MarinTrust Standard V2

Wholefish Fishery Assessment Report

Pacific Anchoveta and Pacific Thread Herring | Panama | FAO 77

MarinTrust Programme
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Table 1 Application details and summary of the assessment outcome

Application details and summary of the assessment outcome			
Name(s): Promarina, S.A.			
Country: Panama			
Email address: pleamar@promarinapanama.com		**Applicant Code:**	n/a
Certification Body Details			
Name of Certification Body:		LRQA	
Assessor Name	**CB Peer Reviewer**	**Assessment Days**	**Initial/Surveillance/Re-approval**
Sam Dignan	Kate Morris	3.0	Surveillance 1, 2023
Assessment Period	January 2022- January 2023		
Scope Details			
Management Authority (Country/State)		Panama, Aquatic Resources Authority of Panama (Autoridad de los Recursos Acuáticos de Panamá, ARAP)	
Main Species		1. Pacific anchoveta (Cetengraulis mysticetus) 2. Pacific thread herrings representing a complex of: a. Pacific thread herring (*Opisthonema libertate*) b. Middling thread herring (*Opisthonema medirastre*) c. Slender thread herring (*Opisthonema bulleri*)	
Fishery Location		Area FAO 77, Eastern Central Pacific (Gulf of Panama)	
Gear Type(s)		Purse seine	
Outcome of Assessment			
Overall Outcome		Pass	
Clauses Failed		Nil	
CB Peer Review Evaluation		Pass	
Fishery Assessment Peer Review Group Evaluation		See report in Appendix B	
Recommendation		Continuing Approval	

Table 2. Assessment Determination

Assessment Determination
The approval statuses of MarinTrust fisheries are valid for 3 years subject to successful completion of annual surveillance assessments. The required assessments during a 3-year approval cycle consist of: • Initial assessment (Year 1) • Surveillance 1 (Year 2) • Surveillance 2 (Year 3) • Reapproval This report represents the 1st surveillance assessment of this fishery. As such it is less in-depth than the initial assessment and primarily covers changes within the subject fishery since the initial assessment of January – February 2022. It is based on information available as of 31st January 2023. This being a surveillance assessment, the assessor has focussed on identifying potential or actual changes in the fishery including, but not limited to changes in: – The status of impacted stocks (i.e., updated stock assessments). – Other scientific information such as catch compositions, habitat and ecosystem impacts etc. – Management systems including underlying regulations. – Key personnel likely to materially impact the management of the fishery. – Traceability systems. While thorough, this surveillance assessment does not constitute a full re-assessment of the fishery so readers should refer to the initial assessment for additional detail where required. Overall, it must be said that there has been little change of note in the year since this fishery was first assessed and certified. The main changes to have occurred have been within the MarinTrust scheme itself with the revision of their criteria for Category D species. Where significant changes have been identified, it is clearly outlined what these are and their impacts (if any) on the fishery's conformance to MarinTrust requirements. For clarity, significant changes are highlighted in **blue** text. The scope of this fishery (targets species, management entities, fishing area, fishing gear etc.) remains unchanged from when it was initial assessed. The subject fishery is a pelagic purse seine fishery targeting small pelagics in Panamanian waters. Mesh sizes vary between the industrial and artisanal sectors with specified minimums of 2.54 cm and 1.90 cm respectively. Maximum net sizes also vary between maximums of 680 m long x 68 m high in the industrial sector and 162 m long x 7 m high in the artisanal sector. By their nature, pelagic purse fisheries tend to be relatively 'clean' and, in this case, the targets species (Pacific anchoveta (*Cetemgraulis mysticetus*) and Pacific thread herrings (*Opisthonema spp.*)) represent a cumulative >95% of the total catch. The remaining <5% is an assemblage of other species including Pacific bumper, white mullet, cachema weakfish, Peruvian moonfish and sea catfish in varying quantities. Thread herring in the context of this assessment represents a complex of three species (*Opisthonema libertate*, *O. medirastre* and *O. bulleri*) that are captured together Panamanian waters and treated as a single unit in for assessment and management purposes. **Overall clause scores for Category A species remain unchanged from when the fishery was initially assessed.** There are numerous Category D species associated with this fishery (essentially species bycaught in comparatively low amounts that are not subject to species-specific management). Category D species are primarily assessed using a Productivity and Susceptibility Analysis (PSA) approach.

Assessment Determination
Ordinarily, during a surveillance assessment, Category D species would only be subjected to a short review to confirm the continuing accuracy of Productivity and Susceptibility attributes and check for updates to relevant life history or fishery characteristics. In this case however, MarinTrust has implemented significant changes to their PSA since the initial assessment of this fishery, so Category D species have essentially been updated to the currently applicable PSA. Changes are discussed in further detail in the Category D species section. Overall, while the changes to the PSA and some updates to life history and fishery-related characteristics resulted in changes to attribute and overall scores, they were no substantive changes to overall outcomes which remain as at the time of initial assessment. **Overall clause scores for Category D species remain unchanged from when the fishery was initially assessed.** Finally, while the Social Criterion section of this report template specifies that applicants must commit to ensuring that vessels operating in the fishery adhere to internationally recognised guidance on human rights and to ensuring there is no use of enforced or unpaid labour in the fleet(s) operating upon the resource., this has not been assessed as part of this surveillance assessment. Overall, the level of conformance of this fishery with MarinTrust requirements remains unchanged since it was initially assessed such that **CONTINUING APPROVAL IS RECOMMENDED.**
Fishery Assessment Peer Review Comments
The whole fishery under assessment here is the Pacific Anchovy (*Cetengraulis mysticetus*) fishery which also targets a Pacific thread herring stock complex. The fishery is pursued by Panama registered vessels in FAO 77 (Gulf of Panama). Anchovy and Thread herring are managed by the Aquatic Resources Authority of Panama (Autoridad de los Recursos Acuáticos de Panamá, ARAP) and scored as Category A species under the MT requirements. By-catch species under assessment include, Pacific bumper, white mullet, cachema weakfish, Peruvian moonfish and sea catfish. These species are also managed by the same Panama agencies but not to species-specific reference points, and thus are scored as Category D species under the MT requirements. All species scoring tables have been completed by the auditor with sufficient evidence presented to support their final determination. The fishery uses purse seines which are generally deployed in the pelagic environment, however regular contact with the seabed is noted for muddy sediments. In the areas where contact can be expected, the degree of interaction is not officially recorded and there is no habitat mapping of vulnerable benthic species. ETP interactions are touched on but it's not clear what new data has been reviewed to confirm the adequate ongoing recording of ETP interactions. For species recorded, record catch relative to population levels should be used to justify no substantial impact. The peer review supports the auditor's recommendation to Pass this fishery under the Marin Trust IFFO RS v2.0 whole-fishery standard for the production of fishmeal and fish oil. However, more data to validate compliance with the MT requirements should be made available at the next audit to guarantee ongoing certification.
Notes for On-site Auditor
Confirm catch composition

Table 3 General Results

General Clause	Outcome (Pass/Fail)
M1 - Management Framework	Pass
M2 - Surveillance, Control and Enforcement	Pass
F1 - Impacts on ETP Species	Pass
F2 - Impacts on Habitats	Pass
F3 - Ecosystem Impacts	Pass

Table 4 Species- Specific Results

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

Category	Species	% landings	Outcome (Pass/Fail)	
A	Pacific anchoveta (*Cetengraulis mysticetus*)	50% – 60% (2022: 79.34%)*	A1	Pass
			A2	Pass
			A3	Pass
			A4	Pass
A	Pacific thread herrings (*Opisthonema* spp.)	35% – 40% (2022: 20.63%)*	A1	Pass
			A2	Pass
			A3	Pass
			A4	Pass
B	Nil			
C	Nil			
D	Pacific bumper (*Chloroscombrus orqueta*)	0.1% – 2% (2022: 0.03%)*	Pass	
D	White mullet (*Mugil curema*)	0.1% – 2% (2022: 0.003%)*	Pass	
D	Cachema weakfish (*Cynoscion phoxocephalus*)	0.1% – 2% (2022: 0.07%)*	Pass	
D	Peruvian moonfish (*Selene peruviana*)	0.1% – 2% (2022: 0.01%)*	Pass	
D	Sea catfishes (*Ariopsis* spp.)	0.1% – 2% (2022: 0.02%)*	Pass	

* From CeDePesca, 2023. Technical Report on Private Onboard Observer Programme, February 2023.

Table 5 Species Categorisation Table

Common name	Latin name	Stock	IUCN Redlist Category[1]	% of landings	Management	Category
Pacific anchoveta	*Cetengraulis mysticetus*	Gulf of Panama	Least concern	50% – 60% (2022: 79.34%)	ARAP	A
Pacific thread herrings*	*Opisthonema* spp.	Gulf of Panama	Per species	35% – 40% (2022: 20.63%)	ARAP	A
Pacific thread herring	*O. libertate*		Least Concern			
Middling thread herring	*O. medirastre*		Least Concern			
Slender thread herring	*O. bulleri*		Least Concern			
Pacific bumper	*Chloroscombrus orqueta*	Gulf of Panama	Least Concern	0.1% – 2% (2022: 0.03%)*	ARAP	D
White mullet	*Mugil curema*		Least Concern	0.1% – 2% (2022: 0.003%)*		D
Cachema weakfish	*Cynoscion phoxocephalus*		Least Concern	0.1% – 2% (2022: 0.07%)*		D
Peruvian moonfish	*Selene peruviana*		Least Concern	0.1% –s 2% (2022: 0.01%)*		D
Sea catfishes*	*Ariopsis* spp.		Per species	0.1% – 2% (2022: 0.02%)*		D
Tete sea catfish	*A. seemanni*		Least Concern			
Blue sea catfish	*A. guatemalensis*		Least Concern			

Species categorisation rationale

*Stock complexes containing multiple species.

New information about catch composition—from CeDePesca, 2023. Technical Report on Private Onboard Observer Programme, February 2023—was provided which showed that, during the period from April to October 2022, observed catches of 3,475.75 mt of small pelagics resulted in 40.59 mt of bycatch (corresponding to 1.17% of the total recorded catch).

