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Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report V2.0

Fishery Under Assessment	**Pacific chub mackerel** *Scomber japonicus* **FAO 87**
Date	March 2020
Assessor	Jim Daly
Stock Pass	FAO 87 Pacific Southeast
Stock Fail	

Application details and summary of the assessment outcome				
Name: Tadel				
Address:				
Country: Ecuador		**Zip:**		
Tel. No.:		**Fax. No.:**		
Email address:		**Applicant Code:**		
Key Contact:		**Title:**		
Certification Body Details				
Name of Certification Body:		SAI Global Ltd		
Assessor	**Peer Reviewer**	**Assessment Days**	**Initial/Surveillance/ Re-approval**	**Whole fish/ By-product**
Jim Daly	Conor Donnelly	0.5	Initial	By-product
Assessment Period	2020			

Scope Details	
Management Authority (Country/State)	Instituto Nacional de Pesca (INP) Ecuador
Main Species	Pacific chub mackerel *Scomber japonicus*
Stock:	FAO 87
Fishery Location	Pacific Southeast
Gear Type(s)	Purse seine, hand-line, other compliant gears
Outcome of Assessment	
Peer Review Evaluation	AGREE
Recommendations	APPROVE

Assessment Determination
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 IFFO RS raw material. Pacific chub mackerel does not appear as Endangered or Critically Endangered on the IUCN Red List, nor does it appear in the CITES appendices; therefore, Pacific chub mackerel is eligible for approval for use as IFFO RS raw material.   The Competent Authority for fisheries research in Ecuador is the Instituto Nacional de Pesca (INP). Latest biomass estimates for this stock (265,714t) were published in March 2018 (R4). In May 2019 preliminary results of that year's acoustic survey were published (R2). No reference points were defined.   The comparative lack of scientific information on the status of the population in the assessment area means that a risk-assessment style approach must be taken. The fishery was assessed using the risk-based Productivity, Susceptibility Analysis (PSA) as per IFFO RS v 2.0 procedures for Category D stocks. Pacific chub mackerel has passed this risk-based assessment (**Table D3**).   Pacific chub mackerel in the assessment area is approved by SAI Global assessors for the production of fishmeal and fish oil under the IFFO RS v 2.0 by-products standard.
Peer Review Comments
Notes for On-site Auditor

HOW TO COMPLETE THIS ASSESSMENT REPORT
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
Pacific Chub mackerel	*Scomber japonicus*	FAO 87	N/A	MCCEIP (Ministerio de Producción, Comercio Exterior, Inversiones y Pesca)	D

CATEGORY D SPECIES
In a whole fish assessment, Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. In a by-product assessment, Category D species are those which are not subject to a species-specific management regime. In both cases, the comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

The process for assessing Category D species involves the use of a Productivity-Susceptibility Analysis (PSA) to further subdivide the species into 'Critical Risk', 'Major Risk' and 'Minor Risk' groups. If there are no Category D species in the fishery under assessment, this section can be deleted.

Productivity and susceptibility ratings are calculated using a process derived from the APFIC document "Regional Guidelines for the Management of Tropical Trawl Fisheries, which in turn was derived from papers by Patrick *et al* (2009) and Hobday *et al* (2007). Table D1 should be completed for each Category D species as follows:

- Firstly, the best available information should be used to fill in values for each productivity and susceptibility attribute.
- Table D2 should be used to convert each attribute value into a score between 1 and 3.
- The average score for productivity attributes and the average for susceptibility attributes should be calculated.
- Table D3 should be used to determine whether the species is required to meet the requirements of Table D4. A species which does not need to meet the requirements of D4 is automatically awarded a pass.
- Table D4 should be used to assess those species indicated by Table D3 to determine a pass/fail rating.
- Any Category D species which has been categorised by the IUCN Red List as Endangered or Critically Endangered, or which appears in the CITES appendices, automatically results in a fail.

