2. STOCK ASSESSMENT UPDATES

With the exception of Atlantic sharks, stock assessments for Atlantic HMS are conducted by ICCAT's SCRS. In 2006, the SCRS completed several stock assessments for Atlantic HMS including Atlantic bluefin tuna, blue and white marlin, and Atlantic swordfish. In 2007, the SCRS conducted stock assessments for bigeye tuna, northern albacore tuna, and Mediterranean swordfish (not considered in the HMS management unit). Furthermore, ICCAT held a data preparation meeting for both blue and shortfin mako sharks in 2007. For porbeagle sharks, NMFS has accepted a 2005 species report and assessment by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (November 7, 2006, 71 FR 65086).

Atlantic shark stock assessments for LCS and small coastal sharks (SCS) are completed by the NMFS Southeast Data, Assessment, and Review (SEDAR) process. The LCS complex, blacktip, and sandbar sharks were evaluated in 2006 (July 24, 2006, 71 FR 41774). The 2006 LCS assessment assessed blacktip sharks for the first time as two separate populations - Gulf of Mexico and Atlantic – and also assessed the status of sandbar sharks separately. In addition, the first dusky-specific shark assessment was released on May 25, 2006 (71 FR 30123). In 2007, NMFS released a stock assessment for SCS. Tables 2.1 and 2.2 have summaries of stock assessment information.

Table 2.1 Stock Assessment Summary Table (SCRS, 2007)

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Rate	Outlook
West Atlantic Bluefin	SSB_{04}/SSB_{MSY} = 0.41 (0.29-0.54) SSB_{04}/SSB_{1975} = 0.18	$0.86SSB_{MSY}$	F_{04}/F_{MSY} = 1.7 (low recruitment) $F_{04}/F_{0.1}$ = 3.1 (high recruitment)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
East Atlantic Bluefin	SSB_{04}/SSB_{74} = 0.48	*Not Estimated*	F_{04}/F_{max} = 3.1	*Not Estimated*	Overfished; overfishing is occurring
Atlantic Bigeye Tuna	B_{06}/B_{MSY} = 0.92 (0.85-1.07)	$0.6B_{MSY}$ (age 2+)	F_{05}/F_{MSY} = 0.87 (0.70-1.24)	F_{year}/F_{MSY} = 1.00	Rebuilding; overfishing is occurring.
Atlantic Yellowfin Tuna	B_{01}/B_{MSY} = 0.73 - 1.10	$0.5B_{MSY}$ (age 2+)	F_{01}/F_{MSY} = 0.87- 1.46	F_{year}/F_{MSY} = 1.00	Approaching an overfished condition.
North Atlantic Albacore Tuna	B_{05}/B_{MSY} = 0.81 (0.68-0.97)	$0.7B_{MSY}$	F_{05}/F_{MSY} = 1.5 (1.3-1.7)	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring.

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Rate	Outlook
South Atlantic Albacore Tuna	B_{05}/B_{MSY} = 0.91 (0.71-1.16)	*Not estimated*	F_{05}/F_{MSY} = 0.63 (0.47-0.9)	*Not estimated*	Overfished; overfishing not occurring.
West Atlantic Skipjack Tuna	*Unknown*	*Unknown*	*Unknown*	F_{year}/F_{MSY} = 1.00	Unknown
North Atlantic Swordfish	B_{06}/B_{MSY} = .99 (0.87-1.27)	*Unknown*	F_{05}/F_{MSY} = 0.86	F_{year}/F_{MSY} = 1.00	Rebuilding; overfishing not occurring
South Atlantic Swordfish	Likely >1	*Unknown*	Likely <1	F_{year}/F_{MSY} = 1.00	Unknown
Blue Marlin	$B_{04}<B_{MSY}$; Yes	$0.9B_{MSY}$	$F_{2004}>F_{MSY}$; Yes	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
White Marlin	$B_{04}<B_{MSY}$; Yes	$0.85B_{MSY}$	$F_{2004}>F_{MSY}$; Possibly	F_{year}/F_{MSY} = 1.00	Overfished; overfishing is occurring
West Atlantic Sailfish	*Unknown*	$0.75B_{MSY}$	*Unknown*	*Not estimated*	Overfished: Overfishing is occurring
Spearfish	*Unknown*	*Unknown*	*Unknown*	*Not estimated*	*Unknown*

