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Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report V2.0

Fishery Under Assessment	**Yellowfin tuna *Thunnus albacares* FAO 77**
Date	**April 2018**
Assessor	**Conor Donnelly**

Application details and summary of the assessment outcome				
Name:				
Address:				
Country: Mexico		**Zip:**		
Tel. No.:		**Fax. No.:**		
Email address:		**Applicant Code**		
Key Contact:		**Title:**		
Certification Body Details				
Name of Certification Body:		**SAI Global**		
Assessor Name	**Peer Reviewer**	**Assessment Days**	**Initial/Surveillance/Re-approval**	**Whole fish/ By-product**
Conor Donnelly	Sam Dignan	1	Initial	By-product
Assessment Period	2017-2018			

Scope Details	
Management Authority (Country/State)	Inter-American Tropical Tuna Commission (IATTC)
Main Species	Yellowfin tuna *Thunnus albacares*
Fishery Location	FAO 77 Pacific, eastern central
Gear Type(s)	Purse seine, floating object, longline
Outcome of Assessment	
Overall Outcome	Pass
Clauses Failed	None
Peer Review Evaluation	Agree with Assessor's determination
Recommendation	Approval

Assessment Determination
Eastern Pacific Ocean (EPO) stock of yellowfin tuna are managed by the Inter-American Tropical Tuna Commission. The Commission co-ordinate scientific research and stock assessment of the species within its remit. The stock is subject to a species-specific management regime and was assessed under clause C. As fishery removals of EPO yellowfin tuna are included in the stock assessment process and the stock can be considered, in its most recent assessment, to have a biomass above its limit reference point it passes clause C. Yellowfin tuna is categorised as near threatened on IUCN's Red List of Threatened Species and is not listed on CITES (http://www.iucnredlist.org/details/21857/0, global assessment undertaken in 2011). **Yellowfin tuna in the EPO are recommended for approval as by-product under the IFFO RS Standard.**
Peer Review Comments
Agree with Assessor's determination.
Notes for On-site Auditor

Species-Specific Results

Category	Species	% landings	Outcome (Pass/Fail)	
Category A			A1	
			A2	
			A3	
			A4	
Category B				
Category C	Yellowfin tuna *Thunnus albacares*	NA	Pass	
Category D				

[List all Category A and B species. List approximate total %age of landings which are Category C and D species; these do not need to be individually named here]

HOW TO COMPLETE THIS ASSESSMENT REPORT

This assessment template uses a modular approach to assessing fisheries against the IFFO RS standard.

Whole Fish

The process for completing the template for a **whole fish** assessment is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table, to determine which categories of species are present in the fishery.
2. ALL ASSESSMENTS: Complete clauses M1, M2, M3: Management.
3. IF THERE ARE CATEGORY A SPECIES IN THE FISHERY: Complete clauses A1, A2, A3, A4 for **each** Category A species.
4. IF THERE ARE CATEGORY B SPECIES IN THE FISHERY: Complete the Section B risk assessment for **each** Category B species.
5. IF THERE ARE CATEGORY C SPECIES IN THE FISHERY: Complete clause C1 for **each** Category C species.
6. IF THERE ARE CATEGORY D SPECIES IN THE FISHERY: Complete Section D.
7. ALL ASSESSMENTS: Complete clauses F1, F2, F3: Further Impacts.

A fishery must score a pass in **all applicable clauses** before approval may be recommended. To achieve a pass in a clause, the fishery/species must meet **all** of the minimum requirements.

By-products

The process for completing the template for **by-product raw material** is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table with the names of the by-product species and stocks under assessment. The '% landings' column can be left empty; all by-products are considered as Category C and D.
2. IF THERE ARE CATEGORY C BYPRODUCTS UNDER ASSESSMENT: Complete clause C1 for **each** Category C by-product.
3. IF THERE ARE CATEGORY D BYPRODUCTS UNDER ASSESSMENT: Complete Section D.
4. ALL OTHER SECTIONS CAN BE DELETED. Clauses M1 - M3, F1 - F3, and Sections A and B do not need to be completed for a by-product assessment.

By-product approval is awarded on a species-by-species basis. Each by-product species scoring a pass under the appropriate section may be approved against the IFFO RS Standard.

