations in movements have been noted (Mather *et al.*, 1995). While bluefin tuna are epipelagic and usually oceanic, they do come close to shore seasonally (Collette and Nauen, 1983). They often occur over the continental shelf and in embayments, especially during the summer months when they feed actively on herring, mackerel and squids in the north Atlantic. Larger individuals move into higher latitudes than do smaller fish. Bluefin tuna are often found in mixed schools with skipjack tuna, these schools consisting of similarly sized individuals (Tiews, 1963).

Predator-prey relationships: Bluefin tuna larvae initially feed on zooplankton but switch to a piscivorous diet at a relatively small size. Small bluefin tuna larvae prey on other larval fishes and are subject to the same predators as these larvae, primarily larger fishes and gelatinous zooplankton (McGowan and Richards, 1989). Adults are opportunistic feeders, preying on a variety of schooling fish, cephalopods, and benthic invertebrates, including silver hake, Atlantic mackerel, Atlantic herring, krill, sandlance, and squid (Dragovich, 1969, 1970a; Mathews *et al.*, 1977; Estrada et. al., 2005). Predators of adult bluefin tuna include toothed whales, swordfish, sharks and other tuna (especially of smaller individuals) (Tiews, 1963; Chase, 1992).

Life history: Western north Atlantic bluefin tuna spawn from April to June in the Gulf of Mexico and in the Florida Straits (McGowan and Richards, 1989; Block *et. al*., 2005). Although individuals may spawn more than once a year, it is assumed that there is a single annual spawning period. Larvae have been confirmed from the Gulf of Mexico and off the Carolinas (Richards, 1991). Most of the larvae found were located around the 1,000 fathom curve in the northern Gulf of Mexico, with some sporadic collections off Texas. In the Florida Straits they are primarily collected along the western edge of the Florida Current, suggesting active transport from the Gulf of Mexico. This would also explain their occasional collection off the southeast United States. Atlantic bluefin tuna have not been observed spawning (Richards, 1991).

It is not believed that much spawning occurs outside the Gulf of Mexico (McGowan and Richards, 1989; Richards, 1991). Also, it appears that larvae are generally retained in the Gulf until they grow into juveniles; in June, young-of-the-year begin movements in schools to juvenile habitats (McGowan and Richards, 1989) thought to be located over the continental shelf around 34°N and 41°W in the summer and further offshore in the winter. Also, they have been identified from the Dry Tortugas area in June and July (Richards, 1991; ICCAT, 1997). Juveniles migrate to nursery areas located between Cape Hatteras, NC and Cape Cod, MA (Mather *et al*., 1995).

Fisheries: Atlantic bluefin tuna are caught using a wide variety of gear types, including longlines, purse seines, traps, and various handgears. ICCAT recognizes two management units of Atlantic bluefin, one in the east and one in the West Atlantic; however, some mixing is probably occurring, as fish tagged in one location have been retrieved in the other (Block *et. al*., 2005). These management units are divided as follows: North of 10°N they are separated at 45°W; below the equator they are separated at 25°W, with an eastward shift between those parallels

(SCRS, 1997). The effects of reduced stock size on distribution and habitat use is unknown at this time. **U.S. Fishery Status:** Overfished, and overfishing is occurring.

Growth and mortality: Bluefin tuna can grow to more than 650 kg in weight and 300 cm in length, with no apparent difference between the growth rates of males and females (Mather *et al.*, 1995). Maximum age is estimated to be more than 20 years, with sexual maturity reached at approximately 196 cm (77 inches) FL and a weight of approximately 145 kg (320 lb). This size is believed to be reached in the West Atlantic at eight years, as opposed to five years in the east Atlantic. Not only do bluefin tuna in the West Atlantic mature more slowly than those in the east Atlantic, but they also are believed to grow more slowly and reach a larger maximum size (SCRS, 1997). The rapid larval growth rate is estimated as one mm/day up to 15 mm, the size at transformation (McGowan and Richards, 1989).

Habitat associations: It is believed that there are probably certain features of the bluefin tuna larval habitat in the Gulf of Mexico which determine growth and survival rates, and that these features show variability from year to year, perhaps accounting for a significant portion of the fluctuation in yearly recruitment success (McGowan and Richards, 1989). The habitat requirements for larval success are not known, but larvae are collected within narrow ranges of temperature and salinity - approximately 26° C and 36 ppt. Along the coast of the southeastern United States onshore meanders of the Gulf Stream can produce upwelling of nutrient rich water along the shelf edge. In addition, compression of the isotherms on the edge of the Gulf Stream can form a stable region which, together with upwelling nutrients, provides an area favorable to maximum growth and retention of food for the larvae (McGowan and Richards, 1989). Size classes used for habitat analysis for bluefin tuna are based on the sizes at which they shift from a schooling behavior to a more solitary existence. Bluefin have traditionally been grouped by small schooling, large schooling, and giant. Future analyses should more fully evaluate habitat differences between the traditional size classes, if the data are available.

Essential Fish Habitat for Atlantic Bluefin Tuna:

- **Spawning, eggs, and larvae:** In pelagic and near coastal surface waters from the North Carolina/South Carolina border at 33.5° N, south to Cape Canaveral, FL from 15 miles from shore to the 200 m isobath; all waters from offshore Cape Canaveral at 28.25° N south around peninsular Florida to the U.S./Mexico border from 15 miles from shore to the EEZ boundary (Figure B.7).

- **Juveniles (<145 cm TL):** All inshore and pelagic surface waters warmer than 12° C of the Gulf of Maine and Cape Cod Bay, MA from Cape Ann, MA (~42.75° N) east to 69.75° W (including waters of the Great South Channel west of 69.75° W), continuing south to and including Nantucket Shoals at 70.5° W to off Cape Hatteras, NC (approximately 35.5° N), in pelagic surface waters warmer than 12° C, between the 25 and 200 m isobaths; also in the Florida Straits, from 27° N south around peninsular Florida to 81° W in surface waters from the 200 m isobath to the EEZ boundary (Figure B.8).

- **Adults (≥145 cm TL):** In pelagic waters of the Gulf of Maine from the 50 m isobath to the EEZ boundary, including the Great South Channel, then south of Georges Bank to 39° N from the 50 m isobath to the EEZ boundary; also, south of 39° N, from the 50 m isobath to the 2,000 m isobath to offshore Cape Lookout, NC at 34.5° N. In pelagic waters from offshore Daytona Beach, FL (29.5° N) south to Key West (82° W) from the 100 m isobath to the EEZ boundary; in the Gulf of Mexico from offshore Terrebonne Parish, LA (90° W) to offshore Galveston, TX (95° W) from the 200 m isobath to the EEZ boundary (Figure B.9).

B.1.1.4 Atlantic Skipjack Tuna

Atlantic Skipjack Tuna (*Katsuwonus pelamis*) Skipjack tuna are circumglobal in tropical and warm-temperate waters, generally limited by the 15° C isotherm. In the west Atlantic skipjack range as far north as Newfoundland (Vinnichenko, 1996) and as far south as Brazil (Collette and Nauen, 1983). Skipjack tuna are an epipelagic and oceanic species and may dive to a depth of 260 m during the day. Skipjack tuna is also a schooling species, forming aggregations associated with hydrographic fronts (Collette and Nauen, 1983). There has been no trans-Atlantic recovery of tags; eastern and western stocks are considered separate (ICCAT, 1997).

Predator-prey relationships: Skipjack tuna is an opportunistic species which preys upon fishes, cephalopods and crustaceans (Dragovich, 1969, 1970b; Dragovich and Potthoff, 1972; Collette and Nauen, 1983; ICCAT, 1997). Predators include other tuna and billfishes (Collette and Nauen, 1983). Skipjack tuna are believed to feed in surface waters down to a depth of five meters. Stomach contents often include *Sargassum* or *Sargassum* associated species (Morgan *et al.*, 1985).

Life history: Skipjack tuna spawn opportunistically in equatorial waters throughout the year, and in subtropical waters from spring to early fall (Collette and Nauen, 1983). Larvae have been collected off the east coast of Florida from October to December (Far Seas Fisheries Research Lab, 1978) and in the Gulf of Mexico and Florida Straits from June to October. However, most spawning takes place during summer months in the Caribbean, off Brazil (with the peak in January through March), in the Gulf of Mexico (April to May), and in the Gulf of Guinea (throughout the year) (Richards, 1967; SCRS, 1978/79).

Fisheries: This fishery is almost exclusively a surface gear fishery, although some skipjack tuna are taken as longline bycatch. Most skipjack tuna are taken in the east Atlantic and off the coast of Brazil, most recently with the use of floating objects to attract them. ICCAT assumes two management units for this species (eastern and western) due to the development of fisheries on both sides of the Atlantic and to the lack of transatlantic tag recoveries. **U.S. Fishery Status:** Unknown.

Growth and mortality: Maximum size of the species is reported at 108 cm FL and a weight of 34.5 kg. Size at sexual maturity is 45 cm (18 inches) for males and 42 cm for females. This size is believed to correspond to about 1 to 1.5 years of age, although significant variability in interannual growth rates makes size-to-age relationships difficult to estimate (Collette and

Nauen, 1983; ICCAT, 1997). Growth rate is variable and seasonal, with individuals from the tropical zone having a higher growth rate than those from the equatorial zone (SCRS, 1997). Life span is estimated to be eight to 12 years (Collette and Nauen, 1983).

Habitat associations: Aggregations of skipjack tuna are associated with convergences and other hydrographic discontinuities. Also, skipjack tuna associate with birds, drifting objects, whales, sharks and other tuna species (Colette and Nauen, 1983). The optimum temperature for the species is 27° C, with a range from 20° to 31° C (ICCAT, 1995).

Essential Fish Habitat for Skipjack Tuna:

- **Spawning, eggs, and larvae:** In offshore waters, from the 200 m isobath out to the EEZ boundary, from 28.25° N south around peninsular Florida and the Gulf Coast to the U.S./Mexico border (Figure B.10).

- **Juveniles/subadults (<45 cm FL):** In pelagic surface waters from 20° to 31° C in the Florida Straights off southeastern Florida, from the 25 m isobath to the 200 m isobath, from 27.25° N south to 24.75° N southwest of the coast of Key Largo, FL (Figure B.11).

- **Adults (≥45 cm FL):** In pelagic surface waters from 20° to 31° C in the Mid-Atlantic Bight, from the 25 m isobath to the 200 m isobath, from 71° W, off the coast of Martha's Vineyard, MA, south and west to 35.5° N, offshore Oregon Inlet, NC (Figure B.12).

B.1.1.5 Atlantic Yellowfin Tuna

Atlantic Yellowfin Tuna (*Thunnus albacres*) Atlantic yellowfin tuna are circumglobal in tropical and temperate waters. In the West Atlantic they range from 45° N to 40° S. Yellowfin tuna is an epipelagic, oceanic species, found in water temperatures between 18° and 31° C. It is a schooling species, with juveniles found in schools at the surface, mixing with skipjack and bigeye tuna. Larger fish are found in deeper water and also extend their ranges into higher latitudes. All individuals in the Atlantic probably comprise a single population, although movement patterns are not well known (Collette and Nauen, 1983; SCRS, 1997). There are possible movements of fish spawned in the Gulf of Guinea to more coastal waters off Africa, followed by movements toward the U.S. coast, at which time they reach a length of 60 to 80 cm (ICCAT, 1977). In the Gulf of Mexico yellowfin tuna occur beyond the 500-fathom isobath (Idyll and de Sylva, 1963).

Predator-prey relationships: Atlantic yellowfin tuna are opportunistic feeders. Stomachs have been found to contain a wide variety of fish and invertebrates (Dragovich, 1969, 1970b; Dragovich and Potthoff, 1972; Matthews *et al.*, 1977). Stomach contents of yellowfin from St. Lucia and the Caribbean contained squid and the larvae of stomatopods, crabs and squirrelfish (Idyll and de Sylva, 1963). Stomach contents often contain *Sargassum* or *Sargassum* associated fauna. Yellowfin tuna are believed to feed primarily in surface waters down to a depth of 100 m (Morgan *et al.*, 1985).

Life history: Spawning occurs throughout the year in the core areas of the species' distribution - between 15° N and 15° S - and also in the Gulf of Mexico and the Caribbean, with peaks occurring in the summer (ICCAT, 1994). Yellowfin tuna are believed to be multiple spawners, and larval distribution appears to be limited to water temperatures above 24° C and salinity greater than 33 ppt (Richards and Simmons, 1971). Larvae have been collected near the Yucatan peninsula and during September in the northern Gulf of Mexico along the Mississippi Delta (ICCAT, 1994).

Fisheries: Yellowfin tuna are caught by surface gears (purse seine, baitboat, troll, and handline) and with sub-surface gears (longline). A single stock is assumed for the Atlantic, based on transatlantic tag recaptures, time/area size frequency distribution, etc. (SCRS, 1997). **U.S. Fishery Status:** Approaching an overfished condition.

Growth and mortality: The maximum size of yellowfin tuna is over 200 cm FL (Collette and Nauen, 1983). Sexual maturity is reached at about three years of age, at 110 cm FL, and a weight of 25 kg. Although it is not known if there is a differential growth rate between males and females (ICCAT, 1994), males are predominant in catches of larger sized fish (SCRS, 1997). Natural mortality is 0.8 for fish less than 65 cm in length, and 0.6 for fish greater than 65 cm. Mortality is higher for females of this size (ICCAT, 1994).

Habitat associations: Adult yellowfin tuna are confined to the upper 100 m of the water column due to their intolerance of oxygen concentrations of less than 2 ml/l (Collette and Nauen, 1983). Association with floating objects has been observed, and in the Pacific larger individuals often school with porpoises (Collette and Nauen, 1983). Juveniles are found nearer to shore than are adults (SCRS, 1994). In the Gulf of Mexico adults usually occur 75 km or more offshore, while in the Caribbean they are found closer to shore. Although there appears to be a year-round population in the southern part of the Gulf of Mexico (Idyll and de Sylva, 1963), in June there appears to be some movement from the southern to the northern part of the Gulf of Mexico, resulting in greater catches in the northern part of the Gulf of Mexico from July to December.

Essential Fish Habitat for Yellowfin Tuna:

- **Spawning, eggs, and larvae:** In offshore waters, from the 200 m isobath out to the EEZ boundary, from 28.25° N south around peninsular Florida and the Gulf Coast to the U.S./Mexico border, especially associated with the Mississippi River plume and the Loop Current. Also, all U.S. waters in the Caribbean from the 200 m isobath to the EEZ boundary (Figure B.13).

- **Juveniles/subadults (<110 cm FL):** Pelagic waters from the surface to 100 m deep between 18° and 31° C from offshore Cape Cod, MA (70° W) southward to Jekyll Island, GA (31° N), between 500 and 2,000 m; off Cape Canaveral, FL from 29° N south to the EEZ boundary (approximately 28.25° N) and from 79° W east to the EEZ boundary (approximately 76.75° W); in the Gulf of Mexico from the 200 m isobath to the EEZ boundary (Figure B.14).

- **Adults (≥110 cm FL):** (Identical to juveniles/subadults EFH) Pelagic waters from the surface to 100 m deep between 18° and 31° C from offshore Cape Cod, MA (70° W) southward to Jekyll Island, GA (31° N), between 500 and 2,000 m; off Cape Canaveral, FL from 29° N south to the EEZ boundary (approximately 28.25° N) and from 79° W east to the EEZ boundary (approximately 76.75° W); in the Gulf of Mexico from the 200 m isobath to the EEZ boundary (Figure B.15).

B.1.2 Swordfish

Swordfish (*Xiphias gladius*) Swordfish are circumglobal, ranging through tropical, temperate and sometimes cold water regions. Their latitudinal range is from 50° N to 40-45° S in the west Atlantic, and 60° N to 45-50° S in the east Atlantic (Nakamura, 1985). The species moves from spawning grounds in warm waters to feeding grounds in colder waters. In the western north Atlantic two movement patterns are apparent: some fish move northeastward along the edge of the U.S. continental shelf in summer and return southwestward in autumn; another group moves from deep water westward toward the continental shelf in summer and back into deep water in autumn (Palko *et al.*, 1981). Swordfish are epipelagic to meso-pelagic, and are usually found in waters warmer than 13° C. Their optimum temperature range is believed to be 18° to 22° C but they will dive into 5° to 10° C waters at depths of up to 650 m (Nakamura, 1985). Swordfish migrate diurnally, coming to the surface at night (Palko *et al.*, 1981). Arocha (1997) observed different diel migrations in two groups of fish: swordfish in neritic (shallow, near-coastal) waters of the northwest Atlantic were found in bottom waters during the day, and then they moved to offshore surface waters at night. Swordfish in oceanic waters migrated vertically from a daytime depth of 500 m to 90 m at night.

Predator-prey relationships: Adult swordfish are opportunistic feeders, having no specific prey requirements. They feed at the bottom as well as at the surface, in both shallow and deep waters. In waters greater than 200 m deep, they feed primarily on pelagic fishes including small tunas, dolphinfishes, lancetfish (*Alepisaurus*), snake mackerel (*Gempylus*), flyingfishes, barracudas and squids such as *Ommastrephes*, *Loligo*, and *Illex*. In shallow water they prey upon neritic fishes, including mackerels, herrings, anchovies, sardines, sauries, and needlefishes. In deep water swordfish may also take demersal fishes such as hakes, pomfrets (Bromidae), snake mackerels, cutlass fish (trichiurids), lightfishes (Gonostomatidae), hatchet fishes (Sternoptychidae), redfish, lanternfishes, and cuttlefishes (Nakamura, 1985).

In the Gulf of Mexico swordfish were found to feed primarily on cephalopods - 90 percent of stomach contents consisted of 13 species of teuthoid squids, most of which were *Illex*, and two species of octopus (Toll and Hess, 1981). Stillwell and Kohler (1985) found that 80 percent of the stomach contents of swordfish taken off the northeast coast of the United States consisted of cephalopods, of which short-finned squid (*Illex illecebrosus*) made up 26.4 percent. Adult swordfish in neritic waters will feed inshore near the bottom during the daytime and head seaward to feed on cephalopods at night. The movement of larger individuals into higher latitudes in the summer and fall may be in part to allow those individuals access to high concentrations of *Illex* (Arocha, 1997). Predators of adult swordfish are probably restricted to sperm whales (*Physeter catodon*), killer whales (*Orcinus orca*) and large sharks, such as mako (*Isurus* spp).

Typically, swordfish larvae less than 9.0 mm in length consume small zooplankton, those 9.0 to 14.0 mm feed on mysids, phyllopods and amphipods, and at sizes greater than 21 mm they begin to feed on the larvae of other fishes. Juveniles feed on squids, fishes, and some pelagic crustaceans (Palko *et al.*, 1981). Larvae are preyed upon by other fishes, and juveniles fall prey to predatory fishes, including sharks, tunas, billfishes, and adult swordfish (Palko *et al.*, 1981).

Life history: First spawning for north Atlantic swordfish occurs at four to five years of age (74 kg) in females. Fifty percent maturity in females is reached at 179 to 182 cm LJFL, and in males at 112 to 29 cm LJFL (21 kg) at approximately 1.4 years of age (Palko *et al.*, 1981; Nakamura, 1985; Arocha, 1997). Most spawning takes place in waters with surface temperatures above 20° to 22° C, between 15° N and 35° N (Palko *et al.*, 1981; Arocha, 1997;). In the western north Atlantic spawning occurs in distinct locations at different times of the year: south of the Sargasso Sea and in the upper Caribbean spawning occurs from December to March, while off the southeast coast of the United States it occurs from April through August (Arocha, 1997). Major spawning grounds are probably located in the Straits of Yucatan and the Straits of Florida (Grall *et al.*, 1983; Govoni *et. al.*, 2000, 2003). Larvae have been found in largest abundance from the Straits of Florida to Cape Hatteras, NC and around the Virgin Islands. Larvae are associated with surface temperatures between 24° and 29°C. The Gulf of Mexico is believed to serve as a nursery area (Palko *et al.*, 1981). Grall *et al.*, (1983) found larvae ten mm and larger to be abundant in the Caribbean, the Straits of Florida and the Gulf Stream north of Florida from December to February. In the western Gulf of Mexico, large larvae were found from March to May and from September to November; many larvae of all sizes were collected in the Caribbean and were also present year-round in the eastern Gulf of Mexico, the Straits of Florida, and the Gulf Stream. Juvenile fish are frequently caught in the pelagic longline fishery in the Gulf of Mexico, the Atlantic coast of Florida, and near the Charleston Bump regions that may serve as nurseries for north Atlantic swordfish (Cramer and Scott, 1998).

Fisheries: Swordfish in the Atlantic are taken by a directed longline fishery and as bycatch of the tuna longline fishery. There are also seasonal harpooning and driftnetting efforts off Nova Scotia (harpooning), off the northeast U.S. coast, and on the Grand Banks (driftnetting) (Arocha, 1997). The effect of this reduction in stock size on habitat use and species distributions is unknown. In January 1999, NMFS prohibited the use of driftnets for the swordfish fishery. In March 1999, NMFS instituted a program requiring all swordfish imported into the United States to have a certificate of eligibility specifying the origin of the fish. If the swordfish is from the Atlantic it must meet the 33-lb dw minimum size requirement of ICCAT.

U.S. Fishery Status: North Atlantic swordfish overfished, overfishing is not occurring, stock is in recovery. South Atlantic swordfish fully fished, overfishing may be occurring.

Growth and mortality: Swordfish reach a maximum length of 445 cm total length (TL) and a maximum weight of 540 kg. Males and females have different growth rates, with females longer and heavier at any given age (Nakamura, 1985). Natural mortality rate was estimated at 0.21 to 0.43 by Palko *et al.*, (1981), but ICCAT presently uses an estimate of 0.2 (Arocha, 1997). Berkeley and Houde (1981) found a higher growth rate for females than males over two years of age, and also found males to have a higher mortality rate than females.

Habitat associations: In the winter in the north Atlantic, swordfish are restricted to the warmer waters of the Gulf Stream, while in the summer their distribution covers a larger area. Distribution is size and temperature related, with few fish under 90 kg found in waters with temperatures less than 18° C. Larvae are restricted to a narrow surface temperature range, and are distributed throughout the Gulf of Mexico, in areas of the Caribbean, and in the Gulf Stream along the U.S. coast as far north as Cape Hatteras, NC. Concentrations of adult swordfish seem to occur at ocean fronts between water masses associated with boundary currents, including the Gulf Stream and Loop Current of the Gulf of Mexico (Arocha, 1997, Govoni *et al.*, 2003).

***Essential Fish Habitat for Atlantic Swordfish*:**

- **Spawning, eggs, and larvae:** From offshore Cape Hatteras, NC (approximately 35° N) extending south around peninsular Florida through the Gulf of Mexico to the U.S./Mexico border from the 200 m isobath to the EEZ boundary; associated with the Loop Current boundaries in the Gulf and the western edge of the Gulf Stream in the Atlantic; also, all U.S. waters of the Caribbean from the 200 m isobath to the EEZ boundary (Figure B.16).

- **Juveniles/subadults (<180 LJFL):** In pelagic waters warmer than 18° C from the surface to a depth of 500 m, from offshore Manasquan Inlet, NJ at 40° N, east to 73° N, and south to the waters off Georgia at 31.5° N, between the 25 and 2,000 m isobaths; offshore Cape Canaveral, FL (approximately 29° N) extending from the 100 m isobath to the EEZ boundary (south and east) around peninsular Florida; in the Gulf of Mexico from Key West to offshore Galveston, TX (95° W) from the 200 m isobath to the EEZ boundary, with the exception of the area between 86° W and 88.5° W, where the seaward boundary of EFH is the 2,000 m isobath (Figure B.17).

- **Adults (≥180 LJFL):** In pelagic waters warmer than 13° C from the surface to 500 m deep, offshore the U.S. east and Gulf coasts from the intersection of the 100 m isobath and the EEZ boundary southeast of Cape Cod, MA to south and offshore Biscayne Bay, FL at 25.5° N, from the 100 to 2,000 m isobath or the EEZ boundary, which ever is closer to land; from offshore Tampa Bay, FL at 85° N to offshore Mobile Bay, AL at 88° N between the 200 and 2,000 m isobaths; from offshore south of the Mississippi River delta, 89° N to offshore waters south of Galveston, TX, 95° N from the 200 m isobath to the EEZ boundary (Figure B.18).

B.1.3 Billfish

B.1.3.1 Blue Marlin

Blue Marlin (*Mokaira nigricans*) Blue marlin inhabit the tropical and subtropical waters of the Atlantic, Pacific and Indian Oceans. Their geographic range is from 45° N to 35° S. In the Atlantic two seasonal concentrations occur: January to April in the southwest Atlantic from 5° to 30° S, and from June to October in the northwest Atlantic between 10° N and 35° N. May, November and December are transitional months (Rivas, 1975). This species is epipelagic and oceanic, generally found in blue water with a temperature range of 22 to 31° C. In the northern Gulf of Mexico fishermen tend to catch more blue marlin when white marlin catches are lowest and vice versa; this probably reflects differences in habitat preferences rather than any interaction between the species. Blue marlin are generally solitary, and do not occur in schools or in coastal waters (Nakamura, 1985). It had been believed that the North and South Atlantic contains two separate spawning populations, but recent evidence, including genetic data, suggests there is intermingling of the two groups. Consistent with SCRS recommendations, this amendment considers there to be a single stock of Atlantic blue marlin. Tag-recapture data from the northern Gulf of Mexico and the Bahamas suggest seasonal movements between the former in summer and the latter in winter, and also two-way movements between the Caribbean Islands and Venezuela and the Bahamas, and at least one-way movements from St. Thomas to West Africa. Blue marlin from this study traveled up to 7,000 km (4,350 mi) and have remained at-large (*i.e.*, from tagging until recapture) for up to eight years (Witzell and Scott, 1990).

As part of the Cooperative Tagging Center (CTC) program, a total of 21,547 blue marlin have been tagged and released over the last 43 years, with the recapture of 147 tagged fish reported (0.68 percent of all releases) over the 23-year collaborative tagging effort (Jones *et al.*, 1997). Most tagging activity has taken place off the U.S. east coast, Gulf of Mexico and Caribbean, generally during the months of July through September. The majority of blue marlin was recaptured in the general area of their release, traveling an average distance of 488 nm. Some individuals have exhibited extended movement patterns, and strong seasonal patterns of movement of individuals between the United States and Venezuela are evident (SCRS, 1997). A blue marlin released off Delaware and recovered off the island of Mauritius in the Indian Ocean represents the only documented inter-ocean movement of a highly migratory species in the history of the CTC. The minimum straight-line distance traveled for this fish was 9,100 nm in 1,108 days-at-large (roughly three years). Other extensive movements include trans-equatorial movements and trans-Atlantic migrations (5.4 percent of CTC recaptures; Jones *et al.*, 1997).

Predator-prey relationships: Blue marlin feed near the surface but also are known to feed in deeper waters than the other istiophorids. They feed primarily on tuna-like fishes, squid, and on a wide size range of other organisms, from 38 mm postlarval surgeonfish to 50 lb. bigeye tuna. Stomach contents have also included deep-sea fishes, such as chiasmodontids. Other important prey species vary by location and include dolphinfishes, especially bullet tuna (*Auxis* sp.) around the Bahamas, Puerto Rico, and Jamaica, and dolphinfishes and scombrids in the Gulf of Mexico. Octopods are also prey items (Rivas, 1975; Davies and Bortone, 1976; Nakamura, 1985). Predators of blue marlin are relatively unknown. Sharks will attack hooked billfish, but it is not known if they attack free-swimming, healthy individuals.

Reproduction and Early Life History: Although recent evidence indicates mixing between the two geographic areas, there are probably two separate spawning “events” (or populations); one in the north Atlantic with spawning from July to September (July to October according to de Sylva and Breder, 1997; May to November, according to Prince *et al.*, 1991) and one in the South Atlantic from February to March. May and June are the peak spawning months for fish off Florida and the Bahamas, and there is a protracted spawning period off northwest Puerto Rico from May to November. Females taken off Cape Hatteras, NC in June were found to have recently spawned (Rivas, 1975). Very few larvae have been collected in the western

Atlantic, but some have been found off Georgia, in the Gulf of Mexico, off Cat Cay, Bahamas, and in the mid- north Atlantic (Ueyanagi *et al.*, 1970; Nakamura, 1975). A few juveniles have been identified off Jamaica (Caldwell, 1962) and one from the Gulf of Mexico.

Blue marlin are sexually mature by 2 to 4 years of age (SCRS, 1997). Female blue marlin begin to mature at approximately 104 to 134 lb, while males mature at smaller weights, generally from 77 to 97 lb. Analysis of egg (ova) diameter frequency suggests that blue marlin, white marlin, and sailfish spawn more than once, and possibly up to four times a year (de Sylva and Breder, 1997). During the spawning season blue marlin release from one million to ten million small (1 to 2 mm), transparent pelagic planktonic eggs (Yeo, 1978). The number of eggs has been correlated to interspecific sizes among billfish and size of individuals within the same species. Ovaries from a 324 lb female blue marlin from the northwest Atlantic were estimated to contain 10.9 million eggs, while ovaries of a 275 lb female were estimated to contain approximately 7 million eggs.

Fisheries: Blue marlin are targeted as a recreational fishery in the United States and Caribbean, and are also caught as bycatch of tropical tuna longline fisheries which use shallow gear deployment. They are also caught by offshore longline fisheries which target swordfish, especially in the western Atlantic, as well as by directed artisanal fisheries in the Caribbean. **U.S. Fishery Status:** Overfished, and overfishing is occurring. The effect of reduced stock size on habitat use, migrations or distribution is unknown but should be investigated in future research.

Growth and mortality: Blue marlin are believed to be one of the fastest growing of all teleosts in the early stages of development, and weigh between 30 and 45 kg by age 1 (SCRS, 1997). Based on analyses of daily otolith ring counts, they reach 24 cm LJFL (lower jaw fork length) in about 40 days, and about 190 cm LJFL in 500 days, with a maximum growth rate of approximately 1.66 cm/day occurring at 39 cm LJFL (Prince *et al.*, 1991). Fish larger than 190 cm LJFL tend to add weight more than length, making the application of traditional growth curve models, in which length or weight are predicted as a function of age, difficult for fish in these larger size categories. Females grow faster and reach much larger maximum sizes than males. Examination of sagitta (otolith) weight, body weight, and length/age characteristics indicate that sex-related size differences are related to differential growth between the sexes and not to differential mortality (Wilson *et al.*, 1991). Sexually dimorphic growth variation (weight only) in blue marlin appears to begin at 140 cm LJFL (Prince *et al.*, 1991). Somatic growth of male blue marlin slows significantly at about 220 lb, while females continue substantial growth throughout their lifetime (Wilson *et al.*, 1991). Male blue marlin usually do not exceed 350 lb, while females can exceed 1,200 lb.

Blue marlin are estimated to reach ages of at least 20 to 30 years, based on analysis of dorsal spines (Hill *et al.*, 1990). Although this spine ageing technique has not been validated, longevity estimates are supported by tagging data. The maximum time at liberty recorded of a tagged individual was 4,024 days (about 11 years) for a blue marlin that was estimated to weigh 65 pounds at the time of release (SCRS, 1996b). Sagitta otolith weight is suggested to be proportional to age, indicating that both sexes are equally long-lived, based on the maximum otolith weight observed for each sex (Wilson *et al.*, 1991). Additionally, predicting age from length or weight is imprecise due to many age classes in the fishery (SCRS, 1996b). Estimates of natural mortality rates for billfish would be expected to be relatively low, generally in the range of 0.15 to 0.30, based on body size, behavior, and physiology (SCRS, 1996b).

Habitat associations: Adults are found primarily in the tropics within the 24°C isotherm, and make seasonal movements related to changes in sea surface temperatures. In the northern Gulf of Mexico they are associated with the Loop Current and are found in blue waters of low productivity rather than in more productive green waters. Off Puerto Rico the largest numbers of blue marlin are caught during August, September and October. Equal numbers of both sexes occur off northwest Puerto Rico in July and August, with larger males found there in May and smaller males in September (Rivas, 1975). Very large individuals, probably females, are found off the southern coast of Jamaica in the summer and off the northern coast in winter, where males are caught in December and January.

Essential Fish Habitat for Blue Marlin:

- **Spawning, eggs, and larvae:** Offshore Florida, identical to adult EFH in that area: from offshore Ponce de Leon Inlet (29.5° N) south to offshore Melbourne, FL from the 100 m isobath to 50 mi seaward (79.25° W); from offshore Melbourne, FL south to Key West from the100 m isobath to the EEZ boundary; also, off the northwest coast of Puerto Rico (from Arecibo to Mayaguez), bounded by the 2000 m isobath to the north and 18° N to the south (Figure B.19).

- **Juveniles/Subadults (20-189 cm LJFL):** Pelagic surface waters not less than 24° C, offshore Delaware Bay to Cape Lookout, NC from the 100 to the 2000 m isobath, and grading further offshore to 73.25° W at 35° N; continuing south from offshore Cape Lookout to Cumberland Island, GA (30.75° N), from the 200 to 2000 m isobath; offshore St. Augustine, FL (30° N) south to 26° N, (Ft Lauderdale, FL) from the 100 m isobath offshore an additional 30 miles to 29° N, then south of 29° N, seaward from the 100 m isobath to the EEZ boundary; off southwest Florida from 24.5° N between the 200 m isobath and the EEZ boundary, north to 28°N, west to 86.25° W, and south to the EEZ boundary; offshore Choctawhatchee Bay to Terrebonne Parish, LA, from the 100 to the 2000 m isobath, continuing west along the 200 m isobath to the Texas/Mexico border out to 2000 meters (Figure B.20).

- **Adults (≥ 190 cm LJFL):** Pelagic surface waters not less than 24° C, from offshore Delaware Bay (38.5° N) south to offshore Wilmington, NC (33.5° N) between the100 and 2000 m isobaths; offshore Charleston, SC (32° N) from 100 m to 78° W to offshore the Georgia/Florida border (30.75° N); from offshore Ponce de Leon Inlet (29.5° N) south to offshore Melbourne, FL from the 100 m isobath to 50 mi seaward (79.25° W); from offshore Melbourne, FL south to Key West from the 100 m isobath to the EEZ boundary; from offshore Choctawhatchee Bay (86° W) to offshore Terrebonne Parish, LA (90° W) between the 100 and 2000 m isobaths; from Terrebonne Parish, LA south to offshore Galveston, TX (95° W) between the 200 and 2000 m isobaths; Puerto Rico and the U.S. Virgin Islands: from 65.25° W east and south to the EEZ northern boundary along the 100 m isobath. Also, off the northern shore of Puerto Rico out to the 2000 m isobath from 65.5° W west to the EEZ boundary, and along the southern coast of Puerto Rico out to the 2000 m isobath, east to 66.5° W (Figure B.21).

B.1.3.2 White Marlin

White Marlin (*Tetrapturus albidus*) White marlin is an oceanic, epipelagic species that occurs in the Atlantic Ocean, Gulf of Mexico, and Caribbean waters. It inhabits almost the entire Atlantic from 45°N to 45°S in the western Atlantic and 45°N to 35°S in the eastern Atlantic. In the tropics white marlin usually occur above the thermocline in deep (depths greater than 100 m), blue waters with surface temperatures above 22°C and salinities of 35 to 37 ppt. They are usually in the upper 20 to 30 m of the water column but may go to depths of 200 to 250 m where the thermocline is deep. In higher latitudes, such as between New Jersey and Virginia, they are found commonly in shallow coastal waters (de Sylva and Davis, 1963). White marlin are found at the higher latitudes of their range only in the warmer months. Although they are generally solitary, they sometimes are found in small, usually same-age groups. White marlin spawn in tropical and sub-tropical waters and move to higher latitudes during the summer (Mather *et al.*, 1975; Nakamura, 1985). Catches in some areas may include a rare species, *Tetrapturus georgei*, which is superficially similar to white marlin. The so-called “hatchet marlin” (Pristas, 1980) may also represent *T. georgei* and has been caught occasionally in the Gulf of Mexico. The similarity between species indicates some reported catches have the potential for error.

This species undergoes extensive movements, although not as extreme as those of the bluefin tuna and albacore. The longest distance traveled by a tagged and recaptured specimen, which had been at-large for 1.4 years, was 3,509 km. The longest time at-large recorded for a white marlin is 11.8 years. Transequatorial movements have not been documented for the species (Bayley and Prince, 1993). There have been 29,751 white marlin tagged and released by the CTC program, with 540 reported recaptures (1.8 percent of all releases). The majority of releases took place in the months of July through September, in the western Atlantic off the east coast of the United States. Releases of tagged white marlin also occurred off Venezuela, in the Gulf of Mexico, and in the central West Atlantic. As noted for blue marlin, the majority of recoveries occurred in the same general area as the original capture. The mean straight-line distance of recaptured white marlin is 455 nm. A substantial number of individuals moved between the mid-Atlantic coast of the United States and the northeast coast of South America. Overall, 1.1 percent of documented white marlin recaptures have made trans-Atlantic movements. The longest movement was for a white marlin tagged during July 1995 off the east coast near Cape May, NJ and recaptured off Sierra Leone, West Africa in November 1996. The fish traveled a distance of at least 3,519 nm over 476 days (1.3 years; Jones *et. al*., 1997).

Predator–prey relationships: The most important prey items of adult white marlin, at least in the Gulf of Mexico, are squid, dolphinfishes (*Coryphaena*) and hardtail jack (*Caranx crysos*), followed by mackerels, flyingfishes, and bonitos. Other food items found inconsistently and to a lesser degree include cutlassfishes, puffers, herrings, barracudas, moonfishes, triggerfishes, remoras, hammerhead sharks, and crabs. Along the central Atlantic coast food items include round herring (*Etrumerus teres*) and squid *(Loligo pealei*). Carangids and other fishes are consumed as well (Nakamura, 1985). Davies and Bortone (1976) found the most frequent stomach contents in 53 specimens from the northeastern Gulf of Mexico, off Florida and off Mississippi to include little tunny (*Euthynnus* sp.), bullet tuna (*Auxis* sp.), squid, and moonfish (*Vomer setapinnis*). They also found white marlin to feed on barracuda and puffer fish. The only predators of adult white marlin may be sharks and possibly killer whales (Mather *et al.*, 1975).

Reproduction and Early Life History: Sexual maturity of female white marlin is reached at about 61 inches LJFL (44 lb). Mature females probably spawn more than once a year and possibly up to four times during the spawning season. The spawning season probably occurs only once a year, from March to June (de Sylva and Breder, 1997). It is believed there are at least three spawning areas in the western north Atlantic: northeast of Little Bahama Bank off the Abaco Islands, northwest of Grand Bahama Island, and southwest of Bermuda. Larvae have also been collected from November to April (Mather *et al.*, 1975; Nakamura, 1985), but these may have been sailfish larvae (*Istiophorus platypterus*), as the two cannot readily be distinguished.

Fisheries: White marlin are targeted as a recreational fishery in the United States and Caribbean, and are also caught as bycatch of tropical tuna longline fisheries which use shallow gear deployment. They are also caught by offshore longline fisheries which target swordfish, especially in the western Atlantic, as well as by directed artisanal fisheries in the Caribbean.
U.S. Fishery Status: Overfished, overfishing is occurring. The effect of reduced stock size on habitat use, migrations or distribution is unknown but should be investigated in future research.

Growth and mortality: Adult white marlin grow to over 280 cm TL (total length) and 82 kg. White marlin exhibit sexually dimorphic growth patterns; females grow larger than males (Mather *et al.*, 1975; Nakamura, 1985), but the dimorphic growth differences are not as extreme as noted for blue marlin (SCRS, 1997). A minimum estimate of longevity can be calculated from the longest time at liberty for a tagged white marlin, 4,305 days (11.8 years). The individual was estimated to weigh 50 lb at the time of first capture, resulting in a minimum age estimate of 14 to15 years (SCRS, 1996b).

Habitat associations: The world's largest sport fishery for the species occurs in the summer from Cape Hatteras, NC to Cape Cod, MA especially between Oregon Inlet, NC and Atlantic City, NJ. Successful fishing occurs up to 80 miles offshore at submarine canyons, extending from Norfolk Canyon in the mid-Atlantic to Block Canyon off eastern Long Island (Mather, *et al.*, 1975). Concentrations are associated with rip currents and weed lines (fronts), and with bottom features such as steep dropoffs, submarine canyons and shoals (Nakamura, 1985). The spring peak season for white marlin sport fishing occurs in the Straits of Florida, southeast Florida, the Bahamas, and off the north coasts of Puerto Rico and the Virgin Islands. In the Gulf of Mexico summer concentrations are found off the Mississippi River Delta, at DeSoto Canyon, and at the edge of the continental shelf off Port Aransas, TX, with a peak off the Delta in July, and in the vicinity of DeSoto Canyon in August. In the Gulf of Mexico adults appear to be associated with blue waters of low productivity, being found with less frequency in more productive green waters. While this is also true of the blue marlin, there appears to be a contrast in the factors controlling blue and white marlin abundances, as higher numbers of blue marlin are caught when catches of white marlin are low and vice versa (Rivas, 1975; Nakamura, 1985). It is believed that white marlin prefer slightly cooler temperatures than blue marlin. Spawning occurs in early summer, in subtropical, deep oceanic waters with high surface temperatures and salinities (20 to 29°C and over 35 ppt). Spawning concentrations occur off the Bahamas, Cuba, and the Greater Antilles, probably beyond the U.S. EEZ, although the locations are unconfirmed. Concentrations of white marlin in the northern Gulf of Mexico and from Cape Hatteras to Cape Cod are probably related to feeding rather than spawning (Mather *et al.*, 1975).

Essential Fish Habitat for White Marlin:

- **Spawning, eggs, and larvae:** At this time the available information is insufficient to identify EFH for this life stage (Figure B.22).

- **Juvenile (20-158 cm LJFL):** Pelagic waters warmer than 22°C, from offshore the U.S. east coast from the 50 to the 2000 m isobath from the EEZ at Georges Bank at 41°N, south to offshore Miami, FL at 25.25°N; off the west coast of Florida, between the 200 and 2000 m isobath from 24.75° N to 27.75°N; then continuing between the 200 and 2000 m isobath west from 86°W to 93.5°W, then off the coast of Texas from west of 95.5°W to the 50 m isobath and south to the EEZ boundary (Figure B.23).

- **Adults (≥159 cm LJFL):** Pelagic waters warmer than 22°C, from offshore the northeast U.S. coast from the 50 to the 2000 m isobath from 33.75° N to 39.25°N, then extending along 39.25°N out to the EEZ boundary; off the coast of South Carolina in the Charleston Bump area, in the region starting from the 200 m isobath at 32.25°N, east to 78.25°W, south to 31°N, west to 79.5°W and north to the 200 m isobath; offshore Cape Canaveral, FL from the 200 m isobath, east at 29°N to the EEZ boundary, south along the 200 m isobath and out to the EEZ boundary to 82°W, in the vicinity of Key West, FL; in the Gulf of Mexico, from 86.5°W to the EEZ boundary, along the 50 m isobath near De Soto canyon, then along the 100 m isobath west to the EEZ boundary offshore the United States/Mexico border (Figure B.24).

B.1.3.3 Sailfish

Sailfish (*Istiophorus platypterus*) Sailfish have a circumtropical distribution (Post, 1998). They range from 40°N to 40°S in the western Atlantic and 50°N to 32°S in the eastern Atlantic. Sailfish are epipelagic and coastal to oceanic, and are usually found above the thermocline at a temperature range of 21 to 28°C, but may dive into deeper, colder water. These are the least oceanic of the Atlantic billfish, often moving to inshore waters. They are found over the shelf edge, and are associated with land masses. However, they have been found to travel farther offshore than was previously thought.

A total of 62,740 sailfish have been tagged and released through the efforts of the CTC program, with reported recapture of 1,090 sailfish (1.7 percent of all releases). Most releases occurred off southeast Florida, from north Florida to the Carolinas, the Gulf of Mexico, Venezuela, Mexico, the northern Bahamas, and the U.S. Virgin Islands. One tagged and recaptured specimen traveled from Juno, FL to the mid-Atlantic, a distance of 2,972 km (Bayley and Prince, 1993). The longest movement tracked by tagging was 3,509 km, with this specimen at-large for 1.4 yrs. The longest period a recaptured tagged animal was found to be at-large was 10.9 years (Bayley and Prince, 1993). During the winter sailfish are restricted to the warmer parts of their range and move farther from the tropics during the summer (Beardsley *et al.*, 1975; Nakamura, 1985). The summer distribution of sailfish does not extend as far north as for marlins. Tag-and-recapture efforts have recovered specimens only as far north as Cape Hatteras, NC. Few transatlantic or transequatorial movements have been documented using tag-recapture methods (Bayley and Prince, 1993).

Predator-prey relationships: Early larvae feed on copepods, but shift to eating fish when they reach 6.0 mm in size. The diet of adult sailfish caught around Florida consists mainly of pelagic fishes such as little thunny (*Euthynnus alletteratus*), halfbeaks (*Hemiramphus* spp.), cutlassfish (*Trichiurus lepturus*), rudderfish (*Strongylura notatus*), jacks (*Caranx ruber*), pinfish (*Lagodon rhomboides*), and squids, including *Argonauta argo* and *Ommastrephes bartrami* (Nakamura, 1985). Sailfish are opportunistic feeders, and there is unexpected evidence that they may feed on demersal species such as sea robin (Triglidae), cephalopods, and gastropods found in deep water. Sailfish in the western Gulf of Mexico have been found to contain a large proportion of shrimp in their stomachs (Beardsley *et al.*, 1975; Nakamura, 1985). Davies and Bortone (1976) report that the stomach contents of 11 sailfish from the Gulf of Mexico most frequently contained little thunny, bullet tuna (*Auxis* sp.), squid, and Atlantic moonfish (*Vomer setapinnis*). Adult sailfish are probably not preyed upon often, but predators include killer whales (*Orcinus orca*), bottlenose dolphin (*Tursiops turncatus*), and sharks (Beardsley *et al.*, 1975).

Reproduction and Early Life History: Spawning has been reported to occur in shallow waters (30-40 ft) around Florida, from the Keys to the region off Palm Beach on the east coast. Spawning is also assumed, based on presence of larvae, offshore beyond the 100 m isobath from Cuba to the Carolinas, from April to September. However, the spawning has not been observed. Sexual maturity occurs in the third year, with females at a weight of 13 to18 kg and males at 10 kg (de Sylva and Breder, 1997). Sailfish are multiple spawners, with spawning activity moving northward in the western Atlantic as the summer progresses. Larvae are found in Gulf Stream waters in the western Atlantic, and in offshore waters throughout the Gulf of Mexico from March to October (Beardsley *et al.*, 1975; Nakamura, 1985; de Sylva and Breder, 1997).

Fisheries: Sailfish are primarily caught in directed sportfisheries and as bycatch of the commercial longline fisheries for tunas and swordfish. Historically, nearly all sailfish from commercial catches have been reported as Atlantic sailfish; however, nearly all of these represent longbill spearfish (and perhaps other spearfish), and it is probable that very few sailfish are taken commercially in offshore waters of the Atlantic. Thus, it is impossible to determine historical trends in sailfish catches since at least two species have been combined. **U.S. Fishery Status:** Unknown.

Growth and mortality: Most sailfish examined that have been caught off Florida are under three years of age. Mortality is estimated to be high in this area, as most of the population consists of only two year classes (Beardsley *et al.*, 1975). Sailfish are probably the slowest growing of the Atlantic istiophorids. Sexual dimorphic growth is found in sailfish, but it is not as extreme as with blue marlin (SCRS, 1997). An individual sailfish that was recaptured after

5,862 days (16 years) at liberty can be used to estimate minimum age of longevity. Unfortunately, the size at release is not available for this fish (SCRS, 1996b). The maximum age can be 13 to15 or more years. Growth rate in older individuals is very slow - 0.59 kg/yr (Prince *et al.*, 1986).

Habitat associations: In the winter sailfish are found in schools around the Florida Keys and eastern Florida, in the Caribbean, and in offshore waters throughout the Gulf of Mexico. In the summer they appear to diffuse northward along the U.S. coast as far north as the coast of Maine, although there is a population off the east coast of Florida all year long. During the summer some of these fish move north along the inside edge of the Gulf Stream. After the arrival of northerlies in the winter they regroup off the east coast of Florida. Sailfish appear to spend most of their time above the thermocline, which occurs at depths of 10 to 20 m to 200 to 250 m, depending on location. The 28°C isotherm appears to be the optimal temperature for this species. Sailfish are mainly oceanic but migrate into shallow coastal waters. Larvae are associated with the warm waters of the Gulf Stream (Beardsley *et al.*, 1975; Nakamura, 1985; Post, 1998).

Essential Fish Habitat for Sailfish:

- **Spawning, eggs, and larvae:** From 28.25°N south to Key West, FL, associated with waters of the Gulf Stream and Florida Straits from 5 mi offshore out to the EEZ boundary (Figure B.25)**.**

- **Juveniles/Subadults (20-142 cm LJFL):** In pelagic and coastal surface waters between 21 and 28°C, from 32°N south to Key West, FL in waters from 5 mi offshore to125 mi offshore, or the EEZ boundary, whichever is nearer to shore; west of Key West, FL, all waters of the Gulf of Mexico from the 200 to the 2000m isobath or the EEZ boundary, whichever is nearer to shore (Figure B.26).

- **Adults (≥143 cm LJFL):** In pelagic and coastal surface waters between 21 and 28°C, offshore of the U.S. southeast coast from 5 mi off the coast to 2000 m, from 36°N to 34°N, then from 5 mi offshore to 125 mi offshore, or the EEZ boundary, whichever is nearer to shore, south to Key West, then from the 200 m isobath to the 2000 m isobath. Additional EFH is delineated in the Gulf of Mexico near DeSoto Canyon up to the 50 m isobath, and areas 5 mi offshore southeast Texas, from Corpus Christy to the EEZ boundary, or the 2000 m isobath, whichever is closer (Figure B.27).

B.1.3.4 Longbill Spearfish

Longbill Spearfish (*Tetrapturus pfluegeri*) Only relatively recently (1963) has the longbill spearfish been reported as a new (distinct) species. It is known, but rare, from off the east coast of Florida, the Bahamas and the Gulf of Mexico, and from Georges Bank to Puerto Rico. More recently it has been observed to be more widely distributed, mostly in the western Atlantic. The range for this species is from 40°N to 35°S. It is an epipelagic, oceanic species, usually inhabiting waters above the thermocline (Robins, 1975; Nakamura, 1985). The species is generally found in offshore waters.

Predator-prey relationships: The diet of the longbill spearfish consists of pelagic fishes and squids. However, little data for diet specific to fish in the north Atlantic is available.

Life history: Spawning is thought to occur in widespread areas in the tropical and subtropical Atlantic (Nakamura, 1985) in the winter from November to May (de Sylva and Breder, 1997). There are a few records of larvae caught near the Mid-Atlantic Ridge from December to February, and in the Caribbean (Ueyanagi *et al.*, 1970; de Sylva and Breder, 1997)

Fisheries: Longbill spearfish is not a target species, but is taken in the recreational fishery; the sportfishery catches only about 100 individuals per year. It is, however, taken as bycatch of the tuna longline fishery. **U.S. Fishery Status:** Unknown.

Growth and mortality: The maximum weight of females at first maturity is approximately 45 kg (de Sylva and Breder, 1997).

Habitat associations: The species ranges farther offshore than sailfish. Nothing is known about its habitat associations.

Essential Fish Habitat for Longbill Spearfish:

- **Spawning, eggs, and larvae:** At this time available information is insufficient to describe and identify EFH for this life stage (Figure B.28).

- **Juvenile/Subadult (~20-182 cm LJFL):** Offshore North Carolina, from 36.5°N to 35°N, from the 200 m isobath to the EEZ boundary (Figure B.29).

- **Adults (≥183 cm LJFL):** The Charleston Bump area of the South Atlantic Bight from 78°W to 79°W, and from 37°N to 31°N; and southwest of the U.S. Virgin Islands from 65° W east to the EEZ boundary or the 2000 m isobath, whichever is nearer to shore (Figure B.30).

B.1.4 Large Coastal Sharks

B.1.4.1 Basking Sharks

Basking shark (*Cetorhinus maximus*) The basking shark is the second largest fish in the world, its size exceeded only by the whale shark. Like the whale shark, it is a filter-feeding plankton eater. It is a migratory species of the subpolar and cold temperate seas throughout the world, spending the summer in high latitudes and moving into warmer water in winter (Castro, 1983). In spite of its size and local abundance in summer, its habits are very poorly known. Sims and Quayle (1998) have shown that basking sharks forage along thermal fronts and seek the highest densities of zooplankton. During the European autumn basking sharks disappear and are not seen until the following summer, when they return after giving birth. Distribution data for the basking shark is incomplete largely because the species is not commonly taken by fisheries. According to one OMB reviewer, EFH for the basking shark may need to include waters east of the Great South Channel and the Gulf of Maine to the Bay of Fundy. Pertinent information on life history and distribution of the basking shark in the North Atlantic may be found in Templeman (1963), Owen (1984), Kenney *et al.* (1985), Sims and Merrett (1997), Sims and Quayle (1998), Sims (1999), Sims *et al.* (2000), Skomal *et al.* (2004), and Wilson (2004).

Reproductive potential: Little is known about basking shark reproductive processes. Males are believed to reach maturity between 460 and 610 cm (Bigelow and Schroeder, 1948), at an estimated age of four to five years (Parker and Stott, 1965). However, these age estimates have not been validated. Females mature at 810 to 980 cm (Compagno, 1984). It is believed that female basking sharks give birth to young measuring about 180 cm total length (TL), probably in high latitudes. There are no modern reports on the size of litters or data on reproductive cycles.

Impact of fisheries: Fishing for the basking shark is prohibited in U.S. waters, although basking sharks are common off the east coast in winter.

***Essential Fish Habitat for Basking Shark*:**

- **Neonate (≥182 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.31).

- **Juveniles (183 to 809 cm TL):** Offshore the mid-Atlantic United States south of Nantucket Shoals at 70°W to the north edge of Cape Hatteras, NC at 35.5°N in waters 50 to 200 m deep; associated with boundary conditions created by the western edge of the Gulf Stream (Figure B.32).

- **Adults (≥810 cm TL):** Offshore southern New England, west of Nantucket Shoals at 70°W to Montauk, Long Island, NY at 72°W, out to the continental shelf in waters 50 to 200 m deep, where water column physical conditions create high abundances of zooplankton (Figure B.33).

B.1.4.2 Hammerhead Sharks

Great hammerhead (*Sphyrna mokarran*) This shark found both in open oceans and shallow coastal waters. One of the largest sharks, the great hammerhead is circum-tropical in warm waters (Castro, 1983). It is usually a solitary fish, unlike the more common scalloped hammerhead which often forms very large schools.

Reproductive potential: In Australian waters males mature at about 210 to 258 cm TL and females mature usually at 210 to 220 cm TL (Stevens and Lyle, 1989). Pups measure about 67 cm TL at birth (Stevens and Lyle, 1989) and litters consist of 20 to 40 pups (Castro, 1983). The gestation period lasts about 11 months (Stevens and Lyle, 1989). The reproductive cycle is biennial (Stevens and Lyle, 1989). There are few reports and little data on its nurseries. Hueter (CSR data) found small juveniles from Yankeetown, FL to Charlotte Harbor, FL from May to October at temperature of 23.9 to 28.9°C and salinities of 21.9 to 34.2 ppt.

Impact of fisheries: Great hammerheads are caught in coastal longline shark fisheries as well as in pelagic tuna and swordfish longline fisheries. Its fins bring the highest prices in the shark fin market. Although finning is prohibited in the Atlantic, in many fishing operations elsewhere the fins are removed while the carcasses are discarded at sea. The great hammerhead is vulnerable to overfishing because of its biennial reproductive cycle and because it is caught both in directed fisheries and as bycatch in tuna and swordfish fisheries.

***Essential Fish Habitat for Great Hammerhead*:**

- **Neonate (≤74 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.34).

- **Juveniles (71 to 209 cm TL):** Off the Florida coast, all shallow coastal waters out to the 100 m isobath from 30°N south around peninsular Florida to 82.5°W, including Florida Bay and adjacent waters east of 81.5°W (north of 25°N), and east of 82.5°W (south of 25°N) (Figure B.35).

- **Adults (≥210 cm TL):** Off the entire east coast of Florida, all shallow coastal waters out to the 100 m isobath, south of 30°N, including the west coast of Florida to 85.5°W (Figure B.36).

Scalloped hammerhead (*Sphyrna lewini*) This is a very common, large, schooling hammerhead of warm waters. It is the most common hammerhead in the tropics and is readily available in abundance to inshore artisanal and small commercial fisheries as well as offshore operations (Compagno, 1984). It migrates seasonally north-south along the eastern United States. Additional life history information can be found in Lessa *et al.* (1998), Hazin *et al.* (2001), and Bush and Holland (2002).

Reproductive potential: Males in the Atlantic mature at about 180 to 185 cm TL (Bigelow and Schroeder, 1948), while those in the Indian Ocean mature at 140 to 165 cm TL (Bass *et al.*, 1973). Females mature at about 200 cm TL (Stevens and Lyle, 1989). The young are born at 38 to 45 cm TL, litters consisting of 15 to 31 pups (Compagno, 1984). The reproductive cycle is annual (Castro, 1993b), and the gestation period is nine to ten months (Stevens and Lyle, 1989). Castro (1993b) found nurseries in the shallow coastal waters of South Carolina; Hueter (CSR data) found small juveniles from Yankeetown to Charlotte Harbor on the west coast of Florida, in temperatures of 23.2° to 30.2 °C, salinities of 27.6 to 36.3 ppt, and DO of 5.1 to 5.5 ml/l.

Impact of fisheries: Because the scalloped hammerhead forms very large schools in coastal areas, it is targeted by many fisheries for its high priced fins. The scalloped hammerhead is considered vulnerable to overfishing because its schooling habit makes it extremely vulnerable to gillnet fisheries and because scalloped hammerheads are actively pursued in many fisheries throughout the world.

***Essential Fish Habitat for Scalloped Hammerhead*:**

- **Neonate (≤62 cm TL):** Shallow coastal waters of the South Atlantic Bight, off the coast of South Carolina, Georgia, and Florida, west of 79.5°W and north of 30°N, from the shoreline out to 25 miles offshore. Additionally, as displayed on Figure 6-10e: shallow coastal bays and estuaries less than 5 m deep, from Apalachee Bay to St. Andrews Bay, FL (Figure B.37).

- **Juveniles (63 to 227 cm TL):** All shallow coastal waters of the U.S. Atlantic seaboard from the shoreline to the 200 m isobath from 39° N, south to the vicinity of the Dry Tortugas and the Florida Keys at 82° W; also in the Gulf of Mexico, in the area of Mobile Bay, AL and Gulf Islands National Seashore, all shallow coastal waters from the shoreline out to the 50 m isobath (Figure B.38).

- **Adults (≥228cm TL):** In the South Atlantic Bight from the 25 to 200 m isobath from 36.5°N to 33°N, then continuing south from the 50 m isobath offshore to the 200 m isobath to 30°N, then from the 25 m isobath to the 200 m isobath from 30°N south to 28°N; also, in the Florida Straights between the 25 and 200 m isobaths, from 81.5°W west to 82.25°W in the vicinity of Key West and the Dry Tortugas (Figure B.39).

Smooth hammerhead (*Sphyrna zygaena*) This is an uncommon hammerhead of temperate waters. Fisheries data for hammerheads includes this species and the scalloped and great hammerheads; however, there is little data specific to the species.

***Essential Fish Habitat for Smooth Hammerhead*:**

- **Neonate (≤66 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.40).

- **Juveniles (67 t0 283 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.41).

- **Adults (≥284 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.42).

B.1.4.3 Mackerel Sharks

White shark (*Carcharodon carcharias*) The white shark is the largest of the lamnid, or mackerel, sharks. It is a poorly known apex predator found throughout temperate, subtropical, and tropical waters. Its presence is usually sporadic throughout its range, although there are a few localities (*e.g.*, off California, Australia, and South Africa) where it is seasonally common. Large adults prey on seals and sea lions and are sometimes found around their rookeries. The white shark is also a scavenger of large dead whales. It has been described as the most voracious of the fish-like vertebrates and has been known to attack bathers, divers, and even boats. According to one OMB reviewer, EFH for the white shark may need to be modified. The review by Casey and Pratt (1985) is a comprehensive size-specific examination of white shark distribution, life history, and nursery habitat in the western North Atlantic. Preliminary estimates of age and growth of this species were recently conducted by Natanson (2002). Estrada *et al.* (in press) present new information on the trophic ecology of this species in the western North Atlantic based on stable isotopes.

Reproductive potential: Very little is known of its reproductive processes because only two gravid females have been examined by biologists in modern times. Both specimens contained seven embryos. Recent observations show that white sharks carry seven to ten embryos that are born at 120 to 150 cm TL (Francis, 1996; Uchida *et al.*, 1996). The lengths of the reproductive and gestation cycles are unknown. White sharks are believed to mature at between 370 and 430 cm at an estimated age of nine to ten years (Cailliet *et al.*, 1985). Cailliet *et al.*, (1985) estimated growth rates of 25.0 to 30.0 cm/year for juveniles and 21.8 cm/year for older specimens, and gave the following von Bertalanffy parameters: n = 21, L_{∞} = 763.7 cm, K = 0.058, t_o = -3.53. They estimated that a 610 cm TL specimen would be 13 to 14 years old. The types of habitats and locations of nursery areas are unknown. It is likely that the nurseries will be found in the warmer parts of the range in deep water.

Impact of fisheries: The white shark is a prized game fish because of its size. It is occasionally caught in commercial longlines or in near-shore drift gillnets, but it must be released in a manner which maximizes its survival. Its jaws and teeth are often seen in specialized markets where they bring high prices. Preliminary observations (Strong *et al.*, 1992) show that populations may be small, highly localized, and very vulnerable to overexploitation. The white shark has been adopted as a symbol of a threatened species by some conservation organizations, and has received protected status in South Africa, Australia, and the State of California. In 1997, the Unites States implemented a catch-and-release only recreational fishery for the white shark, while prohibiting possession of the species. There are no published population assessments, or even anecdotal reports, indicating any population decreases of the white shark. Nevertheless, it is a scarce apex predator and a long-lived species of a limited reproductive potential that is vulnerable to longlines.

***Essential Fish Habitat for White Shark*:**

- **Neonate (≤166 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.43).

- **Juveniles (167 to 479 cm TL):** Offshore northern New Jersey and Long Island, NY in pelagic waters from the 25 to 100 m isobath in the New York Bight area, bounded to the east at 71.5°W and to the south at 39.5°N; also, offshore Cape Canaveral, FL between the 25 and 100 m isobaths from 29.5° N south to 28°N (Figure B.44).

- **Adults (≥480 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.45).

B.1.4.4 Nurse Sharks

Nurse shark (*Ginglymostoma cirratum* The nurse shark inhabits littoral waters in both sides of the tropical and subtropical Atlantic, ranging from tropical West Africa and the Cape Verde Islands in the east, and from Cape Hatteras, NC to Brazil in the west. It is also found in the east Pacific, ranging from the Gulf of California to Panama and Ecuador (Bigelow and

Schroeder, 1948). It is a shallow water species, often found lying motionless on the bottom under coral reefs or rocks. It often congregates in large numbers in shallow water (Castro, 1983; Pratt and Carrier, 2002).

Reproductive potential: The nurse shark matures at about 225 cm total length (Springer, 1938). Litters consist of 20 to 30 pups, the young measuring about 30 cm total length at birth. The gestation period is about five to six months and reproduction is biennial (Castro, 2000). The age at maturity is unknown, but the nurse shark is a long-lived species. Clark (1963) reported an aquarium specimen living up to 24 years in captivity.

Its nurseries are in shallow turtle grass (*Thalassia*) beds and shallow coral reefs (Castro, 2000; Pratt and Carrier 2002). However, juveniles are also found around mangrove islands in south Florida. Hueter and Tyminski (2002) found numerous juveniles along the west coast of Florida, in temperatures of 17.5° to 32.9°C, salinities of 28.0 to 38.5 ppt, and DO of 3.1 to 9.7 mg/l. Large numbers of nurse sharks often congregate in shallow waters off the Florida Keys and the Bahamas at mating time in June and July (Fowler, 1906; Gudger, 1912; Pratt and Carrier, 2002). A small area has been set up for protection of mating sharks at Fort Jefferson in the Dry Tortugas. It is not certain, however, whether this area is a primary mating ground or a refuge for mated females.

Impact of fisheries: In North America and the Caribbean the nurse shark has often been pursued for its hide, which is said to be more valuable than that of any other shark (Springer, 1950a). The fins have no value, and the meat is of questionable value (Springer, 1979). The U.S. commercial bottom longline fleet catches few nurse sharks.

***Essential Fish Habitat for Nurse Shark*:**

- **Neonate (≤ 36 cm total length):** Areas of shallow coastal areas from West Palm Beach, FL, south to the Dry Tortugas in waters less than 25 m deep, including Charlotte Harbor, FL at 82°W and 26.8°N in waters less than 25 m deep (Figure B.46).

  Juvenile (37 to 221 cm total length): Shallow coastal waters from the shoreline to the 25 m isobath off the east coast of Florida from south of Cumberland Island, GA (at 30.5°N) to the Dry Tortugas; also shallow coastal waters from Charlotte Harbor, FL (at 26°N) to the north end of Tampa Bay, FL (at 28°N); also, off southern Puerto Rico, shallow coastal waters out to the 25 m isobath from 66.5°W to the southwest tip of the island. Areas in the northeast Gulf of Mexico (Apalachee Bay, Apalachicola Bay, and Crooked Island Sound, FL) (Figure B.47).

- **Adults (≥ 221 cm total length):** Shallow coastal waters from the shoreline to the 25 m isobath off the east coast of Florida from south of Cumberland Island, GA (at 30.5°N) to the Dry Tortugas; also, shallow coastal waters from Charlotte Harbor, FL (at 26°N) to the north end of Tampa Bay, FL (at 28°N); also, off southern Puerto Rico, shallow coastal waters out to the 25 m isobath from 66.5°W to the southwest tip of the island (Figure B.48).

B.1.4.5 Requiem Sharks

<u>Bignose shark (*Carcharhinus altimus*)</u> The bignose shark is a poorly known, bottom dwelling shark of the deeper waters of the continental shelves. It is found in tropical and subtropical waters throughout the world (Castro, 1983).

Reproductive potential: The smallest mature specimens recorded by Springer (1960) were a 213 cm TL male and a 221 cm TL female. Springer (1950c) reported litters of seven to eight pups, while Stevens and McLoughlin (1991) noted from three to 15 pups. Birth size is probably around 70 cm TL based on the largest embryos (65 to 70 cm TL) reported by Fourmanoir (1961), and free swimming specimens with fresh umbilical scars seen by Bass *et al.*, (1973). The lengths of the gestation period and of the breeding cycle have not been reported. The location of the nurseries is unknown.

Impact of fisheries: Springer (1950c) stated that the bignose shark appeared to be the most common large shark of the edges of the continental shelves in the West Indian region, and that the species made up a substantial portion of the catch in the Florida shark fishery of the1940s. In some areas bignose sharks are mistaken for sandbar sharks.

***Essential Fish Habitat for Bignose Shark*:**

- **Neonate (≤67 cm TL):** From offshore the Delmarva Peninsula at 38°N, to offshore Bull's Bay, SC at 32°N, between the 100 and 200 m isobaths (Figure B.49).

- **Juveniles (68 to 225 cm TL):** From offshore the Delmarva Peninsula at 38°N, to offshore Bull's Bay, SC at 32°N, between the 100 and 500 m isobaths; also, from St. Augustine, FL at 30°N, south to offshore West Palm Beach, FL at 27°N, between the 100 and 500 m isobaths (Figure B.50).

- **Adults (≥226 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.51).

<u>Blacktip shark (C*archarhinus limbatus*)</u> The blacktip shark is circumtropical in shallow coastal waters and offshore surface waters of the continental shelves. In the southeastern United States it ranges from Virginia to Florida and the Gulf of Mexico. Garrick (1982), on examining a large number of museum specimens, believed it to be a single worldwide species. Dudley and Cliff (1993), working off South Africa, and Castro (1996), working on blacktip sharks off the southeastern United States, showed that there were significant differences among the various populations. For example, the median size for blacktip sharks in the Atlantic is 126.6 cm fork length, whereas the median size in the Gulf region is 117.3 cm fork length. The blacktip shark is a fast moving shark that is often seen at the surface, frequently leaping and spinning out of the water. It often forms large schools that migrate seasonally north-south along the coast. This species is much sought after in the eastern United States because of the quality of its flesh. The blacktip and the sandbar shark are the two primary species in the U.S. commercial fisheries. In the markets of the United States "blacktip" has become synonymous with good quality shark; therefore, many other species are also sold under that name.

Additional information on blacktip shark nursery habitat can be found in Heupel and Hueter (2002), Heupel and Simpfendorfer (2002), Keeney *et al.* (2003), Heupel *et al.* (2004), Keeney *et al.* (2005), and Heupel and Simpfendorfer (2005a; 2005b).

Reproductive potential: Off the southeastern United States males mature at between 142 and 145 cm total length and females at about 156 cm total length (Castro, 1996). According to Branstetter and McEachran (1986), in the western north Atlantic males mature at 139 to 145 cm total length at four to five years and females at 153 cm total length at six to seven years. A similar pattern is evident in the Atlantic and Gulf of Mexico, with larger size at maturity in the Atlantic than in the Gulf region. However, these ages are unvalidated and based on a small sample. Branstetter and McEachran (1986) estimated the maximum age at ten years, and gave the von Bertalanffy parameters for combined sexes as: $L_\infty = 171$, K= 0.284, t_o= -1.5.

The young are born at 55 to 60 cm total length in late May and early June in shallow coastal nurseries from Georgia to the Carolinas (Castro, 1996), and in Bay systems in the Gulf of Mexico (Carlson, 2002; Parsons, 2002), and the Texas coast (Jones and Grace, 2002) Litters range from one to eight pups (Bigelow and Schroeder, 1948) with a mean of four. The gestation cycle lasts about a year; the reproductive cycle is biennial (Castro, 1996).

According to Castro (1993b), the nurseries are on the seaward side of coastal islands of the Carolinas, at depths of two to four meters. Carlson (2002) found neonates in depths of 2.1 to 6.0 m under a variety of habitat conditions. Castro (1993b) found neonates over muddy bottoms off Georgia and the Carolinas, while Hueter found them over seagrass beds off west Florida (unpublished Mote Laboratory CSR data). Neonates and juveniles were found off west Florida (from the Florida Keys to Tampa Bay) at temperatures of 18.5^o to 33.6^{o}C, salinities of 15.8 to 37.0 ppt, and DO of 3.5 to 9.0 mg/l. The neonates were found from April to September, while juveniles were found there nearly year-round.

Impact of fisheries: The blacktip shark is caught in many diverse fisheries throughout the world. Off the southeastern United States it is caught in commercial longlines set in shallow coastal waters, but it is also pursued as a gamefish. There are localized gillnet fisheries in Federal waters off Florida that target blacktips during their migrations, when the schools are close to shore in clear waters. Aircraft are often used to direct net boats to the migrating schools, often resulting in the trapping of large schools. The species is pursued commercially throughout its range and is targeted because it is often found in shallow coastal waters. Their habit of migrating in large schools along shorelines makes it extremely vulnerable to organized drift gillnet fisheries.

Essential Fish Habitat for Blacktip Shark

- **Neonate (≤ 69 cm total length):** Shallow coastal waters to the 25 m isobath, from Bull's Bay, SC at 33.5°N, south to Cape Canaveral, FL at 28.5°N; also, on the west coast of Florida from Thousand Islands at 26°N to Cedar Key, FL at 29°N, especially Tampa Bay and Charlotte Harbor, FL. Additionally, shallow coastal waters with muddy bottoms less than five meters deep on the seaward side of coastal islands from Apalachee Bay to St. Andrews Bay, FL.

EFH areas are identified above with the following modifications from Amendment 1. EFH includes shallow coastal waters south of the Thousand Islands, FL at 26°N south to Key West, FL at 24.5°N; also the northeastern Gulf of Mexico (Apalachee Bay, Apalachicola Bay, St. Joseph Bay, Crooked Island Sound and St Andrew Bay) at 85°W to the mouth of St. Louis Bay and the Terrebonne Timbalier Bay System, LA at 91.2°W; also, all major bay systems along the Gulf coast of Texas from Sabine Lake to Lower Laguna Madre (Figure B.52).

Juvenile (69 to 155 cm total length): Shallow coastal waters from the shoreline to the 25 m isobath: from Cape Hatteras, NC at 35.25°N to 29°N at Ponce de Leon Inlet; the west coast of Florida, including the Florida Keys and Florida Bay, north to Cedar Key at 29°N; from Cape San Blas, FL north of 29.5°N to the east coast of the Mississippi River delta north of 29°N; also, the west coast of Texas from Galveston, west of 94.5°N, to the U.S./Mexico border. Areas from the northeastern Gulf of Mexico (Apalachee Bay, Apalachicola Bay, St. Joseph Bay, Crooked Island Sound and St Andrew Bay) to the mouth of St. Louis Bay and the Terrebonne Timbalier Bay System, LA; also, all major bay systems along the Gulf coast of Texas from Sabine Lake to Lower Laguna Madre (Figure B.53).

- **Adult (≥ 155 cm total length):** Shallow coastal waters of the Outer Banks, NC from the shoreline to the 200 m isobath between 36°N and 34.5°N; shallow coastal waters offshore to the 50 m isobath from St. Augustine, FL (30°N) to offshore Cape Canaveral, FL (28.5°N); on the west coast of Florida, shallow coastal waters to the 50 m isobath from 81°W in Florida Bay, to 85°W, east of Cape San Blas, FL. Areas north of St. Augustine, FL at 30°N to Cumberland Island, GA at 30.9°N, but excludes areas south from Apalachicola Bay to Tarpon Springs at 28.2°N (Figure B.54).

Bull shark (*Carcharhinus leucas*) The bull shark is a large, shallow water shark that is cosmopolitan in warm seas and estuaries (Castro, 1983). It often enters fresh water, and may penetrate hundreds of kilometers upstream.

Reproductive potential: Males mature at 210 to 220 cm TL or 14 to 15 years of age, while females mature at >225 cm TL or 18+ years of age (Branstetter and Stiles, 1987). Growth parameters have been estimated by Branstetter and Stiles (1987) as L_∞ = 285 cm TL, K= 0.076, t_o = -3.0 yr. Thorson and Lacy (1982) estimated that females reached "their larger size at approximately 16 years and that males of maximum size were 12 years old." The pups measure about 75 cm TL at birth (Clark and von Schmidt, 1965). Jensen (1976) stated that litters ranged from one to ten pups and that the average size was 5.5 pups. The gestation period is estimated at ten to eleven months (Clark and von Schmidt, 1965). The length of the reproductive cycle has not been published, but it is probably biennial. In the United States the nursery areas are in low-salinity estuaries of the Gulf of Mexico Coast (Castro, 1983) and the coastal lagoons of the east coast of Florida (Snelson *et al.,* 1984). Hueter (CSR data), working off the Florida west coast, found neonates in Yankeetown, Tampa Bay, and Charlotte Harbor from May to August. The neonates were in temperatures of 28.2° to 32.2°C, with salinities of 18.5-28.5 ppt. Hueter (CSR data) found juveniles off the west coast of Florida in temperatures of 21.0° to 34.0°C, salinities of 3.0 to 28.3 ppt, and DO of 3.7 to 8.4 ml/l.

Additional information on bull shark life history and nursery habitat can be found in Tremain *et al.* (2004), Neer *et al.* (2005), and Simpfendorfer *et al.* (2005).

Impact of fisheries: The bull shark is a common coastal species that is fished in both artisanal and industrial/modern fisheries. Clark and von Schmidt (1965) found it to be the most common shark caught in their survey of the sharks of the central Gulf coast of Florida, accounting for 18 percent of the shark catch. Dodrill (1977) reported it to be the seventh most commonly taken shark at Melbourne Beach, Florida, composing 8.6 percent of all longline landings. Thorson (1976) recorded a marked decline of the Lake Nicaragua-Rio, San Juan population from 1963 to1974, resulting from a small-scale, but sustained commercial fishing operation. This fishery intensified in 1968, and by 1972 bull sharks in the area had become so scarce that Thorson (1976) predicted that any other developments would eliminate the bull shark from Lake Nicaragua. Russell (1993) indicated that the bull shark constituted three percent of the shark catch in the directed shark fishery in the U.S. Gulf of Mexico. Castillo (1992) referred to the species in Mexico as "intensely exploited in both coasts." The bull shark is vulnerable to overfishing because of its slow growth, limited reproductive potential, and because it is pursued in numerous fisheries.

***Essential Fish Habitat for Bull Shark*:**

- **Neonate (≤83 cm TL):** In shallow coastal waters, inlets and estuaries in waters less than 25 m deep: from just north of Cape Canaveral, FL at 29°N to just south of Cape Canaveral, FL at 28°N; from just south of Charlotte Harbor, FL at 26.5°N north to Cedar Key, FL at 29°N; the mouth of Mobile Bay, AL from 87.75°W to 88.25°W; the mouth of Galveston Bay, TX from 94.5°W to 95°W; from South Padre Island, TX south of 28.5°N to Laguna Madre, TX at 27°N (Figure B.55).

- **Juveniles (84 to 225 cm TL):** In shallow coastal waters, inlets and estuaries in waters less than 25 m deep: from Savannah Beach, GA at 32°N southward to the Dry Tortugas, FL; from Ten Thousand Islands, FL at 26°N north to northern Cedar Key, FL at 29°N; from Apalachiacola, FL at 85°W to the Mobile Bay, AL area at 88.5°W; from just east of Galveston Bay, TX at 94.5°W to the U.S./Mexico border (Figure B.56).

- **Adults (≥226 cm TL):** In shallow coastal waters, inlets and estuaries in waters less than 25 m deep: from just south of Charlotte Harbor, FL at 26.5°N to Anclote Key, FL at 28°N (Figure B.57).

Caribbean reef shark *(Carcharhinus perezi)* The Caribbean reef shark inhabits the southeast coast of Florida, the Caribbean, and the west Atlantic south to Brazil. This is a poorly known, bottom-dwelling species that inhabits shallow coastal waters, usually around coral reefs (Castro, 1983).

Reproductive potential: Males mature about 170 cm TL and females at about 200 cm TL. Pups are born at about 70 cm TL, litters consisting of four to six pups. The reproductive cycle is biennial (Castro, unpub.). The nurseries have not been described.

***Essential Fish Habitat for Caribbean Reef Shark*:**

- **Neonate (≤66 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.58).

- **Juveniles (67 to 199 cm TL):** Shallow coastal waters of the Florida Keys less than 25 m deep from Key Largo to the Dry Tortugas (Figure B.59).

- **Adults (≥200 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.60).

Dusky shark (*Carcharhinus obscurus*). The dusky shark is common in warm and temperate continental waters throughout the world. It is a migratory species which moves north-south with the seasons. This is one of the larger species found from inshore waters to the outer reaches of continental shelves. It used to be important as a commercial species and a game fish, but is currently prohibited.

Reproductive potential: Males mature at 290 cm total length and reach at least 340 cm total length. The females mature at about 300 cm total length and reach up to 365 cm total length. The dusky shark matures at about 17 years and is considered a slow growing species (Natanson, 1990). Litters consist of six to14 pups, which measure 85 to 90 cm total length at birth (Castro, 1983). The gestation period is believed to be about 16 months (Clark and von Schmidt, 1965), but this has not been confirmed. Natanson (1990) gave the following parameters for males L_{max}= 351 cm FL (420 cm total length), K= .047, t_o = −5.83; and females at L_{max}= 316 cm total length (378 cm total length), K= .061, t_o=-4.83. The growth rate is believed to be about ten cm/yr for the young and five cm/yr for the adults. Age and growth information can also be found in Natanson *et al.* (1995).

The nursery areas are in coastal waters. Castro (1993c) reported that dusky sharks gave birth in Bulls Bay, SC in April and May. Musick and Colvocoresses (1986) stated that the species gives birth in the Chesapeake Bay, MD in June and July, however, Grubbs and Musick (2002) note that they use nearshore waters in VA as nursery areas but rarely enter estuaries.

Impact of fisheries: The dusky shark has played an important role in the coastal shark fisheries for flesh and fins and is taken as bycatch in the swordfish and tuna fisheries. The dusky shark is one of the slowest growing requiem sharks and is often caught on both bottom and pelagic longlines, making it highly vulnerable to overfishing. Dusky sharks are currently prohibited and are a candidate for listing under the ESA.

***Essential Fish Habitat for Dusky Shark*:**

- **Neonate (≤ 110 cm total length):** Shallow coastal waters, inlets and estuaries to the 25 m isobath from the eastern end of Long Island, NY at 72°W south to Cape Lookout, NC at 34.5°N; from Cape Lookout south to West Palm Beach, FL (27.5°N), shallow coastal waters, inlets and estuaries and offshore areas to the 90 m isobath. Areas out to the 200 m isobath off the states of Maryland south to North Carolina, and out to the 70 m isobath off New Jersey north to Long Island, NY (Figure B.61).

- **Juvenile (110 to 299 cm total length):** Areas off the coast of southern New England from 70°W west and south, coastal and pelagic waters between the 25 and 200 m isobaths; shallow coastal waters, inlets and estuaries to the 200 m isobath from Assateague Island at the Virginia/Maryland border (38°N) to Jacksonville, FL at 30°N; shallow coastal waters, inlets and estuaries to the 500 m isobath continuing south to the Dry Tortugas, FL at 83° W (Figure B.62).

  Adult (≥ 299 cm total length): Pelagic waters offshore the Virginia/North Carolina border at 36.5°N south to Ft. Lauderdale, FL at 28°N between the 25 and 200 m isobaths, includes coastal waters offshore from the Virginia/North Carolina border at 36.5°N south to Cape Romain, NC out to the 25 m isobath; also, coastal waters offshore from the Georgia/Florida border at 30.8°N to Cape Canaveral at 28.5°N (Figure B.63).

Galapagos shark (*Carcharhinus galapagensis*) The Galapagos shark is circumtropical in the open ocean and around oceanic islands (Castro, 1983). It is very similar to the dusky shark and is often mistaken for it, although the dusky prefers continental shores (Castro, 1983). The Galapagos shark is very seldom seen in the continental United States. A few Galapagos sharks are undoubtedly caught off the east coast every year, but they can be easily misidentified as dusky sharks.

Reproductive potential: Males reach maturity between 205 and 239 cm TL and females between 215 and 245 cm TL (Wetherbee *et al.*, 1996). Pups are born at slightly over 80 cm TL, and litters range from four to16 pups, the average being 8.7. The gestation cycle is estimated to last about a year (Wetherbee *et al.*, 1996), but the length of the reproductive cycle is not known.

***Essential Fish Habitat for Galapagos Shark*:**

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults (≥215 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage.

<u>Lemon shark (*Negaprion brevirostris*)</u> The lemon shark is common in the American tropics, inhabiting shallow coastal areas, especially around coral reefs. It is reported to use coastal mangroves as some of its nursery habitats, although this is not well documented in the literature. The primary population in continental U.S. waters is found off south Florida, although adults stray north to the Carolinas and Virginia in the summer. Additional life history information can be found in Sundstrom *et al.* (2001) and Barker *et al.* (2005).

Reproductive potential: Lemon sharks mature at about 228 cm TL (Springer, 1950b). Brown and Gruber (1988) estimated an age at maturity of 11.6 years for males and 12.7 years for females, showing the species to be slow growing and long lived. Brown and Gruber reported the von Bertalanffy parameters as: L_∞ =317.65, K= .057, and t_o= -2.302. Litters consist of five to 17 pups, which measure about 64 cm TL at birth (Springer, 1950b; Clark and von Schmidt, 1965). Its reproductive cycle is biennial (Castro, 1993c), and gestation lasts ten (Springer, 1950b) to12 months (Clark and von Schmidt, 1965). Its nurseries are in shallow waters around mangrove islands (Springer 1950b) off tropical Florida and the Bahamas. Hueter (CSR data) found lemon shark neonates in Tampa Bay, FL during the month of May, at temperatures of 22.0° to 25.4°C, salinities of 26.8 to 32.6 ppt, and DO of 5.9 to 9.6 ml/l. He also found juveniles over a wider area off western Florida and in a wider range of temperatures and salinities.

Impact of fisheries: The lemon shark is caught throughout its range, although it is not a primary commercially important species along the Atlantic coast. Anecdotal evidence indicates that lemon sharks are vulnerable to local depletions.

***Essential Fish Habitat for Lemon Shark*:**

- **Neonate (≤68cm TL):** Shallow coastal waters, inlets and estuaries out to the 25 m isobath from Savannah, GA at 32°N, south to Indian River Inlet, FL at 29°N; shallow coastal waters, inlets and estuaries from Miami around peninsular Florida to Cape Sable at 25.25°N including the Keys in waters less than 25 m deep; waters of Tampa Bay, FL including waters immediately offshore the mouth of the bay; shallow coastal waters, inlets and estuaries from South Padre Island, TX at 95.5°N south to the U.S./Mexico border in waters less than 25 m deep (Figure B.64).

- **Juveniles (69 to 235 cm TL):** Shallow coastal waters, inlets and estuaries offshore to the 25 m isobath, west of 79.75°W from Bull's Bay, SC to south of Cape Canaveral (West Palm Beach), FL at 28°N; Shallow coastal waters, inlets and estuaries offshore to the 25 m isobath from Miami at 25.5°N, around peninsular Florida to Tampa Bay, FL (including the Keys) to 28°N; shallow coastal waters, inlets and estuaries offshore to the 25 m isobath off the south coast of Puerto Rico from 66°W to 67°W (Figure B.65).

- **Adults (≥236 cm TL):** Shallow coastal waters, inlets and estuaries offshore to the 25 m isobath from Cumberland Island, GA at 31°N to St. Augustine, FL at 31°N; from West Palm Beach, FL at 27°N around peninsular Florida to 28.5° N near Anclote Key in shallow coastal waters, inlets and estuaries and offshore to the 25 m isobath (Figure B.66).

<u>Narrowtooth shark (*Carcharhinus brachyurus*)</u> This is a coastal-pelagic species of widespread distribution in warm temperate waters throughout the world. In general, it is a temperate shark, absent or rare in tropical waters (Bass *et al.*, 1973). Although the species has been reported for the California coast by Kato *et al.*, (1967) as *C. remotus*, and for the southwest Atlantic, few data exist for the western north Atlantic.

Reproductive potential: Males mature between 200 and 220 cm TL, and females mature below 247 cm TL. The young are born at about 60 to 70 cm TL. Six pregnant females averaged 16 embryos, with a range of 13 to 20 pups per litter (Bass *et al.*, 1973). Walter and Ebert (1991) calculated age at sexual maturity at 13 to 19 years for males and 19 to 20 years for females. Gestation is believed to last a year (Cliff and Dudley, 1992). The length of the reproductive cycle is not known, but it is probably biennial as it is for most large carcharhinid sharks.

Impact of fisheries: Because it appears to be a very slow growing carcharhinid (based on the unvalidated ages by Walter and Ebert (1991)), the narrowtooth shark is probably vulnerable to overfishing.

***Essential Fish Habitat for Narrowtooth Shark*:**

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults:** At this time, available information is insufficient for the identification of EFH for this life stage.

<u>Night shark (*Carcharhinus signatus*)</u> This carcharhinid shark inhabits the waters of the western north Atlantic from Delaware to Brazil and the west coast of Africa. It is a tropical species that seldom strays northward. It is usually found at depths greater than 275 to 366 m during the day and about 183 m at night (Castro, 1983).

Reproductive potential: There is little information on night shark reproductive processes. Litters usually consist of 12 to 18 pups which measure 68 to 72 cm TL at birth (Castro, 1983). Length at maturity has been reported for females as 150 cm FL (178 cm TL) (Compagno, 1984). The nurseries remain undescribed. Hazin *et al.* (2000) and Santana and Lessa (2004) provide additional information on reproduction and age and growth, respectively.

Impact of fisheries: The night shark was abundant along the southeast coast of the United States and the northwest coast of Cuba before the development of the swordfish fishery of the 1970s. Martinez (1947) stated that the Cuban shark fishery relied heavily on the night shark, which constituted 60 to 75 percent of the total shark catch, and that the average annual catch for 1937 to1941 was 12,000 sharks. Guitart Manday (1975) documented a precipitous decline in night shark catches off the Cuban northwest coast during the years 1971 to 1973.

Berkeley and Campos (1988) stated that this species represented 26.1 percent of all sharks caught in swordfish fisheries studied by them along the east coast of Florida from 1981 to 1983. Anecdotal evidence from commercial swordfish fishermen also indicates that in the late 1970s it was not unusual to have 50 to 80 dead night sharks, usually large gravid females, in every set from Florida to the Carolinas. During the 1970s sports fishermen in south Florida often resorted to catching night sharks when other more desirable species (marlins) were not biting. The photographic record of sport fishing trophies landed shows that large night sharks were caught daily and landed at the Miami docks in the 1970s. Today, the species is rare along the southeast coast of the United States. The decline of the night shark may be an example of how a species can decline due to bycatch mortality.

***Essential Fish Habitat for Night Shark*:**

- **Neonate (≤70 cm TL):** At this time, the information available is insufficient to identify EFH for this life stage (Figure B.67).

- **Juveniles (71 to 177 cm TL):** From offshore Assateague Island, MD at 38°N south to offshore Cape Fear at 33.5°N, from the 100 to 2,000 m isobath (Figure B.68).

- **Adults (≥178 cm TL):** In the South Atlantic Bight, from the 100 m isobath to either the 2,000 m isobath, 100 miles from shore, or the EEZ boundary, whichever is nearest, from 36°N offshore Oregon Inlet, NC to 25.5°N, off the coast of Miami, FL (Figure B.69).

Sandbar shark (*Carcharhinus plumbeus*) The sandbar shark is cosmopolitan in subtropical and warm temperate waters. It is a common species found in many coastal habitats. It is a bottom-dwelling species most common in 20 to 55 m of water, but occasionally found at depths of about 200 m.

Reproductive potential: The sandbar shark is a slow growing species. Both sexes reach maturity at about 147 cm total length or approximately 5 feet (Merson, 1998). Estimates of age at maturity range from 15 to 16 years (Sminkey and Musick, 1995) to 29 to 30 years (Casey and Natanson, 1992), although 15 to 16 years is the commonly accepted age of maturity. The von Bertalanffy growth parameters were proposed for combined sexes are L_∞= 186 cm FL (224 cm total length; 168 cm PCL), K= 0.046, t_o= -6.45 by Casey and Natanson (1992); and re-evaluated by Sminkey and Musick (1995) as L_∞= 164 cm PCL (219 cm total length; 182 cm Fl), K= 0.089, and t_o= -3.8. Young are born at about 60 cm total length (smaller in the northern parts of the North American range) from March to July. Litters consist of one to 14 pups, with nine being the average (Springer, 1960). The gestation period lasts about a year and reproduction is biennial (Musick *et al.*, 1993). Hoff (1990) used an age at maturity of 15 years, a life span of 35 years, and a two-year reproductive cycle to calculate that each female may reproduce only ten times. New maturity estimates and the increased mortality in the fishery may reduce that reproductive potential much further.

In the United States the sandbar shark has its nurseries in shallow coastal waters from Cape Canaveral, FL (Springer, 1960), to Great Bay, NJ (Merson and Pratt, 2002). Delaware

Bay, DE (McCandless *et al.*, 2002), Chesapeake Bay, MD (Grubbs and Musick, 2002), and the waters off Cape Hatteras, NC (Jensen *et al.*, 2002) are important primary and secondary nurseries. Juveniles return to Delaware Bay after a winter absence around May 15, and are found as far north as Martha's Vineyard, MA in the summer. Neonates have been captured in Delaware Bay in late June. Young of the year were present in Delaware Bay until early October when the temperature fell below 21°C. Another nursery may exist along the west coast of Florida and along the northeast Gulf of Mexico. Hueter and Tyminski (2002) found neonates off Yankeetown, FL from April to July, in temperatures of 25.0° to 29.0°C and salinities of 20.4 to 25.9 ppt. Neonate sandbar sharks were found in an area between Indian Pass and St. Andrew Sound, FL in June when the temperature had reached 25°C (Carlson 2002).

Impact of fisheries: The sandbar shark is one of the most important commercial species in the shark fishery of the southeastern United States, along with blacktip sharks. It is a preferred species because of the high quality of its flesh and large fins. Commercial longline fishermen pursue sandbar stocks in their north-south migrations along the coast; their catches can be as much as 80 to 90 percent sandbar sharks in some areas. Musick *et al.* (1993) have documented a severe decline in CPUE of the sandbar shark in the Chesapeake Bay area. It is considered highly vulnerable to overfishing because of its slow maturation and heavy fishing pressure, as evidenced in the catch per unit effort (CPUE) declines in U.S. fisheries.

***Essential Fish Habitat for Sandbar Shark*:**

- **Neonate (≤ 71 cm total length):** Shallow coastal areas to the 25 m isobath from Montauk, NY at 72°W, south to Cape Canaveral, FL at 80.5°W (all year); nursery areas in shallow coastal waters from Great Bay, NJ to Cape Canaveral, FL, especially Delaware and Chesapeake Bays (seasonal-summer); also shallow coastal waters to up to a depth of 50 m on the west coast of Florida and the Florida Keys from Key Largo at 80.5°W north to south of Cape San Blas, FL at 85.25°W. Typical parameters: salinity-greater than 22 ppt; temperatures-greater than 21°C. Also on the west coast of Florida from the 50 m isobath to the 30 m isobath and approximately 20 miles offshore from the Virginia/Maryland border at 37.8°N south to Pamlico Sound, NC at 35.4°N (Figure B.70).

- J**uvenile (71 to 147 cm total length):** Areas offshore southern New England and Long Island, NY, all waters, coastal and pelagic, north of 40°N and west of 70°W; also, south of 40°N at Barnegat Inlet, NJ, to Cape Canaveral, FL (27.5° N), shallow coastal areas to the 25 m isobath; also, in the winter, from 39°N to 36°N, in the Mid-Atlantic Bight, at the shelf break, benthic areas between the 90 and 200 m isobaths; also, on the west coast of Florida, from shallow coastal waters to the 50 m isobath, from Florida Bay and the Keys at Key Largo north to Cape San Blas, FL at 85.5°W. Includes Cape Poge Bay, MA around Chappaquiddick Island, MA, and off the south shore of Cape Cod, MA (Figure B.71).

- **Adult (≥ 147 cm total length):** Areas on the east coast of the U.S., shallow coastal areas from the coast to the 50 m isobath from Nantucket, MA, south to Miami, FL; also, shallow coastal areas from the coast to the 90 m isobath around peninsular

Florida to the Florida panhandle at 85.5°W, near Cape San Blas, FL, including the Keys and saline portions of Florida Bay (Figure B.72).

- **Habitat Areas of Particular Concern (HAPC):** Important nursery and pupping grounds have been identified in shallow areas and at the mouth of Great Bay, NJ, in lower and middle Delaware Bay, DE, lower Chesapeake Bay, MD, and near the Outer Banks, NC, and in areas of Pamlico Sound and adjacent to Hatteras and Ocracoke Islands, NC, and offshore of those islands (Figure B.73).

Silky shark (*Carcharhinus falciformis*) The silky shark inhabits warm, tropical, and subtropical waters throughout the world. Primarily, the silky is an offshore, epipelagic shark, but juveniles venture inshore during the summer. The silky shark is one of the most abundant large sharks in the world.

Reproductive potential: Data on the silky shark are variable. There is a strong possibility that different populations may vary in their reproductive potential. Litters range from six to 14 pups, which measure 75 to 80 cm TL at birth (Castro, 1983). According to Bonfil *et al.* (1993), the silky shark in the Campeche Bank, Mexico, has a 12-month gestation period, giving birth to ten to 14 pups, with an average of 76 cm TL during late spring and early summer, possibly every two years. Males mature at 225 cm TL (about ten years) and females at 232-245 cm TL (>12 yrs of age). The von Bertanffy parameters estimated by Bonfil *et al.* (1993) are: $L_\infty = 311$ cm TL, K= 0.101, and t_o= -2.718 yr. Maximum ages were 20+ years for males and 22+ years for females (Bonfil *et al.*, 1993). Springer (1967) describes reefs on the outer continental shelf as nursery areas. Bonfil *et al*, (1993) mentions the Campeche Bank as a prime nursery area in the Atlantic.

Impact of Fisheries: The silky shark is caught frequently in swordfish and tuna fisheries. Berkeley and Campos (1988) found it to constitute 27.2 percent of all sharks caught in swordfish vessels off the east coast of Florida from 1981 to1983. Bonfil *et al*, (1993) considered that the life-history characteristics of slow growth, late maturation, and limited offspring may make it vulnerable to overfishing. In all probability, local stocks of this species cannot support sustained heavy fishing pressure.

***Essential Fish Habitat for Silky Shark*:**

- **Neonate (≤85 cm TL):** Waters off Cape Hatteras, NC between the 100 and 2,000 m isobaths; plus shallow coastal waters just north and immediately west of Cape Hatteras; waters off St. Augustine, FL south to off Miami in depths 25 to 1,000 m, (likely along the west edge of the Gulf Stream); off northwest FL- De Soto Canyon area between the 200 and 2,000 m isobaths (Figure B.74).

- **Juveniles (86 to 231 cm TL):** Waters off the mouth of the Chesapeake Bay, MD south to waters offshore west of the North Carolina/South Carolina border from the 50 to 2,000 m isobath; from the North Carolina/South Carolina border south to Key West paralleling the 200 m isobath; the area northwest of Key West to west of Ten Thousand Islands between the 50 and 2,000 m isobaths (Figure B.75).

- **Adults (≥232 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.76).

Spinner shark (*Carcharhinus brevipinna*) The spinner shark is a common, coastal-pelagic, warm-temperate and tropical shark of the continental and insular shelves (Compagno, 1984). It is often seen in schools, leaping out of the water while spinning. It is a migratory species, but its patterns are poorly known. Off eastern North America it ranges from Virginia to Florida and in the Gulf of Mexico.

Reproductive potential: Males mature at 130 cm TL or four to five years, females mature at 150 to 155 cm TL or seven to eight years (Branstetter, 1987). According to Branstetter (1987), males reach maximum size at ten to 15 years and females at 15 to 20 years. However, he added the caveat that as sharks near their maximum size, their growth is slower, therefore, their maximum ages may be much greater. Branstetter (1987) gave von Bertalanffy parameters for both sexes were: L_∞ = 214 cm, K= 0.212, t_o = -1.94 yr. The ages have not been validated. According to Garrick (1982), the species reaches 278 cm TL. The young are born at 60 to 75 cm TL in late May and early June. The litters usually consist of six to 12 pups (Castro, 1983). It has a biennial reproductive cycle (Castro, 1993c). In the Carolinas the nursery areas are in shallow coastal waters (Castro, 1993c); however, the extent of the nursery areas is unknown. Hueter (CSR data) found juveniles along the west coast of Florida in temperatures of 21.9° to 30.1° C, salinities of 21.0 to 36.2 ppt, and DO 3.5 to 5.0 ml/l. Additional life history information on the spinner shark can be found in Allen and Wintner (2002), Capape *et al.* (2003), Bethea *et al.* (2004), Carlson and Baremore (2005), and Joung *et al.* (2005).

Impact of fisheries: Unknown. The spinner shark is similar in reproductive potential and habits to the blacktip shark, and its vulnerability to fisheries is probably very similar to that of the blacktip. In fact, the blacktip-spinner complex is a commonly used category that combines the landings of these two species because of species similarities and difficulties in distinguishing the two species.

***Essential Fish Habitat for Spinner Shark*:**

- **Neonate (≤71 cm TL):** Along the coast of the southeastern United States and the west coast of Florida, shallow coastal waters out to the 25 m isobath, from Cape Hatteras, NC at 35.25° N around Florida including Florida Bay and the Florida Keys, and north to 29.25° N. Additionally, as displayed in Figure 6-25e: shallow coastal waters with muddy bottoms less than five meters deep, on the seaward side of coastal islands, and in shallow bays along seagrass beds from Apalachee Bay to St. Andrews Bay, FL (Figure B.77).

- **Juveniles (72 to 184 cm TL):** Off the east coast from the Florida/Georgia border at 30.7° N south to 28.5° N, from shallow coastal waters to the 200 m isobath (Figure B.78).

- **Adults (≥185 cm TL):** Off the east coast of Florida, from shallow coastal waters out to the 100 m isobath, from 30° N to 28.5° N offshore Cape Kennedy (Figure B.79).

Tiger shark (*Galeocerdo cuvieri*). The tiger shark inhabits warm waters in both deep oceanic and shallow coastal regions (Castro, 1983). It is one of the larger species of sharks, reaching over 550 cm TL and over 900 kg. Its characteristic tiger-like markings and unique teeth make it one of the easiest sharks to identify. It is one of the most dangerous sharks and is believed to be responsible for many attacks on humans (Castro, 1983).

Reproductive potential: Tiger sharks mature at about 290 cm TL (Castro, 1983; Simpfendorfer, 1992). The pups measure 68 to 85 cm TL at birth. Litters are large, usually consisting of 35 to 55 pups (Castro, 1983). According to Branstetter *et al.* (1987), males mature in seven years and females in ten years, and the oldest males and females were 15 and 16 years of age. The ages have not been validated. Branstetter *et al*, (1987) gave the growth parameters for an Atlantic sample as L_∞ = 440 cm TL, K= 0.107, and t_o= -1.13 years, and for a Gulf of Mexico sample as L_∞ = 388 cm TL, K= 0.184, and t_o= -0.184. There is little data on the length of the reproductive cycle. Simpfendorfer (1992) stated that the females do not produce a litter each year. The length of the gestation period is also uncertain. Clark and von Schmidt (1965) stated that the gestation period may be slightly over a year. While this estimate has not been confirmed, it is probably correct, given that many large carcharhinid sharks have biennial reproduction and year-long gestation periods. The nurseries for the tiger shark appear to be in offshore areas, but they have not been described. More recent age and growth information on the tiger shark can also be found in Natanson *et al.* (1999) and Wintner and Dudley (2000).

Impact of Fisheries: This species is frequently caught in coastal shark fisheries but is usually discarded due to low fin and meat value.

***Essential Fish Habitat for Tiger Shark*:**

- **Neonate (≤90cm TL):** From shallow coastal areas to the 200 m isobath from Cape Canaveral, FL north to offshore Montauk, Long Island, NY (south of Rhode Island); and from offshore southwest of Cedar Key, FL north to the Florida/Alabama border from shallow coastal areas to the 50 m isobath (Figure B.80).

- **Juveniles (91 to 296 cm TL):** Shallow coastal areas from Mississippi Sound (just west of Mississippi/Alabama border) to the 100 m isobath south to the Florida Keys; around the peninsula of Florida to the 100 m isobath to the Florida/Georgia border; north to Cape Lookout, NC from the 25 to100 m isobath; from Cape Lookout north to just south of the Chesapeake Bay, MD from inshore to the 100 m isobath; north of the mouth of Chesapeake Bay to offshore Montauk, Long Island, NY (to south of Rhode Island between the 25 and 100 m isobaths; south and southwest coasts of Puerto Rico from inshore to the 2,000 m isobath (Figure B.81).

- **Adults (≥297 cm TL):** Offshore from Chesapeake Bay, MD south to Ft. Lauderdale, FL to the western edge of the Gulf Stream; from Cape San Blas, FL to

Mississippi Sound between the 25 and 200 m isobaths; off the south and southwest coasts of Puerto Rico from inshore to the 2,000 m isobath (Figure B.82).

B.1.4.6 Sand Tiger Sharks

Bigeye sand tiger (*Odontaspis noronhai*) This is one of the rarest large sharks. Its large eyes and uniform dark coloration indicate that it is a deep-water species. The few catch records that exist indicate that it frequents the upper layers of the water column at night. The species was originally described based on a specimen from Madeira, FL (?). A few specimens were caught at depths of 600-1,000 m off Brazil (Compagno, 1984). A 321 cm TL immature female was caught in the Gulf of Mexico, about 70 miles east of Port Isabel, TX in 1984. Another specimen was caught in the tropical Atlantic (5° N; 35° W) at a depth of about 100 m where the water was about 3,600 m deep. These appear to be all the records for the species. Nothing is known of its habits. Possession of this species is prohibited in Atlantic waters of the United States.

***Essential Fish Habitat for Bigeye Sand Tiger Shark*:**

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults:** At this time, available information is insufficient for the identification of EFH for this life stage.

Sand tiger shark (*Carcharias taurus*) The sand tiger is a large, coastal species found in tropical and warm temperate waters throughout the world. It is often found in very shallow water (4 m) (Castro, 1983). It is the most popular large shark in aquaria, because, unlike most sharks, it survives easily in captivity. It has been fished for its flesh and fins in coastal longline fisheries; although possession of this species in Atlantic waters of the United States is now prohibited.

Reproductive potential: According to Gilmore (1983), males mature at about 191.5 cm TL. According to Branstetter and Musick (1994), males reach maturity at 190 to 195 cm TL or four to five years and females at more than 220 cm TL or six years. The largest immature female seen by J. Castro was 225 cm TL and the smallest gravid female was 229 cm TL, suggesting that maturity is reached at 225 to 229 cm TL. The oldest fish in Branstetter and Musick's (1994) sample of 55 sharks was 10.5 years old, an age that has been exceeded in captivity (Govender *et al.*, 1991). The von Bertalanffy parameters, according to Branstetter and Musick (1994), are for males: L_{max}= 301 cm, K= 0.17, and t_o= -2.25; and for females: L_{max}= 323 cm, K= 0.14, and t_o= -2.56 yrs. Gilmore (1983) gave growth rates of 19 to 24 cm/yr for the first years of life of two juveniles born in captivity. The sand tiger has an extremely limited reproductive potential, producing only two young per litter (Springer, 1948). In North America the sand tiger gives birth in March and April to two young that measure about 100 cm TL. Parturition (birth of the young) is believed to occur in winter in the southern portions of its range, and the neonates migrate northward to summer nurseries. The nursery areas are the following Mid-Atlantic Bight estuaries: Chesapeake, Delaware, Sandy Hook, and Narragansett Bays as well as coastal sounds. Branstetter and Musick (1994) suggested that the reproductive cycle is biennial, but other evidence suggests annual parturition. Additional information on the sand tiger shark may be found in Gelsleichter *et al.* (1999) and Lucifora *et al.* (2002).

Impact of fisheries: The species is extremely vulnerable to overfishing because it congregates in coastal areas in large numbers during the mating season. These aggregations are attractive to fishermen, although the effects of fishing these aggregations probably contribute to local declines in the population abundance. Its limited fecundity (two pups per litter) probably contributes to its vulnerability. In the United States there was a very severe population decline in the early 1990s, with sand tigers nearly disappearing from North Carolina and Florida waters. Musick *et al.*, (1993) documented a decrease in the Chesapeake Bight region of the U.S. Mid-Atlantic coast. In 1997, NMFS prohibited possession of this species in U.S. Atlantic waters.

***Essential Fish Habitat for Sand Tiger Shark*:**

- **Neonate (≤117cm TL):** Shallow coastal waters from Barnegat Inlet, NJ south to Cape Canaveral, FL to the 25 m isobath (Figure B.83).

- **Juveniles (118 to 236 cm TL):** At this time, available information is insufficient for the identification of EFH for this life stage (Figure B.84).

- **Adults (≥237 cm TL):** Shallow coastal waters to the 25 m isobath from Barnegat Inlet, NJ to Cape Lookout; from St. Augustine to Cape Canaveral, FL (Figure B.85).

B.1.4.7 Whale Sharks

Whale shark (*Rhincodon typus*) The whale shark is a sluggish, pelagic filter feeder, often seen swimming on the surface. It is the largest fish in the oceans, reaching lengths of 1210 cm TL and perhaps longer. It is found throughout all tropical seas, usually far offshore (Castro, 1983). Possession of this species in Atlantic waters of the United States is now prohibited.

Reproductive potential: For many years the whale shark was believed to be oviparous, based on a presumably aborted egg case trawled from the Gulf of Mexico many years ago. Recent discoveries (Joung *et al.*, 1996) proved the whale shark to be viviparous and the most prolific of all sharks. The only gravid female examined carried 300 young in several stages of development. The embryos measured 580 to 640 mm TL, the largest appearing ready for birth. The length of the reproductive cycle is unknown, but is probably biennial such as the closely related nurse shark (*Ginglymostoma cirratum*) and most other large sharks (Castro, 1996). Based on unpublished information on the growth rate of one surviving embryo from a female reported by Joung *et al.*, (1996), the whale shark may be the fastest growing shark. Only a handful of small juveniles have ever been caught, probably because of the extremely fast growth rate or high mortality rate of juveniles. The location of the whale shark nurseries is unknown and remains as one of the interesting mysteries of shark biology. Additional life history information can be found in Chang *et al.* (1997), Colman (1997), and Wintner (2000).

Impact of fisheries: There are very few observations of aggregations of whale sharks. The range of the whale shark may be extremely vast, perhaps encompassing entire ocean basins. Thus it may be necessary to consider whale shark fisheries on an ocean-wide perspective. There have been a few small fisheries for whale sharks in India, the Philippines, and Taiwan, but it is of little commercial importance elsewhere. The whale shark used to be fished for its flesh, but presently the fins and oil are also used. Generally, the size of the whale shark safeguards it from most fisheries. Records of the Taiwanese fishery demonstrate that whale sharks, like most elasmobranchs, are susceptible to overfishing. In 1997, NMFS prohibited possession of this species in U.S. Atlantic waters.

***Essential Fish Habitat for Whale Shark*:**

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults:** At this time, available information is insufficient for the identification of EFH for this life stage.

B.1.4.8 Small Coastal Shark

Atlantic angel shark *(Squatina dumerili)* The angel shark is a flattened shark that resembles a ray. It inhabits coastal waters of the United States from Massachusetts to the Florida Keys, the Gulf of Mexico, and the Caribbean. It is common from southern New England to the Maryland coast (Castro, 1983).

Reproductive potential: Maturity is probably reached at a length of 90 to 105 cm TL. The pups measure 28 to 30 cm TL at birth. Up to 16 pups in one litter have been observed (Castro, 1983). Very little is known about its biology.

***Essential Fish Habitat for Atlantic Angel Shark*:**

- **Neonate (≤31 cm TL):** Off the coast of southern New Jersey, Delaware, and Maryland from 39° N to 38° N, in shallow coastal waters out to the 25 m isobath, including the mouth of Delaware Bay (Figure B.86).

- **Juveniles (32 to 113 cm TL):** (Identical to neonate EFH) Off the coast of southern New Jersey, Delaware, and Maryland from 39° N to 38° N, in shallow coastal waters out to 25 m isobath, including the mouth of Delaware Bay (Figure B.87).

- **Adults (≥113 cm TL):** (Identical to neonate EFH) Off the coast of southern New Jersey, Delaware, and Maryland from 39° N to 38° N, in shallow coastal waters out to the 25 m isobath, including the mouth of Delaware Bay (Figure B.88).

B.1.4.9 Hammerhead Sharks

<u>Bonnethead (*Sphyrna tiburo*)</u> The bonnethead is a small hammerhead that inhabits shallow coastal waters where it frequents sandy or muddy bottoms. It is confined to the warm waters of the western hemisphere (Castro, 1983).

Reproductive potential: Males mature at about 70 cm TL, and females at about 85 cm TL (Parsons, 1993). Litters consist of eight to12 pups, with the young measuring 27 to 35 cm TL at birth (Castro, 1983; Parsons, 1993). Parsons (1993) estimated the gestation period of two Florida populations at 4.5 to 5 months, one of the shortest gestation periods known for sharks. The reproductive cycle is annual (Castro, pers. obs.). Hueter (CSR data) found young of the year and juveniles in the west coast of Florida at temperatures of 16.1° to 31.5° C, salinities of 16.5 to 36.1 ppt, and DO of 2.9 to 9.4 ml/l. Additional life history information can be found in Cortes *et al.* (1996), Cortes and Parsons (1996), Cortes *et al.* (1996), Carlson and Parsons (1997), Lessa and Almeida (1998), Marquez-Farias *et al.* (1998), Carlson *et al.* (1999), and Lombardi-Carlson *et al.* (2003).

Impact of fisheries: The bonnethead is at a lesser risk of overfishing because it is a fast growing species that reproduces annually and, due to its small size, is generally not targeted by commercial fisheries. Although bonnetheads are caught as bycatch in gillnet fisheries operating in shallow waters of the southeastern United States, many of these fisheries have been prohibited by various states and therefore forced into deeper Federal waters where gillnets are less effective. Bonnethead bycatch in the U.S. Gulf of Mexico shrimp fishery seems to have remained stable over the last twenty years, from 1974 to 1994 (Pellegrin, 1996).

***Essential Fish Habitat for Bonnethead Shark*:**

- **Neonate (≤38 cm TL):** Shallow coastal waters, inlets and estuaries less than 25 m deep from Jekyll Island, GA to just north of Cape Canaveral, FL; in shallow waters on the Gulf-side of the Florida Keys as far north as Cape Sable in water less than 25 m deep. Additionally, as displayed on Figure 6-31e: shallow coastal bays and estuaries less than five meters deep, from Apalachee Bay to St. Andrews Bay, FL (Figure B.89).

- **Juveniles (39 to 82 cm TL):** Shallow coastal waters, inlets and estuaries from Cape Fear, NC southward to West Palm Beach, FL in waters less than 25 m deep; shallow coastal waters, inlets and estuaries from Miami around peninsular Florida as far north as Cedar Key in waters less than 25 m deep; shallow coastal waters, inlets and estuaries from the Mississippi River westward to the Rio Grande River (Texas/Mexico border) (Figure B.90).

- **Adults (≥83 cm TL):** Shallow coastal waters, inlets and estuaries from Cape Fear, NC to Cape Canaveral, FL; shallow waters around the Florida Keys; shallow coastal waters from Mobile Bay, AL west to South Padre Island, TX from inshore to the 25 m isobath (Figure B.91).

B.1.4.10 Requiem Sharks

Atlantic sharpnose shark (*Rhizoprionodon terraenovae*) The Atlantic sharpnose shark is a small coastal carcharhinid, inhabiting the waters of the northeast coast of North America. It is a common year-round resident along the coasts of South Carolina, Florida, and in the Gulf of Mexico and an abundant summer migrant off Virginia. Frequently, these sharks are found in schools of uniform size and sex (Castro, 1983).

Reproductive potential: The male Atlantic sharpnose sharks mature at around 65 to 80 cm TL and grow to 103 cm TL. The females mature at 85 to 90 cm TL and reach a length of 110 cm TL. Litters range from four to seven pups, which measure 29 to 32 cm TL (Castro, 1983). Mating is in late June; the gestation period is about 11 to 12 months (Castro and Wourms, 1993). The von Bertalanffy growth parameter estimates for the species are L_∞ = 108, K= 0.359, and t_o= -0.985 yr (Branstetter, 1987). Cortés (1995) calculated the population's intrinsic rate of increase was, at best, r= .044, or a finite increase of e_r = 1.045. Off South Carolina the young are born in late May and early June in shallow coastal waters (Castro and Wourms, 1993). Hueter (CSR data) found neonates off the west coast of Florida at Yankeetown and Anclote Key during the months of May to July. These neonates were found in temperatures of 24.0° to 30.7° C, salinities of 22.8 to 337 ppt, and DO of 5.7 ml/l. Larger juveniles were also found in the area in temperatures of 17.2° to 33.3° C, salinities of 22.8 to 35.5 ppt, and DO of 4.5 to 8.6 ml/l. Additional life history information can be found in Cortes (1995), Marquez-Farias and Castillo-Geniz (1998), Gelsleichter et al. (1999), Carlson and Baremore (2003), Hoffmayer and Parsons (2003), Loefer and Sedberry (2003), and Bethea et al. (2004).

Impact of fisheries: Large numbers of sharpnose are taken as bycatch in the U.S. shrimp trawling industry. The Texas Recreational Survey, NMFS Headboat Survey, and the U.S. Marine Recreational Fishing Statistics Survey have estimated a slow increase in the sharpnose fishery. The Atlantic sharpnose is a fast-growing species that reproduces yearly. In spite of being targeted by recreational fisheries and the large bycatch in the shrimp industry, the populations seem to be maintaining themselves.

Essential Fish Habitat for Atlantic Sharpnose:

- **Neonate (≤40 cm TL):** Shallow coastal areas including bays and estuaries out to the 25 m isobath from Galveston Island south to the Rio Grande (Texas/Mexico border); from Daytona Beach north to Cape Hatteras, NC. Additionally, as displayed on Fig. 32e: shallow coastal bays and estuaries less than five meters deep, from Apalachee Bay to St. Andrews Bay, FL (Figure B.92).

- **Juveniles (41 to 78 cm TL):** Shallow coastal areas including bays and estuaries out to the 25 m isobath from Galveston Island south to the Rio Grande (Texas/Mexico border); off Louisiana from the Atchafalya River to Mississippi River Delta out to the 40 m isobath; from Daytona Beach, FL north to Cumberland Island, GA; Hilton Head Island, SC north to Cape Hatteras, NC out to the 25 m isobath (slightly deeper - to the 50 m isobath off North Carolina) (Figure B.93).

- **Adults (≥79 cm TL):** From Cape May, NJ south to the North Carolina/South Carolina border; shallow coastal areas north of Cape Hatteras, NC to the 25 m isobath; south of Cape Hatteras between the 25 and 100 m isobaths; offshore St. Augustine, FL to Cape Canaveral, FL from inshore to the100 m isobath, Mississippi Sound from Perdido Key to the Mississippi River Delta to the 50 m isobath; coastal waters from Galveston to Laguna Madre, TX to the 50 m isobath (Figure B.94).

Blacknose shark (*Carcharhinus acronotus*) The blacknose shark is a common coastal species that inhabits the western north Atlantic from North Carolina to southeast Brazil (Bigelow and Schroeder, 1948). It is very abundant in coastal waters from the Carolinas to Florida and the Gulf of Mexico during summer and fall (Castro, 1983). Schwartz (1984) hypothesized that there are two separate populations in the West Atlantic.

Reproductive potential: Maturity is reached at about 100 cm TL. Litters consist of three to six pups, which measure 50 cm TL at birth (Castro, 1983). Dodrill (1977) estimated the gestation period to be ten to eleven months and suggested that the breeding cycle was biennial. Schwartz (1984) estimated that the largest adult male captured was 164 cm TL and was 9.6 years old, while an adult female 154 cm TL was also 9.6 years old. Castro (1983) stated that in South Carolina nursery areas were in shallow waters. The species is common throughout the year off Florida, suggesting that part of the population may be non-migratory and that nursery areas may exist in Florida as well. Hueter (CSR data) found 13 neonates in the Ten Thousand Islands and off Sarasota in June and July at temperatures 29° to 30.1° C, salinities of 32.2 to 37.0 ppt, and DO of 6.5 ml/l. He also found young of the year and juveniles at temperatures of 17.3° to 34° C, salinities of 25.0 to 37.0 ppt, and DO of 4.8 to 8.5 ml/l. Additional life history information can be found in Carlson *et al*. (1999), Hazin *et al*. (2002), and Driggers *et al*. (2004a; 2004b).

Impact of fisheries: Large numbers of blacknose sharks are caught in shallow coastal waters of the southeastern United States. The species is vulnerable to overfishing because it has typical carcharhinid characteristics such as biennial reproductive cycle, and it is targeted in the shark fisheries in the southeastern United States.

***Essential Fish Habitat for Blacknose Shark*:**

- **Neonate (≤52 cm TL):** Shallow coastal waters to the 25 m isobath from North Carolina/South Carolina border south to Cape Canaveral, FL; shallow waters to the 25 m isobath from Ten Thousand Islands north to just south of Tampa Bay, FL (Figure B.95).

- **Juveniles (53 to 106 cm TL):** Shallow coastal waters to the 25 m isobath from the Georgia/Florida border south to West Palm Beach, FL; shallow waters to the 25 m isobath from the Florida Keys north to the mouth of Tampa Bay, FL. Additionally, as displayed on Figure 6-33e: shallow coastal bays and estuaries less than five meters deep with expanses of seagrasses, from Apalachee Bay to St. Andrews Bay, FL (Figure B.96).

- **Adults (≥107 cm TL):** Shallow coastal waters to the 25 m isobath from St. Augustine south to Cape Canaveral, FL; shallow waters to the 25 m isobath from the Florida Keys north to Cedar Key, FL; Mississippi Sound from Mobile Bay, AL to the waters off Terrebonne Parish, LA in waters 25 to100 m deep (Figure B.97).

Caribbean sharpnose shark (*Rhizoprionodon porosus*) The Atlantic sharpnose and the Caribbean sharpnose sharks are cognate species, separable only by having different numbers of precaudal vertebrae (Springer, 1964). However, they have non-overlapping ranges - the Caribbean sharpnose shark inhabits the Atlantic from 24° N to 35° S, while the Atlantic sharpnose is found at latitudes higher than 24° N. Their biology is very similar.

***Essential Fish Habitat for Caribbean Sharpnose*:**

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults:** At this time, available information is insufficient for the identification of EFH for this life stage.

Finetooth shark (*Carcharhinus isodon*) This is a common inshore species of the west Atlantic. It ranges from North Carolina to Brazil. It is abundant along the southeastern United States and the Gulf of Mexico (Castro, 1983). Sharks captured in the northeastern Gulf of Mexico ranged in size from 48 to 150 cm total length were generally found in water temperatures averaging 27.3°C and depths of 4.2 m (Carlson, 2002). Important nursery habitat is also located in South Carolina (Ulrich and Riley, 2002), Louisiana (Neer *et al.*, 2002), and the coast of Texas (Jones and Grace, 2002).

Reproductive potential: Males mature at about 130 cm total length and females mature at about 135 cm total length. The young measure 48 to 58 cm total length at birth. Litters range from two to six embryos, with an average of four. The gestation period lasts about a year, and the reproductive cycle is biennial. Some of the nurseries are in shallow coastal waters of South Carolina (Castro, 1993b). Additional life history information can be found in Carlson *et al.* (2003), Hoffmayer and Parsons (2003), and Bethea *et al*. (2004).

Impact of fisheries: According to the SCS stock assessment, finetooth sharks are caught commercially almost exclusively in the South Atlantic region and mostly with gillnets (approximately 80 percent of finetooth landings) and longlines (approximately 20 percent). The SCS stock assessment estimates 16,658 finetooth sharks were landed commercially in 2000, and of these, only 8 percent were from HMS fisheries. The majority of the catch thus appears to come from fishermen in non-HMS fisheries. The species is vulnerable to overfishing because of its biennial reproductive cycle and small brood size.

*Essential Fish Habitat for Finetooth Shark***:**

Neonate (≤ 65 cm total length): The 1999 HMS FMP identified EFH for neonates (≤90 cm total length) as shallow coastal waters of South Carolina, Georgia, and Florida out to the 25 m isobath from 33° N to 30° N. Additionally, shallow coastal waters less than five meters deep with muddy bottoms, and on the seaward side of coastal islands from Apalachee Bay to St. Andrews Bay, FL, especially around the mouth of the Apalachicola River. Includes coastal waters out to the 25 m isobath from Mobile Bay, AL to Bay St. Louis, MS from 88° W to 89.5° W, and from near Sabine Pass, TX to Laguna Madre, TX (Figure B.98).

Juvenile (65 to 135 cm total length): Shallow coastal waters of South Carolina, Georgia, and Florida out to the 25 m isobath from 33° N to 30° N. Additionally, shallow coastal waters less than five meters deep with muddy bottoms, and on the seaward side of coastal islands from Apalachee Bay to St. Andrews Bay, FL, especially around the mouth of the Apalachicola River. Includes coastal waters out to the 25 m isobath from Mobile Bay, AL to Atchafalaya Bay, LA from 88° W to 91.4° W, and from near Sabine Pass, TX at 94.2° W to Laguna Madre, TX at 26° N; also, coastal waters out to the 25 m isobath from South Carolina north to Cape Hatteras, NC at 35.5° N (Figure B.99).

Adult (≥ 135 cm total length): Shallow coastal waters of South Carolina, Georgia, and Florida out to the 25 m isobath from 33°N to 30° N. Additionally, shallow coastal waters less than five meters deep with muddy bottoms, and on the seaward side of coastal islands from Apalachee Bay to St. Andrews Bay, FL, especially around the mouth of the Apalachicola River. Includes areas identical to those for juveniles: coastal waters out to the 25 m isobath from Mobile Bay, AL to Atchafalaya Bay, LA from 88° W to 91.4° W, and from near Sabine Pass, TX at 94.2° W to Laguna Madre, TX at 26° N; also, coastal waters out to the 25 m isobath from South Carolina north to Cape Hatteras, NC at 35.5° N (Figure B.100).

Smalltail shark *(Carcharhinus porosus)* This is a small, tropical, and subtropical shark that inhabits shallow coastal waters and estuaries in the West Atlantic, from the Gulf of Mexico to south Brazil, and the east Pacific from the Gulf of California to Peru (Castro, 1983). A few specimens have been caught in the Gulf of Mexico off Louisiana and Texas.

Reproductive potential: There is almost no published data on its reproductive processes. Females observed in Trinidad were in different stages of gestation, suggesting a wide breeding season. Embryos up to 35 cm TL were observed. The reproductive cycle appears to be annual. Additional life history information can be found in Lessa and Santana (1998) and Lessa *et al*. (1999b).

Impact of fisheries: The species is marketed in many areas of Central America; Springer (1950a) stated that large numbers were sold in the Trinidad market.

Essential Fish Habitat for Smalltail Shark (Figure B.101)**:**

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults:** At this time, available information is insufficient for the identification of EFH for this life stage.

B.1.5 Pelagic Sharks

B.1.5.1 Cow sharks

Bigeye sixgill shark (*Hexanchus vitulus*) This is a poorly known deep-water shark that was not described until 1969. Most specimens have been accidental captures at depths of 400 m in tropical waters (Castro, 1983). In North America most catches have come from the Bahamas and the Gulf of Mexico.

Essential Fish Habitat for Bigeye Sixgill Shark (Figure B.102)**:**

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults:** At this time, available information is insufficient for the identification of EFH for this life stage.

Sevengill shark (*Heptranchias perlo*) This is a deep-water species of the continental slopes, where it appears to be most common at depths of 180 to 450 m. It has a world-wide distribution in deep tropical and warm temperate waters. In the United States the sevengill shark ranges from South Carolina to the Gulf of Mexico.

Reproductive potential: Maturity is reached at about 85-90 cm TL. Litters consist of nine to 20 pups, which measure about 25 cm TL at birth (Castro, 1983). According to Tanaka and Mizue (1977), off Kyushu, Japan the species reproduces year round. The lengths of the reproductive and gestation cycles are unknown. The location of the nurseries is unknown.

Impact of fisheries: The sharpnose sevengill shark is sometimes caught in large numbers as bycatch in fisheries using bottom trawls or longlines (Compagno, 1984). In North America it is occasionally seen in small numbers as bycatch of tilefish longlines (Castro, unpublished).

Essential Fish Habitat for Sevengill Shark (Figure B.103):

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults:** At this time, available information is insufficient for the identification of EFH for this life stage.

Sixgill shark (*Hexanchus griseus*) One of the largest sharks, the sixgill is a common, bottom-dwelling, species usually reported from depths of 180 to 1,100 m, in deep, tropical, and temperate waters throughout the world (Castro, 1983). It often comes close to the surface at night, where it may take longlines set for other species. Juveniles stray into very shallow cool waters.

Reproductive potential: Very few mature sixgill sharks have been examined by biologists; thus the reproductive processes are poorly known. Ebert (1986) reported a 421-cm TL female to be gravid with term embryos. Harvey-Clark (1995) stated that males mature at 325 cm TL, without providing any evidence for this. The species has not been aged. It is probably long-lived, as the Greenland shark, another deep-water giant shark. The pups measure 60 to 70 cm TL at birth. Litters are large - up to 108 pups have been reported (Castro, 1983). Juveniles are often caught in coastal waters, suggesting that the nurseries are in waters much shallower than those inhabited by the adults. Nothing else is known about its nurseries. Additional life history information can be found in Ebert (2002) and McFarlane *et al*. (2002).

Impact of fisheries: Although juveniles are common in deep continental shelf waters and often enter coastal waters, the adults are seldom taken (Springer and Waller, 1969; Ebert, 1986). Apparently, adults are in waters deeper than those regularly fished, or perhaps these very large animals break the gear and escape. Thus, the very deep habitat of the adults or perhaps their large size seems to convey some measure of protection from most fisheries. According to Harvey-Clark (1995), in 1991 the sixgill shark became the target of a directed, subsidized, longline fishery off British Columbia, Canada. At about the same time, the species also became of interest as an ecotourism resource, with several companies taking diving tourists out to watch sixgill sharks in their environment. The fishery was unregulated and lasted until 1993, when the commercial harvest of sixgill sharks was discontinued due to conservation and management concerns. According to Harvey-Clark (1995), diver observations of sharks decreased in 1993, and it was unclear at the time whether the fishery or the ecotourism could be sustained. It is difficult to evaluate the vulnerability of the sixgill shark because of the lack of fisheries or landings data. The only fishing operations on record collapsed in a few years, suggesting that the species may be very vulnerable to overfishing.

Essential Fish Habitat for Sixgill Shark (Figure B.104):

- **Neonate:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Juveniles:** At this time, available information is insufficient for the identification of EFH for this life stage.

- **Adults:** At this time, available information is insufficient for the identification of EFH for this life stage.

B.1.5.2 Mackerel Shark

Longfin mako shark (*Isurus paucus*) This is a deep dwelling lamnid shark found in warm waters. The species was not described until 1966 and it is very poorly known.

Reproductive potential: There is very little data on the reproductive processes of the longfin mako. Litters consist of two to eight pups, which may reach 120 cm TL at birth (Castro, unpublished).

Impact of fisheries: The longfin mako is a seasonal bycatch of the pelagic tuna and swordfish fisheries. Possession of this species in Atlantic waters of the United States is now prohibited.

***Essential Fish Habitat for Longfin Mako Shark*:**

Note: At this time, insufficient data is available to differentiate EFH by size classes, therefore, EFH is the same for all life stages.

- **Neonate (≤149 cm TL):** Off the northeast U.S. coast from the 100 m isobath out to the EEZ boundary, from south Georges Bank to 35° N; from 35° N south to 28.25° N off Cape Canaveral, FL, from the 100 m isobath to the 500 m isobath; from 28.25° N south around peninsular Florida and west to 92.5° W in the Gulf of Mexico, from the 200 m isobath to the EEZ boundary (Figure B.105).

- **Juveniles (150 to 244 cm TL):** (Identical to neonate EFH) Off the northeast U.S. coast from the 100 m isobath out to the EEZ boundary, from south Georges Bank to 35° N; from 35° N south to 28.25° N off Cape Canaveral, FL, from the 100 m isobath to the 500 m isobath; from 28.25° N south around peninsular Florida and west to 92.5° W in the Gulf of Mexico, from the 200 m isobath to the EEZ boundary (Figure B.106).

- **Adults (≥245 cm TL):** (Identical to neonate EFH) Off the northeast U.S. coast from the 100 m isobath out to the EEZ boundary, from south Georges Bank to 35° N; from 35° N south to 28.25° N off Cape Canaveral, FL, from the 100 m isobath to the 500 m isobath; from 28.25° N south around peninsular Florida and west to 92.5° W in the Gulf of Mexico, from the 200 m isobath to the EEZ boundary (Figure B.107).

Porbeagle (*Lamna nasus*) The porbeagle is a lamnid shark common in deep, cold temperate waters of the north Atlantic, south Atlantic and south Pacific Oceans. It is highly esteemed for its flesh. There have been fisheries for this species in the north Atlantic for many years.

Reproductive potential: Very little is known about its reproductive processes. Aasen (1963) estimated that maturity was reached at 150 to 200 cm TL for males and 200 to 250 cm TL for females. Castro (year or unpublished?) estimated that porbeagles reach 20 years of age and possibly 30. Shann (1911) reported an embryo 61 cm TL, and estimated that porbeagles were probably born at about 76 cm TL. Bigelow and Schroeder (1948) recorded a free swimming specimen at 76 cm TL. Gauld (1989) gave 3.7 as the mean number of embryos in a sample of 12 females. The frequency of reproduction is not known. According to Aasen (1963), the porbeagle probably reproduces annually, but there is no evidence to support this claim. The nurseries are probably in continental shelf waters. More recent life history information can be found in Francis and Stevens (2000), Jensen *et al*. (2002), Joyce *et al.* (2002), Natanson *et al.* (2002), Campana and Joyce (2004), and Francis and Duffy (2005).

Impact of fisheries: The porbeagle is presently targeted in northern Europe and along the northeast coast of North America. Whether the porbeagles in the north Atlantic constitute one or more separate stocks is not known. A small porbeagle fishery resumed in the early 1990s in the northeastern United States, after being practically non-existent for decades. Intensive fisheries have depleted the stocks of porbeagles in a few years wherever they have existed, demonstrating that the species cannot withstand heavy fishing pressure.

***Essential Fish Habitat for Porbeagle Shark*:**

- **Neonate (≤79 cm TL):** From the 100 m isobath to the EEZ boundary from offshore Cape May, NJ, approximately 39° N to approximately 42° N (west of Georges Bank) (Figure B.108).

- **Juveniles (80 to 209 cm TL):** From the 200 m isobath to the EEZ boundary; from offshore Great Bay, approximately 38° N to approximately 42° N (west of Georges Bank) (Figure B.109).

- **Adults (≥210 cm TL):** From offshore Portland, ME south to Cape Cod, MA along the 100 m isobath out to the EEZ boundary and from Cape Cod south to the 2,000 m isobath out to the EEZ boundary (Figure B.110).

Shortfin mako shark (*Isurus oxyrinchus*) The shortfin mako is found in warm and warm-temperate waters throughout all oceans. It is an oceanic species at the top of the food chain, feeding on fast-moving fishes such as swordfish, tuna, and other sharks (Castro, 1983). It is considered one of the great game fish of the world, and its flesh is considered among the best to eat.

Reproductive potential: According to Pratt and Casey (1983), females mature at about 7 years of age. Cailliet *et al.* (1983) estimated the von Bertalanffy parameters (*n*= 44) for the shortfin as: L_∞ = 3210 mm, K= .072, and t_o= -3.75. Cailliet and Mollet (1997) estimated that a female mako lives for approximately 25 years, matures at four to six years, has a two-year reproductive cycle, and a gestation period of approximately 12 months. The litters range from 12 to 20 pups, although only a handful have been examined (Castro, unpubl.). There is circumstantial evidence that the nursery areas are in deep tropical waters. The life span of the species has been estimated at 11.5 years (Pratt and Casey, 1983). Additional life history information can be found in Stillwell and Kohler (1982), Pratt and Casey (1983), Heist *et al.* (1996), Mollet *et al.* (2000), Campana *et al.* (2002), Estrada *et al.* (2003), Francis and Duffy (2005), Loefer *et al.* (2005), and MacNeil *et al.* (2005).

Impact of fisheries: The shortfin mako is a common bycatch in tuna and swordfish fisheries. Because of their high market value, shortfin mako are usually the only sharks retained in some pelagic fleets with high shark bycatch rates. Off the northeast coast of North America, most of the catch consists of immature fish (Casey and Kohler, 1992). The index of abundance for shortfin makos in the commercial longline fishery off the Atlantic coast of the United States shows a steady decline (Cramer, 1996a). The few indices available (ICES, 1995; Cramer, 1996a; Holts *et al.*, 1996) indicate substantial population decreases. Because the species is commonly caught in widespread swordfish and tuna operations, it is reasonable to assume that similar decreases are occurring in areas for which there are limited data.

***Essential Fish Habitat for Shortfin Mako*:**

- **Neonate (≤85 cm TL):** Between the 50 and 2,000 m isobaths from Cape Lookout, NC, approximately 35° N, north to just southeast of Georges Bank (approximately 42° N and 66° W) to the EEZ boundary; and between the 25 and 50 m isobaths from offshore the Chesapeake Bay (James River) (North Carolina/Virginia border) to a line running west of Long Island, NY to just southwest of Georges Bank, approximately 67° W and 41° N (Figure B.111).

- **Juveniles (108 to 262 cm TL):** Between the 25 and 2,000 m isobaths from offshore Onslow Bay, NC north to Cape Cod, MA; and extending west between 38° N and 41.5° N to the EEZ boundary (Figure B.112).

- **Adults (≥263 cm TL):** Between the 25 and 2,000 m isobaths from offshore Cape Lookout, NC north to Long Island, NY; and extending west between 38.5° N and 41° N to the EEZ boundary (Figure B.113).

B.1.5.3 Requiem Sharks

Blue shark (*Prionace glauca*) One of the most common and widest-ranging of sharks, the blue shark is cosmopolitan in tropical, subtropical and temperate waters. It is a pelagic species that inhabits clear, deep, blue waters, usually in temperatures of 10° to 20° C, at depths greater than 180 m (Castro, 1983). Its migratory patterns are complex and encompass great distances, but are poorly understood. The biology, migrations, and the impact of fisheries on the blue shark must be considered on the basis of entire ocean basins. Males and females are known to segregate in many areas (Strasburg, 1958; Gubanov and Grigoryev, 1975). Strasburg (1958) showed that blue sharks are most abundant in the Pacific between latitudes of 40° N and 50° N.

Reproductive potential: Although some authors have examined very large numbers of blue sharks, the data on its size at maturity are imprecise. This may be due to poor criteria for maturity, incomplete samples, samples that did not include animals of all sizes, or some peculiarities of the blue shark. Pratt (1979) used different criteria for determining maturity of males and gave a range of 153 to 183 cm FL for male maturity, but when he used the standard criterion of clasper calcification, he observed that the males reached maturity at 183 cm FL (218 cm TL). Bigelow and Schroeder (1948) suggested that females mature at 213 to 243 cm TL. Strasburg (1958) stated that the smallest gravid female seen by him measured 214 cm TL. Nakano (1994) used data from 105,600 blue sharks and stated that females matured at 140 to160 cm (166 and 191 cm TL, using the regression of Pratt), and males at 130 to 160 cm PCL, based on clasper development.

This is probably the most prolific of the larger sharks; litters of 28 to 54 pups have been reported often (Bigelow and Schroeder, 1948; Pratt, 1979), but up to 135 pups in a litter have also been reported (Gubanov and Grigoryev, 1975). Nakano (1994) observed 669 pregnant females in the North Pacific and stated that the number of embryos ranged from one to 62, with an average of 25.6 embryos. Strasburg (1958) gave the birth size as 34 to 48 cm TL. Suda (1953) examined 115 gravid females from the Pacific Ocean and concluded that gestation lasts nine months and that birth occurs between December and April. Pratt (1979) examined 19 gravid females from the Atlantic and used data from 23 other Atlantic specimens to arrive at a gestation period of 12 months. Nakano (1994) stated that gestation lasts about a year, based on length frequency histograms, but did not state how many gravid animals had been observed nor showed any data. The length of the reproductive cycle is believed to be annual. Nakano (1994) gave the age at maturity as four or five years for males and five or six years for females, based on growth equations. According to Cailliet *et al*, (1983), blue sharks become reproductively mature at six or seven years of age and may reach 20 years. The nursery areas appear to be in open oceanic waters in the higher latitudes of the range. Strasburg (1958) attributed the higher CPUE in the 30° N to 40° N zone of the Pacific Ocean in summer to the presence of newborn blue sharks, and commented on the absence of small blue sharks in the warmer parts of the range. Nakano (1994) also stated that parturition occurred in early summer between latitudes of 30° N to 40° N of the Pacific Ocean. Additional life history and ecological information can be found in Kenney et al. (1985), Estrada et al. (2003), and Skomal and Natanson (2003).

Impact of fisheries: Although finning is now prohibited in U.S. Atlantic waters, blue sharks have historically been finned and discarded because of the low value of their flesh. Large numbers of blue sharks are caught and discarded yearly in pelagic tuna and swordfish fisheries. The blue shark is one of the most abundant large vertebrates in the world, yet it may be vulnerable to overfishing because it is caught in tremendous numbers as bycatch in numerous longline fisheries. Preliminary catch rate information for some areas suggests that this species may be declining.

***Essential Fish Habitat for Blue Shark*:**

- **Neonate (≤60 cm TL):** North of 40° N from Manasquan Inlet, NJ to Buzzards Bay, MA in waters from 25 m to the EEZ boundary (Figure B.114).

- **Juveniles (61 to 183 cm TL):** From 45°N (offshore Cape Hatteras, NC) in waters from the 25 m isobath to the EEZ boundary (Figure B.115).

- **Adults (≥184 cm TL):** From 45°N (offshore Cape Hatteras, NC) in waters from the 25 m isobath to the EEZ boundary; extending around Cape Cod, MA to include the southern part of the Gulf of Maine (Figure B.116).

<u>Oceanic whitetip shark (*Carcharhinus longimanus*)</u> The oceanic whitetip is one of the most common large sharks in warm oceanic waters (Castro, 1983). It is circumtropical and nearly ubiquitous in water deeper than 180 m and warmer than 21° C.

Reproductive potential: Both males and females appear to mature at about 190 cm TL (Bass *et al.*, 1973). The young are born at about 65-75 cm TL (Castro, 1983). The number of pups per litter ranges from two to ten, with a mean of six (Backus *et al.*, 1956; Guitart Manday, 1975). The length of the gestation period has not been reported, but it is probably ten to 12 months as for most large carcharhinids. The reproductive cycle is believed to be biennial (Backus *et al.*, 1956). Although the location of nurseries has not been reported, preliminary work by Castro indicates that very young oceanic whitetip sharks are found well offshore along the southeastern United States in early summer, suggesting offshore nurseries over the continental shelves. Additional life history information can be found in Lessa *et al.* (1999a), Lessa *et al.* (1999c), and Whitney *et al.* (2004).

Impact of fisheries: Large numbers of oceanic whitetip sharks are caught as bycatch each year in pelagic tuna and swordfish fisheries. Strasburg (1958) reported that the oceanic whitetip shark constituted 28 percent of the total shark catch in exploratory tuna longline fishing south of 10° N in the central Pacific Ocean. According to Berkeley and Campos (1988), oceanic whitetip sharks constituted 2.1 percent of the shark bycatch in the swordfish fishery along the east coast of Florida in 1981 to1983. Guitart Manday (1975) demonstrated a marked decline in the oceanic whitetip shark landings in Cuba from 1971 to1973. The oceanic whitetip shark is probably vulnerable to overfishing because of its limited reproductive potential, and because it is caught in large numbers in various pelagic fisheries and in directed fisheries. There are no data on populations or stocks of the species in any ocean.

***Essential Fish Habitat for Oceanic Whitetip Shark*:**

- **Neonate (≤83 cm TL):** In the vicinity of the Charleston Bump, from the 200 m isobath to the 2,000 m isobath, between 32.5° N and 31° N (Figure B.117).

- **Juveniles (84 to 136 cm TL):** Offshore the southeast U.S coast from 32° N to 26° N, from the 200 m isobath to the EEZ boundary, or 75° W, whichever is nearer (Figure B.118).

- **Adults (≥137 cm TL):** Offshore the southeast U.S. coast from the 200 m isobath out to the EEZ boundary, from 36° N to 30° N; also, in the Caribbean, south of the U.S. Virgin Islands, from east of 65° W to the EEZ boundary or the 2,000 m isobath, whichever is nearer (Figure B.119).

B.1.5.4 Thresher Sharks

<u>Bigeye thresher shark (*Alopias superciliosus*)</u> The bigeye thresher is cosmopolitan in warm and warm-temperate waters. It is a deep-water species which ascends to depths of 35 to 150 m at night. It feeds on squid and small schooling fishes (Castro, 1983), which it stuns with blows from its tail. This is one of the larger sharks, reaching up to 460 cm TL (Nakamura, 1935).

Reproductive potential: Males mature at about 270 cm TL and females at about 340 cm TL (Moreno and Moron, 1992). Litters consist of two pups, one in each uterus. Gestation probably lasts about a year, but there is no evidence to support this. The length of the reproductive cycle and the location of nursery areas are unknown. Additional life history information can be found in Chen *et al.* (1997), Liu *et al.* (1998), and Weng and Block (2004).

Impact of fisheries: The bigeye thresher is often caught as bycatch of swordfish fisheries. A shark will often dislodge several baits before impaling or hooking itself. The flesh and fins of the bigeye thresher shark are of poor quality, thus it is usually discarded dead in swordfish and tuna fisheries. Possession of this species in Atlantic waters of the United States is now prohibited.

***Essential Fish Habitat for Bigeye Thresher Shark*:**

- **Neonate (≤116 cm TL):** At this time, available information is insufficient to identify EFH for this life stage.

- **Juveniles (117 to 340 cm TL):** Offshore North Carolina, from 36.5° N to 34° N, between the 200 and 2,000 m isobaths (Figure B.120).

- **Adults (≥341 cm TL):** Offshore North Carolina, from 35.5° N to 35° N, between the 200 and 2,000 m isobaths (Figure B.121).

<u>Thresher shark (*Alopias vulpinus*)</u> The common thresher shark is cosmopolitan in warm and temperate waters. It is found in both coastal and oceanic waters, but according to Strasburg (1958) it is more abundant near land. It is a large shark that uses its tremendously large tail to hit and stun the small schooling fishes upon which it feeds.

Reproductive potential: According to Strasburg (1958), females in the Pacific mature at about 315 cm TL. According to Cailliet and Bedford (1983), males mature at about 333 cm TL. Cailliet and Bedford (1983) stated that the age at maturity ranges from three to seven years. Litters consist of four to six pups, which measure 137 to 155 cm TL at birth (Castro, 1983). According to Bedford (1985), gestation lasts nine months and female threshers give birth annually every spring (March to June). New age and growth information can be found in Gervelis (2005).

Impact of fisheries: Thresher sharks are caught in many fisheries. The most detailed data available are for the California drift gillnet fishery which started in 1977 for thresher sharks, shortfin makos, and swordfish, extending from the Mexican border to San Francisco, CA

(Hanan, 1984). After 1982, the fishery expanded northward yearly, ultimately reaching the states of Oregon and Washington (Cailliet *et al.*, 1991). Thresher shark landings peaked in 1982, and the thresher shark resource quickly began to decline after that year (Bedford, 1987). Catches have continued to decline and the average size has remained small in spite of numerous regulations restricting fishing (Hanan *et al.*, 1993). Cailliet *et al.*, (1991) summarized the condition of the resource by stating, "The coastwise fishery for this once abundant shark is now a thing of the past." Legislation passed in 1986 limited the directed thresher shark fishery in the Pacific. Off the U.S. Atlantic coast, the CPUE has shown a considerable decline (Cramer, 1996).

***Essential Fish Habitat for Thresher Shark*:**

- **Neonate (≤175 cm TL):** Offshore Long Island, NY and southern New England in the northeastern United States, in pelagic waters deeper than 50 m, between 70° W and 73.5° W, south to 40° N (Figure B.122).

- **Juveniles (176 to 388 cm TL):** (Identical to neonate EFH): Offshore Long Island, NY and southern New England in the northeastern United States, in pelagic waters deeper than 50 m, between 70° W and 73.5° W, south to 40° N (Figure B.123).

- **Adults (≥389 cm TL):** (Identical to neonate EFH) Offshore Long Island, NY and southern New England in the northeastern United States, in pelagic waters deeper than 50 m, between 70° W and 73.5° W, south to 40° N (Figure B.124).

Table B.1 1999 FMP size ranges for different life stages of sharks.

	Map Neonates/ early juveniles TL (cm) ≤ or range	Text Pup size TL (cm)	Map Late Juveniles/ subadults TL (cm)	Text: M maturity TL (cm) ≥ or range	Text: F maturity TL (cm) ≥ or range	Map Adults TL (cm) ≥ or range
Large Coastal Sharks						
Cetorhinidae Cetorhinus maximus	N/A (text 270)	180	271-810	460-610	810-980	810
Sphyrnidae Sphyrna mokarran	N/A (text 70)	67	71-220	210-258	210-220	221
S. lewini	45	38-45	46-249	140-185	200	250
S. zygaena	N/A		N/A			N/A
Lamnidae Carcharodon carcharias	(text 175)	120-150	175-479	370-340	370-340	(text 480)
Ginglymostomatidae Ginglymostoma cirratum	13-60	30	61-225	225	225	226
Carcharhinidae Carcharhinus altimus	70-155	70	156-220	213	221	N/A (text 221)
C. limbatus	99 (text 100)	55-60	100-155 (text 100-156)	139-145	153-156	156
C. leucas	110	75	111-225	210-220	225	226
C. perezi	N/A (text 105)	70	106-199	170	200	N/A (text 200)
C. obscurus	115	85-100	116-300	290	300	301

	Map Neonates/ early juveniles TL (cm) ≤ or range	Text Pup size TL (cm)	Map Late Juveniles/ subadults TL (cm)	Text: M maturity TL (cm) ≥ or range	Text: F maturity TL (cm) ≥ or range	Map Adults TL (cm) ≥ or range
C. galapagensis	N/A	80	N/A	205-239	215-245	N/A (text 215)
Negaprion brevirostris	90	64	91-228	228	228	229
C. brachyurus	N/A (text 100)	60-70	N/A (text 101-230)	200-220	247 (text 231)	N/A
C. signatus	N/A (text 100)	68-72	101-178	N/A	178	179
C. plumbeus	90	60	90-179	180	180	180
C. falciformis	55-97	75-80	98-231	225	232-245	N/A (text 232)
C. brevipinna	90	60-75	91-154	130	150-155	155
Galeocerdo cuvier	120	68-85	121-289	290	290	290
Odontaspididae Odontaspis noronhai	N/A	N/A	N/A	N/A	N/A	N/A
Carcharias taurus	125	100	N/A (text 126-220)	190-195	220-229	221
Rhincodontidae Rhincodon typus	N/A	N/A	N/A	N/A	N/A	N/A
Small Coastal Sharks **Squatinidae** Squatina dumeril	50	28-30	51-105	90-105	90-105	106

	Map Neonates/ early juveniles TL (cm) ≤ or range	Text Pup size TL (cm)	Map Late Juveniles/ subadults TL (cm)	Text: M maturity TL (cm) ≥ or range	Text: F maturity TL (cm) ≥ or range	Map Adults TL (cm) ≥ or range
Sphyrnidae Sphyrna tiburo	50	27-35	51-84	70	85	85
Carcharhinidae Rhizoprionodon terraenovae	17-55	29-32	56-84	65-80	85-90	85
Carcharhinus acronotus	35-75	50	76-99	100	100	100
R. porosus	N/A	N/A	N/A	N/A	N/A	N/A
C. isodon	90	48-58	91-135	130	135	136
C. porosus	N/A	N/A	N/A	N/A	N/A	N/A
Pelagic Sharks **Hexanchidae** Hexanchus vitulus	N/A	N/A	N/A	N/A	N/A	N/A
Heptranchias perlo	N/A	25	N/A	85-90	85-90	N/A
Hexanchus griseus	N/A	60-70	N/A	325	421	N/A
Lamnidae Isurus paucus	no sizes	N/A	no sizes	N/A	N/A	no sizes
Lamna nasus	50-100	76	101-224	150-200	200-250	225-280
I. oxyrinchus	95	N/A	96-279	N/A	N/A	280

	Map Neonates/ early juveniles TL (cm) ≤ or range	Text Pup size TL (cm)	Map Late Juveniles/ subadults TL (cm)	Text: M maturity TL (cm) ≥ or range	Text: F maturity TL (cm) ≥ or range	Map Adults TL (cm) ≥ or range
Carcharhinidae Prionace glauca	75	34-48	76-220	218	166-243	221
Carcharhinus longimanus	115	65-75	116-190	190	190	191
Alopiidae Alopias superciliosus	N/A (text 135)	N/A	136-339	270	340	340
A. vulpinus	200	137-155	200-319	333	315	320

Table B.2 Size ranges used in this Amendment for mapping distribution data for different life stages of sharks.

	Neonates max embyro+10% TL (cm) ≤	**Literature** embryo size range or max embryo size in term females **TL (cm)**	**Juveniles** TL (cm)	**Literature** M maturity TL (cm) ≥ or range	**Literature** F maturity TL (cm) ≥ or range	**Adults** F 1st mat TL (cm) ≥
Large Coastal Sharks						
Cetorhinidae Cetorhinus maximus	182	165** Castro 83	183-809		810 Castro 99	810
Sphyrnidae Sphyrna mokarran	74	67.5 Clarke & von Schmidt 65	75-209		210-220 Steven & Lyle 89	210
S. lewini	50	39-51 Clarke 71, Carlson 2002	51-227		228 Steven & Lyle 89	228
S. zygaena	66	60** NMFS upubl.	67-283		284 Castro & Mejuto 95	284
Lamnidae Carcharodon carcharias	166	151 Uchida *et al* 96	167-479		480 Uchida *et al* 96	480
Ginglymostomatidae Ginglymostoma cirratum	N/A*	28-30.5 Castro 00	37-221	214-214.6 Castro 00	222-232 Castro 00	222
Carcharhinidae Carcharhinus altimus	67	61 Springer 60	68-225		226 Springer 60	226
C. limbatus	66	45-70***	67-149	125-140	141-152	156
C. leucas	83	55-85 Clarke & von Schmidt 65	84-225		226 Branstetter & Stiles 87	226
C. perezi	66	60**** Castro 83	67-199		200 Compagno 84	200
C. obscurus	110	85-100 Castro 83	111-299	290 Castro 83	300 Castro 83	300

	Neonates **max embyro+10%** **TL (cm)** **≤**	**Literature** embryo size range or max embryo size in term females **TL (cm)**	**Juveniles** **TL (cm)**	**Literature** **M maturity** **TL (cm)** **≥ or range**	**Literature** **F maturity** **TL (cm)** **≥ or range**	**Adults** **F 1st mat** **TL (cm)** **≥**
C. galapagensis - NO DATA (all Atlantic data off Bermuda)	N/A	81 Wetherbee *et al* 96	N/A		215 Wetherbee *et al* 96	N/A
Negaprion brevirostris	68	62 Clarke & von Schmidt 65	69-235		236 Clarke & von Schmidt 65	236
C. brachyurus - NO DATA	N/A	N/A	N/A	N/A	N/A	N/A
C. signatus	70	55-75 Raschi *et al* 82	71-199	185-190	200-205	200
C. plumbeus	70	44.2-64 Castro 93b	71-147	139-153 Merson 98	148-175 Merson 98	148
C. falciformis	85	77 Bonfil *et al* 93	86-231		232 Branstetter 87 Bonfil *et al* 93	232
C. brevipinna	71	60-75 Branstetter 81	72-184		185	185
Galeocerdo cuvier	90	82 NMFS upubl.	91-296		297 Clarke & von Schmidt 65	297
Odontaspididae Odontaspis noronhai - NO DATA	N/A	N/A	N/A	N/A	N/A	N/A
Carcharias taurus	117	106 Gilmore *et al* 83	118-236		236.6 Gilmore *et al* 83	237
Rhincodontidae Rhincodon typus LITTLE DATA, ONE MAP	N/A		N/A			N/A
Small Coastal Sharks **Squatinidae** Squatina dumeril	28	26****	26-82	84	89	89

	Neonates **max embyro+10%** **TL (cm)** **≤**	**Literature** embryo size range or max embryo size in term females **TL (cm)**	**Juveniles** **TL (cm)**	**Literature** **M maturity** **TL (cm)** **≥ or range**	**Literature** **F maturity** **TL (cm)** **≥ or range**	**Adults** **F 1st mat** **TL (cm)** **≥**
Sphyrnidae Sphyrna tiburo	38	22-30*****	40-66	66-83	77-94 Parsons 93	77
Carcharhinidae Rhizoprionodon terraenovae	40	36 Parsons 83	41-75	73-75	70-85 Loefer & Sedberry 03 Carlson and Baremore 03	76
Carcharhinus acronotus	48	38-44	95	108	115 Hazin *et al* 02	115
R. porosus - NO DATA	N/A					N/A
C. isodon	64	43.7-58 Castro 93a & 93b	65-120	119-130	123-132	123
C. porosus LITTLE DATA, ONE MAP	N/A	30	30-70	71-75	70	70
Pelagic Sharks **Hexanchidae** Hexanchus vitulus LITTLE DATA, ONE MAP	N/A		N/A		158 Springer & Waller 69	N/A
Heptranchias perlo LITTLE DATA, ONE MAP	N/A		N/A		89-93 Compagno 84	N/A
Hexanchus griseus LITTLE DATA, ONE MAP	N/A		N/A		421 Ebert 86	N/A
Lamnidae Isurus paucus	149	135.5 NMFS upubl	150-244		245 Guitart-Manday 66	245
Lamna nasus	79	72 Jensen *et al* 02	80-209		210 Jensen *et al* 02	210
I. oxyrinchus	85	77	108-262		263	263

	Neonates **max embyro+10%** **TL (cm)** **≤**	**Literature** embryo size range or max embryo size in term females **TL (cm)**	**Juveniles** **TL (cm)**	**Literature** **M maturity** **TL (cm)** **≥ or range**	**Literature** **F maturity** **TL (cm)** **≥ or range**	**Adults** **F 1st mat** **TL (cm)** **≥**
		Duffy & Francis 01			Mollet *et al* 00	
Carcharhinidae						
Prionace glauca	60	54.4 Pratt 1979	61-183		184 Williams 1977	184
C. longimanus	83	75 Seki *et al* 98	84-136		137 Seki *et al* 98	137
Alopiidae						
Alopias superciliosus	116	105.5 Gilmore 83	117-340		341 Moreno & Moron 92	341
A. vulpinus	175	159 Moreno *et al* 89	176-388		389 Moreno *et al* 89	389

*nurse sharks below 37 cm TL in the 1999 FMP database were actually embryos and not free swimming sharks
**confirmed report of the smallest free swimming individual, not an embryo
***Castro has seen one litter with sizes beyond the above range (70.4-74.2 cmTL). This litter was not included because it was unusually large for this species.
****based on estimated size at birth
*****average of three full term embryos from one female collected in Tampa Bay, FL

Table B.3 Blacktip shark (*Carcharinus limbatus*) Life History and Habitat Characteristics. From Amendment 1 to the FMP.

