



MarinTrust Standard V2

By-product Fishery Assessment *Bigeye tuna (Thunnus obesus) in FAO Area 51*

MarinTrust Programme

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Table 1 Application details and summary of the assessment outcome

Fishery Under Assessment	Species:	Bigeye Tuna (<i>Thunnus obesus</i>)
	Geographical area:	FAO Area 51, Western Indian Ocean
	Country of origin of the product:	Mauritius (Flag state: Mauritius)
	Stock:	Bigeye tuna in area 51
Date	18 April 2023	
Report Code	MUS02	
Assessor	Matthew Jew	
Country of origin of the product - PASS	Mauritius (Flag state: Mauritius)	
Country of origin of the product - FAIL	NA	

Application details and summary of the assessment outcome			
Company Name(s): Marine Biotechnology Products Ltd			
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
Matthew Jew	Léa Lebechnech	0.5	Surveillance 1
Assessment Period	Up to April 2023		

Scope Details	
Main Species	Bigeye Tuna (<i>Thunnus obesus</i>)
Stock	Bigeye tuna in FAO Area 51
Fishery Location	FAO Area 51, Western Indian Ocean
Management Authority (Country/ State)	Mauritius (Flag state: Mauritius)
Gear Type(s)	Not provided by client
Outcome of Assessment	
Peer Review Evaluation	Agree with the assessor's determination
Recommendation	APPROVED

Table 2. Assessment Determination

Assessment Determination
If any species is categorised 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 Marin trust raw material. Bigeye tuna (<i>Thunnus obesus</i>) is not assessed on IUCN's Red List, and does not appear in CITES appendices; therefore, <i>Thunnus obesus</i> is eligible for approval for use as Marin trust by-product raw material. The bigeye tuna in FAO 51 is managed by the Indian Ocean Tuna Commission (IOTC) which is an intergovernmental organization responsible for managing tuna and tuna-like species in the Indian Ocean. The IOTC provides stock assessments and advice for these species on a three-year cycle (approximately). The most recent stock assessment for bigeye tuna was conducted in 2022. Fishery removals are included in the stock assessment and it PASSES Clause C1.1. The stock is considered, in its most recent stock assessment, to have biomass below the limit reference point, it FAILS Clause C1.2. As the stock fails category C, it was assessed under category D. Table D1 (PSA) shows that the stock as an average productivity score of 1.71 and an average susceptibility score of 3. The PSA risk rating results (Table D3) determined that the species passes. Therefore, bigeye tuna in FAO Area 51 is APPROVED for the production of fishmeal and fish oil under the current MarinTrust v2.0 by-products.
Fishery Assessment Peer Review Comments
The internal peer reviewer agrees with the assessor's determination, who correctly classified first the stock of bigeye tuna (<i>Thunnus obesus</i>) in FAO 51 under Category C, as a stock assessment with reference points is available by the IOTC. However, even if fishery removals are included in the stock assessment, the stock is considered, in its most recent assessment, to have biomass below the limit reference point, so it FAILS Clause C1.2. The internal peer reviewer agrees with the decision of the assessor to assess it under category D. The stock of bigeye tuna in FAO 51 passed the PSA risk rating (Table D3), with an average productivity score of 1.71 and an average susceptibility score of 3. Therefore, bigeye tuna in FAO Area 51 is APPROVED for the production of fishmeal and fish oil under the current MarinTrust v 2.0 by-products standards.
Notes for On-site Auditor
N/A

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
Bigeye tuna	<i>Thunnus obesus</i>	Bigeye tuna in FAO	IOTC	Fails Category C, Passes Category D	VU	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		Bigeye tuna (<i>Thunnus obesus</i>)
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. No

Clause outcome: Fail

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.

The fisheries removals are reported as commercial catches. Data are considered to be relatively reliable for the main industrial fleets targeting bigeye tuna, with the proportion of catches estimated or adjusted by the IOTC Secretariat relatively low. Therefore, each IOTC dataset (nominal catch, catch-and-effort, and length frequency) are assessed against IOTC reporting standards.