In the main, these new data were non-substantive in terms of their impacts on species categorisation for the purpose of this surveillance assessment, with the target species continuing to represent the vast majority (99.97%) of catches therefore, species categorisation is as at the initial assessment. These data should be included in a new 'average' species assemblage at the next full assessment. Where relevant, all species within a species grouping are presented for clarity.

While Pacific bumper is the subject of the same Fisheries Management Plan (FMP) as the target species, there are no reference points and no stock assessments such that a species-specific management regime is not deemed in place; therefore, despite its inclusion in the FMP, the species is most appropriately considered as Category D.

[1] https://www.iucnredlist.org/

MANAGEMENT

The two clauses in this section (M1, M2) relate to the general management regime applied to the fishery under assessment. The clauses should be completed by providing sufficient evidence to justify awarding each of the requirements a pass or fail rating. A fishery must meet all the minimum requirements in every clause before it can be recommended for approval.

M1	Management Framework – Minimum Requirements		
	M1.1	There is an organisation responsible for managing the fishery.	**MET**
	M1.2	There is an organisation responsible for collecting data and assessing the fishery.	**MET**
	M1.3	Fishery management organisations are publicly committed to sustainability.	**MET**
	M1.4	Fishery management organisations are legally empowered to take management actions.	**MET**
	M1.5	There is a consultation process through which fishery stakeholders are engaged in decision-making.	**MET**
	M1.6	The decision-making process is transparent, with processes and results publicly available.	**MET**
		Clause outcome:	**PASS**

M1.1 There is an organisation responsible for managing the fishery.

There have been no substantive changes since the initial assessment of this fishery. The organisation primarily responsible for fisheries management in Panama remains the Authority of Aquatic Resources of Panama (Autoridad de los Recursos Acuáticos de Panamá (ARAP) established under Law 44/2006.

Additionally, a new fisheries law was implemented in March 2021 (Law 204/2021) which, at Article 2, states that the ARAP is the guiding entity of the Panamanian State in managing and ensuring the compliance and execution of the Law, its regulations regarding aquaculture, fishing, and activities connected and related to fishing (see Article 2 of Law 204/2021).

As at the time of the initial assessment, there remains an organisation (ARAP) responsible for managing the fishery; **sub-clause M1.1 continues to be met.**

M1.2 There is an organisation responsible for collecting data and assessing the fishery.

ARAP (see above) is the organisation primarily responsible for collecting data and assessing fisheries in Panama with support from Albor Tecnológico, the company charged with conducting hydroacoustic surveys, CeDePesca and the fishing industry.

As at the time of the initial assessment, there remains an organisation (ARAP) responsible for collecting data and assessing the fishery **sub-clause M1.2 continues to be met.**

M1.3 Fishery management organisations are publicly committed to sustainability.

The ARAP's (see above) stated mission is:

"to ensure the development of a productive and social culture of aquatic resources in a sustainable and sustainable way in harmony with the environment to improve the quality of life of the inhabitants of the Republic".

A new fisheries law was implemented in March 2021, with objectives including implementing sustainable management of fishery resources and the application of the precautionary approach to fisheries management in the Panama (see Article 8 of Law 204/2021).

Article 8. The Authority will execute its management considering general principles of the fishing and water sector, with special attention of:

1. ***Sustainability.*** *The aquatic ecosystems, either marine or continental, should be used according to responsible fishing and aquaculture practices, guaranteeing the option of benefits for current and future generations.*
2. ***Precautionary criteria.*** *The criteria applied on the conservation, ordainment, and exploitation of the living aquatic resources, with the end of protecting and preserving the aquatic environment, considering the most trustworthy scientific data available. Before the lack of adequate scientific information, corresponding measures will be taken following the principle of environmental precaution established on the standards of international environmental law.*
   (…)

M1	Management Framework – Minimum Requirements		
	M1.1	There is an organisation responsible for managing the fishery.	MET
	M1.2	There is an organisation responsible for collecting data and assessing the fishery.	MET
	M1.3	Fishery management organisations are publicly committed to sustainability.	MET
	M1.4	Fishery management organisations are legally empowered to take management actions.	MET
	M1.5	There is a consultation process through which fishery stakeholders are engaged in decision-making.	MET
	M1.6	The decision-making process is transparent, with processes and results publicly available.	MET
		Clause outcome:	**PASS**

As at the time of the initial assessment, fishery management organisations remain publicly committed to sustainability; **sub-clause M1.3 continues to be met.**

M1.4 Fishery management organisations are legally empowered to take management actions.

ARAP are, under Law 204/2021, legally empowered to take management actions including:

- Chapter II Fishing Licenses
- Chapter III Management Plan of the Fishing Resources
- Title XII Breaches and Fines
  - Chapter II Administrative Sanctioning Process
  - Chapter III Breaches and Sanctions

As at the time of the initial assessment, ARAP remain legally empowered to take management actions; **sub-clause M1.4 continues to be met.**

M1.5 There is a consultation process through which fishery stakeholders are engaged in decision-making.

ARAP are, under Law 204/2021, required to pay particular attention to stakeholder consultation in their management of Panamanian fisheries.

Article 8. The Authority will execute its management considering general principles of the fishing and water sector, with special attention of:

3. ***Citizen's participation**. The organizations of the fishing and aquaculture sectors, the communities and families directly related to fishing activities and aquaculture will have room to express their opinion and actions in the execution of this Law, policies and consequent actions.*

Fishery stakeholders were heavily involved in the previous Fisheries Improvement Project (FIP) of this fishery which included developing the research and management of the fishery.

A management committee is also in place for this fishery to monitor the execution and/or modification of the Fishery Management Plan (FMP). The committee includes a representative from each of the ARAP (who chairs the Commission), each fishmeal and fish oil processing company, each of the industrial (high seas) and artisanal (inshore) fishery sectors and a representative chosen from amongst relevant NGOs (CeDePesca, 2021).

As at the time of the initial assessment, there remains a consultation process through which fishery stakeholders are engaged in decision-making; **sub-clause M1.5 continues to be met.**

M1.6 The decision-making process is transparent, with processes and results publicly available.

A Fishery Management Plan (FMP) for this fishery has been in place since 2018 (ARAP 2018). It does not however set official reference points or harvest control rules and the opening and closing of the fishery is primarily based on the estimated size structures of the respective target stocks and in-season monitoring of the status of the resource respectively. Nonetheless, the process by which decisions are made is transparent, with processes and results publicly available; as an example, the 2021 anchoveta fishery was:

- Opened on 07 April 2021 by Resolution 035/2021: https://cedepesca.net/wp-content/uploads/2021/08/Resolucion-Apertura-2021.pdf.
- Closed on 12 August 2021 by Resolution 122/2021: https://cedepesca.net/wp-content/uploads/2022/02/resolucion-de-cierre-de-anchovetas-2021.pdf.
  - Based on an ARAP Technical Report: https://cedepesca.net/wp-content/uploads/2022/02/Informe-de-Cierre-de-Temporada-de-Anchoveta-2021.pdf.

M1	Management Framework – Minimum Requirements		
	M1.1	There is an organisation responsible for managing the fishery.	MET
	M1.2	There is an organisation responsible for collecting data and assessing the fishery.	MET
	M1.3	Fishery management organisations are publicly committed to sustainability.	MET
	M1.4	Fishery management organisations are legally empowered to take management actions.	MET
	M1.5	There is a consultation process through which fishery stakeholders are engaged in decision-making.	MET
	M1.6	The decision-making process is transparent, with processes and results publicly available.	MET
		Clause outcome:	**PASS**

Overall, as at the time of the initial assessment, decision-making processes remain transparent, with processes and results publicly available; **sub-clause M1.6 continues to be met.**

References

Most references are in Spanish, where available, English translations are also provided.

ARAP 2018. Plan de manejo de la pesqueria de pequenos pelagicos anchoveta, arenque y orqueta en el Pacifico de Panama Management plan for small pelagic (anchoveta, thread herring and bumper) fisheries in the Panamanian Pacific): https://cedepesca.net/wp-content/uploads/2021/08/Plan%20de%20Manejo%20PPP.pdf.

Law 44/2006 establishing Autoridad de los Recursos Acuáticos de Panamá (ARAP): https://arap.gob.pa/wp-content/uploads/2015/05/ARAP_legislacion_ley-2006-44.pdf.

Law 204/2021 regulating fisheries and aquaculture in the Republic of Panama (Official, *in Spanish*): https://cedepesca.net/wp-content/uploads/2021/08/Panama-Ley-de-Pesca-2021.pdf.

Law 204/2021 regulating fisheries and aquaculture in the Republic of Panama (Unofficial English translation of the original document in Spanish): https://panamamaritime.com/wp-content/uploads/sites/9/2022/09/Law-N%C2%B0204-Fishing-and-aquaculture-activities-in-Panama.pdf.

CeDePesca 2021 conformation meeting of the Small Pelagics Fisheries Committee (*in Spanish*): (https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VII.-Agenda-comite-Pequenos-Pelagicos-Marzo-2021-y-borrador-reglamento.pdf)

ARAP Resolution 035/2021 opening the 2021 anchovy fishery: https://cedepesca.net/wp-content/uploads/2021/08/Resolucion-Apertura-2021.pdf.

ARAP Resolution 122/2021 closing the 2021 anchovy fishery: https://cedepesca.net/wp-content/uploads/2022/02/resolucion-de-cierre-de-anchovetas-2021.pdf.

ARAP, 2021. Technical Report based on Management Plan criteria used as basis for closing the 2021 anchovy fishery: https://cedepesca.net/wp-content/uploads/2022/02/Informe-de-Cierre-de-Temporada-de-Anchoveta-2021.pdf.