Life Stage	Species Distributions		Habitat Characteristics				Source*
	Location	Season	Temp (°C)	DO (mg/l)	Sal (ppt)	Depth (m)	
			B = bottom and S = surface				
Neonate and young of the year (YOY)	Off Yaupon and Holden Beaches, NC	summer primary nursery	no data	no data	no data	no data	Jensen et al (2002)
	SC estuarine and nearshore waters	summer primary nursery, pupping late May/early June to early July	no data	no data	no data	no data	Ulrich and Riley, SEAMAP (2002)
	GA estuarine waters	summer primary nursery (June-Sept)	21-30.4	4.35-6.08	22-36.1	0.5-11.6	Belcher and Shierling Gurshin
	Yankeetown to 10,000 Islands on the west coast of Florida, Cape Canaveral on the east coast of FL and the Florida Keys. Also found in the Marquesas Islands west of the Florida Keys	summer primary nursery (June-Oct); FL Keys – found year round; Marquesas Islands – overwintering grounds	19.1-33.6	3.28-9.26	15.8-41.1	0.9-12.5	Hueter and Tyminski, Michel and Steiner
	Northeast Gulf of Mexico (Apalachee Bay, Apalachicola Bay, St. Joseph Bay, Crooked Island Sound and St Andrew Bay)	summer primary nursery	22.5-31.4	3.6-7	19-38	2.1-6	Carlson
	From the mouth of St Louis Bay, MS to the tip of Fort Morgan, AL	summer primary nursery	B 29.3 S 30.6	B 6.6 S 6.6	B 20.3 S 17.8	3.4	Parsons (env. parameters are average values
	Terrebonne/Timbalier Bay System, LA	summer primary nursery (May-Sept)	22.6-32.4	no data	18-34.7	1.2-5.2	Neer et al
	All major bay systems along the Gulf coast of Texas from Sabine Lake to Lower Laguna Madre	summer primary nursery (May-Sept)	16.7-34	no data	0-54	no data	Jones and Grace

Life Stage	Species Distributions		Habitat Characteristics				Source*
Juvenile	Nearshore and inshore waters from Cape Hatteras and Core Sound to Holden Beach, NC	summer secondary nursery	no data	no data	no data	no data	Jensen et al.
	SC estuarine and nearshore waters	secondary summer and overwintering nursery (May-Dec)	18-24	no data	no data	no data	Ulrich and Riley, SEAMAP, Hueter and Tyminski
	GA estuarine waters	summer secondary nursery (June-Sept)	21-30.4	4.35-6.08	22-36.1	0.5-11.6	Belcher and Shierling, Gurshin
	Yankeetown to 10,000 Islands on the west coast of Florida, Cape Canaveral on the east coast of FL and the Florida Keys	summer secondary nursery (March-Nov); warm water effluents of Tampa Bay and Yankeetown power plants during winter months	20.8-33.6	2-8.3	27-38	0.7-5	Hueter and Tyminski, Michel and Steiner
		summer secondary nursery	16-32.5	1.9-8.3	19-38	0.7-6.4	
	Northeast Gulf of Mexico (Apalachee Bay, Apalachicola Bay, St. Joseph Bay, Crooked Island Sound and St Andrew Bay)						Carlson
	north central Gulf of Mexico	summer secondary nursery	B 27.3-28.1	B 3.2-6.2	B 34.3-37	5.8-7.6	
	Coastal Alabama off Dauphin Island and Mobile Point	summer secondary nursery	B 28 S 28.8	B 6.3 S 6.9	B 19.4 S 17.7	3.1	
	From the mouth of St Louis Bay, MS to the tip of Fort Morgan, AL						Gurshin
		summer secondary nursery (April-Nov)	22.6-32.4	no data	18-34.7	1.2-5.2	
		summer secondary nursery					Parsons (env. parameters are average values)
	Terrebonne/Timbalier Bay System, LA						
	All major bay systems along the Gulf coast of Texas from Galveston Bay to Lower Laguna Madre, except Corpus Christi Bay						
							Neer et al
							Jones and Grace
Adult	Outer Banks of NC, St Augustine to Cape Canaveral, FL,		Unk	Unk	Unk	Unk	

* Contributing authors in: McCandless, C.T., H.L. Pratt Jr., and N.E. Kohler. 2002. Shark nursery grounds of the Gulf of Mexico and the East Coast waters of the United States: an overview. Authors and papers are cited separately in References section.

Table B.4 Dusky shark (*Carcharinus obscurus*) Life History and Habitat Characteristics.

Life Stage	Species Distributions		Habitat Characteristics				Source*
	Location	Season	Temp (°C)	DO (mg/l)	Sal (ppt)	Depth (m)	
			B = bottom and S = surface				
Neonate and young of the year (YOY)	Nearshore waters from Cape Hatteras to Bogue Banks and off Holden Beach, NC	Oct and Nov; pupping April and May off Holden beach	no data	no data	no data	no data	Jensen et al, SEAMAP
	SC coastal waters	transient or overwintering nursery (Nov)	18	no data	no data	no data	Ulrich and Riley
Juvenile	In the coastal waters of Martha's Vineyard, MA (off East and South Beaches of Chappaquiddick Island)	summer secondary nursery	17-24	no data	no data	4.8-19.2	Skomal
	Exposed nearshore waters in Virginia, rarely enter the estuaries (one juvenile female (79cm PCL) caught in lower Chesapeake Bay in August of 1990	summer secondary nursery	no data	no data	no data	no data	Grubbs and Musick
	Nearshore waters from Cape Hatteras to Holden Beach, NC	summer secondary and overwintering nursery grounds	18.1-22.2	no data	no data	4.3-15.5	Jensen et al, SEAMAP
	SC coastal waters	transient or overwintering nursery (Nov)	18	no data	no data	no data	Ulrich and Riley
Adult	Pelagic waters offshore the Virginia/North Carolina border and south to Fort Lauderdale, FL Nearshore waters beginning at the border of Georgia and Florida south to Fort Lauderdale	Migrations moving north-south with the seasons	Unk	Unk	Unk	Unk	

* Contributing authors in: McCandless, C.T., H.L. Pratt Jr., and N.E. Kohler. 2002. Shark nursery grounds of the Gulf of Mexico and the East Coast waters of the United States: an overview. Authors and papers are cited separately in References section.

Table B.5 Sandbar shark (*Carcharinus plumbeus*) Life History and Habitat Characteristics

Life Stage	Species Distributions		Habitat Characteristics				Source*
	Location	Season	Temp (°C)	DO (mg/l)	Sal (ppt)	Depth (m)	
			B = bottom and S = surface				
Neonate and young of the year (YOY)	Great Bay, NJ	summer primary nursery (pupping early July)	23.8	7.01	26.5	2.4	Merson and Pratt
	Delaware Bay (DE & NJ waters)	summer primary nursery (June-Oct with majority of pupping from late June to early July)	18-29.9	no data	18.3-30.4	0.9-16.6	McCandless et al
	Lower Chesapeake Bay, VA and the tidal creeks and lagoons along Virginia's Eastern Shore	summer primary nursery	17-28	no data	no data	no data	Grubbs and Musick
	In coastal waters from Cape Hatteras to Bogue Banks, off Holden Beach and in Pamlico Sound, NC	summer primary nursery (May-July); overwintering grounds off Cape Hatteras, NC (catches increase greatly in Oct and Nov)	no data	no data	no data	no data	Jensen et al, SEAMAP
	SC estuarine and nearshore coastal waters	summer primary nursery (May-Sept), with coastal waters also serving as overwintering grounds	no data	no data	no data	no data	Ulrich and Riley
	GA estuarine waters	summer primary nursery (June-Sept)	26.9-30.1	4-5.9	29.6-30.1	3.7-13.1	Belcher and Shierling
	Off Yankeetown, FL (N=3)	summer primary nursery	25-29	no data	20.4-25.4	2.4-3.7	Hueter and Tyminski
	Northeast Gulf of Mexico (Apalachicola Bay and Crooked Island	summer primary nursery	26.6-30.8	5-7.3	19-39	3-5.2	Carlson

Life Stage	Species Distributions		Habitat Characteristics				Source*
Juvenile	Cape Poge Bay, MA, around Chappaquiddick Island, MA (East and South Beaches), and off the south shore of Cape Cod, MA	summer secondary nursery (June -Oct)	20-24	no data	no data	2.4-6.4	Skomal
	Delaware Bay (DE & NJ waters)	summer secondary nursery (May-Oct)	15.5-30	no data	18.3-31.4	0.8-23	McCandless et al
	Lower Chesapeake Bay, VA and the tidal creeks and lagoons along Virginia's Eastern Shore	summer secondary nursery (May-Oct)	17-28	no data	no data	no data	Grubbs and Musick
	Coastal NC waters	summer secondary nursery; overwintering grounds off Cape Hatteras, NC	22.6-28.1	no data	no data	no data	Jensen et al, SEAMAP
	SC estuarine and coastal waters	summer secondary (April - Sept) and overwintering grounds (Dec)	15-28	no data	no data	no data	Ulrich and Riley, SEAMAP
	GA estuarine waters	summer secondary nursery (June-Sept)	26.9-30.1	4-5.9	29.6-30.1	3.7-13.1	Belcher and Shierling
	Northeast Gulf of Mexico (Apalachicola Bay and Crooked Island Sound)	summer secondary nursery	19.8-30.8	5-7.3	19-36	2.1-5.2	Carlson
	North central Gulf of Mexico (just north of Cat and Horn Islands, MS) (N=4)	summer secondary nursery	23.3-24.4	8-8.3	13.4-14.8	2.1	Parsons
	Upper Texas coast, LA coast, and Bulls Bay, SC	spring/summer secondary nursery	no data	no data	no data	no data	Hueter and Tyminski
Adult	Unk	Unk	Unk	Unk	Unk	Unk	

* Contributing authors in: McCandless, C.T., H.L. Pratt Jr., and N.E. Kohler. 2002. Shark nursery grounds of the Gulf of Mexico and the East Coast waters of the United States: an overview. Authors and papers are cited separately in References section.

Table B.6 Nurse shark (*Ginglymostoma cirratum*) Life History and Habitat Characteristics.

Life Stage	Species Distributions		Habitat Characteristics				Source*
	Location	Season	Temp (̊C)	DO (mg/l)	Sal (ppt)	Depth (m)	
			B = bottom and S = surface				
Neonate and young of the year (YOY)	Charlotte Harbor, FL and the Florida Keys	primary nursery	31.7	7.01	33.9	2.1	Hueter and Tyminski
Juvenile	Tampa Bay, Charlotte Harbor, 10,000 Islands Estuary and the Florida Keys Dry Tortugas, FL Northeast Gulf of Mexico (Apalachee Bay, Apalachicola Bay, and Crooked Island Sound)	secondary nursery (April-Nov) summer secondary nursery summer secondary nursery	17.5-32.9 no data 22.6-28.1	3.1-9.7 no data 5-8.3	28-38.5 no data 27-37	0.6-2.9 no data 3.5-6	Hueter and Tyminski, Michel and Steiner Pratt and Carrier Carlson
Adult	From tropical West Africa and the Cape Verde Islands in the east, and from Cape Hatteras to Brazil in the west. Littoral waters of the tropical and subtropical Atlantic, shallow water, often under coral reefs or rocks	Unk	Unk	Unk	Unk	Unk	

* Contributing authors in: McCandless, C.T., H.L. Pratt Jr., and N.E. Kohler. 2002. Shark nursery grounds of the Gulf of Mexico and the East Coast waters of the United States: an overview. Authors and papers are cited separately in References section.

Table B.7 Essential fish habitat maps by species.

TUNAS
Figure B.1 to B.3 Atlantic Albacore (*Thunnus alalunga*)
Figure B.4 to B.6 Atlantic Bigeye Tuna (*Thunnus obesus*)
Figure B.7 to B.9 Atlantic Bluefin Tuna (*Thunnus thynnus*)
Figure B.10 to B.12 Atlantic Skipjack (*Katsuwonus pelamis*)
Figure B.13 to B.15 Atlantic Yellowfin Tuna (*Thunnus albacares*)

SWORDFISH
Figure B.16 to B.18 Swordfish (*Xiphias gladius*)

BILLFISH
Figure B.19 to B.21 blue marlin (*Makaira nigricans*)
Figure B.22 to B.24 white marlin (*Tetrapturus albidus*)
Figure B.25 to B.27 sailfish (*Istiophorus platypterus*)
Figure B.28 to B.30 spearfish (*Tetrapturus pfluegeri*)

LARGE COASTAL SHARKS
Basking sharks - Cetorhnidae
Figure B.31 to B.33 basking shark (*Cetorhinus maximus*)
Hammerhead sharks - Sphyrnidae
Figure B.34 to B.36 great hammerhead (*Sphyrna mokarran*)
Figure B.37 to B.39 scalloped hammerhead (*S. lewini*)
Figure B.40 to B.42 smooth hammerhead (*S. zygaena*)
Mackerel sharks - Lamnidae
Figure B.43 to B.45 white shark (*Carcharodon carcharias*)
Nurse sharks - Ginglymostomatidae
Figure B.46 to B.48 nurse shark (*Ginglymostomatidae cirratum*)
Requiem sharks - Carcharhinidae
Figure B.49 to B.51 bignose shark (*Carcharhinus altimus*)
Figure B.52 to B.54 blacktip shark (*C. limbatus*)
Figure B.55 to B.57 bull shark (*C. leucas*)
Figure B.58 to B.60 Caribbean reef shark (*C. perezi*)
Figure B.61 to B.63 dusky shark (*C. obscurus*)
Figure B.64 to B.66 lemon shark (*Negaprion brevirostris*)
Figure B.67 to B.69 night shark (*C. signatus*)
Figure B.70 to B.73 sandbar shark (*C. plumbeus*)
Figure B.74 to B.76 silky shark (*C. falciformis*)
Figure B.77 to B.79 spinner shark (*C. brevipinna*)
Figure B.80 to B.82 tiger shark (*Galeocerdo cuvieri*)

Sand tiger sharks - Odontaspididae
Figure B.83 to B.85 sand tiger shark (*Odontaspis taurus*)

SMALL COASTAL SHARKS
Angel sharks - Squatinidae
Figure B.86 to B.88 Atlantic angel sharks (*Squatina dumerili*)
Hammerhead sharks - Sphyrnidae
Figure B.89 to B-91 bonnethead (*Sphyrna tiburo*)
Requiem sharks - Carcharhinidae
Figure B.92 to B-94 Atlantic sharpnose (*R.. terraenovae*)
Figure B.95 to B-97 blacknose shark (*C. acronotus*)
Figure B.98 to B-100 finetooth shark (*C. isodon*)
Figure B.101 smalltail shark (*C. porosus*)

PELAGIC SHARKS
Cow sharks - Hexanchidae
Figure B.102 bigeye sixgill shark (*Hexanchus vitulus*)
Figure B.103 sevengill shark (*Heptranchias perlo*)
Figure B.104 sixgill shark (*Hexanchus griseus*)
Mackerel sharks - Lamnidae
Figure B.105 to B.107 longfin mako (*Isurus paucus*)
Figure B.108 to B.110 porbeagle shark (*Lamna nasus*)
Figure B.111 to B.113 shortfin mako (*Isurus oxyrinchus*)
Requiem sharks - Carcharhinidae
Figure B.114 to B.116 blue shark (*Prionace glauca*)
Figure B.117 to B.119 oceanic whitetip shark (*C. longimanus*)
Thresher sharks - Alopiidae
Figure B.120 to B.121 bigeye thresher (*Alopias superciliosus*)
Figure B.122 to B.124 thresher shark (*A. vulpinus*)

Table B.8 List of abbreviations and acronyms for EFH data sources used in the maps.

Belcher	Belcher and Shierling 2002
Carlson	Carlson 2002
COASTSPAN	Cooperative Atlantic States Shark Pupping and Nursery Area Program
CSTP	Cooperative Shark Tagging Program
CTS	Cooperative Tagging System
Govoni	Govoni *et al*., 2003
Gurshin	Gurshin 2002
Jensen	Jensen *et al*., 2002
Jones/Grace	Jones and Grace 2002
Michel/ST	Michel and Steiner 2002
Mote	Mote Marine Laboratory
Neer	Neer *et al*., 2002
Parsons	Parsons 2002
POP	Pelagic Observer Program
SEAMAP	Southeast Area Monitoring and Assessment Program
SELL	Southeast Longline Survey
SOP	Shark Observer Program
Ulrich	Ulrich and Riley 2002

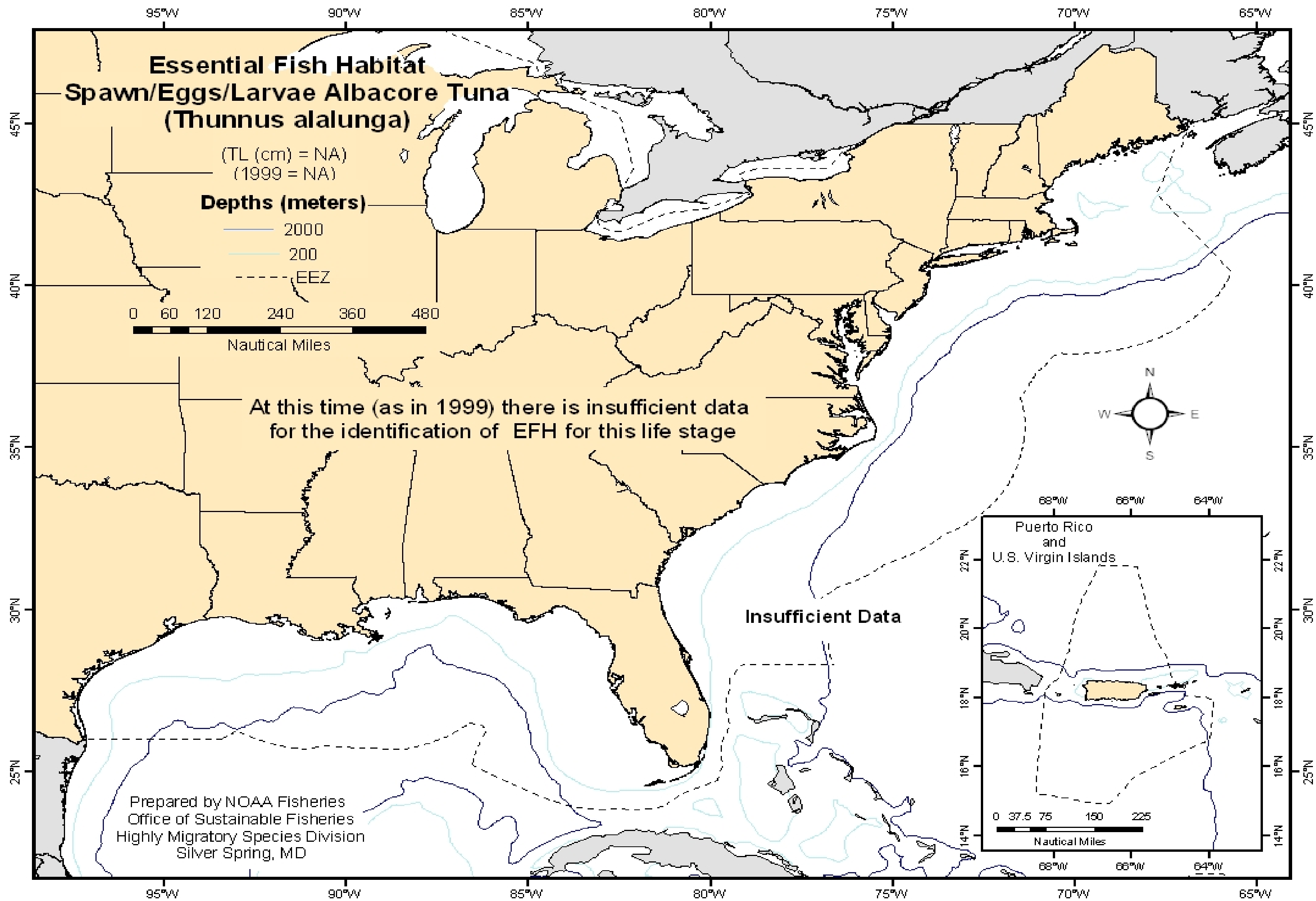

Figure B.1 **Atlantic Albacore Tuna: Spawning, Eggs, and Larvae.**

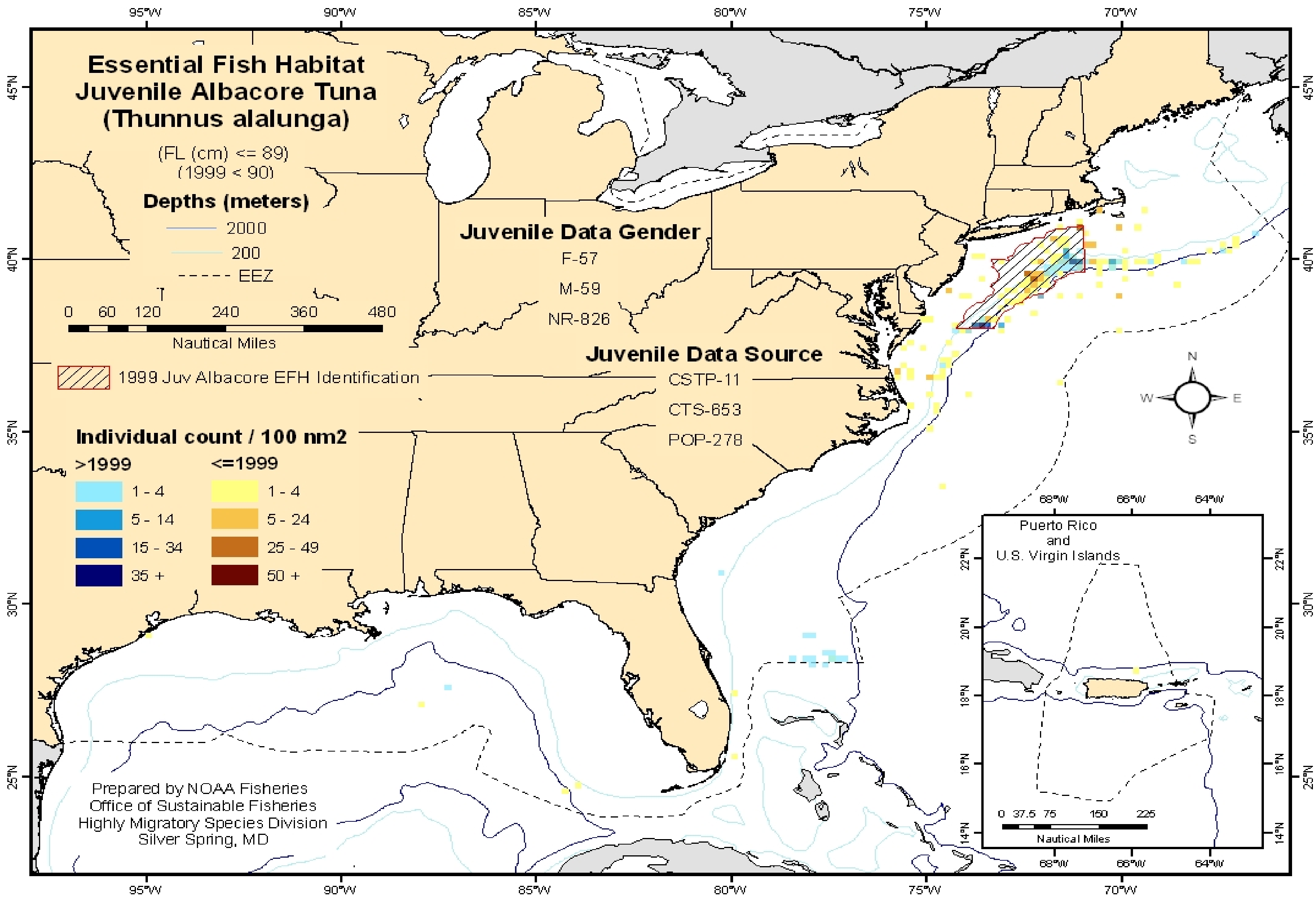

Figure B.2 Atlantic Albacore Tuna: Juvenile.

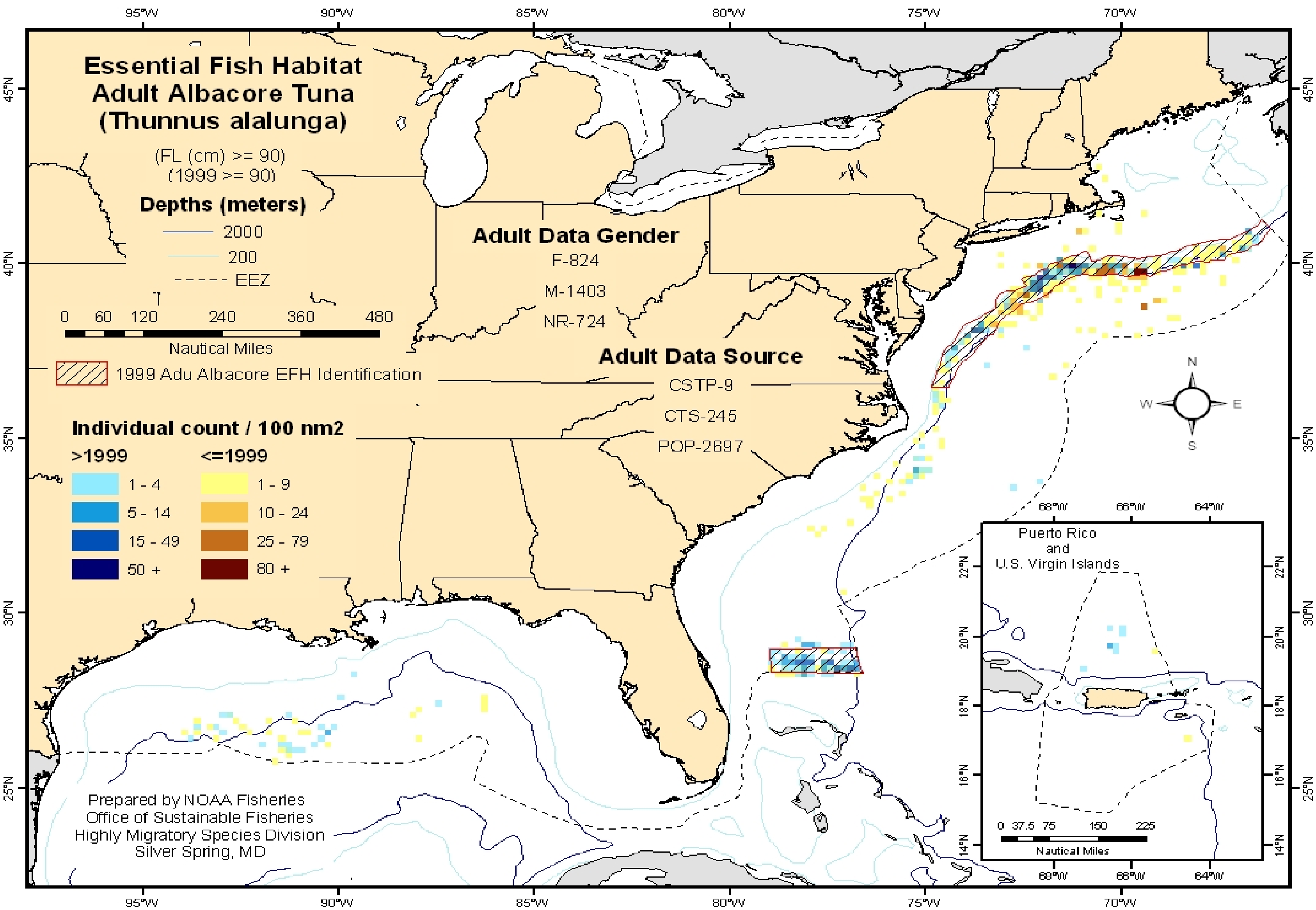

Figure B.3 Atlantic Albacore Tuna: Adult.

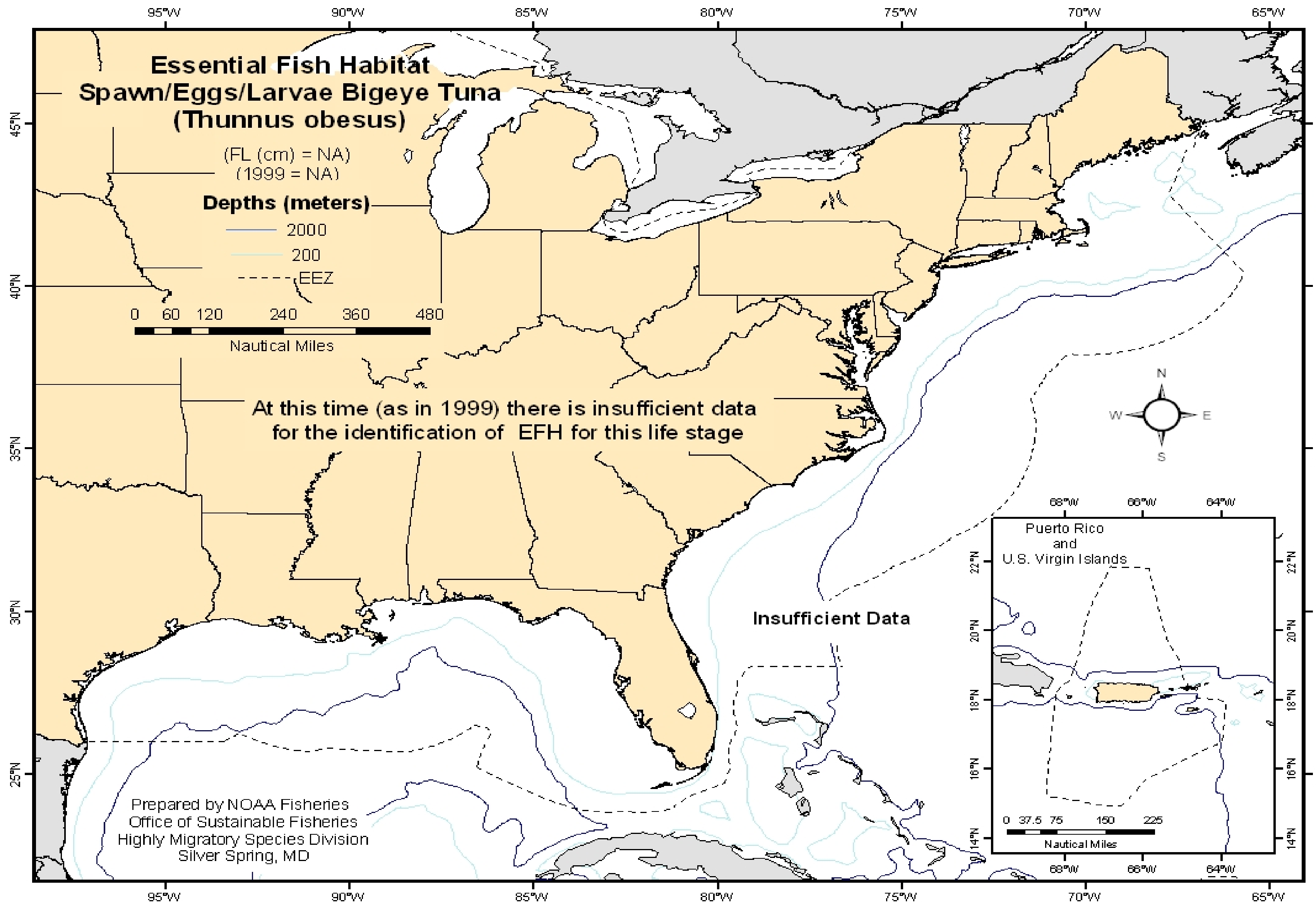

Figure B.4 **Atlantic Bigeye Tuna: Spawning, Eggs, and Larvae.**

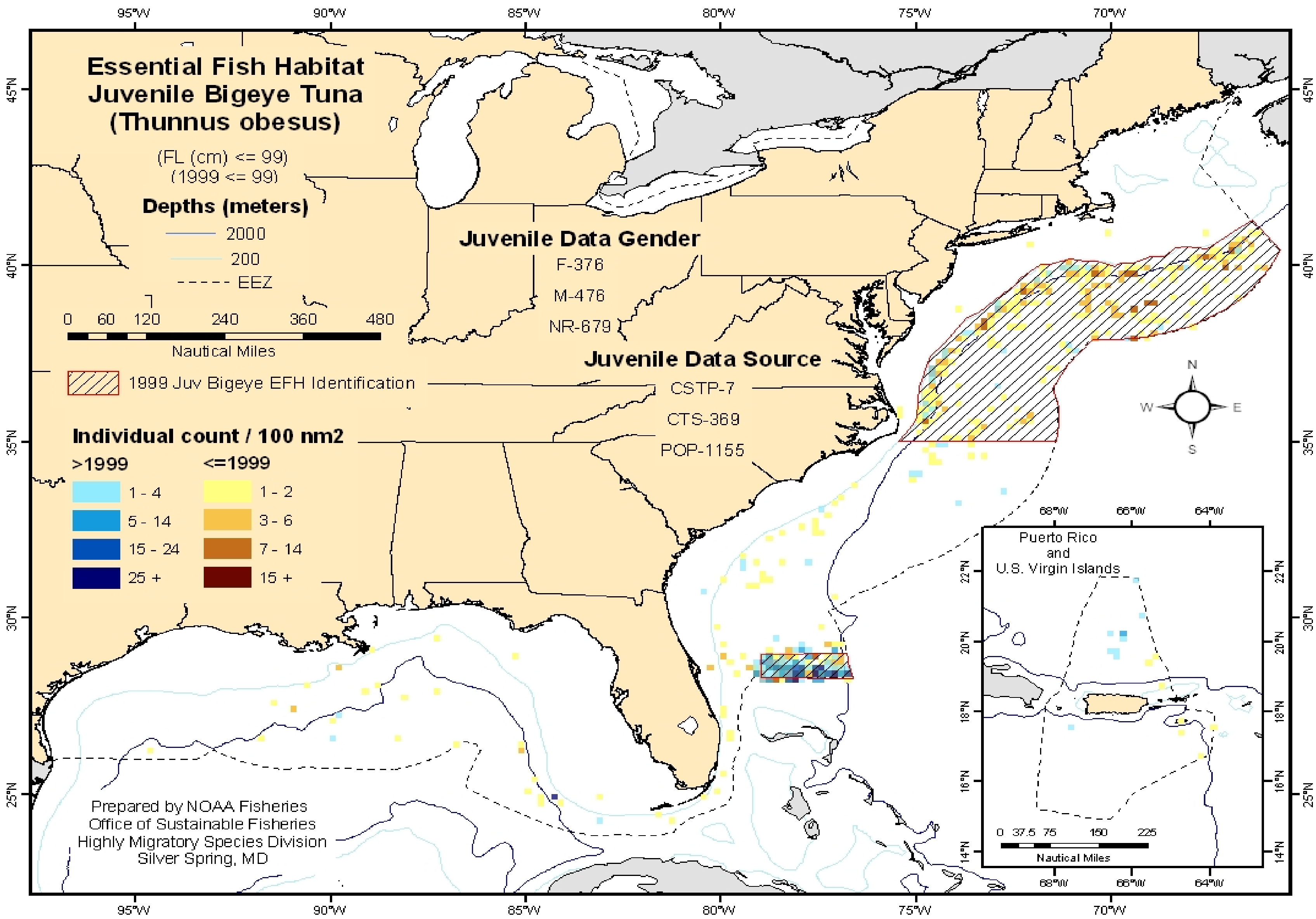

Figure B.5 **Atlantic Bigeye Tuna: Juvenile.**

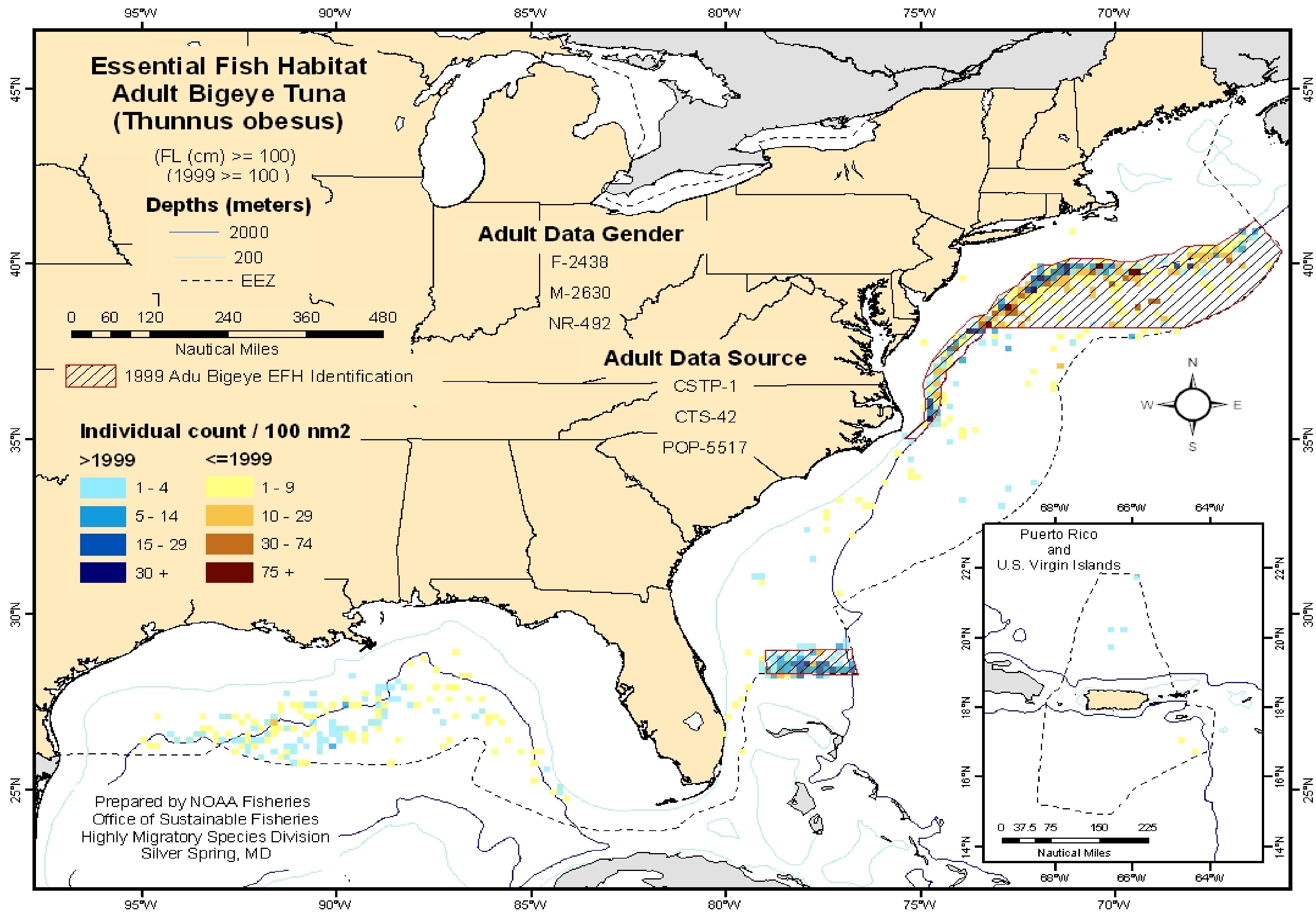

Figure B.6 Atlantic Bigeye Tuna: Adult.

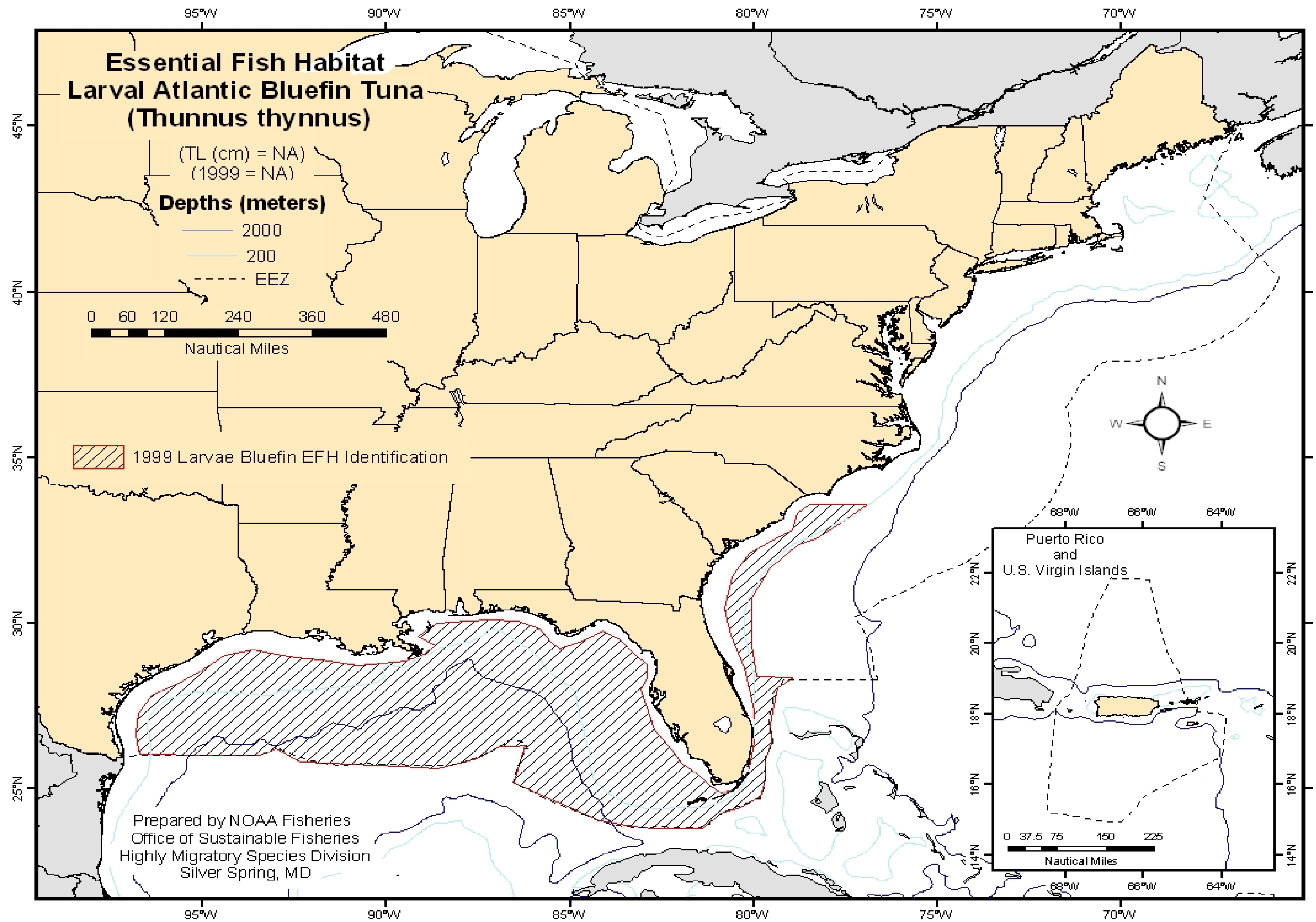

Figure B.7 **Atlantic Bluefin Tuna: Spawning, Eggs, and Larvae.**

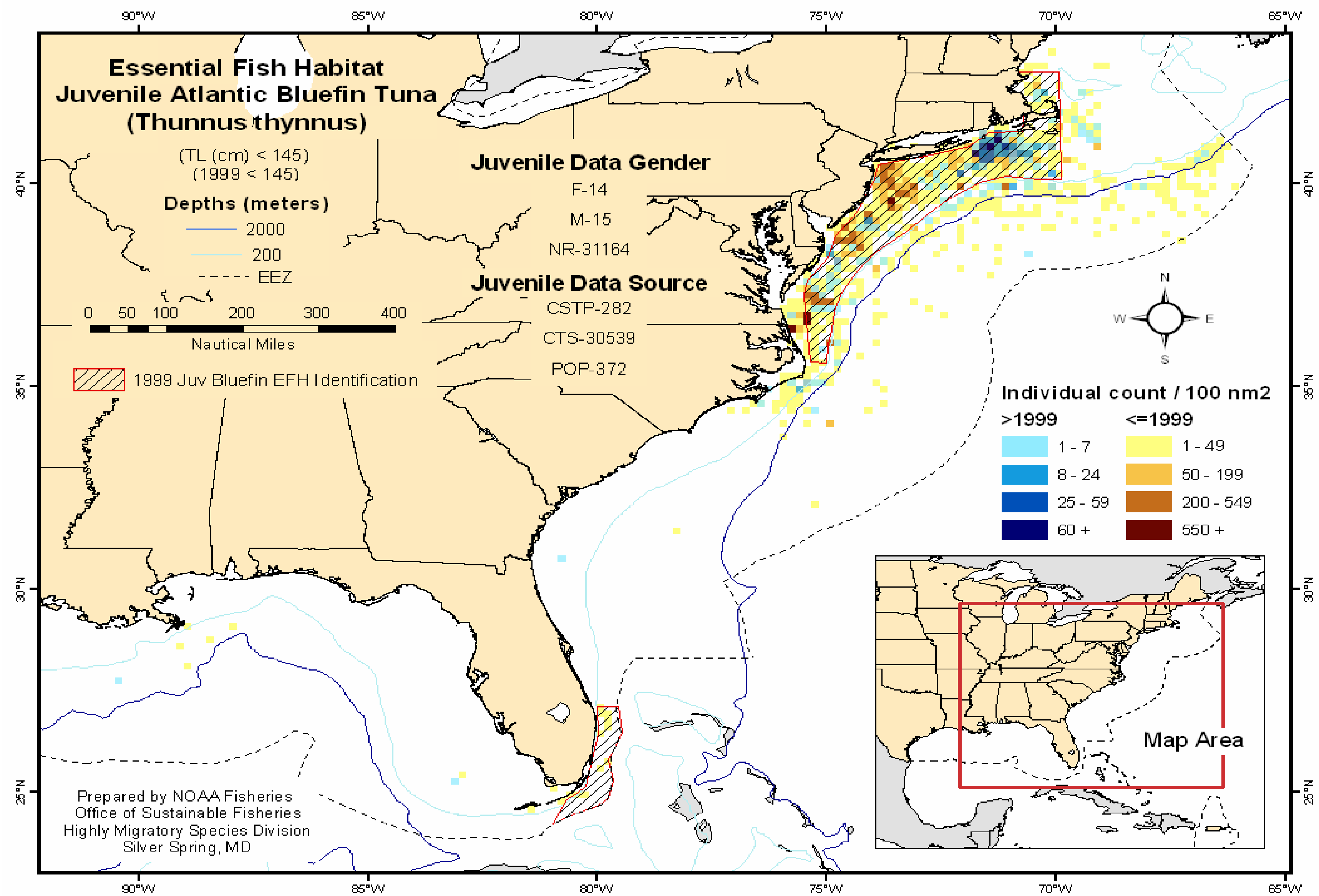

Figure B.8 Atlantic Bluefin Tuna: Juveniles.

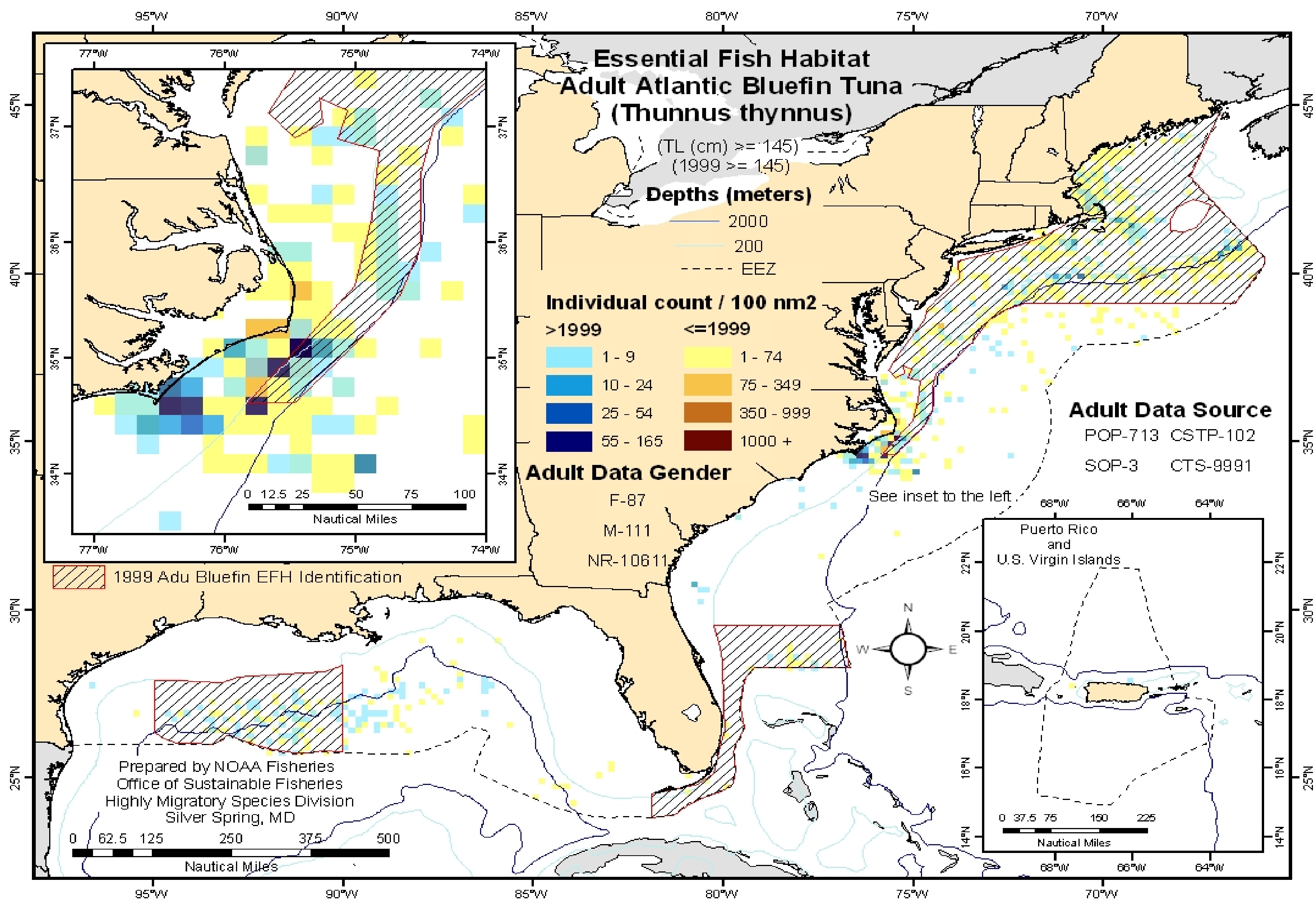

Figure B.9 **Atlantic Bluefin Tuna: Adults.**

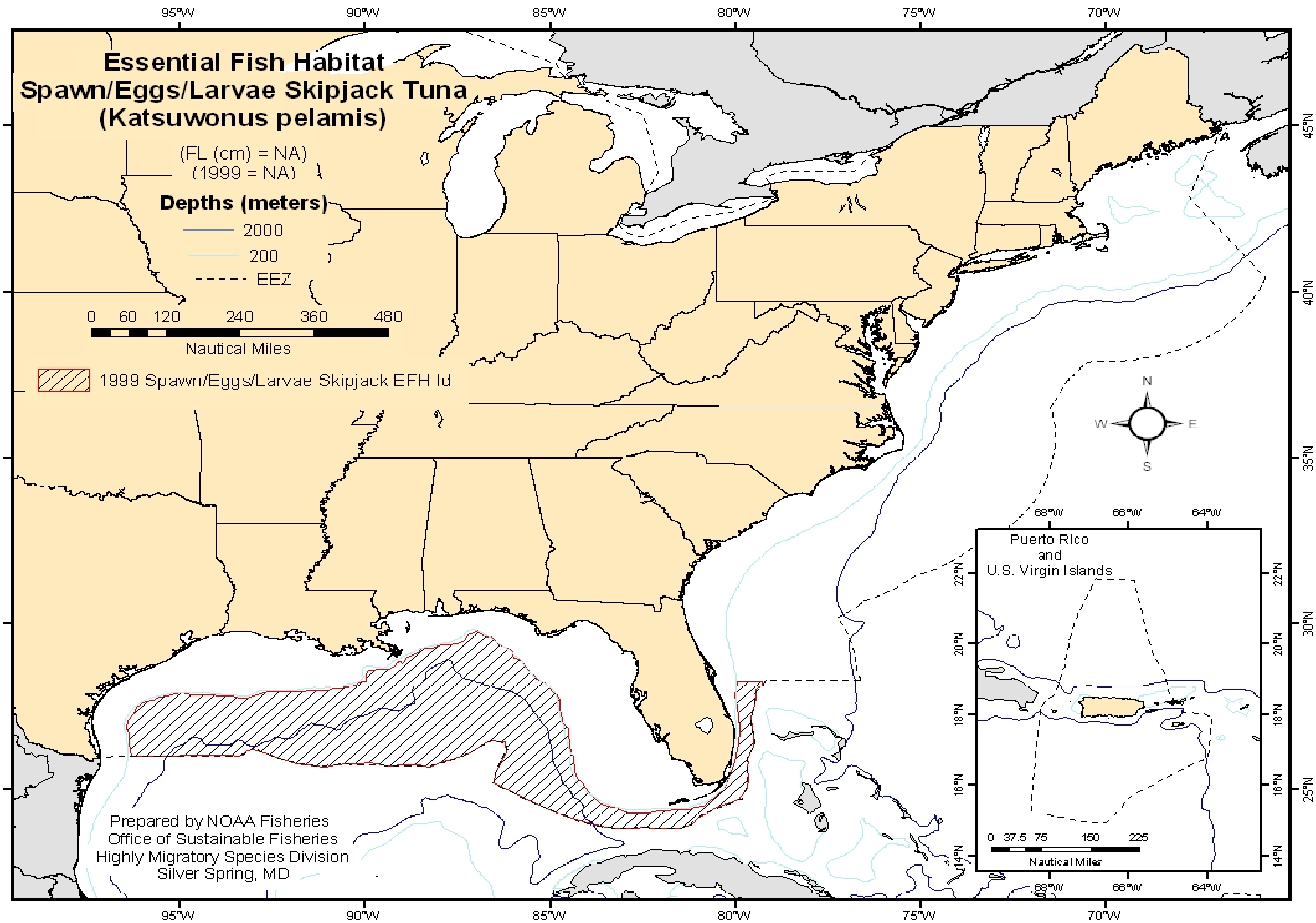

Figure B.10 Atlantic Skipjack Tuna: Spawning, Eggs, and Larvae.

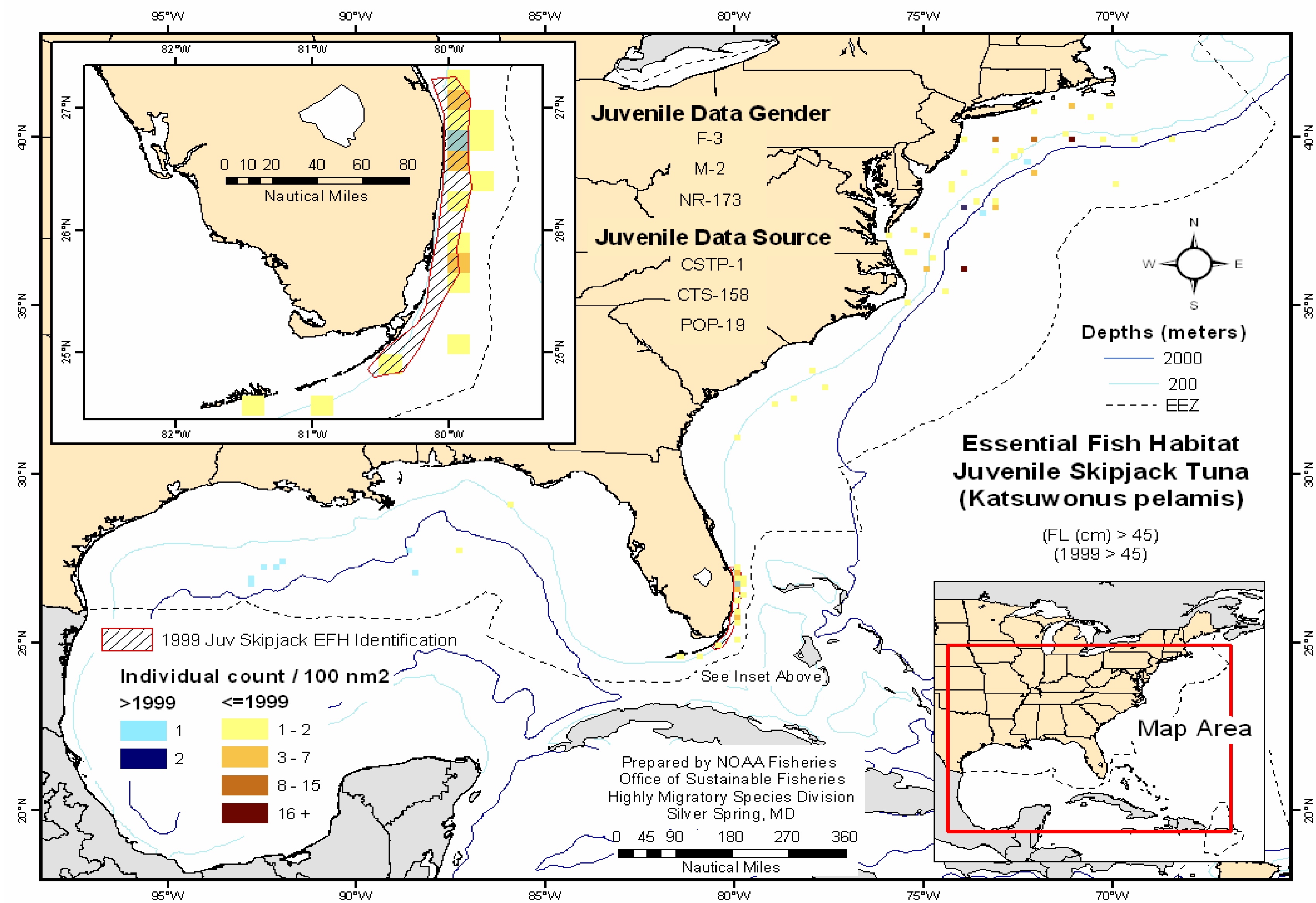

Figure B.11 Atlantic Skipjack Tuna: Juvenile.

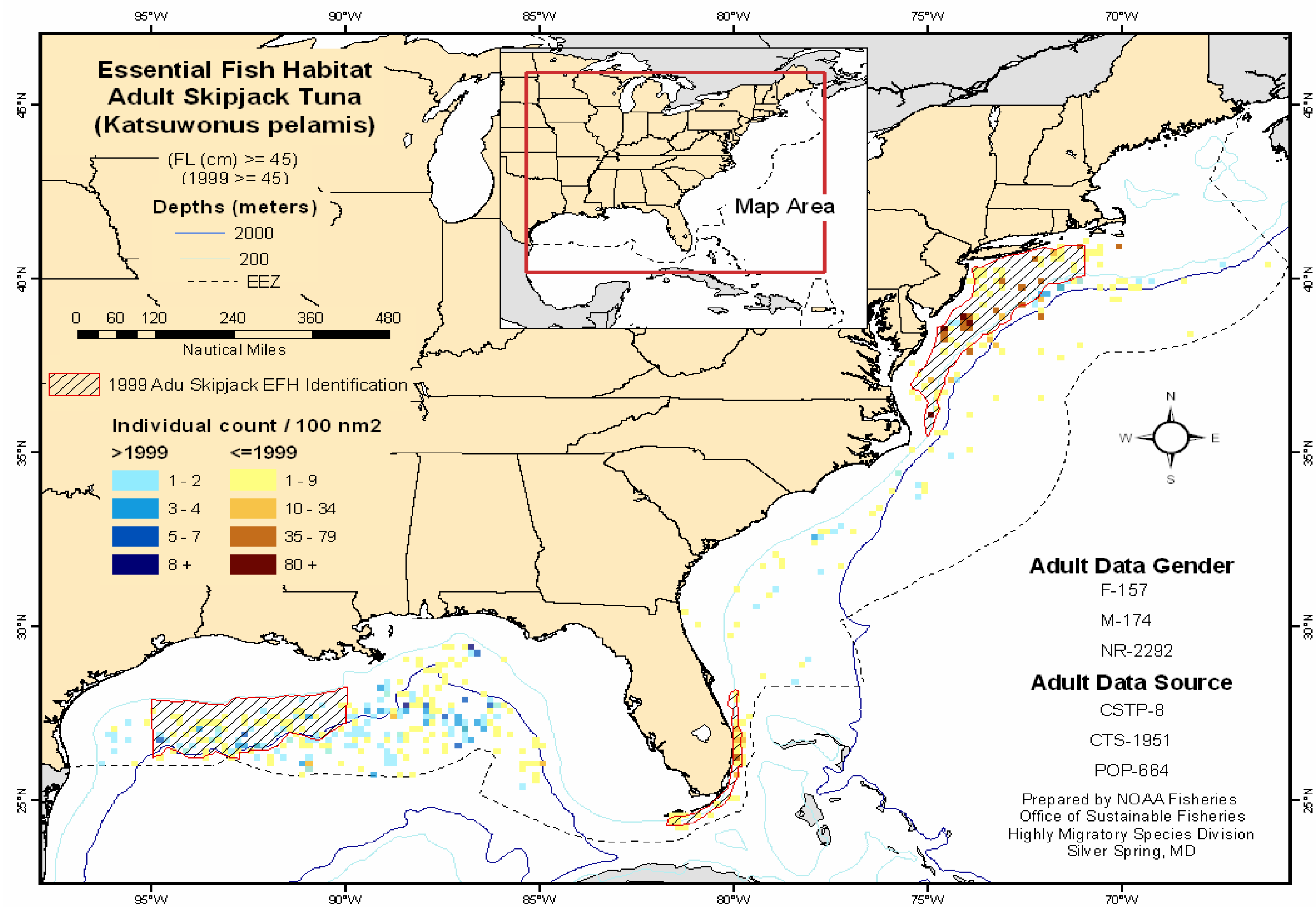

Figure B.12 Atlantic Skipjack Tuna: Adult.

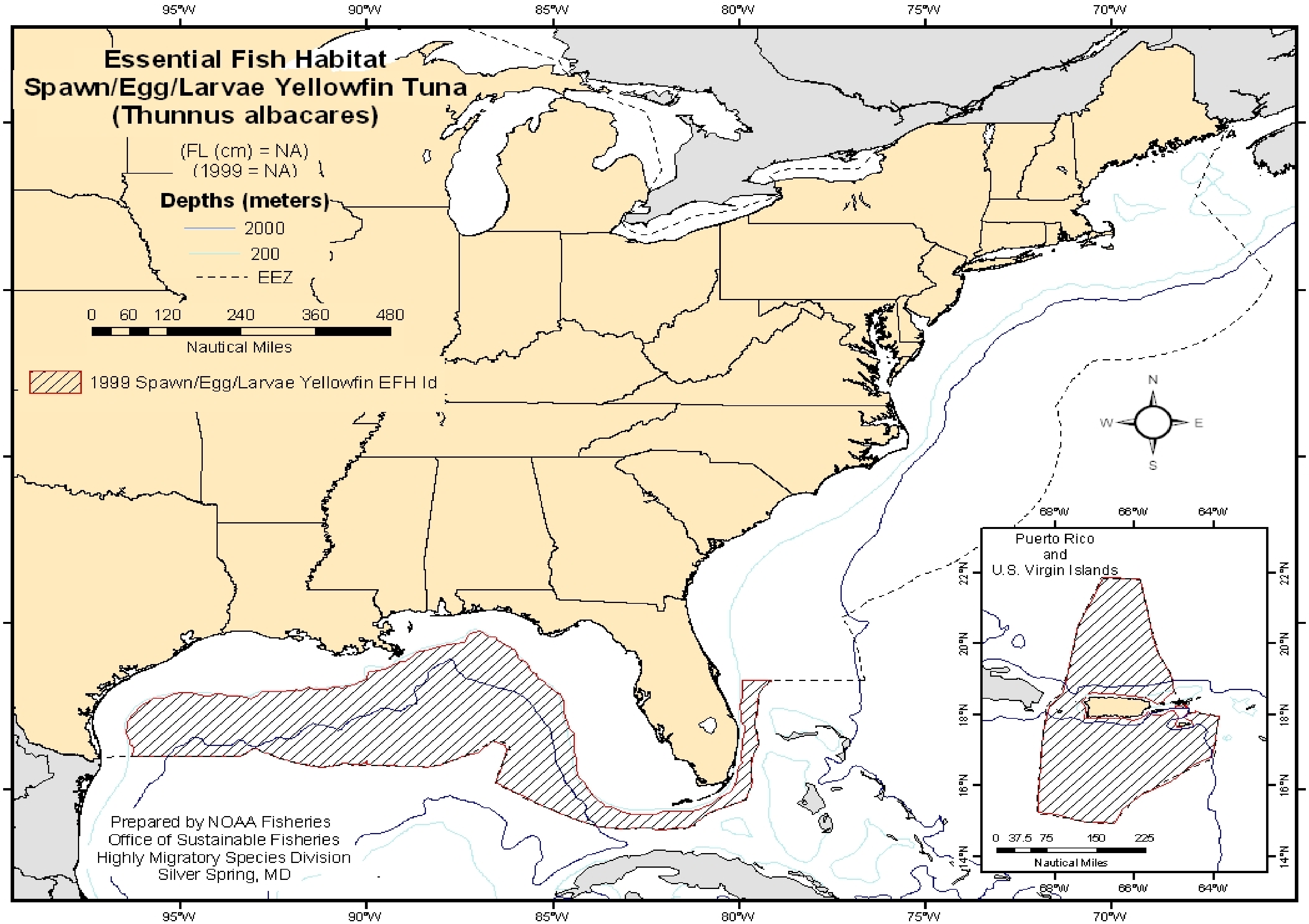

Figure B.13 Atlantic Yellowfin Tuna: Spawning, Eggs, and Larvae.

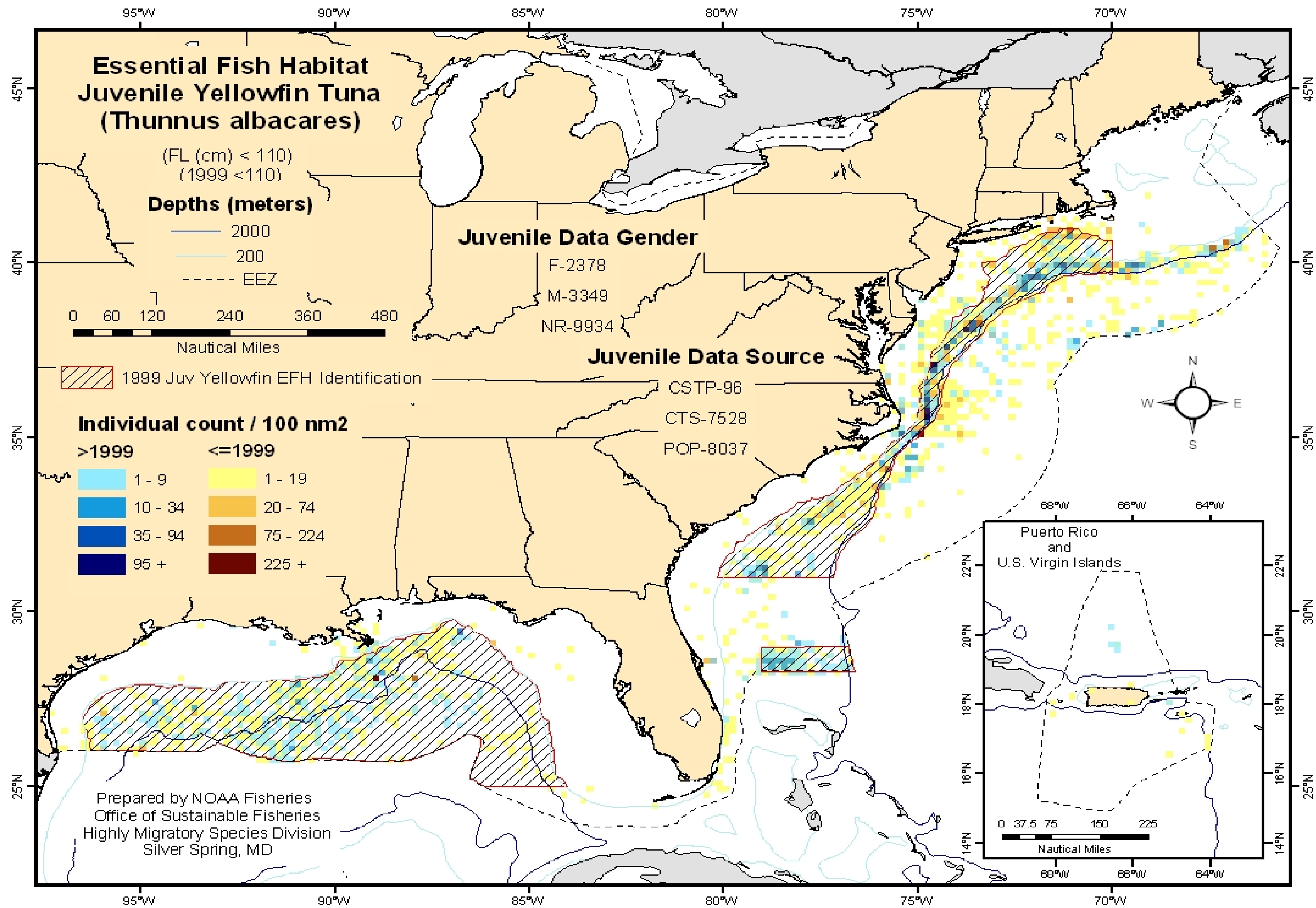

Figure B.14 Atlantic Yellowfin Tuna: Juvenile.

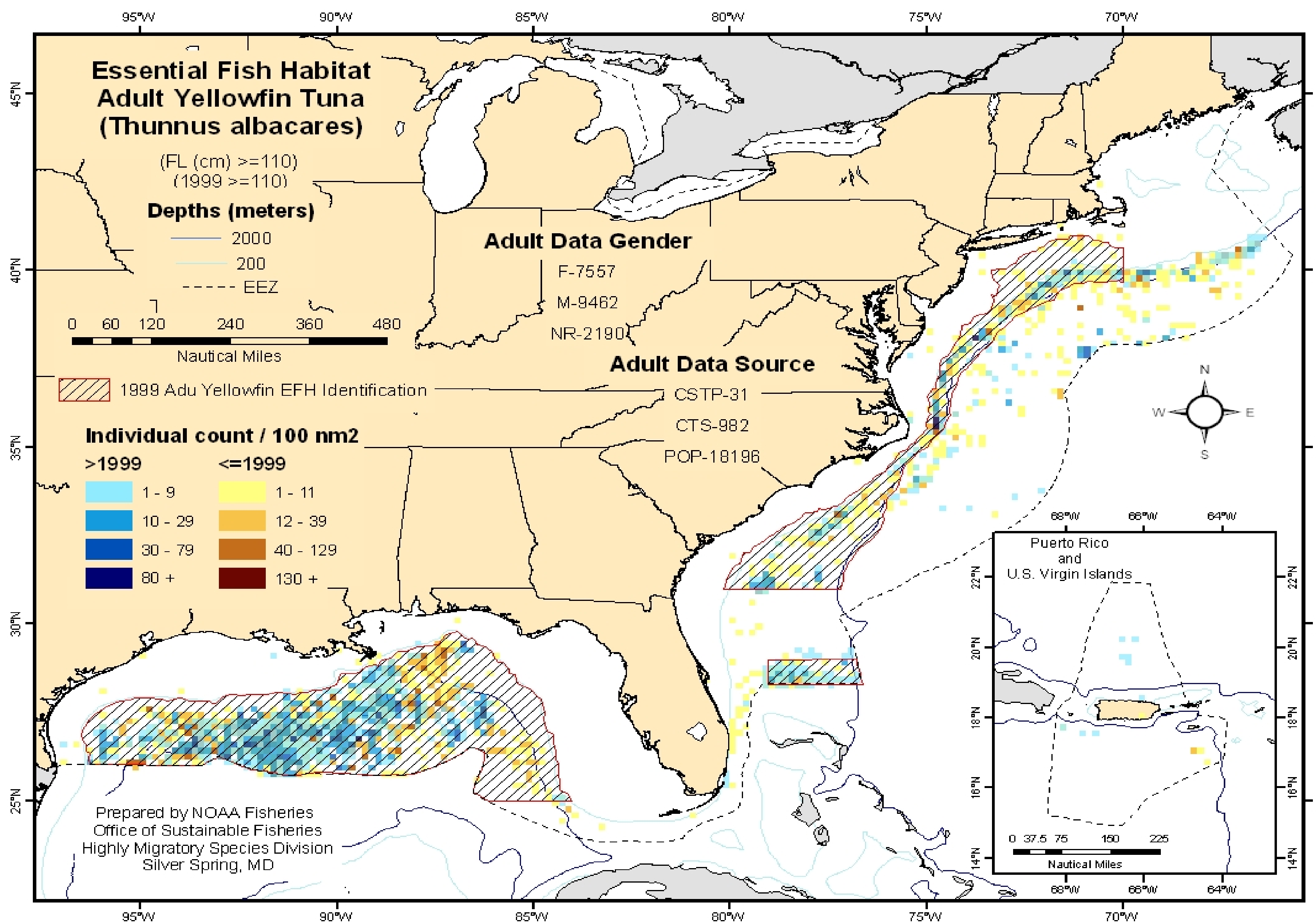

Figure B.15 **Atlantic Yellowfin Tuna: Adult.**

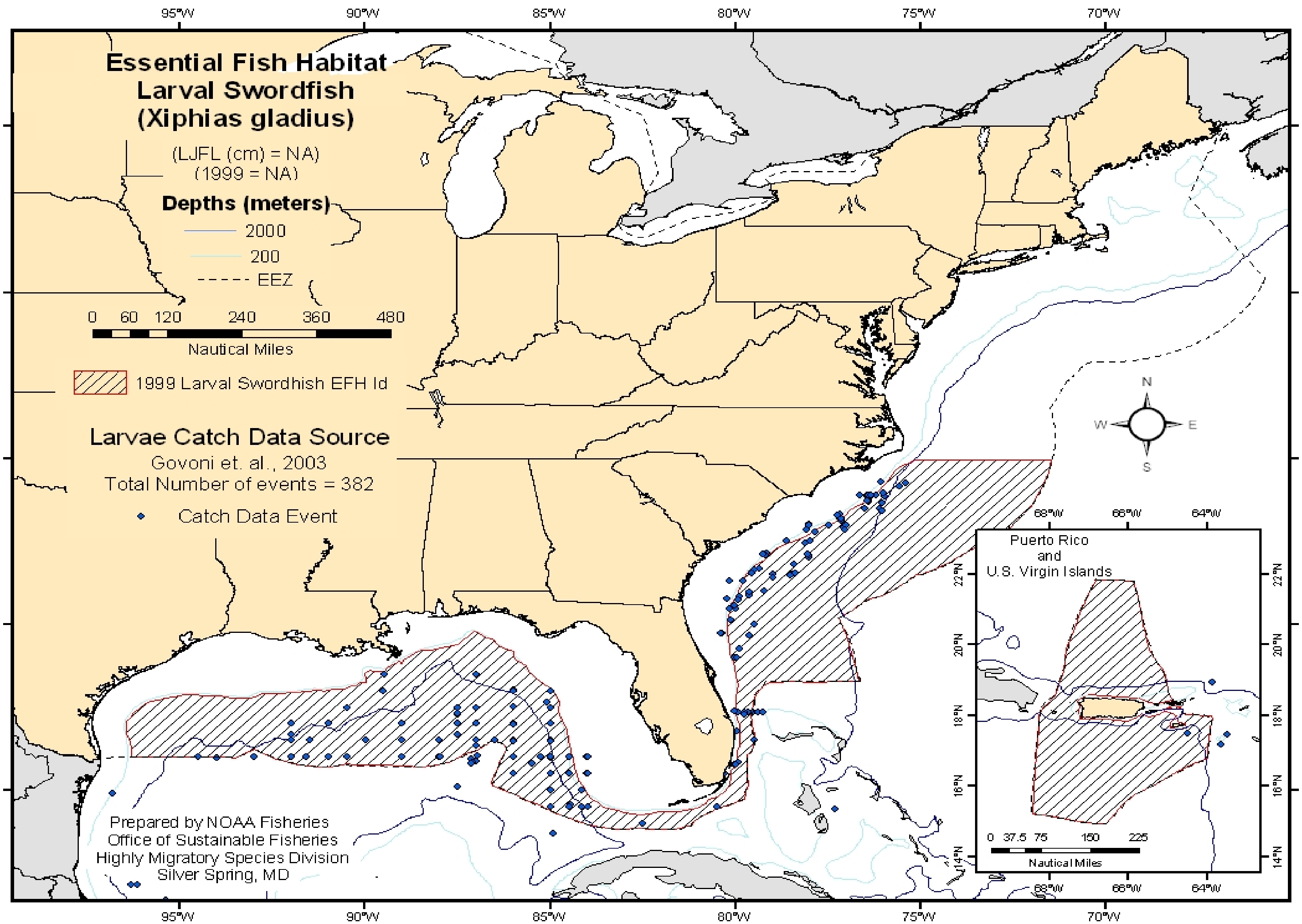

Figure B.16 **Atlantic Swordfish: Spawning, Eggs, and Larvae.**

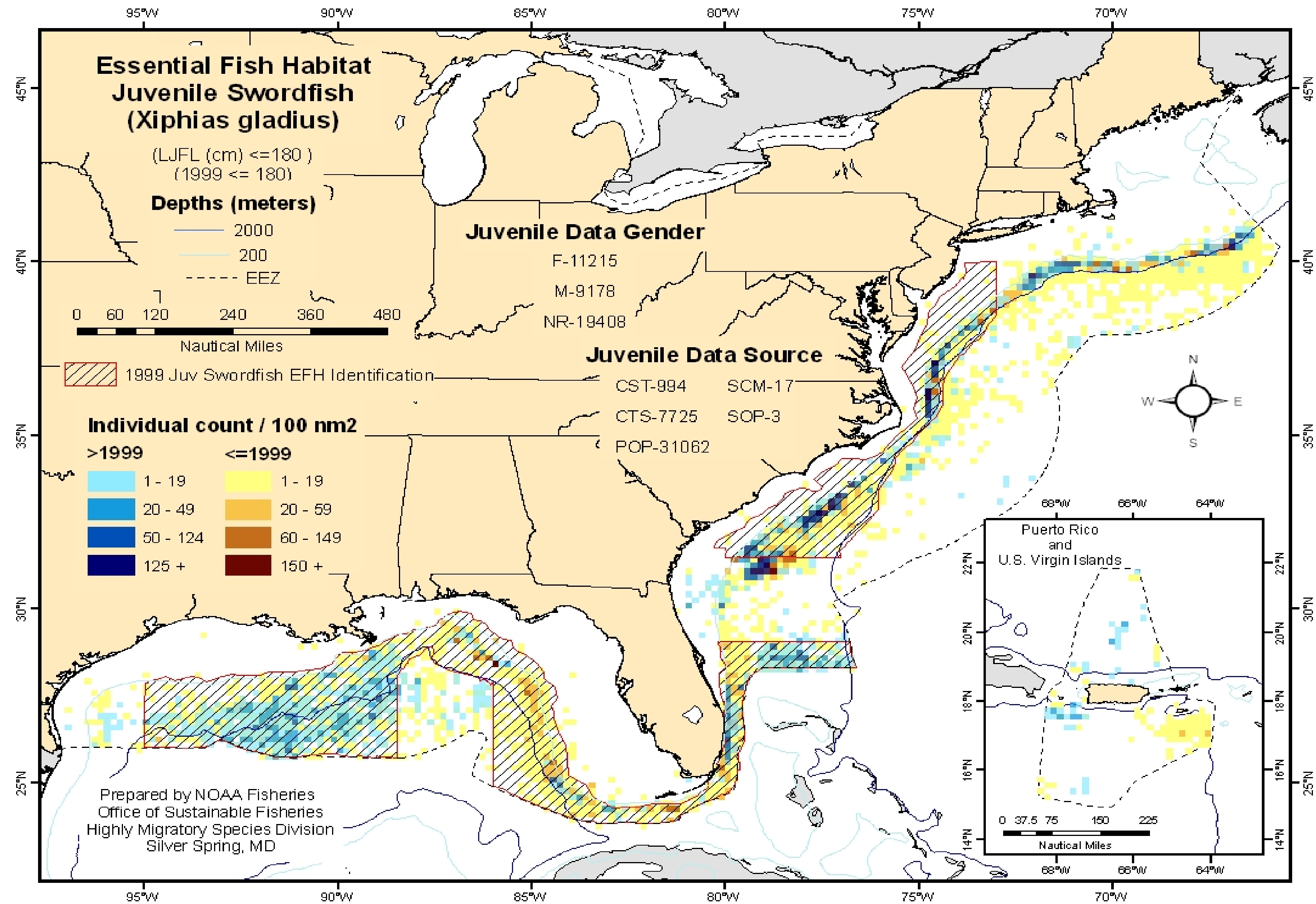

Figure B.17 **Atlantic Swordfish: Juvenile.**

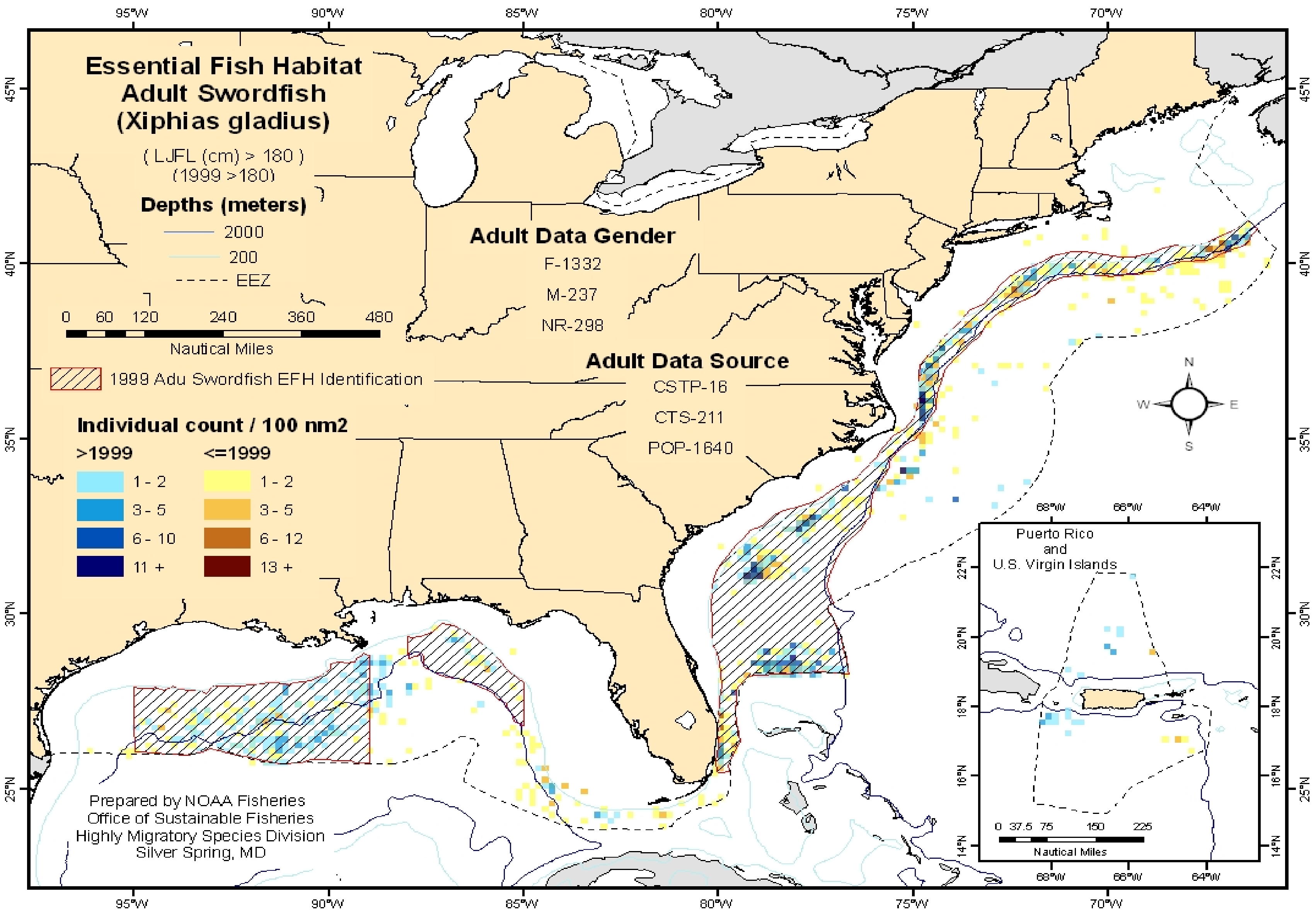

Figure B.18 Atlantic Swordfish: Adult.

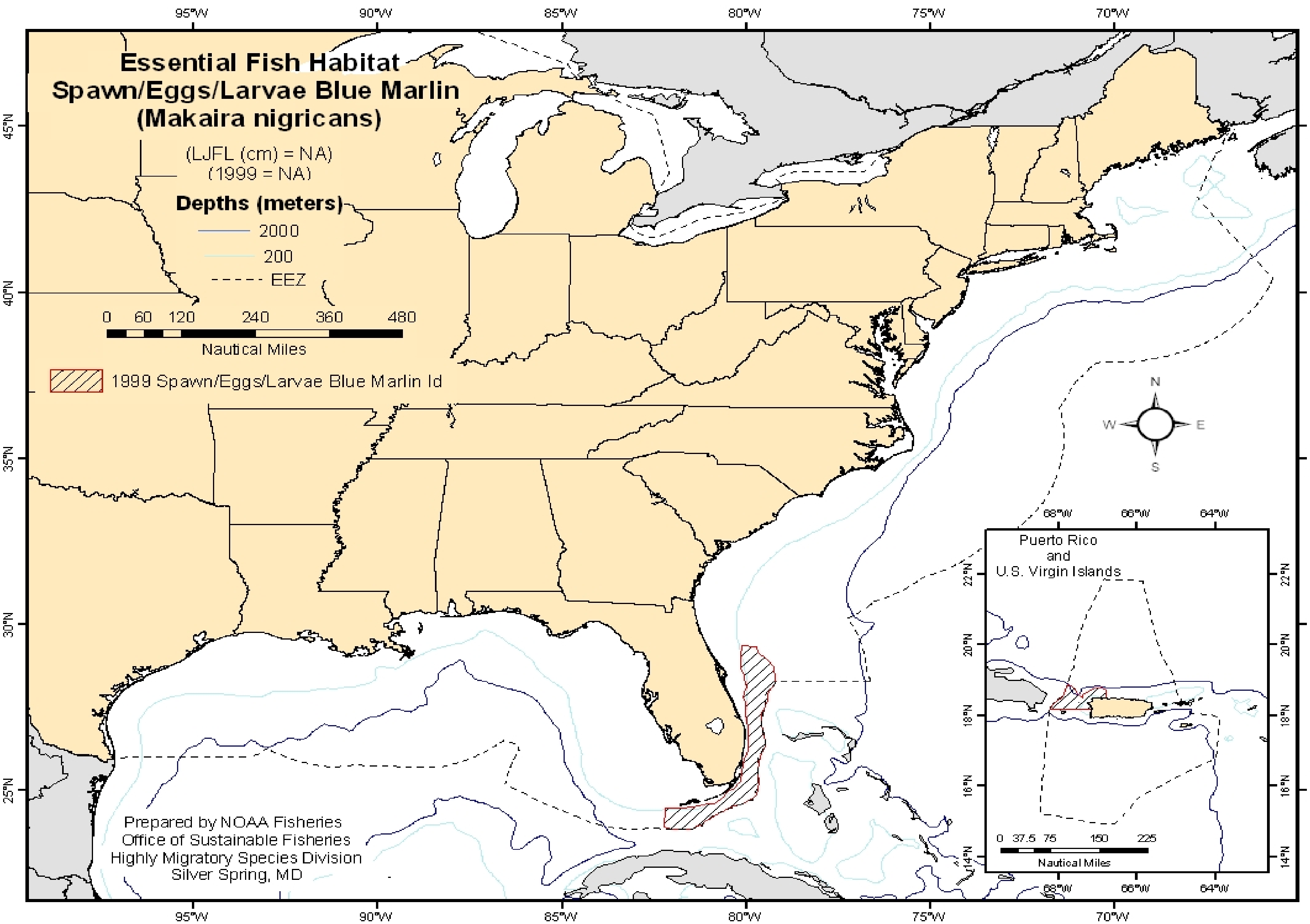

Figure B.19 **Blue Marlin: Spawning, Eggs, and Larvae.**

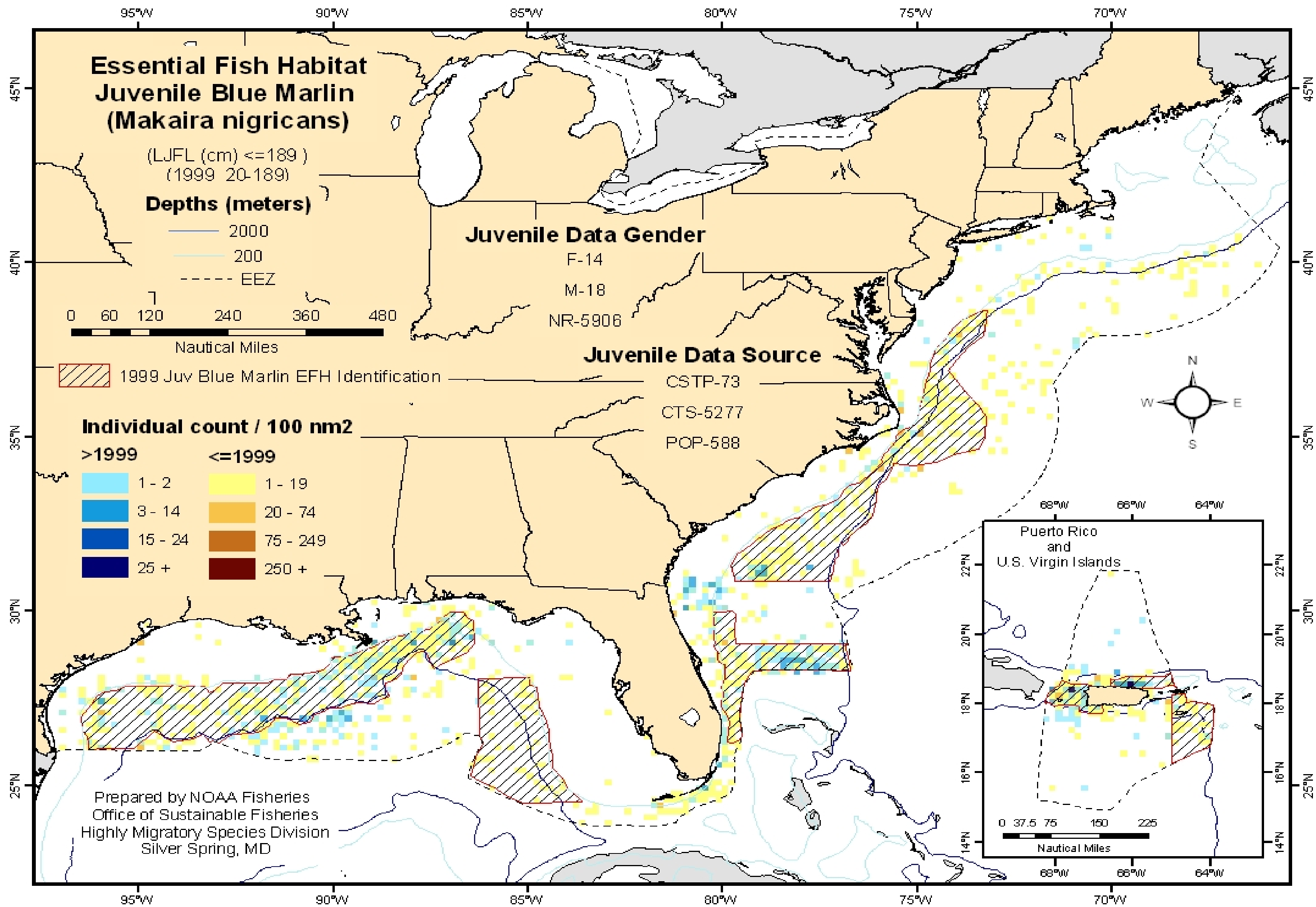

Figure B.20 Blue Marlin: Juvenile.

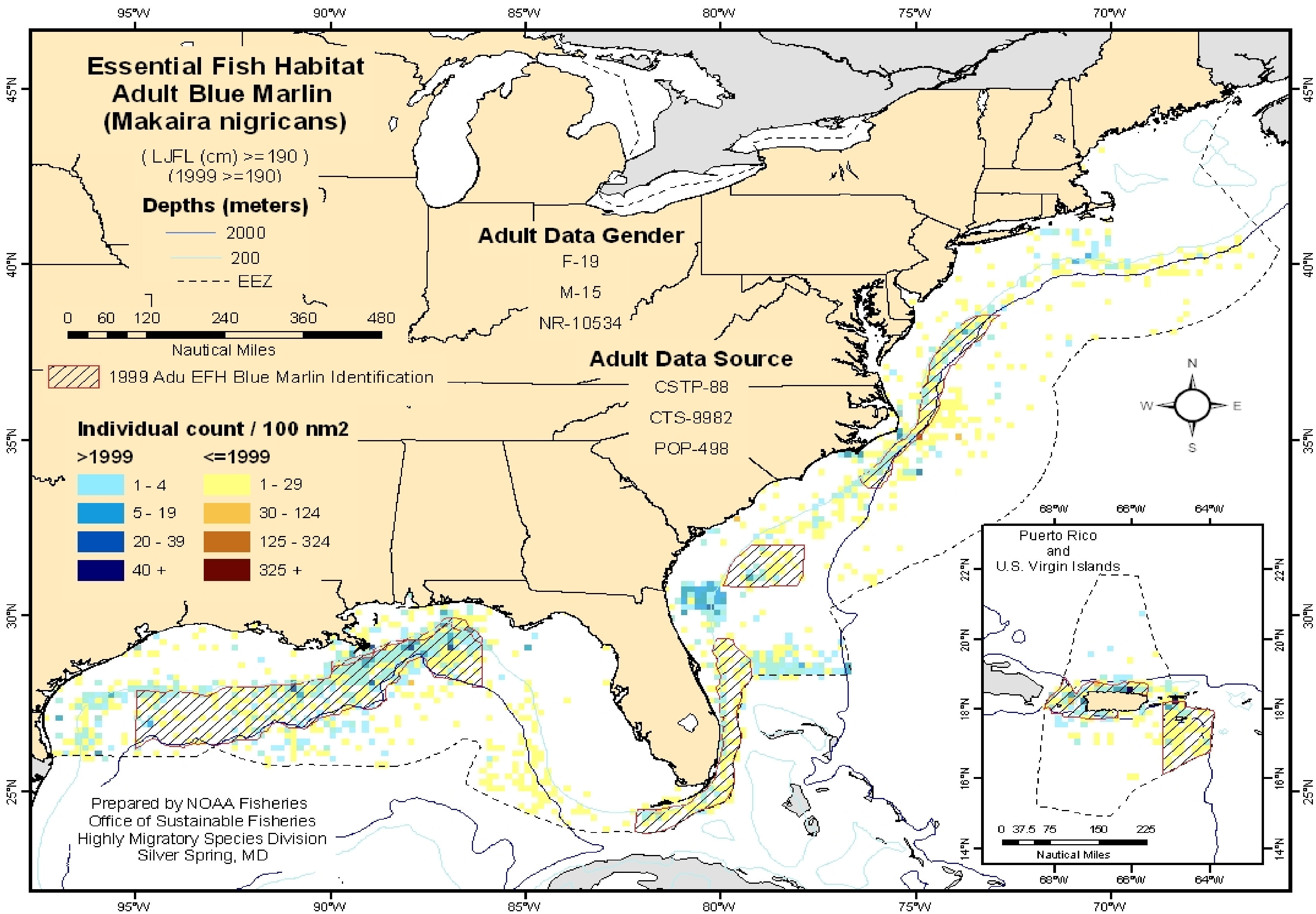

Figure B.21 Blue Marlin: Adult.

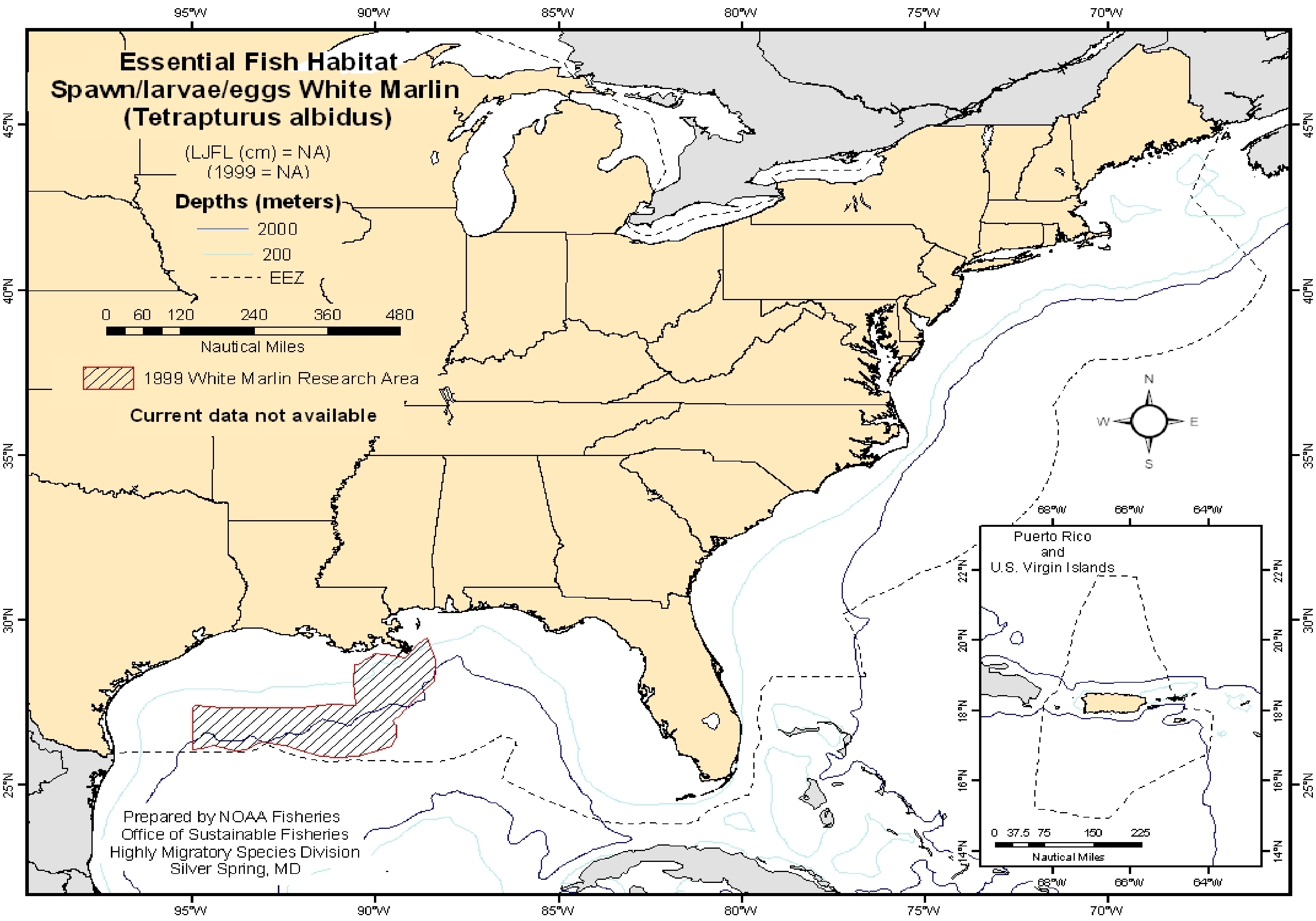

Figure B.22 White Marlin: Spawning, Eggs, and larvae.

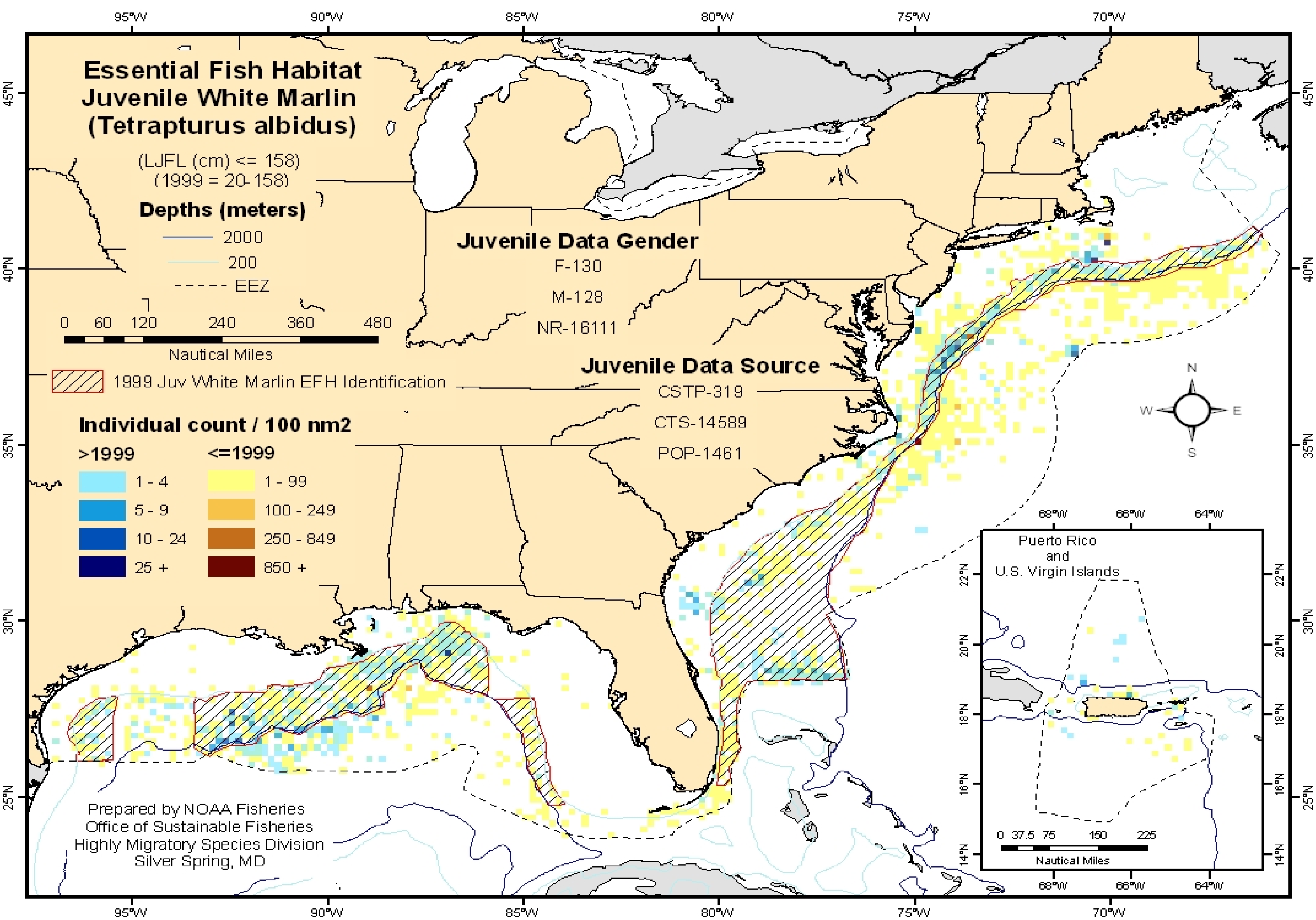

Figure B.23 **White Marlin: Juvenile.**

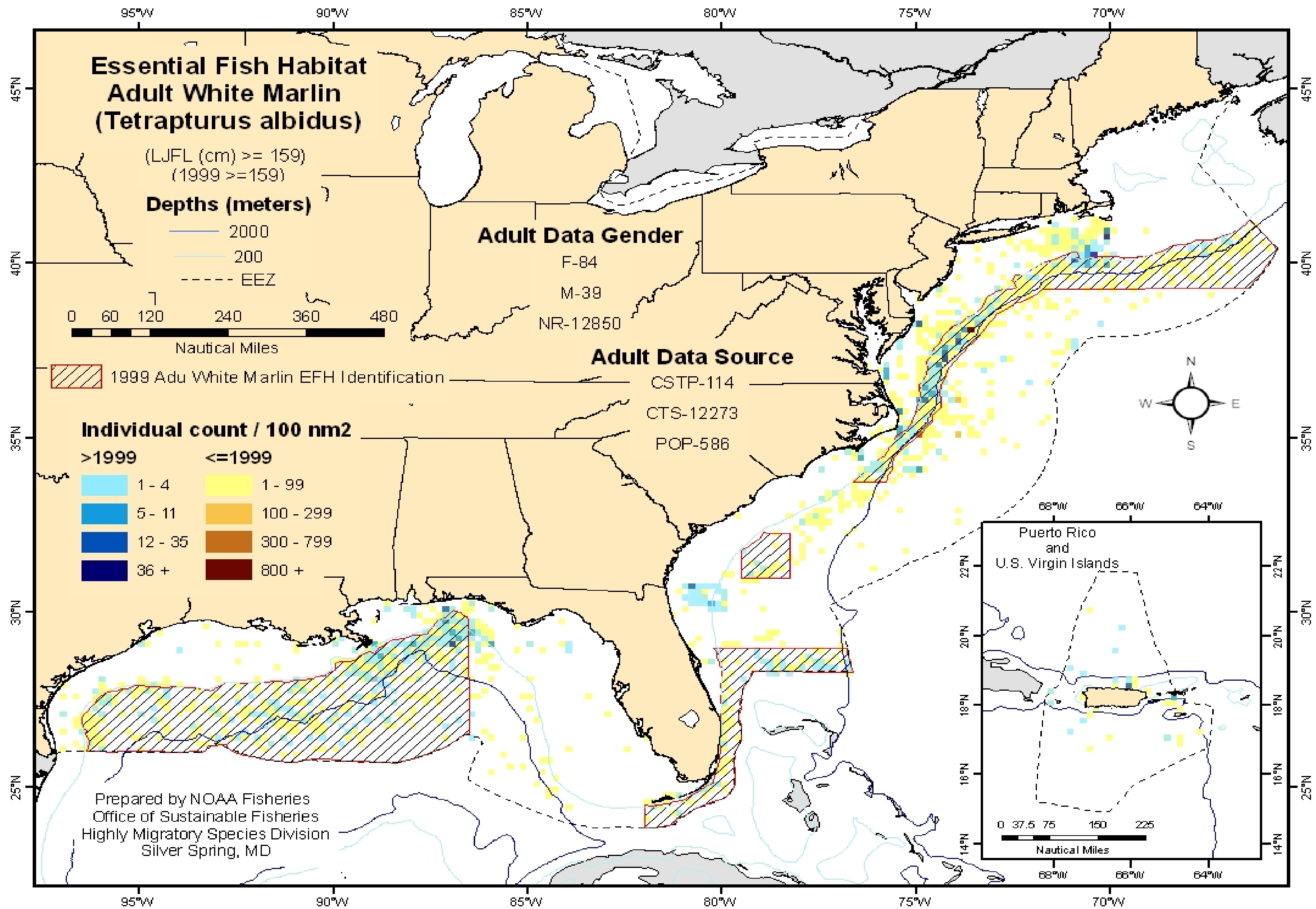

Figure B.24 White Marlin: Adult.

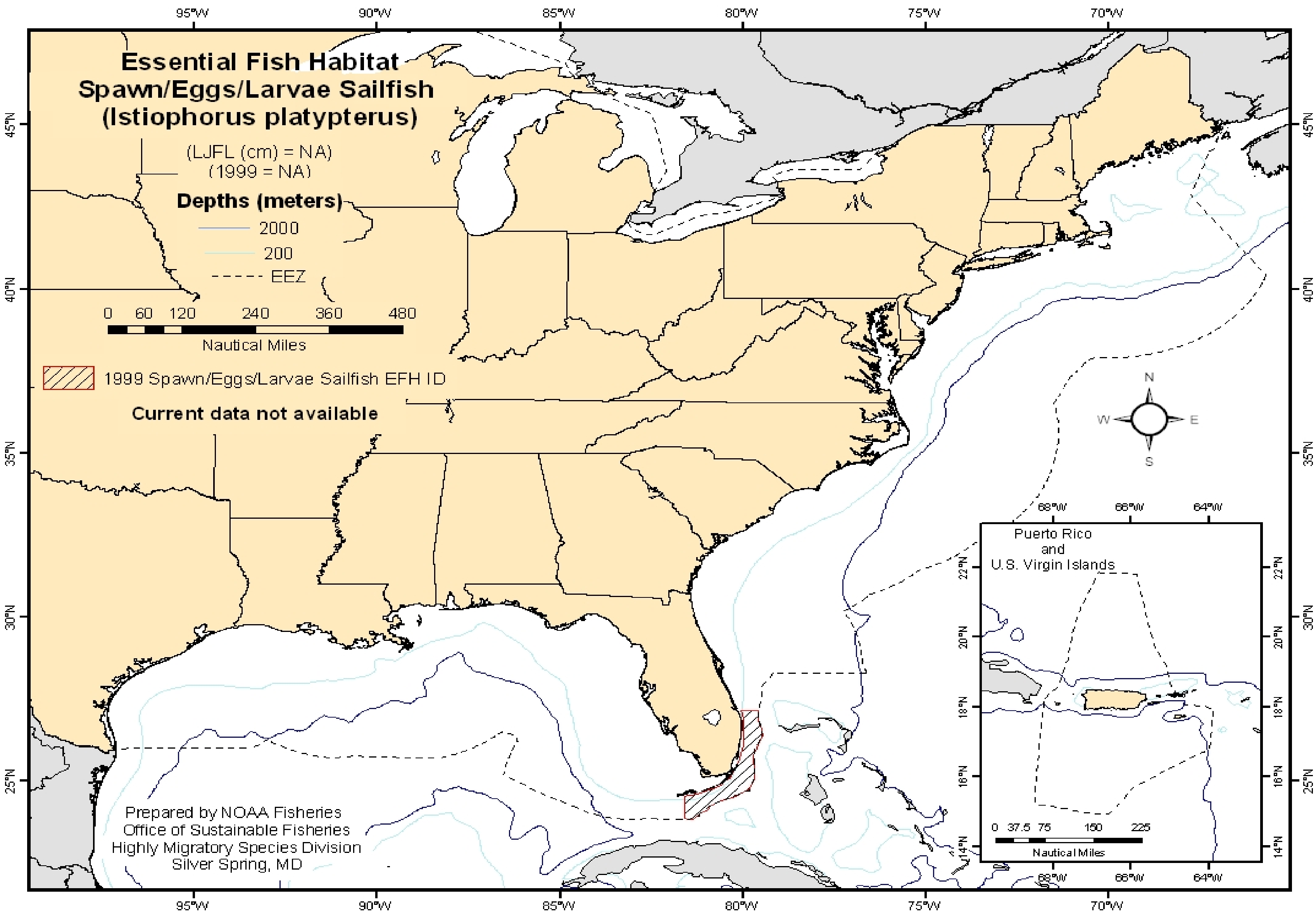

Figure B.25 **Sailfish: Spawning, Eggs, and Larvae.**

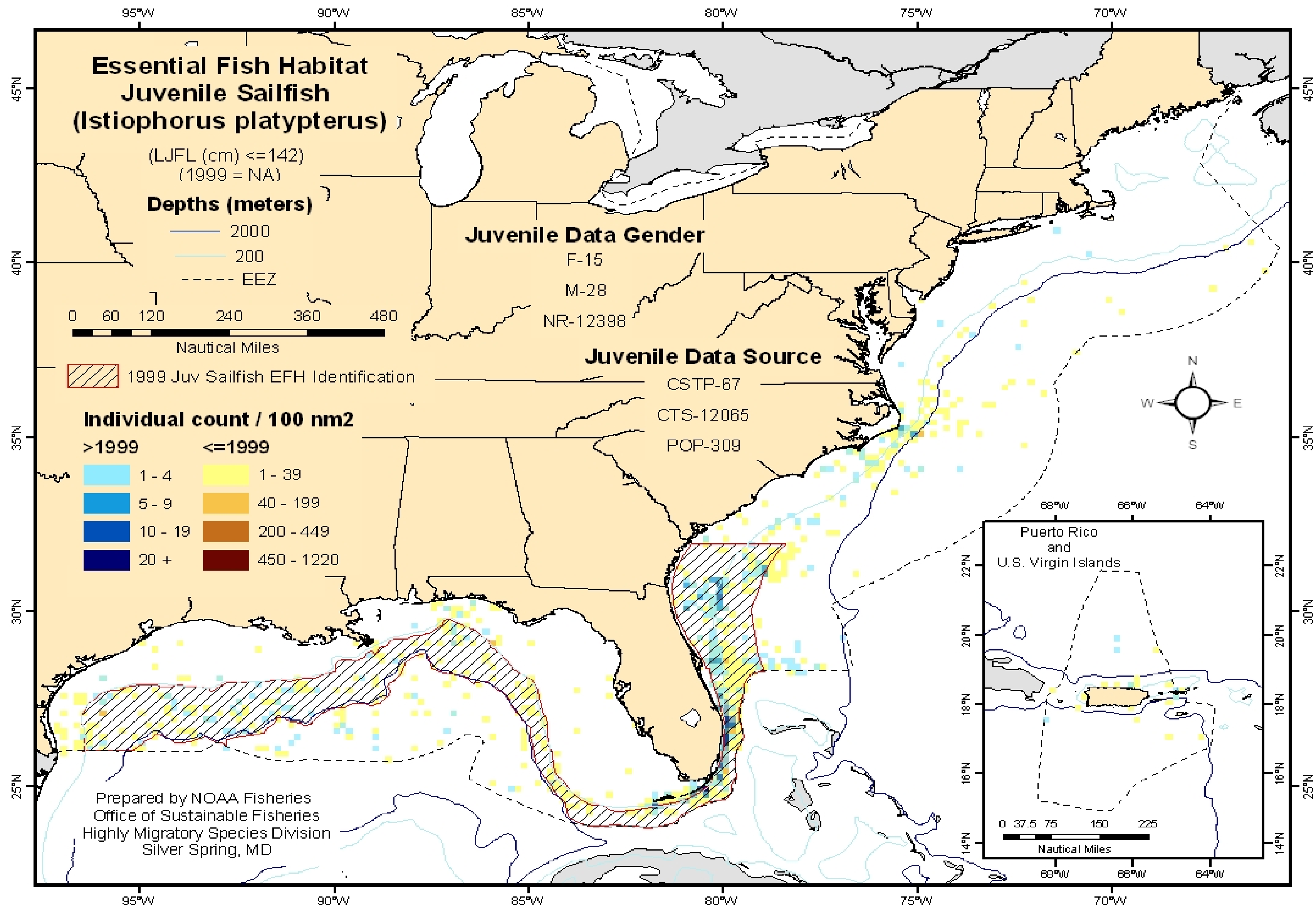

Figure B.26 Sailfish: Juvenile.

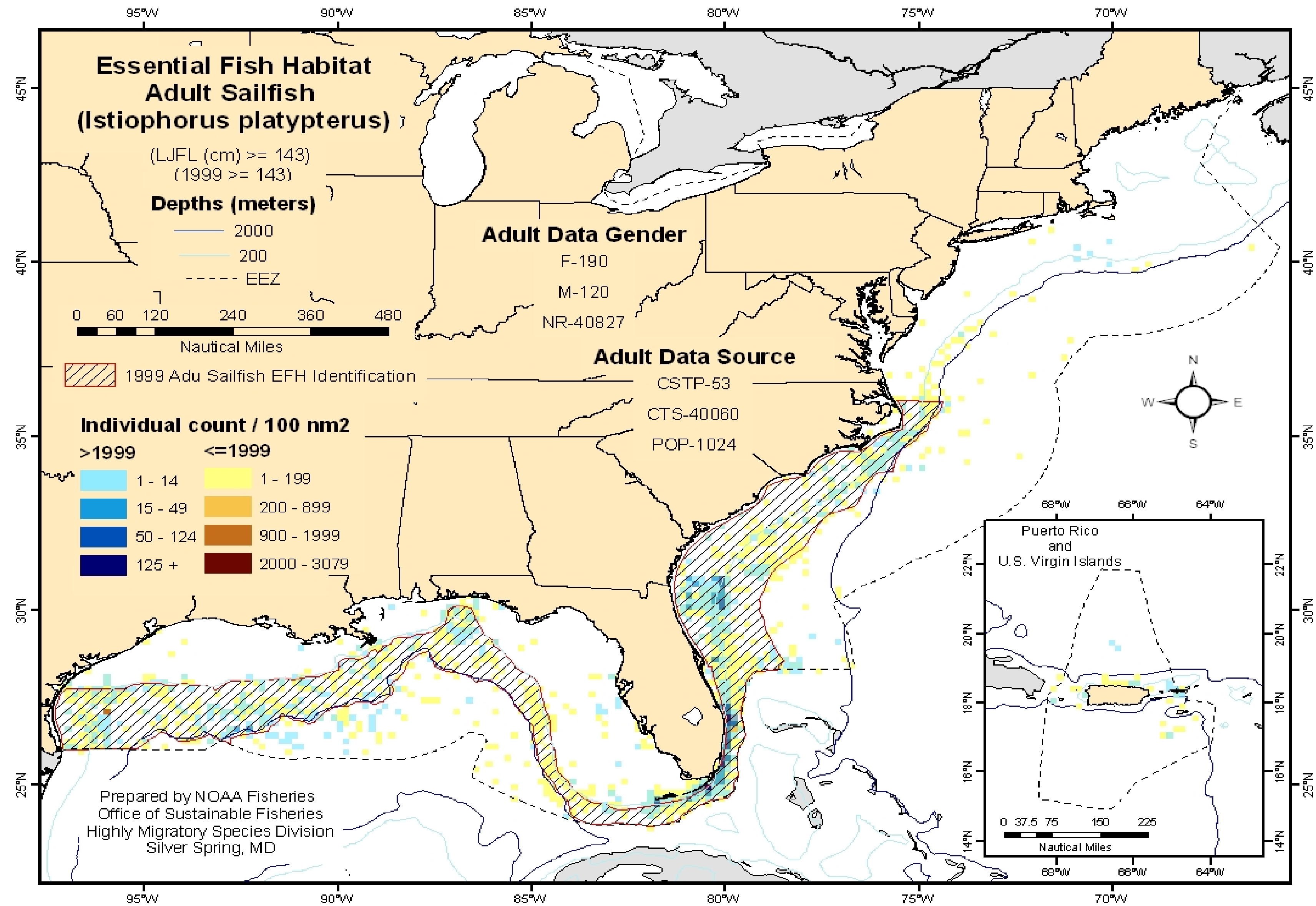

Figure B.27 Sailfish: Adult.

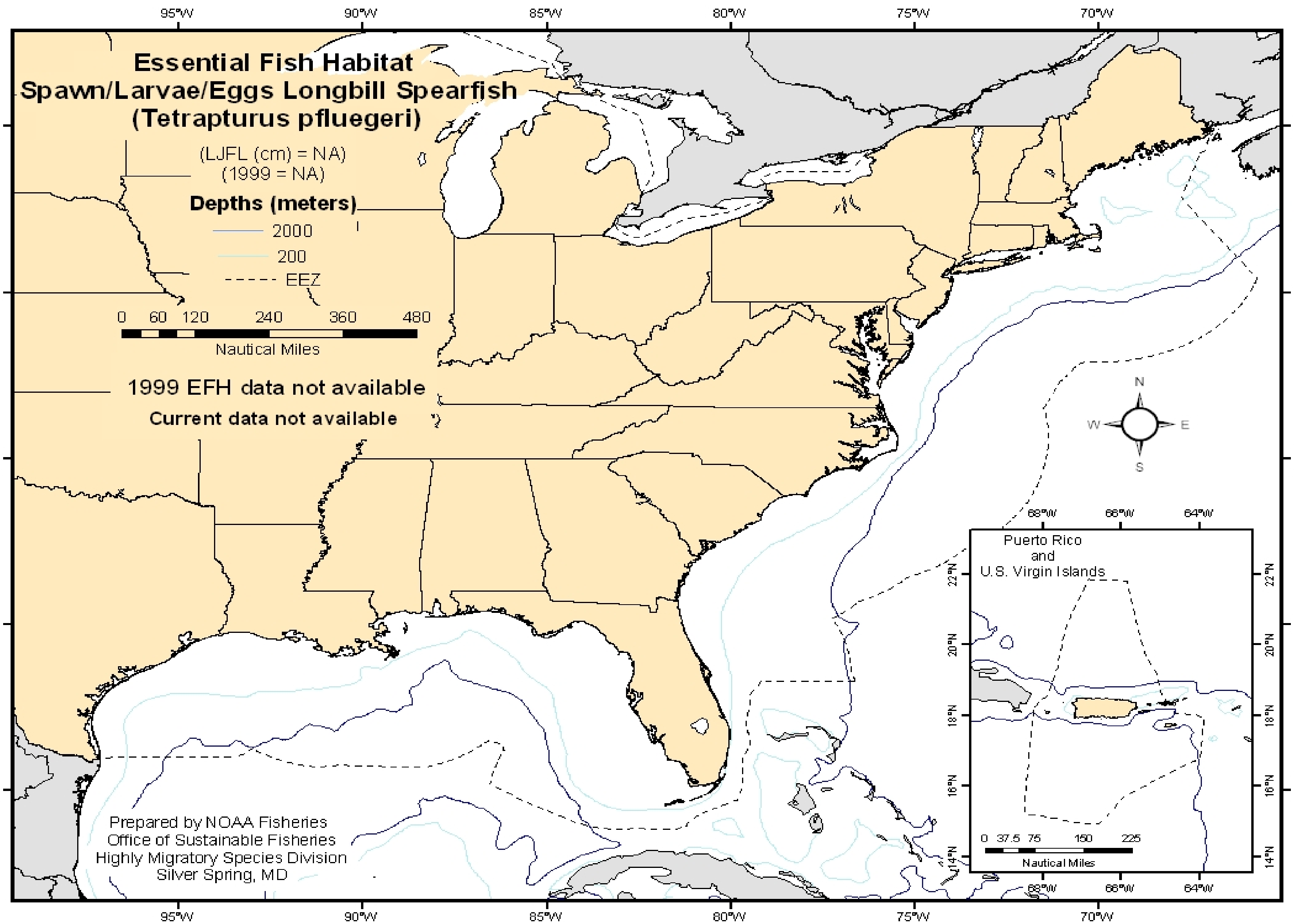

Figure B.28 **Spearfish: Spawning, Eggs, and Larvae.**

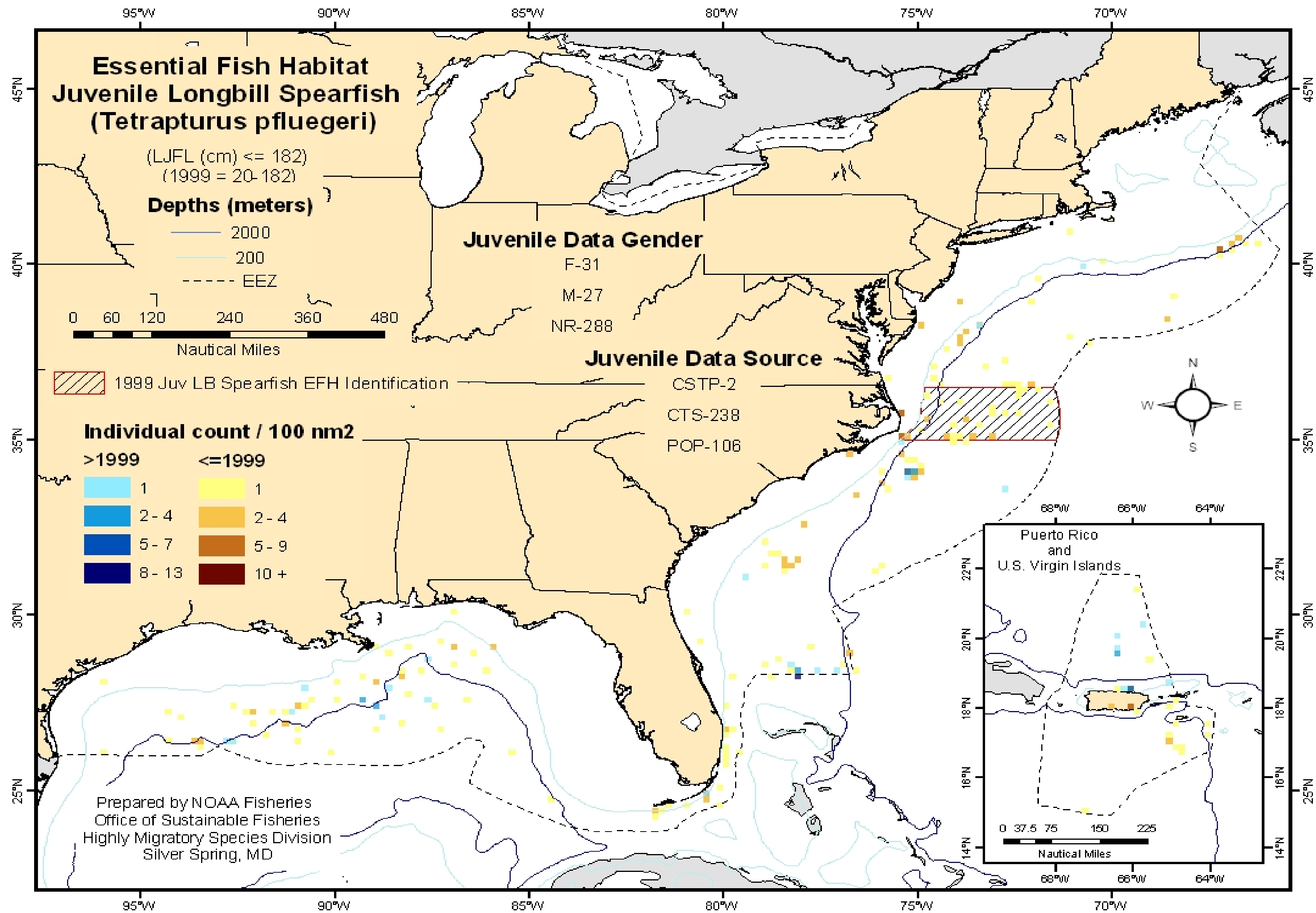

Figure B.29 Spearfish: Juvenile.

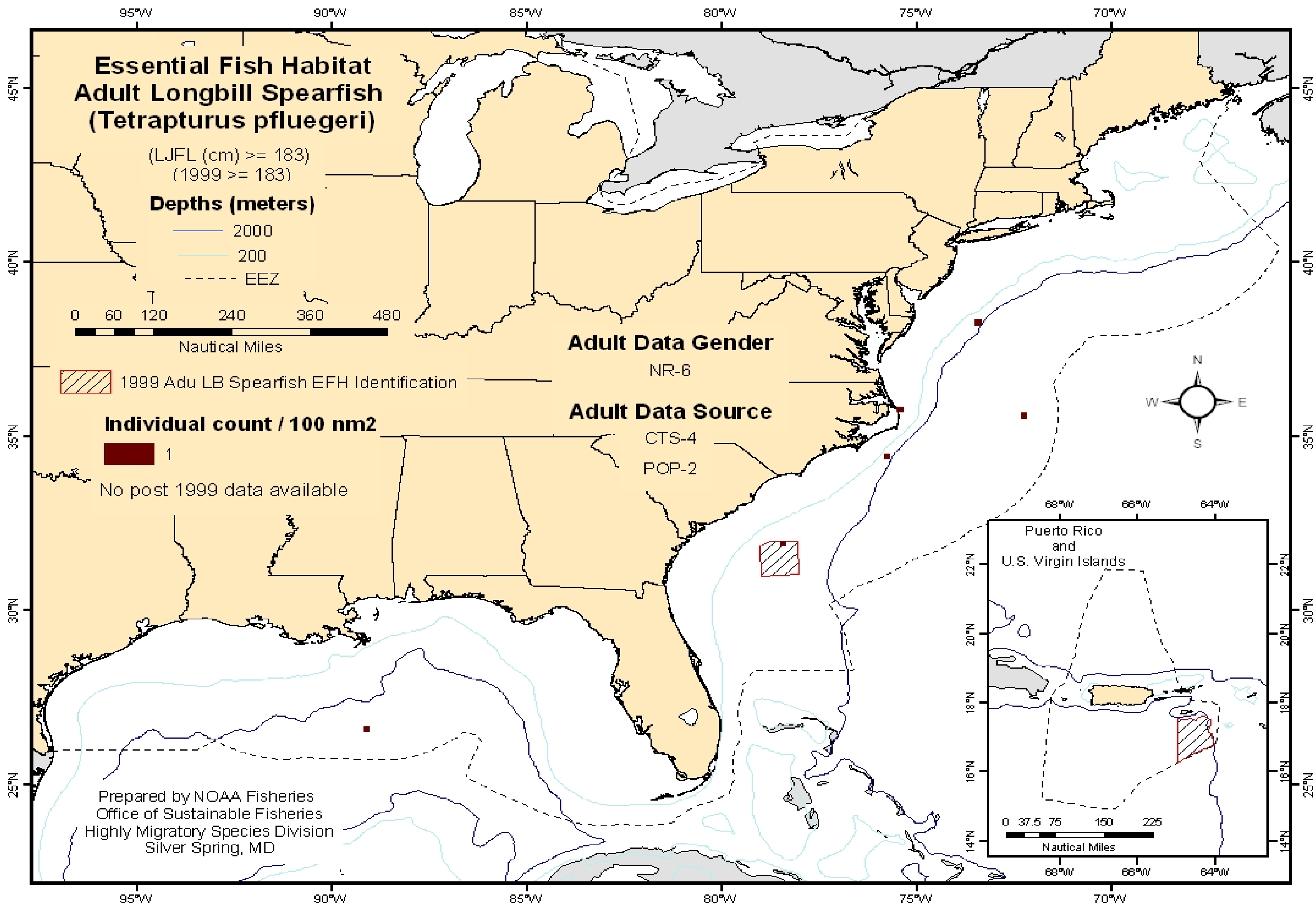

Figure B.30 Spearfish: Adult.

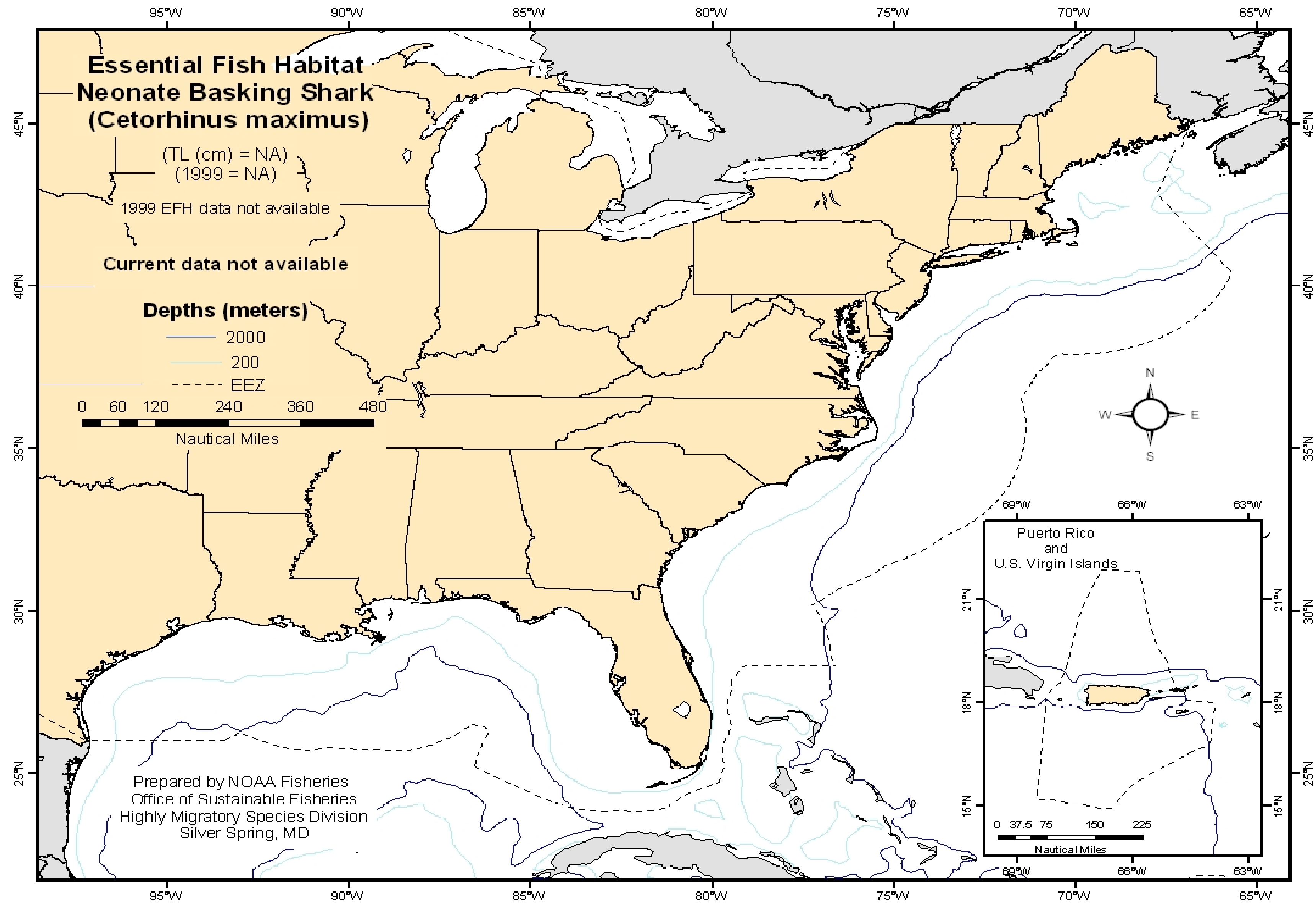

Figure B.31 Basking Shark: Neonate.

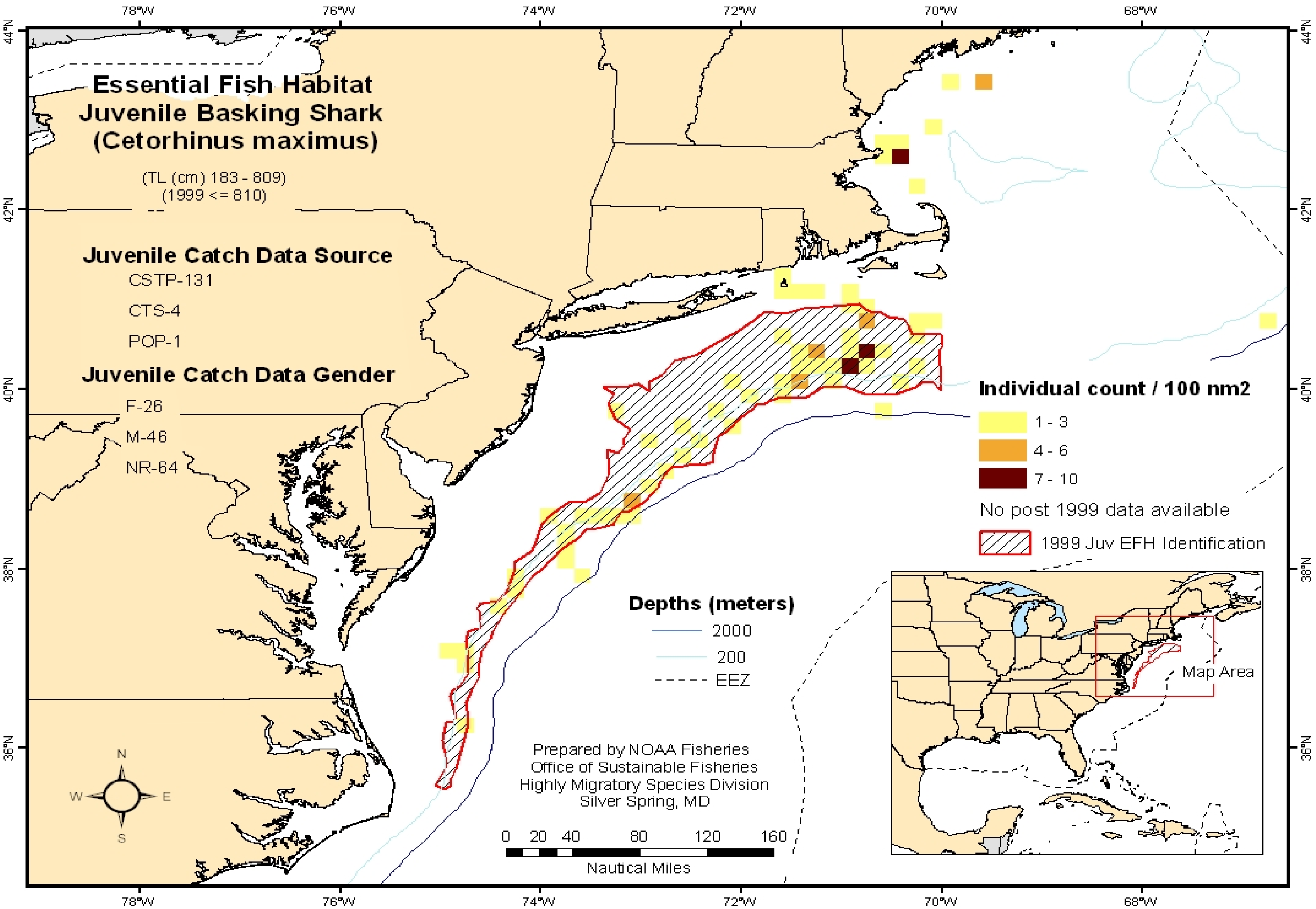

Figure B.32 **Basking Shark: Juvenile.**

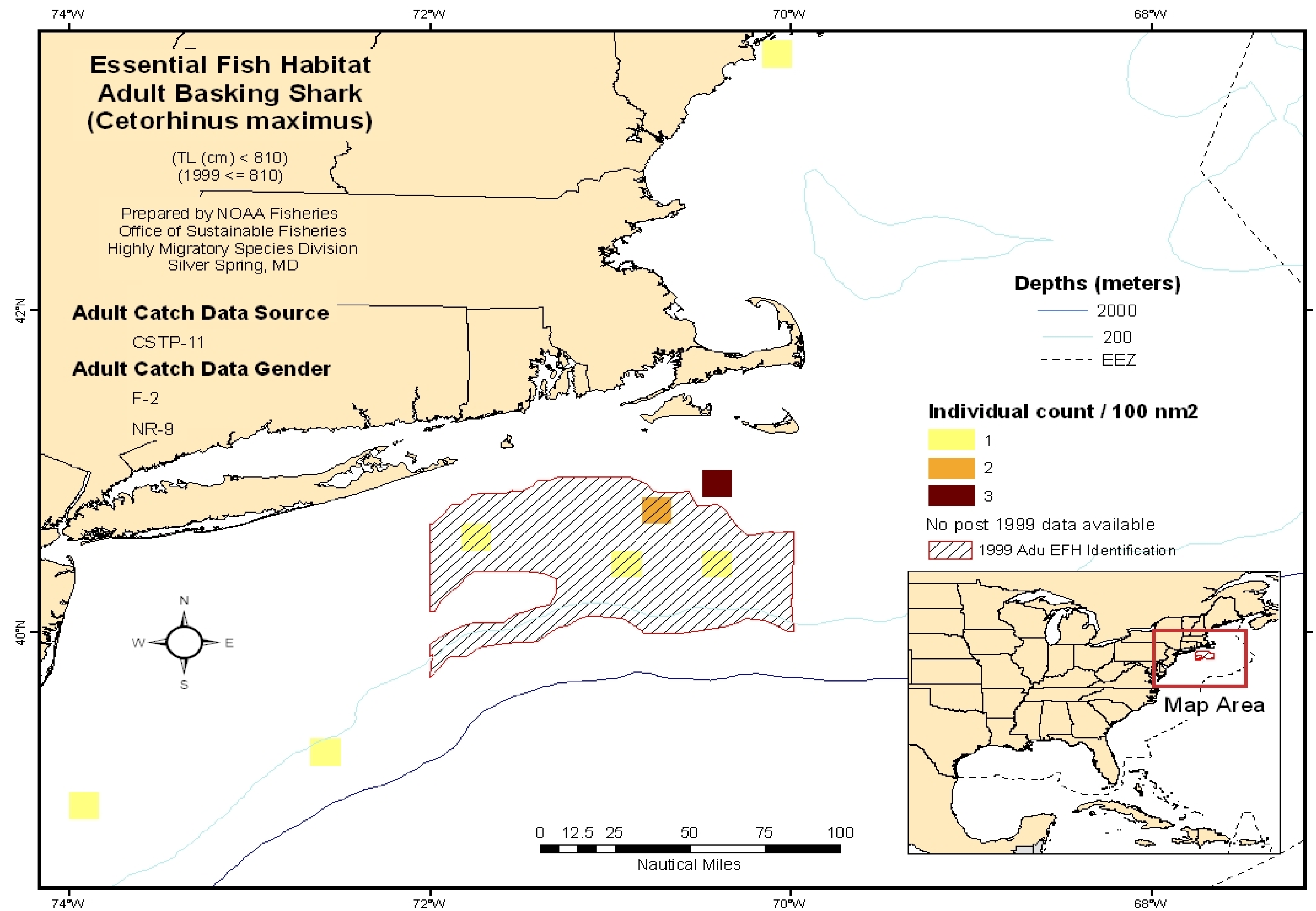

Figure B.33 Basking Shark: Adult.

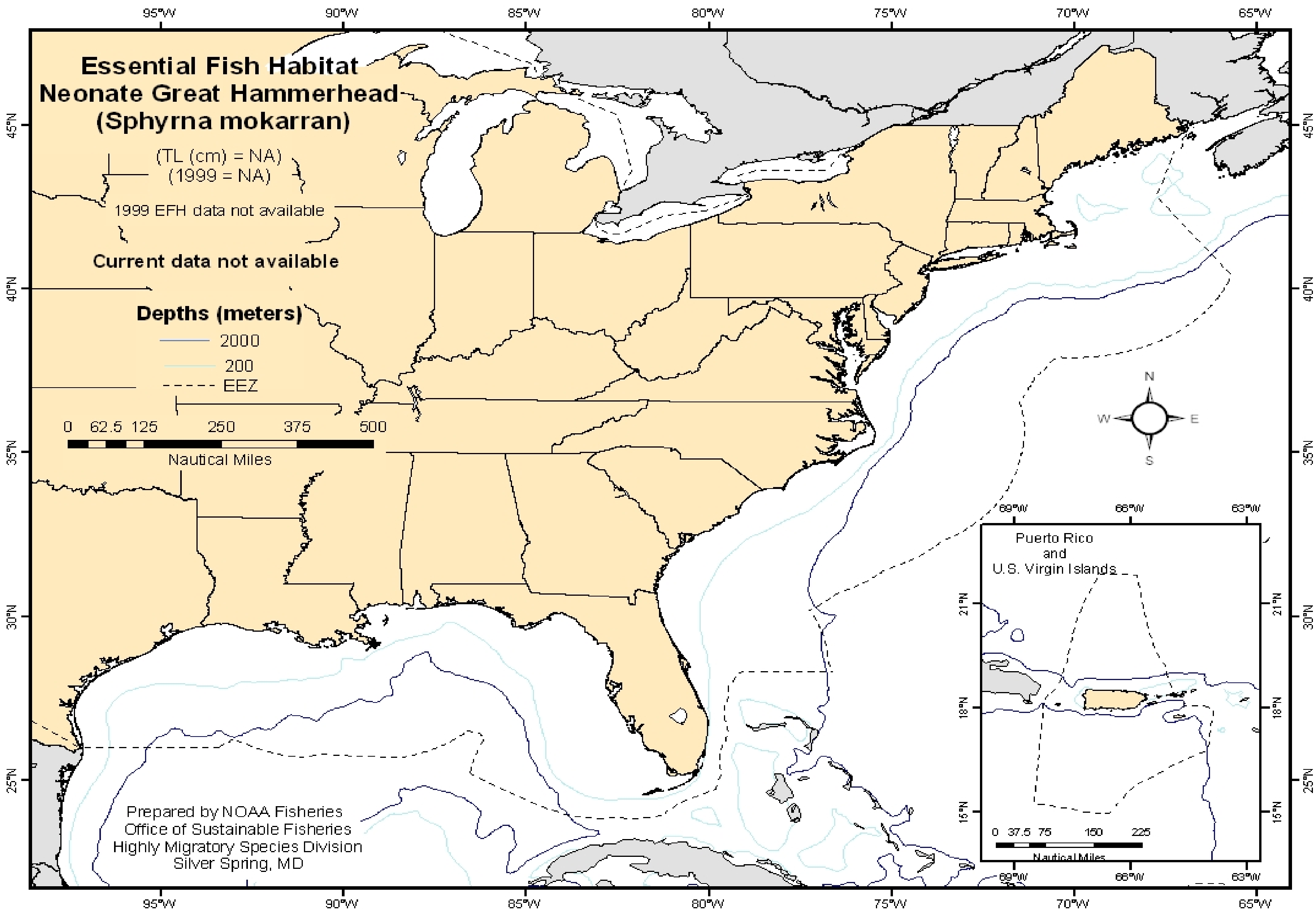

Figure B.34 Great Hammerhead: Neonate.

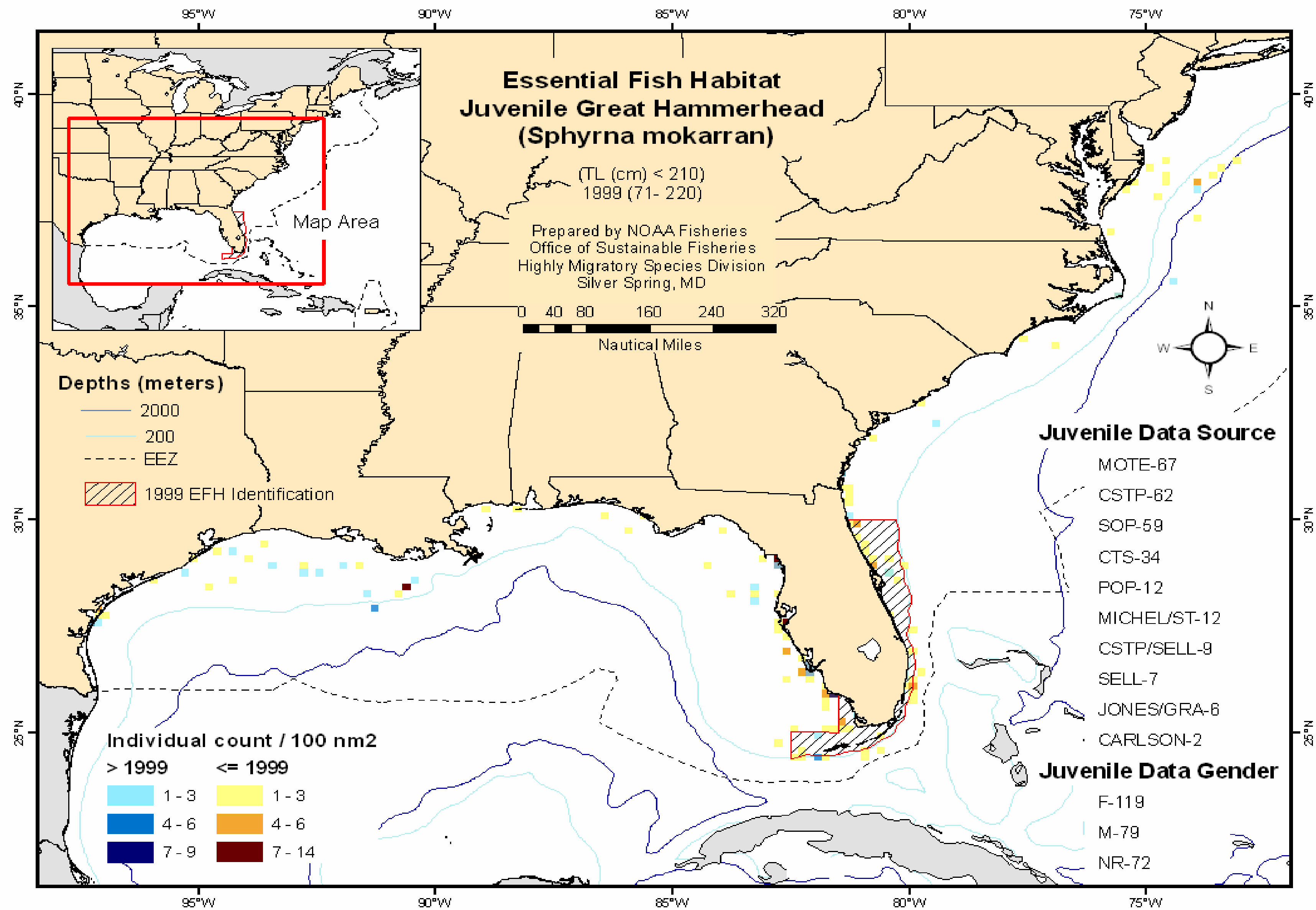

Figure B.35 Great Hammerhead: Juvenile.

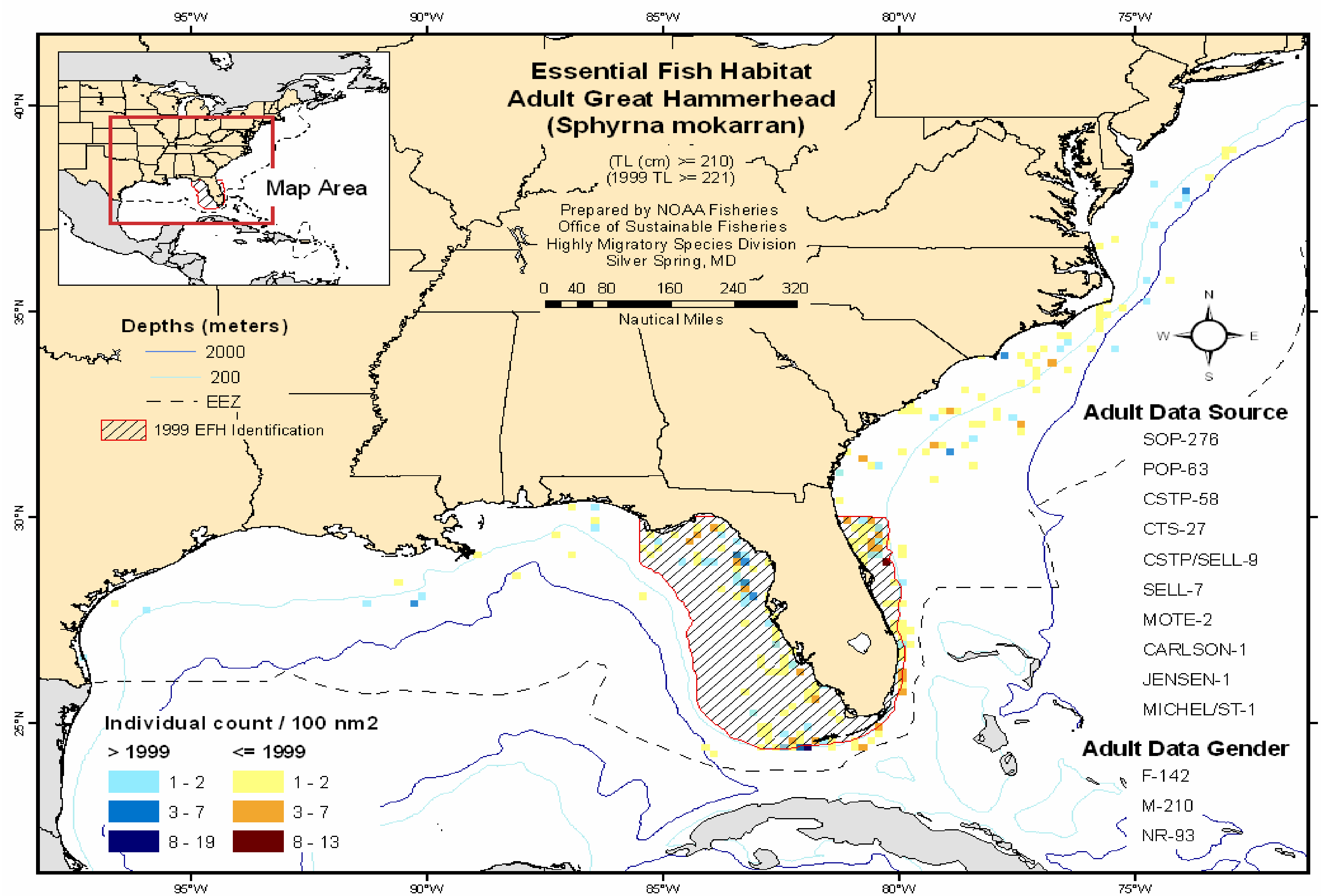

Figure B.36 Great Hammerhead: Adult.

