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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 34 (Eastern Atlantic) FAO 31 (Western Atlantic)**
Date	**December 2018**
Assessor	**Jim Daly**

Application details and summary of the assessment outcome				
Name: TCF Co Ltd and others				
Address:				
Country: Thailand		**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**
Jim Daly	Virginia Polonio	0.5	Surveillance	By-product
Assessment Period	2017-2018			

Scope Details	
Management Authority (Country/State)	ICCAT
Main Species	Yellowfin tuna (*Thunnus albacares*)
Fishery Location	FAO 34 (Eastern Atlantic) FAO 31 (Western Atlantic)
Gear Type(s)	Longline, baitboat and purse seine.
Outcome of Assessment	
Overall Outcome	**PASS**
Clauses Failed	**None**
Peer Review Evaluation	**Pass**
Recommendation	**Approve byproduct**

Assessment Determination
The Regional Fishery Management Organisation (RFMO) managing the fishery in the assessment area is the International Commission for the Conservation of Atlantic Tuna (ICCAT). The Common Fisheries Policy, especially its external dimension, establishes a legal framework for EU fishing activities outside European waters. Sustainable Fisheries Partnership Agreements (SFPA's) allow EU vessels fish for surplus stocks in non-EU Country's exclusive economic zone (EEZ) in a legally regulated environment. A single stock for the entire Atlantic is currently assumed. A Multi-annual Management and Conservation Programme (ICCAT) initiated in 2012 for yellowfin tuna is still in place. An ICCAT Recommendation in 2016 called for an annual TAC, seasonal closures for the protection of juveniles and measures to reduce Fish Aggregating Devices (FAD) related mortality and other fishing related mortality of small yellowfin. The recently launched Atlantic Ocean Tropical Tuna Tagging Programme (AOTTP) has been designed to primarily serve the needs of the Tropical Tuna Working Group (TTWG) in their stock assessments. The ASPIC (Stock Production Model Incorporating Covariates) Production Model was used. ASPIC can fit data from up to 10 data series of fishery-dependent or fishery-independent indices, and uses bootstrapping to construct approximate nonparametric confidence intervals and to correct for bias. In addition, ASPIC can fit the model by varying relative importance placed on yield versus measures of effort or indices of abundance. The results of the model indicate that the stock status was estimated to be not overfished nor subject to overfishing, although current biomass was close to BMSY level. Fishery removals of the species in the fishery under assessment are included in the stock assessment process. IUCN has categorised yellowfin tuna as a near-threatened species. The species does not appear in the current CITES appendices (both sites accessed 11.12.18). The assessment team recommends approving this by-product material against the IFFO RS standard v 2.0 (by-product) for the production of fishmeal and fish oil.
Peer Review Comments
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*)	N/A	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]

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*	Atlantic East, West	N/A	ICCAT/EU	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**

C1.1:

EU Sustainable Fisheries Partnership Agreements (SFPA's):

The Common Fisheries Policy, especially its external dimension, establishes a legal framework for EU fishing activities outside the European waters. Financial and technical support is given in exchange for fishing rights, generally with the EU's Southern partner countries. They are intended to allow EU vessels fish for surplus stocks in that country's exclusive economic zone (EEZ), in a legally regulated environment. These agreements also focus on resource conservation and environmental sustainability, ensuring that all EU vessels are subject to the same rules of control and transparency. At the same time, a clause concerning respect for human rights has been included in all protocols to fisheries agreements.

Tuna agreements allow EU vessels to pursue migrating tuna stocks as they move along the shores of Africa and through the Indian Ocean. The EU currently has tuna agreements with a number of Atlantic Coastal African Countries in the assessment area. In 2018 an EU Quota of 111,000t was allocated to EU vessels fishing for yellowfin tuna in the Atlantic Ocean.