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf

Links	1.3.1.1, 1.3.1.2
MarinTrust Standard clause	7.2, 7.3.1, 7.4.4, 12.3
FAO CCRF	D.1.01, D.4.01, D2.01, D1.07, D1.04,
GSSI	

M2	Surveillance, Control and Enforcement - Minimum Requirements		
	M2.1	There is an organisation responsible for monitoring compliance with fishery laws and regulations.	MET
	M2.2	There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken.	MET
	M2.3	There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing.	MET
	M2.4	Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.	MET
		Clause outcome:	**PASS**

M2.1 There is an organisation responsible for monitoring compliance with fishery laws and regulations.

The ARAP's Directorate of Inspection, Surveillance and Control (DISC) is responsible for monitoring compliance with fishery laws and regulations (refer to Article 38 of Law 44/2006). Their objective is to "Promote, organize, monitor, coordinate and execute the general policy, strategy, plans and programs regarding inspection, surveillance, control and control of aquatic resources" with tasks including conducting inspections, issuing certificates of inspections, investigating complaints, ensuring vessels adhere to safety legislation, and imposing sanctions for violations of legal and regulatory norms regulations ().

As at the time of the initial assessment, there is an organisation (the ARAP's Directorate of Inspection, Surveillance and Control (DISC)) responsible for monitoring compliance with fishery laws and regulations; **sub-clause M2.1 continues to be met.**

M2.2 There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken.

Title IV of the Articles 52 to 57 of Panama Law no. 44, 2006 describes infractions and sanctions in Panamanian fisheries where minor and serious infractions are subject to fines of $100 – $10,000 and $10,001 - $1,000,000 respectively. Additional sanctions are also available to authorities including the power to revoke fishing permits, licenses or authorisations.

As at the time of the initial assessment, a framework of sanctions remains in place which is applied when laws and regulations are discovered to have been broken; **sub-clause M2.2 continues to be met.**

M2.3 There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing.

There are numerous measures to monitor compliance in the fishery including a catch database, onboard observers and Vessel Monitoring Systems (VMS). Enforcement activities are routinely carried out and sometimes, where non-compliance is proven, result in sanctions. In the period April – October 2022, 229 sets, made by 17 vessels during 72 fishing trips were observed.

As at the time of initial assessment, there is some occasional non-compliance in the fishery but no substantial evidence of widespread non-compliance nor of IUU fishing; **sub-clause M2.3 continues to be met.**

M2.4 Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.

As above, and as the time of the initial assessment, there are numerous measures to actively monitor compliance in the fishery including a catch database, onboard observers and Vessel Monitoring Systems (VMS); **sub-clause M2.4 continues to be met.**

References

Law 44/2006 establishing Autoridad de los Recursos Acuáticos de Panamá (ARAP): https://arap.gob.pa/wp-content/uploads/2015/05/ARAP_legislacion_ley-2006-44.pdf.

CeDePesca, 2023. Technical Report on Private Onboard Observer Programme, February 2023.

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf

Links	
MarinTrust Standard clause	1.3.1.3
FAO CCRF	7.7.2
GSSI	D1.09

CATEGORY A SPECIES

The four clauses in this section apply to Category A species. Clauses A1 - A4 should be completed for **each** Category A species. If there are no Category A species in the fishery under assessment, this section can be deleted. A Category A species must meet the minimum requirements of all four clauses before it can be recommended for approval. The clauses should be completed by providing sufficient evidence to justify awarding each of the requirements a pass or fail rating. The species must achieve a pass rating against all requirements to be awarded a pass overall. **If the species fails any of these clauses it should be re-assessed as a Category B species.**

Species Name	**Pacific anchoveta (*Cetengraulis mysticetus*)**	
A1	**Data Collection - Minimum Requirements**	
A1.1	Landings data are collected such that the fishery-wide removals of this species are known.	**Met**
A1.2	Sufficient additional information is collected to enable an indication of stock status to be estimated.	**Met**
	Clause outcome:	**PASS**

A1.1 Landings data are collected such that the fishery-wide removals of this species are known.

As at the initial assessment of this fishery, the latest assessment of the status of the anchoveta stock remains Canales, 2020 with 2019 being the terminal year of the assessment. That said, a peer review of Canales, 2020 was conducted in 2021 (Minte-Vera, C. V. 2021).

According to Canales, 2020 (the latest assessment of the stock), landings data per fishing trip from vessel logbooks are available from 1995 to 2019. These data, following some treatment (via Generalised Linear Models (GLM)) to standardise for variability in catch rates including between fishing areas and vessel classes, are then used in the stock assessment. (See Tabla 9 *in* Canales, 2020).

Overall, there is no change since the initial assessment of this fishery in that landings data continue to be collected such that the fishery-wide removals of Pacific anchoveta are known; **sub-clause A1.1 continues to be met**.

A1.2 Sufficient additional information is collected to enable an indication of stock status to be estimated.

Aside from landings data, additional information is also collected including the size composition of catches from biological sampling of catches, fishery Catch Per Unit Effort (CPUE) estimates and biomass estimates from hydroacoustic surveys. These data are also used in the stock assessment.

Overall, there is no change since the initial assessment of this fishery in that sufficient additional information continues to be collected to enable an indication of stock status to be estimated.; **sub-clause A1.2 continues to be met**.

References

Canales, C. M. 2020. Evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenque (*Opisthonema* sp.) en el Golfo de Panamá. (Stock assessment of anchovy (*Cetengraulis mysticetus*) and herring (*Opisthonema* sp.) in the Gulf of Panama) (in Spanish): https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf

Minte-Vera, C. V. 2021. Revisión por pares de la evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenques de hebra (*Opisthonema* spp.) en el Golfo de Panamá 2021 (informe no-publicado. 35 pgs) (in Spanish) (Peer review of the stock assessment of anchovy (*Cetengraulis mysticetus*) and thread herring (*Opisthonema* spp.) in the Gulf of Panama): https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf

Links	
MarinTrust Standard clause	1.3.2.1.1, 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2
FAO CCRF	7.3.1, 12.3
GSSI	D.4.01, D.5.01, D.6.02, D.3.14

Species Name	Pacific thread herring (Opisthonema spp.)	
A1	**Data Collection - Minimum Requirements**	
A1.1	Landings data are collected such that the fishery-wide removals of this species are known.	**MET**
A1.2	Sufficient additional information is collected to enable an indication of stock status to be estimated.	**MET**
	Clause outcome:	**PASS**

A1.1 Landings data are collected such that the fishery-wide removals of this species are known.

As at the initial assessment of this fishery, the latest assessment of the status of the anchoveta stock remains Canales, 2020 with 2019 being the terminal year of the assessment. That said, a peer review of Canales, 2020 was conducted in 2021 (Minte-Vera, C. V. 2021).

According to Canales, 2020 (the latest assessment of the stock), landings data per fishing trip from vessel logbooks are available from 1995 to 2019. These data, following some treatment (via Generalised Linear Models (GLM)) to standardise for variability in catch rates including between fishing areas and vessel classes, are then used in the stock assessment (See Tabla 12 *in* Canales, 2020).

Overall, there is no change since the initial assessment of this fishery in that landings data continue to be collected such that the fishery-wide removals of Pacific anchoveta are known; **sub-clause A1.1 continues to be met**.

A1.2 Sufficient additional information is collected to enable an indication of stock status to be estimated.

Aside from landings data, additional information is also collected including the size composition of catches from biological sampling of catches, fishery Catch Per Unit Effort (CPUE) estimates and biomass estimates from hydroacoustic surveys. These data are also used in the stock assessment.

Overall, there is no change since the initial assessment of this fishery in that sufficient additional information continues to be collected to enable an indication of stock status to be estimated.; **sub-clause A1.2 continues to be met**.

References

Canales, C. M. 2020. Evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenque (*Opisthonema* sp.) en el Golfo de Panamá. (Stock assessment of anchovy (*Cetengraulis mysticetus*) and herring (*Opisthonema* sp.) in the Gulf of Panama) (in Spanish): https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf

Minte-Vera, C. V. 2021. Revisión por pares de la evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenques de hebra (*Opisthonema* spp.) en el Golfo de Panamá 2021 (informe no-publicado. 35 pgs) (in Spanish) (Peer review of the stock assessment of anchovy (*Cetengraulis mysticetus*) and thread herring (*Opisthonema* spp.) in the Gulf of Panama): https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf

Links	
MarinTrust Standard clause	1.3.2.1.1, 1.3.2.1.2, 1.3.2.1.4, 1.3.1.2
FAO CCRF	7.3.1, 12.3
GSSI	D.4.01, D.5.01, D.6.02, D.3.14

Species Name		1. Pacific anchoveta (*Cetengraulis mysticetus*) 2. Pacific thread herring (*Opisthonema* spp.)	
A2	**Stock Assessment - Minimum Requirements**		
	A2.1	A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.	**MET**
	A2.2	The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.	**MET**
	A2.3	The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.	**MET**
	A2.4	The assessment is subject to internal or external peer review.	**MET**
	A2.5	The assessment is made publicly available.	**MET**
		Clause outcome:	**PASS**

A2.1 A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.

As at the initial assessment of this fishery, the latest assessment of the status of the anchoveta stock remains Canales, 2020. Prior to that, stock assessments for both Pacific anchoveta and thread herring were conducted in 2015 and 2016 as part of the Fisheries Improvement Project (FIP) of which this fishery was the subject. Given that a stock assessment has been completed in the last 3 years, it can be said that a stock assessment is conducted at least once every 3 years; therefore, the first part of sub-clause A2.1 continues to be met.

That said, unless there is substantial supporting information that a stock assessment every 5 years is sufficient for the long-term sustainable management of the stocks, an updated stock assessment should be expected in 2023; this will be evaluated at the next surveillance assessment in 2024.

As to whether the stock assessment considers all fishery removals and the biological characteristics of the species, it is clear from the latest assessment that the methodology employed considers *inter alia* all fisheries removals (landings) and biological characteristics (size composition of catches); therefore, the second part of sub-clause A2.1 is also met.

Overall, there is no change since the initial assessment of this fishery in that a stock assessment is conducted at least once every 3 years which considers all fishery removals and the biological characteristics of the species; **sub-clause A2.1 continues to be met**.