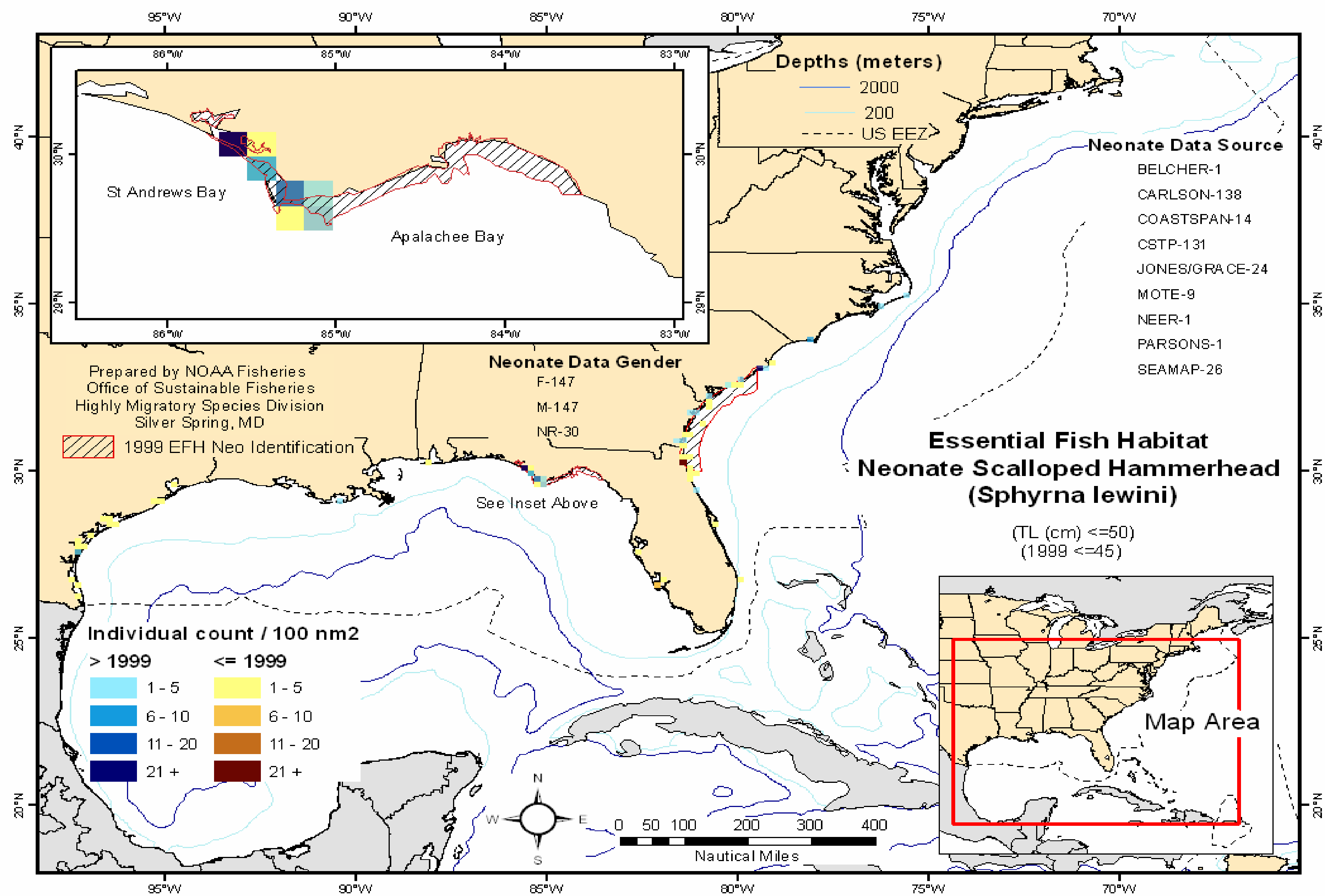

Figure B.37 Scalloped Hammerhead: Neonate.

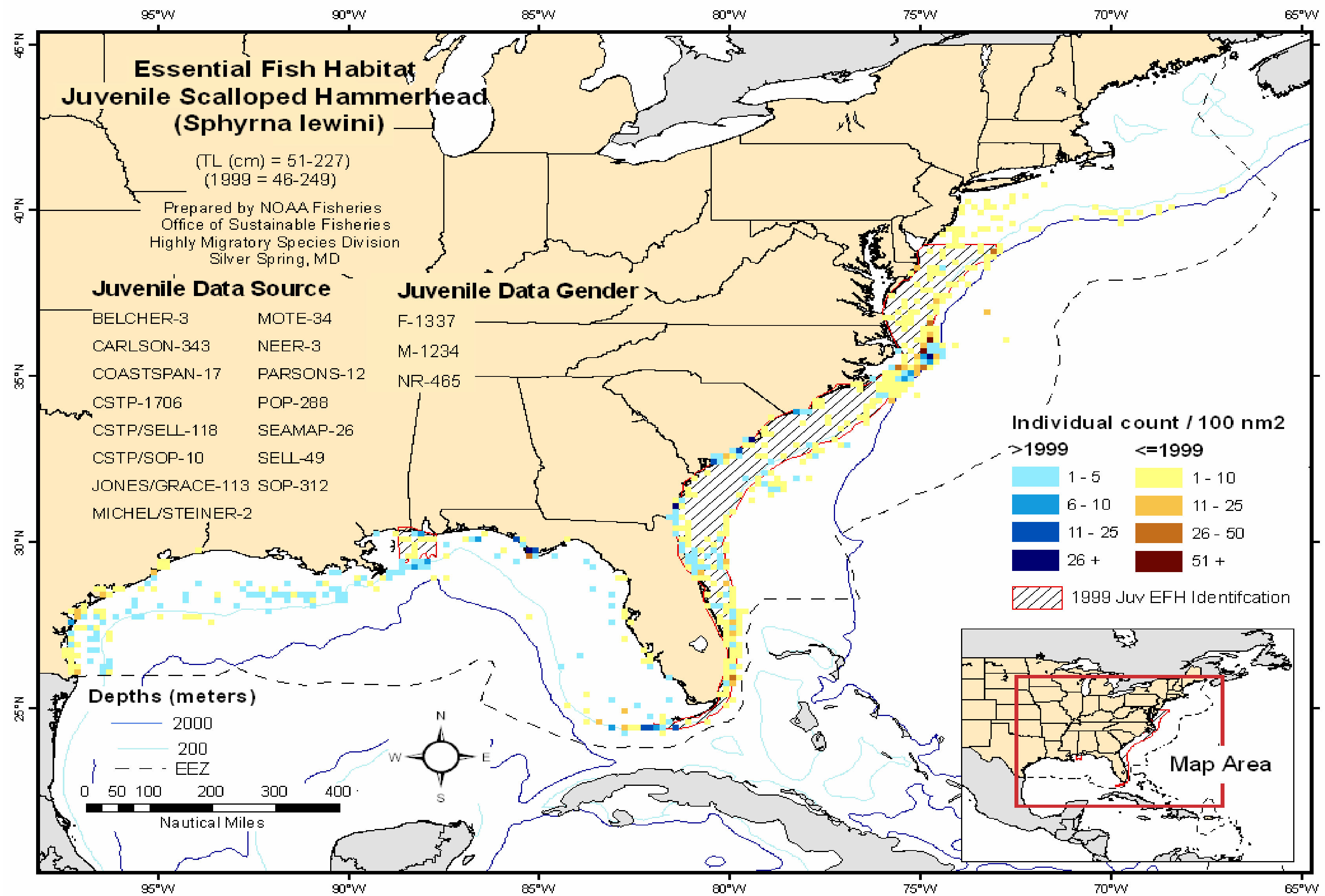

Figure B.38 Scalloped Hammerhead: Juvenile.

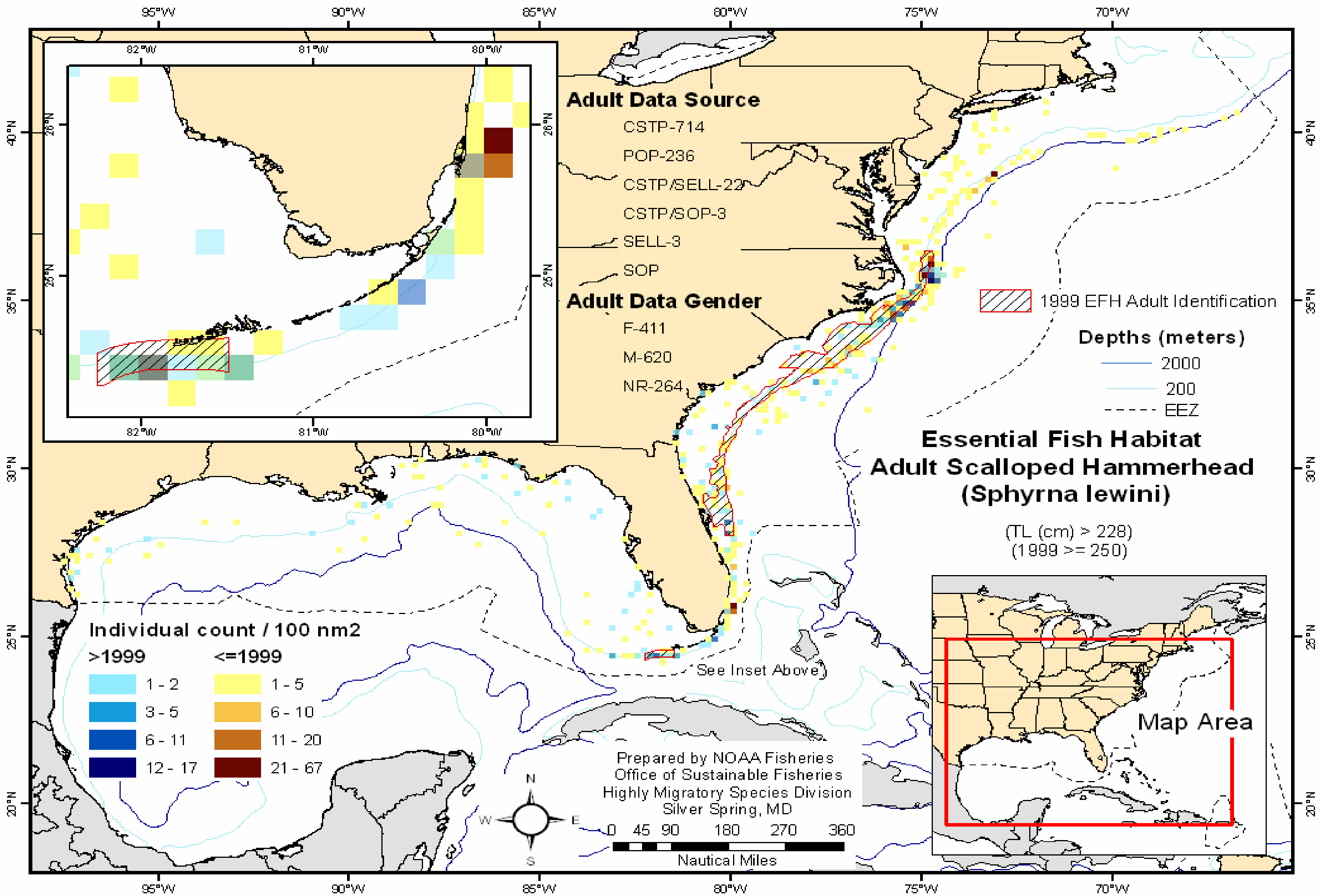

Figure B.39 **Scalloped Hammerhead: Adult.**

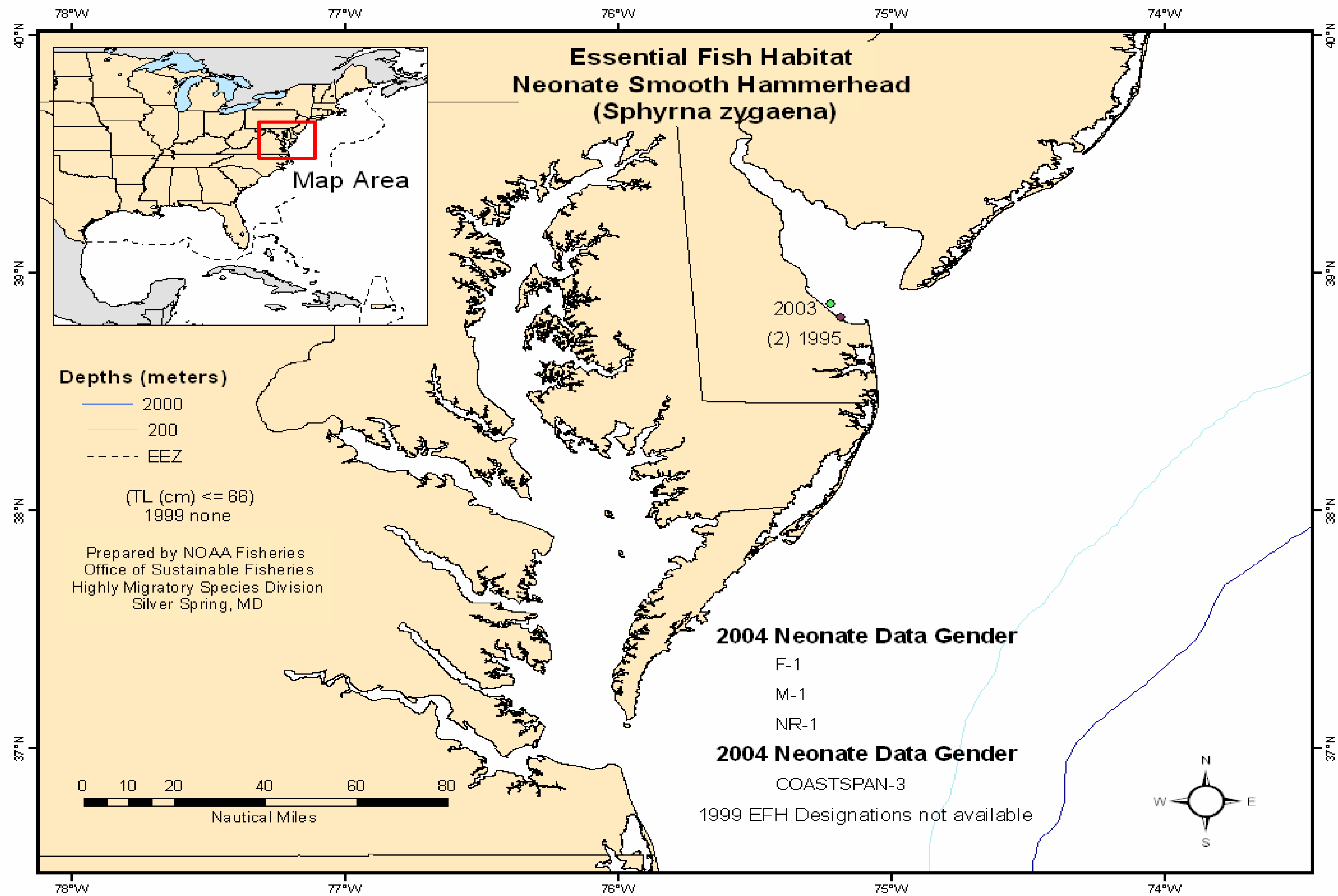

Figure B.40 **Smooth Hammerhead: Neonate.**

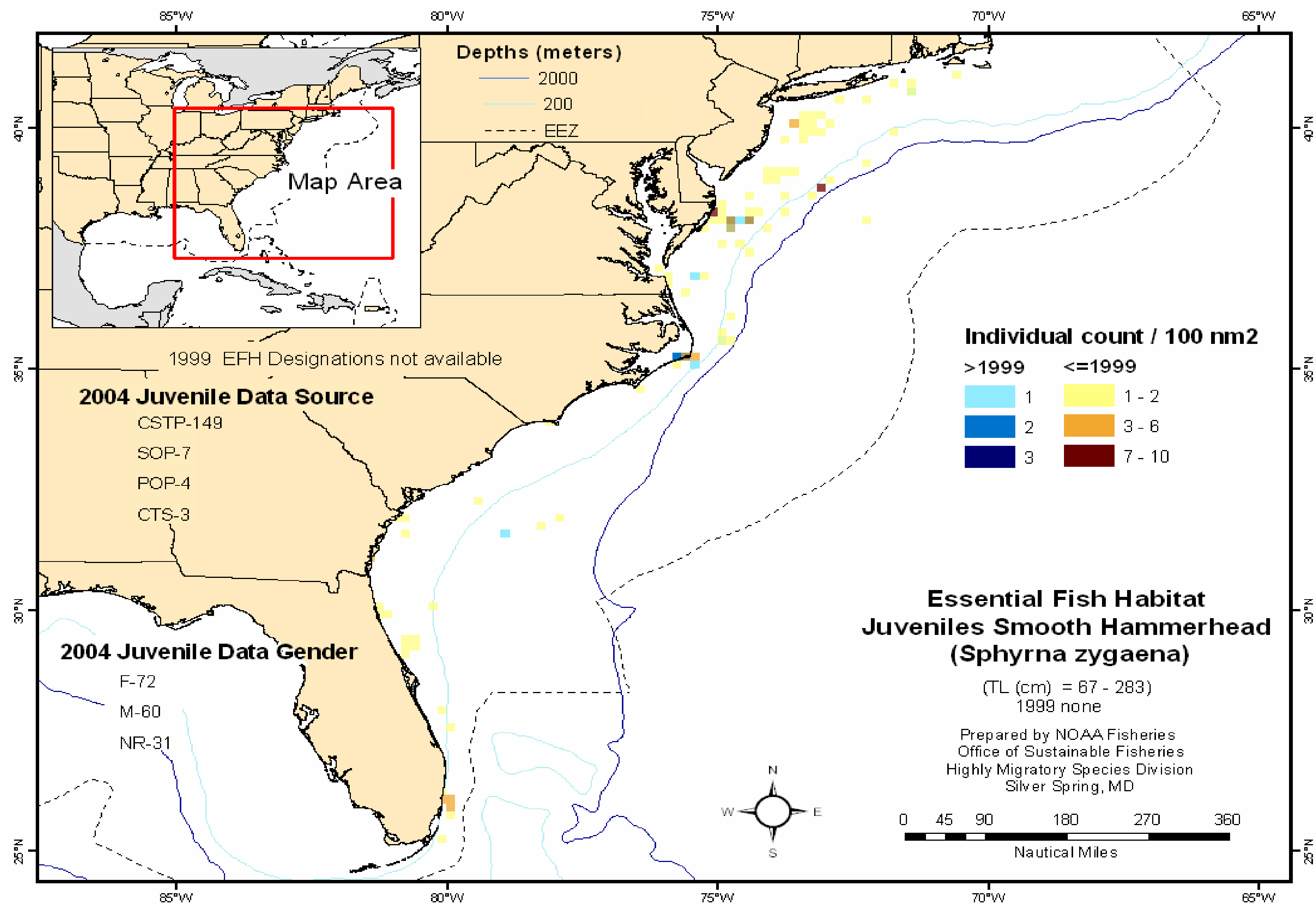

Figure B.41 **Smooth Hammerhead: Juvenile.**

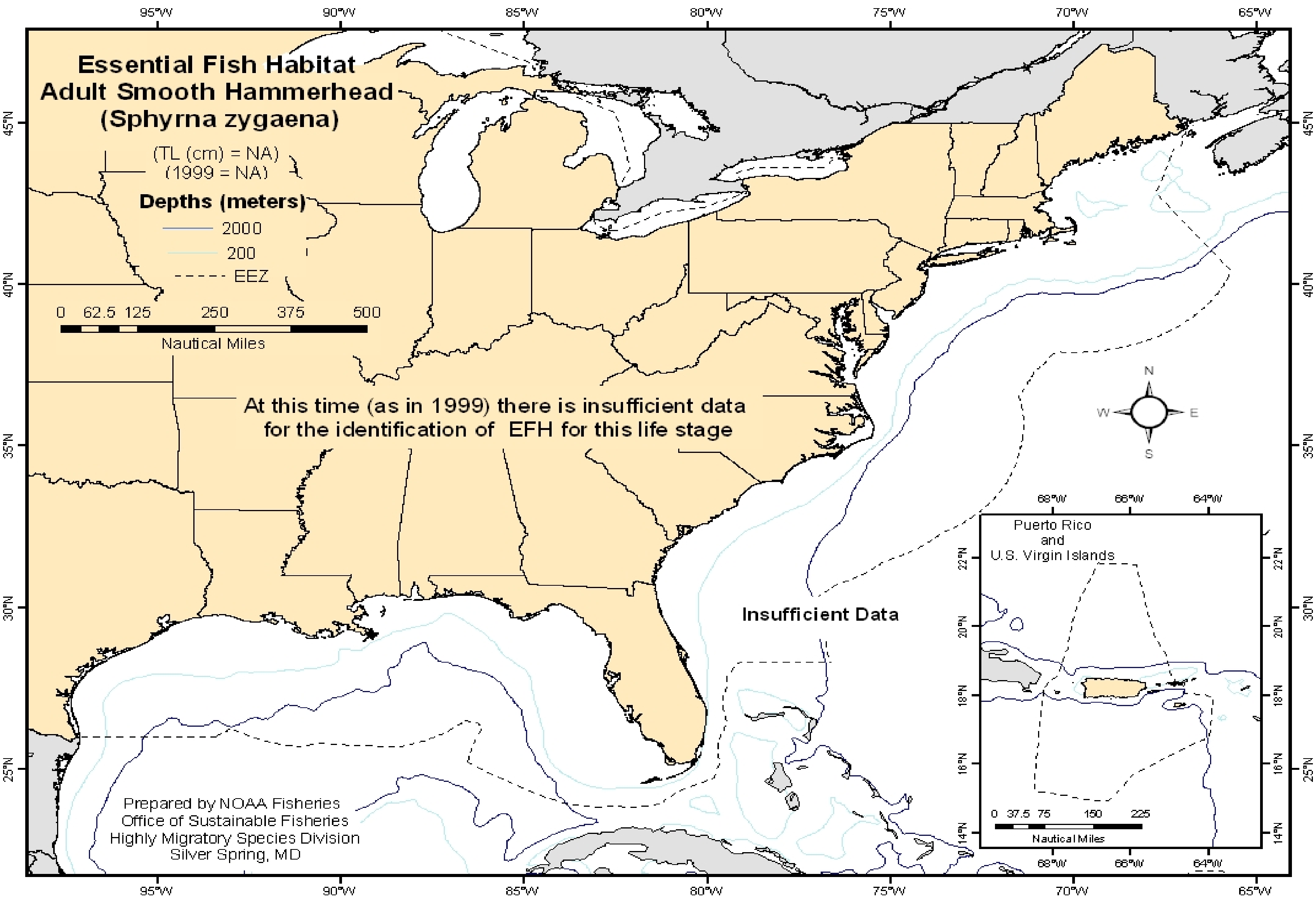

Figure B.42 **Smooth Hammerhead: Adult.**

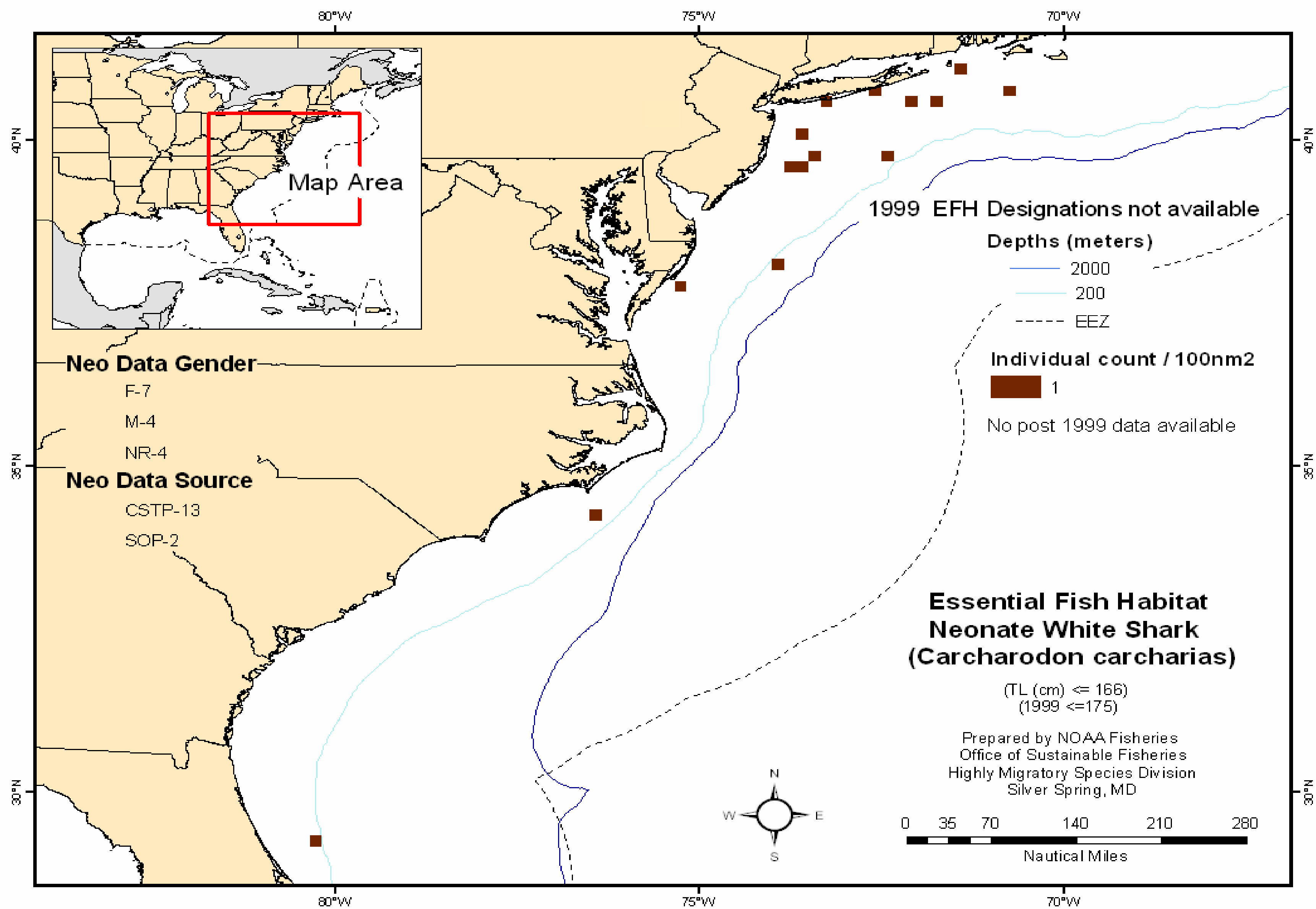

Figure B.43 **White Shark: Neonate.**

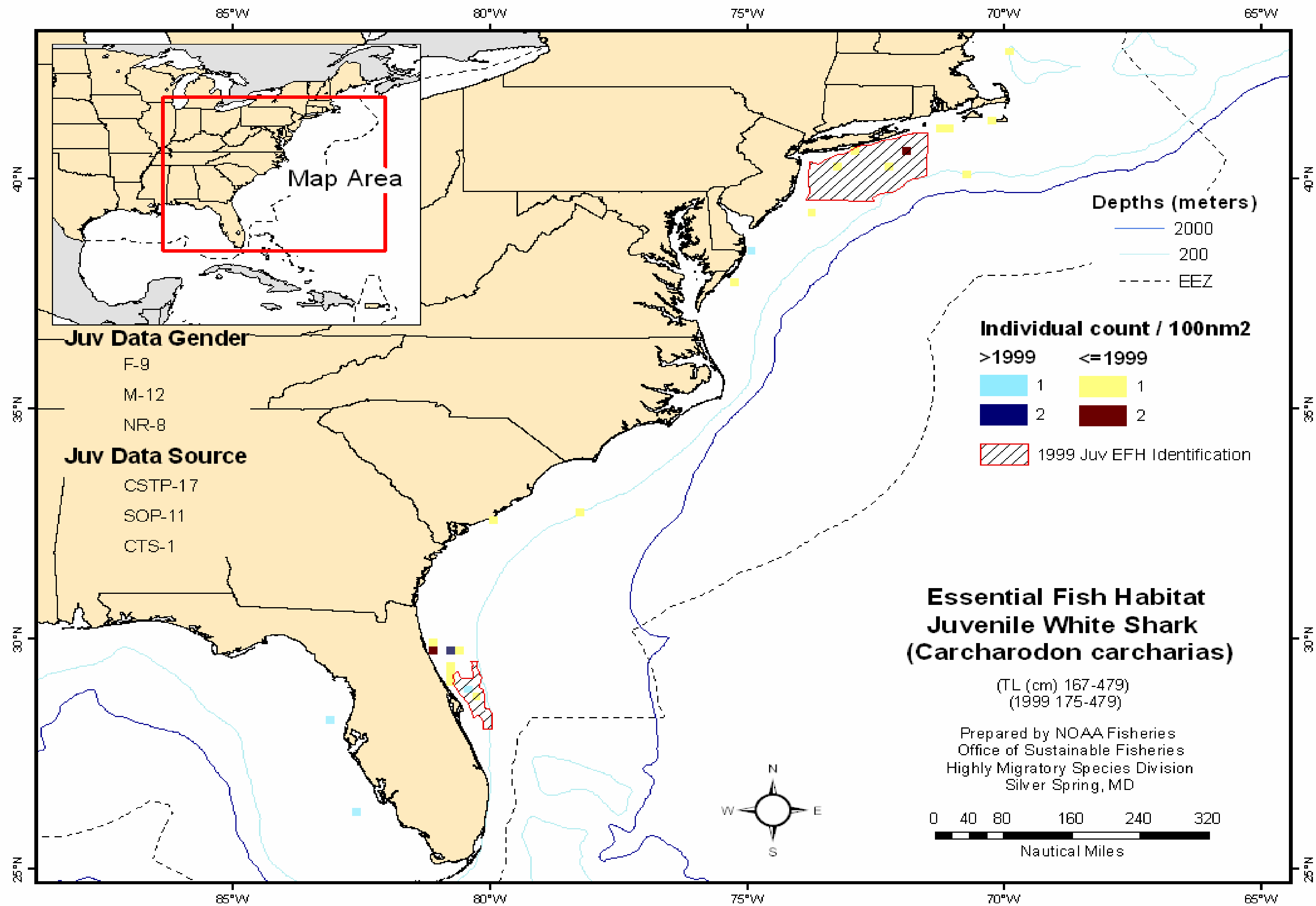

Figure B.44 White Shark: Juvenile.

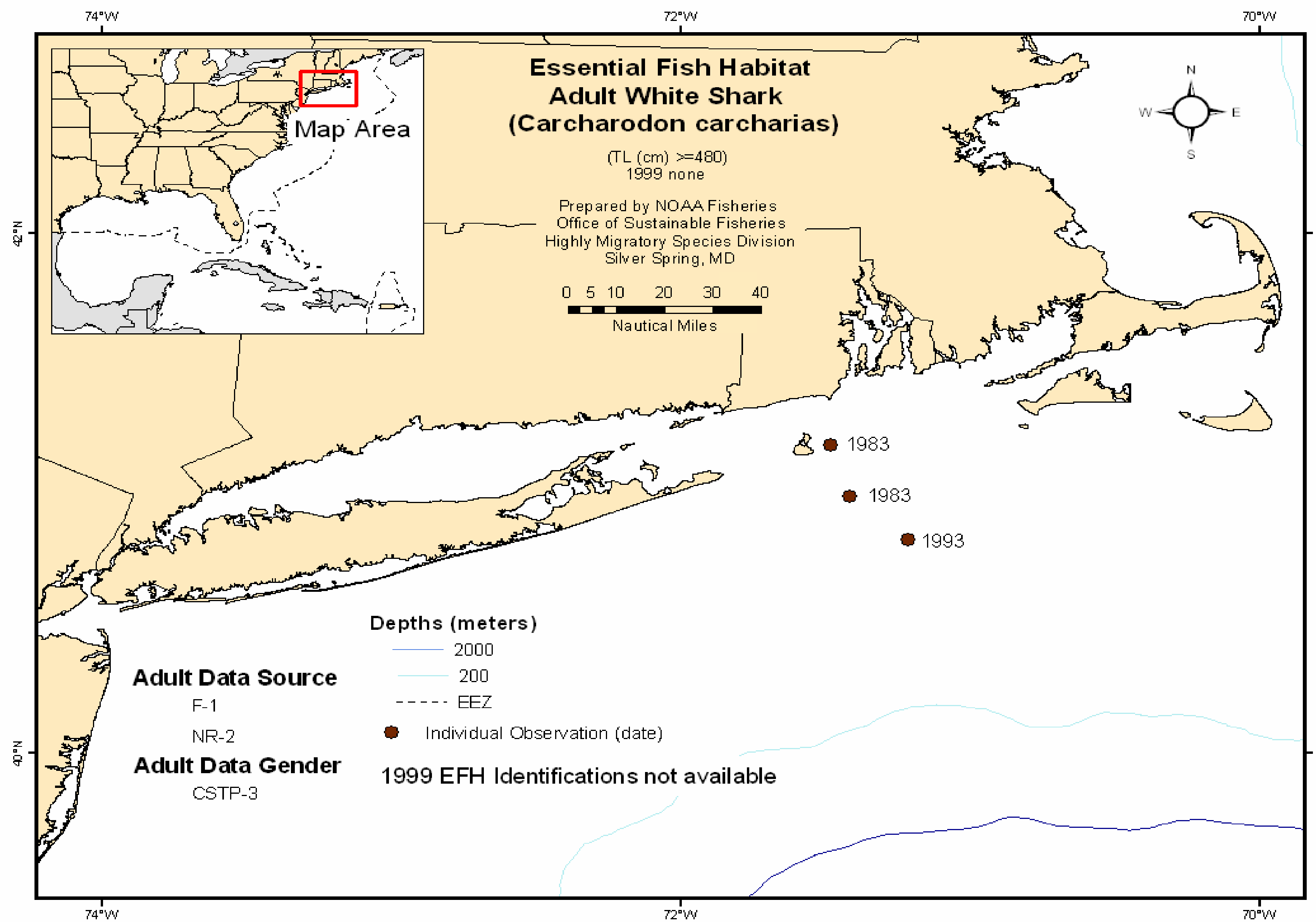

Figure B.45 White Shark: Adult.

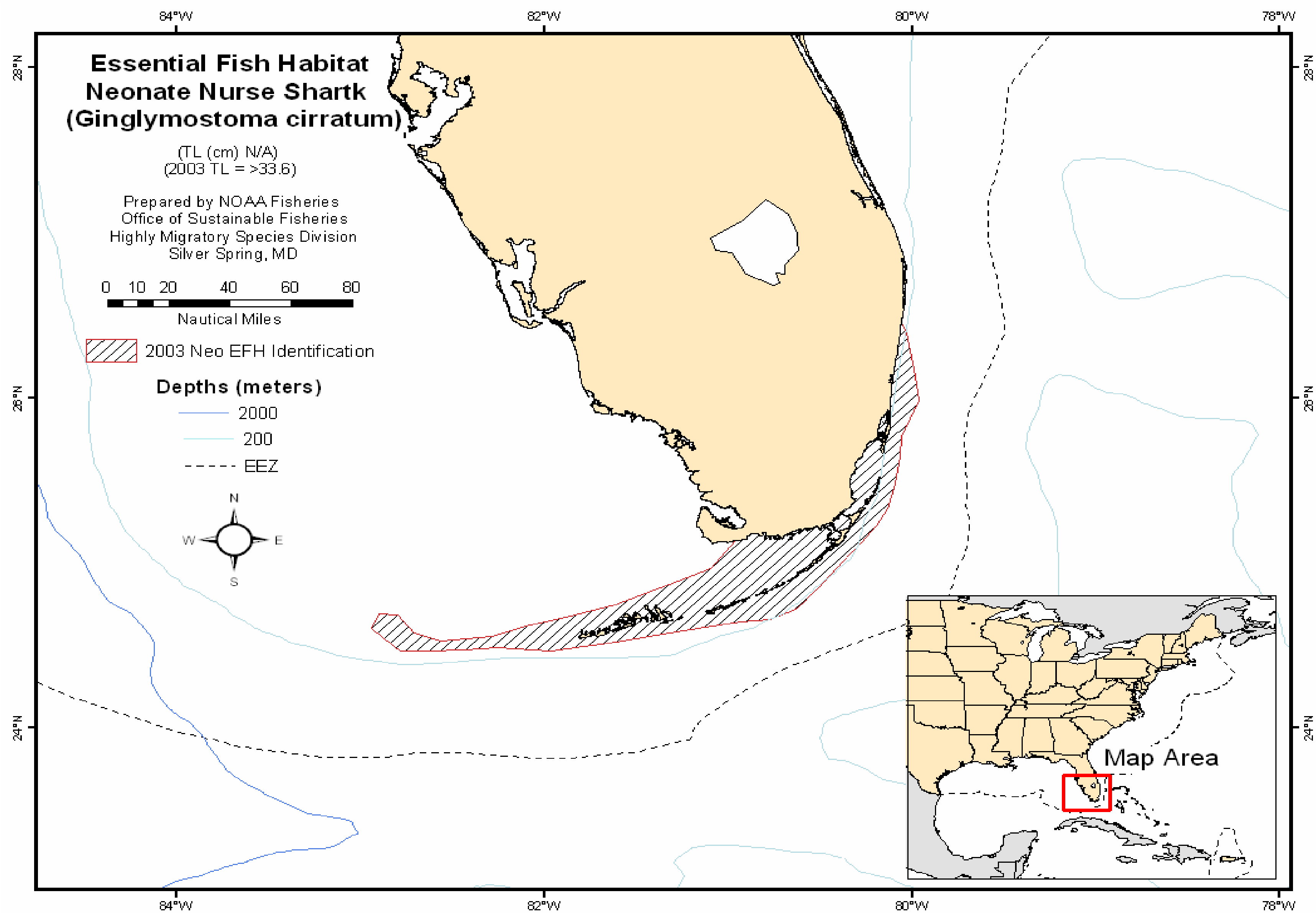

Figure B.46 Nurse Shark: Neonate.

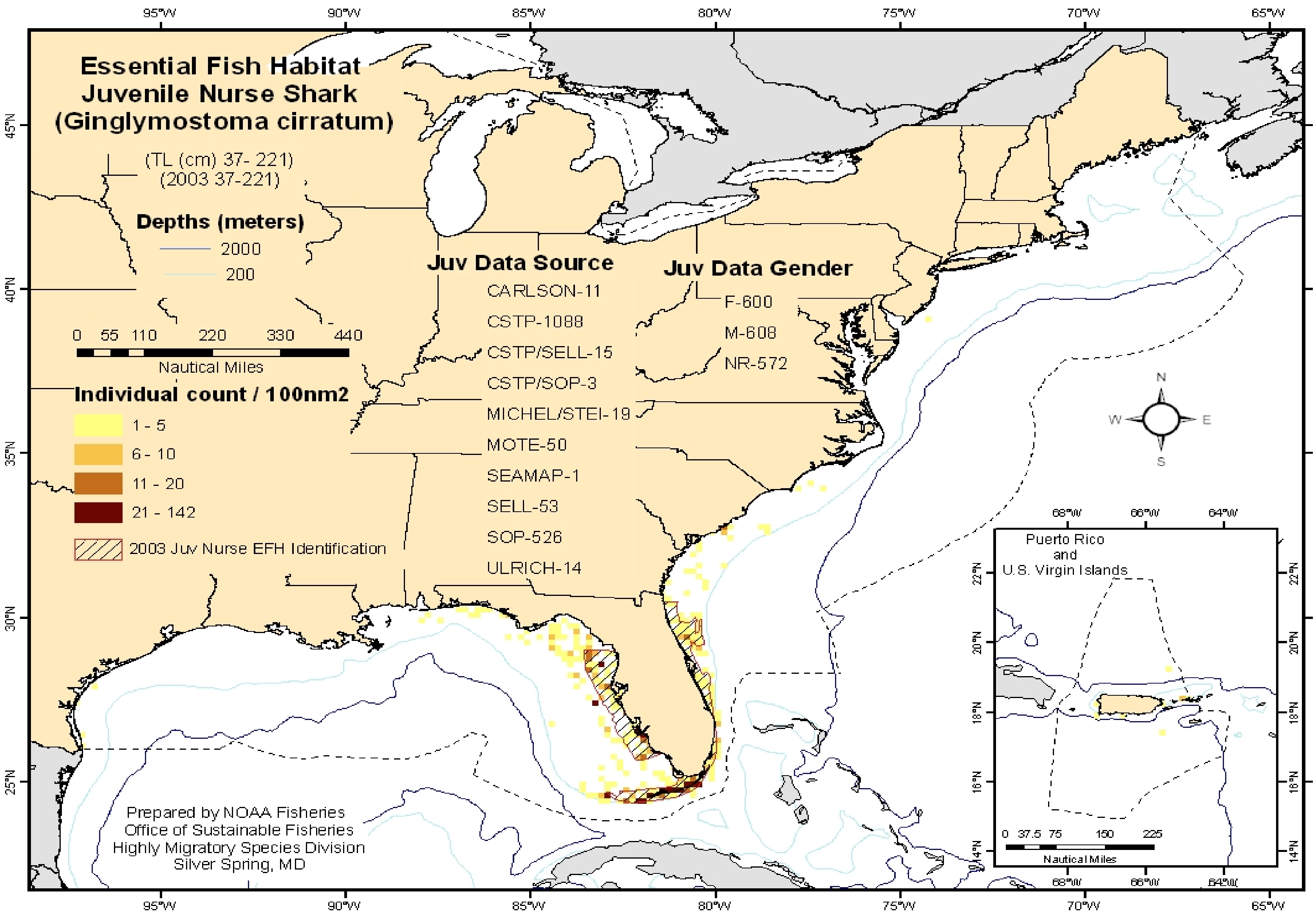

Figure B.47 Nurse Shark: Juvenile.

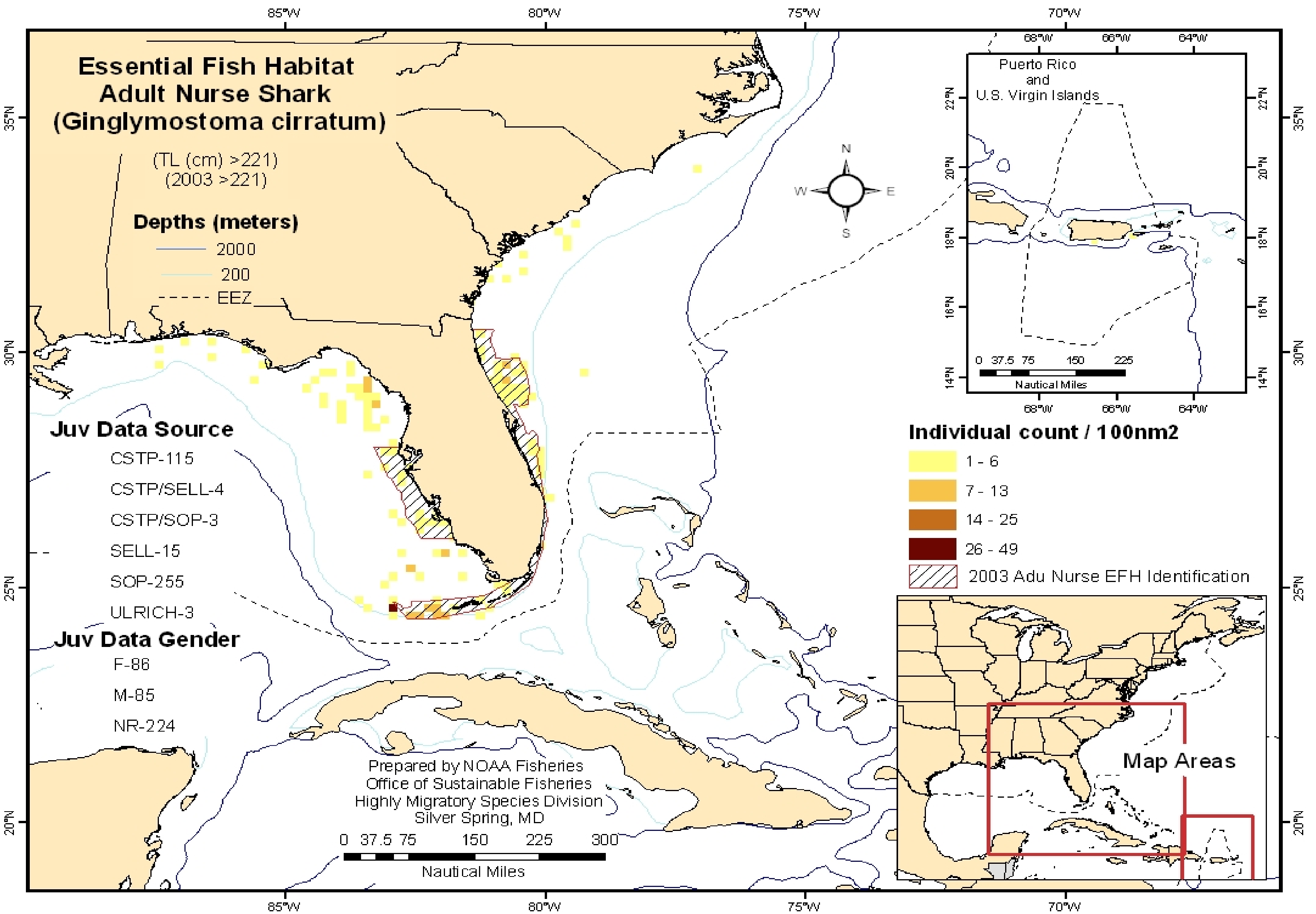

Figure B.48 Nurse Shark: Adult.

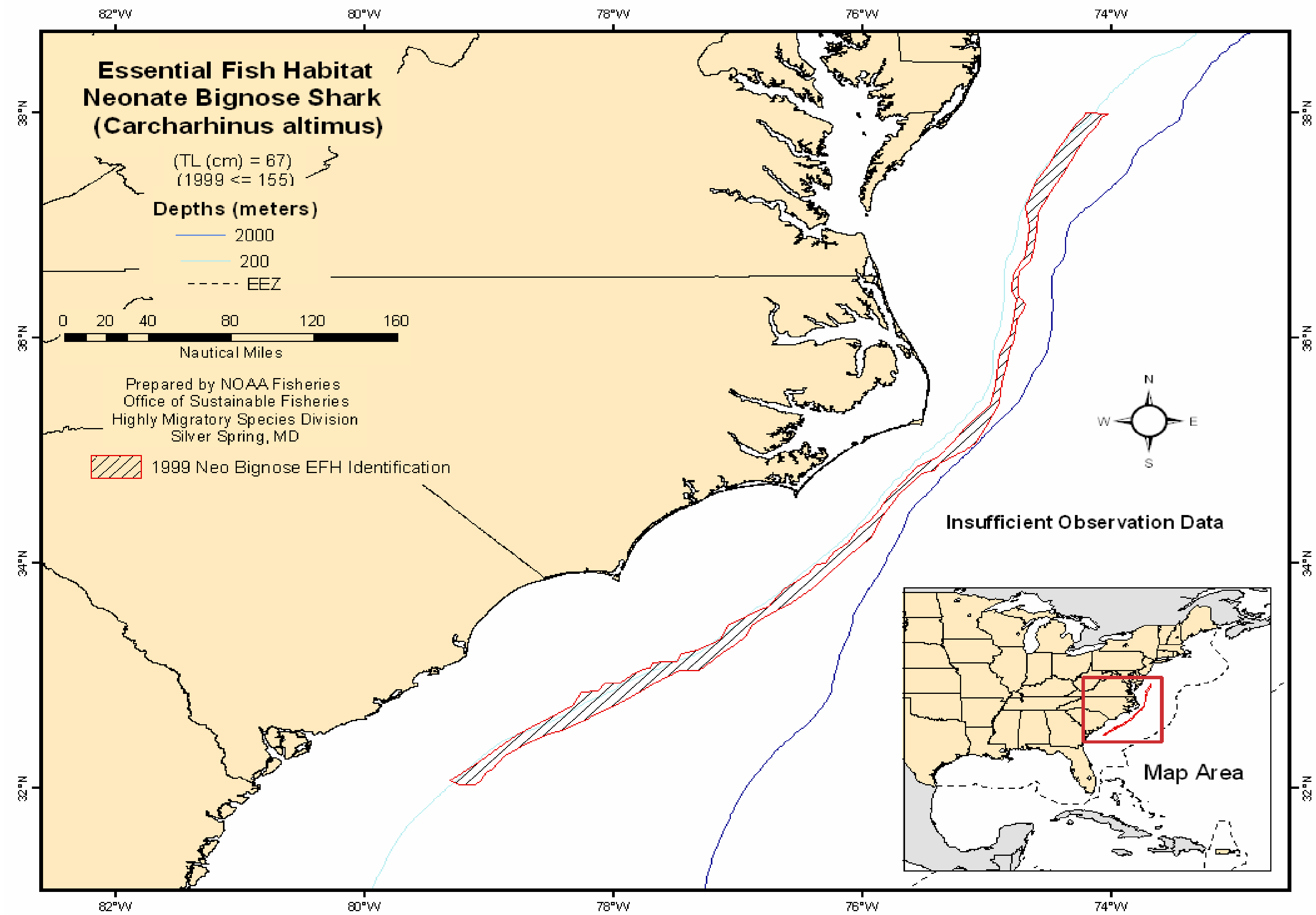

Figure B.49 **Bignose Shark: Neonate.**

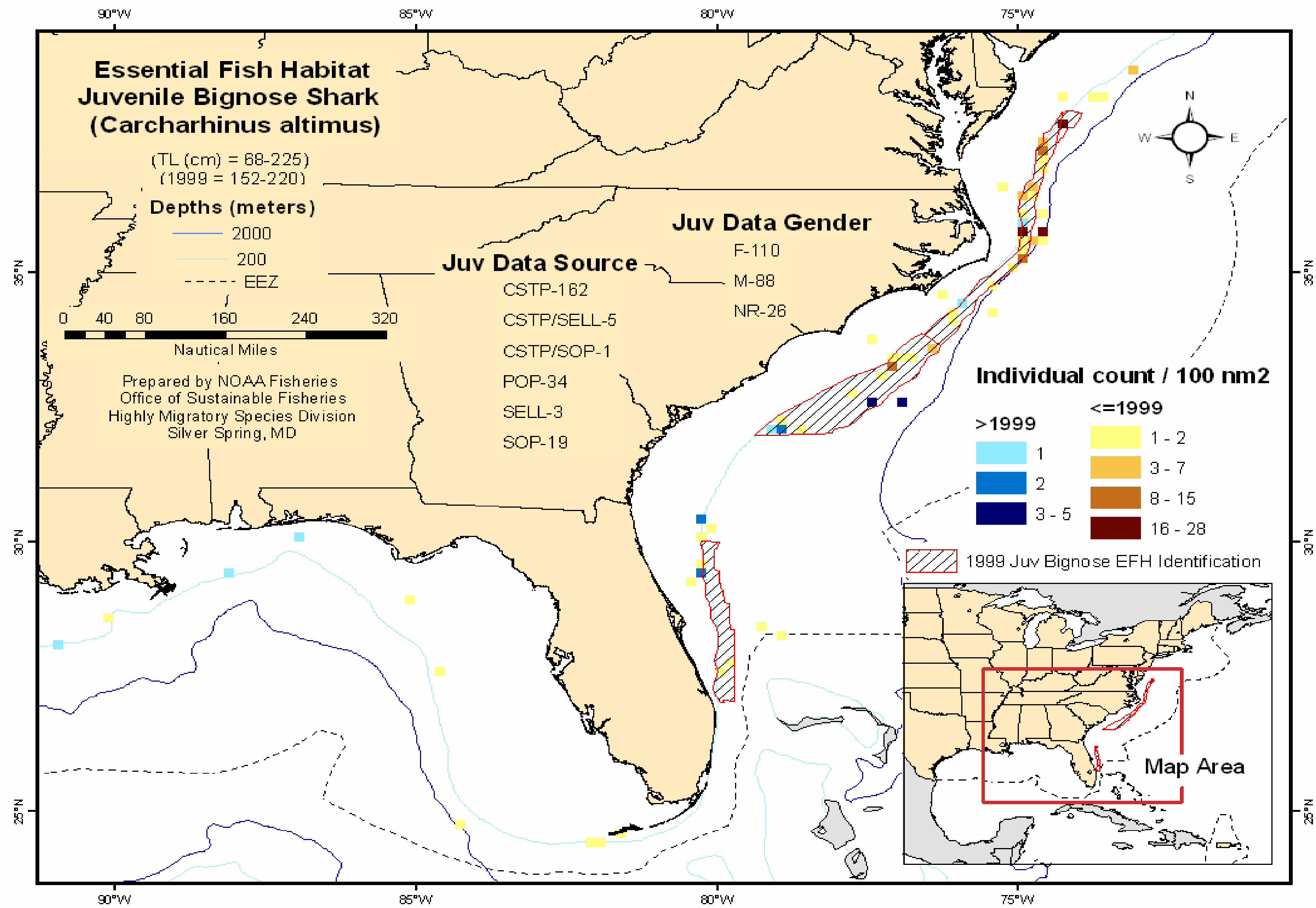

Figure B.50 Bignose Shark: Juvenile.

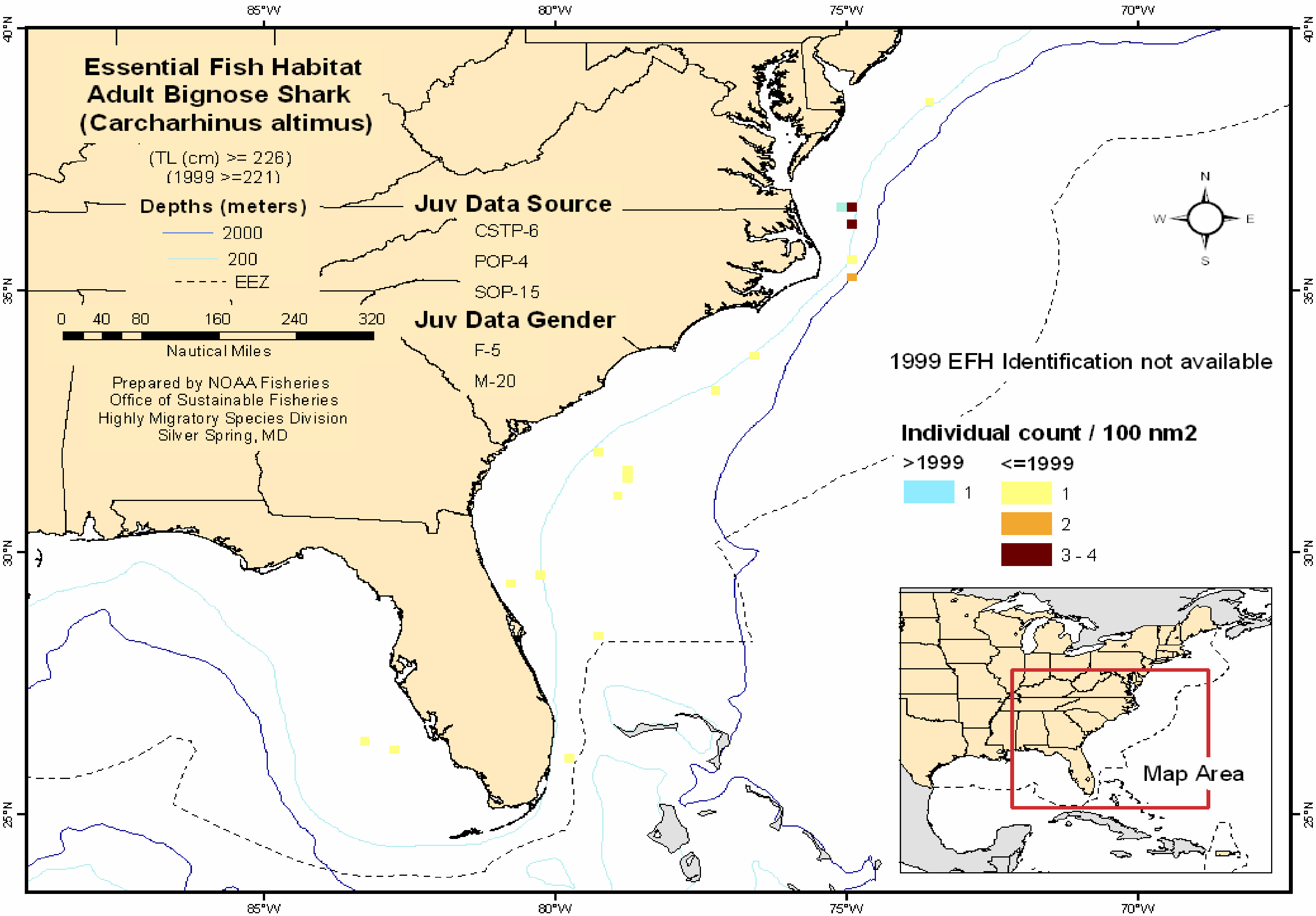

Figure B.51 Bignose Shark: Adult.

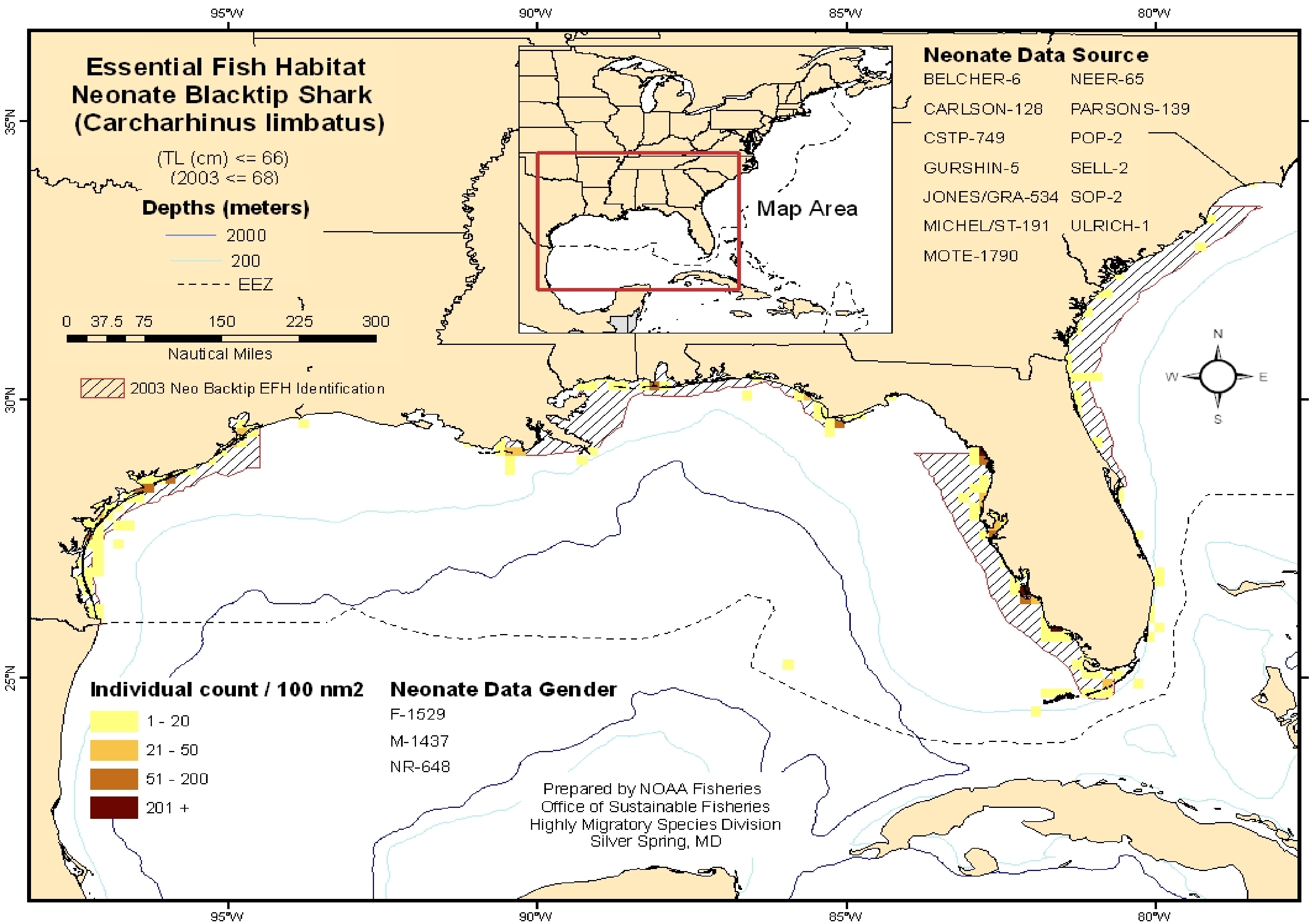

Figure B.52 Blacktip Shark: Neonate.

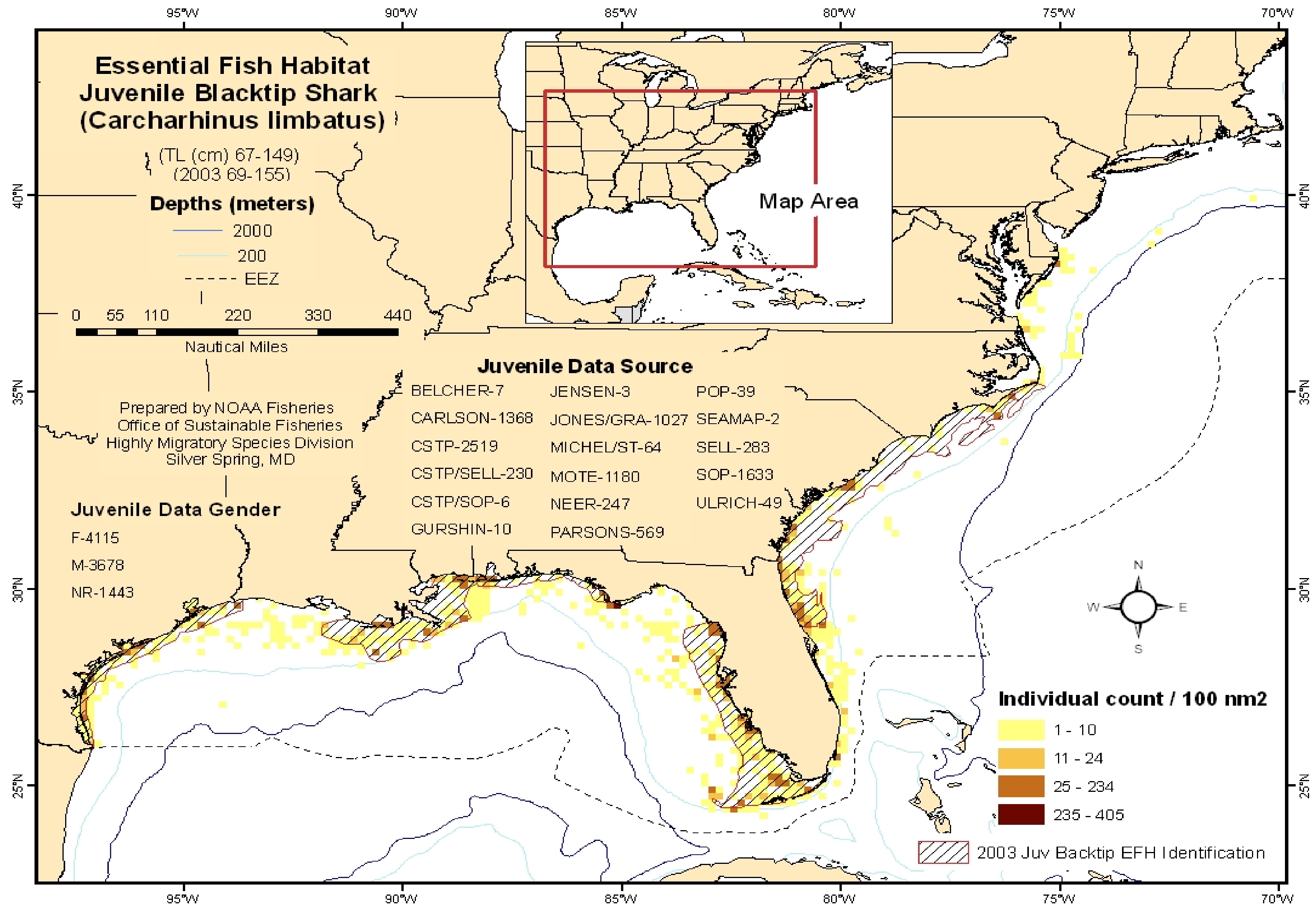

Figure B.53 **Blacktip Shark: Juvenile.**

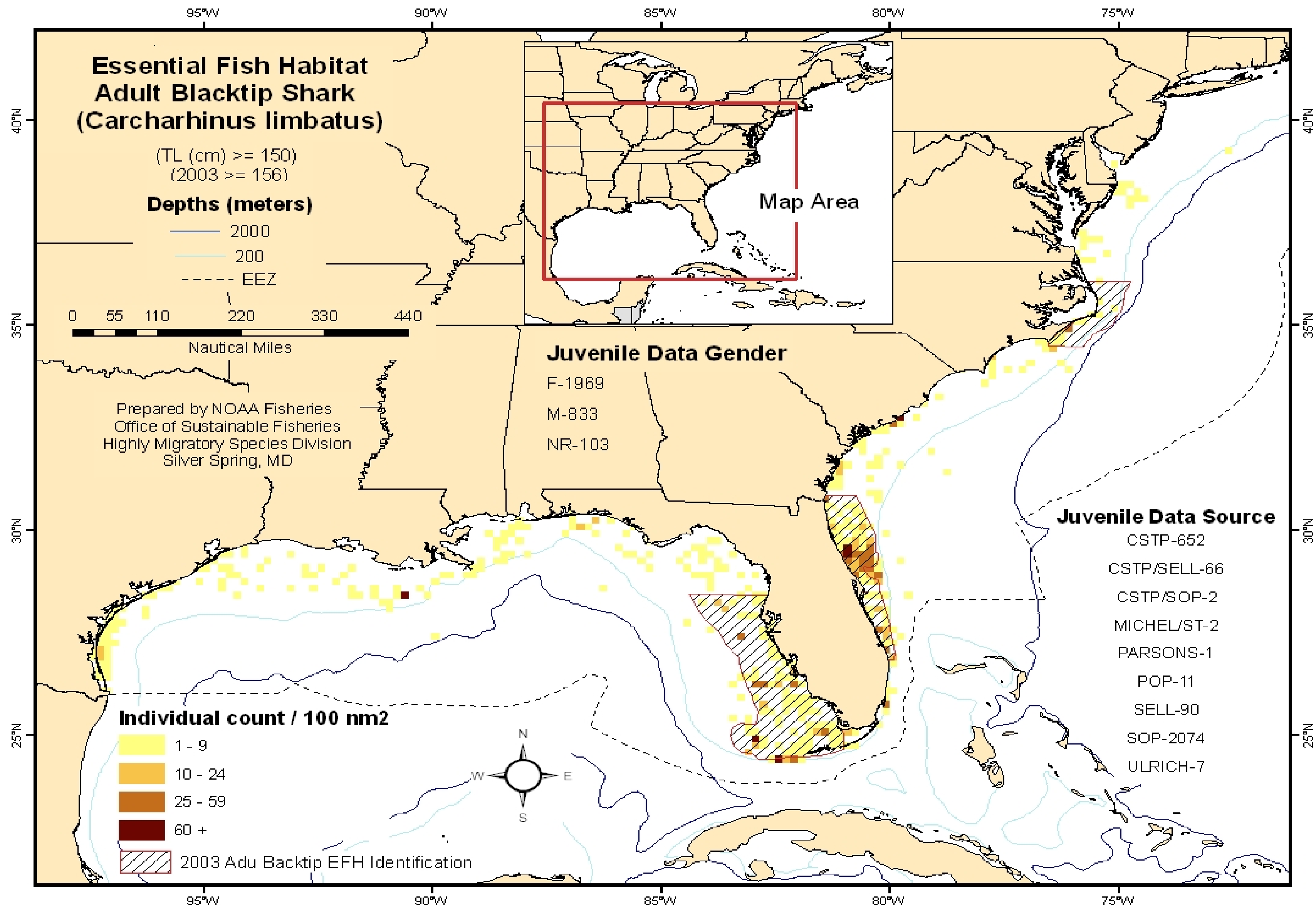

Figure B.54 **Blacktip Shark: Adult.**

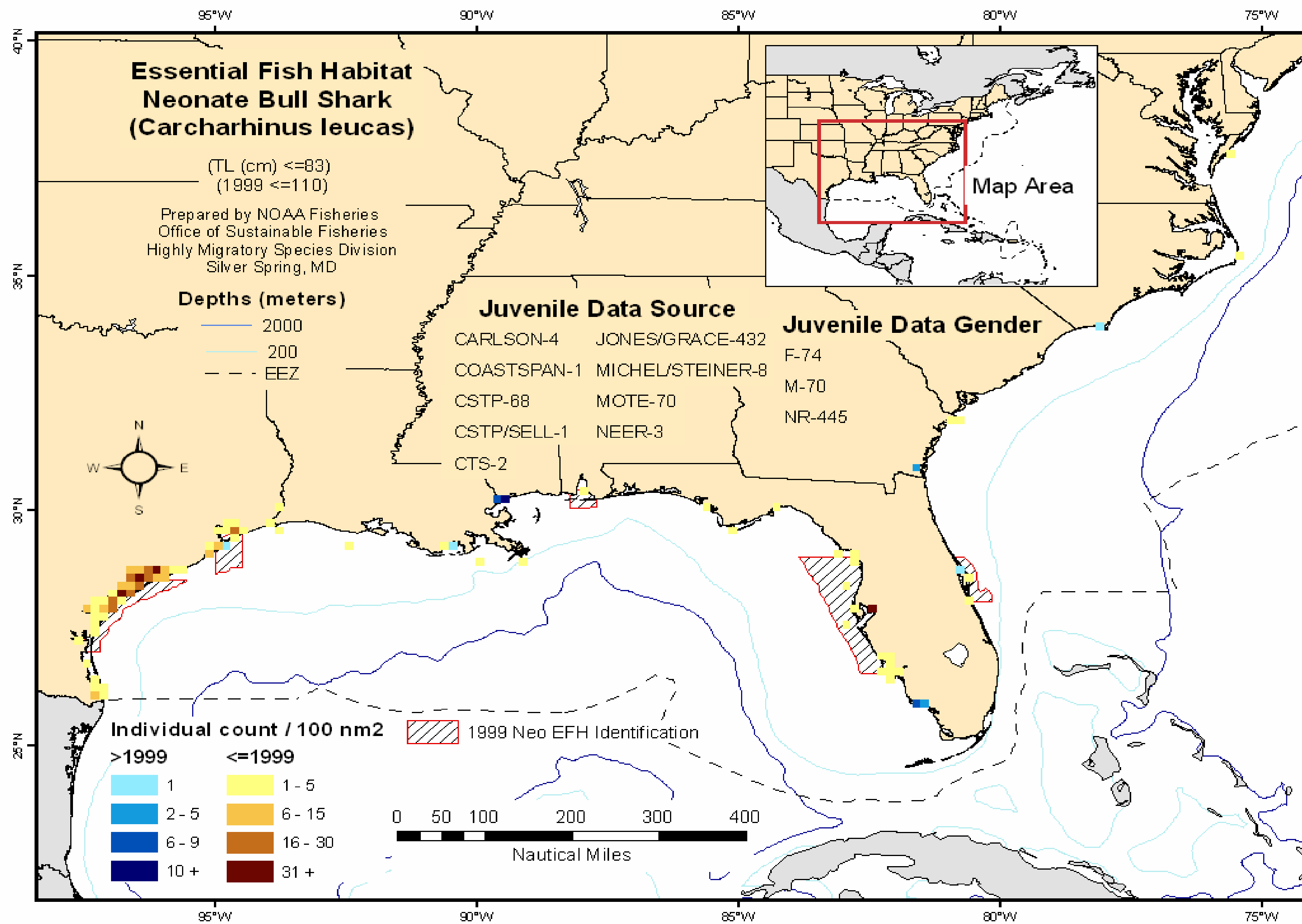

Figure B.55 **Bull Shark: Neonate.**

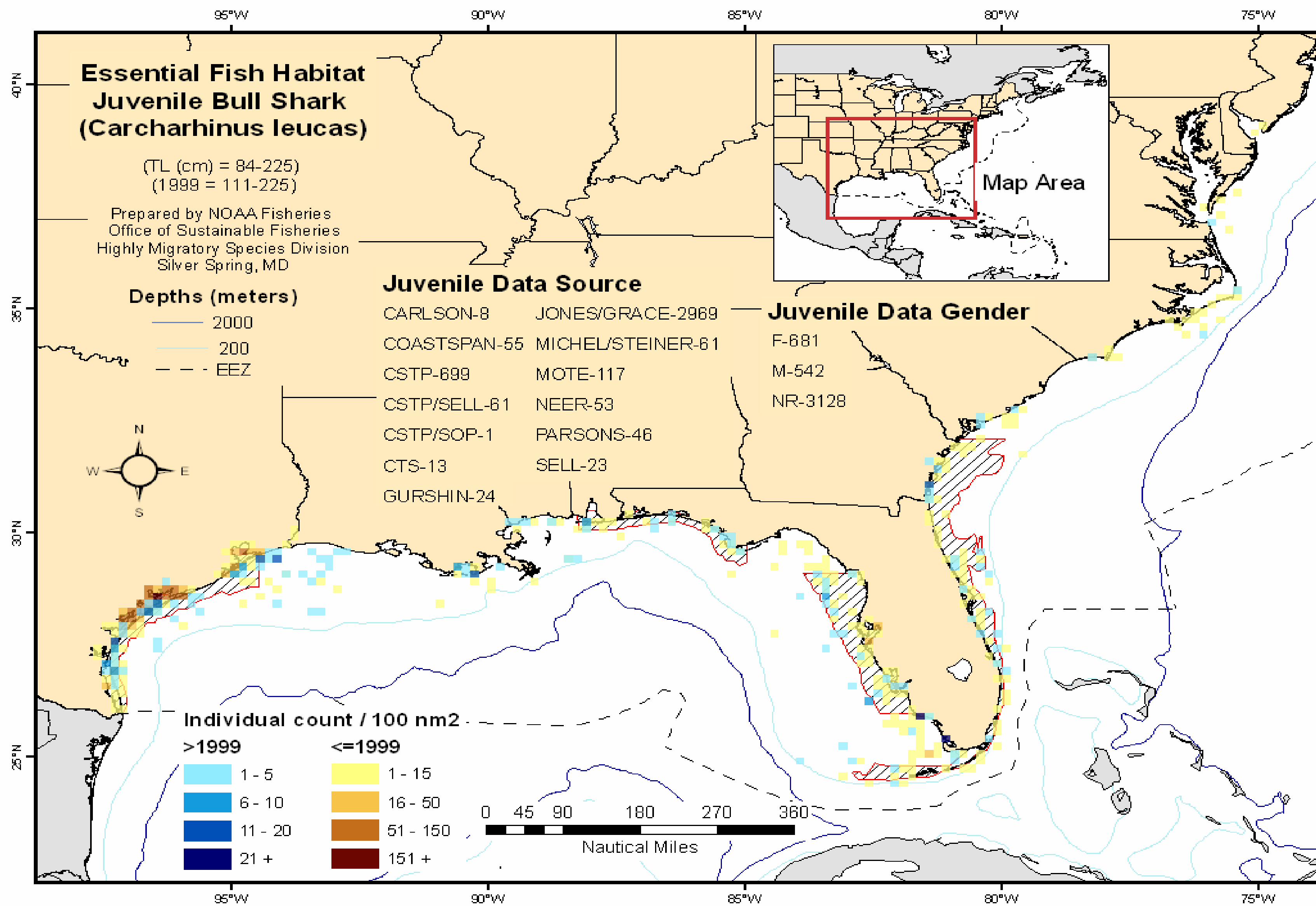

Figure B.56 **Bull Shark: Juvenile.**

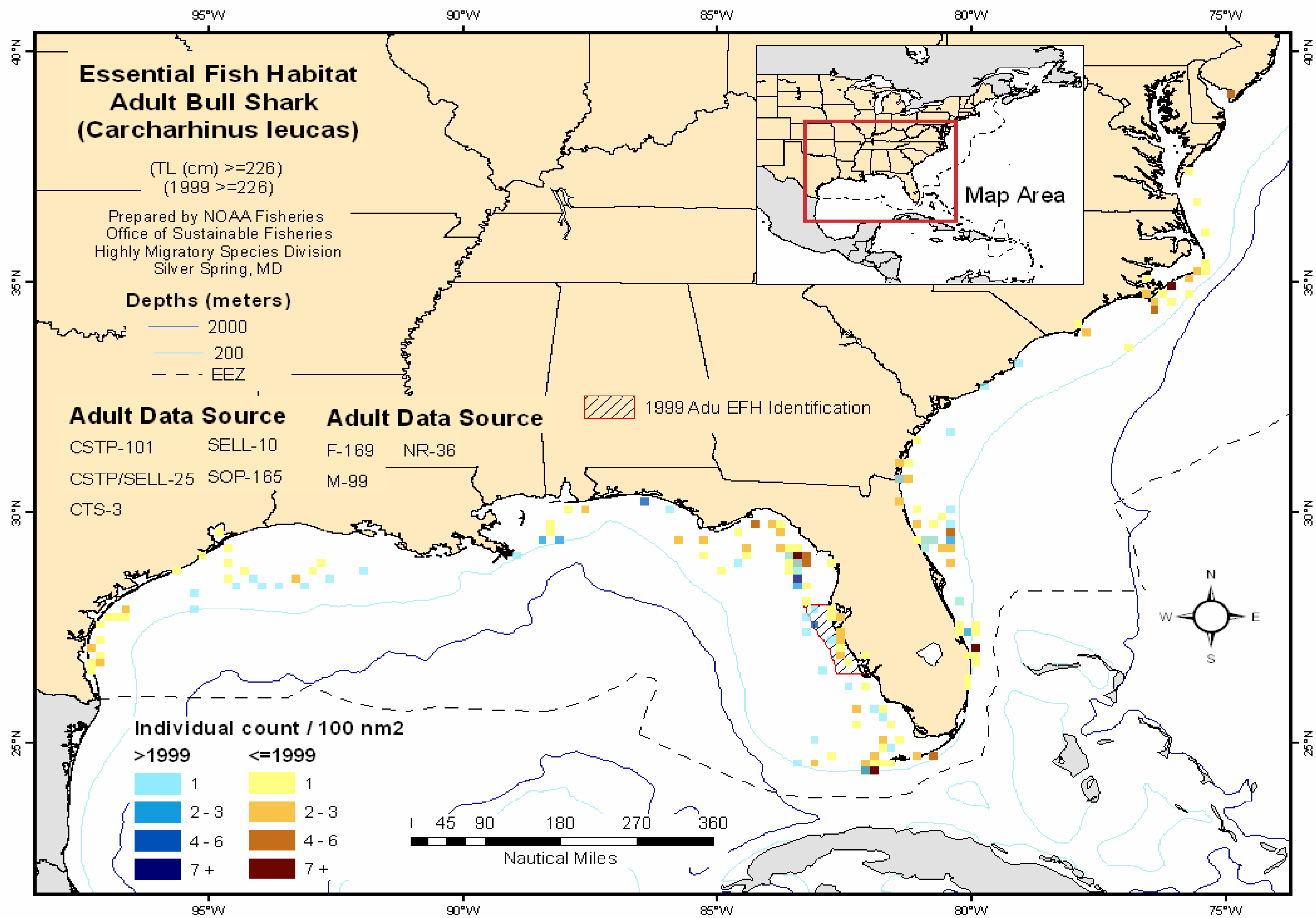

Figure B.57 Bull Shark: Adult.

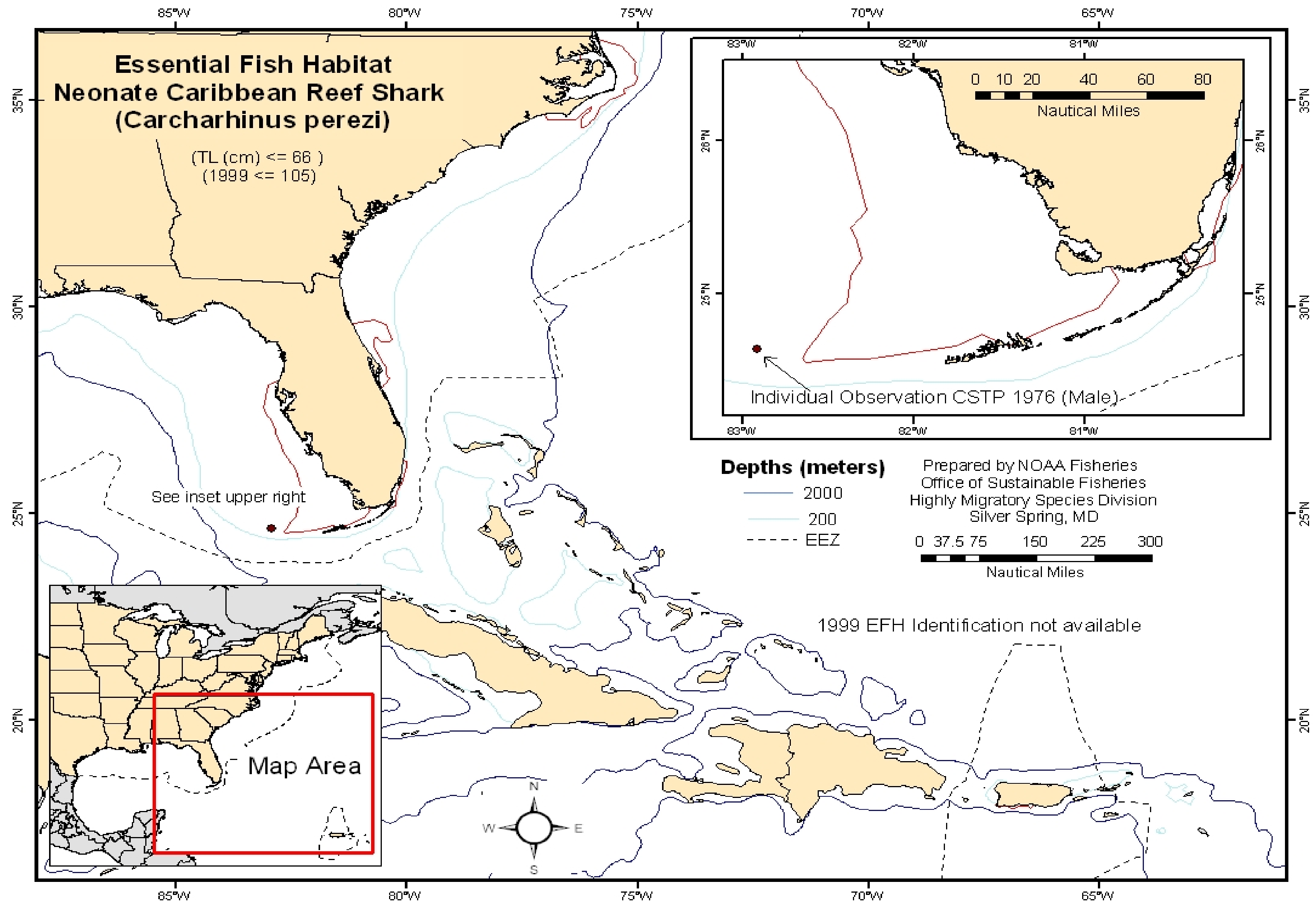

Figure B.58 Caribbean Reef Shark: Neonate.

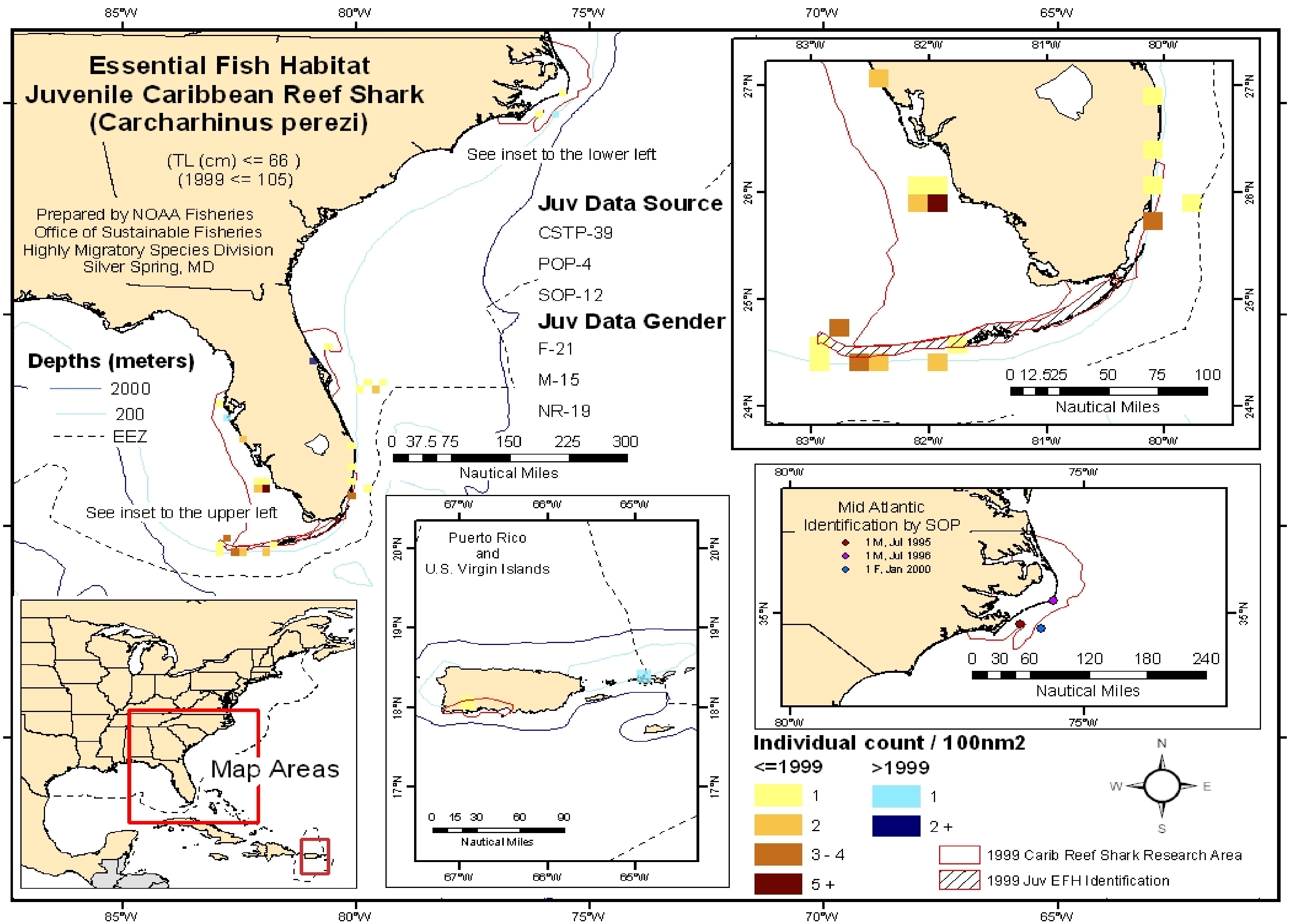

Figure B.59 Caribbean Reef Shark: Juvenile.

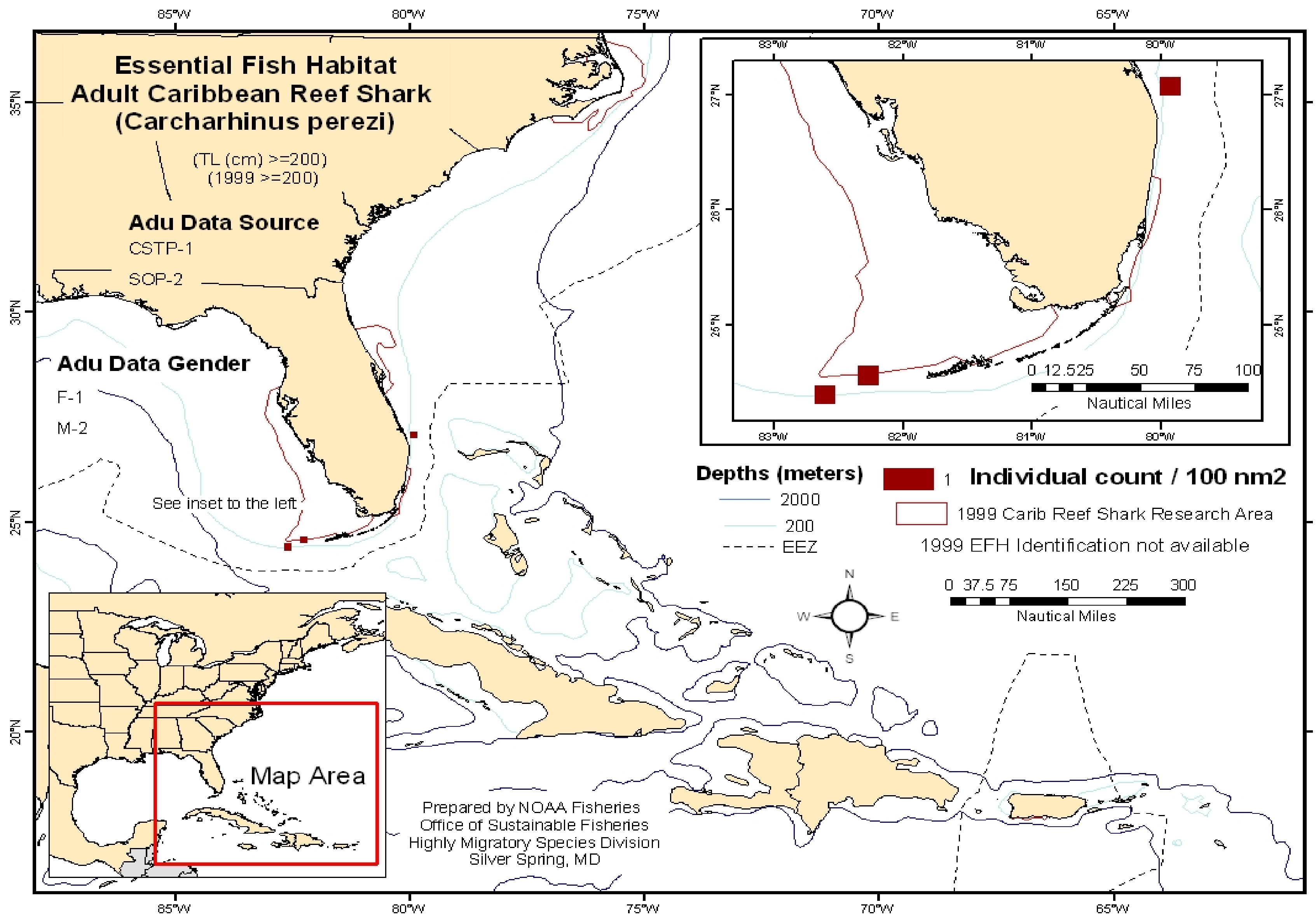

Figure B.60 Caribbean Reef Shark: Adult.

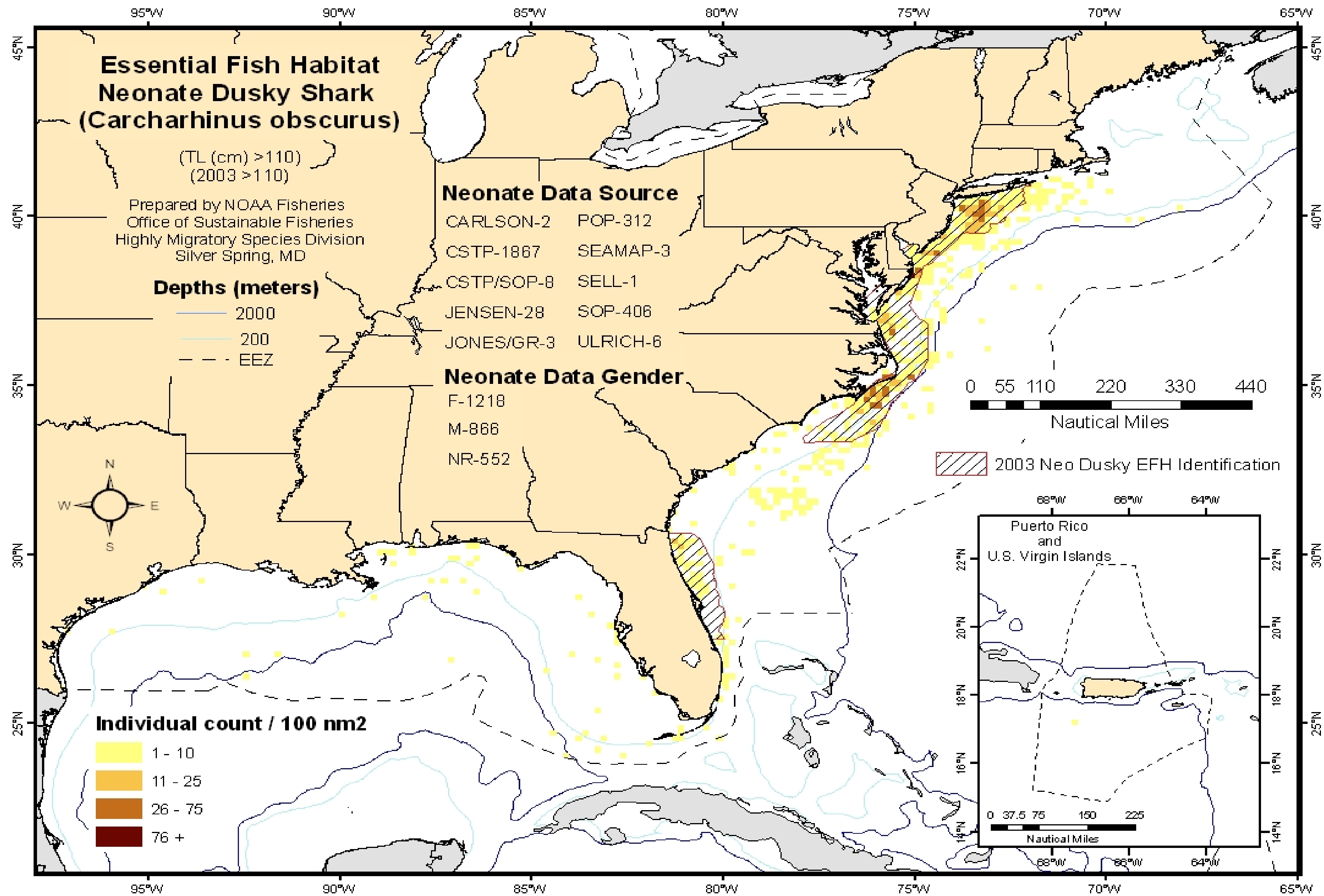

Figure B.61 Dusky Shark: Neonate.

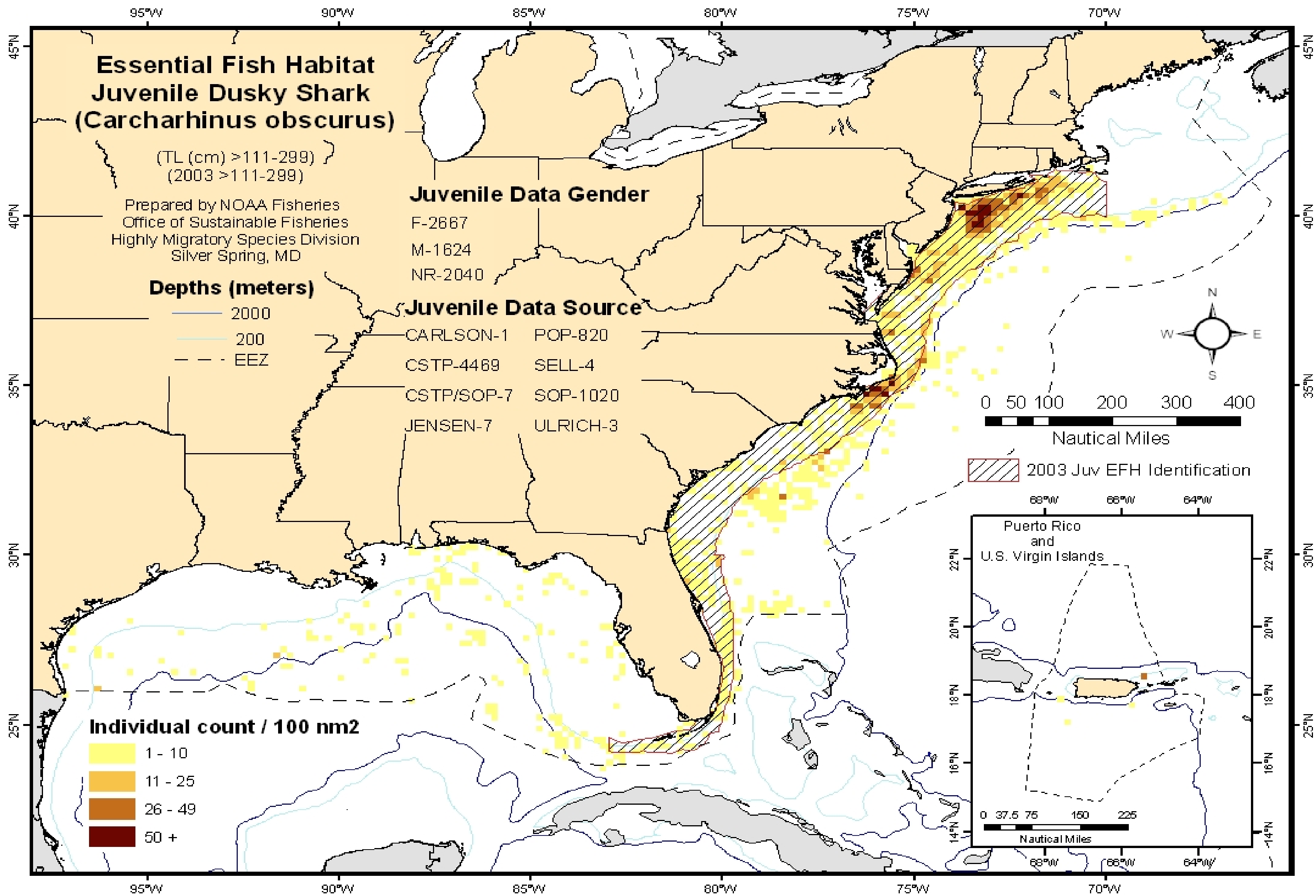

Figure B.62 Dusky Shark: Juvenile.

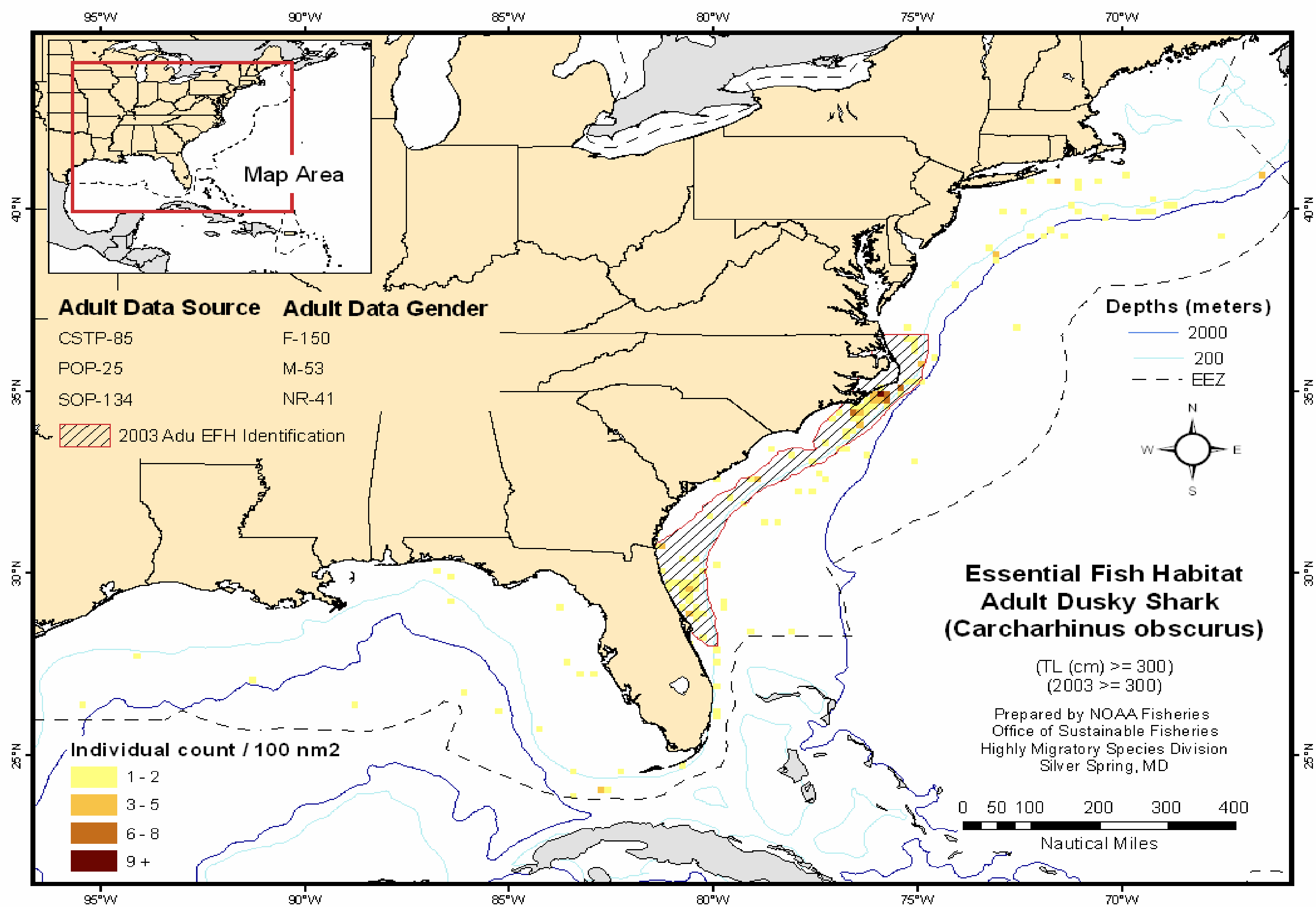

Figure B.63 **Dusky Shark: Adult.**

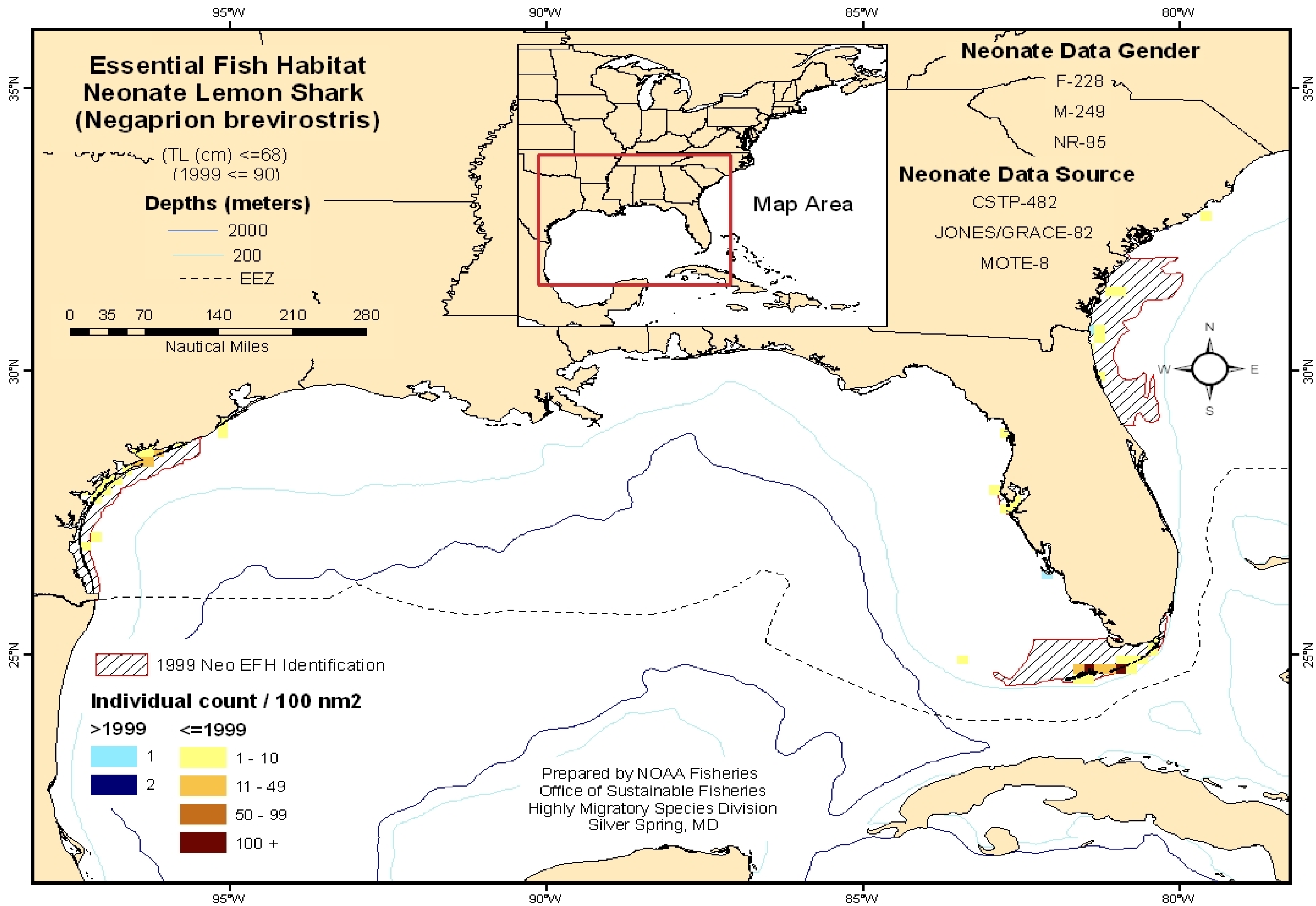

Figure B.64 **Lemon Shark: Neonate.**

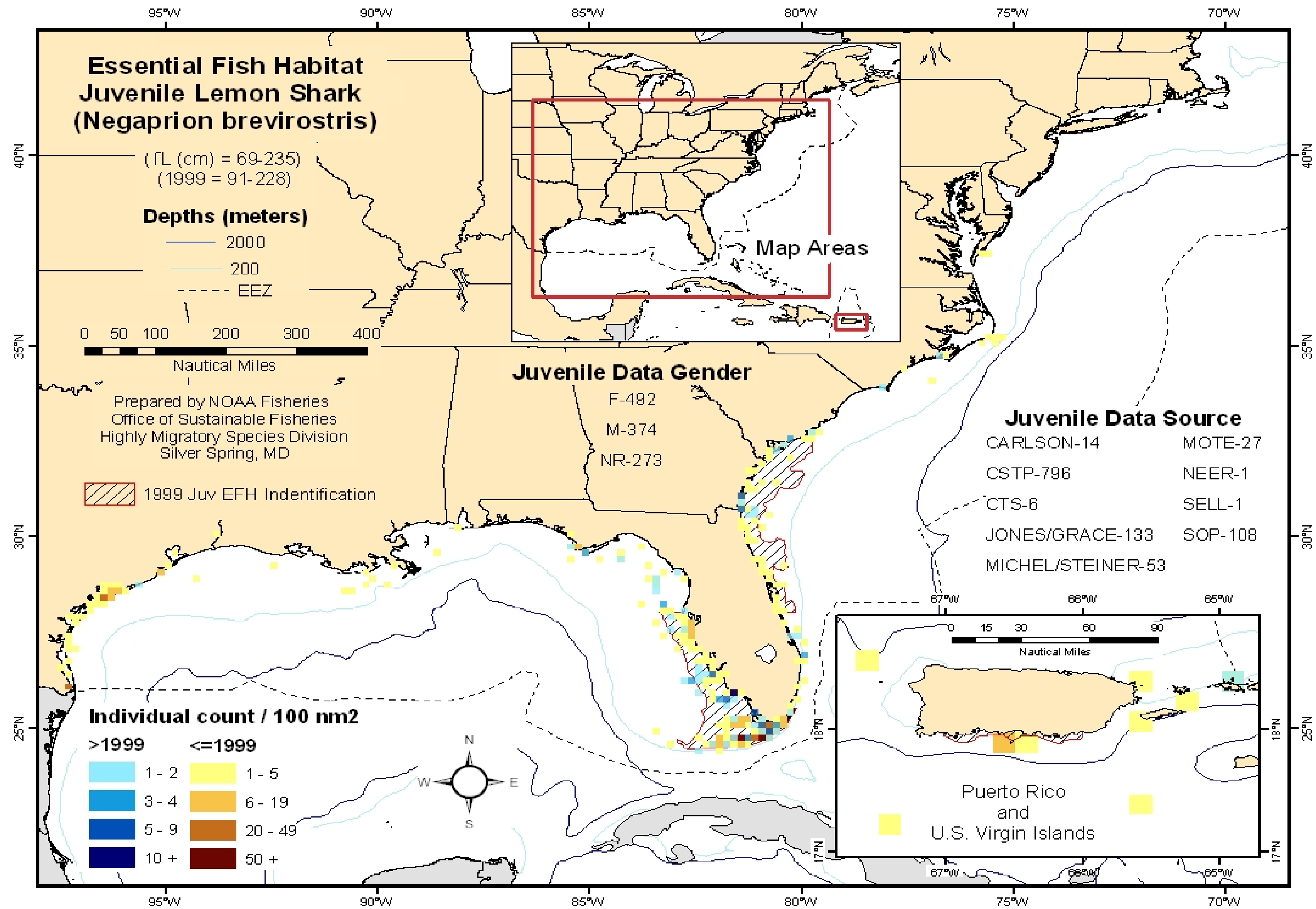

Figure B.65 Lemon Shark: Juvenile.

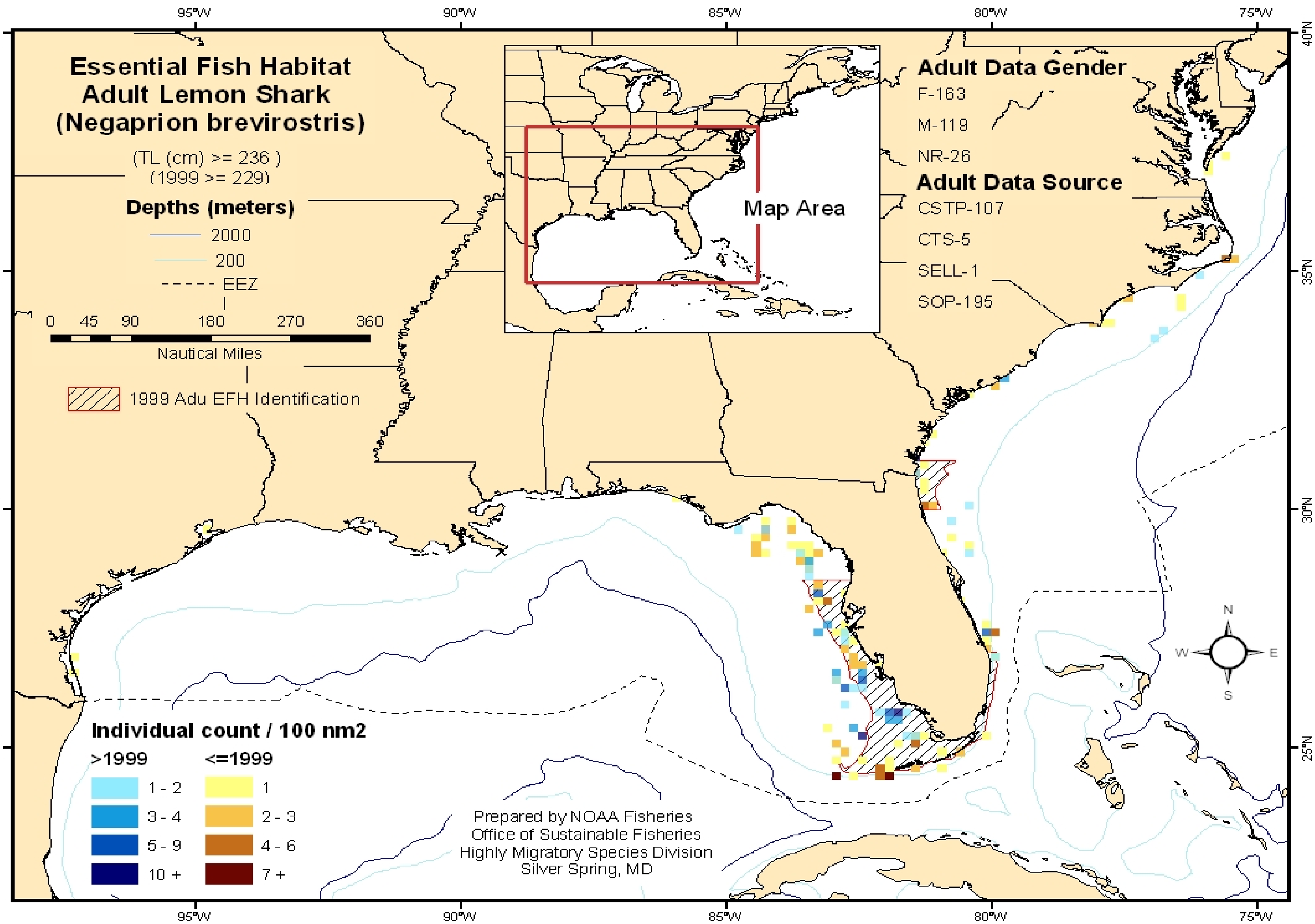

Figure B.66 Lemon Shark: Adult.

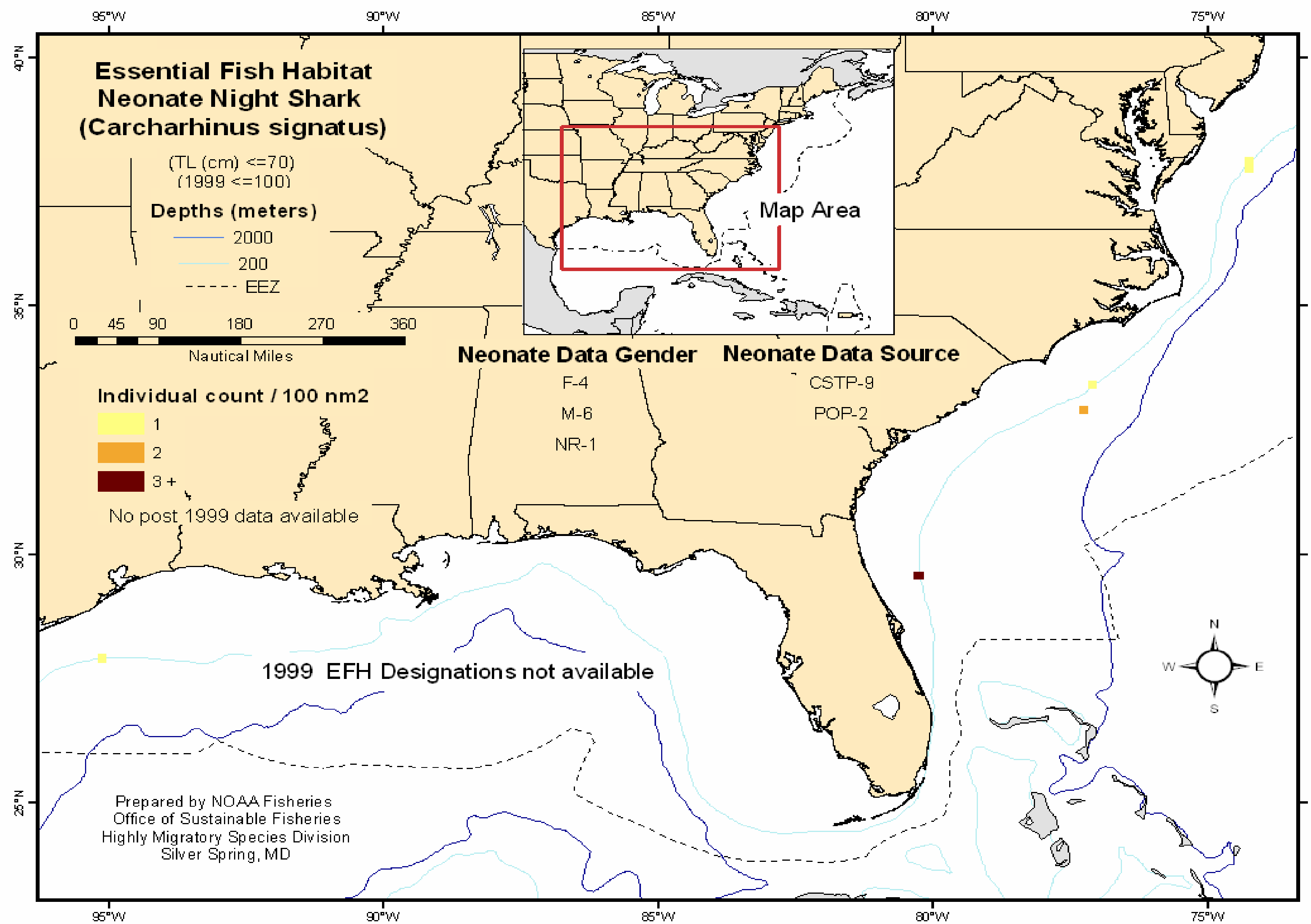

Figure B.67 **Night Shark: Neonate.**

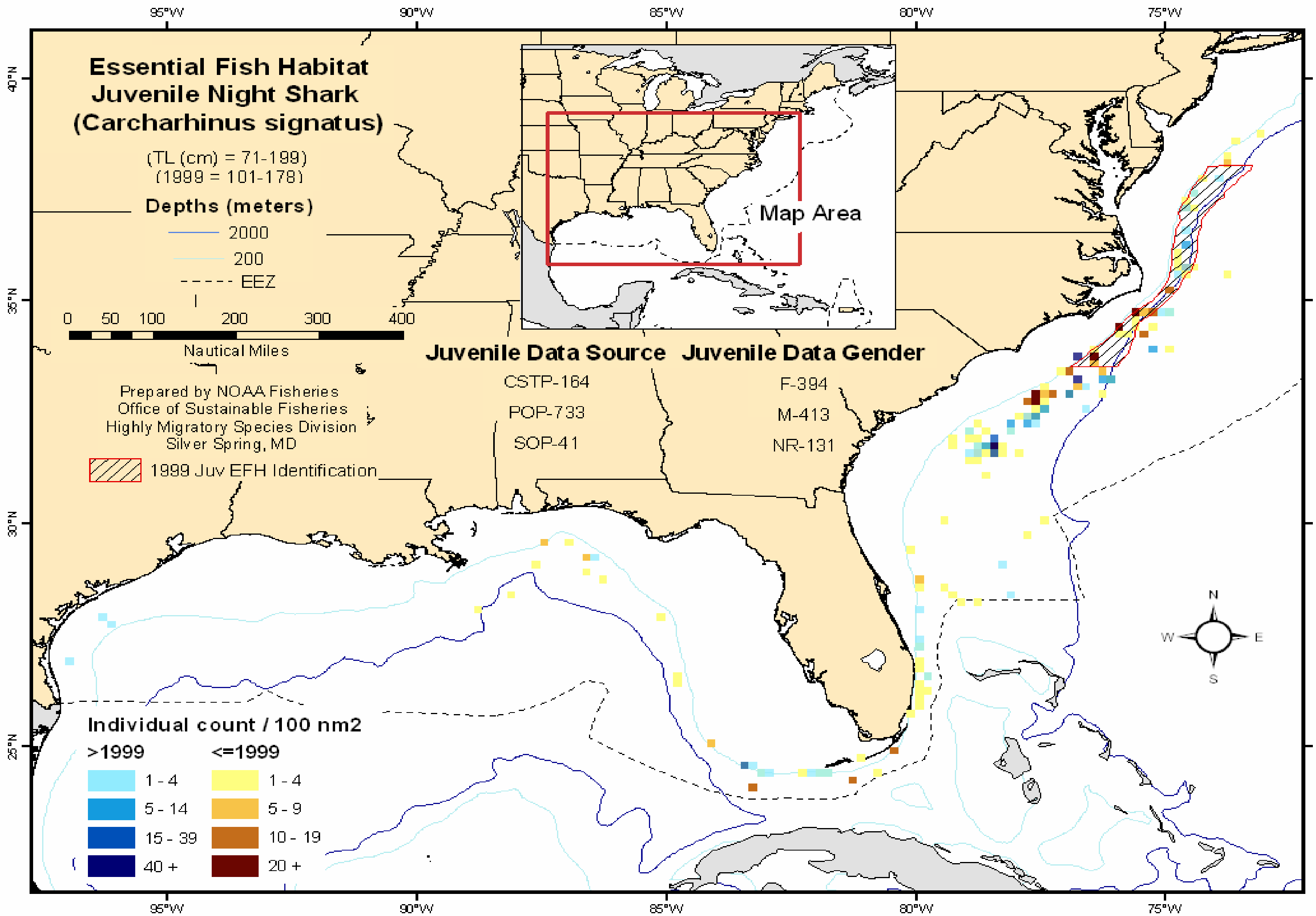

Figure B.68 Night Shark: Juvenile.

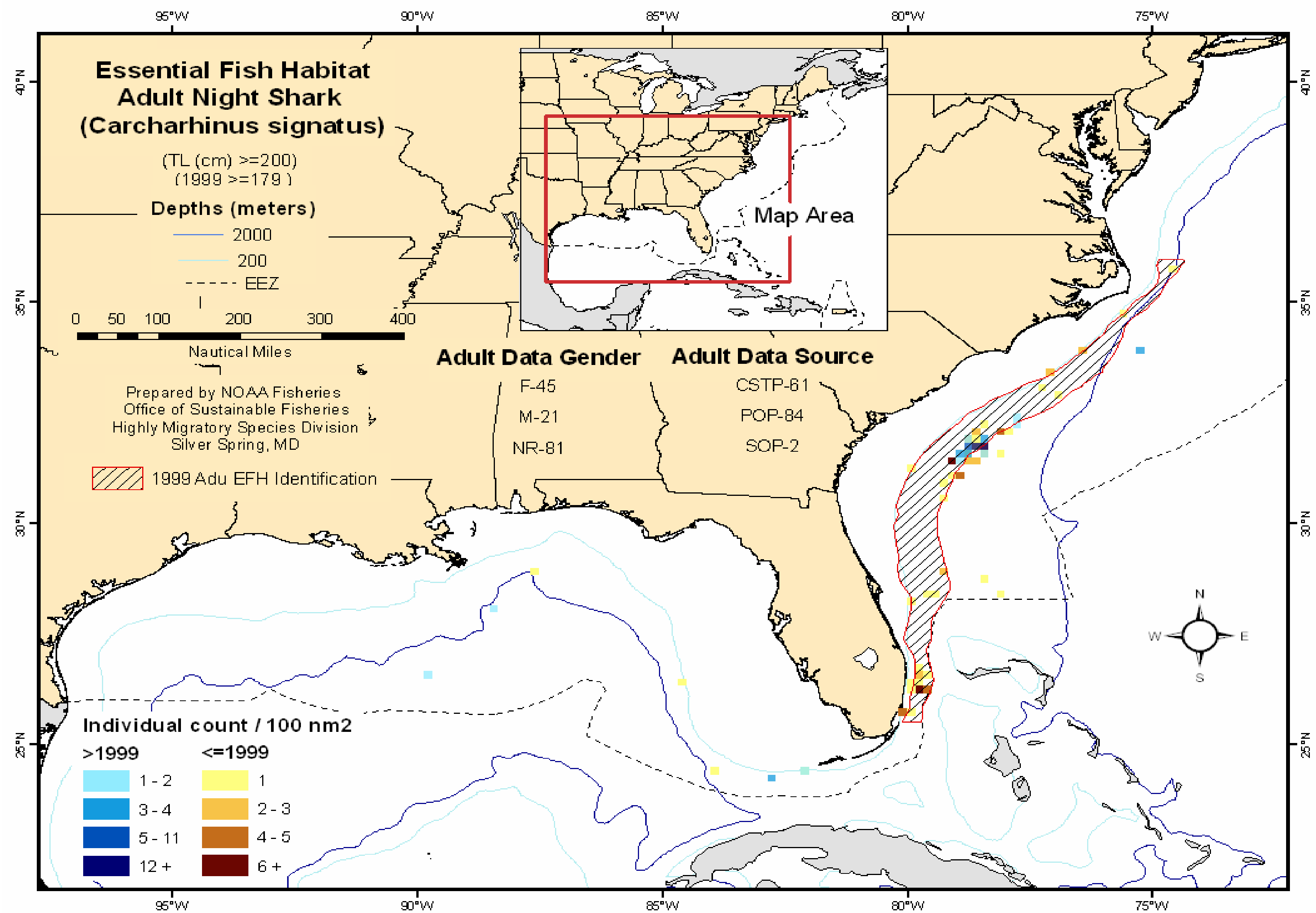

Figure B.69 Night Shark: Adult.

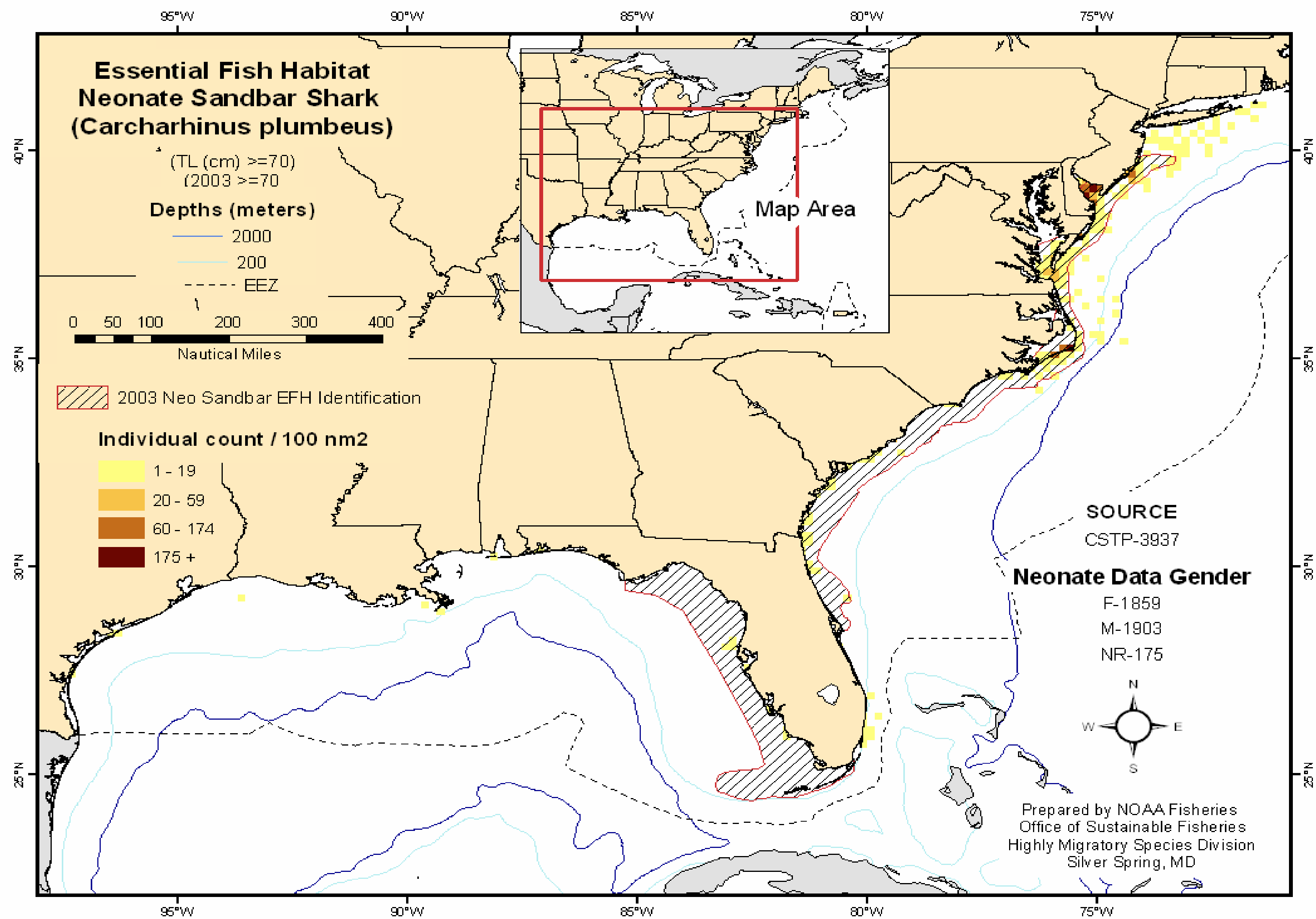

Figure B.70 Sandbar Shark: Neonate.

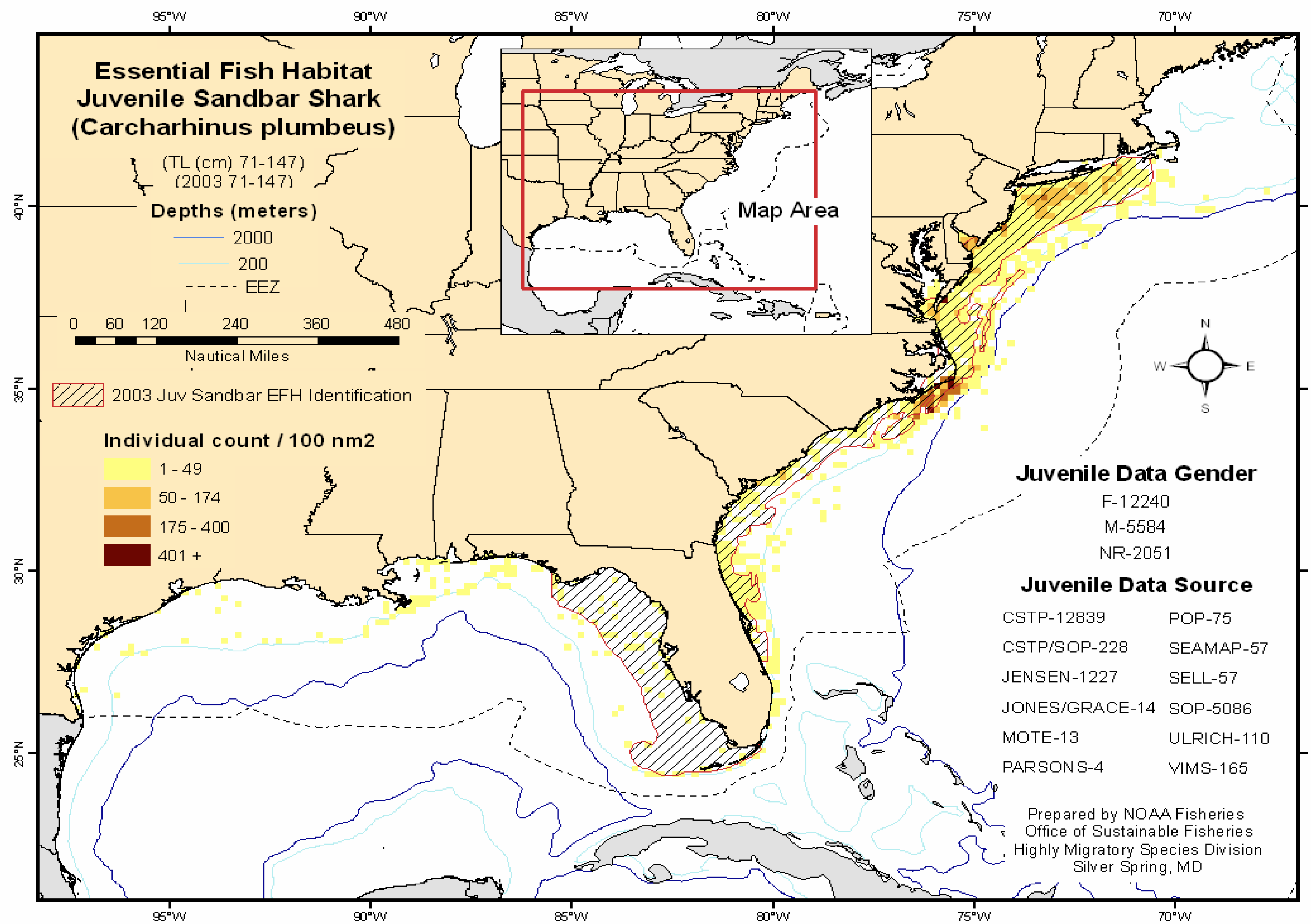

Figure B.71 **Sandbar Shark: Juvenile.**

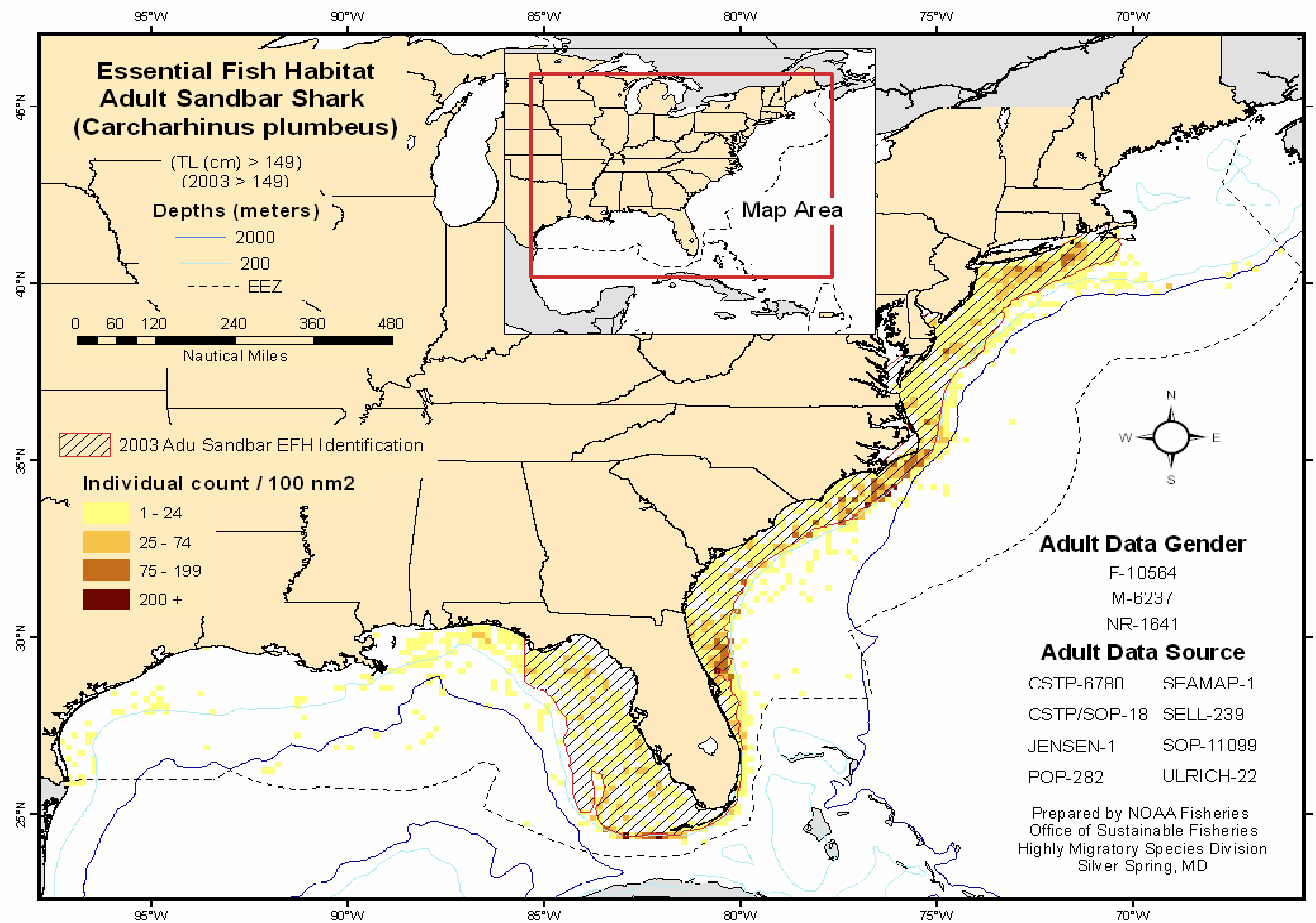

Figure B.72 **Sandbar Shark: Adult.**

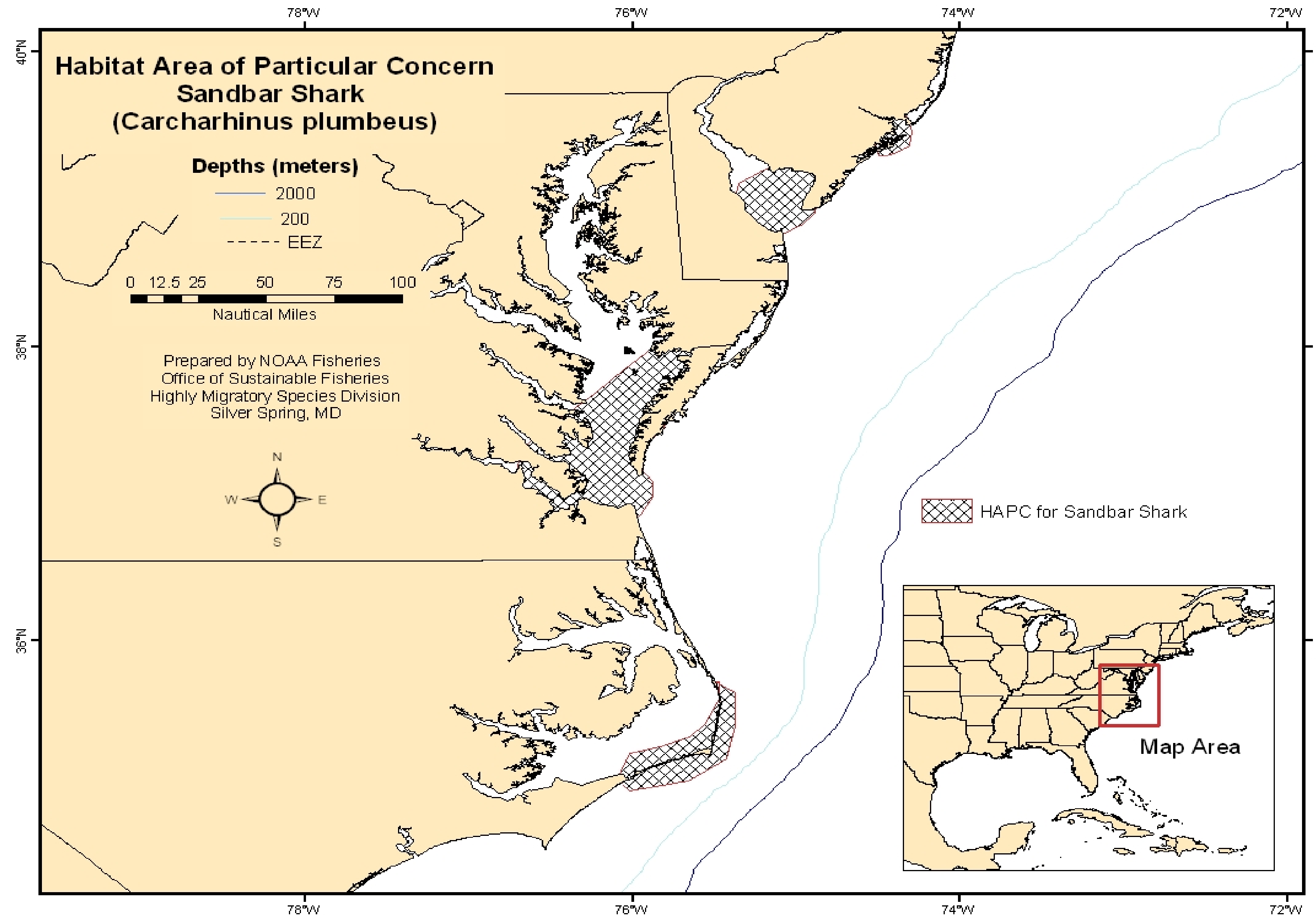

Figure B.73 **Sandbar Shark Habitat Area of Particular Concern.**

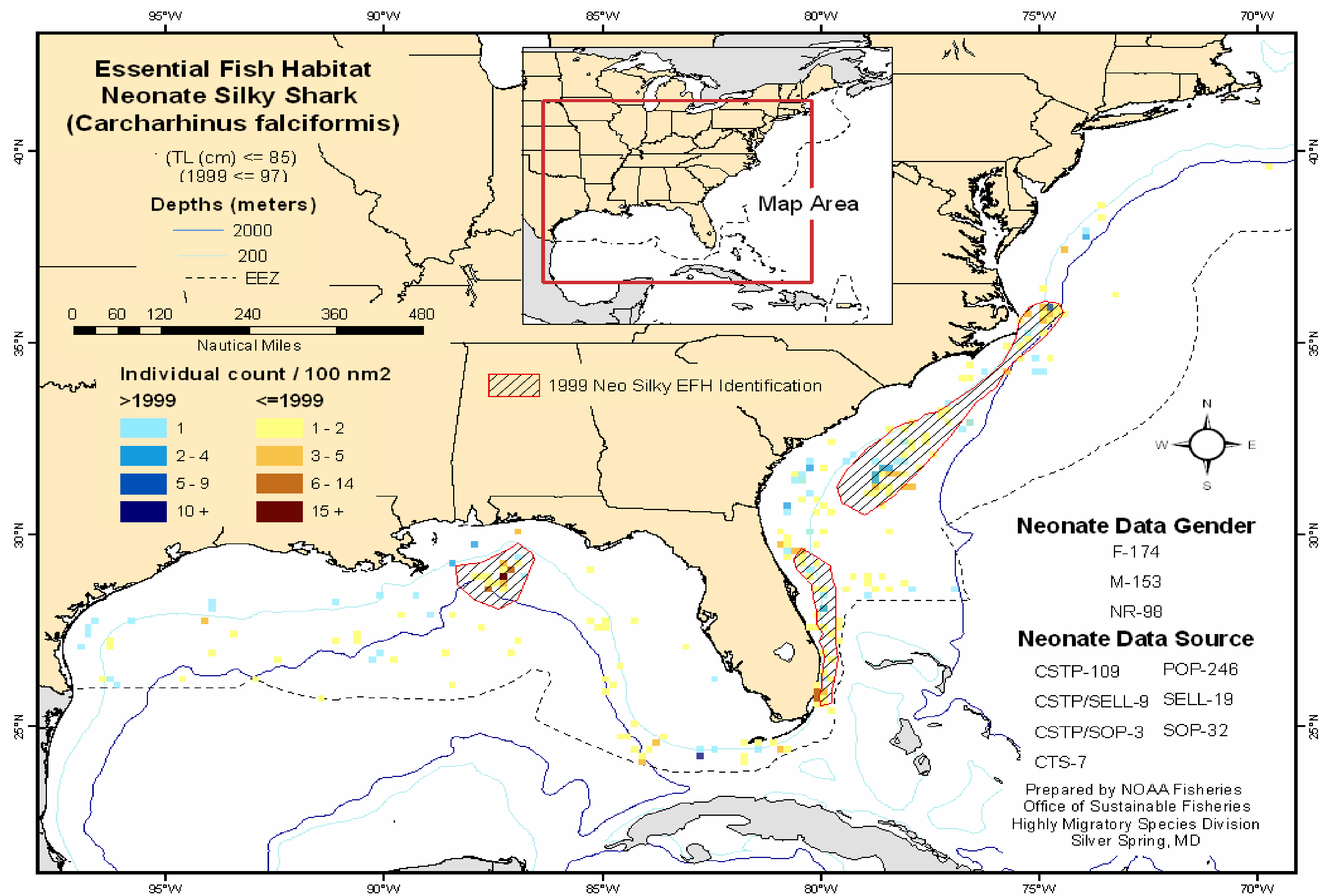

Figure B.74 Silky Shark: Neonate.

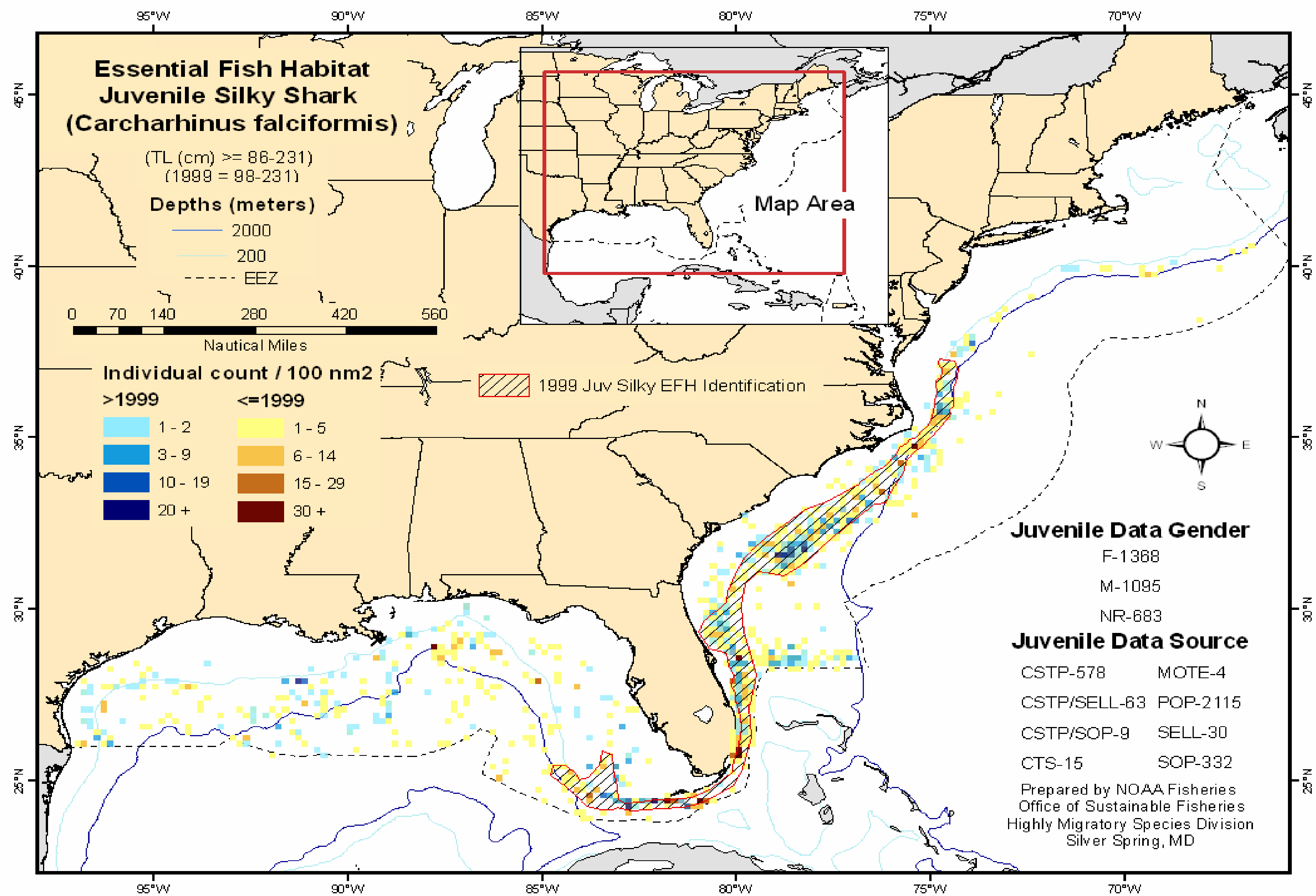

Figure B.75 Silky Shark: Juvenile.

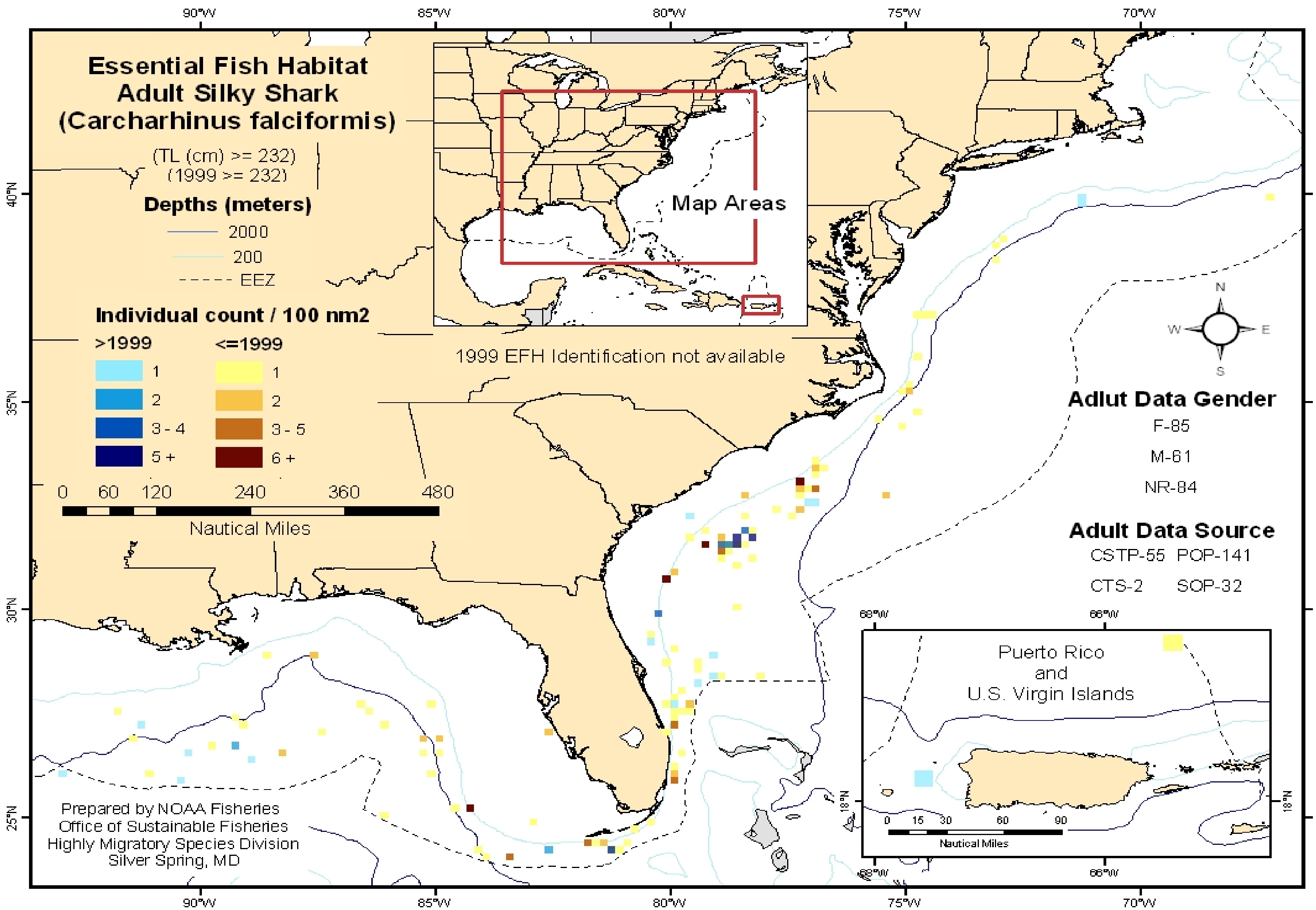

Figure B.76 Silky Shark: Adult.

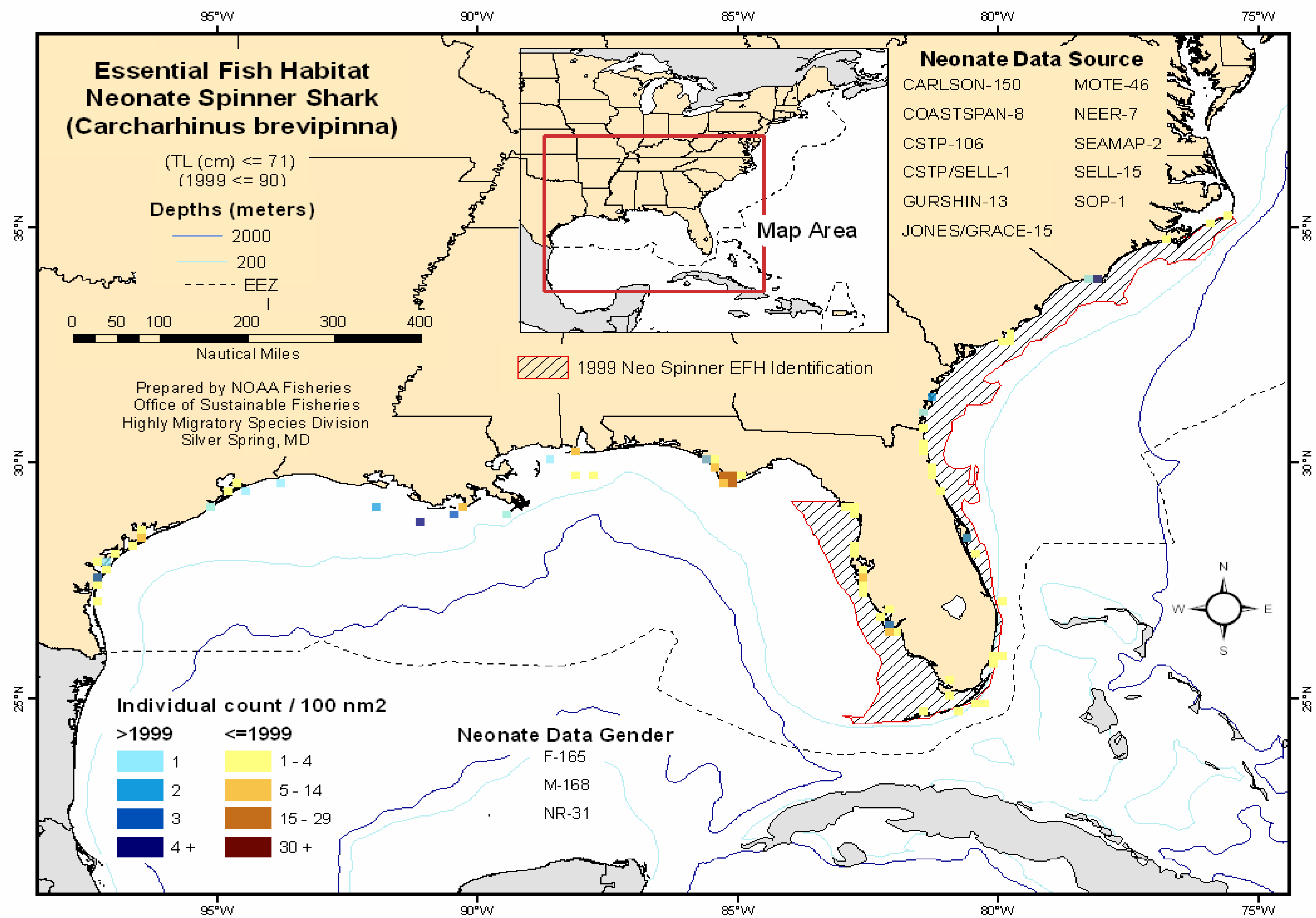

Figure B.77 Spinner Shark: Neonate.