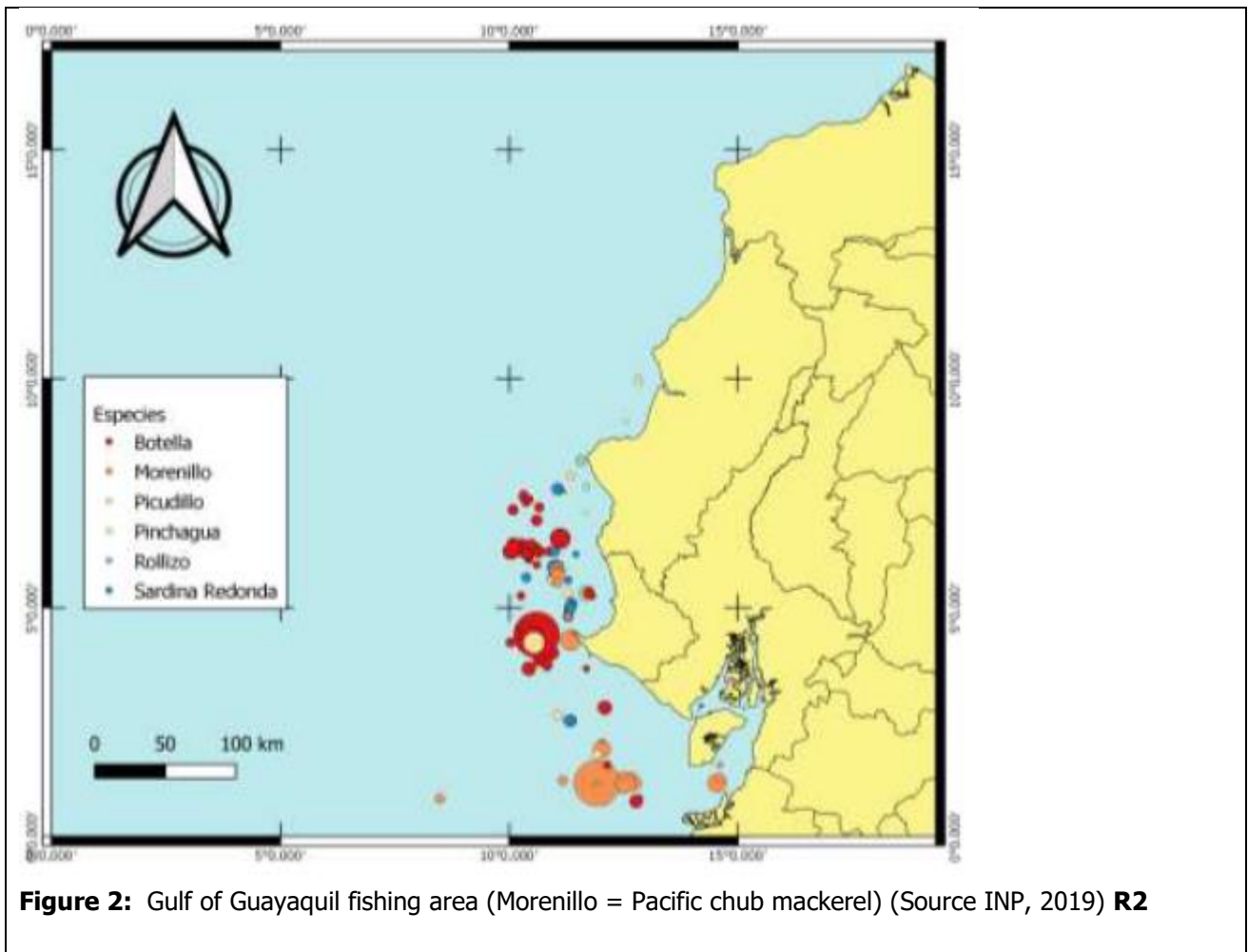| D1	Species Name:	Pacific Chub mackerel	*Scomber japonicus*	
	Productivity Attribute		**Value**	**Score**
	Average age at maturity (years)*		2	2
	Average maximum age (years)*		7.9	1
	Fecundity (eggs/spawning) *		86,616-213,422	1
	Average maximum size (cm)		30	1
	Average size at maturity (cm)*		22	1
	Reproductive strategy		Open water / substratum egg scatterers	1
	Mean trophic level		3.4	3
			Average Productivity Score	**1.43**
	Susceptibility Attribute		**Value**	**Score**
	Overlap of adult species range with fishery		>50% of stock occurs in area fished	3
	Distribution		Not scored when overlap scored (table D2)	Not scored
	Habitat		Coastal pelagic	Not scored
	Depth range		50-200m	1
	Selectivity		Up to 4m in length	3
	Post-capture mortality		Short tows	2
			Average Susceptibility Score	**2.25**
			PSA Risk Rating (From Table D3)	**PASS**

Evidence:

*References: Life history tool (**Figure 3**).

Major fishing areas for this stock are off the Ecuador coast (**Figures 1,2**):

Figure 1: Pacific chub mackerel distribution **R1**

Figure 2: Gulf of Guayaquil fishing area (Morenillo = Pacific chub mackerel) (Source INP, 2019) **R2**

