



MarinTrust Standard V2

By-product Fishery Assessment *Yellowfin Tuna (Thunnus albacares) FAO Fishing Area 51 Western Indian Ocean*

MarinTrust Programme

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Table 1 Application details and summary of the assessment outcome

Fishery Under Assessment	Species:	Yellowfin tuna (<i>Thunnus albacares</i>)
	Geographical area:	FAO Fishing Area 51 (Indian Ocean, Western)
	Country of origin of the product:	Mauritius
	Stock:	Yellowfin tuna in the Indian Ocean
Date	February 2022	
Report Code	BP028	
Assessor	Ivan Mateo, Ph.D.	
Country of origin of the product - PASS	Mauritius	
Country of origin of the product - FAIL		

Application details and summary of the assessment outcome			
Company Name(s):			
Country: Mauritius			
Email address:		Applicant Code:	
Certification Body Details			
Name of Certification Body:		Global Trust Certification	
Assessor	Peer Reviewer	Assessment Days	Initial/Surveillance/ Re-approval
Ivan Mateo	Conor Donnelly	0.5	Surveillance 2
Assessment Period	2022		

Scope Details	
Main Species	Yellowfin tuna (<i>Thunnus albacares</i>)
Stock	Yellowfin tuna in the Indian Ocean
Fishery Location	FAO fishing areas 51 (Indian Ocean, Western)
Management Authority (Country/ State)	Internationally: IOTC National authorities of Mauritius
Gear Type(s)	Pole-and-Line; longline and other gears (e.g., troll line, handline, artisanal longline).
Outcome of Assessment	
Peer Review Evaluation	Agree with recommendation
Recommendation	APPROVE

Table 2. Assessment Determination

Assessment Determination
<p>If any species is categorized as Endangered or Critically Endangered on IUCN's Red List, or if it appears in the CITES appendices, it cannot be approved for use as IFFO RS raw material. Indian Ocean yellowfin tuna does not appear as Endangered or Critically Endangered on IUCN's Red List, nor does it appear in CITES appendices; therefore, product originating from this fishery is eligible for approval for use as IFFO RS by-product raw material.</p> <p>For assessment and management purposes, one discrete stock of yellowfin is recognized in the Indian Ocean; therefore, this assessment covers one stock (i.e., yellowfin tuna in the Indian Ocean) when fished within FAO fishing areas 51.</p> <p>Fishery removals from the stock are considered in the IOTC stock assessment processes such that the stock PASSES Clause C1.1.</p> <p>In addition, the most recent stock assessment for the stock shows it to be above relevant limit reference points defined by management such that the stock PASSES clause C1.2.</p> <p>In order to be approved, stocks assessed must pass both Clause C1.1 and C1.2; therefore, as this is the case here, by-product covered by this report is APPROVED for the production of fishmeal and fish oil under the current the current Marintrust v 2.0 by-product standard.</p>
Fishery Assessment Peer Review Comments
<p>The stock has been correctly identified as a Category C stock and since fishery removals are considered in the stock assessment process and the stock is above its limit reference point the stock can be approved.</p>
Notes for On-site Auditor
<p>None</p>

Species Categorisation

NB: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in CITES Appendix 1, it **cannot** be approved for use as an MarinTrust raw material.

IUCN Red list Category

By-product material from a species listed by IUCN (the International Union for Conservation of Nature) under the Red List for the following categories shall immediately fail the assessment;

- EXTINCT (E) AND EXTINCT IN THE WILD (EW)
- CRITICALLY ENDANGERED (CR) facing an extremely high risk of extinction in the wild.
- ENDANGERED (EN) facing a very high risk of extinction in the wild.

By-product material may be used from the following categories provided that all clauses in the MarinTrust standard are passed.

- VULNERABLE (VU) facing a high risk of extinction in the wild.
- NEAR THREATENED (NT) does not qualify for above now, but is close or is likely to qualify for, a threatened category in the near future.
- LEAST CONCERN (LC) Widespread and abundant.
- DATA DEFICIENT (DD) and NOT EVALUATED (NE)

Table 3 Species Categorisation Table

Common name	Latin name	Stock	Management	Category	IUCN Red List Category ¹	CITES Appendix 1 ²
Yellowfin tuna	<i>Thunnus albacares</i>	Yellowfin tuna in the Indian Ocean.	Yes (IOTC)	C	No	No

¹ <https://www.iucnredlist.org/>

² <https://cites.org/eng/app/appendices.php>

CATEGORY C SPECIES

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. Where a species fails this Clause, it should be assessed as a Category D species instead.