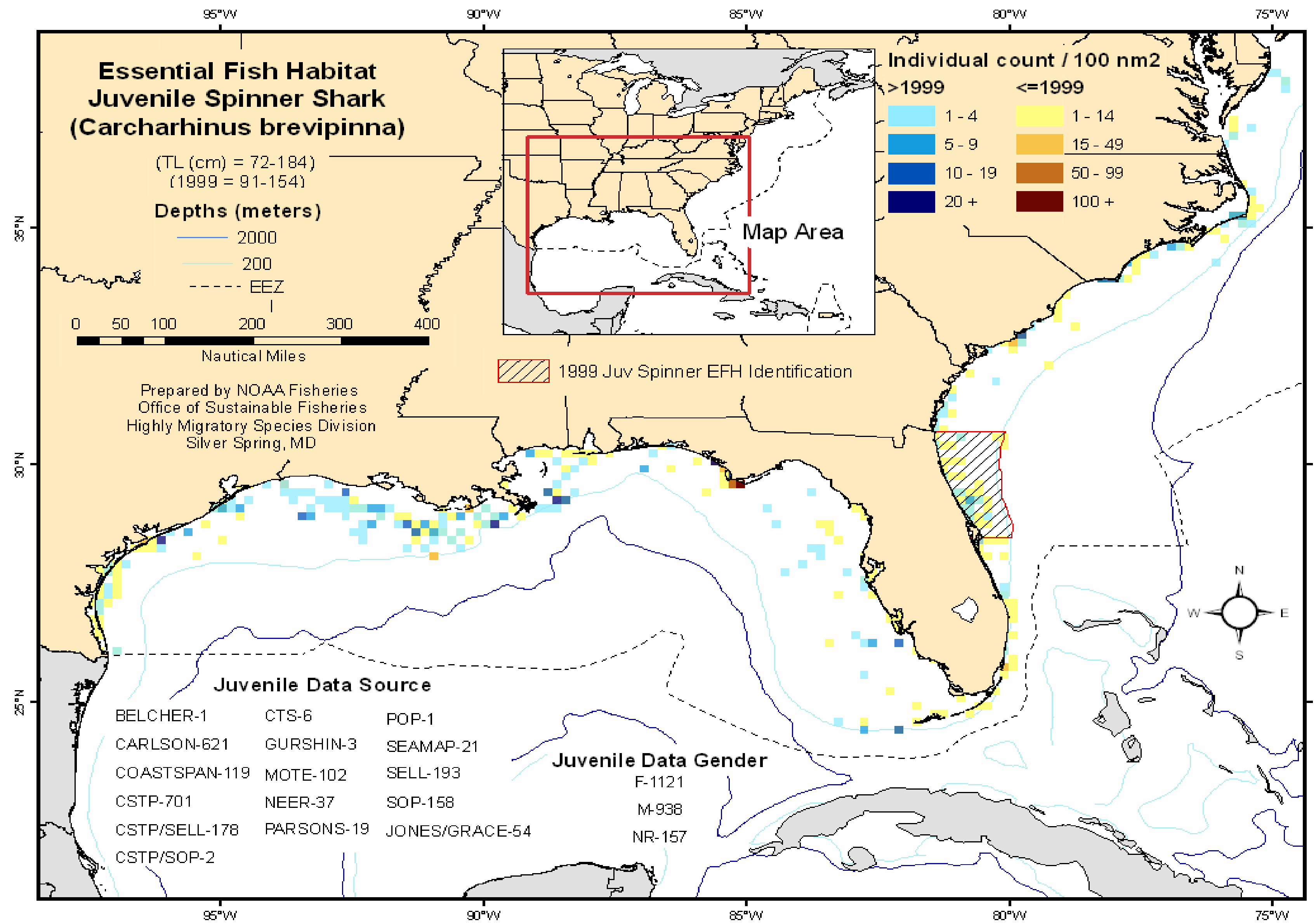

Figure B.78 Spinner Shark: Juvenile.

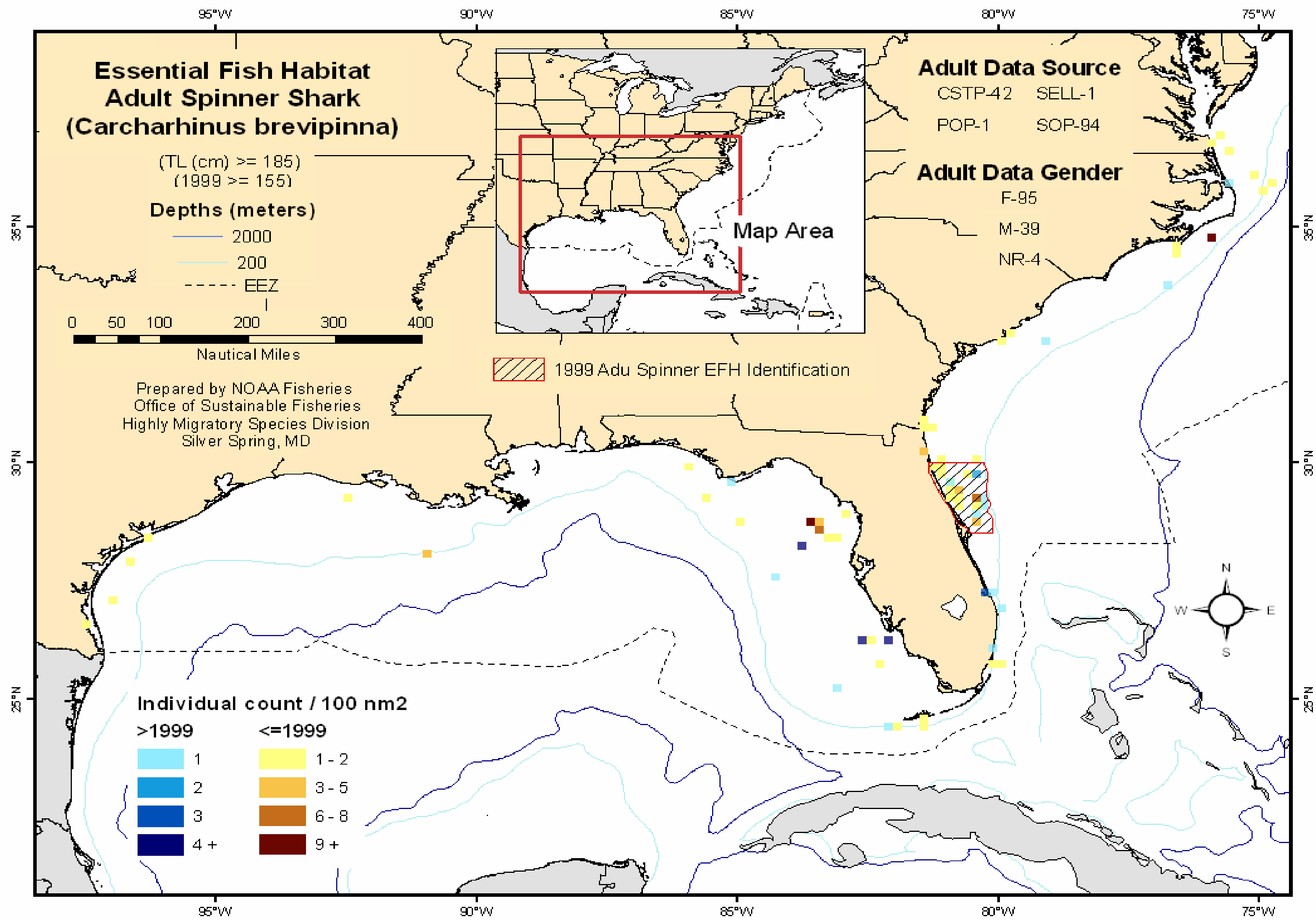

Figure B.79 Spinner Shark: Adult.

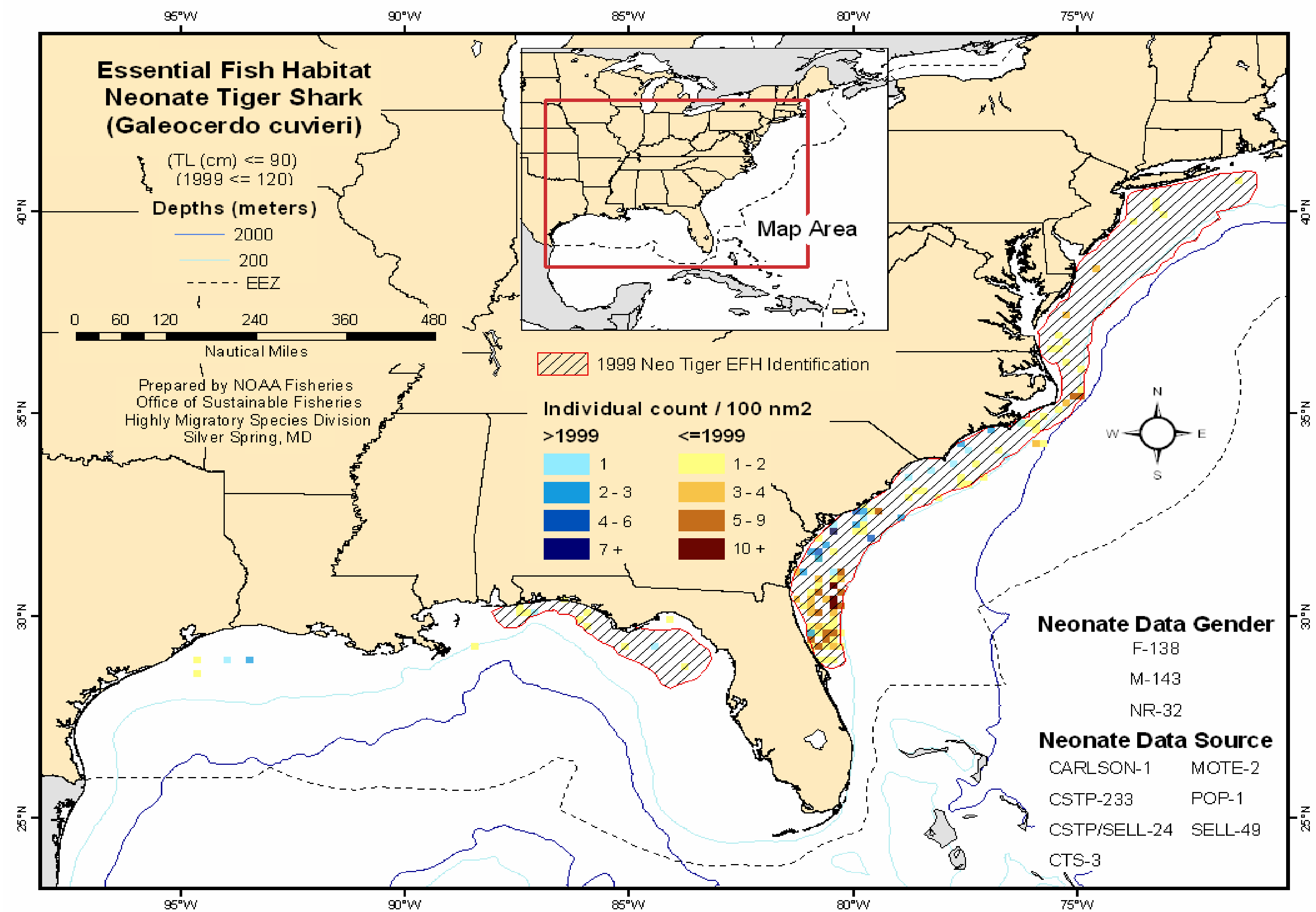

Figure B.80 Tiger Shark: Neonate.

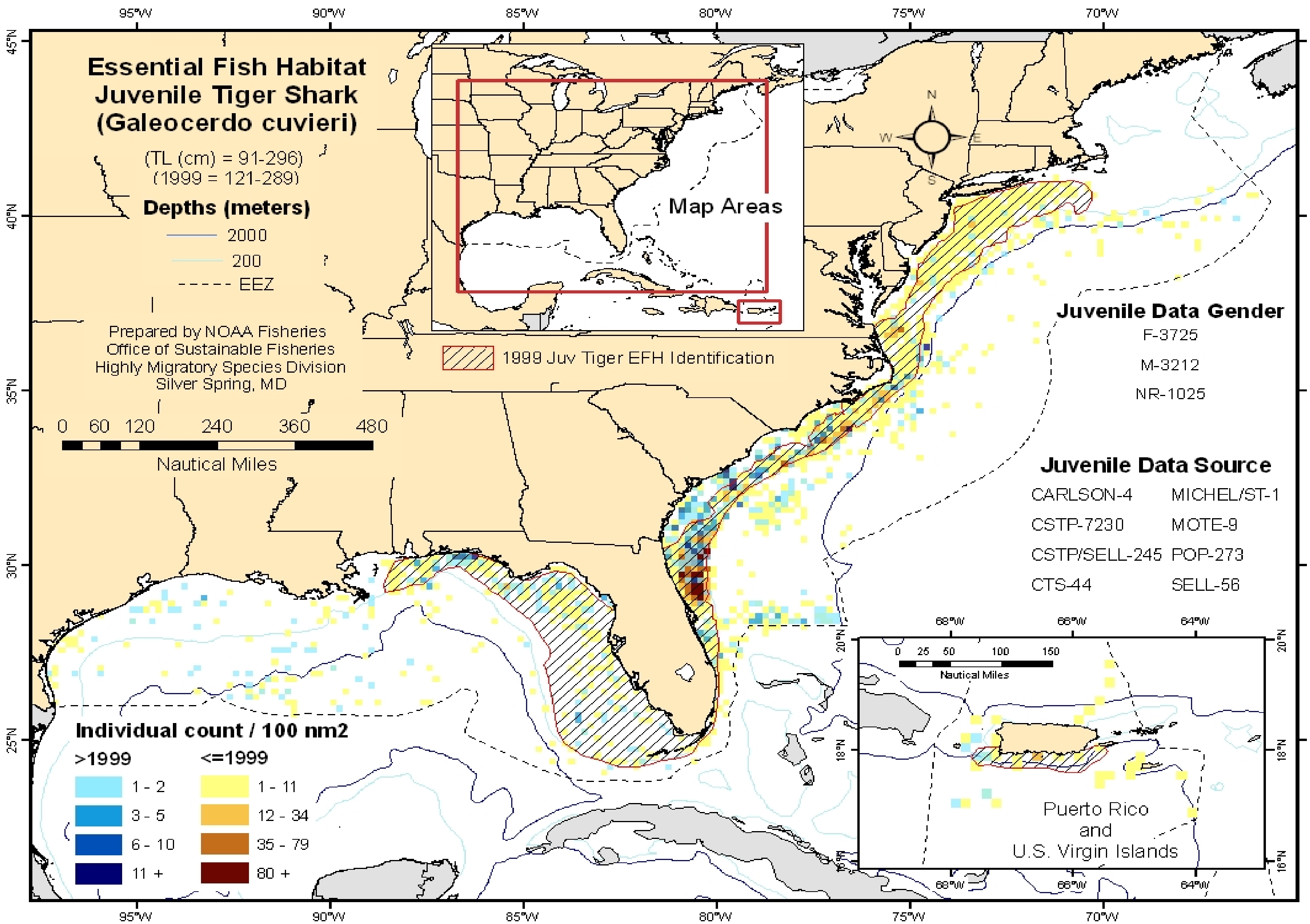

Figure B.81 Tiger Shark: Juvenile.

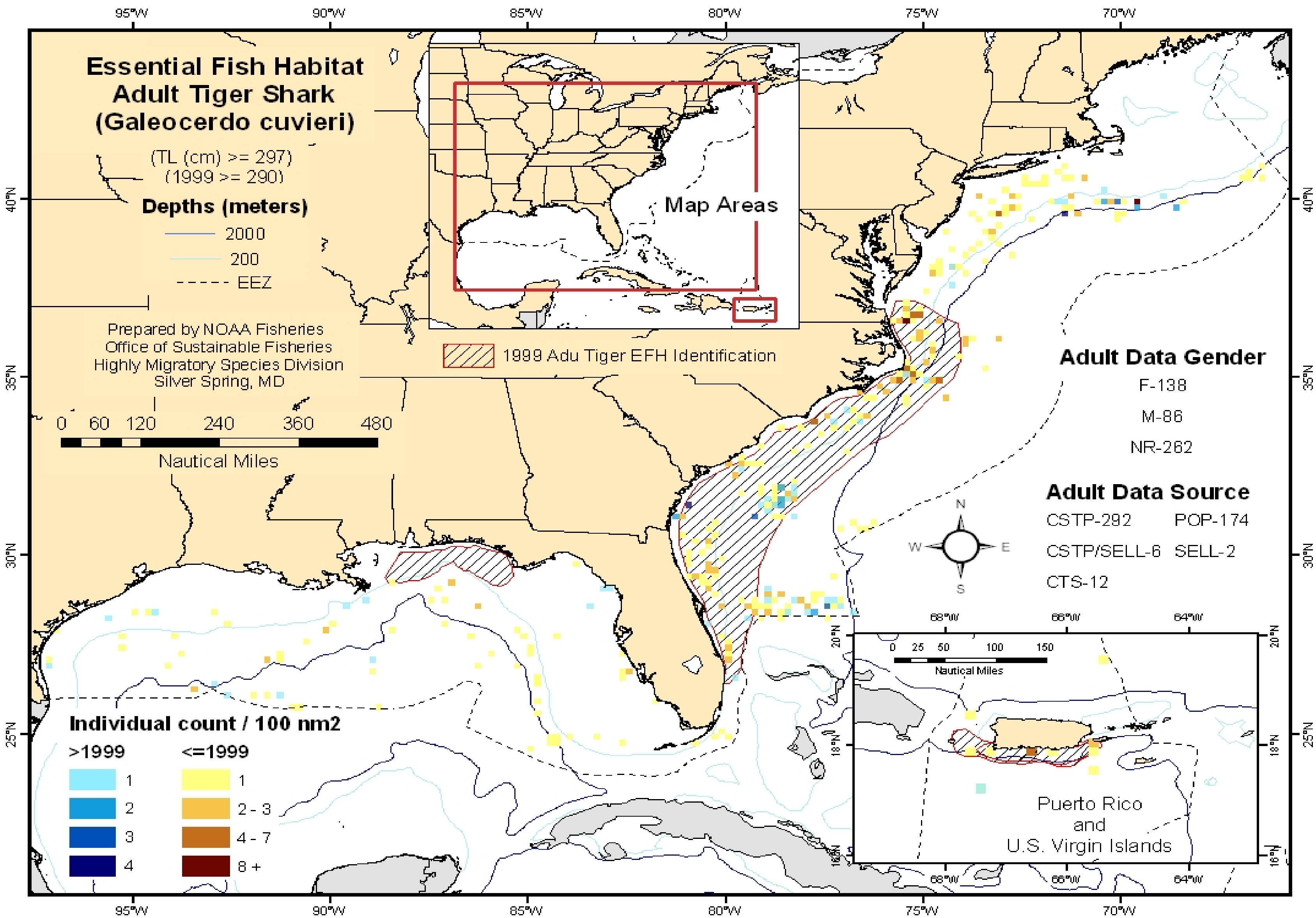

Figure B.82 Tiger Shark: Adult.

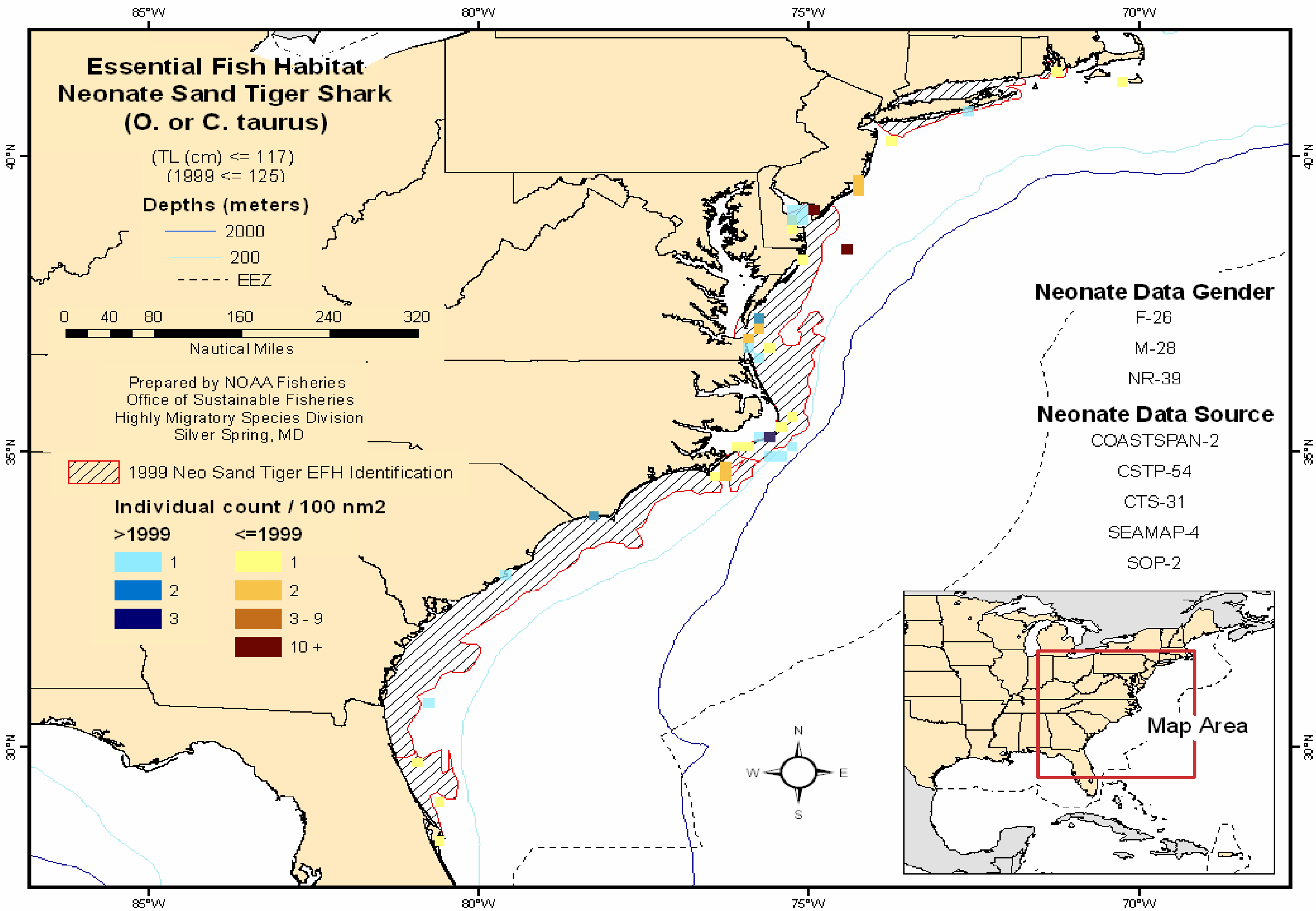

Figure B.83 Sand Tiger Shark: Neonate.

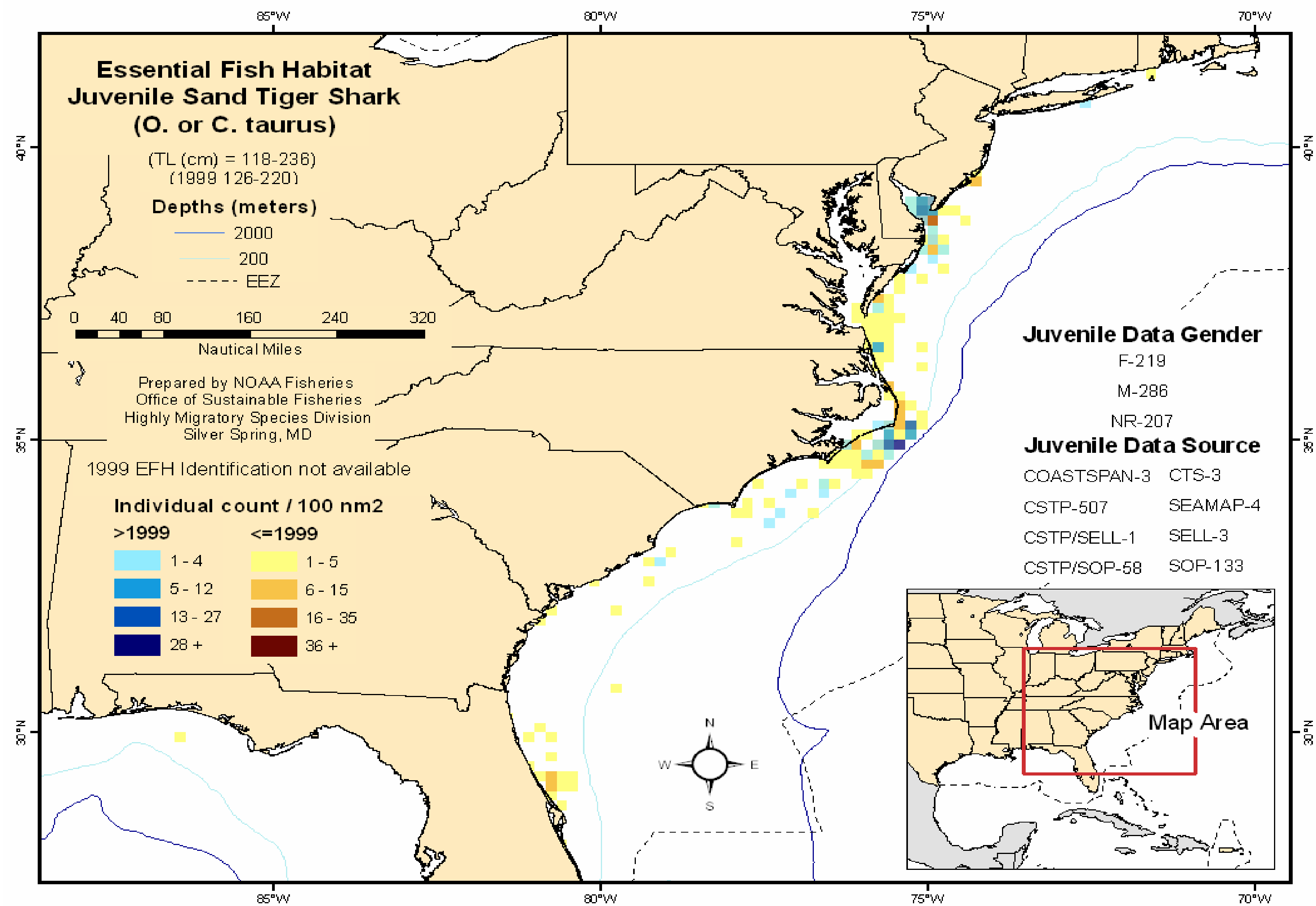

Figure B.84 **Sand Tiger Shark: Juvenile.**

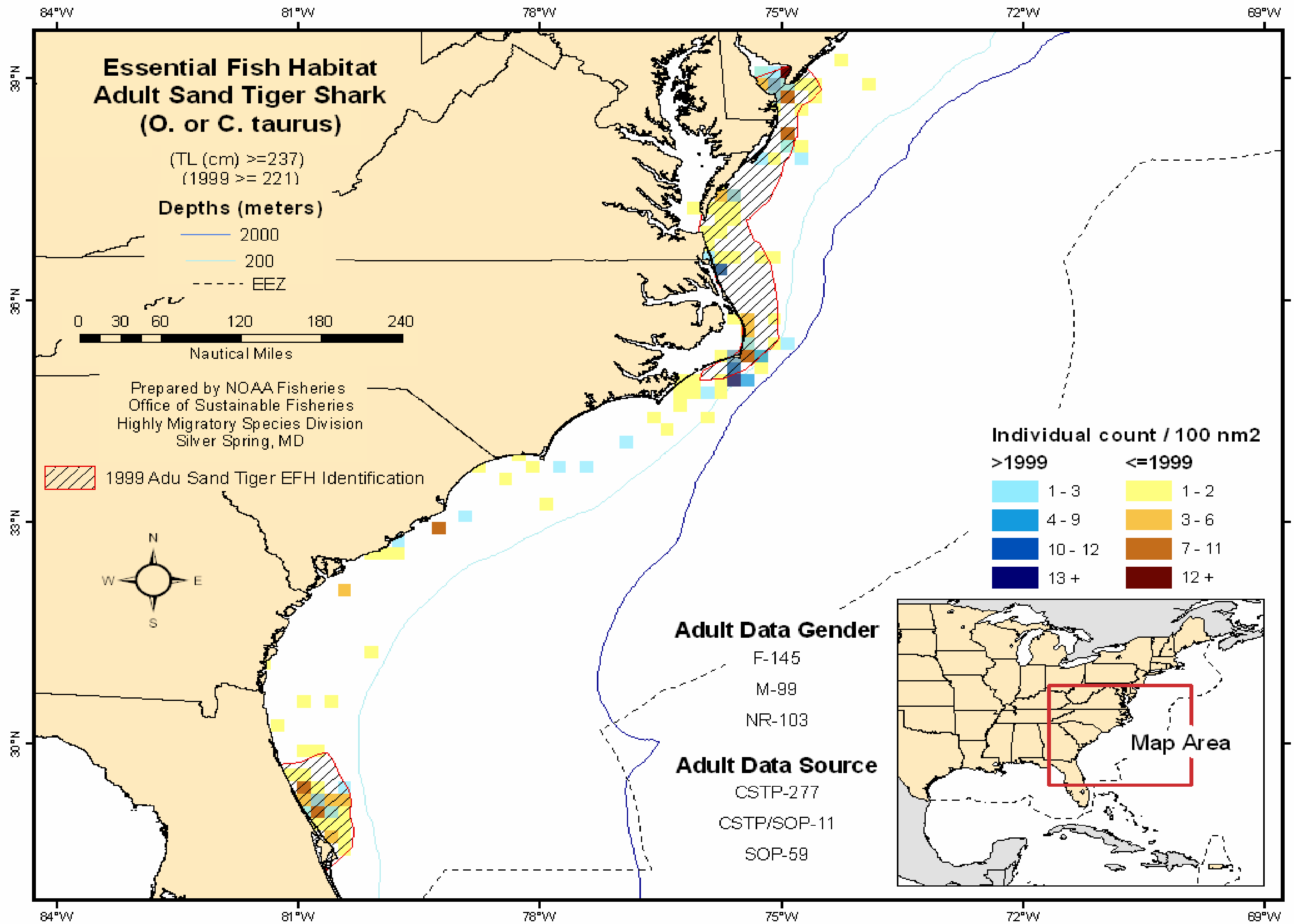

Figure B.85 Sand Tiger Shark: Adult.

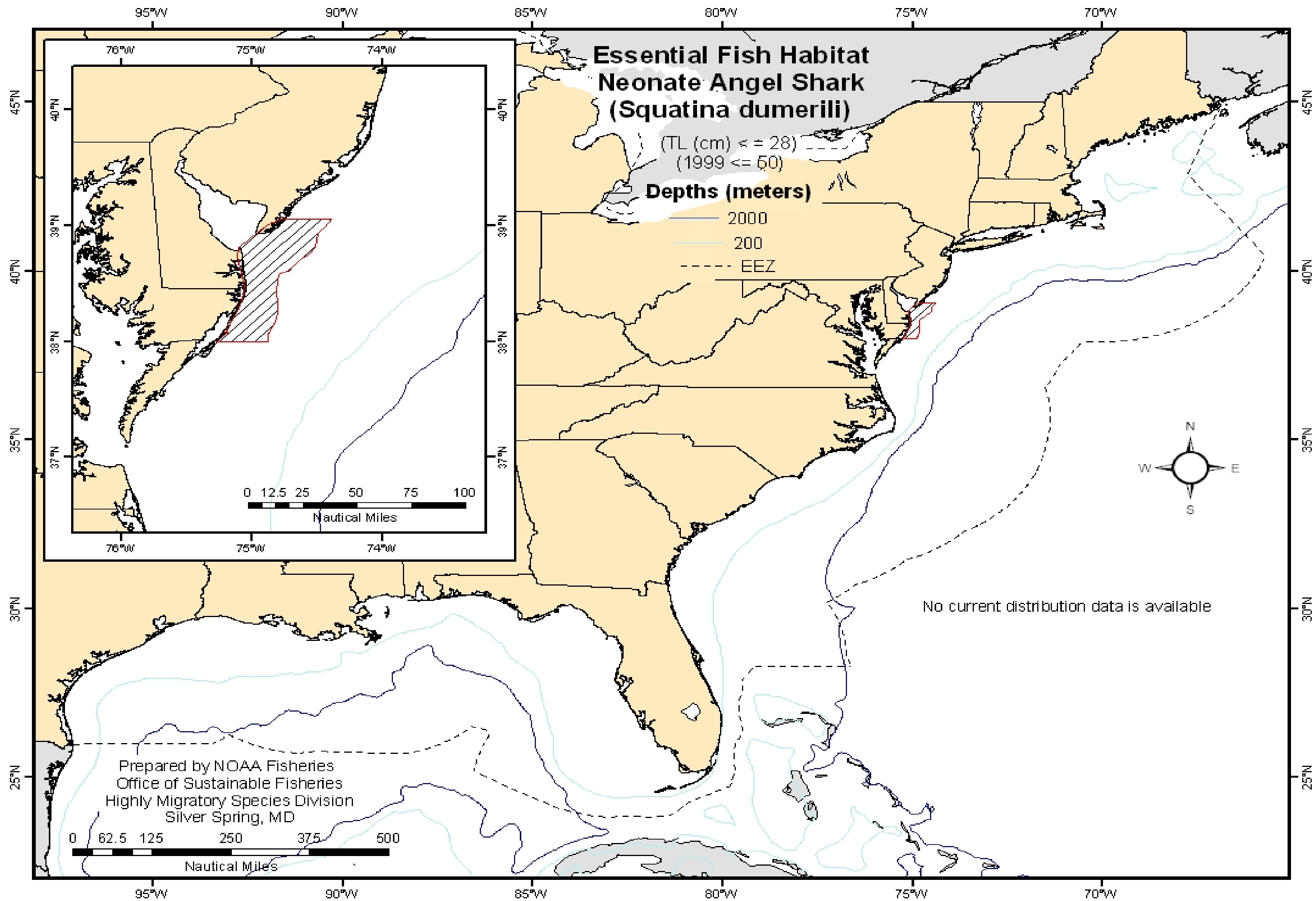

Figure B.86 Angel Shark: Neonate.

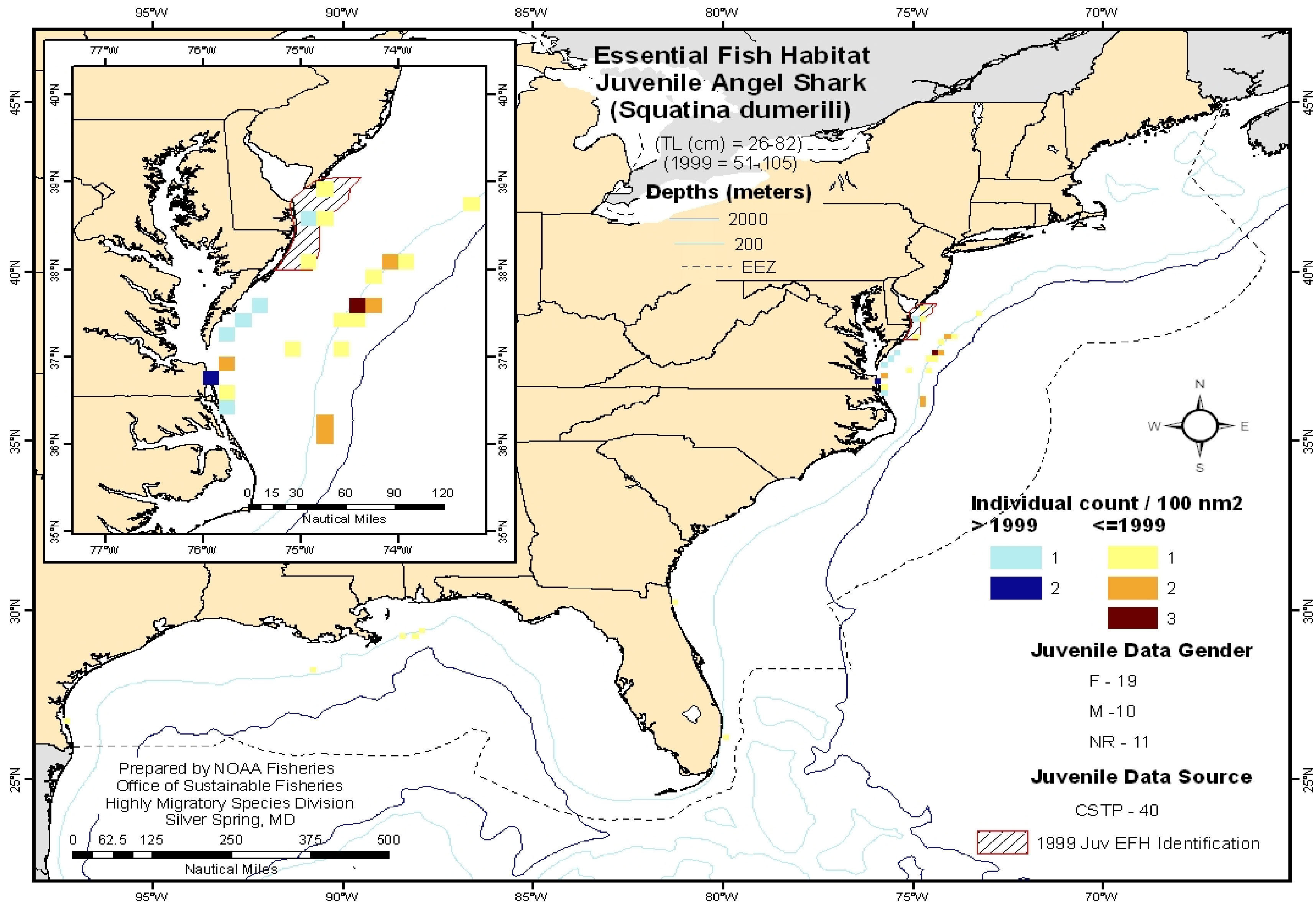

Figure B.87 **Angel Shark: Juvenile.**

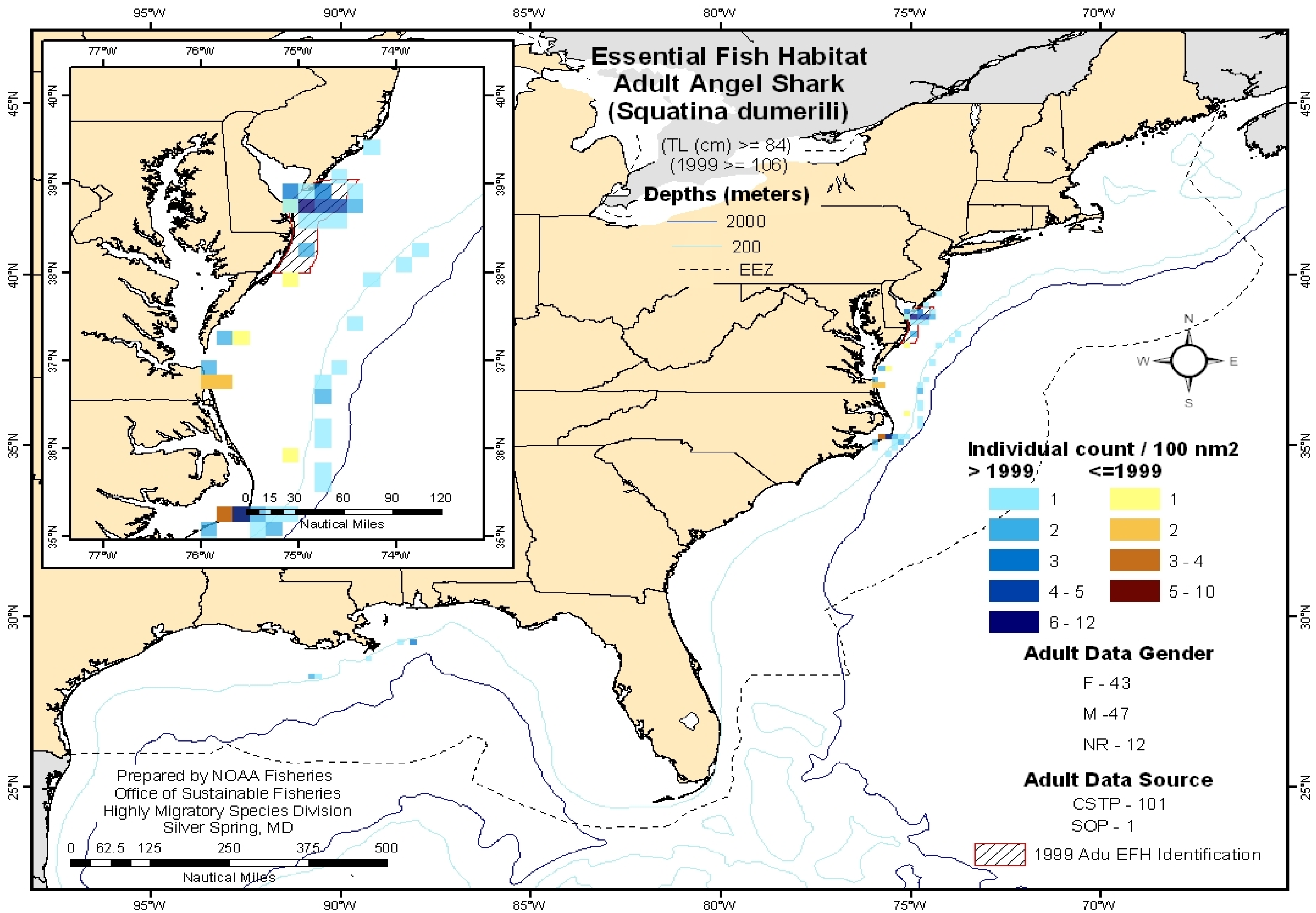

Figure B.88 Angel Shark: Adult.

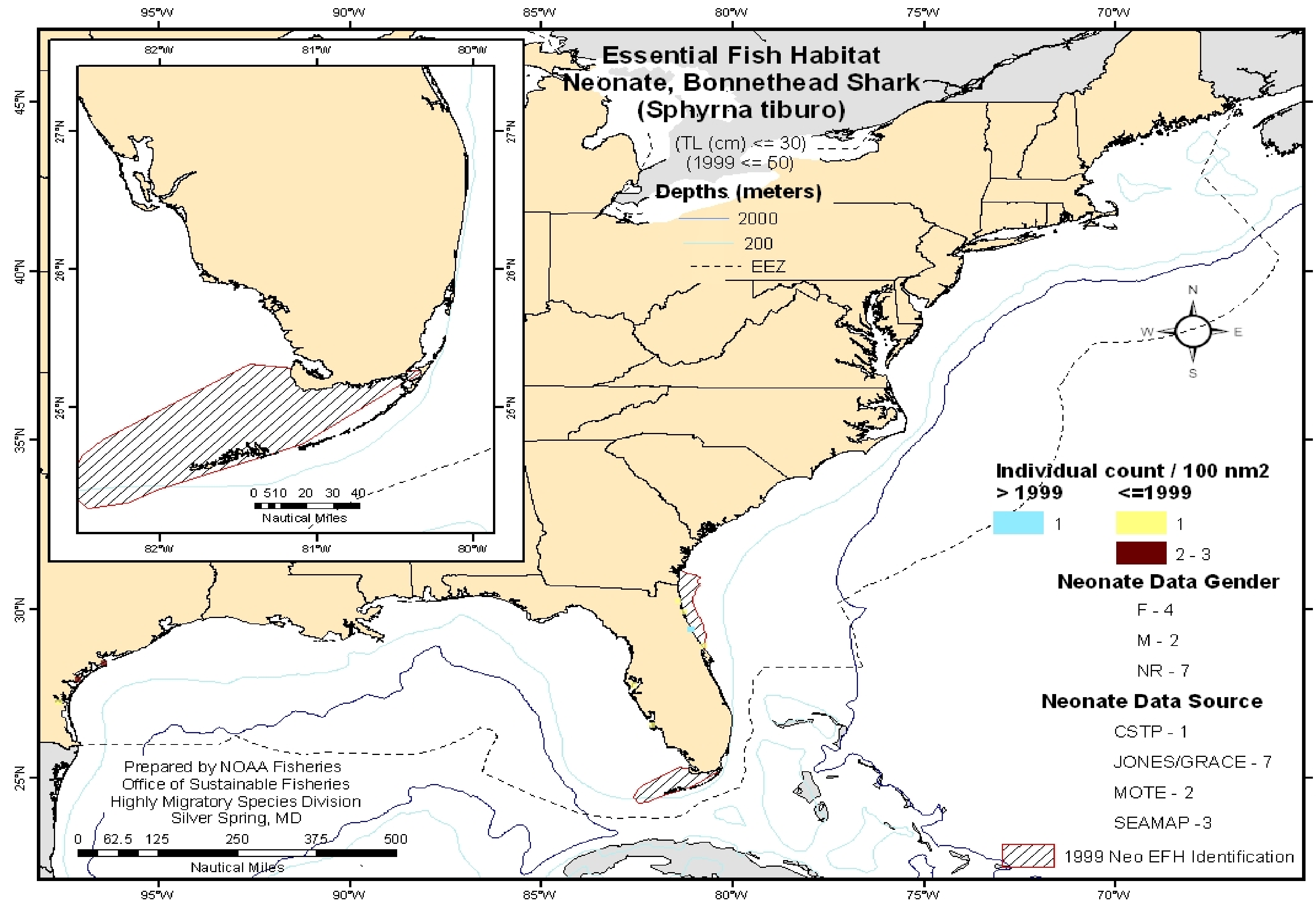

Figure B.89 **Bonnethead Shark : Neonate.**

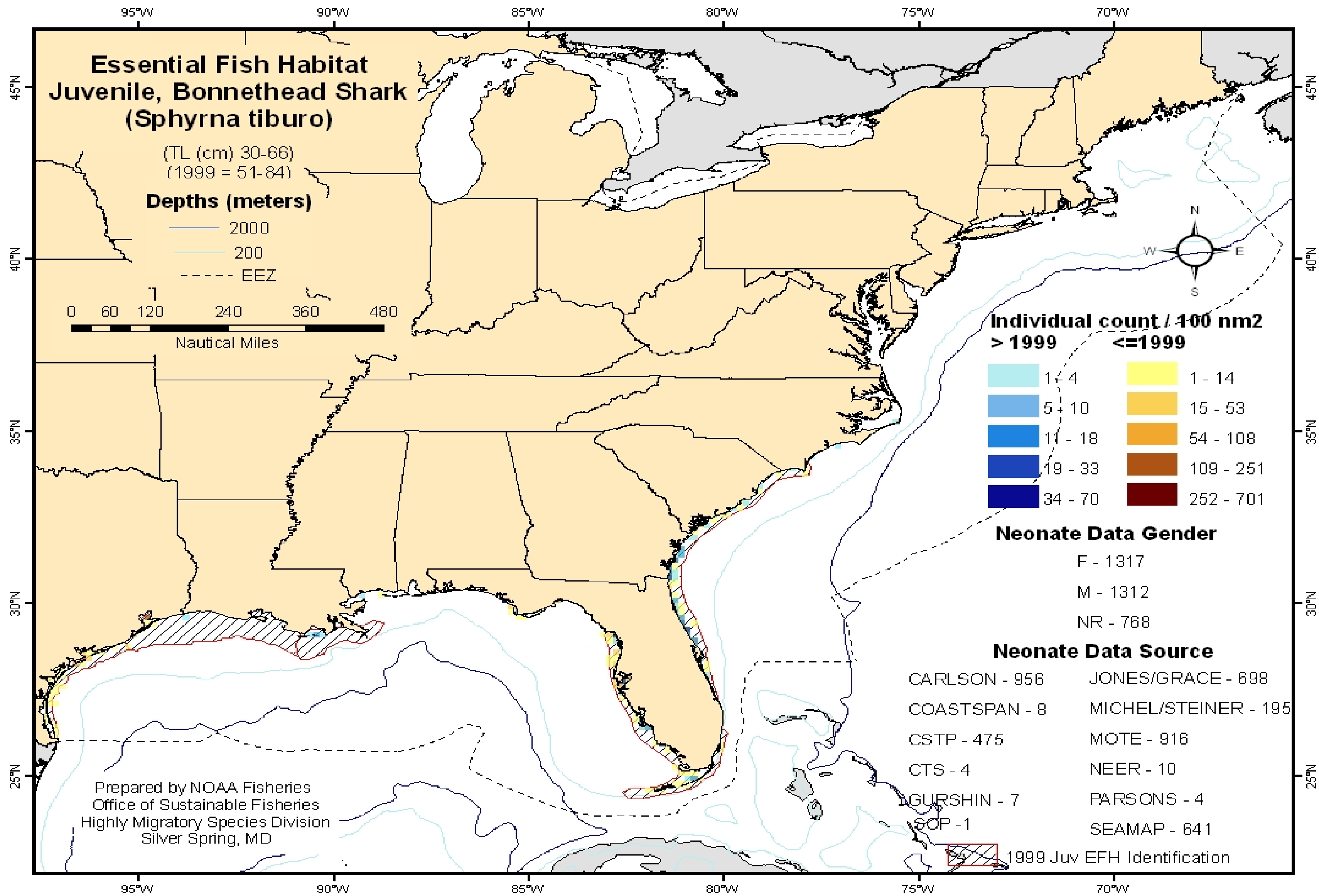

Figure B.90 **Bonnethead Shark: Juvenile.**

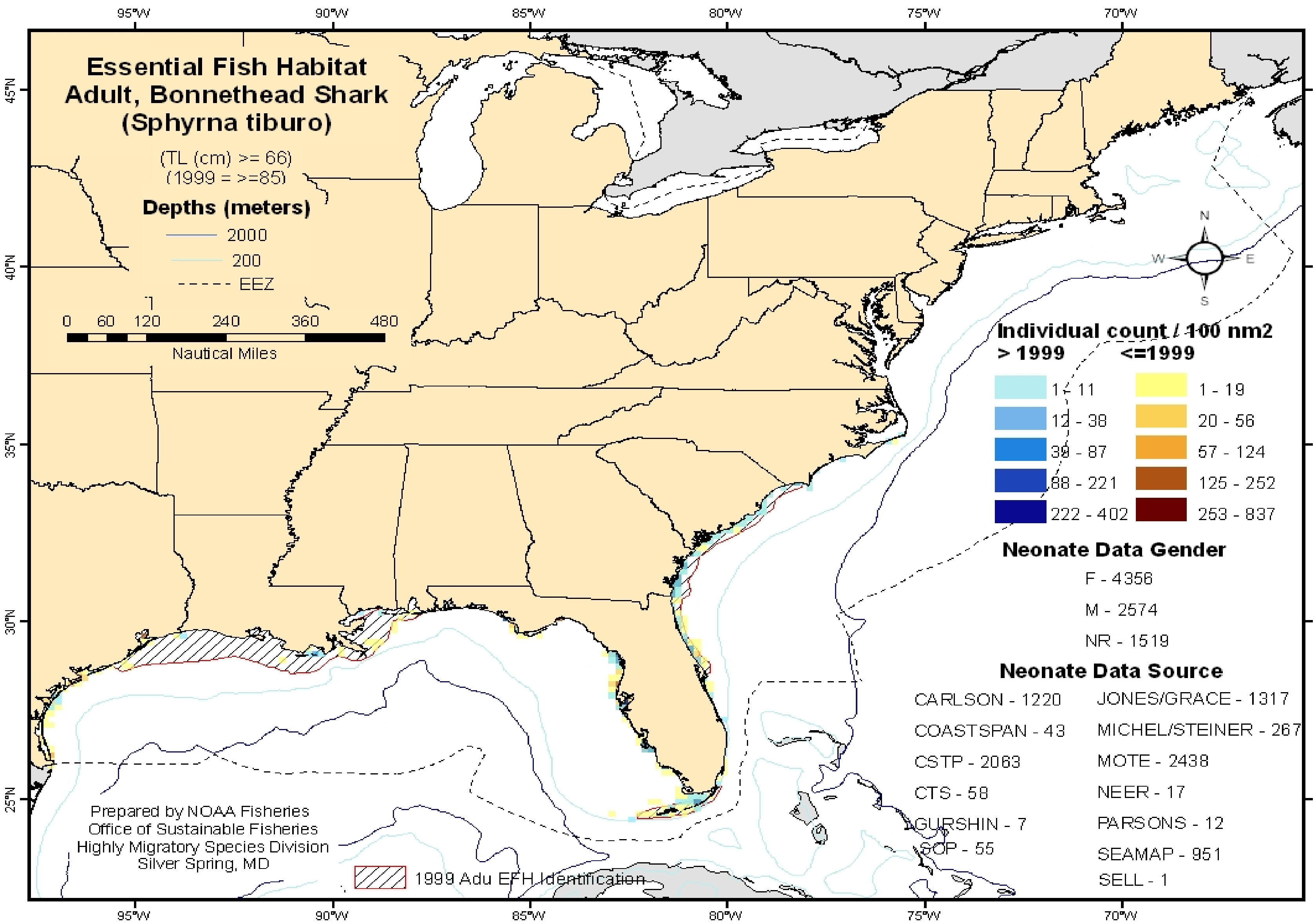

Figure B.91 Bonnethead Shark: Adult.

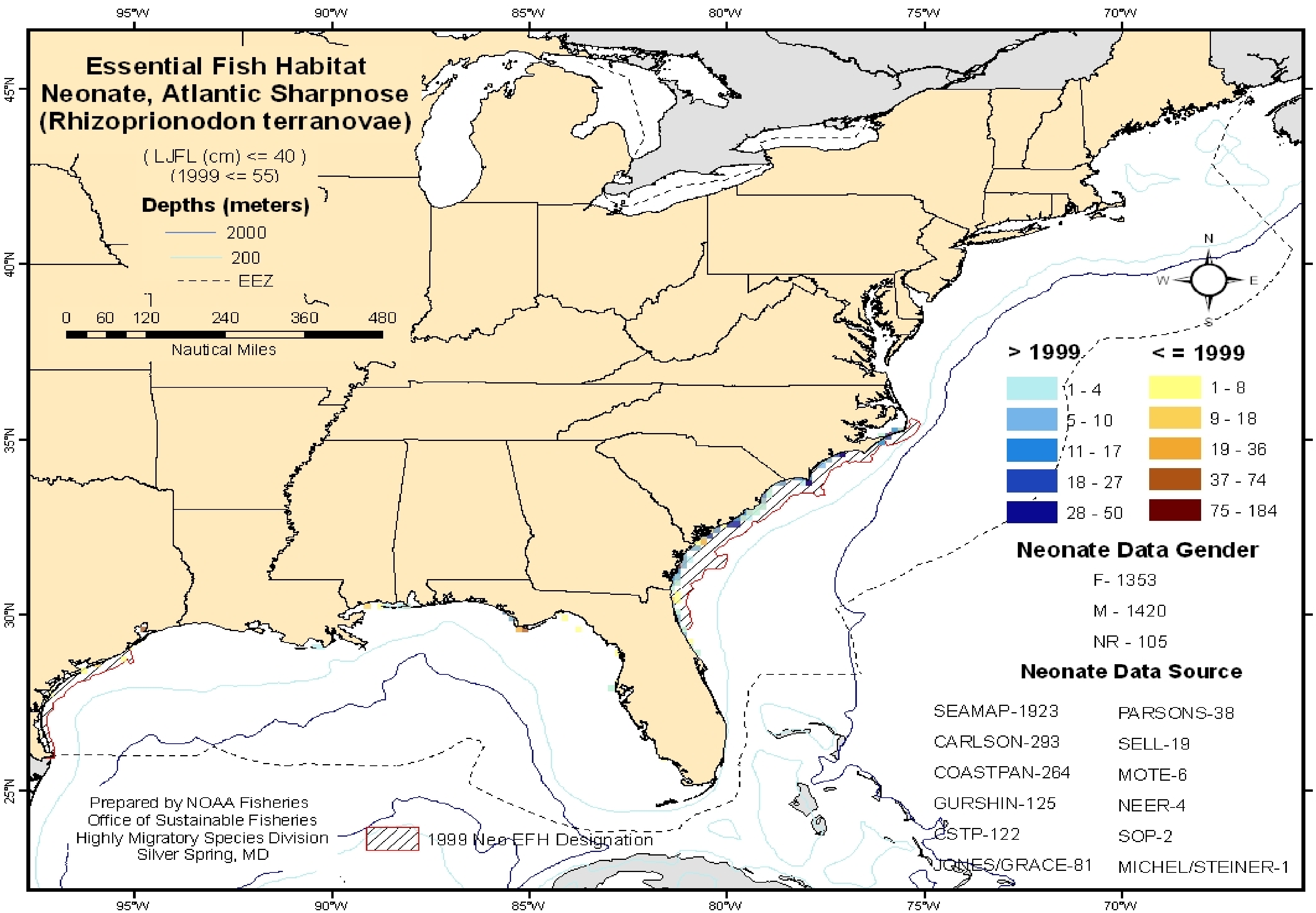

Figure B.92 **Altantic Sharpnose: Neonate.**

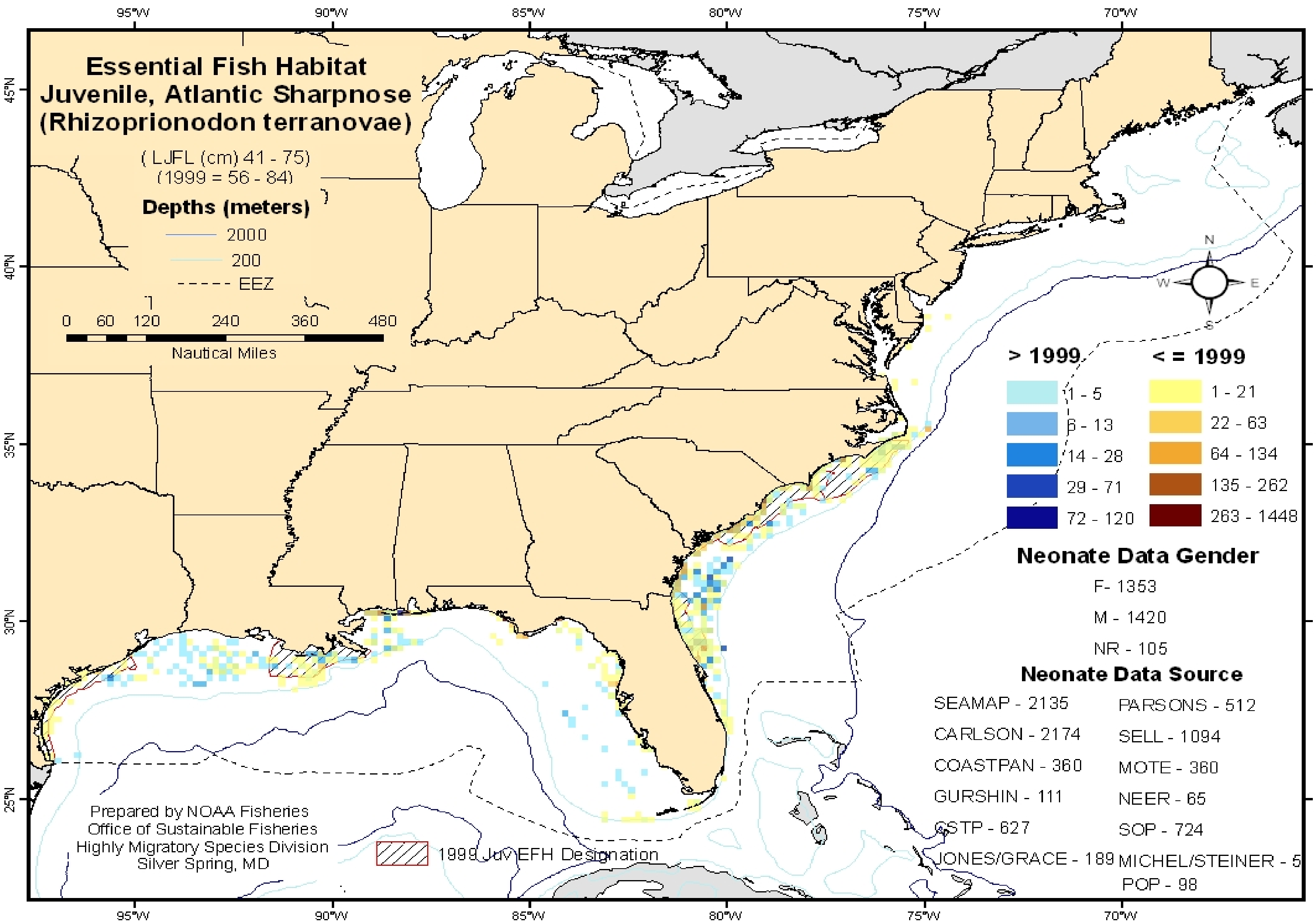

Figure B.93 Atlantic Sharpnose: Juvenile.

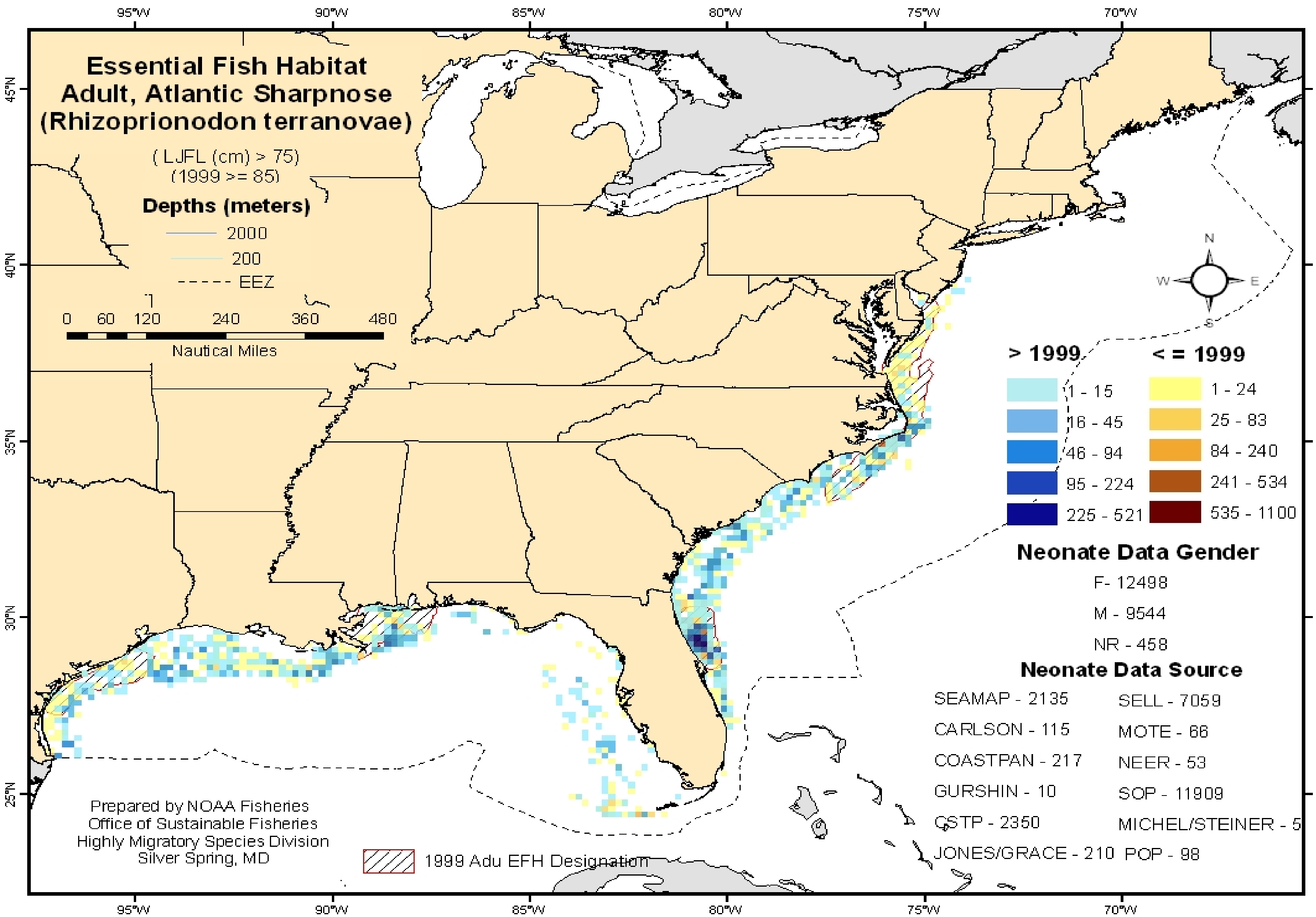

Figure B.94 **Atlantic Sharpnose Shark: Adult.**

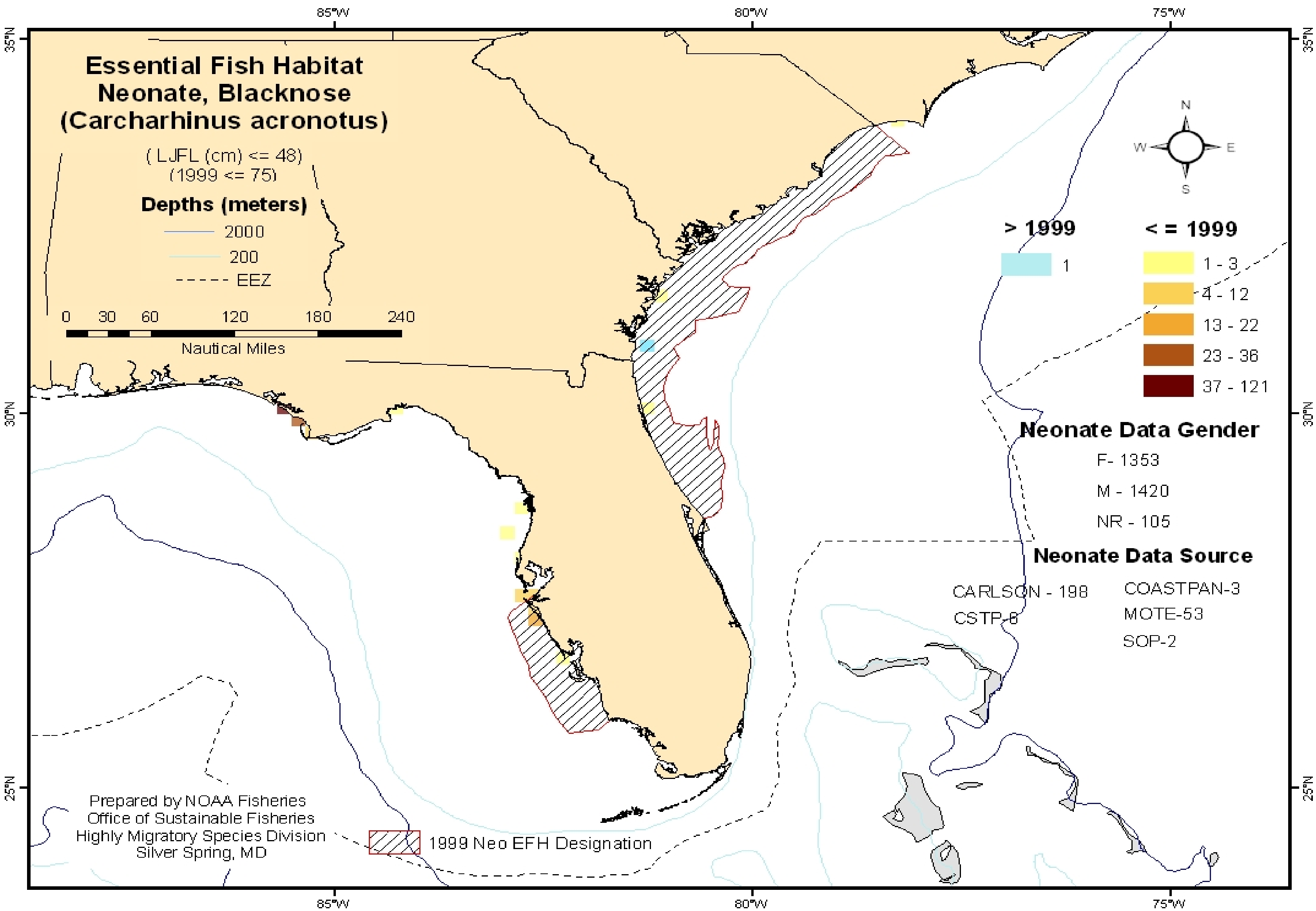

Figure B.95 **Blacknose Shark: Neonoate.**

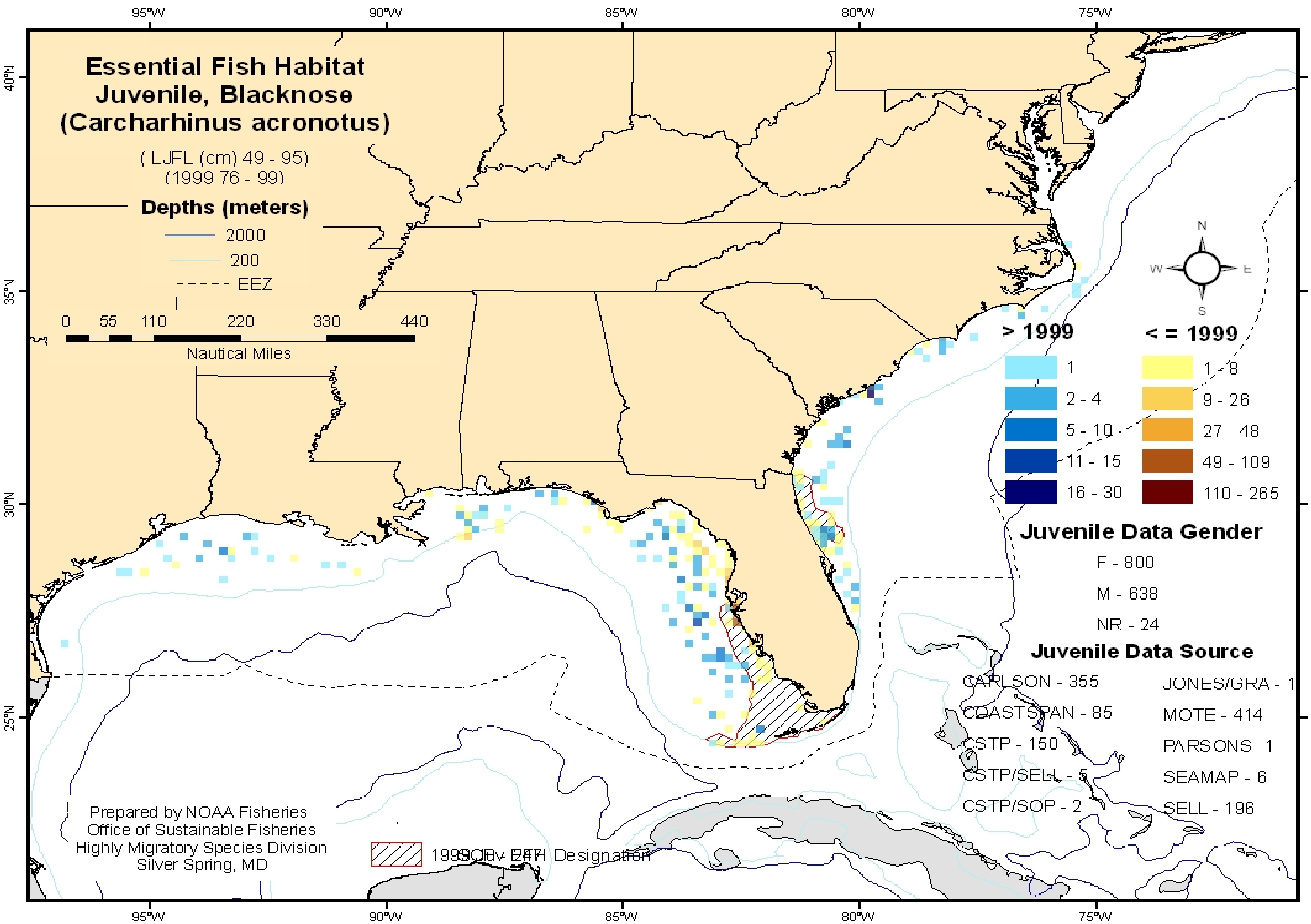

Figure B.96 **Blacknose Shark: Juvenile.**

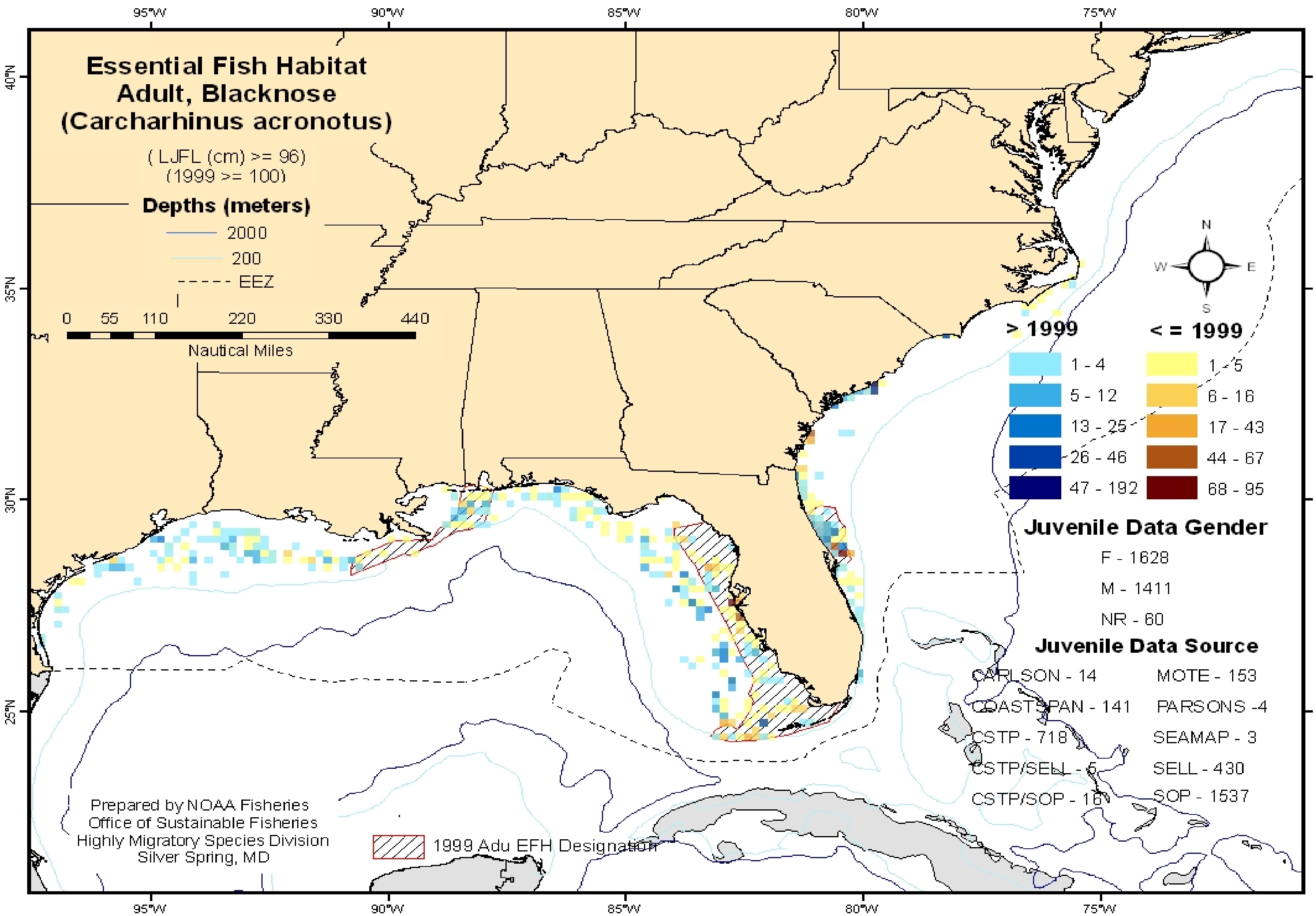

Figure B.97 Blacknose Shark: Adult.

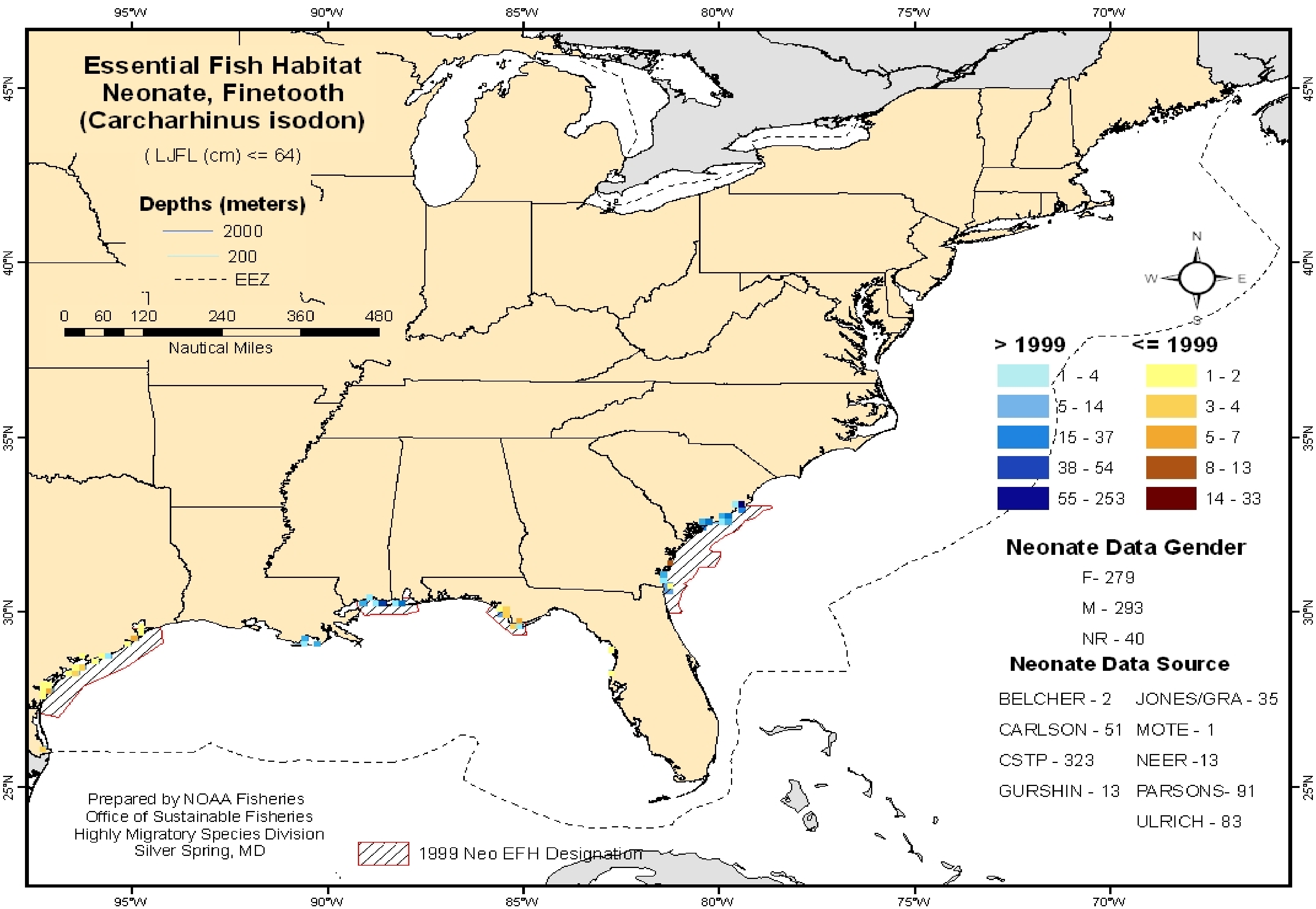

Figure B.98 Finetooth Shark: Neonate.

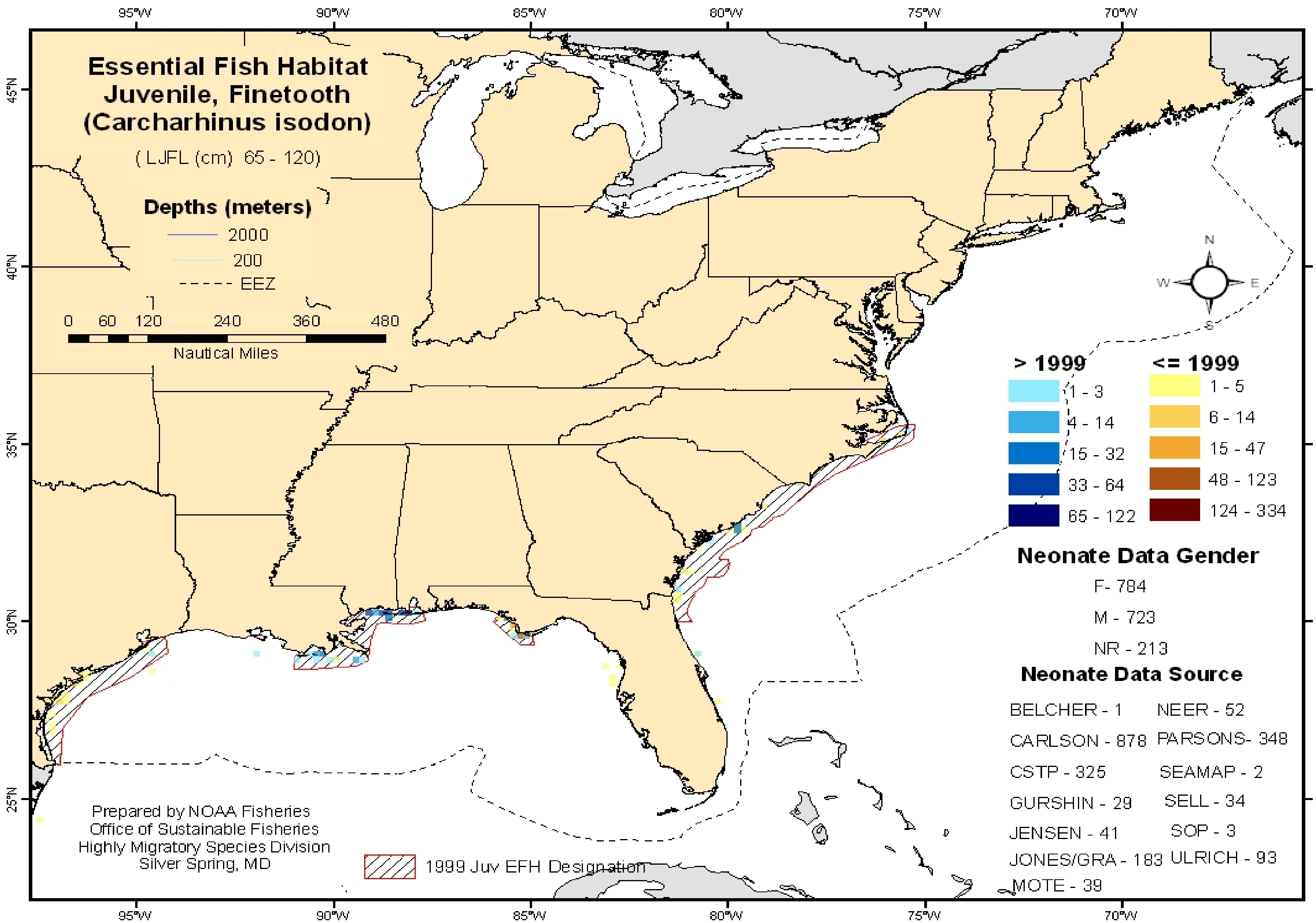

Figure B.99 Finetooth Shark: Juvenile.

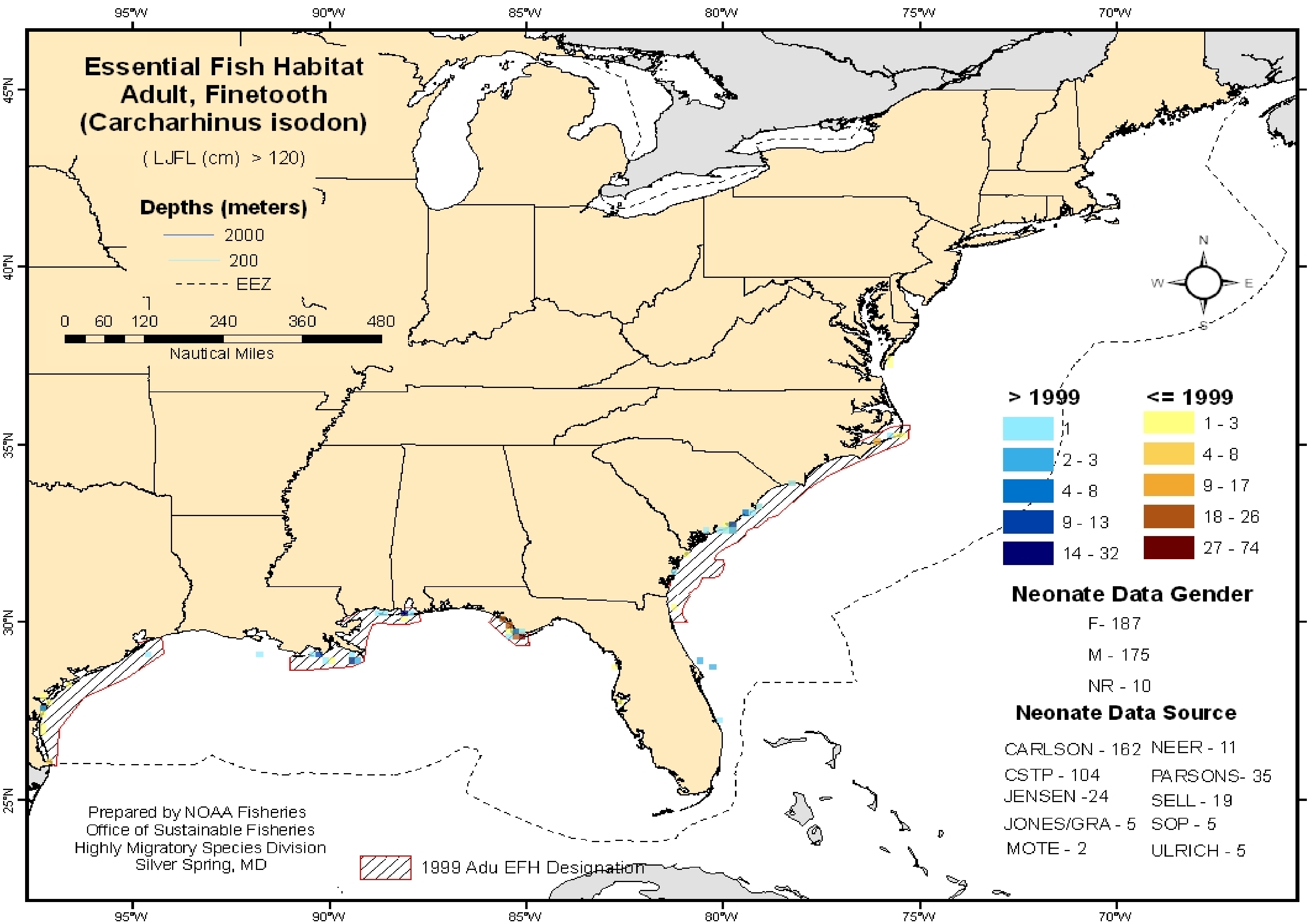

Figure B.100 **Finetooth Shark: Adult.**

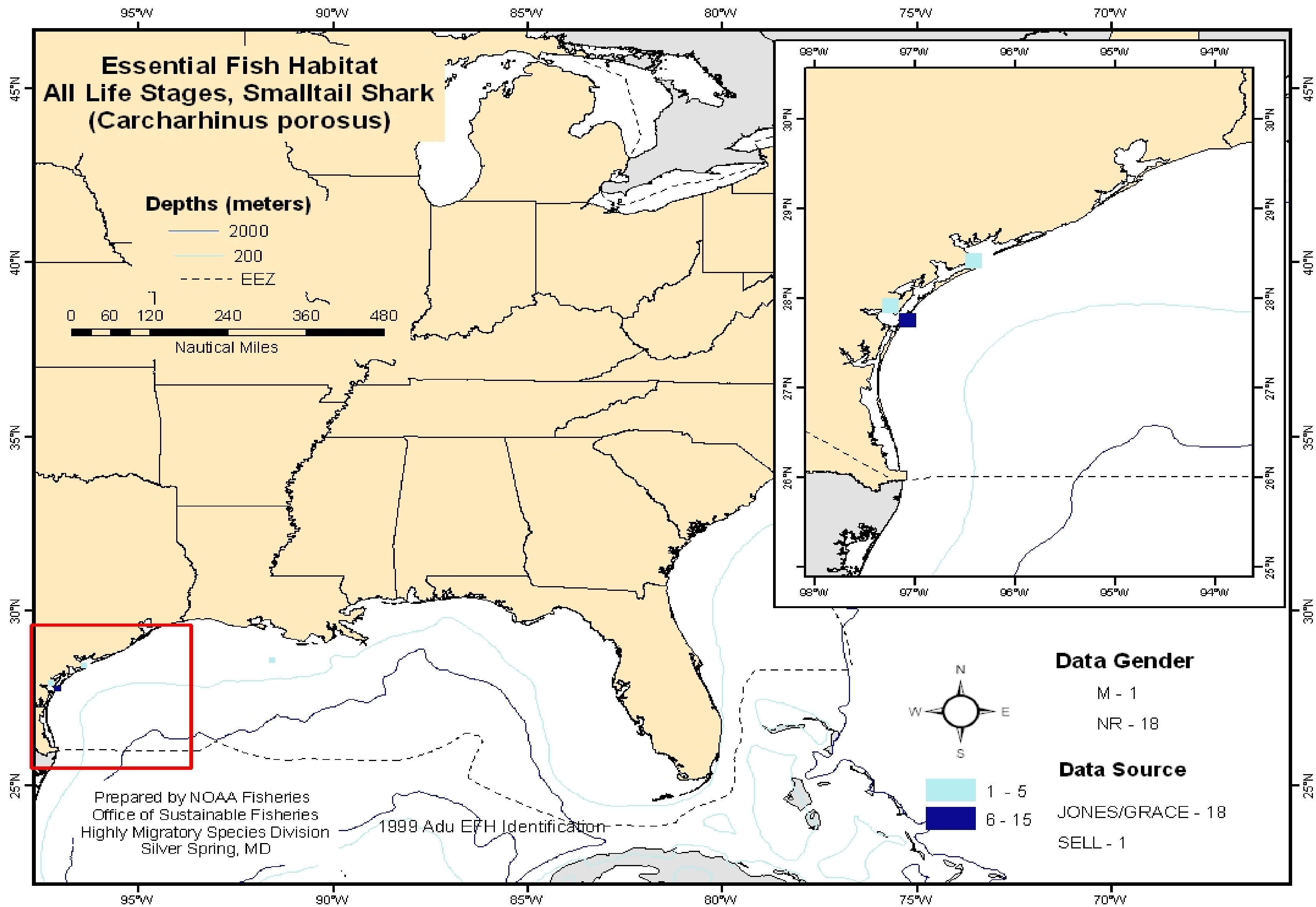

Figure B.101 Smalltail Shark: All Life Stages.

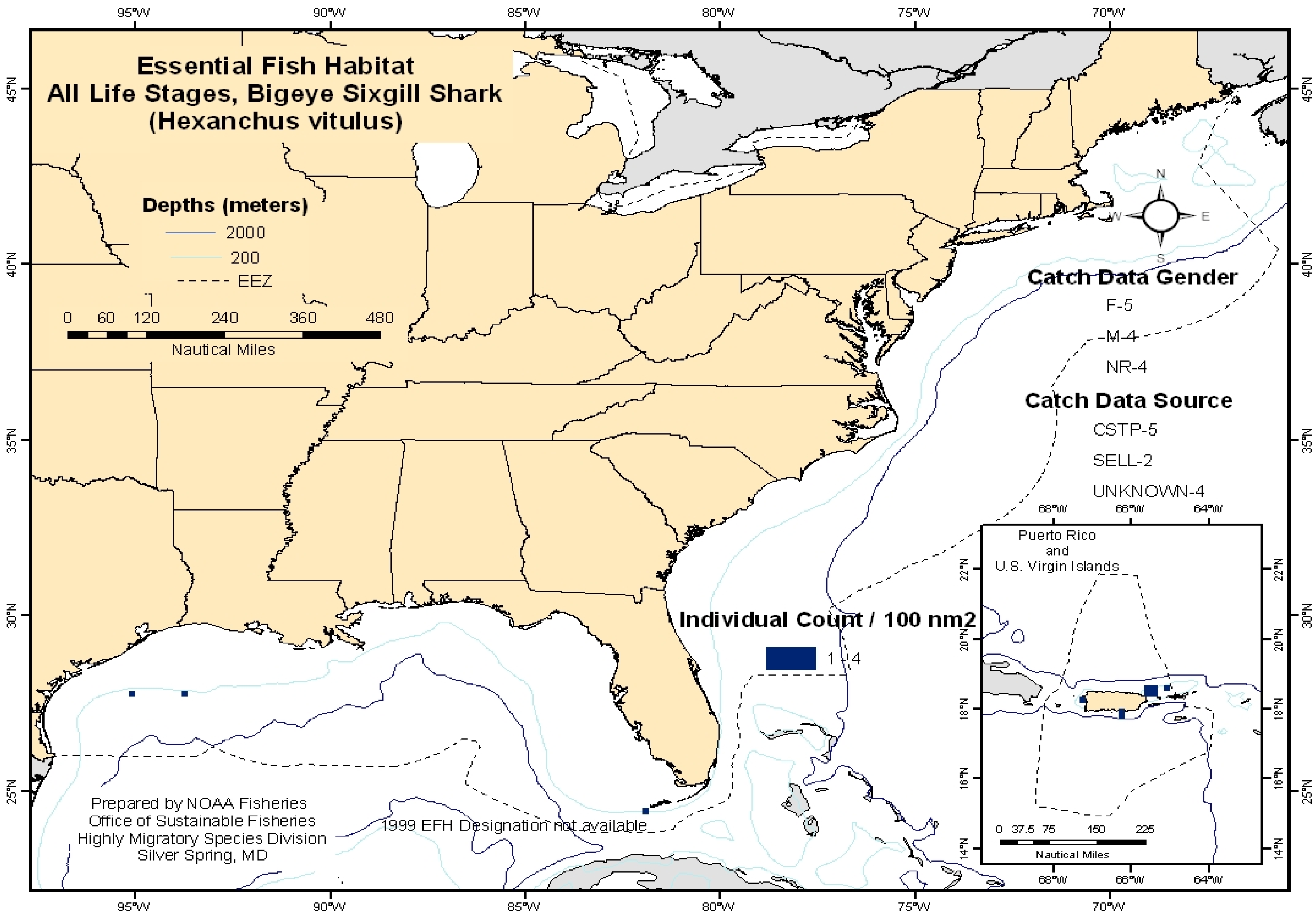

Figure B.102 **Bigeye Sixgill Shark: All Life Stages.**

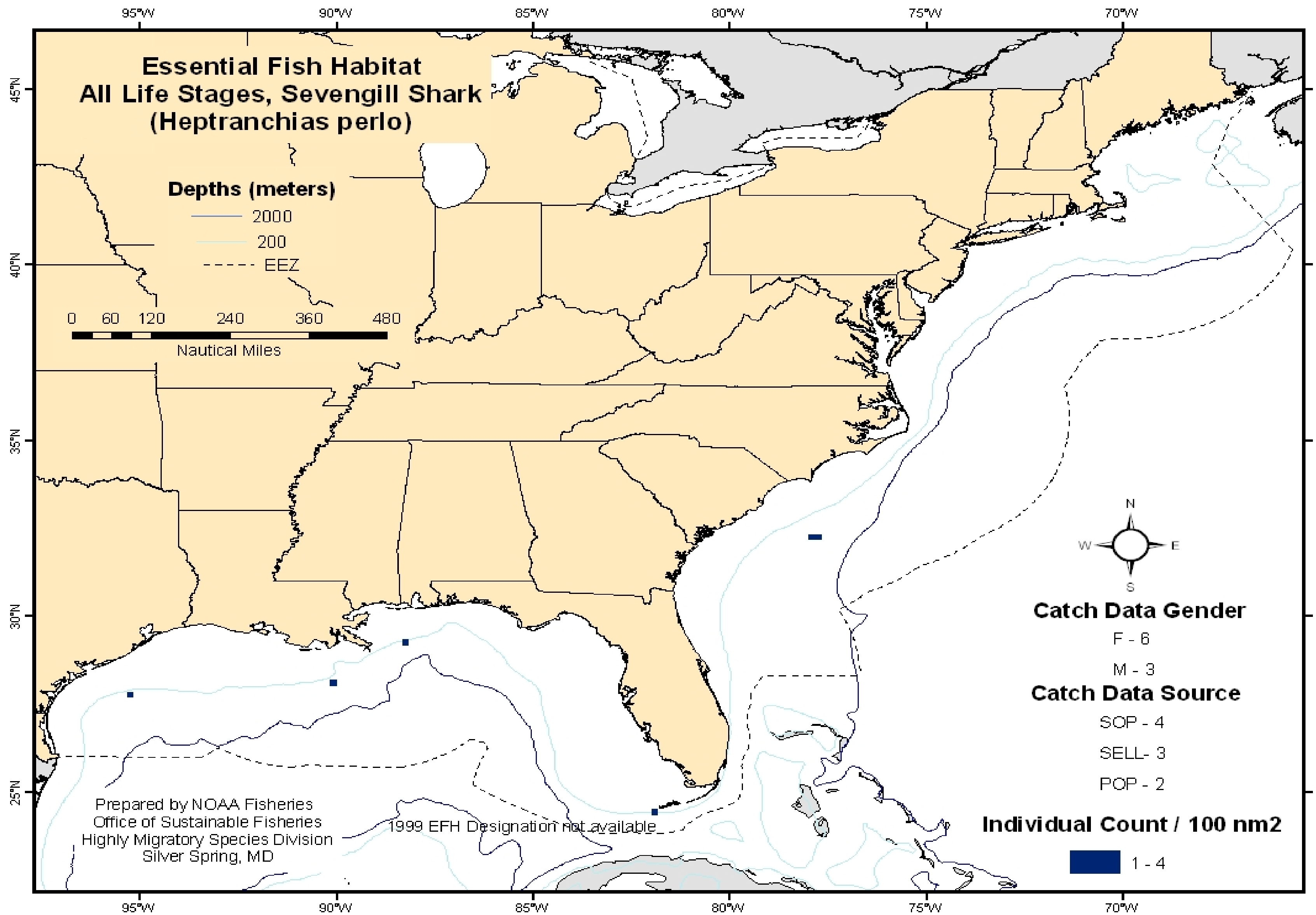

Figure B.103 Sevengill Shark: All Life Stages.

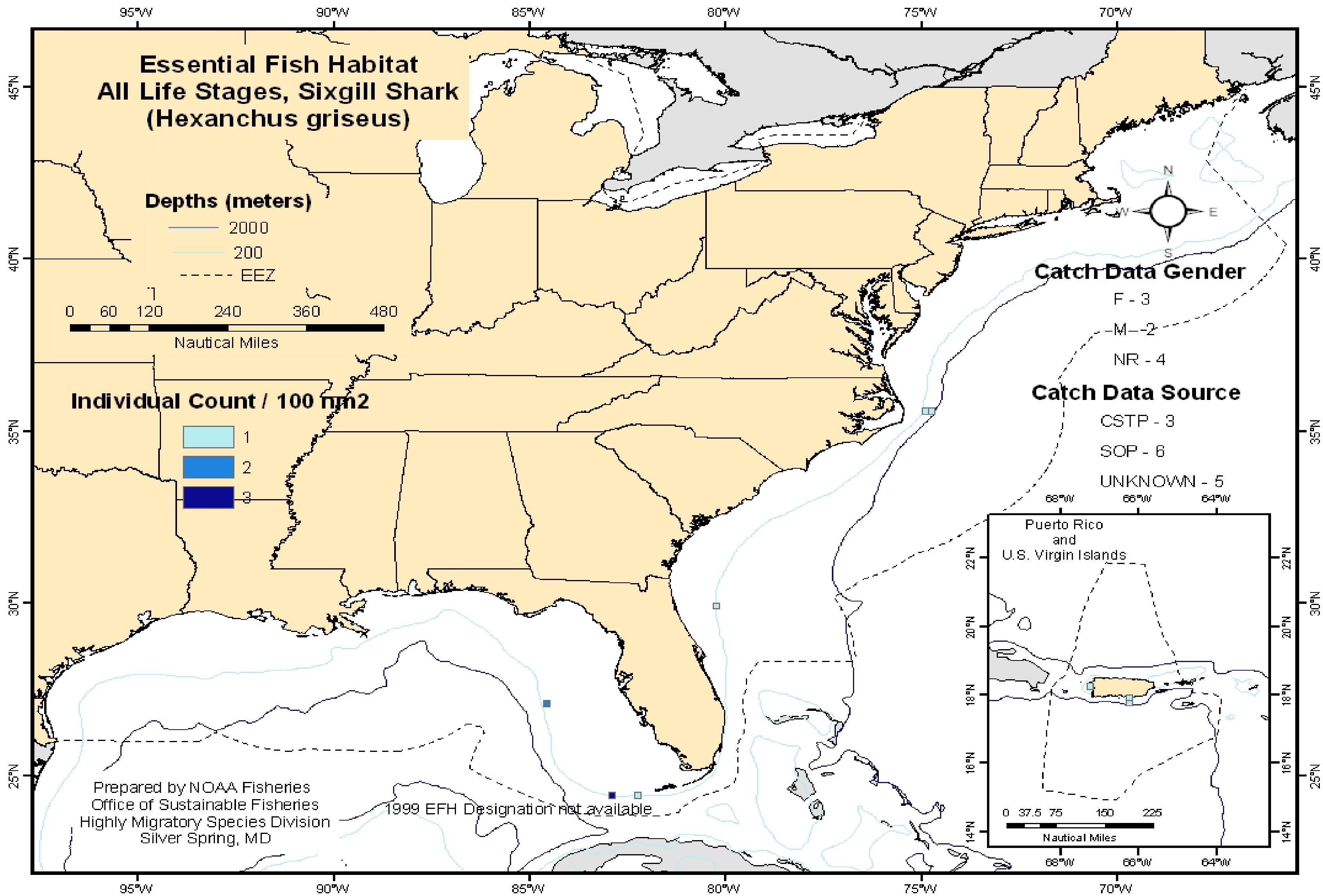

Figure B.104 **Sixgill Shark: All Life Stages.**

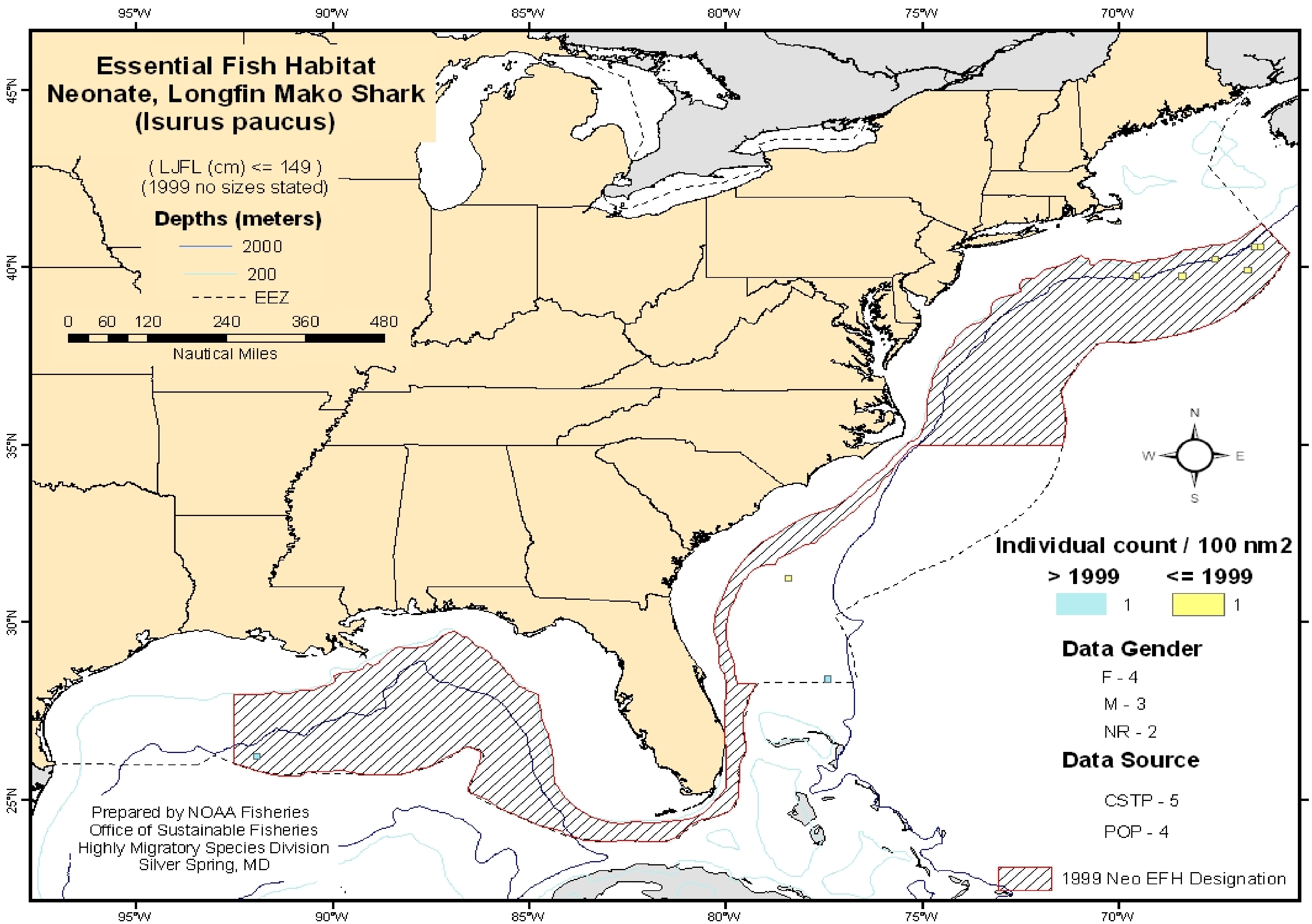

Figure B.105 **Longfin Mako Shark: Neonate.**

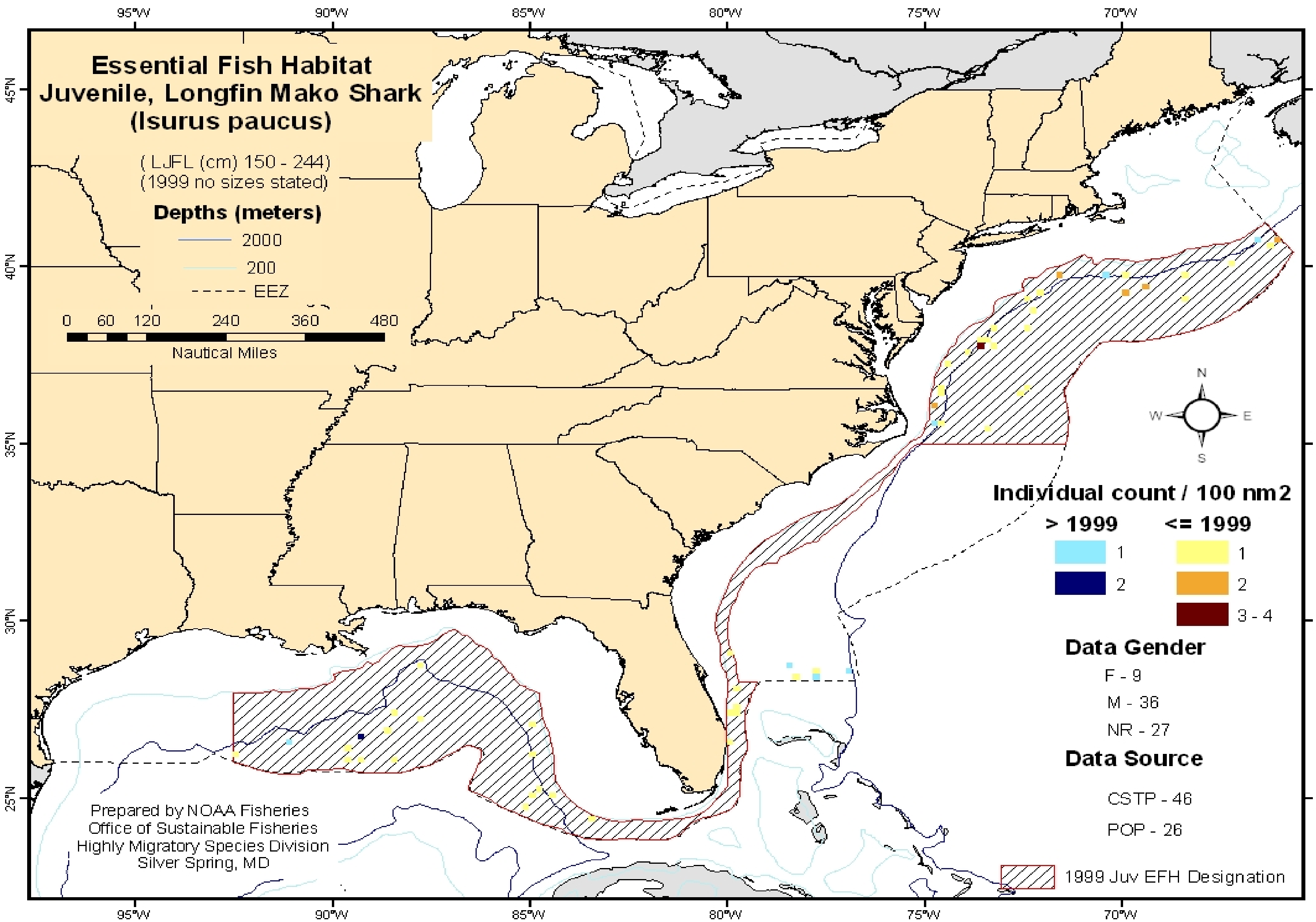

Figure B.106 Longfin Mako Shark : Juvenile.

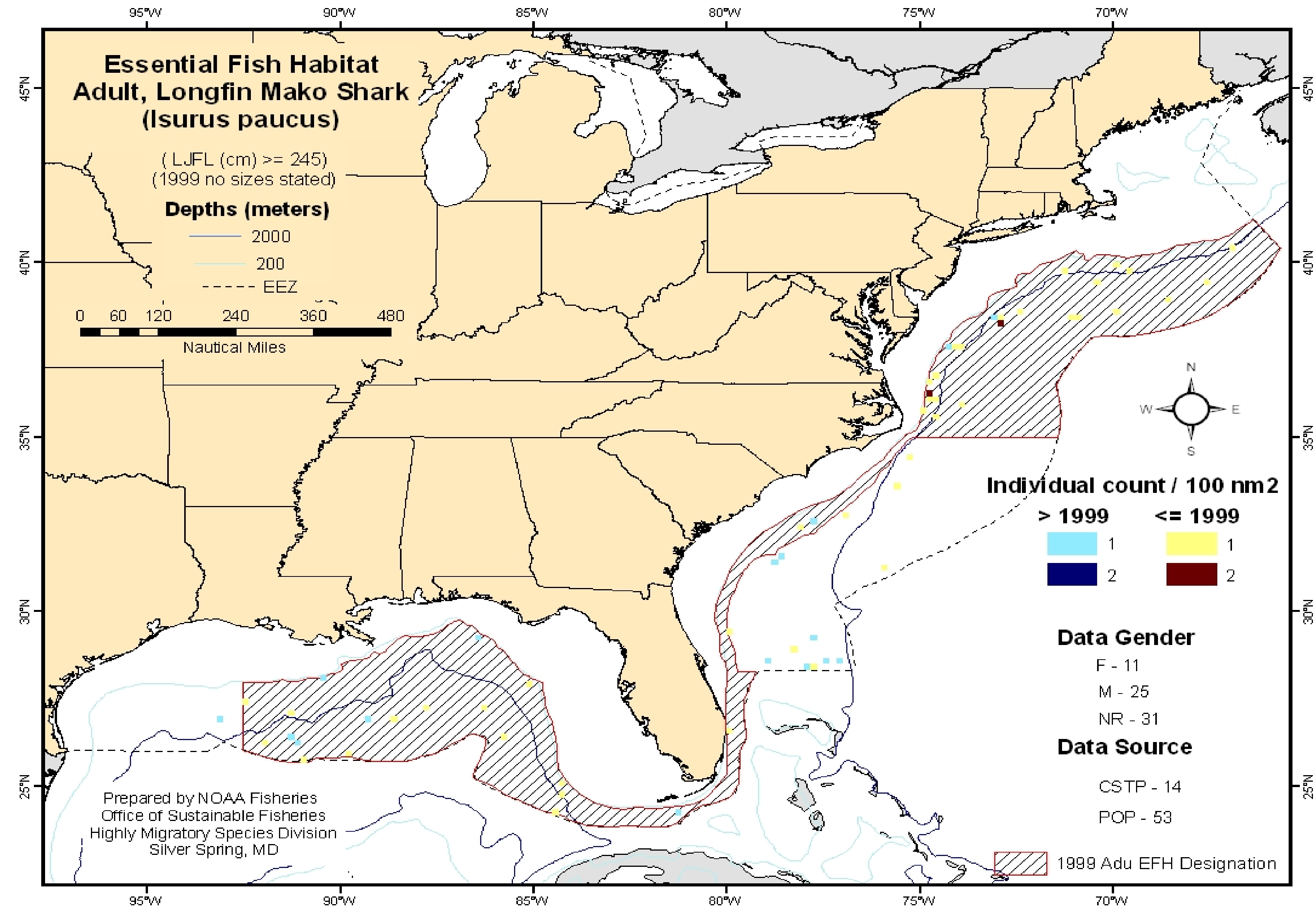

Figure B.107 **Longfin Mako Shark: Adult.**

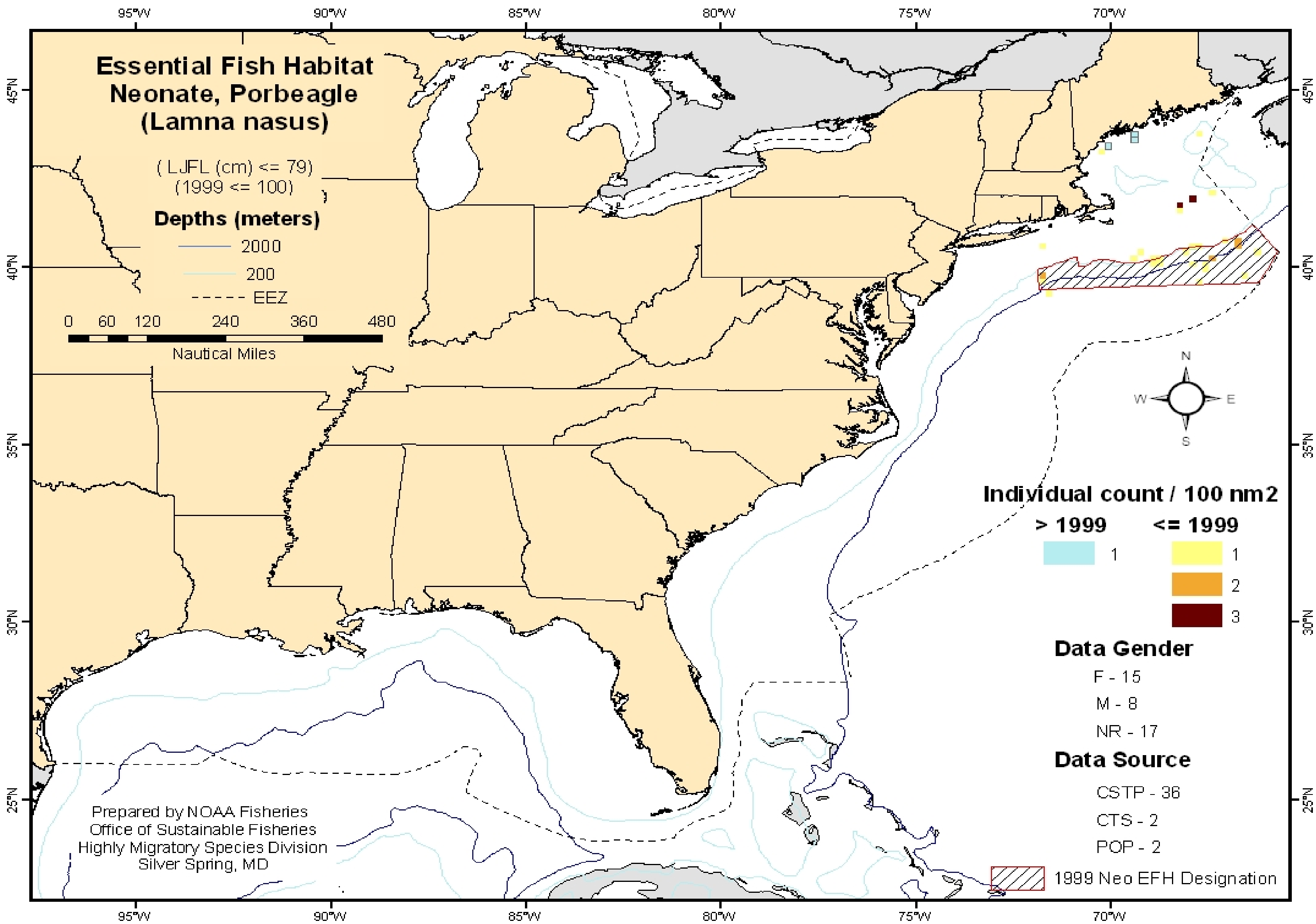

Figure B.108 **Porbeagle Shark: Neonate.**

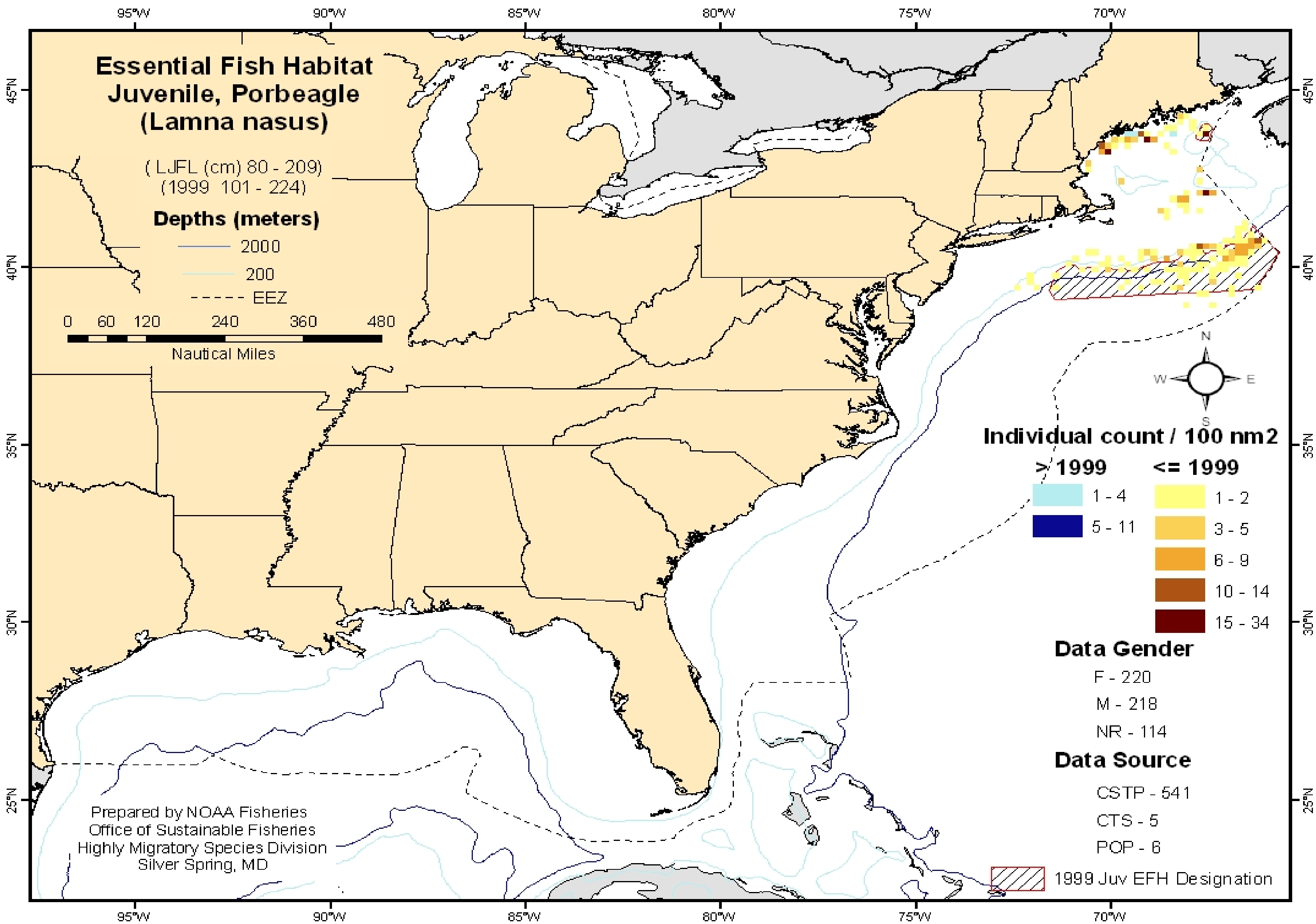

Figure B.109 Porbeagle Shark: Juvenile.

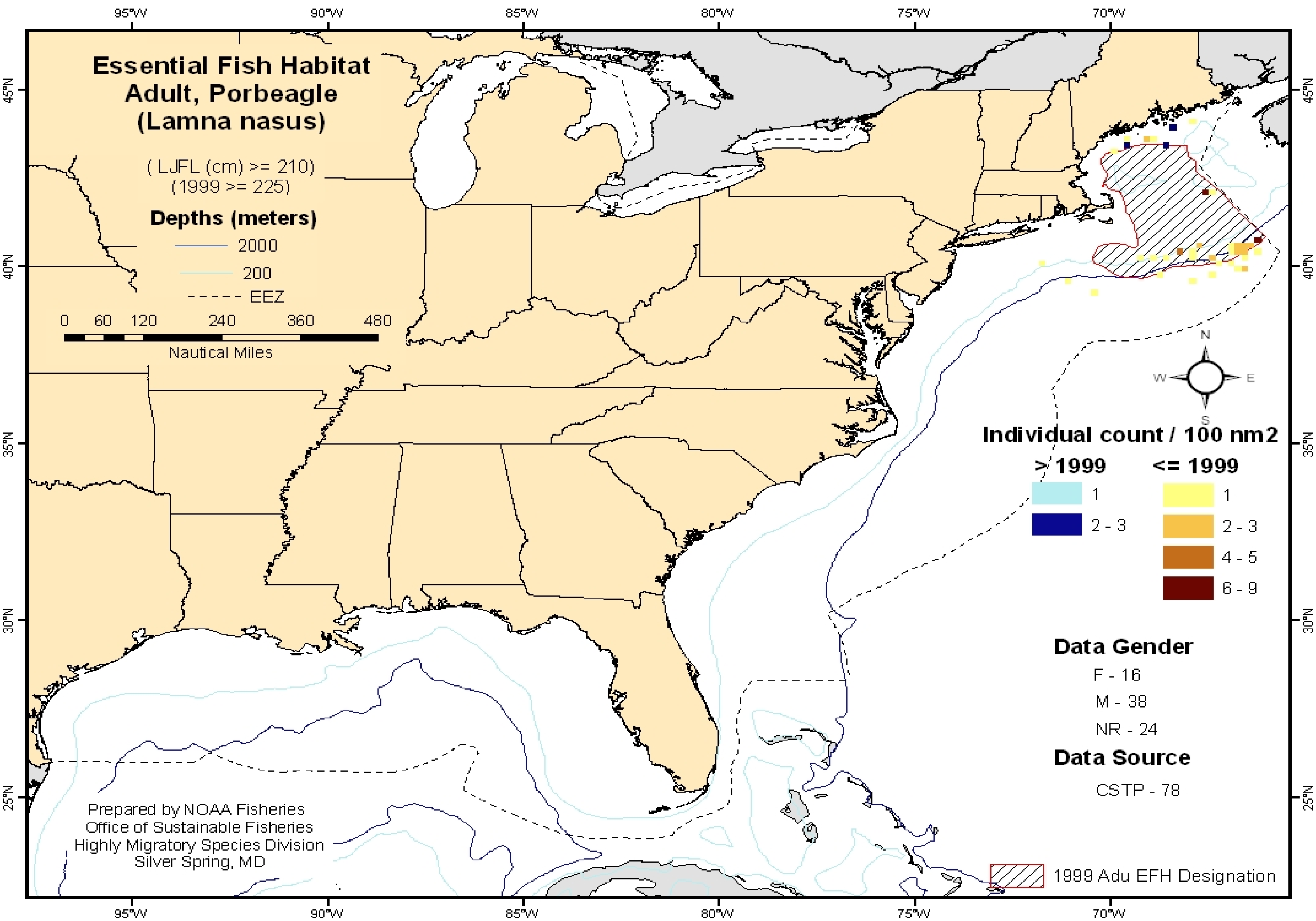

Figure B.110 **Porbeagle Shark: Adult.**

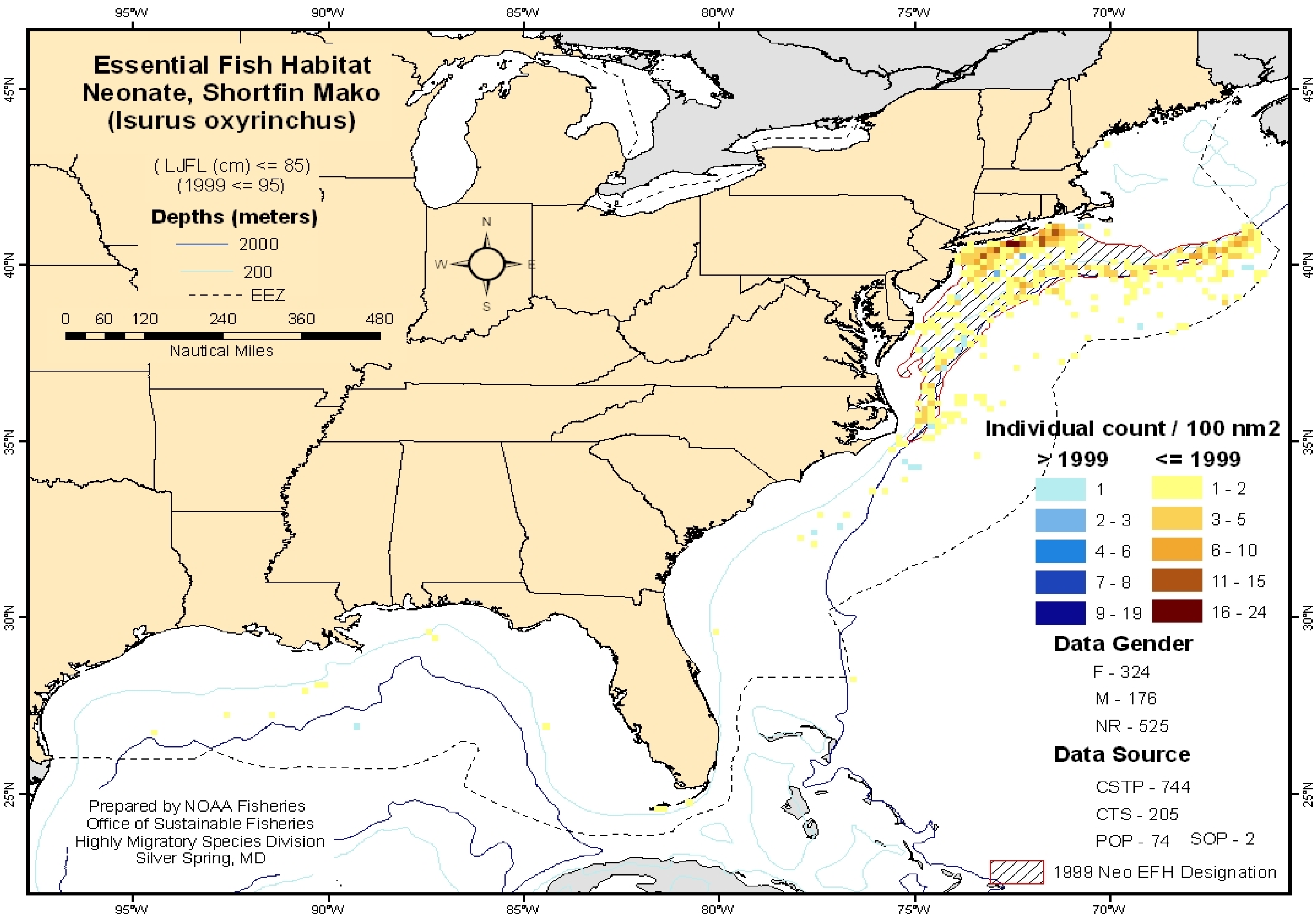

Figure B.111 Shortfin Mako Shark: Neonate.

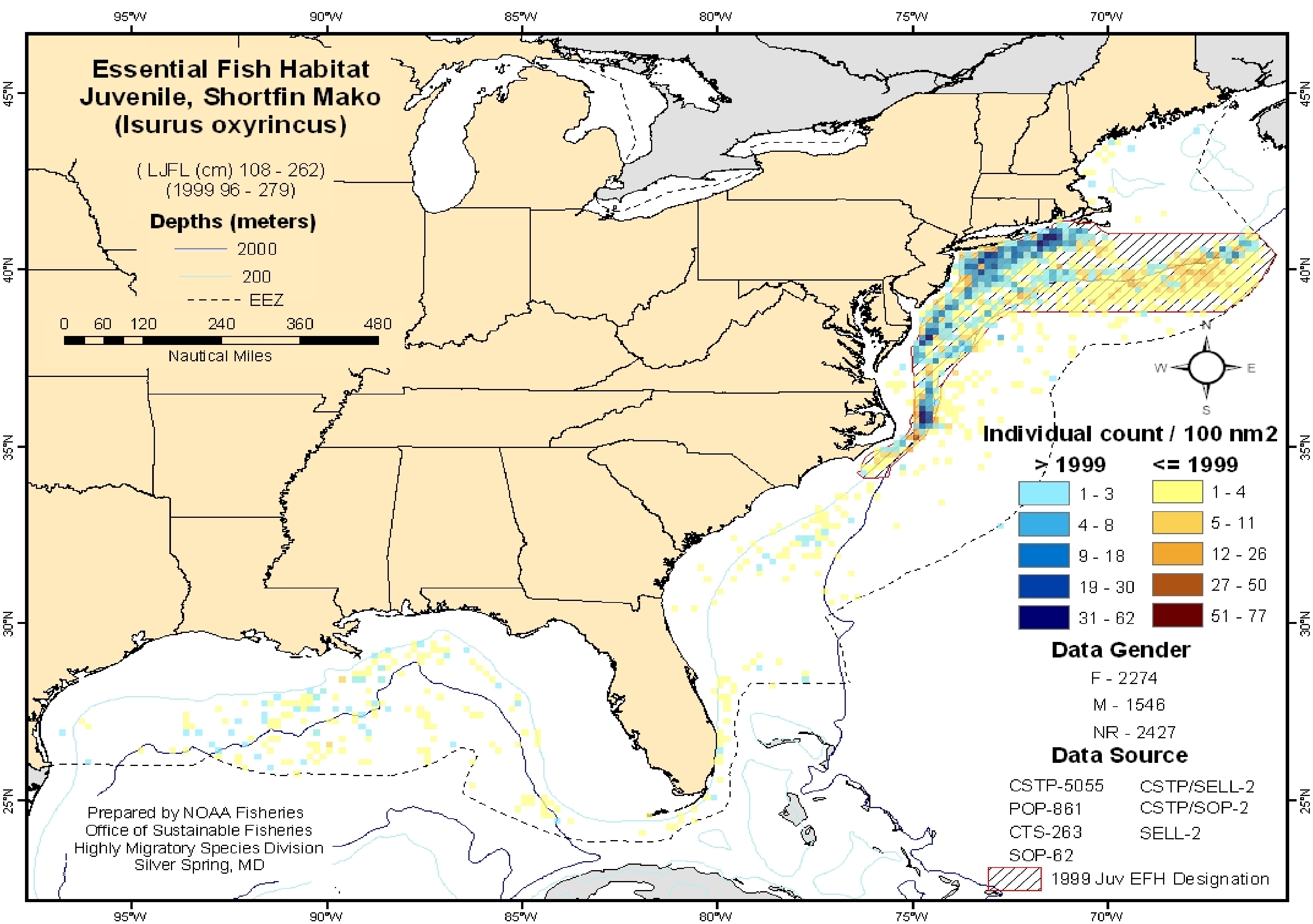

Figure B.112 **Shortfin Mako Shark: Juvenile.**

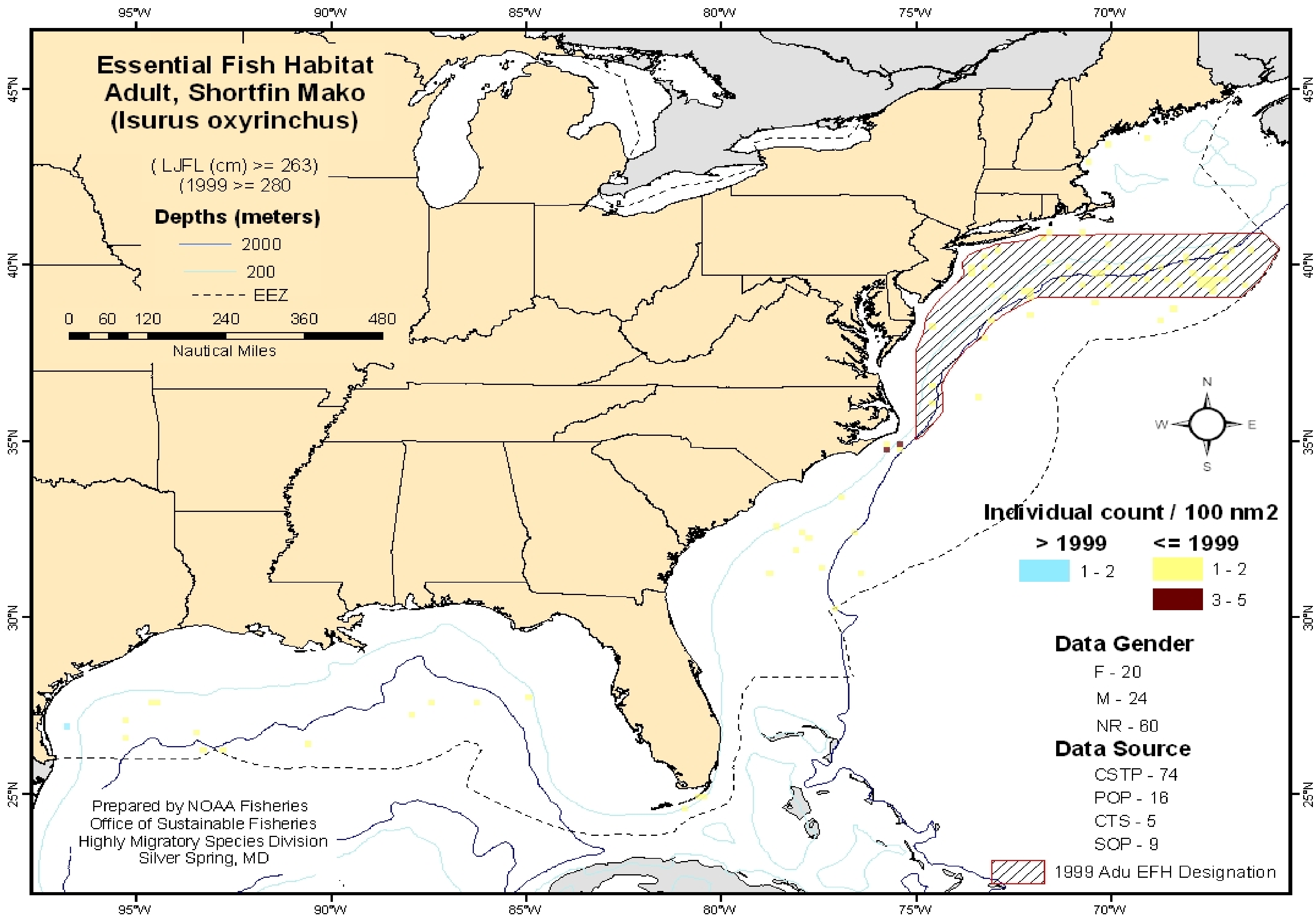

Figure B.113 Shortfin Mako Shark: Adult.

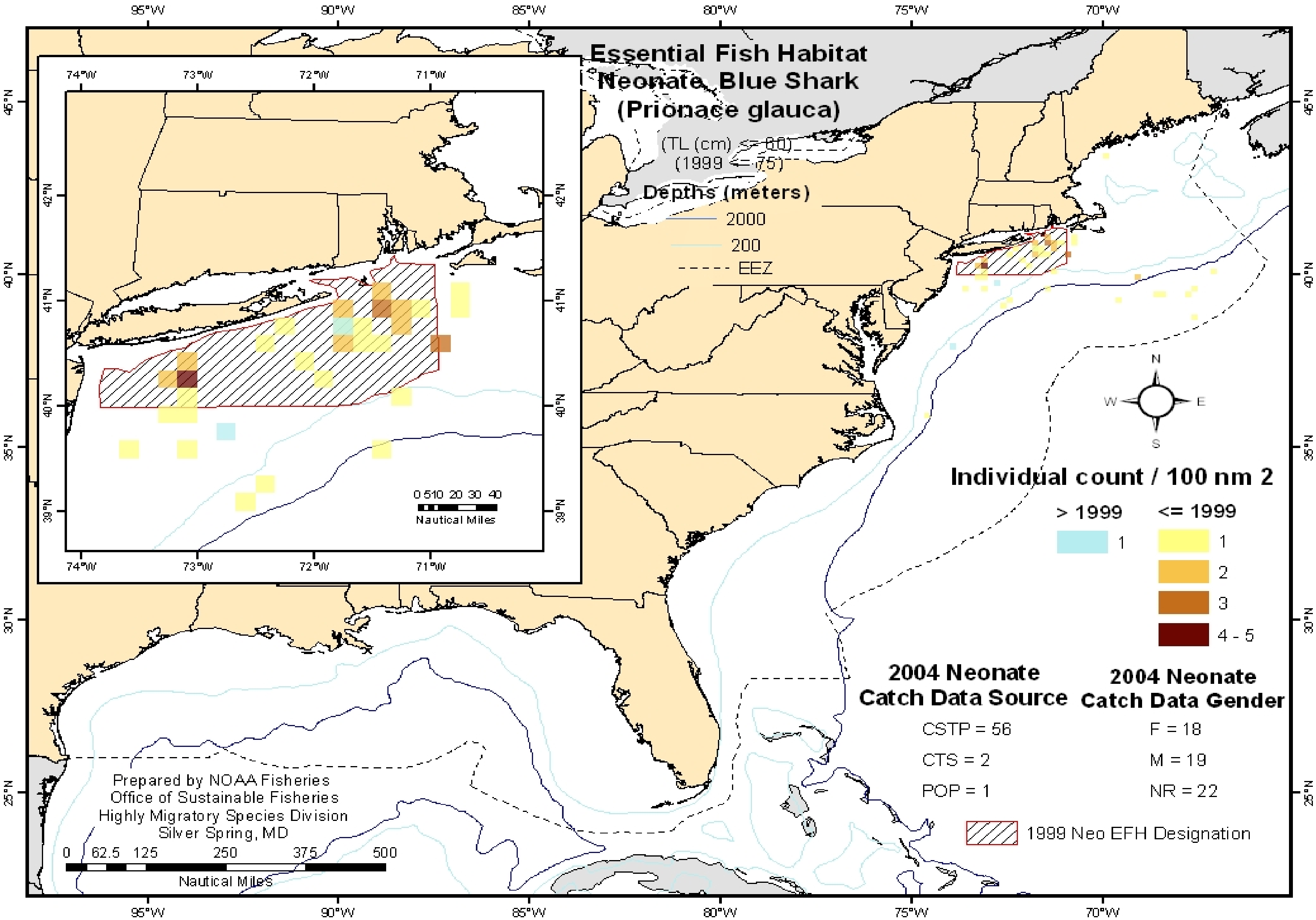

Figure B.114 Blue Shark: Neonate.

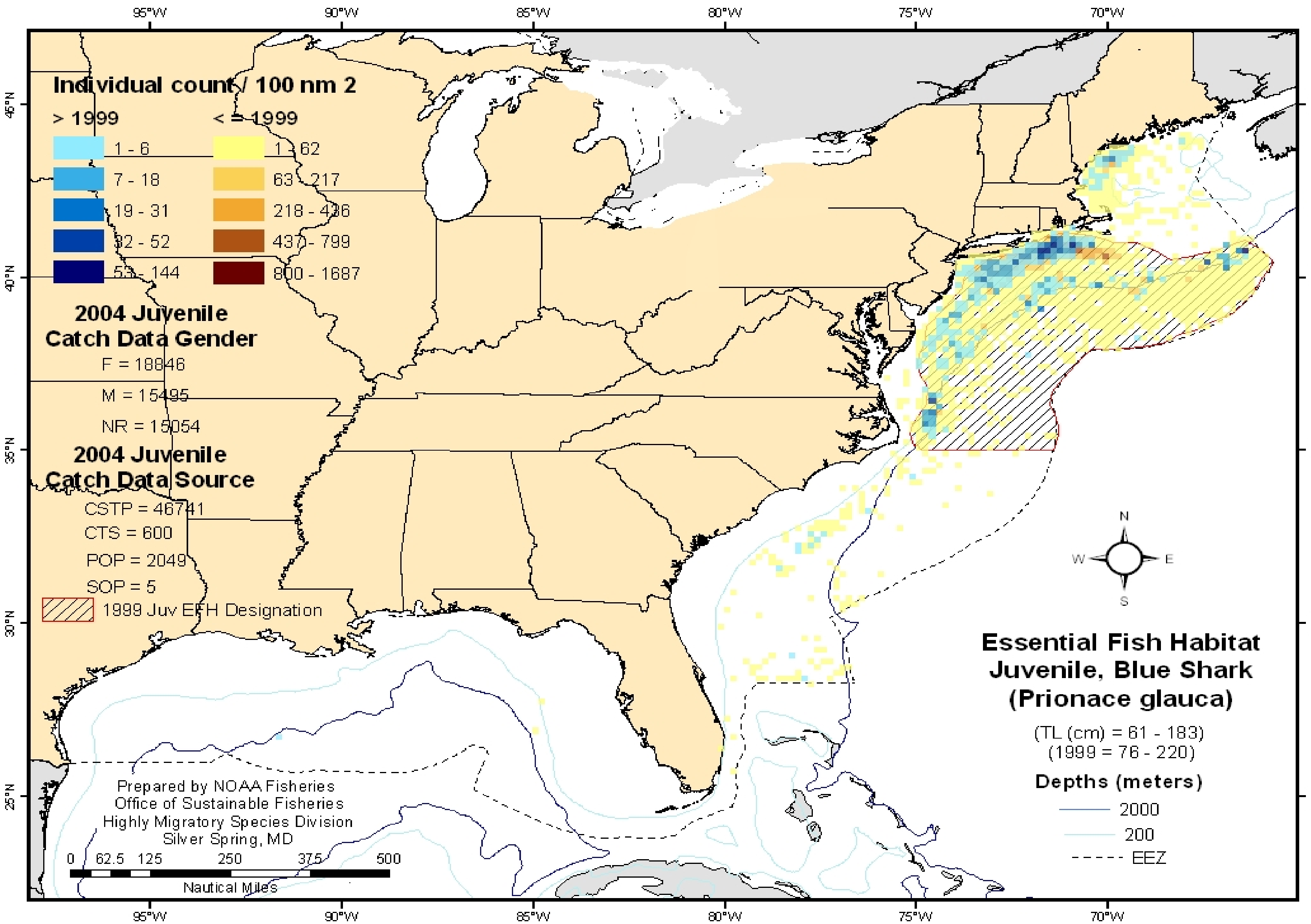

Figure B.115 **Blue Shark: Juvenile.**

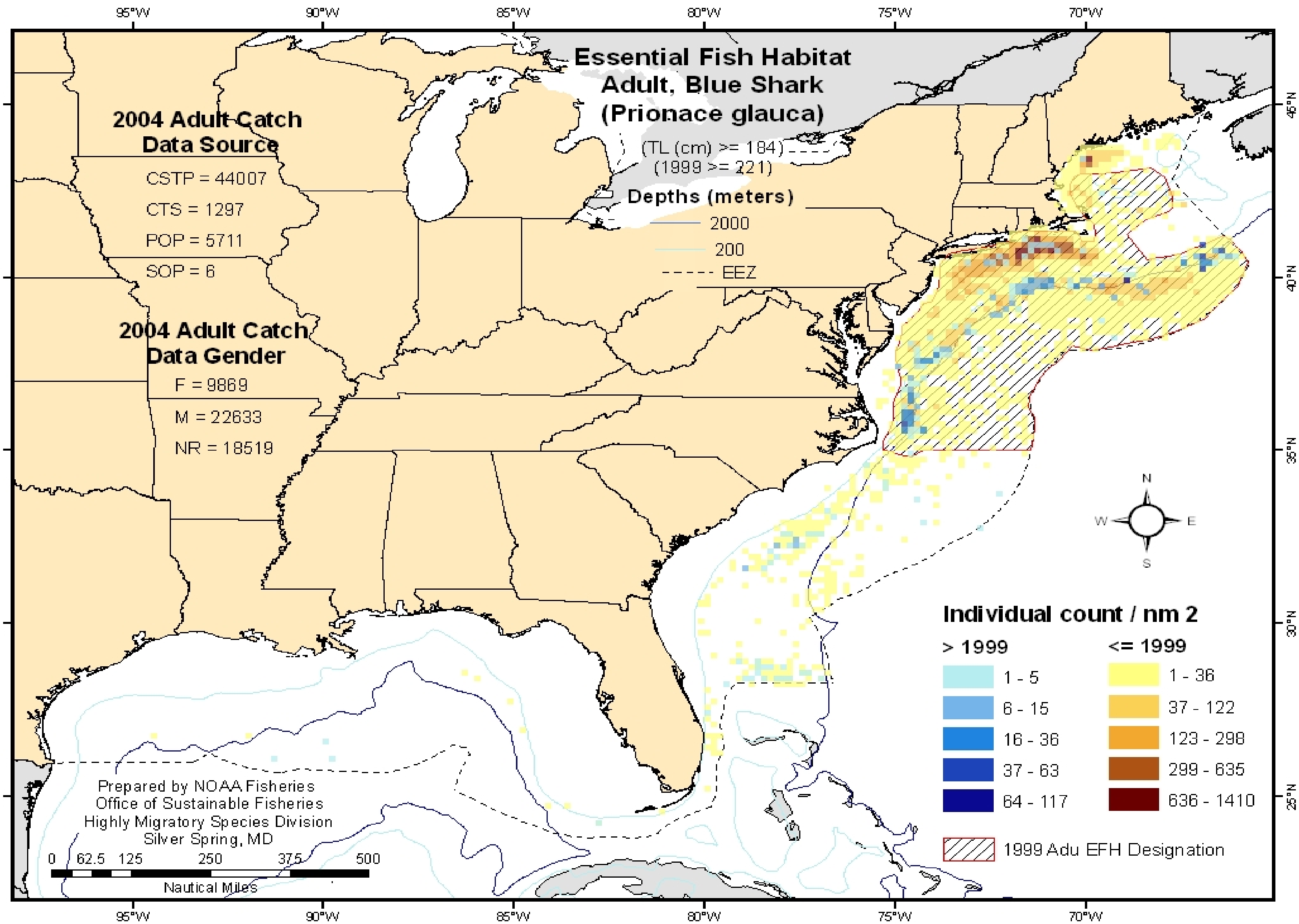

Figure B.116 **Blue Shark: Adult.**

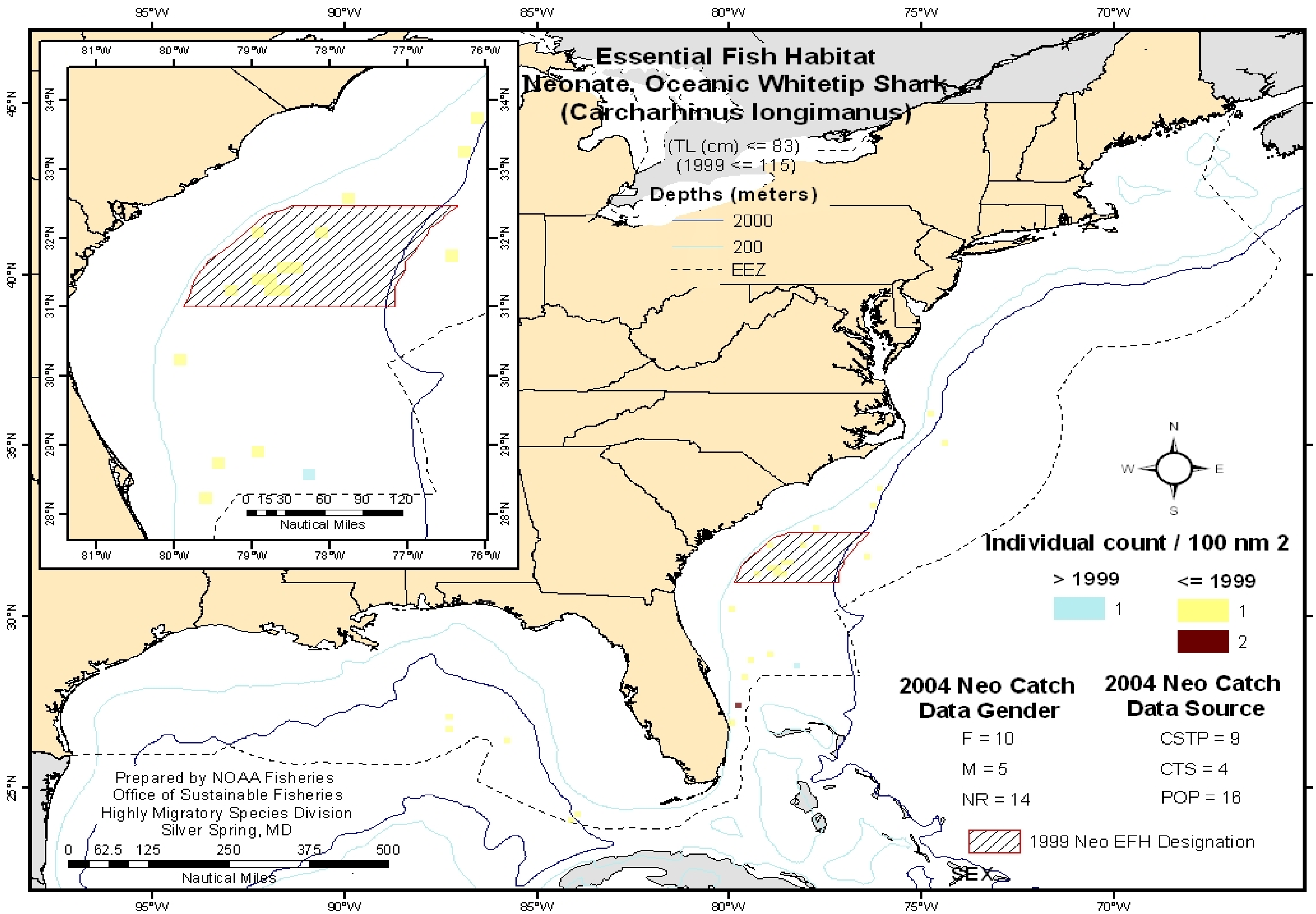

Figure B.117 Oceanic Whitetip Shark: Neonate.

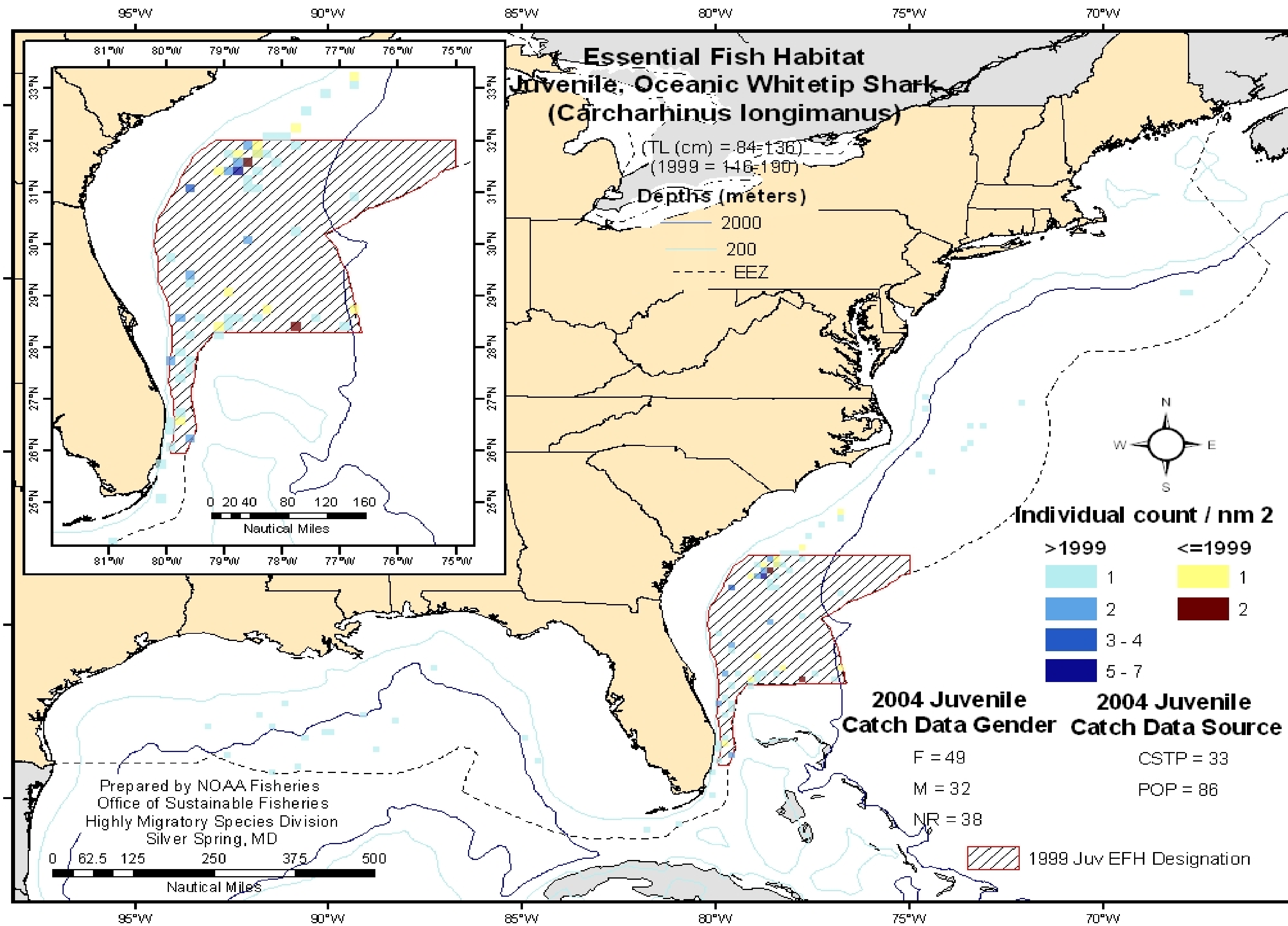

Figure B.118 Oceanic Whitetip Shark: Juvenile.

