MarinTrust Whole fish fishery assessment report

Document TEM-002 (prev. FISH2) - Version 3.0

Issued June 2024 – Effective June 2024

Panama - Pacific anchoveta (Cetengraulis mysticetus), Pacific thread herring (Opisthonema spp.) - FAO 77

Surveillance 1
WF20

Table 1: Whole fish fishery assessment scope

Fishery name	**Panama – Pacific Anchoveta (*Cetengraulis mysticetus*) and Pacific Thread Herring (*Opisthonema spp.*) – FAO 77**
MarinTrust report code	**WF20**
Type 1 species (common name, Latin name)	*Pacific anchoveta (Cetengraulis mysticetus)* *Pacific thread herring (Opisthonema spp.)* *(note: it is a complex of at least 3 different species)*
Fishery location	*Area FAO 77, Eastern Central Pacific, Panama (Gulf of Panama)*
Gear type(s)	*Purse seine*
Management authority (country/state)	*Aquatic Resources Authority of Panama (Autoridad de los Recursos Acuáticos de Panamá - ARAP) Panamá*

Table 2: Applicant and Certification Body details

Application details			
Applicant(s)		*Promarina SA, Procesadora Bayano SA*	
Applicant country		*Panama*	
Certification Body details			
Name of Certification Body		LRQA	
Contact Information for CB (e.g. email address/address/telephone number)		E: mt-ca@lrqa.com LRQA, 4-5 Lochside Way, Edinburgh Park, EH12 9DT T: +44 800 092 0452	
Fishery Assessor name		Jim Missen	
CB Peer Reviewer name		Sam Peacock	
Number of assessment days	3	**Assessment period**	02/2026 to 02/2027

Table 3: Assessment outcome

Assessment outcome (See Table 4 for a summary of assessment determination)		*Approve*
Approval validity	Valid from*: 02/2026*	Valid until*: 02/2027*
CB peer reviewer evaluation		*Agree with assessment determination*
Fishery Assessment Peer Review Group external peer reviewer evaluation		Choose an item.

Table 4: Assessment determination

Assessment determination **Summary of assessment and outcome**
The Panamanian Pacific anchoveta (*Cetengraulis mysticetus*) and Pacific thread herring (*Opisthonema spp.*) fishery is an industrial purse seine fishery. This assessment considers the FAO Area 77, Gulf of Panama stock, where Pacific anchoveta and Pacific thread herring comprise, on average, 69.0% and 30.03% of total landings, respectively. Bycatch occurs in small quantities and consists primarily of Pacific bumper (*Chloroscombrus orqueta*) at 0.4%, Peruvian mojarra (*Diapterus peruvianus/brevirostris*) at 0.2%, Mexican barracuda (*Sphyraena ensis*) at 0.12%, Pacific harvestfish (*Prionotus medius*) at 0.12%, Hairfin lookdown (*Selene brevoortii*) at 0.1%, Panama longfin herring (*Odontognathus panamensis*) at 0.1%, and White mullet (*Mugil curema*) at 0.1%. The remaining landings consist of eight additional species, none exceeding the 0.1% threshold for assessment. This assessment is designated as the first surveillance assessment under the MarinTrust Version 3 Whole Fish Fishery criteria, following the fishery's reapproval in 2025 under the same version. All species considered in this assessment are listed as Least Concern by the IUCN, and none are included in any CITES appendix, making them eligible for approval as MarinTrust Whole Fish material and compliant with MarinTrust management requirements (Category M). Both Pacific anchoveta and Pacific thread herring were assessed as Category A species, applying the most recent 2024 stock assessment and 2025 hydroacoustic cruise. Management plans are in place for both species, and evidence of fishery closures is documented. For Pacific anchoveta, biomass was estimated above the reference biomass (BMSY) of 110,000 tonnes. The corresponding fishing mortality consistent with Maximum Sustainable Yield (FMSY) was estimated at 0.32, while the average fishing mortality was approximately 10% of this value. Based on the 2024 stock assessment, the fishery was above the reference target and beyond the risk of overfishing or overexploitation. The 2025 hydroacoustic cruise estimated biomass at 84,000 tonnes, although below the reference biomass, it remains above Blim. This reduction coincides with the failure of the Gulf of Panama seasonal upwelling system, and future assessments will need to consider the long-term implications of this event. Therefore, anchoveta is assessed as a Category A species and meets the requirements of this section. For Pacific thread herring, the 2024 stock assessment estimated biomass above the reference biomass (BMSY) of 40,000 tonnes. Reproductive potential was estimated at approximately 50,000 tonnes, or 72% of the adult biomass that would exist without fishing. Historical fishing mortality has occasionally exceeded FMSY, surpassing 10%, resulting in the stock not meeting Clause A3.2. When assessed under Category B, the stock passed Table B(a) as biomass remained above the MSY/target reference point, and the 2024 stock assessment indicated fishing mortality below FMSY, with average fishing mortality corresponding to 50% of FMSY (0.071). Therefore, thread herring meets the requirements of this section after being reassessed under Category B. Peruvian mojarra, Mexican barracuda, Pacific harvestfish, Hairfin lookdown, Panama longfin herring, and White mullet are not managed by the Aquatic Resources Authority of Panama (ARAP) and each represents less than 5% of total catch composition. Pacific bumper also constitutes less

than 5% of the total catch; however, it is formally included under ARAP management through the 2018 small pelagic fishery management plan. Despite this, no reference points have been established, and no stock assessments have been conducted, meaning that a management regime cannot be considered to be in place. These species are assessed as Category D and meet the requirements for a Productivity-Susceptibility Analysis (PSA). Management measures to mitigate ecosystem impacts are in place. Consequently, the fishery's impact on ETP species is considered low. While seabird bycatch occurs, all species involved are listed as Least Concern. Some Critically Endangered and Vulnerable shark species are occasionally caught and, in some cases, retained for consumption, however, incidences are very low. No interactions with turtles or marine mammals were reported in 2024. The purse seine fishery has minimal impact on marine habitats. The fishery management framework applies an ecosystem approach to ensure the long-term conservation and sustainable use of resources while safeguarding the marine ecosystem. As a result, the Pacific anchoveta and Pacific thread herring fishery meets MarinTrust standards concerning marine habitats, ETP species, and ecosystem impacts. The Pacific anchoveta and Pacific thread herring fishery in FAO Area 77, Eastern Central Pacific, Panama (Gulf of Panama) passed all MarinTrust requirements in this assessment. Therefore, its continued use as raw material in MarinTrust-certified products is recommended. Last data accessed: February 1, 2026.