Table 2.2 Stock Assessment Summary Table

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Rate	Outlook
LCS	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Sandbar	SSF_{04}/SSF_{MSY}= 0.72	4.75-5.35E+05	F_{04}/F_{MSY}=3.72	0.015	Overfished; Overfishing is occurring
Gulf of Mexico Blacktip	SSF_{04}/SSF_{MSY}= 2.54-2.56	0.99-1.07E+07	F_{04}/F_{MSY}= 0.03-0.04	0.20	Not overfished; overfishing not occurring
Atlantic Blacktip	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Dusky Sharks	B_{2003}/B_{MSY}= 0.15 - 0.47	unknown	F_{2003}/ F_{MSY}=1.68-1,810	0.00005 – 0.0115	Overfished; Overfishing is occurring

Species	Current Relative Biomass Level	Minimum Stock Size Threshold	Current Relative Fishing Mortality Rate	Maximum Fishing Mortality Rate	Outlook
SCS	N_{2005}/N_{MSY} = 1.69	2.1 E+07	F_{2005}/F_{MSY} = 0.25	F_{MSY} = 0.091	Not overfished; overfishing not occurring
Bonnethead Sharks	SSF_{2005}/SSF_{MSY} = 1.13	1.4 E+06	F_{2005}/F_{MSY} = 0.6	F_{MSY} = 0.31	Not overfished; overfishing not occurring
Atlantic Sharpnose Sharks	SSF_{2005}/SSF_{MSY} = 1.47	4.09 E +06	F_{2005}/F_{MSY} = 0.74	F_{MSY} = 0.19	Not overfished; overfishing not occurring
Blacknose Sharks	SSF_{2005}/SSF_{MSY} = 0.48	4.3 E+05	F_{2005}/F_{MSY} = 3.77	F_{MSY} = 0.07	Overfished; Overfishing is occurring
Finetooth Sharks	N_{2005}/N_{MSY} = 1.80	2.4 E+06	F_{2005}/F_{MSY} = 0.17	F_{MSY} = 0.03	Not overfished; overfishing not occurring
Pelagic sharks (SCRS)	*Unknown*	*Unknown*	*Unknown*	*Unknown*	*Unknown*
Porbeagle Sharks (COSEWIC)	SSN_{2004}/SSN_{MSY} = 0.15 – 0.32	*Unknown*	F_{2004}/F_{MSY} = 0.83	0.033 – 0.065	Overfished; overfishing is not occurring

2.1 Stock Assessment Update: ATLANTIC BLUEFIN TUNA

2.1.1` Life History/Species Biology

Current life history information for Atlantic bluefin tuna can be found in the Consolidated HMS FMP. In 2006, the SCRS was concerned with issues of mixing between the western and eastern bluefin tuna stocks. Movements between the east and west are complex and it is difficult to quantify the amount of mixing that occurs. A positive correlation between age and migration distances exists with all Atlantic bluefin tuna. Recent research activities for bluefin tuna can be found in the 2007 Annual Report of the United States to ICCAT (NMFS, 2007). This document can be found at www.nmfs.noaa.gov/sfa/hms/hmsdocument_files/ICCAT.htm or by calling the HMS Management Division at 301-713-2347.