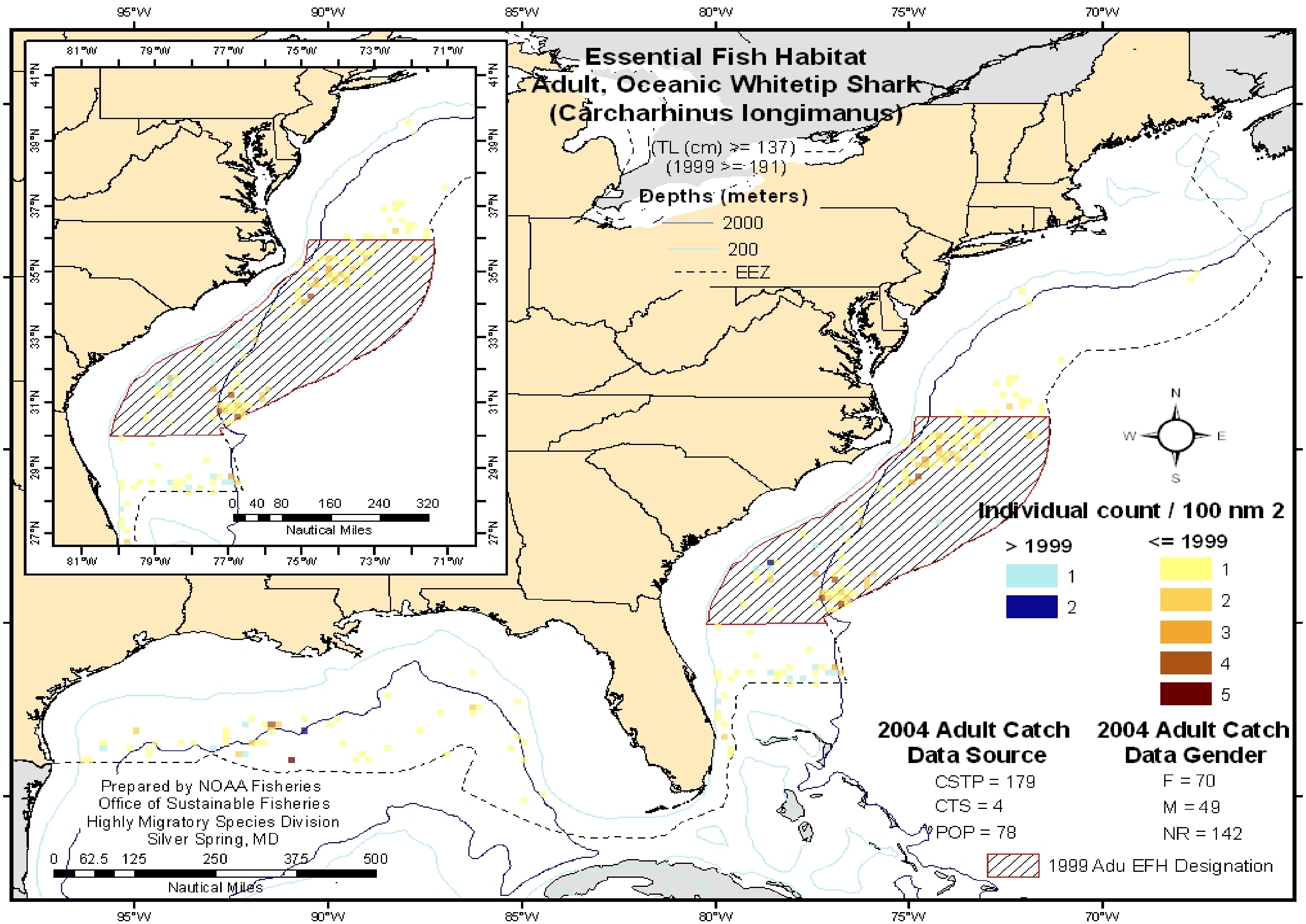

Figure B.119 Oceanic Whitetip Shark: Adult.

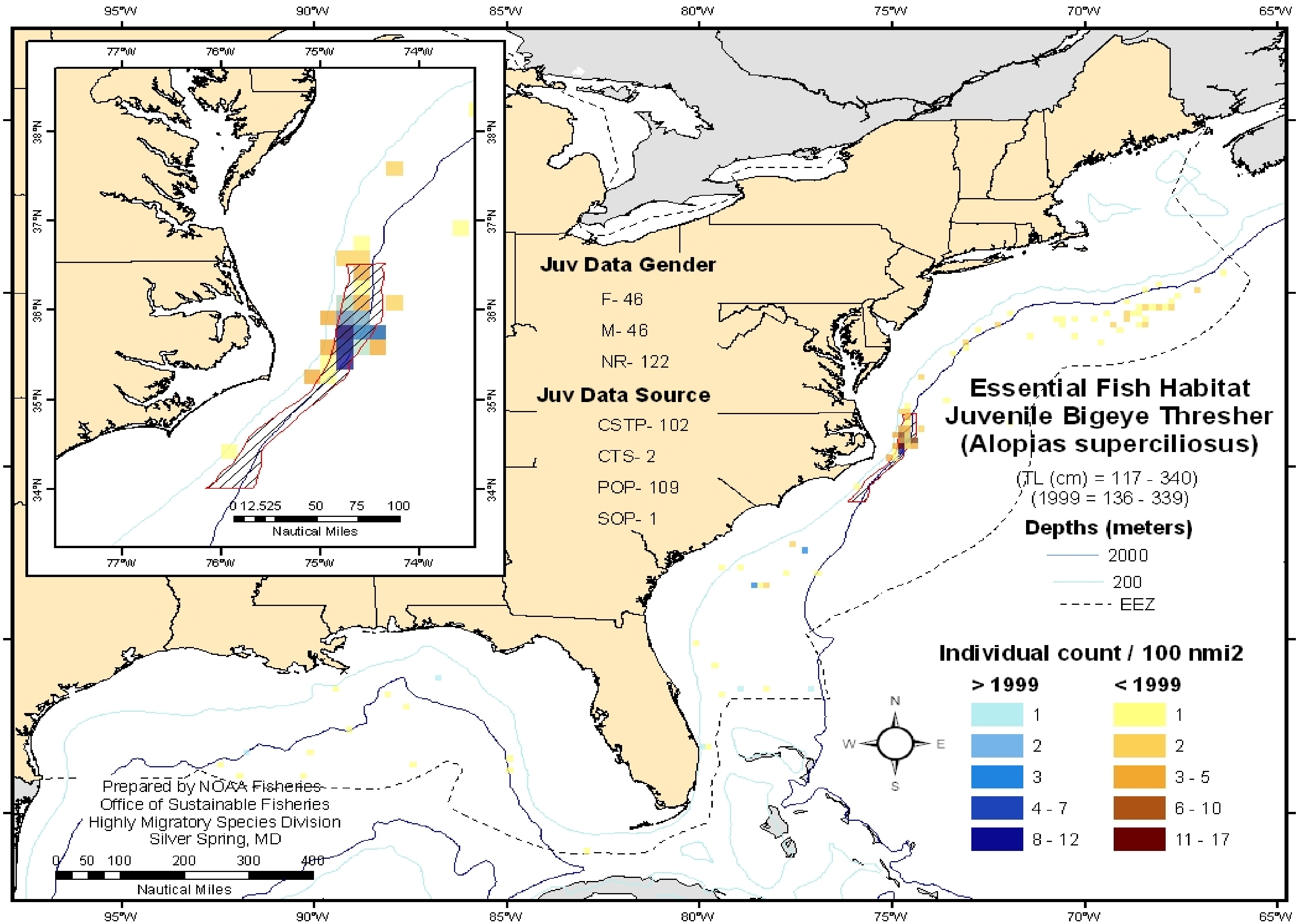

Figure B.120 **Bigeye Thresher Shark: Juvenile.**

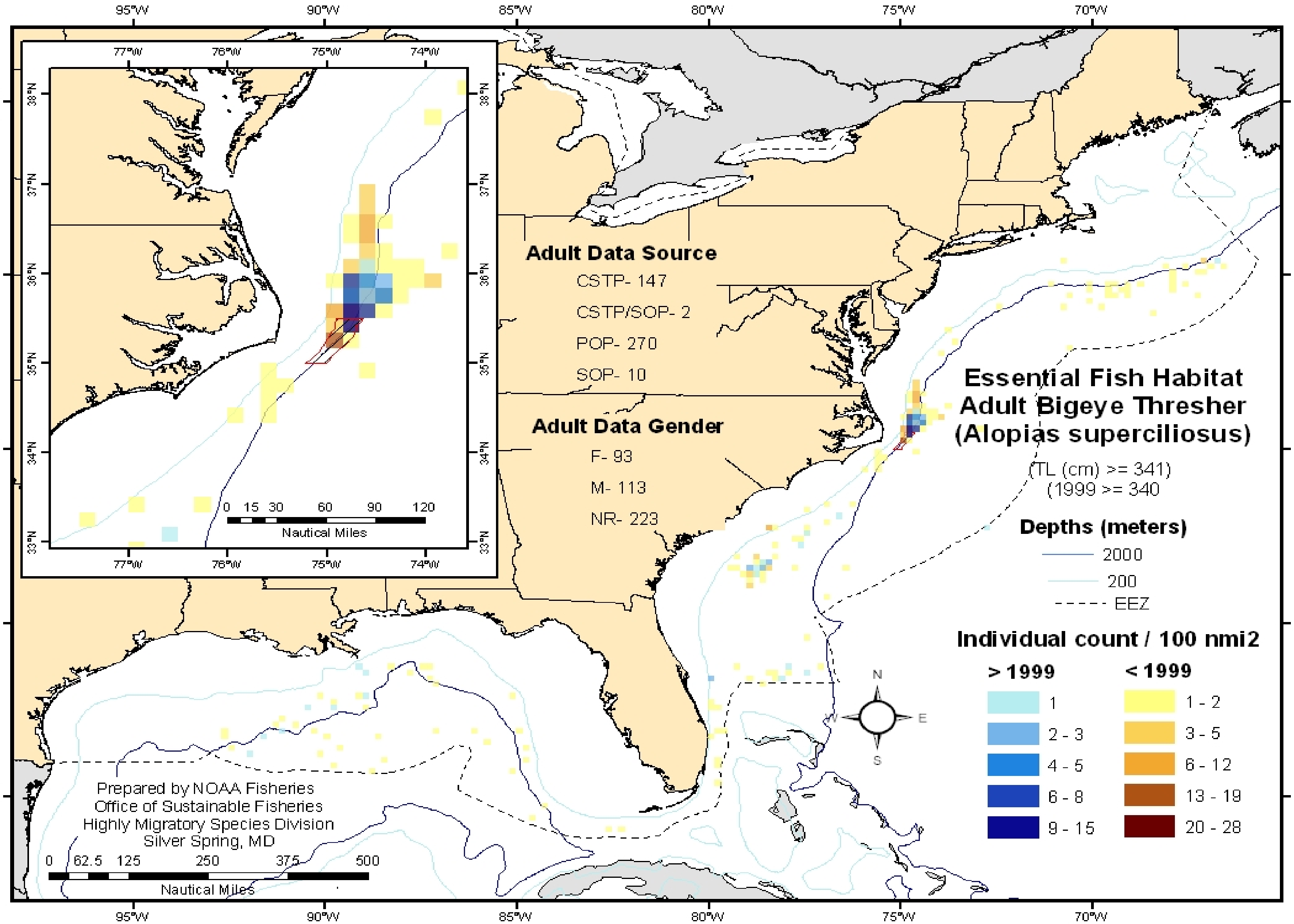

Figure B.121 Bigeye Thresher Shark: Adult.

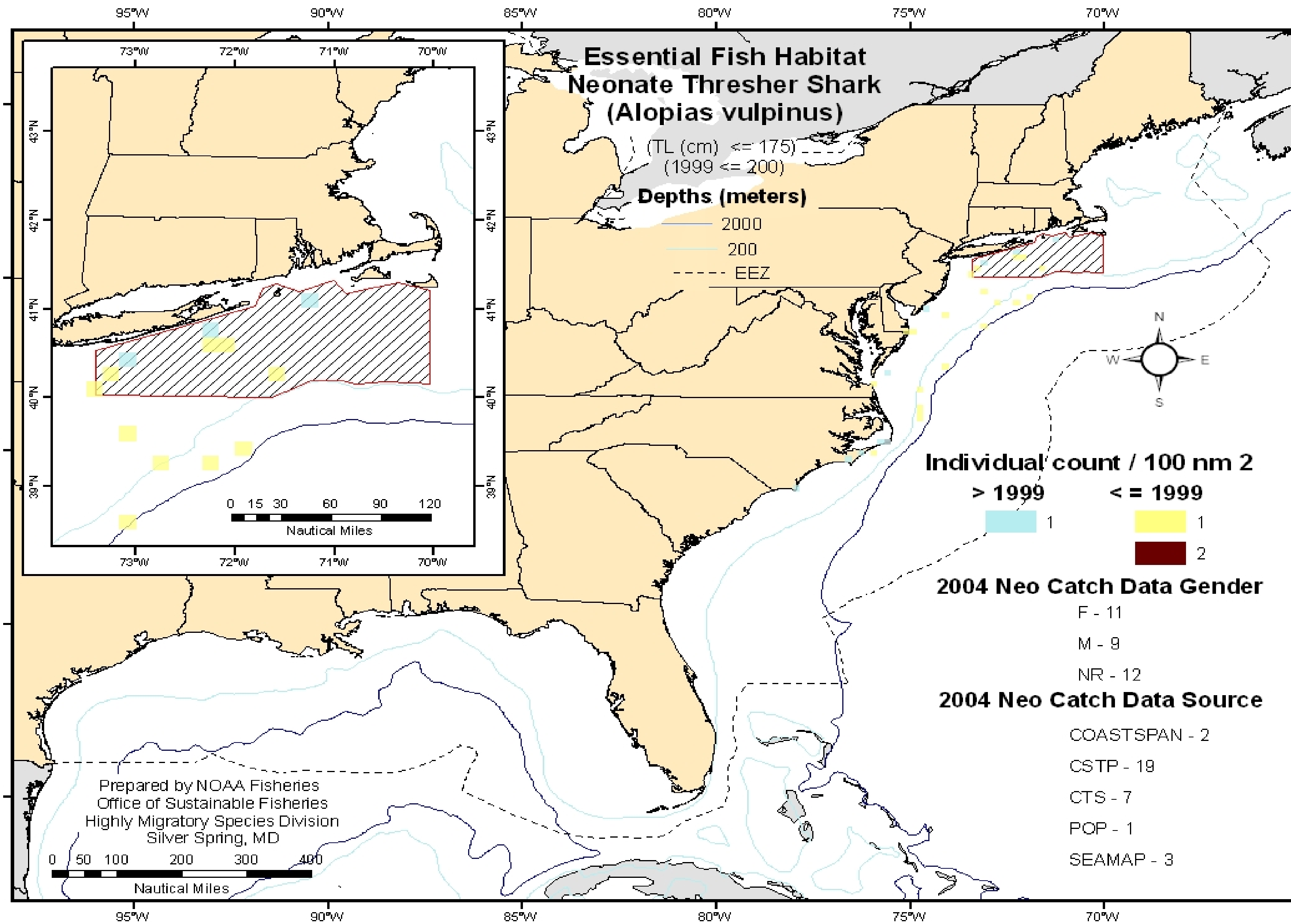

Figure B.122 Thresher Shark: Neonate.

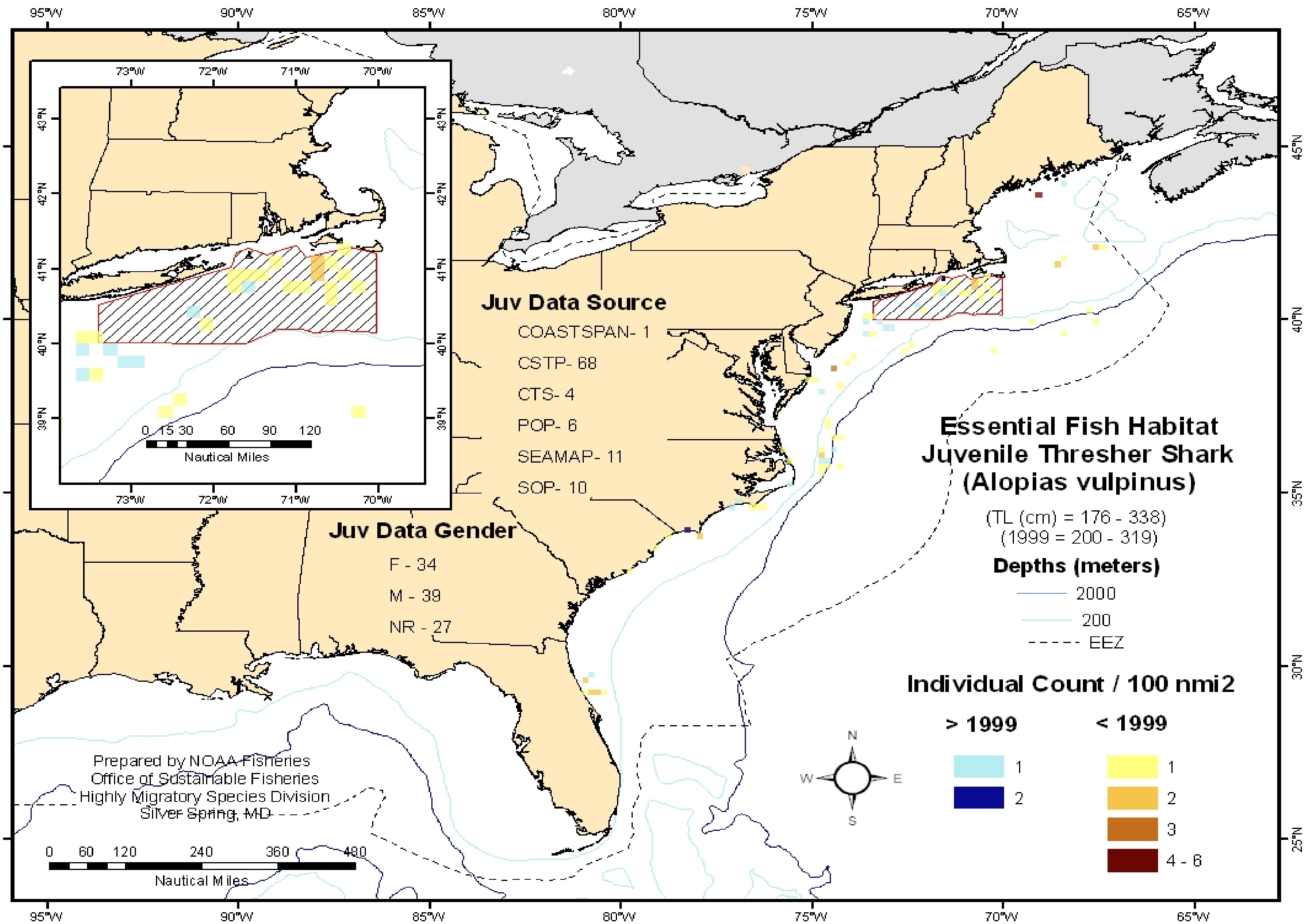

Figure B.123 Thresher Shark: Juvenile.

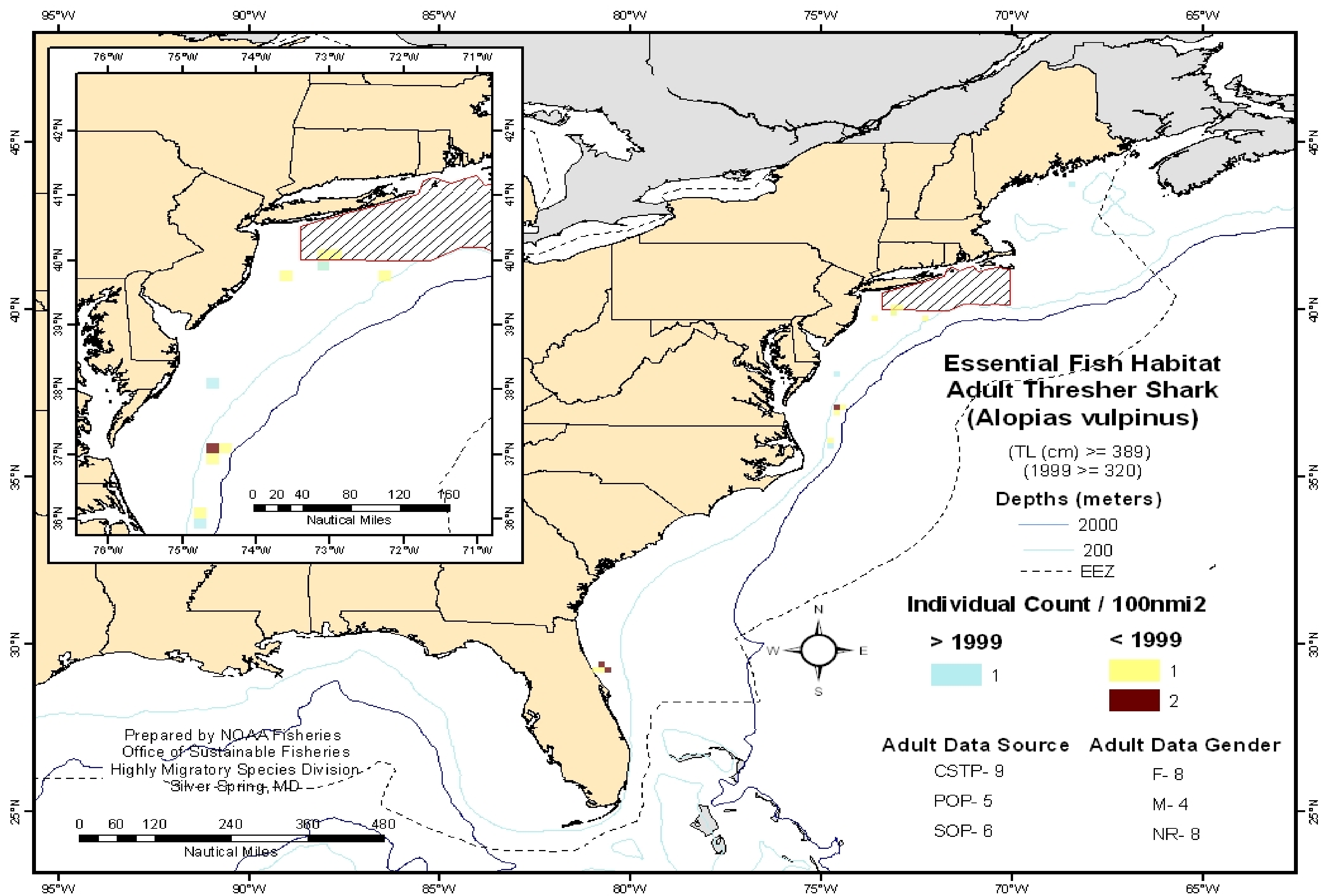

Figure B.124 Thresher Shark: Adult.

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C APPENDIX: AGGREGATE DOMESTIC PELAGIC LONGLINE AND RECREATIONAL ATLANTIC WHITE MARLIN FISHING MORTALITY ESTIMATES 2001 - 2004

Table C.1 Estimated Domestic Aggregate Pelagic Longline Atlantic White Marlin Mortalities in Numbers of Fish 2001-2004. Source: Pelagic Longline Logbook; Kerstetter, 2006

Year	Reported Atlantic PLL Killed/ Dead Discard	Reported Atlantic PLL Live Releases	Estimated PLL Post-Release Mortalities (PRM)*	Annual Estimate
2001	267	617	343.1	610.1
2002	456	989	549.9	1,005.9
2003	275	539	299.7	574.7
2004	305	755	353.9	658.9
Sub-Totals	1,303	2,900	1,546.6	2,849.6
Estimated Aggregate PLL WHM Mortality	2,849.6			
Estimated Average Annual Aggregate PLL White Marlin Mortality	712.4			

* Various post-release mortality rates were applied by hook type (55.6% for J-hook; 27.7% for circle hook per Kerstetter, 2005), area, and time period, as appropriate. J-hook PRM rates were applied to PLL live releases for 2001, 2002, 2003, and January – June (inclusive) 2004. J-hook PRM rates were applied to non-NED PLL live releases for July 2004. Circle hook PRM rates were applied to NED PLL live releases for July 2004. Circle hook PRM rates were applied to PLL live releases for all areas for August – December (inclusive) 2004.

Table C.2 Estimated Domestic Aggregate Recreational Atlantic White Marlin Mortalities, in Number of Fish, as Derived from the RBS Database by Combining Retained Fish and Dead Discarded Fish with Estimated Post-Release Mortalities (PRM) (applying a 35% post-release mortality estimate) 2001-2004. Source: Recreational Billfish Survey; Horodysky, 2005

Year	RBS Kept	RBS Discarded Dead	RBS Live Releases	RBS Estimated PRM	Estimated Total Annual Recreational White Marlin Mortality
2001	22.0	0.0	1,306	457.1	479.1
2002	33.0	0.0	2,207	772.5	805.5
2003	20.0	0.0	614	214.9	234.9
2004	25.0	0.0	1,349	472.2	497.2
Sub-Totals	100.0	0.0	5,476	1,916.6	2,016.6
Estimated Aggregate Domestic Recreational White Marlin Mortality	2,016.6				
Estimated Average Annual Aggregate Recreational White Marlin Mortality	504.15				

Table C.3 Estimated Domestic Aggregate Recreational Atlantic White Marlin Mortalities, in Number of Fish, as Derived from the MRFSS Database by Combining Retained Fish and Dead Discarded Fish with Estimated Post-Release Mortalities (PRM) (applying a 35% post-release mortality estimate) 2001-2004. Source: Marine Recreational Fishing Statistics Survey; Horodysky, 2005

Year	MRFSS Kept	MRFSS Discarded Dead	MRFSS Live Releeases	MRFSS Estimated PRM	Estimated Total Annual Recreational White Marlin Mortality
2001	0.0	0.0	11,255	3,939.3	3,939.3
2002	0.0	0.0	4,633*	1,621.6	1,621.6
2003	0.0	0.0	339*	118.7	118.7
2004	0.0	0.0	7,060*	2,471.0	2,471.0
Sub-Totals	0.0	0.0	23,287	8,150.5	8,150.5
Estimated Aggregate Domestic Recreational White Marlin Mortality			8,150.5		
Estimated Average Annual Aggregate Recreational White Marlin Mortality			2,037.6		

*Data not available from all areas in that year.

Table C.4 Estimated Domestic Aggregate Recreational Atlantic White Marlin Mortalities, in Number of Fish, as Derived from the LPS Database by Combining Retained Fish and Dead Discarded Fish with Estimated Post-Release Mortalities (PRM) (applying a 35% post-release mortality estimate) 2001-2004. Source: Large Pelagics Survey; Horodysky, 2005; Large Pelagic Survey; Horodysky, 2005

Year	LPS Kept	LPS Discarded Dead	LPS Live Releases	LPS Estimated PRM	Estimated Total Annual Recreational White Marlin Mortality
2001	4.0	0.0	703	246.1	250.1
2002	218.0	0.0	5,616	1,965.6	2,183.6
2003	365.0	0.0	3,069	1,074.2	1,439.2
2004	78.0	0.0	5,573	1,950.6	2,028.6
Sub-Totals	665.0	0.0	14,961	5,236.5	5,091.5
Estimated Aggregate Domestic Recreational White Marlin Mortality	5,901.5				
Estimated Average Annual Aggregate Recreational White Marlin Mortality	1,475.4				

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D PROPOSED RULE AND DEIS COMMENTS AND RESPONSES

D.1 Bycatch Reduction

D.1.1 Workshops

Comment 1: NMFS should have workshops for the recreational fishing industry explaining the use of circle hooks.

Response: NMFS has conducted circle hook outreach in the past and will continue to promote circle hook use in the future. NMFS has disseminated information on circle hooks through informational pamphlets and in person through billfish tournament outreach. At this time, this action would implement shark identification and careful release and disentanglement workshops as required by Biological Opinions. The Agency may consider hosting voluntary workshops to address the use of circle hooks in the recreational fishery and may provide additional outreach targeting billfish tournaments.

Protected Species Safe Handling, Release, and Identification Workshops for Pelagic Longline, Bottom Longline, and Gillnet Fishermen

Comment 2: Post-release survival is important to any successful conservation management regime and sustainable fisheries. NMFS needs additional education and outreach workshops, as well as cooperative research initiatives, before significant reductions in post-release mortality can be achieved.

Response: The protected species safe handling, release, and identification workshops are intended to help further reduce the mortality of sea turtles, smalltooth sawfish, and other protected resources and non-target species captured incidentally in the HMS pelagic and bottom longline and gillnet fisheries. Owners and operators of PLL, BLL, and gillnet vessels would receive instruction on techniques for disentanglement, resuscitation, release, and identification of protected resources and other non-target species. The dissemination of this information is an important element in further reducing post-release mortality of protected resources in the PLL, BLL, and gillnet fisheries in compliance with requirements of the 2003 and 2004 BiOps. The goal for these workshops would be to increase fishermen's proficiency with required release equipment and protocols, while reducing the number of protected and non-target species mortalities. Through the NED experiment, NMFS has shown that significant bycatch reductions can be achieved through proper research, education, and outreach. These workshops are intended to disseminated the information learned from the NED experiment, as well as other information for the BLL and gillnet fisheries.

Comment 3: Several comments supported mandatory protected species workshops for captains and owners. Some of those comments include: owners and captains should attend the workshops, but attendance should not be mandatory for the crew because it would not be feasible for crew members, who are not U.S. citizens, to attend a workshop; owners' attendance would discourage hiring green captains who do not know how to handle sea turtles; support for mandatory training to reduce post-release mortality of longline-caught marine mammals and turtles; the GMFMC supports mandatory workshops for captains on pelagic longline vessels; getting their gear off the turtles should be all the incentive fishermen need; industry will benefit from attending these workshops because it will enable them to avoid further regulations; NMFS needs to comply with the BiOp to keep the fishery open; workshops are a good investment for the fishermen; and, EPA supports alternatives A2 and A3 requiring mandatory workshops on handling protected species captured or entangled in fishing gear for all HMS pelagic and bottom longline vessel owners (A2) and operators (A3). EPA also supported preferred alternatives A5 (mandatory workshops/certification for shark gillnet vessel owners/operators).

Response: Under the preferred alternatives, NMFS would require owners and operators, but not crew members, of HMS longline and shark gillnet vessels to attend the protected species safe handling, release, and identification workshops. Owners would be required to attend and successfully complete the workshop before renewing their HMS fishing permit in 2007. Without workshop certification, the vessel's permit would not be renewed. Operators would be required to attend the workshop to ensure that at least one person on board the vessel, who is directly involved with the vessel's fishing activities, has been successfully trained in the proper safe handling, release, and identification of protected species. Without an operator trained in these techniques, the vessel would be prohibited from engaging in HMS PLL, BLL, and gillnet fishing activities. A safe handling, release, and identification workshop certificate would be required on board HMS permitted longline and gillnet vessels during fishing operations. Due to the large universe of HMS longline and shark gillnet crew members, NMFS would not require their attendance at these workshops. Crew members, compared to owners and operators, would incur a higher individual cost to attend the workshops in relation to their income per fishing trip. Additionally, crew member certification would be difficult to monitor and enforce. NMFS would encourage operators to transfer the knowledge and skills obtained from successfully completing the workshops to the crew members potentially increasing the proper release, disentanglement, and identification of protected resources. While crew members are not required to attend the workshops, to the extent practicable, the workshops would be open to anyone who wishes to attend and receive certification.

Comment 4: NMFS received several comments supporting mandatory workshop certification for all HMS commercial and recreational hook and line fisheries. Those comments include: Handling and release workshops should be implemented immediately for all HMS commercial and recreational hook and line fisheries in order to gain the maximum benefit from mitigation technologies and fishing practice; training the greatest number of crew members is the key to protecting these imperiled species. To offset the economic impact, we support a longer interval between required trainings for the rest of the crew, but not a complete exemption; and, all HMS fishermen should complete workshops. Just because something is hard does not mean NMFS should not train the fishermen.

Response: The preferred alternatives would require owners and operators of PLL, BLL, and gillnet vessels to obtain the safe handling, release, and identification workshop certification. Certified operators would be encouraged to transfer the knowledge, skills, and protocols obtained from the workshops to the vessel's crew members. While these workshops would be mandatory for owners and operators, the workshops would be open to other interested parties, including crew members and other HMS fishermen. Crew members that may have an opportunity to serve as an operator on board a vessel would be encouraged to obtain the workshop training and certification. Crew members would not be required to obtain certification in the safe handling and release protocols because the average crew member's individual cost to attend the workshop is greater than the owner and operator. Additional information suggests that turnover is higher with the vessel's crew, making it difficult to continue operating a vessel with a fully certified crew. With at least one individual on board the vessel trained and proficient in the safe handling and release protocols, the likelihood of the safe release and disentanglement of protected species increases significantly. While implementing mandatory workshops for all commercial and recreational HMS fishermen may be a laudable goal, NMFS does not have the resources to train such a large group of individuals at this time. Nearly 30,000 HMS recreational permit holders would need to be trained and certified. The cost and logistics of doing this would be prohibitive. However, NMFS may consider these workshops and other means for educating these permit holders in the future.

Comment 5: NMFS received comments opposed to the protected species workshops. These comments include: handling bycatch correctly wastes too much time on a valuable money-making longline trip; I am opposed to alternative A2 and part of A5, mandatory workshops and certification for all HMS pelagic and bottom longline and shark gillnet vessel owners is unnecessary, unless they are an owner and an operator; owners may not be the vessel operator on fishing trips. The first priority should be the vessel operator onboard while at sea on fishing trips.

Response: NMFS agrees that handling bycatch correctly may take extra time and effort; however, this time and effort will be well spent if it helps to ensure the continued survival of protected species, prevents an exceedance of the incidental take statement (ITS), and prevents a shutdown of the fishery. By taking this necessary training, fishermen would be helping to protected threatened and endangered species, make the fishery less likely to shut down, and therefore, promote economic stability. NMFS realizes that many vessel owners may not operate or be on their vessels during fishing trips. Under the preferred alternative, protected species safe handling, release, and identification workshops would be mandatory for all longline and gillnet vessel operators. NMFS would encourage these operators to disseminate the workshop information to their fishing crews. By certifying vessel owners, NMFS would ensure that the owners are aware of the certification requirement and skills and would hold them accountable for preventing their vessel from engaging in fishing activities without a certified operator onboard. Additionally, the certification requirement would be linked to a vessel's limited access permits and owners would not be able to renew their permits without successful completion of the required workshop. NMFS requires that vessel operators follow safe release and handling protocols when they have interacted with certain protected species. All other non-marketable species should be released in a way that maximizes their chances of survival. NMFS requires vessel owners and operators to meet or exceed the performance standards laid out in the 2004 Biological Opinion.

Comment 6: NMFS received comments suggesting that the operator be required to train the vessel's crew with the safe handling and release protocols. Those comments include: alternative A3 and A5 should include a stipulation that the certified vessel operator train new crew members prior to each trip as is customary for safety drills; and, it should be clarified that a trained and certified owner or operator must be aboard at all times and that this individual is responsible for ensuring that proper release and disentanglement gear is aboard, the crew is informed, and correct procedures are followed.

Response: Owners and operators of HMS permitted longline and gillnet vessels would be required to obtain the protected safe handling, release, and identification workshop certification before the vessel's permit expires in 2007. Operators would be required to be proficient in the safe handling and release protocols to ensure that there is an individual on board the vessel with the necessary skills to disentangle, safely release, and accurately identify any protected species caught in the vessel's gear. Owners and operators would be encouraged to explain and demonstrate the safe handling and release protocols with the vessel's crew members. Owners and operators would not be required to train crew members, as this requirement would be difficult to monitor and enforce. While crew members would not be required to attend the protected species safe handling, release, and identification workshops, to the extent practicable, these workshops will be open to individuals interested in receiving the certification.

Comment 7: NMFS received comments in support of training fishermen in the proper release of prohibited species and billfish, as well as protected species. These comments include: NMFS should include safe release training for sharks and billfishes in these workshops; these workshops should be referred to as "Careful Handling and Release Workshops," rather than protected species workshops because the workshops are appropriate for many species; and, the scope of the protected species workshops should be expanded to include prohibited species.

Response: NMFS agrees that safe handling, release, and identification training may be beneficial to all participants in HMS fisheries, including those that interact with sharks and billfishes. The need for protected species safe handling, release, and identification workshops stems from two Biological Opinions (BiOp) issued for the commercial shark fishery and the pelagic longline fishery. The intent of these workshops is to reduce the post-release mortality of sea turtles (in compliance with these BiOps) that are most frequently caught by participants using either bottom longline to target sharks or pelagic longline to target swordfish and tunas. These workshops would facilitate improved hook removal and safe release of sharks and billfishes because the equipment and protocols, although specific to sea turtles, could be used to safely disengage hooks in other fish and/or mammals that may be encountered. Billfish are often encountered as bycatch in the pelagic longline fishery and the dehooking equipment and protocols could be employed to safely dehook and release billfish, thus increasing their post-release survival rates. The only fisheries authorized to target billfish are recreational rod and reel fisheries. The two BiOps require outreach to the commercial fisheries employing PLL, BLL, and shark gillnet gear on the proper safe handling, release, and identification of protected species. While workshop attendance and certification would not be mandatory for recreational fishermen, these individuals are welcome to attend any of the workshops on safe handling, release, and identification to voluntary become more familiar with these techniques and protocols.

Comment 8: NMFS received comment on grandfathering individuals who attended the industry certified workshops held in Orlando, Florida and New Orleans, Louisiana. Those comments include: the industry should be recognized for holding workshops before NMFS finalized mandatory workshops; the three-year clock should start ticking on January 1, 2007 for those who are grandfathered in, not from when they took the workshop; certification should be given to fishermen and owners who attended previously held workshops; 85 percent of pelagic longline fishermen were trained and industry certified in 2005. The industry was supportive and actively engaged. These workshops should serve as a template for the future workshops; if the industry-certified sea turtle handlers who have already attended and passed the industry mandatory certification classes are required to do something, it should be an online review and should not have to lose additional time at sea and incur additional travel expenses; and, the process should be streamlined for these individuals to receive their initial certification.

Response: NMFS agrees that industry should be recognized for holding voluntary workshops before NMFS finalized the Consolidated HMS FMP. As such, all owners and operators that, as documented by workshop facilitators, attended and successfully completed industry certification workshops held on April 8, 2005, in Orlando, FL, and on June 27, 2005, in New Orleans, LA, would automatically receive valid protected species workshop certificates. For those who participated in the industry-sponsored workshops, the certification must be renewed every three years prior to the expiration date printed on the workshop certificate and would need to be renewed prior to renewing their HMS permit in the third year.

Comment 9: NMFS received several comments requesting careful consideration when scheduling the workshops. Comments include: the lunar cycles should be considered when scheduling the workshops; workshops during closed season can still inconvenience people because shark fishermen also fish for wahoo, dolphin, etc.; NMFS needs to be cognizant of the time burden involved for fishermen; the mandatory workshops should be held only for critical issues because fishermen must be out fishing to be profitable; and, there needs to be flexibility in the process because not everyone will be able to attend the workshops.

Response: NMFS realizes that some HMS fisheries are dependent on the lunar cycle; and therefore, would consider timing the workshops to ensure that most fishermen are able to attend. To the extent practicable, NMFS would consider the lunar cycles and their resultant impacts on availability of HMS participants when scheduling protected species safe handling, release, and identification workshops. Scheduling the shark identification workshops for Federal dealers would not be influenced by the lunar cycles because shark fisheries using bottom longline gear (primary gear used to target large coastal sharks) are not as synchronized with the lunar cycles. However, since the Agency does not know what other fisheries in which fishermen may be participating, the Agency cannot guarantee that all workshops would be held at times to minimize all lost fishing opportunities. The workshops would be held in areas where there is a high concentration of permit holders, according to the addresses provided when applying for an HMS permit. The schedule of these workshops would be made available in advance to allow fishermen to attend the workshop most convenient to them. While a number of workshops could be informative to HMS fishermen, the Agency chose to conduct the protected species workshops required by the Biological Opinions and the recommendation from the Biological Opinion to conduct shark identification workshops. The Agency may provide an opportunity for the industry to schedule one-on-one training at the expense of the individual (*i.e.*, trainer fees), if they are unable to attend any of the previously scheduled workshops.

Comment 10: Some identification training should be provided to the owners and operators during the release and disentanglement workshops.

Response: Species identification is vital for determining how best to handle a de-hooking event, and would also enhance the amount and quality of data available regarding protected species interactions. Accurate species identification is also important for compliance with HMS fishery regulations, including the avoidance of prohibited species, maintaining quota limits, and accurate data collection. NMFS intends to make education a key component of the workshops, and would provide workshop participants with training to safely disentangle, resuscitate, and release sea turtles, as well as identify and release other protected species such as marine mammals and smalltooth sawfish. Sea turtle identification guides are also available on the internet at http://www.nmfs.noaa.gov/sfa/hms/. Some marine mammal identification information can be obtained from the Office of Protected Resources website: http://www.nmfs.noaa.gov/pr/species/mammals/. The HMS website also contains a link (HMS ID Guide) to the Rhode Island Sea Grant bookstore where you may purchase identification guides for marine mammals, sharks, tunas, and billfish.

Comment 11: NMFS received several comments on alternatives A6 and A16, certification renewal timetable. Those comments include: renewal of the workshop certification should occur every three years; NMFS should recertify every three years, but recertification every five years would be better. Recertification held more frequently than three-years would be too much; the workshop certification requirement could be an impediment to someone selling a vessel if one cannot transfer the certification; certification should be tied to the operator, not the vessel; and, EPA supports alternative A6.

Response: Under the preferred alternative, owners and operators of HMS longline and shark gillnet vessels would be required to renew the mandatory protected species safe handling, release, and identification workshop certification every three years. A three-year period for recertification would maintain proficiency in the release, disentanglement and identification protocols, and allow NMFS to update owners and operators on new research and developments related to the subject matter while not placing an excessive burden on the participants (*e.g.*, lost fishing time and travel to attend workshops). NMFS considered recertifying owners and captains every five years, but determined that it allows a more extensive period of time to lapse between certification workshops, possibly impacting maintenance of proficiency and ability to obtain the latest updates on research and development of handling and dehooking protocols. NMFS also considered recertifying owners and operators every two years, but did not prefer the option because it would likely have the greatest economic burden for the participants due to increased frequency. Federally permitted shark dealers would also be required to renew the mandatory Atlantic shark identification workshop certification on a three-year timetable. A renewal frequency of three years ensures proficiency in shark identification and would provide an update on new developments in shark identification and HMS regulations.

The workshop certification would not be transferable to any other person and would state the name of the permit holder on the certificate. If acquiring an HMS LAP from a previous permit holder, the new owner would need to obtain a workshop certification prior to transferring the permit into the new owner's name. This requirement ensures that every HMS LAP owner is fully aware of and accountable for the mandatory protocols that must be followed on board a vessel with longline gear.

The initial operator certification would be linked to the renewal of the vessel's HMS LAP(s) in 2007. If the vessel owner holds multiple HMS LAPs, the operator would need to be certified prior to the earliest expiration date on any of the permits in 2007. After the initial certification, the operator's workshop certificate is no longer linked to the renewal of a vessel's HMS LAP and would need to be renewed prior to the expiration date on the operator's workshop certificate. The workshop certification would not be transferable to any other person and would have the operator's name on the certificate.

<u>Comment 12</u>: PLL, BLL, and gillnet vessel owners may need to be allowed proxies as well as dealers. NMFS should consider a proxy for elderly owners.

<u>Response</u>: NMFS believes that allowing proxies to attend workshops on behalf of longline and gillnet owners would reduce the likelihood that those involved in the operation of individual vessels would be the ones attending the workshops. NMFS is concerned that vessel owners would select proxies that are not involved in the day-to-day operation of their fishing vessel, thus compromising the goal of these workshops. If permit holders were to send proxies involved with the day-to-day activities of the vessel (i.e., crew or operators), the permit holder runs the risk of having no proxy available on the boat due to the high turnover of crew and operators. The proxy may not be employed on permit holder's vessel for the entire three years that the permit is valid. Additionally, NMFS does not have the means to validate a connection between the permit holder and the proxy. It is important for vessel owners that are not actually involved in the day-to-day operations of their vessels to be aware of the regulations and management of the fisheries in which their vessels are participating in order to fully and effectively implement the techniques taught at the workshops. Vessel owners should be aware of the concepts and breadth of material, as well as the tools and techniques, that would be covered in the workshops to understand the requirements for engaging fishing activities with PLL, BLL or gillnets on board the vessel and to understand what is expected of the vessel's crew. By certifying vessel owners, NMFS ensures that the owners are aware of the certification requirement and skills and will hold them accountable for preventing their vessel from engaging in fishing activities without a certified operator onboard. Non-compliance with the requirements of the 2003 and 2004 BiOps could result in additional, more restrictive management measures in the future.

<u>Comment 13</u>: EPA commented that the Draft Consolidated HMS FMP would be improved by providing a more balanced discussion of workshop costs, and noted that in today's society, most trades and professions require practitioners to obtain licenses demonstrating competence. Additionally, without authorized takings procedures, owners/operators might have to defend themselves in courts of law for violating ESA. EPA stated that if one considers the time invested in attending a one-day workshop, this measure seems like a bargain. EPA questioned the assumption inherent in the cost/earnings analysis that accepts the premise that time spent becoming qualified to practice longline fishing is time lost, and of no value.

Response: NMFS acknowledges that most trades and professions require practitioners to obtain licenses demonstrating competence. However, there is still an economic opportunity cost associated with any required activity that would not otherwise be taken voluntarily. In the case of analyzing the economic costs associated with workshop alternatives, NMFS assumed the activity that workshop participants would be engaged in, if they were not attending the workshop, would be fishing. In the economic literature, it is common practice to use wage rates from primary job activities as the opportunity cost of engaging in other activities.

NMFS recognizes that the training provided by workshops is valuable to fishermen and may offset some unquantifiable portion of the opportunity costs that were estimated. The opportunity cost estimates provided in the Draft Consolidated HMS FMP were considered, and should continue to be considered, upper bounds on the potential economic costs associated with attending workshops. Information quantifying the economic value of time spent at the workshops is not currently available to further refine the upper bound cost estimates used in the economic analysis of workshop alternatives.

Atlantic Shark Identification Workshops

Comment 14: NMFS received several comments in support of alternative A9, mandatory Atlantic shark identification workshops for all shark dealers. Those comments include: dealers should be required to attend the shark identification workshops. If shark dealers cannot properly identify a fish, their license and ability to be a dealer should be permanently revoked; workshops for species identification are generally unnecessary for commercial fishermen although shark identification workshops may be necessary for dealers or recreational fishermen; NMFS needs to rename the Identification Workshops as being Shark and not HMS, since only shark dealers are expected to be in attendance and certified at identifying sharks, not tunas; NMFS should have two days of training, one mandatory (dealers) and one voluntary (fishermen, public, etc); workshops give the dealer a good housekeeping seal of approval; NMFS should consider prioritizing the certification of shark dealers because the universe is so large. The prioritization could be based on a minimum annual purchase of shark products; and, EPA supported alternative A9, stating that accurate species identification is necessary for compliance with HMS fishery regulations, including avoidance of prohibited species, maintaining quota limits, and also for accurate data collection.

Response: Under the preferred alternative, A9, NMFS would rename the workshops as Atlantic shark identification workshops because only Federally permitted shark dealers would be required to attend the workshops and receive certification. Identification training would be focused on various species of sharks likely to be encountered by the dealer in both whole and dress form. These mandatory identification workshops would improve the ability of shark dealers to identify sharks to the species level and would improve the data collected for quota monitoring, stock assessments, and decision making processes for formulating appropriate fishery management strategies. While mandatory for shark dealers, these workshops would be open to other interested individuals, to the extent possible. Workshop locations would be based on dealer permit addresses. A schedule of workshops would be available in advance to allow dealers to select the workshop most convenient to their schedule. The Agency may provide an opportunity for the industry to schedule one-one-one training at the expense of the individual (*i.e.*, trainer costs), if they are unable to attend any of the previously scheduled workshops.

Comment 15: NMFS received several comments concerned about the effectiveness of the HMS identification workshops for only shark dealers. The comments include: limiting HMS identification workshops to dealers only will mean proper species identification will come too late for prohibited species such as dusky sharks and such a strategy will not address problems with recreational compliance. NMFS should expand the required audience at the HMS identification workshops and/or expand the scope of the protected species workshops to include identification and safe release of prohibited shark species; the identification workshop for dealers only is not enough. It will help with data collection and stock assessments, but it will not help with conservation; and, the Agency should focus their efforts on the directed shark fishermen that are actually landing sharks and dealers with 90 percent of the catch.

Response: Under the preferred alternatives, Atlantic shark identification workshops would be mandatory for Federally permitted shark dealers, but, to the extent possible, these workshops would be open to other interested individuals (*e.g.*, individuals participating in the shark fishery, port agents, law enforcement officers, state shark dealers, and recreational fishermen) on a voluntary basis. Under the preferred alternatives, Federally permitted shark dealers would be required to receive this training in an effort to reduce unclassified shark landings and improve species-specific landings data. Improvements in shark dealer data would improve existing quota monitoring programs as well as improve the accuracy of future stock assessments. With improved dealer identification, dealers would be more accountable for the sharks purchased, potentially discouraging the purchase of prohibited species. If there is no market for prohibited species, fishermen may modify their behavior and safely release any incidental catch of prohibited species. To train and certify the greater than 25,000 anglers that participate in the HMS recreational fishery would exceed the Agency's resources at this time. While commercial and recreational shark fishermen would not be required to attend the Atlantic shark identification workshops, to the extent possible the workshops would be open to anyone who wishes to attend and receive certification. In the future, additional actions may be taken to improve the data collected from the HMS recreational industry.

Comment 16: NMFS received comments on Alternative A15, mandatory attendance at HMS identification workshops for all HMS Angling category permit holders. Those comments include: mandatory attendance for all HMS Angling category permit holders would be a substantial undertaking; HMS identification workshops should be mandatory for all fishermen that land sharks; HMS Angling category permit holders should also have to attend because they are the primary misidentification and non-reporting problem; most commercial fishermen know how to identify species; and, some of the species identification problem is an angler problem.

Response: At this time, HMS identification workshops would not be required for HMS Angling category permit holders. Under the preferred alternative, all Federally permitted shark dealers would be required to attend the Atlantic shark identification workshops. The successful completion of the workshop would be linked to the dealer's ability to renew a Federal dealer permit. The purpose of the Atlantic shark identification workshops is to improve the data collected from the fishery, thereby improving quota monitoring and stock assessments. Dealer reports are an important data source for quota monitoring and management decisions; and therefore, these workshops would have great impact on improving the accuracy of the shark species identification. While the recreational fishery also contributes to shark misidentification, mandatory attendance for the angling community would not resolve the data quality issues associated with commercial vessel logbooks and dealer reports. Thus, quota monitoring and commercial regulatory compliance would not benefit from mandatory angler attendance as they would under mandatory shark dealer certification. Commercial and recreational shark fishermen would not be required to attend the Atlantic shark identification workshops, but to the extent possible, the workshops would be open to anyone who wishes to attend and receive certification. The money and time required to track and link permits to the workshop certification, to hold an appropriate number of workshops to certify all HMS anglers permit holders (over 25,000 individuals), and to enforce the workshop requirement for all HMS angler permit holders currently exceed the Agency's resources. In the future, additional actions may be taken to improve the data collected from the HMS recreational industry.

Comment 17: NMFS received two comments about mandatory workshops for state shark dealers. Those comments are: HMS identification workshops should be held for state dealers to encompass the entire universe of dealers reporting unclassified sharks; and, NMFS needs more information on state shark landings. The Agency is wasting the industry's time requiring the wrong people to attend these workshops.

Response: NMFS does not have any jurisdiction over state permitted shark dealers and cannot require their attendance at Federal workshops. However, to the extent possible, the Atlantic shark identification workshops would be open to other interested individuals, including state shark dealers, on a voluntary basis. To purchase sharks from a Federally permitted vessel, a state shark dealer must also possess a Federal shark dealer permit and, therefore, would be required to attend the workshops.

Comment 18: NMFS should require port agents to attend these workshops to improve their shark identification. Law enforcement needs to learn how to identify sharks.

Response: The Agency would encourage port agents to attend these workshops to improve their identification skills, especially since port agents are often responsible for the collection of biological information on many species that the Agency manages. Furthermore, law enforcement officials also need to identify sharks to the species level to enforce regulations related to seasons, minimum sizes, bag limits, and trip limits. Port agents and law enforcement officials are required to attend rigorous training on the identification of HMS regulated species; however, the material that would be covered in these workshops might provide additional morphological characteristics to facilitate shark identification in various conditions at landing (*i.e.*, no fins, no head, several days since landing, and gutted). As mentioned previously, law enforcement officials and port agents would be notified of workshops in their respective regions and encouraged to attend, to the extent practicable.

Comment 19: It is very difficult to sell 'unknown' sharks in the market and sharks are being listed as unclassified because it is the path of least resistance when they are reporting.

Response: Landings data from 2004 indicate that the number of unclassified large coastal, small coastal, and pelagic shark landings was 19 percent, 0.3 percent, and 53 percent of total shark landings. These percentages indicate that a significant number of sharks do enter the market as unclassified despite regulations that require species-specific reporting by vessel owners and dealers. NMFS does not know if sharks are being listed as unclassified because fishermen and dealers are unable to identify them, to circumvent prohibited species restrictions, or because it is the most expeditious manner to process the catch as the commenter suggests. However, NMFS believes that mandatory Atlantic shark identification workshops would improve the ability of shark dealers to identify sharks to the species level. NMFS anticipates that these workshops would improve the data collected to assess stock status and decision making processes for formulating appropriate fishery management strategies.

Comment 20: NMFS received comment on the workshop materials and the need to hold shark identification workshops. These comments include: NMFS will need pictures of all the shark species to teach proper identification. Those pictures will need to include pictures of dressed fish, whole fish, and fins of each species, especially prohibited species; and, NMFS should consider enlisting members of the industry to help with these workshops.

Response: NMFS would coordinate with local shark dealers to have some dressed sharks available for each workshop. If the workshops are held after a closure or in an area where no carcasses are available, NMFS would use other tools, such as photo presentations and dichotomous keys, to present methods for identifying dressed sharks to the species level. The Agency intends to use a combination of dressed sharks, fins, photo presentations, and dichotomous keys to improve species-specific shark carcass identification. The success of the Atlantic shark identification workshops will depend upon cooperation between the Agency and the industry.

Comment 21: Please consider Houma as a location to conduct the shark dealer workshops, if selected.

Response: NMFS would not be able to hold workshops at every shark dealer facility; however, the Agency examined the number and location of shark dealers in each region, and would work to provide workshops in areas that are convenient to the greatest number of people. A preliminary evaluation of dealers in the southern Louisiana region shows that Houma proportionally does not land the most sharks in the region, but is central to other locations. As suggested, the Agency will consider Houma as a potential site for an Atlantic shark identification workshop.

Comment 22: NMFS received several comments on allowing a proxy to attend the Atlantic shark Identification workshops for the shark dealers. Those comments are: NMFS should allow a purchase agent proxy to attend instead of the shark dealer permit owner. NMFS needs to consider all of the truck drivers operating under the single NMFS shark dealer permit who purchase sharks products from satellite locations; if a shark dealer loses their proxy due to unforeseen circumstances, NMFS should have some flexibility on allowing the fishhouse to continue operating until a replacement is found and certified; a trained and certified dealer representative must be present at all times whenever HMS catches are offloaded to be responsible for ensuring that all HMS landings are monitored and properly documented. Therefore, dealers should be allowed more than one proxy if it is requested; "Dockside

Technicians" should be allowed as a proxy for the fish dealer who may not be present during vessel pack-outs; the document has some good ideas for proxies, but you will need to be careful about a lapse between proxies, should the individual leave the business; and, there must be a fast track way to get certified if a proxy leaves, such as online certification.

Response: Under the preferred alternatives, all Federally permitted shark dealers would be required to obtain Atlantic shark identification workshop certification. NMFS encourages shark dealers to send as many proxies as is necessary to train staff members responsible for shark species identification within the dealer's business. Federally permitted shark dealers would be held accountable for ensuring that the appropriate individuals receive the proper training in shark identification. Shark dealer permit holders would be encouraged to share the workshop information and training with individuals that were unable to attend the workshop. Multiple proxies per shark dealer would ensure that the dealer has at least one person on staff with the workshop certification and skills to properly identify sharks if another proxy's employment is terminated. The schedule for Atlantic shark identification workshops would be available in advance to allow dealers and proxies to select the workshop closest to them and most convenient to their schedule. If a dealer and/or proxy is unable to attend a scheduled workshop, NMFS will consider granting one-on-one workshop training at the expense of the individual. These one-on-one training sessions could accommodate the replacement of a proxy whose employment was terminated on short notice.

Other Workshop Related Comments

Comment 23: NMFS received several comments on outreach beyond the two workshops. These comments included: regardless of who is required to attend the workshops, the Agency should do at-sea identification; a field guide should be sent out to all HMS permit holders; NMFS should provide waterproof field identification materials; manuals should be developed on the proper billfish and tuna release handling procedures; and, HMS Identification Guide should be required on board permitted vessels and in the office of HMS permitted fish dealers. The Guide could also be made available online.

Response: The HMS website (http://www.nmfs.noaa.gov/sfa/hms/) currently provides a diversity of information on a number of HMS and protected species, including a tutorial on sea turtle identification and handling, and a link to purchase the waterproof HMS identification guide from Rhode Island Sea Grant, as well as the actual safe handling and release protocols and placards in three different languages (English, Spanish, and Vietnamese). Curriculum for the Atlantic shark identification workshops is in development. However, current plans include distributing waterproof identification material at the protected species workshops, as well as distributing and training participants to use a key for distinguishing species-specific features at Atlantic shark identification workshops. NMFS recommends that these materials be readily accessible in dealer offices and onboard fishing vessels, and encourages workshop participants to share knowledge gained with their crew and other employees. While NMFS would like to distribute the HMS guide to all HMS permit holders, the resources to do so are not currently, nor are they likely to be available in the future.

Comment 24: NMFS received several comments about providing an expedited means for receiving the training, certification, and renewal. Those comments include: there should be internet training and certification; can HMS identification workshops and renewals occur online?; certification over the internet might not suffice, however, recertification might be possible; to facilitate normal turnover, review and busy schedules, NMFS could conduct training via the internet and/or by mail; NMFS needs to provide a convenient way for new captains to be certified prior to their first trip. Initial certification for new vessel operators must be conveniently available, such as a self-course over the internet or overnight mail. Vessel operations should not be held up unnecessarily; NMFS needs to make sure to develop a streamlined approach to keeping this certification effort simple and convenient so as to not to be a burden to all folks participating; and, hands-on training is important. The first time going through the training must occur in the workshop.

Response: The Agency's priority is to make the workshops as successful and effective as possible. Due to the nature of workshop subject matter, hands-on training and interaction with the workshop leader is vital for initial skill development and certification for the protected species safe handling, release, and identification workshops, as well as the Atlantic shark identification workshops. Once the first round of certifications are complete, NMFS will explore alternative means for renewing permits, including online or mail-in options. The Agency also hopes to develop an online program that will serve as a medium for providing up-to-date information regarding Atlantic shark identification and protected species handling techniques.

To facilitate coordination between workshops and regular business activities, NMFS plans to do focused mailing to permit holders to ensure that the workshop times and locations are known in advance. This will hopefully allow workshop participants to plan workshop attendance accordingly and prevent lapses in fishing activities.

Comment 25: How did NMFS analyze the economic impacts of attending these workshops?

Response: NMFS conducted an opportunity cost analysis to determine the economic costs associated with attending the various workshop alternatives. This analysis utilized the economic information gathered in the HMS Logbook, and in particular the information in the economic costs section of the logbook that is required to be completed by selected vessels. For the vessels that completed the economic portion of the HMS Logbook in 2004, revenues per trip were estimated by taking the number of fish caught per trip, multiplying the number of fish by average weights for each species harvested, and multiplying the total weights for each species by average prices for each species as reported in the dealer landings system. The costs reported for each trip were then subtracted from the estimated revenue for each trip. Then the number of days at sea as reported in logbooks was used to determine the average net revenue per day at sea for each trip taken. Finally, the information provided on crew shares was used to allocate the net revenue per day at sea to owner, captain, and crew. Information from the HMS permits database was then used to estimate the potential number of participants in each of the workshop alternatives. Since information on the number of captains per permitted vessel was not available, NMFS conservatively estimated that there could be two captains per permit for PLL vessels and one captain for all others. Net revenues per day for owners, captains, and crew were then multiplied by the number of participants expected for each workshop alternative to estimate the opportunity cost for a one day workshop. The economic impacts (*i.e.*, out of pocket cash costs) associated with attending workshops is likely to be less than the economic opportunity costs estimated since NMFS plans on scheduling workshops on less productive fishing days to avoid lost time at sea.

Comment 26: If training and certification is mandated, it is essential that NMFS ensure that adequate funding and personnel resources are dedicated to develop and fully support all program facets.

Response: The Agency agrees and is fully aware of the ramifications of these workshops and the need to implement them successfully. Numerous individuals, with a variety of expertise and backgrounds have been involved in the implementation of the voluntary workshops to date, and will be involved in any future mandatory workshops, including: shark identification and biology, fishing gear technology and deployment, safe release and handling of protected resources, vessel permitting, fisheries law enforcement, and shark carcass identification.

Comment 27: NMFS should consider how to ensure compliance with this requirement and should have a plan to measure the effectiveness of the workshops.

Response: Successful completion of both workshops would be linked to the renewal of the owner's or dealer's HMS permits. Longline and gillnet vessel owners would need to be certified in the safe release and disentanglement protocols before they can renew their limited access permits. Additionally, longline and gillnet vessels would not be allowed to engage in fishing operations without a certified operator onboard, as well as proof of owner and operator certification. Similarly, Federal shark dealers would need to be certified in shark identification, or have a certified employee, to renew their dealer permit. NMFS would gauge the success of these requirements by monitoring compliance with the sea turtle release and disentanglement performance standards established in the 2004 Biological Opinion, as well as by monitoring the amount of unclassified sharks reported by Federal dealers.

Comment 28: NMFS received comment suggesting that the Agency provide the workshop materials in other languages, such as Spanish and Vietnamese, as well as English.

Response: NMFS acknowledges the diversity of HMS fishery participants, and would make workshop materials accessible to as many of its constituents as possible. While workshops would be conducted in English, NMFS hopes to provide workshop materials in other languages for distribution at and outside of the workshops. Placards of sea turtle handling and release guidelines are currently available in English, Spanish, and Vietnamese. To the extent practicable, the Agency will work to develop shark identification materials in these languages as well.

Comment 29: NMFS received several comments related to alternative A17, Compliance with and Understanding of HMS Regulations. Those comments include: compliance and increased understanding of HMS regulations could be addressed by mailing an updated HMS Compliance Guide to each HMS recreational and commercial permit holder each year; workshops on the regulations is unnecessary as long as brochures are available; the proposed workshops should cover new regulatory requirements, such as the new PLL TRT regulations;

there are no alternatives in the Draft Consolidated HMS FMP for workshops on HMS regulations. The GMFMC recommends that an interactive web-based tutorial be available to improve the understanding and compliance with HMS regulations. This training should be mandatory for commercial captains; and, NMFS should consider mandatory recreational compliance workshops because many U.S. regulations are adhered to by commercial vessels while the less emphasis is placed on recreational non-compliance.

Response: During scoping, NMFS explored an alternative that focused on enhancing compliance with and understanding of HMS regulations via Agency sponsored workshops. NMFS received comments noting that mandatory workshops need to be prioritized due to the time and cost to those who must attend. Furthermore, comments received were supportive of continuing the current methods of disseminating information pertaining to HMS regulations (*e.g.*, Annual HMS Compliance Guide) rather than spending Federal dollars to hold workshops on regulations at this time. Advisory Panel members were supportive of focusing on mandatory requirements (*e.g.*, workshops required under Biological Opinions and other mandates) first and then following up with additional hard copy outreach materials to meet regulatory informational needs. Since NMFS already disseminates this type of information and, given that this information can be distributed to participants attending NMFS sponsored workshops, that alternative was not further analyzed in the Consolidated HMS FMP. Compliance guides and brochures can be obtained from on the HMS website (http://www.nmfs.noaa.gov/sfa/hms/). Anyone requesting hard copies of the compliance guides and/or brochures will have the materials mailed to them.

Under the preferred alternatives, NMFS would require owners and operators to attend mandatory protected species release, disentanglement, and identification workshops. Furthermore, shark dealers (or their designated proxy(ies)) would be required to attend shark identification workshops. In doing so, NMFS may consider the use of web-based training as a suitable media for disseminating training information following an initial face-to-face workshop.

D.1.2 Time/Area Closures

New Closures

Comment 1: Alternative B2(a) indicates that there would be ecological benefits to leatherback sea turtles and blue and white marlin, yet this alternative was given cursory treatment.

Response: NMFS disagrees that alternative B2(a) was given cursory treatment. The Draft and Final HMS FMPs comprehensively analyzed this and all other alternatives for ecological and economic impacts. In the Draft HMS FMP, NMFS investigated potential changes in bycatch and discards with and without the redistribution of fishing effort for all the time/area closure alternatives considered. For alternative B2(a), NMFS evaluated a total of three scenarios of redistributed effort, each of which had different assumptions regarding how fishing effort would be redistributed into open areas. The first scenario assumed that fishing effort (*i.e.*, hooks) from alternative B2(a) would be displaced into all open areas. The second scenario assumed all fishing effort would only be redistributed within the Gulf of Mexico. The third scenario assumed that fishing effort would be displaced within the Gulf of Mexico and into an area (*i.e.,* Area 6) where the majority of vessels with Gulf of Mexico homeports have reported fishing during 2001 – 2004.

All three of these scenarios predicted that bycatch and discards would increase for at least one of the species considered. For instance, under the first scenario, NMFS predicted an increase in loggerhead sea turtle interactions (7.9 percent or 14 turtles/over three years; annual numbers may be obtained by dividing by three), bluefin tuna (BFT) discards (10.3 percent or 166 discards/over three years), swordfish discards (4.4 percent or 1,635 discards/over three years), yellowfin discards (3.0 percent or 166 discards/over three years), and bigeye tuna discards (11.6 percent or 117 discards/over three years). Under the second scenario of redistributed effort (effort only redistributed in the Gulf of Mexico), NMFS predicted increases in sailfish discards (1.8 percent or 18 discards/over three years), spearfish discards (3.3 percent or 14 discards/over three years), pelagic shark discards (0.3 percent or 112 discards/over three years), large coastal shark discards (3.6 percent or 598 discards/over three years), swordfish discards (4.4 percent or 1,635 discards/over three years), yellowfin discards (22.3 percent or 1,224 discards/over three years), bigeye tuna discards (0.4 percent or 4 discards/over three years), and BAYS tuna discards (1.0 percent or 91 discards/over three years). Finally, under the third scenario (redistribution in the Gulf of Mexico and Area 6), NMFS predicted increases in sailfish (4.7 percent or 61 discards/over three years), pelagic sharks (4.4 percent or 834 discards/over three years), BFT discards (1.6 percent or 35 discards/over three years), and BAYS tuna discards (0.7 percent or 70 discards/over three years). Given the potential negative ecological impact of B2(a) under all three redistribution of effort scenarios, NMFS is not preferring alternative B2(a) at this time.

<u>Comment 2</u>: NMFS decided against any new closures to protect sea turtles, billfish, and other overexploited species at this time because there is no closure that will benefit all species. Closures should not be rejected because they do not "solve" the bycatch problem on their own. Rather, they should be coupled with other sensible measures to ensure that all species are receiving the protection they need to recover to and maintain healthy populations.

<u>Response</u>: NMFS agrees that closures can be combined with other measures to achieve management objectives. However, NMFS did not reject closures because there was not a closure that benefited all species. To the contrary, NMFS is not preferring the closures because, in part, there were indications that the closures could actually result in an increase in bycatch to the detriment of some species with redistribution of effort. Additionally, NMFS does not prefer implementing new closures at this time, other than the Madison-Swanson and Steamboat Lumps Marine Reserves, for a number of other reasons, including those discussed below. All of the data used in the time/area analyses were based on J-hook data. The Northeast Distant experiment suggested that circle hooks likely have a significantly different catch rate than J-hooks; further investigations are required to determine the potential impact of any new time/area closures. NMFS anticipates that 2005 Highly Migratory Species (HMS) final logbook data will become available in the summer of 2006. In the meantime, the Agency will continue to monitor and analyze the effect of circle hooks on catch rates and bycatch reduction as well as assess the cumulative effect of current time/area closures and circle hooks. NMFS does not prefer to implement new closures as this time until the effect of current management measures, and potential unanticipated consequences of those management measures, can be better understood. Second, NMFS is awaiting additional information regarding the status of the pelagic longline

(PLL) fleet after the devastating hurricanes in the Gulf of Mexico during the fall of 2005. A majority of the PLL fleet was thought to be severely damaged or destroyed during the 2005 hurricane season. The amount of PLL fishing effort, especially within the Gulf of Mexico, will be assessed in the summer of 2006 when data quality control procedures on the 2005 HMS logbook data are complete. Until NMFS can better estimate the current fishing effort and potential recovery of the PLL fleet, it may be premature to implement any new time/area closures at the present time. Third, a number of stock assessments will be conducted during 2006 (LCS, blue marlin, white marlin, north and south swordfish, eastern and western BFT, and large coastal sharks). NMFS is waiting on the results of these stock assessments to help determine domestic measures with regard to management of these species. Once NMFS has this updated information, NMFS will consider additional management measures, potentially for all gear types, to help reduce bycatch and discard rates. NMFS is also trying to assess how protecting one age class at the potential detriment of other age classes will affect the fish stock as a whole. For instance, how will protecting spawning BFT help rebuild the stock if it results in increased discards of non-spawning adults, juvenile, and sub-adult BFT along the eastern seaboard? Therefore, more information is needed to further understand how to manage this species given its complex migratory patterns, life history, and age structure. NMFS is also considering developing incentives that would dissuade fishermen from keeping incidentally caught BFT, particularly spawning BFT, in the Gulf of Mexico. This may involve research on how changes in fishing practices may help reduce bycatch of non-target species as well as tracking discards (dead and alive) by all gear types. In addition, sea surface temperatures in the Gulf of Mexico have recently been thought to be associated with congregations of BFT and putative BFT spawning grounds in the Gulf of Mexico (Block, pers. comm.). NMFS intends to investigate the variability associated with sea surface temperatures as well as the temporal and spatial consistency of the association of BFT with these temperatures regimes. By better understanding what influences the distribution and timing of BFT in the Gulf of Mexico, NMFS can work on developing tailored management measures over space and time to maximize ecological benefits while minimizing economic impacts to the extent practicable.

Comment 3: NMFS received several comments regarding additional closures to consider including: NMFS should consider a time/area closure for longlining from the 35th parallel to the 41st parallel, from the 30 fathom line to the 500 fathom line, from June 15th to September 30th; NMFS should consider longline closures around San Juan, Puerto Rico and other areas around Puerto Rico; NMFS should pressure the states north of the North Carolina closed area to close their state waters during April through July 31 to protect juvenile sandbar sharks; since the sandbar shark HAPC includes a major U.S. nursery area for this species, NMFS should close the federal waters out to 10 fathoms beginning in April and ending on July 31 each year; NMFS should reevaluate its decision not to close the Northeast Central statistical area proposed as Alternative A14 in the June 2004 SEIS; and, Georgia CRD requests either the closure of the EEZ off Georgia to gillnet gear to facilitate state enforcement and management efforts or the requirement for shark gillnet vessels to carry VMS year-round to facilitate Georgia's cooperative state/Federal enforcement efforts.

Response: While there may always be additional areas that could potentially be considered for time/area closures, NMFS considered a number of different closures that encompassed the major areas of bycatch for the greatest number of species of concern. Most of the areas were initially selected by plotting and examining the HMS logbook and Pelagic Observer Program (POP) data from 2001 – 2003 to identify areas and times where bycatch was concentrated. NMFS also took into account information received in a petition for rulemaking to consider an additional closure (alternative B2(c)) to reduce BFT discards in a reported spawning area in the Gulf of Mexico (Blue Ocean Institute *et al*., 2005; Block *et al*., 2005), and a settlement agreement relating to white marlin, which was approved by the court in Center for Biological Diversity v. NMFS, Civ. Action No. 04-0063 (D.D.C.). Additional closures, including closures for juvenile sandbar sharks and closures for other gear types, including gillnets and/or recreational gear, could be considered in future rulemakings, as needed.

Comment 4: NMFS received several comments in favor of maintaining existing time/area closures. These comments included: time/area closures should be used to promote conservation of all HMS species; marine sanctuaries need to be established for all species of fish; these areas need to remain closed until the fishery is rebuilt to the 1960s levels that existed prior to the overcapitalization of this fishery; as a result of the existing closures, overall discards have declined by as much as 50 percent so NMFS should continue to expand the existing closures; the reductions in bycatch as a result of the existing closures benefit a wide range of species; current closed areas are effective, based upon recent increases in swordfish size and weight in the deep-water recreational swordfish fishery; and suggestions by the industry that the closed area goals have been met because swordfish are rebuilt ignore the broader purpose and benefit of the closures.

Response: NMFS agrees that the existing closures have been effective at reducing bycatch of protected species and non-target HMS and have provided positive ecological benefits, and NMFS prefers to keep existing closures in place at this time. For example, the overall number of reported discards of swordfish, BFT, and bigeye tunas, pelagic sharks, blue and white marlin, sailfish, and spearfish have all declined by more than 30 percent. The reported discards of blue and white marlin declined by about 50 percent, and sailfish discards declined by almost 75 percent. The reported number of sea turtles caught and released declined by almost 28 percent. However, these analyses are based on J-hook data, and the fishery is required to use circle hooks. It is possible that the impact of such closures since implementation of circle hooks may be greater in ecological benefits than expected. If this happens, NMFS may not need to implement new closures and may be able to reduce existing closures. NMFS currently only has final, quality controlled HMS logbook data on the catch associated with circle hooks from July through December of 2004. NMFS anticipates having final, quality controlled 2005 HMS logbook data in the summer of 2006. At that time, NMFS will examine and analyze the effect of circle hooks on catch rates and bycatch reduction. Any changes to the existing closures would occur through a proposed and final rulemaking using the criteria in the preferred alternative B5.

Comment 5: NMFS received a number of comments in opposition to closures including: the effectiveness of time/area closures as a management tool to address bycatch issues has been exhausted; bycatch measures other than time/area closures should be considered; closures are not conservation, but reallocation to prohibit one hook and line gear (especially, circle hook gear) while allowing another hook and line gear (especially, more harmful J-style hook gear and live baiting); these areas were closed to rebuild the now fully rebuilt swordfish stock; an alternative to a full area closure could be to conduct an experimental fishery to test gear modifications - if the modifications do not work then put in a full closure; and the pelagic longline industry cannot withstand additional time/area closures.

Response: NMFS does not believe that the effectiveness of time/area closures as a management tool has been exhausted. The existing closures have been effective at reducing bycatch of protected species and many non-target HMS and have provided positive ecological benefits. For example, the overall number of reported discards of swordfish, BFT and bigeye tunas, pelagic sharks, blue and white marlin, sailfish, and spearfish have all declined by more than 30 percent. The reported discards of blue and white marlin declined by about 50 percent, and sailfish discards declined by almost 75 percent. The reported number of sea turtles caught and released declined by almost 28 percent. Thus, the current time/area closures have had positive ecological impact by reducing the overall bycatch of non-target and protected species. However, NMFS recognizes that the current closures have had an impact on retained species' landings as well. For example, from 1997 to 2003, the number of swordfish kept declined by nearly 28 percent, the number of yellowfin tuna kept declined by 23.5 percent, and the total number of BAYS kept (including yellowfin tuna) declined by 25.1 percent. Such declines in landings have resulted in negative economic impacts for the fleet and may explain the overall decline in effort by the Atlantic PLL fishery from the pre- to post-closure period. Thus, while time/area closures play an important part in resource management, NMFS does not prefer to implement new closures, except for the Madison-Swanson and Steamboat Lumps Marine Reserves, until NMFS can assess the cumulative effect of the current time/area closures and circle hooks. In addition, NMFS is waiting for additional information regarding the status of the PLL fleet after the devastating hurricanes in the Gulf of Mexico during the fall of 2005. A portion of the PLL fleet was thought to be severely damaged or destroyed during the 2005 hurricane season. Until NMFS can better estimate the current fishing effort and potential recovery of the PLL fleet, NMFS believes that it may be premature to implement any new time/area closures, particularly on the PLL fleet.

BFT/Gulf of Mexico

Comment 6: NMFS received comments regarding time/area closures to protect BFT spawning areas in the Gulf of Mexico (Alternatives B2(c) and B2(d)). Some of these comments suggested NMFS should consider different months or permutations of months between January and August. Other comments included: NMFS should implement additional measures to protect the Atlantic BFT biomass, especially spawning fish in the Gulf of Mexico; NMFS should consider closing the Gulf of Mexico to protect spawning BFT and analyze different time periods in combination with the northeast closures during months of high discards or high CPUE that might address effects on loggerhead sea turtles; an area south of Louisiana surrounding known BFT spawning areas should be closed to all longline fishing for a reasonable period of time – at a minimum this should include the area identified in Alternative B2(c); the *Nature* study firmly establishes the time and location of the spawning season and affords NMFS the opportunity to close a hot spot based on the best available science; Japan has recommended a longline closure of the entire Gulf of Mexico at ICCAT; NMFS should immediately initiate interim or emergency action to close the longline fishery in the Gulf of Mexico, starting in January of 2006 that would be effective for six months each year from January through June; NMFS should explain why the ecological benefits of closing the longline fishery in the Gulf of Mexico during BFT spawning season, as described in Alternative B2(c), would be minimal; why does NMFS assume that a longline closure in the Gulf of Mexico would cause a redistribution of effort to areas where BFT discards could increase?; what are the positive and negative economic consequences of allowing longline fishing to continue in the Gulf of Mexico during BFT spawning season?

Response: NMFS considered a wide range of alternatives ranging from maintaining existing closures (No Action) to a complete prohibition of PLL gear in all areas in order to reduce the bycatch and bycatch mortality of non-target HMS and protected species, such as sea turtles, in Atlantic HMS fisheries. After comparing the potential bycatch reduction for all of the closures that NMFS initially considered (see Chapter 2), NMFS chose five closures with the highest overall bycatch for further analysis. Alternative B2(c) was chosen for analysis in response to a petition received by NMFS from several conservation organizations requesting consideration of a closure of the "Gulf of Mexico BFT spawning area" (Blue Ocean Institute *et al.*, 2005). The times and areas analyzed for alternative B2(c) were directly from the petition. Alternative B2(d) was chosen for analysis in order to determine if any other closure, or combination of closures, would be more effective at reducing bycatch than some of the other alternatives considered. The analyses indicated that almost all of the closures and combinations of closures considered for white marlin, BFT, or sea turtles would result in a net increase in bycatch for at least some of the primary species considered when redistribution of fishing effort was taken into account. In addition, the predicted reduction in bycatch when redistribution of fishing effort was taken into account was typically less than 30 percent for any given species with overall reduction in the number of individual species being very low.

According to the POP data, alternative B2(c), closing 101,670 nm^2 in the Gulf of Mexico from April through June, would reduce discards of all non-target HMS and protected resources from a minimum of 2.3 percent for spearfish to a maximum of 25.0 percent for other sea turtles (comprised of green, hawksbill, and Kemp's ridley sea turtles). Without redistribution of effort, the logbook data indicate that alternative B2(c) would potentially reduce discards of all of the species being considered from a minimum of 0.8 percent for pelagic sharks to a maximum 21.5 percent for BFT. In a more likely scenario that assumes redistribution of effort, however, bycatch was predicted to increase for all species except leatherback and other sea turtles. Even BFT discards, which showed a fairly dramatic decline without redistribution of effort, were predicted to increase by 9.8 percent with redistribution of effort. Alternative B2(d) would prohibit the use of PLL gear by all U.S. flagged-vessels permitted to fish for HMS in a 162,181 nm^2 area in the Gulf of Mexico west of 86 degrees W. Long. year-round, thus eliminating an area where approximately 50 percent of all effort (Atlantic, Gulf of Mexico, and Caribbean) and 90 percent of all effort in the Gulf of Mexico has been reported in recent years (2001 – 2003). Without the redistribution of effort, the closure could have resulted in large reductions in all non-target HMS, ranging from a 10.1 percent reduction in loggerheads to 83.5 percent reduction in spearfish discards. With the redistribution of effort, NMFS predicted a decrease in discards of blue marlin (20.3 percent or 497 discards/over three years; annual estimates can be obtained by dividing by three), sailfish (26.8 percent or 276 discards/over three years), and spearfish (73.3 percent or 276 discards/over three years). However, given the size and timing of this closure (*i.e.*, year-round), NMFS also predicted an increase in white marlin discards (0.3 percent or 10 discards/over three years), loggerhead sea turtle interactions (65.5 percent or 117 turtles/over three years), BFT discards (38 percent or 614 discards/over three years), swordfish discards (31.9

percent or 11,718 discards/over three years), and bigeye tuna discards (84.8 percent or 853 discards/over three years).

Other alternatives, such as alternative B2(b), which would close a much smaller area in the Northeastern United States, could have greater benefits in terms of the number of BFT discards reduced. Although alternative B2(b) is not considered a BFT spawning area, data from the POP program indicate that large fish (>171 cm TL) are present in the area. Additionally, there is evidence to indicate that the area is utilized as a feeding and staging area by BFT prior to migrating to the Gulf of Mexico to spawn (Block *et al*., 2005). Hence, while NMFS recognizes that the same proportion of western spawning BFT would not be protected from a closure in the Northeast as one in the Gulf of Mexico, potentially a small proportion of western spawning-size BFT could be protected by a closure like B2(b), especially given the prevalence of larger individuals in Northeast area from the POP data. Therefore, a closure like B2(b) may be able to protect a few spawning-size individuals as well as pre-spawners, or sub-adults, which are also valuable age classes with regard to the stock (although, presumably, there is a mixture of eastern and western origin fish in this area, and a closure in this area may protect sub-adults of western as well as eastern origin). Furthermore, the total proportion of dead discards in the Northeast was similar to the Gulf of Mexico. In the Northeast, 48 percent (219 out of 461) of all BFT discards from 2001 – 2003 were discarded dead, whereas 53 percent (249 out of 470) of all BFT discards from the Gulf of Mexico were discarded dead. Given the high number of BFT discards in the Northeast, a smaller closure there may provide similar ecological benefit compared a closure in the Gulf of Mexico (depending on post-release survival rates in the two areas), and would minimize the economic impacts on the fleet.

NMFS will continue to pursue alternatives to reduce bycatch of spawning BFT. NMFS has currently adopted all of the ICCAT recommendations regarding BFT, a rebuilding plan is in place domestically for this species, and NMFS has implemented measures to rebuild this overfished stock. NMFS is currently trying to assess how protecting one age class at the potential detriment of other age classes will affect the fish stock as a whole. For instance, how will protecting spawning BFT help rebuild the stock if it results in increased discards of non-spawning adults, juveniles, and sub-adult BFT along the eastern seaboard? Therefore, more information is needed to further understand how to manage this species given its complex migratory patterns, life history, and age structure. As described above, NMFS is also considering developing incentives that would dissuade fishermen from keeping incidentally caught BFT, particularly spawning BFT in the Gulf of Mexico.

<u>Comment 7</u>: NMFS received several comments regarding the biology of spawning BFT in the Gulf of Mexico. These comments included: the management measures currently in place do not protect spawning BFT nor create the conditions necessary for BFT to survive, reproduce, and increase their population; current U.S. regulations result in a situation where almost half the BFT landed by longline fishermen come from the Gulf of Mexico when spawning fish are present, resulting in a significant de facto directed fishery; warm water in the Gulf of Mexico poses particular risks to BFT captured on longline gear due to the physiological stress caused in warm, low oxygen waters; and the spawning fish in this time and place are more valuable to the population than at other times of year.

Response: Although NMFS does not prefer alternative B2(c), or any other closure specific to spawning BFT in the Gulf of Mexico at this time, NMFS plans to pursue alternatives to reduce bycatch in the Gulf of Mexico, especially for spawning BFT. Such actions could improve international rebuilding efforts of this species. NMFS is also considering developing incentives that would dissuade fishermen from keeping incidentally caught BFT, particularly spawning BFT, in the Gulf of Mexico. This may involve research on how changes in fishing practices may help reduce bycatch of non-target species as well as the tracking of discards (dead and alive) by all gear types. In addition, sea surface temperatures in the Gulf of Mexico have recently been thought to be associated with congregations of BFT and putative BFT spawning grounds in the Gulf of Mexico (Block, pers. comm.). NMFS intends to investigate the variability associated with sea surface temperatures as well as the temporal and spatial consistency of the association of BFT with these temperatures regimes. By better understanding what influences the distribution and timing of BFT in the Gulf of Mexico, NMFS can work on developing tailored management measures over space and time to maximize ecological benefits while minimizing economic impacts, to the extent practicable.

Comment 8: NMFS should outline the methods and mortality rates used to estimate dead discards as reported to ICCAT, and comment on the likely associated uncertainty. The current regulations are currently failing to implement key provisions of the ICCAT rebuilding plan, in violation of ATCA. The model used by NMFS in its Draft HMS FMP assumes that the reproductive value of western Atlantic BFT caught in the Atlantic Ocean off the northeastern United States later in the year is equivalent to that of BFT caught from March-June in the Gulf of Mexico. This is a faulty and risky assumption. Does the analysis in the Draft HMS FMP take into account the current low stock status of western Atlantic BFT? The draft HMS FMP is flawed when it does not prefer closing BFT spawning grounds because it erroneously analyzes the closure primarily with regard to minimize bycatch to the extent practicable. In fact, the primary legal duty falls under the need to rebuild the western Atlantic BFT population in as short a period of time as possible. Overfishing continues at high rates and the model used for the rebuilding program is unrealistically optimistic.

Response: The estimates of discards used in the analyses include both live and dead discards, as reported by fishermen in logbooks. While NMFS ultimately used logbook data for the time/area analyses, NMFS also compared estimates of discards from the POP data. NMFS did not develop mortality estimates from the data. Rather, NMFS evaluated percent change in total discards as the measure of the effectiveness of potential time/area closures. NMFS disagrees that the current regulations are failing to implement provisions of the rebuilding plan. NMFS has currently adopted all of the ICCAT recommendations regarding BFT, a rebuilding plan is in place domestically for this species, and NMFS has implemented measures to rebuild this overfished stock. The model used by NMFS did not make any assumptions about the reproductive value of BFT. Rather, the intent of examining different closures was to maximize the potential reduction in bycatch for the greatest number of species, while minimizing losses in target catch.

Comment 9: NMFS received a comment that the area in the *Nature* study extends beyond the U.S. EEZ and so should the analyses in the Draft HMS FMP. There is no legal reason to limit the analysis to the U.S. EEZ.

Response: While NMFS has analyzed closures beyond the U.S. EEZ (*e.g.*, the Northeast Distant closed area), except for two relatively small areas, the U.S. EEZ in the Gulf of Mexico abuts the Mexican EEZ. U.S. fishermen are not allowed to fish in the Mexican EEZ, and NMFS does not have the legal authority to regulate foreign fisheries that operate outside of the U.S. EEZ. As such, the analyses were limited to the U.S. EEZ in the Gulf of Mexico utilizing logbook and POP data from the U.S. PLL fishery.

Comment 10: Demographics in the Gulf of Mexico have changed due to last summer's hurricanes. No one knows what the impacts of that will be. NMFS should not rush into changes in the Gulf of Mexico that are not necessary.

Response: NMFS is aware that there have been significant impacts in the Gulf of Mexico as a result of the 2005 hurricanes, which may take time to be fully realized. After carefully reviewing the results of all the different time/area closures analyses, and in consideration of the many significant factors that have recently affected the domestic PLL fleet, NMFS does not prefer to implement any new closures, except the complementary measures in the Madison-Swanson and Steamboat Lumps closed areas at this time. As described above in the response to Comment 2 in this section, this decision is based on a number of reasons including the potential impacts of the hurricanes on the PLL fleet.

White Marlin

Comment 11: NMFS received several comments in support of additional time/area closures to protect white marlin. Comments included: NMFS should consider a closure for white marlin in the mid-Atlantic; NMFS has never implemented a time/area closure for PLL fishing specifically to reduce blue and white marlin, or sailfish bycatch even though exceedingly high levels of bycatch occur; and NMFS must reduce marlin bycatch by closing areas to longline fishing when and where the most bycatch continues to occur to avoid a white marlin ESA listing.

Response: While NMFS has never implemented a closure to specifically reduce bycatch of blue and white marlin, current closures (the Northeastern U.S. closure, the DeSoto Canyon closure, the Charleston Bump, the East Florida Coast closures, and the Northeast Distant closed area) have resulted in large decreases in blue and white marlin discards from PLL gear, and billfish were considered in the analyses of these closures. Percent change in discards from the HMS logbook data before (1997 – 1997) versus after (2001 – 2003) the closures were implemented showed an overall 47.5 percent decrease in white marlin discards and an overall 50.3 percent decrease in blue marlin discards. In addition, NMFS implemented a ban on live bait in the Gulf of Mexico on August 1, 2000 (65 FR 47214), for PLL vessels to help reduce billfish bycatch. In the Draft HMS FMP, NMFS considered areas specifically for white marlin, per a settlement agreement relating to white marlin (Center for Biological Diversity v. NMFS, Civ. Action No. 04-0063 (D.D.C.)). Based on the HMS logbook and POP data from 2001 – 2003, other potential time/area closures were predicted to result in larger ecological benefits for all the species, including white marlin, rather than the areas outlined in the settlement agreement. Ultimately, NMFS chose to further analyze time/area closure boundaries that included the areas of highest interactions for a number of species. However, based on the results of these analyses and for the reasons discussed under the response to Comment 2, NMFS chose not to implement any new closures at this time beside the complementary measures in the Madison-Swanson and Steamboat Lumps Marine Reserves.

Comment 12: NMFS received a number of comments on alternative B2(c) including: Alternative B2(c) corresponds to the location of significant incidental catches of white marlin and leatherback sea turtles - NMFS should consider that area for closures, effort restrictions, or stricter gear requirements rather than allow itself to be paralyzed in the search for a single time/area closure that will address all bycatch reduction needs for more than a dozen species; NMFS should consider closed areas in the western Gulf of Mexico because that is where marlin are being killed; Alternative B2(c) should be closed from June through August to protect the greatest abundance of billfish in the Gulf of Mexico; the draft HMS FMP does not propose a closure big enough or long enough to generate a meaningful reduction in billfish bycatch; U.S. and Japanese data shows that bycatch of billfish is higher in the Gulf of Mexico than in any other part of the commercial fishery, and the closures to protect blue and white marlin in the Gulf of Mexico could save more of these species than any other closure in the entire United States, yet NMFS did not consider that there would be enough positive impact to consider implementing a closure.

Response: As described above in Comment 6 of this section, NMFS examined alternative B2(c) specifically in response to a petition for rulemaking regarding protection of spawning BFT. Under the full redistribution of fishing effort model for B2(c) (fishing effort distributed to all open areas), NMFS predicted an increase in white marlin discards (7.0 percent or 221 discards/over three years; annual estimates can be found by dividing by three), blue marlin discards (2.0 percent or 50 discards/over three years), sailfish discards (4.4 percent or 45 discards/over three years), loggerhead sea turtle interactions (23.5 percent or 42 turtles/over three years), BFT discards (9.8 percent or 158 discards/over three years), swordfish discards (6.0 percent or 2,218 discards/over three years), and bigeye tuna discards (1.7 percent or 18 discards/over three years). Under the second scenario of redistributed effort (redistribution in the Gulf of Mexico and Area 6), NMFS predicted increases in blue marlin discards (0.7 percent or 20 discards/over three years), sailfish discards (21.7 percent or 283 discards/over three years), spearfish discards (2.0 percent or 10 discards/over three years), large coastal sharks (12.8 percent or 2,454 discards/over three years), swordfish tuna discards (5.0 percent or 2,109 discards/over three years), and bigeye tuna discards (0.6 percent or 7 discards/over three years). Although white marlin discards were predicted to decrease under the second scenario evaluated (by 2.6 percent or 98 discards/over three years), there were potential negative ecological impacts of B2(c) for other species considered under the different scenarios of redistributed effort. Therefore, NMFS decided to not prefer alternative B2(c) at this time.

Based on a submission by the Japanese at ICCAT on BFT management (Suzuki and Takeuchi, 2005), the proposed closures and subsequent ecological benefits were based on closing the entire Gulf of Mexico and did not considered redistribution of fishing effort. As described above in Comment 9 of this section, NMFS has no jurisdiction to close the Mexican EEZ, and U.S. PLL vessels are prohibited from fishing in the Mexican EEZ. NMFS also believes it is critical to consider the redistribution of fishing effort before implementing management measures, such as time/area closures, because potential increases in discards and bycatch can result from time/area closures as effort is moved to remaining open areas. Additionally, as described above, NMFS is considering future management measures to minimize bycatch of non-target HMS in the Gulf of Mexico.

Comment 13: Longlining should be banned off the East Coast from June to September when white marlin are present in this area.

Response: NMFS currently has several closures along the eastern seaboard specifically for pelagic and bottom longline. These consist of the Northeastern United States closed area, which is closed to pelagic longlining during the month of June; the mid-Atlantic Shark Closure, which is closed during January through July to bottom longline gear; the Charleston Bump closed area that is closed to PLL gear from February through April; and the East Florida Coast closure that is closed year-round to PLL gear. The Florida East Coast (FEC), the Mid-Atlantic Bight (MAB), and the Northeastern Coastal (NEC) statistical reporting areas cover the extent of the U.S. Atlantic PLL logbook reporting areas along the East Coast. Comparing the number of discards for the months of July through December between the pre-closure period 1997 – 1999 and the period 2001 – 2003, when closures were in effect, reported landings of white marlin decreased by 95.4 percent in the FEC, 53.4 percent in the MAB, and 77.8 percent in the NEC. Therefore, while NMFS has not implemented a closure for white marlin specifically along the East Coast, data show a substantial decrease in white marlin discards likely resulting from the current time/area closures along the eastern seaboard.

Current Closed Areas

Comment 14: NMFS received several comments regarding the East Florida Coast closed area. These comments are: NMFS should prohibit all commercial fishing for swordfish in the East Florida Coast closed area; NMFS should eliminate all commercial shark fishing in the East Florida Coast closed area; NMFS should impose a 20-mile limit for the entire East Florida Coast that would prohibit commercial fishing in the area; NMFS should set a policy for the East Florida Coast closed area that allows for recreational swordfish hook and line fishing for a three to four month period or adopt management measures that allow for recreational swordfish hook and line fishing only on an every other year basis; NMFS needs to protect the Florida east coast because it is a nursery area for juvenile swordfish; NMFS should readjust the offshore border of the East Florida Coast Closed Area to allow PLL vessels a reasonable opportunity to harvest its ICCAT quotas; and NMFS should reopen the offshore border - the inshore and Straits of Florida portions that will remain closed afford adequate ongoing protections for undersized swordfish and other bycatch.

Response: NMFS closed the East Florida Coast closed area to PLL gear effective in 2001 (August 1, 2000, 65 FR 47214) in order to reduce bycatch of HMS and other species by PLL gear. One reason NMFS closed that area was because it is a swordfish nursery area and many of the swordfish being caught by PLL fishermen were undersized and therefore discarded dead. However, the goal of the closures was to reduce bycatch in general in the PLL fishery, and analyses conducted for that rulemaking also indicated that closing the area to PLL gear would reduce bycatch and discards of other species as well. The closure was not intended to be for all commercial fishing or to be permanent. Nor was the closure meant to allow only recreational fishing in that area. Because the area is a swordfish nursery area, it is likely that any fishing gear in that area, particularly those fishing for swordfish, will catch undersized swordfish that must be discarded, as well as juvenile swordfish that meet the legal minimum size. The preferred alternative that establishes criteria should allow NMFS to consider closing the East Florida Coast to other gears to reduce bycatch or for other reasons or to modify the closed area to PLL gear to either expand or reduce it, as needed. NMFS considered modifications to the closed area to allow PLL fishermen into an area that they claimed had swordfish larger than the minimum size. The analyses for this rulemaking concluded that swordfish in the potential re-opened area are significantly larger than those in the remaining closed area; however, the analyses also indicated potential increases in marlin bycatch. For this reason and others, NMFS did not prefer any alternative that would modify the East Florida Coast closed area at this time. NMFS may consider changes to that area or to the gears allowed to fish in that area in future rulemakings.

Modifications to Current Closed Areas

Comment 15: NMFS received comments supporting and opposing modifications of the existing HMS time/area closures to allow additional fishing effort into these areas. Comments in support of modifying the existing closures include: the existing time/area closures to protect small swordfish are no longer needed and should be reduced in size and/or duration or eliminated all together; NMFS inaction to adjust the offshore closure borders prevents U.S. fishermen from having a reasonable opportunity to harvest its ICCAT quota share, contrary to ATCA and the Magnuson-Stevens Act; NMFS needs to re-examine the area closures and provide immediate modifications to at least some areas. Other areas may require a period of heightened monitoring to determine the effects of new circle hook gear and careful handling/release procedures; NMFS should continuously monitor whether the existing closed areas are having the desired effect to determine whether modifications can occur; NMFS should reevaluate the PLL gear time/area closures for their necessity and effectiveness and redevelop these closures to include prohibiting all HMS hook and line fishing if the biological justification warrants retaining any such closures; NMFS should consider modifying the offshore borders of existing closures in several areas where the deeper depth contours provide relatively clean directed fishing; NMFS should have considered modifying the Desoto Canyon; opening the area offshore of the 250 fathom curve in the Desoto Canyon could benefit YFT fishermen; and if NMFS allows vessels into closed zones by using Vessel Monitoring Systems (VMS), then VMS should also be used to implement and enforce additional new closures that follow oceanic bottom contour lines. Comments opposed to modifying the existing HMS closures include: NMFS should not rely on old logbook data to modify existing closures; the existing closures should not be modified; NMFS should not consider areas that may serve as nursery areas for North Atlantic swordfish; NMFS should not consider opening the DeSoto Canyon areas to longlining because this would adversely affect the health of the fisheries ecologically and would prove detrimental to the economic interests of the commercial fleet; and the figures in this section show longline sets after the 2000 closure of the Desoto Canyon and the harvest of BFT dead discards - if this is illegal, how do these individuals make the sets and record them in the logbooks?

Response: NMFS considered making modifications to the current time/area closures, including modifications to the DeSoto Canyon, and is continuously monitoring the effect of current closures. As described above, an analysis of pre-closure and post-closure data indicate that the existing closures have been effective at reducing bycatch of protected species and non-target HMS, and have provided positive ecological benefits. The analysis also indicated that none of the modifications considered would have resulted in a large enough increase in retained catch to alleviate concerns over uncaught portions of the swordfish quotas. Specifically for the DeSoto Canyon, NMFS considered modifying the existing DeSoto Canyon time/area closure boundary to allow PLL gear in areas seaward of the 2000 meter contour from 26º N Lat., 85º 00' W Long., to 29º N Lat., 88º 00' W Long (alternative B3(d)). However, the average swordfish size was significantly smaller in the area to be reopened (average size = 108 cm LJFL) compared to the area to remain closed (average size = 116 cm LJFL; $P = 0.03$). Both average swordfish sizes are smaller than the minimum size limit of 119 cm LJFL. Therefore, NMFS believes that modifying the Desoto Canyon closure could result in increased swordfish discards. In addition, new circle hook management measures were put into place in 2004, and NMFS is still assessing the effects of circle hooks on bycatch rates for HMS. Until NMFS can better evaluate the effects of circle hooks on bycatch reduction, especially with regards to protected species interaction rates, the Agency is not preferring to modify the current time/area closures, at this time. Furthermore, as described in the response to Comment 14 above, the current time/area closures were established to reduce bycatch of more than just swordfish. Nonetheless, if the upcoming ICCAT swordfish stock assessment indicates the species is rebuilt, NMFS may reconsider modifying the existing closures taking into consideration things such as the impact of circle hooks and protected species interaction rates. Finally, while VMS allows fishermen to travel through the closed area, oceanic bottom contours are often irregularly shaped lines that despite VMS, may be more difficult to enforce. Geometric coordinates greatly aid in enforcement of time/area closures.

The baseline that NMFS has used to calculate bycatch reduction associated with current time/area closures is the U.S. Atlantic HMS logbook data just prior to the implementation of the closures (1997 – 1999). NMFS feels this best reflects the status of the stocks at the time of the closures. More current data is not available because PLL gear has been prohibited in these areas since 2000 or 2001, depending on the closure. The figures referred to by the commenter (Figures 4.3 and 4.8 in the Draft FMP) incorrectly showed all of the 1997 – 1999 reported sets rather than the intended 2001 – 2003 reported sets. The figures have been corrected. Very few, if any, sets have been reported in the Desoto Canyon since 2000. The figures in the Final HMS FMP only show where BFT discards occurred for PLL vessels from 2001 through 2003. NMFS also implemented the use of a vessel monitoring system (VMS) for all PLL vessels on September 1, 2003 (68 FR 45169). This monitoring system helps track where PLL vessels are placing sets, and NMFS has been able to track whether or not PLL vessels are placing sets in closed areas. VMS has helped alert enforcement of illegal activities occurring in closed areas under real time conditions, which has led to prosecution for illegal fishing in closed areas.

Comment 16: We support a modification of the area described in alternative B3(a) (modifications to the Charleston Bump closed area). While the analysis shows a negligible amount of bycatch, there is an opportunity for catching marketable species for boats that are struggling and need access to this area.; We also support a modification of the area described in alternative B3(b) (modifications to the Northeastern U.S. closed area), this area should never have been closed in the first place. The entire June BFT closure area should be reevaluated in light of all the mandatory bycatch reduction measures and the inability to harvest the U.S. BFT quota in recent years.

Response: NMFS analyzed both alternatives B3(a) and B3(b). The analyses indicate that alternative B3(a) would result in an increase in swordfish catch of 1.1 percent and yellowfin tuna catch of 0.16 percent. However, it could result in an increase of bycatch for sailfish (3.0 percent), spearfish (2.4 percent), and white marlin (2.0 percent). Alternative B3(b) would result in a minimal increase in bycatch and retained catch (*i.e.*, 3 swordfish, 1 BFT, and 1 BAYS tuna would be expected to be caught based on 1997 – 1999 data). As described above, NMFS is not preferring to implement any new or to modify any existing closures, except for Madison-Swanson or Steamboat Lumps, at this time for the reasons stated in the response to Comment 2, and with regard to alternatives B3(a) and B3(b) because neither of the modifications considered would have resulted in a large enough increase in retained catch to alleviate concerns over uncaught portions of the swordfish and BFT quotas. NMFS may consider changes to the current time/area closures depending on the results of the circle hook analyses, the 2006 ICCAT stock assessments (BFT, swordfish, and billfish), and protected species interaction rates, and criteria preferred in a future rulemaking.

Madison-Swanson/Steamboat Lumps

Comment 17: NMFS received contrasting comments regarding preferred alternative B4 (implement complementary HMS management measure in Madison-Swanson and Steamboat Lumps Marine Reserves) including: I support preferred alternative B4 and the maintenance of the existing closures; the Agency appears to be acting positively on the Gulf of Mexico Fishery Management Council's request for complementary closures; I support this alternative even though this will have virtually no significant impact on HMS fisheries because the area is so small; I support alternative B4 because it will make enforcement easier; we support alternative B4 with the following edit, "Maintain existing time/area closures and implement complementary…November through April (6 months) – Preferred Alternative"; and we do not support complementary closures with Madison-Swanson and Steamboat Lumps - the PLL industry has had to withstand numerous stringent measures in recent years and cannot withstand any additional closures.

Response: NMFS is implementing alternative B4, complementary HMS management measures for the Madison-Swanson and Steamboat Lumps Marine Reserves, at the request of the Gulf of Mexico Fishery Management Council. These closures were designed primarily to provide protection for spawning aggregations of gag grouper and other Gulf reef species. Similar management measures are already in effect for holders of southeast regional permits. The complementary HMS management measures would close any potential loopholes by extending the closure regulations to all other vessels that could potentially fish in the areas. As a result, this action is expected to improve the enforcement of the Madison-Swanson and Steamboat Lumps Marine Reserves. Only minor impacts on HMS fisheries, including the PLL fishery, are anticipated because the marine reserves are relatively small, and little HMS fishing effort has been reported in these areas. The suggested edit to the title of this alternative is appreciated, but is not necessary because the existing closures will remain in effect by default, absent additional action to remove or modify them.

Criteria/Threshold/Baseline

Comment 18: NMFS received several comments on using the criteria on current closures including: NMFS should have created these criteria when establishing the closed area off NC - NMFS then could have modified the economic impacts to the NC directed shark fishermen by having flexibility to reduce the time and area of the current closed area; and all existing closed areas should be immediately re-evaluated in terms of the new criteria.

Response: NMFS used many of the criteria when establishing the current time/area closures. NMFS currently prefers the criteria alternative in order to clarify the process and allow constituents to see what NMFS would consider before implementing new or modifying current time/areas closures. In addition, in this rulemaking, NMFS evaluated the impacts of most of the current time/area closures in the No Action alternative, B1, and the impacts of modifying four current time/area closures. Thus, NMFS has already re-evaluated some of the current time/area closures using the criteria. Once the criteria are implemented, NMFS would continue using them in future rulemakings. The only time/area closure that was not re-evaluated during this rulemaking was the mid-Atlantic shark closure off North Carolina. NMFS did not re-evaluate this closure because, as described in the response to a petition for rulemaking from the State of North Carolina (October 21, 2005, 70 FR 61286), the closure became effective in January 2005, and NMFS did not have any additional information on which to reevaluate the conclusions of the rulemaking that established the closure (December 24, 2003, 68 FR 74746). However, when NMFS established the mid-Atlantic shark time/area closure, the Agency considered the social and economic impacts on directed shark fishermen, while also balancing reductions in the catch of juvenile sandbar sharks, the bycatch of prohibited dusky sharks, and the quota throughout the entire large coastal shark fishery. As described in this rulemaking and in previous rulemakings, the primary goals of time/area closures are to maximize the reduction of bycatch of non-target and protected species while minimizing the reduction in the catch of retained species. NMFS believes that the mid-Atlantic shark closure should accomplish these goals even though there may be negative economic impacts as a result of that closure. Once the results of the ongoing LCS and dusky shark stock assessment are finalized, NMFS may consider if changes in any management measures regarding LCS, including dusky sharks, are appropriate, and may reconsider the mid-Atlantic closed area using the criteria listed in the preferred alternative.

Comment 19: NMFS received several comments regarding research and closed areas including: NMFS should support additional research to determine where other closed areas should be placed; research to collect data for use in establishing such criteria should be done in open areas to the maximum extent possible; and there must be overwhelming reason to pay fishermen to use illegal gear in a closed area in the name of research (while still being able to sell their catch) when such studies could just as easily be performed in vast areas of the oceans where it is legal to fish in that manner.

Response: NMFS supports research to determine how changes in fishing gear and/or fishing practices can reduce bycatch. Research in closed areas to test how changes in fishing gear and/or fishing practices may reduce bycatch is particularly important. Due to the spatial and temporal variability of HMS and species that HMS interact with, the results of experiments in open areas may not be applicable to closed areas. Oftentimes, these areas are “hot spots” and were closed because they are areas where there are high congregations of HMS or other species.

The congregations usually occur along bathymetric contour lines or areas where currents interact. In order to scientifically test if a certain change in the gear would result in a significant reduction in bycatch, scientists may need to be in areas where there is a high degree of certainty that the gear will interact with the bycatch species. Testing for bycatch reductions in areas where there is little to no bycatch likely would require more resources, in terms of money, fishermen, and time than in areas that are considered "hot spots." Scientists do conduct preliminary tests in open areas to ensure that the change in gear or fishing method could work but may need to be allowed access to the closed areas at some point in order to be certain that the change works. Therefore, in order to understand how technological advances in bycatch reduction would operate in closed areas, research would likely need to be conducted in closed areas. Otherwise, NMFS could reopen such areas in light of technological advances in bycatch reduction and not see the expected reduction rates in bycatch, or potentially see an increase in bycatch rates in these once closed areas.

Comment 20: NMFS received comments regarding the specific criteria that NMFS should consider when examining potential area closures including: the criteria should include the status of the stock in each area under consideration; the set of criteria should include bycatch baselines, targets, reduction timetables, and consider impacts on all HMS, with an emphasis on overfished species; what percent reduction in discards is required to implement a time/area closure, and on what basis is this threshold determined? What is the threshold the Agency is trying to achieve? There are no standards. Was a target bycatch reduction level identified? The Agency should quantitatively use an optimization model to combine areas to achieve the optimum benefit; these criteria should be developed in a workshop of managers, scientists, and stakeholders to ensure their success; the discussion of how specific criteria would be developed, reviewed, and authorized is vague; and the criteria seem overall to restrict NMFS' use of discretion in using closed areas as part of a comprehensive strategy to reduce bycatch and ensure sustainable ecosystems. NMFS should preserve the availability of the greatest range of options to address its fisheries management, protected resources, and marine ecosystem conservation responsibilities.

Response: NMFS already considers the status of the stocks when implementing time/area closures. Closed areas like the Northeastern United States closed area, the mid-Atlantic shark closed area, and the Northeast Distant closed area were all implemented to address specific overfished or protected species. The other closed areas, while implemented to reduce bycatch in general, also considered the status of the stocks before implementation. Establishing pre-determined thresholds or target reduction goals for specific species, as requested in the comment, is inappropriate because it does not consider the impact on the remaining portion of the catch. NMFS stated this in response to comments on the rulemaking that implemented the East Florida Coast, the DeSoto Canyon, and the Charleston Bump closures, and continues to believe the statement is valid. Consideration of the overall catch is critical when implementing a multispecies or ecosystem-based approach to management. Furthermore, while the Magnuson-Stevens Act provides NMFS the authority to manage all species, NMFS must balance the impacts of management measures on all managed species and may not choose protections for one species to the detriment of protected and overfished species (*e.g.*, NMFS may not choose to protect BFT even if sea turtle interactions or bycatch of overfished species may increase substantially). National Standard 1, which requires NMFS to prevent overfishing while achieving on a continuing basis, the optimum yield from each fishery for the United States fishing industry, clearly applies to all species and all fisheries. Similarly, National Standard 9, which requires NMFS to minimize bycatch and bycatch mortality to the extent practicable, applies to all species and fisheries. By not choosing a specific threshold or establishing a decision matrix, NMFS retains the flexibility to balance the needs of all the species encountered and the fishery as a whole. If NMFS is given a specific goal (*e.g.*, a jeopardy conclusion regarding the PLL fishery and leatherback sea turtles), this flexibility allows NMFS to close certain areas or take other actions to protect that specific species while also protecting, to the extent practicable, the other species and the rest of the fishery. Without this flexibility, NMFS might potentially have to implement more restrictive measures to protect one species causing potential cascade effects (*e.g.*, closing one area may increase the bycatch of another species, which could result in closing another area, etc.). This approach also provides NMFS with the flexibility to re-examine the need for existing closures and modify them appropriately based on the analyses rather than the attainment of a specific goal (*e.g.*, NMFS would not have to wait for 30 percent reduction in bycatch to be met; it could open the closure at 25 percent, depending on the result of reducing bycatch of other species or other considerations, as appropriate). The present criteria do not preclude NMFS from considering the establishment of a decision matrix in the future if such a matrix could be designed that would provide for the flexibility to consider all the species involved. This may be more appropriate when NMFS has a longer temporal dataset on the simultaneous effect of circle hooks and the current time/closures. At this time, NMFS believes that the criteria contained in the preferred alternative B5 would provide the guidance needed, consistent with the Magnuson-Stevens Act and this FMP, to help NMFS make the appropriate decisions regarding the use of time/area closures in HMS fisheries. NMFS developed such criteria as a way to help make the overall process of implementing and/or modifying current time/area closures more transparent, not more vague. The criteria themselves are a list of the issues that NMFS would consider when devising or modifying time/area closures. The criteria listed in the preferred alternative are what NMFS would consider for new or modified time/area closures. While NMFS did not hold a workshop on these criteria, these criteria were considered by multiple stakeholders during the scoping and public comment period for this rule and refined, as appropriate.

Comment 21: NMFS received many comments regarding the use of criteria to open or modify closed areas. These comments included: criteria are needed to allow for modifications of the closed areas; I cannot support the preferred alternative B5, area closure framework alternative, because it could allow NMFS to open existing closures; changes to existing closed areas must, at a minimum, be conservation neutral; we need a mechanism to open or modify closed areas. The present closures appear to be larger or different from necessary. To go through an entire regulatory process to change or eliminate them takes too long and is too costly to both the government and the fishery.

Response: NMFS already has the authority to modify current closed areas once NMFS determines that a closed area has met its original management goal. The existing time/area closures were not meant to be permanent closures. Rather, each closure was implemented with a specific management goal(s) in mind. Once those goals are met, NMFS may decide to modify or remove the time/area closure. Through the implementation of the criteria, and using the appropriate analyses, NMFS would be able to modify current time/area closures in a more timely manner and transparent process. No changes were made to existing time/area closures at this time because such modifications could potentially result in bycatch of non-target HMS and protected resources, such as sea turtles. However, once NMFS better understands the effects of circle hooks, which were implemented fleet-wide in mid-2004, on all species, NMFS may consider modifying the current time/area closures. Such modifications would need to be either conservation neutral or positive.

Comment 22: Since the East Florida Coast, Charleston Bump, and DeSoto Canyon closures went into effect, bycatch and fishing effort has been reduced. Those three closures achieved a greater than predicted reduction in bycatch. NMFS should use the year before the closures went into effect as a baseline to determine what the existing management measures have produced, rather than taking additional actions and expecting the bycatch to continually diminish. NMFS could modify closures and allow increases in bycatch up to the reductions expected as a result of the analyses that closed those areas. This would reduce the economic impacts on fishermen.

Response: NMFS agrees that the current closures reduced bycatch of most species to levels greater than those predicted by the analyses in the rulemaking that closed the areas. NMFS used data just prior to the implementation of these closures (*i.e.*, logbook data from 1997 – 1999) because the Agency felt this time series best represented the status of the stocks at the time the closures were implemented. NMFS considered modifications to these areas in this rulemaking. However, the current analyses indicated that bycatch of some species, such as marlin and sea turtles, could increase as a result of those modifications. Given the status of marlin and the jeopardy finding on leatherback sea turtles, NMFS believes that increases in bycatch of those species is not appropriate. Additionally, the analyses in this rulemaking are based on mostly J-hook data, which are no longer in use in the fishery. NMFS will continue to monitor the effectiveness of the closures and may consider modifications in the future, particularly as the amount of circle hook data increases.

Fleet Mobility/Redistribution of Effort

Comment 23: NMFS received several comments regarding the mobility of the fleet. These comments included: I do not believe that effort will move to the Atlantic from the Gulf of Mexico - commercial fishermen would rather stay home and move to fishing for another species; longline vessels are tied to communities; given rising fuel prices, an increase in long distance relocation seems unlikely; NMFS states that Vietnamese fishermen are reluctant to fish outside the Gulf of Mexico and uses this statement to conduct a separate analysis specific to the Gulf of Mexico. This thought process was inexplicitly applied to the analysis for only one alternative for the Gulf of Mexico. It should be applied to all; how does the 2001 NMFS VMS study support conducting a fleet-wide analysis when the majority of effort is in or adjacent to the homeport fishing area?

Response: To determine fleet mobility, NMFS relied on a 2001 report submitted to the U.S. District Court in response to a lawsuit filed by the fishing industry against NMFS for implementing the vessel monitoring system (VMS) requirement. That document indicated that fishermen were as likely to fish in areas away from their homeport as in areas immediately adjacent to their homeport, even without the added pressure of a closure in an area adjacent to their homeport. In addition, in the Draft HMS FMP, NMFS conducted a separate analysis for alternative B2(a), which limited the redistribution of effort in the Gulf of Mexico only because B2(a) was the smallest of the three closures considered in the Gulf of Mexico and represents the most likely case in which fishermen would stay in the Gulf of Mexico. Since there would still be open areas left to fish in the Gulf of Mexico during this period (May through November), fishermen may turn to those areas rather than move out of the Gulf and into the Atlantic. In addition, NMFS recognized that Vietnamese fishermen are reluctant to fish outside of the Gulf of Mexico, especially for a small time/area closure. Such limited redistribution of effort was not appropriate for other closures in the Gulf of Mexico based on their size and temporal duration.

However, NMFS further analyzed fleet mobility in the current rulemaking by examining logbook data from 2001 – 2004 (this included only the first six months of 2004 to include only J-hook data) to determine the amount of movement of vessels along the Atlantic coast and in the Gulf of Mexico. The data indicated that there was movement of vessels out of the Gulf of Mexico, and that vessels sometimes fished as far away as the central Atlantic. Similarly, in the Atlantic, there were vessels that fished in areas far from their homeports, although movement from the Atlantic into the Gulf of Mexico was minimal. Additionally, there were no physical differences in terms of length or horsepower between vessels that fished inside or outside the Gulf of Mexico. Thus, NMFS concluded that HMS vessels continue to be highly mobile, are capable of fishing in areas distant from their homeports, and that the closure analyses would need to take into account the potential for redistribution of fishing effort, particularly for a potentially large closure such as B2(c) in the Gulf of Mexico. Based on this additional analysis of fleet mobility, NMFS considered different scenarios of redistributed of effort for alternatives B2(a), B2(b), and B2(c), where each scenario had different assumptions regarding where effort would be redistributed based on the current fleet's movement. However, NMFS recognizes that the cost of fuel and other supplies may limit the movement of the pelagic fleet.

Comment 24: NMFS received comments regarding the redistribution of fishing effort model used to analyze the time/area closure alternatives. Comments included: Does the model assume random distribution to other fishing grounds?; how does the redistribution of effort model result in more bycatch?; how does the redistribution of effort model work with circle hooks?; the model is based on discard rates, which implies some mortality.

Response: NMFS considered a broad range of time/area closure alternatives that estimated potential bycatch with and without redistribution of fishing effort. Considering the impacts of closures with and without redistribution of effort provides NMFS with the potential range for which changes in catch could occur as a result of the closure(s). One end of the range assumes that all fishing effort within a given closed area would be eliminated (*i.e.*, fishermen who fished in the closed area would stop fishing for the duration of the closure). Thus, the number and percent reduction in catch of both non-target and target species in these analyses represents the highest possible expected reduction. This would also represent the greatest negative social and economic impact that is anticipated for the industry. The other end of the spectrum assumes that all fishing effort in a closed area would be distributed to open areas (*i.e.*, fishermen would continue fishing in surrounding open areas, move their business, or sell their permits).

Rather than random redistribution, the full redistribution model calculates resulting catch of target and non-target species by multiplying the effort that is being redistributed due to the closure by the CPUE for each species in all remaining open areas. This amount is then subtracted from the estimated reduction inside the closed area (for a complete description of the methodology used for redistribution of effort, please see Appendix A of the Final HMS FMP.) This end of the continuum would be expected to provide the least amount of bycatch reduction for a given closure, depending on the CPUE of each species in all remaining open areas. Often times, this model provides mixed results regarding the ecological, economic, and social impacts because HMS and protected species are not uniformly distributed throughout the ocean and tend to occur in higher concentrations in certain areas. Therefore, a closure in one area might reduce the bycatch of one or two species, but may increase bycatch of others. An increase in bycatch for a particular species occurs if that species is more abundant or more frequently caught (*i.e.*, higher CPUE) in areas outside of the closed area. For example, the analyses indicate that a closure in the central Gulf of Mexico could reduce BFT and leatherback sea turtle discards because CPUE for those species is higher in the Gulf of Mexico than along the eastern seaboard. However, such a closure result in an increase in sailfish, spearfish, and large coastal shark discards because the CPUE for those species is higher outside the Gulf of Mexico. In reality, the actual result is expected to be between the results obtained from these two different considerations of redistributed effort. In addition, NMFS combined dead and live discards in these analyses, so mortality is accounted for in terms of discards. Given the number of species that NMFS had to consider, there was no single closure or combination of closures that resulted in a reduction of bycatch of all species considered. The data analyzed in the Draft FMP (2001 – 2003) and additional analyses in the Final FMP (2001 – 2004, including the first six months of 2004 only) did not include circle hook data. The implementation of the circle hook requirement in June 2004 resulted in a change to the baseline. NMFS needs to fully analyze the circle hook data to determine the extent of bycatch reduction and the effects of post-release mortality resulting from this new gear requirement.

<u>Comment 25</u>: How is NMFS going to address the peer review comments that found fault with the effort redistribution model?

<u>Response</u>: Not all of the peer reviewers found fault with the redistribution of effort analysis. For example, one peer reviewer made the following comment:

The time area closure model is based on generally accepted principles in fisheries science. In general such models rely on a set of assumptions related to static patterns of relative abundance at some temporal and spatial resolution, limited consideration of fish movements, and incomplete understanding of the effects of closure areas on redistribution of fishing effort. Nonetheless, such models can provide useful insights for comparisons of alternative management strategies. This is the approach taken within this Draft EIS. Twelve combinations of seasonal and spatial closures are evaluated in Section 4.1.2. Without such a model there would be no pragmatic way of comparing the proposed closed areas. In general it is probably safe to assume that the limitations of the model will be comparable across alternatives. Thus the rankings of each alternative should be relatively insensitive to the assumptions.

However, in response to another peer reviewer's comment that NMFS test assumptions and consider other plausible alternatives to the random effort redistribution model, NMFS evaluated different scenarios of redistributed effort that had different assumptions regarding where effort would be redistributed in the Final FMP, including redistribution of effort in the Gulf of Mexico only for closures in the Gulf of Mexico, redistribution of effort in the Atlantic only for a closure in the Atlantic, and redistribution of effort in the Gulf of Mexico and the Atlantic for closures in the Gulf of Mexico. These scenarios were based on an analysis of the movement of fishing effort out of the Gulf and into the Atlantic. In order to perform this last analysis, NMFS examined logbooks from 2001 – 2004 and tracked the movement of vessels out of the Gulf of Mexico into different areas of the Atlantic. By examining the movement of effort between the Gulf of Mexico and the Atlantic, NMFS was able to modify the existing full redistribution of effort model and apply different proportions of effort to the average CPUEs of species in the different areas. Using these additional analyses, NMFS could ask different questions about the assumptions of the existing model (*e.g.*, should all fishing effort from a closed area be distributed to all open areas or redistributed only within remaining open areas of the Gulf of Mexico?).

Comment 26: The random redistribution of effort model weighs nearby and distant areas equally. This may artificially emphasize distant areas where bycatch rates are higher, and may result in unlikely assumptions about how the effort will shift. This model suggests that Gulf of Mexico vessels are mobile and might fish as far away as Florida but does not suggest that effort is distributed randomly or that significant effort would be displaced to the Northeast. To close or not close an area based on random redistribution of effort is not reasonable. We are concerned about the model given the fact that the data clearly show where concentrations of marlin are caught.

Response: As described above, the method used to calculate redistribution of effort and the resulting catch of target and non-target species is to multiply the effort that is being redistributed by the average catch rate (CPUE) for each species in all remaining open areas, and subtract it from the estimated reduction inside the closed area (for a complete description of the methodology used for redistribution of effort, please see Appendix A of the Final FMP.) In some cases, depending upon the average CPUE in open areas, this approach may emphasize distant areas where bycatch rates may be higher. However, in other cases, low bycatch rates in distant areas would not be a factor. For example, a small closure such as B2(a) in the central Gulf of Mexico might result in fishing effort being displaced into areas immediately adjacent to and surrounding the closed area. NMFS tried to take this into account by analyzing redistribution of effort only in the Gulf of Mexico for alternative B2(a). For larger closures in the Gulf of Mexico such as alternative B2(c), NMFS considered redistribution of effort in the Gulf of Mexico and Atlantic based on known movement of fishing vessels and effort into areas of the Atlantic. Finally, for a closure such as B2(b) located in the Atlantic, NMFS considered redistribution of effort in open areas of the Atlantic only. In all cases, NMFS considered the results of both no redistribution of effort and the full redistribution of effort model and assumed that the actual result of the closure would be somewhere between the results of the two scenarios.

Comment 27: NMFS needs a probabilistic model for effort redistribution that considers things such as the history of effort.

Response: NMFS is aware of other models that have investigated redistribution of effort as a result of time/area closures (*i.e.*, random utility models (RUMs) used for the Hawaiian PLL fishery, and a closed area model used by the New England Fishery Management Council (NEFMC) to evaluate closures for the groundfish fishery). These types of models are econometric models, which predict where fishermen will reallocate effort based on maximizing revenues and/or profits. However, these models were not designed to be used for the current HMS PLL fishery, and in order for either framework to be applicable to a time/area analysis for the Atlantic HMS PLL fishery, NMFS would have to develop a specific model for the PLL fleet based the current economics, fishing grounds, and fishing effort of the Atlantic HMS PLL fleet. Development of such a model would require considerable additional investment, time, and effort. At present, NMFS has not developed a probabilistic model that considers the history of effort or other complicating factors (*i.e.*, trip costs, revenues or profits). Prior to developing such a model, NMFS would need to consider the limitations of the Agency, both financially and logistically, to build such a model and the approach the Agency should take. For example, despite the fairly straightforward model used in this rulemaking and previous time/area rulemakings, to calculate redistribution of fishing effort, many commenters found the procedure confusing or misunderstood the approach and results. This confusion could become even worse if a more complicated model were used. Some models require substantial capital investment for the Agency, years to develop, and years of testing before they can be used. Nevertheless, NMFS sees the benefits to improving the models used to analyze the impacts of time/area closures and is considering different options.

Comment 28: NMFS has applied the redistribution model beyond its usefulness because the model does not describe where the vessels are likely to go. NMFS places an overemphasis on the dangers of redistribution of effort instead of making balanced recommendations based on both the lower and upper estimates of the model.

Response: NMFS disagrees that the redistribution model has been applied beyond its usefulness. It is highly unlikely that NMFS could develop a perfect model that accurately predicts fishing behavior. The redistribution of effort model is useful in providing one end of a range of potential outcomes resulting from new closures. NMFS does not overemphasize the dangers of redistribution of effort, but rather considers it likely that fishing effort may be displaced into open areas and that there may be some increase in bycatch as a result. This is not highly speculative, but rather based on quantitative assessments of fishing effort, bycatch rates, and resulting ecological impacts. For instance, there was an increase in fishing effort in the open areas in the Gulf of Mexico after the implementation of the existing closures, which suggests that fishing effort will be displaced to other areas. Furthermore, NMFS does not believe that fishing effort that occurred historically within an area would be completely eliminated with a new closure.

Comment 29: NMFS received comments regarding effort shifts in the Gulf of Mexico including: effort shifts have not occurred in the Gulf of Mexico as predicted for other species; vessels may be offloading in different ports but still in the Gulf of Mexico; and the assumption that vessels would move out of the Gulf of Mexico and catch BFT, particularly spawning western BFT, is unlikely.

Response: While there has been an overall decrease in fishing effort since implementation of the closures in 2000 – 2001, NMFS has seen evidence of an increase in effort in the Gulf of Mexico during 2001 – 2004, possibly as a result of the East Florida Coast closure implemented in 2001, which forced fishermen who originally fished in the east coast of Florida into the Gulf of Mexico. The difference between closures implemented in 2000 and the closures being considered in this FMP is that many of the areas of high bycatch were targeted for closures in 2000 and remain closed today. NMFS is now analyzing an additional series of closures that may not produce the same tangible results that occurred after the first round of closures. Additionally, as the areas open to fishermen become more restricted, fishing effort will tend to become more and more concentrated in smaller and smaller areas where even low bycatch rates may result in increases in bycatch due to the high effort levels. Some of the closures considered in this rulemaking such as alternatives B2(c) and B2(d) would close very large portions of the Gulf of Mexico where approximately 90 percent of the historic fishing effort in the Gulf has occurred. Closing such a large area in the Gulf of Mexico would be unprecedented, and predicting the outcome would likewise be difficult. It should be noted that while the NED closure was just as large as some of the closures proposed in this rulemaking, the closures proposed in this rulemaking are closer to land and more accessible to vessels. However, NMFS disagrees with the comment that vessels would be unlikely to move out of the Gulf of Mexico in response to such an unprecedented large closure. The analyses indicate that fishermen currently homeported in the Gulf of Mexico move out of the Gulf of Mexico into the Atlantic even without the added incentive of a closure. Even in the highly unlikely event that fishermen did not move out of the Gulf of Mexico in response to a closure, the economic impact could force them to sell their permits to fishermen in the Atlantic, thereby increasing fishing effort in those areas. The redistribution of effort analysis in the FMP would take this into account.

Comment 30: NMFS received many comments regarding where effort would be redistributed including: the model fails to consider redistribution of effort from one fishing gear to another (*e.g.*, longline to gillnet); the model inappropriately predicts spatially heterogeneous increases in regional fishing effort and bycatch; NMFS should acknowledge the limitations of the model when selecting the final alternatives and base predictions about redistribution of effort on credible, transparent sources and peer-reviewed literature or on comparisons to the outcomes of previous time/area closures; and NMFS initially argued that there would not be a displacement of effort if closures were implemented, but now is arguing the opposite.

Response: While the redistribution of effort model does not explicitly take into account the potential for fishermen to shift from one gear to another, NMFS has discussed a number of unintended consequences that could result from new closures, including fishermen selling their permits, moving to other areas, and possibly switching gears to target other species. However, given the limited access restrictions of permits for other fisheries, NMFS predicts that it would be difficult for fishermen to switch to a different gear and different fisheries unless they currently possess other permits. NMFS continues to acknowledge the limitations of the redistribution of effort model, and has made an attempt to consider and analyze other plausible alternatives to the current redistribution scenario. NMFS considered both the redistribution of effort model and results from considering no redistribution of effort since the first closure for HMS fishermen was implemented in 1999. In none of the rules that implemented time/area closures did NMFS argue that there would be no displacement of effort. To the contrary, NMFS has consistently taken both scenarios into account when considering new or additional closures.

Data Concerns

Comment 31: Does the recent article in the journal "Nature" regarding BFT spawning, which indicated that discards are being underestimated, affect NMFS assumptions about the benefits (and costs) of the proposed time/area closures? Does NMFS have any data indicating that bycatch rates are significantly lower than those recorded by the scientific observers?

Response: NMFS is aware that discards may be underreported in the HMS logbook data compared to the POP data. However, NMFS tested to see if there were any differences in underreporting for different species between different regions. If no differences in underreporting occurred between regions, then the relative effect of each closure on bycatch reduction for each species should be comparable across alternatives. Cramer (2000) compared dead discards from HMS logbook and POP data. In her paper, Cramer used POP data to estimate dead discards of undersized swordfish, sailfish, white and blue marlin, and pelagic sharks from the PLL fishery operating in the U.S. Atlantic, Caribbean, and Gulf of Mexico. She also provided the ratio of catch estimated from the POP data divided by the reported catch in the HMS logbooks. This ratio indicates the amount of underreporting for different species in a given area. NMFS analyzed these ratios to test whether underreporting varied for different species in different parts of the Atlantic, Caribbean, and Gulf of Mexico. NMFS found that there was no statistical difference in the ratio of estimated catch versus reported catch for undersized swordfish, pelagic sharks, sailfish, or white or blue marlin in the Atlantic, Caribbean, or Gulf of Mexico. Based on the available information, NMFS believes HMS logbooks may underestimate the amount of bycatch, however, the relative effect of each closure for each species should be comparable across alternatives. While the data used in the Cramer (2000) study represented an earlier time period (1997 – 1998) compared to the 2001 – 2003 data used here, it gives some indication that the use of HMS logbook data over POP data should not invalidate or bias the results of the time/area analyses. NMFS will continue to investigate potential differences in reporting between HMS logbook and POP data for all discarded species as well as potential biases in reporting between geographical areas for different species.

Comment 32: NMFS should use the observed sea turtle CPUE by season for each region and multiply it by the amount of effort anticipated to return to that particular area in order to obtain a more accurate assessment of changes to sea turtle bycatch.

Response: NMFS chose to use HMS logbook data for all the analyses to maintain consistency among the alternatives and species. If NMFS were to have used the POP data for all of the species, NMFS would have had to calculate extrapolated takes for all the species considered. This extrapolation would have introduced more assumptions and uncertainty than using HMS logbook data to analyze the potential impacts of time/area closures. As mentioned in the response to Comment 31, NMFS found that HMS logbooks may underestimate the amount of bycatch, however, the relative effect of each closure for each species should be comparable across alternatives. The analyses conducted in this rulemaking (and described in the response to Comment 31) give some indication that the use of HMS logbook data over POP data should not invalidate or bias the results of the time/area analyses. NMFS will continue to investigate potential differences in reporting between HMS logbook and POP data for all discarded species.

Comment 33: How did NMFS conduct the overlap analysis comparing effects of bycatch on BFT, marlin, and sea turtles?

Response: NMFS analyzed the distribution of white marlin, BFT, leatherback and loggerhead sea turtles, as well as a number of other species from the 2001 – 2003 HMS logbook and POP data using GIS. Data for each of the species were mapped and compared spatially to one another in order to select the areas of highest concentration of bycatch. The areas of highest concentrations of bycatch for all species were then selected for further analysis. NMFS provided maps of bycatch for individual species in the Draft HMS FMP, and has provided a map showing the overlap of BFT, white marlin, and sea turtles in the Final HMS FMP. NMFS combined the bycatch data from the HMS logbook for BFT, white marlin, and sea turtles into one combined dataset, and then joined them to a 10 x 10 minute grid (which is equivalent to approximately 100 nm^2) to get the number of discards for all species combined per 100 nm^2. A color scale is included to show the number of observations per 100 nm^2. The maps show the areas of highest bycatch for the three species combined. Monthly interactions for the different species (*i.e.*, temporal variability) were considered in the redistribution of effort analyses.

Comment 34: NMFS should consider increasing observer coverage throughout the longline fleet to document unintended bycatch.

Response: NMFS' target for PLL observer coverage is eight percent. This is based on the recommendation from the National Bycatch Report that found coverage of eight percent would yield statistical analyses of protected resources that would result in coefficient of variance estimates that were below 30 percent.

Comment 35: Available evidence suggests that leatherbacks, loggerheads, and BFT may share similar hot spots in the Gulf of Mexico, thus closures could be beneficial to all species – despite the opposite conclusion in the Draft HMS FMP.

Response: Pelagic logbook data also showed areas in the Gulf of Mexico where leatherbacks, loggerheads and BFT have been present. NMFS considered closures in the Gulf of Mexico for white marlin, blue marlin, sailfish, spearfish, leatherback sea turtles, loggerhead sea turtles, other sea turtles, pelagic and large coastal sharks, swordfish, BFT, bigeye, albacore, yellowfin, and skipjack tunas (BAYS). However, no single closure or combination of closures would reduce the bycatch of all species considered, and in certain cases resulted in increases of bycatch for some species with the consideration of redistribution of effort.

Pelagic longline

Comment 36: NMFS received several comments regarding alternative B7, the prohibition of PLL gear. These comments included: we oppose any rule that would allow the further use or experimentation of such gear, and support alternative B7, prohibit the use of PLL gear in HMS fisheries and areas (this alternative would save the fishery if buoy gear was also prohibited);

NMFS needs to look at data prior to the introduction of PLL gear in relation to the decline of billfish; and this should be about the gear, not the fishermen - PLL gear does not work.

Response: NMFS has not preferred alternative B7 at this time because while prohibiting the use of PLL gear would eliminate bycatch associated with that gear, it would also eliminate retained catch of swordfish and tuna. Elimination of this retained catch would result in substantial negative social and economic impacts. Under ATCA, the United States cannot implement measures that have the effect of raising or lowering quotas, although NMFS has the ability to change the allocation of that quota among different user groups. The swordfish fishery is confined, by regulation, to three gear types: harpoon, longline, and handlines. Under preferred alternative H5, the commercial swordfish fishery would also be authorized to use buoy gear. Since it is unlikely that the handgear sector would be able to catch the quota given the size distribution of the stock, prohibiting longline gear may reduce the ability of U.S. fishermen to harvest the full quota. It may also have the effect of reducing traditional participation in the swordfish fishery by U.S. vessels relative to the foreign competitors because the United States would harvest a vastly reduced proportion of the overall quota.

In addition, any ecological benefits may be lost if ICCAT reallocates U.S. quota to other countries that may not implement comparable bycatch reduction measures as the United States. The PLL fishery has undergone many management measures to reduce bycatch including circle hooks implementation, live bait restrictions in the Gulf of Mexico, no targeted catch of billfish and BFT, time/area closures, and safe handling and release protocols for protected resources. These restrictions have been successful. Methods that have been employed and designed by U.S. PLL fishermen, such as circle hooks and safe handling and release protocols for protected resources, are being transferred around the world to reduce bycatch world-wide. Therefore, this alternative could ultimately provide support for the fisheries of other countries that do not implement or research conservation and bycatch reduction measures to the same extent that the United States does.

Comment 37: NMFS needs to consider the adverse economic impact of existing time/area closures on the commercial longline fishery. The PLL fleet was reduced to approximately 88 vessels due to existing restrictions. The current high cost of fuel is severely impacting the PLL fleet, and recent hurricanes may have further reduced the fleet.

Response: NMFS evaluated the effect of current time/area closures on the PLL fleet in the No Action alternative, B1. While the closures have had a positive impact on bycatch, they have also had a negative impact on retained species landings. For example, from 1997 to 2003, the number of swordfish kept declined by nearly 28 percent, the number of yellowfin tuna kept declined by 23.5 percent, and the total number of BAYS kept (including yellowfin tuna) declined by 25.1 percent. Overall effort in the Atlantic PLL fishery, based on reported number of hooks set, declined by 15 percent during the pre- to post-closure period. NMFS acknowledges that one reason for this decline may be that fishermen left the fishery as a result of time/area closures. In addition, NMFS realizes that other factors, which are out of NMFS' control, such as hurricanes and fuel prices, have negatively impacted the PLL fishery. This is one reason why NMFS is not preferring any new time/area closures, except for Madison-Swanson and Steamboat Lumps, at this time. Rather, NMFS intends to continue to estimate the current fishing effort and potential recovery of the PLL fleet while also considering protected species and other takes.

Comment 38: Why is NMFS considering additional closures for the PLL fishery when analyses indicate that the original goals of the closures have been met or exceeded? NMFS does not react this way for the BFT fishery. NMFS protects spawning or pre-adult swordfish, exceeding the ICCAT standards, yet promotes full utilization of the BFT angling quota. NMFS must realize that the PLL fishery is not always the highest contributor to mortality, and that other fisheries continue to hide behind their lack of data. NMFS should show recreational data and analyze closures for other gears. The issue is fishing mortality, regardless of where it comes from. NMFS must consider all forms of fishing mortality including post release mortality from catch and release fishing.

Response: As part of its annual review process, NMFS evaluates the effectiveness of existing time/area closures. Analysis of the change in effort and bycatch after implementation of existing closures indicates that reduction in bycatch may have been greater than predicted with redistribution of effort, and in some cases, without redistribution of effort. There are several possible explanations for the higher than predicted decline in bycatch and effort resulting from time/area closures that may have ecological impacts as well as economic repercussions on fishing behavior and the PLL fishing industry: (1) stocks may be declining; (2) time/area closures may have acted synergistically with declining stocks to produce greater declines in catch than predicted; (3) fishermen may have left the fishery; and (4) fishing effort may have been displaced into areas with lower CPUEs. With regard to the last point, the redistribution of effort model is incapable of making predictions based on a declining CPUE. Instead, the model assumes a current CPUE that remains constant in the remaining open areas when estimating reductions. Modifications to the existing closures such as alternatives B3(a) and B3(b) were also considered as ways to refine existing closures so as to provide additional opportunity to harvest legal-sized swordfish while not increasing bycatch. NMFS, however, is currently not preferring any modifications to the current closures for the reasons discussed in response to Comment 15. NMFS agrees that all sources of fishing mortality should be considered in evaluating new and existing management measures. For this reason, circle hooks would be required with natural baits in all billfish tournaments (preferred alternative, E3). Estimated mortality contributions of the domestic PLL and recreational sectors toward Atlantic white marlin can be seen in Appendix C of the Consolidated HMS FMP. NMFS will consider additional information on post release mortality as it becomes available.

Comment 39: NMFS must consider safety. Overly restrictive closed areas force small vessels to stretch beyond their offshore capabilities.

Response: NMFS agrees that safety concerns should be considered when developing any new management measures, consistent with National Standard 10. After carefully reviewing the results of all the different time/areas closures analyses, and in consideration of the many significant factors that have recently affected the domestic PLL fleet, NMFS has decided, at this time, not to prefer any new closures, except the complementary measures in the Madison-Swanson and Steamboat Lumps Marine Reserves. This decision is based primarily upon the analyses indicating that no single closure or combination of closures would reduce the bycatch of all species when the redistribution of effort was considered. Furthermore, the economic impacts of each of the alternatives may be substantial, ranging in losses of up to several million dollars annually, depending upon the alternative, and displacement of a significant number of fishing vessels.

Bottom Longline

Comment 40: We support the prohibition of bottom longline gear in the southwest of Key West to protect smalltooth sawfish (alternative B6). This alternative can provide a head-start in reducing sawfish bycatch during the lengthy process of review and implementation of the Smalltooth Sawfish Recovery Plan (SSRP). NMFS should coordinate closely with the Panama City Laboratory and Mote Marine Laboratory to ensure full funding of their proposed research into sawfish critical habitat and act promptly on their recommendations regarding additional time/area closures for the species.

Response: The alternative to close an area off of Key West relied upon a limited amount of Commercial Shark Fishery Observer Program (CSFOP) data, thus making it difficult to determine whether the area being considered would result in overall reduction in interactions, or whether sawfish exhibit a higher degree of mobility, and are as likely to be caught in other areas. Recent information indicates that additional sawfish interactions have occurred outside the proposed area, thus necessitating further review of the most appropriate location for a potential closure. In addition, the Smalltooth Sawfish Recovery team is currently in the process of identifying sawfish critical habitat, which may be helpful in determining an appropriate closure area in the future. NMFS supports this and other efforts to further delineate critical habitat for this endangered species.

Comment 41: NMFS received several comments regarding the bottom longline closed area off North Carolina including: NMFS should comprehensively examine and assess the effectiveness of closures and have the confidence that alterations would not reduce protection for dusky and sandbar sharks; I recommend removing the NC BLL closure and re-analyzing the impacts in the same manner as was done for this document. Displacement was not considered for that closure; and NMFS should change the NC closed area to only be closed out to 15 fathoms maximum depth, and change the time to begin April and continue until July 31 each year. These changes protect juvenile sandbar sharks, keep protections in place for the peak "pupping season," and balance the needs of the directed shark fishermen whose economic livelihood has been hurt by the Amendment 1 measures.

Response: The bottom longline closed area off North Carolina was implemented in Amendment 1 to the FMP in December 2003, and became effective on January 1, 2005. The time/area closure has only been in place for one complete management period from January 1 to July 31, 2005 (January 1, 2006, marked the start of the second year for the closure). The final, quality controlled 2005 logbook data will become available in early summer 2006, and NMFS will evaluate the impacts of the first period of this closure once this data is available. Otherwise, NMFS does not have any other new information to support removal or modification of the closure to include only those areas inside 15 fathoms along the North Carolina coast. Furthermore, NMFS does not have any data to support the assertion that such a modification or removal of the closure would attain the management goal of protecting prohibited dusky and sandbar sharks. NMFS will consider new information, such as the results of the LCS stock assessment and the newly completed dusky shark stock assessments, to determine whether changes to the time/area closure are appropriate. In addition, NMFS will continue to monitor changes to shark regulations by coastal states and will continue to work with the Atlantic States Marine Fisheries Commission (ASMFC) to develop an interstate shark plan, which may warrant a review of existing Federal regulations and consideration of further changes to the time/area closure. NMFS considered redistribution of fishing effort for the time/area closure off North Carolina in Amendment 1. The redistribution of fishing effort analysis indicated that, despite an increase in fishing effort outside the time/area closure, the overall catch of juvenile sandbar and dusky sharks would be reduced by the time/area closure. The analysis showed that the number of juvenile sandbar and prohibited dusky sharks outside the time/area closure was low compared to the number being caught inside the time/area closure.

Hook Types

Comment 42: NMFS received several comments regarding hook types and time/area closures, including: the time/area closure analyses are based on J-hook data, which the Agency has admitted is obsolete. The analyses do not take into account new CPUE or PRM rates based on circle hooks; the impact of the area closures will be larger than predicted because the PLL industry is already using circle hooks; all of NMFS analyses are based on J-hook data and a much larger fleet. Bycatch and bycatch mortality will be further reduced due to the exclusive use of circle hooks in the PLL fishery; NMFS should consider banning all J-hooks and live bait fishing in all areas that are currently closed to PLL fishing.

Response: NMFS used the best scientific information available to analyze the various time/area closure alternatives. Circle hooks were not required in the PLL fishery until July 2004, and all of the data used in the time/area analyses were based on J-hook data. The approach NMFS will take regarding the evaluation of the effects of circle hooks is discussed in the response to Comment 2. An important component of the rationale supporting the Agency's decision not to prefer new time/area closures (notwithstanding Madison-Swanson and Steamboat Lumps) is based upon absence of information regarding the effects of circle hooks on bycatch rates in the PLL fishery.

Similarly, there is an absence of information to analyze the effects of a ban on all J-hooks and live bait fishing in areas that are currently closed to PLL fishing. Some studies are available documenting the effects of circle hooks on certain species (*i.e.*, white marlin), and NMFS is preferring specific, targeted hook requirements in these fisheries to reduce bycatch mortality. However, the effect of circle hooks on other HMS species (*i.e.*, swordfish and sharks) and fisheries is largely unknown. As additional information becomes available, NMFS will assess the need to require circle hooks or to prohibit live bait in other HMS fisheries in areas that are closed to PLL fishing.

General Time/Area Comments

Comment 43: NMFS chose to combine some of the closures in the analyses. How were those areas chosen?

Response: NMFS analyzed the combination of areas that had the highest bycatch of certain species in the Gulf of Mexico and the Atlantic to maximize potential bycatch reduction, and to take into account high bycatch for the same species in different areas as described in response to Comment 33. For example, there is high bycatch for BFT in both the Gulf of Mexico and in areas of the Northeast. By combining these two areas, NMFS took into account the fact that, if effort were redistributed, it would not be redistributed into the areas of highest bycatch in a different geographic region.

Comment 44: What is the new process for establishing/modifying closures?

Response: NMFS is not implementing a new process for establishing or modifying HMS time/area closures. Rather, the Agency would identify specific criteria to consider for regulatory framework adjustments to implement new time/area closures or to modify existing time/area closures in the future. These criteria, or combinations of them, have always been considered in establishing time/area closures. The preferred alternative, however, should provide for greater transparency and predictability in the decision making process by clarifying exactly what the Agency is looking for or considering during its analyses. The same criteria would be used for both establishing new closures and modifying existing closures. The preferred alternative to establish criteria to consider would not change the ability of the public to submit a petition for rulemaking to NMFS if they believe that modification to an existing time/area closure or the establishment of a new time/area closure is warranted.

Comment 45: The proposed time/area closure alternatives do not achieve the conservation objectives of the FMP.

Response: NMFS disagrees. There are many objectives in the HMS FMP. All of the objectives must be balanced and considered in their entirety and in consideration of the Magnuson-Stevens Act and other domestic laws when implementing management measures. Some of the objectives are especially relevant to this particular comment. The first objective is to prevent or end overfishing of Atlantic tunas, swordfish, billfish and sharks and adopt the precautionary approach to fishery management. The second objective is to rebuild overfished Atlantic HMS stocks and monitor and control all components of fishing mortality, both directed and incidental, so as to ensure the long-term sustainability of the stocks and promote Atlantic-wide stock recovery to the level where MSY can be supported on a continuing basis. The third objective is to minimize, to the extent practicable, bycatch of living marine resources and the mortality of such bycatch that cannot be avoided in the fisheries for Atlantic HMS or other species, as well as release mortality in the directed billfish fishery. Finally, another objective that is relevant to this comment indicates that NMFS should minimize, to the extent practicable, adverse social and economic impacts on fishing communities and recreational and commercial activities during the transition from overfished fisheries to healthy ones, consistent with ensuring achievement of the other objectives of this plan and with all applicable laws. These objectives clearly indicate that the biological impacts on all HMS species must be considered, as well as the bycatch of all other living marine resources. In addition, NMFS must minimize, to the extent practicable, adverse social and economic impacts on fishing communities and fisheries, while remaining consistent with the other objectives. In selecting the preferred time/area closure alternatives, NMFS has accomplished these objectives.

In this rulemaking, NMFS does not prefer any new closures, except for complementary measures in the Madison-Swanson and Steamboat Lumps Marine Reserves. This decision is based primarily upon the analyses described in the Final HMS FMP indicating that no single closure or combination of closures would reduce the bycatch of all species when considering redistribution of effort. Furthermore, the economic impacts associated with each of the new closure alternatives may be substantial, ranging in losses of up to several million dollars annually, depending upon the alternative, and could result in the displacement of a significant number of fishing vessels. Even when the time/area closure alternatives were combined in an attempt to maximize bycatch reduction, the ecological benefits were minimal at best, with increases in discards of some species. NMFS considered a number of closures based upon analyses with and without the redistribution of fishing effort. The Agency believes it is important to consider redistribution of fishing effort because HMS and protected species are not uniformly distributed throughout the ocean, and they tend to occur in higher concentrations in certain areas. Fishing vessels, which are mobile, can move from one location to another, if necessary, when a closure is implemented. Therefore, a closure in one area might reduce the bycatch of one or two species, but may increase the bycatch of others. NMFS additionally considered alternative approaches to effort redistribution for closures to protect BFT in spawning areas in the Gulf of Mexico. Even using this revised approach, which is described in the Final HMS FMP, it was found that closures in the Gulf of Mexico could still result in an increase in bycatch for some of the species being considered. Based upon these results, and in consideration of other recent significant developments in the PLL fishery (mandatory circle hooks, rising fuel costs, devastating hurricanes, etc.), NMFS believes that not preferring new time/area closures is appropriate and is fully consistent with the objectives of the Consolidated HMS FMP and all applicable law.

Comment 46: If species identification is questionable how can the impacts of closures be analyzed?

Response: NMFS agrees that species identification can be problematic when it comes to large coastal sharks, especially at the dealer level. However, this should not be a problem for evaluating the potential impacts of various time/area closures as large coastal sharks were combined into a single group for the analyses. Identification of other species which achieve legal minimum sizes may be less problematic. Nevertheless, NMFS has used the best available scientific data in this analysis as required by law.

Comment 47: NMFS must consider the turtle take and gear removal data from the first two years of the pelagic longline fishery's three-year ITS. Pursuant to the BiOp, annual take estimates based on POP and effort data are required to be completed by March 15th of each year. Additionally, NMFS should take this opportunity to provide a framework to take corrective actions as recommended by the BiOp

Response: NMFS agrees that changes may have occurred in the PLL fishery since implementation of the circle hook requirement and safe handling and release guidelines in July 2004. Fishery data collected in 2005 will represent the first full year under these requirements. NMFS will continue to evaluate the effectiveness of existing management measures based on current fishing practices. NMFS currently only has finalized logbook data on the catch associated with circle hooks from July through December of 2004. Because circle hooks likely have a significantly different catch rate than J-hooks, further investigation is required to determine the potential impact of any new time/area closures. NMFS anticipates that 2005 HMS final logbook data will become available in the summer of 2006. The Agency will continue to monitor and analyze the effect of circle hooks on catch rates and bycatch reduction as well as assess the cumulative affect of current time/area closures and circle hooks. NMFS has also completed its annual take estimates of sea turtles for both 2004 and 2005 and both loggerhead and leatherback interactions have decreased substantially. During 2005, the first full year under the circle hook requirement, a total of 282 loggerhead and 368 leatherback sea turtles were estimated to have been taken. This represents decreases of 64.8 and 65.8 percent compared to the annual mean for 2000 – 2003 for loggerheads and leatherbacks, respectively. In regard to the framework mechanism recommended by the BiOp, NMFS requested comments on this mechanism and other ways to reduce unanticipated increases in sea turtle takes by the PLL fishery (August 12, 2004, 69 FR 49858). NMFS is considering the comments received and notes that the preferred alternative to establish criteria is a step towards allowing for such proactive measures.

D.2 Rebuilding and Preventing Overfishing

D.2.1 Northern Albacore Tuna

Comment 1: NMFS received comments opposed to alternative C2, unilateral reduction in albacore fishing mortality, which indicated such restrictions would only create unnecessary waste and discards. Commenters remarked that the U.S. only weakens its negotiating position by taking unilateral steps prior to ICCAT action. Even prohibiting retention of albacore by all U.S. vessels would have negligible conservation effects. Some commenters stated that the U. S. should go forward ahead of ICCAT and not negotiate our position.

Response: NMFS recognizes the costs associated with imposing restrictions on albacore tuna landings for U. S. fisheries, and at the present time believes that the costs are greater than potential ecological benefits the northern albacore stock as a whole. Restrictions that affect U.S. fishermen solely are not expected to be of significant ecological value to the Atlantic albacore stocks as a whole, as U.S. albacore landings account for less than two percent of the international landings. Furthermore, albacore stock assessment data has been updated but not re-evaluated since 2000. It would not be consistent with ATCA to impose fishing restrictions on this stock in the absence of current data supporting such an action. The Agency therefore prefers to move forward with alternative C3, which would allow the U.S. to build a foundation with ICCAT contracted parties to develop a comprehensive management plan for albacore.

Comment 2: NMFS received comments in opposition to the preferred alternative, including: “the Gulf of Mexico Fishery Management Council is concerned that regulations to rebuild the northern albacore could impact other Gulf fisheries and recommends that no action be taken in the Gulf as part of the United States foundation for the ICCAT rebuilding program, since there is not a substantial albacore catch in the Gulf”; I am leery about any regulations relating to albacore since albacore is an important fishery in Aug-Sept off Long Island; NMFS should set a bag limit of three albacore per person and a minimum size of 27 inches curved fork length now, and perhaps enact a seasonal catch limit as well.

Response: As noted by the SCRS in 2003, trends for CPUE of albacore are stable and possibly increasing for the PLL fleet; however, in the absence of more recent stock assessment data, the Agency believes that no action, or moving forward with a unilateral reduction in U.S. fishing mortality are not consistent with ATCA and are therefore inappropriate alternatives at this time. In alternative C2, NMFS considered the ecological, social and economic impacts of unilateral action. Restrictions that affect U.S. fishermen solely, including the implementation of bag and size limits, or catch limits, are not expected to significantly benefit the Atlantic albacore stocks as a whole, as U.S. albacore landings account for less than two percent of the international landings. NMFS prefers to work with ICCAT to develop an international rebuilding plan for albacore. No immediate restrictions will be imposed on fisheries in the Gulf or elsewhere as NMFS develops the appropriate foundation for such a plan as described in alternative C3. Upon adoption of an ICCAT rebuilding plan, domestic management would be developed in separate rulemaking and Gulf regulations options would be considered at that time.

Comment 3: NMFS received support for the preferred alternative, which entails establishing a foundation at ICCAT for developing an international rebuilding program for albacore. These comments included: The management approach for Northern Albacore is favorable and NMFS should apply this approach to many other domestic fisheries; and we support alternative C3, which would actively encourage ICCAT to develop and implement an international rebuilding plan for albacore tuna. While we support an albacore-rebuilding plan, we do not believe that the U.S. should implement reductions on its albacore fishermen. For meaningful and effective rebuilding of albacore to take place, U.S. managers must be willing to put significant pressure on countries with high fishing mortalities; and, EU countries have felt compelled to ban gillnets in this fishery.