Summary of CB peer review	This surveillance assessment provides a thorough and well-referenced review of the status of the Panama small pelagic fishery, which primarily catches Pacific anchoveta and Pacific thread herring. There have been no substantial changes in the management of the fishery since the 2025 re-assessment, and there has been no new stock assessment. This means the situation is largely unchanged from the time the re-assessment was conducted, and the identical outcome is appropriate. The peer reviewer agrees with the decision to maintain approval.
Summary of external peer review (see Appendix 1 for the full peer review report)	*Note to assessor: Include a brief summary of the external peer review evaluation.*
Notes for on-site auditor	*Note to assessor: Notes for on-site auditor should be included where there may be reason to validate the findings of the assessment during the on-site audit. For example, if a marine mammal or ETP shark is allowed to be landed by the fishery, the auditor on site can review evidence to ensure this species is not used for reduction purposes.*

Table 5: General results

Section	Outcome (Pass/Fail)
M1 - Management Framework	Pass
M2 - Surveillance, Control and Enforcement	Pass

E1 - Impacts on ETP Species	Pass
E2 - Impacts on Habitats	Pass
E3 - Ecosystem Impacts	Pass

Table 6: Species-specific results

See Table 7 for further details of species categorisation.

Category	Species name (common & Latin name)	Outcome (Pass/Fail/n/a)	
Category A	Pacific anchoveta, anchoveta (*Cetengraulis mysticetus*)	A1	Pass
		A2	Pass
		A3	Pass
		A4	Pass
Category A	Pacific thread herring, arenque (*Opisthonema spp.*)	A1	Pass
		A2	Pass
		A3	Failed A3.2
		A4	Pass
Category B	Pacific thread herring, arenque (*Opisthonema spp.*)	Pass (after failing Category A)	
Category C		/	
Category D	Pacific bumper, orqueta (*Chloroscombrus orqueta*)	Pass	
Category D	Peruvian mojarra, Palomillo aleta amarilla (*Diapterus peruvianus/brevirostris*)	Pass	
Category D	Mexican barracuda, barracuda gigante (*Sphyraena ensis*)	Pass	
Category D	Pacific harvestfish (*Prepilus medius*)	Pass	
Category D	Hairfin lookdown, Jorobado antena (*Selene brevoortii*)	Pass	
Category D	Panama longfin herring, sardina machete (*Odontognathus panamensis*)	Pass	
Category D	White mullet, lisa (*Mugil curema*)	Pass	

Table 7: Species categorisation table

List of all the species assessed. Type 1 species are assessed against Category A or Category B. Type 1 species must represent 95% of the total annual catch. Type 2 species are assessed against Category C or Category D. Type 2 species may represent a maximum of 5% of the annual catch. Species that comprise less than 0.1% of the catch are not required to be assessed or listed here.

Species name (common &	Stock	CITES listed	IUCN Red list	% catch composition	Management	Category

Latin name)		yes/no	Category		(Y/N)	(A, B, C or D)
Pacific anchoveta, anchoveta (*Cetengraulis mysticetus*)	Gulf of Panama	No	LC[1]	69.0%	Y	A
Pacific thread herring, arenque (*Opisthonema spp.*)	Gulf of Panama	No	LC[2]	30.3%	Y	A
Pacific bumper, orqueta (*Chloroscombrus orqueta*)	Gulf of Panama	No	LC[3]	0.4%	Y	D
Peruvian mojarra, Palomillo aleta amarilla (*Diapterus peruvianus/brevirostris*)	Gulf of Panama	No	LC[4]	0.2%	N	D
Mexican barracuda, barracuda gigante (*Sphyraena ensis*)	Gulf of Panama	No	LC[5]	0.12%	N	D
Pacific harvestfish (*Prepilus medius*)	Gulf of Panama	No	LC[6]	0.12%	N	D
Hairfin lookdown, Jorobado antena (*Selene brevoortii*)	Gulf of Panama	No	LC[7]	0.1%	N	D
Panama longfin herring, sardina machete (*Odontognathus panamensis*)	Gulf of Panama	No	LC[8]	0.1%	N	D
White mullet, lisa (*Mugil curema*)	Gulf of Panama	No	LC[9]	0.1%	N	D

Rationale

No new complete catch composition data were provided for this assessment. An applicant, Promarina SA, provided personal 2025 landings data for Pacific anchoveta (*Cetengraulis mysticetus*) and Pacific thread herring (*Opisthonema spp.*); however, this has not been considered here as it is incomplete. Therefore, to determine the catch composition of the fishery, data from the Panamanian observer programme were used, taking the average of the 2025, 2024, and 2023 reports[10,11,12]. The resulting catch composition was approximately 69.0% Pacific anchoveta, 30.3% Pacific thread herring, 0.4% Pacific bumper (*Chloroscombrus orqueta*), 0.2% Peruvian mojarra (*Diapterus peruvianus/brevirostris*), 0.12% Mexican barracuda (*Sphyraena ensis*), 0.12% Pacific harvestfish (*Peprilus medius*), 0.1% hairfin lookdown (*Selene brevoortii*), 0.1% Panama longfin herring (*Odontognathus panamensis*), and 0.1% white mullet (*Mugil curema*). The remaining landings consist of eight species, none of which exceeds the 0.1% assessment threshold.

Pacific anchoveta and Pacific thread herring were assessed as Category A species, as they are listed as Least Concern by the IUCN, are not included in any CITES appendix, are managed by the Aquatic Resources Authority of Panama (ARAP) and together comprise more than 95% of the fishery's total catch.

Pacific bumper, Peruvian mojarra, Mexican barracuda, Pacific harvestfish, hairfin lookdown, Panama longfin herring, and white mullet were all assessed as Category D species, as they are listed as Least Concern by the IUCN, are not included in any CITES appendix, are not managed by ARAP (except in the case of Pacific bumper), and each comprises less than 5% of the fishery's total catch.

Pacific bumper is managed by ARAP under the 2018 management plan for the small pelagic fishery in Panama, which also includes Pacific anchoveta and Pacific thread herring (ADM/ARAP No. 027 of 2018)[13]. However, no reference points have been established and no stock assessments have been conducted; therefore, a robust management regime cannot be considered to be in place. Accordingly, although Pacific bumper is included within the management plan, it is most appropriately assessed as a Category D species.

