

5.0 UPDATED STATUS OF THE HIGHLY MIGRATORY SPECIES MANAGEMENT UNIT SPECIES

This chapter contains a brief review of the stock status for each species with respect to the Council-adopted Control Rules. Section 5.1 summarizes the adopted Control Rules and the Status Determination Criteria. In Section 5.2, a table of the recent and upcoming assessment efforts of various international scientific bodies responsible for assessing several of the stocks is presented. Section 5.3 contains summaries or excerpts from the results of stock assessments conducted in 2007. The summaries are derived from the assessments or reports of working group meetings associated with the assessments and do not necessarily represent the conclusions of the Council's HMS Management Team or NMFS. In many cases there has been minimal outside review of the assessment. Nevertheless, they represent the best available information for those species in 2007 to compare to past and future work. A table summarizes the current stock status of the management unit species with respect to overfishing and overfished criteria. The conclusions presented in the table should be reasonably accurate, but should also be treated with caution. Assessments of stock status always involve assumptions, use of uncertain parameters, and particular interpretations of fishery statistics. There are no universally-accepted standards by which to determine confidence for particular assessments, and "ground-truthing" (i.e., comparing assessment estimates to actual population counts) will never be possible over the broad range occupied by highly migratory species. Furthermore, for most of these species, the scientific bodies developing the assessments have not agreed upon appropriate biological reference points for use in the context of managing fisheries. Therefore, explicit definitions for both overfished and sustainable exploitation levels are not currently available. Finally, Section 5.4 provides some information on assessments that have already been produced in 2008 but may not yet be endorsed by the plenary bodies of the respective RFMOs. This information is provided so that readers can access the most recent publicly available assessments of the management unit species. However, keep in mind that these assessment results are preliminary until endorsed by the respective RFMOs and published in final form. These assessments will be reported on in the 2008 HMS SAFE Report (to be published in September 2009).

5.1 Control Rules for Management

The Control Rules and Status Determination Criteria implemented in the HMS FMP are based on the Technical Guidance for National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (Restrepo, et al. 1998). The following is a summary of the Control Rules for Management adopted for the HMS FMP.

In general, a default maximum sustainable yield (MSY) control rule was adopted for most MUS, with an optimum yield (OY) target control rule for the vulnerable species (Figure 5-1).

For the less vulnerable species managed under the MSY Control Rule, the minimum stock size threshold (MSST), the minimum biomass at which recovery measures are to begin, is the ratio B_{MSST}/B_{MSY} . It specifies a lower biomass level that allows remedial action not to be triggered each time B drops below B_{MSY} , simply from natural variation. In terms of B_{MSY} the recommended level of B_{MSST} is:

$$\begin{aligned} B_{MSST} &= (1-M)B_{MSY} && \text{when } M \text{ (natural mortality)} \leq 0.5, \text{ and} \\ B_{MSST} &= 0.5B_{MSY} && \text{when } M > 0.5 \end{aligned}$$

(i.e., whichever is greater). B_{MSST} must not be less than $B_{MIN} = 0.5B_{MSY}$ and should allow recovery back to B_{MSY} within 10 years when F (fishing mortality) is reduced to zero (to the extent possible).

