NATIONAL MARINE FISHERIES SERVICE (NMFS) WEST COAST REGION AND SOUTHWEST FISHERIES SCIENCE CENTER (SWFSC) JOINT REPORT ON BIENNIAL MANAGEMENT MEASURES

This report provides an overview of completed or pending status determinations for highly Migratory species (HMS) stocks based on stock assessments reviewed in 2019 and 2020. A list of these assessments is included in this report. Additionally, this report provides estimates of the maximum sustainable yield (MSY), maximum fishing mortality threshold (MFMT), and minimum stock size threshold (MSST); as well as updates on reference points adopted by Regional Fishery Management Organizations (RFMOs) for the stocks discussed below.

International Scientific Committee (ISC) Assessments

In 2019, International Scientific Committee (ISC) Working Groups assessed the striped marlin (*Kajikia audax*) stock in the Western and Central Pacific Ocean (WCPO). NMFS determined that this stock continues to be both overfished and subject to overfishing, based on the best scientific information available (BSIA), as reflected in Tables 1 and 2. In September 2016, pursuant to 304(i) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), NMFS sent notice to the Pacific Fishery Management Council (Council) regarding this stock status (see Agenda Item J.3). In July 2017, the Council recommended no new domestic regulations or additional international recommendations, citing no known impact of U.S. West Coast vessels on the WCPO stock and evidence that all Western and Central Pacific Fisheries Commission (WCPFC) members were complying with catch reductions in conservation and management measure 2010-01. Currently, NMFS has no plans to send the Council another letter pursuant to MSA 304(i) regarding the status of striped marlin. However, that does not preclude the Council from making recommendations for domestic or international measures aimed at ending overfishing on this stock.

In 2020, ISC Working Groups assessed Pacific bluefin tuna (PBF, *Thunnus orientalis*) and albacore tuna (*Thunnus alalunga*) in the North Pacific Ocean (NPO). The results from these stock assessments, reflected in Tables 1 and 2, are considered BSIA. These results indicate that PBF is overfished and subject to overfishing, and that albacore is not overfished nor subject to overfishing. However, NMFS' status determination for these stocks is pending. The 2020 assessments will be considered by the WCPFC Northern Committee (NC) and Fifth Joint Inter-American Tropical Tuna Commission (IATTC)-NC Working Group Meeting on PBF Management in September 2020, as well as by the IATTC at its next meeting (date TBD).

NMFS does not anticipate sending the Council another letter pursuant to MSA 304(i) regarding the status of PBF. Domestic regulations are consistent with international measures that appear effective in increasing biomass consistent with the schedule and rebuilding targets adopted by the RFMOs. However, the lack of a formal letter from NMFS pursuant to 304(i) does not preclude the Council from making additional domestic or international recommendations aimed at ending overfishing on this stock.

IATTC Assessments

In 2019, IATTC Scientific Staff determined, and the IATTC Scientific Advisory Committee (SAC) concurred, that the stock assessments for bigeye tuna (*T. obesus*) and yellowfin tuna (*T. albacares*) in the eastern Pacific Ocean (EPO) were not suitable for management. IATTC staff, NMFS, and the SSC considered several issues with the longline index that needed to be addressed. In 2019, the IATTC completed indicator analyses for the EPO stocks of bigeye, yellowfin, and skipjack tuna (*Katsuwonus pelamis*) for management purposes, and planned a rigorous update to the models for benchmark assessments of both EPO bigeye and yellowfin stocks in 2020. NMFS last determined EPO yellowfin to be subject to overfishing, but not overfished, based on a 2018 assessment (see Tables 1 and 2); and the Council made recommendations in 2019 pursuant to MSA 304(i). This was despite concerns regarding the effect of the longline index on the F-multiplier in the 2018 assessment since these issues were not as apparent until IATTC staff produced the results of the 2019 assessment. Most recently, EPO bigeye tuna was determined to be neither overfished nor subject to overfishing, based on BSIA from a 2017 assessment, as reflected in Table 1 and Table 2. The last status determination for skipjack was in 2011, and it was neither overfished nor subject to overfishing.

In 2020, IATTC scientific staff used a new approach for assessing bigeye and yellowfin tuna in the eastern Pacific Ocean. IATTC scientific staff presented risk assessments for both stocks instead of base case assessments. The risk assessments show the probability of exceeding F_{MSY} or SSB_{MSY} as opposed to providing a base case model estimate for $F_{current}$ and $SSB_{current}$. This change may have implications for evaluating the results of these assessments relative to status determination criteria specified in the HMS Fishery Management Plan. The SAC plans to review these assessments during a meeting planned for September 21-25, 2020. Once these assessments are final, NMFS can consider whether they constitute BSIA for determining the status of these stocks. NMFS intends to update the Council in advance of its November 2020 meeting on this process. It may be useful to obtain Council input at that time on applying the results of the new risk assessment models to status determination criteria.