SPECIES CATEGORISATION

The following table should be completed as fully as the available information permits. Any species representing more than 0.1% of the annual catch should be listed, along with an estimate of the proportion of the catch each species represents. The species should then be divided into Type 1 and Type 2 as follows:

- **Type 1 Species** can be considered the 'target' or 'main' species in the fishery. They make up the bulk of annual landings and are subjected to a detailed assessment.
- **Type 2 Species** can be considered the 'bycatch' or 'minor' species in the fishery. They make up a small proportion of the annual landings and are subjected to relatively high-level assessment.

Type 1 Species must represent 95% of the total annual catch. Type 2 Species may represent a maximum of 5% of the annual catch (see Appendix B).

Species which make up less than 0.1% of landings do not need to be listed (NOTE: ETP species are considered separately). The table should be extended if more space is needed. Discarded species should be included when known.

The 'stock' column should be used to differentiate when there are multiple biological or management stocks of one species captured by the fishery. The 'management' column should be used to indicate whether there is an adequate management regime specifically aimed at the individual species/stock. In some cases it will be immediately clear whether there is a species-specific management regime in place (for example, if there is an annual TAC). In less clear circumstances, the rule of thumb should be that if the species meets the minimum requirements of clauses A1-A4, an adequate species-specific management regime is in place.

NOTE: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it **cannot** be approved for use as an IFFO RS raw material. This applied to whole fish as well as by-products.

TYPE 1 SPECIES (Representing 95% of the catch or more)
Category A: Species-specific management regime in place.
Category B: No species-specific management regime in place.

TYPE 2 SPECIES (Representing 5% OF THE CATCH OR LESS)
Category C: Species-specific management regime in place.
Category D: No species-specific management regime in place.

Common name	Latin name	Stock	% of landings	Management	Category
Yellowfin tuna	*Thunnus albacares*	EPO	NA	IATTC	C

CATEGORY C SPECIES

In a whole fish assessment, Category C species are those which make up less than 5% of landings, but which are subject to a species-specific management regime. In most cases this will be because they are a commercial target in a fishery other than the one under assessment. In a by-product assessment, Category C species are those which are subject to a species-specific management regime, and are usually targeted species in fisheries for human consumption.

Clause C1 should be completed for **each** Category C species. If there are no Category C species in the fishery under assessment, this section can be deleted. A Category C species does not meet the minimum requirements of clause C1 should be re-assessed as a Category D species.

Species Name		Yellowfin tuna *Thunnus albacares*	
C1	**Category C Stock Status - Minimum Requirements**		
	C1.1	Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible.	Pass
	C1.2	The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	Pass
		Clause outcome:	Pass

Evidence

This by-product assessment is of the Eastern Pacific Ocean (EPO) stock of yellowfin tuna. Yellowfin are distributed across the Pacific Ocean, but the bulk of the catch is made in the eastern and western regions. Purse-seine catches of yellowfin are relatively low in the vicinity of the western boundary of the EPO at 150^{O}W. The regional fidelity found in tagging studies and geographic variation in phenotypic and genotypic characteristics of yellowfin shown in some studies, suggests that there might be multiple stocks of yellowfin in the EPO and throughout the Pacific Ocean. However, the stock assessment assumes a single stock of yellowfin in the EPO (Minte-vera *et al*, 2016).

The stock was last assessed in 2016 (Minte-vera *et al*, 2016) using an integrated statistical age-structured stock assessment model (Stock Synthesis Version 3.23b). The assessment requires a significant amount of information including data on retained catch, discards, catch per unit of effort (CPUE), and size compositions of the catches from several different fisheries.

The IATTC adopted interim target and limit reference points (TRP and LRP) for tropical tunas including yellowfin in 2014. The TRP is biomass (B) and fishing mortality rate (F) corresponding to maximum sustainable yield (Bmsy and Fmsy). The LRP is the B and F associated with a 50% reduction in unfished recruitment (50% R_0) using a conservative assumption of stock recruitment relationship (steepness, or h = 0.75) (Valero *et al*, 2017). This LRP relates to a depletion of 0.077B_0 (figure 1). The TRP and LRP for yellowfin tuna are shown in figure 2 and status against these targets shown in figure 3.