References

1. International Union for Conservation of Nature. (n.d.). Species 183878. IUCN Red List of Threatened Species. https://www.iucnredlist.org/species/183878/102902497
2. International Union for Conservation of Nature. (n.d.). Search results for Opisthonema. IUCN Red List of Threatened Species. https://www.iucnredlist.org/search?query=Opisthonema&searchType=species
3. International Union for Conservation of Nature. (n.d.). Species 183872. IUCN Red List of Threatened Species. https://www.iucnredlist.org/species/183872/8192316
4. International Union for Conservation of Nature. (n.d.). Species 183874. IUCN Red List of Threatened Species. https://www.iucnredlist.org/species/183874/8192692
5. International Union for Conservation of Nature. (n.d.). Species 178106. IUCN Red List of Threatened Species. https://www.iucnredlist.org/species/178106/7488815
6. International Union for Conservation of Nature. (n.d.). Species 183339. IUCN Red List of Threatened Species. https://www.iucnredlist.org/species/183339/8096349
7. International Union for Conservation of Nature. (n.d.). Species 183636. IUCN Red List of Threatened Species. https://www.iucnredlist.org/species/183636/8148902
8. International Union for Conservation of Nature. (n.d.). Species 183387. IUCN Red List of Threatened Species. https://www.iucnredlist.org/species/183387/102906414
9. International Union for Conservation of Nature. (n.d.). Species 190168. IUCN Red List of Threatened Species. https://www.iucnredlist.org/species/190168/82660284
10. MarinTrust. (2023). Pacific anchoveta and thread herring Panama FAO 77: Fishery assessment. https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/WF20_2023%20-%20Pacific%20anchoveta%20and%20thread%20herring%20Panama%20FAO%2077%20FINAL%20with%20peer%20review.pdf
11. MarinTrust. (2024). MarinTrust Standard V2.0 wholefish fishery assessment: Pacific anchoveta (Cetengraulis mysticetus) and thread herring (Opisthonema spp.) (WF20). https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/WF20%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_v5.PR_JPC_Final_MTPR%20addressed%20%281%29.pdf
12. MarinTrust. (2025). Pacific anchoveta and thread herring fishery assessment: Panama FAO 77

(2025). https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/WF20_Panama_Pacific_anchoveta_and_thread_herring_FAO77_2025_0.pdf
13. Autoridad de los Recursos Acuáticos de Panamá. (2018). Administrative Resolution ARAP No. 027 of August 28, 2018: Adopting the management plan for the small pelagic fishery, anchoveta (Cetengraulis mysticetus), thread herring (Opisthonema spp.), and Pacific bumper (Chloroscombrus orqueta) in the Pacific of Panama. https://cedepesca.net/wp-content/uploads/2018/09/Resoluci%C3%B3n-ADM-ARAP-No.-027-de-28-de-agosto-de-2018_GO-28605-B.pdf

Management requirements

This section, or module, assesses the general management regime applied to the fishery under assessment. It comprises two parts, M1, which evaluates the management framework, and M2, which evaluates surveillance, control and enforcement within the fishery.

1.6. All management criteria must be met (pass) for a fishery to pass the Management requirements.

1.6.1. The sub-criteria offer a structured evidence base to demonstrate that the fishery sufficiently meets the management criteria. It is not expected that sub-criteria are assessed independently of the main criterion.

M1 Management framework

M1.1	**M1.1 There is an organisation responsible for managing the fishery.** *In reaching a determination for M1.1, the assessor should consider if the following is in place:*
	M1.1.1 The management and administration organisations within the fishery are clearly identified.
	M1.1.2 The functions and responsibilities of the management organisations include the overall regulation, administration, science and data collection and enforcement roles, and are documented and publicly available.
	M1.1.3 Fishers have access to information and/or training materials through nationally recognised organisations.
Outcome	*Pass*

Rationale

No fundamental changes have occurred since the last re-approval assessment.

The organisation responsible for the management of fisheries resources in Panama is the Aquatic Resources Authority of Panama (Autoridad de los Recursos Acuáticos de Panamá, ARAP), created in 2006 under Law No. 44[1]. ARAP is responsible for the collection and analysis of fisheries data in Panama, with support from Albor Tecnológico, the company in charge of conducting hydroacoustic surveys with the support of the fishing industry and the Centre for Sustainable Fisheries Development (CeDePesca)[2,3].

A new Law on Fisheries and Aquaculture was implemented in 2021 under Law No. 20[4]. Under this law, ARAP is responsible for preparing, updating, and implementing the National Fisheries and Aquaculture Policy, in coordination with the National Responsible Fisheries Commission, the National Aquaculture Commission, and all entities linked to fishing, aquaculture, and related activities[5].

A management plan for the small pelagic fishery in Panama, including Pacific anchoveta, Pacific

thread herring, and Pacific bumper, was approved in 2018 (ADM/ARAP No. 027 of 2018), and an update to the plan has been discussed[6]. Additionally, since 2013, the small pelagic fishery of Panama has been part of a Fishery Improvement Program (FIP), and several training workshops have been held for onboard observers and skippers over the years[7,8].

Information relating to fisheries management measures is publicly available. These are regularly published through official gazettes, such as the closure of the anchoveta fishery in 2022 (Resolution DGOMI 152-2022) and the closure of the Pacific thread herring fishery in 2022 (Resolution 271/2022)[9,10]. Landings data are also publicly available on the Panama Open Data website[11].

Based on the above, the fishery passes Clause M1.1.

References

1. Autoridad de los Recursos Acuáticos de Panamá. (2006). Ley 44 de 2006: Ley General de Pesca y Acuicultura. https://arap.gob.pa/wp-content/uploads/2015/05/ARAP_legislacion_ley-2006-44.pdf
2. Albor Tecnológico. (n.d.). Página principal. https://www.albortecnologico.com/wp/
3. CeDePesca. (n.d.). Página principal. https://cedepesca.net/
4. Autoridad de los Recursos Acuáticos de Panamá. (n.d.). Ley No. 204 de 18 de marzo de 2021. https://arap.gob.pa/ley-no-204-18-de-marzo-de-2021/
5. MarViva Foundation. (2022). Panama's law on fisheries and aquaculture: A compendium. https://marviva.net/wp-content/uploads/2022/11/Panamas-Law-on-Fisheries-and-Aquaculture.-A-compendium-by-MarViva-Foundation.pdf
6. CeDePesca. (2024). Panamá – Pequeños pelágicos: Se reunió el comité de manejo de la pesquería con participación de CeDePesca. https://cedepesca.net/panama-pequenos-pelagicos-se-reunio-el-comite-de-manejo-de-la-pesqueria-con-participacion-de-cedepesca/
7. CeDePesca. (2020). Taller de identificación de aves marino-costeras que interactúan con la pesquería de pequeños pelágicos del Golfo de Panamá. https://cedepesca.net/taller-de-identificacion-de-aves-marino-costeras-que-interactuan-con-la-pesqueria-de-pequenos-pelagicos-del-golfo-de-panama/
8. CeDePesca. (2025). Panamanian small pelagics: Fishery Improvement Project. https://cedepesca.net/prome/panamanian-small-pelagics/
9. Gaceta Oficial de Panamá. (2022). Gaceta Oficial No. 29588. https://www.gacetaoficial.gob.pa/pdfTemp/29588/GacetaNo_29588_20220728.pdf
10. Gaceta Oficial de Panamá. (2022). Gaceta Oficial No. 29684. https://www.gacetaoficial.gob.pa/pdfTemp/29684/95490.pdf
11. Datos Abiertos Panamá. (n.d.). Dataset: Pesca. https://www.datosabiertos.gob.pa/dataset/?tags=Pesca