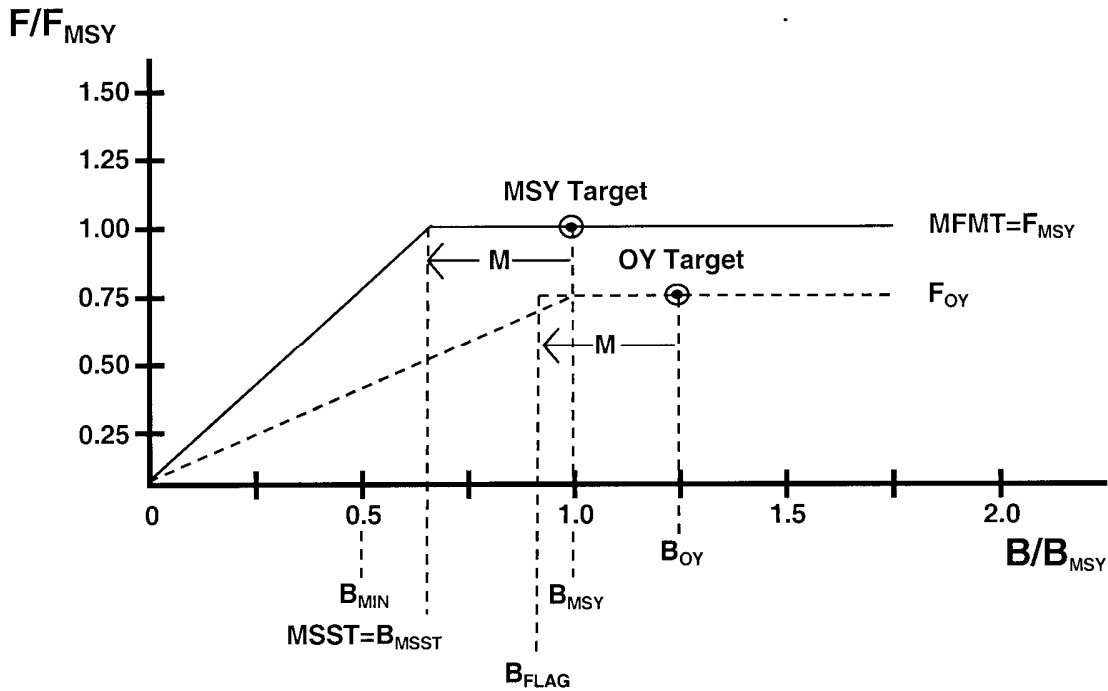


Table 5-1. General model of MSY and OY Control Rules, from Restrepo, et al. 1998.

For the vulnerable species, which in this FMP includes the pelagic sharks, bluefin tuna, and striped marlin, there is a Minimum Biomass Flag (B_{FLAG}) for the OY Control Rule equal to $(1-M)B_{OY}$ or $0.5B_{OY}$ (whichever is greater). B_{FLAG} , which would then be equivalent to $1.25(B_{MSST}/B_{MSY})$, serves as a warning call to halt biomass reduction that would jeopardize obtaining OY (which is defined as MSY reduced by relevant socioeconomic factors, ecological considerations, and fishery-biological constraints so as to provide the greatest long-term benefits to the Nation) on average. In this FMP, the OY for vulnerable species is set at $0.75MSY$ (or MSY proxy), and any harvest guideline is set equal to OY.

Rebuilding of overfished stocks is a unilateral requirement by the Magnuson-Stevens Act (MSA), but internationally-fished stocks require cooperative catch reductions among the fishing nations for this rebuilding to be effective. U.S. responsibility in the rebuilding, however, will be greater the more localized the stock and the greater the domestic take of the stock's production.

Table 5-2. Recent stock status with respect to management criteria.

Note that for most of these species, the scientific bodies developing the assessments do not have a consensus biological reference point for use in the context of managing the fisheries. Levels of F and B are provided based on the most recent analyses, but in many cases the analyses have not been updated for several years. Thus, those findings should be viewed cautiously for management purposes.