The stock is currently above its LRP but below its TRP. Minte-vera *et al*, 2016 note that the spawning biomass ratio (the ratio of the spawning biomass to that of the unfished population; SBR) at the start of 2017 was estimated to be 0.23, below the MSY level (0.27). Since 2011 the SBR has been estimated to be slightly below or at the MSY level, following the series of low recruitments since 2007, which coincided with a series of strong La Niña events. Under the current (2014-2016 average) fishing mortality, the SBR is predicted to increase in the next two years, following the above-average recruitments of 2015 and 2016, and stabilize slightly above the MSY in the future (figure 4) if recruitment is average. Minte-vera *et al*, 2016 note that the different productivity regimes may support different MSY levels and associated SBRs.

Consequently, fishery removals of yellowfin tuna in the EPO are included in the stock assessment process and the species is considered, in its most recent stock assessment, to have a biomass above the limit reference point. It passes clause C.

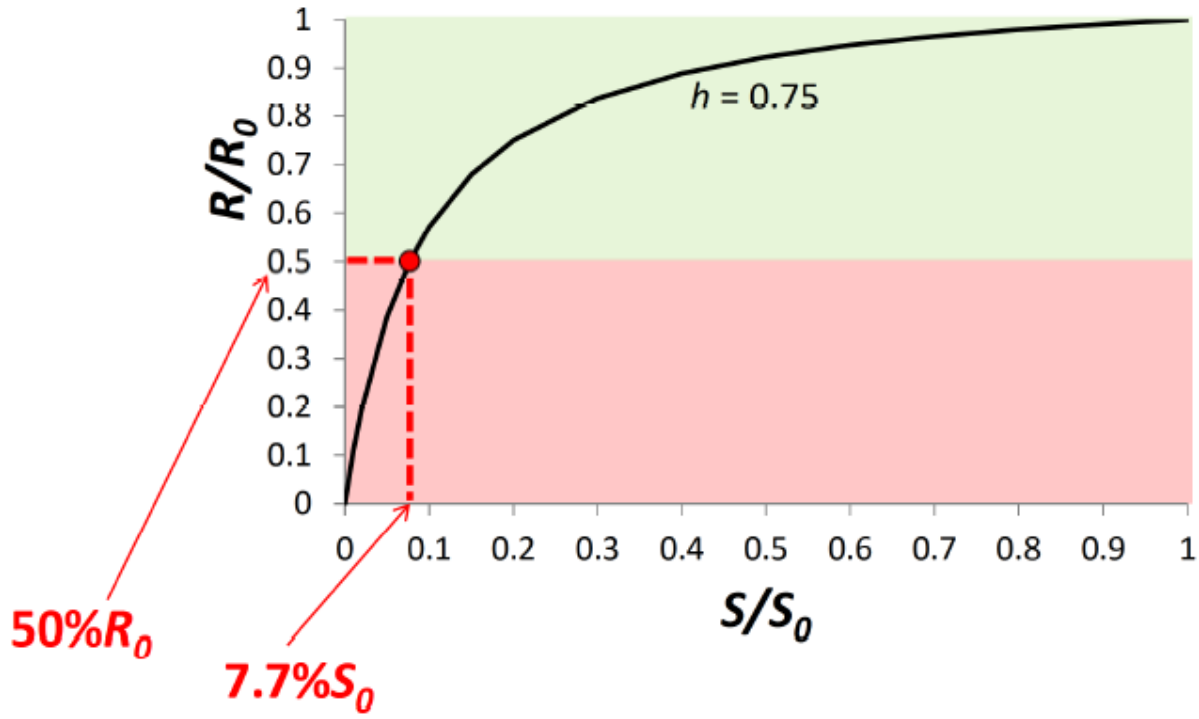

Figure 1. IATTC interim limit reference point. Source: Valero et al, 2017.