M1.2	**M1.2 Fishery management organisations are legally empowered to take management actions.** *In reaching a determination for M1.2, the assessor should consider if the following is in place:*
	M1.2.1 There are legal instruments in place to give authority to the management

	organisation(s) which can include policies, regulations, acts or other legal mechanisms.
	M1.2.2 Vessels wishing to participate in the fishery must be authorised by the management organisation(s).
	M1.2.3 The management system has a mechanism in place for the resolution of legal disputes.
	M1.2.4 There is evidence of the legal rights of people dependent on fishing for food or livelihood.
Outcome	*Pass*

Rationale

No fundamental changes have occurred since the last re-approval assessment.

ARAP, through Article 4(2) of Law No. 44 of 2006, has the authority to apply technical measures and processes for the rational, sustainable, and responsible use of aquatic resources, in order to protect the national aquatic heritage and contribute to environmental protection[1]. The Law on Fisheries and Aquaculture legally empowers ARAP to take management actions related to fishing licenses, management plans for fishery resources, the application of sanctions, and other related measures[2].

The Panamanian judicial system is governed by statutory law. Disputes are resolved under the Administrative Procedures Law (Law No. 38 of 2000), which provides an appeals process if a responsible party believes that their rights have been violated due to the imposition of an administrative sanction[3].

Panama's Fishery Law of 1959 recognizes subsistence fishing. Vessels greater than 10 Gross Registered Tonnage (GRT) are classified as industrial fishing vessels, while smaller vessels are classified as artisanal. An Action Plan for Sustainable Fisheries addresses artisanal fisheries management and development and provides mechanisms to protect legal rights[4].

Based on the above, the fishery passes Clause M1.2.

References

1. Autoridad de los Recursos Acuáticos de Panamá. (2006). Ley 44 de 2006: Ley General de Pesca y Acuicultura. https://arap.gob.pa/wp-content/uploads/2015/05/ARAP_legislacion_ley-2006-44.pdf
2. Food and Agriculture Organization of the United Nations. (2021). FAOLEX: Database on national fisheries legislation — Panama Law No. 204 (2021). https://www.fao.org/faolex/results/details/en/c/LEX-FAOC201649/
3. Comisión Nacional de Acuicultura y Pesca (CNA) – Panamá. (n.d.). Documento: CNA fisheries reference manual (2016). http://www.cna.gob.pa/content/20161205145256-4.pdf
4. Marine Stewardship Council. (n.d.). Eastern Pacific Ocean tropical tuna – purse seine (TUNACONS) fishery. MSC Fisheries. https://fisheries.msc.org/en/fisheries/eastern-pacific-ocean-tropical-tuna-purse-seine-tunacons-fishery/@@assessments

M1.3	**M1.3 There is an organisation responsible for collecting data and (scientifically) assessing the fishery.** *In reaching a determination for M1.3, the assessor should consider if the following is in place:*
	M1.3.1 The organisation(s) responsible for collecting data and assessing the fishery is/are clearly identified.
	M1.3.2 The management system receives scientific advice regarding stock, non-target species and ecosystem status.
	M1.3.3 Scientific advice is independent from the management organisation(s) and transparent in its formulation through a clearly defined process.
Outcome	*Pass*

Rationale

No fundamental changes have occurred since the last re-approval assessment.

ARAP is the body responsible for the collection and analysis of fisheries data in Panama, with support from Albor Tecnológico. Albor Tecnológico is the company responsible for conducting hydroacoustic surveys, with support from the fishing industry and CeDePesca[1].

A management plan for the small pelagic fishery in Panama, including Pacific anchoveta, Pacific thread herring, and Pacific bumper, was approved in 2018 (ADM/ARAP No. 027 of 2018), and an update to the plan has been discussed[2].

During the fishing season, data on catch per unit effort (CPUE), size, weight, and maturity are collected by onboard observers for the main target species of this stock[3]. The General Directorate of Research and Development collects this information, which feeds directly into advice provided to the authorities and subsequent regulations. This is reflected in the closure notice for the anchoveta fishery, which makes specific reference to weekly CPUE and catch size classes[4].

Based on the above, the fishery passes Clause M1.3

References

1. CeDePesca. (2021). Proyecto de mejoras de la pesquería: I Campaña 2021 – Evaluación hidroacústica de recursos pelágicos. Informe ejecutivo – Panamá, del 21 al 27 de febrero 2021. CeDePesca.
2. CeDePesca. (2024). Panamá – Pequeños pelágicos: Se reunió el comité de manejo de la pesquería con participación de CeDePesca. https://cedepesca.net/panamapequenos-pelagicos-se-reunio-el-comite-de-manejo-de-la-pesqueria-conparticipacion-de-cedepesca/
3. Ceballes, A., Palacios, M., & Palacios, M. (2024). Informe técnico programa privado de observadores a bordo: Pesquería de pequeños pelágicos de Panamá. Temporada

2023. CeDePesca.
4. Autoridad de la Gaceta Oficial de Panamá. (2024). *Gaceta Oficial No. 30008*. p. 31. https://www.gacetaoficial.gob.pa/pdfTemp/30008/GacetaNo_30008_20240411.pdf

M1.4	**M1.4 The fishery management system is based on the principles of sustainable fishing and a precautionary approach.** *In reaching a determination for M1.4, the assessor should consider if the following is in place:* M1.4.1 A policy or long-term management objective for sustainable harvesting based on the best scientific evidence and a precautionary approach is publicly available and implemented for the fishery.
Outcome	*Pass*

Rationale

No fundamental changes have occurred since the last re-approval assessment.

The commitment of Panama's fisheries management system to sustainable fishing and the precautionary approach is evident at all levels of the system. At the highest level, the Law on Fisheries and Aquaculture underscores these principles in Article 8[1]. Sustainability, the precautionary approach, and an ecosystem approach comprise three of the six governing principles.