ICCAT:

The International Commission for the Conservation of Atlantic Tunas (ICCAT) is an intergovernmental organization responsible for the management and conservation of tuna and tuna-like species in the Atlantic Ocean. Scientists from the Standing Committee on Research and Statistics (SCRS) analyse fisheries statistics and advise the Commission on the need for specific conservation and management measures. As a Contracting Party since 1992 the European Union provides data to the SCRS to facilitate its work.

A Multi-Annual Management and Conservation Programme initiated in 2012 for yellowfin tuna is still in place. The latest stock assessment (desk-study) for Atlantic yellowfin tuna was undertaken in 2016. In 2016 ICCAT Recommendation 16-01 called for an annual TAC (Atlantic) of 110,000t to remain in place until changed based on scientific advice. Other conservation measures announced in Recommendation 16-01 include seasonal closures for the protection of juveniles and measures to reduce Fish Aggregating Devices (FAD) related and other fishing mortality of small yellowfin.

Thailand:

The Thailand Department of Fisheries (DOF) is the primary fishery management organisation in Thailand. The DOF is responsible for the implementation of Thai fishery legislation, the undertaking of fishery and aquaculture research, fishery control and enforcement, the management of international fishery affairs, and the engagement of fishery and aquaculture stakeholders. The current Thai fisheries management objectives are set out in The Master Plan - Marine Fisheries Management in Thailand. The Master Plan applies for ten years beginning in 2009. The Plan includes five major strategies, the third of which is ''Development and Promotion of Responsible and Sustainable Fisheries''.

Yellowfin tuna:

Yellowfin tuna is a cosmopolitan species distributed mainly in the tropical and subtropical oceanic waters of the three oceans. A single yellowfin tuna stock for the entire Atlantic is currently assumed. Juvenile yellowfin

tuna form mixed schools with skipjack and juvenile bigeye, and are mainly limited to surface waters, while larger fish form schools in surface and sub-surface waters. Growth rates are relatively slow initially, increasing at the time the fish leave the nursery grounds. Younger age classes of yellowfin tuna (40-80 cm) exhibit a strong association with FADs.

Fishery removals of the species in the fishery under assessment are included in the stock assessment process **R1-R5**

C1.2:
Species-Specific Stock Assessments:
In the Eastern Atlantic, purse seine catches declined by over 60% between 1990 and 2007 (127,700 t to 47,900 t) but subsequently increased to 71,827 t in 2014. Baitboat catches have declined by 50% since 1990 (from 19,600 t to 9,400 t). Longline catches, which were 10,300 t in 1990, declined to 5,000 t in 2014**.** The decline in purse seine catches during 1992-2007 was in large part due to a decline in the number of European and associated fleet purse seine vessels operating in the Eastern Atlantic (e.g. from 44 vessels in 2001 to 25 vessels in 2006). In 2015, three new purse seine vessels moved from the Pacific Ocean to the Atlantic Ocean.

Since 2011, significant catches of yellowfin tuna have been obtained by EU purse seiners off the coast of West Africa (in association with skipjack and bigeye on Fish Aggregating Devices (FADs)). Another recent change is the implementation in 2012 of the strategy of fishing on floating objects off Mauritania. Catches on floating objects in this area tended to consist almost entirely of skipjack. Effort directed in this manner may therefore have a reduced impact on yellowfin tuna.

Purse seine and baitboat catches in the western Atlantic have declined about 90% since the mid 1980's and 1974 respectively. However, longline catches have mostly fluctuated between 10,000t and 20,000t. Abundance indices show conflicting trends in abundance. One cluster indicates an initial decline into 1990, followed by a more constant abundance since. The second cluster shows an increase in abundance during the 1990's, followed by a decline in abundance.

A full stock assessment was conducted for yellowfin tuna in 2011, applying both an age-structured model and a non-equilibrium production model to the available catch data through 2010. As has been done in previous stock assessments stock status was evaluated using both production and age-structured models. The estimate of MSY (~144,600 t) may be below what was achieved in past decades because overall selectivity has shifted to smaller fish. 2010 reported catches were well below MSY levels, stock biomass was estimated to most likely be about 15% below the Convention objective and fishing mortality rates most likely about 13% below FMSY.