Response: To prevent an ineffective approach to management and impose a unilateral economic burden on U.S. fisheries, and to ensure that international efforts are taken to regulate albacore fishing mortality in attempts to provide a sustainable fishery, the Agency plans to work with ICCAT to develop a rebuilding program for albacore. As current international catch rates exceed the levels needed to produce MSY, NMFS believes that international cooperation is essential and would result in long-term positive ecological impacts on the stock.

Comment 4: NMFS received a number of comments in regard to data that is used to determine the U.S. catch and status of Atlantic albacore, including: We are concerned about the use of survey data for the for-hire sectors of this fishery. A study by Loftus and Stone showed that the LPS data was often a significant underestimate of recreational catches of northern albacore tuna, which supports the need for increased recreational data collection; there is a directed fishery for longfin tuna that catches albacore; this fishery is not important to the GOM but it could affect other GOM fisheries. I think it is important to get data straightened out now rather than after the fact; and, we need better recreational data. The draft FMP did not pay adequate attention to data issues, including looking at a census approach rather than sampling. We need to work with ACCSP to create census data with good quality control.

Response: Adequate data collection is an ongoing concern for successful management of Highly Migratory Species. NMFS funds the Large Pelagic Survey (LPS) which is a sampling based catch data collection program for HMS species. In three states, ME, VA, NC, catch-card and tail-wrap tagging programs are part of the LPS which is making an effort to use the census approach to catch data collection. NMFS is working with managers to include data collection for all HMS species, including Atlantic albacore, through the ACCSP program. In addition the Gulf Council has asked the Gulf Commission to look into statistic and census based data collection programs for HMS in the Gulf of Mexico.

Comment 5: NMFS received comments asking to explain what "establish the foundation with ICCAT…" means in terms of a specific plan. One commenter suggested that the plan needed to be fully developed and explained in the proposed FMP.

Response: If the stock is determined to be overfished during the 2007 assessment, the United States would work with ICCAT to develop a comprehensive international rebuilding plan to be adopted by ICCAT, and that would comply with the Magnuson-Stevens Act. Implementation of the selected alternative would include a thorough analysis of the ICCAT Rebuilding Program to ensure that it includes a specified recovery period, biomass targets, fishing mortality rate limits, and explicit interim milestones expressed in terms of measurable improvement of the stock. Each of these components is necessary to support the objectives of this FMP and the intent of the Magnuson-Stevens Act. An Atlantic-wide TAC for northern albacore tuna, along with other conservation and management measures, would be adopted by ICCAT to rebuild the stock. Upon adoption by ICCAT, domestic management and conservation measures for the United States would be developed in a separate rulemaking.

Comment 6: One commenter asked how the 607 mt quota is to be divided between the commercial and recreational fisheries.

Response: Currently, the U.S. does not have domestic quota for recreational albacore catches, nor are there restrictions on the number of albacore that may be landed by commercial vessels issued an Atlantic tuna permit. Allocation of the quota between commercial and recreational fisheries has not been of concern during recent years as the U.S. harvest has been below the quota allocated by ICCAT. During the last eight years (1997 to 2004), an average of 161.4 mt and 311.4 mt of northern albacore were caught on longlines and rod and reel respectively.

Comment 7: NMFS received a comment that a lot of albacore tuna are seen off New York. The commenter wanted to know how it is that NMFS can conclude they are overfished.

Response: During the last 20 years, the spawning stock biomass of albacore has declined significantly, according to the SCRS. The most recent SCRS stock assessment (reviewed in 2004, using catch at age data from 2003 to update the 2000 assessment) for albacore, indicates that the spawning stock biomass is 30 percent below maximum sustainable yield. A new assessment is anticipated in 2007. According to the MSFCMA, a stock is overfished if the level of fishing mortality is greater than the capacity of that fishery to produce the maximum sustainable yield on a continuing basis. The presence of fish therefore, does not necessarily mean that a stock is not overfished. However, NMFS recognizes the seasonal nature of the albacore fisheries and would take this into account in developing management measures as needed.

D.2.2 Finetooth Sharks

Comment 1: NMFS received several comments in support of seasonal commercial gillnet fishing restrictions to reduce finetooth shark fishing mortality, including one from the South Atlantic Fishery Management Council. These comments included: If seasons of high finetooth shark landings can be identified from the observer program, landings, or other data, then we suggest closing the small coastal shark fishery during that season for gillnetters, or having shark fishermen move offshore into deeper waters away from where finetooth sharks are typically found; fishing on these schools during pupping season may have significant biological implications; and, the seasonality of finetooth shark pupping should be investigated to determine whether some finetooth shark bycatch is more biologically significant than others.

Response: Seasonal closures of commercial gillnet fisheries landing finetooth shark were not analyzed as part of alternative D2, however, these closures may be considered in the future, as necessary, to reduce fishing mortality. Closing the small coastal shark fishery would not prevent dead discards, or account for finetooth that are landed in other fisheries such as Spanish mackerel. In the Final Consolidated HMS FMP, trips that landed finetooth sharks between 1999 - 2004, according to the Coastal Fisheries Logbook data, were analyzed by gear and month. These data indicate that the number of trips landing finetooth sharks increases in October and November. This could be attributed to finetooth sharks moving in schools southward from the Carolinas to warmer waters off Florida in these months leading to an increase in finetooth landings. Furthermore, there is an expansion of fishing effort targeting Spanish mackerel as these fish are also moving south to Florida in October and November each year, which might also lead to increased landings during this period.

Commercial shark gillnet fishermen are already subject to stringent regulations during October and November including: prohibitions on fishing in state waters of FL, GA, and SC with gillnets longer than 100', the directed shark gillnet fishery in Federal waters is subject to 100 percent observer coverage and the use of VMS in the vicinity of the Southeast U.S. Restricted Area for north Atlantic right whales between Savannah, GA and Sebastian Inlet, FL; and all gillnet fishermen are prevented from deploying shark gillnets (stretched mesh >5") in the Southeast U.S. Restricted Area between November 15 and March 31 every year. Since most states in the region already have bans on gillnet gear, and seeing that most of the fishing pressure on finetooth sharks occurs after they have already dropped their pups in the coastal waters (2-7 m water depth), it is difficult to use protection during pupping season as a justification for seasonal closures. Fishermen are not able to target finetooth sharks when fishing with gillnets. Any management measures that are solely directed at fishermen using gillnet gear and in possession of a commercial shark permit, could easily be circumvented as gillnets are also an authorized gear for Spanish mackerel or are used by fisheries pursuing currently unregulated species. Furthermore, closures may result in increased fishing effort in other areas or seasons, which could lead to increased dead discards of finetooth sharks.

Comment 2: NMFS received several comments in support of the proposed preferred alternative for finetooth shark management, including: identifying sources of finetooth shark fishing mortality to target appropriate management actions is appropriate; the occurrence of overfishing is a function of data deficiency; I agree with the preferred alternative; we need clarification about the landings information in the SCS assessment; I support the preferred alternative and the stock assessment; I applaud NMFS for taking the approach with the level of uncertainty; NMFS scientists cautioned the reader about conclusions made for finetooth and blacknose shark; ASMFC is trying to address these issues; we need to know which fishery is catching these fish; I know that under the law we are supposed to reduce mortality, but I think that we need more information; we support alternative D4 because it is critical to improve the assessment for finetooth sharks in 2007; NMFS should wait on the updated assessment results for finetooth sharks before attempting a quota reduction on the commercial shark fishermen; the March 2002 SCS assessment did not have bycatch estimates to include with the short catch and catch per unit of effort (CPUE) series, as well as no catch for finetooth and blacknose sharks, which may have effected the results; if the majority of mortality occurs in non-HMS fisheries, why should HMS fishermen have to solve the problem; and if there is little connection to HMS, and if we want to get to fishing mortality, we need to collect information.

Response: NMFS agrees that implementing a plan for preventing overfishing of finetooth sharks is necessary, and that appropriate measures are included in preferred alternative D4. The majority of finetooth sharks are landed in the South Atlantic region (primarily Florida) by vessels deploying a non-selective gear type (gillnet gear) and in possession of both a Spanish mackerel permit and a commercial shark permit and/or targeting species that are currently unmanaged (kingfish). Thus, any management measures that are solely directed at fishermen using gillnet gear and in possession of a commercial shark permit, could easily be circumvented as gillnets are also an authorized gear for Spanish mackerel or are used by fisheries pursuing currently unregulated species. NMFS continues to explore which vessels may be engaged in fisheries that harvest finetooth sharks and intends to conduct a new SCS stock assessment following the Southeast Assessment, Data, and Review (SEDAR) process starting in 2007. Reducing finetooth shark fishing mortality via regulations targeting commercial shark permit holders is further confounded by the fact that finetooth sharks are within the SCS complex, which is not currently overfished or experiencing overfishing, and commercial fishermen have only caught, on average, 20 percent of the SCS quota between 1999-2004. The highest landings of SCS reached 74 percent in 2003. Measures directed at the shark gillnet fishery would result in an increased number of dead discards of finetooth sharks and removing gillnets from the authorized gear list for the shark fishery (closing the shark gillnet fishery). Fishermen do not appear to selectively target finetooth sharks and these sharks have a tendency to roll upon contact with gillnets. Observer data from the five vessels targeting sharks indicate that they are only responsible for a small portion of the commercial finetooth shark landings. Most of the gillnet vessels in the South Atlantic region have permits for both HMS and non-HMS species. If gillnets were no longer an authorized gear for harvesting HMS, vessels would continue to discard dead finetooth sharks caught as bycatch in pursuit of other non-HMS species. Furthermore, a fishery closure could lead to adverse economic impacts and unknown ecological impacts as this displaced fishing effort would likely shift to other fisheries or increase fishing pressure on LCS using bottom longline gear. Recreational landings of finetooth sharks only comprise 10 percent of annual finetooth shark landings on average. Recreational landings of finetooth sharks are approximately 1.5 percent of the landings within the SCS complex.

In 2002, NMFS conducted a stock assessment for all SCS, including finetooth sharks. These catch rate series data were combined with life history information for finetooth sharks and evaluated with several stock assessment models. The lack of bycatch data in the catch series data led to low values of MSY predicted for finetooth sharks in the SCS stock assessment (especially those obtained through the SPM models). This lack of bycatch data and shorter catch and catch per unit effort (CPUE) series, coupled with no catches reported in some years, led to some uncertainty in the stock assessment for finetooth sharks. In the case of finetooth sharks, model estimates of recent F levels are above F_{MSY}, indicating that recent levels of effort directed at this species, if continued, could result in an overfished status in the relatively near future. The preferred alternative may increase the amount of available catch series and bycatch data by expanding existing observer programs and contacting state and Federal fisheries management entities to collect additional landings data, which may be available for the upcoming stock assessment starting in 2007.

ASMFC is in the initial steps of developing an interstate FMP for coastal sharks. ASMFC staff has drafted a Public Information Document (PID), equivalent to Scoping Document drafted prior to initiating a fishery management plan. The PID is currently available online at www.asmfc.org. The deadline for submitting public comment is July 14, 2006.

Comment 3: NMFS received several comments either opposing the preferred alternative (alternative D4), or expressing concern over the fact that more progress has not already been made to prevent overfishing of finetooth sharks, including: NMFS acknowledged finetooth shark overfishing three years ago and the current preferred alternative simply collects more data on sources of mortality for the species; it has already taken three or more years to amend this plan; NMFS should reconsider proposing more specific management measures in this Draft HMS FMP to conserve finetooth sharks; we have a species that is in trouble, and under the law, you need to do something; we are disappointed that you are picking an alternative that won't do anything for the mortality; you need to change the preferred alternative to something more conservation-oriented; NMFS has not done anything in the past 4 years and finetooth has overfishing occurring; we support alternative D4, but note our disappointment that NMFS has not already directed the appropriate Regional Council to take action to end the overfishing of finetooth sharks; NMFS should contact states directly as they should be more than willing to provide information; NMFS has made some steps forward in collecting more information, however, you are going to have to work harder to get more data; and, NMFS needs to develop and pursue specific management measures to end finetooth shark overfishing.

Response: The preferred alternative implements an effective plan to prevent overfishing. Based on our present knowledge of the fisheries that interact with finetooth sharks, management actions that affect only HMS fisheries will not adequately address finetooth shark overfishing. The majority of finetooth shark landings occur in commercial fisheries deploying a non-selective gear (gillnets) in a region (south Atlantic) where other non-HMS fisheries also deploy gillnets. Thus, measures that prohibit the use of gillnets for landing sharks (alternative D2), if aimed exclusively at the commercial shark gillnet fishery, would not prevent overfishing of finetooth sharks. Most of the five vessels that comprise the commercial shark gillnet fishery also possess Spanish mackerel permits. If gillnets were not allowed for the harvest of sharks the vessels could continue to deploy gillnets to catch other species, including Spanish mackerel, catch finetooth sharks incidentally, and then discard dead finetooth sharks. Finetooth sharks are caught in a wide range of gillnet mesh sizes and are often dead at haulback, rendering trip limits and/or gear modifications (alternative D2) ineffective at preventing overfishing because dead sharks would continue to be discarded. Mortality of finetooth sharks in fisheries outside the jurisdiction of HMS (state waters) or in unregulated fisheries in Federal waters (*i.e*, kingfish) would also be unaffected. The preferred alternative will provide additional information on finetooth shark landings to allow enactment of comprehensive, collaborative measures that effectively reduce finetooth shark fishing mortality.

The preferred alternative would not simply collect more data. NMFS has sent a letter to the South Atlantic Fishery Management council and attended a recent meeting in Coconut Grove, FL (June 13-15, 2006) to request consideration of joint management initiatives. Without cooperative measures vessels may be able to circumvent any additional regulations that would be enacted for the commercial shark fishery when pursuing Spanish mackerel. The Agency has attained, and will continue to evaluate, landings of finetooth sharks by non-HMS fisheries in state and Federal waters. Furthermore, the Agency has analyzed Federal logbook data to better understand what non-HMS fishermen are catching when they land finetooth sharks, has determined seasonality of landings by Federally permitted fishermen, has analyzed the Federal permits of vessels that land finetooth sharks, and has analyzed the Florida trip ticket data to better understand the seasonality, extent of landings, and what permits vessels possess that are landing finetooth sharks in the state of Florida. The Agency has expanded the directed shark gillnet fishery observer program to include observer coverage on vessels using alternative types of gillnet gear (sinknet) or targeting non-HMS species to determine the extent of finetooth shark landings in these fisheries and added finetooth sharks to the select species list for bycatch sub-sampling in the Gulf of Mexico shrimp trawl fishery to monitor bycatch of finetooth sharks in this fishery. These activities will form the basis for selecting additional management measures, either analyzed in the Final Consolidated HMS FMP, or otherwise, to ensure that overfishing of finetooth sharks is prevented.

<u>Comment 4</u>: There should be a cap on the number of vessels allowed into the directed shark gillnet fishery and a limited entry program that only allows the five vessels that are currently participating in the fishery**.**

<u>Response</u>: NMFS does not currently employ a gear based permit endorsement for shark fisheries; rather, permit holders possess either directed or incidental permits and both permits are valid for any of the authorized gears for sharks (gillnet, bottom and pelagic longlines, handline, rod and reel, or bandit gear). NMFS did not consider specific permit endorsements or gear-based permits in this rulemaking, but may consider options to limit vessel participation in the shark gillnet fishery in the future. Logbook and permit data does not indicate that there has been a significant increase in recent years in the number of vessels targeting sharks with gillnet gear. The majority of shark fishermen deploy bottom longline gear for LCS; however, directed shark gillnet fishermen most frequently target SCS and blacktip sharks. As blacktip sharks and the SCS species complex are not overfished or experiencing overfishing, capping the number of vessels allowed into the fishery may not be justified.

<u>Comment 5</u>: NMFS received several comments in favor of banning gillnets for the directed harvest of sharks, including: banning gillnets might help reduce finetooth shark mortality; in the absence of removing gillnets from the authorized HMS gear list, there should be a requirement for year-round use of VMS on gillnet boats; drift gillnets should be prohibited; the

State of Georgia supports the prohibition of gillnet gear to target finetooth sharks to prevent overfishing; and, I suggest that this fishery be banned in the South Atlantic and GOM until we determine the status of finetooth sharks and get things straight with the Right whale calf that was caught with gillnet gear.

Response: NMFS considered the prohibition of gillnet gear within Alternative D2 (implement commercial management measures to reduce fishing mortality of finetooth sharks). A similar alternative was also considered in Amendment 1 to the Fishery Management Plan for Atlantic, Tunas, Swordfish, and Sharks. NMFS agrees that banning the use of gillnets for the five vessels that comprise the directed shark drift gillnet fishery may reduce fishing mortality of finetooth sharks. However, other gillnet fisheries in the South Atlantic that target non-HMS (Spanish mackerel and kingfish) would continue to catch finetooth sharks, and other species of sharks. Observer data indicate that the five vessels targeting sharks in the South Atlantic region are only responsible for a small portion of the commercial finetooth shark landings. Since most of the gillnet vessels in the South Atlantic have permits for both HMS and non-HMS (Council-managed) species, if gillnets were no longer an authorized gear for harvesting HMS, these vessels would continue to land, and discard dead, finetooth sharks caught as bycatch in pursuit of other non-HMS species. If gillnet gear were banned for HMS, fishermen in other fisheries would continue to catch finetooth sharks but without coordination with management entities and possibly without observer coverage. Furthermore, the current regulations in place for the Southeastern U.S. Restricted Area currently prohibit the use of shark gillnet gear in the water between Savannah, GA and Sebastian Inlet, FL. Shark gillnet gear is defined as a gillnet with stretched mesh greater than 5”. Gillnets that are less than 5” stretched mesh could still be deployed if the directed shark gillnet fishery were banned, and finetooth sharks would continue to be landed as a result. Gillnets are already banned in Georgia and Florida and restricted to less than 100 feet in length for recreational fisheries in South Carolina.

Generally, VMS is required to aid in enforcement of time/area closures. Because no gillnet closures were fully analyzed in the Draft HMS FMP, the requirement to use VMS on gillnet vessels year-round was not considered as an alternative in this rulemaking. The existing requirement was originally implemented in 2003 by Amendment 1 to the FMP for Atlantic Tunas, Swordfish, and Sharks, and requires that all vessels with gillnet gear onboard and a commercial shark permit have a functioning VMS unit onboard and that the unit is operational during all fishing activities, including transiting, between November 15st and March 31st each year. This requirement applies to all areas between November 15-March 31 and not just in the vicinity of the Southeastern U.S. Restricted Area. If additional time and area closures were implemented outside of the right whale calving season, it may be prudent to reevaluate the need for a year-round VMS requirement for all shark drift gillnet vessels.

The Atlantic Large Whale Take Reduction Team (ALWTRT) met in St. Augustine, FL, on April 10-11, 2006, to determine what course of action should be taken to prevent future interactions between right whales and gillnet gear. The ALWTRT did not reach consensus on all the management measures that were being considered at the meeting and are still deliberating on how to address the co-existence of gillnet fisheries and right whales on their calving grounds in the Southeastern U.S. Restricted Area. NMFS will work with the team to minimize mortality of these endangered marine mammals.

Comment 6: Identification of finetooth sharks is difficult because they are often confused with blacktip sharks.

Response: The Agency agrees that finetooth sharks are difficult to identify, especially for dealers who are required to positively identify sharks to species based on a log (carcass that has been gutted and finned). The preferred Alternative A9, mandatory HMS identification workshops for all shark dealers, would provide shark dealers with tools and instruction that they could employ to prevent mis-identification of finetooth sharks and minimize the likelihood of confusion between *Carcharinid* species of sharks.

Comment 7: Spanish mackerel fishermen catch finetooth sharks intermixed with blacktip sharks.

Response: An analysis of Federal logbook data from 1999-2004 indicates that 17 vessels landed finetooth sharks with gillnet gear and possessed both a Spanish mackerel and commercial shark permit. Since gillnets are a not selective gear and finetooth sharks, blacktip sharks, and Spanish mackerel have similar temperature and habitat preferences, it is not unreasonable to assume that there are some gillnet sets where all three species are landed. The Federal logbook data indicated that Spanish mackerel were the most abundant non-HMS reported on trips that landed finetooth sharks and accounted for approximately 13.6 percent (by weight) of landings.

Comment 8: NMFS states that 80 percent of finetooth sharks are caught in gillnets, and the majority is landed in FL and GA, but gillnets are banned in these states. So finetooth sharks must not be all that coastal if they are being caught outside of state waters (> 3 miles).

Response: Generally speaking, finetooth sharks inhabit shallow coastal waters of the western Atlantic Ocean from North Carolina to Brazil. Finetooth sharks travel north to waters adjacent to South Carolina when the surface temperature of the water increases to approximately 20ºC then returns south to off the coast of Florida when temperatures fall below 20ºC. Finetooth seem to prefer water temperatures in this range, and they feed primarily on menhaden, which are also generally found closer to shore. However, finetooth sharks are opportunistic and will likely inhabit more coastal state waters or locales offshore in Federal waters as oceanographic and feeding conditions allow. Finetooth sharks would not be allowed to be harvested with gillnets within State waters of Flordia, Georgia, or South Carolina, however; they would still be vulnerable to fishing mortality resulting from interactions with gear in other fisheries and may be landed in Florida if they are caught in gillnets deployed in Federal waters.

Comment 9**:** There are only five vessels are in the fishery- where do all the catches come from?

Response: The five gillnet vessels that target sharks with drift gillnet or strikenet gear are responsible for less than 10 percent of the commercial finetooth shark landings. The majority of finetooth sharks may be landed either in state waters, or by fishermen pursuing other species, such as those managed by the Gulf of Mexico or South Atlantic Fishery Management Councils (*i.e.*, Spanish mackerel) or species that are not currently managed (*i.e.*, kingfish). Since these fishermen hold directed shark permits, they can opportunistically keep all finetooth sharks;

however, because their harvest of finetooth sharks is incidental to landing of other non-HMS species, these vessels have not been selected for HMS observer coverage. Vessels fishing sink gillnet gear on the bottom and targeting other non-shark species are some of the same vessels in the shark drift gillnet fishery.

A recent analysis of landings data submitted via the Fishing Vessel Logbook/Gulf of Mexico Reef Fish/South Atlantic Snapper-Grouper/King and Spanish Mackerel/Shark (Coastal Fisheries Logbook) from 1999 - 2004, indicate that a total of 46 vessels reported landings of finetooth sharks. Of these, 17 vessels had only a shark limited access permit, 17 vessels had both a shark and a Spanish mackerel permit (managed under the Coastal Pelagics FMP and its amendments by the South Atlantic Fishery Management Council), and 12 vessels had neither permit. In 2003, 15 vessels reported landings of finetooth sharks and all of these vessels had both a shark directed permit and a Spanish mackerel permit. Furthermore, since approximately 29 vessels are either targeting other non-HMS species and keeping finetooth sharks opportunistically, or are not covered under existing management regimes, these vessels would likely continue to contribute to finetooth shark fishing mortality by participating in coastal gillnet fisheries within the finetooth shark's range.

Comment 10: NMFS received several comments questioning the 2002 SCS stock assessment, including: in 1995, 95 percent of finetooth came from PLL and not gillnets, in 1996-2000 there was this shift to gillnet, and I don't understand why; the document says that less than 1 percent came from the commercial fishery in the GOM- how can shrimp trawls not catch finetooth?; and, 100 percent of recreational landings came from the GOM, it just does not make any sense.

Response: NMFS analyzed landings data from 1999-2004 for the analysis of alternatives to prevent overfishing of finetooth sharks in this rulemaking. It is possible that there are inconsistencies between more recent data analyzed for this rulemaking and those data employed for the 2002 stock assessment. This could be a result of misidentification or misreporting of finetooth sharks, general lack of data for the 2002 SCS stock assessment, or changes in fishing effort that may have occurred. The commenter does not provide specific examples of which data set they are referring to that was used in the 2002 SCS assessment; therefore, it is difficult to explain any potential inconsistencies. Alternative D4 would include finetooth sharks as a select species for bycatch sub-sampling in the Gulf of Mexico shrimp trawl observer program which will provide additional bycatch and landings information from this fishery. In the past, finetooth sharks were not identified in the bycatch associated with shrimp trawls, however, they may have been present. The Marine Recreational Fisheries Statistics Survey (MRFSS) and the Texas Parks and Wildlife Service estimated that 14,811 finetooth sharks were landed between 1999 and 2005. The data used for the 2002 SCS stock assessment indicate that there were several years where all of the recreational landings of finetooth shark occurred in the Gulf of Mexico. However, there are also years where the majority of recreationally caught finetooth sharks were caught in both the South Atlantic and Mid-Atlantic regions. This could be attributed to changes in oceanographic conditions and/or fishing effort.

Comment 11: NMFS should investigate bycatch in other areas and consider the suite of management measures by other states that may be affecting finetooth shark mortality. In the

State of Texas, there are bag limits but no commercial fisheries. Sharks can only be caught on rod and reel. They may be sold, but only one fish per boat. There are also some shrimp trawl closures (seasonal) that may provide some indirect benefits for finetooth and other sharks.

Response: Since this comment was received, NMFS has contacted the Regional Fishery Management Councils and discussed possible fisheries where finetooth sharks may be harvested incidentally. The Agency has also compiled a list of state and Council regulations that affect gillnet and bottom longline fisheries and therefore may impact finetooth fishing mortality either directly or indirectly. Creel surveys from Texas Parks and Wildlife indicate that on average, nine finetooth sharks are landed a year, with 193 landings documented since 1984. Shark specific landing restrictions similar to those imposed by Texas and other states, while helpful, may not significantly reduce finetooth landings as the majority of finetooth landings are from commercial fisheries in the South Atlantic that use non-selective gear. Successful management of this species will likely only be attained through cooperative efforts between the fishermen, States, Regional Fishery Management Councils, the Atlantic States Marine Fisheries Commission, and NMFS.

Comment 12: NMFS received several comments expressing concern about the fact that the Agency did not know exactly where all finetooth shark landings are coming from, including: how is it that NMFS has catch data coming from dealers, but does not know which vessels are catching finetooth?; NMFS should call the dealers and find out which types of boats are offloading/selling the finetooth; in 1999, you changed the criteria for boats that could get a directed shark permit so that the smaller croaker boats, etc. catch sharks, and they have to report to the Federal dealer, so you should be able to get the dealer information; and dealers should be required to provide vessel information with all shark landings.

Response: General canvass data submitted by Federally permitted shark dealers does not include information pertaining from which vessel that fish were purchased. These reports are submitted every two weeks. NMFS agrees that the General Canvass data should be linked to the individual vessel from which those fish were purchased. NMFS has also been contacting states between Texas and North Carolina to determine whether or not they had any records of finetooth sharks being landed. Many states maintain trip ticket programs that can be linked to individual vessels from which seafood products were purchased. This information was analyzed for the Florida trip ticket program because that is where the majority of finetooth shark landings are occurring. Starting in 2000, some of the Florida trip tickets reporting finetooth sharks included the vessel identification. Of the vessels that were associated with these landings in the Florida trip ticket data, six vessels had only a Federal shark permit, eight had both a Federal shark and Spanish mackerel permit, and three vessels had neither permit. The fact that vessels possess multiple permits reiterates the need for collaborative management efforts between HMS, the Regional Fisheries Management Councils, and individual states.

Comment 13: NMFS received a comment based on the 2005 observer report for the Directed Shark Gillnet Fishery that stated that in the shark gillnet fishery, five vessels used three different fishing methods. Of the three methods, the strikenet gets the most finetooth sharks. This is a fishery that is targeting finetooth sharks. The average size is 123 cm for finetooth sharks, which is smaller than what the recreational fishery can take.

Response: The 2005 observer report indicated an increase in the observed landings of finetooth sharks with strikenet gear. This gear is generally used to target schools of blacktip sharks, which are located from the air using a spotter plane. Historically, most observed landings of finetooth sharks occur in the drift gillnet segment of the fishery. 2005 may have been an anomalous year with regard to prey abundance or distribution, thereby, making finetooth sharks more vulnerable to strikenet gear. Strikenet fishermen are subject to the same restrictions as other shark gillnet gear. The average size of finetooth sharks landed in 2005 was 123 cm, based on measurements obtained from 38 individuals.

Comment 14: NMFS received a number of comments opposed to Alternative D2, implement commercial management measures to reduce fishing mortality of finetooth sharks, including: A subquota for finetooth sharks is not necessary; I oppose alternative D2 unless the fishery is harvesting its entire commercial quota; and, we are opposed to alternative D2 because it appears that the allocated quota is not being overharvested.

Response: The quota for SCS is not currently, and has never been, fully utilized. Observer data indicate that finetooth sharks are not the primary shark species harvested in the directed shark gillnet fishery. Since finetooth sharks have a tendency to roll upon contact with gillnet gear, prohibiting landings of finetooth sharks would not reduce fishing mortality, as most of these fish would then be discarded dead. Additional dead discards may encourage fishermen to make more trips to replace lost revenues, leading to more dead discards and an increase in fishing mortality level. Since the rest of the SCS complex is not experiencing overfishing and is not overfished, reducing the overall SCS quota was not considered in this FMP.

Comment 15: NMFS received several comments in support of alternative D3, implement recreational management measures to reduce fishing mortality of finetooth sharks, including: I support alternative D3 because between 2000 and 2003, 6,732 and 5,742 finetooth sharks were reported to MRFSS. What is the expansion? What are the Post-Release Mortality estimates?; recreational landings of finetooth sharks looks like they may potentially be the majority of mortality for yet another HMS species; mandatory circle hooks would reduce mortality; it appears that the actions described in the preferred alternative only intend to pursue commercial mortality and ignore recreational mortality; I would suggest getting into the MRFSS system because there is a problem with shark reporting and MRFSS; no one reports finetooth sharks to the Councils; and MRFSS does not have sharks listed, but that is where I would suggest looking for information.

Response: NMFS is not preferring recreational measures to reduce fishing mortality of finetooth sharks at this time because the vast majority of finetooth sharks are landed commercially, most recreational fisheries for finetooth sharks are likely in state waters, and there is not conclusive evidence that circle hooks would reduce post hooking release mortality of finetooth sharks. Between 1999 and 2004, average landings of finetooth sharks in recreational and commercial fisheries were 11.2 (10 percent) and 93.6 (90 percent) mt dw/year, respectively. MRFSS data would include landings of finetooth sharks in state waters, which is where most finetooth sharks are found, however, NMFS can not directly implement regulations in state waters. A study by Gurshin and Szedlymayer (2001) estimated that only 10 percent (1 of 10 captured) of sharpnose sharks, a similar species, died as a result of capture on hook and line.

Post release mortality depends on water temperature, hook used, whether or not live bait is used, and the overall condition of fish at hooking. MRFSS lists sharks and estimates of finetooth shark landings were obtained from this program and included in this rulemaking. NMFS also does not prefer recreational measures at this time because there is already a conservative bag limit in place and a minimum size well above the size at first maturity. Recreational measures may be considered in the future as necessary. NMFS will continue to explore all sources of finetooth sharks fishing mortality, both recreational and commercial, and will consider further exploration of the landings reported to NMFS and individual states.

Comment 16: Due to the lack of progress towards ending overfishing, finetooth sharks should be added to the prohibited species list while means to reduce mortality are investigated.

Response: NMFS considered, but did not analyze, an alternative that included adding finetooth sharks to the prohibited species list for Atlantic sharks. Presently, finetooth sharks do not meet any of the four criteria defined under 50 CFR Part 635.34 (c) for inclusion of species to the prohibited species list. The existing criteria are: (1) there is sufficient biological information to indicate the stock warrants protection, such as indications of depletion or low reproductive potential or the species is on the ESA candidate list; (2) the species is rarely encountered or observed caught in HMS fisheries, (3) the species is not commonly encountered or observed caught as bycatch in fishing operations, or (4) the species is difficult to distinguish from other prohibited species (*i.e.*, look alike issue). With regards to these criteria, finetooth sharks are not currently overfished, are commonly encountered and observed in HMS fisheries, are commonly caught as bycatch in non-HMS fisheries, and upon capture (prior to dressing), are distinguishable from prohibited species. As new biological and fishery data becomes available, NMFS may make adjustments to the prohibited species list, as needed in the future.

D.2.3 Atlantic Billfish

ICCAT Landing Limits

Comment 1: NMFS received a number of basic questions pertaining to the history, data, U.S. actions, and the requirements of the ICCAT marlin recommendations. The comments included: Where did the 250 marlin limit come from? What was the biological data used to limit the recreational harvest of blue and white marlin to 250 fish?; has the 250 white marlin limit ever been exceeded?; what is the harvest quota for the commercial harvest of blue and white marlin?; what is the breakdown of white and blue marlin bycatch compared to the recreational catch?; and, where does NMFS get the authority to establish a quota (250-fish marlin limit)?

Response: The annual landing limit of 250 recreationally caught blue and white marlin, combined, stems from ICCAT Recommendation 00-13. ICCAT recommendations are binding instruments that the United States, as a contracting party to ICCAT, is obligated to implement. Recommendation 00-13, was proposed by the United States and established a number of additional stringent conservation measures intended to improve the stock status of Atlantic marlin. The 250 marlin number was the result of a dynamic international negotiation at ICCAT that included, and was supported by, the U.S. recreational, commercial, and government commissioners. Considerations in the U.S. negotiating position included, but were not limited to, data from the Recreational Billfish Survey and the Marine Recreational Statistics Survey, and intentionally included a buffer to account for changes in the fishery and improved monitoring. The Atlantic Tunas Convention Act provides NMFS the regulatory authority to implement ICCAT recommendations by authorizing the promulgation of regulations as may be necessary and appropriate to implement binding recommendations adopted by ICCAT. The 250 marlin limit is for both blue and white Atlantic marlin combined, and was exceeded for the calendar year 2002, when the U.S. reported 279 recreationally landed marlins. This exceedance was the result of methodological change that was applied to U.S. recreational landings retroactively. Further, while the United States exceeded its landing limit in that one year, the United States remained in compliance with Recommendation 00-13 because, as allowed by ICCAT Recommendation 00-14, the U.S. underharvest from 2001 was applied to the "negative" 2002 balance and was of sufficient magnitude to allow the United States to remain in compliance with the recommendation. The United States does not have a commercial quota or allowable level of landings for Atlantic billfish. Commercial possession and sale of Atlantic billfish have been prohibited since 1988 in the United States. Internationally, commercial quotas vary by country. Foreign pelagic longline and purse seine vessels, the gear types that dominate commercial Atlantic billfish landings, are restricted to 50 percent and 33 percent of Atlantic blue and white marlin landings, respectively, from the years 1996 or 1999, whichever is greater. The breakdown of domestic commercial and recreational harvests varies considerably by year and are presented in detail in Chapter 4 of the Final Consolidated HMS FMP. For the period 1999 - 2004, pelagic longline dead discards and recreational harvests of Atlantic blue marlin averaged 44.2 metric tons (mt) and 22.9 mt, respectively; Atlantic white marlin averaged 31.8 mt and 2.3 mt, respectively; and Atlantic sailfish averaged 24.5 mt and 81.6 mt, respectively. These numbers do not necessarily reflect the true mortality contributions of each sector to the fishery. Recent data on post-release mortality indicates that the aggregate domestic recreational white marlin mortality contribution may be equal to, or greater than, the aggregate domestic pelagic longline white marlin mortality contribution, in some years, and may be the result of the substantial difference in the scale of these fisheries.

Comment 2: NMFS received public comment both endorsing and opposing preferred alternative E6, Implement ICCAT Recommendations on Recreational Marlin Landings Limits, for widely varying reasons, and with varying qualifiers. Comments in support of this preferred alternative included: We endorse alternative E6; I support alternative E6 because it has been five years since the ICCAT recommendation and we need stricter regulations; NMFS has to implement alternative E6 to comply with international obligations; NMFS must codify the 250-fish marlin limit because it came as a *quid pro quo* with other countries agreeing to measures. If the U.S. does not codify the 250-fish limit, it will result in loosening of restrictions in other countries, which we don't want; if something is not done now, ESA will take all the fisheries away from us. We should show we are doing all we can to stop the killing of marlin. NMFS should implement the 250 marlin limit and the calendar year; I'm not opposed to the 250-fish limit (alternative E6), but somehow the U.S. got into a bad deal and is stuck with it; and I support alternative E6 only if the original accounting system (RBS data) is used to count U.S. landings.

Response: NMFS agrees that the United States is obligated to implement the 250 recreationally caught Atlantic marlin landing limit and that more needs to be done to reduce fishing mortality levels on these species if they are to recover. The U.S. landing limit was part of a comprehensive plan to begin the process of rebuilding Atlantic marlins and which obligated other nations to make substantial sacrifices on behalf of their fishing interests. NMFS shares concerns that a failure of the United States to fully implement an ICCAT recommendation may allow other nations to rationalize non-compliance on their behalf. NMFS further acknowledges that domestic implementation of the 250 Atlantic marlin landing limit has taken longer than anticipated. The United States has led international conservation efforts on Atlantic marlin and other species and will maintain its credibility and leadership role on these issues by fully implementing its international obligations through the adoption of the preferred alternatives.

NMFS believes that adoption of ICCAT recommendation 00-13 was an important step toward stemming long-term declines in Atlantic marlin populations and rebuilding their populations. Under this agreement, the U.S. was limited to landing 250 recreationally caught blue and white marlin combined on an annual basis, as previously discussed. The U.S. has reported marlin landings below the 250 fish limit in three of the previous four years. Other ICCAT nations whose fishermen catch and sell Atlantic marlin were obligated to reducing their pelagic longline and purse seine landings of blue marlin by 50 percent and white marlin by 67 percent. The recommendation also required release of live marlins brought to the vessel along with other various restrictions. As conditions in the fishery change, NMFS will continue to review the appropriateness of measures contained in the ICCAT recommendations and seek changes as appropriate.

NMFS acknowledges concerns of anglers regarding the use of a different accounting methodology for compliance purposes than was originally used to contribute to the negotiation 250 marlin limit. However, as discussed in the response to Comment 1, the 250 marlin number was based, in part on RBS and MRFSS data, but also intentionally included a buffer to account for changes in the fishery and improved monitoring. The number was the result of a negotiation and not a specific scientific methodology. Under the recommendation, the United States is obligated to report all verifiable recreational landings of Atlantic blue and white marlin for compliance purposes. New sources of data on domestic recreational landings have been developed since the 2000 negotiation, including catch-card programs in North Carolina and Maryland as well as the billfish and swordfish reporting line, which provide a small number of additional marlin each year. These sources of data have represented a very limited number of verifiable fish in any given year, with tournaments representing the majority of landings.

Comment 3: Comments opposing preferred alternative E6, Implement ICCAT Recommendations on Recreational Marlin Landings Limits, included: We cannot comprehend why NMFS, knowing of our small percentage of the harvest would even consider establishing severe restrictions on the recreational harvest; this alternative A6 is unnecessary and arbitrary and should be eliminated, especially since the fishery is mostly catch and release; it should be removed at the 2006 ICCAT meeting; from a conservation and negotiating standpoint, the 250 landing cap is neither needed nor of any value to the United States; mandating this cap when low marlin landings are already driven by a strong, voluntary conservation ethic will do little or nothing to reduce overall marlin mortality; why implement increased size limits to avoid reaching the 250 mark, when the existing regulations seem to work?; there should be a provision for underages and overages; the 250 marlin limit derives only from tournament landings and is not an appropriate limit for the fishery as a whole; if NMFS restricts landings of marlin species to 250 fish and prohibits white marlin catches for five years, tournament fishing will take a massive economic hit. Towns that host tournaments would have to rely on an alternative form of tourism; I oppose Alternative E6 because it will cause economic harm, unless anglers switch to blue marlin; 250 fish are insignificant compared to longline bycatch mortality; and alternative E6 is problematic considering the unknown landings in the Caribbean. The large landings of blue marlin in Puerto Rico can be addressed through enforcement of existing management measures (minimum size, no sale, etc.); and, we must address the foreign sources of billfish mortality at ICCAT if we are to achieve the recovery of billfish stocks.

Response: NMFS disagrees that alternative E6, implement the ICCAT established recreationally caught marlin landing limit, is unnecessary or arbitrary in any way. This alternative would implement U.S. obligations negotiated as part of a key international agreement that has the potential to dramatically reduce fishing mortality of Atlantic marlins. As discussed in the response to Comment 1, the United States is obligated to implement ICCAT recommendations under the Atlantic Tunas Convention Act. Further, to maintain credibility and leadership on international billfish conservation issues, and limit opportunities for foreign nations to rationalize potential non-conformity with billfish conservation measures, the United States must abide by its international obligations. Unilateral elimination of the 250 marlin landing limit is not an option available to NMFS or even the United States. However, should ICCAT choose to do so during a future Commission meeting, it could remove the restriction thereby allowing the United States to follow suit. NMFS acknowledges that, in and of themselves, the 250 fish allocated to the United States may not dramatically impact stock status, however, the implementation of U.S. international obligations is critical to a credible negotiating position and reduces the ability of other nations to rationalize potential non-conformity with international billfish conservation measures. Under the preferred alternative, potential increases in size limits would only occur if the United States were approaching its 250 marlin limit. The intent of potential in-season minimum size limit increase would be to minimize impacts to the fishery by slowing landings and allowing the fishery to continue until the 250 fish limit is reached but not exceeded. Allowing landings to continue at a slower pace over a longer period in the fishing year is anticipated to have reduced socio-economic impacts as compared to a shift to catch and release only fishing earlier in a given year. Consistent with ICCAT Recommendation 00-14, the preferred alternative would mandate carry-over of overharvest and would allow for carry-over of underhavest. Contrary to some comments received, and as discussed more fully in the responses to Comments 1 and 2, the 250 marlin number did not stem from only tournament landings. Consistent with those previous responses, NMFS does not believe that the 250 fish limit is inappropriate for the U.S. directed billfish fishery at this time. NMFS disagrees that implementation of the 250 marlin limit would cause substantial adverse economic impacts. As discussed in the response to Comment 2, the United States has landed 75 percent of its landing limit, on average, over the past four years and in half of the years reviewed, the United States has been 40 percent below the allowable landing limit for recreationally caught Atlantic marlin.

Further, preferred alternative E6 was specifically designed in a way to minimize economic impacts should fishing or retention patterns change and result in the United States approaching the 250 marlin limit. Should the 250 marlin limit be achieved, NMFS believes that it would occur relatively late in the fishing season, thereby impacting a limited number of fishery participants and resulting in relatively minor impacts to the fishery as a whole. There could potentially be heightened localized impacts in a small number of communities, where, for instance, tournament participation may be reduced or a tournament cancelled. However, based on the significant level of catch and release fishing practiced in the Atlantic billfish fishery (75 to 99 percent), NMFS believes any reductions in participation would be minor as fishermen could still catch and release Atlantic marlin.

Based on public comment that indicated more substantial concerns over potential adverse economic impacts to the fishery if catch and release only fishing for Atlantic white marlin were required, as well as a number of other factors including, but not limited to, the impending receipt of a new assessment for Atlantic white marlin, upcoming international negotiations on Atlantic marlin, and a somewhat limited ecological benefit, NMFS does not prefer the alternative to allow catch and release only fishing for Atlantic white marlin. NMFS acknowledges that the 250 recreational marlin allocated to the United States represent a small portion of total billfish mortality from the full ICCAT pelagic longline fleet. However, from a domestic perspective, if the full allocation of 250 marlin were landed by the recreational sector, it would represent approximately one-third (35 percent) of the annual number of Atlantic marlin (blue and white combined) discarded dead from the domestic pelagic longline fleet, on average, over the four year period 2001-2004. Of more importance to the overall health of the stock than landings or dead discards, is total mortality inflicted upon the stock. As noted in the response to Comment 1, recent estimates and data on post-release mortality indicate that the aggregate domestic recreational white marlin mortality contribution may be equal to or greater than the aggregate domestic pelagic longline white marlin mortality contribution, in some years. This appears to be a result of the substantial difference in the scale of these fisheries. NMFS acknowledges that there is some uncertainty associated with marlin landings statistics from the U.S. Caribbean, and the Agency is working to improve these statistics by increasing enforcement of existing permitting and reporting requirements, including those for tournaments. Finally, NMFS agrees that foreign sources of billfish mortality must be addressed at ICCAT if we are to achieve the recovery of Atlantic billfish stocks. As such, the United States will continue its efforts to champion billfish conservation at ICCAT and in other appropriate fora.

Comment 4: NMFS received a number of comments asking for clarification of authority and the regulations pertaining to the potential implementation of alternative E6, Implement ICCAT Recommendations on Recreational Marlin Landings Limits, including: Would the "priority" be given to tournaments in catching the 250 fish limit?; if 20 tournament boats catch-and-release 10 fish in the season, what are the rest of the private and recreational anglers and thousands of boats to do? Can the unharvested portion of the 250 fish limit be carried over into the next year? Once the quota is established, which we have never approached, except for the year NMFS counted differently, then what happens?; and, does the U.S. have the authority to reduce the 250-fish limit? It goes against ICCAT. In every other case, the U.S. must give fishermen a reasonable opportunity to catch fish.

Response: The 250 recreationally caught marlin landing limit applies to the Atlantic recreational billfish fishery as a whole. NMFS has no intent to assign Atlantic marlins that are available for landing to any particular sector or component of the recreational fishery in this rulemaking. NMFS appreciates the concern expressed by some anglers regarding the opportunity to land a fish when one looks at the large number of participants in the fishery.

However, the United States has been bound by the 250 recreationally caught Atlantic marlin landing limit since June of 2001, and only in one year has that 250 fish number been achieved, as previously discussed. Under the preferred alternative (E6), if the landing limit is approached, regardless of whether those fish are landed by a small number of vessels or by many individual vessels, the Agency would consider the appropriateness of an inseason minimum size increase or prohibition on retention based on the criteria identified in the discussion of preferred alternative E6 in Chapter 4 of the Final Consolidated HMS FMP. Even if all retention were prohibited for the remainder of a given fishing year, anglers would be permitted to continue catch and release fishing for Atlantic marlin, and Atlantic sailfish would be available for landing. As previously discussed, 75 to 99 percent of all billfish are currently released on a voluntary basis, so NMFS anticipates little disruption in the fishery, should either a minimum size increase or all release fishery become necessary. As discussed in the response to Comment 3, consistent with ICCAT Recommendation 00-14, the preferred alternative would mandate carry-over of overharvest and would allow for carry-over of underhavest into the next management period. The Agency would monitor recreational landings of Atlantic blue and white marlin and would make decisions as appropriate regarding in-season management actions based on the decision criteria identified in the preferred alternative. NMFS is not proposing to reduce the 250 recreationally caught marlin landing limit.

Comment 5: NMFS received a number of suggestions for substitute alternatives to preferred alternative E6, including: Spread the 250 fish limit over 12 months so that all areas get to land marlin (spatial and temporal); divide the 250 fish limit up by state. Let the states exchange billfish for bluefin tuna quota until each state can support the tournaments they need to; white and blue marlin should have separate limits because they are such different animals; and, not landing the 250 marlin recreational landing limit and eliminating the entire commercial billfish harvest could not solve any of the problems. To solve the problem, the United States should prohibit the importation of billfish, swordfish, and tuna from other countries.

Response: NMFS appreciates these comments and suggestions, however, these options were not analyzed in the Draft Consolidated HMS FMP and as such are beyond the scope of this Final Consolidated HMS FMP. The Agency may consider these and other options as needed, if necessary and appropriate, in a future rule making.

Comment 6: I am opposed to counting fish that are caught by U.S. vessels fishing abroad against the United States' quota.

Response: The United States is obligated to account for all recreational landings of Atlantic marlin by U.S. citizens. If a U.S. citizen is fishing in the waters of an ICCAT contracting party or cooperating entity or on the high-seas on a vessel flagged by that nation, it is assumed that that nation has a reporting mechanism. If the nation in whose waters and upon whose flagged vessel the angler is fishing does not report to ICCAT, then the U.S. citizen is considered to be participating in an illegal, unregulated, and unreported (IUU) fishery. If a landing occurs on a U.S. flagged vessel fishing in foreign waters or on the high-seas, then the angler is required to report that fish to the National Marine Fisheries Service, and the United States must report that landing. If the angler is aboard a U.S. flag vessel and is fishing in the waters of a foreign nation that is not party to nor cooperating with ICCAT, and the angler fails to report the landing to the United States National Marine Fisheries Service, then that angler is deemed to be participating in an IUU fishery.

Comment 7: The British Virgin Islands (BVI) have separate regulations from the United States. International coordination on HMS management is critical. In 15 minutes time, we can be out of the United States Virgin Island waters. For us, the importance is the coordination of international HMS management. The BVI folks can catch and sell their billfish. What is being done on the international front to resolve these types of conservation concerns? The Draft Consolidated HMS FMP does not include anything that addresses international coordination efforts.

Response: NMFS appreciates the frustration felt by anglers in the Caribbean regarding the current differences in regulations between the United States and the British Virgin Islands. The Agency also agrees that Atlantic billfish management requires international cooperation to be successful. However, international relations are beyond the scope of this domestic rule making, and, as such, this Final Consolidated HMS FMP does not address relations between the United States and the British Virgin Islands or any other nation on any subject. International management issues are handled jointly between Department of Commerce staff, including NOAA and NMFS staff, and the Department of State.

Comment 8: Will the ICCAT landing limit be placed under "Quotas" in the Code of Federal Regulations (CFR), so that it will be easy to update annually as with tuna and swordfish quotas?

Response: The majority of regulatory text associated with ICCAT landing limits would likely be placed in 635.27 (d) because it is the most appropriate place for it in the regulations. That is the same section that includes the tuna and swordfish quotas.

Comment 9: NMFS received a number of comments on the potential impacts of the 250 marlin limit in combination with the possible shift to only catch and release fishing for Atlantic white marlin, including: the United States will catch the 250-fish limit if white marlin landings are prohibited, because redistribution will occur between different species. When you ban white marlin, people will fish for blue marlin. The bigger Northeast tournaments will fish harder on blue marlin; it's not desirable to make all of the fish under the limit be blue marlin; with the proposed change in the fishing year, some tournaments could be penalized if they take place after the 250-fish limit is exceeded.

Response: Based on public comment expressing deep concern over the ratio of potential adverse economic impacts relative to estimated ecological benefits, the prospect of a new international assessment, an impending international negotiation, and other factors, NMFS is not preferring to implement catch and release only fishing for Atlantic white marlin at this time. NMFS disagrees with the characterization that some tournaments may be penalized if they take place after the 250 fish limit is exceeded. The United States has been bound by the 250 fish limit since it went into effect at ICCAT in June of 2001. At that time, the only mechanism the Agency had available to address fulfillment of the 250 marlin landing limit was an emergency closure of the fishery. Thus, any tournament that would have occurred after the 250 fish limit had been reached, even prior to this action, would have been required to operate on a catch and release basis only. However, they would have had little warning. The preferred alternative was specifically designed to minimize the likelihood of a shift to catch and release only fishing for Atlantic marlin. The preferred alternative would provide the Agency with the ability to slow landings by quickly implementing a minimum size increase for the specific purpose of avoiding a mandatory shift to catch and release only fishing for Atlantic marlin, if possible, to minimize adverse impacts. If the ICCAT recreationally caught marlin landings limit is still achieved, despite the minimum size increase, then the Agency would retain the ability to quickly mandate catch and release only fishing. Thus, any tournament that occurs, or would have occurred, after the 250 fish limit is/was achieved, either prior to implementation of this action or after, would have to operate under an all release scenario. Tournaments actually gain an advantage with implementation of the preferred alternative because it would provide the ability to implement in-season minimum size increases, and thereby reduce the likelihood of exceeding the 250 limit, which would force a shift to an all release fishery. Further, the preferred alternative would also include a 14-day delayed effective date which would further allow tournament operators and billfish anglers to adjust to any possible in-season management actions.

Comment 10: NMFS received a number of comments regarding carry over of underharvest and overharvests, including: if NMFS intends to go forward with the 250-fish landing limit, underages should be added to the next years limit and fishermen should not be penalized if the limit is exceeded; the U.S. should mandate that underages be carried-over like every other quota; codifying the 250-fish limit is not a problem, but the proposed regulations with respect to overages and underages is unacceptable. Rulemakings to deal with underages should not be necessary.

Response: As previously discussed in the response to Comment 3, the preferred alternative would mandate carry-forward of overharvest and would allow for carry-forward of underharvest, consistent with ICCAT Recommendation 00-14. A failure to account for overharvest, as suggested by one commenter, would be inconsistent with ICCAT Recommendation and result in non-compliance by the United States. The United States has pledged to its ICCAT partners not to carry forward underharvest until uncertainty surrounding landings of marlin in the Commonwealth of Puerto Rico and the U.S. Caribbean is reduced. To decrease or increase the annual 250 marlin landings limit as a result of carrying forward future over or underharvest of Atlantic marlins the Agency will publish a notice in the Federal Register. To increase or decrease the 250 marlin recreational landing limit as a result of a new ICCAT recommendation, would require rulemaking under the preferred alternative.

Comment 11: NMFS received several questions, comments, and suggestions on billfish monitoring and reporting, including: how comprehensive or adequate is the monitoring of recreational billfish landings?; how would the public know when 250 fish are landed? Marlin recreational data collection methods are not accurate. Ninety percent of fish caught now are not reported. NMFS should implement mandatory logbooks for all permitted HMS fisheries, commercial and recreational, and require that trip reports be submitted because MRFSS interviews are not effective; enforcement is lacking. That is why people do not report their billfish landings. NMFS should develop a better system to account for marlin landings, such as tail tags; and, NMFS is not receiving all non-tournament marlin landings. There are clubs that land marlin and do not report them. NMFS should instead require each club to report their marlin landings, just like tournament are currently required to do. Penalties should be imposed on fishing clubs that do not report.

Response: NMFS has a comprehensive system in place to capture billfish landings which includes the Recreational Billfish Survey, the Atlantic HMS Non-tournament Billfish and Swordfish Reporting system, the Large Pelagics Survey (including dockside intercepts), and the Marine Recreational Fishing Statistics Survey (including dockside intercepts), as well as cooperative agreements to access landings tag/card data from the states of North Carolina and Maryland. NMFS is always looking to improve its data collection systems, and this may or may not include future tagging programs, log book reporting programs, improvements to the MRFSS, LPS and other systems, among other efforts. If the 250 marlin landing limit is achieved, NMFS would likely notify the public via a number of mechanisms, including: publication of a notice in the Federal Register, issuance of a fax notice to interested stakeholders, notification of the HMS consulting parties, telephone contact with recreational constituent leaders, posting information on the HMS website, placing information on the HMS Information telephone line, and working with popular sportfishing magazines and websites to notify constituents, along with other means, as appropriate. NMFS encourages the public to continue to suggest potential improvements. It should be noted however, that most any reporting system relies on the willingness of anglers to accurately report, and when this does not occur the veracity of the data is compromised. NMFS acknowledges that recreational landings data pertaining to Atlantic billfish do not account for every billfish landed, and thus some level of uncertainty surrounds billfish landings estimates. NMFS has undertaken efforts to improve enforcement of reporting requirements, has improved the MRFSS and LPS, and has recently received a report from the National Research Council that may allow for improvements to be made to some data collection systems.

Comment 12: NMFS received contrasting comments on the proposed five-day minimum notification period for in-season billfish management actions intended to ensure compliance with the ICCAT 250 marlin landing limit. Comments opposing a minimum five-day notification window included; we support E(6), establish the 250 recreationally caught marlin landing limit. However, 21 days would be the minimum acceptable notice period; we support implementation of the 250 marlin landing limit. If an additional increase in minimum size becomes necessary, a notice for an inseason adjustment should be given at least 30 days in advance. This will give tournament directors ample time to notify participants of a size change; tournament directors will need more than a few days (about a month) to make changes to their regulations, minimum sizes, and brochures if the United States approaches the 250-fish marlin limit; and, five days is not enough time to make changes to the Atlantic billfish regulations and to inform the public of such changes, as specified in Preferred Alternative E6, which would implement ICCAT Recommendations regarding recreational marlin landings. NMFS will probably just shut down tournaments. Most HMS tournaments print their information packets long before their start date. To the extent that in-season marlin adjustments can be avoided, they should be. Comments supportive of a minimum five day notification period for in-season management action included: A five-day notice should provide sufficient time for in-season billfish management actions. Bluefin tuna has a shorter notice period. Especially with the Internet, five days is sufficient time for billfish regulatory notification for changes in size limits or closures.

Response: NMFS appreciates the concerns expressed by tournament operators and fishery participants that a five-day minimum delay in effective date may present difficulties with regard to potential rule changes just prior to or during a tournament. In selecting a period for notification and implementation of potential in-season regulatory changes to ensure compliance with ICCAT recreational marlin landings limits, NMFS sought to balance the need to act quickly to ensure compliance, if necessary, while providing an appropriate period of time to adequately notify the public of any such regulatory changes. If too short of a period were selected, anglers and tournament operators may not have time become aware of the regulatory changes. If too lengthy of a period were selected, restrictions may be enacted too late to ensure compliance with ICCAT recommendations or stave off more stringent in-season management measures. Based on public comment requesting additional notice period, a review of the estimated time necessary to collect and analyze landings information and project the date at which regulatory action may become necessary, the National Marine Fisheries Service now prefers to alter the minimum delay in effective date from five to 14 calendar days, inclusive of the date of publication in the Federal Register, for in-season billfish management actions. NMFS has determined that providing more than a 14 calendar day minimum delay in effective date would not provide the Agency sufficient control over the fishery if landings rates were high. NMFS believes that this 14 day period would still allow the agency to implement regulatory changes in a timely manner, thus ensuring compliance with ICCAT recommendations or staving off more stringent in-season management measures and would provide anglers and tournament operators an improved ability to adapt to any potential in-season changes. NMFS also believes that there is a substantial misunderstanding of this provision. The minimum 14 day delay in effective date means that upon publication, any in-season action to increase the minimum legal size of Atlantic marlin or requirement to shift the fishery to catch and release only cannot become effective in less than fourteen days. It does not mean that no more than 14 days advanced notice can be provided to the public, tournament operators, and anglers. The Agency will seek to project potential regulatory action as far ahead as reasonably possible to aid in mitigating any potential adverse impacts to the extent practicable.

Landing Restrictions

White Marlin

Comment 13: NMFS received a number of comments in support of alternative E7, Allow Only Catch and Release Fishing for Atlantic White Marlin from January 1, 2007 to December 31, 2011. Comments in support of this alternative included the need for NMFS to do all it can to avoid having Atlantic white marlin placed on the Endangered Species Act List of Threatened and Endangered Species, the need to reduce fishing mortality to the greatest extent possible to help rebuild overfished populations; statements that there is no reason to land Atlantic white marlin in tournaments because there are techniques to verify releases, including the use of video and still cameras; it makes sense to prohibit all landings, if not all directed fishing for white marlin, since they are in severe decline; we support alternative E7, the Agency has the authority to remove the requirement earlier than five years if the assessment shows that the stock is improving; and, there is strong support for prohibiting the landing of white marlin in Florida and the Gulf.

Response: The Agency appreciates these comments, however, based on public comment indicating more significant concerns over potential adverse economic impacts to the fishery if catch and release only fishing for Atlantic white marlin were required, as well as a number of other factors, including but not limited to, the impending receipt of a new stock assessment for Atlantic white marlin and upcoming international negotiations on Atlantic marlin, NMFS prefers not to prohibit landings of Atlantic white marlin, at this time. The implementation of circle hook requirements is an important first step in reducing mortality in the directed billfish fishery. NMFS may consider catch and release only fishing options for Atlantic white marlin as well as other billfish conservation measures in future rulemakings, as necessary and appropriate. In regard to the Atlantic white marlin ESA listing review, any management measures in place at the time of the review would be considered during deliberations of the listing review team. NMFS cannot forecast the impacts of any particular management action on the outcome of the anticipated ESA listing review.

Comment 14: NMFS received a number of comments opposing alternative E7, Allow only catch and release fishing for Atlantic white marlin from January 1, 2007 to December 31, 2011. Those comments include: allowing only catch and release recreational fishing for Atlantic white marlin would have substantial adverse economic impacts on the recreational fishing community, including charter boat operators, shoreside facilities, and entire communities that host white marlin tournaments; NMFS underestimated the negative economic impacts of prohibiting landings of Atlantic white marlin; prohibiting landings of white marlin would do little to improve the population status of the species, the landings prohibition is unnecessary given the strong conservation ethic among U.S. anglers and as evidenced by the high release rate in the U.S. recreational fishery; the entire U.S. recreational fleet landing a few white marlin each year has little or no impact on billfish stocks; what is the rationale for prohibiting recreational landings of white marlin given the small number of recreational landings and the large economic impact generated by fishing for white marlin?; and, I don't believe in mandatory catch and release. It doesn't work and the public won't support it.

Response: In the Draft Consolidated HMS FMP, the Agency preferred a catch and release only alternative for Atlantic white marlin as well as a circle hook requirement for the tournament billfish fishery to maximize the mortality reduction and associated ecological benefits from the directed billfish fishery. NMFS received strong public comment opposed to the Atlantic white marlin catch and release alternative. As discussed under the response to Comment 13, NMFS prefers not to prohibit landings of Atlantic white marlin at this time, however, the Agency believes the implementation of the circle hook requirement is an important first step in reducing mortality in the directed billfish fishery. NMFS appreciates these comments and will consider catch and release only options as well as other billfish conservation measures in future rulemakings, as necessary and appropriate.

Comment 15: NMFS received a number of comments specifically pertaining to the potential impacts of alternative E7 (which would allow only catch and release fishing for Atlantic white marlin from January 1, 2007 to December 31, 2011) on tournament operations. Those comments include: the proposed rule would unfairly impact white marlin tournaments along the United States mid-Atlantic coast; NMFS should not prohibit tournament landings of Atlantic white marlin because few white marlin are landed in tournaments; NMFS should not prohibit landings of Atlantic white marlin in tournaments because they are the only cost and personnel effective means to scientifically sample Atlantic white marlin; alternative E7 would change the dynamic of fishing tournaments from contests where an anglers' luck or skill may prevail (biggest fish) to one where only skill would prevail (most fish) and would thus decrease participation; alternative E7 would create operational problems for tournament operators pertaining to verification of released fish; a fish killed and discarded as bycatch in the pelagic longline fishery has no direct economic impact. However, a fish killed as a tournament trophy or through release mortality contributes to a multi-million dollar industry and benefits the local economy and the nation as a whole; if alternative E7 is implemented, people will not go to tournaments to see the results; my concern for tournaments is that people like to see the result on the docks. If NMFS is going to full catch and release for white marlin, I do not believe that people will look at tournament videos of catches. The social aspect and behavior of tournament participants will be negatively impacted; decreasing numbers of tournament participants are participating in the White Marlin Open under the catch and release category; Maryland has the most to lose by prohibiting landings of white marlin. Ocean City is the white marlin capital of the world. Ocean City doesn't think that they should suffer the loss of the White Marlin Open; and, alternative E7 is unnecessary, will accomplish nothing for conservation, and would have a significant impact on billfish tournaments in the mid-Atlantic areas.

Response: As stated above, NMFS is not preferring the catch and release alternative for Atlantic white marlin in the Final Consolidated HMS FMP. Based on overwhelming public concerns for the social and economic impacts resulting from a shift to catch and release only fishing for white marlin, as well as the recognition of the limited ecological benefits relative to the potentially adverse social and economic impacts to billfishermen, tournaments, and other shore side businesses, as well as other reasons discussed under the response to Comment 13, the Agency has determined that it may be premature to implement this measure at this time. The Agency will, however, consider catch and release only options as well as other billfish conservation measures in future rulemakings, as necessary and appropriate.

Comment 16: NMFS received comment requesting that the Agency modify alternative E7 to allow for some tournament landings of white marlin. Those comments include: if the Agency cannot go with zero landings, then implement a cap for tournaments that already have a history of landing white marlin. Do not throw out the whole proposal; and, if NMFS prohibits landings of white marlin, the Agency should allow retention of recreationally caught white marlin in tournaments or when prominent billfish tournaments are scheduled.

Response: NMFS appreciates these comments and suggestions to address mortality in the directed billfish fishery. At this time, the Agency does not believe that only allowing Atlantic white marlin to be landed in tournaments is the most appropriate solution, as nearly all Atlantic white marlin reported as retained are landed in tournaments. Further, as some of these suggestions were not analyzed in the Draft Consolidated HMS FMP, they and are beyond the scope of this rulemaking. The Agency will, however, consider catch and release only options as well as other billfish conservation measures in future rulemakings, as necessary and appropriate.

Comment 17: The U.S. only lands less than 1% of the white marlin, so why do we worry about mortality?

Response: The United States is responsible for approximately 4.5 percent of white marlin catches in the Atlantic. Fishing mortality rates are a concern regardless of the size of the U.S. contribution because the current fishing mortality rate is more than eight-times the level that the species can sustain. As a steward of the fishery, it is appropriate for the United States to work toward reducing and limiting both domestic and international fishing mortality rates. The United States will continue its efforts to reduce billfish mortality domestically and through ICCAT at the international level.

Comment 18: NMFS received comment concerned with fishermen shifting target species if white marlin landings are prohibited. Those comments include: it's not desirable to make all of the fish under the ICCAT 250 marlin limit be blue marlin, which is what would happen if white marlin landings are prohibited; I would not support a prohibition on landing white marlin because we will kill more white marlin converting to targeting blue marlin; and, I oppose alternative E7 because fishing effort will be redistributed to different species.

Response: As stated above, NMFS does not prefer to prohibit landings of Atlantic white marlin, at this time. NMFS understands the concern over potential increases in Atlantic blue marlin mortality, given the species' overfished status. The preferred circle hook measure and measures to codify and ensure compliance with the ICCAT marlin landings limit would address mortality of both Atlantic blue and white marlin in the directed billfish fishery. The Agency may consider catch and release only options, as well as other billfish conservation measures, in future rulemakings, as necessary and appropriate.

Comment 19: Tournament spectators can still be involved in release tournaments if you use large viewing screens playing movie clips showing the fight and release of marlins. Dead fish on the dock doesn't allow for this type of participation.

Response: NMFS applauds the innovative efforts of some tournament organizers in working to limit marlin mortality. The Agency urges tournament organizers to be creative and to work to create formats which maximize the social and economic benefits from tournament operations while minimizing impacts to billfish resources.

Comment 20: NMFS received comment recommending that the Agency should implement measures to further reduce marlin mortality in other fisheries. Those comments include: NMFS should implement additional regulations on the pelagic longline fishery, which is responsible for the majority of marlin mortality, not impose landings restrictions on recreational fishermen; alternative E7 places a restriction on recreational fishermen without addressing the real issue; I am opposed to alternative E7 because recreational landings are not the problem; and, the billfish fishery was supposed to be managed for the recreational sector and NMFS has failed to make any meaningful reductions to the longline bycatch issue since 1997.

Response: In recent years, the Agency has undertaken multiple rulemakings intended to reduce bycatch and bycatch mortality in the pelagic longline fishery. Since implementing the 1999 FMP, NMFS has closed multiple areas to pelagic longline fishing, prohibited the use of live bait in the Gulf of Mexico, required the use of circle hooks, as well required the possession and use of dehooking devices. The closed areas and live bait restriction were implemented, in part, to reduce the bycatch of billfish in commercial fishing operations. Circle hook and release gear requirements were implemented to reduce sea turtle bycatch and bycatch mortality, however, these measures likely contribute to reductions in billfish release mortality as well. Further, as discussed in more detail under the response to Comments 1 and 3, recent data and estimates on post-release mortality indicate that the aggregate domestic recreational billfish mortality contribution may be equal to or greater than the aggregate domestic pelagic longline billfish mortality contribution, in some years.

Comment 21: NMFS received comment relating to the ESA listing review of white marlin. Those comments include: Would a prohibition on landings of Atlantic white marlin influence the potential listing of Atlantic white marlin under the Endangered Species Act?; and, selecting alternative E7 will not necessarily prevent an ESA listing of white marlin.

Response: In regard to the Atlantic white marlin ESA listing review, any management measures in place at the time of the review would be considered during deliberations of the listing review team. NMFS cannot forecast the impacts of any particular management action on the outcome of the anticipated ESA listing review.

Comment 22: The white marlin settlement agreement between NMFS and Turtle Island Restoration network does not preclude further regulation of billfish catches under the Magnuson-Stevens Act, but does require a complete reassessment of white marlin by the United States no later than 2007.

Response: The Agency intends to complete the Atlantic white marlin ESA Listing Review on or before December 31, 2007, as per the settlement agreement. NMFS realizes that it has the authority to impose additional restrictions on fisheries which interact with Atlantic white marlin, including the directed billfish fishery; however as discussed under the response to Comment 13, NMFS does not prefer a prohibition on landings of Atlantic white marlin at this time. The Agency believes that the implementation of circle hook requirements is an important first step in reducing billfish mortality in the directed billfish fishery. NMFS will consider catch and release only options as well as other billfish conservation measures in future rulemakings, as necessary and appropriate.

Comment 23: NMFS received comment inquiring about the Agency's legal authority to prohibit landing of white marlin. Those comments include: NMFS does not have the legal authority to restrict landings of Atlantic marlin to levels below ICCAT landings limits; I am opposed to alternative E7 because it is contrary to giving fishermen a reasonable opportunity to catch fish as required by ATCA.

Response: NMFS disagrees. The ICCAT 250 marlin landings limit could apply to both species combined, or one species alone, if landings of the other species were to be prohibited domestically. ICCAT Recommendation 00-13, and the subsequent recommendations that modified it, did not include species specific landings limits or any references to particular landings ratios of between Atlantic blue and white marlin. The ICCAT recommendations simply provided an aggregate annual landing limit that is not to be exceeded. Thus, if the landings of one marlin species were prohibited domestically, anglers would have 250 of the other marlin species available for landing, thereby providing a reasonable opportunity for anglers to fulfill their ICCAT landing limit.

Comment 24: Why is there a timeframe associated with alternative E7? The target should be MSY. The proposed timeframe seems political. A biological threshold seems more appropriate.

Response: NMFS felt that a five-year time frame would allow for adequate time to gauge the potential impacts of such measures on marlin stocks and determine, at that point, if the measures achieved the objectives of the fishery management plan. Additionally, NMFS is required to consider factors beyond biology in making management decisions. However, as noted in the response to Comment 13, NMFS does not to prefer this alternative in the Final Consolidated HMS FMP, but may consider landings prohibitions for Atlantic marlins and other species in future rulemakings, as necessary and appropriate.

Comment 25: Recreational fishermen would release all billfish if they thought it would do any good. However, it will not. The United States has always said that its catch is an insignificant piece of the Atlantic-wide take. The Draft FMP throws this concept out the window and directs its regulatory muscle at a tiny number of recreational billfish landings. It is as if NMFS is deciding to make them a prohibited species before the ICCAT stock assessment or the ESA status review.

Response: NMFS believes that the majority of recreational fishermen understand the value of catch and release fishing for Atlantic billfish as supported by the 75 to 99 percent release rate in this fishery. NMFS believes that catch and release fishing significantly reduces the domestic mortality contribution to the Atlantic-wide stock. The implementation of circle hook requirements for this sector of the fishery is anticipated to further reduce mortality by significantly reducing post release mortality. The Agency recognizes that other ICCAT nations kill significantly more billfish than the United States. In comparison to other nations, the U.S. landings and dead discards represent approximately 2.4 and 4.5 percent of total Atlantic landings of Atlantic blue and white marlin, respectively. Recent information suggests that the U.S. mortality contribution for Atlantic billfish may be significantly higher than previous estimates, given new studies on recreational post-release mortality. This rulemaking acknowledges the U.S. billfish mortality contribution and seeks to minimize this mortality in an appropriate manor.

Comment 26: The entire U.S. recreational fleet and charter/headboats are landing very few white marlin each year, approximately 227 total fish over the last three years. These landings have little or no impact on the stock, but generate tremendous social and economic benefits for coastal communities particularly where tournaments are held.

Response: NMFS acknowledges the significant social and economic benefits that the recreational billfish fishery provides to coastal communities. Additionally, NMFS acknowledges the limited conservation benefit that could be realized from a prohibition on the landings of Atlantic white marlin. This measure was preferred in the Draft Consolidated HMS FMP in addition to a circle hook requirement for tournament billfish fishermen. The Agency preferred these alternatives together in an attempt to maximize reductions in total Atlantic white marlin mortality resulting from the directed billfish fishery. However, as noted in the response to Comment 13, NMFS does not prefer this alternative in the Final Consolidated HMS FMP, but may consider landings prohibitions for Atlantic marlins and other species in future rulemakings, as necessary and appropriate. In the Final Consolidated HMS FMP, the Agency has preferred a non-offset circle hook requirement for HMS permitted vessels participating in billfish tournaments. This measure is anticipated to achieve a substantial reduction in mortality without the potential adverse economic impacts associated with a prohibition on white marlin landings.

Comment 27: NMFS received comment in support of alternative E8, which would allow only catch and release recreational fishing for Atlantic blue marlin. Additionally, one commenter added that alternative E8 may be needed if overfishing cannot be addressed.

Response: As a steward of the fishery, it is appropriate for the Agency to investigate potential options to reduce domestic mortality rates for blue marlin. This alternative was analyzed but not preferred in the Draft Consolidated HMS FMP or Final Consolidated HMS FMP due, in part, to potentially severe negative social and economic impacts, and for other reasons. The United States will continue its efforts to reduce billfish mortality both domestically and at the international level. Additionally, the Agency may consider catch and release only options for Atlantic blue marlin as well as other billfish conservation measures in future rulemakings, as necessary and appropriate.

Comment 28: NMFS received comment opposed to alternative E8, which would allow only catch and release fishing for Atlantic blue marlin from January 1, 2007 to December 31, 2011. Those comments include: we are vehemently opposed to alternative E(8), catch and release only for blue marlin. This is not a conservation issue, this is a socio-economic issue and to implement alternative E8 would be economic suicide; and, this alternative exceeds the ICCAT Recommendations for this species. NMFS should focus on compliance with ICCAT's recommendations. The U.S. directed billfish fishery should be allowed to harvest their allocated quota.

Response: The Agency did not prefer this alternative in the Draft Consolidated HMS FMP, however, it remains a valid management tool available to NMFS if warranted by stock status or other factors. NMFS' preferred alternative E6 would fully implement U.S. international obligations as per ICCAT Recommendation 00-13 and subsequent amendments to it. Additionally, the Agency has preferred other domestic measures in the Final Consolidated HMS FMP to reduce post-release mortality of billfish stocks.

Comment 29: By itself, alternative E8, which would allow only catch and release fishing for Atlantic blue marlin from January 1, 2007 to December 31, 2011, will not substantially reduce blue marlin fishing mortality unless 100 percent circle hook use, careful handling/release tools, procedures, and training are also required. Even then, unless such responsible actions are taken by foreign fisheries, especially in the directed fisheries, reducing the U.S. blue marlin fishing mortality is unlikely to have substantial conservation gains.

Response: NMFS agrees that improved handling and release skills may reduce domestic post-release mortality of billfish and that foreign fishing nations reducing total mortality through reductions in post-release mortality or other measures is critical to improving stock status of Atlantic billfish. NMFS did not consider the other measures suggested in Comment 29, such as careful handling and release tools, and thus, they are beyond the scope of the Final Consolidated HMS FMP, but may consider them in future rulemakings as necessary and appropriate. NMFS also agrees that international cooperation is essential to rebuilding Atlantic billfish populations and, as such, will continue to pursue international billfish conservation through ICCAT.

Comment 30: NMFS should not impose any new restrictions on HMS tournaments until after 2006.

Response: To provide Atlantic billfish tournament operators and participants time to acclimate to new regulations requiring the use of non-offset circle hooks when natural baits and or natural bait/artificial lure combinations are deployed from HMS permitted vessels that are participating in billfish tournaments, NMFS prefers January 1, 2007, as the effective date for these requirements. Barring unforeseen circumstances, no new restrictions would be imposed on HMS tournaments during 2006.

Comment 31: NMFS should consider a limited entry system for tournaments with a specific white marlin quota. Tournaments should be issued a permit and a quota for white marlin kills. Outside of tournaments, recreational vessel owners should be required to have a permit and to abide by a catch-and-release only policy. This would allow for the continuation of HMS tournaments, which provide the largest economic benefits. It would also facilitate more accurate counting of marlin, and provide some fish for biologists to conduct scientific research.

Response: NMFS appreciates the suggestions submitted to the Agency regarding potential additional tournament regulations and other management suggestions for the directed billfish fishery, and asks commenters to continue to submit innovative ideas to improve billfish management. While these suggestions are beyond the scope of this rulemaking because as they were not considered for analysis in the Draft Consolidated HMS FMP, they may be considered in future rule makings, as necessary and appropriate.

Comment 32: How many Atlantic white marlin are brought to the dock in tournaments each year?

Response: Between 1999 and 2004, inclusive, a total of 144 Atlantic white marlin were reported to the Recreational Billfish Survey as landed in tournaments. According to RBS data, landings of Atlantic white marlin in tournaments ranged from a low of eight in 2000, to a high of 36 in 1999, and averaged 24 annually for the six year period under discussion.

Comment 33: All fishing tournament participants should be required to use circle hooks, not just billfish tournament participants.

Response: NMFS believes that the current severely overfished stock status of Atlantic blue and white marlin and the proven ability of circle hooks to reduce post-release mortality support the preferred alternativeto require use of non-offset circle hooks in billfish tournaments. However, NMFS believes that the collection and analysis of more data on the impacts of circle hooks with regard to non-billfish species and fisheries is preferable prior to proposing additional hook and bait requirements for all HMS tournaments. NMFS may consider additional hook and bait requirements for other segments of the HMS recreational fisheries in future rulemakings, as appropriate.

Comment 34: I spend $3,000.00 a year on the White Marlin Tournament in Ocean City, Maryland. There are five fishermen on the boat pumping $15,000 into the Ocean City, Maryland economy on our boat alone. I do not want this tournament to end.

Response: NMFS is interested in seeing a healthy HMS tournament industry continue operations and continuing to provide benefit to the nation. The preferred alternatives regarding Atlantic billfish, implementation of non-offset circle hook requirements under certain conditions in billfish tournaments, and the ICCAT recreational marlin management measures, have been crafted in a way to minimize and mitigate potential adverse socio-economic impacts and are not expected to have significant impacts on billfish tournaments. Please refer to Chapter 4 of the Final Consolidated HMS FMP for additional detail regarding the estimated impacts of the preferred alternatives.

Comment 35: NMFS received several comments, including one from the Gulf of Mexico Fishery Management Council, in favor of increasing the minimum size limits for white and/or blue marlin, including: even a limited benefit is worth implementing; people interested in a smaller size limit are trying to make loopholes so they can catch and keep smaller fish; NMFS should increase the size limit of blue marlin because the Puerto Rico Game fish association has only taken 15 marlin all year in tournaments; increasing the size by approximately 40 percent, we would not have to apply the 250 fish cap; I support E4(b), increasing the minimum size of blue marlin because length and weight are correlated for blue marlin; increase the minimum size for blue marlin to 105" LJFL because most tournaments have a minimum weight of 400 pounds; increasing the minimum size for blue marlin would reduce the number of legal fish landed by one third; there should be at least a 106 inch minimum size limit to allow them to live for three more years and at least two years of spawning; and, I support a minimum size of 104 inches for blue marlin.

Response: The Agency does not prefer to implement an increase in minimum size for blue or white marlin at this time for several reasons. There are limited conservation benefits that might be attained by increasing the minimum sizes for white marlin because relatively few blue and white marlin are landed on an annual basis. In 2004, there were 118 blue marlin and 18 white marlin reported to ICCAT, comprised mainly of tournament landings, but also including North Carolina and Maryland catch card landings, and non-tournament landings reported to HMS. Since the majority of landings occur in tournaments and numerous tournaments already have a minimum size greater than the current minimum size, increasing the minimum size may not have any significant ecological benefits. The Agency has also received information that white marlin might not display a consistent length-weight relationship, meaning that very few of these fish would even attain the minimum size if it were increased.

As indicated above, the United States is currently well under its 250 fish limit imposed by ICCAT and therefore does not need to reduce landings to maintain compliance with international obligations at this time. Lastly, other management measures preferred in this action (mandatory use of circle hooks when using natural bait by HMS angling permit holders in tournaments that have a billfish prize category (alternative E2) and implementation of ICCAT recommendations that establish an in-season adjustment framework to increase minimum sizes or catch and release, if necessary (alternative E6)) should result in the desired conservation benefits by reducing landings if the ICCAT landings limit is approached in the future and reducing post release mortality of billfish caught in tournaments. The Agency may consider permanent modifications to the minimum size in the future as necessary to ensure compliance with international obligations and facilitate rebuilding of blue and white marlin stocks.

<u>Comment 36</u>: NMFS received numerous comments opposing the implementation of a minimum size for white and/or blue marlin as described in Alternative E4 (a), increase the minimum legal size for Atlantic white marlin to a specific size between 68 - 71" LJFL and Alternative E4 (b), increase the minimum size of blue marlin to a specific size between 103-106" LJFL, including: many tournaments already have a larger minimum size than what NMFS has implemented (*i.e.*, 110 inches or 400 lbs), therefore, no benefits will be realized from increasing minimum sizes; NMFS had already established minimum size limits for white and blue marlin and these limits should not be increased; because of the differences in growth patterns between white and blue marlin, an increased size limit for white marlin would be ineffective because these fish grow to size and then put on additional weight and not necessarily length; for white marlin weight and length are not closely correlated for fish above 62 inches LJFL; there is no rationale for increasing minimum sizes, because requiring circle hooks will accomplish the same thing; and, why implement increased size limits to avoid reaching the 250 mark, when the existing regulations seem to work?

<u>Response</u>: NMFS is not preferring an increased minimum size for white or blue marlin at this time, however, may consider modifications to minimum sizes in the future, as necessary. NMFS is unaware of the exact number of billfish tournaments that currently require a minimum size greater than the current Federal regulations, however, they are numerous. Since this is where the majority of reported landings occur, increasing the minimum size may not result in significant positive ecological benefits. In 2004, all but 3 of the 149 billfish reported to ICCAT were landed in tournaments. The United States has been well under its ICCAT allocated quota of 250 billfish/year every year (except 2002) and preferred alternative E6 would implement an increase in the minimum size for white and blue marlin if there is a possibility of approaching the landings limit in the future, mitigating the need to permanently increase minimum sizes to comply with the ICCAT landings limit. NMFS is also preferring an alternative mandating the use of non-offset circle hooks in billfish tournaments by HMS anglers when deploying natural baits to reduce post hooking mortality of released fish. Furthermore, because the majority of billfish are caught and released and catch rates are low (1.03 and 1.13 white and blue marlin per 100 hours angling, respectively), conservation benefits of increasing the minimum size may be minimal.

<u>Comment 37</u>: NMFS received comments both opposing and supporting alternatives E4(a) and E4(b) on the basis that a larger size limit would result in fishermen targeting larger, more fecund females and that NMFS should consider a slot limit to protect these larger, more fecund, marlin.

Response: Generally speaking, the likelihood of landing a more fecund female may increase if NMFS implemented a larger minimum legal size for blue marlin. For white marlin, the correlation between length and age or fecundity is less certain as current information indicate that white marlin may first put on length, and then weight. The fishery is generally opportunistic in nature, with a low CPUE, and with little ability for fishermen to "target" a large or small billfish. Further, the recreational billfish fishery is an overwhelmingly catch and release fishery. As such, while a larger legal minimum size may result in larger fish being landed, it is unlikely that anglers could successfully "target" larger billfish. NMFS appreciates the suggestion of analyzing a slot limit, and encourages anglers to continue to submit suggestions to the Agency, however that is beyond the scope of this rulemaking. As discussed in the response to comment 35, NMFS does not prefer this alternative at this time for the reasons discussed above, however the Agency may consider minimum size changes in the future.

Comment 38: NMFS received a comment asking what data were used to determine the billfish size limits.

Response Size distributions from Atlantic billfish tournaments held from 1995-1997 were used to analyze minimum size alternatives contained in Amendment One to the Billfish FMP (1999), which resulted in the current minimum legal sizes for Atlantic billfish. Minimum size ranges analyzed for this rulemaking were based on RBS landings of white and blue marlin in tournaments between 1999-2004.

Comment 39: NMFS received several comments in support of Alternative E5 (bag limit of one billfish/vessel/day), including: the fact that the United States is under such a limited quota for white and blue marlin (250 fish/year combined for both species); a bag limit might result in some high grading, but it should not be much of a problem; and, if the United States recreational sector is limited to 250 blue marlin and white marlin, it is inappropriate to let one boat come back with more than a single fish on any given day.

Response: NMFS recognizes the concerns of anglers regarding allocation of fish, particularly given the strict marlin landings limits placed upon the United States. As discussed in Chapter Four of the Final Consolidated HMS FMP, the United States is limited to 250 white and blue marlin, combined, on an annual basis, per ICCAT recommendation (00-13). Since 2001, the United States has only exceeded its annual 250 fish limit one time (2002) and that was because of a modification to the accounting methodology for compliance with ICCAT. Alternative E6 would implement ICCAT Recommendations on Recreational Marlin Landings Limits and is a preferred alternative in the Final Consolidated HMS FMP. At this time, there is little evidence that individual anglers are landing excessive numbers of marlin and potentially depriving other anglers of the opportunity to land a marlin. No multiple marlin trips have been reported to the Atlantic billfish and swordfish non-tournament landings system. However, NMFS may consider implementation of a bag limit in the future as necessary and appropriate.

Comment 40: NMFS received several comments objecting to alternative E5 (bag limit of one billfish/vessel/trip) for varied reasons, including: it would encourage the culling of fish; landing a few fish is not the issue; and, a bag limit will not reduce post-release mortality of billfish unless careful handling and release guidelines are followed.

Response: As discussed in the response to Comment 39, there is little evidence, at this time, that individual anglers are landing excessive numbers of marlin on individual trips and potentially depriving other anglers of the opportunity to land an Atlantic marlin. Further, overall landings of Atlantic marlin by U.S. recreational fishermen are low and well below the U.S. marlin landing limit. This is due, in large part to the conservation ethic of the anglers who choose not to land marlin that are legally available for landing. NMFS is always concerned about the potential for increases in culling and discards which may result from regulation. NMFS acknowledges the limited conservation benefit that a bag limit may produce and agrees that a bag limit alone would not reduce post-release mortality. NMFS is preferring a circle hook alternative (E3) in the Final Consolidated HMS FMP that is expected to reduce post-release mortality of Atlantic billfish.

Gears and Gear Restrictions

Comment 41: NMFS received comment in support of non-preferred alternative E2, which would require the use of circle hooks in all HMS recreational fisheries when using natural bait, including: only a fraction of the offshore recreational effort occurs in tournaments and that there would be a larger conservation benefit if circle hooks were required in all offshore fisheries. This alternative would facilitate enforcement by requiring that all HMS fishermen use circle hooks; NMFS should require circle hooks, careful handling/release tools and training for all HMS hook and line fisheries that interact with white marlin. This may be the only way for NMFS to prevent an ESA listing for white marlin. It cannot be ignored that the directed recreational fishery is likely the majority of domestic white marlin mortality, which is a minute percent. Unfortunately, even such a sacrifice may not be successful, unless adopted by other foreign fisheries, especially directed fisheries that interact with white marlin. Circle hooks are needed for all HMS fisheries, not just in tournaments. If an HMS fishery interacts with billfish, then it needs to use circle hooks.

Response: NMFS agrees that Atlantic billfish tournaments represent a subset of total fishing effort targeting Atlantic billfish and that there would be a greater conservation gain if circle hooks were required in all offshore recreational fisheries. NMFS is interested in all potential means of further reducing the post-release mortality of all HMS. However, NMFS believes that the collection and evaluation of additional data regarding the impacts of circle hook requirements on non-billfish species and fisheries prior to potentially mandating circle hooks for all HMS fisheries is preferable at this time. Other possible methods of reducing post-release mortality of all HMS could include the use of careful handling and release guidelines, release equipment and training, and may consider the feasibility of additional circle hook and other requirements in the future, as suggested by the commenter. NMFS also agrees that uniform fishery-wide circle hook requirements would likely facilitate enforcement. However, NMFS believes that the requirements for the use of circle hooks by permitted HMS fishermen when natural bait and natural bait/artificial lures are deployed in billfish tournaments, can be adequately enforced by NOAA Enforcement. NMFS further believes that given the conservation ethic of billfish anglers and the vested financial interests of billfish tournament participants in ensuring that all tournament participants compete under the same rules and conditions, that there would be significant self-enforcement of tournament circle hook requirements. The impacts of all regulations in effect, including circle hook requirements, when the Atlantic white marlin ESA Listing Review panel undertakes its deliberations would be taken into consideration by the panel when making its recommendations. NMFS cannot predict the outcome of these deliberations or the direct impact that any particular regulation may have on the outcome of such deliberations. Data indicates that the domestic directed fishery for Atlantic white marlin is responsible for a significant proportion of total domestic white marlin mortality, and may, in some years, exceed the level of mortality inflicted by the domestic pelagic longline fleet. NMFS also agrees that the directed fishery for Atlantic white marlin and the bycatch of this species in other fisheries, represent only a small portion of total Atlantic-wide on both an individual and a collective basis. NMFS also agrees that the recovery of this severely depleted fishery is dependant upon the cooperation of the international community. To this end, the United States has, and continues to aggressively pursue marlin conservation at the international level through ICCAT.

Comment 42: NMFS received conditional support for alternative E2, Effective January 1, 2007, limit all participants in Atlantic HMS recreational fisheries to using only non-offset circle hooks when using natural baits or natural bait/artificial lure combinations, including; I support the use of circle hooks with natural baits in all HMS fisheries, only if no J-hooks are allowed on board the vessel.

Response: Public comment during the scoping phase of this rulemaking was nearly unanimous on the need to allow the use of J-hooks with artificial lures when fishing for Atlantic blue marlin given the feeding behaviors of this species. Additionally, during analysis of circle hook requirements, NMFS found that the post-release mortality rate of Atlantic blue marlin caught recreationally on J-hooks appears to be comparable to post-release mortality rates of Atlantic white marlin caught recreationally on circle hooks. As such, the preferred alternative, which would require the use of non-offset circle hooks by permitted HMS fishermen when natural bait and natural bait/artificial lures are deployed all billfish tournaments, but would allow J-hooks to be used with artificial lures would reduce mortality in the directed billfish fishery by providing a significant and appropriate conservation benefit.

Comment 43: NMFS received comment opposing Alternative E2, including: I do not support alternative E2; I am concerned about requiring circle hooks in all HMS fisheries because dolphin, wahoo, king mackerel, and inshore fisheries could be impacted; how would NMFS determine who is in the HMS fishery?; I strongly oppose requiring the use of circle hooks in all HMS fisheries because circle hooks do not work on swordfish and the catch rate goes down; and there may be a problem in terms of enforcement with making circle hooks mandatory in all HMS fisheries (alternative E2), but it could work in Atlantic billfish tournaments (preferred alternative E3).

Response: NMFS acknowledges that requiring circle hooks in all HMS fisheries could have impacts on secondary fisheries, including dolphin, wahoo, king mackerel, and other inshore fisheries. As previously acknowledged, NMFS would prefer to collect additional data on the impacts of fishery-wide circle hook requirements. Such data collection would include HMS fisheries and may also include some non-HMS species and fisheries. The NED circle hook study indicated that deployment of circle hooks in the commercial pelagic longline fishery can result in a decrease in the number of swordfish caught under some oceanographic conditions. However, NMFS has only limited data on the impact of circle hooks in the recreational swordfish fishery. With regard to enforcement, NMFS believes that given the conservation ethic of billfish anglers and the vested financial interests of billfish tournament participants in ensuring that all tournament participants compete under the same rules and conditions, there would be significant self-enforcement of tournament circle hook requirements.

Comment 44: NMFS received comment on the adequacy of data and assumptions made in support of non-preferred alternative E2, which would require all HMS fishermen to use circle hooks when using natural bait and preferred alternative E3, which would require the use of non-offset circle hooks in billfish tournaments when using natural bait, including: NMFS cannot justify alternatives E2 or alternative E3. We do not believe that there is data to support the preferred alternative to require circle hooks in tournaments; and, the assumptions made to support the use of circle hooks are not specified in the text and leads one to believe that there are another set of assumptions, which would not support the use of circle hooks. Where the '23 percent overall' figure comes from is not discoverable in the text. It is one of those derived from assumptions that are not spelled out. The "65.7 percent" figure is right from the Horodysky and Graves study which, as argued, is simply insufficient to support any of the proposals.

Response: NMFS disagrees. The significant potential reductions in post-release mortality of recreationally caught Atlantic billfish that are anticipated to be achieved through the shift from J-hooks to non-offset circle hooks in the directed fishery provide ample support for implementing these measures. A potential reduction by two-thirds in the post-release mortality of Atlantic white marlin would be a landmark achievement in efforts to reduce fishing mortality. The shift to circle hooks in the directed Atlantic billfish fishery would be the most effective single management tool known to the Agency at this time to control post-release mortality, and would have the added benefit of having minimal impacts on the fishery. NMFS has relied on publicly available peer-reviewed scientific papers and available recreational data sets in developing its analyses. The assumptions made to support the use of circle hooks are clearly articulated in Chapter 4 of the Draft Consolidated HMS FMP. The reference to 23 percent overall reduction simply represents another statistical perspective on the anticipated reduction. It represents the change in absolute terms of reducing the estimated post-release mortality of Atlantic white marlin from 35 percent overall on J-hooks to approximately 12 percent overall on circle hooks (35 percent – 12 percent = 23 percent). The 65.7 percent figure represents the relative decrease in post-release mortality between J-hook and circle hook caught Atlantic white marlin (23 percent / 35 percent = 65.7 percent).

Comment 45: NMFS received a number of comments opposing preferred alternative E3, which would require the use of non-offset circle hooks by HMS permitted fishermen participating in billfish tournaments when using natural baits, including: we support the voluntary use of circle hooks and oppose mandating use of circle hooks in tournaments when using natural baits; if NMFS lets the recreational and charter/headboat fleet implement circle hooks on a voluntary basis, there will be 90% or better compliance at using circle hooks in a year or two; all south Florida tournaments have already voluntarily converted to circle hooks because they work, NMFS should ask tournament directors to add 5 extra points to anglers who used circle hooks to catch their fish; the number of fish saved will be ten times greater with the voluntary use of circle hooks rather than mandatory use, because the public does not like to be forced into doing things; individual tournaments should be allowed to determine which type of hook is most appropriate for their own needs; we agree with NMFS that promoting their use in tournaments will result in non-tournament anglers using them also, however it should not be required by regulation. Anglers will ignore the circle hook requirement at tournaments and will choose the best tackle to win. The blue marlin fishery is a mixed fishery and circle hooks do not work well on other tournament species such as wahoo; enforcing circle hook requirements will be difficult or impossible, especially at tournaments; circle hooks need to be phased in through angler education, because they are not enforceable at this time with no proposed specifications; NMFS should educate anglers on the use and benefits of circle hooks. NMFS needs to provide specifications on circle hooks (offset, circularity, shank length, size, gap, etc.) before requiring them; I don't want NMFS to advocate one hook manufacturer over another; NMFS needs written specifications that are clear to everyone in order to encourage compliance; Circle hooks could potentially have huge negative economic impacts on tournaments. They may decrease anglers' ability to catch non-billfish species that are landed for food or tournament winnings and as such may decrease willingness to participate in tournaments. This commenter also noted that the transition to circle hooks may require angler to invest between $15,000 and $20,000 in the way they fish tournaments; potential adverse economic impacts of implementing circle hooks may outweigh the conservation benefits derived from anticipated decreases in post-release mortality and as such other areas of conservation should be explored; anglers need to use J-hooks with artificial lures because of the way marlin feed; circle hooks do not work well for species that are trolled for at higher speeds; fish do not get gut hooked with J-hooks and artificial bait. Anglers need natural bait with circle hooks because the use of circle hooks for marlin fishing with lures will not work. Marlins smack the live bait with circle hooks and will get hooked in the mouth or bill so there is very little chance of gut hooking anything; the best way to catch them [blue marlin] is to slow troll natural bait with no drop back. Circle hooks may not work without a drop back; and, I oppose Alternative E3 because it falls short of what is needed.

Response: NMFS disagrees that there will be significantly greater use of circle hooks by anglers in the Atlantic billfish fishery if circle hook use remains voluntary, as opposed to being required under certain circumstances. Circle hook use has always been voluntary, and yet significant portions of the fishery continue to use J-hooks. Further, NMFS has been actively encouraging the use of circle hooks in HMS Fisheries since 1999. NMFS advocated circle hook use through placement of articles on circle hooks, held discussions with industry leaders to encourage their use and educate anglers on their benefits, recommended their use during public hearings and elsewhere, and encouraged circle hook use in tournaments by affording monetary support to provide incentives to anglers for their use. While there has been some progress in sectors of the fishery, anecdotal evidence suggest that substantial portions of the fishery continue using J-hooks as the standard hook. With the substantial conservation benefit associated with the use of circle hooks, recent information suggesting that the post-release mortality rate of Atlantic white marlin caught recreationally on J-hooks is substantially higher than previous estimates, data indicating that the mortality contribution of the recreational community toward Atlantic marlin may equal or exceed that of the pelagic longline fishery in some years, and the fact that circle hook requirements are already in place in the pelagic longline fishery, NMFS prefers to require non-offset circle by HMS permitted vessels participating in billfish tournaments when deploying natural baits at this time.

As discussed in the response to Comment 41 regarding enforcement of circle hook use in tournaments, NMFS believes that given the conservation ethic of billfish anglers and the vested financial interests of billfish tournament participants in ensuring that all tournament participants compete fairly under the same rules and conditions, there would be significant self-enforcement of tournament circle hook requirements. A general definition of circle hooks is included in the current Federal regulations governing Atlantic HMS, and NMFS understands the desire of tournament operators for additional circle hook specifications. However, as there are no industry standards with regard to hook specifications, NMFS is not prepared to provide an index of detailed hook specifications for each size circle hook that could be used in the recreational billfish fishery at this time. NMFS is continuing to work on various definitions of circle hooks that could be applied in future rule makings. Further, to ease concerns of anglers and simplify hook choice, NMFS is considering undertaking efforts to work with hook manufacturers to ensure that all hooks marketed as circle hooks are true circle hooks. NMFS disagrees that implementation of circle hooks requirements would cause large adverse economic impacts. NMFS has not seen evidence that participation in the fishery would decrease as a result of circle hook use. Further circle hooks have been shown to increase catch rates of some billfish and are, on average, slightly less expensive than J-hooks. Many commenters suggested that if circle hook use were left voluntary that compliance rates would be very high. The implication of commenters is that mandatory circle hook use, where all anglers are subject to the same regulations and conditions, would create some significant artificial cost or economic losses, while universal voluntary use of circle hooks would not create such costs, or that such costs would be somehow reduced or more acceptable to anglers. NMFS agrees that circle hooks may impact the catches of some non-HMS species, but cannot predict whether these catches may increase or decrease. However, to clarify, it should be noted that circle hooks would only be required to be deployed on HMS permitted vessels participating in billfish tournaments when natural baits or natural bait/artificial lure combinations are deployed. Based on public comment during scoping and an examination of post-release mortality data of blue marlin caught on J-hooks, NMFS would allow anglers on HMS permitted vessels in billfish tournaments to continue to use J-hooks with artificial lures. NMFS remains convinced that implementing non-offset circle hook requirements in Atlantic billfish tournaments when natural baits or natural bait/artificial lures are deployed from permitted HMS vessels would be an important and productive first step that would noticeably reduce mortality in the U.S. directed billfish fishery.

Comment 46: I am concerned that alternative E3 specifies circle hooks for "all Atlantic billfish tournament participants" rather than "HMS-permitted vessels in all Atlantic billfish tournaments."

Response: NMFS agrees. NMFS has made a technical clarification to the wording of the alternative to correct any misperceptions. NMFS did not intend, nor mean to imply, that regulations governing 50 CFR part 635 would apply to fisheries under the jurisdiction of the regional fishery management councils. It should be noted that NMFS analyzed this alternative from the perspective of applying circle hook requirements to only HMS-permitted vessels. To clarify, recreational circle hook requirements would apply only to Atlantic HMS permitted vessels participating in Atlantic billfish tournaments when deploying natural baits or natural bait/artificial lure combinations.

Comment 47: NMFS received a number of comments in support of preferred alternative E3, Effective January 1, 2007, limit all Atlantic billfish tournament participants to using only non-offset circle hooks when using natural or natural bait/artificial lure combinations, including: I support alternative E3, which would require circle hooks in Atlantic billfish tournaments; the results of recent circle hook studies are very compelling; NMFS should make a tough decision and implement circle hooks because they work; circle hooks can help with catch and release by reducing post-release mortality; NMFS must reduce mortality on marlin and should require circle hooks; limiting tournaments to circle hooks should reduce post-release mortality and provide additional conservation to billfish in the recreational fishery. Mandatory use is viable in the tournament setting. Outside of tournaments, NMFS needs an aggressive education program to promote the use of circle hooks; it is easy to get a circle hook back, and circle hooks have the benefit of not leaving any gear on the fish; circle hooks do work, save fish, and result in less hooking trauma; I support the use of circle hooks, but they may not work with combination baits; Our club adopted the use of circle hooks exclusively for all our tournaments, and we generally have a short ten to 15 minute release time on sailfish and white marlin, which minimizes stress on the animal; we support alternative E3, non-offset circle hooks with dead or live natural baits in tournaments, but a circle hook needs to be clearly defined; circle hooks should be mandatory for billfish tournaments; I support the mandatory use of circle hooks in billfish tournaments because it is enforceable. Tournament directors can give out hooks or inspect them; Tournaments are a good place to start implementing circle hooks; there is an international movement to use circle hooks; the U.S. needs to put circle hook requirements on paper to show ICCAT our commitment and credibility, rather than doing this voluntarily; the international focus needs to be on improving the post-release mortality of Atlantic billfish and requiring circle hooks in U.S. fisheries will help with this effort; and, the recreational sector claims they are not ready for circle hooks, but the commercial sector was forced to move to circle hooks. Anything that can be done to reduce mortality is good. The commercial fishing sector has stepped up to the plate, so the recreational community should do the same.

Response: NMFS agrees with comments suggesting that implementing circle hook requirements in tournaments would likely reduce post-release mortality of billfish caught in tournaments, and should help reduce the overall fishing mortality rate of Atlantic marlins. Recent data indicates that switching to circle hooks could reduce post-release mortality rates for individual fish by approximately two-thirds. NMFS also agrees with comments indicating the mandatory circle hook use in tournaments would be viable and enforceable for the reasons discussed in the response to Comment 41. NMFS also concurs with the need to continue educational efforts to better educate anglers in the use and benefits of circle hooks, as noted by some commenters, and encourages anglers to minimize fight times, release fish quickly, and to release fish in a manner the maximize the probability of survival to further minimize billfish mortality. NMFS agrees with commenters who suggest that there is growing international momentum to use circle hooks in various fisheries. However, NMFS sees a need for continuing pressure on the international community to implement circle hook use more rapidly. As discussed, in the response to Comment 46, a general definition of circle hooks is included in the current Federal regulations governing Atlantic HMS, and NMFS understands the desire of anglers and tournament operators for additional circle hook specifications. However, an index of detailed hook specifications for each size circle hook that could be used in the recreational billfish fishery is not available at this time. NMFS is continuing to work on various definitions of circle hooks that could be applied in future rule makings. Further, to ease concerns of anglers and simplify hook choice, NMFS is considering undertaking efforts to work with hook manufacturers to ensure that all hooks marketed as circle hooks are true circle hooks. Implementing circle hooks requirements in portions of the domestic recreational billfish fishery would provide a means of applying additional pressure to the international community on this issue, and further demonstrating the commitment of the United States to billfish conservation. Improving post-release mortality in both the commercial and recreational fisheries is a critical component of halting the current decline of Atlantic marlin populations. NMFS agrees that the commercial fishing sector is subject to a significant number of restrictions to reduce bycatch and bycatch mortality, however, the Agency is cognizant of the fact that recreational and commercial sectors are unique and need to be managed in ways most appropriate for each of them, as well as for the health of the fish stocks under consideration. In some instances, this may mean implementing comparable measures between sectors of the fishery, but in other cases, such actions may not be appropriate. With regard to circle hook requirements analyzed in this rulemaking, the data overwhelmingly indicate that circle hooks can substantially reduce post-release mortality in the recreational billfish fishery.

Comment 48: NMFS received a number of comments conditionally supporting implementation of circle hooks in billfish fisheries, including: the use of circle hooks should be voluntary until NMFS develops a specification on the off-set and shank length; we support alternative E3, circle hooks in tournaments, provided it includes provisions to conduct cooperative scientifically valid research, determine and specify minimum design specifications for circle hooks, require the handling and release equipment be on board, and allow for voluntary participation in handling and release workshops. The current definition for a circle hook is not adequate. Rather, NMFS needs to outline minimal design specifications as was done in the NED experimental design; and, if voluntary conversion to circle hooks is low, then I would support their mandatory use.

Response: As discussed fully in Chapter 4 of the Final Consolidated HMS FMP and in the response to Comment 45, NMFS believes it is appropriate to implement particular circle hook requirements for HMS permitted vessels participating in Atlantic billfish tournaments at this time, despite a lack of detailed circle hook specifications. NMFS is continuing to work on development of more detailed circle hook specifications, but believes that the conservation benefits derived from implementation of circle hook requirements at this time outweigh any possible adverse impacts that may result from a lack of detailed circle hook specifications. NMFS has not considered or proposed implementing any restrictions on scientific research in this Final Consolidated HMS FMP. Interested parties would be able to conduct scientific research as appropriate under the preferred circle hook alternative. Should the design of such scientific research call for utilizing gears or undertaking activities prohibited by regulation, interested parties may apply for either an Exempted Fishing Permit or Scientific Research Permit, whichever type of permit would be most appropriate. Requiring handling and release equipment and workshops for the recreational sector is beyond the scope of this rule making, but may be considered in a future rule making, if appropriate. NMFS is preferring mandatory shark identification workshops for Federally permitted shark dealers, as well as mandatory protected resources identification and release and disentanglement workshops for longline and gillnet vessel owners and operators. However, to the extent possible these workshops would be open to other interested parties, including recreational fishery participants. As previously discussed, NMFS is unable to determine what percentage of billfish trips deploy circle hooks. However, the Agency believes that the data clearly demonstrate significant conservation benefits can be derived from the use of circle hooks in the portions of the recreational billfish fishery.

Comment 49: NMFS received comment regarding the timing of implementing possible circle hook requirements suggesting the need for a short phase-in of circle hooks into tournaments and the recreational fishery and advance notice of impending circle hook regulations to allow for changes in the production of rules and advertising, and to inform tournament participants of potential circle hook requirements. Commenters also suggest that increased educational efforts should be undertaken to promote and enhance the growing recreational awareness and use of circle hooks.

Response: NMFS agrees. NMFS surveyed a number of tournament operators in the Atlantic, Gulf of Mexico, and Caribbean to better understand various aspects of tournament operations. NMFS determined that a delayed date of effectiveness of between four and six months would likely provide adequate time for tournament operators and participants to adjust tournament rules, formats, and advertising, as necessary, as well as to notify anglers of changes, and allow anglers to adjust fishing practices and take other steps, as appropriate, to minimize any potential adverse impacts stemming from preferred circle hook requirements. As such, given the anticipated publication date for the Final Consolidated HMS FMP of July 2006, and the anticipated publication date for the Final Rule of August 2006, NMFS prefers to maintain the effective date of January 1, 2007, for preferred alternative E3. This effective date would be consistent the effective date proposed for preferred alternative E3 as contained in the Draft Consolidated HMS FMP. NMFS has also had a public circle hook public education program in place for a number of years to educate anglers and encourage the use of circle hooks in recreational fisheries.

Comment 50: Why would the recreational fishery not be allowed to have offset hooks, while the PLL fishery can have a 10% offset?

Response: Pelagic longline circle hook and bait requirements were developed to specifically address bycatch and bycatch mortality of Atlantic sea turtles, while the preferred circle hook requirements for Atlantic HMS permitted fishermen participating in Atlantic billfish tournaments are intended to reduce post-release mortality of Atlantic billfish. In other words, they were developed to address different issues. The pelagic longline fishery may only possess circle hooks offset up to 10 degrees if they are 18/0 or larger in size. The offset was determined to be necessary to allow the use of large baits (*e.g.* whole Atlantic mackerel), which can act as a shield to the hook. The recreational billfish fishery typically uses significantly smaller hooks (sizes 8/0 and 9/0), which, if offset, may diminish the conservation benefit of circle hook requirements by resulting in higher rates of deep hooking and soft tissue damage to vital organs.

Comment 51: NMFS received comments on the potential applicability of circle hook requirements of preferred alternative E3, which would require billfish tournament participants to use non-offset circle hooks when deploying natural baits, including: would participants in tournaments that offer prizes for both billfish and non-HMS species be required to use circle hooks for the non-HMS species; and would the circle hook requirement apply to vessels fishing in U.S. waters, or to all U.S. flagged vessels everywhere?

Response: HMS permitted vessels participating in Atlantic billfish tournaments would be required to use non-offset circle hooks when deploying natural baits and natural bait/artificial lure combinations. However, HMS permitted vessels participating in Atlantic billfish tournaments would be able to deploy J-hooks on artificial lures. Circle hook requirements would pertain to U.S. flagged vessels possessing an HMS permit and participating in an Atlantic billfish tournament regardless of where that vessel was fishing.

Comment 52: NMFS received a number of comments and suggestions on potential gear and bait restrictions or policy programs beyond those analyzed in the Draft Consolidated HMS FMP, including: there should be no live bait fishing; prohibit the use of "live bait" in all HMS J-style hook fisheries and areas known to have billfish interactions; the use of kites and offset circle hooks may be more damaging than J-hooks; NMFS should allow only one hook per lure to reduce foul hooking and injuries to the fish and anglers; NMFS should implement minimum line test requirements during the season or in tournaments; and, NMFS should create a buyback program for J-hooks; and, it would be useful to convene a summit of HMS tournament directors to work on a protocol to get anglers to switch to circle hooks.

Response: NMFS appreciates the thoughtful and creative suggestions made by commenters to address billfish issues. However, these ideas were not considered in the Draft Consolidated HMS FMP and, as such, are beyond the scope of this rulemaking. These issues may be may be considered in a future rulemaking if appropriate.

Comment 53: NMFS received a number of questions specific to tournaments landings of billfish in South Carolina, including: how many billfish are caught annually in South Carolina tournaments? What is the number harvested for weigh-in versus number released? What is the estimated mortality for those released? What is the financial gain to the state and does this offset the number of fish kept or lost?

Response: An examination of the Recreational Billfish Survey, which records tournament landings, indicates that there were an average of four Atlantic billfish (blue marlin, white marlin, and sailfish) landed in South Carolina in tournaments annually for the period 1999 – 2004, inclusive. There was a high of seven (blue marlin) landed in tournaments in South Carolina in 1999, with a low of one (blue marlin) landed in 2002. In total, for the period 1999 - 2004, there were 25 billfish retained and 73 released in tournaments, as reported through the RBS. According to RBS data, there were between seven and eight (7.6) tournaments per year conducted in South Carolina. Rounding-up to an estimate of eight tournaments per year, and applying an average value of $1,375,481 per tournament, the estimated impact to coastal South Carolina equates to $11,003,848. NMFS does not understand the implication of the question "does this [value] offset the number of fish kept or lost." If the commenter is suggesting that the preferred alternatives to address billfish mortality would result in the cancellation of South Carolina's tournaments and the loss of the estimated $11 million dollars to the state, NMFS disagrees with this suggestion. First, circle hook requirements would not likely result in decreased tournament participation, given the high catch and release rate practiced by billfish anglers, the fact that all tournament anglers would have to abide by the same circle hook requirements from Maine to Texas to the U.S. Caribbean, the already low number of marlins landed in South Carolina, and the fact that marlin are available for landing. Further, NMFS does not believe that South Carolina tournaments are likely to realize any impacts from the 250 recreationally landed marlin landing limit, because with the switch to the calendar year fishing year management cycle, South Carolina tournaments all occur before the date at which estimated impacts may occur, under the assumptions made in Chapter four of the Final Consolidated HMS FMP.

Circle Hooks And/Or Post-Release Mortality Data

Comment 54: NMFS received several comments on the adequacy of some of the studies cited in development of the Draft Consolidated HMS FMP, including: the Horodysky and Graves study is flawed because it is based on a sample size of only 40 fish and because they landed the fish in 30 - 40 minutes which is unreasonable. Most anglers will land their fish much more quickly in 5 - 10 minutes thus reducing stress on the fish and increasing survival rates; the Horodysky and Graves study concludes that there is a 35 percent greater likelihood that a white marlin will survive release if taken on a circle hook, rather than a J-hook. Other factors resulting in post-release mortality must come into play; *e.g.*, no one would expect fish fought for 83 minutes ((DR02-04) or 46 minutes (VZ03-11) to survive and it has nothing to do with the type of hook used. Yet, the study takes into consideration nothing but the type of hook used to conclude that hook type alone results in a lower mortality rate; I have problems with one of the circle hook studies cited because one of the authors was sent to a Guatemalan fishing lodge, and the captains on these vessels were required to use offset circle hooks only versus non-offset circle hooks. The study was done in the Pacific Ocean. The methods in the study do not represent how fishermen fish. This study does not have a comparison of circle hooks with J-hooks.

Response: NMFS appreciates the concerns expressed over the methods and or validity of the studies cited in the Final Consolidated HMS FMP. Nevertheless, the studies cited in Final Consolidated HMS FMP have been peer-reviewed and constitute the best available science regarding the topics under discussion. NMFS would appreciate receipt of additional relevant peer-reviewed studies on these subjects of which commenters may be aware. NMFS is always searching for, interested in applying, and required to utilize the best available science on relevant issues.

Comment 55: NMFS received a number of comments which provided research and data collection recommendations or asking about the availability of certain data, including: we recommend research to determine the impacts of circle hooks on catch rates, not only of billfish, but other species such as dolphin, wahoo, and tuna; NMFS should conduct studies on the post-release mortality of sailfish with circle versus J-hooks in the Atlantic Ocean. Do not rely on studies from the Pacific Ocean because the sailfish are different between the oceans; more data via PSAT tagging and angler experience is needed to provide a foundation for any drastic change in regulations pertaining to marlins; has there been any research on exhaustion mortality, *e*.g., fighting fish for different times on different gear (drop back, hook type, etc) and the resultant impacts on mortality?; we see big blue marlin occasionally and are wondering about post-release mortality and catch-and-release rates. Predation should be considered in estimating post-release mortality; NMFS should conduct additional studies to identify more effective ways for the pelagic longline fishery to reduce bycatch of marlin and sharks; NMFS should evaluate the impacts of using “live bait” and circle-style hooks as well as careful handling and release tools and procedures; and, NMFS should further investigate how the feeding and behavior of Atlantic blue marlin may affect catch rates with circle hooks.

Response: NMFS appreciates these research recommendations as a way to help guide future research efforts and funds. The Agency is always looking for, and appreciative of, relevant research suggestions and additional data that can benefit the management of Atlantic HMS. While these suggestions are beyond the scope of this rule making, the answers to many of the research suggestions could potentially benefit management. Some of the research suggestions contributed by commenters are currently under investigation by either NMFS or private sector entities. NMFS will consider these suggestions in the future, as appropriate.

Comment 56: Off-set circle hooks show less mortality than non off-set circle hooks.

Response: NMFS is unaware of data showing off-set circle hooks result in a lower mortality rate than non-offset circle hooks. NMFS would appreciate being supplied with any such data that may support this contention, and will consider it in future rule makings, as appropriate.

Comment 57: The Agency has not published specifications for circle hooks and I am requesting clarification of the definition of non-offset circle hooks by NMFS because, in part, each manufacturer creates its own definition for non-offset circle hooks.

Response: A general definition of circle hooks is included in the current Federal regulations governing Atlantic HMS, and NMFS understands the desire of tournament operators for additional circle hook specifications. The current definition of a circle hook, as per, 50 CFR Part 635 is: "A circle hook means a fishing hook originally designed and manufactured so that the point of the hook is turned perpendicularly back toward the shank to form a generally circular or oval shape." NMFS is continuing to work on various definitions of circle hooks that may lead to a more refined hook definition in the future. At this time, however, an index of detailed hook specifications for each size circle hook that could be used in the recreational billfish fishery is not available. There are no industry standards with regard to hook specifications. As detailed under the discussion of preferred alternative E3, in Chapter 4 of the Final Consolidated HMS FMP, NMFS finds that it is appropriate to require the use of non-offset circle hooks in portions of the recreational billfish fishery at this time in an effort to reduce post-release mortalities in the recreational billfish fishery. Further, to ease concerns of anglers and simplify hook choice, NMFS is considering undertaking efforts to work with hook manufacturers to ensure that all hooks marketed as circle hooks are true circle hooks.

Comment 58: The Maryland Department of Natural Resources submitted a comment indicating that they would be willing to work with NMFS to teach voluntary use of circle hooks, noting that anglers must learn how to fish these hooks and that education for the offshore fishermen is necessary.

Response: NMFS appreciates the State of Maryland's willingness to work with the Agency to reach out to anglers and educate them on the use of circle hooks. Circle hooks have been to shown to effectively reduce post-release mortality of many species and while having little impact on rates of catch. The Agency hopes that the offer by the State of Maryland will remain open if the preferred alternative to implement circle hook requirements is finalized.

Comment 59: NMFS' statement in the Draft Consolidated HMS FMP that increases in recreational fishing effort and stable fishing mortality indicate that white marlin are decreasing in number is incorrect. Fishing mortality has not increased, the recreational fishing community is releasing more of them.

Response: NMFS was unable to locate this statement in the Draft Consolidated HMS FMP. However, NMFS believes that the commenter may have intended to state that increases in recreational fishing effort and stable landings of white marlin indicate that white marlin may be decreasing in number. The number of recreationally landed Atlantic white marlin reported to ICCAT between 2001 and 2004 varied considerably, ranging from a high of 191 in 2002 to a low of 23 in 2003. The number of Atlantic white marlin reported to NMFS via the Recreational Billfish Survey has remained relatively stable over the same period. However, the release rate of live Atlantic white marlin in the recreational fishery has also remained stable. In the face of increased effort, a lack of increases in landings, when coupled with stable release rates implies decreased angler success. Decreased angler success could be attributable to a number of factors, and one legitimate assumption, given that the fishing mortality rate of Atlantic white marlin is more than eight times higher than the population can sustain, is that it could be the result of diminished populations. Furthermore, as discussed in Chapter 4 of the Final Consolidated HMS FMP, the current estimate of recreationally caught Atlantic white marlin post-release mortality is now significantly higher than previous estimates, so an increase in the number of releases would be anticipated to result in additional mortalities.

Comment 60: Six to ten thousand white marlin are caught each year by U.S. fishermen, both commercial and recreational. I have data showing that commercial mortality is higher than recreational mortality in general, but in the past 6 years, the recreational mortality has exceeded the commercial mortality.

Response: New post-release mortality estimates allowed NMFS to examine total mortality contributions of the commercial and recreational sectors regarding Atlantic white marlin over the past four years. Mortality varies greatly by year and data set. In some years, using some data sets, the recreational mortality contribution appears to exceed the commercial mortality contribution and in some years the reverse appears to be true. Please see Appendix C in the Final Consolidated HMS FMP for more detailed information by year and fishery sector. Appendix C provides a ranges of mortality estimates, but does not attempt to definitively identify mortality contributions, rather, the estimates provided in that table are intended to provide reference points for discussion. NMFS will continue to examine this issue as new and refined data become available.

Elimination of the 'No Sale' Exemption

Comment 61: The "no sale" exemption for Atlantic billfish should be removed. The sale of all billfish in the United States should be prohibited.

Response: NMFS agrees that the exemption to the no sale provision for Atlantic billfish should be removed and prefers to do so. However, NMFS does not agree that the sale of all billfish, including those from Pacific stocks should be prohibited. Stock status of Pacific billfish is currently unknown, and as such a nation-wide ban on the sale of billfish may not be appropriate. The Certificate of Eligibility program in place for Atlantic billfish is designed to ensure that no Atlantic billfish enter the stream of commerce, while allowing Pacific billfish to legally be sold. However, the Agency may reconsider a prohibition on the sale of Pacific billfish in the future, as necessary and appropriate.

Comment 62: The potential ecological impact of billfish sales from fishermen in Puerto Rico would be minimal because the individuals who may sell Atlantic billfish take only 10 – 15 fish a year, and only keep fish that come to the boat dead in an effort to minimize waste.

Response: NMFS has little data on the extent of illegal sales of billfish in Puerto Rico, and as such cannot verify the veracity of the commenter's claims. As such, the Agency cannot assess their impact. NMFS has received a significant number of anecdotal reports of sales of Atlantic marlin in Puerto Rico. The number of these anecdotal reports suggests that a sizable number of Atlantic marlin may be illegally sold and implies that more than just those fish that come to the boat dead are illegally entered into commerce.

Comment 63: The sale of billfish is legal outside of the United States. Do foreign vessels fishing in waters of the United States need to obtain U.S. fishing permits and abide by U.S. regulations?

Response: The sale of Atlantic billfish is legal in most ICCAT nations. Foreign commercial vessels are not allowed to fish in waters of the United States without explicit permission from the Secretary of Commerce and the Secretary of State, and being provided a Total Allowable Level of Foreign Fishing (TALFF). Such vessels would be subject to strict regulation, and a number of conditions that would not ordinarily apply to U.S. vessels. Foreign flagged recreational vessels may obtain an HMS Angling category permit. In such cases, the U.S. recreationally permitted foreign flagged vessels would be subject to U.S. regulations.

Comment 64: How many comments were received from Puerto Rico on the proposed removal of the no sale exemption for billfish?

Response: No comments from Puerto Rico directly addressed removal of the no sale provision. However, one commenter from Puerto Rico requested increased law enforcement at establishments that may illegally sell Atlantic billfish, such as restaurants. NMFS interprets this comment to be supportive of prohibiting sale of Atlantic marlin. Further, the Caribbean Fishery Management Council adopted a motion supporting elimination of the exemption to the no-sale provision in August of 2005.

General Billfish Comments

Comment 65: The proposed Atlantic billfish alternatives are in direct conflict with the 1988 Billfish FMP and the 1999 Billfish FMP Amendment's stated objective of "Maintaining the highest availability of billfishes to the United States recreational fishery by implementing conservation measures that will reduce fishing mortality."

Response: NMFS disagrees. The preferred Atlantic billfish alternatives are consistent with the stated objective of maintaining the highest availability of billfishes to the United States recreational fishery by preferring conservation measures that would reduce fishing mortality. Recent studies by Cramer (2005) and Kerstetter (2005-in press) and analyses in the Final Consolidated HMS FMP indicate that recreational fishing activities contribute significantly to Atlantic billfish mortality. Because biomass levels of both Atlantic blue and white marlin are currently very low, it is imperative for NMFS to implement conservation measures on the domestic recreational Atlantic billfish fishery to reduce post-release mortality and better ensure the highest, long- term availability of these important species to the United States recreational fishery. The preferred management measures, specifically the requirement to utilize non-offset circle hooks when deploying natural bait in billfish tournaments, would be an important step towards accomplishing this objective.

Comment 66: NMFS must determine the sustainable biomass for spearfish and sailfish independently, as soon as possible.

Response: Due to the highly migratory nature of these species, stock assessments are conducted by the Standing Committee on Research and Statistics (SCRS) of ICCAT. The last assessment for sailfish was conducted in 2001. The SCRS expressed concern about the incomplete reporting of catches, lack of sufficient reports by species, and evaluations of new methods used to split the sailfish and spearfish catch and to index abundance. The SCRS recommended that all countries landing sailfish/spearfish, or having dead discards, report these data to the ICCAT Secretariat. The SCRS also indicated that it should consider the possibility of a spearfish "only" stock assessment in the future.

Comment 67: I support decreasing the mortality on Atlantic billfish as much as possible; the focus of billfish management has to be on post-release mortality.

Response: The preferred management measure alternative E3, which would require the use of non-offset circle hooks with natural bait in billfish tournaments, is intended to reduce the post release mortality of Atlantic billfishes. A recent study by Horodoysky and Graves (2005) has shown that circle hooks can reduce post-release mortality on white marlin by as much as 65 percent, when compared to J-hooks.

Comment 68: Billfish conservation is an international problem, and the focus has to be international.

Response: NMFS agrees that billfish conservation is an issue that must be addressed at the international level. Nevertheless, given the very low biomass levels of Atlantic blue and white marlin, and the importance of these species to the domestic recreational fishery, it is prudent, and consistent with the precautionary management approach, to implement measures to reduce post-release mortality to the extent practicable in the domestic recreational Atlantic billfish fishery. The United States will continue to vigorously pursue international agreements at ICCAT to reduce billfish mortality levels caused by foreign fishing vessels.

Comment 69: NMFS should designate all marlin, spearfish, sailfish, and sharks as catch-and-release species, and allow fishing for these species only with rod and reel and circle hooks.

Response: In the Draft Consolidated HMS FMP, NMFS proposed a prohibition on landings of Atlantic white marlin. Although there was some support for this measure, many commenters indicated that a white marlin landings prohibition was unnecessary, and that it would produce significant adverse social and economic impacts. After much consideration, NMFS does not prefer this alternative at this time. Many HMS recreational anglers have a strong conservation ethic, and already practice catch and release fishing for white marlin and other species. Furthermore, the commercial sale of Atlantic billfish is prohibited, landings of longbill spearfish are prohibited, and several shark species may not be landed. Strict quotas and other management measures based upon the best available scientific information govern commercial landings of most other shark species, while the recreational sector is required to adhere to shark bag limits and minimum size restrictions. As a result, mandatory catch and release in the recreational sector may not be necessary at this time and prohibiting all commercial shark landings is not necessary. Domestically, the most important factor in conserving billfish is to improve their survival after the catch and release experience. NMFS prefers alternative E3 in the Final Consolidated HMS FMP, which requires HMS permitted fishermen to use non-offset circle hooks when using natural baits in billfish tournaments. This measure would complement existing circle hook requirements in the commercial PLL fishery by reducing post-release mortality and contributing to the rebuilding of Atlantic billfish stocks.

Comment 70: The economic effects associated with the proposed billfish measures go far beyond the initial impacts that were analyzed in the Draft Consolidated HMS FMP.

Response: NMFS appreciates this comment. Economic impacts are a fundamental consideration in the Agency's decision making. Oftentimes, however, the data are not sufficient to predict, for example, how recreational anglers might react to proposed management measures. If the measures change, would anglers switch to other species, quit fishing altogether, take fewer trips, or travel shorter distances? Each of these potential behavioral reactions would impart different economic impacts. One of the primary reasons for conducting public hearings and soliciting public comment is to obtain supplemental information on the analyzed impacts associated with proposed management measures. All written comments, as well as those received verbally at public hearings, were considered by the Agency in the selection of preferred management alternatives. NMFS will continue working to improve available social and economic data and analyses.

Comment 71: NMFS should require a Billfish Certificate of Eligibility to help improve compliance, facilitate enforcement and improve information on billfish shipments coming into the United States.

Response: A Certificate of Eligibility for Billfishes is required under 50 CFR 635.31(b)(2)(ii), and must accompany all billfish, except for a billfish landed in a Pacific state and remaining in the state of landing. This documentation certifies that the accompanying billfish was not harvested from the Atlantic Ocean management unit, and identifies the vessel landing the billfish, the vessel's homeport, the port of offloading, and the date of offloading. The certificate must accompany the billfish to any dealer or processor who subsequently receives or processes the billfish. The certificate of eligibility helps to maintain the recreational nature of Atlantic billfish fishery, with no commercial trade.

Comment 72: NMFS received a number of comments pertaining to pelagic longline fishing, its impact on billfish, and suggestions for new management measures that should be researched or implemented. The comments included: new data shows that just under 65 percent of all white marlin caught as bycatch on pelagic longline vessels are dead, or die soon after being released alive; it makes absolutely no sense to close fishing to the group that kills less than one percent of the fish they catch while allowing the other group that kills almost 100 percent of the billfish they catch to continue doing so. The major source of billfish mortality (pelagic longlining) has still not been satisfactorily regulated to offer these fish adequate protection; the commercial pelagic longline fishery is causing the decline in billfish abundance; billfish were making a comeback until longline fishing of their prey species, dolphin and wahoo, was allowed. Our club used to tag and release 35 to 40 marlins per year. Now we see only five to six marlin tags and most of them are from the other side of the Gulf Stream; NMFS should limit the length of pelagic longlines; and, limit the number of hooks that pelagic longline fishermen are allowed to set, and require that pelagic longline vessels retrieve their gear every three hours to reduce billfish mortality.

Response: Many commenters stated that the recreational HMS fishery has only a minor impact on billfish populations relative to the commercial PLL fleet, and that additional management measures should be imposed upon the commercial PLL fleet rather than upon the recreational sector. To confirm the veracity of this long-held assumption, NMFS examined data from the pelagic longline logbook program and the RBS, MRFSS, and LPS databases. New information on recreational and commercial post-release mortality rates (Horodysky, 2005, and Kerstetter, 2006, respectively), when combined with information from these data bases, indicates that in some years, the total mortality contribution of the domestic recreational billfish fishery may equal or exceed the total mortality contribution of the domestic pelagic longline fleet with regard to Atlantic white marlin. As described in Appendix C of the Final Consolidated HMS FMP, estimates of total annual recreational white marlin mortality, which combines landings, dead discarded fish, and estimated post-release mortalities, vary greatly by data set and year. MRFSS and LPS databases indicate that for the period 2001 – 2004, inclusive, that the aggregate level of recreational mortality was approximately three times and two times higher, respectively, than aggregate mortality contributions (dead discards and estimated post-release mortality) of the domestic pelagic longline fleet. Using RBS data, a known subset of recreational effort, estimated aggregate domestic recreational mortality with regard to white marlin appears to be about 71 percent of estimated total domestic pelagic longline mortality for the same period. When taken in combination, and in consideration of the limitations and uncertainties associated with each data base involved, two general conclusions can be drawn: (1) The aggregate domestic recreational fishing mortality contribution is higher than previously thought with regard to Atlantic white marlin; and, (2) there is more parity between the mortality contributions of the domestic recreational and domestic pelagic longline fleets than previously thought. Cramer

(2005) and Kerstetter (2006) also examined this same issue to varying degrees. Both papers support the same basic conclusion drawn in this Final Consolidated HMS FMP, that in some years, the domestic recreational billfish fishery may impose equivalent or even greater levels of mortality on Atlantic white marlin populations than the domestic pelagic longline fishery. This finding, which is contrary to the widely held beliefs, appears to be a result of new data indicating higher post-release estimates for the recreationally released white marlin and the size differential between the two fisheries. Presently, the domestic commercial PLL fleet is regulated by a limited access permit program; observers; vessel upgrading restrictions; year-round and seasonal closed areas; ICCAT-recommended quotas; minimum size restrictions; circle hook requirements; bait restrictions; careful release protocols; mandatory logbooks; and a VMS requirement, among others. The recreational HMS sector is governed by an open access permit program; minimum size restrictions; reporting requirements for swordfish, BFT, and billfish; gear restrictions; a no-sale provision; and possession limits for swordfish, sharks and tunas, among others. The preferred billfish management measures are intended to reduce recreational post-release mortality of white marlin, because current estimates are substantially higher that previously thought. NMFS will continue to evaluate the need for additional management measures for both the domestic PLL fleet and the recreational HMS fishery. NMFS also recognizes that foreign commercial longline vessels contribute significantly to Atlantic billfish mortality, and will continue to vigorously pursue international agreements at ICCAT to reduce these levels.

Comment 73: NMFS would be negligent not to require mandatory tournament registration at this time. Registration should include all contests in which any prize, award and/or monetary exchange is made relating to the capture of Atlantic HMS.

Response: NMFS requires that all tournament operators register any tournament awarding points or prizes for HMS with the HMS Management Division, at least four weeks prior to the commencement of the tournament. In the Regulatory Housekeeping section of Chapter 2 of the Final Consolidated HMS FMP, a clarification would be added to the regulations specifying that tournament registration is not considered complete unless the operator has also received a confirmation number from NMFS. This clarification is expected to improve the HMS tournament registration process.

Comment 74: NMFS received some comment on the alternative E9, implement a mandatory Atlantic HMS tournament permit, which was considered but not fully analyzed. I support alternative E9, which would implement a mandatory HMS tournament permit, because monitoring and enforcement of HMS tournaments is necessary; HMS tournaments need to be permitted because we need reporting from them.

Response: As mentioned above, a clarification would be added to the regulations specifying that HMS tournament registration is not considered complete unless the operator has also received a confirmation number from NMFS. In the Draft Consolidated HMS FMP alternative E9 was considered, but not further analyzed, because improvements to tournament registration, data collection, and enforceability can be achieved with significantly less burden to the public and government by instead requiring a tournament confirmation number. Because HMS tournaments frequently change operators, names, and dates, a tournament permit would be burdensome to administer and enforce. NMFS believes that requiring a tournament confirmation number, issued by the HMS Management Division, would accomplish the same objective (*i.e*., increased compliance) as would a tournament permit.

D.3 Management Program Structure

D.3.1 Bluefin Tuna Quota Management Measures

Comment 1: NMFS received a number of comments on the management of the purse seine sector of the Atlantic BFT fishery. These comments consisted of: BFT fisheries need every opportunity to harvest the quota and not addressing the large medium tolerance limits imposed on the purse seine sector in this rule is disappointing; the Purse Seine category should be allowed to fish throughout the year provided quota is available; and the purse seine BFT fishery needs to become a "true" individual transferable quota (ITQ) fishery and thereby not addressing the ability to transfer purse seine quota outside the category is disappointing. Some comments stated that the Purse Seine category should be eliminated from the BFT fishery or purse seine vessels should be limited in the areas they fish to minimize any potential gear conflicts with commercial and recreational handgear vessels.

Response: During this rulemaking, NMFS heard many comments regarding management issues in the BFT fishery in general and the purse seine sector in particular that are beyond the scope of this action. Many of these comments arise from recent issues regarding the status of BFT, underharvests in recent years, and current size and trip limits. ICCAT is conducting a stock assessment this summer that should provide additional information regarding the status of BFT and the current rebuilding plan. In November 2006, ICCAT may recommend new management measures for BFT. In addition to any future ICCAT recommendations for BFT, NMFS intends to conduct a rulemaking regarding all HMS permits that could include, among other things, further rationalizing some segments of the HMS fisheries, streamlining or simplifying the permitting process, restructuring the permit process (gear-based, species-based, or both), reopening some segments of the limited access system to allow for the issuance of additional permits, modifying when permits are renewed (fishing year or birth month), and considering dedicated access privileges (*e.g.*, individual transferable permits). This future rulemaking may be better suited to address the entire range of purse seine comments above.

Comment 2: NMFS received a few comments regarding PLL in general and the incidental catch of BFT by PLL including: the effectiveness of the June PLL closure should be reevaluated in light of circle hook catch data; the PLL fishery should be afforded a greater opportunity to catch its targeted species of swordfish, allowable tunas, and sharks, especially considering the existing protections for BFT in the GOM and Florida East Coast, as well as 100 percent circle hooks, careful handling and release tools, and certified training; NMFS should take incremental steps to ensure that the Incidental Longline category fully utilizes its domestic BFT allocation in order to reduce dead regulatory discards to the maximum extent feasible within this category’s allocation; due to the overall underharvest of U.S. Atlantic BFT quota, NMFS should cautiously relax the incidental catch criteria to reduce/eliminate regulatory discards and effectively utilize this category’s quota.

Response: NMFS thoroughly analyzed the incidental catch requirements of BFT by PLL vessels and published a Final Rule on May 30, 2003 (68 FR 32414), that substantially revised the management scheme for this incidental bycatch of BFT. NMFS continues to gather information regarding the effectiveness of incidental harvest restrictions, as well as the effectiveness of all bycatch reduction measures that have been implemented in the PLL fishery. In addition, as more information becomes available, NMFS will reevaluate which measures, if any, it may be appropriate to add, modify, reduce, and/or remove all together, as appropriate.

Comment 3: NMFS received two comments regarding rebuilding of the Western Atlantic BFT stock. These comments consisted of: Agency efforts should be more focused on the international BFT issues to be effective in rebuilding the stock; and, BFT stocks should be rebuilt by preventing the commercial interests from overfishing.

Response: NMFS agrees that international cooperation is critical to rebuilding the BFT stocks. The United States has been at the forefront of efforts to develop appropriate rebuilding plans that balance biological and socio-economic imperatives and will continue to press the international community to implement appropriate measures to rebuild Atlantic BFT stocks. ICCAT recommended the current U.S. BFT TAC based on the 1998 stock assessment for the Western Atlantic BFT stock and the rebuilding plan with the goal of achieving maximum sustainable yield within 20 years. Under the current rebuilding plan, the United States needs to maintain its allocation to prevent overfishing and contribute to rebuilding the stock. Allocation of the U.S. quota to the commercial or recreational sector is conducted in accordance with the international rebuilding plan. In the past few years, all the commercial BFT categories have landed fewer fish than their allocations would allow for. Further, ATCA requires that no regulation promulgated under ATCA may have the effect of increasing or decreasing any allocation or quota of fish or fishing mortality level to which the United States agreed pursuant to a recommendation of ICCAT.

Comment 4: Are herring issues addressed in this document in terms of the impacts they are having on BFT?

Response: Atlantic herring are currently managed under a separate fishery management plan by the New England Fishery Management Council (NEFMC). The Atlantic herring fishery management plan is being amended. During a NEFMC meeting on January 31, 2006, the NEFMC approved a seasonal purse seine/fixed-gear-only fishery for the Western Gulf of Maine (Area 1A) from June 1 through September 31. The NEFMC's action recognizes the importance of herring in the Gulf of Maine ecosystem. In addition, NMFS recognizes the importance of considering ecosystem interactions in fishery management planning, and addresses ecosystem management as one of the goals of the NMFS Strategic Plan. The Agency continues to work toward integrating an ecosystem approach into fishery management practices.

Comment 5: Yellowfin tuna should not take a "back seat" to BFT, and NMFS needs to put more resources into yellowfin tuna data collection, analyses, and regulation.

Response: NMFS acknowledges the importance of yellowfin tuna to the U.S. fishing industry. The latest SCRS report indicates that the current fishing mortality rate may be higher than that which would support maximum sustainable yield on a continuing basis. NMFS has chosen to take the precautionary approach managing YFT since they are considered fully-exploited by taking a number of actions during, and since, the implementation of the 1999 FMP to address the management of the YFT fisheries (*e.g.*, imposing limited access on the longline and purse seine sectors of the fleet and implementing a recreational retention limit). By taking initiatives for conservation measures, the United States will have a stronger negotiating position at ICCAT should additional management measures be necessary. NMFS currently has reporting programs in place to collect commercial and recreational YFT data. This information, in turn, is then provided to ICCAT and the SCRS to be compiled with other information from member nations to be used in assessing the YFT stock. Therefore, NMFS maintains that no further action regarding the YFT fisheries is necessary at this time. However, NMFS will continue to monitor the status of the YFT fisheries as SCRS has indicated that the yellowfin tuna stock is fully-exploited and will pursue future actions if warranted.

Comment 6: Does NMFS have the authority to close an area or region to BFT fishing via an inseason action?

Response: NMFS has the regulatory authority to provide for maximum utilization of the BFT quota by conducting various types of inseason actions. The inseason actions may consist of: increasing or decreasing the General category daily retention limits; adding or waiving RFDs; increasing or decreasing the recreational retention limit for any size-class BFT or change a vessel trip limit to an angler limit and vice versa; conducting quota transfers to/from any fishing category or to the Reserve; closing domestic quota categories based on when that quota is reached, or is projected to be reached; and, closing/reopening the Angling category BFT fishery by accounting for variations in seasonal distribution, abundance, or migration patterns of BFT, or catch rates in one area, which may have precluded anglers in another area from a reasonable opportunity to harvest a portion of the Angling category quota. The Angling category BFT fishery or part of the fishery may be reopened at a later date if it is determined that BFT migrated into the other area. NMFS must consider specific sets of criteria prior to conducting each type of inseason action. Currently, NMFS has multiple sets of criteria, each one designed for a specific type of inseason action, that are used in making a determination, however in this action NMFS prefers to consolidate those lists to assist in making the inseason action determination process more transparent as well as consistent.

The end results of some inseason actions may be perceived as a geographic closure. For instance, if NMFS were to implement a number of consecutive RFDs in the General category it would suspend fishing activities for that time period. NMFS also has the ability to conduct an interim closure in the Angling category as described above. An area closure for any other BFT category or a multi-year area closure for any BFT category would require a regulatory amendment, including public comment.

Comment 7: The SAFMC supports alternative F3(c), which accommodates the opportunity for a winter BFT fishery. Further, the Council supported an equitable BFT quota allocation for the South Atlantic region (North Carolina southward), as well as any other actions that would ensure fishermen in all the South Atlantic states (North Carolina, South Carolina, Georgia, and Florida's East coast) have an opportunity to participate in this fishery. The SAMFC is concerned about the proposed January 1 starting date for BFT fishing because it will prevent underages from being carried over into the following January of the new fishing year.

The ability to carry these underages forward can keep the fishery open through the month of January, which is critical to the fisheries south of North Carolina, off South Carolina, Georgia, and Florida.

Response: Currently, the last General category time-period spans the winter BFT fishery which usually begins in November and runs through the end of the General category season (at the latest on January 31). Under the preferred alternative (F3(c)), the current time-period of October through January and the associated subquota would be adjusted so that the later portion of the fishery would consist of three separate time-periods; October through November, December, and January. With the implementation of the preferred alternative in the CY/FY section, the December and January time-periods would fall in separate fishing years. The situation of having an active fishery occurring across fishing years did not occur prior to the 1999 FMP, which originally adjusted the BFT fishery from a calendar year to a fishing year that spans two calendar years. Under the preferred alternative, the January time-period would be allocated 5.3 percent of the coastwide General category quota as and annual baseline quota. As indicated in Section 4.3.1.1, there are several options that may be used to address the disposition of carryover of any under or overharvest during the December time-period. In the first alternative, any under or overharvest could be entirely rolled over into January of the following fishing year and added to the baseline 5.3 percent allocation. Under this scenario, the entire underharvest would be added to the January time-period subquota, or the entire overharvest would be subtracted from the time-period subquota. In another potential alternative, 5.3 percent of the under or overharvest may be applied to the January time-period in addition to the baseline 5.3 percent allocation. In a third alternative, no under or overharvest may be applied in addition to the January time-period subquota. NMFS will work with the affected constituents through the annual BFT specification process to determine the most appropriate approach based on constituent needs and Federal regulatory requirements.

Comment 8: The allocations between domestic quota categories should be adjusted, specifically increasing the quota for the Angling category.

Response: The Agency did not consider a modification to the sector allocations in this action; therefore, a separate rulemaking and FMP amendment would be needed to consider an increase in the allocation to the Angling category. The original allocations are a reflection of the sector's historical share of the landings during the 1983 through 1991 time period and were codified as part of the 1999 FMP process. The Agency would need to initiate an amendment to the FMP to modify the sector allocations for BFT.

Comment 9: NMFS received numerous comments for and against the adjustment of the General category time-periods and associated subquotas. Those comments in support of an adjustment include: September through December have been the strongest months for BFT fishing and should have their allocations increased; General category time-period subquota allocations should allow for a dependable winter BFT fishery according to the percentages in the NCDMF Petition for Rulemaking; General category time-period and subquota allocations should reflect the migration of the fish through a particular area; there needs to be a balance between flexibility and predictability; the General category should be split across 12 months of equal portions and any arbitrary closure date should be removed to allow full harvest of the quota; is there a biological reason we do not allow the General category BFT fishery to be prosecuted in the months of February through May; all preferred alternatives should allow for the full utilization of the available quota so the United States can prove we have a stake in these fisheries. Vessels need to be able to catch fish and then make money off those fish to reinvest into the fishery in the following years as this is a sign of a healthy fishery; catching wild BFT throughout the year is in the best interests of U.S. fishermen and the United States should remove any arbitrary controls (*e.g.*, seasonal closures) to allow for the harvest of U.S. quota; and, regardless of which alternative is preferred, when the fishery converts back to the calendar year, a methodology needs to be developed to allow quota to carry forward from December into January, *i.e.*, across years, in a timely fashion. In addition, there was broad support at the March 2005 AP meeting for revising the General category time-periods and subquotas to allow for a winter fishery, due to the slight increase in quota as well as on informal agreements between user groups and the Agency.

Comments in opposition of an adjustment include: the Agency needs to manage the BFT fishery in the traditional manner; and changing the General category time-periods and subquotas will have negative impacts on the traditional New England fishermen.

Response: The preferred subalternative to amend the coastwide General category time-periods and their associated subquota allocations would strike a balance between formalizing a winter fishery, acknowledging recent trends in the BFT fishery, as well as recognizing the traditional patterns of the fishery. The preferred alternative would also allow for proper business planning throughout the entire General category season. In light of recent underharvests in the General category, NMFS is acutely aware of the need to provide reasonable opportunities to harvest the General category quota, and how this relates to requests to extend the fishery throughout the year. However, as catch rates in the BFT fishery can increase quite dramatically in a short time period, there are concerns in allowing a fishery to emerge that may be unsustainable or cause overcapitalization on a species that is currently designated as overfished.

Comment 10: NMFS received comments both in favor of and opposed to the preferred alternative to establish General category time-periods, subquotas, and geographic set-asides via annual framework actions. The comment in favor stated the preferred alternative allows for a balance between flexibility and predictability in the General category BFT fishery. The comment opposed stated the overall BFT management program should not be modified.

Response: Annual regulatory framework actions would be used to establish and adjust the General category time-periods, subquotas, and geographic set-asides. This procedural change to the management of this category would expedite the process, providing the agency with greater flexibility to adapt to changes in the fishery and the industry with greater predictability in the management of the General category's upcoming fishing year. The General category would have consistent time-periods and subquota allocations from one year to the next unless ICCAT provides a new recommendation for the U.S. BFT TAC.

Comment 11: NMFS received a number of comments opposing the removal of the Angling category North/South dividing line and one comment supporting its removal. The comments include: the BFT North/South dividing line should be maintained as it was created to provide "fair and equitable" distribution of the BFT quota; it appears that the reason for removing the North/South line is not due to a lack of real time data, but because of participant noncompliance with the current call-in system; NMFS should maintain the North/South line and devise a reliable real-time data collection system for recreational BFT landings; the North/South line should be maintained and the funds used to support the current LPS program should be reallocated to implement tail tag programs at the state level, similar to North Carolina and Maryland; and, the agency should develop more recreational set-asides to further ensure that recreational participants are provided an equitable opportunity to harvest a portion of the Angling category quota.

Response: NMFS has modified the preferred alternative, F4, from the Draft HMS FMP by removing the proposal to eliminate the North/South Angling category dividing line and thereby maintaining the status quo regarding this recreational management tool.
NMFS acknowledges the recreational fishery supports the North/South line for a variety of socio-economic reasons. Based on the social and economic impacts associated with the status quo alternative, NMFS has opted to prefer retaining the North/South line at this time. However, for this management tool to be most effective, NMFS requires real-time BFT landings data from the recreational sector. To date, compliance with the recreational Automated Landing Reporting System (ALRS) has been low, thus hindering the real-time effectiveness of this management tool. If compliance with the ALRS requirements increases or, as recreational catch monitoring programs are improved over time, the effectiveness of this management tool may increase.

Comment 12: NMFS received two comments regarding the clarification of the school size-class BFT tolerance calculation. One comment supported the preferred alternative which would calculate the school size-class tolerance amount prior to accounting for the NED set-aside quota because it brings the calculation more in line with the ICCAT recommendation regarding school size-class BFT tolerances. The second comment stated there was no recreational input when the tolerance limit was implemented, and the tolerance limit should be 15 or 16-percent of the total quota.

Response: The preferred alternative would clarify the procedure NMFS uses to calculate the ICCAT recommended eight percent tolerance for BFT under 115 cm (young school and school BFT), thus implementing the ICCAT recommendation more accurately based on the specific language contained in the recommendation. Regarding the comment stating a lack of recreational input in developing the eight percent tolerance limit for the smaller size classes of BFT, ATCA authorizes domestic implementation of ICCAT- adopted management measures, and provides that no U.S. regulation may have the effect of either increasing or decreasing the quota or fishing mortality level adopted by ICCAT. ATCA also provides that not more than three Commissioners shall represent the United States in ICCAT. Of the three U.S. Commissioners, one must have knowledge and experience regarding recreational fishing in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. In addition to having a recreational commissioner, the U.S. Commissioners are required to constitute an Advisory Committee to the U.S. National Section to ICCAT. This body, to the maximum extent practicable, consists of an equitable balance representing the interests of various groups concerned with the fisheries covered by the Convention, including those of the recreational community.

Comment 13: NMFS received a number of comments for and against implementing a rollover limitation for each domestic quota category. Those in support of the limitation include: a rollover cap should be implemented, but the cap should be set lower because a rollover of up to 100 percent of a category's baseline allocation could be harmful to the fishery in future years as it would lead to unsustainable overcapitalization; and NMFS must develop a way to track size classes of BFT entering the Reserve category as a result of this cap, so there are no conflicts with overall mortality estimates.

Comments in opposition of the rollover limitation include: rollover of quotas should be eliminated to increase conservation; limiting the amount of quota that categories can roll over is not appropriate at this time; NMFS should not get ahead of ICCAT as it compromises the U.S. delegations' ability to negotiate multilateral implementation in the future; long term ramifications of lost quota have not been fully explored on both domestic and international fronts; and the United States should not ask any more of its citizens while quota is not harvested, and international conservation measures are not equivalent.

Other comments NMFS received regarding this issue include: when there is surplus quota in commercial categories, recreational anglers should be permitted to take part of this surplus; categories should not be punished or rewarded for not harvesting the quota until all arbitrary regulations have been removed; the Agency needs to proceed cautiously with rolling over quota in case there is a stock issue; however, the United States needs to maintain control of the underharvests due to the lack of conservation of other member nations; rollovers from the previous fishing year should be accessible in January time period if the preferred alternative to change back to a calendar year is implemented; uncaught sub-period quota should be rolled forward to allow for year-round General category landings. If the fishing year is changed to January 1, then any prior year's uncaught quota should be allowed to be caught between February 1 and May 31; implementing a domestic rollover limitation would adversely affect our ability to negotiate at ICCAT as the bottom line remains the same regardless of which domestic category the underharvest resides in; rollover limitations are helpful, however this item should be addressed at ICCAT; and, the Agency needs to be aware of the ripple effects quota rollovers have on business planning late in the season.

Response: The preferred alternative would grant NMFS the authority to limit the amount of BFT quota that may be carried forward from one fishing year to the next. By establishing a limitation that may be imposed on each domestic quota category, except the Reserve, NMFS would be better equipped to address quota stockpiling situations if they arise. The implementation of the preferred alternative would not preclude the use of inseason quota transfers to any of the domestic quota categories if warranted. Due to the different size classes that each category may target, the number of BFT per metric ton may differ; therefore the origin of the quota entering the must be noted, to ensure mortality levels are consistent with those accounted for in the stock assessment. NMFS is also aware that the preferred alternative would have minimal if any conservation benefits on the Western Atlantic BFT stock as a whole. NMFS supports an international discussion on the use of rollover caps, as well as their pros and cons. Implementing the potential use of a cap domestically should not adversely affect the U.S. delegation's ability to negotiate and play a strong role on this issue as U.S. BFT quota levels will remain consistent under this alternative.

Comment 14: NMFS received comments supporting the consolidation of the inseason action determination criteria. These comments consisted of: revising and consolidating the criteria for BFT management actions improves the agencies flexibility and consistency in making determinations; and the preferred alternative should be preferred, however, it needs to be clarified if the criteria have a different ranking of importance.

Response: Consolidating and refining the criteria that NMFS must consider prior to conducting any inseason, and some annual, actions would assist in meeting the consolidated HMS FMP's objectives in a consistent manner, providing reasonable fishing opportunities, increasing the transparency in the decision making process, and balancing the resource's needs with users' needs. The criteria listed are in no particular order of importance and would be fully considered, as appropriate, in making a determination; however, in some circumstances, not all criteria will be relevant to the decision making process.

Comment 15: NMFS received a number of comments that did not directly speak to actions being proposed in the Consolidated HMS FMP, but are more general in nature or are more pertinent to the recently proposed 2006 Atlantic BFT Quota Specification and effort controls. These comments consist of: the maximum three fish per day General category bag limit should be eliminated. Flexibility to set it higher may be needed as the fishery evolves and to allow for the possibility of a distant water General category fishery; NMFS should relax the "tails on tuna" requirement. The tail is not necessary for species identification. This requirement prevents higher quality cleaning and storage at sea. Many years of data confirm that prohibited undersized tunas are either not encountered or are extremely rare in this fishery. ICCAT has eliminated the minimum size for some Atlantic tunas. The tails on requirement is an unnecessary and costly burden that should be removed; NMFS is using RFDs to deny fishermen a reasonable opportunity to catch the quota and to make U.S. fishermen do more to conserve BFT than fishermen from other countries with ICCAT BFT quotas. NMFS should not implement RFDs unless the General category quota is in immediate danger of being exceeded. NMFS should remove every domestic restriction that denies U.S. fishermen a reasonable opportunity to catch the quota.

Response: This action does not address these specific items, however, the 2006 Atlantic BFT quota specifications and effort controls address retention limits, as well as the use of RFDs in the coastwide General category. The final initial 2006 specifications published on May 30, 2006 (71 FR 30619). Regarding the removal of tuna tails, NMFS has received past comments and from the industry, particularly the HMS CHB sector, to investigate this possibility. However, it remains a concern that the proposal to process HMS at sea would compromise enforcement of domestic size limits. To date, NMFS has been able to enforce the domestic size limits for HMS through curved measurements. This has been an efficient and effective way of enforcing size limits.

Comment 16: NMFS received comments requesting changes in the allowable use of harpoons on CHB vessels. These comments include: NMFS should authorize the use of harpoons as primary gear to target giant BFT from the pulpit of CHBs to allow maximum flexibility. With the cost of doing business rising daily and the fishery changing dramatically over the past few years, this antiquated prohibition needs to be modified to allow CHB operators the opportunity and versatility to harpoon BFT on days that they are not carrying paying passengers. This rule was originally written to curb the sale of undersized BFT, which is no longer an issue.

Response: In 1993, NMFS created a recreational Atlantic tunas permit that was required for those CHB or privately operated vessels targeting any of the regulated Atlantic tuna species. This rulemaking also established a list of allowable gears that can be used to harvest tunas. In 1995, NMFS removed the ability for vessels to hold more than one permit at a time. In that 1995 rulemaking, NMFS proposed, collected comment on, and finalized a list of authorized gears for the CHB sector of the fishery. Harpoons were not proposed as an authorized gear, nor were any comments received requesting this gear type be authorized for CHB vessels at that time; therefore, harpoon gear was not listed as an authorized primary gear type at that time. As NMFS has conducted a number of rulemakings regarding permits, permissible gears, and targeted species, NMFS intends to conduct a comprehensive rulemaking regarding all HMS permits that could include, among other things, further rationalizing some segments of the HMS fisheries or restructuring the permit process (gear-based, species-based, or both). This future rulemaking may be better suited to address further revisions to authorized gears and the permitting structure for managed HMS. The issue of allowing the use of various gears to subdue HMS caught on authorized primary gears was analyzed in the Final Consolidated HMS FMP. Please refer to discussions of Authorized Fishing Gear.