This approach also permeates ARAP, which states its mission as: "to ensure the development of a productive and social culture of aquatic resources in a sustainable manner and in harmony with the environment, thereby improving the quality of life of the inhabitants of the Republic"[2].

In 2017, the Government of Panama approved the Action Plan for Sustainable Fisheries[3]. The Plan is intended to guide reform of the outdated legal framework and improve coordination at the sectoral and inter-institutional levels. The Action Plan for Sustainable Fisheries guides the work of the National Responsible Fisheries Commission, which can recommend initiatives to achieve the sustainable development of the fisheries sector, as well as the policies and measures necessary to regulate fishing activity in Panama's Exclusive Economic Zone (EEZ).

Based on the above, the fishery passes Clause M1.4.

References

1. Autoridad de los Recursos Acuáticos de Panamá. (2021). Ley No. 204 de 18 de marzo de 2021. https://arap.gob.pa/ley-no-204-18-de-marzo-de-2021/
2. Autoridad de los Recursos Acuáticos de Panamá. (n.d.). Misión y visión. https://arap.gob.pa/mision-y-vision/
3. Autoridad de los Recursos Acuáticos de Panamá. (2017). Action plan for sustainable fisheries. https://arap.gob.pa/avances-plan-de-accion-pesca-sostenible-en-panama/

M1.5	**M1.5 There is a clearly defined decision-making process which is transparent, with processes and results made publicly available.** *In reaching a determination for M1.5, the assessor should consider if the following is in place:*	
	M1.5.1 There is participatory engagement through which fishery stakeholders and other stakeholders can access, provide information, consult with, and respond to, the management systems' decision-making process.	
	M1.5.2 The decision-making process is transparent, with results made publicly available.	
	M1.5.3 The fishery management system is subject to periodic internal or external review to validate the decision-making process, outcomes and scientific data.	
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

A formal process for consultation and representation in the development of regulations under the Law on Fisheries and Aquaculture was established by Administrative Resolution No. 022 of 2021. Article 8 of the Law on Fisheries and Aquaculture lists the main objectives, including the promotion of stakeholder participation in fisheries management in the country[1]. Furthermore, Law No. 6 of 2002 addresses transparency in the public sector (Panama's Freedom of Information legislation)[2]. Law No. 33 of 2013 provides for the establishment of an Information Officer within each public institution, with responsibility for proactive transparency, open data, and information requests[3].

Fishery stakeholders, including industry producers (Promarina and Probasa), NGOs (CeDePesca), and management authorities (ARAP), have been engaged in research and management of the fishery through the Fishery Improvement Program (FIP), which has been in place since 2011[4].

In 2017, Panama approved the Action Plan for Sustainable Fisheries[5]. The Action Plan was published following extensive stakeholder consultation.

In 2021, a management committee was created for this fishery. It includes representatives from the government (ARAP), the fishmeal industry, the pelagic industrial fishery, the pelagic artisanal fishery, and a relevant NGO[6]. The role of this committee is to monitor the implementation and/or modification of the small pelagic fishery management plan[7]. More recently, ARAP conducted a number of meetings with artisanal and industrial fishers to discuss legislation applicable to the different fisheries covered by the law, including the pelagic fishery[8].

Based on the above, the fishery passes Clause M1.5.

References

1. Autoridad de los Recursos Acuáticos de Panamá. (n.d.). Ley de pesca 2021.

https://cedepesca.net/wpcontent/uploads/2021/08/Panama-Ley-de-Pesca-2021.pdf
2. Asamblea Legislativa de Panamá. (2002). Ley N° 6: Que dicta normas para la transparencia en la gestión pública, establece la acción de Hábeas Data y dicta otras disposiciones. https://www.oas.org/es/sla/ddi/docs/acceso_informacion_base_dc_leyes_pais_P_2.pdf
3. Dirección General de la Contraloría de Panamá (DIGECA). (2013). Ley 33: Que crea la Autoridad Nacional de Transparencia y Acceso a la Información. https://www.digeca.gob.pa/tmp/file/1202/Ley%20No33%20DE%2025%20abril%20de%202013%20-Que%20crea%20la%20Antai.pdf
4. Autoridad de los Recursos Acuáticos de Panamá. (n.d.). Laws and administrative resolutions. https://arap.gob.pa/legislacion/
5. Autoridad de los Recursos Acuáticos de Panamá. (2017). Action plan for sustainable fisheries. https://arap.gob.pa/avances-plan-de-accion-pesca-sostenible-en-panama/
6. Autoridad de los Recursos Acuáticos de Panamá (ARAP). (2018). Plan de manejo de la pesquería de pequeños pelágicos: Anchoveta, arenque y orqueta en el Pacífico de Panamá (31 pp.).
7. CeDePesca. (2021). Anexo VII: Agenda comité pequeños pelágicos marzo 2021 y borrador reglamento. https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VII.-Agenda-comite-Pequenos-PelagicosMarzo-2021-y-borrador-reglamento.pdf
8. Panama America. (n.d.). ARAP y sector pesquero revisan regulación de ley de pesca. https://www.panamaamerica.com.pa/economia/arap-y-sector-pesquero-revisanregulacion-de-ley-de-pesca-1227480

M2 Surveillance, control and enforcement

M2.1	**M2.1**	**There is an organisation responsible for monitoring compliance with fishery laws and regulations.** *In reaching a determination for M2.1, the assessor should consider if the following is in place:*
	M2.1.1	There is an organisation responsible for monitoring compliance with specific monitoring, control and surveillance (MCS) mechanisms in place.
	M2.1.2	There are relevant tools or mechanisms used to minimise IUU fishing activity.
	M2.1.3	There is evidence of monitoring and surveillance activity appropriate to the intensity, geography, management control measures and compliance behaviour of the fishery.
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

In 2009, a National Action Plan to prevent, discourage, and eliminate illegal, unreported, and unregulated (IUU) fishing was developed, containing comprehensive monitoring, control, and surveillance measures. It identified the implementing authorities as the Maritime Authority of Panama, through the Directorate of Merchant Marine, the National Air Service, the National Customs Authority, the Ministry of Health, through the Directorate of Public Health, Department of Food Protection, and the Ministry of Foreign Relations, through the Directorate General for International Economic Relations.

ARAP's Directorate of Inspection, Surveillance and Control (DISC) is responsible for monitoring compliance with fishery laws and regulations (Article 38 of Law No. 44 of 2006)[1]. The objective of DISC is to "promote, organize, monitor, coordinate, and execute general policy, strategy, plans, and programs regarding the inspection, surveillance, and control of aquatic resources." DISC's tasks include conducting inspections, establishing baseline technical standards for fishing and aquaculture activities, issuing inspection certificates, investigating complaints, ensuring vessels adhere to safety legislation, and imposing sanctions for violations of legal and regulatory requirements[2].