2.1.2 Recent Stock Assessment Results

The SCRS completed the stock assessment for both management units (east and west) of Atlantic bluefin tuna in 2006 and provided additional comment on the stock outlook during their 2007 meeting, in advance of the next assessment in 2008. The 2006 western bluefin tuna assessment showed results consistent with previous year evaluations, where the spawning stock biomass (SSB) declined rapidly in the early 1970s. This sharp decline was followed by a more gradual decline in SSB during the early 1990s. The SSB did, however, make a slight recovery in 1998 climbing to 28 percent of the SSB level in 1975. The 2006 assessment shows a decline in 2004 to about 18 percent of SSB when compared to the 1975 SSB level. Recruitment following the decline during the 1970s-1990s varied from year to year and did not conform to any particular trend.

The SCRS noted that although the large decline in SSB since the early 1970's is clear from the assessment, the potential for rebuilding is less clear. There has been poor western bluefin tuna recruitment since 1976 (with the reasons unclear), although the 1994 year class was relatively strong.

The current assessment done by the SCRS used data through 2004, since 2005 data were not fully available. The SCRS has noted the failure of the fishery to take a substantial portion of the total allowable catch (TAC) (about a third in 2005) and noted that this trend continued in 2006 (with only about 15 percent of the TAC landed). The SCRS has identified two reasons that could account for the low catch of the U.S. quota: (1) the availability of fish to the U.S. fishery was abnormally low, and/or (2) the overall size of the population of bluefin tuna in the western Atlantic has dropped substantially. The fact that Canada and Japan did not have abnormally low catches in 2005 and 2006 supports the first explanation. Conversely, other fishery indicators (e.g., some abundance indices and declining size in some areas in 2005) support the second explanation. The SCRS has not found any evidence to favor either explanation over another, but notes that for a fishery to only catch a third of its TAC, especially a highly susceptible species like bluefin tuna, is cause for concern. The SCRS noted that the continuation of this trend in 2006, and probably in 2007, and other new evidence reviewed by the SCRS, heightened concern that the estimate of stock status from the 2006 assessment may be optimistic (i.e., gives further weight to the second explanation). It noted that this phenomenon has been seen in other fisheries prior to it becoming clear that they were in trouble. The SCRS also noted that the incorporation of the relatively low catch in 2005 into short term projections may lead to somewhat of an increase in projected abundance in the first few years of the projections, and if the second explanation is correct, this gives an overly optimistic outlook.

2.1.3. Management Recommendations

The SCRS gave the following advice for consideration by ICCAT in 2006:

1) Given the current recruitment that has been exhibited by western Atlantic bluefin tuna, it is extremely unlikely that SSB can recover to levels that were exhibited in the 1970s in the next 15 years or so without reducing catch to near zero.

2) The current TAC (2,700 t) is not expected to result in major changes in SSB from 2007-2009 (small declines on the order of 3 percent per year).

3) Fishing at F_{MSY} (conditional on current recruitment) during the period 2007-2009 would be expected to increase SSB over that period by about 1.5 percent per year.

4) A constant TAC over the period 2007-2009 which would produce gains in SSB equivalent to those gains in 3) would be about 2,100 t.

5) The constant TAC over the period 2007-2009 which would be expected to maintain SSB at 2006 levels would be about 2,300 t.

The SCRS noted that the evidence is accumulating which indicates that both the productivity of western bluefin tuna and western bluefin tuna fisheries are linked to the eastern Atlantic and Mediterranean stock. The western fishery is partly dependent on fish of eastern origin, and the population of eastern origin fish has become less available to the west. Therefore, management actions in the east are likely to impact recovery in the west, because even small rates of mixing from east to west can have significant effects on the west due to the fact that the eastern Atlantic and Mediterranean stock is so much larger than that of the western Atlantic.