D.3.2 Timeframe for Annual Management of HMS Fisheries

Comment 1: Support and opposition for administratively adjusting all HMS fisheries to a calendar year were expressed in public comments. Commenters asked the following: what has changed since fisheries were originally shifted from a calendar year; Is the United States in compliance with ICCAT reporting requirements using a fishing year? Several commenters stated that use of a fishing year was not a disadvantage at ICCAT.

Response: The preferred alternative would adjust tuna, swordfish, and billfish fisheries so that all HMS fisheries occur on a calendar year. The previous shift from a calendar year to a fishing year (1996 for swordfish, 1999 for tuna and billfish) accommodated domestic markets for swordfish and provided additional time for rulemaking to implement ICCAT recommendations, since ICCAT traditionally meets in November of each year. Use of a fishing year is allowed by ICCAT. Since the fishing year was implemented for these species, several aspects of the fisheries and their management have changed. For the past several years, the United States has not fully harvested its swordfish quota, and has carried-over quota underharvest from one year to the next. Because of this underharvest, summer swordfish markets have not been limited by the amount of quota available, and starting the fishing year in early summer to avoid quota shortfalls has been unnecessary. In addition, after several years of experience with ICCAT negotiations since the United States implemented the fishing year, NMFS and the United States' ICCAT delegation have found that it is difficult to be assertive in pursuing international enforcement of ICCAT recommendations when the catch data the United States submits is misunderstood and/or suspect because of the confusing fishing year reporting schedule. NMFS has determined that adjusting tuna, swordfish, and billfish fisheries to a calendar year would increase transparency in U.S. data and statistics, and help focus on achieving domestic and international fishery management objectives such as reducing/eliminating IUU fishing.

Comment 2: Commentors expressed concern about the timely implementation of ICCAT recommendations under a calendar year, the potential disadvantage to U.S. fishermen if ICCAT recommendations were not implemented in a timely fashion, and the need for fishery specifications to be available prior to the start of calendar year fisheries.

Response: NMFS recognizes that switching back to a calendar year would reduce the amount of time between the adoption of ICCAT recommendations in November and the start of calendar year fisheries on January 1. This HMS FMP would adjust the process for issuing annual BFT specifications by consolidating the analysis in the FMP itself, and thus reducing the annual burden and associated amount of time necessary for promulgation of the annual specifications. NMFS anticipates that BFT specifications would usually be issued on time using these newly adopted procedures. Although ICCAT recommendations that can adjust quotas may be adopted at any time, usually such adjustments occur after stock assessments, which are performed at several year intervals. Thus, on average, more complex rulemakings are anticipated to occur less frequently. NMFS notes that rulemakings that adjust quotas or implement other significant changes in fishery management programs usually require more than the amount of time (e.g. seven months) that would have been available between adoption of a recommendation at ICCAT and start of the fishing year, if fisheries had been maintained on a fishing year schedule rather than adjusted to a calendar year.

Comment 3: Commentors expressed opposition to the adjustment to a calendar year because of potential socio-economic impacts of a shift to calendar year in combination with the proposed ICCAT 250 marlin limit, particularly for billfish tournaments. Commenters stated the following: a basic analysis demonstrating the economic importance of billfish tournaments should be included, and millions of dollars of prize money is missing from the current analysis; what is the impact if a large tournament that happened later in the year was restricted to catch and release fishing only; and, it appears that adjusting all HMS fisheries to a fishing year would socio-economically benefit most HMS fisheries.

Response: The HMS FMP identifies that the potential for reaching the ICCAT marlin 250 limit is low and subsequent prohibition of marlin landings unlikely. Over the past several years, U.S. billfish landings have only been attained in a single year. In addition, the FMP includes a measure that would allow increases in size limits as a means of reducing landings to avoid attaining the limit and implementation of catch and release fishing only. Despite the limited potential for reaching the limit, the Consolidated HMS FMP analyzes potential impacts should the limit be attained, using the worse case scenario that tournaments would be cancelled if the limit were attained. This analysis indicates that socio-economic impacts could be higher under a calendar year scenario. These impacts could be mitigated if tournaments implemented a requirement for catch and release. On balance, NMFS anticipates that the benefits provided by switching to a calendar year and other regulatory adjustments set forth in the Consolidated HMS FMP will outweigh potential negative impacts. NMFS did not identify, nor did commenters provide, any positive socio-economic impacts for switching the shark fishery to a fishing year. Impacts of concern for ICCAT managed fisheries (e.g. tuna, swordfish, and billfish) are discussed above.

Comment 4: Several commentors questioned the effect of a change to calendar year on the January General category BFT fishery, particularly the disposition of quota underages that may have occurred in the previous calendar year. Commentors stated the following: I oppose a shift to calendar year because of the potential negative impacts to southeastern fishermen; and, I support a roll-over provision from December to January similar to the rollover provision that exists between sub-periods during a fishing year.

Response: The HMS regulations at 50 CFR 635.27(a)(1) divide the General category quota into three subperiods including June through August, September, and October through January. These regulations further state that NMFS will adjust General category subperiod quotas based on under- or overharvest during the previous subperiod. Currently, the last subperiod spans the winter south Atlantic BFT fishery which usually begins in November until the General category closes (at the latest on January 31). Under the Consolidated HMS FMP, these subperiods would be adjusted so that the winter fishery would include separate subperiods in December and January, each of which occur in a separate fishing year. The situation of having an active fishery occurring across the change of quota years did not occur prior to the 1999 FMP, which originally adjusted the BFT fishery to a fishing year. In addition, prior to 2003, the BFT fishery rarely experienced underharvest and roll-over of unharvested quota. Under this Consolidated HMS FMP, the January subperiod would be provided with a quota of 5.3 percent of the annual ICCAT allocation. In consideration of a potential underharvest and rollover of General category quota from one calendar year to the next (i.e., December to January), NMFS has explored various ways to manage this situation. A preferred approach would depend upon the magnitude of the underharvest and the needs of the fishery at the time. Several potential alternatives regarding the disposition of carryover of any under or overharvest during the December subperiod are discussed in Chapter 4 of the Consolidated HMS FMP. In the first alternative, any under or overharvest could be fully rolled over into January of the following fishing year in addition to the baseline 5.3 percent. Under this scenario, the entire underharvest would be added to the January subperiod quota, or the entire overharvest would be subtracted from the subperiod quota. In another potential alternative, 5.3 percent of the under- or overharvest would be applied to the January subperiod in addition to the baseline 5.3 percent. In a third alternative, no under- or overharvest would be applied in addition to the January subperiod 5.3 percent allocation. NMFS will work with the affected constituents through the annual BFT specification process to determine the most appropriate approach based on constituent needs and Federal requirements.

D.3.3 Authorized Fishing Gear

Comment 1: NMFS received several comments in support of and opposed to the introduction of new gear. Comments supporting the introduction of new gears include: expansion of authorized gears would be acceptable in underexploited fisheries. Gears without bycatch problems could improve the availability of swordfish to the American public; and, gear innovations should not be stymied. Comments opposed to the introduction of new gears include: I am opposed to the introduction any new commercial fisheries; do not allow new effective gears in fisheries that are undergoing rebuilding; do not allow any new gear types, especially for BFT; why should NMFS authorize new gears?; NMFS has reported that all HMS fisheries are fully harvested or overfished. NMFS's proposal to legalize new commercial gear violates National Standard 1, which is to prevent or end overfishing of tuna, swordfish, billfish, and sharks; this will not permit overfished stocks to rebuild. Additional new commercial gear can only result in fully harvested HMS becoming overfished; we do not support allowing new gears into overfished fisheries except for use as experimental fishing permits; NMFS proposes to authorize new commercial gear types that can only increase the harvest of HMS; and, there is a lot of resistance to new gears in the Gulf of Mexico.

Response: As current or traditional gears are modified and new gears are developed, NMFS needs to be cognizant of these advances to gauge their potential impacts on target catch rates, bycatch rates, and protected species interactions, all of which can have important management implications. While new and innovative gears and techniques need to be evaluated by NMFS to increase efficiency and reduce bycatch in fisheries for Atlantic HMS, the Agency does not prefer any new fishing gears for the HMS commercial fisheries at this time. Further, this action would not authorize any new gears for the bluefin tuna commercial or recreational fisheries.

In this action, NMFS considered the definition and authorization of speargun gear, green-stick gear, and buoy gear, as well as the clarification of the allowable use of handheld cockpit gears. At this time, NMFS prefers to authorize only one new gear for the HMS fisheries, recreational speargun fishing for Atlantic BAYS tunas. BFT are excluded from the list of allowable target species for speargun gear due to the recent declining performance of the existing BFT fishery, recent quota limited situations within the BFT Angling category, and ongoing concerns over stock status. All sale of tuna harvested with this gear type would be prohibited in order to clarify the intent of authorizing this gear type, which would allow a small group of fishermen an opportunity to use spearguns to recreationally target BAYS tuna. Relative to the current number of participants in the recreational Atlantic tuna fishery, and taking into account the estimated low encounter rates for target species, the additional anticipated effort from spearfishermen would likely result in minimal increased landings compared with the landings by current Angling and CHB category participants. A limited number of additional individual fishermen would be expected to use this gear type, and spearfishermen may actually fish for months or years without having an opportunity to spear a tuna.

The preferred buoy gear alternative would not authorize a new gear; rather, it would rename the handline fishery for commercial swordfish and limit the number of gears deployed in this fishery. Defining buoy gear was necessary because the Final Consolidated HMS FMP would also modify the handline definition to require that the gear be attached to a vessel. Therefore, under the preferred alternative, the commercial swordfish handgear fishery would be the only fishery where free-floating handlines, now referred to as buoy gear, would be authorized. Under the preferred alternative, buoy gear fishermen would be limited to possessing or deploying no more than 35 floatation devices, with no more than two hooks or gangions attached to each individual gear. Prior to this action, buoy gear had been utilized with no limit on the number of gears deployed, as long as each gear had no more than two hooks attached and it was released and retrieved by hand. Also, both recreational and commercial fishermen were able to use this gear in areas closed to PLL gear. Under the preferred alternative, buoy gear would be prohibited for use by all commercial fishermen without a swordfish handgear or directed limited access permit and by all recreational fishermen. Additionally, when targeting swordfish commercially, the number of individual gears a vessel may possess or deploy would be limited to no more than 35. Vessels with directed swordfish or swordfish handgear LAPs may use this gear type to capture swordfish in pelagic longline closed areas, provided all longline gear has been removed from the vessel. While buoy gear would be allowed in the Gulf of Mexico, the swordfish handgear fishery does not appear to be widespread and operates primarily off the East Coast of Florida, according to public comment.

Based on public comment, the Agency prefers to clarify the authorized configuration of green-stick gear, rather than proceed with authorization and definition of the gear-type that may further add to the confusion and have unintended negative consequences to the fishery and resource. Public comments were opposed to and supported authorizing green-stick gear for the commercial harvest of Atlantic BAYS tunas; expressed considerable confusion over the current regulatory regime; were concerned about the need for better reporting, monitoring, and overall data collection for this gear-type; and expressed a need to further understand the gear's technical nature.

Comment 2: Commercial HMS handline gear, buoy gear, and green-sticks should be prohibited in the closed areas.

Response: The current HMS closed areas were specifically developed for a particular gear type (*e.g.*, PLL or BLL) to reduce bycatch and discards. There are no time/area closures for buoy and handline gear. If a green-stick is configured with more than two hooks, then it would meet the definition of longline, and thus, would also be prohibited from certain closed areas.

Comment 3: NMFS received comment from individuals concerned about the bycatch associated with the introduction of new gears. Those comments include: small tuna fisheries, like NMFS is trying to promote with the handline, buoy, and green-stick fisheries will negatively impact marlin stocks because they target marlin prey species; and, were any bycatch analyses conducted for the proposed authorized gears?

Response: This action would not change the currently allowed and authorized use of green-stick gear in any HMS commercial fishery. This action would make a distinction between handlines and buoy gear, such that handlines must be attached to the vessel and buoy gear would be allowed to float freely; however, both handlines and buoy gear were authorized and used in HMS fisheries commercially and recreationally prior to this action. The preferred alternative would limit buoy gear use to the commercial swordfish fishery for individuals with a swordfish handgear or directed limited access permit. No HMS other than swordfish could be harvested with buoy gear. Because swordfish is not a marlin prey species, the Agency does not believe buoy gear will have a negative impact on marlin stocks. No bycatch analyses are available for handline or buoy gear, but data from the logbooks were reviewed. The HMS logbook does not distinguish between attached and unattached handlines, so specific information on unattached handline (or buoy gear) catch is limited. In general, the HMS commercial handline fishery has relatively few discards. While there are no bycatch analyses available for recreational speargun fishing, public comment suggests that the number of individuals using this gear would be small and those that do use the gear, expect low encounter rates with target species. According to public comment, this fishery is highly selective and the gear has been designed to retain speared fish and reduce fish loss. With the authorization of this gear for the recreational harvest of BAYS tunas only, information about speargun catch will be captured via the MRFSS and LPS.

Comment 4: NMFS should clarify the HMS authorized gear regulations to allow for gear stowage provisions. Such provisions would enable vessels to diversify, and would also provide vessels with the ability to operate in other fisheries. The Northeast gear stowage provision needs to be acknowledged in the HMS regulations.

Response: A gear stowage provision for HMS permitted vessels was not considered in this action and, therefore, is not authorized at this time. NMFS has concerns about the enforceability of such a provision in HMS closed areas. The Agency would appreciate additional comments on situations where gear stowage provisions are necessary, as well as for which particular gears and areas. A gear stowage provision may be considered in a future rulemaking, if appropriate.

Comment 5: NMFS received comment from individuals concerned about the use of gillnets in HMS fisheries. These comments include: the Georgia Coastal Resources Division supports the removal of shark gillnet from the list of authorized HMS gear; and, gillnets should not be an authorized gear, particularly sink gillnets due to interactions with protected resources and other bycatch. If NMFS is going to continue to allow gillnets, the vessels should be required to use VMS year round.

Response: NMFS considered prohibiting the use of shark gillnet gear as part of a range of commercial management measures to prevent overfishing of finetooth sharks, but did not pursue this option because finetooth sharks would continue to discarded dead in other non-HMS fisheries, and thus, would not likely prevent overfishing. In this action, NMFS is preferring an alternative that would require shark gillnet vessel owners and operators to obtain the protected species safe handling and release workshop certification. The goal for this workshop would be to reduce the mortality of sea turtles, smalltooth sawfish, and other protected species. At this time, vessels issued a directed shark LAP with a gillnet on board that are away from port during the right whale calving season must have VMS on board. This action did not consider expanding this condition to require VMS on shark gillnet vessels year round.

Comment 6: There is a lot of confusion regarding the proposed gears. The process needs to slow down, and we need to make sure we understand what our goal is. We should be encouraging innovation. Each gear needs to be reviewed to determine where each gear appropriately fits; the public is going to need more education on the proposed gears and associated requirements. The Agency needs to clarify before authorizing; and, the language in the alternatives needs to be looked at, it appears some alternatives are allowing use to continue and others are allowing its entry.

Response: While NMFS encourages the use of clean and efficient gears, this action would authorize the use of only one new gear type due to the stock status of several HMS. Speargun fishing gear would be authorized in the HMS Angling category and users would be allowed to target Atlantic BAYS tunas recreationally. It would not be authorized for BFT, or any other HMS. The preferred alternative for buoy gear would not be an introduction of new gear, rather a clarification of an existing gear and a restriction on the number of floatation devices used in the existing commercial swordfish handgear fishery. In an effort to reduce confusion and increase compliance, NMFS will modify the HMS compliance guide and other outreach materials to reflect these changes to the HMS authorized gears.

Comment 7: NMFS must clarify that a longline vessel is allowed to use the following fishing gears when not longline fishing: handgear including, harpoon, handline, and rod and reel (plus the green-stick method, if authorized).

Response: The HMS regulations at § 635.21(e)(1) state that if an Atlantic BFT is retained or in possession, the vessel may employ only the gear authorized for the particular Atlantic tunas or HMS permit category issued to the vessel. In other words, with a BFT on board and an Atlantic Tunas Longline permit issued to the vessel, only longline gear may be possessed or employed. When fishing for Atlantic BAYS tunas, the vessel may employ fishing gear authorized for any Atlantic Tunas permit category. The two exceptions are that purse seine gear may be used only on board vessels permitted in the Purse Seine category and pelagic longline gear may be used only on board vessels issued an Atlantic Tunas Longline category tuna permit as well as LAPs for both swordfish and sharks. When targeting Atlantic BAYS tunas with an Atlantic Tunas Longline permit, a vessel may use handgear (*i.e.*, harpoon, handline, rod and reel, and bandit gear) provided BFT are not in possession or retained on board the vessel. However, the vessel must possess all applicable and valid Federal permits, possess the safe-handling and release placard and equipment, and abide by the longline gear restrictions (*e.g.*, closed areas and circle hooks). If a vessel is fishing in a closed area and has longline gear on board, it is a rebuttable presumption that longline gear was used to catch any fish on board that vessel. Green-stick and rod and reel gear may be utilized on a pelagic longline vessel, so long as all other PLL management measures are adhered to, including the use of circle hooks.

Spearfishing

Comment 8: NMFS received numerous comments supporting the authorization of speargun gear in the recreational Atlantic tuna fishery, specifically alternative H2, which would authorize speargun fishing gear in the recreational Atlantic tuna fishery. The comments include: authorizing speargun fishing gear for Atlantic tunas would provide very high economic benefits and produce very low ecological impacts; the impact of tuna spearfishing would be minimal and the number of participants would be low; spearfishermen were left out of the List of Fisheries for tunas and sharks when initially established; and, a speargun fisherman can choose his target, assess his chances, and be more discriminate in his hunting, which is not something a hook and line fisherman can do. Comments received in support also stated affirmation that recreational divers would be allowed to be transported to the site by a charter dive boat; and, the tuna regulations would allow the taking of tuna in the Atlantic with handheld, rubber band or pneumatic power spearguns by recreational fishermen while underwater.

Response: The preferred alternative would authorize the use of spearguns in the recreational Atlantic BAYS tuna fishery. Holders of recreational HMS Angling and HMS CHB permits would be allowed to carry spearguns and fish for, retain, and possess any of the BAYS tunas using speargun gear. Speargun gear would not be authorized under any other HMS or Atlantic tuna vessel permit or for any other HMS species. Speargun gear would not be authorized to fish for, retain, or land Atlantic BFT. BAYS tunas killed and landed with the use of speargun gear may not be sold under any circumstances, including by owners, operators, or participants on HMS CHB vessels. Fishermen using speargun fishing gear would be allowed to freedive, use SCUBA, or other underwater breathing devices, and would be required to be physically in the water when they fire their speargun. Only free-swimming fish, not those restricted by fishing lines or other means, could be taken. The use of powerheads, or any other explosive devices, would not be allowed to harvest or subdue BAYS tunas with this gear type. In addition, spearfishermen would be required to abide by all existing recreational management measures under the Angling category regulations when recreationally fishing for BAYS tunas (*i.e.*, minimum size requirements of 27 inches curved fork length for BET and YFT, three YFT retention limit per person per day, as well as all current state and Federal reporting requirements).

Comment 9: NMFS received several comments that supported spearfishing gear but requested allowing its expansion beyond recreational tuna fishing while other comments supported additional restrictions. Comments in support of expansion include: adding spearguns as an allowed gear for sharks; and, all HMS fisheries should eventually open to spearfishing. The GMFMC specifically supported spearfishing as an approved gear for all HMS fisheries, including sharks, and recommended that the gear be authorized for recreational and commercial harvest. In contrast, other comments supported restricting the use of spearguns as proposed, stating no sale should be allowed for anyone when a tuna is harvested with a speargun under any circumstances, and speargun fishermen should not be allowed to sell tuna catches from CHB vessels as proposed. A commenter stated his concern that the ability to sell fish might be viewed as an impediment to allow participation in this fishery and, thus, NMFS should not allow sale of fish to avoid jeopardizing any chance of authorizing recreational use of speargun fishing gear. NMFS also received comment to further restrict the use of speargun fishing gear to allow only freedivers to harvest tuna (*i.e.*, not allow SCUBA gear) consistent with original public comment on use of this gear-type.

Response: The preferred alternative would authorize the use of spearguns in the HMS recreational fishery only for Atlantic BAYS tunas. This alternative would provide speargun fishermen an opportunity to use this gear-type and would increase the social and economic benefits for this user-group. While providing this opportunity, NMFS is also balancing concerns of introducing a new gear type in fisheries with considerable numbers of existing fishermen participating in severely exploited fisheries. Since publication of the list of authorized gears and fisheries and the 1999 FMP, spearfishermen have consistently argued for access to HMS fisheries. Spearfishermen have argued in particular for recreational access to the Atlantic tuna fishery to target big tuna for the social and recreational opportunity rather than the desire for economic gain. The preferred alternative would prohibit the sale of Atlantic BAYS tunas captured by speargun to minimize the possibility of additional expansion of the user-group to those interested in commercial gain from the activity and inconsistent with intent of the preferred alternative. Spearguns would not be allowed to target BFT, primarily due to the severely depleted status of the western Atlantic stock, uncertainty over the status of the stock, and continuing poor performance of the fishery. The use of spearguns in HMS fisheries other than the Atlantic tuna fishery, (*i.e.*, shark, billfish or swordfish fishery) was not considered in the Draft Consolidated HMS FMP, although as these stocks improve some additional fishing opportunities for new and efficient gear-types may be considered in the future. NMFS considered further restricting speargun activity to only free-divers, (*i.e.*, no SCUBA gear or other types of underwater breathing apparatus) to further limit the universe of participants. Free-divers were the original group of speargun fishermen who had requested the opportunity to participate in the recreational tuna fishery. However, it was determined that not allowing SCUBA gear would have raised additional safety concerns.

Comment 10: NMFS received several comments regarding aspects of speargun fishing that would keep participation and catch low. Those comments include: technical knowledge barriers for a novice and inexperienced individual that wish to engage in this activity; harvesting two or three tunas in a lifetime would be lucky because a speargun fisherman needs to know what they are doing and where to go fishing; there are not a lot of opportunities to learn how to spear BAYS tuna; the cost of the equipment including the initial cost of upgrading spearfishing gear (*e.g*., larger gun, shafts, spearpoints, floats, lines, and safety items) will exceed $3,000 and that is before chartering a vessel; and, the need to use a boat to access BAYS fishing grounds.

Response: NMFS acknowledges that the number of participants using spearguns in a recreational BAYS tuna fishery is likely to be low and the number actually encountering and successfully striking a BAYS tuna lower still. NMFS understands that the primary intent of allowing the use of spearguns in the recreational BAYS tuna fishery is to allow participants the opportunity and access to the fishery for the recreational and social benefits it affords. Successful participation would still mean adequate preparation and/or possible training (*e.g.*, dive certificate) and the correct equipment. However, willing participants would no longer be prohibited by regulation from using spearguns in the recreational BAYS fishery.

Comment 11: NMFS received comments related to the level of bycatch associated with speargun fishing. Those comments include: most recreational fishermen practice catch-and-release fishing, but speargun fishermen practice release-and-catch fishing; speargun fishermen are very selective about the fish being targeted and use one shot, usually resulting in no bycatch; and spearfishermen can see the fish and do not take unwanted species or undersized fish; and they leave no lines or other gear on the bottom to snag other fish, lobster, or turtles. A few comments stated concerns that some spearguns under this gear type may not have the capability to land large HMS, resulting in a source of unreported mortality and that spearing a fish that dies without being harvested would be considered bycatch.

Response: There are minimal data available to support or refute concerns regarding bycatch by spearguns in the BAYS fisheries. It is evident that the nature of the gear-type can be highly selective and targeted to specific fish, unlike traditional hook-and-line fishery. Spearfishermen are unlikely to injure other species such as HMS, sea turtles, or marine mammals as they can selectively target their catch. However, it remains unknown how many strikes of targeted BAYS may result in mortality and retention versus wounding and subsequent escape with some unknown proportion mortally wounded. Public comment by spearfishermen states that it is possible to accurately identify species and size class before firing the spear and thus the bycatch and mortality of incorrect species (*e.g.*, BFT) or undersized tuna (*i.e*., less than 27 inches) should be minimal.

Comment 12: NMFS received several comments regarding potential gear and user conflict that may arise with the authorization of speargun gear such as: nothing prevents divers from dropping a dive flag in the middle of a group of rod and reel vessels or on a specific wreck, and driving rod and reel vessels off the fish/wreck. In contrast, other commenters noted that spearfishermen and diver interactions with boat traffic should not be an issue in offshore fisheries, as it can be in inshore waters, that the spearfishing community has taken as many precautions as possible, and that no accidents have occurred in New Hampshire or Rhode Island where speargun fishing gear is currently allowed in state waters when targeting striped bass.

Response: Speargun users and rod-and-reel recreational fishermen would need to respect each other's activities and safety when sharing the same fishing grounds to avoid gear and user conflicts. Speargun fishermen would likely choose fishing areas and tuna hunting grounds away from other rod-and-reel vessels to maximize the diver's recreational opportunity and minimize safety concerns. Likewise, under existing vessel safety regulations, recreational vessels must give adequate berth to dive-flags in the water and vessels flying diver-down signals.

Comment 13: NMFS received several comments on the economic benefits associated with speargun fishing. These comments include: allowing recreational speargun fishing for tuna would create an economic boost to coastal communities. When spearfishing, one would usually fill up the car with gas, have lunch, buy souvenirs or gear, and sometimes pay for a boat ride and not spear many fish; and, at the 4th Annual Hatteras Blue Water Open this year, there were 50 entrants from all over the world and eight charter vessels generating $60-$75,000 in revenue to the area in four days and that there would have been more participants if tunas were included.

Response: It is expected that allowing spearguns into the recreational tuna fishery would provide an economic benefit to the fishery even though the actual sale of landed BAYS tuna would be prohibited. Recreational speargun fishermen are likely to invest in fishing stores and dive-shops for appropriate gear and contribute to local economies by renting hotel rooms and chartering vessels or renting equipment, *etc*.

Comment 14: NMFS received comments stating that if spearfishing gear is allowed to harvest Atlantic tunas, then the Agency must devise and implement mandatory permitting, reporting, monitoring, and enforcement. One comment specifically stated that if NMFS cannot guarantee this, there should not be an additional uncontrollable fishery.

Response: All HMS recreational spearfishing activity must be conducted from a Federally permitted HMS Angling or HMS CHB category vessel. NMFS currently requires mandatory reporting of all recreational landings of BFT, swordfish, and billfish via automated telephone systems. Although the Agency does not currently have similar requirements for recreational landings of BAYS tunas, NMFS monitors HMS recreational effort and landings through Federal recreational surveys, such as the MRFSS and LPS in addition to State monitoring programs. NMFS enforcement works in cooperation with local and State enforcement programs to ensure compliance with management measures in both recreational and commercial fisheries. NMFS will monitor compliance with reporting requirements and may consider modifications to requirements, as appropriate, in the future.

Comment 15: NMFS received a comment stating that there are fishermen currently using spearguns to harvest YFT that do not realize it is illegal to use the gear to target Atlantic tunas. Spearfishing has been included as a category in some of the tournaments.

Response: Until the final rule authorizing recreational speargun fishing for BAYS tunas takes effect, any use of spearguns to fish for any HMS is illegal. The list of authorized gears has been published since the end of 1999 (Dec 1, 1999, 64 FR 67511) and numerous brochures and guides that have been published since that date clearly list the authorized gears for HMS with valid permits. Currently, speargun gear is not an authorized gear for any HMS. After the effective date of the final rule implementing this preferred alternative, speargun gear may be legal for BAYS tunas, but not for other HMS.

Comment 16: NMFS should not allow another directed commercial fishery (*e.g.*, speargun fishing gear) for giant BFT.

Response: None of the preferred alternatives would authorize another directed commercial fishery for giant BFT. The preferred alternative H2 would not authorize the use of spearguns to fish for, retain, or land any Atlantic BFT, in either the recreational or commercial fishery.

Comment 17: Speargun fishermen would want to target the largest fish available due to the difficulty in taking smaller fish, the trophy nature of the fishery itself, and the largest take for time and money invested in the opportunity.

Response: NMFS recognizes that a prime motivation for spearfishermen to enter the Atlantic BAYS tuna fishery is the opportunity to recreationally fish for a big fish. Spearfishermen would need to abide by all existing recreational management measures, including the minimum size for YFT and BET of 27 inches curved fork length and retention limits. There is no minimum size for albacore or skipjack tuna. Blackfin tuna are not Federally regulated.

Green-Stick Gear

Comment 18: NMFS received several comments supporting the preferred alternative to authorize green-stick gear for the commercial BAYS tuna fishery. These comments include: green-stick gear is much better than longlines and could be an alternate gear; green-stick gear is the most environmentally sound way to harvest tuna; if green-stick gear is a viable U.S. HMS fishery, then NMFS needs to be flexible in allowing its use; and, the use of green-stick gear for directed fishing by pelagic longline vessels when targeting BAYS should be approved. In contrast, NMFS received several comments opposed to authorizing green-stick gear for tunas. The GMFMC commented that green-stick gear is classified as longline gear in the Gulf of Mexico and if it is authorized, it is likely to become very abundant and could have a negative impact on stressed and overfished stocks; green-stick gear is an excuse for more longline fishing using a slightly different method; and, green-stick gear is similar to longline gear and therefore should not be allowed into closed areas.

Response: The preferred alternative would not provide a regulatory definition of green-stick gear as a separate authorized gear and as differentiated from already authorized forms of handgear (rod-and-reel or handline) and longline gear. This is a change from what was proposed. Under existing regulations, green-stick gear is already authorized depending on how it is configured and how many hooks are on each line. Due to the current confusion over what is already allowed and how the draft preferred alternative may or may not have changed current uses of green-stick gear, NMFS is not modifying the list of authorized gears for green-stick gear at this time. In addition to the existing confusion and the potential to exacerbate the situation by changing the regulations, there is conflicting opinion and little data to support or refute its efficiency and impact on target and non-target stocks. NMFS intends to publish a brochure clarifying acceptable configuration of green-stick gear under the existing HMS regulations. In the meantime, NMFS will also work with current logbook and monitoring programs to examine ways to collect additional information on the use of green-stick gear and its impact on the environment as well as its social and economic benefits and consequences.

Comment 19: NMFS received numerous comments in support of authorizing green-stick gear for targeting BFT, as well as BAYS. These comments include: green-sticks are permanently attached to the vessel, so why do the proposed regulations state that a vessel could never possess a BFT onboard if green-stick gear is onboard; green-stick gear is the same as the trolling fishery, meaning the same boats, same gear, and same permits are used as those used to target BFT; the Japanese use this gear to harvest BFT because minimal lactic acids build during the fight; green-stick gear should be allowed for all Atlantic tunas provided there are mandatory permitting, reporting, monitoring, and enforcement of this fishery; BFT have been harvested using green-stick gear in the past and should be allowed to be continued; in North Carolina, green-stick gear has been used to catch BFT; past BFT landings using this gear type have been reported as rod-and-reel therefore a group of individuals are going to be adversely impacted if BFT are not allowed; this rule will make it even harder to catch the BFT quota; and, curiosity as to what conservation benefits are to be had by not allowing BFT to be retained as there are other management measures in place for BFT such as size and retention limits as well as quotas. One comment stated support for General category fishermen to target BFT with green-stick. The same commenter only supported the authorized use of green-sticks by longline permitted vessels as an allowed gear for directed YFT fishing and did not support the use of green-sticks by pelagic longline fishermen to target BFT while aboard a permitted pelagic longline vessel.

Response: Throughout the development of the Draft Consolidated HMS FMP, most of the analysis and comment from scoping led the Agency to determine that green-stick gear was primarily used to target BAYS tunas and that the methods of fishing with the gear were not conducive to targeting BFT. In addition, due to the current severely depleted status of the BFT stock, the introduction of a new gear-type and adding fishing pressure in this already heavily capitalized fishery is not appropriate at this time. Thus, it was determined in the Draft HMS FMP that it was possible to consider the use of green-stick gear, in a modified manner to the status quo, for a BAYS only fishery. Furthermore, it was determined that excluding BFT from the allowed list of target species would still provide marginal positive economic and social impacts to the BAYS fishery with neutral biological impacts to the BFT stock. However, at several public meetings on the Draft Consolidated HMS FMP and in written comment, particularly from the mid-Atlantic area, it was made evident that there is an active interest in using the gear to target BFT. The preferred alternative in the Draft Consolidated HMS FMP could have eliminated this opportunity allowed under the status quo, provided the gear is configured to conform to the current regulations. For BFT fishing, these conditions exist generally when commercial fishing for BFT in the General category (or with an HMS CHB permit) using handgear (rod-and-reel, handline, or bandit gear) with two hooks or less. These conditions also exist when recreationally fishing for BFT in the Angling category (or with an HMS CHB permit) using handgear (rod-and-reel or handline) with two hooks or less. The limit on the number of hooks for both recreational and commercial handgear has helped limit effort in currently overcapitalized fisheries targeting species with weak stock status (*i.e*., either overfished or approaching overfishing). Furthermore, the incidental retention of BFT by green-stick gear, trailing more than two hooks, is authorized under a Longline category permit so long as all other corresponding management measures are adhered to such as target catch restrictions, use of circle hooks, avoidance of closed areas, *etc*.

Since the publication of the Draft Consolidated HMS FMP in August 2005, NMFS received data on the performance of both the recreational and commercial BFT fishery, which exacerbated concerns over the ecological health and management of this stock. In the case of the commercial fishery, landings were low throughout the 2005 fishing season. The 2005 season was also marked by a noticeable lack of availability of commercial sized BFT throughout their traditional fishing range and, in particular, BFT were largely absent off southern states during the winter of 2005/2006. Although there is a high magnitude of available quota in the commercial size classes, scientists continue to be concerned over the status of this stock, especially the abundance of these larger fish that represent the potential spawners for future recruitment, particularly in the Gulf of Mexico. An international stock assessment on the current status, and future prognosis, of BFT is scheduled this year by the SCRS and new recommendations, if any, by ICCAT would not be available until November 2006. NMFS will continue to analyze potential impacts of authorizing green-stick gear and may consider modifications in the future, as appropriate.

<u>Comment 20</u>: NMFS received several comments regarding the technical nature of green-stick gear including comments comparing and contrasting the gear type to longline gear and commercial or recreational handgear such as handline and rod-and-reel. Comments included: green-stick gear is very different from longline gear in that when deploying green-stick gear the greatest distance the hooks are from the boat is 500 feet, whereas PLL gear has one hook a football field length away from one another; longline gear is set in the water column with many hooks while green-stick is trolled at a high speed with the artificial baits suspended above or skipping across the waters surface; this gear is trolled and is not set out to drift, which makes it very different from the definition of a longline gear; green-stick is similar to longline gear therefore it should be prevented from entering into closed areas; this gear is still a longline because of the use of hydraulics and several hooks; there are two distinct types of green-stick fishing and each should be carefully defined separately; the commercial green-stick method uses multiple hooks with artificial baits on a single line to catch Atlantic tunas, including BFT; the recreational green-sticking is an “angling” method primarily using rods-and-reels to catch Atlantic tunas, including BFT; some recreational gear is being pulled with more than two hooks per line; teasers without hooks should be allowed; the definition should include using no more than two hooks per any single line attached to the green-stick that basically acts as a vertical out-

rigger; green-stick gear should be restricted to hand powered reels; green-stick gear is also appropriate for use in the Angling and General category fisheries; and, recreational fishermen using green-stick gear could open up illegal commercial sale opportunities.

Response: NMFS notes that there are considerable similarities between the use of green-stick gear and recreational and commercial handgear as well as longline gear depending on how green-stick gear is configured and used under current definitions at 50 CFR part 600 and 635 and in accordance with all gear operation and deployment restrictions at 50 CFR 635.21. Longline means fishing gear that is set horizontally, either anchored, floating, or attached to a vessel, and that consists of a mainline or groundline with three or more leaders (gangions) and hooks, whether retrieved by hand or mechanical means. Any hook and line gear with three or more hooks is considered to be a longline. In addition to the use of rods and reels, handline gear means fishing gear that consists of a mainline to which no more than two leaders (gangions) with hooks are attached, and that is released and retrieved by hand, rather than by mechanical means. Finally, the use of bandit gear and downriggers is also an authorized means of deploying and retrieving the hook and line. Bandit gear means vertical hook and line gear with rods that are attached to the vessel when in use. Lines are retrieved by manual, electric or hydraulic reels. A downrigger is a piece of equipment attached to a vessel and with a weight on a cable that is in turn attached to hook-and-line gear to maintain lures or bait at depth while trolling. In addition to the above definitions and gear restrictions, specific additional management measures may apply to the use of gear depending on the targeted fishery and HMS or tuna vessel permits (*i.e.* 50 CFR 635 Subpart C as well as general permitting, recordkeeping, and monitoring requirements at 50 CFR 635 Subpart A).

Comment 21: NMFS received several comments and questions noting the level of confusion regarding what constitutes the technical nature of 'green-stick' gear, and how it can already be used versus modified by the proposed alternative. Comments include: the definition of longline gear is the problem, not green-stick gear; over one hundred green-sticks have been sold and you need to change the definition; it is not the stick that is the most important part of this gear, rather the suspended bait attracts the fish, not the number of baits; fishermen can use only one rod due to tangling; green-sticks are permanently attached to the vessel; green-stick gear is used to catch larger tuna, and that the gear is set-up vertically allowing the bait to fish further from the vessel; we support the use of green-stick gear by commercial vessels, but only if restricted to hand powered reels, but not if used with electric or hydraulic reels; this trolling method does not require any large device and is easy to set up on a small vessel and it is used to catch BFT and YFT around the world; the name “green-stick” comes from the original color of the pole, but today it is available in a variety of colors; and, as green-stick gear is permanently attached to the vessel there could be enforcement issues as the gear can be configured either as commercial or recreational. Questions include: what permit would be required to use this gear; would live bait be allowed with this gear; will configuration of the gear use rods and reels or hydraulic drum, how would one know the type of gear used to catch the fish if different gear types are allowed on the same vessel but not authorized to land the same species; is there a length limit on a rod and reel to distinguish it from green-stick gear; what does it matter how many hooks are on the line when operating under a General category permit; If we have longline and incidental BFT permits can we use green-stick gear; how do the incidental limits apply to longline vessels using green-stick gear; under the current regulations, what permit would be required for someone who fishes with green-stick gear for YFT; which will have more hooks - green-stick gear versus recreational gear; can green-stick gear fish in the closed areas; do the reporting requirements for General category permit holders call for reporting the gear employed; would green-stick fishermen be able to use live bait as it is proposed currently; in which fishery can the gear be authorized; is green-stick gear currently used in the Gulf; and can it be used at all in the Gulf of Mexico where BFT cannot be targeted since it is a spawning area?

Response: NMFS acknowledges that there is considerable confusion over the status of green-stick in the HMS fisheries under current management measures. NMFS intends to publish a brochure to clarify the current situation. The preferred alternative would maintain the current definitions for use of longline gear in the longline fishery and handgear in the commercial General category, the recreational HMS Angling, and the HMS CHB fishery. Thus, the use of green-stick gear is still allowed as in the past and in conformance with the appropriate management measures and existing reporting requirements for these HMS fisheries. No new regulatory definitions or permits are preferred at this time. Green-stick gear can be used in any configuration so long as it conforms to current definition of the use of longline or hook-and-line handgear as currently defined in the regulations and as listed above.

Comment 22: NMFS received several comments regarding the need for additional data regarding this gear-type. One comment stated the fishery needs further analysis on the use and configuration of green-stick gear and one commenter questioned what information would NMFS need collected to conduct a more detailed analysis of the impacts of using this gear. A comment stated that there needs to be some accommodation of this gear type, even if it is through an EFP to collect further information. A comment stated that the information used from the North Carolina Sea Grant paper referenced in the Draft Consolidated HMS FMP is out of date and that the gear has been altered as individuals have gained experience using it.

Response: NMFS agrees that the Agency and the fishery could benefit from additional data on the use of green-stick gear and its impact on both the recreational and commercial constituencies, HMS stocks, and any bycatch. In the past, green-stick gear was identified as a unique gear type on HMS Vessel Pelagic Logbook reports, but was discontinued as it was not a uniquely identified and defined gear. It also appears that fishermen had already been reporting green-stick HMS landings under either hook and line gear or longline gear. As a first step, NMFS intends to publish a brochure to clarify current allowable uses of the gear and how existing vessel and dealer permit and reporting requirements apply. NMFS also intends to examine whether or not existing monitoring programs should be modified to understand more adequately the uses and impacts of this gear or whether some additional program is necessary, including potential use of the EFP program. Finally, it would be helpful to the Agency to know how many fishermen use, or have used, this gear and in what configurations that conform with or differ from the current definitions. In addition, it would be valuable to know the locale and distribution of its use, preferred target species, efficiency over other gear-types, amounts and rates of bycatch, and social and economic costs and benefits of using the gear, among other research questions. Some useful historical and background data on green-stick gear is available in the North Carolina Sea Grant paper published by Westcott that was especially helpful defining and graphically laying out different ways to configure the gear. More recent updates and publications would be helpful to assist with the development of the planned brochure.

Comment 23: NMFS received comment on the bycatch associated with green-stick gear. Those comments include: almost all tuna are hooked in the mouth and could be released relatively unharmed, there are no turtle interactions, and other bycatch is limited because billfish and shark species have difficulty reaching bait that spends so much time in the air; and, that green-stick gear is a gear that minimizes the interactions of billfish with commercial handgear and should be promoted. Other comments noted a need to be cautious about potential bycatch issues and that NMFS needs to confirm the level of bycatch associated with this gear type; NMFS needs to prohibit this gear's use in the Gulf of Mexico due to potential bluefin tuna bycatch; the description of green-stick gear sounds like longline gear, which could mean greater bycatch and there should be no additional gear used in the Gulf of Mexico; and, we are opposed to green-stick gear because it appears to be a trolled longline and the biggest bycatch of marlin is in the yellowfin tuna fishery.

Response: The preferred alternative would not modify the regulations to define green-stick gear and thus NMFS does not expect the levels of bycatch to change as a result of implementing the No Action alternative. Trolled green-stick gear, configured as a version of rod-and-reel handgear, is likely to have few bycatch issues. Minimal data are available to analyze the bycatch issues associated with green-stick gear deployed as a form of handgear or as a longline, however, data from Pacific green-stick fisheries indicate that increases in billfish bycatch are possible. Under the current regulations, the use of green-stick gear is allowed (as clarified above) in the Gulf of Mexico although it remains prohibited to target BFT with any gear in this area to protect spawning BFT. NMFS continues to be concerned about levels of bycatch in HMS fisheries as well as in other fisheries that encounter HMS as bycatch. Overall, the Agency has continued to address bycatch issues in Federally managed fisheries and, consistent with National Standard 9, to implement management measures that minimize bycatch. Since 1999, NMFS has implemented a number of time/area closures to reduce bycatch to the extent practicable and, in the Draft Consolidated HMS FMP, examined numerous alternatives to determine if the closures were still meeting their original goals. Many of these measures, but not all, were designed to reduce bycatch in the pelagic longline fleet. In addition, the Draft Consolidated HMS FMP examined alternatives to train and certify fishermen in the safe handling, release, and disentanglement of protected resources from pelagic and bottom longline and gillnet gear. With the addition of new measures in the Final Consolidated HMS FMP, NMFS expects to continue minimizing bycatch throughout HMS fisheries.

Buoy Gear

Comment 24: NMFS received several comments supporting alternative H5, which would authorize the use of buoy gear only in the commercial swordfish handgear fishery. Some of those comments include: buoy gear should be for commercial use and handlines for recreational use; there are currently more recreational fishermen using buoy gear than commercial fishermen; buoy gear should be used to target swordfish because it is an effective gear; I do not support the use of recreational buoy gear, but it should be a commercial subcategory; buoy gear should be allowed, but not where it will have conflicts with recreational vessels/gear; and, this alternative is trying to establish a commercial fishery. Pelagic longline vessels could remove their longline gear and set buoy gear in closed areas.

Response: Free-floating buoyed lines are currently in use in many areas; however, they are being fished as handline gear, as defined by current HMS regulations. Currently, there are no limits on how many handlines a vessel may deploy, as long as each gear has no more than two hooks attached. The preferred alternatives would change the definition of handline gear to require that the gear be attached to a vessel and allow free-floating handlines, renamed as buoy gear, to be utilized in the swordfish handgear fishery only. The preferred alternative takes steps to limit the number of individual gears a vessel may possess or deploy when targeting swordfish commercially and would eliminate their use in all other HMS fisheries, both recreational and commercial. Vessels with directed swordfish or swordfish handgear LAPs would be authorized to utilize this gear type to capture swordfish in pelagic longline closed areas as long as the longline gear had been removed from the vessel.

Comment 25: NMFS received several comments opposed to alternative H5, which would authorize buoy gear for the commercial swordfish handgear fishery and limit vessels to possessing or deploying no more than 35 individual buoys, with each gear deployed consisting of one buoy supporting a single mainline with no more than two hooks or gangions attached. The comments include: buoy gear is needless and would be harmful to recreational interests; recreational fishermen are concerned about the use of this gear type; buoy gear would increase fishing effort on swordfish when it is still overfished; opening up the buoy fishery to fill the quota is a mistake; buoy gear is indiscriminate and destructive and has no place in a sustainable, viable fishery; buoy gear is nothing more than a vertical longline and we need reductions in bycatch or bycatch mortality. We are opposed to any fishing that allows unattended gear; buoy gear should not be allowed in the HMS fisheries for numerous reasons, including: a hazard to navigation; an indiscriminate killer like longlines; and deployment of the gear with live baits will increase discards and dead discards of numerous species; if buoy gear use continues, it is probable that the gear will interact with marine mammals in the U.S. EEZ; and, it is morally incomprehensible that NMFS is going to shut down the recreational white marlin fishery and yet allow thousands of hooks to be deployed with live baits on buoy gears.

Response: As discussed in Chapter 2 of the Consolidated HMS FMP, this gear type is currently in use as handline gear and anecdotal information suggests that it is being used by both commercial and recreational fishermen to target swordfish as well as other species. The preferred alternative would re-name the gear to buoy gear, limit its use to only those vessels permitted to participate in the limited access commercial swordfish handgear fishery, and significantly limit the number of individual gears that vessels could possess or deploy (from an unrestricted number to a maximum of 35). Consistent with the current definition of handline gear, each buoy gear would be limited to having no more than two hooks or gangions attached. Vessels deploying buoy gear would be allowed to use live or dead baits and may only retain swordfish captured on the gear. All tunas, sharks, marlins, or sailfish captured on buoy gear must be released in a manner that maximizes their probability of survival. This gear differs significantly from longline gear, which is defined as having three or more hooks or gangions attached. The preferred alternative would allow vessels deploying this gear type to use multiple floatation/gear marking devices, including but not limited to, buoys, floats, lights, radar reflectors, reflective tape, and high-flyers, to minimize any hazards to navigation. Logbook data from 2004 show that 68 percent of swordfish captured on commercial handline trips were retained. These same data show that over 75 percent of swordfish discarded from these trips were released alive. NMFS monitors gears for interactions with marine mammals and sea turtles and would continue to monitor buoy gear catch, bycatch, and any interactions with protected resources though the HMS logbook program.

Comment 26: If handgear must be attached to the vessel, how do the buoy gear requirements impact alternative H5, which authorizes buoy gear in the commercial swordfish handgear fishery, and limits vessels employing buoy gear to possessing and deploying no more than 35 individual buoys, with each buoy having no more than two hooks or gangions attached?

Response: Handgear (handline, harpoon, rod and reel, and bandit gear) are not all currently required to be attached to a vessel. A preferred alternative would modify the definition of handline to require that handlines be attached to a vessel. The buoy gear alternatives would not be impacted by the handline definition change as the preferred buoy gear alternative defines buoy gear as a separate gear type.

Comment 27: NMFS received a few comments opposed to alternative H6, authorize buoy gear in the commercial swordfish handgear fishery and limit vessels to no more than 50 individual buoys, each supporting a single mainline with no more than 15 hooks or gangions attached. These comments include: we do not support alternative H6; and, alternative H6 is mini-longlining and should be limited to vessels with all three permits (Directed or Incidental Swordfish, Atlantic Tunas Longline, and Directed or Incidental Shark).

Response: The Agency is not preferring alternative H6. In this action, the Agency is preferring a modification of alternative H5 which would authorize buoy gear for the commercial swordfish handgear fishery and limit vessels to possessing or deploying no more than 35 floatation devices, with each gear consisting of one or more floatation devices supporting a single mainline with no more than two hooks or gangions attached. This gear differs significantly from longline gear, which is defined as having three or more hooks or gangions attached. Fishermen deploying buoy gear must possess a commercial swordfish handgear or a swordfish directed limited access permit.

Comment 28: NMFS received a number of comments regarding buoy gear capturing undersized swordfish, including: 35 individual buoys fished at one time is in direct conflict with the HMS FMP objective to reduce bycatch and to minimize mortality of juvenile swordfish; this alternative will produce dead juvenile swordfish that are hooked and not successfully released due to lost gear or gear that cannot be checked in a timely manner; what studies show the successful release of juvenile swordfish when using 35 individual buoys with two hooks?; buoy gear fishermen currently catch approximately 25 - 30 percent juvenile swordfish (< 33 inches); circle hooks can reduce post–release mortality of juvenile swordfish and non-targeted species, they should be considered for this gear; and, about 50 percent of fish caught on well tended buoy gear can be released.

Response: In response to public comment, the Agency has modified the preferred alternative to allow buoy gear fishermen the option of deploying multiple floatation devices on individual buoy gears. The modified alternative would maintain the maximum limit of 35 floatation devices possessed or deployed. Under the modified alternative, fishermen who opt to fish three floatation devices per gear would be limited to deploying approximately 11 individual buoy gears. Similarly, fishermen using four floatation devices per gear would be limited to deploying approximately eight buoy gears. Logbook data from 2004 show that 68 percent of swordfish captured on commercial handline trips were retained. These same data show that over 75 percent of swordfish discarded from these trips were released alive. Commenters requested the ability to use several floatation devices per gear to allow for the use of a "bite indicator" float, which will let fishermen know when a fish is captured by the gear. This modification could allow fishermen to easily identify those gears that have captured fish and may allow fishermen to release any undersized swordfish or non-target species more quickly and with a greater probability of survival. Additionally, the modification to allow multiple floatation devices per gear may reduce the number of gears deployed and may minimize lost gear by making the gears more buoyant and visible. Although the Agency received public comment supporting the use of circle hooks with buoy gear, a circle hook option was not included in the alternatives in the Draft Consolidated HMS FMP. NMFS may analyze a circle hook requirement for buoy gear in a future rulemaking.

Comment 29: NMFS received a few comments related to the monitoring requirements for buoy gear. Such comments include: can fishermen use additional locating devices in addition to the single buoy required (*e.g.*, high flier to locate the buoy in bigger seas) to improve monitoring?; all four methods of marking buoy gear are needed to avoid lost fish and gear; there should definitely be a requirement for marking and monitoring; a visual radius or reasonable area a fisherman could fish with buoy gear should be defined; buoy gear "tending" requirements should be defined, like in the shark gillnet fishery, to prevent fishermen from tending buoys that belong to others; it would be impossible to monitor all 35 buoys that are free floating in rough weather conditions; while the handgear operator is retrieving a buoy that has hooked a swordfish of sustainable size, the other 34 buoys will not be attended; there are no minimum requirements for flags, radar reflectors, radio beacons, or strobe lights; and, is there any information about the loss of buoys?

Response: In response to public comment, the Agency has modified the preferred alternative to allow buoy gear fishermen the option of deploying multiple floatation devices on individual buoy gears. The modified alternative would maintain the maximum limit of 35 floatation devices possessed or deployed. Under the modified alternative, fishermen who opt to fish three floatation devices per gear would be limited to deploying approximately 11 individual buoy gears. Similarly, fishermen using four floatation devices per gear would be limited to deploying approximately eight buoy gears. If a gear monitoring device used by a fisherman were positively buoyant, it would be included in the 35 floatation device vessel limit. Consistent with current regulations, each floatation device attached to a buoy gear must be marked with either the vessel's name, registration number, or permit number. At this time, NMFS is not requiring any specific gear tending requirements for vessels deploying buoy gear; however, the Agency recommends that fishermen remain in the general area where they have set their gear and monitor each gear as closely as possible. NMFS realizes that different vessels and crews will have varying abilities to monitor gear and that weather and sea condition may also impact their ability to monitor gear closely. The Agency cautions fishermen to limit the number of gears they deploy to a reasonable number that they can realistically monitor and retrieve safely. At this time, the Agency does not possess any data regarding gear loss in this fishery. The Agency may conduct additional rulemaking in the future, if additional data indicates that gear tending requirements or other bycatch reduction measures are needed.

Comment 30: NMFS received a number of comments regarding the definition of buoy gear, including: consider modifying the definition of buoy gear because one buoy and all the line fished vertically will make it difficult to keep visual contact with the gear; without some way of knowing when a small fish is hooked, it may be several hours before the gear is retrieved; consider allowing a maximum of 20 feet of horizontal line on the surface for the purpose of identifying and monitoring buoy gear allowing space for "bite indicator" float and an identification buoy/hi-flier; additional equipment may be necessary to prevent large swordfish from sounding; allow additional gear at each buoy for retrieval and to determine if a fish is on the line; why is there no length or distance specified between buoys for the commercial buoy gear?; do the regulations stipulate how far apart the buoy gear can be spaced?; are buoy gears allowed to be attached to a hydraulic drum when being used commercially?; circle hooks, VMS, light sticks, live bait, and Careful Handling/Release training and certification should be mandatory; could you require the use of Global Positioning Systems (GPS) on the buoy gear?; there should be a prohibition on using live bait; an electronic monitoring system must be required for each buoy; there is no data to justify limitations on the number of buoys and/or hooks at this time; and, there is no criteria for what would constitute an acceptable buoy for this type of gear.

Response: As discussed above, NMFS has modified the preferred alternative in response to public comment and included a definition of floatation device. The modified alternative would allow fishermen deploying buoy gear to attach multiple floatation devices to each buoy gear, including "bite indicator floats," however the alternative would maintain the limit of 35 floatation devices possessed or deployed. A floatation device would be defined as any positively buoyant object rigged to be attached to a fishing gear. Buoy gear would be required to be released and retrieved by hand. If gear monitoring devices used by fishermen are positively buoyant and rigged to be attached to a fishing gear, they would be included in the 35 floatation device vessel limit and would need to be marked as per the gear marking regulations. Additionally, if more than one floatation device is used, no hook or gangion could be attached to the mainline or a floatation device on the horizontal portion of the gear. At this time, NMFS is not specifying any maximum or minimum length of horizontal line at the surface. However, to limit any hazard to navigation and potential gear loss by ship strike, NMFS recommends that fishermen set only the amount of gear that is needed at the surface. Similarly, NMFS is not preferring an alternative to specify a minimum or maximum distance between deployed buoy gears. NMFS urges fishermen to be responsible in their fishing activities and to only fish gear over a distance that they can realistically monitor. NMFS would not require GPS, electronic monitoring equipment, circle hooks, light sticks, live bait, or Careful Handling/Release training and certification for buoy gear fishermen at this time. NMFS may investigate some of these options for the buoy gear fishery in future rulemakings.

Comment 31: NMFS received a few comments regarding permit requirements for using buoy gear and comments supporting a limit on the number of vessels using buoy gear. These comments include: buoy gear should be limited to current permit holders only and no increase in its use should be allowed in future permit considerations; what kind of permit do you need for buoy gear?; buoy gear users should have the three permits that PLL needs; approximately 10 boats have used buoy gear in the past, however, it is now likely that only about three vessels use this gear type; how many participants are actively using buoy gear?; and, how many swordfish permits are there? Effort is going to increase.

Response: The preferred alternative would only authorize buoy gear in the commercial swordfish handgear fishery. Vessels deploying buoy gear must have a commercial swordfish handgear limited access permit or a swordfish directed limited access permit. As of February 2006, there were 88 commercial swordfish handgear permits and 191 directed swordfish permits. In 2004, seven vessels reported using handline gear in the HMS logbook. The logbook does not differentiate between trolled handlines, free-floating handlines, or attached handlines; however, some of those seven vessels likely fished free-floating handlines (buoy gear) and targeted swordfish. Based on historic participation and new restrictions, NMFS does not anticipate large increases in participation in this sector of the swordfish fishery.

Comment 32: NMFS received two comments inquiring about 35 buoys as the appropriate limit for buoy gear. These comments are: what is the basis for selecting 35 buoys as the limit?; and, how did the Agency select 35 buoys?

Response: NMFS selected the 35 buoy limit based on support from public comment and because the Agency identified this number as the manageable upper limit for the commercial sector that would prevent excessive amounts of unattended floating gear from being lost while allowing vessels to possess spare gear onboard.

Comment 33: NMFS received a number of comments on the proposed limit of 35 buoys, including: tending 35 buoys will be inefficient, taking 2 - 2.5 hours to set 35 buoys and 3 - 3.5 hours to check each one; no more than 12 buoys should be allowed when operating alone; with two crew members, up to 20 buoys could be fished; can the number of permissible buoys be linked to people onboard the vessel; participants currently cannot fish 35 buoys but may be able to in the future; 35 buoys with two hooks a piece is almost like hauling a 30 mile longline with the current; define and allow this gear type for swordfish commercial harvest, but limit the number of buoys to a more manageable number for protection of juvenile swordfish, allowing no more than 10 buoys makes the gear maintainable and produces a high quality product with minimal impact on juvenile fish; 35 buoys are unmanageable and are tended exactly like a short pelagic longline with overnight soak time violating the intent of the area closure; 10 to 12 buoys with a maximum of two hooks is the most that should be allowed, a prudent skipper and crew could not manage more than 10 buoys at a time and that would be under ideal sea conditions; The regulations should allow a maximum of 10 to 12 buoys, otherwise bycatch cannot be prevented; 35 buoys with two hooks each is not considered "handgear"; and, 35 buoys are far too many and may allow bigger vessels from the NED to move in and use this gear in closed areas, this shift could create tension between user groups and, displace the smaller vessels that pioneered this type of gear. This already happened in the FEC area with a boat using 20 - 25 radio buoys; 35 buoys are unmanageable; more than 12 buoys are unmanageable. The definition of this gear should be by the drop line, not the number of buoys; pelagic longline fishermen would need more than 35 buoys to make a go of the buoy fishery; and, there is no data that shows a limit on buoy gear is needed.

Response: In response to public comment, the Agency is preferring a modification of alternative H5 which would authorize buoy gear for the commercial swordfish handgear fishery and limit vessels to possessing or deploying no more than 35 floatation devices, with each gear consisting of one or more floatation devices supporting a single mainline with no more than two hooks or gangions attached. As discussed above, the modified alternative would allow fishermen deploying buoy gear to attach multiple floatation devices to each buoy gear, including "bite indicator" floats, however the alternative maintains the limit of 35 floatation devices possessed or deployed. This alternative gives greater flexibility in the gear configuration by allowing fishermen to alter the gear depending on weather or sea conditions, crew size, and characteristics of different fishing vessels. If gear monitoring devices used by fishermen are positively buoyant and rigged to be attached to a fishing gear, they would be included in the 35 floatation device vessel limit and would need to be marked as per the gear marking regulations. Additionally, if more than one floatation device is used, no hook or gangion could be attached to the mainline or a floatation device on the horizontal portion of the gear. Under the modified alternative, fishermen who opt to fish three floatation devices per gear would be limited to deploying approximately 11 individual buoy gears. Similarly, fishermen using four floatation devices per gear would be limited to deploying approximately eight individual buoy gears. NMFS realizes that different sized vessels and crews will have varying abilities to monitor gear and that weather and sea conditions may also impact their ability to monitor gear closely. The Agency cautions fishermen to limit the number of buoy gears they deploy to a reasonable number that can be realistically monitored and retrieved safely. NMFS realizes that the limits on buoy gear would likely reduce the chances that large distant water vessels could make profitable trips with buoy gear. During the scoping process, the Agency received comment indicating that the swordfish handgear fishery does not appear to be widespread and appears to operate off the East Coast of Florida. The preferred alternative was developed in an attempt to maintain positive economic benefits for the commercial sector currently utilizing the gear type.

Comment 34: NMFS received a number of comments opposed to authorizing buoy gear and the use of buoy gear in pelagic longline closed areas. Those comments include: the proposed buoy gear would operate in a manner similar to longline gear. Do not reopen the longline fishery to further commercial exploitation in our waters; buoy gear is proposed for use in areas currently closed to longline gear; this commercial gear violates the intent and purpose of closed areas and the basic reason these areas were originally created; how do these new proposed gears mesh with the current closed areas?; longline fishermen are by far the most indiscriminate killers of the very species that recreational fishermen and conservation groups try to protect. Yet, they are being allowed back into closed areas and are allowed to continue using longline tackle that has been renamed; these areas were closed to PLL and allowing buoy gear in will eliminate any benefits that the closures had; and, all the issues for PLL seem to be there for buoy gear. Bycatch issues are still there.

Response: The preferred buoy gear alternative would re-name free-floating handline gear as "buoy gear," limit vessels deploying the gear to possessing or deploying no more than 35 floatation devices, and would limit its use to commercial swordfish handgear fishermen. This alternative represents a limitation on the handgear fishery over the status quo, and is not modifying any current restrictions on longline fishing. This gear has been utilized with no gear limits by both recreational and commercial fishermen in areas closed to pelagic longline fishing in the past and would be prohibited for use by recreational fishermen and all commercial fishermen not possessing a swordfish handgear or swordfish directed limited access permit. The continued use of this gear by a limited number of fishermen would not violate the intent and purpose of the East Florida Coast closed area (or other PLL closed areas), which was to minimize bycatch in the PLL fishery while maximizing the retention of target species.

Comment 35: NMFS received several comments expressing concern over the authorization of buoy gear in the East Florida Coast PLL closed area, including: pelagic longline vessels once contributed to a vast amount of dead discards of juvenile swordfish in the East Florida Coast area and buoy gear will have the same effect; the East Florida Coast closed area is a vital nursery area that needs to be protected; there should be no free-floating gear allowed in the Florida Straits; buoy gear is like longline gear, and NMFS should ban longlining for swordfish in the Florida Straits; to fish buoy gear in the Straits of Florida the handgear operator must ensure 100 percent release of juvenile swordfish; and, a limit might be necessary off Florida, but there might be possibilities in other areas where limits are not needed.

Response: As discussed in the response above, the preferred alternative would restrict the number of unattached handlines or buoy gear that may be deployed and would limit the number of permit holders authorized to utilize the gear type relative to the status quo. This gear is currently authorized for use with no limitations on numbers of buoy gears deployed by both recreational and commercial fishermen in the East Florida Coast closed area. The preferred alternative would prohibit all recreational fishermen and commercial fishermen not possessing a swordfish handgear or swordfish directed limited access permit from utilizing the gear type. According to 2004 logbook data, 64 commercial handline trips were reported with 404 swordfish reported caught. Of those 404 swordfish captured, 67.8 percent (274 fish) were retained, 24.3 percent (98 fish) were released alive, and 7.9 percent (32 fish) were discarded dead.

Comment 36: NMFS received several comments concerned about allowing buoy gear to operate in the Gulf of Mexico. Those comments include: buoy gear should not be allowed in the DeSoto closures area, nor should it be allowed in the Southern Canyon area. There should be no free floating gear because it could get entangled with oil rigs; buoy gear may need greater restrictions in the Gulf. I am worried about excessive gears and bycatch with the currents and weather; concerns on how buoy gear will be deployed in the Gulf of Mexico with free floating drilling barges and their multiple thrusters, may lead to pollution issues; future generations will suffer and only one group will benefit from allowing 30 - 50 hook sets with no radar reflectors into the DeSoto area south of Destin. After the buoy fishermen have moved on, there will never be another blue marlin, swordfish, tuna, or shark in the Gulf of Mexico; the De Soto Canyon pelagic longline closure has been successful over the past five years with more tuna, dolphin, swordfish, and wahoo; and, buoy gear should be banned completely from the Gulf of Mexico.

Response: During the scoping process, the Agency received comment indicating that the swordfish handgear fishery does not appear to be widespread and appears to operate off the East Coast of Florida. As discussed under Comment 34, the preferred alternative would restrict the number of unattached handlines or buoy gear that may be deployed and the number of permit holders authorized to utilize the gear type relative to the status quo. In addition, the preferred requirement to affix gear monitoring equipment is intended to reduce the likelihood of gear loss.

Additionally, under the preferred alternative, buoy gear would only be authorized to harvest swordfish, no other HMS species may be targeted with buoy gear. All other HMS species captured must be released in a manor that maximizes their probability of survival. NMFS will monitor bycatch and gear loss, and may make adjustments, as needed, in the future.

Comment 37: NMFS should consider geographic limitations for buoy gear to minimize negative gear conflicts in a future action.

Response: During the scoping process, the Agency received comment indicating that the swordfish handgear fishery does not appear to be widespread and appears to operate off the East Coast of Florida. However, if circumstances warrant changes, the Agency may consider making adjustments to minimize negative impacts in the future, if necessary.

Comment 38: There is no penalty for clipping the buoy gear together to create a longline.

Response: Under the current regulations, lines with three hooks or more are longlines. Vessels clipping buoy gears together and having more than two hooks on any combination of lines would need the appropriate permits allowing the operators to harvest HMS with longline gear. Additionally, these vessels could only set this type of gear in areas not closed to longline fishing. The preferred alternative would prohibit linking buoy gear together.

Comment 39: Buoy gear exponentially increases the footprint of the vessel because it is not attached to the vessel. It will become entangled in offshore oil platforms and dynamic positioning vessels, and other oilfield related facilities and will result in more stand-off regulations for the recreational and commercial fisheries from these structures, not to mention the additional expense to the oil companies of removing this gear and repairing damage caused by it.

Response: As discussed under Comment 34, the preferred alternative would restrict the number of unattached handlines or buoy gear that may be deployed and the number of permit holders authorized to utilize the gear type relative to the status quo. In addition, the requirement to affix gear monitoring equipment is intended to reduce the likelihood of gear loss.

Secondary Cockpit Gear

Comment 40: NMFS received comments on the types of cockpit gears that would be authorized under the proposed Consolidated HMS regulations. Those comments include: what are the primary cockpit gears included for authorization?; will the regulations have a list of acceptable cockpit gears because that list is going to be extremely long to cover all the methods currently used?; people are going to need to provide NMFS with a list of gears currently used to be sure they are included; do not allow dart harpoons and other secondary gears to be used as primary authorized gears; mechanical harpoons should not be used as secondary cockpit gear; and, if there is choice between a gaff, flying gaff, and cockpit harpoon, I am going for a cockpit harpoon every time to kill fish and protect myself.

Response: Under the preferred alternative, the regulations would not list specific acceptable secondary cockpit gear; rather, secondary gears would be authorized for assisting in subduing an HMS already brought to the vessel with an authorized primary gear. Primary authorized gears are listed in the current HMS regulations at 50 CFR § 635.21(e). This action would clarify the regulations to state that secondary cockpit gears would not be allowed to capture undersized or free-swimming HMS, but only to gain control of legal-sized HMS brought to the vessel with an authorized primary gear with the intent of retaining the HMS. This measure would acknowledge and account for the current HMS regulations at 50 CFR § 635.21(a), which state that an Atlantic HMS harvested from its management unit that is not retained must be released in a manner that will ensure maximum probability of survival, but without removing the fish from the water.

Comment 41: NMFS received comments supporting the use of secondary gears. Those comments include: I support alternative H7, clarify the allowance of hand-held cockpit gears used at boat side for subduing HMS captured on authorized gears; hand darts need to be authorized as secondary gear so that the people in Florida's swordfish recreational fishery are not fishing illegally; and, this action is necessary to avoid enforcement conflicts over what gear is legal for subduing HMS.

Response: The preferred alternative would authorize the use of hand-held cockpit gears to aid anglers in subduing large HMS captured by authorized primary gear types to reduce the loss of fish at the side of the boat, increase safety when subduing large HMS, minimize enforcement problems, and respond to requests from fishery participants to clarify the regulations. This action would not specify acceptable secondary cockpit gears, rather it would clarify the HMS regulations to state that secondary cockpit gear may be used to aid in the landing or subduing of HMS after they are brought to the vessel using a primary authorized gear type only. Secondary hand-held cockpit gears may also reduce the loss of fish at boat side, increasing retention rates. Primary authorized gears are listed in the current HMS regulations at 50 CFR § 635.21(e).

D.3.4 Regulatory Housekeeping

Issue 1: Definitions of Pelagic and Bottom Longline

Comment 1: NMFS received comments in support of the no-action alternative to maintain the current PLL and BLL gear definitions, and a comment in support of the two alternatives that were preferred in Draft HMS FMP. These included: I support Alternative I1(a) – no action. The other alternatives tend to micromanage directed shark fishermen out of the closed areas, in particular the NC BLL time/area closure, by reducing profits and causing unnecessary economic impacts; if fishermen can tell the difference between BLL and PLL gears, they should be able to teach NMFS enforcement agents the difference; it is still clear that there is a problem with the BLL and PLL definitions. NMFS should reexamine this issue with some fishing industry assistance; and, NMFS is making a big deal and creating potential additional economic impacts for enforcement's convenience. It is not an enforcement necessity; and, PLL and BLL gears should be differentiated by the number of floats (alternative I1(b)) as well as the types of species landed (alternative I1(c)).

Response: NMFS believes that the existing regulations defining pelagic and bottom longline gear at § 635.21(c) and (d), respectively, are generally sufficient. However, there could be situations where it is difficult for law enforcement to differentiate between the two gear types while enforcing the closed areas or VMS regulations. Difficulties could arise, for example, in determining whether the weights and/or anchors are capable of maintaining contact between the mainline and the ocean bottom in the case of bottom longlines, or whether the floats are capable of supporting the mainline in the case of pelagic longlines. These difficulties could result in lengthier boardings at sea by law enforcement, temporary curtailment of fishing activities, and potential legal proceedings. For these reasons, NMFS sought to reexamine the current PLL and BLL definitions in this amendment to ascertain whether improvements were warranted. Based upon public comment and consultations with law enforcement, NMFS found that the current PLL and BLL definitions could be strengthened by establishing limits on the types of species that could be possessed when fishing in HMS closed areas with these gears. However, in order to maintain operational flexibility for the HMS longline fleet, and in recognition of the impracticality of defining and limiting the number of "fishing floats" possessed or deployed, gear-based alternative I1(b) is no longer preferred. The overall objective of this issue, preserving the integrity of the HMS time/area closures, can effectively be achieved by implementing preferred alternative I1(c) alone, species composition of catch. This alternative addresses the crux of the issue, which is to discourage catches of pelagic species in PLL closed areas (and vice versa), without the adverse economic impacts associated with additional gear restrictions. This alternative is expected to accommodate the majority of commercial fishing operations, yet still provide a quantifiable method to differentiate between PLL and BLL vessels. As a result, the ecological benefits associated with HMS closed areas are expected to remain intact, including reductions in discards of swordfish, bluefin tuna, dusky sharks, sandbar sharks, other HMS, other finfish, and protected species. By implementing preferred alternative I1(c) alone, NMFS anticipates that HMS longline vessel operators will be prudent when fishing in the HMS closed areas and catch predominantly pelagic species in BLL closed areas, or demersal species in PLL closed areas. However, the establishment of quantifiable gear-based criteria to differentiate between PLL and BLL gear could still potentially offer an effective method to further eliminate ambiguities between the two gear types. The Agency intends to continue to assess the need for, and potential effectiveness of, gear-based criteria. If needed, such criteria could be developed in consultation with the fishing industry to further improve the monitoring of, and compliance with, HMS closed areas.

Comment 2: NMFS received several comments indicating that HMS longline vessel operators need to maintain their operational flexibility. These comments include: Longline vessels need to maintain their ability to change between PLL and BLL gear in order to ensure versatility. For economic survival and efficiency, vessels often conduct both PLL and BLL sets on a single trip. This is especially true for PLL vessels that fish with BLL gear during rough weather days on a PLL trip. There will be an economic loss if NMFS restricts this flexibility; definitions for PLL and BLL gear should be developed to facilitate identification by law enforcement, while not precluding fishermen from choosing between gear types; and, in order to allow flexibility to conduct both PLL and BLL sets, the final regulations may need to specify differences between active gear and gear onboard the boat and not in use, because there have been some enforcement errors.

Response: NMFS recognizes that HMS longline vessels need to maintain their ability to change between PLL and BLL gear in order to ensure versatility. The reason for addressing the gear definition issue in this amendment was not to impose additional economic costs on longline vessels, but rather to preserve the conservation benefits associated with the HMS time/area closures. The HMS longline closed areas were implemented to provide important protection to a variety of HMS and other protected species. This protection could be compromised if HMS longline vessels are catching large amounts of pelagic species in the PLL closed areas, while under the guise of BLL fishing, and vice-versa. The critical factor in maintaining the integrity of the HMS time/area closures is, therefore, to ensure that the proper species are hooked. This could potentially be accomplished in a variety of ways. NMFS believes that establishing a limit on the species composition of the catch when fishing in the HMS closed areas (preferred alternative I1(c)) is an efficient method to discourage illegal fishing activities in these areas, without imposing additional gear requirements that could restrict operational flexibility. As long as a vessel is in compliance with the current PLL or BLL definitions when fishing in the HMS closed areas, the operator will retain the flexibility to choose how to comply with the catch limits specified in preferred alternative I1(c). Importantly, however, these catch limits must be adhered to if any portion of a trip is in an HMS closed area. NMFS believes that it is not unreasonable, or unduly burdensome, for HMS longline vessels to adhere to the intent of the HMS closed areas and to avoid pelagic or demersal species, especially when legally fishing in these areas with BLL or PLL gear, respectively. Because NMFS is implementing a species-based, rather than a gear-based, alternative to differentiate between pelagic and bottom longlines, a gear stowage provision is not necessary at this time.

Comment 3: Comments were received indicating that vessel monitoring systems (VMS) could be used to help differentiate between PLL and BLL vessels. These comments included: Since VMS are already required for the closed areas, NMFS should establish a declaration system allowing the VMS monitors to know what gear type is being utilized and why. Law enforcement and/or observers could verify compliance, and impose penalties for non-compliance; and, it has been suggested that vessels “call-in” and declare their intentions prior to engaging in fishing in a closed area. This would be an unnecessary burden, but it is feasible.

Response: This comment was also raised by both the public and the Office of Law Enforcement during scoping hearings, and was considered during the development of alternatives for the DEIS. However, NMFS decided against including an alternative with a VMS declaration because it would not alleviate the need for a quantifiable method to differentiate between PLL and BLL gear. Although a vessel operator could declare to be fishing with PLL or BLL gear, it would still be necessary to verify compliance. Nevertheless, there may be a potential benefit to a VMS declaration system, and NMFS will continue to assess the need for such a system.

Comment 4: Comments opposed to alternative I1(b), defining BLL or PLL gear based on the number of floats onboard, included: We are strongly opposed to alternative I1(b); defining BLL and PLL gear by the number of floats will not work; and, alternative I1(b) would impose an unnecessary additional economic and logistic burden on already over-regulated fisheries.

Response: Although the analysis in the Draft HMS FMP indicated that relatively few HMS longline vessels would be impacted by the float requirement in alternative I1(b), this alternative is no longer preferred in the Final HMS FMP. As discussed above, several commenters stated that a float requirement would diminish the flexibility of vessel operators to participate in different fishing activities, depending upon the circumstances. Also, consultations with NMFS Law Enforcement indicated that defining "fishing floats" and limiting the number that could be possessed or deployed would not be practical. In light of these concerns, NMFS believes that the overall objective of this issue, preserving the integrity of the HMS time/area closures, can effectively be achieved by implementing preferred alternative I1(c) alone, species composition of catch. By not preferring alternative I1(b), any potential adverse economic impacts associated with restricting the allowable number of floats should be mitigated.

Comment 5: NMFS received many comments regarding the float requirement in alternative I1(b), and suggestions for developing other gear-based methods to better differentiate between PLL and BLL. These comments include: There is some confusion in preferred alternative I1(b) between the terminology that the industry is accustomed to using versus what NMFS is using; how do the proposed regulations define PLL and BLL gear and floats?; floats are used for recovery and monitoring sections of the gear. The types of mainline and anchor are related to where the gear is fishing in the water column. The mainline and anchors onboard a vessel would be better indicators of what type of longline gear is onboard a vessel; if NMFS proceeds with alternative I1(b), it is important to make sure that an anchor ball is accounted for in the float enumeration; there is no critical need for BLL vessels to possess "bullet" type floats. Such floats can be replaced with polyballs on BLL vessels at minimum costs. On the contrary, PLL vessels must carry large quantities of both polyball and "bullet" floats, this difference would enable enforcement officers to differentiate between PLL and BLL vessels while underway and/or fishing. NMFS could allow PLL vessels to retain the necessary flexibility if they required all "bullet" type floats to be stowed below deck and/or completely covered before engaging in BLL fishing in a PLL closed area. It would be awkward but it is feasible; NMFS enforcement should not require an adjustment to the definition. A PLL vessel is easy to spot by the amount of "bullet" floats and balls. While deployed, the gear is easy to determine by the consecutive "bullet" floats along the line. When a PLL vessel is engaged in BLL fishing, there is no consecutive string of "bullet" floats and a BLL vessel does not require hundreds of bullet floats; and, on the Grand Banks, fishermen use polyballs, bullet floats and radio buoys, but I do not know the exact number of each; Radio buoys are probably used more with PLL than with BLL gear.

Response: NMFS appreciates these comments. The proposed regulations did not contain new definitions for PLL and BLL gear, and did not define "fishing floats." Rather, comments were specifically requested on potential definitions for "fishing floats." While differences between PLL and BLL gear might be readily apparent, these comments highlight the difficulties associated with developing definitions that are quantifiable, understandable, practical, enforceable, and can accommodate a variety of different fishing techniques. These limitations greatly restrict the ability to develop practical, quantifiable definitions for PLL and BLL gear that are improvements over the existing definitions. For these reasons, as discussed above, NMFS believes that the current PLL and BLL definitions do not require significant modification, but can be strengthened by establishing limits on the types of species that can be possessed when fishing in HMS closed areas. In order to maintain operational flexibility for the HMS longline fleet, and in recognition of the impracticality of defining and limiting the number of "fishing floats" possessed or deployed, gear-based alternative I1(b) is no longer preferred. Nevertheless, the establishment of quantifiable gear-based criteria to differentiate between PLL and BLL gear using the recommendations contained in this comment could help to eliminate ambiguity between gear types in the future, if necessary. NMFS will continue to assess the need for, and potential effectiveness of, gear-based criteria. If needed, such criteria could be developed in consultation with the fishing industry to further improve the monitoring of, and compliance with, HMS closed areas.

Comment 6: Comments regarding the numbers of floats specified in alternative I1(b) included: The number of floats proposed for the PLL/BLL designation in alternative I1(b) (*i.e.*, 71 or more floats for PLL) is appropriate, but fishermen could run into trouble with enforcement during test sets. These are sets fishermen use to determine what fish, if any, are in the area. Test sets are usually shorter and have fewer floats; NMFS is proposing too many floats to differentiate between BLL and PLL gear in alternative I1(b). BLL gear would have far fewer floats. Most BLL may have two to four floats with maybe a 12 to 15 maximum; and, a fisherman may do a short PLL set that would have less than 71 floats when fishing in closed areas and might be able to catch demersal fish, like sandbar sharks, on PLL gear.

Response: Based upon an analysis of the HMS logbook in the Draft HMS FMP, NMFS believes that the number of floats specified to differentiate between PLL and BLL gear in alternative I1(b) is appropriate. The analysis indicated that at least 90 percent of all reported BLL sets in 2002 and 2003 possessed fewer than 70 floats, and approximately 95 percent of all reported PLL sets in 2002 and 2003 possessed more than 70 floats. However, public comment indicated that, in some instances, the float requirement could adversely impact operational flexibility. For this reason and the others discussed above, the float requirement in alternative I1(b) is no longer preferred. NMFS believes that the concern expressed in this comment regarding catching demersal fish on PLL gear in BLL closed areas would be adequately addressed by alternative I1(c), which would limit the amount of species (either pelagic or demersal, as appropriate) that may be possessed or landed from HMS closed areas.

Comment 7: Alternative I1(b) may assist in defining greenstick gear by specifying the numbers of floats for pelagic and bottom longlines.

Response: The issues involved in defining greenstick gear are addressed in the Authorized Fishing Gear section of the Final HMS FMP (see Section 4.3.3). NMFS is no longer preferring alternative I1(b), which would specify the number of floats for PLL and BLL gear. If needed in the future, NMFS may consider distinguishing between greenstick and longline gear based upon the number of floats.

Comment 8: NMFS received comments in opposition to alternative I1(c), including: I vehemently oppose preferred alternative I1(c) which differentiates between BLL and PLL gear based upon the species composition of the catch. There is no difference between PLL and BLL gear. BLL gear takes so long to set and retrieve that it can kill pelagic species while the hooks are being retrieved. Enforcement will be ineffective on this alternative. What is a vessel considered to be, PLL or BLL, after it has just switched from one mode to the other prior to harvest in the second mode?; and, I am opposed to this alternative because it will limit the abilities of the directed shark fishery.

Response: There is a difference between PLL and BLL gear. PLL gear fishes for pelagic species in the water column, while BLL gear fishes for demersal species and is in contact with the seafloor. Although the gears can each catch both types of species, the catch rates of demersal and pelagic species are very different between the gears. This fact is evident in the Coastal logbook where, on average, from 2000 – 2004, over 95 percent of the reported landings were demersal “indicator” species, as measured relative to the total amount of “indicator” species. Similarly, in the PLL logbook, from 2000 – 2004, on average, over 95 percent of the reported landings were pelagic “indicator” species, as measured relative to the total amount of “indicator” species. For this reason, a 5-percent threshold of pelagic and demersal “indicator” species would be established for BLL and PLL gear, respectively, in preferred alternative I1(c). NMFS recognizes that a small percentage of species caught on BLL and PLL gear will be the unavoidable bycatch of pelagic and demersal species, respectively. Also, the logbook data indicate that the five-percent threshold would have been exceeded on a fishery-wide basis in 2004, whereas both fisheries (PLL and BLL) would have been well below the threshold from 2000 – 2003. If necessary, both the 5-percent threshold and the list of indicator species can be modified in the future based upon a review of current and historic landings and the effectiveness of the regulation. Presently, the Agency does not expect that preferred alternative I1(c) would significantly limit the abilities of either fishery. NMFS further believes that it is not unreasonable, or unduly burdensome, for HMS longline vessels to adhere to the intent of the HMS closed areas and to avoid pelagic or demersal species, especially when legally fishing in these areas with BLL or PLL gear, respectively. If any portion of an HMS longline trip occurs within a BLL or PLL closed area, then that vessel would be required to adhere to the 5-percent threshold for pelagic or demersal species, respectively. This management measure is readily enforceable, either through dockside verification of landings or by at-sea boardings. If difficulties arise in determining whether a vessel is fishing with PLL or BLL gear in a closed area using the existing definitions, the species composition of catch methodology described in the alternative provides a quantifiable method to verify fishing technique.

Comment 9: Comments specifically referencing the five-percent species composition threshold for differentiating between gears include: In order to differentiate between PLL and BLL gear, NMFS should prevent fishermen with BLL gear from landing any pelagic species in preferred alternative I1(c). This prohibition would eliminate the profit incentive and motive for violating closed areas and manipulating set time, depth at which gear is set, and the number of buoys; I am opposed to the 5-percent tolerance for species because there is too much variability in the catch. This ratio could also be problematic when combined with the alternative addressing dealers and vessels buying and selling fish in excess of retention limits, because there is no room for error and no way to dispose of catch that is useful; NMFS must make sure that the species composition lists in preferred alternative I1(c) are complete enough to allow for gear definitions based on species; and, tilefish should be added to the list of demersal indicator species.

Response: NMFS appreciates these comments. As discussed above, both types of gear can occasionally catch both types of “indicator” species, pelagic and demersal. The establishment of a zero-tolerance for pelagic “indicator” species when fishing in PLL closed areas with BLL gear could create a situation where regulatory discards occur, due to the unavoidable bycatch of pelagic species. Alternative I1(c) would strike an appropriate balance by establishing a 5-percent tolerance, which should discourage directed fishing on pelagic species by BLL vessels and vice-verse, but not increase regulatory discards. Data from the Coastal and HMS logbooks indicate that, on average, vessels remained below this threshold from 2000 – 2004, although it would have been exceeded in 2004. Based upon public comment, NMFS has modified the list of demersal "indicator" species by removing hammerhead and silky sharks, and by adding tilefish to the list. If necessary, both the 5-percent threshold and the list of indicator species could be modified in the future based upon a review of current and historic landings.

Comment 10: More enforcement time should be spent at the docks rather than spending resources on investigating boats at sea. At-sea enforcement of alternative I1(c) could initiate unnecessary de-icing of fish in the hold while at sea, which has a substantial economic impact.

Response: As discussed above, preferred alternative I1(c) is readily enforceable, either through dockside verification of landings or by at-sea boardings. If difficulties arise in determining whether a vessel is fishing with PLL or BLL gear in a closed area using the existing definitions, the species composition of catch methodology described in the alternative provides a quantifiable method to verify fishing technique.

Comment 11: The Gulf of Mexico Fishery Management Council and others have recommended that the preferred alternative be changed from I1(b) to I1(e): Base HMS time/area closures on all longlines (PLL and BLL); alternative I1(e) would be the easiest alternative to enforce. This is the only way to achieve a meaningful reduction in bycatch; billfish feed throughout the water column. To provide the proper protection needed, both types of longline gear should be prohibited from closed areas; alternative I1(e) should also prohibit buoy gear from the closed areas; alternative I1(e) is the only way to reduce bycatch and facilitate enforcement; and, how deep must BLL gear be set before it does not adversely affect pelagic species?

Response: NMFS agrees that alternative I1(e) would be the easiest to enforce, but believes that preferred alternative I1(c), which would implement limits on bycatch, can be effective at preserving the conservation benefits associated with the closed areas while simultaneously mitigating adverse economic impacts on longline vessels fishing in the areas. When deployed and fished properly, available logbook information suggests that BLL and PLL gear can be set and retrieved with only minor impacts on pelagic and demersal species, respectively. Closing these areas to all gears, therefore, would impose economic costs while achieving only minimal ecological benefits. NMFS anticipates that HMS longline vessels will continue to be prudent, especially when fishing in the HMS closed areas by catching predominantly pelagic species in BLL closed areas, and demersal species in PLL closed areas. NMFS does not agree that closures for PLL or BLL gear also need to be closed to buoy gear. As described earlier, NMFS prefers to authorize buoy gear in the commercial swordfish handgear fishery with gear marking requirements and limits on the number that may be deployed. Those measures would prevent the uncontrolled future expansion of this gear sector, while simultaneously providing a reasonable opportunity for the U.S. to harvest its ICCAT swordfish quota.

Issue 2: Shark Identification

Comment 12: We support alternative I2(a) which would retain the current regulations regarding shark landing requirements (No Action) because the preferred alternative, I2(b), could have a negative economic impact on the fish houses due to degradation of the product. The sharks could be overexposed to heat after unloading and weighing, instead of going directly into the ice vats after weighing. It costs time and money to stop and try to cut off all the secondary fins, particularly small ones after the boat has docked and the fish house has began the unloading efforts.

Response: In an effort to improve data collection, quota monitoring, and stock assessments of shark species, the Agency prefers alternative I2(b). While initial adjustments may have to be made to the offloading and processing procedures, NMFS believes that efforts to improve shark identification and enforcement of regulations would improve the overall status of the shark fishery. Alternative I2(b) would be an intermediate action (relative to I2(a) and I2(d)) in terms of economic impacts, in that the second dorsal and anal fins are typically the least valuable and are usually sold as the lowest quality grade. Either the dealer or the fishermen can remove these fins after landing. If removing the fins at the dock becomes problematic, it is possible that fishermen could pre-cut fins, so that they are only partially attached, to decrease processing time. Alternatively, dealers could remove the fins later when processing the rest of the carcass.

Comment 13: NMFS received the following comments supporting the preferred alternative: I support preferred alternative I2(b) which requires fishermen to retain the second dorsal and anal fins on sharks; these measures will greatly enhance species-specific shark landing data and improve identification; retention of the second dorsal fin and anal fins of landed sharks, including nurse and lemon sharks, will improve quota monitoring, prohibited species enforcement, and species-specific identification of sharks; and, lemon sharks and great hammerheads have valuable fins- they should be ok to remove after landing.

Response: NMFS agrees. The preferred alternative, I2(b), is expected to generate ecological benefits by enhancing and improving species identification and data collection, particularly in coordination with the preferred alternative for dealer identification workshops, thereby leading to improved management and a sustainable fishery.

Comment 14: Maintaining the second dorsal fin in alternatives I2(b) and I2(c) will do little to improve shark identification.

Response: The second dorsal and anal fins of sharks vary in color, shape, and size (relative to the body). While retaining these fins may not allow for all shark species to be distinguished from each other, NMFS believes that it would aid identification at landing, which, in conjunction with HMS species identification workshops, should reduce the number of unclassified sharks reported. While retaining these fins is expected to enhance identification, non-preferred alternative I2(c) could confuse identification by allowing some sharks to be completely finned, and could have adverse ecological impacts compared to either the no action or the preferred alternative.

Issue 3: HMS Retention Limits

Comment 15: NMFS received the following comment in support of the no action alternative I3(a): Proceeds from fish caught in excess of a vessel's trip limit should be donated to NMFS to help fund the observer program up to a certain limit, such as five percent, and fishermen should get fined for anything above that percentage.

Response: For each of the regulated HMS, specific trip limits have been developed based upon a number of biological, social, and/or economic reasons, such as the nature of the trip (commercial or recreational), the gear types used to harvest the fish, or the status of the stock in question. Thus, tolerance limits need to be developed for each individual species on a fishery-by-fishery basis, and may not be appropriate for all regulated species. Also, even with tolerance limits, the likelihood of exceeding these limits would still exist and NMFS would likely continue to receive comments to adjust the limit or tolerance limit. The suggestion to fund the observer program through proceeds from fish landed above the trip limit raises a number of practical and legal concerns. If these can be satisfactorily resolved, NMFS may consider this suggestion in the future, as needed.

Comment 16: Does the inclusion of alternative I3(b) mean that we are currently allowed to exceed the retention limits?

Response: No. Currently all vessels fishing for, retaining, or possessing Atlantic HMS, with the intent to sell that catch, must abide by the commercial retention limits as stated in §§ 635.23 and 635.24. The current prohibitions located in § 635.71 reinforce the applicability of these commercial limits. This alternative would implement a new prohibition, not a new regulation, making it illegal for any person to, "Purchase any HMS from an individual vessel in excess of the commercial retention limits." As such, dealers or buyers of HMS in excess of commercial retention limits would be held responsible for their actions. This prohibition is intended to improve compliance with HMS retention limits by extending the regulations to both of the parties involved in a transaction. It would reinforce and clarify other existing regulations regarding landings of HMS in excess of commercial retention limits.

Comment 17: NMFS received comment both in support of and opposition to alternatives I3(b) and I3(c). Those comments in support stated that NMFS needs to make all parties involved in violating the intent of the fishery regulations accountable, both vessel owners and dealers regardless if they are commercial or recreational. Those comments opposed stated: Alternatives I3(b) and I3(c) eliminate flexibility when it comes to shark landings. As scales are not used on small boats vessel owner/operators can only estimate a trip limit at sea based upon a carcass count and an estimated average weight; and, concerns exist regarding the five-percent shark fin/body ratio. The ratio is not correct as it was based on one species. Thus, we need to have species-specific ratios for these alternatives to be fair.

Response: The final action is intended to improve compliance with HMS retention limits by extending the regulations to both of the parties involved in a transaction where HMS exceeding trip limits are sold or purchased. It would also reinforce and clarify other existing regulations regarding landings of HMS in excess of commercial retention limits. As with any limitation on catch, vessel owner/operators must use their experience and professional judgment in determining where their harvest stands in regard to catch/possession/trip limits to ensure that they do not exceed those limits. Regarding the five-percent tolerance limit on shark fins, this limit is currently dictated by the Shark Finning Prohibition Act. NMFS does not have the ability to alter this limit.

Comment 18: In addition to the selected alternatives, NMFS should enforce the existing prohibition on the sale of recreationally caught HMS. NMFS should levy heavy fines and permanent permit sanctions on the fishermen, vessel owner, and buyer if any bag limit fish are sold, traded, or bartered. NMFS should make additional provisions in the Final HMS FMP to prevent the illegal sale of recreational catches.

Response: The current suite of regulations and prohibitions contained in 50 CFR § 635 address the illegal sale, trade, and bartering of recreationally landed HMS. As the range of violations regarding these types of activities can vary greatly, the current penalty schedule provides enforcement agents and prosecutors with the flexibility to determine a suitable fine, based on information pertaining to each specific infraction.

Issue 4: Definition of East Florida Coast Closed Area

Comment 19: NMFS received contrasting comments on preferred alternative I4(b), which would modify the outer boundary of the East Florida Coast Closed Area so that it corresponds with the EEZ. These comments include: I support alternative I4(b), which amends the coordinates of the Florida East Coast closure; and, I am opposed to expanding any of the existing closed areas, including the East Florida Coast closed area described in preferred alternative I4(b). The PLL fleet needs every inch of available fishing grounds.

Response: NMFS does not expect a reduction in HMS catches associated with the preferred alternative because the geographic size increase is very small (0.5 nm) and, according to the PLL logbook data, there have not been any recent catches or PLL sets in this area. Fishing effort that would have occurred in this area would likely relocate to nearby open areas with similar catch rates. Therefore, overall fishing effort is not expected to change under this alternative. NMFS is correcting the coordinates to reflect the original intent of the East Florida Coast closed area to extend to the outer boundary of the EEZ.

Issue 5: Definition of Handline

Comment 20: I support preferred alternative I5(b), which requires that handlines be tied to the boat. If it is tied to the boat it is a handline, if it is not, it is a longline.

Response: NMFS prefers to implement alternative I5(b), which would require that all handlines be attached to, or in contact with, a vessel. However, by authorizing buoy gear in the commercial swordfish handgear fishery (see section 4.3.3), unattached lines would not, by default, automatically be considered longline gear. Buoy gear would be authorized only in the commercial swordfish handgear fishery with gear marking requirements, hook limitations, and limits on the number that may be deployed. Both handlines and buoy gear would still be limited to no more than two hooks per line.

Comment 21: We support alternative I5(c), which would require fishermen to attach their handlines to their vessels, because handlines should remain as recreational gear (attached to the vessel) and buoy gear should be designated as commercial gear. However, there are times when fishermen need to detach their handlines, particularly when a large captured fish has spooled several reels, in order to retrieve the gear. Is that now going to be prohibited?

Response: Buoy gear would be authorized only for the commercial swordfish fishery. However, handlines are, and will continue to be, authorized in both the commercial and recreational fisheries. The preferred alternative I5(b) would require that handlines be attached to the vessel. It does not change which fisheries the gear is authorized for. The situation where a large fish spools several reels and must be "tethered-off" to retrieve the gear and/or the fish is an uncommon, but not rare, occurrence. The important factor in determining if this is an allowable practice is whether or not the handline was attached to the vessel when the fish was first hooked. Primarily to facilitate safety at sea, the handline could be "tethered-off" if it was attached to the vessel when the fish was hooked. NMFS anticipates that these situations would need to be examined on a case-by-case basis, in consideration of the circumstances affecting the decision to detach the handline.

Comment 22: How is the definition of handline gear different from buoy gear?

Response: Under the preferred alternatives, the main difference between the two gears would be whether or not the gear is attached to the vessel. If the gear is attached, it would be considered handline and could be used, with the appropriate permits, in any of the tunas, swordfish, or shark fisheries. If the gear is not attached, it would be considered buoy gear and could be used only in the commercial swordfish handgear fishery. Specifically, preferred alternative I5(b) would define handline as fishing gear that is attached to, or in contact with a vessel; that consists of a mainline to which no more than two hooks or gangions may be attached; and that is released and retrieved by hand rather than by mechanical means. Preferred alternative H5 would define buoy gear for the commercial handgear fishery as 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. Buoy gear would be required to be constructed and deployed so that the hooks are attached to the vertical portion of the mainline. Flotation devices may be attached to one, but not both ends of the mainline, and no hooks or gangions may be attached to any horizontal portion of the mainline. If more than one floatation device is attached to a buoy gear, no hook or gangion would be allowed to be attached to the mainline between them. Individual buoy gears may not be connected together in any way. All buoy gears would be required to be released and retrieved by hand. Fishermen using buoy gear would be required to also affix monitoring equipment to each individual buoy gear. Gear monitoring equipment may include, but would not be limited to, radar reflectors, beeper devices, lights, or reflective tape. If only reflective tape is used, the vessel deploying the buoy gear would be required to possess an operable spotlight capable of illuminating deployed flotation devices. Additionally, a floatation device would be defined as any positively buoyant object rigged to be attached to a fishing gear.

Comment 23: Are floating handlines being used to catch juvenile swordfish in the East Florida Coast closed area?

Response: Available HMS logbook data from 2000 to 2004 indicates that the "handline-only" fishery grew significantly in 2004, and that catches and discards of swordfish in the "handline-only" fishery increased as well. However, the HMS logbook does not differentiate between "attached" and "unattached" handlines, and recreational data are limited. Given these limitations, it is not possible to determine conclusively if floating handlines are being used to catch juvenile swordfish in the East Florida Coast closed area. However, given that the legal minimum size is below the size of maturity, the average size of swordfish caught across all fisheries is below the size of maturity, and because the area off the east coast of Florida is a known nursery ground for swordfish, it is likely that any fishing gear, including rod and reel or handlines, used to catch swordfish off the east coast of Florida catches juvenile swordfish, to at least some degree.

Issue 6: Possession of Billfish on Vessels Issued HMS Commercial Permits

Comment 24: What types of permits would be affected by preferred alternative I6(b), which prohibits vessels issued commercial permits and operating outside of a tournament from possessing or taking Atlantic billfish?

Response: Under the preferred alternative I6(b), only persons issued an HMS Angling or HMS Charter/Headboat, or who have been issued an Atlantic Tunas General Category permit and are participating in a registered HMS tournament, would be allowed to possess or take an Atlantic billfish. Persons only issued Federal swordfish, shark, or Atlantic Tunas permits (including General Category permits outside of registered HMS tournaments) would not be allowed to possess or take an Atlantic billfish. Persons issued both commercial and recreational HMS permits could take billfish, but only if the HMS species possessed onboard the vessel do not exceed the HMS recreational retention limits.

Comment 25: NMFS needs to make sure that the language in preferred alternative I6(b) is very clear in specifying that a commercial permit refers to HMS commercial fisheries.

Response: The regulations would be clear that only persons issued an HMS Angling or HMS Charter/Headboat, or who have been issued an Atlantic Tunas General Category permit and are participating in a registered HMS tournament, would be allowed to possess or take an Atlantic billfish. Persons issued non-HMS commercial permits may possess or take Atlantic billfish only if they have also been issued the appropriate HMS permits.

Comment 26: NMFS received several comments in support of, or in opposition to, the preferred alternative I6(b) including: I support preferred alternative I6(b) until Atlantic billfish stocks are rebuilt; we support prohibiting commercial vessels from possessing, retaining, or taking Atlantic billfish (alternative I6(b)); I support preferred alternative I6(b), because it would help to eliminate gillnet fisheries that kill billfish and other non-target species; I am opposed to preferred alternative I6(b) because all commercial vessels should be able to retain recreational bag limits; and, the preferred alternative I6(b) would have more negative impacts than NMFS has listed presently in the DEIS.

Response: The preferred alternative I6(b) would clarify that commercial HMS vessels cannot possess or take Atlantic billfish. The preferred alternative would also clarify that the current Atlantic billfish fishery is a recreational fishery and that Atlantic billfish should only be possessed or retained when taken recreationally by rod and reel. The preferred alternative would not eliminate any existing fisheries, but it would mean that commercial fishermen onboard gillnet or bottom longline vessels could not retain a billfish taken with rod and reel for personal use, unless the vessel possessed both the recreational and commercial permits (*e.g.*, a commercial shark limited access permit and an HMS Charter/Headboat permit) and if the other HMS onboard did not exceed the HMS recreational retention limits. Furthermore, General Category fishermen fishing for Atlantic tunas with rod and reel would not be allowed to possess billfish outside of registered HMS tournaments. To the extent that some fishermen with commercial HMS permits may take billfish, there could be minimal impacts in terms of commercial fishermen taking fish off the vessel for personal use. Current regulations do not allow commercial HMS fishermen to take recreational limits of HMS. NMFS believes that few commercial HMS fishermen take billfish, this alternative would clarify the regulations, and this alternative reinforces the recreational nature of the Atlantic billfish fishery. Once Atlantic billfish are rebuilt, NMFS may consider alternatives that would allow persons issued HMS commercial permits to possess a limited number of Atlantic billfish for personal use.

Issue 7: Bluefin Tuna Dealer Reporting

Comment 27: I support preferred alternative I7(b), which provides tuna dealers with an option to submit their required reports using the Internet; NMFS should move towards alternative I7(c), which would require mandatory internet reporting, as soon as possible.

Response: Due to the importance NMFS places on reporting, the Agency wants to ensure that reporting is both convenient and fair for all user groups. Mandatory Internet reporting would not be enacted until NMFS is confident that such an action would not impede the reporting process.

Issue 8: "No-Fishing", "Cost-Earnings", and "Annual Expenditures" Reporting Forms

Comment 28: I support preferred alternative I8(b), which requires the submission of "no-fishing" forms. Is there latitude with logbooks coming in from different countries? If you do not have all the parts of the logbook submission, should you send in what you have or wait until you have everything? For instance, I often do not have the offload tally by the time the logbook is due (seven days after offloading).

Response: As specified in the Atlantic HMS regulations 50 CFR §635.5, owners of vessels issued an HMS permit must submit a fishing record that reports the vessel's fishing effort, and the number of fish landed and discarded. This information should be entered in the logbook within 48 hours of completing that day's activities on a multi-day trip, or before offloading on a single day trip. Additionally, if HMS are sold, the vessel owner must acquire copies of the weigh out slips for submittal with the logbook forms. All forms must be postmarked within seven days of offloading HMS, regardless of offloading location. The preferred alternative I8(b) would not change these requirements.

Issue 9: Non-Tournament Recreational Landings Reporting

Comment 29: Vessel owners should not have to report their recreationally-caught fish because they are often too busy (*e.g.*, absentee boat owners that fly into Florida from New York City for the weekend).

Response: Because vessel owners are issued HMS permits, the recreational non-tournament reporting requirement should logically, and for compliance purposes, be incumbent upon vessel owners. Furthermore, since vessel owners are the permit holders, they are more likely to be familiar with the regulations governing their fishery than non-permitted anglers who might be onboard, possibly for just a day on a charter trip. The preferred alternative would achieve better consistency with other HMS recreational reporting requirements, and could also enhance the accuracy of, and compliance with, non-tournament HMS recreational data collection. However, in response to this comment and other comments, NMFS will slightly modify the preferred alternative to allow an owner's designee to report non-tournament recreational landings of Atlantic billfish and swordfish. The vessel owner would still be held responsible for reporting, but the owner's designee could fulfill the requirement.

Issue 10: Pelagic Longline 25 mt NED Incidental BFT Allocation

Comment 30: NMFS should clarify whether "carryover" provisions would apply to the underharvest of the 25 mt NED BFT quota set-aside described in alternative I10(b).

Response: The alternative that was formerly preferred in the Draft HMS FMP, I10(b), would have clarified that carryover procedures apply to the NED set-aside, and that any under/overharvest of the 25 mt (ww) NED set-aside would be carried forward into, or deducted from, the subsequent fishing year's set-aside allocation. This alternative was originally preferred in the Draft HMS FMP, but after subsequent analysis of the recommendation and in response to comments seeking clarification, the Agency has determined that the ICCAT recommendation provides the flexibility to avoid some of the potential negative consequences associated with alternative I10(b). Alternative I10(c) is now the preferred alternative.

Comment 31: NMFS received a comment in support of alternative I10(b), which would allocate 25 mt (ww) for PLL incidental catch in the NED each year.

Response: This alternative was originally preferred in the Draft HMS FMP, because NMFS believed that its interpretation would provide consistency between the regulations and operational practices regarding rollovers and final set-aside quotas in excess of 25 mt (ww). However, since publication of the Draft HMS FMP, additional analysis of the ICCAT recommendation indicated that the previously preferred alternative, I10(b), might have some potential negative consequences that could be avoided. Thus, under alternative I10(b), incidental BFT landings from the NED Statistical area would be accounted for in this specific set-aside quota and any under/overharvest of the set-aside quota would be added to, or deducted from, the following year's baseline quota allocation of 25 mt (ww). The under/overharvest accounting procedures contained in this alternative may have some potentially adverse ecological impacts. Specifically, if the NED set-aside was not attained in multiple successive years, this set-aside quota could increase quite dramatically and, as the wording in the ICCAT recommendation specifically allocates this quota to the longline sector of the U.S. fleet, NMFS would not have the flexibility to transfer this quota to the Reserve or to another domestic user group, to avoid a 'stockpiling' situation from occurring. An unrestrained build-up of the incidental NED set-aside quota may eventually undermine the intent of the set-aside itself by leading to additional effort being deployed in the NED, and potentially providing an incentive to direct additional effort on BFT. For example, this set-aside could increase to a level that makes it more attractive for pelagic longline vessels to target BFT, which could possibly result in negative impacts to BFT stocks. Therefore, this alternative is no longer preferred and, instead, alternative I10(c) is preferred. Alternative I10(c) would not carry forward any under/overharvest, until such time as further ICCAT discussions regarding quota rollovers are conducted.

Issue 11: Permit Condition for Recreational Trips

Comment 32: NMFS received comments in support of preferred alternative I11(b), a permit condition in the regulations for recreational trips, including: We support preferred alternative I11(b) because it will enhance Atlantic shark conservation efforts while ASMFC develops an interstate FMP; and, I support the presumption that an HMS onboard a vessel was caught in Federal waters because the current regulations cause enforcement problems.

Response: NMFS agrees that the recreational permit condition would enhance HMS conservation efforts and would improve enforcement of HMS regulations. Currently, in many states, fishermen are able to bypass both Federal and state regulations by stating they were fishing in state waters, rather than Federal, or vice versa. With the permit condition, recreational fishermen fishing in Federal waters, who have a Federal permit, would agree to abide by the more restrictive regulation just by obtaining a Federal permit. Recreational fishermen who do not have a Federal permit will continue to have to abide by only state regulations. Thus, under the preferred alternative, enforcement officers would no longer need a statement from a fisherman with a Federal permit regarding where the fish was caught. Rather, they could take action under the more restrictive regulations. This permit condition has been in place for a number of years for shark and swordfish commercial fishermen and has been useful in enforcing commercial regulations.

Comment 33: Will NMFS consider the full suite of regulations implemented by states with regards to HMS or will it simply look at each regulation individually? How does NMFS intend to define "strict?"

Response: Each situation would need to be examined on a case-by-case basis; however, it is likely that the regulations would be enforced individually rather than as a suite. For instance, if a state has a larger bag limit and larger minimum size than the Federal regulations, the fishermen would be limited by both the Federal bag limit and the state minimum size.

Comment 34: NMFS could say that all HMS vessels with Federal permits (instead of just recreational-permitted vessels) should comply with Federal regulations when in Federal or state waters.

Response: NMFS already has the permit condition in place for commercial shark and swordfish fishermen. NMFS also already has the authority, under the Atlantic Tunas Convention

Act (ATCA), to manage Atlantic tunas all the way to shore for most states. The preferred alternative would improve the enforcement of the remaining fisheries (recreational shark, swordfish, and billfish) without superseding the regulations of the states. Thus, the preferred alternative would allow states to establish their own regulations for shark, swordfish, and billfish fishermen who are fishing only within state waters (Maine and Connecticut can also establish their own regulations for Atlantic tunas). NMFS has the authority to pre-empt states regarding HMS under both the Magnuson-Stevens Act and ATCA. However, NMFS prefers to work with states and the Atlantic and Gulf States Marine Fisheries Commissions towards consistent regulations that meet both international and domestic goals, because each state is different and the fishermen in each state prefer to fish for different HMS and use different gears. If necessary to ensure rebuilding under the HMS FMP or under an ICCAT Rebuilding Program, NMFS may consider pre-empting state authority for specific HMS. Under this scenario, NMFS would provide states and the public adequate time to comment and adjust regulations per the appropriate process.

Comment 35: NMFS received related comments from the South Atlantic Fishery Management Council (SAFMC) and the State of Georgia. These comments are summarized here. The preferred alternative I11(b) for state/Federal regulations does not implement the correct intent as previously requested by the SAFMC and the State of Georgia, which is to have the more restrictive requirements, whether they are Federal or state, apply in each area. For example, if a state has a retention prohibition, then the adjacent Federal waters should also have a retention prohibition. The SAFMC does not understand why the "more restrictive" clause was not more simply stated, as in other FMPs. The permit condition should be a two-way street where more restrictive state regulations should apply in adjacent federal waters. The specific language should be: For allowable Atlantic billfish (and other HMS that can legally be included), if a state has a catch, landing, or gear regulation that is more restrictive than a catch, landing, or gear regulation in the HMS FMP, a person landing in such state Atlantic Billfish (and other HMS to be included) taken from the U.S. EEZ must comply with more restrictive state regulation.

Response: NMFS does not agree. In many cases, the regulations are established based on ICCAT recommendations (*e.g.*, the billfish size limits). Under ATCA, the United States is bound to implement the ICCAT recommendation. Extending a more restrictive state regulation into Federal waters would be inconsistent with ATCA. Similarly, if the more restrictive regulation is not part of or consistent with the HMS FMP, the regulations may also be inconsistent with the Magnuson-Stevens Act.

Comment 36: HMS needs to check with the Regional Fishery Management Councils to make sure they are not running afoul of one another. The preferred alternative I11(b) could create more confusion if there is not a consistent policy for all federal fishery regulations.

Response: While NMFS agrees that consistent policies across fisheries regulations are often appropriate, NMFS disagrees that a permit condition in the regulations would cause confusion if it were not consistent across the different Regional Fishery Management Councils. The regulations across state and Federal boundaries depend upon the species involved. For many HMS, the majority of the fishing opportunities are in Federal waters. For instance, a fisherman is more likely to catch a billfish in Federal waters than fishing off a dock.

Additionally, HMS are managed both domestically and internationally unlike many of the species that the Regional Fishery Management Councils manage. While Councils often manage species jointly, in some cases, such as spiny dogfish, the fisheries in states are just as, if not more, predominant than those in the Federal waters. Thus, a permit condition that is appropriate for HMS may not be appropriate for a species managed by a Council or even by the Atlantic States Marine Fisheries Commission. In all cases, fishermen need to be aware of and follow the regulations of the specific permits they hold, just as they need to be aware of different laws as they travel between states (e.g., speed limits, hunting laws, etc).

Comment 37: Texas Parks and Wildlife opposes the preferred alternative I11(b), which would establish a permit condition on recreational permit holders. The alternative would increase confusion because it applies only to HMS and not to the many other species in state waters. Second, Texas regulations require that recreational landings in Texas meet Texas bag and size limits regardless of where the fish was caught unless the regulations in the waters where they were caught are more restrictive. Third, the preferred alternative applies only to Federal permit holders and would therefore create a scenario where different regulations apply in the same location. Lastly, the alternative does not simplify already confusing and complex regulations.

Response: NMFS does not agree that the preferred alternative would increase confusion. The preferred alternative would decrease confusion by clarifying that fishermen who decide they want the opportunity to fish for HMS in Federal waters must abide by Federal regulations regardless of where they are fishing, and that if they are fishing in state waters they must abide by the more restrictive regulation. Without this regulation, fishermen may need to abide by one regulation while fishing in Federal waters and another regulation while fishing in state waters. The preferred alternative would especially clarify issues if the fishermen were fishing in both state and Federal waters on the same trip. In regard to the second point, it appears that the State of Texas has implemented the same regulation as the preferred alternative but in regard to state waters. The preferred alternative would not change this and could complement the regulation by ensuring that Federally permitted fishermen do not exceed either the Federal or Texas bag and size limits when fishing in or near Texas waters. NMFS agrees that the preferred alternative would mean that different regulations could apply to Federally permitted fisherman fishing in state waters next to a state-only permitted fisherman. This should not be an issue since the more restrictive regulation would apply. It may appear to be unfair to the Federally permitted fisherman if the Federal regulations for that species are more restrictive than the state regulations for that species. However, the Federally permitted fisherman also has the opportunity to fish for HMS outside of state waters. If the Federally permitted fisherman decides that the opportunity is not worth the additional restrictions, then that fisherman could decide not to obtain the permit. The preferred alternative would not change the regulations for the state-only permitted fisherman, who restricted to fishing within state waters and must abide by state, not Federal, regulations.

Comment 38: While the South Carolina Department of Natural Resources understands the importance of consistent protection for HMS in state and Federal waters, we do not believe it was the intent of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to regulate fisheries in state waters except under unusual circumstances. We request that preferred alternative I11(b) be deleted from the plan, and that HMS caught within state waters be regulated through complementary state legislation and regulations, or through provisions already existing in the Act that address special cases.

Response: NMFS does not agree that the permit condition is regulating fisheries in state waters. The Magnuson-Stevens Act does give the Secretary of Commerce the authority to manage HMS fisheries to ensure their conservation and achievement of optimum yield throughout their range, both within and beyond the exclusive economic zone (16 U.S.C. 1812 section 102). Implementing a permit condition on recreational fishermen to abide by Federal regulations regardless of where they are fishing, unless a state has more restrictive regulations, allows NMFS to manage these fisheries in a more effective manner. Additionally, the permit condition only applies to those fishermen who obtain a Federal permit and who, presumably, fish in Federal waters at least some of the time. The permit condition would not change state regulations. Thus, states still have the opportunity to establish their own regulations for fishermen who fish in their waters and not in Federal waters. Fishermen still have the opportunity not to obtain a Federal permit and to abide only by state regulations. NMFS could follow the process that would pre-empt states rights under either the Magnuson-Stevens Act or under ATCA. However, as stated above, NMFS would prefer to work with states as each state has different needs and fishermen.

Proposed Regulatory Changes that Do Not Need Alternatives

Comment 39: We support the regulatory changes that do not have alternatives.

Response: NMFS appreciates this comment. The regulatory changes that do not need alternatives include corrections, clarifications, minor changes in definitions, and modifications to remove obsolete cross-references. It is occasionally necessary to make these types of regulatory changes as dates expire, or as minor issues are brought to the Agency's attention.

Comment 40: NMFS received a comment regarding the changes to clarify the definition of shark and the shark management unit: I am concerned about any item that lessens conservation on deepwater sharks; and, deepwater sharks should be added to the prohibited list rather than removed from the management unit in Regulatory Housekeeping.

Response: The minor changes to the shark definition and management unit would not lessen the conservation of deepwater sharks. Deepwater sharks were previously removed from the management unit in Amendment 1 to the HMS FMP. The referenced changes clarify the regulations by linking the definition of "shark" more directly to the definition of the shark "management unit." NMFS will continue to collect information on deepwater sharks and may add them to the management unit or implement additional management measures in the future.

Comment 41: The proposed changes to the HMS tournament registration process appear to complement proposed improvements to HMS tournament registration, data collection, and enforcement described in Alternative E9. Data collection should be mandatory for all tournaments, just as it has been for all non-tournament landings since 2003. There must be more accurate estimates of billfish mortality.

Response: These regulatory changes, which would specify that HMS tournament registration is not complete unless the tournament operator receives a confirmation number from the HMS Management Division, would serve a very similar purpose to non-preferred alternative E9, which would implement a mandatory HMS tournament permit. HMS tournament registration is already mandatory, so the issuance of a confirmation number would provide verification that the process is complete in a manner that is much less burdensome on the public than the issuance of a tournament permit. Currently, NMFS has the authority to select all registered HMS tournaments for mandatory reporting. Data obtained from HMS tournament reporting is used for a variety of purposes.

D.4 Essential Fish Habitat

Comment 1: NMFS should look at recent *Sargassum* research that suggests that *Sargassum* is essential fish habitat for juvenile billfish. The United States should pursue all appropriate opportunities to ensure that this unique EFH is protected in international waters from excessive harvest and degradation.

Response: NMFS is aware of recent research on *Sargassum* regarding the role of *Sargassum* as EFH for certain species, including HMS. However, NMFS does not have the authority to identify and describe EFH in international waters. Furthermore, NMFS is not modifying the current descriptions or boundaries of EFH in the Consolidated HMS FMP. Rather, NMFS gathered all new and relevant information and presented it in the Draft FMP to determine whether changes to EFH may be warranted. If NMFS determines that EFH for some or all HMS needs to be modified, then that would be addressed in a subsequent rulemaking, at which point *Sargassum* could also be considered as potential EFH. With regard to harvest, the final South Atlantic Fishery Management Council FMP for Pelagic *Sargassum* Habitat in the South Atlantic Region was approved in 2003 and implemented strict restrictions on commercial harvest of *Sargassum*. The approved plan includes strong limitations on future commercial harvest. Restrictions include prohibition of harvest south of the boundary between North Carolina and South Carolina, a total allowable catch (TAC) of 5,000 pounds wet weight per year, limiting harvest to November through June to protect turtles, requiring observers onboard any vessel harvesting *Sargassum*, prohibiting harvest within 100 miles of shore, and gear specifications.

Comment 2: The U.S. proposal at ICCAT to identify *Sargassum* as EFH was met with absolute resistance. NMFS has to be careful in dealing with this subject in an international forum. It can undermine what NMFS is trying to do.

Response: NMFS is aware that there are many issues to consider with regard to identifying and describing *Sargassum* as EFH for HMS species. In addition, there are potential international concerns, as expressed at ICCAT, regarding *Sargassum* as sensitive and valuable habitat. NMFS will continue to examine these issues carefully, and work to improve our understanding of the role of *Sargassum* as valuable habitat for HMS.

Comment 3: Does NMFS have data to justify not designating the entire northern Gulf of Mexico as EFH, where the “Nature” paper shows the presence of adult BFT from January to June?

Response: As described in response to comment 1, NMFS is not currently changing any of the EFH areas identified for HMS, including EFH for BFT through this FMP. However, it should be noted that large portions of the Gulf of Mexico are already identified as EFH per the original EFH descriptions in the 1999 FMP for several life stages of BFT, including adult and larval BFT.

Comment 4: The HMS regulations should acknowledge and comply with Gulf of Mexico EEZ EFH and Habitat Areas of Particular Concern (HAPC) designation and regulations, including any future designations that the Gulf of Mexico Fishery Management Council may make when conducting the subsequent rulemaking mentioned in the Draft HMS FMP.

Response: NMFS agrees that any future modifications to EFH or new HAPC areas in the Gulf of Mexico, or any region for that matter, should be coordinated with appropriate Regional Fishery Management Council designations and regulations. the EFH guidelines require NMFS to consider fishing and non-fishing impacts of other fisheries on HMS EFH, as well as the impact of HMS fishing activities on EFH for other Federally managed species.

Comment 5: What process did NMFS use to identify shark EFH areas north of Cape Hatteras? EFH boundaries appear to follow bathymetric contour intervals. Is this deliberate or just a coincidence?

Response: EFH areas north of Cape Hatteras were identified and described in the 1999 FMP through a combination of fishery dependent and independent surveys and data collection, research, and the input of fishery managers and scientists. References to peer-reviewed scientific publications that were used to help identify important spawning and nursery habitat for sandbar and dusky shark are included in the 1999 FMP as well as the Consolidated HMS FMP. As described in the 1999 FMP, in some cases bathymetric contours were used to help delineate EFH boundaries because they can mirror the observed distributions of HMS and important areas for spawning, feeding, and growth to maturity.

Comment 6: NMFS should not use the same process the Gulf of Mexico Fishery Management Council did in identifying EFH and impacts to EFH. The Gulf of Mexico Fishery Management Council managed areas are completely different, and people fish differently here (in the Atlantic) than in the Gulf of Mexico.

Response: The species managed by each of the Regional Fishery Management Councils are unique, with characteristics that require different approaches and methodologies for identification and description of EFH, including addressing both fishing and non-fishing impacts. Similarly, HMS have unique habitat requirements that require a unique approach to identification of EFH. However, EFH guidelines require NMFS to consider fishing and non-fishing impacts of other fisheries on HMS EFH, as well as the impact of HMS fishing activities on EFH for other Federally managed species. Therefore, NMFS must coordinate with the relevant Regional Fishery Management Councils as part of the process of modifying EFH.

Comment 7: Does HMS EFH include liquefied natural gas (LNG) facilities?

Response: NMFS has not specifically identified the structures associated with LNG facilities as EFH, however, these structures may be located within waters that have been identified as HMS EFH. For example, there are energy production facilities off the coast of Louisiana and Texas that may fall within EFH identified and described for BFT, yellowfin tuna, swordfish, and other HMS species.

Comment 8: NMFS received several comments regarding BFT EFH in the Gulf of Mexico including, NMFS must identify the Gulf of Mexico spawning area as EFH for BFT and consider appropriate measures to minimize the impact of fishing on this EFH, and if NMFS identifies the Gulf of Mexico BFT EFH, then NMFS should include the rest of Atlantic and Mediterranean also.

Response: Portions of the Gulf of Mexico, Florida east coast, and Atlantic were identified and described as adult and larval BFT EFH in the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks, and the areas remain in effect to this day. NMFS is reviewing new and existing information, including data on potential BFT spawning areas, and will take that information into account if any modifications to EFH areas are proposed in a future rulemaking. NMFS does not have the authority to identify and describe EFH outside of the U.S. EEZ.

Comment 9: NMFS is to be commended for substantial progress in development of the HMS EFH Plan. NMFS has come a long way in identifying EFH and should be congratulated on the work completed in the EFH review and the review of fishing impacts. However, there is still a disconnect between the available data, especially with sharks, and what is in the Draft Consolidated HMS FMP. NMFS should do a better job of including data from research institutions and grants. NMFS should include individual researcher's names that have contributed toward identifying EFH.

Response: NMFS appreciates the favorable comment, while acknowledging that there is considerable work left to do in order to accurately identify and describe EFH for HMS. As described in the Final Consolidated FMP, there are significant hurdles that must be overcome and NMFS is attempting to address these. For example, NMFS is continually working with NMFS scientists and other experts to update relevant data regarding HMS EFH as it becomes available. NMFS will also include the names of researchers responsible for collecting the data. Where possible and appropriate, NMFS has already included the names of individual researchers in the text, maps, and tables.

Comment 10: NMFS needs to update EFH for sandbar sharks, all age groups, by including a nursery area in the western Gulf of Mexico off the Texas coast, which is a straddling stock with Mexico. It gets into the straddling stock issue instead of the closed stock scenario. NMFS needs to recognize the reality of the straddling stock. This area is referred to in Stewart Springer's "The Natural History of the Sandbar Shark."

Response: NMFS is aware of research done by Springer (1960) who proposed the existence of two breeding populations of sandbar sharks, one off the mid-Atlantic coast, and one in the Gulf of Mexico. One of the research recommendations of the 2005 LCS Stock Assessment was to identify nursery areas of sandbar sharks in the northern Gulf of Mexico, and

NMFS will consider this information in any subsequent updates or modifications to sandbar shark EFH. Although the Springer research showed a few neonates in the Gulf of Mexico, there may not have been enough to consider this area a primary nursery habitat like the Mid-Atlantic.

Comment 11: NMFS has identified HAPCs off of North Carolina and other areas further north. Since NMFS has implemented a closure off North Carolina, NMFS should also bring Virginia into compliance to discourage shark fishing during pupping periods.

Response: NMFS agrees, and has asked Virginia to implement state regulations that complement the Federal regulations. Recently Virginia implemented a 4,000 lb trip limit consistent with the Federal regulations. NMFS is continuing to work, through ASMFC and the development of a coastwide state fishery management plan, with Virginia and other states to implement similar regulations as the Federal fishery.

Comment 12: NMFS should consider differences between monofilament and cable bottom longline when it comes to gear and impacts to coral reefs and sponges. Bottom longline gear would not much damage on mud bottoms.

Response: NMFS agrees that the type of gear used to fish in sensitive habitat areas may make a considerable difference in terms of the overall impacts. NMFS will also be looking at overall fishing effort in sensitive coral reef areas to determine whether fishing impacts are more than minimal and not temporary. If NMFS finds that the adverse fishing effects on EFH are more than minimal and not temporary in nature, then NMFS will have to consider alternatives to reduce fishing impacts.

Comment 13: Most HMS gears such as pelagic longline would not have an impact on HMS EFH.

Response: NMFS agrees that pelagic longline along with all other gears used to fish for HMS, with the possible exception of bottom longline gear, would have little or no impact on HMS EFH.

Comment 14: NMFS should look at sink gillnets and possible impacts on EFH. Fishermen may not want to fish on live bottom and reefs, but they do hit them as evidenced by the catch, which includes various reef species that they catch incidentally. These may include HMS forage species as well. NFMS should investigate the possible impacts of sink gillnet gear on offshore hard bottoms and reefs. This gear is being deployed on sensitive sponge-coral areas.

Response: The full extent of sink gillnet impacts on benthic habitat is not known at this time. NMFS agrees that the primary adverse impact of sink gillnets to sensitive habitat would be to areas containing coral reefs or soft sponges. Sink gillnets set on sandy or mud bottom would be less likely to have an adverse effect, as there would be little vertical structure that could be damaged. NMFS will continue to gather information to assess whether sink gillnets are having adverse effects on EFH and whether actions to minimize adverse impacts should be taken in a future rulemaking.

Comment 15: Will NMFS be documenting where the prey species are found?

Response: Similar to what was done in the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks, NMFS will document areas that are important to HMS for spawning, feeding, breeding, and growth to maturity. This will require identification of prey species and the degree to which they overlap both temporally and spatially with HMS in a given area.

Comment 16: NMFS should consider EFH designation for forage species for BFT in the Gulf of Maine. By removing prey species such as herring, mid water trawling has been destroying BFT in the Northeast. Fish are moving to Canada, and Canada would be happy to take our fish. Mid-water trawling is banned in Canadian waters, and they have a booming BFT fishery right now. We have seen in the past that the BFT will modify their migrations, and we would not want to see that happen now. We are disappointed to see that this has not been addressed at all in the FMP. The New England Fishery Management Council is taking Amendment 7 under consideration, and we would like to see an emergency rule take place to ban mid-water trawling gear.

Response: In the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks, NMFS identified and described large portions of the Gulf of Maine as EFH for adult BFT, and smaller portions of the Gulf as EFH for juvenile BFT. As set forth in the EFH guidelines, loss of prey species may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat. Therefore, actions that reduce the availability of a major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species, may be considered adverse effects on EFH if such actions reduce the quality of EFH. However, as described in the FMP, BFT are opportunistic feeders that prey on a variety of schooling fish, cephalopods, benthic invertebrates, including silver hake, Atlantic mackerel, Atlantic herring, krill, sandlance, and squid. Thus, NMFS needs to determine the extent to which herring or other prey species contribute to BFT EFH, and whether the removal of a portion of herring in the Gulf of Maine constitutes a negative effect on BFT EFH prior to taking any action. The EFH areas identified and described as EFH for adult BFT in the Gulf of Maine may overlap with a number of different prey species in the area in addition to Atlantic herring. These types of analyses would be part of a follow up rulemaking in which any changes to EFH boundaries, as well as any measures to minimize adverse effects, would be proposed. NMFS will continue to examine the importance of forage species on BFT and other HMS EFH.

Comment 17: NMFS should implement measures taken by the New England Fishery Management Council recommendations. Even though herring are not an HMS species, HMS is part of sustainable fisheries, and NMFS has an interest at stake. HMS should speak up for NMFS when NMFS is considering what to do with the herring plan.

Response: NMFS is aware that the New England Fishery Management Council has proposed several measures for the Atlantic herring fishery in the Gulf of Maine, including limited access permits, a mid-water trawl restricted area, area specific total allowable catches, and vessel monitoring systems, among others. NMFS is following the development of the FMP and will provide comments on the plan as appropriate.

Comment 18: EFH designations are intended to address the physical habitat and not forage species. EFH is not an appropriate forum to address forage issues. For example, herring fishermen could say that they cannot catch herring because the BFT are eating them all. The timing and location of harvest is a management issue, not a habitat issue. This is a question about access.

Response: The EFH guidelines state that FMPs should list the major prey species for the species in the fishery management unit and discuss the location of prey species habitat, and that loss of prey may be considered an adverse effect on EFH. Thus, NMFS considers it appropriate to examine the presence of Atlantic herring and their role as a forage species for BFT.

Comment 19: NMFS should not draw too many conclusions on less than complete data. HMS species are ocean-wide. NMFS needs to get the international forum involved. They have done some research utilizing very progressive techniques. Predator-prey relationships are important to every species.

Response: NMFS has been cautious in the interpretation of data based largely on presence or absence (level 1). While there is a great deal of ongoing research to identify and describe EFH, in many instances the research is localized or regional in nature, whereas HMS exhibit trans-regional movement and migrations. This makes identifying and describing EFH for HMS particularly challenging. For example, even though researchers may identify an area in the Gulf of Mexico as EFH for a particular species, those habitat characteristics may not necessarily constitute EFH for the same species in other regions.

Comment 20: The definition of EFH for Atlantic HMS should be modified to include the geographic range of the species and to add the availability of forage for HMS in critical areas, in time and space.

Response: The EFH guidelines require EFH to be distinguished from the geographic range of the species. The principle of the EFH provisions in the Magnuson-Stevens Act was to identify only those areas that are essential for feeding, breeding, or growth to maturity, and not all areas where a particular species is present. For example, if only level 1 information is available, distribution data should be evaluated to identify EFH as those habitat areas most commonly used by the species. Level 2 through 4 information, if available, should be used to identify EFH as the habitats supporting the highest relative abundance, growth, reproduction, or survival rates within the geographic range of a species. The geographic range for HMS is extremely large and would likely result in identifying all areas in the EEZ as EFH. Due to the vastness of such an area, it would be difficult to propose effective conservation measures. Narrowing or refining the extent of EFH can improve NMFS's ability to focus its conservation and management efforts on those habitats most important to the health of the managed species. NMFS agrees that forage species may be an important component of HMS EFH and has taken steps to identify those areas.

Comment 21: Shark pupping and nursery areas remain unprotected. Conserving shark habitat is closely linked with state cooperation. NMFS should continue to fund and encourage research into shark EFH and to publish and distribute the results of such studies.

Response: NMFS disagrees that shark pupping and nursery areas remain unprotected. In 2005, NMFS implemented a time/area closure off North Carolina in shark pupping and nursery areas to reduce the bycatch and mortality of neonate and juvenile sandbar sharks as well as all life stages of prohibited dusky sharks. While there are many other areas that may not have the same level of protection, NMFS currently closes the large coastal shark (LCS) fishing season from April through June to reduce impacts on pregnant females who may be moving into coastal areas for pupping. Many states have implemented a similar closure of state waters for LCS shark fishing during these months consistent with the Federal regulations. Finally, most HMS gears have little or no impact on HMS EFH. Bottom longline gear is the only HMS gear that may have impacts on hard bottom habitat such as corals and sponges, but many shark pupping and nursery areas are located outside of these habitat types. NMFS continues to fund shark research, such as surveys conducted through the Cooperative Atlantic States Shark Pupping and Nursery Areas (COASTSPAN) and a similar survey in the Gulf of Mexico (GULFSPAN), and will continue to distribute the results of such studies.

Comment 22: NMFS must continue to recognize that these HMS must be conserved through out their range internationally. Assumptions made on partial information may not necessarily be valid Atlantic-wide.

Response: NMFS agrees that it is important to consider habitat conservation measures throughout the range of HMS which may include international waters, particularly for tunas, swordfish, billfish, and pelagic sharks. NMFS has taken steps in the past to raise the level of awareness of the importance of certain habitats such as *Sargassum* at ICCAT, and will continue to try to lead the effort in promoting conservation of HMS EFH. However, as discussed in an earlier response, NMFS is only authorized to identify and describe EFH within the U.S. EEZ pursuant to the Magnuson-Stevens Act.

D.5 Economic and Social Impacts

Comment 1: The high fuel costs are having a tremendous negative economic impact on all U.S. commercial fisheries. While prices for fuel and fuel products have dramatically risen, the price of fish has nearly collapsed our markets far below the levels necessary for profitable operations, due in part to a flow of imports from largely unregulated sources.

Response: NMFS recognizes that fuel prices have recently risen to above average levels and continue to fluctuate. The Agency is monitoring the impacts of high fuel costs and other expenses as part of ongoing cost and earnings data collection efforts in the HMS fisheries. The Agency encourages fishermen to participate in this data collection effort on a voluntary basis in order to improve the quality of information available on HMS commercial fisheries. The trend in ex-vessel prices for HMS fish has varied by species and is detailed in Chapter 3 of the Final HMS FMP. The flow of imports of many HMS products are managed by international agreements, include ICCAT and the supply of imports will vary based on market forces. Details regarding information concerning imports are also detailed in Chapter 3 of the Final HMS FMP.

Comment 2: Holding workshops for just owners and captains could have an impact on the market. A number of captains coming in at the same time to the workshop means they will end up fishing at the same time and bringing fish to the market at the same time.

Response: NMFS acknowledges that holding workshops that bring together owners and captains at the same time could have an impact on local markets. As discussed in Chapter 4 of the Final HMS FMP regarding workshops, the Agency plans to minimize these impacts by timing workshops to coincide with closed seasons, moon phases, and other events that normally are down times for local HMS fishing operations where workshops will be held. Fishermen will also have the option of attending workshops in other neighboring regions on different dates.

Comment 3: NMFS received comments emphasizing the economic importance of recreational fishing for HMS and concern regarding the economic impacts additional regulations could have on the recreational sector of local economies. Comments include: fishing is a key part of the whole coastal economy and NMFS should take care not to over-regulate; tourists have many options, and may choose not to fish if the regulations are too burdensome and decrease enjoyment; Mid-Atlantic $500,000 tournament brings over 2,000 people to Cape May County who will eat, sleep, and shop in this tourism dependent area for the length of the tournament spending an estimated $450,000 in lodging alone and this event is very important to this tourism driven economy, providing jobs for year-round residents and students who earn college money during the summer months; and the economic value of recreational fishing is much greater than that of commercial fishing, and according to a 2001 United States FWS report, the value of the recreational fishery is $116 billion.

Response: NMFS recognizes the economic importance of recreational fishing for HMS, including its impact on tourism, lodging, and local employment. Chapters 3 and 4 of the Final HMS FMP have sections regarding billfish that provide extensive information regarding the economic importance of recreational anglers and tournaments.

Comment 4: We are disturbed by the lack of any economic data or references for the recreational sector. This indicates a lack of concern for the recreational sector and ignores the enormous economic impact of this sector.

Response: NMFS has taken measures to improve the amount of economic data and references regarding the recreational sector of the HMS fishery. This information is detailed in Chapters 3 and 4 regarding billfish, and Chapter 4 regarding authorized gear. Direct measures in this HMS FMP regarding the recreational sector include, but are not limited to, the authorization of speargun fishing for Atlantic BAYS tunas, improving BFT quota management, and improving information gathering by requiring vessel owners to report non-tournament recreational landing of swordfish and billfish. The speargun authorization was designed specifically to enhance economic opportunities associated with HMS recreational fishing sector.

Comment 5: The Draft HMS FMP does not discuss the socioeconomic impact to the recreational fishing sector. The fishing and boating industry is essential. Nationally, it generates $34 billion annually, which is more than the longliners. The Destin Charterboat fleet has a study that it generates $134 million annually to the local economy. A 2003 article in the Destin Log quotes a Haas Center for Business Research and Economic Development at the University of West Florida study, which says that the Charter boat fleet alone has a $349 million economic impact on Okaloosa and Walton counties.

Response: The HMS FMP assesses the impacts of regulatory alternatives on the HMS recreational fishery. Chapter 3 provides a detailed discussion of the socioeconomic impacts of the recreational HMS fleet. A full assessment of the total economic impacts of all recreational fishing is beyond the scope of this FMP.

The Agency notes the Destin Charterboat fleet study on the impacts of that fleet on the local economy. However, the impact of the HMS portion of the Destin Charterboat fleet is not discernable from that study and thus only represents a portion of the $134 million total annual impact of recreational fishing on the local economy.

Comment 6: In 1989, the SAFMC documented the HMS commercial fisheries above the $100 million threshold. NMFS has a range of values in various documents but certainly below $40-45 million ex-vessel value. Who is responsible for the economic losses over $100 million from unnecessary and cumulative regulatory discard policies?

Response: A combination of long-term market forces, biological changes to species populations and necessary regulatory activities have had an impact on the ex-vessel value of the HMS fisheries. In Chapter 3 of the Final HMS FMP, the Agency notes that the ex-vessel value of the HMS fisheries has been estimated to be between $44 and $92 million over the past six years.

Comment 7: The information in the community profiles is so dated that they do not present an accurate current portrayal, at least concerning the HMS fisheries, which has very rapidly declined since the implementation of the 1999 HMS FMP measures, especially the time/area closures implemented in 2000.

Response: While information in community profiles included in this document are now several years old, it represents the best available information and includes the latest U.S. Census data from 2000. However, NMFS intends to update this information regarding community profiles. Chapter 9 documents a list of communities that need to be further examined. The Agency recently published a solicitation to update these profiles.

Comment 8: In terms of social and economic issues, the data need to be standardized to recent dollars. I am troubled by NMFS staying with limited knowledge. There is additional work that can be done to understand social and economic changes. There are lots of other things that can be done to understand how people are impacted. Recreational data is a whole area lacking data. The cumulative impacts section is the soft underbelly of this plan. You need to work on this section. It characterizes the impacts without providing much evidence of assessment. NMFS uses soft language. NMFS does not know much about the people that are being regulated, and that is a problem.

Response: Economic data was standardized to 2003 dollars in the Draft HMS FMP and to 2004 dollars in the Final HMS FMP using the Consumer Price Index (CPI-U). NMFS has taken measures to enhance the information available regarding social and economic changes. The Agency has added information regarding charter boat rates for HMS trips and angler expenditure data. Other research projects throughout the Agency regarding the impacts of the 2005 hurricanes and a recreational fishing survey currently being conducted will further enhance the Agency's knowledge of the characteristics of the regulated community.

D.6 Consolidation of the FMPs

Comment 1: NMFS received comments in support and in opposition to the consolidation of the FMPs. Those in support included: we support consolidation of the FMPs contingent on preserving the objectives of the Atlantic billfish plan and the original objectives pertaining to swordfish and traditional swordfish handgear (harpoon and rod-and-reel) fisheries; and we had concerns that several of the most important objectives from the billfish FMP had been left out, but we are pleased that NMFS has addressed those concerns by including them in this draft. As a result, we now support the consolidation. Those comments opposed to the consolidation include: The GMFMC and others recommend that the HMS and Billfish FMPs and APs be kept separate; the GMFMC and others noted that the Billfish FMP is primarily a recreational FMP whereas the Atlantic Tunas, Swordfish and Sharks FMP is both recreational and commercial; the U.S. billfish fisheries are unique and recreational only while swordfish, tunas, and sharks are managed to utilize country-specific quotas; the billfish fishery is the only HMS fishery to practice catch-and-release; those whose efforts have saved and conserved these species should govern it; Atlantic billfish fishery is the most valuable fishery in the country and ought to retain its distinct and separate status; I have some concerns regarding the consolidation of FMPs and managing billfish for maximum sustainable yield, when it is primarily a catch-and-release fishery, as no social or economic impacts are assessed; Puerto Rico Game Fish Association opposes the consolidation due to the recreational nature of the billfish fishery and because they do not fish for shark or tunas in tournaments. They are concerned that by combining plans, billfish will be viewed as a bycatch species; tuna and other offshore "meat fish" species should not be "consolidated" with billfish in regulatory legislation; tunas have been traditionally treated as fish to be harvested, not as a "catch-and-release" species, and they should have the issues which concern them addressed separately from the unique circumstances concerning marlin and sailfish; economic expenditures involved in the bluefin tuna fishery are just as important as that in the marlin fishery; I favor more micro-management rather than one FMP because it takes so long for changes to occur if everything is consolidated. This way, any particular species will need an entire FMP to take regulatory action; combining fishery management plans is an example of how you prejudice your research and analyses. The longline fishermen come in and take the bait that the billfish seek reducing the number of billfish coming in to areas that were once critical to their life history. A billfish FMP approach would have been to look at bait removal or spawning and nursery areas.

Response: NMFS agrees that commercial fisheries aim to fully utilize a quota and many recreational fisheries practice catch-and-release fishing. NMFS also agrees that the billfish fishery is unique in many aspects, and notes that the individual tunas, swordfish, and shark fisheries also have many unique aspects. NMFS believes that these differences between the commercial and recreational fisheries, and the different aspects of the individual recreational fisheries, can be accommodated in a consolidated FMP just as those differences are already accommodated in the existing Atlantic Tunas, Swordfish, and Shark FMP. Given the interconnected nature of the billfish fishery with other HMS fisheries, both on the water and in the regulatory and policy arenas, as well as the current permitting structure, changes in any of the non-billfish fisheries are likely to have impacts on the billfish fishery. Combining the FMPs should allow those changes to be analyzed more holistically with clearer links among the impacts and issues between fisheries. For example, the Billfish FMP has only directed billfish measures while the FMP for Atlantic Tunas, Swordfish, and Sharks has bycatch reduction measures for billfish caught in the swordfish and tuna fisheries. Combining the FMPs will present the whole suite of billfish management measures in one document. NMFS believes that the decision in 1999 to combine the FMPs for tunas, swordfish, and sharks and to consolidate the actual regulations for all HMS, while a challenge at first, has led to a more holistic view of the fishery. This view has allowed the impacts of management measures on all sectors of tunas, swordfish, and shark fisheries to be fully analyzed whereas before, the links between these fisheries may not have been seen or analyzed so readily. By combining both FMPs now, NMFS is moving toward an ecosystem-based approach to the management of HMS. Such an approach could ultimately benefit the resource and the people involved. As an example of potential links, at public hearings and in written comments, recreational billfish fishermen have noted that using circle hooks while trolling for blue marlin is impracticable. Similarly, at public hearings and in written comments, recreational tuna fishermen have asked for the use of circle hooks on rod and reel. In many cases, these fishermen fish for tunas and billfish, sometimes on the same trip. While NMFS could implement different regulations for recreational tuna trips and recreational billfish trips, more effective and appropriate management can only be done by considering the implications on all recreational HMS trips. Combining the FMPs will not change the composition of the APs in terms of representation by states and sectors (commercial, recreational, academic, or conservation). Also, combining the FMPs will not change the priorities of managing HMS, which are dictated by the Magnuson-Stevens Act and other domestic law. Combining the regulations should not affect the length of time it takes to amend or change the regulations. NMFS has not experienced any delays in changing the regulations for a specific species or gear since combining the tunas, swordfish, and shark FMPs. To the extent that combining the FMPs will allow NMFS and the public to see links between the fisheries easier, combining the FMPs should allow for more efficient and effective regulations.

Comment 2: NMFS received a number of questions regarding the consolidation including: How will the consolidation change HMS management? How is this FMP easier to comprehend? I understand NMFS needs to consolidate, but how does this improve management?

Response: Consolidating the FMPs will not change the existing regulations since they are already consolidated. Rather, consolidating the FMPs should change how HMS fisheries are viewed and the ecological and economic impacts analyzed. Having two separate FMPs can give the impression that the billfish fishery does not affect the tunas, swordfish, and shark fisheries and vice versa. This impression is incorrect. The same fishermen fish for and/or catch all HMS, often on the same trip. Thus, changes in the regulations need to be analyzed and considered across all HMS fisheries. For example, regulations that limit the recreational catch of one species or the gear that can be used could result in changes in recreational effort on other species or on social and economic impacts on the entire recreational community. As described above, consolidating the FMPs should allow NMFS to take a more holistic view of HMS fisheries and analyze these links. Those analyses should also be more apparent to the affected and other interested parties. Together the analyses and the public comment on the analyses of the impacts and the potential alternatives to a regulation should lead to more efficient and effective management.

Comment 3: NMFS received comments regarding the combination of the APs. These comments included: the number of people on the Billfish AP should not decline; we support combining the APs; it is redundant, confusing and inefficient to have separate APs; the customary joint meetings of the HMS and Billfish APs over the past six years ensured an imbalance of representation by the recreational fishing sector and the result has been lopsided and ineffective advice; and the combined AP should be fair in representing the various user groups.

Response: NMFS is not expecting to change the composition of the APs as a result of consolidating the FMPs. Once this document and its final rule are finalized, NMFS intends to combine the APs in their entirety. Over time, NMFS will adjust the number of people on the AP and/or representing each group as needed to ensure a balanced representation of all interested sectors and regions.

D.7 Objectives of the FMP

Comment 1: The proposed objectives of the Consolidated HMS FMP are acceptable, including all suggested deletions and revisions, but it is not possible to continuously reduce bycatch and mortality. Logically, as the status of stocks improve, these numbers will likely increase. At some point, NMFS must recognize that incidental catches and mortality will occur and set practical and reasonable levels of allowable incidental catch.

Response: Consistent with National Standard 9, NMFS aims to minimize bycatch to the extent practicable, and to the extent that bycatch cannot be avoided, minimize the mortality of such bycatch. As described in the time/area section above, NMFS continues to examine the impact of closures and other bycatch reduction measures to ensure the goals are met. Consistent with protected species incidental take statements, the results of the stock assessments, and the impact of circle hooks on bycatch rates, NMFS may consider modifying the existing time/area closures or changing existing trip limits of the incidental limited access permits.

Comment 2: Regarding Objective 2, “Atlantic-wide” is a more appropriate term than using “management unit” because even a total prohibition on any domestic fishing effort would not recover the fish stock for most ICCAT species.

Response: NMFS agrees.

Comment 3: We are concerned about Objective 3, to reduce landings of Atlantic billfish in directed and non-directed fishery. It is completely unnecessary to reduce directed landings which only come from the recreational sector.

Response: Objective 3 does not address landings of Atlantic billfish. Rather, Objective 3 addresses bycatch in all HMS fisheries and post-release mortality of billfish in the directed billfish fishery.

Comment 4: Objective 4, establish a foundation for international negotiation of conservation and management measure, sounds as though the intent would be to propose the creation of additional international management entities, other than ICCAT, creating a tremendous amount of unnecessary bureaucracy that ultimately weakens the efficient management of these important species. This objective needs to be clarified before final approval.

Response: Objective 4 states that NMFS would establish foundations to work with other international organizations to manage Atlantic HMS. NMFS already works with, and intends to continue working with, several international organizations regarding Atlantic HMS including ICCAT, NAFO, FAO, and CITES.

Comment 5: Regarding Objective 4, the old practice of "the United States goes farthest first" simply does not work and often results in the United States being diminished in its capabilities and influence within ICCAT.

Response: Objective 4 does not state that the United States should work unilaterally to rebuild or maintain Atlantic HMS stocks. Rather, Objective 4 builds in the concept that NMFS would work with international bodies, such as ICCAT, to rebuild or maintain sustainable fisheries.

Comment 6: Objective 7 calls for the management of Atlantic HMS to achieve optimum yield and to provide the greatest benefit to the Nation, including food production. Atlantic billfish should not be managed with the intent to increase food supply and the 250 marlin landing limit is not managing in terms of optimum yield. This landing limit is not based on maximum sustainable yield, nor does it take into account relevant social, economic, or ecological factors. This objective should be reworded to say that Atlantic billfish will be managed to provide the greatest benefit to the nation with respect to recreational opportunities, preserving traditional fisheries to the extent practicable, and taking into account protection of marine ecosystems.

Response: NMFS agrees that Atlantic billfish should not be managed with the intent to increase food supply. NMFS did not mean to imply that in the proposed change to Objective 7. NMFS has reworded this objective to clarify its intent.

Comment 7: Objective 12 calls for the promotion of live release and tagging of Atlantic HMS. We do not believe it is in the Nation's best interest to promote live release for all HMS of legal size and those caught within a legal season because any HMS poundage under the quota resulting from live release stands the likely fate of being transferred to a country that will harvest the difference, ultimately reducing the U.S. ICCAT quota. This objective should be reworded to state that NMFS would promote live release and tagging of Atlantic billfish and sub-legal HMS.

Response: NMFS agrees and has reworded the objective to address this issue.

Comment 8: Regarding Objective 12, all hook and line fishing post-release mortality should be addressed.

Response: NMFS believes that this concern is already addressed in Objective 12.

Comment 9: NMFS should make the proposed deletions to Objectives 13 and 14; however, if NMFS does not make these deletions, it must reevaluate its proposed revisions to Objectives 2, 4, 5, and 7.

Response: While NMFS did suggest removing these objectives at the Predraft stage, NMFS did not proposed removing them in the Draft HMS FMP due to the concern expressed by the recreational billfish community. NMFS does not believe that these objectives conflict with objectives 2, 4, 5, and 7. Therefore, no changes to those objectives are needed.

Comment 10: Please eliminate the word "almost" from Objective 14: "Optimize the social and economic benefits to the nation by reserving the billfish resource for its traditional use, which in the continental United States is almost entirely a recreational fishery."

Response: The word almost has been removed and the objective clarified to refer only to Atlantic billfish.

Comment 11: Objective 16 needs to be rewritten or eliminated because there is no method for measuring over capitalization in the recreational fleet. Recreational fisheries should not be managed by fleet capacity and over capitalization.

Response: NMFS has decided to delete Objective 16 for this and other reasons, as explained in response to comment 12 below.

Comment 12: Objective 16, the consideration of fishing effort, should not be explicit to commercial fisheries. Latent effort is only a problem in overcapitalized fisheries and the U.S. pelagic longline fishery is undercapitalized. NMFS needs to encourage latent pelagic longline effort to become active or reopen the "directed" swordfish permit category in a measured, incremental manner to allow new entrants.

Response: NMFS has deleted Objective 16. While Objective 16 was an important part of the limited access program established in the 1999 FMP, it does not apply to all HMS commercial fisheries. Instead, NMFS has reworded Objective 17, create a management system to make fleet capacity commensurate with resource status, in order to express more fully NMFS' intent.

Comment 13: Regarding Objective 18, NMFS should not condone a reallocation that is contrary to the intent of the Magnuson-Stevens Act.

Response: Objective 18 does not address reallocation contrary to the Magnuson-Stevens Act.

D.8 Comment Period/Outreach

Comment 1: NMFS received several comments regarding the length of the comment period as a result of hurricanes. These comments are: due to the impacts of Hurricane Katrina on the fishing fleets in the Gulf of Mexico and the lack of communication with people in that area, NMFS should consider a substantial extension of the comment period and consideration of suspending the scheduled public hearings; a large portion of the longline fleet is damaged and without communications - they cannot respond to the proposal at this time; we are sensitive to extension of comment period to accommodate the Gulf of Mexico Area, but we do not want to see an overly lengthy delay in the process.

Response: NMFS agrees that Hurricanes Katrina and Rita severely impacted the fishermen, infrastructures, communication, and the communities in the Gulf of Mexico region. As a result, NMFS extended the comment period on the Draft HMS FMP and proposed rule from October 18, 2005, to March 1, 2006. NMFS also rescheduled three public hearings in the area from September/October to January and February. NMFS believes that this extension in the comment period and rescheduling of public hearings gave affected entities an opportunity to review and comment on the Draft HMS FMP and its proposed rule without delaying the implementation of the management measures significantly.

Comment 2: NMFS received a number of comments about the advertisement of public hearings and the Draft HMS FMP including: many of the public hearings are not well publicized, which leads the Agency to miss a lot of key people at those hearings; a lot people at the fish pier did not know about this hearing; NMFS should hold additional hearings in the same areas; without better publication to increase participation, NMFS is not going to get enough comment from the people who are going to be impacted by this rule; NMFS should improve their outreach to magazines; NMFS needs to buy mail and email lists of anglers from publicly available sources and send them meeting notices to ensure adequate public participation; NMFS should use the mailing and email addresses provided when applying for permits to notify the industry; NMFS has adequately informed us through various sources (e.g., internet, facsimile, and public hearing notices) of all germane and relevant issues, options, and comment deadlines; your notices are all fuzzy, full of Federal Register type language - they should be earlier in the process, more widely distributed, and focused on the user groups in simple language.

Response: NMFS agrees that public participation and outreach regarding proposed or final management measures is critical to the management of HMS. NMFS attempts to notify all interested parties of all actions using a variety of methods. The official notification is through the Federal Register. The Federal Register is available on the web at http://www.gpoaccess.gov/fr/index.html. Alternatively, interested parties can go to http://www.regulations.gov to review and comment on all proposed rules and documents open for public comment throughout the Federal government. Documents can be searched by Agency, topic, and date. NMFS also releases information regarding proposed and final rules and fishing seasons for HMS through the HMS fax network. NMFS intends to develop an email system that would allow anyone to sign up to receive these information packages. These information packages are also usually published on Fishnews, an electronic newsletter produced weekly by NMFS. To sign up for this newsletter, go on the web to http://www.nmfs.noaa.gov. NMFS releases Press Releases, which the media can publish in local fishing magazines and newspapers, regarding public hearings and proposed rules. However, NMFS cannot require these sources of information to publish information regarding proposed rules or public hearings. NMFS has tried using the email addresses included in the permit application to provide HMS fishermen with information about their permits. Often times, the email addresses have proved incorrect and the information was not delivered. Nonetheless, NMFS is working to improve communication with constituents and is open to additional suggestions on how to improve outreach.

Comment 3: I found the public hearing presentations completely frustrating with biomass, metric tons, and other words and numbers used as if I were in a marine biology class. At the end of the presentation, the billfish and tuna changes were slipped in as if to lull us into sleep so that the changes slip by unnoticed. It appeared as if the intent of the presentation was to confuse the average angler with statistical data.

Response: NMFS agrees that information regarding stock status and quotas can be confusing. However, this information is the basis for many of the management measures that were proposed and will be the basis of many of the final management measures. Without an understanding of the basic information regarding life history, stock status, maximum sustainable yield, and other concepts, the reasons and impacts of all the alternatives considered cannot be explained. NMFS did not present the information to confuse anyone; rather, NMFS presented the information to explain the basis of any proposals or decisions and why one alternative was preferred over another. NMFS welcomes any specific comments on the presentations that would improve the clarity of the presentations.

Comment 4: If NMFS accepts comments by email, the Agency should implement a requirement for using Digital Certificates to authenticate that the comments were from the identified party and was not contaminated in transit.

Response: NMFS accepts comments by email. To date, NMFS has not had any problems regarding authenticating the sender of the comment. However, NMFS will continue to examine this and other technological issues.

Comment 5: Please limit your future rulemakings to fewer topics. Large documents like this one are too difficult for many of your constituents comprehend.

Response: NMFS agrees that large documents with many issues are difficult to understand. To the extent that rulemakings can be limited, NMFS will attempt to simplify and reduce the issues in the future. However, to some extent, rulemakings are dictated by priorities and the need to act on certain issues. Thus, some rulemakings may have more issues than others.

D.9 General

Comment 1: NMFS received several comments on how the overall rulemaking process works. These comments include: NMFS needs to clarify if we have a choice or if the decision on these proposed actions is already made?; what agency is pushing for these changes?; there is an overriding opinion that NMFS does not listen during these comment periods; it is difficult for us to know how and where to get involved; during scoping, it would be nice to know that the information we provide is helping to form future regulations.