A2.2 The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.

The management objectives for these stocks, established following Canales 2020, are essentially escapement based and are to ensure that the stocks remain above (Note. Minte-Vera, 2021 suggested that the 20%B_0 limit reference point might not be sufficiently conservative):

1. Target reference point = 60% of the expected biomass in the absence of fishing (virgin biomass, B_0) (B_{target} = 60%B_0).
2. Limit reference point = 20% of the expected biomass in the absence of fishing (virgin biomass, B_0) (B_{limit} = 20%B_0).

Thereafter, in Table 9 and Table 12 for Anchoveta and thread herring respectively, the assessment provides estimates of the 2019 status of each of the subject stocks relative to B_0 (Anchoveta = 73.4%B_0; Thread herring = 87.6%B_0).

Overall, there is no change since the initial assessment of this fishery in that the assessment continues to provide estimates of the statuses of the relevant biological stocks relative to reference points; **sub-clause A2.2 continues to be met**.

A2.3 The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.

The assessment provides estimates of Maximum Sustainable Yield (MSY) (Rendimiento Máximo Sostenido (RMS)) for the fishery of 71,000 mt anchoveta and 66,100 mt of thread herring respectively. In both cases it is estimated that fishing at FMSY (Frms) would result in spawning biomass >70%SSB_0. The Maximum Sustainable Yield in each case is the estimated maximum volume of fish that can be removed from each stock by fishing which can still be expected to result in the stocks being at, or above, their defined target reference points.

Species Name	1. Pacific anchoveta (*Cetengraulis mysticetus*) 2. Pacific thread herring (*Opisthonema* spp.)	
A2	**Stock Assessment - Minimum Requirements**	
A2.1	A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species.	**MET**
A2.2	The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.	**MET**
A2.3	The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.	**MET**
A2.4	The assessment is subject to internal or external peer review.	**MET**
A2.5	The assessment is made publicly available.	**MET**
	Clause outcome:	**PASS**

Overall, there is no change since the initial assessment of this fishery in that the assessment continues to provide an indication of an appropriate volume of fishery removals from each stock based on their current status; **sub-clause A2.3 continues to be met**.

A2.4 The assessment is subject to internal or external peer review.
As indicated previously, the latest assessment (Canales, 2020) was subjected to peer review in 2021 and a report is available (Minte-Vera, C. V. 2021).

The assessment is subject to internal or external peer review; **sub-clause A2.4 continues to be met.**

A2.5 The assessment is made publicly available.
The latest assessment (Canales, 2020) is publicly available on the Cedepesca website here; **sub-clause A2.5 continues to be met.**

References

Canales, C. M. 2020. Evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenque (*Opisthonema* sp.) en el Golfo de Panamá. (Stock assessment of anchovy (*Cetengraulis mysticetus*) and herring (*Opisthonema* sp.) in the Gulf of Panama) (in Spanish): https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf

Minte-Vera, C. V. 2021. Revisión por pares de la evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenques de hebra (*Opisthonema* spp.) en el Golfo de Panamá 2021 (informe no-publicado. 35 pgs) (in Spanish) (Peer review of the stock assessment of anchovy (*Cetengraulis mysticetus*) and thread herring (*Opisthonema* spp.) in the Gulf of Panama): https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf

Links	
MarinTrust Standard clause	1.3.2.1.2, 1.3.2.1.4, 1.3.1.2
FAO CCRF	12.3
GSSI	D.5.01, D.6.02, D.3.14

Species Name	1. Pacific anchoveta (*Cetengraulis mysticetus*) 2. Pacific thread herring (*Opisthonema* spp.)	
A3	**Harvest Strategy - Minimum Requirements**	
A3.1	There is a mechanism in place by which total fishing mortality of this species is restricted.	**MET**
A3.2	Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.	**MET**
A3.3	Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).	**MET**
	Clause outcome:	**PASS**

A3.1 There is a mechanism in place by which total fishing mortality of this species is restricted.

The mechanism by which total fishing mortality of this species is restricted remains unchanged from the time of the initial assessment and as outlined in Executive Decree No. 107. Essentially, there are no Total Allowable Catches (TACs) in this fishery and total fishing mortality is instead controlled indirectly by restricting the number of fishing licences and opening and closing the fishery in consideration of the availability and the size structures of the resource. Other technical measures such as gear size and mesh limits and closed areas also contribute to curbing overall fishing mortality.

The mechanism to open and close the fishery is by Resolution where the fishery is opened based on the availability of the resource and the size structures of the target species as estimated by a pre-season survey. For the fishery to open, survey results must show the average total length of anchoveta and thread herring to be ≥12.5 cm and ≥17.0 cm respectively which are in turn based on the estimated average size at maturity.

Anchoveta is initially targeted until July, when spawning peaks, before thread herring is targeted from July onwards until weekly yields start to decrease, and the fishery is closed (generally around October).

Overall, as at the time of initial assessment, a mechanism (or more accurately a suite of mechanisms) remain in place by which total fishing mortality of this species is restricted; **sub-clause A3.1 continues to be met.**

A3.2 Total fishery removals of this species do not regularly exceed the level indicated or stated in the stock assessment. Where a specific quantity of removals is recommended, the actual removals may exceed this by up to 10% ONLY if the stock status is above the limit reference point or proxy.

As previously discussed, the stock assessment for this fishery has not been updated since the initial assessment where the assessment provides estimates of Maximum Sustainable Yield (MSY) for each species of 71,000 mt of anchoveta and 66,100 mt of thread herring. While not directly used in the management of the fishery, these estimates may be used as the 'level indicated or stated in the stock assessment' against which removals can then be assessed.

In the 25-year (1995 – 2019) time series of the stock assessment, thread herring landings have never come remotely close to the estimated MSY level (max = 37,297 mt; mean: 24,753 mt; median: 25,535 mt) while anchoveta landings have only been above once (115,747 mt in 2019) and are routinely well below the estimated MSY level (mean: 45,571 mt; median: 42,012 mt).

Overall, it remains the case that fishery removals do not regularly exceed the level indicated or stated in the stock assessment; **sub-clause A3.2 continues to be met.**

A3.3 Commercial fishery removals are prohibited when the stock has been estimated to be below the limit reference point or proxy (small quotas for research or non-target catch of the species in other fisheries are permissible).

While limit reference points for the target stocks have been proposed at 20% of the expected biomass in the absence of fishing (B_{limit} = 20%B_0) they do not currently function as hard limits. It is however expected that the fishery would not open were hydroacoustic surveys to indicate that the stocks were depressed. The fishery is closed in response to decreasing yields which may be considered a proxy for stock size.

Overall, fishery removals are prohibited, or could reasonably be expected to be, when stocks are estimated below 'limit' levels; **sub-clause A3.3 continues to be met.**
References Canales, C. M. 2020. Evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenque (*Opisthonema* sp.) en el Golfo de Panamá. (Stock assessment of anchovy (*Cetengraulis mysticetus*) and herring (*Opisthonema* sp.) in the Gulf of Panama) (in Spanish): https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf Minte-Vera, C. V. 2021. Revisión por pares de la evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenques de hebra (*Opisthonema* spp.) en el Golfo de Panamá 2021 (informe no-publicado. 35 pgs) (in Spanish) (Peer review of the stock assessment of anchovy (*Cetengraulis mysticetus*) and thread herring (*Opisthonema* spp.) in the Gulf of Panama): https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf
Links

MarinTrust Standard clause	1.3.2.1.3, 1.3.2.1.4
FAO CCRF	7.2.1, 7.22 (e), 7.5.3
GSSI	D3.04, D6.01

Species Name	1. Pacific anchoveta (*Cetengraulis mysticetus*) 2. Pacific thread herring (*Opisthonema* spp.)	
A4	**Stock Status - Minimum Requirements**	
A4.1	The stock is at or above the target reference point, OR IF NOT: The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT: The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.	**MET**
	Clause outcome:	**PASS**

A4.1 The stock is at or above the target reference point, OR IF NOT:
The stock is above the limit reference point or proxy and there is evidence that a fall below the limit reference point would result in fishery closure OR IF NOT:
The stock is estimated to be below the limit reference point or proxy, but fishery removals are prohibited.

As discussed previously, the stock assessment has not been updated since the initial assessment of this fishery where Canales 2020 assessed both stocks to be above the proposed target levels of 60%B_0. See also Figure 1 below.

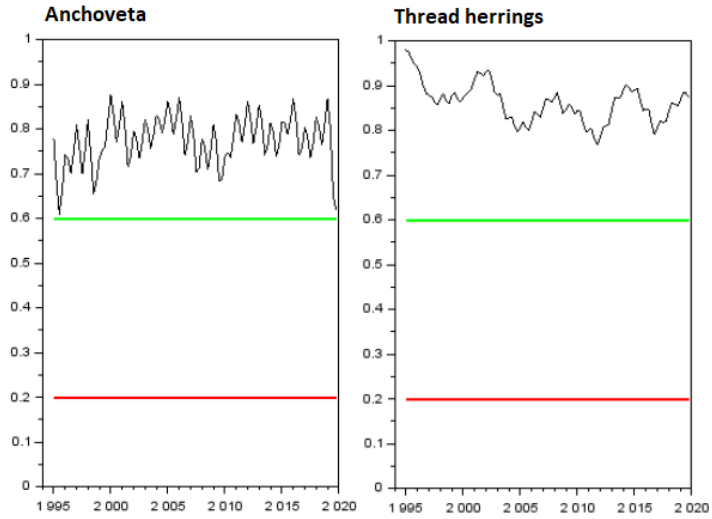

Figure 1. Stock status of Anchoveta (left) and Thread herrings (right) in relation to proposed limit (20%B_0, red line) and target (60%B_0, green line) reference points (Source: modified from Canalse, 2020).