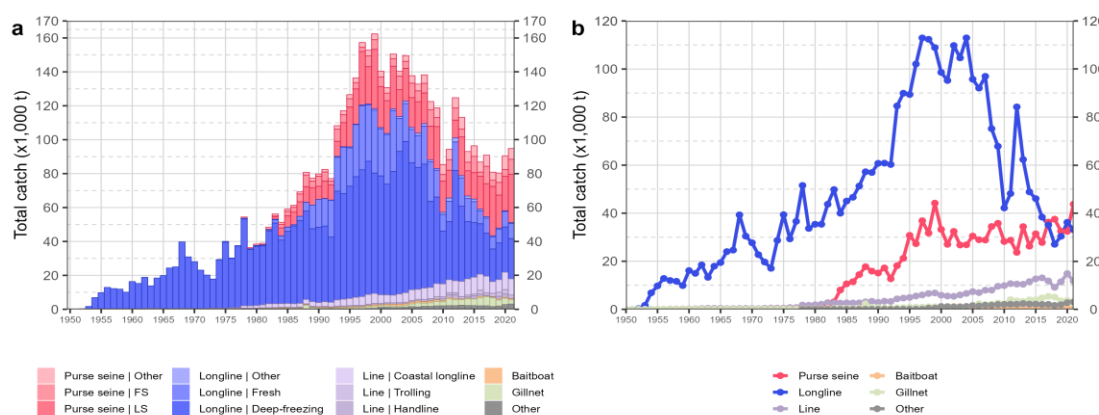


Figure 1. Long-term catches for whiting in ICES 6.a from 1981 to 2021.

Source: ICES 2022.

Therefore, fishery removals of the species in the fishery under assessment are included in the stock assessment process and therefore the stock PASSES clause C1.1

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.

In 2022 a new stock assessment was carried out for bigeye tuna in the IOTC area of competence to update the stock assessment undertaken in 2019. Two models were applied to the bigeye stock (Statistical Catch at Size (SCAS) and Stock Synthesis (SS3)), with the SS3 stock assessment selected to provide scientific advice. The reported stock status is based on a grid of 24 model configurations designed to capture the uncertainty on stock recruitment relationship, longline selectivity, growth and natural mortality. Spawning biomass in 2021 was estimated to be 25% (80% CI: 23-27%) of the unfished levels in 2021 and 90% (75-105%) of the level that can support MSY. Fishing mortality was estimated at 1.43 (1.1-1.77) times the F_{MSY} level. Considering the

characterized uncertainty, the assessment indicates that SB2021 is below SBMSY and that F_{2021} is above FMSY (79%). On the weight-of-evidence available in 2022, the bigeye tuna stock is determined to be **overfished** and **subject to overfishing**.

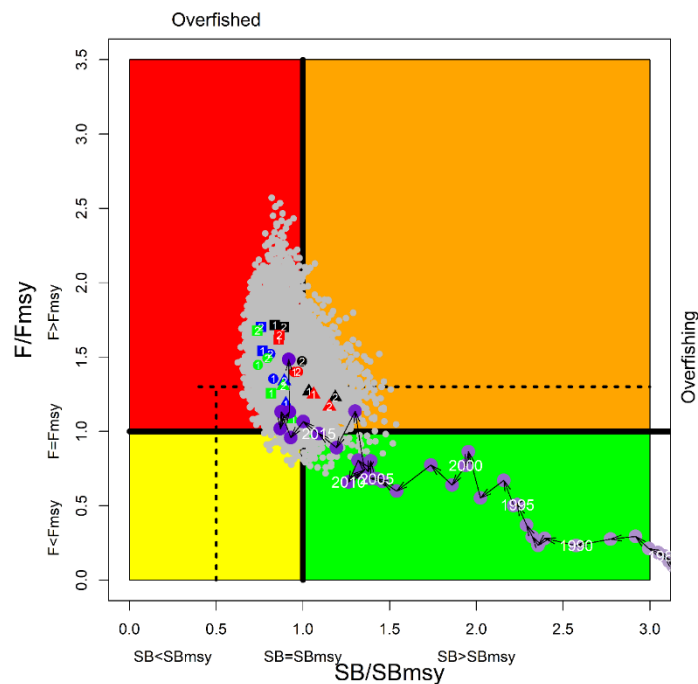


Figure 2. Kobe plot for bigeye tuna in Indian Ocean. SS3 Aggregated Indian Ocean assessment Kobe plot. The coloured points represent stock status estimates from the 24 model options. Coloured symbols represent Maximum posterior density (MPD) estimates from individual models: square, circle, and Triangles represents alternative steepness options; black, red, blue, and green represents alternative growth and natural mortality option combination; 1, 2, represents alternative selectivity options. The purple dot and arrowed line represent estimates of the reference model (the last purple dot represents the terminal year of 2021). Grey dots represent uncertainty from individual models. The dashed lines represent limit reference points for IO bigeye tuna ($SB_{lim} = 0.5 SB_{MSY}$ and $F_{lim} = 1.4 F_{MSY}$)

Source: IOTC 2022.