Secretariat of the Pacific Community (SPC) Assessments

In 2019, SPC staff assessed the WCPO stock of skipjack tuna. In 2020, NMFS determined that stock was neither overfished nor subject to overfishing based on BSIA, which is included in Table 1 and Table 2.

In 2020, SPC staff assessed the WCPO stocks of bigeye tuna and yellowfin tuna. BSIA and status determinations based on those assessments are pending.

List of 2019-2020 HMS Stock Assessments

North Pacific Albacore (2020): Stock Assessment of Albacore Tuna in the North Pacific Ocean in 2020. Report of the Albacore Working Group. International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean 15-20 July 2020.

Pacific Bluefin (2020): Stock Assessment of Pacific Bluefin Tuna in the Pacific Ocean in 2020. ISC Pacific Bluefin Tuna Working Group. International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean 15-20 July 2020.

Bigeye (EPO) (2020): Bigeye Tuna in the Eastern Pacific Ocean, 2019: Benchmark Assessment. Haikun Xu, Mark N. Maunder, Carolina Minte-Vera, Juan L. Valero, Cleridy Lennert-Cody, and Alexandre Aires-da-Silva. Prepared for the Eleventh Meeting of the Inter-American Tropical Tuna Commission (IATTC) Scientific Advisory Committee. Doc SAC-11-06.

Bigeye (WCPO) (2020): Stock assessment of bigeye tuna in the western and central Pacific Ocean. N. Ducharme Barth, M. Vincent, J. Hampton, P. Hamer, P. Williams, G. Pilling. Scientific Committee Sixteenth Regular Session, August 11-20, 2020. SC16-SA-WP-03.

Skipjack (EPO) (2019): Updated Indicators Of Stock Status for Skipjack Tuna in the Eastern Pacific Ocean. Maunder, M. Prepared for the Tenth Meeting of the IATTC SAC, May 13-17, 2019, La Jolla, California USA. Doc SAC-10-09.

Skipjack (WCPO) (2019): Stock assessment of skipjack tuna in the western and central Pacific Ocean (25July) – Rev.02. Vincent, M., G. Pilling and J. Hampton. Scientific Committee Fifteenth Regular Session. Western and Central Pacific Fisheries Commission, August 12-19, 2019. WCPFC-SC15-2019/SA-WP-05.

Yellowfin (EPO) (2020): Yellowfin Tuna in the Eastern Pacific Ocean, 2019: Benchmark Assessment. Carolina Minte-Vera, Mark N. Maunder, Haikun Xu, Juan L. Valero, Cleridy E. Lennert-Cody, and Alexandre Aires-da-Silva. Prepared for the Eleventh Meeting of the Inter-American Tropical Tuna Commission (IATTC) Scientific Advisory Committee. Doc SAC-10-07.

Yellowfin (WCPO) (2020): Stock assessment of yellowfin tuna in the western and central Pacific Ocean. M. Vincent, N. Ducharme Barth, J. Hampton, P. Hamer, P. Williams, G. Pilling. Scientific Committee Sixteenth Regular Session, August 11-20, 2020. SC16-SA-WP-04.

Striped marlin (WCPO) (2019): Stock Assessment Report for Striped Marlin *(Kajikia audax*) in the Western and Central North Pacific Ocean Through 2017. Report of the Billfish Working Group. International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean, July 11-15, 2019, Taipei, Taiwan.

Table 1. Stock assessment information for the purposes of determining whether HMS stocks are subject to overfishing.

Management Unit Species	**Assessment Overview**			**Overfishing**					
Stock	**Assessment or Indicator Analysis**	**Assessment Year**	**Assessment Lead**	**MFMT (F_{MSY} or Proxy)**	**Current F_{MSY} or proxy estimate**	**Current F quantity estimate**	**RFMO Ref. point (if adopted)**	**F/F_{MSY} ratio**	**Subject to Overfishing?**
North Pacific albacore tuna	Assessment	2020	ISC	F_{MSY}	0.83	F2015-17= 0.5	NA	0.60	No
Blue shark in the NPO	Assessment	2017	ISC	F_{MSY}	0.35	F2002-14 = 0.13	NA	0.37	No
Pacific bluefin tuna in the NPO	Assessment	2020	ISC	$1\text{-}SPR_{MSY}$	0.79	1-SPR2016-18 = 0.86	NA	1.09	Pending
Shortfin mako shark in the NPO	Assessment	2018	ISC	$1\text{-}SPR_{MSY}$	0.26	$1\text{-}SPR_{MSY}$ 2013-15 = 0.16	NA	0.62	No
WCNPO swordfish	Assessment	2018	ISC	F_{MSY}	0.68	F2013-15 = 0.32	NA	0.47	No
Bigeye tuna in the EPO	Assessment	2017	IATTC	F_{MSY}	NA	F2014-16 = NA	NA	$F2014\text{-}16/F_{MSY}$ = 0.87	No
Yellowfin tuna in the EPO	Assessment	2018	IATTC	F_{MSY}	NA	F2015-17 = NA	NA	$F2015\text{-}17/F_{MSY}$ = 1.01	Yes
Skipjack tuna in the EPO	Assessment	2004	IATTC	NA	NA	NA	NA	NA	No
Common thresher shark	Assessment	2018	NMFS	$1\text{-}SPR_{MSY}$	0.45	1-SPR2012-14 = 0.097	NA	0.21	No
Bigeye tuna in the WCPO	Assessment	2020	SPC	F_{MSY}	0.05	F2018 = NA	NA	0.74	Pending
Yellowfin tuna in the WCPO	Assessment	2020	SPC	F_{MSY}	0.10	F2018=NA	NA	0.366	Pending
EPO swordfish	Assessment	2014	ISC	U (exploitation rate = catch/biomass)	0.18	F2012 = 0.19	NA	1.11	Yes
EPO striped marlin	Assessment	2010	IATTC	F	NA	NA	NA	0.16	No
Dorado									Unknown
WCNPO striped marlin	Assessment	2019	ISC	F_{MSY}	0.6	F3-12 ages in 2015-2017 = 1.07	NA	1.78	Yes