Table 2.1.1 Summary Table for the Status of West Atlantic Bluefin

Age/size at Maturity	Age 8 (~196 cm CFL), or older in the Gulf of Mexico
Spawning Sites	Gulf of Mexico and Florida Straits
Current Relative Biomass Level *Minimum Stock Size Threshold*	$SSB_{04}/SSB_{MSY} = 0.18$ $SSB_{04}/SSB_{MSY/R} = 0.41$ (0.29-0.54) $0.86SSB_{MSY}$
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	$F_{04}/F_{MSY} = 1.7$ (low recruitment) $F_{04}/F_{0.1} = 3.1$ (high recruitment) $F_{year}/F_{MSY} = 1.00$
Maximum Sustainable Yield	3,200 t (3,000-3,400)
Current (2006) Catch (including discards)	1,929 t
Current (2006) Replacement Yield	2,300 t
Outlook	Overfished; overfishing is occurring

Table 2.1.2 Summary Table for the Status of East Atlantic Bluefin

Age/size at Maturity	Age 4-5 (~25 kg)
Spawning Sites	Mediterranean
Current Relative Biomass Level	$SSB_{04}/SSB_{74} = 0.48$
Current Relative Fishing Mortality Rate	$F_{04}/F_{max} = 3.1$

Maximum Fishing Mortality Threshold	*not estimated*
Maximum Sustainable Yield	~15,000 t
Current (2006) Yield	32,665 t reported; 50,000 t estimated by SCRS
Long-term Potential Yield	~45,000 t
Outlook	Overfished; overfishing is occurring

2.2 Stock Assessment Update: BLUE AND WHITE MARLIN

2.2.1 Life History/Species Biology

Blue and white marlin can be found in both temperate and tropical waters of the Atlantic and other oceans across the world. Both marlin species range from Canada to Argentina in the western Atlantic and from the Azores to South Africa in the eastern Atlantic. Blue marlin attain an average weight of between 100-175 kg. White marlin, on the other hand, reach an average weight between 20-30 kg. Blue marlin are known to be solitary and highly migratory in nature. White marlin can exhibit the same characteristics, but have also been known to congregate in small groups. Young blue marlin are one of the fastest, if not the fastest growing of all teleosts, reaching from 30 – 45 kg by age 1. Female white and blue marlin grow faster and reach a much larger maximum size than males. Very little is known about the age and growth of white marlin, although they are considered to be very fast growing, as are all the Istiophoridae

A new study has confirmed the existence of the round scaled spearfish through scale shape and relative anus position, morphometrics, and DNA sequencing. Misidentification between white marlin and round scale spearfish is possible where these two overlap. The importance of these misidentifications is being evaluated by several researchers. Other recent research activities for white and blue marlin can be found in the 2007 Annual Report of the United States to ICCAT (NMFS, 2007). This document can be found by calling the HMS Management Division at 301-713-2347.

2.2.2 Recent Stock Assessment Results

Blue Marlin

The recent biomass level most likely remains well below the B_{msy} estimated in 2000. Current and provisional diagnoses suggest that F has recently declined and is possibly smaller than $F_{replacement}$, but larger than the F_{msy} estimated in the 2000 assessment. Over the period 2001-2005, several abundance indicators suggest that the decline has been at least partially arrested, but some other indicators suggest that abundance has continued to decline. Confirmation of these recent apparent changes in trend may require an additional four or five years of data, especially since the reliability of the recent information has diminished and may continue to do so.

White Marlin

The recent biomass most likely remains well below the B_{msy} estimated in the 2002 assessment. Current and provisional diagnoses suggest that F is probably smaller than $F_{replacement}$ and probably also larger than the F_{msy} estimated in the 2002 assessment. Over the period 2001-2004, combined longline indices and some individual fleet indices suggest that the decline has been at least partially reversed, but some other individual fleet indices suggest that abundance has continued to decline. Confirmation of these recent apparent changes in trend may require an additional four or five years of data, especially since the reliability of the recent information has diminished and may continue to do so.

2.2.3 Management Recommendations

The SCRS made five management recommendations regarding Atlantic blue and white marlin to the Commission in the 2007 SCRS report. These included:

1) ICCAT should, at a minimum, continue the management measures already in place because marlins have not yet recovered.

2) ICCAT should take steps to assure that the reliability of the recent fishery information improves in order to provide a basis for verifying possible future rebuilding of the stocks. Improvements are needed in the monitoring of the fate and amount of dead and live releases, with verification from scientific observer programs. In addition, verification of current and historical landings from some artisanal and industrial fleets needs to be conducted.