Species (stock)	$F_{\text{Recent}}/F_{\text{MSY}} > 1.0$	Overfishing? ($F/F_{\text{MSY}} > 1.0$)	$B_{\text{Recent}}/B_{\text{MSY}} > 1.0$	$B_{\text{MSST}}/B_{\text{MSY}}$	Overfished? ($B_{\text{Recent}} < B_{\text{MSST}}$)	$B_{\text{FLAG}}^2 / (1.25B_{\text{MSST}}/B_{\text{MSY}})$	Assessment
TUNAS							
Albacore (NPO)	1.67–2.31 ³	Unknown ³	Unknown ³	0.7	Unknown ³		ISC 2007a
Bluefin (NPO)	>1.0 ⁴	Unknown ⁴	Unknown	0.75	Unknown	0.94	ISC 2006
Bigeye (EPO)	1.30 ⁵	Y	Y	1.08 ⁵	N		IATTC, Aires-da-Silva and Maunder 2007
Bigeye (WCPO)	1.32 ⁶	Y	Y	1.27 ⁶	N		WCPFC, Hampton, et al. 2006
Skipjack (EPO)	Unknown ⁷	Unlikely ⁷	Unlikely ⁷	0.5	Unlikely ⁷		IATTC, Maunder and Deriso 2007
Skipjack (WCPO)	0.17 ⁸	N	N	3.01 ⁸	N		WCPFC, Langley, et al. 2005
Yellowfin (EPO)	1.14 ⁵	Y	Y	0.96 ⁵	N		IATTC, Maunder 2007
Yellowfin (WCPO)	0.95 ⁶	Y	Y	1.10 ⁶	N		WCPFC, Langley, et al. 2007
BILLFISHES							
Striped Marlin (NPO)	Unknown ⁹	Unknown	Unknown	0.5	Unknown		ISC 2007b
Striped Marlin (EPO)	<1.0 ¹⁰	N	N	≥1.0	N	0.63	IATTC, Hinton and Maunder 2003
Swordfish (NWPO)	Unknown ¹¹	Unlikely	Unlikely	0.61–0.8	Unlikely		ISC 2004
Swordfish (SEPO)	Unknown ¹²	Unknown	Unknown		N		IATTC, Hinton and Maunder 2006
SHARKS							
C. Thresher (CA,OR,WA)	<1.0 ¹³	N	N	~1.10	N	0.96	NMFS, PFMC HMS plan development team 2002
Pelagic Thresher	Unknown ¹⁴	Unknown	Unknown	0.85	Unknown	1.06	
Bigeye Thresher	Unknown ¹⁵	Unknown	Unknown	0.78	Unknown	0.97	
Shortfin Mako	<1.0 ¹⁶	N	N	0.71	N	0.89	NMFS, PFMC HMS plan development team 2002
Blue	<0.5 ¹⁷	N	N	0.78	N	0.97	NMFS and NRIFS Japan, Kleiber, et al. 2001
OTHER							
Dorado	Unknown ¹⁸	Unknown	Unknown	0.5	Unknown		

Notes:

- Measures of F_{MSY} and B_{MSY} are not available for all species. Various proxies for these values have been used in preparing this table. However, PFMC has not adopted the use of a particular proxy; hence the designation of Overfishing and Overfished should be considered preliminary.
- For vulnerable species managed under the OY control rule only: bluefin tuna, striped marlin, and pelagic sharks.
- Albacore results are based on a suite of F_{MSY} proxies ($F_{40\%}$, $F_{35\%}$, $F_{30\%}$ and $F_{0.1}$), the estimated level of recent (2002–2004) fishing pressure ($F=0.75$), and constant productivity ($R = 27.375$ million recruits. However, “Unknown” is indicated because of the lack of a PFMC reference point for management.

4 Bluefin analyses indicated that F has exceeded F_{Max} 2-fold during the last 2 decades. However, “Unknown” is indicated because of the lack of a PFMC reference point for management.

5 EPO bigeye and EPO yellowfin results are based on base-case assessments assuming no stock-recruitment relationships and estimated recent (2004–2005) fishing effort.

6 WCPO bigeye and yellowfin results are based on the base-case assessments.

7 Because of uncertainties in the estimates of growth and natural mortality, MSY-proxy reference points could not be calculated for EPO skipjack; however, based on a new model examining non-MSY based stock condition indicators, the IATTC does not consider there to be a need for management due increasing CPUE indices and high biomass estimates relative to historical levels.

8 CWPO skipjack results are from the base-case assessment.

9 MSY-proxy reference points were not be calculated for NP striped marlin; however, the declining biomass trend and the level of recent fishing effort relative to many commonly used MSY proxy reference points indicates overfishing may be occurring. The ISC recommended that F not be increased.