Overall, it remains the case that, both stocks are above proposed target reference points; **sub-clause A4.1 continues to be met.**

References

Canales, C. M. 2020. Evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenque (*Opisthonema* sp.) en el Golfo de Panamá. (Stock assessment of anchovy (*Cetengraulis mysticetus*) and herring (*Opisthonema* sp.) in the Gulf of Panama) (in Spanish): https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf

Minte-Vera, C. V. 2021. Revisión por pares de la evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenques de hebra (*Opisthonema* spp.) en el Golfo de Panamá 2021 (informe no-publicado. 35 pgs) (in Spanish) (Peer review of the stock assessment of anchovy (*Cetengraulis mysticetus*) and thread herring (*Opisthonema* spp.) in the Gulf of Panama): https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf

Links	
MarinTrust Standard clause	**1.3.2.1.4**
FAO CCRF	**7.2.1, 7.2.2 (e)**
GSSI	**D6 01**

CATEGORY D SPECIES

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. 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.

As this is a surveillance assessment, a short review has been conducted to confirm the continuing accuracy of Productivity and Susceptibility attributes and check for updates to relevant life history or fishery characteristics.

The main change of note is that MarinTrust have significantly changed their PSA since this fishery was initially assessed including changes to the Productivity attributes as outlined below (throughout this section, blue text is used to identify where changes have occurred):

Productivity attributes	**High productivity (Low risk, score = 1)**		**Medium productivity (Medium risk, score = 2)**		**Low productivity (High risk, score = 3)**	
Report template (Doc FISH2) version	v2.1	v2.2	v2.1	v2.2	v2.1	v2.2
Average age at maturity	<2 years	<5 years	2 – 4 years	5 – 15 years	>4 years	>15 years
Average maximum age	<10 years	<10 years	10 – 30 years	10 – 25 years	>30 years	>25 years
Fecundity	<10,000 eggs per spawning	>20,000 eggs per year	1,000 – 10,000 eggs per spawning	100 – 20,000 eggs per year	<1,000 eggs per spawning	<100 eggs per year
Average maximum size	<60 cm	<100 cm	60 – 150 cm	100 – 300 cm	>150 cm	>300 cm
Average size at maturity	<30 cm	<40 cm	30 – 150 cm	40 – 200 cm	>150 cm	>200 cm
Reproductive strategy	Broadcast spawner	Broadcast spawner	Demersal spawner "berried"	Demersal egg layer	Live bearer, mouth brooder or significant parental investment	Live bearer
Mean Trophic Level	<2.50	<2.75	2.50 – 3.25	2.75 – 3.25	>3.25	>3.25

Note also that the Susceptibility portion of the PSA has changed significantly with the removal, consolidation and/or simplification of attributes such that it now consists of only four main attributes:

1. Areal overlap (availability)
2. Encounterability
3. Selectivity of gear type
4. Post-capture mortality (PCM)

Based on the above, and even though the 'on the ground' attributes of the species and/or fishery may not have changed in the period since the initial assessment of this fishery, individual attribute, average Productivity and Susceptibility and overall outcome scores may have changed.

Additionally, during the initial assessment of this fishery, the two relevant catfish species were assessed together whereas, at this surveillance assessment, it has been deemed appropriate to assess them individually to properly account for potential differences in life history characteristics.

Finally, there was a slight non-substantive error in the Susceptibility portion of the various PSAs during the initial assessment whereby the assessor did not correctly apply the footnote associated with Table D2 of the prior version of the report template and instead used the average of all Susceptibility attributes. In calculating the overall susceptibility score, he should instead have used Availability 2 only where no information was available for Availability 1 and used only the most conservative of the Encounterability scores.

D1	Species Name	Pacific bumper (*Chloroscombrus orqueta*)	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	<2 years	**1**
	Average maximum age (years)	<10 years	**1**
	Fecundity (eggs/spawning)	300,000 – 4,000,000	**1**
	Average maximum size (cm)	30 cm	**1**
	Average size at maturity (cm)	12 cm	**1**
	Reproductive strategy	Broadcast spawner	**1**
	Mean trophic level	2.5	**(2) 1**
		Average Productivity Score	**(1.14) 1.00**
	Susceptibility Attribute	**Value**	**Score**
	Availability (area overlap)	<10% overlap	**1**
	Encounterability (the position of the stock/species within the water column relative to the fishing gear)	High overlap with fishing gear (high encounterability).	**3**
	Selectivity of gear type	Species >2 times	**3**
	Post-capture mortality	Retained species	**3**
		Average Susceptibility Score	**(1.67) 2.50**
		PSA Risk Rating (From Table D3)	**PASS**
		Compliance rating	**PASS**

Further justification for Productivity scoring (where relevant)

There is no new information of relevance to the life history characteristics of this species. Nevertheless, the mean trophic level attribute score has changed from 2 to 1 following a change to the relevant high productivity bin from <2.5 to <2.75.

Overall, a change in the mean trophic level score has resulted in an increase in the Productivity score (implying a reduction in risk) from **1.14 to 1.0**.

Further justification for susceptibility scoring (where relevant)

Availability (area overlap)

Pacific bumper is widely distributed in the eastern Pacific from southern California to Peru, including the Gulf of California; therefore, the areal overlap of effort in the fishery under assessment and the species range is likely <10% such that an areal overlap score of 1 is appropriate.

Encounterability

The bumper stock is pelagic and likely to occur in similar depth ranges to the target species of the fishery; therefore, encounterability is likely to be high such that a score of 3 is appropriate.

Selectivity of gear type

Bumper is a generally larger species than the target species of this fishery such that any encountered by the fishing gear are most likely retained within it; therefore, the potential of the gear to retain bumper is high and a score of 3 is appropriate.

Post-capture mortality (PCM)

If caught, bumper is retained such that a score of 3 is appropriate.

Overall

Overall, changes in the Encounterability score and a reduction in the denominator (i.e. the number of categories on which the average is calculated) has led to a change in the overall Susceptibility score from **1.67 to 2.5**.

References

Primarily FishBase for productivity attributes.

Standard clauses 1.3.2.2

D1	Species Name	White mullet *(Mugil curema)*

Productivity Attribute	Value	Score
Average age at maturity (years)	2 – 3 years	**(2) 1**
Average maximum age (years)	16 years	**2**
Fecundity (eggs/spawning)	50,000 – 1,000,000	**1**
Average maximum size (cm)	91 cm	**(2) 1**
Average size at maturity (cm)	19.7 cm	**1**
Reproductive strategy	Broadcast spawner	**1**
Mean trophic level	2	**1**
	Average Productivity Score	**(1.40) 1.14**

Susceptibility Attribute	Value	Score
Availability (area overlap)	<10% overlap	**1**
Encounterability (the position of the stock/species within the water column relative to the fishing gear)	High overlap with fishing gear (high encounterability).	**3**
Selectivity of gear type	Species >2 times	**3**
Post-capture mortality	Retained species	**3**
	Average Susceptibility Score	**(1.80) 2.50**
	PSA Risk Rating (From Table D3)	**PASS**
	Compliance rating	**PASS**

Further justification for Productivity scoring (where relevant)

There is no new information of relevance to the life history characteristics of this species.

The average age at maturity attribute score has changed from 2 to 1 following a change to the relevant high productivity bin from <2 years to <5 years.

The average maximum size attribute score has changed from 2 to 1 following a change to the relevant high productivity bin from <60 cm to <100 cm.

Overall, the above changes have resulted in an increase in the Productivity score (implying a reduction in risk) from **1.40 to 1.14**.

Further justification for susceptibility scoring (where relevant)

Availability (area overlap)

Mullet is widely distributed in the Atlantic and eastern Pacific such that the areal overlap of effort in the fishery under assessment and the species range is <<10% meaning an areal overlap score of 1 is appropriate.

Encounterability

The mullet stock is pelagic and likely to occur in similar depth ranges to the target species of the fishery; therefore, encounterability is likely to be high such that a score of 3 is appropriate.

Selectivity of gear type

Mullet is a generally larger species than the target species of this fishery such that any encountered by the fishing gear are most likely retained within it; therefore, the potential of the gear to retain mullet is high and a score of 3 is appropriate.

Post-capture mortality (PCM)

If caught, mullet is retained such that a score of 3 is appropriate.

Overall

Overall, changes in the Encounterability score and a reduction in the denominator (i.e., the number of categories on which the average is calculated) has led to a change in the overall Susceptibility score from **1.80 to 2.5**.

References

Primarily FishBase for productivity attributes.

Standard clauses 1.3.2.2

D1	Species Name	Cachema weakfish (*Cynoscion phoxocephalus*)	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	1 year	**1**
	Average maximum age (years)	6 years	**1**
	Fecundity (eggs/spawning)	47,000 – 550,000	**1**
	Average maximum size (cm)	60 cm	**(2) 1**
	Average size at maturity (cm)	23.6 cm	**1**
	Reproductive strategy	Broadcast spawner	**1**
	Mean trophic level	3.8	**3**
		Average Productivity Score	**(1.40) 1.29**
	Susceptibility Attribute	**Value**	**Score**
	Availability (area overlap)	<10% overlap	**(1) 2**
	Encounterability (the position of the stock/species within the water column relative to the fishing gear)	High overlap with fishing gear (high encounterability).	**3**
	Selectivity of gear type	Species >2 times	**3**
	Post-capture mortality	Retained species	**3**
		Average Susceptibility Score	**2.75**
		PSA Risk Rating (From Table D3)	**PASS**
		Compliance rating	**PASS**

Further justification for Productivity scoring (where relevant)

There is no new information of relevance to the life history characteristics of this species.

The average maximum size attribute score has changed from 2 to 1 following a change to the relevant high productivity bin from <60 cm to <100 cm.

Overall, the above changes have resulted in an increase in the Productivity score (implying a reduction in risk) from **1.40 to 1.29**.

Further justification for susceptibility scoring (where relevant)

Availability (area overlap)

The species is widely distributed in the eastern Pacific from southern Mexico to Peru but, considering the species range and the fishery, overlap is likely >10% such that an aerial overlap score of 2 is appropriate. While the species and fishery distributions have not changed, this change in the areal overlap score from 1 to 2 results from a change to the relevant low susceptibility bin from <25% stock-fishery overlap to <10% overlap.