	Stock overfished ($SB_{2021} / SB_{MSY} < 1$)	Stock not overfished ($SB_{2021} / SB_{MSY} \geq 1$)
Stock subject to overfishing ($F_{2021} / F_{MSY} \geq 1$)	79%	17%
Stock not subject to overfishing ($F_{2021} / F_{MSY} \leq 1$)	2%	2%
Not assessed / Uncertain		

Figure 3. Kobe plot for bigeye tuna in Indian Ocean. Probability of stock status with respect to each of four quadrants of the Kobe plot. Percentages are calculated as the proportion of model terminal values that fall within each quadrant with model weights taken into account

Source: IOTC 2022.

Therefore, the species is considered, in its most recent stock assessment, to have a biomass below the limit reference point and it Fails clause C1.2.

References

IOTC. 2022. Executive summary Bigeye Tuna 2022_rev1.

https://iotc.org/sites/default/files/content/Stock_status/IOTC-2022-SC25-ES02_BET_E_rev1.docx

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	Bigeye Tuna (<i>Thunnus obesus</i>)	
	Productivity Attribute	Value	Score
	Average age at maturity (years)	2.3 years	1
	Average maximum age (years)	11.6 years	2
	Fecundity (eggs/spawning)	4,274,342 eggs	1
	Average maximum size (cm)	200.1 cm	2
	Average size at maturity (cm)	97.4 cm	2
	Reproductive strategy	Broadcast spawner	1
	Mean trophic level	4.5	3
	Average Productivity Score		1.71
	Susceptibility Attribute	Value	Score
	Availability (area overlap)	>30%	3
	Encounterability (the position of the stock/species within the water column relative to the fishing gear)	High Susceptibility	3
	Selectivity of gear type	High Susceptibility	3
	Post-capture mortality	Retained	3
	Average Susceptibility Score		3
	PSA Risk Rating (From Table D3)		Pass
	Compliance rating		Pass
	Further justification for susceptibility scoring (where relevant)		
	1. Availability: The submitted stock is for FAO Area 51 and IOTC’s stock definition is for bigeye tuna in the Indian Ocean. As Area 51 consists of the western half of the Indian Ocean, areal overlap of the fishery and the stock is 50%. 2. Encounterability: Marine Biotechnology Products Ltd did not provide gear type on the application form, thus Encounterability cannot be accurately determined. This attribute was scored as high susceptibility out of precaution. 3. Selectivity of gear type: Marine Biotechnology Products Ltd did not provide gear type on the application form, thus Selectivity cannot be accurately determined. This attribute was scored as high susceptibility out of precaution. 4. Post-capture mortality: Retained species is scored as a 3.		
	References		
Fishbase. <i>Thunnus obesus</i> , Bigeye tuna: https://fishbase.mnhn.fr/Summary/SpeciesSummary.php?ID=146&AT=Tonfisk			
Standard clauses 1.3.2.2			

Table D2 - Productivity / Susceptibility attributes and scores.

Productivity attributes	High productivity (Low risk, score = 1)	Medium productivity (medium risk, score = 2)	Low productivity (high risk, score = 3)
Average age at maturity	<5 years	5-15 years	>15 years
Average maximum age	<10 years	10-25 years	>25 years
Fecundity	>20,000 eggs per year	100-20,000 eggs per year	<100 eggs per year
Average maximum size	<100 cm	100-300 cm	>300 cm
Average size at maturity	<40 cm	40-200 cm	>200 cm
Reproductive strategy	Broadcast spawner	Demersal egg layer	Live bearer
Mean Trophic Level	<2.75	2.75-3.25	>3.25

Susceptibility attributes	Low susceptibility (Low risk, score = 1)	Medium susceptibility (medium risk, score = 2)	High susceptibility (high risk, score = 3)
Areal overlap (availability) Overlap of the fishing effort with the species range	<10% overlap	10-30% overlap	>30% overlap
Encounterability The position of the stock/species within the water column relative to the fishing gear, and the position of the stock/species within the habitat relative to the position of the gear	Low overlap with fishing gear (low encounterability).	Medium overlap with fishing gear.	High overlap with fishing gear (high encounterability). Default score for target species
Selectivity of gear type Potential of the gear to retain species	a Individuals < size at maturity are rarely caught	a Individuals < size at maturity are regularly caught.	a Individuals < size at maturity are frequently caught
	b Individuals < size at maturity can escape or avoid gear.	b Individuals < half the size at maturity can escape or avoid gear.	b Individuals < half the size at maturity are retained by gear.
Post-capture mortality (PCM) The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival	Evidence of majority released post-capture and survival.	Evidence of some released post-capture and survival.	Retained species or majority dead when released.

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