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SCIENTIFIC ADVISORY COMMITTEE

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Appendix 6: **Response to requests from IATTC-WCPFC NC Joint Working Group**

ISC PBFWG

2019

The following requests were made to ISC by the IATTC-WCPFC NC Joint Working Group meeting in September 2018 at NC14 (see Attachment E of NC14 Report (https://www.wcpfc.int/system/files/0_NC14%20Summary%20Report%20rev.1%20%2810Dec2018%29_0.docx)). Responses from ISC PBFWG are provided below the requests.

Request 1: review the updated abundance indices, including recruitment index, up to 2017 to evaluate the need to change its scientific advice in 2018.

Response from ISC PBFWG

The WG noted that some positive signs for the PBF stock were observed after the last assessment. In the 2018 assessment, the projections were considered optimistic because they were influenced by a high but uncertain recruitment in the terminal year (2016). The WG notes that the Japanese troll recruitment index value estimated for 2017 is similar to its historical average (1980-2017), that Japanese recruitment monitoring indices in 2017 and 2018 are higher than the 2016 value and that there is anecdotal evidence that larger fish are becoming more abundant in EPO, although this information needs to be confirmed for the next stock assessment expected in 2020.

After reviewing the updated CPUE indices as well as the Japanese recruitment monitoring results, the PBFWG recommends maintaining the conservation advice from ISC18 (in 2018) that the projection mimicking the current management measures under the low recruitment scenario resulted in an estimated 98% probability of achieving the initial rebuilding target (6.7%SSBF=0) by 2024 and that of achieving the second rebuilding target (20%SSBF=0) 10 years after the achievement of the initial rebuilding target or by 2034, whichever is earlier, is 96%.

In the projections reported here, the projected future SSBs are the medians of the 6,000 individual SSB calculated for each 300 bootstrap replicates (i.e. catch, CPUE and size) to capture the uncertainty of parameter estimations followed by 20 stochastic simulations based on the different future recruitment time series. The projection assumes that each harvesting scenario is fully implemented and is based on certain biological or other assumptions of base case assessment model. If conditions change, the projection results would be more uncertain.

Request 2: Conduct projections of harvest scenarios shown below based on 2018 assessment and provide probability of achieving initial and 2nd rebuilding targets in accordance with paragraph 2.1 of HS2017-02.

Scenarios for catch increase

West Pacific		East Pacific
Small fish	Large fish	
0	600t	400t
5%	1300t	700t
10%	1300t	700t
5%	1000t	500t
0	1650t	660t
5%		5%
10%		10%
15%		15%

* 250t transfer of catch limit from small fish to large fish by Japan is assumed to continue until 2020.

Response from ISC PBFWG

PBFWG conducted projections in the same manner as in the 2018 assessment. The recruitment scenario followed paragraph 2.1 of WCPFC Harvest Strategy 2017-02; and was kept at a low level (re-sampling from 1980-1989) until the initial rebuilding target is achieved and then changed to the historical average level.

The projection results are shown in Table 2 and Figure 1. The results show that increasing the catch limit of small PBF (<30 kg) in the WPO has the largest impact on the probability of achieving the interim and 2nd rebuilding targets. In addition, an overall increase in catch from the current limits, particularly a 15% increase, has the largest impact on achieving rebuilding targets.

Scenario #	Fishing mortality	Catch limit					Catch limit Increase		
		WPO		EPO			WPO		EPO
		Small	Large	Small	Large	Sport	Small	Large	
Base case	F2002-2004	4725	6582	3300		-		0%	
Current catch limit	F2002-2004*2	4725	6582	3300		-		0%	
1	F2002-2004*2	4725	7180	3699		-	0%	600	400
2	F2002-2004*2	4960	7880	4000		-	5%	1300	700
3	F2002-2004*2	5196	7880	4000		-	10%	1300	700
4	F2002-2004*2	4960	7580	3800		-	5%	1000	500
5	F2002-2004*2	4725	8231	3960		-	0%	1650	660
6	F2002-2004*2	4960	6909	3465		-		5%	
7	F2002-2004*2	5196	7238	3630		-		10%	
8	F2002-2004*2	5433	7567	3794		-		15%	

Table 2: Probability of achieving targets under projection scenarios for Pacific bluefin tuna Future projection scenarios for Pacific bluefin tuna and their probability of achieving various target levels by various time schedules based on the 2018 base-case model.