3) Should ICCAT wish to increase the likelihood of success of the current management measures of the marlin rebuilding plan, further reduction in mortality would be needed, for example by:

- implementing plans to improve compliance of current regulations,
- encouraging the use of circle hooks in fisheries where its use has been shown to be beneficial,
- broader application of time/area catch restrictions.

4) Given the recent importance of the catch from artisanal fisheries, and to increase the likelihood of recovery of marlin stocks, ICCAT should consider regulations that control or reduce the fishing mortality generated by these fisheries.

5) While substantial research into habitat requirements of blue and white marlin have been undertaken since the last assessments, the results of this research are not yet sufficient to allow the SCRS to reach scientific consensus on the best method for directly estimating MSY benchmarks for these species based on the complete time-series of data. ICCAT should encourage continued research on thedevelopment of methods to

incorporate this information into stock assessments in order to provide a basis for increasing the certainty with which management advice can be provided.

Table 2.2.1 Summary Table for the Status of Blue Marlin

Age/size at Maturity	Age 2-4 (Females: 193 cm Males: 175 cm)
Spawning Sites	Tropical and subtropical waters in summer and fall
Current Relative Biomass Level *Minimum Stock Size Threshold*	$B_{04}<B_{MSY}$; Yes $0.9B_{MSY}$
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	$F_{2004}>F_{MSY}$; Yes $F_{year}/F_{MSY} = 1.00$
Maximum Sustainable Yield	~ 2,000 t (1,000 ~ 2,400 t)
Current Catch (2004)	2,916 t
Outlook	Overfished; overfishing is occurring

Table 2.2.2 Summary Table for the Status of White Marlin

Age/size at Maturity	Unknown (Females: 155 cm Males: 140 cm)
Spawning Sites	Tropical and subtropical waters in the mid- to late spring
Current Relative Biomass Level *Minimum Stock Size Threshold*	$B_{04}<B_{MSY}$; Yes $0.85B_{MSY}$
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	$F_{2004}>F_{MSY}$; Possibly $F_{year}/F_{MSY} = 1.00$
Maximum Sustainable Yield	600-1,320 t
Current Catch (2004)	610 t
Outlook	Overfished; overfishing is occurring

2.3 Stock Assessment Update: ATLANTIC SWORDFISH

2.3.1 Life History/Species Biology

Swordfish are one of the fastest and largest predators of the Atlantic Ocean, reaching maximum size at 530 kg. Highly migratory in nature, swordfish exhibit a long bill that is used for both foraging and defense of territory. Swordfish are also pelagic in nature, but have been known to feed throughout the water column on ground fish,

pelagic, deep-water fish, and invertebrates. A fusiform body and stiff, deeply forked tail allow them to swim at high speeds.

In 2006, a SCRS workshop took place to determine both swordfish stock structure and boundaries of the North and South Atlantic and Mediterranean stocks. This workshop, held in Crete, was conducted to satisfy ICCAT's resolution 99-03, *Resolution by ICCAT on the Clarification of the Stock Structure and Boundaries Between the Swordfish Stocks in the Atlantic.* In 1999, ICCAT noted that there were considerable uncertainties about the structure, mixing and boundaries of the swordfish stocks, and called for national and international research programs on swordfish stock structure. The stock structure data presented at the workshop was consistent with current theories about Atlantic and Mediterranean swordfish stock structure. Researchers at the workshop found that without intensified collaborative and multi-disciplinary research, different swordfish stock boundaries could not be improved upon. However, the workshop confirmed that some mixing of stocks between the Atlantic and Mediterranean occur, and fish from the Mediterranean stock are genetically different from swordfish in other oceans. The next stock assessment scheduled by ICCAT is to take place in 2009.