The Atlantic yellowfin tuna stock was estimated to be overfished in 2010. Maintaining catch levels at 110,000 t had been expected to lead to a biomass somewhat above BMSY by 2016 with a 60% probability. Overall catches in 2012-2014 were lower than 110,000t. In 2015 catches of yellowfin tuna (Atlantic and Mediterranean) were reported as 108,917t (ICCAT Statistical Bulletin (July 2017).

A yellowfin tuna stock assessment (SCRS) meeting was undertaken in July 2016 with the aim of providing management advice to ICCAT. For 2015 data, about 53% of the Contracting Parties (CPC)) submitted preliminary estimates of yellowfin nominal catches. The agreed nominal catch for 2015 and 2016 for projections was set at 110,337t. Relative abundance estimates were derived from Catch Per Unit Effort (CPUE) data from six CPC's.

The ASPIC (Stock Production Model Incorporating Covariates) Production Model was used. This is a non-equilibrium implementation of Schaefer's surplus production model. ASPIC can fit data from up to 10 data

series of fishery-dependent or fishery-independent indices, and uses bootstrapping to construct approximate nonparametric confidence intervals and to correct for bias. In addition, ASPIC can fit the model by varying relative importance placed on yield versus measures of effort or indices of abundance. The model has been extensively reviewed and tested in the context of various applications to tuna stocks via ICCAT (**Figure 1**).

The results of the model indicate that the stock status was estimated to be not overfished nor subject to overfishing, although current biomass was close to BMSY level (**Table 1**):

	Run_01		Run_05	
SSB_0	995.7		1024.0	
SSB_{MSY} at 2014	256.5		264.3	
MSY at 2014	150.3	(133.9-164.6)	145.5	(123.9-163.4)
Catch at 2014	97.0			
Catch at 2015	110.3			
SSB_{2014}/SSB_{MSY}	1.002	(0.775-1.240)	1.025	(0.610-1.429)
F_{2014}/F_{MSY}	0.558	(0.445-0.692)	0.625	(0.423-0.989)

Table 1: ASPM estimates of the MSY and its associated quantities for yellowfin tuna for the base case models. SSBrecent and SSBMSY are defined as the biomass of matured fish defined by the maturity vector (in thousand ton) at the beginning of 2014 and at MSY, respectively. The Frecent and FMSY indicates the fishing mortality in 2014 and at MSY, respectively. 80 percent confidence interval (90 percentiles to 10 percentiles) are also presented if available for bootstrap examinations (1,000 replicates). **R6**