Species Name		Yellowfin tuna	
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.	Yes
	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.	Yes
			Clause outcome: PASS
<p>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.</p> <p>Catch data are available on the IOTC website.</p> <p>Yellowfin tuna have been exploited in the Indian Ocean for more than 700 years (Adam 2004). The industrial fishery dates back to 1952 when longliners started operating in the eastern region followed by the western region in 1954 and by 1960s most areas of the Indian Ocean were being exploited (Pecoraro et al. 2017). Taiwanese and South Korean longliners led this initial gradual expansion (Pecoraro et al. 2017).</p> <p>Catches of yellowfin tuna remained stable between the mid-1950s and the early-1980s, ranging between 30,000 t and 70,000 t, with longliners and gillnetters as the main gear types being used. The purse seine fishery started in the early 1980s following exploratory cruises by Japanese, Mauritian and French purse seiners in the 1970s and then later, large numbers of European purse seine vessels moved to the Indian Ocean from the Atlantic Ocean (Pecoraro et al. 2017). The expansion of this fleet was supported by the development of modern equipment, the increasing use of support vessels and FADs which improved the efficiency of the fishery (Miyake et al. 2010, Pecoraro et al. 2017). Catches increased rapidly in the early-1980s with the arrival of the purse seiners and increased activity of longliners and other fleets, reaching over 400,000 t by 1993.</p> <p>Landings of yellowfin tuna increased throughout the 1990s, fluctuating around 400,000 t until 2002 after which landings increased further up to a peak of 525,000 t in 2004. In the following years, overall landings decreased significantly due to displacement of effort in the western Indian Ocean as a result of the threat of piracy in this region until the introduction of armed personnel onboard purse seine vessels since 2009 at which point the decline in landings was less pronounced (Chassot et al. 2010). In recent years the effort of all fleets has increased significantly leading to higher landings up to a peak of around 448,000 t in 2019.</p> <p>Total catches of yellowfin tuna in Indian Ocean in 2020 were estimated as 430,977 mt. Catches in 2020 reported by Mauritius were estimated at 11,656.01 mt Therefore, removals in the fishery under assessment are included in the stock assessment process such that the species PASSES clause C1.1</p> <p>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.</p> <p>A new stock assessment was carried out for yellowfin tuna in 2021. The 2021 stock assessment was carried out using Stock Synthesis III (SS3), a fully integrated model that is currently used to provide scientific advice for the three tropical tunas stocks in the Indian Ocean. The model used in 2021 is based on the model developed in 2018 with a series of revisions that were noted during the WPTT in 2018, 2019 and 2020.</p>			

Spawning biomass in 2020 was estimated to be 87% of the level that supports the maximum sustainable yield (SB2020/ SBMSY = 0.87) (Figure 1). Current fishing mortality is estimated to be 32% higher than FMSY (F2020/ FMSY = 1.32). The probability of the stock being in the red Kobe quadrant in 2020 is estimated to be 68%. On the weight-of-evidence available since 2018, the yellowfin tuna stock is determined to remain overfished and subject to overfishing. Nevertheless, the 2021 stock assessment shows the 2020 stock status to be comfortably above 0.5 SBMSY even accounting for these uncertainties with 95% confidence limits showing SB well above 0.5 SBMSY; therefore, the stock is considered, in its most recent stock assessment, to be above its limit reference point such that the species **PASSES clause C1.2**.