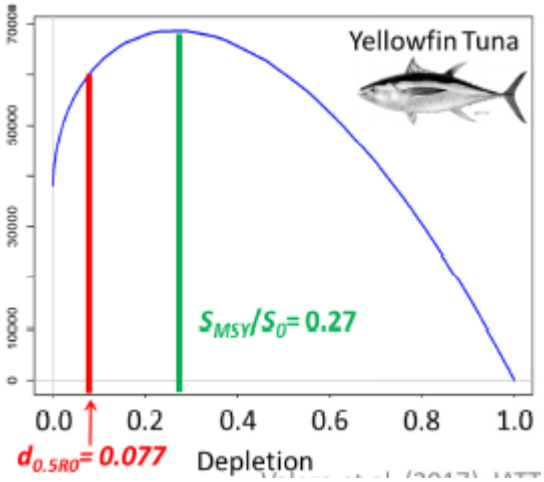

Figure 2. Yellowfin tuna interim reference points. Source: Valero et al, 2017.

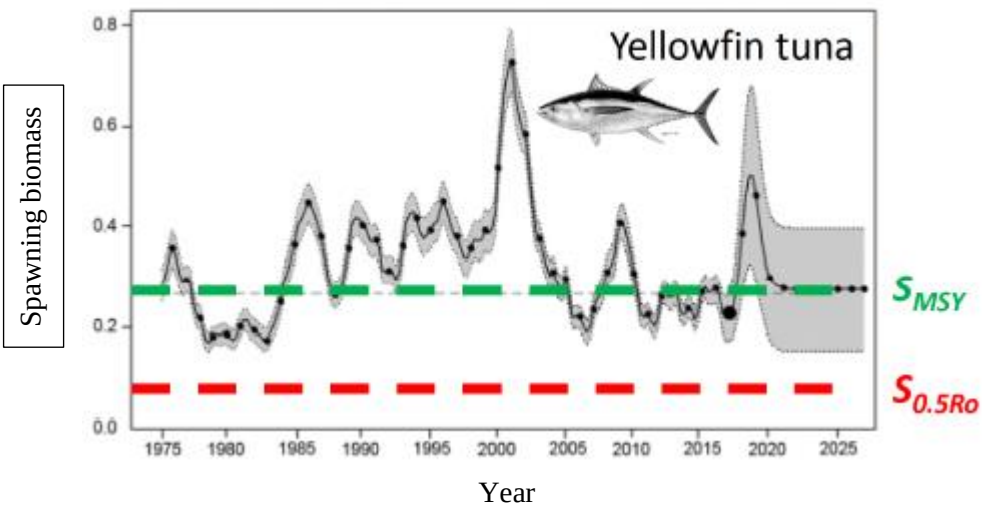

Figure 3. Yellowfin tuna spawning biomass in relation to interim reference points. Source: Valero et al, 2017.