2.3.2 Recent Stock Assessment Results

North Atlantic

The biomass of North Atlantic swordfish has improved, reaching 99 percent MSY in 2006. Several strong year classes in the late 1990s, and a reduction in the overall catch since 1987 has allowed the rebound of swordfish in the North Atlantic. In 2005, the fishing mortality for North Atlantic swordfish was 14 percent below the level needed to maintain MSY. The F_{2005} was less than $F_{MSY,}$ but the SCRS has shown some uncertainty in the estimates of F_{2005}. The replacement yield for 2006 (14,438 t) was slightly above MSY, and the TAC set by ICCAT in 2005 was 14,000 t assuming that North Atlantic swordfish biomass would continue to reach B_{MSY} with those catch levels.

South Atlantic

The SCRS used a simple production model using catch per unit effort (CPUE) data to estimate the biomass of South Atlantic swordfish. Depending on the use of bycatch fishery data or target fishery data, two different outcomes are reached. When using bycatch CPUE the conclusion is a relatively low abundance. In contrast, using target CPUE data leads to a positive outlook. The SCRS believes that the bycatch CPUE data could not be supported as an indictor of abundance. In addition, the use of target fishery data cannot be used because it is believed that increased catchablity of South Atlantic swordfish and not abundance was the reason for high CPUE. The SCRS choose to use a composite CPUE for both fisheries data for the base case estimate. Though more research is needed, results from the analyses using data from both fisheries show that current fishing mortality is less than that needed to maintain MSY, and biomass levels are above that which would occur when fishing at F_{MSY} for a long period of time. The estimated MSY (about 17,000 t) is 33 percent higher than current reported landings.

2.3.3 Management Recommendations

North Atlantic

The current TAC, which has been set at 14,000 t, should continue to be used for the foreseeable future. Given the current MSY at 14,100 t and productivity (r=0.42), this TAC should provide sustainable fishing practices, as long as changes in the environment or fishery do not occur.

South Atlantic

The SCRS recommends keeping the TAC (~17,000 t) for South Atlantic swordfish until more substantive research is done.

Table 2.3.1 Summary Table for the Status of North Atlantic Swordfish

Age/size at Maturity	Females: 180 cm lower jaw fork length (LJFL) Male: 129 cm LJFL
Spawning Sites	Warm tropical and subtropical waters throughout the year
Current Relative Biomass Level	B_{06}/B_{MSY} = .99 (0.87-1.27)
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	F_{05}/F_{MSY} = 0.86 F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	14,133 t (12,800-14,790)
Current (2006) Yield	11,445 t
Current (2006) Replacement Yield	14,438 t
Outlook	Stock is nearly rebuilt; overfishing is not occurring

Table 2.3.2 Summary Table for the Status of South Atlantic Swordfish

Age/size at Maturity	Females: 180 cm lower jaw fork length (LJFL) Male: 129 cm LJFL
Spawning Sites	Warm tropical and subtropical waters throughout the year
Current Relative Biomass Level	Likely >1
Current Relative Fishing Mortality Rate *Maximum Fishing Mortality Threshold*	Likely <1 F_{year}/F_{MSY} = 1.00
Maximum Sustainable Yield	~17,000 t
Current (2006) Yield	13,354 t

Current (2006) Replacement Yield	*not estimated*
Outlook	*unknown*

2.4 Stock Assessment Update: ATLANTIC SHARKS

NMFS is responsible for conducting stock assessments for the LCS and SCS complexes. Atlantic shark stock assessments are performed by the SEDAR process. This process is a cooperative program designed to improve the quality and reliability of the stock assessments. The SEDAR process emphasizes constituent and stakeholder participation in the assessment development, transparency in the assessment process, and a rigorous and independent scientific review of the completed stock assessment. Pelagic shark stock assessments are conducted by SCRS. NMFS relies on these assessments to determine the stock status of pelagic shark species.