Since October 15, 2024, Panama has been implementing several recommendations issued by the Directorate-General for Maritime Affairs and Fisheries (DG Mare) of the European Commission and is expected to demonstrate its commitment to combating IUU fishing in mid-2025. ARAP has reduced and streamlined the list of authorized ports for maritime operations, from 290 to 92 ports, as full control could not be ensured at all previous entry and exit points for fishery resources. A smartphone tool, the "ARAP Móvil" app, has been developed to report illegal fishing activities and supports the identification and location of vessels engaged in such practices. ARAP is also working on additional initiatives, including a national fisheries traceability system, which will incorporate software to monitor and manage the operations of the country's fishing fleets[3].

In addition to domestic efforts to minimise IUU fishing, Panama also provides its Vessel Monitoring System (VMS) data to Global Fishing Watch (GFW)[4]. This collaboration, which began in 2019, signals Panama's commitment to combating IUU fishing.

Based on the above, the fishery passes Clause M2.1.

References

1. Autoridad de los Recursos Acuáticos de Panamá. (n.d.). Dirección de inspección, vigilancia y control. https://arap.gob.pa/direccion-de-inspeccion-vigilancia-y-control-2/
2. Autoridad de los Recursos Acuáticos de Panamá. (2006). Ley 44 de 2006: Ley general de pesca y acuicultura. https://arap.gob.pa/wp-content/uploads/2015/05/ARAP_legislacion_ley-2006-44.pdf
3. La Estrella de Panamá. (2025). Panamá afina estrategia en su lucha contra la pesca ilegal y conseguir la tarjeta verde. https://www.laestrella.com.pa/economia/panamaafina-estrategia-en-su-lucha-contra-la-pesca-ilegal-y-conseguir-la-tarjeta-verde-GD10752150
4. Global Fishing Watch. (n.d.). Our work in Panama. https://globalfishingwatch.org/our-work-in-panama/

M2.2	**M2.2 There is a framework of sanctions which are applied when infringements against laws and regulations are discovered.** *In reaching a determination for M2.2, the assessor should consider if the following is in place:*
	M2.2.1 The laws and regulations provide for penalties or sanctions that are adequate in severity to act as an effective deterrent.
	M2.2.2 There is no evidence of systematic non-compliance.
Outcome	*Pass*

Rationale

No fundamental changes have occurred since the last re-approval assessment.

The Law on Fisheries and Aquaculture provides the framework for sanctions for infringements of fisheries laws and regulations in Panama under Chapter III[1]. In particular, Articles 145 and 146 set out the definitions of severe violations and the corresponding sanctions, respectively. Severe violations may result in a variety of sanctions, including the suspension or cancellation of captain and fishing licences, confiscation of aquatic resources and fishing gear, and monetary fines. Monetary fines are categorised according to small-, medium-, and large-scale fishing operations.

A number of measures have been implemented in the fishery that make it difficult for fishers to be non-compliant with regulations in the small pelagic fishery. These include the implementation of a catch database, the introduction of an onboard observer programme with a target of covering at least 20% of trips (Executive Decree No. 107 of 2016), VMS requirement for all industrial vessels, and landing declarations (Law No. 204 of 2021)[2,3].

Since 2022, the country has operated a control and monitoring centre for local and international vessels to prevent illegal fishing. Progress in combating IUU fishing has been praised by the EU[4]. In 2025, the National Border Service (Senafront) responded to a citizen report of a fishing vessel operating illegally in a protected area of Piña Bay, in Darién Province. The vessel, named Ana de Jesús and flying the Panamanian flag, was found about 10 miles offshore in a zone restricted to large-scale fishing. After inspection and coordination with ARAP, authorities confirmed that it was carrying 1,672 pounds of seafood, including species such as ajillo fish, mahi-mahi, black grouper, red grouper, and yellow snapper. Although the vessel was allowed to continue its journey, the captain was summoned by ARAP for administrative proceedings, and the catch was confiscated[5].

Based on the above, the fishery passes Clause M2.2.

References

1. Food and Agriculture Organization of the United Nations. (2021). Ley Nº 204: Ley que regula la pesca y la acuicultura en la República de Panamá. FAOLEX. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC201649/
2. Autoridad de los Recursos Acuáticos de Panamá. (2016). Decreto Ejecutivo 107 de 2016. http://www.viceipup.up.ac.pa/cidim/files/ARAP-Decreto-Ejecutivo-107-de-2016.pdf

3. Autoridad de los Recursos Acuáticos de Panamá. (2023). Borrador de reglamentación de Ley de Pesca. https://arap.gob.pa/wpcontent/uploads/2023/02/Borrador-de-Reglamentaci%C3%B3n-de-Ley-de-Pesca.pdf
4. La Estrella de Panamá. (2023). Panamá aumenta la vigilancia en contra de la pesca ilegal no declarada. https://www.laestrella.com.pa/vida-y-cultura/planeta/panamaaumenta-vigilancia-pesca-ilegal-DELE490993
5. La Estrella de Panamá. (2025). Panamá afina estrategia en su lucha contra la pesca ilegal y conseguir la tarjeta verde. https://www.laestrella.com.pa/economia/panamaafina-estrategia-en-su-lucha-contra-la-pesca-ilegal-y-conseguir-la-tarjeta-verde-GD10752150

M2.3	**M2.3 There is substantial evidence of widespread compliance in the fishery, and no substantial evidence of IUU fishing.** *In reaching a determination for M2.3, the assessor should consider if the following is in place:*	
	M2.3.1	The level of compliance is documented and updated routinely, statistically reviewed and available.
	M2.3.2	Fishers provide additional information and cooperate with management/enforcement agencies/organisations to support the effective management of the fishery.
	M2.3.3	The catch recording and reporting system is sufficient for effective traceability of catches per vessel and supports the prevention of IUU fishing.
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

ARAP demonstrates a strong commitment to ensuring compliance in the fishery and preventing IUU fishing in Panama.

This follows Panama receiving a yellow card from DG MARE in 2019. This was the country's second yellow card, following one issued in 2012 that was subsequently lifted in 2014[1]. These warnings were issued due to non-compliance with international conservation and management measures, as well as shortcomings in efforts to combat IUU fishing[2]. Since the most recent notification, Panama has made a concerted effort to have the card lifted[3].