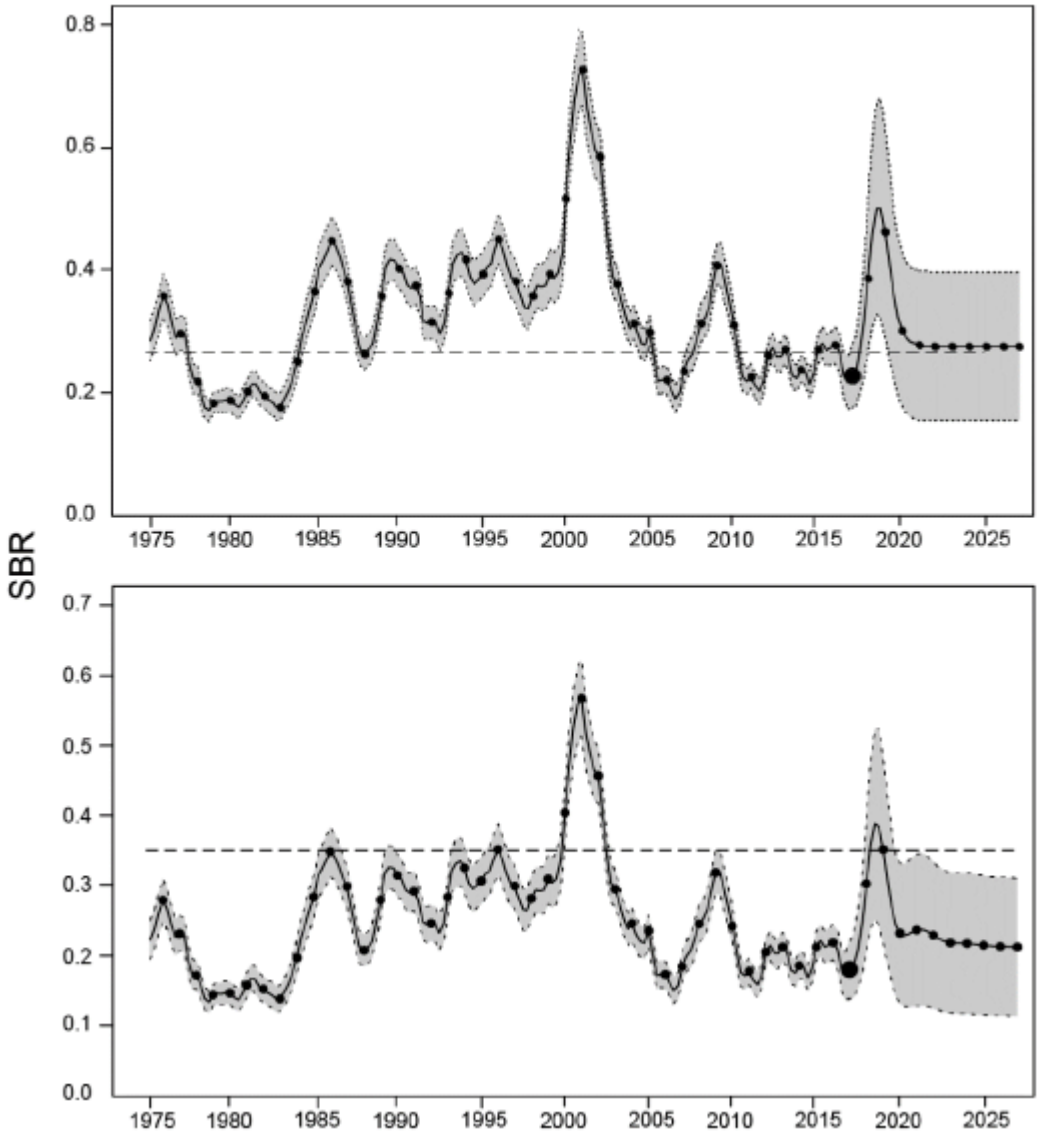

Figure 4. Spawning biomass ratios (SBRs) for yellowfin tuna in the EPO, including projections for 2017-2027 based on average fishing mortality rates during 2014-2016, from the base case (top) and the sensitivity

analysis that assumes a stock-recruitment relationship (h = 0.75, bottom). The dashed horizontal line (at 0.27 and 0.35, respectively) identifies the SBR at MSY. The solid curve illustrates the maximum likelihood estimates, and the estimates after 2017 (the large dot) indicate the SBR predicted to occur if fishing mortality rates continue at the average of that observed during 2014-2016, and average environmental conditions occur during the next 10 years. The shaded area indicates the approximate 95% confidence intervals around those estimates. Source: Minte-vera *et al*, 2016.

References

Minte-Vera, C.V., Aires-da-Silva, A. & Maunder, M., 2017. Status of yellowfin tuna in the eastern Pacific Ocean in 2016 and outlook for the future. IATTC Stock Assessment Report 18, prepared for the 8th meeting of the IATTC Scientific Advisory Committee in May 2017.
https://www.iattc.org/PDFFiles/StockAssessmentReports/_English/SAR-18-2-YFT-assessment-2016.pdf

Valero, J.L., Maunder, M. N., Aires-da-Silva, A.M., Minte-Vera, C. and Zhu, J. (2017). Limit reference points in fisheries management and their application to tuna and billfish stocks SAC-08-05e(ii). Presentation to 8th Meeting of IATTC Scientific Advisory Committee. La Jolla, California, USA. 8-12 May, 2017.
https://www.iattc.org/Meetings/Meetings2017/SAC-08/PDFs/Presentations/_English/SAC-08-05e(ii)-PRES_Review-of-limit-reference-points.pdf

Standard clauses 1.3.2.2

SOCIAL CRITERION

In addition to the scored criteria listed above, applicants must commit to ensuring that vessels operating in the fishery adhere to internationally recognised guidance on human rights. They must also commit to ensuring there is no use of enforced or unpaid labour in the fleet(s) operating upon the resource.