Response: NMFS relies on public comment and participation at all stages when conducting rulemaking. The comments received during scoping were crucial for defining the scope of this rulemaking and the alternatives considered. The issues explored in the rulemaking were not pushed by any particular agency. Rather they were considered as a result of the comments received during scoping and management needs as dictated by the Magnuson-Stevens Act and other domestic laws. Public comment at the proposed rule stage is critical in helping NMFS decide to implement certain measures or not. Often, as a result of public comment, NMFS decides not to implement one or more of the proposed management measures or to redesign how to implement some of the management measures. For example, in this rulemaking NMFS is not implementing several of the proposed measures including removal of the Angling Category North/South line and clarifying the commercial definition of greenstick. When considering public comments, NMFS does not look at the quantity of public comments received but the quality and issues raised in each individual comment. Every written comment and every statement made at a public hearing is considered. In every final rule, NMFS responds to the comments received during the public comment period. At that time, interested parties can see how their comments affected the decisions of the Agency.

Comment 2: NMFS would have more cooperation from fishermen if managers got out on the water instead of sitting at a desk all the time.

Response: While fishery managers do spend much of their time behind a desk writing regulations and related documents, NMFS staff try to go out on the water and interact with fishermen as possible.

Comment 3: I am opposed to management via Petition for Rulemaking. It undermines the role of the Advisory Panels and the International Advisory Committee.

Response: The public may petition an agency for rulemaking. NMFS is required to respond to any petition that is filed. This process does not undermine the role of the Advisory Panel or the ICCAT Advisory Committee as these parties can comment on the adequacy of the Petition for Rulemaking, as appropriate, or any rulemaking that results from the Petition.

Comment 4: NMFS received several comments regarding the relationship of the FMP to the Magnuson-Stevens Act including: Will this FMP be consistent with the revisions/reauthorization of the Magnuson-Stevens Act?; NMFS is not following its own rules in regard to National Standard 4 of the Magnuson-Stevens Act (fair and equitable distribution of fishing privileges).

Response: The Final HMS FMP will be in full compliance with the current Magnuson-Stevens Act, including the National Standards. In regard to National Standard 4, none of the preferred alternatives discriminate between residents of different states. While NMFS is tracking congressional actions to reauthorize the Magnuson-Stevens Act, it cannot predict the outcome of these efforts. If needed, NMFS would make the appropriate changes in a future rulemaking.

Comment 5: What management measures are applicable to the Caribbean?

Response: All management measures for HMS are applicable to fishermen fishing in the Atlantic, including the Gulf of Mexico and the Caribbean.

Comment 6: NMFS is allowing so much overfishing of one species after another that our children have no expectation of there being fish in the ocean when they grow up.

Response: NMFS disagrees. While overfishing does continue to happen for some species, other species have formal rebuilding plans and are being rebuilt. In the case of HMS, since the 1999 FMP, blacktip sharks have been rebuilt and other species such as bigeye tuna and Atlantic sharpnose sharks are still considered healthy. NMFS continues to monitor the status of all HMS and take appropriate action, consistent with the Magnuson-Stevens Act and ATCA, to prevent overfishing, rebuild overfished stocks, and maintain optimum yield.

Comment 7: For any HMS management program to be effective, fair, and reasonable to U.S. fishermen and anglers, international transference and comparable compliance of management mitigation measures must be adopted by the global HMS fishing community. Our fishermen practice and embrace the most effective and stringent conservation measures in the world and U.S. fishermen and anglers suffer economic hardships and fishing days due to these measures. However, few international partners practice any conservation at all. The United States needs to continue to lead the conservation initiative but it is unfair to assume that other countries will follow our example if we only put our fishermen out of business or deny them the opportunity to fish for quota.

Response: NMFS agrees that effective management of HMS requires international cooperation and compliance to management measures. NMFS also agrees that the United States needs to indicate that U.S. fishermen can meet conservation goals while also remaining economically viable. To that end, NMFS and the Department of State continue to work through ICCAT to enforce compliance of existing management measures and an end to illegal, unreported, and unregulated fishing. Additionally, in this rulemaking, NMFS either allows for additional opportunities for U.S. fishermen to take the quota (*e.g.*, changing the time periods and subquotas for the General category) or provides the groundwork for future opportunities (*e.g.*, establishes criteria to modify existing time/area closures).

Comment 8: Remove "including landings" from the third bullet on the bottom half of page 1-40 of the Draft Plan. The emphasis is properly on reducing mortality and post-release mortality.

Response: This comment refers to one of the specific goals of this rulemaking, not one of the objectives of the FMP. NMFS agrees and has reworded the goal accordingly.

Comment 9: In the Management History (section 1.1), include ATCA provision, "shall not disadvantage U.S. fishermen relative to their foreign counterparts."

Response: That provision (evaluate the likely effects of conservation and management measures on participants and minimize, to the extent practicable, any disadvantage to U.S.

fishermen in relation to foreign competitors) is not a requirement of ATCA. It is a requirement under the Magnuson-Stevens Act (16 U.S.C. §1854 (g)(1)(B)). A description of this provision is included in the description of the management history in Chapter 1 and the requirements of the Magnuson-Stevens Act in Chapter 11 of the HMS FMP.

Comment 10: In the section of Chapter 1 regarding the pre 1999 Atlantic tunas management section, NMFS needs to clarify that the longline fishery does not seek a directed fishery on the currently overfished stock of bluefin tuna.

Response: This section has been moved to Chapter 3 in the Final HMS FMP. Together, this section along with the other sections in Chapter 3 regarding the landings by gear and the status of the stocks indicate that the pelagic longline fishery is prohibited from targeting bluefin tuna.

Comment 11: The HMS longline fishery was unaware of NMFS's "technical revisions" following completion of the HMS FMP in 1999, which changed the Atlantic Tunas longline permit to a "limited access" status. NMFS should create an opportunity for longline vessels with valid swordfish and shark permits to obtain an Atlantic Tunas longline permit. This will help to reduce or eliminate unnecessary discarding and encourage the return of pelagic longline fishing effort.

Response: As described in the 1999 Atlantic Tunas, Swordfish, and Shark FMP, NMFS made the Atlantic tunas longline permit a limited access permit, along with the swordfish and shark permits, at the request of the fishing industry in order to close a potential loophole in the regulations. The technical revisions to the rule implementing the 1999 FMP clarified that intent and did not make any substantial changes. Nonetheless, NMFS intends to conduct a rulemaking to reform certain aspects of the HMS permitting system and may consider changes based on this concern in that rulemaking.

D.9.1 Recreational

Comment 12: NMFS received general comments related to recreational fishing including: I will not stand for the over-regulation of recreational fishing; and, NMFS has done nothing for the recreational fisherman but give him table scraps and ruined fishery resources.

Response: NMFS recognizes the value and important contribution of recreational fishermen throughout HMS fisheries. The Agency continues to take numerous steps to recognize this critical sector of the fishery, while ensuring that recreational effort is properly accounted for and managed to assist stock recovery. Comments from the recreational sector, and others, were fully considered in deciding upon the management measures in the Final Consolidated HMS FMP. For example, NMFS no longer prefers the alternative that would have prohibited landings of white marlin based, in part, upon comments indicating that this alternative could produce sizeable adverse social and economic impacts upon recreational fishermen. NMFS believes, however, that the preferred alternative to require circle hooks when using natural baits in billfish tournaments is appropriate, and is not overly burdensome. Many HMS recreational anglers already possess a strong personal conservation ethic and practice catch and release fishing for white marlin and other species. However, the mortality rate associated with these releases is now estimated to be substantially higher than previously thought. The use of circle hooks when deploying natural bait in billfish tournaments is an important step towards reducing billfish fishing mortality, and will help to maintain the highest availability of billfishes to the United States recreational fishery. Billfish tournament anglers must comply with the new circle hook requirement so that these species may better survive the catch and release experience. NMFS strongly disagrees with the comment that recreational fishermen have been given table scraps and ruined fishery resources. Numerous examples could be cited to demonstrate the balanced consideration that is given to recreational HMS fishery interests. Foremost, the recreational sector is, and will continue to be, prominently represented on the HMS Advisory Panel. Additionally, several large areas are closed year-round or seasonally to commercial HMS longline vessels, whereas recreational anglers retain full access to these areas. The recreational sector has benefited greatly from this access, and is currently enjoying the resurgence of recreational fishing for swordfish and other species in these areas. Also, the commercial sale of Atlantic billfish has been prohibited since 1988. To reinforce the recreational nature of this fishery, a preferred alternative in the Final Consolidated HMS FMP would prohibit the possession or retention of any Atlantic billfish for vessels issued a commercial permit and operating outside of a tournament. Another preferred alternative in the Final Consolidated HMS FMP would prohibit fishing for HMS in the Madison-Swanson and Steamboat Lumps Marine Reserves, with the notable exception that high-speed trolling is allowed during the prime recreational summer fishing months. NMFS believes that these comments are not supported factually, and are inappropriately directed at the Agency in response to recreational management measures that are currently necessary to reduce recreational fishing mortality in the directed billfish fishery and to rebuild other HMS.

Comment 13: Recreational fishing should be truly recreational fishing. A CHB vessel operator knows where to go fishing, so it gives the recreational fisherman onboard an advantage. CHB vessel operators use this expertise to sell the catch from the recreational fishery. This practice gives access to the recreational fishery where only the commercial fishermen typically go. The CHB vessel is already getting paid to go out there, he does not need to also get money from selling the tunas. NMFS should decrease bag limits on charter/headboats to avoid incentive to sell recreationally caught fish.

Response: NMFS regulates and manages HMS CHB permit holders differently than HMS recreational or commercial permit holders due to the unique characteristics of the CHB sector. These vessels may be both recreational and commercial, so the regulations governing them are necessarily different. For instance, some CHB captains may fish commercially for tunas on one trip, and then fish under recreational retention limits when carrying paying passengers the next day. NMFS believes that the regulations governing the sale of HMS from CHB vessels are appropriate. CHB vessels that also possess commercial limited access permits are subject to recreational catch limits when engaged in for-hire fishing, but may sell tunas (except for BFT caught under the recreational angling category regulations, i.e. BFT between 27 inches and 73 inches CFL or trophy fish greater than 73 inches) on non for-hire trips. CHB vessels may sell sharks and swordfish only if the appropriate commercial shark and/or swordfish permits have also been issued to the vessel.

D.9.2 Commercial Fishery

Comment 14: The United States should inflict penalties and tariffs on countries that do not follow similar rules as the United States; push to stop longlining worldwide; stop all longlining in the United States now; and make it illegal to import any fish from other countries that longline, do not follow conservation limits, and do not require longlines to only use circle hooks.

Response: The United States has been a leader internationally in promoting fishing practices that reduce bycatch and promote conservation of HMS and other fish stocks. Pelagic longlining gear is not being prohibited at this time due to reasons discussed in the response to Comment 36 of the Time/Area Closures section. NMFS believes that international cooperation, including sharing science and technology such as circle hooks and bycatch reduction gears, is the primary and most effective means to achieve conservation goals. The United States will continue to promote these types of measures both domestically and internationally, and will encourage efforts by other countries to implement similar measures.

Comment 15: Are fish that are caught by commercial permit holders and retained for personal use counted against the quota?

Response: NMFS is preferring an alternative that would prohibit vessels issued commercial permits and operating outside of a tournament from possessing, retaining, or taking Atlantic billfish from the management unit. Under this alternative, only fishermen issued either an HMS Angling or Charter/headboat permit could take or possess Atlantic billfish. Additionally, General category fishermen fishing in a registered tournament could take and possess Atlantic billfish. In the case of General category fishermen participating in a tournament, the tournament operator must report any billfish landed in the tournament. Charter/headboat vessel owners are required to report billfish under the recreational reporting requirements. Atlantic marlin landings are counted against the 250-fish landing limit. All landings from commercial shark or swordfish vessels must be reported in the HMS logbook, if selected for reporting, regardless of whether the fish are retained for personal use. Sharks landed by commercial permit holders are counted against commercial quotas. A swordfish from the North Atlantic stock caught prior to a directed fishery closure by a vessel with a directed or handgear swordfish permit is counted against the directed fishery quota. A North Atlantic swordfish landed by a vessel issued an incidental swordfish permit or a Charter/headboat permit or landed after the directed swordfish fishery is closed is counted against the incidental catch quota. Owners of Atlantic Tunas vessels must also report landings in the HMS logbook, if selected for reporting. There are no quotas for bigeye, albacore, yellowfin, or skipjack tunas. BFT landed but not sold must be reported and are applied to the quota category according to the permit category of the vessel from which it was landed.

Comment 16: All commercial vessels that have not landed a fish in the past three years should be "retired."

Response: NMFS does not necessarily agree with this statement for HMS. Commercial fishermen can take time away from fishing for certain species for numerous reasons including repairs or replacement of vessels, a desire to help rebuild the stocks, or more opportunities in another fishery. In the current situation, many PLL or shark fishermen have stopped fishing for HMS due to current restrictions such as the time/area closures and short shark seasons. Additionally, for some commercial fisheries, such as the BFT General category fishery, the quota does not allow for every permit holder to land a fish in every year. Thus, some vessels may not land a BFT for several years. In some fisheries, such as those that are severely overfished, such a measure may be needed to ensure that latent permit holders cannot re-enter the fishery and increase effort. NMFS may conduct a rulemaking in the future to reform the current permit structure. At that time, NMFS may consider measures such as this one, as necessary.

Comment 17: NMFS heard two opposing comments related to commercial vessels impacted by the hurricanes last fall. These comments were: NMFS needs to provide buyout programs for the commercial fishery, especially now that vessels active in this fishery have been impacted by hurricane Katrina; and NMFS should not subsidize the replacement of commercial vessels impacted by hurricane Katrina.

Response: NMFS is still analyzing the impacts of Hurricanes Rita and Katrina on fishermen and communities in the Gulf of Mexico. At this time, NMFS does not know the extent of lasting damage or the most appropriate measures needed to rebuild the affected fisheries, either commercial or recreational. NMFS would take the appropriate actions in the future, as needed.

D.9.3 Longline

Comment 18: Why are there no proposed measures for the commercial PLL fishery in the Draft HMS FMP?

Response: Many measures in the HMS FMP could have ancillary impacts on PLL fishery such as going to ICCAT regarding a rebuilding plan for northern albacore tuna and the change in fishing years. There are also alternatives that specifically consider the PLL fishery. All of the alternatives in the time/area section, except for alternative B6, were considered for the PLL fishery in the Draft HMS FMP. NMFS is not preferring, at this time, to implement any new closures, except the complementary measures in the Madison-Swanson and Steamboat Lumps Marine Reserves, which would prohibit fishing for and possessing all HMS by all HMS gears in the marine reserves from November through April (except when transiting and the gear is stowed). The possession of Gulf reef fish in these areas is already prohibited year-round (except when transiting and the gear is stowed). From May through October, surface trolling would be the only HMS fishing activity allowed. No new measures were proposed at this time because there are already a number of restrictions, including time/area closures, gear requirements, VMS, observers, and a host of other measures required to reduce bycatch in the PLL fishery. However, NMFS would continue to examine the issue of targeted time/area closures to further reduce bycatch in the future. Other alternatives that could affect specifically PLL fishermen include workshops, changes to the definition of PLL gear, modifications to the definition of the East Florida Coast closed area, and the decision regarding the 25 mt BFT available in the NED.

Comment 19: NMFS should allow the practice of using live baits on PLL gear again.

Response: The Agency is aware of the concern expressed in this comment. Currently in the Gulf of Mexico, vessels with PLL gear onboard are prohibited from deploying or fishing with live bait, possessing live bait, or setting up a well or tank to maintain live bait. This prohibition was implemented in lieu of closing the western Gulf of Mexico through a final rule published on August 1, 2000 (65 FR 47214), and became effective on September 1, 2000. It was established to reduce the bycatch of billfish on PLL gear and this remains an important priority. However, given the recent mandatory requirement for PLL vessels to possess and deploy only large circle hooks and to carry release and disentanglement gear, a reexamination of the live bait prohibition may be warranted. Before this issue could be considered in a future rulemaking, it would be beneficial to obtain additional gear research information, such as bycatch rates and post-release mortality rates of billfish on PLL gear deploying large circle hooks with both live and dead baits.

Comment 20: Without a relaxation of the restrictions, the longline fishery will continue to fail – not due to stock declines but due to over-restrictions.

Response: NMFS acknowledges that the PLL fishery has decreased in size over time possibly due to current time/area closures but also due to other factors, which are out of NMFS control (*i.e.*, hurricanes, fuel prices, etc.). NMFS is not preferring, at this time, to implement any new closures, except the complementary measures in the Madison-Swanson and Steamboat Lumps Marine Reserves. The United States has not been able to catch its swordfish ICCAT quota allocation. While NMFS considered modifications to current time/area closures, none of the modifications considered would have resulted in a large enough increase in target catch to alleviate concerns over uncaught portions of the swordfish quota. NMFS is investigating ways to revitalize the swordfish fishery and is waiting on the results of the ICCAT stock assessments to help determine domestic measures with regard to management of these species.

D.9.4 Swordfish

Comment 21: NMFS received comments regarding the trade of swordfish including: Is there anything in the Draft HMS FMP regarding the import of swordfish from countries that have exceeded their ICCAT quota? This exceedance has been a perennial problem at ICCAT Advisory Committee Meetings and it is annoying when fishermen say that this type of fishing encroaches on "our" fishery when it is the fishery as a whole, not only the U.S. swordfish fishery; U.S. swordfish fishermen should be provided reasonable opportunity to harvest quota - United States has a high demand that U.S. fishermen should have an opportunity to fill; NMFS should prohibit all imports on swordfish and tuna.

Response: ICCAT is an international organization that addresses quota overages and penalties associated with those overages through a process that requires the adoption of recommendations and then implementation of those recommendations by contracting parties. The United States is a contracting party at ICCAT and participates in the evaluation of compliance with quotas. Quota compliance is an important issue right now for the United States during ICCAT negotiations. However, ICCAT would be the lead in imposing trade sanctions or other appropriate penalties on a particular country if found to be violating ICCAT agreements. Such actions have been taken by ICCAT in the past. Also, NMFS agrees that overharvests of ICCAT quotas impact the entire swordfish fishery and not just the U.S. allocation, and it is important to manage the fishery as a whole and not to become too focused on just the U.S. quota.

NMFS is currently working on different ways to revitalize the U.S. swordfish fishery. An SCRS stock assessment is scheduled for 2006, and the results from this stock assessment will help determine domestic measures for this species.

Comment 22: NMFS received comments regarding the need to revitalize the PLL and/or swordfish fishery including: in the face of our consistently rolled-over quota and fully-rebuilt swordfish stock, why are there no provisions to allow for U.S. fishermen to get newer, more efficient, and safer vessels?; NMFS should eliminate the vessel upgrading restrictions to help revitalize the PLL fishery; what is there in the draft HMS FMP that would allow the U.S. ICCAT Delegation to convince foreign ICCAT Delegations that the United States is serious about revitalizing its swordfish fishery in order to utilize the full United States ICCAT swordfish quota?; NMFS should make reasonable adjustments to the offshore borders of existing closed areas; eliminate the limited access upgrading criteria; re-evaluate the use of “live bait” for circle hooks only; provide a more reasonable trip limit for incidental PLL to eliminate wasteful and unnecessary regulatory discarding; re-open the swordfish handgear fisheries, especially in light of the inability of the United States to land its current ICCAT quota; the United States is looking at a stockpile for swordfish and BFT; if the United States does not have any quota it will be difficult to have a voice in international negotiations; $86 million of swordfish was not caught; this domestic fleet is so over restricted that it cannot harvest the quota; count recreational swordfish live and dead releases as well as commercial catches when negotiating the United States quota at ICCAT; eliminate the recreational bag limit to be replaced with a higher minimum size of 47 inches LJFL and authorize anyone holding a general category tuna permit to land swordfish; increase the number of swordfish that may be kept by swordfish incidental permit holders in the Gulf of Mexico or convert all Gulf of Mexico incidental permits to directed permits.; adjust the existing PLL time/area closures within the U.S. EEZ in consideration of a fully rebuild North Atlantic swordfish stock and the U.S. swordfish fishery’s ability to harvest its ICCAT quota share; longline fishermen made great sacrifices to rebuild this fish stock and have been the world’s leading innovators of “bycatch friendlier” pelagic hook and line fishing – NMFS must take action to revitalize this fishery.

Response: For the past several years, the swordfish fishery has been unable to catch the full quota. This is a change from the fishery in the 1990s where the quota was usually taken. In 1997, the quota was overharvested and the fishery was closed. There are a number of possible explanations for the inability of the fleet to harvest the quota including time/area closures to PLL (the primary gear used to harvest swordfish), the reduction in permit holders through limited access, the restrictions on vessel upgrading, the incidental take limits, and the paucity of reporting from the recreational sector. Given the anticipated rebuilt status of swordfish (the next stock assessment is scheduled for September 2006), a number of fishermen and others have asked NMFS to revitalize this fishery. Many people are concerned that without a plan to revitalize the fishery, the quota would be taken from the United States and given to other countries, many of which do not view conservation as the United States does. NMFS is also concerned about the status of this fishery and its quota. While this rulemaking was not intended to revitalize the swordfish fishery, many of the actions would allow for actions to be taken in the future. For example, NMFS does not prefer to modify any existing closures at this time but the preferred criteria would allow for modifications to the closed areas and/or experiments to test gears or other fishing methods in the closed areas. Additionally, NMFS is defining a “new” swordfish commercial gear type (i.e., buoy gear) and clarifying the difference between this commercial gear and the primarily recreational gear of handline. Depending on the stock assessment and the upcoming ICCAT recommendations, NMFS expects to do rulemaking in the near future that could help revitalize the swordfish fishery. Any effort to revitalize the fishery must take care not to increase sea turtle takes (the PLL fishery has a jeopardy conclusion under ESA for leatherback sea turtles), marine mammal interactions (there is a PLL Take Reduction Team that is considering methods of reducing interactions under the Marine Mammal Protection Act), and catches of marlin, BFT, and other overfished species. Over time, consistent with the objectives of this FMP, the Magnuson-Stevens Act, Marine Mammal Protection Act, and the ESA, NMFS intends to revitalize the fishery so that swordfish are harvested in a sustainable and economically viable manner and bycatch is minimized to the extent practicable.

Comment 23: NMFS received comments regarding the trip limit for swordfish incidental limited access permit holders. These comments included: NMFS must reevaluate the incidental swordfish trip limits in order to reduce or eliminate unnecessary discards by valid permit holders; there was an allowance of five swordfish in the squid fishery. If a swordfish comes aboard in a trawl, it is dead. Mid-water trawls are not directing or targeting swordfish. So, can there be an allowance for 15 swordfish in a mid-water trawl? It seems to be a waste to throw dead swordfish overboard.

Response: The current trip limits for incidental permit holders and permit holders using mid-water trawls were implemented in 1999 as part of the limited access program for swordfish. At that time, swordfish were overfished, there were a number of latent permit holders, and the quota was being landed. Thus, the limited number of swordfish that could be landed by incidental permit holders or permit holders using mid-water trawls (an unauthorized gear) was appropriate and was aimed at reducing swordfish mortality by fishermen not targeting swordfish, to the extent practicable. The situation has now changed and, depending on the results of the upcoming 2006 stock assessment, NMFS may reconsider these limits in a future rulemaking.

Comment 24: U.S. recreational fishermen should be allowed to sell their swordfish.

Response: Under current HMS regulations, recreational fishermen are not allowed to sell HMS. If fishermen wish to sell their swordfish, they can obtain a commercial swordfish limited access permit from commercial fishermen who are leaving the fishery. Anecdotal information indicates there are a number of commercial swordfish permits available. However, depending on the type of swordfish permit obtained, these permits may limit fishermen to the commercial suite of permits and they would not be able to obtain either an HMS Angling or HMS Charter/Headboat permit. All recreational landings are counted against the domestic quota for swordfish (300 mt dw of the quota are allocated for recreational landings). Comments in the past have indicated concern to the public health regarding the quality of recreationally-caught swordfish. These commenters have noted that while commercial fishermen are trained and have the facilities to maintain fresh swordfish, recreational fishermen generally keep the swordfish in a cooler. Nevertheless, as discussed above, fishermen have requested NMFS to revitalize the swordfish fishery. The suggestion in this comment may be one potential option for such a goal.

D.9.5 Tunas

Comment 25: The draft HMS FMP does not consider the uncertainty associated with estimates of recent BFT recruitment in recent years, the probable outcomes for BFT under different estimates, or the impact on rebuilding of the current high mortality in the Gulf of Mexico. The draft HMS FMP needs to consider this while also keeping in mind the feasibility of changing ICCAT management measures and quotas at the upcoming ICCAT meeting.

Response: The ecological impacts of this final action on BFT are at most, minimal. The overall quotas for each domestic fishing category are not changed, nor are the size classes of BFT that each domestic category targets. The preferred alternatives for BFT comply with the ICCAT BFT rebuilding plan, which considers the uncertainty associated with BFT stock assessment analyses. The preferred alternatives also continue the prohibition on directed fishing for BFT in the Gulf of Mexico, and review the efficacy of additional management options to reduce BFT bycatch in the Gulf of Mexico. The West Atlantic BFT stock is scheduled to be re-assessed by ICCAT in June 2006, and the assessment will be evaluated at the upcoming annual ICCAT meeting in November 2006. Any changes to the rebuilding plan would be implemented by NMFS as required under ATCA.

Comment 26: Filleting tunas at-sea should be acceptable on HMS CHB vessels. By allowing filleting at-sea, the catch can be prepared and put on ice much sooner than if cleaning occurs upon returning to the dock; it will be better for public safety because tuna deteriorate quickly in warm summer and fall months; and preparing tuna sooner also improves the quality of the meat, and ultimately, angler satisfaction. The season is relatively short, so filleting at-sea allows for a quicker turn around time between trips. It will not compromise enforcement of size limits, retention limits, and species identification. Retaining the racks can facilitate enforcement.

Response: Under current regulations at 50 CFR 635.30(a), "persons who own or operate a fishing vessel that possesses an Atlantic tuna in the Atlantic Ocean or that lands an Atlantic tuna in an Atlantic coastal port must maintain such Atlantic tuna through offloading either in round form or eviscerated with the head and fins removed, provided that one pectoral fin and the tail remain attached." Eviscerated is defined as a fish that has only the alimentary organs removed. The regulations are intended to aid in enforcing the minimum size limit, retention limits, and species identification. Over the past several years, the HMS CHB industry, more specifically the headboat sector, has requested that it be exempt from the current regulations and allowed to fillet Atlantic tunas at sea. While authorizing filleting at-sea may have social and economic benefits for the industry as set forth above, waiving the current regulations could render enforcement of size limits, retention limits, and species identification difficult.

D.9.6 Sharks

Comment 27: NMFS has placed sharks as the lowest priority. NMFS has not adequately addressed persistent overfishing, population depletion, and the need for a precautionary approach with regard to a number of exceptionally vulnerable, coastal, and pelagic shark species. The draft HMS FMP lacks goals, timetables, and milestones toward conserving sharks and their habitats.

Response: NMFS disagrees that sharks are the lowest priority. The implementing regulations for Amendment 1 to the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks (December 24, 2003, 68 FR 74746) included management measures to address overfishing and population depletion of sharks. These management measures included, but were not limited to: aggregating the LCS shark complex, using MSY as a basis for setting commercial quotas, implementing a 4,000 lb trip limit in the commercial LCS fishery, establishing regional commercial quotas and trimester seasons, establishing gear restrictions to reduce bycatch, and establishment of a time area closure in the mid Atlantic region from January to July each year to reduce interactions with sandbar and prohibited dusky sharks. There are also several preferred shark management measures in the Final Consolidated HMS FMP that would address overfishing of finetooth sharks, improve shark dealer identification of commercially harvested shark species, and require fishermen to leave the second dorsal and anal fin on all commercially landed sharks to facilitate improved identification, among others. Furthermore, the HMS Management Division is currently engaged in a proposed rulemaking (March, 29, 2006, 71 FR 15680) that may facilitate improved handling, release, and disentanglement of non-target bycatch, including sharks, sea turtles, and smalltooth sawfish. NMFS recently released a dusky shark assessment (May 25, 2006, 71 FR 30123), and is considering the results of the Canadian porbeagle assessment. The final LCS stock assessment review workshop was held in June of this year, and the SCS stock assessment workshops will begin in 2007. Additional management measures for shark fisheries in the Atlantic Ocean may be implemented in the future, as necessary.

Comment 28: NMFS should release and begin work to address the findings of LCS assessment as soon as possible.

Response: The LCS stock assessment is following the SEDAR process, which emphasizes constituent and stakeholder participation in assessment development and transparency in the assessment process. As they are completed, all documents related to the LCS assessment have been placed on the SEDAR webpage at: http://www.sefsc.noaa.gov/sedar/. The final LCS review workshop was held on June 5-9, 2006. As per all stock assessments, NMFS will review the final determinations from the workshop and proceed with regulatory or management actions as necessary, consistent with Magnuson-Stevens Act, the HMS FMP, and other federal laws.

Comment 29: NMFS has relaxed the conservation framework for exceptionally vulnerable deepwater sharks by removing this special grouping from the management unit. Contrary to NFMS assertions, the finning prohibition alone is not sufficient to conserve these species. NMFS should work towards adding deepwater sharks to the list of prohibited shark species in subsequent rulemaking.

Response 30: The deepwater sharks were added to the management unit in 1999 because the Agency wanted to ensure that finning was prohibited for all sharks, including deepwater sharks. NMFS however, does not contend that the finning prohibition was sufficient to conserve these species. When deepwater sharks were included in the management unit, there were no other management regulations in place (*i.e*, permitting, reporting, trip limits, minimum size). NMFS believes that maintaining data collection only on the deepwater sharks is sufficient because they are not targeted in the shark fishery. Prohibiting landings of these species would not likely reduce mortality, as most of these sharks are dead at haulback and take of these species is a rare occurrence. Furthermore, NMFS does not want to further jeopardize the collection of data on these species, which is a rare event, by including them in the prohibited species management unit. If deepwater sharks were prohibited, scientists and fishermen would need to have an exempted fishing permit to retain them. Currently, on the rare occasions when fishermen catch a deepwater shark, they can give it to a scientist. If the species were prohibited, every fisherman and scientist who might catch a deepwater shark and who would want to retain any part of it for research would need to have an EFP on the off chance that such a shark would be caught. NMFS currently receives complaints from scientists about disruption to research for other species that are prohibited and caught more often than deepwater sharks, such as white sharks. Nonetheless, if directed fisheries for deepwater sharks are developed and/or extensive landings of these species begins to occur as bycatch in other fisheries, the Agency may implement additional measures.

Comment 31: NMFS needs to review and release the long-awaited population assessment for dusky sharks, as a matter of priority. We are concerned about the more than 23,000 dusky sharks landed in 2003, despite their prohibited species status. NMFS should investigate and address this problem immediately.

Response: The Southeast Fishery Science Center recently released the dusky shark assessment (May 25, 2006, 71 FR 30123). This document is available on the internet (http://www.sefscpanamalab.noaa.gov/shark/pdf/Dusky_Shark_Assessment.zip). NMFS is also concerned about the status of dusky sharks; hence, this species has been on the prohibited species list since 1999. In 2003, there were 23,288 lbs dw of dusky sharks reported landed in commercial shark fisheries. In 2004, only 1,025 lbs dw of dusky sharks were landed. Effective January 1, 2005, the mid-Atlantic time area closure closed commercial shark fishing with bottom longline gear from January 1 through July 31 of every year. This area was closed in part to reduce commercial fishery interactions with dusky sharks. NMFS may also implement additional management measures as a result of the recently released dusky shark assessment.

Comment 32: NMFS received comments regarding management of porbeagle sharks including: The porbeagle population is eleven percent of its size in 1961 which is too low; Canada has already listed porbeagle sharks as endangered - the United States needs to prohibit all landing immediately and eliminate the directed quota for porbeagle sharks; we are concerned about the continuation of the directed quota for Northwest Atlantic porbeagles, given that this population has been proposed as “Endangered” by the IUCN SSG and Canada; NMFS should end the directed fishery for porbeagles by eliminating the directed commercial quota and allowing only incidental landings; we support NMFS stated interest in working with Canada to address porbeagle conservation - such negotiations will be more successful if the United States takes action to end directed porbeagle fisheries in U.S. waters; the United States should aggressively pursue no directed porbeagle shark fisheries with Canada and within ICCAT.

Response 33: The United States has, on average, landed less than 1 mt of porbeagle sharks in the last four years, most of which was incidental, not directed catch. NMFS, however recognizes the ecological significance of the historical decline in porbeagle sharks, and is currently considering the stock assessment report recently completed by Canada in the fall of 2005. Management alternatives and regulations to prevent further declines in the porbeagle stocks will likely be considered in upcoming rulemaking actions, if necessary.

Comment 34: NMFS needs to make permits available to Puerto Rican shark fishermen or allow them to retain sharks since they are retaining sharks anyway.

Response: All fishermen, fishing for HMS, are already required through state regulations to have the appropriate HMS permits when fishing in state waters. Additionally, shark fishermen fishing in Federal waters are required to have the appropriate Federal HMS permit consistent with Federal regulations. The limited access permits are available from people leaving the fishery, and the recreational permits are available to anyone and may be obtained online at: http://www.nmfspermits.com/initialapp.asp. Fishermen from all states and territories, including Puerto Rico and the Virgin Islands, may face legal action if they do not comply with Federal regulations.

Comment 35: NMFS received two comments regarding the need to propose options for adding sharks to the prohibited species list including: NMFS has offered no alternatives at all to address depletion of these species in the draft HMS FMP (oceanic whitetip, silky sharks, and hammerheads); these species are not targeted but measures to avoid and reduce bycatch of these species are urgently needed. To reduce regulatory discards within the directed and incidental shark fishing fleets, NMFS should consider removing certain species of sharks from the prohibited species list, such as bignose, Caribbean reef, dusky, Galapagos, night, sand tiger, and Caribbean sharpnose.

Response: NMFS did not consider changes to the prohibited species management unit in this rulemaking. Amendment 1 to the 1999 FMP for Atlantic Tunas, Swordfish, and Sharks established criteria for addition or removal of species to/from the prohibited species group. These four criteria include: there is sufficient biological information to indicate that stock warrants protection, the species is rarely encountered or observed caught in HMS fisheries, the species is not commonly encountered or caught as bycatch in fishing operations, and the species is difficult to distinguish from other prohibited species. NMFS may consider changes to the prohibited species management unit in a future rulemaking, if necessary.

Comment 36: Because smooth dogfish is the only U.S. Atlantic shark that is subject to a directed fishery and not covered by management measures, NMFS should conduct an evaluation of this fishery and assess the population. NMFS should begin this work immediately, present the findings to the Mid-Atlantic Fisheries Management Council (MAFMC), and suggest a way forward as soon as possible.

Response: During the summer of 2005, NMFS received a request from the MAFMC to transfer management of smooth dogfish to the council. NMFS asked for more information regarding why the MAFMC should have sole jurisdiction over the stock. NMFS continues to wait for a response and will work with any Regional Fishery Management Council(s) to determine the appropriate management body for this species.

Comment 37: EPA noted that bycatch of SCS in the Gulf shrimp fishery fell approximately 46 percent following the introduction of turtle excluder devices in 1999. If this trend continues, this represents an encouraging level of success for the use of turtle excluder devices. EPA also noted that data entries for Table 3.90 in the Draft HMS FMP for the year 1999 and 2000 were the same and assumed that 2000 data were estimated.

Response: NMFS agrees that turtle excluder devices should reduce the amount of bycatch. Regarding 1999 and 2000 data, 1999 data were calculated as the average of the value of 1992 to 1997 divided by two in order to account for the effect of the turtle excluder devices. Data from 2000 were assumed to be the same as the 1999 data.

Comment 38: EPA notes that Table 3.90 indicates that the dressed weights of SCS are approximately one pound per shark. This suggests that these are small sharks and that would have little commercial value.

Response: SCS are generally the small sharks, and they have the lowest commercial value of all Atlantic sharks, generally less than $0.50 per pound. Many fishermen use these species as bait. In 2004, not including shark fin values, the SCS fishery was worth approximately $340,000 compared to $2.7M for LCS and just over $500,000 for pelagic sharks.

D.9.7 Fishing Mortality and Bycatch Reduction

Comment 39: Table 3.24 contains an error that has been repeated in several documents. The Technical Memorandum – SEFSC-515 cited as Garrison 2003 contains an error in addition concerning the total number of observed sets (both Total and non-NED) for 2001. The correct Total is 584 and non-NED is 398, which would change the correct percentages to 5.4 percent and 3.7 percent, respectively. Also the 2002 Non-NED percentage should be 3.9 percent. Lance Garrison confirms these inadvertent errors in his published errata affixed to the document.

Response: NMFS has made the requested corrections.

Comment 40: Has NMFS considered the fact that the Gulf of Mexico is a special region with special needs? Could there be regulations on a regional basis (*i.e.*, regulations different for the Gulf of Mexico from that of other regions)?

Response: It is possible to implement regulations on an area-specific basis to fit the special needs of a fishery whenever possible. NMFS has implemented different regulations for the pelagic longline fishery on an area-specific basis in the past. For instance, a live bait prohibition for this fishery has been implemented in the Gulf of Mexico in an attempt to reduce the bycatch of billfish. NMFS has also implemented regional allocations and seasons for LCS and SCS including ones for the Gulf of Mexico, and BFT regulations in the Gulf of Mexico are different than those along the east coast. Another example of regionally-specific regulations is the requirement to use only 18/0 or larger circle hooks in the NED for the pelagic longline fishery while requiring 16/0 or larger circle hooks elsewhere. NMFS will continue to evaluate alternative management measures in light of the specific needs of a fishery when possible.

Comment 41: NMFS should request that the Gulf of Mexico Fishery Management Council and the Gulf states cooperate with NMFS to minimize shark bycatch associated with fisheries under their purview (*i.e.*, Gulf of Mexico shrimp and menhaden fisheries).

Response: NMFS agrees that cooperation amongst the States, Regional Fishery Management Councils, and the Agency can help to address bycatch issues, particularly in those fisheries that cross jurisdictional boundaries. NMFS has contacted the Gulf and South Atlantic States and Regional Fishery Management Councils in an attempt to identify fisheries where finetooth shark bycatch may be occurring. NMFS also consulted with all Regional Fishery Management Councils and both the Atlantic and Gulf States Marine Fisheries Commissions regarding the Draft HMS FMP and its proposed measures.

Comment 42: NMFS has failed to make any meaningful reductions to longline bycatch since 1997. While time/area closures give the appearance that something is being done, this is not the only answer.

Response: NMFS disagrees that no meaningful reductions in longline bycatch have been realized. NMFS analyzed the reported landings and bycatch in the pelagic longline fishery from 1997-99 versus 2001-03 to measure the effectiveness of the time/area closures implemented in 2000-01. The analyses showed that the existing closures have been effective at reducing bycatch of protected species and non-target HMS and have provided positive ecological benefits. For example, the overall number of reported discards of swordfish, bluefin and bigeye tunas, pelagic sharks, blue and white marlin, sailfish, and spearfish have all declined by more than 30 percent. The reported discards of blue and white marlin declined by about 50 percent and sailfish discards declined by almost 75 percent. The reported number of sea turtles caught and released declined by almost 28 percent.

It appears that bluefin tuna discards in the MAB and NEC have been reduced considerably since the implementation of the June closure in 1999. Reported discards of BFT prior to implementation of the closure ranged from 558 to over 2,700 per year. Since 1999, the number of bluefin tuna reported discarded has remained below 500 per year. The number of swordfish kept in the MAB and NEC has increased since the closure was implemented while the number of billfish discarded has declined.

NMFS agrees that time/area closures are not the only management tool that can be utilized to reduce bycatch. NMFS has also implemented circle hook and bait requirements for the pelagic longline fishery and a live bait prohibition for that fishery in the Gulf of Mexico as well. These measures are intended to reduce the bycatch of non-target species and protected resources in the pelagic longline fishery.

Comment 43: NMFS should allow longline fishermen to sell their bycatch for charity.

Response: Commercial fishermen are already allowed to sell their catch for whatever purpose unless it is a prohibited species or specific regulations prohibit its retention such as the season is closed, quota has been met, the fish is undersized, or the animal is a protected resource.

Comment 44: NMFS received several comments regarding the need for additional research including: NMFS should research live baiting using circle hooks as a technique to increase catch of YFT and reduce bycatch; NMFS should conduct and/or continue experiments on non-offset circle hooks, circle hooks 20/0 and larger, bait options, and post-hooking effects.

Response: NMFS agrees that additional research can be conducted on a number of topics to evaluate their effectiveness in reducing bycatch of non-target species and protected resources. NMFS intends to continue to evaluate research proposals in many of these areas. New research is dependent on funding availability.

Comment 45: In our scoping comments, we set forth a proposal to count, cap, and control bycatch as required. NMFS left that proposal out of the draft FMP even though it is required under international and domestic laws to develop fully and analyze that proposal.

Response: NMFS disagrees that all comments offered during the scoping process need to be developed fully and analyzed. The Agency analyzed a broad range of alternatives for the measures included in the draft FMP, however, not all of these were fully developed and analyzed for a variety of reasons. There may have been more effective alternatives considered for further analysis or a proposed measure was found to not meet the needs or objectives of the FMP, and therefore was not considered further.

Comment 46: NMFS received comments about the need to implement a cap or quota on bycatch. These comments include: to reduce bycatch, NMFS should implement a hard cap system. Such a system would, among other things, set limits on fishing mortality of marine life, provide accountability by dividing limits between fishing sectors, set limits that would stop fishing for that sector, reward clean fishing, prevent a race to fish, and result in a reduction in bycatch. Such caps should be set for commercially targeted species, spawning species, recreationally targeted species, endangered species, marine mammals, and other species, such as sea birds, that are needed to promote the health of the marine ecosystem; NMFS should implement a hard cap on the takes of protected species similar to the one successfully implemented in the Western Pacific. This would remedy the historic failure of the pelagic longline fleet to maintain up-to-date records of turtle bycatch, allow for timely corrective action to reinitiate under the ESA, and help the fleet stay within take levels intended to protect against the jeopardy to the species. Such a system would require real time observer reporting and a "yellow light" system to warn fishermen when takes are approaching the limit.

Response: NMFS agrees that additional measures designed to reduce bycatch can be examined in the future, possibly on a sector by sector basis, if the data are available to provide an analysis. However, a hard cap system may not necessarily be appropriate or feasible in every sector due to resource constraints and other restrictions that are already in place for the fishery. There are also international concerns related to rebuilding plans, fishing effort and mortality rates, and bycatch that would need to be considered prior to establishing hard caps. A hard cap on the number of sea turtle interactions in all HMS fisheries already exists. Each fishery is operating under an Incidental Take Limit that once reached can close that fishery and/or result in a re-initiation of consultation under Section 7 of the ESA.

Comment 47: NMFS has a study that indicates a default standardized bycatch reporting methodology (SBRM) must include observer coverage of at least 20 percent (or 50 percent when endangered species are at risk). Rather than analyzing its needs to meet the conservation and management goals of the fishery, NMFS claims the study was simplistic and failed to account for "limited resources." This arbitrary failure to analyze alternatives for establishing a reporting methodology violates NEPA and the Magnuson-Stevens Act. NEPA requires NMFS to undertake an analysis to determine the level of observer coverage necessary to provide accurate and precise data for each conservation and management need addressed in the draft FMP. Congress and the Magnuson-Stevens Act do not give NMFS the ability to ignore the reporting methodology based on "limited resources." Nevertheless, a NEPA analysis could consider them.

Response: The effectiveness of any SBRM depends on its ability to estimate the type and quantity of bycatch precisely and accurately enough to meet the conservation and management needs of a fishery. The National Bycatch Report contains an in-depth examination of the issues of precision and accuracy in estimating bycatch and how precision relates to sampling and to assessments. The precision of an estimate is often expressed in terms of the coefficient of variation (CV) defined as the standard error of the estimator divided by the estimate. The lower the CV, the more precise the estimate is considered to be. A precise estimate is not necessarily an accurate estimate.

The National Working Group on Bycatch recommended that at-sea sampling designs should be formulated to achieve precision goals for the least amount of observation effort, while also striving to increase accuracy. This can be accomplished through random sample selection, developing appropriate sampling strata and sampling allocation procedures, and by implementing appropriate tests for bias. Sampling programs should be driven by the precision and accuracy required by managers to address management needs for estimating management quantities such as allowable catches through a stock assessment, for evaluating bycatch relative to a management standard such as allowable take, and for developing mitigation mechanisms. The recommended precision goals for estimates of bycatch are defined in terms of the coefficient of variation (CV) of each estimate. For marine mammals and other protected species, including seabirds and sea turtles, the recommended precision goal is a 20-30 percent CV for estimates of interactions for each species/stock taken by a fishery. For fishery resources, excluding protected species, caught as bycatch in a fishery, the recommended precision goal is a 20-30 percent CV for estimates of total discards (aggregated over all species) for the fishery; or if total catch cannot be divided into discards and retained catch, then the goal is a 20-30 percent CV for estimates of total catch (NMFS, 2004a). The report also states that attainment of these goals may not be possible or practical in all fisheries and should be evaluated on a case-by-case basis.

Rago *et al.*, (2005) examined potential sources of bias in commercial fisheries of the Northeast Atlantic by comparing measures of performance for vessels with and without observers. Bias can arise if the vessels with observers onboard consistently catch more or less than other vessels, if trip durations change, or if vessels fish in different areas. Average catches (pounds landed) for observed and total trips compared favorably and the expected differences of the stratum specific means and standard deviations for both kept weight and trip duration was near zero (Rago *et al.*, 2005).

The report cited by this commenter suggests that relatively high percentages of observer coverage are necessary to adequately address potential bias in bycatch estimates from observer programs. However, the examples cited in that report as successful in reducing bias through high observer coverage levels are fisheries comprised of relatively few vessels compared to many other fisheries, including the Atlantic HMS fishery. Their examples are not representative of the issues facing most observer programs and fishery managers, who must work with limited resources to cover large and diverse fisheries. It is also incorrect to assume that simply increasing observer coverage ensures accuracy of the estimates. Bias due to unrepresentative sampling may not be reduced by increasing sample size due to logistical constraints, such as if certain fishermen refuse to take observers, or if certain classes of vessels cannot accommodate observers. Increasing sample size may only result in a larger, but still biased, sample. Observer programs strive to achieve samples that are representative of both fishing effort and catches. Representative samples are critical not only for obtaining accurate (*i.e.*, unbiased) estimates of bycatch, but also for collecting information about factors that may be important for mitigating bycatch. Bias may be introduced at several levels such as when vessels are selected for coverage or when only a portion of the haul can be sampled due to weather or other concerns.

NMFS has conducted analyses to determine the level of observer coverage needed for the pelagic longline, bottom longline and shark gillnet fisheries to produce estimates for protected resource interactions with a CV of 0.3 (30 percent) or less. NMFS will continue to provide observer coverage at this level, subject to available resources.

Comment 48: NEPA requires that the EIS analyze the cumulative effect of all takes on sea turtles, not just the effects of takes in the HMS fisheries. While the pelagic longline fishery is one of the most damaging fisheries to sea turtle populations, a true determination of environmental impacts of this fishery cannot be made without examining the effects of all U.S. fisheries cumulatively.

Response: NMFS agrees that impacts to sea turtles and other protected resources are not limited to takes in HMS fisheries. The environmental impacts of the pelagic longline fishery and a description of the fishery are covered in Chapters 3 and 4 of the draft FMP. It is beyond the scope of the analyses for this draft amendment to consider all fisheries and non-fisheries impacts on the status of each protected resource. Much of that is already analyzed in the biological opinion for the PLL fishery. In addition, the impacts of not only U.S. fisheries, but foreign fisheries and non-fisheries impacts would need to be examined to evaluate the true impacts to protected resources world-wide.

Comment 49: The EIS provides only a cursory analysis of the impacts of HMS fisheries on marine mammals. The current bycatch monitoring methodology is not adequate for the conservation and management needs of marine mammals. Collecting the information is necessary to allow NMFS to devise specific bycatch reduction measures based on the actual behavior of marine mammals in HMS fisheries. NMFS should require fishermen to report in real-time where they are place gear and where gear is lost and to mark gear with colors to indicate the type and location of fishing gear. NMFS must also prioritize the granting of scientific research permits.

Response: As a requirement of the MMPA, all marine mammal interactions are required to be reported within 24 hours. Marine mammal interactions have been documented in the pelagic longline fishery and the shark gillnet fishery. Both fisheries are subject to observer coverage at levels that produce estimates of marine mammal interactions with a CV less than thirty percent. For marine mammals and other protected species, including seabirds and sea turtles, the recommended precision goal in the National Bycatch Report is a 20-30 percent CV for estimates of interactions for each species/stock taken by a fishery. In June 2005, NMFS convened the Pelagic Longline Take Reduction Team to assess and reduce the takes of marine mammals, specifically pilot whales and Risso's dolphins, by the pelagic longline fishery. NMFS will take action based on the results of the Pelagic Longline Take Reduction Plan, as necessary.

Comment 50: NMFS must implement comparable bycatch and sea turtle safe conservation certification program on all HMS product imports.

Response: NMFS appreciates this comment and may evaluate the efficacy and feasibility of requiring this type of certification program as part of a future action.

Comment 51: While NMFS received a number of comments on ways to better monitor recreational landings including logbook data that is tied to renewing permits, catch cards, and Vessel Trip Reports (VTR), the issue was relegated to one paragraph in the "Issues for Future Consideration and Outlook" section. The AP wants to move from survey methods to census methods and that idea is lost in this draft. NMFS should work with ACCSP to implement a mandatory VTR program that provides timely, accurate catch and effort data for the for-hire fleets. And NMFS received a comment that NMFS should state that it supports a comparison of existing for-hire VTR catch data with LPS data for the same time periods.

Response: NMFS recognizes the desire to make improvements in the collection of recreational landings data. At the request of NMFS, the National Academy of Science recently conducted a review of marine recreational fishery surveys, both state and federal. The review committee's report has been published and the Agency is evaluating the recommendations.

Comment 52: The Agency has a lack of attention to recreational fisheries data collection resulting in negative impacts to the recreational fishery.

Response: NMFS disagrees with this comment. The Agency spends considerable time and money collecting data from recreational fisheries, including recreational fisheries for HMS. Considerable time and effort is also spent by NMFS staff monitoring data collection and reviewing recreational fishery data for HMS fisheries. The Agency is evaluating the recommendations of the recent review of marine fishery surveys by the NAS to identify where improvements may be made. The Agency agrees that more data from the commercial fisheries for HMS is collected each year given the mandatory reporting requirements for these fisheries. Outside of the complementary time/area closures for Madison-Swanson and Steamboat Lumps, the recreational HMS fishery has very few restrictions. In addition to mandatory reporting, commercial fishermen are negatively impacted by area closures, gear restrictions such as the circle hook requirement, and mandatory observer coverage if selected.

Comment 53: Maryland catch card data should be used to determine total BFT catch instead of using LPS catch data for Maryland.

Response: NMFS has reviewed the Maryland BFT catch card data from 2002-2005 to evaluate its utility for management purposes. Although current reporting appears to be high, there is a measured level of non-compliance with the program. This non-compliance has been determined by comparing directly observed BFT in the intercept portion of the LPS with catch card records. Non-compliance with the Maryland catch card program is currently estimated to be fifteen percent. NMFS will continue to work with the Maryland DNR to integrate the catch card program into the monitoring and management program for BFT.

D.9.8 Permitting, Reporting, and Monitoring

Comment 54: NMFS received a number of comments regarding HMS permitting in general. These comments consisted of: NMFS should provided updated HMS regulations to permit holders when they are issued a permit; permit renewals should be conducted on a calendar year basis so fishing groups can notify their memberships and therefore improve renewal compliance; and, NMFS should implement a salt water fishing license for all fishermen in order to develop a database for data collection and observer coverage.

Response: NMFS agrees that the idea of providing copies of relevant regulations when an HMS permit is applied for and sent has merit; however that are also some negative aspects to this as well. Due to the ever changing dynamics of HMS fisheries, the rules and regulations that may apply to individuals may change throughout the season. Providing permit holders with a snapshot of the rules and regulations that exist early in the season may lead to a false sense of security that these regulations would remain consistent for the entire season. In an attempt to strike a balance, NMFS has included a number of useful pieces of information on the Atlantic tunas and HMS permits that allow the permit holder to access the most recent information. For instance, NMFS includes a web address and toll-free telephone number where permit holders can locate the most up to date regulations. For those permits that authorize the user to participate in recreational HMS fisheries, NMFS has included the appropriate telephone numbers to report their catch. In the Management Program Structure section of this document, NMFS has preferred an alternative to adjust the annual management time-frame of HMS fisheries to a calendar year, versus a wrap around fishing year, *i.e.*, June through May of the following year. As a result of implementing this preferred alternative, NMFS would realign the HMS permitting to coincide with the calendar year. For consistency purposes the shark and swordfish commercial permits, both vessel and dealers, would still be issued according to birth month, as per the business rules of the Southeast Permitting Office. NMFS encourages organization leaders to remind their membership when permits are available for renewal, whether or not it coincides with the calendar year.

Comment 55: NMFS received a comment stating that NMFS should redesign vessel permits based on fishing methods and geographic area. NMFS should combine vessel permitting for coastal pelagics and HMS for the charter boats, headboats, and commercial handgear vessels.

Response: Since the inception of the 1999 FMP, a number of issues pertaining to the permitting program have been identified by constituents, advisory panel members, NMFS staff, and others. These have included, but are not limited to, further rationalizing some segments of the HMS fisheries, streamlining or simplifying the permitting process, restructuring the permit process to a gear-based permit system from the current species-based permit system, and reopening some segments of the limited access system to allow for the issuance of additional permits. Addressing these issues in the future may be important to the successful long-term stewardship of HMS fisheries, and therefore NMFS may consider restructuring these elements in future rulemakings.

Comment 56: A mandatory HMS tournament permit (alternative E9) would help to provide an exact count of the number of marlin landed in tournaments.

Response: In the Draft Consolidated HMS FMP, a mandatory HMS tournament permit (alternative E9) was considered, but not further analyzed, because improvements to tournament registration, data collection, and enforceability may be achieved with considerably less burden to the public and the government by issuing a confirmation number, rather than a permit, to tournament operators who have registered their tournaments with NMFS. Because HMS tournaments frequently change operators, names, and dates, a tournament permit would be very burdensome to administer and enforce. Therefore, a clarification is being added to the regulations, as described in the Regulatory Housekeeping section of the Final Consolidated HMS FMP, specifying that HMS tournament registration is not considered complete unless the operator has also received a confirmation number from the HMS Management Division of NMFS. Requiring a tournament confirmation number, issued by the HMS Management Division, will achieve the same objective (*i.e.*, increased compliance) as a tournament permit. Since all tournaments awarding points or prizes for HMS are currently required to be registered with NMFS, and because all billfish tournaments are currently selected for reporting, the Agency is already obtaining an exact count of the number of marlin landed in tournaments.

Comment 57: NMFS received general comments regarding the recreational reporting requirements including: Non-compliance with recreational swordfish and billfish reporting occurs because it takes too much time to report fish to NMFS using the telephone. NMFS needs to simplify the telephone reporting system and increase Customer Service; to increase compliance with recreational reporting requirements, NMFS should provide a bumper sticker, or token reward, to those fishermen that have reported their catch. This technique has been successful in other fisheries.

Response: The recreational billfish and swordfish telephone reporting system has recently been modified to provide quicker and more convenient access. HMS Angling category permit holders (or their designees) must report landings of these species within 24 hours of landing by calling 800-894-5528, and then pushing 21 to provide information regarding the catch. A representative from NMFS will later contact the permit holder (or designee) to obtain verification of the landing and provide a confirmation number. The initial telephone call should only take a few minutes. Since the system has been modified to provide quicker access, the number of first-time callers has increased. Additionally, NMFS is actively working towards implementing an Internet reporting system for these species. The Agency appreciates suggestions to increase compliance with the mandatory recreational reporting requirement and will consider these in the future, if necessary.

Comment 58: Until NMFS seriously invests in comparable permitting, reporting, monitoring, and enforcement across all HMS fisheries, commercial and recreational, it will not be able to appropriately manage Atlantic HMS fisheries. Currently, NMFS has adequate data for only a couple of commercial fisheries.

Response: NMFS realizes the importance permitting, reporting, monitoring, and enforcement in maintaining viable management of Atlantic HMS. There are several measures included in this rulemaking that address these issues. Quality stock assessments, accurate quota monitoring, fishing effort control, and complying with current HMS regulations are paramount to the HMS management program and the Agency agrees that these programs are worth serious investments of personnel and financial resources. The Agency currently maintains a comprehensive permitting system for both commercial and recreational fisheries, including both limited and open access regimes. Reporting is required of all shark and swordfish commercial fisheries participants, and some commercial tuna fishery participants, including costs and earnings reports from selected commercial fisheries participants. Landings are monitored consistently to ensure that landings are within their allotted quotas. Recreational reporting is currently required for all non-tournament landings of bluefin tuna, swordfish, and billfish. Tournaments are also required to register and report any landings of HMS. NMFS is dependant on several entities for dockside and at sea enforcement, including NMFS/NOAA Office of Law Enforcement, the United States Coast Guard, and individual states that maintain a Joint Enforcement Agreement with NMFS. NMFS is perpetually involved in activities to enhance, update, and/or modify the permitting, reporting, monitoring, and enforcement systems currently in place.

Comment 59: NMFS received comments pertaining to the longline sector of the HMS fishery. The comments consisted of: NMFS must monitor and account for all sources of fishing mortality, not just mortality from the PLL fleet; and, is the VMS requirement meeting its intended purpose and who needs to possess one?; and, NMFS should put 100 percent observer coverage on commercial vessels around Puerto Rico for a few years due to gear conflicts between PLL vessels and other commercial vessels. These conflicts are attributed to PLL vessels operating closer to shore and thus interfering with traditional trolling practices.

Response: NMFS agrees that it is important to account for all sources of fishing mortality, not just the mortality from the PLL fleet. NMFS accounts for recreational landings in stock assessments and uses the best available science regarding post-release mortality of billfish in the recreational sector to consider impacts on billfish and other HMS taken in fisheries other than commercial longlining. VMS is required on all vessels fishing for HMS with pelagic longline gear onboard, on all directed shark bottom longline vessels between 33 º North and 36 º 30' North from January through July, and on all gillnet vessels with a directed shark permit during the Right Whale Calving Season from November 15 to March 31. VMS is meeting its intended purpose by assisting in the monitoring and enforcement of closed areas. It is one of several tools including logbooks, observer programs, gear requirements, quotas, and limited access permits that NMFS uses to manage HMS fisheries. Resources for observer programs are limited, and having 100 percent observer coverage on commercial vessels around Puerto Rico would likely not be possible due to funding constraints. Furthermore, observers are not trained as enforcement personnel, and would not be in a position to reduce conflicts between different gear sectors in and around Puerto Rico. These types of issues are more appropriately handled by enforcement personnel.

Comment 60: NMFS received a number of comments regarding the deployment of observers in HMS fisheries. These comments consisted of: Observer coverage on the pelagic longline fishery must be significantly increased from current levels, especially in areas with high levels of sea turtle take (e.g., the Northeast Distant and the Gulf of Mexico). Higher level of coverage is essential to provide data on the effectiveness of the gear and bait modifications and the rate and location of sea turtle capture. The 2004 BiOp required eight percent coverage but this increase was established by ICCAT for the purpose of assessing the bycatch of tuna species and will not be effective at assessing the bycatch of rarely encountered species such as sea turtles; proper measurement for observer coverage levels should be based on the number of observed hooks out of the number of hooks reported to have been fished, rather than number of observed sets; a voluntary HMS CHB observer program should be tested; and, NMFS should implement electronic reporting and mandatory observer coverage for all HMS fisheries.

Response: NMFS increased observer coverage in the pelagic longline fishery to eight percent in 2004 in order to effectively monitor bycatch after implementation of new gear requirements. The pelagic longline observer program coverage level was raised to eight percent not just to meet ICCAT targets, but also to improve the precision of catch and bycatch estimates specified in NMFS' guidelines for fisheries observer coverage levels. The number of sets is the standard effort used by other fisheries in calculating the level of observer coverage required. Additionally, the set location is more easily tracked to the statistical reporting areas in the Atlantic than logbook or fishing effort based on the number of hooks would be. NMFS agrees that voluntary observer coverage would be helpful in a number of different fisheries, as would electronic reporting if it were technologically feasible and not cost prohibitive. NMFS will continue to explore these options in the future.

Comment 61: An operator's permit should be required for all HMS fisheries.

Response: NMFS did not include measures to requiring a vessel operator's permit in all HMS fisheries in this rulemaking. The HMS Management Division is aware of several other federally managed fisheries that have imposed this requirement, however, have not proposed similar measures for HMS at this time. This requirement may be considered in the future as necessary and appropriate.

D.9.9 Enforcement

Comment 62: NMFS received several comments related to the lack of enforcement of HMS regulations, including: the Agency needs to enforce the HMS regulations for all people fishing for HMS, there is virtually no fisheries enforcement in the United States Virgin Islands, lack of enforcement is a big problem in Puerto Rico, law enforcement should increase effort around places where marlin are sold illegally and there are many issues with billfish landings in Puerto Rico and there should be continued focused efforts to better understand how many billfish are being landed in the Caribbean.

Response: NOAA Fisheries Office for Law Enforcement (NOAA OLE) has Special Agents stationed in Puerto Rico conducting enforcement of all federal fisheries laws, included those involving HMS. In addition, the United States Coast Guard (USCG) conducts fisheries enforcement in all federal waters, including the waters off the coast of Puerto Rico. With regard to the specific concerns that the commenter raised about billfish, NMFS has very little hard data on the extent of illegal sales of billfish in Puerto Rico, and as such cannot verify the veracity of the commenter's claims or assess their impact. NMFS has received a significant number of anecdotal reports of sales of Atlantic marlin in Puerto Rico. The number of these anecdotal reports suggests that a sizable number of Atlantic marlin may be illegally sold and implies that more than just those fish that come to the boat dead are illegally entered into commerce. NMFS acknowledges that there is some uncertainty associated with marlin landings statistics from the U.S. Caribbean, and the Agency is working to improve these statistics by increasing enforcement of existing permitting and reporting requirements, including those for tournaments.

Comment 63: One commenter was confused by the 3 and 12 mile limits, other confusing rules, and whom they should call to complain and ask for patrols.

Response: Most states on the Atlantic Ocean, with the exception of Texas and the west coast of Florida, have a 3 mile limit which delineates their states' waters. Individual states (or commonwealths) have jurisdiction over fisheries management and enforcement in their waters. The west (Gulf of Mexico) coast of Florida and Texas have jurisdiction out to nine miles within their respective states. Puerto Rico, a U.S. Territory, has jurisdiction out to nine miles. The 2005 Guide for Complying With the Regulations for Atlantic Tunas, Swordfish, Sharks, and Billfish provides detailed information and responses to frequently asked questions concerning HMS regulations. The contact numbers for law enforcement are also provided in this document which can be downloaded from the HMS website or by contacting NMFS.

Comment 64: NMFS must do a better job in protecting and preserving our marine resources in general. Possible strategies that NMFS should consider include: discouraging overfishing by increasing fees, implementing stricter regulations, and improving enforcement.

Response: NMFS is concerned about protecting and preserving our marine resources. NMFS has implemented numerous rules and regulations that are intended to prevent overfishing, rebuild overfished stocks, reduce bycatch, and limit fishing capacity in efforts to ensure that viable stocks of HMS are enjoyed by future generations of stakeholders. Enforcement of HMS regulations is one of several priorities shared the NOAA OLE, USCG, and states that have a Joint Enforcement Agreement with the Federal government. NOAA OLE, USCG, and individual states are constantly striving to improve enforcement of not just HMS regulations, but regulations pertaining to all fisheries. This particular rulemaking includes regulations aimed at rebuilding overfished stocks of billfish, preventing overfishing of finetooth sharks, reducing post release mortality of sea turtles and other protected resources, simplifying management of bluefin tuna, authorizing additional fishing gears for HMS, and improving identification of sharks by dealers, among other measures. Increasing fees was not analyzed in this rulemaking, however, NMFS has implemented a suite of other regulations, in this rulemaking and otherwise, that prevents or discourages overfishing.

Comment 65: There is a provision under ATCA and the Magnuson-Stevens Act stating that U.S. flagged vessels must comply with U.S. regulations when pursuing ICCAT managed species, regardless of where they are fishing. This would impact recreational vessels fishing outside the U.S.

Response: Generally, U.S. flagged vessels are required to comply with U.S. domestic regulations that pertain to Atlantic HMS while fishing anywhere in the Atlantic Ocean. Depending on circumstances, however, the requirements may change. Some U.S. citizens, even on foreign flagged vessels, may need an Exempted Fishing Permit from NMFS.

Comment 66: Possession of HMS angling permits in South Florida is still an issue. Many anglers do not possess the appropriate permit. Could the Sun Sentinel or Miami Herald be involved in reporting cases where anglers are caught for fishing without the proper permits?

Response: NMFS agrees that it is important for all participants in HMS fisheries to possess the appropriate permit and is interested in exploring options to improve outreach in all areas of the Atlantic with the objective of increased compliance with HMS permitting requirements. Advertising the requirements in newspapers or other media may be a viable option to improve compliance. However, individuals have the primary responsibility for knowing the laws surrounding their participation in all activities, including the pursuit of HMS. Many freshwater, estuarine, and/or marine fisheries require compliance with regulations that include, but are not limited to: permitting, size and bag limits, and seasons. HMS fisheries are no exception.

Comment 67: NOAA OLE needs to prioritize which violations are the most significant and pursue these cases first.

Response: NOAA OLE, in conjunction with the NMFS Regional Administrator, does set regional enforcement priorities. These priorities are set based on the threat that a certain violation or category of violations presents to marine resources, identified trends in noncompliance, as well as other factors. In addition, the Magnuson-Stevens Act, as well as the Agency's own civil monetary penalty schedule, provides that the egregiousness of the offense and the violator's history of prior violations is considered, along with other factors, in determining the appropriate civil monetary penalty.

D.9.10 ICCAT

Comment 68: NMFS received a number of comments pertaining to ICCAT, the 250 recreationally caught marlin landing limit, U.S. participation at ICCAT, and U.S. negotiating positions at ICCAT, including: ICCAT should look at a longer billfish time series so they can see the increase in biomass overtime; the bargaining power of the United States may be reduced at ICCAT if the full quota is not being utilized; the United States impact on Atlantic blue and white marlin is probably considerably less than five percent. The White Marlin Status Review Team noted that if the United States were to stop all commercial and recreational fishing mortality for white marlin, the impact on the stock trajectory would be minimal. The United States cannot have a meaningful impact acting alone. ICCAT does not give credit for unilateral conservation measures. If the United States implements the preferred alternatives measures now, we will greatly reduce our ability to negotiate with other nations to further reduce their impacts on these overfished stocks; we do not favor additional domestic regulations on catches of marlin until after further development of a rebuilding plan by ICCAT; we would be better off if NMFS waited until the other countries reduced their commercial landing by 50 percent before we agree to the 250. We would like to see verification of the 50 percent and 66 percent landing reductions that other countries have agreed to; United States ICCAT representatives should demand the unjustified 250 marlin limit be remanded. Particularly, when across the ocean, foreign longliners harvest these species for sale, with no thought of conservation; if NMFS wants angler support of recreational limits, they need to prove to recreational anglers that the United States will take a tougher stand at ICCAT; ICCAT may not be enough to deal with global conservation concerns relating to billfish; I support aggressive efforts to attain international agreements regarding HMS; more pressure needs to be applied on countries that are not complying with ICCAT recommendations; the United States should reconsider how we participate in the ICCAT process due to its effectiveness and the inability to get other member nations to comply with recommendations; and, NMFS must strengthen its ability to establish responsible fishing practices in other countries and protect this global resource.

Response: Contrary to the assertion of one commenter that an examination of data over a longer time series would reveal an increase in billfish biomass overtime, an examination of Atlantic billfish biomass, catch, CPUE, and fishing mortality rate data back to the late 1950s shows an even more extreme decline in biomass than an examination of more recent time series. To use Atlantic blue marlin as an example, biomass of Atlantic blue marlin fell from an estimated 200 percent of MSY in the late 1950s to just 40 percent of MSY in 2000. CPUE during the same period fell by more than eighty percent and total Atlantic catches of blue marlin fell from approximately 9,000 mt to just over 2,000 mt. These dramatic declines were accompanied by similarly large increases in the fishing mortality rate, which rose from less than 0.3 to approximately 4.0. Catches of U.S. flagged vessels represent 4.5 percent of catches reported to ICCAT. NMFS agrees that U.S. action alone is not sufficient to fully recover stocks of Atlantic billfish, and believes that reductions in catches, landings, and post-release mortalities from the pelagic longline and recreational fisheries, at both the international and domestic levels, are essential to the recovery of the Atlantic billfish. NMFS is further convinced that there are appropriate domestic management measures, including implementation of circle hook requirements and implementation of ICCAT recommendations, as per the preferred alternatives in this rulemaking, among others, that can and should be implemented at this time. A unilateral decision by the United State to tie implementation of the 250 fish limit to the actions of other ICCAT nations, as suggested by one commenter, is not an option and NMFS rejects the notion that the annual 250 recreationally landed marlin limit is unjustified or unfair. The 250 marlin landing limit was contained in a recommendation (00-13) championed by the United States and supported by the U.S. recreational, commercial, and government ICCAT commissioners. Recommendation 00-13 established a number of additional stringent conservation measures on other nations intended to improve the stock status of Atlantic marlin, including mandatory reductions in landings of blue and white marlin by 50 percent and 67 percent, respectively, among others. On average for the period 2001 through 2004, the United States has averaged 189 recreationally landed marlins, or approximately 75 percent of the landing limit each year. In two of those four years, the United States was more than 100 marlin, or the equivalent of more than 40 percent, below the U.S. landing limit, and U.S. fishermen are free to practice catch and release unabated, which is the dominant component of the fishery by choice. While it may be appropriate to reexamine the 250 marlin limit, NMFS rejects the notion that it is unjustified. NMFS further believes that establishing a policy of delaying any further management measures until international bycatch issues are fully addressed would result in a detrimental and unnecessary continuation of elevated levels of fishing mortality of Atlantic billfish when appropriate domestic management measures became available. As mentioned previously, NMFS agrees that aggressive international action is needed to reverse current trends in billfish stock status and that ICCAT is the only viable mechanism to address these issues at this time. The United States has championed, and will continue to champion, billfish conservation internationally, and important components of a successful international strategy is to abide by U.S. international obligations and lead by example when appropriate. NMFS agrees that substantial quota stockpiles of certain species may present some negotiating challenges, but also believes that such stock piles may present certain opportunities.

Comment 69: The biggest threat to Atlantic billfish is illegal, unregulated, and unreported (IUU) fishing activities by foreign longline vessels. ICCAT nations must agree to eliminate these activities. No further restrictions should be placed upon U.S. recreational billfish fishermen until the problems associated with IUU fishing are addressed, and a further reduction in bycatch by legitimate longline vessels is achieved.

Response: NMFS agrees that IUU fishing represents a substantial threat to the health of Atlantic billfish populations, and as such, the United States continues to work through ICCAT to address this issue as rapidly and efficiently as possible. NMFS is convinced that reductions in bycatch and bycatch mortality from the pelagic longline and recreational fisheries, at both the international and domestic levels, are essential to the recovery of the Atlantic billfish. NMFS is further convinced that there are appropriate domestic management measures, including implementation of circle hook requirements and implementation of ICCAT recommendations, as per the preferred alternatives in this rulemaking, among others, that can and should be implemented while concurrently working to end IUU fishing. Establishing a policy of delaying any further management measures until IUU fishing and international bycatch issues are fully addressed would result in a detrimental and unnecessary continuation of elevated levels of fishing mortality of Atlantic billfish when appropriate domestic management measures became available.

Comment 70: NMFS received suggestions recommending consideration or adoption of a number of international positions and trade restrictive actions by the United States, including: To effectively reduce billfish mortality, NMFS should first impose trade penalties and tariffs on other countries that do not adhere to their ICCAT billfish recommendations; initiate action at ICCAT to stop longlining worldwide; prohibit all longlining in the United States immediately; and, prohibit the importation of any fish from other countries whose vessels deploy longlines, do not adhere to ICCAT quotas, and do not require circle hooks on longlines.

Response: NMFS appreciates these suggestions and encourages the public to continue to provide suggestions to the Agency to help address billfish issues. The above suggestions are beyond the scope of this rulemaking, but NMFS may consider such proposals in future rulemakings, as necessary and appropriate. NMFS has imposed import restrictions on swordfish below the ICCAT minimum size, and may consider imposing future trade restrictions on any ICCAT species, in accordance with adopted ICCAT recommendations to impose trade restrictions. The United States continues to believe multilateral trade restrictions, as approved via ICCAT recommendations, are an effective tool for addressing nations whose vessels fish in a manner that undermines the effectiveness of ICCAT conservation recommendations. Pelagic longline gear is the predominant gear type for harvesting highly migratory species and, with application of appropriate management measures, can provide for the sustainable harvest of fisheries resources in many instances. NMFS is not convinced that an international or domestic prohibition on pelagic longline fishing is appropriate at this time.

Comment 71: NMFS should not implement any additional management measures on billfish until after the ICCAT meeting following the next assessments of blue and white marlin; I support alternative E1 (no action) because I disagree that we need to put more regulations on US fishermen. Our State department needs to be listening to the United States, but they don't care that they are putting U.S. fishermen out of business. What the United States cares about is leading by example without compliance. The United States still does not take international compliance at ICCAT seriously. The United States should say that it would not do anything to domestic fishermen unless we see better international compliance through ICCAT. Why is NMFS in such a hurry to put more regulations on U.S. fishermen?

Response: As discussed in the response to Comment 69 above, NMFS is convinced that reductions in bycatch and bycatch mortality from the pelagic longline and recreational fisheries, at both the international and domestic levels, are appropriate at this time and essential to the recovery of the Atlantic billfish. NMFS is further convinced that there are appropriate domestic management measures, including implementation of circle hook requirements and implementation of ICCAT recommendations, as per the preferred alternatives in this rulemaking, among others, that can and should be implemented while concurrently working with the international community to improve management and compliance with existing ICCAT recommendations. Establishing a policy of delaying any further management measures until compliance measures are fully addressed would result in a detrimental and unnecessary continuation of elevated levels of fishing mortality of Atlantic billfish when appropriate domestic management measures became available. The United States takes compliance issues at ICCAT very seriously and has led efforts at ICCAT to improve compliance at every available opportunity. The United States has been the driving force behind most measures at ICCAT that have resulted in improved compliance with management recommendations and data collection requirements.

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E OMB PEER REVIEW BULLETIN

On December 16, 2004, the Office of Management and Budget (OMB) issued a directive requiring Federal Agencies to have "influential scientific information" and "highly influential scientific assessments" peer reviewed. NMFS decided that certain sections of the Draft Consolidated Atlantic HMS FMP could contain "influential scientific information," which is defined as: scientific information (factual inputs, data, models, analyses, technical information, or scientific assessments) that the agency reasonably can determine does have or will have a clear and substantial impact on important public policies or private sector decisions. As such, NMFS requested three scientists who were not involved in the drafting of HMS FMP to review certain sections of the HMS FMP. Specifically, NMFS asked them to review the standardized bycatch reporting methodology (Sections 3.8.2 through 3.8.5), time/area closure analyses (Section 4.4.2 and Appendix A), and essential fish habitat (EFH) sections (Chapter 10 and Appendix B).

Per the OMB peer review bulletin, NMFS noted that such a peer review should evaluate the clarity of hypotheses, the validity of the research design, the quality of data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypotheses being tested, the extent to which the conclusions follow from the analysis, and the strengths and limitations of the overall product. The peer reviews will be used, as appropriate, to clarify assumptions, findings, and conclusions of the bycatch, time/area closure, and EFH sections of the Final HMS FMP. Their reviews are reproduced in their entirety below. A copy of Gregory Skomal's certification of no conflict of interest is on file with the HMS Management Division.

The following sections provide each peer reviewer's complete comments, followed by a response section by NMFS. In the response section, NMFS uses the same section headings used by the peer reviewer to respond to the comments. NMFS used this approach of providing the peer reviewer's comments in their entirety to offer the reader the full context of the reviewer's comments, for ease of reading, and to avoid any confusion between the reviewer's comments and NMFS' response which follows each reviewer's section.

E.1 Peer Review by Gregory Skomal, Commonwealth of Massachusetts, Division of Marine Fisheries, December 21, 2005

Commonwealth of Massachusetts

Division of Marine Fisheries

Martha's Vineyard Field Station

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Paul J. Diodati

Director

December 21, 2005

Mr. John H. Dunnigan
Director, Office of Sustainable Fisheries
National Marine Fisheries Service
Silver Spring, MD 20910

Dear Mr. Dunnigan:

As per your request, I've conducted a peer review of the following sections of the Draft Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Sections 3.8.2-3.8.5 (Standardized Bycatch Reporting Methodology), 4.4.2 (Time/Area Closures), Chapter 10 (Essential Fish Habitat) and associated appendices (A, B).

In doing so, I made every effort to evaluate the clarity of hypotheses, the validity of the research design, the quality of the data collection procedures, the robustness of the methods employed, the appropriateness of the methods for the hypothesis being tested, the extent to which the conclusions follow from the analysis, and the strengths and limitations of the overall product. My comments on each of the sections follow.

Please do not hesitate to contact me for any additional information. I thank you for the opportunity to comment on this important Fishery Management Plan.

Sincerely,

Gregory Skomal
Senior Marine Fisheries Biologist

Section 3.8.2: Standardized Reporting of Bycatch

This section describes and discusses the three major sources of bycatch data for HMS: self-reported logbook data, at-sea observer data, and survey data. While this would imply three discrete sources, fishery-specific information indicates that there are multiple self-reporting programs (e.g. HMS logbook, vessel trip reports, supplemental discard forms), two observer programs, and two recreational dockside surveys. I suggest that a table or two be added to this section to clarify each of these programs on a fishery-specific basis and to eliminate any potential redundancies.

Section 3.8.2.6: Recreational Handgear Fishery

For the last several years, members of the US Advisory Committee to ICCAT have questioned the validity of HMS catch and bycatch estimates derived from the two recreational surveys (MRFSS and LPS). Specifically, the BAYS species working group stated in 2005 that "MRFSS and LPS landings data collection programs are fatally flawed and have failed. It is time to acknowledge that they cannot be further modified or adapted for the current needs of fishery management. The BAYS SWG recommends the development of a HMS landings data collection program that meets high standards for accuracy and precision." While NMFS notes that CV's are very high for most HMS estimates derived from these sources, there has been little effort to alleviate this longstanding problem over the last several years.

Section 3.8.5: Bycatch Mortality

This section presents very qualitative information on fishery-specific bycatch mortality. In my view, this section is incomplete. Although NMFS purports to have estimates of bycatch and bycatch disposition, these data are not reported on a fishery-specific or species-specific basis. I suggest that this section or section 3.4.6 be augmented to include these data so that the reader has a quantitative sense of this issue. For example, a table containing annual fishery-specific estimates of HMS bycatch (e.g. blue shark) including catch disposition (released alive, dead discards) would be very useful.

Bycatch mortality comprises two issues, direct mortality and post-release mortality, which have been combined into a single section. These two issues should be addressed separately to avoid confusion. Estimates of direct mortality are derived from bycatch data sources, but estimates of release mortality require catch disposition information coupled with species and fishery-specific release mortality rates. Although the latter is largely lacking for most HMS bycatch species, the section on release mortality should consolidate what is known to date on a fishery-specific basis. The new section would include the published information on billfish release mortality currently referenced under "Recreational Handgear Fishery". It should be noted that Kerstetter et al. (2003) conducted similar research on longline-caught blue marlin.

Moreover, section 3.8.2 states that "post-release mortality of HMS is accounted for in stock assessments to the extent that the data allow". However, there is no indication in the current section that post-release mortality rates are incorporated into stock assessments. The section should include a table summarizing fishery and species-specific estimates of post-release mortality rates and post-release bycatch mortality (numbers of fish) used in stock assessment.

Section 4.1.2/Appendix A: Time/Area Closures

NMFS provides an extensive and comprehensive analysis of the ecological/economic/social benefits and impacts of existing and proposed time/area closures. In virtually all cases, the ecological benefits are inversely related to the economic impacts and both are greatly influenced by the potential redistribution of effort. Without redistribution of effort, there are ecological benefits and discard reductions across all species, but economic and social impacts. With redistribution of effort, all of the time/area closures analyzed have positive and negative feedbacks that render none of them fully effective. Given the assumption of effort redistribution, it is difficult to believe that NMFS will be able to implement a time/area closure that does not have ecological impacts that counter positive gains. Hence, for time/area closures to be effective, assumptions on effort redistribution need to be rigorously tested. There are strong indications that there was not a significant spatial redistribution of effort resulting from the current time/area closures (Table 4.9). Moreover, discard reductions realized by the current closures met or exceeded those predicted without the redistribution of effort (Tables 4.7, 4.8). However, as stated in the draft FMP, reality likely lies between no effort redistribution and complete redistribution.

In light of this conundrum, I concur with the preferred option (B5) to establish criteria to consider when implementing new time/area closures or making modifications to existing time/area closures. These criteria must include objective quantitative thresholds for bycatch reduction taking into account those factors listed under this alternative (page 4-34) as well as status of the stocks, assessment information, and stock rebuilding schedules. In addition, as stated above, discard reduction analyses should make every attempt to test hypotheses of effort redistribution while taking into account the potential influence of declining stocks.

Minor edit: There is an inconsistency between the percent reduction of bluefin tuna discards reported in Table 4.6 and Table 4.11. For alternatives B2(d), B2(e), and B2(a)/B2(b)(year round) the former lists -3.3%, 5.7%, and -24.3% respectively; these are reflected in the text. However, Table 4.11 reports different values of 38%, -40.7%, and -19.1%, respectively. Two of these values counter the arguments presented in the text.

Chapter 10/Appendix B: Essential Fish Habitat

In this chapter and the associated appendix (B), NMFS presents a comprehensive five-year review of Essential Fish Habitat (EFH) for all HMS. In addition, the chapter makes every effort to identify fishing and non-fishing activities that may adversely affect EFH. EFH is defined as "those habitats necessary to the species for spawning, breeding, or growth to maturity".

Section 10.2.1: Descriptions of Datasets Used in the Review

In addition to the datasets used in the current analyses, two surveys are conspicuously absent. The NEFSC Longline Shark Survey has been conducted by the NMFS Apex Predators

Investigation for no less than 30 years. These biological surveys targeted pelagic sharks, swordfish, and tunas in the early years and large coastal sharks in recent years. Like the Southeast Fishery Longline Shark Survey, biological and associated environmental data are collected from all captures and most fishes are tagged and released. This survey would contribute useful fisheries independent data. Also, the now defunct CETAP (Cetacean and Turtle Assessment Program) survey is another fisheries independent historical source of distribution data on large pelagic fishes (see Kenney et al., 1985). This is particularly important for shark species that are not routinely taken in fisheries (e.g. basking shark).

Section 10.2.2: Methods Used to Map and Analyze EFH Data

While it is clear that size stratified spatial data from multiple sources were plotted to identify areas of high concentration, it is unclear how this grid will be used to designate EFH.

Section 10.3: Summary of Review and Findings

Reference to the McCandless et al. (2002) study should note that 15 separate research studies were conducted from Massachusetts to Texas, not New York to Texas.

As written, the text in this and the previous section implies that new EFH has been designated based on recent information. However, it is stated in the Introduction (Section 10.1) that EFH has not been modified from the 1999 designations and that the current review is simply to provide new EFH information and data collected since that time. Since there is a great deal of discussion regarding new EFH information and species-specific descriptions of EFH, clarification is warranted.

Section 10.3.2: Swordfish

Reference to juvenile swordfish in the vicinity Long Island Sound needs to be substantiated. Perhaps this information refers to historical reports of swordfish east of Long Island in the vicinity of Block Island and Nomans Island south of Martha's Vineyard.

Appendix B: Essential Fish Habitat

Many of the species-specific descriptions in this appendix present life history information that has been updated or replaced with new or more applicable research findings. In the following sections, I've noted recently published literature that may assist NMFS in identifying EFH for several species of HMS.

B.1.4.1: Basking Shark

Distribution data for the basking shark is incomplete largely because the species is not commonly taken by fisheries. EFH for the basking shark should include waters east of the Great South Channel and the Gulf of Maine to the Bay of Fundy. Pertinent information on life history and distribution of the basking shark in the North Atlantic may be found in Templeman (1963), Owen (1984), Kenney et al. (1985), Sims and Merrett (1997), Sims and Quayle (1998), Sims (1999), Sims et al. (2000), Skomal et al. (2004), and Wilson (2004).

B.1.4.2: Hammerhead Sharks

Scalloped Hammerhead

Additional life history information can be found in Lessa et al. (1998), Hazin et al. (2001), and Bush and Holland (2002).

B.1.4.3: Mackerel Sharks

White Shark

In all likelihood, EFH of the white shark will need to be modified. The review by Casey and Pratt (1985) is a comprehensive size-specific examination of white shark distribution, life history, and nursery habitat in the western North Atlantic. Preliminary estimates of age and growth of this species were recently conducted by Natanson (2002). Estrada et al. (in press) present new information on the trophic ecology of this species in the western North Atlantic based on stable isotopes.

Nurse Shark

This species should not be listed under Mackerel Sharks (Section B.1.4.3).

B.1.4.4: Requiem Sharks

Blacktip Shark

Additional information on blacktip shark nursery habitat can be found in Heupel and Hueter (2002), Heupel and Simpfendorfer (2002), Keeney et al. (2003), Heupel et al. (2004), Keeney et al. (2005), and Heupel and Simpfendorfer (2005a; 2005b).

Bull Shark

Additional information on bull shark life history and nursery habitat can be found in Tremain et al. (2004), Neer et al. (2005), and Simpfendorfer et al. (2005).

Dusky Shark

Age and growth information can be found in Natanson et al. (1995).

Lemon Shark

Additional life history information can be found in Sundstrom et al. (2001) and Barker et al. (2005).

Night Shark

Hazin et al. (2000) and Santana and Lessa (2004) provide additional information on reproduction and age and growth, respectively.

Spinner Shark

Additional life history information on the spinner shark can be found in Allen and Wintner (2002), Capape et al. (2003), Bethea et al. (2004), Carlson and Baremore (2005), and Joung et al. (2005).

Tiger Shark

More recent age and growth information on the tiger shark can be found in Natanson et al. (1999) and Wintner and Dudley (2000).

B.1.4.5: Sand Tiger Sharks

Sand tiger shark

Additional information on the sand tiger shark may be found in Gelsleichter et al. (1999) and Lucifora et al. (2002).

B.1.4.6: Whale Sharks

Additional life history information can be found in Chang et al. (1997), Colman (1997), and Wintner (2000).

B.1.4.8: Hammerhead Sharks

Bonnethead

Additional life history information can be found in Cortes et al. (1996), Cortes and Parsons (1996), Cortes et al. (1996), Carlson and Parsons (1997), Lessa and Almeida (1998), Marquez-Farias et al. (1998), Carlson et al. (1999), and Lombardi-Carlson et al. (2003).

B.1.4.9: Requiem Sharks

Atlantic Sharpnose Shark

Additional life history information can be found in Cortes (1995), Marquez-Farias and Castillo-Geniz (1998), Gelsleichter et al. (1999), Carlson and Baremore (2003), Hoffmayer and Parsons (2003), Loefer and Sedberry (2003), and Bethea et al. (2004).

Blacknose Shark

Additional life history information can be found in Carlson et al. (1999), Hazin et al. (2002), and Driggers et al. (2004a; 2004b).

Finetooth Shark

Additional life history information can be found in Carlson et al. (2003), Hoffmayer and Parsons (2003), and Bethea et al. (2004).

Smalltail Shark

Additional life history information can be found in Lessa and Santana (1998) and Lessa et al. (1999b).

B.1.5.1: Cow Sharks

Sixgill Shark

Additional life history information can be found in Ebert (2002) and McFarlane et al. (2002).

B.1.5.2: Mackerel Sharks

Porbeagle Shark

More recent life history information can be found in Francis and Stevens (2000), Jensen et al. (2002), Joyce et al. (2002), Natanson et al. (2002), Campana and Joyce (2004), and Francis and Duffy (2005).

Shortfin Mako Shark

Additional life history information can be found in Stillwell and Kohler (1982), Pratt and Casey (1983), Heist et al. (1996), Mollet et al. (2000), Campana et al. (2002), Estrada et al. (2003), Francis and Duffy (2005), Loefer et al. (2005), and MacNeil et al. (2005).

B.1.5.3: Requiem Sharks

Blue Shark

Additional life history and ecological information can be found in Kenney et al. (1985), Estrada et al. (2003), and Skomal and Natanson (2003).

Oceanic Whitetip Shark

Additional life history information can be found in Lessa et al. (1999a), Lessa et al. (1999c), and Whitney et al. (2004).

B.1.5.4: Thresher Sharks

Bigeye Thresher

Additional life history information can be found in Chen et al. (1997), Liu et al. (1998), and Weng and Block (2004).

Thresher Shark

New age and growth information can be found in Gervelis (2005).

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E.2 Response to OMB Peer Review by Gregory Skomal, Commonwealth of Massachusetts, Division of Marine Fisheries, December 21, 2005

Section 3.8.2: Standardized Reporting of Bycatch

The reviewer indicated that there was some confusion as to the various reporting programs for the different fisheries which harvest HMS. Additional clarification was added to the descriptions in the text.

Section 3.8.2.6: Recreational Handgear Fishery

The reviewer indicated that the catch and bycatch estimates derived from the programs used to monitor recreational landings of HMS have been questioned by members of the U.S. ICCAT Advisory Committee and that changes should be made to ensure that high standards of accuracy and precision are met. NMFS recognizes the desire to make improvements in the collection of recreational catch and landings data. At the request of NMFS, the NAS recently conducted a review of marine recreational fishery surveys, both state and federal. The review committee's report has been published and the Agency is evaluating the recommendations.

Section 3.8.5: Bycatch Mortality

The reviewer suggested that this section be augmented by adding estimates of bycatch and bycatch disposition on a fishery-specific basis. This information has been included for those fisheries where it is available and can be found in Section 3.4.

Section 4.1.2/Appendix A: Time/Area Closures

The review noted that the criteria must include objective, quantitative thresholds for bycatch reduction taking into account those factors listed under this alternative as well as status of the stocks, assessment information, and stock rebuilding schedules. In addition, the reviewer stated that discard reduction analyses should make every attempt to test hypotheses of effort redistribution while taking into account the potential influence of declining stocks.

NMFS does not believe that established quantitative thresholds for strict bycatch reduction percentages need to be created for specific time/area closures. Pre-determined target reduction goals for specific species are inappropriate because it does not consider the impact on the remaining portion of the catch. By not setting such thresholds, NMFS retains the flexibility of considering percent change of bycatch for all species before implementing a time/area closure. Consideration of the overall catch is critical when implementing a multispecies or ecosystem-based approach to management. Furthermore, while the Magnuson-Stevens Act provides NMFS the authority to manage all species, NMFS must balance the impacts of management measures on all managed species and may not choose protections for one species to the detriment of protected or overfished species (*e.g.*, NMFS may not choose to protect BFT even if sea turtle interactions may increase substantially). Under the approach preferred in this rulemaking (the criteria), NMFS can consider the largest range of alternatives when considering time/area closures. For example, if NMFS is given a specific goal (*e.g.*, a jeopardy conclusion regarding the PLL fishery and leatherback sea turtles), this flexibility outlined in the criteria allows NMFS to close certain areas or take other actions to protect that specific species while also protecting, to the extent practicable, the other species and the rest of the fishery. Absent this flexibility, NMFS might potentially have to implement more restrictive measures to protect one species causing potential cascade effects (*e.g.*, closing one area may increase the bycatch of another species, which could result in closing another area, etc.).

NMFS already considers the status of the stocks when implementing time/area closures. Closed areas like the Northeastern U.S. closed area, the mid-Atlantic shark closed area, and the Northeast Distant closed area were all implemented to address specific overfished or protected species. The other closed areas, while implemented to reduce bycatch in general, also considered the status of the stocks before implementation. In addition, considering the status of a stock is one criterion in the preferred alternative, B5.

NMFS currently does not test "hypotheses" of effort redistribution, but agrees that assumptions of the redistribution of effort need to be tested. To test this model, NMFS explored different assumptions regarding the movement of the PLL fleet and how more limited movements by the fleet may affect predictions regarding bycatch reduction. NMFS investigated the movement of the PLL fleet from 2001 through June of 2004 to see where vessels fished in relation to their reported homeports. This mobility analysis broke the Atlantic, Caribbean, and Gulf of Mexico into six distinct areas, with one area, Area 2, split along the west and east coasts of Florida (Areas 2A and 2B, respectively). Using GIS, NMFS plotted the locations vessels reported fishing (*i.e.*, made sets) in six different areas in relation to their reported homeport in order to determine the distance different vessels traveled. Overall, of the vessels that moved out of the Gulf of Mexico, the majority (80 percent in terms of hooks) moved out of the Gulf of Mexico (Areas 1 and 2A) into Area 6, the high seas, but other vessels also moved from the Gulf to the eastern seaboard. Conversely, a few vessels that fished along the eastern seaboard also moved into the Gulf of Mexico, although the movement was somewhat limited.

NMFS also investigated the physical characteristics of vessels to see if there were any differences in the vessels that reported fishing only in the Gulf of Mexico compared to vessels that reporting fishing out of the Gulf of Mexico. NMFS found no significant difference in the vessels' length ($t_{104} = 0.43$, $P = 0.35$) or vessels' horsepower ($t_{104} = 0.43$, $P = 0.66$) for vessels that fished only in the Gulf of Mexico versus those that fished out of the Gulf of Mexico. These results indicate that vessels that fish exclusively in the Gulf of Mexico have the physical capability (in terms of vessel size and horsepower) to fish outside of the Gulf of Mexico. Furthermore, despite the upgrading restrictions, this indicates that the Gulf of Mexico vessel owners could sell their permits to fishermen who may want to fish outside the Gulf of Mexico.

Based on these analyses, NMFS evaluated different scenarios of the redistribution of effort model where each scenario had a different assumption regarding where effort from a closure would be displaced. NMFS calculated redistribution of fishing effort only to open areas along the eastern seaboard for a closure in the Northeast [B2(b)]. NMFS also redistributed fishing effort in the open areas of the Gulf of Mexico and Area 6 for two closures in the Gulf of Mexico [B2(a) and B2(c)]. Taken with the results of not considering redistribution of effort to the full effort redistribution model, these additional scenarios provide estimates of changes in bycatch and retained catch somewhere in-between the two base scenarios (*i.e.*, some movement is expected, and thus, some redistribution of effort is expected into a particular area (in this case, Area 6)). However, these additional scenarios assume that the same amount of effort is moved out of the Gulf of Mexico regardless of the size of the closure in the Gulf of Mexico, when in reality, larger closures may result in more movement out of the Gulf of Mexico. These scenarios also assume that fishermen do not relocate, possibly due to community ties to unloading docks, processing plants, etc. However, it should be noted that while fishermen may prefer not to disrupt ties to their communities, the 2001-2004 HMS logbook data indicate that fishermen from the Gulf of Mexico already fish outside of the Gulf of Mexico. If a large closure were implemented in the Gulf of Mexico, it is likely that additional fishermen would move their fishing locations or sell their permits rather than go out of business. However, in the future, NMFS intends to investigate the choices fishermen have made regarding previous closures (*i.e.*, did they move, sell their permits, go out of business, retain their permit but fish for something else, etc?). This type of analysis could help NMFS improve the effort redistribution models used in the future.

The reviewer also noted that there was an inconsistency between the percent reduction of BFT discards reported in Table 4.6 and Table 4.11 of the Draft HMS FMP. For alternatives B2(d), B2(e), and B2(a)/B2(b)(year round) the former listed -3.3%, 5.7%, and -24.3% respectively; these were reflected in the text. However, Table 4.11 reported different values of 38%, -40.7%, and -19.1%, respectively. Two of these values countered the arguments presented in the text. NMFS found that the values reported in Table 4.6 were incorrect and the values listed in Table 4.11 of the Draft HMF FMP were correct. NMFS has corrected these discrepancies in the tables and the text of the Final HMS FMP. However, these changes did not affect the overall conclusions.

Chapter 10/Appendix B: Essential Fish Habitat

<u>Section 10.2.1.: Descriptions of Dataset Used in the Review</u>

The reviewer noted that two data sources were conspicuously absent: the NEFSC Longline Shark Survey conducted by the NMFS Apex Predators Investigation, and the CETAP (Cetacean and Turtle Assessment Program) survey which would be particularly important for shark species not normally taken in fisheries such as the basking shark. The NEFSC Longline Shark Survey data was included in the data compiled during the review, but was labeled as Cooperative Shark Tagging Program (CSTP). Thus all shark data collected during the NEFSC Longline Shark Survey were included (C. McCandless pers. comm.). The CETAP survey was not obtained but references have been included in the life history section for basking sharks.

Section 10.2.2: Methods Used to Map and Analyze EFH Data

It was unclear to the reviewer how the grid used to plot data for each of the species would be used to designate EFH. As described in the FMP, the grid has a dual purpose, to allow the viewer to distinguish between low and high number of observations which would be difficult with point data only, and to serve as a guide for potential future modifications to EFH boundaries. The grid could be used to include or exclude a given number of observations per 100 nm^2 area in the EFH boundary. NMFS could establish criteria for each species and use the grid to decide whether to include or exclude those areas. This would allow NMFS to consider different alternatives for EFH boundaries based on different criteria. For example, in Amendment 1 to the FMP, criteria (presented here for reference only) for including or excluding a given number of observations per square were established for each species based on the status of the stock, and used as a guide to identify appropriate EFH areas. For a rebuilt species like blacktip shark, a criteria of greater than 10 observations per 100 nm^2 was used to help identify and map areas as EFH. For an overfished species such as finetooth shark, a more precautionary criteria of > 1 observation per 100 nm^2 was used to help identify and map EFH areas. Thus, the grid might be used in a future rulemaking to analyze potential alternatives based on including or excluding a specific number of observations per 100 nmi^2 area.

Section 10.3: Summary of Review and Findings

Based on the reviewer's comment, the reference to the McCandless et al. (2002) study was modified to note that 15 separate research studies were conducted from Massachusetts to Texas, not New York to Texas. The reviewer commented that the document seemed to imply that new EFH had been designated based on recent information, contrary to what was stated in the Introduction that EFH was not being modified in this FMP. NMFS did not mean to imply that EFH was being modified in this FMP. Rather, NMFS was attempting to provide NOAA technical reviewer's comments and concerns regarding the existing EFH boundaries and whether they considered changes to EFH to be warranted. In some cases the reviewers seemed to indicate that this was the case, but NMFS did not mean to imply that those changes would be made in this FMP. Any references to EFH being modified have been clarified to indicate that no changes are being made at this point.

Section 10.3.2: Swordfish

The reviewer noted that references to juvenile swordfish in the vicinity of Long Island Sound would need to be substantiated. NMFS agrees, and has asked NMFS technical experts to confirm whether they consider the datapoints to be valid. NMFS is awaiting a response from the NMFS technical experts, and would make any necessary changes prior to amending any swordfish EFH boundaries.

Appendix B: Essential Fish Habitat

The peer reviewer noted that many of the references in the life history section had been updated or replaced with new or more applicable research findings. NMFS incorporated all references provided by the peer reviewer in the life history section.

E.3 Peer Review by Chris Boggs and Keith Bigelow, NMFS SWFSC, January 9, 2006

GENERAL COMMENTS:

This consolidated FMP is a mammoth undertaking. The breadth and detail of the information that has been reviewed considered and presented is staggering. The quality of the data information is highly variable and the document does a good job of indicating problems and issues with data sources, and with the appropriateness of their application to management measures. And the document identifies the many areas that require improvement in information and management alternatives based on future study and deliberation. The greatest limitations to the overall products reviewed by PIFSC seems to be in the closed area alternatives, but this is to be expected. The other sections reviewed by PIFSC do not lead directly to management decisions that immediately affect fishery operations.

The section on bycatch could be improved by some clarification of terminology (as indicated in the specific comments). A few areas of information regarding bycatch mortality appear to have been missed, but the document is a comprehensive and thorough compendium of our current position in terms of knowledge and application to management issues as well as the needed direction for improvement. The theory behind establishing a standardized methodology for precision and accuracy in bycatch estimation exceeds the practice, which has been slow to develop and thus is not extensively covered. However the agency is hamstrung by lack of resources even to conduct analyses of cost/improvement ratios in any but a few fisheries, let alone to increase the myriad of observer and other monitoring programs that would be required for all fisheries. Documenting the present status of this effort is the appropriate first step for the FMP, which can present no more than what is the best available information.

The section on area closures presented the most difficulty and the specific comments may prompt clarification of the presentation. The rationale for the preferred alternatives could use strengthening where indicated. It is clear that a very large amount of information and comment was considered and a host of differing objectives had to be balanced. This will always produce choices which reflect compromise. The rationale for some of these choices appears to need some bolstering, especially as they face challenge from specific interest groups.

The section on EFH benefits from a greater wealth of published scientific information than the other sections, and results in no specific management alternatives to be considered at this time. The one identified area for future consideration appropriately awaits further data collection (bottom longline impacts on reef habitat). The rationale for expecting little impact of the fisheries on EFH at present is convincing. The issues for this section revolve around the practice of EFH designation, and these issues are well described and critiques from previous reviews made available. To be more thorough on scientific content this section would have to become encyclopedic, which would not be appropriate to its purpose. Possible errors for one species (specific comment) stood out only because of the focus by the PIFSC on the habitat of this species. The coverage of coastal anthropogenic effects on the HMS EFH is much more thorough than in our FMP for the central and western Pacific…but that seems appropriate given the greater ratio of coasts to ocean.

SPECIFIC COMMENTS:

Bycatch

3.8
Regarding the 2nd par:

"The national goal of the Agency's bycatch plan activities is to implement conservation and management measures for living marine resources that will minimize, to the extent practicable, bycatch and the mortality of bycatch that cannot be avoided. Inherent in this goal is the need to avoid bycatch, rather than create new ways to utilize bycatch. The plan also established a definition of bycatch as fishery discards, retained incidental catch, and unobserved mortalities resulting from a direct encounter with fishing gear."

Fishery Councils may disagree that utilization (and thus reduction) of bycatch is not a valid goal under Magnusson. Can the statement to the contrary be supported more thoroughly?

And in the next section

3.8.1 Bycatch Reduction and the Magnuson-Stevens Act

"The Magnuson-Stevens Act defines bycatch as fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic and regulatory discards. Fish is defined as finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds. Seabirds and marine mammals are therefore considered 'incidental catch.'"

Rather than re-visit here all the discussion about the National Plan's different (from Magnuson) definition of bycatch, it is suggested that the text avoid using incidental catch in two contradictory ways in two succeeding paragraphs. There are clearer and widely-used terms for catch of seabirds and marine mammals, such as "takes of protected species" or "protected species interactions". NOAA Fisheries claims important successes in reducing bycatch" when referring to reductions in seabird and mammal takes, and can continue to do so in a broadly understood use the term "bycatch". But it isn't a broadly understood that "incidental catch" to refer to protected species. "Incidental take" might be better understood.

Next par

"National Standard 9 of the Magnuson-Stevens Act requires that fishery conservation andmanagement measures shall, to the extent practicable, minimize bycatch and minimize the mortality of bycatch that cannot be avoided. In many fisheries, it is not practicable to eliminate all bycatch and bycatch mortality. Some relevant examples of fish caught in Atlantic HMS fisheries that are included as bycatch or incidental catch…"

Should turtles also be listed as examples? They were includsed as fish bycatch under Magnuson-Stevens (was this changed recently?) and some of the subsequently listed options for bycatch reduction in this section are specific to turtles and have no documented utility for reducing any other bycatch (e.g. large circle hooks reduce turtle bycatch, but otherwise reduce mostly injury or mortality of other bycatch).

Then in a following par

"Therefore, to totally eliminate bycatch of all non-target species in Atlantic HMS fisheries would be impractical. The goal then is to minimize the amount of bycatch to the extent practicable and minimize the mortality of species caught as bycatch."

This statement is laudably practical, and such a statement was requested in the council/public reviews. However, the statement and the preceding discussion leave moot the issue of whether incidental takes of protected species (or just "fish" including [?] turtles) are addressed by the statement. The latter (just fish bycatch) is implied by the heading "Magnuson-Stevens" but the preceding section mentioned broader issues, and the mention of incidental takes in this section implicates protected species due to the use of incidental takes to refer to them in the previous section.

3.8.2 Standardized Reporting of Bycatch

"The National Bycatch Report (NMFS, 2004a) contains an indepth
examination of the issues of precision and accuracy in estimating bycatch. Precision of an estimate refers to its variability, or how repeatable the estimate is. The more precise an estimate is, the less variable it is. Precision of estimates is usually expressed in terms of a statistical value, the coefficient of variation (CV) of the estimate (NMFS, 2004a), which is the ratio of the square root of the estimate (also known as the standard error) to the estimate itself."

Both yellow highlighted words should be "variance". I'm not sure the blue highlighted captures the proper meaning. Marti McCracken (PIFSC mathematical statistician) provided the following, more rigorous explanation which might avoid some criticisms regarding your use of "variability" (for your consideration).

"The National Bycatch Report(NMFS, 2004a) contains an in depth examination of the issues of precision and accuracy in estimating bycatch. Accuracy refers to the closeness between the estimated value and the (unknown) true value that the statistic was intended to measure. Precision refers to how closely multiple measurements of the same statistic cluster to one another when obtained under the same protocol. The more precise an estimate is the tighter the cluster. The precision of an estimate is often expressed in terms of the coefficient of variation (CV) defined as the standard error of the estimator divided by the estimate. A precise estimate is not necessarily an accurate estimate."

One might add that "A more precise estimate is more easily distinguished from a second estimate (different time, place, treatment, etc) especially when they are close in value. Testing hypotheses about changes or differences from reference values or limits is the motivation for our interest in the precision and accuracy of bycatch estimates. We frequently need to evaluate whether or not bycatch is altered by events or actions.

Three pars down the document states:

"The CV of an estimate can also be reduced and the precision increased by increasing sample size.

Delete the highlighted "also" which is confusing because no other means of improving CV has yet been mentioned. The prior paragraph listing of randomization, stratification, sampling allocation, and testing for bias pertain to "while striving to achieve accuracy" not to precision. Balancing "precision goals and the least amount of observation effort" is basically the issue of what sample size (= precision) one can afford.

In the following paragraph:

"While the relationship between precision and sample size is relatively well known (NMFS, 2004), the relationship between sample size and accuracy is not so easily determined."

It might be better to say "is not reliable" or "can often be complex" to better anticipate the following paragraph. More samples can mean more or less accuracy. For example, when observer coverage is increased late in a season to catch up to a target level of coverage, the increased sample size may reduce accuracy if not properly stratified and weighted.

3.8.2.3 *Shark Bottom Longline Fishery*

The par starting with "Effective August 1, 2001 …" is u necessarily reproduced in full in the following Section 3.8.2.4.

3.8.4 Evaluation and Monitoring of Bycatch

3rd par. Fix "estimated…estimates". It seems overly cautious to apologize for a lack of bycatch estimates in harpoon fisheries. How does one harpoon an unwanted catch? A proper approach is used under mortality in the next section and should be used here as well.

3.8.5 Bycatch Mortality

3.8.5.2 Mortality by Fishery

Pelagic longline Last sentence says to see section 3.4.1 for more information, inferring more information will be found there on "hook location, trailing gear and injury status of protected species interactions". I couldn't find that information in section 3.4.1 (did I miss it somewhere?). There is a literature on estimating turtle longline mortality, including US policies for estimating turtle mortality from hook location and trailing gear, and extensive tagging studies of post-release mortality, that could be cited and discussed. This lack is particularly at odds with the detailed discussion given on tagging study of released fish mortality below in the recreational handgear section. Nor is the turtle bycatch condition (alive/dead) or estimated post-release mortality covered in the ESA section which follows…where some information on marine mammal and seabird mortality is provided. Turtles seem to be given comparatively short shrift. The longline turtle bycatch mortality estimation also relies on gear configuration (i.e. shallow and deep setting). And the illustration of longine gear configuration in Section 3.4.1 taken from the Honolulu Advertiser (p.3-89) may be misleading in several ways. For one, this illustration has a strong vertical exaggeration/horizontal compression that gives a "wall of death" impression of the gear configuration. There are better technical illustrations of longline gear configuration in the literature. Second, none of the 5 types of US longline fishing described underneath the figure is close to the illustrated "tuna set" configuration. The latter best describes certain Asian and European fleets in the Atlantic, but not the US. This should be made clear. In a world context, all of the U.S. fisheries (except maybe the Carribean fishery?) are relatively shallow compared with Asian tuna longline fishing.

Purse Seine Fishery
This section is hard to believe. There are huge finfish bycatch mortality issues in Pacific tuna purse seines. The fish can not be easily released alive. Small fish are gillnetted by the mesh and larger ones smothered in the brail. There is an active research program in Europe looking for grids or gratings that can release purse seine bycatch that could be referenced. Pacific purse seine fisheries bycatch of small bigeye and yellowfin tunas is a major cause of overfishing, and there are also huge discarded (dead) bycatches of mahimahi, sharks, and other finfishes documented in IATTC reports. Why assume that discards are small and can easily be released in the U.S. Atlantic purse seine fishery for bluefin? Is it a very different operation? Explain.

Bottom Longline Fishery
Shark Gillnet Fishery Again both of these sections refer the reader to section 3.4.?.? for more information but there is no information on mortality in the cited sections.

4.1.2 Time/Area Closures

Alternative B1 is to maintain the existing time/area closures; no new time/area closures (No Action). There are no tables which present the results from Alternative B1. Isn't this necessary as some of the closures were not in effect (e.g. Mid-Atlantic Closure (effective Jan. 1, 2005, Northeast Distant Restricted (effective June, 30, 2004)) for the entire 2001−2003 period? Maybe these closures are for non-Pelagic fishing. Additionally, on p. 4-21 it says "To determine the effectiveness of the current closures, NMFS compared data prior to implementation of the closed areas (1997−1999) with effort and catch rates from 2001−2003 for various species". I couldn't locate this comparison or a reference. As such this would be a different comparison then Alternatives B2−B7 which compare catch and effort from 2001 to 2003.

Statistical validity − under-reporting in logbooks, assumptions on the redistribution of fishing effort and CPUE. Perhaps the following is addressed in additional documentation, but these are concerns regarding the presented statistics and associated assumptions for the catch and effort analyses. While I realize that the time-frame of a final FMP is rapidly approaching, perhaps the statistical validity of some of these concerns can be better documented or referenced.

Two data sources are used – the Pelagic Observer Program (POP) data and Pelagic Longline Logbook [HMS logbook] data. There is no doubt that various species will either be non-reported or under-reported in logbook data. Figures 4.1 through 4.8 clearly illustrate difference in interaction rates between PPL and POP sets. A comparison of Table 4.5 and 4.6 (A.7) indicates that the percent reduction for most species is greater with the Pelagic Longline Logbook data than Observer data which may have led to the statement for Alernative B2(a) that "the percent reductions in most bycatch were similar for the observed and reported data, and for the year-round versus May through November closures (4−26)". This is counter-intuitive given the comparison of Figures 4.1−4.8, but may relate to spatio-temporal effects. Is there any analysis or reference by NMFS which compares observer and logbook data for observed longline sets? The absolute numbers and percent reductions for bycatch species using logsheet data would correspond to a minimum value given difficulties associated with under-reporting. In contrast, the percent reductions/increases for retained species are probably more realistic as they are more accurately reported in logbooks.

The assumptions on redistribution of effort and application of corresponding CPUE values are problematic. The current model assumes that effort will be uniformly distributed into all remaining ocean areas. Is a uniform distribution a valid assumption, or could other more plausible assumptions be considered? Specifically, if a portion of the Gulf of Mexico (GOF) is closed, is it reasonable to redistribute effort within open areas of the GOF as well as the Atlantic? While I'm not familiar with longline fleet movements under this FMP, do the fleets routinely move between the GOF and Atlantic and vice-versa? As noted periodically throughout the document, there are interactions that increase due to closed areas because interaction rates are higher in the open areas (e.g. loggerhead turtles). While the uniform distribution is easy to comprehend, could another redistribution scenarios be considered to redistribute effort in the same ocean basin?

The CPUE values are estimated as the number of animals per 1,000 hooks. I could not locate any reference as to how CPUE indices were constructed given a prevalence of zero observations. Given that some animal interactions (e.g. bluefin tuna, sea turtles) represent rare events it would be better to represent the redistribution of effort and corresponding CPUE by a statistical sub-sampling technique rather than a mean CPUE. This would also provide corresponding confidence intervals for bycatch reduction, albeit it is still based on the aforementioned logbook data with potential under-reporting.

I couldn't locate any objectives or decision matrix in deciding on the preferred HMS alternatives. Most of the decisions seem to correspond to a percentage of reduction/increases for retained species/bycatch and associated economics. Perhaps consider a re-evaluation of those alternatives that represent a moderate closed area, such as B2(a) and B2(f) which provide substantial bycatch reduction of white and blue marlin, sailfish and sea turtles. With the redistribution of effort, these areas could have resulted in negative ecological impacts with increased discards of swordfish, bluefin and bigeye tuna. Do the negative impacts result from a redistribution to the Atlantic and associated higher catch rates?

The rational for preferred alternative B4 and benefit to HMS species appears extremely vague. Alternative B4 implements complementary HMS management measures in Madison-Swanson and Steamboat Lumps Marine Reserves. There is no indication as to the spatial size of such reserves (it's not illustrated on any of the maps) and curiously there is the statement that "any positive ecological impacts on HMS are expected to be minimal (4-34)". Again, I'm not familiar with Gulf issues, but if this is a gag grouper issue why can't the Gulf Council enact appropriate regulations as the gag grouper problems and pelagic fishing exploitation appear mutually exclusive?

Preferred alternative B5 appears straightforward, but I'm not certain that it adds much more to the status quo. Doesn't the current FMP have criteria for regulatory framework adjustments for closures, given the fact that closures currently exist?

Appendix A was a very necessary appendix for following the discussion in section 4.1.2.

Chapter 10 – see general comments

Appendix B – see general comments

B.1.1.2 Atlantic Bigeye Tuna (Thunnus obesus)
Regarding "Although its distribution with depth in the water column varies, it is regularly found in deeper waters than are other tuna - to a depth of 250 m." As a Pacific expert this seems surprising to me, since archival tag data show routine behavior to 400 m and deeper, and much older studies also indicate these depths as part of the habitat in the Pacific.

Habitat associations see the IATTC proceedings on the World Bigeye Tuna workshops. There is an extensive literature on dissolved oxygen and temperature as the limiting factor on bigeye tuna depth distribution. Since it is a world meeting with a review for each ocean it may cover differences between oceans that could satisfactorily explain this discrepancy.

E.4 Response to OMB Peer Review by Chris Boggs and Keith Bigelow, NMFS SWFSC, January 9, 2006

General Comments: Bycatch

The reviewers indicated that this section could be improved by some clarification of terminology which they included in the specific comments. These clarifications have been made as suggested.

General Comments: Time/Area

In the general comments section the reviewers noted that the rationale for the preferred alternatives could use strengthening where indicated as well as the rationale for some of these choices appears to need some bolstering, especially as they face challenges from specific interest groups. NMFS used Chapter 2 of the Final HMS FMP to better explain the rationale for the alternatives that were further analyzed. In addition, NMFS used Chapter 4 to clarify reasoning for the preferred alternatives and conducted additional analyses in response to comments from different interest groups.

Specific Comments:

3.8 Bycatch

The reviewer's suggested edits have been incorporated where applicable.

3.8.5.2 Mortality by Fishery

Pelagic Longline

The reviewer's noted that the cross-references for further information did not provide the information as stated. In general, these sections have been revised under Section 3.4 to be more concise and inclusive. The reviewer's suggested that the illustration of longline gear configuration in Section 3.4.1 may be misleading in that it has a strong vertical exaggeration/horizontal compression. NMFS agrees that this illustration may not be representative of how all U.S. longline gear is configured and that it was intended to only portray the gear in a general sense. Additional illustrations of all possible combinations of longline gear configuration would have been confusing to the reader.

Purse Seine Fishery

The reviewer's raised concerns regarding bycatch issues in the Atlantic BFT purse seine fishery by comparisons to the Pacific tuna purse seine fishery. Finfish bycatch and protected species interactions in the Atlantic purse seine fishery have not been an issue to date and the scope of the fishery is limited to only five vessels, whereas there are over one hundred purse seine vessels listed in the 2005 LOF for the Pacific tuna fishery.

Bottom Longline Fishery

The reviewer's noted that the cross-reference for further information did not provide the information as stated. In general, these sections have been revised under Section 3.4 to be more concise and inclusive.

4.1.2 Time/Area Closures

The reviewers stated that there were no tables which presented the results from Alternative B1. The reviewers felt that this was necessary and questioned whether some of the closures were not in effect (e.g. Mid-Atlantic Closure (effective Jan. 1, 2005, Northeast Distant Restricted (effective June, 30, 2004)) for the entire 2001−2003 period.

In the no action alternative, B1, NMFS evaluated the effect of the June Northeastern U.S. closure (effective June 1, 1999), the DeSoto Canyon (effective November 1, 2000), the Charleston Bump and Florida East Coast closures (effective March 1, 2001), and the Northeast Distant closed area (effective July 9, 2002, modified July 6, 2004). The Northeast Distant area is currently a restricted fishing area with specific gear requirements (69 FR 40734, July 6, 2004). Since most of the time/area closures were implemented in 2001 or earlier, data from 2001 - 2003 provided the basis for evaluating the effectiveness of the closures. NMFS did not re-evaluate the mid-Atlantic shark closure because, as described in the response to a petition for rulemaking from the State of North Carolina (October 21, 2005, 70 FR 61286), the closure was first effective in 2005, and NMFS did not have any additional information on which to change the conclusions of the rulemaking that established the closure (December 24, 2003, 68 FR 74746). In addition, this is the only closure that is for bottom longline gear; the rest of the closures are for pelagic gear. In the Draft HMS FMP Tables 4.7, 4.8, 4.9, and 4.10 showed the results the analysis for alternative B1. NMFS has also made sure to reference the appropriate tables in Chapter 4 of the Final HMS FMP.

The reviewers also noted that they could not locate the comparison of data prior to implementation of the closed areas (1997−1999) with effort and catch rates from 2001−2003 for various species, which NMFS used to evaluate the effectiveness of the current time/area closures. As noted above, Tables 4.7, 4.8, 4.9, and 4.10 showed the results the analysis for alternative B1 in the Draft HMS FMP. In the Final HMS FMP, NMFS clarified the references to these tables.

The reviewers also noted concerns regarding underreporting in logbooks and how this would affect the assumptions on the redistribution of fishing effort and catch-per-unit-effort (CPUE). NMFS is aware that discards may be underreported in the HMS logbook data compared to the POP data. However, NMFS tested to see if there were any differences in underreporting for different species between different regions. If no differences in underreporting occurred between regions, then the relative effect of each closure on bycatch reduction for each species should be comparable across alternatives. In order to test this, NMFS compared HMS logbook data to POP data for a dataset provided by Cramer (2000), which compared dead discards from HMS logbook and POP data. In her paper, Cramer used POP data to estimate dead discards of undersized swordfish, sailfish, white and blue marlin, and pelagic sharks from the PLL fishery operating in the U.S. Atlantic, Caribbean and Gulf of Mexico. Cramer (2000) provided the ratio of catch estimated from the POP data divided by the reported catch in the HMS logbooks. This ratio indicated the amount of underreporting for different species in a given area. NMFS analyzed the ratios in Cramer (2000) to test whether underreporting varied for different species in different parts of the Atlantic, Caribbean, and Gulf of Mexico. NMFS used a Kruskal-Wallis test (a non-parametric test equivalent to a parametric Analysis of Variance) to account for small sample sizes and non-normally distributed data. NMFS found that there was no difference in the ratio of estimated catch versus reported catch for undersized swordfish, sailfish, blue marlin, white marlin, or pelagic sharks (undersized swordfish: Chi-square=3.63; *d.f.*=5; *P*=0.60; sailfish: Chi-square=1.72; *d.f.*=5; *P*=0.89; blue marlin: Chi-square=3.89; *d.f.* =5; *P*=0.57; white marlin: Chi-square=2.97; *d.f.* =5; *P*=0.70; pelagic sharks: Chi-square=4.78; *d.f.* =5; *P*=0.44). Therefore, there were no differences in underreporting between the POP and HMS logbooks for the different species in the Atlantic, Caribbean, or Gulf of Mexico. Based on the available information, NMFS believes HMS logbooks may underestimate the amount of bycatch, however, the relative effect of each closure for each species should be comparable across alternatives. While the data used in the Cramer (2000) study represented an earlier time period (1997-1998) compared to the 2001-2003 data used here, it gives some indication that the use of HMS logbook data over POP data should not invalidate or bias the results of the time/area analyses.

In addition, the reviewers noted that a comparison of Tables 4.5 and 4.6 in the Draft HMS FMP indicated that the percent reduction for most species is greater with the HMS logbook data than POP data, which may have led to the statement for alternative B2(a) that "the percent reductions in most bycatch were similar for the observed and reported data, and for the year-round versus May through November closures..." The reviewers stated this was counter-intuitive given the comparison of Figures 4.1−4.8, but may relate to spatio-temporal effects. It must be noted that the POP data only represents, on average, effort of approximately five percent of the PLL fleet, and extrapolated takes were not estimated in the Draft HMS FMP. While the POP data may more accurately report all of the bycatch associated with a given trip, it does not represent the entire PLL fishing effort. And, while underreporting may be occurring for certain species in the HMS logbooks, the HMS logbooks represent all of the PLL effort by the U.S. Atlantic PLL fleet; therefore, in absolute terms, the HMS logbook data would give the highest number of discards, and thus, the highest amount of bycatch reduction for analyses without the redistribution of effort. While the number of sets observed in the POP is much lower than the total reported sets in the HMS logbook, the relative percent reductions in bycatch were similar regardless of the dataset used.

The reviewers also asked if there was any analysis or reference by NMFS which compares POP and HMS logbook data for observed longline sets. The reviewers noted that the absolute numbers and percent reductions for bycatch species using logbook data would correspond to a minimum value given difficulties associated with underreporting. In contrast, the percent reductions/increases for retained species were probably more realistic as they are more accurately reported in logbooks. NMFS agrees that underreporting for bycatch may occur in logbook data whereas underreporting of target catch may occur in POP data. NMFS chose to use HMS logbook data for all the analyses so as to maintain consistency among the alternatives and species. If NMFS were to have used the POP data for all of the species, NMFS would have had to calculate extrapolated takes for all the species considered. NMFS felt that this extrapolation would introduce more assumptions and uncertainty than using HMS logbook data to analyze the potential impacts of time/area closures. And, if, in fact, retained catch is underreported in the POP data, then NMFS would have had the same problem with the retained catch as the reviewers noted with bycatch with in HMS logbook data. Additionally, if the maximum bycatch reductions would be seen using POP data, then the maximum bycatch increases would also be seen using POP data once extrapolated takes were calculated and redistribution of effort was considered. Therefore, NMFS felt that the relative effect of each closure could best be attained with the HMS logbook data in terms of predicted changes in bycatch, discards, and retained catch. In addition, NMFS was able to introduce the least amount of uncertainty and assumptions using HMS logbook data over extrapolated POP data. NMFS will continue to investigate potential differences in reporting between HMS logbook and POP data for all discarded species as well as potential biases in reporting between geographical areas for different species.

The two reviewers also stated that the assumptions on redistribution of effort and application of corresponding CPUE values were problematic. They asked if a uniform distribution is a valid assumption, or could other more plausible assumptions be considered? Specifically, they asked if a portion of the Gulf of Mexico is closed, is it reasonable to redistribute effort within open areas of the Gulf of Mexico as well as the Atlantic? They also asked if the fleets routinely move between the Gulf of Mexico and Atlantic and vice-versa?

Finally, they noted that while the uniform distribution is easy to comprehend, could another redistribution scenario be considered to redistribute effort in the same ocean basin?

NMFS explored different assumptions regarding the movement of the PLL fleet and how more limited movements by the fleet may affect predictions regarding bycatch reduction. As explained in the response to the Skomal review, NMFS investigated the movement of the PLL fleet from 2001 through June of 2004 to see where vessels fished in relation to their reported homeports using 2001-2004 HMS logbook data. Based on these analyses, NMFS evaluated different scenarios of the redistribution of effort model where each scenario had different assumptions regarding where effort from a closure would be displaced. Taken with the results of not considering the redistribution of effort to the full effort redistribution model, these additional scenarios provide estimates of changes in bycatch and retained catch somewhere in-between the two base scenarios (*i.e.*, some movement is expected, and thus, some redistribution of effort is expected into a particular area).

The reviewers claimed that the CPUE values were estimated as the number of animals per 1,000 hooks. The reviewers stated that they could not locate any reference as to how CPUE indices were constructed given a prevalence of zero observations. Given that some animal interactions (e.g. BFT, sea turtles) represent rare events, the reviewers felt that it would be better to represent the redistribution of effort and corresponding CPUE by a statistical sub-sampling technique rather than a mean CPUE. The reviewers stated that this would also provide corresponding confidence intervals for bycatch reduction, albeit it would still be based on the aforementioned logbook data with potential underreporting.

NMFS believes that the reviewers misunderstood how the logbook data were analyzed to evaluate the current/time area closures and to determine the effect of all the proposed closures. To select areas for proposed closures, NMFS initially analyzed both absolute numbers of discards as well as areas of highest catch and CPUE (number of animals per 1,000 hooks) for non-target HMS and protected resources (white marlin, bluefin tuna (BFT), and sea turtles). In some cases these areas overlapped, in others, they did not. This may be due to the fact that there are localized areas of high CPUE that may not necessarily represent the areas of highest bycatch in terms of absolute numbers. In order to avoid underestimation of bycatch reduction, in cases where the highest CPUE did not overlap with the areas of highest absolute numbers of discards, NMFS decided to further analyze the area that had the highest overall discards (in absolute terms), rather than areas with the highest CPUE. Thus, NMFS selected proposed closed areas and based the redistribution of effort analyses on absolute numbers to maximize the reduction in overall number of discards.

To analyze the effect of current closures, the reported catch and discards for each species and the number of hooks set were pooled by month. In a few of the tables that reported the results of the current time/area closures the number of hooks were presented as "Number of hooks set (x1000)"; NMFS believes that this led to the confusion where the reviewers thought CPUE were calculated as the number of animals per 1,000 hooks. In these tables, however, the number of hooks was meant to be multiplied by 1,000 to calculate the total monthly number of hooks; these numbers were not standardized by 1,000 nor were CPUEs or the number of animals captured per 1,000 hooks calculated in the tables. Instead, the monthly and annual Atlantic wide totals ~~s~~ catch and discards were calculated for each species. In the Final HMS FMP, NMFS has clarified in the text that absolute numbers were used for all analyses and refrains from using the term “catch rates,” except where only appropriate. In addition, NMFS clarified the table legends so that it is clear that the numbers of hooks presented in the table are meant to be multiplied by 1,000. Therefore, the statistical sub-sampling and corresponding confidence intervals for bycatch reduction do not apply.

The reviewers stated that they could not locate any objectives or decision matrix in deciding on the preferred HMS alternatives. The reviewers felt that most of the decisions seem to correspond to a percentage reduction/increase for retained species/bycatch and associated economics. While not a formalized decision matrix, NMFS used the analyses in time/area closure section, which considered all species, to evaluate the effects of the proposed time/area closures, including all species for a combination of closures. NMFS used the results of the analyses to guide the Agency in determining which management measures are appropriate at this time. NMFS, however, cannot place more value on one species over another species and believes that setting pre-determined or pre-set reduction goals in bycatch and/or discards would compromise NMFS’ ability to consider multiple species. However, the present criteria do not preclude NMFS from considering the establishment of a more formalized decision matrix in the future if such a matrix could be designed that would provide for the flexibility to consider all the species involved. This may be more appropriate when NMFS has a longer temporal dataset on the simultaneous effect of circle hooks and the current time/closures. At this time, NMFS believes that the criteria contained in the preferred alternative B5 provides the guidance needed, consistent with the Magnuson-Stevens Act and this FMP, to help NMFS make the appropriate decisions regarding the use of time/area closures in HMS fisheries.

The reviewers stated that NMFS should consider a re-evaluation of those alternatives that represent a moderate closed area, such as B2(a) and B2(f), which provide substantial bycatch reduction of white and blue marlin, sailfish, and sea turtles. The reviewers also asked if the negative impacts resulting from these closures could have been from redistribution of effort into the Atlantic and associated higher catch rates. NMFS considered a range in closures both in time and spatial size. NMFS re-evaluated the impact of B2(a) with redistribution of effort in the Gulf of Mexico only as well as redistribution of effort in the Gulf of Mexico and into an area outside of the Gulf of Mexico (*i.e.*, Area 6; see response to the Skomal review) that NMFS has shown vessels from the Gulf of Mexico currently fish in. With redistribution of effort in the Gulf of Mexico only, NMFS predicted increases in sailfish discards (1.8 percent or 18 discards/over three years; annual estimates can be obtained by dividing by three), spearfish discards (3.3 percent or 14 discards/over three years), pelagic shark discards (0.3 percent or 112 discards/over three years), large coastal shark discards (3.6 percent of 598 discards/over three years), swordfish discards (4.4 percent or 1,635 discards/over three years), yellowfin discards (22.3 percent or 1,224 discards/over three years), bigeye tuna discards (0.4 percent or 4 discards/over three years), and BAYS tuna discards (1.0 percent or 91 discards/over three years). With redistribution of effort in the Gulf of Mexico and Area 6, NMFS predicted increases in sailfish (4.7 percent or 61 discards/over three years), pelagic sharks (4.4 percent or 834 discards/over three years), BFT discards (1.6 percent or 35 discards/over three years), and BAYS tuna discards (0.7 percent or 70 discards/over three years). Therefore, increases in bycatch are predicted from the redistribution of effort into the Atlantic as well as the Gulf of Mexico. Given the potential negative ecological impact of B2(a) under the different redistribution of effort scenarios, NMFS is not preferring alternative B2(a) at this time.

NMFS did not further analyze alternative B2(f) as outlined in Chapter 2. When redistribution of fishing effort was considered, a seven-month closure for alternative B2(f) was predicted to result in an increase in the number of swordfish, BFT, and bigeye tuna discards (2,081, 219, and 150 discards over three years for the seven-month closure, respectively). NMFS compared possible reductions and increases of discards and retained catch with the redistribution of effort for B2(f) with results from other closures. For instance, B2(f) is larger in size than B2(a). Thus, NMFS would expect a greater ecological benefit in terms of bycatch reduction from the larger B2(f) closure rather than the smaller B2(a) closure. However, the model predicted comparable results in terms of bycatch reduction between B2(a) and B2(f). In addition, B2(a) would not have resulted in as many BFT discards or potentially had as large of a negative economic impact in terms of a reduction in retained catch as B2(f). B2(f) is also smaller than B2(d). However, NMFS choose to analyze the larger closure to better assess the ecological, social and economic impacts of a large closure in the Gulf of Mexico. Therefore, by further analyzing B2(a) and B2(d), NMFS was able to analyze a range in terms of potential ecological, social, and economic impacts with regard to the size of a closure in this area of the Gulf of Mexico.

The reviewers felt that the rationale for preferred alternative B4 and benefit to HMS species appears extremely vague. Alternative B4 implements complementary HMS management measures in Madison-Swanson and Steamboat Lumps Marine Reserves. The reviewers stated that there was no indication as to the spatial size of such reserves and were confused by the statement that “any positive ecological impacts on HMS are expected to be minimal.” The reviewers asked why the Gulf Fishery Management Council cannot enact appropriate regulations since the gag grouper problems and pelagic fishing exploitation appear mutually exclusive.

Complementary HMS management measures for the Madison-Swanson and Steamboat Lumps Marine Reserves are being preferred at the request of the Gulf of Mexico Fishery Management Council. The purpose of this alternative is to implement compatible HMS regulations in the Madison-Swanson and Steamboat Lumps Marine Reserves to provide protection for spawning aggregations of gag grouper to prevent overfishing, improve spawning success, protect a portion of the offshore population of male gag grouper, and facilitate continued evaluation of the effect and usefulness of marine reserves as a fishery management tool. Similar management measures are already in effect for holders of southeast regional permits. The complementary HMS management measures would close any potential loopholes by extending the closure regulations to all other vessels that could potentially fish in the areas. As a result, this alternative is expected to improve the enforcement of the Madison-Swanson and Steamboat Lumps Marine Reserves. Only minor impacts on HMS fisheries are anticipated because the marine reserves are relatively small, and little HMS fishing effort has been reported in these areas (*i.e.*, a total of three sets were recorded between 1996 and 2004). In addition, in the Draft HMS FMP and the Final HMS FMP, there is a figure that shows the spatial extent of these two reserves. In Chapter 2 of the Draft HMS FMP and the Final HMS FMP, it is explained that the Madison-Swanson Marine Reserve is 115 nm^2 in size, rectangular-shaped, and is positioned southwest of Apalachicola, FL (29° 17’ N. Lat., 85° 50’ W. Long. to 29° 17’ N. Lat., 85° 38’ W.

Long. to 29° 06' N. Lat., 85° 38' W. Long. to 29° 06' N. Lat., 85° 50' W. Long.). The Steamboat Lumps marine reserve is 104 nm^2 in size, rectangular-shaped, and is positioned due west of Clearwater, FL (28° 14' N. Lat., 84° 48' W. Long. to 28° 14' N. Lat., 84° 37' W. Long. to 28° 03' N. Lat., 84° 37' W. Long. to 28° 03' N. Lat., 84° 48' W. Long.

Finally, the Gulf of Mexico Fishery Management Council does not have the authority to change HMS regulations. Therefore, they have requested that NMFS implement complementary management measures in these areas.

The reviewers stated that the preferred alternative, B5, appeared to be straightforward, but did not add much more to the status quo. The reviewers asked if the current FMP already has criteria for regulatory framework adjustments for closures, given the fact that closures currently exist. Currently, formalized criteria for establishing or modifying closures do not exist in NMFS' regulations. NMFS can implement time/area closures under framework actions; however, the current regulations only allow for time/area restrictions under framework actions. In the Final HMS FMP, NMFS prefers to change the regulations so that additions, changes, or modifications to time/area closures would also be allowed under a framework action. The Final HMS FMP would further allow NMFS to change or implement a new time/area without an FMP amendment. Finally, NMFS prefers to establish the criteria to help make the overall process of implementing and/or modifying current time/area closures more transparent.

Appendix A was a very necessary appendix for following the discussion in section 4.1.2.

Specific Comments:

Essential Fish Habitat

B.1.1.2 Atlantic Bigeye Tuna (*Thunnus obesus*)

The reviewer stated that NMFS' description of bigeye tuna depth distributions to a depth of 250 m may have been incorrect. The reviewer was surprised, since archival tag data show routine behavior to 400 m and deeper, and much older studies also indicate these depths as part of the habitat in the Pacific. NMFS agrees that Atlantic bigeye tuna are regularly found deeper than 250 m and has amended the section to reflect this change. The new description currently reads "Although its distribution with depth in the water column varies, it is regularly found in deeper waters than are other tuna, descending to 300–500 m and then returning regularly to the surface layer (Musyl *et al*., 2003)."

E.5 Peer Review by Paul J. Rago, NMFS NEFSC, January 25, 2006

Assigned Sections:

A. Standardized Bycatch Reporting Methodology
   1. Section 3.8.2 Standardized reporting of bycatch
B. Time/Area Closure Analyses
   1. Section 4.1.2 Time Area Closures
   2. Appendix A. Time/Area Closures
C. Essential Fish Habitat
   1. Chapter 10. Essential Fish Habitat
   2. Appendix B. Essential Fish Habitat

A. Standardized Bycatch Reporting Methodology
1. Section 3.8.2 Standardized reporting of bycatch, pp 3-191 to 3-201.

This section primarily contains descriptive material on Standardized Bycatch Reporting Methodology (SBRM) and the data collection procedures for the various fisheries that harvest highly migratory species. The descriptive material draws heavily from the work of the National Working Group on Bycatch (NWGB) and other national initiatives on bycatch analyses. The discussions of tradeoffs between precision and sampling effort, and measures to estimate bias are useful. The report continues with a description of the two major sources of bycatch data—mandatory logbooks and fisheries observers. It further notes that the two sources of information can be used together to estimate total bycatch wherein logbook effort estimates are multiplied by observer-based bycatch rates.

This approach is used in the Pelagic longline fishery (Sec. 3.8.2.1). In recent years, observer sampling rates for this fishery were fairly high (6-9%) overall and 100% in the NED experimental fishery. The stratification by area and quarter should be sufficient to address spatial and temporal heterogeneity issues.

The purse seine fishery (3.8.2.2) also uses both observers and mandatory reporting but bycatch rates are apparently too low to warrant much observer coverage in recent years.

The shark bottom longline fishery (3.8.2.3) uses a combination of voluntary observer coverage (i.e., vessel is not required to take observer when asked) and a mandatory logbook for a subsample (20%) of the fleet. The sampling design seems appropriate, but the lack of validation of the bycatch rates reported by the selected fishermen compromises estimates based on this approach. If fleet size and number of trips makes it infeasible to require logbooks for all vessels, then some effort should be made to conduct experiments to validate voluntarily reported bycatch rates. For example, one could compare bycatch rates from selected vessels with and without observers present. In addition, use of observers on vessels not required to use logbooks, could be useful. Such experiments would provide a measure of the validity of the self-reported bycatch rates. As the report acknowledges earlier, self-reported bycatch estimates are likely to be negatively biased.

The shark gillnet fishery (3.8.2.4) is the first section that mentions estimated precision levels and required sampling effort. My comments regarding section 3.8.2.3 can be applied here as well.

Discussions of commercial (3.8.2.5) and recreational (3.8.2.6) handgear fisheries note either no estimates of bycatch or very imprecise estimates, respectively. These problems are well known and the efforts to collect improved estimates from the Charter/Headboat component should greatly improve our understanding of this harvest sector.

Section 3.8.4 (Evaluation and Monitoring of Bycatch) refers to section 3.4 for species specific information. Estimates of the CVs of bycatch estimates do not appear to be reported in this chapter. If available, a summary table showing the sampling coverage, bycatch rates, and CVs would be a useful contribution to the EA. It would also be useful to describe the types of estimators used in this EA. I have inferred that most are ratio based estimators within some sort of stratified design. If model based estimators, such as Generalized Additive Models, have been used, it would be useful to include some background information on same.

Section 3.8.5.2 on discard mortality is a useful summary of difficult topic. Inclusion of information on the Code of Angling Ethics, is also a useful contribution.

Overall the SBRM describes the fisheries and monitoring systems well. Available data may not yet permit useful estimates of precision or evaluations of accuracy. Research on both of these topics should be continued. Voluntary submissions of bycatch can be difficult to decipher. True zeros or low numbers are difficult to distinguish from under reporting or failure to report. As noted earlier, large scale comparisons among bycatch rates for observed and non-observed vessels should be conducted to support expansions based on subsets of total trips.

B. Time/Area Closure Analyses
1. Section 4.1.2 Time Area Closures; Pp 4-20 to 4-101
2. Appendix A. Time/Area Closures

The time area closure model is based on generally accepted principles in fisheries science. In general such models rely on a set of assumptions related of assumptions related to static patterns of relative abundance at some temporal and spatial resolution, limited consideration of fish movements, and incomplete understanding of the effects of closure areas on redistribution of fishing effort. Nonetheless, such models can provide useful insights for comparisons of alternative management strategies. This is the approach taken within this Draft EIS. Twelve combinations of seasonal and spatial closures are evaluated in Section 4.1.2. Without such a model there would be no pragmatic way of comparing the proposed closed areas. In general it is probably safe to assume that the limitations of the model will be comparable across alternatives. Thus the rankings of each alternative should be relatively insensitive to the assumptions.

The model assumptions and application are well described in Appendix A. In particular the comparisons of model results with and without redistribution of existing effort are shown clearly. It should be noted however, that the use "plus" and "minus" signs in the Appendix is not consistent. Table A.1 uses a minus sign to denote a decrease in discards, and plus for increases. In contrast, Table A.28 uses a minus to denote an increase in discards and plus sign to denote a decrease. This can be seen in table A.1 for Loggerhead discards under alternative B2(d) with redistribution of effort (p.A-6) which has a value of 117. In table A.28 in the total column for column I (p. A-37) the comparable value is -117. It may be useful to make the example consistent with the usage elsewhere in the document.

For any given management alternative, the lack of consistent effects across species is also a useful conclusion from the time-area closure model. It highlights the complexity of the bycatch estimation and illustrates the importance of general effort reduction in conjunction with closure strategies. For example, it might be argued that the demonstrated declines in bycatch associated with the existing closures (alternative B1) seem to be related to a 15% reduction in effort induced by, or coincident with, the closure areas (p. 4-38).

The model discussion could be improved by emphasizing some of the assumptions more explicitly. Past patterns can be used to predict future patterns of abundance only if the distributions are persistent across years. The model assumes that CPUE or bycatch per unit effort is independent of the amount of effort present in the open area. The initial distribution of CPUE may be a valid estimate of conditions at the start of the closure. However, if fishing mortality is sufficiently high to reduce abundance, then CPUE will decline. Under these conditions, the use of a dynamic model that links abundance levels between closure periods or among closure areas would be an appropriate tool. Data necessary to support such a model for management do not appear to exist at present. Consideration should be given to the development of an operational/simulation model that embeds hypothesized fish movement patterns, fleet dynamics, and arbitrary closure area times and boundaries. Such a model would elucidate the effects of the current model assumptions that do not appear to explicitly treat species-specific movements among open and closed areas.

As noted in the report, the fleet itself is highly mobile and its ability to find fish concentrations in the open areas would tend to further diminish the effectiveness of the closure areas. By the same token, fleet mobility may also allow it to move away from high concentrations of undesirable bycatch. Fleet mobility, coupled with appropriate incentives (positive or negative) could lead to reduced bycatch. In the absence of such incentives, the assumption that fleet effort is uniformly redistributed over the open areas, is compromised. Fishermen seek profits rather than CPUE. Thus the assumptions about redistribution of effort in response to management alternatives might be improved by considering redistributions based on another simplified model, such as distance from shore or some other surrogate measure for variable costs. It may be too facile to state that the “with” and “without” redistribution of effort scenarios are sufficient to bound the effectiveness of management alternatives.

The efficacy of alternative B5 would be enhanced by developing a comprehensive procedure for evaluating tradeoffs among alternatives. Otherwise the proposed process is rather ambiguous and seems to mimic the standard Council process. All of the factors listed need to be considered and the goals of transparency and predictability are noble. However, the huge number of potential alternatives need to be evaluated and ranked quickly. Otherwise, the debates will paralyze the process. Formal procedures for considering multiple objectives and constraints, and establishing tradeoffs should be an adjunct to this alternative.

On an editorial note, I found the use of CPUE to describe both landings (kept) and discard measures somewhat confusing. This ambiguity is especially confusing when one is considering the effects of reallocating effort in response to closed areas. In general one would expect the reallocation to be redirected toward areas of highest kept CPUEs rather than high discard CPUEs.

Overall the analytical approach seems sound. It is consistent with the limitations of the data and lack of explicit understanding of migrations. Improvements may be possible by incorporating explicit movement patterns of the fish and protected resources, and fleet dynamics. Such improvements to model structure would have to be weighed against the suitability of existing data to support such a model, and the available time to implement such a model. If sufficient time is not available, then development of such a model should be considered as part of future management of HMS.

C. Essential Fish Habitat
1. Chapter 10. Essential Fish Habitat
2. Appendix B. Essential Fish Habitat

This review of EFH appears to be very thorough. The review is not restricted to the published literature and appears to fully, and appropriately use the existing databases from a wide number of government and private institutions. Moreover, the review draws extensively from experts in the scientific community. Both Chapter 10 and Appendix B are well written and technically sound.

The difficulties of evaluating EFH for HMS are perhaps best stated on page 10-20 "…the quantitative relationships between fishery production and habitat are very complex, and no reliable models currently exist. Accordingly, the degree to which habitat alterations have affected fishery production is unknown."

Appendix B appears to be an extraordinarily comprehensive and thorough compilation of existing data on the life history and distribution of HMS. The only cautionary comment I would have is that one should be careful when drawing conclusions about distributions derived from multiple data sets. Apparent habitat associations can be aliased with the sampling domains of specific programs. Different gears, sampling strategies and so forth can make it difficult to distinguish differences in sampling intensity from differences in true habitat usage. Percentile scale measures (e.g., quartiles) could be considered when multiple databases are depicted

E.6 Response to OMB Peer Review by Paul J. Rago, NMFS NEFSC, January 25, 2006

A. Standardized Bycatch Reporting Methodology

1. Section 3.8.2 Standardized reporting of bycatch. Pp 3-191 to 3-201

The reviewer appears to have been confused regarding the observer coverage and reporting requirements for the shark bottom longline fishery. To clarify, vessels are currently required to take an observer when selected, voluntary coverage was employed prior to this. In addition, all vessels participating in the bottom longline fishery are required to submit logbook reports for each trip. NMFS agrees that the analyses suggested by the reviewer to compare bycatch rates between observed and reported trips are still valid and should be conducted. Observer coverage and reporting requirements for the shark gillnet fishery are also similar in addition to the one hundred percent observer coverage required during right whale season.

The reviewer notes the lack of or imprecise estimates of bycatch in the commercial and recreational handgear fisheries. NMFS recognizes the desire to make improvements in the collection of recreational (and commercial) handgear catch and landings data. At the request of NMFS, the NAS recently conducted a review of marine recreational surveys, both state and federal. The review committee's report has been published and the Agency is evaluating the recommendations.

B. Time/Area Closure Analyses

1. Section 4.1.2 Time Area Closures; Pp 4-20 to 4-101

2. Appendix A. Time/Area Closures

The reviewer noted that the use of "plus" and "minus" signs in the Appendix A was not consistent. In the Draft HMS FMP, Table A.1 used a minus sign to denote a decrease in discards, and a plus for increases. In contrast, Table A.28 used a minus to denote an increase in discards and a plus sign to denote a decrease. This could be seen in Table A.1 for loggerhead discards under alternative B2(d) with redistribution of effort, which had a value of 117. In Table A.28 in the total column for column I, the comparable value was -117. The reviewer stated that it may be useful to make the example consistent with the usage elsewhere in the document. NMFS recognized this inconsistency and made all the minus and plus sign consistent throughout Appendix A and other appropriate chapters.

The reviewer stated that it might be argued that the demonstrated declines in bycatch associated with the existing closures (alternative B1) seem to be related to a 15 percent reduction in effort induced by, or coincident with, the closure areas. While NMFS agrees that the reduction in bycatch may be related to the current time/area closure, NMFS also realizes that other factors may be attributing to the decline. These include: (1) stocks may be declining; (2) time/area closures may have acted synergistically with declining stocks to produce greater declines in catch than predicted; (3) fishermen may have left the fishery; and (4) fishing effort may have been displaced into areas with lower CPUEs.

The reviewer stated that the model discussion could be improved by emphasizing some of the assumptions more explicitly. The reviewer suggested that past patterns can be used to predict future patterns of abundance only if the distributions are persistent across years. NMFS explored different assumptions regarding the movement of the PLL fleet and how more limited movements by the fleet may affect predictions regarding bycatch reduction. As explained in the response to the Skomal review, NMFS investigated the movement of the PLL fleet from 2001 through June of 2004 to see where vessels fished in relation to their reported homeports. Based on these analyses, NMFS evaluated different scenarios of the redistribution of effort model where each scenario had different assumptions regarding where effort from a closure would be displaced. Taken with the results of not considering redistribution of effort to the full effort redistribution model, these additional scenarios provide estimates of changes in bycatch and retained catch somewhere in-between the two base scenarios (*i.e.*, some movement is expected, and thus, some redistribution of effort is expected into a particular area).

The reviewer stated that the model assumes that CPUE or bycatch per unit effort is independent of the amount of effort present in the open area. The initial distribution of CPUE may be a valid estimate of conditions at the start of the closure. However, if fishing mortality is sufficiently high to reduce abundance, then CPUE would decline. Under these conditions, the use of a dynamic model that links abundance levels between closure periods or among closure areas would be an appropriate tool. Data necessary to support such a model for management do not appear to exist at present. The reviewer suggested that consideration should be given to the development of an operational/simulation model that embeds hypothesized fish movement patterns, fleet dynamics, and arbitrary closure area times and boundaries. Such a model would elucidate the effects of the current model assumptions that do not appear to explicitly treat species-specific movements among open and closed areas.

NMFS acknowledges that the redistribution of effort model is incapable of making predictions based on a declining CPUE. Instead, the model assumes a current CPUE that remains constant in the remaining open areas when estimating reductions. While NMFS would like to develop a dynamic model that links abundance levels between closure periods or among closure areas, as the reviewer has pointed out, the data necessary to build such a model are not available at the present time. NMFS is working on improving the effort redistribution models to be used in the future as more appropriate data become available.

The reviewer stated that as noted in the VMS remand report, the fleet itself is highly mobile, and its ability to find fish concentrations in the open areas would tend to further diminish the effectiveness of the closure areas. By the same token, the reviewer argued that fleet mobility may also allow it to move away from high concentrations of undesirable bycatch. Fleet mobility, coupled with appropriate incentives (positive or negative) could lead to reduced bycatch. In the absence of such incentives, the assumption that fleet effort is uniformly redistributed over the open areas is compromised. The reviewer stated that fishermen seek profits rather than CPUE. Thus, the reviewer suggested that the assumptions about redistribution of effort in response to management alternatives might be improved by considering redistributions based on another simplified model, such as distance from shore or some other surrogate measure for variable costs. The reviewer stated that it may be too facile to state that the "with" and "without" redistribution of effort scenarios are sufficient to bound the effectiveness of management alternatives.

Predicting fishermen's behavior in light of changing management measures is difficult. In addition, while many fishermen may want to avoid bycatch, many of the retained HMS coexist with non-target HMS, such as bluefin and yellowfin tuna in the Gulf of Mexico. Therefore, it could be potentially difficult for fishermen to avoid bycatch while fishing for retained HMS. However, NMFS is considering research on how changes in fishing practices may help reduce bycatch on non-target species as well as the tracking of discards (dead and alive) by all gear types. NMFS is also considering developing incentives that would dissuade fishermen from keeping incidentally caught species, such as BFT. This is of particular concern for incidentally caught spawning BFT in the Gulf of Mexico.

In the future, NMFS intends to investigate the choices fishermen have made regarding previous closures (*i.e.*, did they move, sell their permits, go out of business, retain their permit but fish for something else, etc?). This type of analysis could help NMFS improve the redistribution of effort models used in the future. While the current redistribution of models may appear overly simplified, they account for the fact that effort would be displaced out of closed areas and acknowledge that there are likely to be areas where bycatch might increase. However, NMFS will continue investigate ways to better predict fishermen's fishing behaviors and refine the current redistribution of fishing effort models.

The reviewer stated that the efficacy of alternative B5 would be enhanced by developing a comprehensive procedure for evaluating tradeoffs among alternatives. Otherwise the reviewer felt that the proposed process was rather ambiguous and seems to mimic the standard Council process. The reviewer noted that all of the factors listed need to be considered and stated that the goals of transparency and predictability are noble. However, the reviewer felt that the huge number of potential alternatives needed to be evaluated and ranked quickly. Otherwise, the debates would paralyze the process. The reviewer said that formal procedures for considering multiple objectives and constraints, and establishing tradeoffs should be an adjunct to this alternative.

As explained in the responses to the Skomal and the Bigelow and Boggs review, while not a formalized decision matrix, NMFS used the analyses in time/area closure section, which considered all species, to evaluate the effects of the proposed time/area closures, including all species for a combination of closures. NMFS used the results of the analyses to guide the Agency in determining which management measures are appropriate at this time. This approach does not preclude NMFS from considering the establishment of a more formalized decision matrix in the future if such a matrix could be designed that would provide for the flexibility to consider all the species involved. This may be more appropriate when NMFS has a longer temporal dataset on the simultaneous effect of circle hooks and the current time/closures. At this time, NMFS believes that the criteria contained in the preferred alternative B5 provides the guidance needed, consistent with the Magnuson-Stevens Act and this FMP, to help NMFS make the appropriate decisions regarding the use of time/area closures in HMS fisheries.

The reviewer felt that the use of CPUE to describe both landings (kept) and discard measures somewhat confusing. The reviewer stated that this ambiguity was especially confusing when one was considering the effects of reallocating effort in response to closed areas. The reviewer stated that one would expect the reallocation to be redirected toward areas of highest kept CPUEs rather than high discard CPUEs.

As explained in the response to the Bigelow and Boggs review, NMFS did not use CPUEs for its final selection of time/area closures. Only absolute numbers of bycatch, discards, and retained catch were used to select areas for potential closures, and absolute numbers were used for its analyses of both with and without the redistribution of fishing effort. The redistribution of effort scenarios calculated increases in bycatch, discards, and retained catch by multiplying the effort that was being redistributed from a given closures by the CPUE for each species in the particular open areas under consideration (*i.e.*, either all remaining open areas, the Atlantic seaboard only, the Gulf of Mexico only, or the Gulf of Mexico and Area 6 in the Atlantic). NMFS then subtracted this number from the estimated reduction inside the closed area. Since many of these areas include areas of high CPUEs for both targeted catch as well as non-target catch, it would be almost impossible to redistribute effort to areas of high CPUEs for retained catch only. However, NMFS intends to investigate the choices fishermen have made regarding previous closures (*i.e.*, did they move, sell their permits, go out of business, retain their permit but fish for something else, etc?). This type of analysis could help NMFS improve the effort redistribution models to be used in the future.

The reviewer suggested that improvements may be possible by incorporating explicit movement patterns of the fish and protected resources, and fleet dynamics. The reviewer stated that such improvements to model structure would have to be weighed against the suitability of existing data to support such a model, and the available time to implement such a model. The reviewer noted that if sufficient time is not available, then development of such a model should be considered as part of future management of HMS. NMFS acknowledges that improvements can be made to the current redistribution of effort model; however, at this time, NMFS does not have the necessary data to make such improvements nor did NMFS have sufficient time between the Draft HMS FMP and the Final HMS FMP to investigate and reanalyze the data with regards to a substantially different redistribution of effort model. NMFS is working on improving the effort redistribution models used in the future as more appropriate data become available.

C. Essential Fish Habitat

1. Chapter 10. Essential Fish Habitat

2. Appendix B. Essential Fish Habitat

The peer reviewer noted that "Appendix B appears to be an extraordinarily comprehensive and thorough compilation of existing data on the life history and distribution of HMS. The only cautionary comment I would have is that one should be careful when drawing conclusions about distributions derived from multiple data sets. Apparent habitat associations can be aliased with the sampling domains of specific programs. Different gears, sampling strategies and so forth can make it difficult to distinguish differences in sampling intensity from differences in true habitat usage. Percentile scale measures (e.g., quartiles) could be considered when multiple databases are depicted."

NMFS agrees that the sampling program, strategy, and methodology used may have an influence on the apparent distribution of a particular species, and that one should use caution when interpreting the results. In part this is why NMFS has included the names of the programs used to collect the data and the number of observations contributed by each program. This additional information should help NMFS technical experts to decide how much weight should be given to a particular dataset. NMFS plans to convene workshops with technical experts who will thoroughly review the data and help to make a determination about which areas should be included as EFH. The distribution data in the maps will one of many contributing factors in that ultimate decision.