10 Two production models demonstrate that the EPO striped marlin population is in good condition with fishing effort and landings in decline since the early 1990s.

11 Standardized CPUEs from swordfish fisheries indicate declining trends in the northwest Pacific; however, the fisheries are causing, at worst, modest declines in abundance.

12 Specific values for F/F_{AMSY} and B/B_{AMSY} are not available; however the assessment results indicate that stock biomass is well above the level which would support AMSY.

13 U.S. west coast EEZ regional catch and CPUE demonstrated the population increasing from estimated low levels in the early 1990s. Recent (2000–03). West coast commercial landings average 318 mt, which is less than $0.75 \times \text{MSY}$ proxy (MSY proxy = LMSY from the Population Growth Rate method).

14 Status unknown, but catches are incidental and occur on the edge of the species’ range, predominately during warm water years.

15 Status unknown, but catches are incidental and occur on the edge of the species’ range.

16 Tentative results based on commercial landings and CPUE calculations. Recent (2000–03) west coast commercial landings average 70 mt, which is less than $0.75 \times \text{MSY}$ proxy (MSY proxy = average landings 1981–99).

17 Analyses demonstrated that for North Pacific blue shark, fishing pressure is 2 to 15 times below F_{MSY} . West coast catch is poorly documented because the fish are not landed.

18 Status unknown, but dorado are highly productive and widely distributed throughout tropical/subtropical Pacific. Recent west coast landings average 16 mt.

Table 5-3. Stockwide and regional catches for HMS management unit species (x1,000 mt round weight), 2002–06.

Species (stock)	Stockwide Catch	U.S. West Coast Catch		Average Annual Fractional Catch
		Commercial	Recreational	
<u>TUNAS</u>				
Albacore (NPO)	62–105 ¹	9–17	0.2–2.8	0.17
Bluefin (NPO)	19–27 ¹	<0.2	0.03–0.3	<0.01
Bigeye (EPO)	111–132 ²	<0.05	<0.01	<0.01
Skipjack (EPO)	154–299 ²	0.05–0.5	0.01–0.1	<0.01
Yellowfin (EPO)	177–440 ²	0.08–0.5	0.1–0.3	<0.01
<u>BILLFISHES</u>				
Striped Marlin (EPO)	1.5–2.2 ²	<0.01 ³	0.02 ⁴	0.01
Swordfish (EPO)	13–20 ²	0.3–2.1	<0.01	0.07
<u>SHARKS</u>				
Common Thresher	Unknown	0.1–0.3	0.01–0.13	
Pelagic Thresher	Unknown	<0.01		
Bigeye Thresher	Unknown	≤0.01		
Shortfin Mako	Unknown	<0.03–0.08	0.02–0.09	
Blue (NPO)	Unknown	<0.06 ³	<0.01	
<u>OTHER</u>				
Dorado	4–11 ⁵	<0.01	0.02–0.26	0.01

Notes:

Data are from updated commercial (Table 4-4), CPFV (Table 4-51), and private recreational (Table 4-47) catches with weight conversions of 8.7 kg/albacore, 8.7 kg/bluefin, 10.0 kg/bigeye tuna, 3.0 kg/skipjack, 4.9 kg/yellowfin, 57.9 kg/striped marlin, 113 kg/swordfish, 29.2 kg/common thresher, 16.8 kg/mako, 8 kg/blue shark, and 5.6 kg/dorado.

¹ International Scientific Committee Eighth Plenary Report Catch Tables, July 2008.

² IATTC catch tables extracted 8/7/08.

³ Striped marlin and blue shark commercial catches include estimates from the drift gillnet observed catch.

⁴ Striped marlin recreational catch is estimated at 300 fish/year based on club records plus CPFV logbook recorded catch.

⁵ FAO Area 77 catch extracted from March 27, 2008 FAO global fishery production dataset.