Appendix A - Determining Resilience Ratings

The assessment of Category B species described in this assessment report template utilises a resilience rating system suggested by the American Fisheries Society. This approach was chosen because it is also used by FishBase, and so the resilience ratings for many thousands of species are freely available online. As described by FishBase, the following is the process used to arrive at the resilience ratings:

"*The American Fisheries Society (AFS) has suggested values for several biological parameters that allow classification of a fish population or species into categories of high, medium, low and very low resilience or productivity (Musick 1999). If no reliable estimate of r_m (see below) is available, the assignment is to the lowest category for which any of the available parameters fits. For each of these categories, AFS has suggested thresholds for decline over the longer of 10 years or three generations. If an observed decline measured in biomass or numbers of mature individuals exceeds the indicated threshold value, the population or species is considered vulnerable to extinction unless explicitly shown otherwise. If one sex strongly limits the reproductive capacity of the species or population, then only the decline in the limiting sex should be considered. We decided to restrict the automatic assignment of resilience categories in the Key Facts page to values of K, t_m and t_{max} and those records of fecundity estimates that referred to minimum number of eggs or pups per female per year, assuming that these were equivalent to average fecundity at first maturity (Musick 1999). Note that many small fishes may spawn several times per year (we exclude these for the time being) and large live bearers such as the coelacanth may have gestation periods of more than one year (we corrected fecundity estimates for those cases reported in the literature). Also, we excluded resilience estimates based on r_m (see below) as we are not yet confident with the reliability of the current method for estimating rm. If users have independent r_m or fecundity estimates, they can refer to Table 1 for using this information*."

Parameter	**High**	**Medium**	**Low**	**Very low**
Threshold	0.99	0.95	0.85	0.70
r_{max} (1/year)	> 0.5	0.16 – 0.50	0.05 – 0.15	< 0.05
K (1/year)	> 0.3	0.16 – 0.30	0.05 – 0.15	< 0.05
Fecundity (1/year)	> 10,000	100 – 1000	10 – 100	< 10
t_m (years)	< 1	2 – 4	5 – 10	> 10
t_{max} (years)	1 - 3	4 – 10	11 – 30	> 30

Taken from the FishBase manual, "Estimation of Life-History Key Facts":
http://www.fishbase.us/manual/English/key%20facts.htm#resilience]

Appendix B – Background on the 5% catch rule

The proposed fishery assessment methodology uses a species categorisation approach to divide the catch in the assessment fishery into groups. These groups are:

- **Category A:** "Target" species with a species-specific management regime in place.
- **Category B:** "Target" species with no species-specific management regime in place.
- **Category C:** "Non-target" species with a species-specific management regime in place.
- **Category D:** "Non-target" species with no species-specific management regime in place

The distinction between 'target' and 'non-target' species is made to enable the assessment to consider the impact of the fishery on all the species caught regularly, without requiring a full assessment be conducted for each. Thus 'target' species are subjected to a more detailed assessment, while 'non-target' species are considered more briefly. For the purposes of the IFFO RS fishery assessment, 'target' and 'non-target' species are defined by their prevalence in the catch, by weight. Applicants must declare which species are considered 'target' species in the fishery, and the combined weight of these must be at least 95% of the annual catch. The remaining 5% can be made up of 'non-target' species. Note also that ETP species are considered separately, irrespective of their frequency of occurrence in the catch.

The proposed use of 5% as a limit for 'non-target' species is one area in which feedback is being sought via the public consultation. The decision to propose a value of 5% ensures consistency with other fishery assessment programmes, such as the MSC which uses 5% to distinguish between 'main' and 'minor' species (see MSC Standard, SA3.4 and GSA3.4.2); and Seafood Watch, which uses 5% when defining the 'main' species for the assessment (see Seafood Watch Standard, Criterion 2). The value is also consistent with the approached used in Version 1 of the IFFO RS Standard, in which up to 5% of the raw material could be comprised of 'unassessed' species.