Table 2. Stock assessment information for the purposes of determining whether HMS stocks are overfished

Management Unit Species	**Assessment Overview**			**Overfished**						
Stock	**Assessment or Indicator Analysis**	**Assessment Year**	**Assessment Lead**	**B_{MSY} or proxy**	**Current B_{MSY} or proxy estimate**	**Current B quantity estimate**	**MSST (1-MxB$_{MSY}$ or 0.5B$_{MSY}$)**	**Current B/MSST**	**RFMO Ref. point (if adopted)**	**Overfished?**
North Pacific albacore tuna	Assessment	2020	ISC	SSB_{MSY}	19,535 mt	SSB2018 = 58,858 mt	10,158 mt	5.8	20%SSBcurrent, F=0 =25,590 mt	No
Blue shark in the NPO	Assessment	2017	ISC	SSB_{MSY}	179,539 mt	SSB2015 = 308,286	136,450-154,608 mt*	2.0 - 2.3	NA	No
Pacific bluefin tuna in the NPO	Assessment	2020	ISC	SSB_{MSY}	131,363 mt	SSB2018 = 28,228 mt	98,522 mt	0.3	NA	Pending
Shortfin mako shark in the NPO	Assessment	2018	ISC	SA_{MSY}	633,700 female sharks	SA2016 = 860,200 female sharks	(1-0.128)x633700 = 552,586 female sharks	1.6	NA	No
WCNPO swordfish	Assessment	2018	ISC	SSB_{MSY}	15,702 mt	SSB2016 = 29,403 mt	(1-0.22)x15702 = 12,248 mt	2.4	NA	No
Bigeye tuna in the EPO	Assessment	2017	IATTC	B (biomass of age 3+ quarters old fish) at $_{MSY}$	96,360 mt	B (age 3+ quarters old fish at start of 2017) = 118,523	48,130 mt	2.9	NA	No
Yellowfin tuna in the EPO	Assessment	2018	IATTC	S_{MSY} (S= unitless spawning biomass index)	3,634	S = 3,925 (S= unitless spawning biomass index)	1,817	2.1	NA	No
Skipjack tuna in the EPO	Assessment	2004	IATTC	NA	NA	NA	NA	NA	NA	No**
Common thresher shark	Assessment	2018	NMFS	SSB_{MSY}	101,500 mature females	SSB = 136,800 mature females	97,500 mature females	1.4	NA	No

Table 2 (continued). Stock assessment information for the purposes of determining whether HMS stocks are overfished.

Management Unit Species	Assessment Overview			Overfished						
Stock	**Assessment or Indicator Analysis**	**Assessment Year**	**Assessment Lead**	**B_{MSY} or proxy**	**Current B_{MSY} or proxy estimate**	**Current B quantity estimate**	**MSST (1-MxB$_{MSY}$ or 0.5B$_{MSY}$)**	**Current B/MSST**	**RFMO Ref. point (if adopted)**	**Overfished?**
Yellowfin tuna in the WCPO	Assessment	2020	SPC	SSB_{MSY}	860,326 mt	2,090.592 mt	NA	NA	20%SBF=0 where SBF=0 is average over 2005–2014	Pending
EPO swordfish	Assessment	2014	ISC	B_{MSY}	31,200	B2012 = 58,590 mt	20,280 mt	3***	NA	No
EPO striped marlin	Assessment	2010	IATTC	SSB_{MSY}	1246 mt	SSB2009 = 1488 mt	623 mt	2.3	NA	No
Dorado										Unknown
WCNPO striped marlin	Assessment	2019	ISC	SSB_{MSY}	2604 mt	SSB2017 = 981 mt	1302 mt	0.75	NA	Yes

***For EPO swordfish, appears $B2012/B_{MSY} = 1.87$ used for the status determination instead of $B2012/B_{MSST} = 3$; status is the same, not overfished.

PFMC
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