Life History Data on *Scomber japonicus*
Chub mackerel

Family:	Scombridae Mackerels, tunas, bonitos
Max. length (Lmax):	64.0 cm TL

L infinity (Linf):	= 38.1 cm TL ∨	Recalculate
K:	0.36 /year Ø' = 2.72 Median Ø' value with related Linf. and K.	Recalculate Growth & mortality data
to:	-0.43 years Estimated from Linf and K.	
Natural mortality (M):	0.60 s.e. 0.40 – 0.91 /year Estimated from Linf., K and annual mean temp. = 16.6 °C	Recalculate
Life span (approx.):	7.9 years Estimated from Linf., K and to. Max. age & size data	
Generation time:	2.4 years Estimated from Lopt, Linf., K and to.	
Age at first maturity (tm):	2.0 years Estimated from Lm, Linf., K and to.	
L maturity (Lm):	22.0 s.e. 16.4 – 29.4 cm TL Estimated from Linf. Maturity data	
L max. yield (Lopt):	24.5 s.e. n.a. – n.a. cm TL Estimated from Linf., K and M.	
Length-weight:	38.1 cm TL ∨ => 645.8 g (wet weight) W = 0.0047 * L ^ 3.25000	Recalculate Length-weight data
Nitrogen & protein:	Weight 646 (g) => whole-body nitrogen (N) 17.6 (g) => whole-body crude protein 109.7 (g)	Recalculate
Reproductive guild:	nonguarders: open water/substratum egg scatterers Reproduction	
Fecundity:	135,962 [86,616-213,422] Estimated as geometric mean. Fecundity	
Relative Yield per Recruit (Y'/R):	0.0377 Estimate Y'/R from M/K, Lc/Linf and E. Lc=15.2 cm TL E=0.50 /year Emsy 0.61 /year Eopt 0.55 /year Fmsy 0.94 /year Fopt 0.73 /year	Recalculate
Exploitation:	Z= F= E= Estimate Z, F, E from Lc, Lmean, Linf, K, M Lc = 15.2 cm TL Lmean = cm TL	Recalculate
Resilience / productivity:	High; decline threshold 0.99 Vulnerable to extinction if decline in biomass or numbers exceeds threshold over the longer of 10 years or 3 generations.	
Intrinsic rate of increase (rm):	1.88 /year Lr = 15.2 cm TL Estimated from Fmsy at Lc = length of recruitment (Lr).	Recalculate
Main food:	mainly animals (troph. 2.8 and up)	
Trophic level:	3.4 +/- s.e. 0.10 Estimated from diet data. Diet	
Food consumption (Q/B):	10.9 times the body weight per year Enter Winf, temperature, aspect ratio (A), and food type to estimate Q/B Winf = 645.8 g Temp. = 16.6 °C A = 5.16 Detrivore Herbivore Omnivore Carnivore	Recalculate

Figure 3: Life history tool Pacific chub mackerel **R3**

The species is highly dependent on environmental changes and its dynamic very influenced by El Niño and La Niña natural events being considering as a bio-indicators in some studies carried out by INP.

Future fisheries assessment reports (2021) will consider biomass and reference points calculated from the 2019 acoustic survey, when these data are published.

References:
R1: Fishsource Pacific chub mackerel (Ecuador): https://www.fishsource.org/stock_page/2280
R2: INP Technical Reports: Reporte Biológico Pesquero, mayo 2019
http://www.institutopesca.gob.ec/wp-content/uploads/2018/01/Seguimiento-a-la-pesquería-de-peces-pelágicos-pequeños-Reporte-Biológico-pesquero-mayo-2019.pdf
R3: Fishbase: Pacific Chub Mackerel (Scomber japonicus)
 http://www.fishbase.org/summary/117
R4: INP (Ecuador): ESTIMACIÓN HIDROACÚSTICA DE LA ABUNDANCIA Y BIOMASA DE LOS PRINCIPALES PECES PELÁGICOS PEQUEÑOS EN EL ECUADOR Y SUDISTRIBUCIÓN GEOESPACIAL, DURANTE MARZO DE2018 (INP-SRP-CNP 18-03-01PV)
http://www.institutopesca.gob.ec/wp-content/uploads/2018/01/CRUCERO-18-03-01PV-RESULTADO-FINAL.pdf

Table D2 - Productivity / Susceptibility attributes and scores.

Productivity attributes	Low productivity/ High risk	Medium productivity/ Medium risk	High productivity/ Low risk
	Score 3	Score 2	Score 1
Average age at maturity (years)	>4	2 to 4	<2
Average maximum age (years)	>30	10 to 30	<10
Fecundity (eggs/spawning)	<1 000	1 000 to 10 000	>10 000
Average maximum size (cm)	>150	60 to 150	<60
Average size at maturity (cm)	>150	30 to 150	<30
Reproductive strategy	Live bearer, mouth brooder or significant parental investment	Demersal spawner "berried"	Broadcast spawner
Mean trophic level	>3.25	2.5–3.25	<2.5

Susceptibility attributes		High susceptibility/ High risk	Medium susceptibility/ Medium risk	Low susceptibility/ Low risk
		Score 3	Score 2	Score 1
Availability	1) Overlap of adult species range with fishery	>50% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	<25% of stock occurs in the area fished
	2) Distribution	Only in the country/ fishery	Limited range in the region	Throughout region/ global distribution
Encounterability	1) Habitat	Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom)	Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs)	Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic)
	2) Depth range	High overlap with trawl fishing gear (20 to 60 m depth)	Medium overlap with trawl fishing gear (10 to 20 m depth)	Low overlap with trawl fishing gear (0 to 10 m, >70 m depth)
Selectivity		Species >2 times mesh size or up to 4 m length	Species 1 to 2 times mesh size or 4 to 5 m length	Species <mesh size or >5 m length
Post capture mortality		Most dead or retained Trawl tow >3 hours	Alive after net hauled Trawl tow 0.5 to 3 hours	Released alive Trawl tow <0.5 hours

Note: Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

D3		Average Susceptibility Score		
		1.00 – 1.75	1.76 – 2.24	2.25 – 3.00
Average Productivity Score	1.00 – 1.75	PASS	PASS	PASS
	1.76 – 2.24	PASS	PASS	TABLE D4
	2.25 – 3.00	PASS	TABLE D4	TABLE D4