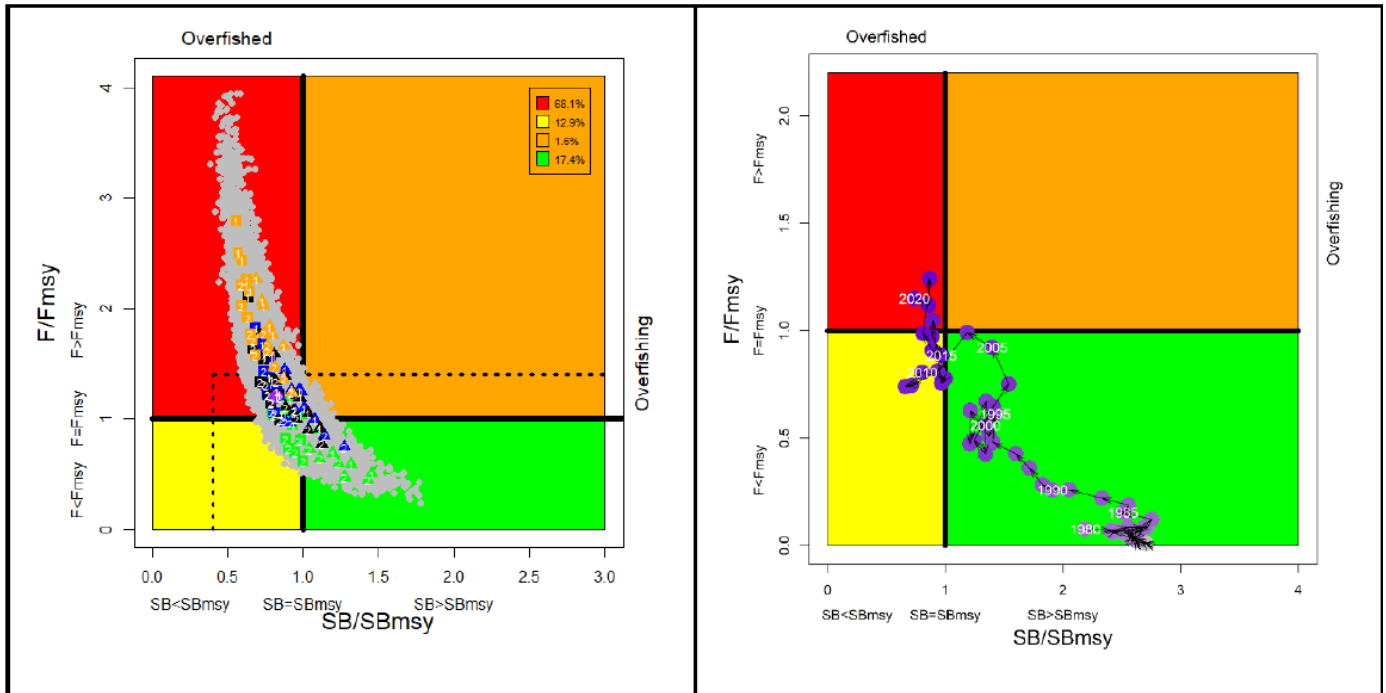


FIGURE 1. SS3 Indian Ocean assessment Kobe plot: (left): current stock status, relative to SBMSY (x-axis) and FMSY (y-axis) reference points for the final model options. Coloured symbols represent Maximum posterior density (MPD) estimates from individual models: square and Triangles and represents LL CPUE catchability options q1 and q2 respectively; green, blue, black, and orange represents growth and natural mortality option combination Gbase_Mbase, GDortel_Mbase, Gbase_Mlow, and GDortel_Mlow respectively; 1,2, represents spatial structure option io and sp respectively. The purple dot represents the base model. Grey dots represent uncertainty from individual models. The dashed lines represent limit reference points for IO yellowfin tuna (SBlim = 0.4 SBMSY and Flim = 1.4 FMSY); (right) stock trajectory from the base model.

References

IOTC-2021-Datasets-NC-SCI: Best scientific estimates of nominal catch data by IOTC species, gear and vessel flag reporting country.
https://iotc.org/sites/default/files/documents/2021/10/IOTC-LATEST-NC-SCI-1950-2020_2021_10_14.zip
<https://www.iotc.org/science/status-summary-species-tuna-and-tuna-species-under-iotc-mandate-well-other-species-impacted-iotc>

Links

MarinTrust Standard clause	1.3.2.2
FAO CCRF	7.5.3
GSSI	D.3.04, D5.01

CATEGORY D SPECIES

Category D species are those which 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. 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.

D1	Species Name		
	Productivity Attribute	Value	Score
	Average age at maturity (years)		
	Average maximum age (years)		
	Fecundity (eggs/spawning)		
	Average maximum size (cm)		
	Average size at maturity (cm)		
	Reproductive strategy		
	Mean trophic level		
	Average Productivity Score		
	Susceptibility Attribute	Value	Score
	Availability (area overlap)		
	Encounterability (the position of the stock/species within the water column relative to the fishing gear)		
	Selectivity of gear type		
	Post-capture mortality		
	Average Susceptibility Score		
	PSA Risk Rating (From Table D3)		
	Compliance rating		
	Further justification for susceptibility scoring (where relevant)		
	<i>For susceptibility attributes, please provide a brief rationale for scoring of parameters where there may be uncertainty affecting your decision</i>		
References			
Standard clauses 1.3.2.2			

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 - 1.75	1.76 - 2.24	2.25 - 3
Average Productivity Score	1 - 1.75	PASS	PASS	PASS
	1.76 - 2.24	PASS	PASS	TABLE D4
	2.25 - 3	PASS	TABLE D4	TABLE D4

D4 Species Name			
Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements			
D4.1	The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.		
D4.2	There is no substantial evidence that the fishery has a significant negative impact on the species.		
Outcome:			
Evidence			
D4.1: The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.			
D4.2 There is no substantial evidence that the fishery has a significant negative impact on the species.			
References			
Links			
MarinTrust Standard clause		1.3.2.2, 4.1.4	
FAO CCRF		7.5.1	
GSSI		D.5.01	