Encounterability

The weakfish stock is pelagic and likely to occur in similar depth ranges to the target species of the fishery; therefore, encounterability is likely to be high such that a score of 3 is appropriate.

Selectivity of gear type

Weakfish is a generally larger species than the target species of this fishery such that any encountered by the fishing gear are most likely retained within it; therefore, the potential of the gear to weakfish is high and a score of 3 is appropriate.

Post-capture mortality (PCM)

If caught, weakfish is retained such that a score of 3 is appropriate.

Overall

Overall, changes in the Encounterability score and a reduction in the denominator (i.e., the number of categories on which the average is calculated) has led to a change in the overall Susceptibility score from **1.67 to 2.75**.

References

Primarily FishBase for productivity attributes.

Standard clauses 1.3.2.2

D1	Species Name	Peruvian moonfish (*Selene peruviana*)	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	(Unknown) **~1.6 years**	**(–) 1**
	Average maximum age (years)	(Unknown) **~6.5 years**	**(–) 1**
	Fecundity (eggs/spawning)	(Unknown) **>20,000 eggs per year**	**(–) 1**
	Average maximum size (cm)	40 cm	**1**
	Average size at maturity (cm)	16 cm	**1**
	Reproductive strategy	Broadcast spawner	**1**
	Mean trophic level	4.3	**3**
		Average Productivity Score	**(n/a) 1.29**
	Susceptibility Attribute	**Value**	**Score**
	Availability (area overlap)	<10% overlap	**1**
	Encounterability (the position of the stock/species within the water column relative to the fishing gear)	High overlap with fishing gear (high encounterability).	**3**
	Selectivity of gear type	Species >2 times	**3**
	Post-capture mortality	Retained species	**3**
		Average Susceptibility Score	**2.50**
		PSA Risk Rating (From Table D3)	**PASS**
		Compliance rating	**PASS**

Further justification for Productivity scoring (where relevant)

There is no new information of relevance to the life history characteristics of this species; however, while values for average age at maturity, average maximum age and fecundity were not presented during the initial assessment and specific estimates remain unavailable, certain data are available that allow average age at maturity and average maximum age to be estimated. In this regard, the FishBase Life-history tool has been used to estimate:

- Life span (approx.): 6.5 years (s.e. 0.6 years – 1.2 years; estimated from $L_{inf.}$, K and t_o)
- Age at first maturity (t_m): 1.6 years (s.e. 1.3 years – 2.0 years; estimated from L_m, $L_{inf.}$, K and t_o)

Additionally, fecundity has been estimated high based on analogy with other members of the family Carangidae (Jacks and Pompano).

Overall, the above changes have meant it is now possible to present an estimated Productivity score (of **1.29**) whereas the value presented at initial assessment was **n/a**.

Further justification for susceptibility scoring (where relevant)

Availability (area overlap)

Peruvian moonfish is widely distributed in the eastern Pacific from southern California to Peru; therefore, the areal overlap the fishery under assessment and the species range is likely <10% and an aerial overlap score of 1 is appropriate.

Encounterability

The moonfish stock is pelagic and likely to occur in similar depth ranges to the target species of the fishery; therefore, encounterability is likely to be high such that a score of 3 is appropriate.

Selectivity of gear type

Moonfish is a generally larger species than the target species of this fishery such that any encountered by the fishing gear are most likely retained within it; therefore, the potential of the gear to bumper is high and a score of 3 is appropriate.

Post-capture mortality (PCM)

If caught, moonfish is retained such that a score of 3 is appropriate.

Overall

Overall, changes in the Encounterability score and a reduction in the denominator (i.e., the number of categories on which the average is calculated) has led to a change in the overall Susceptibility score from **1.67 to 2.5**.

References

Primarily FishBase for productivity attributes.

Standard clauses 1.3.2.2

D1	Species Name	Tete sea catfish (*Ariopsis seemanni*)	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	(Late maturity (?)) **~2.5 years**	**(3) 1**
	Average maximum age (years)	(24 years) **10.2 years**	**2**
	Fecundity (eggs/spawning)	<100 (low fecundity)	**3**
	Average maximum size (cm)	(35 cm) **46.3 cm**	**1**
	Average size at maturity (cm)	(17 cm) **26.2 cm**	**1**
	Reproductive strategy	(Water column) **Live bearer**	**(1) 3**
	Mean trophic level	(3.5) **3.6**	**3**
		Average Productivity Score	**2.00**
	Susceptibility Attribute	**Value**	**Score**
	Availability (area overlap)	<10% overlap	**1**
	Encounterability (the position of the stock/species within the water column relative to the fishing gear)	Medium overlap with fishing gear (medium encounterability).	**2**
	Selectivity of gear type	Species >2 times	**3**
	Post-capture mortality	Retained species	**3**
		Average Susceptibility Score	**2.25**
		PSA Risk Rating (From Table D3)	**Table D4**
		Compliance rating	**Table D4**

Further justification for Productivity scoring (where relevant)

There is no new information of relevance to the life history characteristics of this species; however, while values for average age at maturity, average maximum age and fecundity were not presented during the initial assessment and specific estimates remain unavailable, certain data are available that allow average age at maturity and average maximum age to be estimated. In this regard, the FishBase Life-history tool has been used to estimate:

- L_{inf}: 46.3 cm
- L maturity (L_m): 26.2 cm (s.e. 19.5 – 35.0 cm; estimated from L_{inf}).
- Life span (approx.): 10.2 years (s.e. 0.9 – 1.9; estimated from $L_{inf.}$, K and t_o)
- Age at first maturity (t_m): 2.5 years (s.e. 1.9 – 3.1 years; estimated from L_m, $L_{inf.}$, K and t_o)

During the initial assessment, the reproductive strategy of catfishes was assessed as 'water column' and a productivity score of 1 applied. While spawning may occur in the water column, the species is a paternal mouthbrooder, whereby spawning occurs at sea before the male collect the eggs in their mouth and incubate them before depositing the fry in freshwater rivers. The fry remains in freshwater during early life stages before later migrating to coastal waters. The reproductive strategy is more akin to 'Live bearer' than 'Broadcast spawner' such that a score of 3 rather than 1 is appropriate.

Overall, the change to the average age at maturity (from 3 to 1) and Reproductive strategy (from 1 to 3) attribute scores cancel each other out such that the overall Productivity score remains unchanged at **2.00**.

Further justification for susceptibility scoring (where relevant)

Availability (area overlap)

Tete sea catfish is widely distributed in Central and South America with its range also extending into rivers and estuaries; Overall, the areal overlap of the fishery under assessment and the species is likely <10% meaning an aerial overlap score of 1 is appropriate.

Encounterability

While not a marine species, tete sea catfish typically inhabit the brackish water transition zone of the rivers and are highly resistant to pure seawater allowing them to migrate along the coast to other rivers. Adults may therefore encounter the fishery under assessment while at sea. As young of the species are to be found in freshwater before later migrating to brackish waters, juveniles of the species are less likely to be encountered than adults. Overall encounterability is likely low but, on a precautionary basis, medium encounterability is assumed and an encounterability score of 2 assigned.

Selectivity of gear type

	As above, the life history characteristics of the species mean that individuals <size at maturity are likely rarely caught. That said, if encountered, the mesh of the gears used in this fishery are such that they will inevitably be retained. On balance, a score of 3 is considered appropriately precautionary. **Post-capture mortality (PCM)** If caught, the species is likely retained such that a score of 3 is appropriate. **Overall** Overall, despite the above changes, the overall Susceptibility score has remained unchanged at **2.25**.
References Primarily FishBase for productivity attributes.	
Standard clauses 1.3.2.2	

D1	**Species Name**	**Blue sea catfish (*Ariopsis guatemalensis*)**	
Productivity Attribute		**Value**	**Score**
Average age at maturity (years)		(Late maturity (?)) **~10.9 years**	**(3) 2**
Average maximum age (years)		(24 years) **~47.6 years**	**(2) 3**
Fecundity (eggs/spawning)		<100 (low fecundity)	**3**
Average maximum size (cm)		(35 cm) **58.6 cm**	**1**
Average size at maturity (cm)		(17 cm) **32.3 cm**	**1**
Reproductive strategy		(Water column) **Live bearer**	**(1) 3**
Mean trophic level		(3.5) **3.6**	**3**
		Average Productivity Score	**(2.00) 2.29**
Susceptibility Attribute		**Value**	**Score**
Availability (area overlap)		<10% overlap	**1**
Encounterability (the position of the stock/species within the water column relative to the fishing gear)		Medium overlap with fishing gear (medium encounterability).	**2**
Selectivity of gear type		Species >2 times	**3**
Post-capture mortality		Retained species	**3**
		Average Susceptibility Score	**2.25**
		PSA Risk Rating (From Table D3)	**Table D4**
		Compliance rating	**Table D4**

Further justification for Productivity scoring (where relevant)

There is no new information of relevance to the life history characteristics of this species; however, while values for average age at maturity, average maximum age and fecundity were not presented during the initial assessment and specific estimates remain unavailable, certain data are available that allow average age at maturity and average maximum age to be estimated. In this regard, the FishBase Life-history tool has been used to estimate:

- L_{inf}: 58.6 cm
- L maturity (L_m): 32.3 cm (s.e. 24.1 – 43.3 cm; estimated from L_{inf}).
- Life span (approx.): 47.6 years (estimated from $L_{inf.}$, K and t_o)
- Age at first maturity (t_m): 10.9 years (estimated from L_m, $L_{inf.}$, K and t_o)

During the initial assessment, the reproductive strategy of catfishes was assessed as 'water column' and a productivity score of 1 applied. While specific reference could not be found, oral incubation (mouth brooding) by males is true of most, if not all species, of the Ariidae (Sea catfishes); on a precautionary basis, this is also assumed to be the case for *A. guatemalensis* meaning a score of 3 rather than 1 is appropriate.