2.4.1 Large Coastal Sharks

The latest 2005/2006 stock assessments for LCS in the Gulf of Mexico and Atlantic Ocean were recently completed. Unlike past assessments, the 2005/2006 LCS stock assessment determined that it is inappropriate to assess the LCS complex as a whole due to the variation in life history parameters, different intrinsic rates of increase, and different catch and abundance data for all species included in the LCS complex. Based on these results, NMFS changed the status of the LCS complex from overfished to unknown and is continuing to examine viable options to assess shark populations (November 7, 2006; 71 FR 65086).

Sandbar Sharks

As with the 2002 LCS stock assessment, the 2005/2006 LCS stock assessment assessed sandbar sharks separately. According to this sandbar stock assessment, sandbar sharks (*Carcharhinus plumbeus*) are overfished ($SSF_{2004}/SSF_{MSY} = 0.72$; SSF is spawning stock fecundity and was used a proxy for biomass), and overfishing is occurring ($F_{2004} / F_{MSY} = 3.72$). The assessment recommends that rebuilding could be achieved with 70 percent probability by 2070 with a total allowable catch across all fisheries of 220 mt whole weight (ww) each year and fishing pressure (F) between 0.0009 and 0.011.

Blacktip Sharks

The 2005/2006 stock assessment assessed blacktip sharks (*Carcharinus limbatus*) for the first time as two separate populations: Gulf of Mexico and Atlantic. The results indicate that the Gulf of Mexico stock is not overfished and overfishing is not taking place (November 7, 2006; 71 FR 65086), but the SEDAR Assessment Panel did not accept the absolute estimates of the stock status from the blacktip stock assessment. The three abundance indices believed to be most representative of the stock were consistent with each other, suggesting that stock abundance has been increasing over a period of

declining catch during the past 10 years. Based on life history characteristics, blacktip sharks are a relatively productive shark species, and a combination of these characteristics and recent increases in the most representative abundance indices suggested that the blacktip stock is relatively healthy. There was no scientific basis, however, to advise an increase in catch. The quota for the non-sandbar LCS complex in the Gulf of Mexico region, which includes blacktip sharks, in Amendment 2 to the Consolidated HMS FMP maintains catch at its current levels.

The 2005/2006 stock assessment also indicated that the current status of the blacktip shark population in the Atlantic region is unknown. The assessment scientists were unable to provide estimates of stock status or reliable population projections, but indicated that current catch levels should not change. As with the Gulf of Mexico region, the quota for the non-sandbar LCS complex in the Atlantic region, which includes blacktip sharks, in Amendment 2 to the Consolidated HMS FMP maintains catch at its current levels. NMFS has declared the status of the Atlantic blacktip shark population to be unknown (November 7, 2006; 71 FR 65086).

Dusky Sharks

The first dusky-specific shark assessment separate from the LCS stock assessment was released on May 25, 2006 (71 FR 30123). The 2006 dusky shark (*Carcharhinus obscurus*) stock assessment used data through 2003 and indicates that dusky sharks are overfished ($B_{2003}/B_{MSY} = 0.15 – 0.47$) with overfishing occurring ($F_{2004}/F_{MSY} = 1.68 – 1810$). The assessment recommends that rebuilding for dusky sharks could require 100 to 400 years. Based on these results, NMFS declared the status of dusky sharks as overfished with overfishing occurring (November 7, 2006; 71 FR 65086).

2.4.2 Small Coastal Sharks

A stock assessment for SCS following the SEDAR process was completed in 2007 (November 13, 2007; 72 FR 63888). Data from the assessment can be found in Table 2.2.

2.4.3 Pelagic Sharks

ICCAT Stock Assessment on Blue and Shortfin Mako Sharks

At the 2004 Inter-Sessional Meeting of the ICCAT Subcommittee on Bycatch, stock assessments for Atlantic blue shark and shortfin mako were conducted (SCRS, 2004). This work included a review of their biology, a description of the fisheries, analyses of the state of the stocks and outlook, analyses of the effects of current regulations, and recommendations for statistics and research. The assessment indicated that the current biomass of North and South Atlantic blue shark seems to be above MSY ($B>B_{MSY}$); however, these results are conditional and based on assumptions that were made by the committee. These assumptions indicate that blue sharks are not currently overfished. However, this conclusion is conditional and based on limited landings data. NMFS has determined that the stock status of blue sharks is unknown (see Table 2.2).