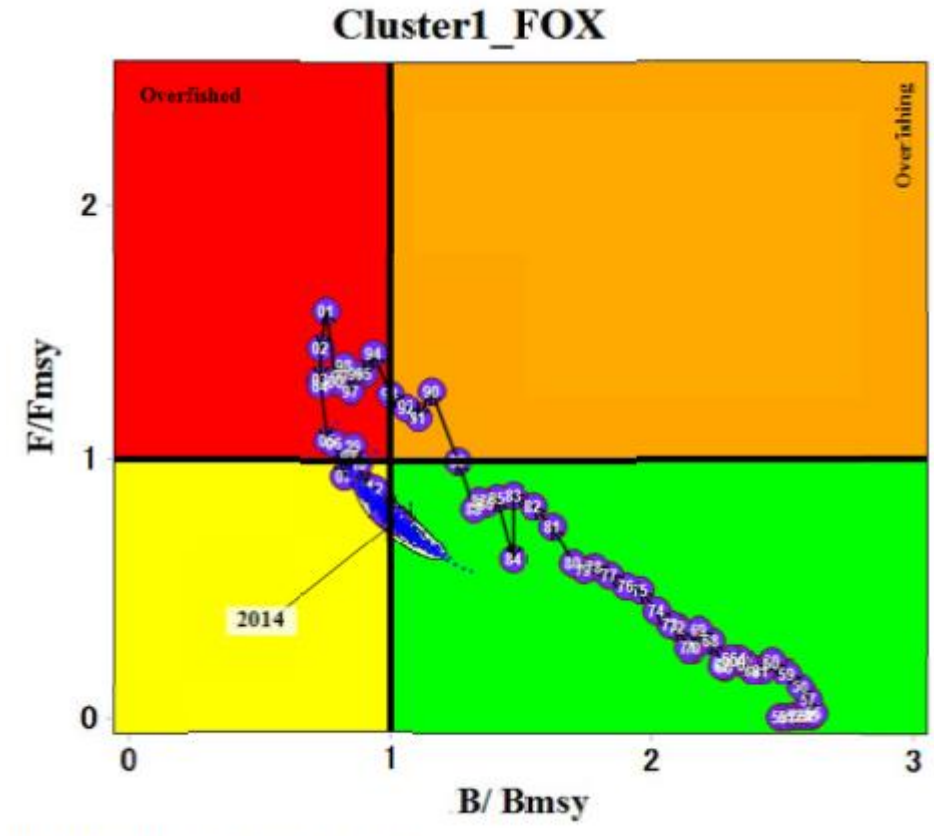

Figure 13. Kobe I plot for ASPIC base model run.

Figure 1: Kobe Plot for ASPIC base model run **R6**

Conclusions from the 2016 (SCRS) Stock Assessment (R6):

The Group expressed concern that spatial and targeting shifts in longline fisheries might have affected the trends of their standardized CPUE series. The Group recommended making advancements on multispecies stock assessment approaches for the tropical tuna complex in the Atlantic. Increased harvests on FADs could also have negative consequences for yellowfin and bigeye tuna, as well as other by-catch species. The results of the model indicate that the stock status was estimated to be not overfished nor subject to overfishing, although current biomass was close to BMSY level.

The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy) **R1-R7**

References:

R1 INTERNATIONAL COMMISSION for the CONSERVATION of ATLANTIC TUNAS **(**ICCAT**)** https://iccat.int/en/

R2 Sustainable Fishing Partnership Agreements (SFPA's): https://publications.europa.eu/en/publication-detail/-/publication/c8b5d962-0d38-11e7-8a35-01aa75ed71a1/language-en/format-PDF/source-37907030

R3 EU Fishing Quotas (2018): Council Regulation (EU) No. 2018/120 fixing for 2018 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in Union waters and, for Union fishing vessels, in certain non-Union waters: Annex I D pp 112-116 http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R0120

R4 FAO Species Fact Sheets (Yellowfin tuna) http://www.fao.org/fishery/species

R5 ANON (June 2015) ICCAT REPORT 2014-2015 (II)) STOCK ASSESSMENT EXECUTIVE SUMMARY YELLOWFIN TUNA: pp14-31 http://www.iccat.int/Documents/SCRS/ExecSum/YFT_ENG.pdf

R6 ANON (July 2016) REPORT OF THE 2016 ICCAT YELLOWFIN TUNA STOCK ASSESSMENT MEETING (SCRS, San Sebastian, Spain) pp1-103. http://www.iccat.int/Documents/Meetings/Docs/2016_YFT_ASSESSMENT_ENG.pdf

R7 ANON (July 2017) ICCAT STATISTICAL BULLETIN TUNA CATCH BY SPECIES: Section 2 Table 6 http://www.iccat.int/en/pubs_sbull.htm

R8 ICCAT RECOMMENDATION (2016-01): MULTI-ANNUAL CONSERVATION AND MANAGEMENT PROGRAMME FOR TROPICAL TUNAS pp1-22 http://www.iccat.int/Documents/Recs/compendiopdf-e/2016-01-e.pdf

R9 CITES Species Endangered list: Yellowfin Tuna (East Atlantic) http://checklist.cites.org/#/en (accessed 11.12.18)

R10 IUCN Red list: Yellowfin Tuna (East Atlantic) http://www.iucnredlist.org/search (accessed 11.12.18)