Overall, the above changes have resulted in a change to the overall Productivity score from **2.00 to 2.29.**

Further justification for susceptibility scoring (where relevant)

Availability (area overlap)

Blue sea catfish is distributed from Mexico to Honduras with its range also extending into rivers and estuaries; Overall, the areal overlap of the fishery under assessment and the species is likely <10% meaning an aerial overlap score of 1 is appropriate.

	Encounterability Not a strictly marine species, blue sea catfish is abundant in marine and brackish waters but also enters freshwater. Adults may therefore encounter the fishery under assessment while at sea. As young of the species are to be found in freshwater before later migrating to brackish waters, juveniles of the species are less likely to be encountered than adults. Overall encounterability is likely low but, on a precautionary basis, medium encounterability is assumed and an encounterability score of 2 assigned. **Selectivity of gear type** As above, the life history characteristics of the species mean that individuals <size at maturity are likely rarely caught. That said, if encountered, the mesh of the gears used in this fishery are such that they will inevitably be retained. On balance, a score of 3 is considered appropriately precautionary. **Post-capture mortality (PCM)** If caught, the species is likely retained such that a score of 3 is appropriate. **Overall** Overall, despite the above changes, the overall Susceptibility score has remained unchanged at **2.25**.
References Primarily FishBase for productivity attributes.	
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 b Individuals < size at maturity can escape or avoid gear.	a Individuals <size at maturity are regularly caught. b Individuals < half the size at maturity can escape or avoid gear.	a Individuals <size at maturity are frequently caught 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

D4	Species Name	Sea catfishes (*Ariopsis* spp.) – **Tete sea catfish (*Ariopsis seemanni*)** – **Blue sea catfish (*Ariopsis guatemalensis*)**	
	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.	MET
	D4.2	There is no substantial evidence that the fishery has a significant negative impact on the species.	MET
		Clause Outcome:	**PASS**

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.

There is no change in the available data since the fishery was initially assessed. It remains the case that catch data are collected and that bycatches of sea catfishes are low.

Objective 5 of the management plan for the fishery under assessment includes "monitor the bycatch in the fishery and implement measures (if necessary)". In the case of catfishes, the relatively low impact of the fishery on these species and their Least Concern status means that no further management measures are necessary.

As the time of the initial assessment, potential impacts of the fishery on the two catfish species are considered during the management process. Additionally, the estimated impacts are so low as to render the lack of further measures 'reasonable'; **sub-clause D4.1 continues to be met**.

D4.2 There is no substantial evidence that the fishery has a significant negative impact on the species.

As the time of the initial assessment, the available evidence is that the two catfish species represent only an extremely small proportion of total catch and are assessed as Least Concern. Additionally, there are no other indications that the fishery has significant negative impacts on either species; **sub-clause D4.2 continues to be met**.

References

Links	
MarinTrust Standard clause	1.3.2.2, 4.1.4
FAO CCRF	7.5.1
GSSI	D.5.01

FURTHER IMPACTS

The three clauses in this section relate to impacts the fishery may have in other areas. A fishery must meet the minimum requirements of all three clauses before it can be recommended for approval.

F1	Impacts on ETP Species - Minimum Requirements		
	F1.1	Interactions with ETP species are recorded.	MET
	F1.2	There is no substantial evidence that the fishery has a significant negative effect on ETP species.	MET
	F1.3	If the fishery is known to interact with ETP species, measures are in place to minimise mortality.	MET
		Clause outcome:	PASS

F1.1 Interactions with ETP species are recorded.

An updated observer programme report covering the period April – October 2022 was reviewed but it remains the case that, while reporting could be improved, interactions with ETP species are monitored by onboard observers and sufficiently recorded to allow for estimation of overall fishery-related impacts.

As at the time of initial assessment, interactions with ETP species are recorded; **sub-clause F1.1 continues to be met**.

F1.2 There is no substantial evidence that the fishery has a significant negative effect on ETP species.

An updated observer programme report covering the period April – October 2022 was reviewed. The fishery does interact with ETP species, including turtles, sharks and rays. By its nature, pelagic purse seining as employed in this fishery often allows for the live release of bycaught ETP species and this is demonstrably true in the case of sea turtles in this fishery where 2022 data showed, in 229 observed sets across 72 fishing trips, the fishery interacting with 32 green turtles (*Chelonia mydas*) of which 31 were released without damage and 1 was released with serious damage. 45,128 seabirds were observed interacting with fishery resulting in 36 dead seabirds where the species with the highest number of deaths were the neotropic cormorants (*Phalacrocorax brasilianus*) (22) and brown pelican (*Pelecanus occidentalis*) (13) both of which are classified as Least Concern. No interactions with marine mammals were observed. Sharks represented 0.0006% of the total observed catch where 357 individuals were recorded. While specific information is not available, being elasmobranchs, sharks and rays could be expected to exhibit post-release survival if released quickly as is encouraged by the voluntary code of conduct.

Added in response to MarinTrust Peer Review comments:
"In this assessment report the species of sharks caught are not named (and no trends are given). If possible, please include this information."

Sharks represented 0.54% of the observed bycatch and 0.006% of the total observed catch. A total of 357 individuals were recorded including:

- Smalltail shark (*Carcharinus porosus*) - 4
- Pacific smalltail shark (*Carcharhinus cerdale*) - 6
- Bull shark (*Carcharhinus leucas*) - 13
- Pacific sharpnose shark (*Rhizoprionodon longurio*) - 2
- Shrapnose sharks (Rhizoprionodon sp.) - 4
- Scalloped bonnethead (*Sphyrna corona*) - 3
- Scalloped hammerhead (*Sphyrna lewini*) - 67
- Hammerhead sharks (Sphyrna sp.) - 67

No finning of any capture individuals was observed.

In terms of frequency of occurrence, scalloped hammerhead sharks were reported in 40.36% of monitored sets being primarily small and medium sized individuals. 68.7% of identified scalloped hammerheads were released, 17.9% discarded, 4.5% went to human consumption and 11.9% entered the hold alongside target catch.

Shark bycatch data are not currently sufficient to elucidate trends.

F1	Impacts on ETP Species - Minimum Requirements		
	F1.1	Interactions with ETP species are recorded.	MET
	F1.2	There is no substantial evidence that the fishery has a significant negative effect on ETP species.	MET
	F1.3	If the fishery is known to interact with ETP species, measures are in place to minimise mortality.	MET
		Clause outcome:	PASS

Overall, while impacts do undoubtably occur, they are likely insignificant in the context of background levels of impacts from other trawl, gillnet and longline fisheries. Overall, as at the time of initial assessment, there is no substantial evidence that the fishery has a significant negative effect on ETP species; **sub-clause F1.2 continues to be met**.

F1.3 If the fishery is known to interact with ETP species, measures are in place to minimise mortality.

There is no change to the information base presented during the initial assessment. Impacts on ETP species are expected to be reduced by mandatory release programmes, and the creation of various types of protected area. Fishery stakeholders have also adopted a voluntary code of conduct including objectives to comply with laws and regulations to protect ETP species and release them as soon as possible.

As at the time of the initial assessment, it remains the case that measures are in place to minimise mortality of ETP species; **sub-clause F1.3 continues to be met**.

References

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf

Links	
MarinTrust Standard clause	1.3.3.1
FAO CCRF	7.2.2 (d)
GSSI	D4.04, D.3.08

F2	Impacts on Habitats - Minimum Requirements		
	F2.1	Potential habitat interactions are considered in the management decision-making process.	MET
	F2.2	There is no substantial evidence that the fishery has a significant negative impact on physical habitats.	MET
	F2.3	If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.	MET
		Clause outcome:	PASS

F2.1 Potential habitat interactions are considered in the management decision-making process.

There is no change to the information base presented during the initial assessment. In general, pelagic purse seine gear is used exclusively in the water column and as result most purse seine fisheries have no physical impacts on the benthos. However, the fishery under assessment here is different in that portions of it are prosecuted in shallow waters over mud such that, following a precautionary approach, regular contact between the bottom and the fishing gear is assumed to occur. In fact, according to the observer report for the 2022 season, it was possible to determine that the fishery operates on bottoms made up of sediments of the sand, mud and biogenic type, due to the presence of benthic fauna recorded as part of the bycatch and sediment remains were observed in the net in 64.2% of monitored sets. That said the expense and relative fragility of the purse seine gear means that there are significant economic incentives to avoid contact and, if this is not possible, to ensure fishing operations are conducted over smooth muddy bottoms less likely to damage the gear. That said, a number of no take zones exist to protect mangroves and river estuaries and there is mandatory use of VMS by industrial vessels ensuring compliance with such.

It remains the case that potential habitat interactions are considered in the management decision-making process; **sub-clause F2.1 continues to be met**.

F2.2 There is no substantial evidence that the fishery has a significant negative impact on physical habitats.

As above, there is no change to the information base presented during the initial assessment. It remains the case that significant incentives exist to avoid impacts on physical habitats and there are no perverse incentives to do otherwise.

Overall, as at the time of the initial assessment, there is no substantial evidence that the fishery has a significant negative impact on physical habitats; **sub-clause F2.2 continues to be met**.

F2.3 If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.

See F2.2 above. There is no change to the information base presented during the initial assessment. It remains the case that, where appropriate, measures to minimise and mitigate negative impacts on physical habitats are in place; **sub-clause F1.1 continues to be met**.

References

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf

Links	
MarinTrust Standard clause	1.3.3.2
FAO CCRF	6.8
GSSI	D.2.07, D.6.07, D3.09

F3	Ecosystem Impacts - Minimum Requirements		
	F3.1	The broader ecosystem within which the fishery occurs is considered during the management decision-making process.	MET
	F3.2	There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.	MET
	F3.3	If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.	MET
		Clause outcome:	**PASS**

F3.1 The broader ecosystem within which the fishery occurs is considered during the management decision-making process.

There is no change to the information base presented during the initial assessment. Being a small pelagic fishery, the fishery under assessment targets 'forage' species (i.e., species that provide food to other groups higher up in food webs). It is therefore to be expected that the main ecosystem consideration afforded the fishery during management decision-making is to account for the ecosystem role of the target species and this is the case here (see also F3.3 below).