These efforts include joint operations with the United States Coast Guard in 2021 to combat IUU fishing[4]. Panama was also included in the five-year North American strategy against IUU fishing from 2022 to 2026. In September 2024, ARAP announced a new commission comprising 10 members, with a mandate to ensure and guarantee compliance with the obligations and commitments set out by DG MARE. Furthermore, Resolution ADM/ARAP No. 052 of 2024 requires that all vessels

conducting transhipment must have an observer onboard[5]. In April 2025, GFW announced that Panama was moving toward achieving ultimate beneficial ownership (UBO) transparency, thereby increasing fleet accountability and governance by identifying previously "invisible" owners, verifying vessel ownership, and reviewing UBO information as part of licence-granting procedures[6].

ARAP has shown a willingness to apply sanctions when appropriate, with 34 fishing licences linked to IUU fishing revoked in 2023. In addition, in January 2025, Panama reported that it had seized six longliner vessels for fishing illegally in protected waters and opened investigations into an additional 10 vessels after surveillance data indicated apparent fishing activity in the area. Administrative sanctioning processes conducted monthly by ARAP are presented on the following website[7].

There are indications that a European Union audit of the industry will take place in the first half of 2026, and there is optimism that the outcome may be a green card in recognition of the progress made[8,9].

While there is a history of insufficient management and IUU compliance, significant efforts have been made to improve performance, and these measures appear adequate.

Based on the above, the fishery passes Clause M2.3.

References

1. Europarl European Parliamentary Research Service. (2022). Illegal, unreported and unregulated (IUU) fishing (EPRS_ATA(2017)614599_EN). European Parliament. https://www.europarl.europa.eu/RegData/etudes/ATAG/2017/614599/EPRS_ATA(2017)614599_EN.pdf
2. Global Fishing Watch. (n.d.). Our work in Panama. https://globalfishingwatch.org/our-work-in-panama/
3. Global Fishing Watch. (2025). Panama strengthens oversight of its international fleet with a new transshipment monitoring policy. https://globalfishingwatch.org/news-story/panama-strengthens-oversight-of-its-international-fleet-with-a-new-transshipment-monitoring-policy/
4. La Estrella de Panamá. (2025). Panamá afina estrategia en su lucha contra la pesca ilegal y conseguir la tarjeta verde. https://www.laestrella.com.pa/economia/panama-afina-estrategia-en-su-lucha-contra-la-pesca-ilegal-y-conseguir-la-tarjeta-verde-GD10752150
5. Autoridad de los Recursos Acuáticos de Panamá. (2025). Resolución ADM-ARAP No. 052-2. https://arap.gob.pa/resolucion-adm-arap-no-052-2/
6. Panama Now Online. (2025). Better compliance over "illegal fishing" keeps Panama on EU list until 2026. https://panamanowonline.com/better-compliance-over-illegal-fishing-keeps-panama-on-eu-list-until-2026/
7. United States Department of State. (2022). LIS151-Panama [Government report]. https://www.state.gov/wp-content/uploads/2022/09/LIS151-Panama.pdf
8. Ministerio de Desarrollo Agropecuario (Datos Abiertos Panamá). (n.d.). Group: Agropecuario dataset. https://www.datosabiertos.gob.pa/group/agropecuario
9. Hook and Net Magazine. (2025, April 1). Panama GreenEng [Article]. https://mag.hookandnet.com/2025/04/01/2025-04panamagreeneng/content.html

Species requirements

This section, or module, comprises of four species categories. Each species in the catch is subject to an assessment against the relevant species category in this section (see clauses 1.2 and 1.3 and Table 6).

Type 1 species can be considered the 'target' or 'main' species in the fishery under assessment. They make up the bulk of the catch and a subjected to a detailed assessment. Type 1 species must represent 95% of the total annual catch. If a species-specific management regime is in place for a Type 1 species, it shall be assessed under Category A. If there is no species-specific management regime in place for a Type 1 species, it shall be assessed under Category B.

Type 2 Species can be considered the 'non-target' species in the fishery under assessment. They comprise a small proportion of the annual catch and are subjected to a relatively high-level assessment. Type 2 species may represent a maximum of 5% of the annual catch. If a species-specific management regime is in place for a Type 2 species, it shall be assessed under Category C. If there is no species-specific management regime in place for a Type 2 species, it shall be assessed under Category D.

Species that comprise less than 0.1% of the catch are not required to be assessed or listed here.

Category A species

2.1. All clauses must be met for a species to pass the Category A assessment.

2.1.1. If a species fails any of the Category A clauses, it should be re-assessed as a Category B species.

Pacific anchoveta (*Cetengraulis mysticetus*)

A1 Data collection

A1.1	**A1.1 Landings data are collected such that the fishery-wide removals of this species are known.**
Outcome	*Pass*
Rationale Landing data in Panama are collected through daily fishing logbooks. The history of the small pelagic fishery dates back to the 1950's, with Pacific anchoveta being the primary species and Pacific thread herring contributing, on average, 25% of landings[1]. However, an applicant, Promarina SA, provided personnel landings data for the 2025 season which suggests a reversal of this trend, with 15% of their landings comprised of anchoveta and the remainder thread herring. Without a complete picture of the fishery, this cannot be stated definitively.	

Anchoveta landings fluctuate around 45,000 tonnes, peaking in the 1980's at over 200,000 tonnes (Figure 1)[1]. In 2024, data covering the period from 1995 to 2023 were collated to assess stock status. The most recent complete landings data are from 2024, when they were provided by the MarinTrust applicant in support of the previous assessment.

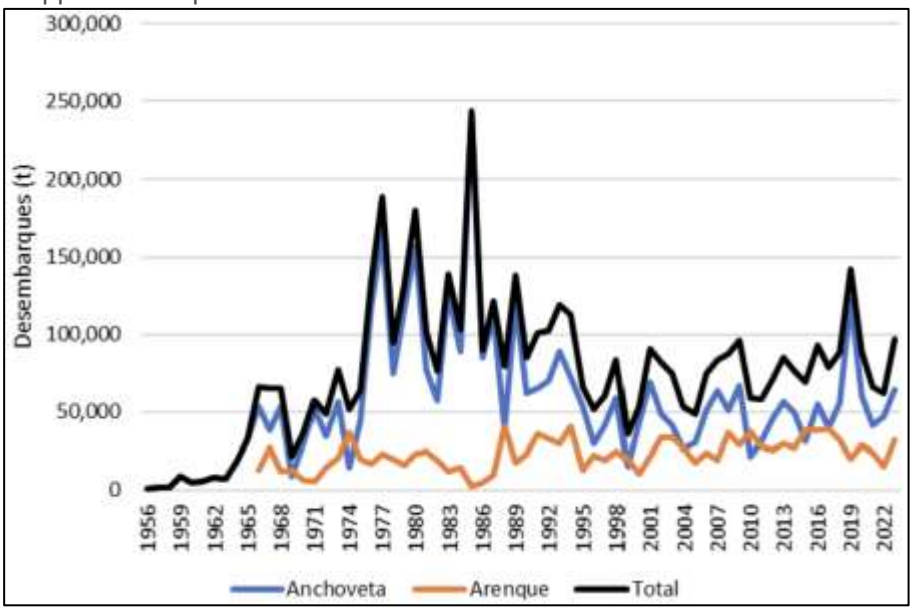

Figure 1. Annual landings of Pacific anchoveta and Pacific thread herring in Panama[1].