The committee estimates that between 82,000 and 114,000 mt ww (180,779,054 – 251,326,978 lb) of blue shark are harvested from the Atlantic Ocean each year.

The North Atlantic shortfin mako population has experienced some level of stock depletion as suggested by the historical CPUE trend and model outputs. The current stock may be below MSY ($B<B_{MSY}$), suggesting that the species may be overfished. Overfishing may also be occurring, as between 13,000 and 18,000 mt ww (28,660,094 – 39,683,207 lb) of shortfin mako are harvested in the Atlantic Ocean annually. South Atlantic stocks of shortfin mako shark are likely fully exploited as well, but depletion rates are less severe than in the North Atlantic. NMFS has determined that the stock status of shortfin mako sharks is unknown (see Table 2.2).

The results of both of these assessments should be considered preliminary in nature due to limitations on quality and quantity of catch data available. The subcommittee stated that catch data currently being reported to ICCAT does not represent the total catch actually landed, and are very limited with regard to size, age, and sex of sharks harvested or caught incidentally. In order to attain a more accurate estimate of total landings, and improve future stock assessments, the committee made several recommendations, including: 1) increase the infrastructure investment for monitoring the overall catch composition of sharks; 2) standardize catch per unit effort (CPUE) from major fishing fleets; 3) expand use of trade statistics (fins) to extend historical time series; and 4) include input from scientists from all Contracting Parties with significant blue and shortfin mako catches in future assessments. ICCAT held pelagic shark (blue and shortfin mako) data review meetings in the fall of 2007. Shark assessments for shortfin mako and blue sharks are scheduled for 2008. An assessment for porbeagle sharks may be completed in the future.

COSEWIC Stock Assessment on Porbeagle

The COSEWIC conducted a species report and assessment for porbeagle sharks in 2004. They suggest that significant declines in porbeagle shark abundance have occurred as a result of overexploitation in the fisheries. In May 2004, the COSEWIC recommended to the Canadian Minister of Fisheries that porbeagle sharks be listed as endangered under the Species at Risk Act (SARA) under Canadian Law. In 2006, the Canadian government decided not to list the porbeagle shark under SARA.

The Canadian Department of Fisheries and Ocean has conducted stock assessments on porbeagle sharks in 1999, 2001, 2003, and 2005. Reduced Canadian porbeagle quotas in 2002 brought the 2004 exploitation rate to a sustainable level. According to the 2005 recovery assessment report conducted by Canada, the North Atlantic porbeagle stock has a 70 percent probability of recovery in approximately 100 years if F is less than or equal to 0.04. To date, the United States has not conducted a stock assessment on porbeagle sharks. NMFS has reviewed the Canadian stock assessment and deems the Canadian assessment to be the best available science and appropriate to use for U.S. domestic management purposes. The Canadian assessment indicates that porbeagle sharks are overfished ($SSN_{2004}/SSN_{MSY} = 0.15 – 0.32$; SSN is

spawning stock number and used as a proxy for biomass). However, the Canadian assessment indicates that overfishing is not occurring ($F_{2004}/F_{MSY} = 0.83$). Based on these results, NMFS declared the status of porbeagle sharks as overfished, but overfishing is not occurring (71 FR 65086).

Additional information on all Atlantic shark species managed by NMFS can be found in the Final Environmental Impact Statement (FEIS) of Amendment 2 to the Consolidated HMS FMP (73 FR 21124, April 18, 2008; Final Rule: 73 FR 35778, June 24, 2008). This document can be found electronically at: http://www.nmfs.noaa.gov/sfa/hms/hmsdocument_files/sharks.htm, or by calling the HMS Management Division at 301-713-2347.

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