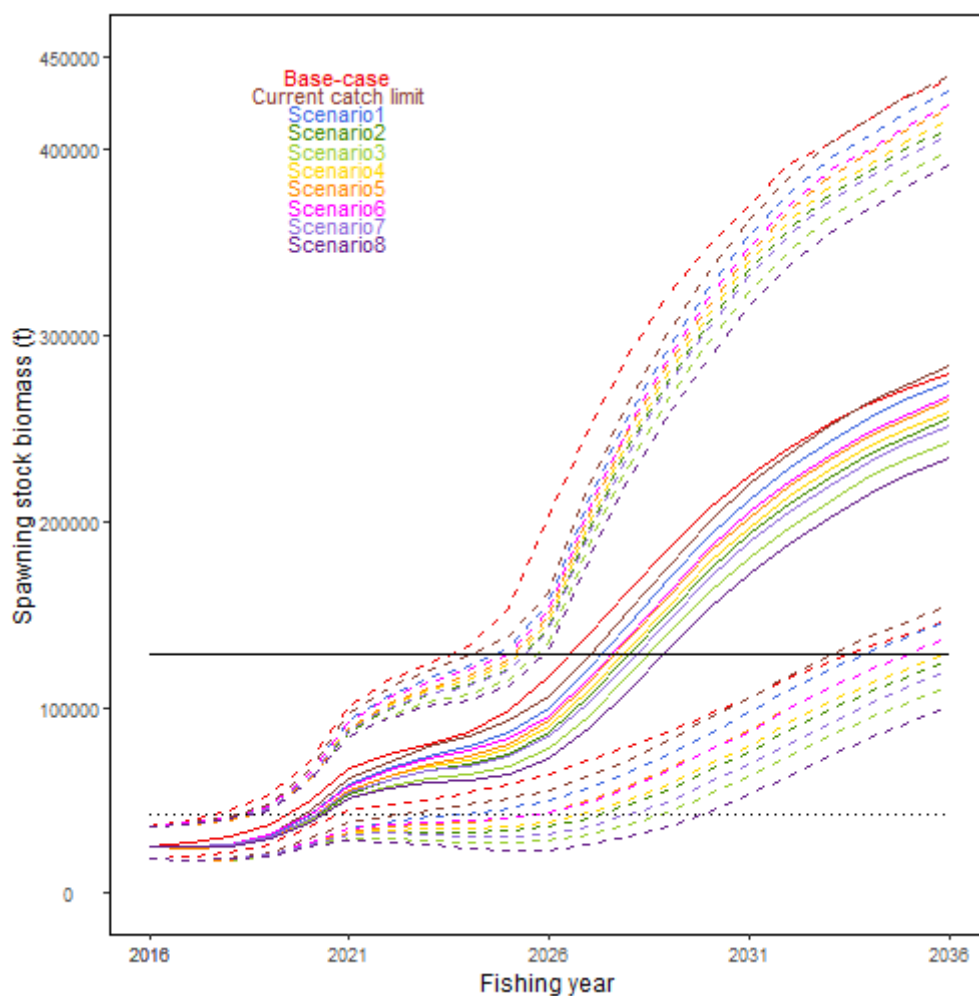| Scenario #	Catch limit Increase				Initial rebuilding target			Second rebuilding target		Median SSB (mt) at 2034
	WPO		EPO		The year expected to achieve the target with >60% probability	Probability of achiving the target at 2024	Probability of SSB is below the target at 2024 under the low recruitment	The year expected to achieve the target with >60% probability	Probability of achiving the target at 2034	
	Small	Large	Small	Large						
Base case	0%				2020	99%	0%	2028	96%	262,952
Current catch limit	0%				2021	97%	0%	2028	96%	264,748
1	0%	600	400		2021	95%	0%	2028	95%	256,252
2	5%	1300	700		2021	88%	0%	2029	91%	236,691
3	10%	1300	700		2021	81%	1%	2030	88%	224,144
4	5%	1000	500		2021	89%	0%	2029	92%	240,739
5	0%	1650	660		2021	92%	0%	2029	94%	246,593
6	5%				2021	93%	0%	2029	94%	248,757
7	10%				2021	86%	1%	2029	90%	232,426
8	15%				2021	76%	2%	2030	85%	215,385

Figure 1: Time series of the projected spawning stock biomass by various harvest scenarios listed on the Table 1. Each colored solid and broken lines indicate the median spawning stock biomass and its 95% confidence intervals, respectively. The black dotted and solid lines are corresponded to the spawning stock biomasses of the initial and second rebuilding targets of Pacific bluefin tuna, respectively.