Overall, as at the time of the initial assessment, the broader ecosystem within which the fishery occurs is considered during the management decision-making process; **sub-clause F3.1 continues to be met**.

F3.2 There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.

There is no change to the information base presented during the initial assessment. Potential impacts on ETP species and habitats have already been considered elsewhere and so are not re-visited here. It remains the case that there is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem; **sub-clause F3.2 continues to be met**.

F3.3 If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.

As indicated previously, being small pelagic, the target species in this fishery are expected to play a key role in the marine ecosystem such that additional precaution in their management is entirely appropriate.

The target reference points proposed by Canales, 2020 are apparently set to account for the ecosystem role of the stocks but the suggested limit (of 20%B_0) is very low for important ecosystem stocks and could be more precautionary.

It is also true that the 'key' nature of a forage fish is expected to vary between population cohorts (e.g., juveniles, being smaller and distributed more in-shore, may be more 'key' than adults). That the fishery does not open until a minimum average fish size is reached means that juveniles (who often form an important part of many species diets) are not targeted by the fishery. This is a conclusion shared by the review of the latest assessment where it is stated that, given the way the fishery currently operates, it is very likely that prey availability can be guaranteed for a wide range of predators (because the predators prefer prey smaller than the sizes that recruit to the fishery).

There is no change to the information base presented during the initial assessment, but it remains the case that some additional precaution is integral to the management of this fishery which effectively safeguards the important ecosystem functions of the target stocks; **sub-clause F3.3 continues to be met**.

References

Canales, C. M. 2020. Evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenque (*Opisthonema* sp.) en el Golfo de Panamá. (Stock assessment of anchovy (*Cetengraulis mysticetus*) and herring (*Opisthonema* sp.) in the Gulf of Panama) (in Spanish): https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf

Minte-Vera, C. V. 2021. Revisión por pares de la evaluación de los stocks de anchoveta (*Cetengraulis mysticetus*) y arenques de hebra (*Opisthonema* spp.) en el Golfo de Panamá 2021 (informe no-publicado. 35 pgs) (in Spanish) (Peer review of the stock assessment of anchovy (*Cetengraulis mysticetus*) and thread herring (*Opisthonema* spp.) in the Gulf of Panama): https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf

LRQA, 2022. MarinTrust wholefish assessment report, Initial assessment of Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema* spp.) | FAO 77: https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/FISH2%20-%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_FINAL_0.pdf	
Links	
MarinTrust Standard clause	1.3.3.3
FAO CCRF	7.2.2 (d)
GSSI	D.2.09, D3.10, D.6.09

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]

Glossary

Non-target: Species for which the gear is not specifically set, although they may have immediate commercial value and be a desirable component of the catch. OECD (1996), Synthesis report for the study on the economic aspects of the management of marine living resources. AGR/FI(96)12

Target: In the context of fishery certification, the target catch is the catch of stock under consideration by the unit of certification – i.e. the fish that are being assessed for certification and ecolabelling. (GSSI)

Appendix B

MarinTrust Fishery Assessment Peer Review Template

This section comprises a summary of the fishery being assessed against version 2 of the MarinTrust Standard.

Fishery under assessment	Pacific Anchoveta and Pacific Thread Herring | Panama | FAO 77
Management authority (Country/State)	Panama, Aquatic Resources Authority of Panama (Autoridad de los Recursos Acuáticos de Panamá, ARAP)
Main species	1. Pacific anchoveta (Cetengraulis mysticetus) 2. Pacific thread herrings representing a complex of: a. Pacific thread herring (Opisthonema libertate) b. Middling thread herring (Opisthonema medirastre) c. Slender thread herring (Opisthonema bulleri)
Fishery location	Area FAO 77, Eastern Central Pacific (Gulf of Panama)
Gear type(s)	Purse seine
Overall recommendation. (Approve/ Fail)	Approve

Summary: in this section, provide any additional information about the fishery that the reviewers feel is significant to their decision.
The assessment is comprehensive and the assessment determination is very complete and give an adequate overview about the scope, level of effort (this is a surveillance audit and it does not constitute a re-assessment) and relevant changes. Only minor comments. A couple of comments: the first about the stock assessment for the target species (see section A). The Marin Trust standard indicates: "*Stock assessments shall be conducted with sufficient frequency to permit the informed management of the stock*" and sub-requirement A2.1. further indicates: "*A stock assessment is conducted at least once every 3 years (or every 5 years if there is substantial supporting information that this is sufficient for the long-term sustainable management of the stock), and considers all fishery removals and the biological characteristics of the species*". Although the stock assessment dates back from 2020 and according to the MT standard is still valid, being the target species short-lived species, I am not entirely sure it can be considered adequate to confirm that the species are not overfished or subject to overfishing. Anyway, I hope the new stock assessment, expected for 2023, confirms is. My second comment is about the bycatch of hammerhead sharks in the fishery (see section F). Al the time of the first assessment of the fishery, there was some concerns about the catch of hammerhead sharks. In this assessment report the species of sharks caught are not named (and no trends are given). If possible, please include this information.
General Comments on the Draft Report provided to the peer reviewer
The short livedness (or otherwise) is not that relevant to the determination of adequacy here. Longer periods between assessments is not uncommon for short-lived, highly fecund species (such as small pelagics) which tend to be highly environmentally driven and where there is often limited evidence of stock-recruit relationships. Anyway, as indicated by the Reviewer, the current assessment remains valid. More info on shark bycatch composition has been added to the report without impacting the overall outcomes.

Summary of Peer Review Outcomes

Peer reviewers should review the fishery assessment report with the primary objective of answering the key questions listed in the table below. Where the situation is more complicated, reviewers may instead answer "See Notes".

	YES	NO	See Notes
A – Fishery Assessment			
1. Has the fishery assessment been fully completed, using the recognised MarinTrust fishery assessment methodology and associated guidance?	X		
2. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery?	X		
3. Are the scores in the following sections accurate (i.e. do the scores reflect the evidence provided)?			
Section M - Management	X		
Category A Species	X		
Category B Species			NA
Category C Species			NA
Category D Species	X		
Section F – Further Impacts			X

Detailed Peer Review Justification

Peer reviewers should provide support for their answers in the boxes provided, by referring to specific scoring issues and any relevant documentation as appropriate.

Detailed justifications are only required where answers given are one of the 'No' options. In other (Yes) cases, either confirm 'scoring agreed' or identify any places where weak rationales could be strengthened (without any implications for the scores).

Boxes may be extended if more space is required.

Detailed Peer Review Justification

Peer reviewers should provide support for their answers in the boxes provided, by referring to specific scoring issues and any relevant documentation as appropriate.

Detailed justifications are only required where answers given are one of the 'No' options. In other (Yes) cases, either confirm 'scoring agreed' or identify any places where weak rationales could be strengthened (without any implications for the scores).

Boxes may be extended if more space is required.

1. Is the scoring of the fishery consistent with the MarinTrust standard, and clearly based on the evidence presented in the assessment report?
The assessment report seems to be adequate and in general, it provides the information necessary to justify the scores assigned to the different categories. Only minor comments in the respective sections.
Certification body response
No response required.

2. Has the fishery assessment been fully completed, using the recognised MARINTRUST fishery assessment methodology and associated guidance?
Yes, the Marintrust fishery assessment methodology and associated guidance has been adequately and clearly applied to this assessment.
Certification body response
No response required.

3. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery?
Yes, catch data has been updated for the most recent year, although the percentage of Pacific anchoveta in the total catch is higher than in previous years (~80% vs 40/50%), no relevant changes are identified in the species categorisation. Only category A and D are identified in the catch.
Certification body response
No response required.

3M. Are the scores in "Section M – Management" clearly justified?
Yes, no relevant changes have occurred in the management of the fishery since it was first assessed. Just a quick question, in sub-requirement M2.3 is indicated: "*There are numerous measures to monitor compliance in the fishery including a catch database, onboard observers and Vessel Monitoring Systems (VMS). Enforcement activities are routinely carried out and sometimes, where non-compliance is proven, result in sanctions. In the period April – October 2022, 229 sets, made by 17 vessels during 72 fishing trips were observed*". Have those onboard observers an enforcement role or they are scientific observers aimed at collecting scientific data?
Certification body response
Onboard observers do not have an enforcement role.

3A. Are the "Category A Species" scores clearly justified?
Yes. As indicated by the assessor in A2.1. "*That said, unless there is substantial supporting information that a stock assessment every 5 years is sufficient for the long-term sustainable management of the stocks, an updated stock assessment should be expected in 2023; this will be evaluated at the next surveillance assessment in 2024*". A new stock assessment is expected for this year then.
Certification body response
Yes.

3B. Are the "Category B Species" scores clearly justified?
No category B species identified in the fishery.
Certification body response
No response required.

3C. Are the "Category C Species" scores clearly justified?
No category C species identified in the fishery.
Certification body response
No response required.

3D. Are the "Category D Species" scores clearly justified?
Yes, the MarinTrust has changed their PSA, it is good that the main changes have been highlighted in the introduction (PSA table) for improving understanding. All Category D species have been now assessed using the new PSA template. The FishBase Life-history tool has been used for the Peruvian moonfish, Tete sea catfish and blue sea catfish. Not entirely sure how these last two species have been identified within the general sea catfishes (Ariopsis spp.) term used by CeDePesca in the catch data (?). The scores given and justifications seem to be adequate. No relevant changes found (all the species pass).
Certification body response
The different catfishes were reference in previous observer reports.

3F. Are the scores in "Section F – Further Impacts" clearly justified?
Yes, but a new observer report was available for the year 2022. I think at the time of the first assessment there were some concerns about the impact of this fishery on hammerhead sharks (if I remember well). No information is given here about the shark species impacted by the fishery. It would be good to include some extra-information about it (and the bycatch trends if possible).
Certification body response

Additional data will be included but are not sufficient to elucidate trends.

Optional: General comments on the Peer Review Draft Report
Certification body response