Based on the above, the fishery passes Clause A1.1.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

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

Rationale

The most recent 2024 stock assessment considered information such as catch statistics, CPUE data, hydroacoustic estimates, and stock unit and biological parameters[1]. This is the same information used by the previous MarinTrust assessment, as no new information has been released. This information was analysed using an integrated statistical catch-at-age model with length data, the findings of which directly inform management advice and regulations through the General Directorate of Research and Development.

Monitoring and data collection are carried out by ARAP and CeDePesca, with industry support since

the mid-nineties. Recently, the fishing companies Promarina and Probasa have financed the development of six acoustic cruises to provide biomass estimates for management recommendations[1].

The stock assessment model showed difficulties in reproducing acoustic survey information, size composition for Pacific anchoveta, and biomass for Pacific thread herring[1]. This lack of fit had been previously highlighted in the 2020 assessment[2]. The results indicate that acoustic biomass estimates may be overestimated by 5% for anchoveta and 20% for thread herring[1]. This is believed to result from the limited survey period (one month per year), which is not standardized, and from major changes in size-specific availability patterns. Efforts to evaluate the optimal timing and strategy for hydroacoustic assessment were previously confirmed by CeDePesca to the assessment team. However, the greater presence of large individuals during surveys suggests that fishing mortality levels have been low, allowing longer-lived individuals to survive.

Recent data reinforce the utility of these monitoring efforts. According to the 2025 acoustic cruise, the anchoveta biomass was estimated at 84,000 tonnes. The stock was composed mainly of adults between 10.0 cm and 21.0 cm total length, with a dominant mode at 18.0 cm, and showed a minimal presence of juveniles (only 0.1%), indicating low recent recruitment[3]. These findings coincide with a disruption of the Gulf of Panama seasonal upwelling system in 2025. This is inconsistent with the previous 40 years and is thought likely to have had a significant effect on the fishery[4]. Future assessments will need to take the impact of low level of recruitment into account in subsequent years. These findings highlight the need for cautious management but also demonstrate that the monitoring system in place is capable of detecting biomass fluctuations and informing responsive measures.

Based on the above, the fishery passes Clause A1.2.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf
2. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf
3. Valdez, C., Iriarte, F., Escobar, C., & Fuertes, J. (2024). Evaluación hidroacústica de recursos pelágicos en la Bahía de Panamá a bordo de la E/P Anchovetas II del 15 al 21 de marzo de 2025 (Informe ejecutivo, 45 pp.). Unpublished technical report.
4. O'Dea, A., Sellers, A. J., Pérez-Medina, C., Pardo Díaz, J. E., Guzmán-Bloise, A., Pöhlker, C., … & Haug, G. H. (2025). Unprecedented suppression of Panama's Pacific upwelling in 2025. Proceedings of the National Academy of Sciences of the United States of America, 122(36), e2512056122. https://doi.org/10.1073/pnas.2512056122

A2 Stock assessment

A2.1	**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.**
Outcome	*Pass*	

Rationale

Stock assessments for Pacific anchoveta and Pacific thread herring were conducted in 2015, 2016, 2020, and 2024[1,2,3]. In addition, before the annual fishing season, the authorities (ARAP), in collaboration with Albor Tecnológico and CeDePesca, conduct a hydroacoustic survey to assess the status of the stocks (Table 1). Based on this information, a potential catch for the fishing season is estimated.

Table 1. Biomass and catches of the target species during the period 2017 to 2025[4].

AÑO	BIOMASA ESTIMADA (t)			CAPTURAS (t) *(Fuente:ARAP)		
	Anchoveta	Arenque	Total	Anchoveta	Arenque	Total
2017	233,138	151,042	384,180	41,463	32,514	73,977
2018	249,851	180,493	430,344	42,011	26,965	68,977
2019	135,596	220,587	356,183	115,747	18,808	134,555
2020	*NO HUBO CRUCERO*			58,276	29,170	87,446
2021	115,775	154,844	270,619	31,029	23,964	54,993
2022	292,864	92,650	385,514	36,431	16,760	53,192
2023	225,523	112,316	337,839	50,068	30,832	80,900
2024	278,742	96,259	375,001	58,902	28,116	87,018
2025	84,428	80,869	165,297			

Data from landings, CPUEs, size classes, and hydroacoustic biomass estimates are complemented by onboard observer data collected during the fishing season, including size, weight, maturity, and CPUEs. These multiple data sources were used in the 2024 stock assessment, with findings directly informing management advice and regulations through the General Directorate of Research and Development[5].

Based on the above, the fishery passes Clause A2.1.

References

1. CeDePesca. (2015). The small pelagic fishery of Panama: population assessment and recommendations for a management plan. https://aquadocs.org/bitstreams/15c12f54-0dfb-441e-b91d-fb39bef49aad/viewer?itemid=f89cfb4f-4ba4-41e6-b3a2-cade1b537076
2. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-

Informe_EvaluacionStocks_PP_Panama_2024.pdf
3. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf
4. Valdez, C., Iriarte, F., Escobar, C., & Fuertes, J. (2024). Evaluación hidroacústica de recursos pelágicos en la Bahía de Panamá a bordo de la E/P Anchovetas II del 15 al 21 de marzo de 2025 (Informe ejecutivo, 45 pp.). Unpublished technical report.

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

Rationale

The Biological Reference Points (BRPs) for Pacific anchoveta were estimated by projecting biomass quarterly over the long term for different values of average annual fishing mortality. A management objective has been established for this stock to ensure that at least 60% of the virgin biomass (the target reference point) is maintained. Overall, reproductive potential is estimated at approximately 90% of the unfished adult biomass for anchoveta.

Hydroacoustic surveys are conducted before the fishing season to estimate biomass and inform the maximum allowable catch for the season. In the most recent stock assessment, a proxy for Maximum Sustainable Yield (MSY) was estimated, with a spawning biomass BMSY of 110,000 tonnes. MSY per quarter is 43,000 tonnes for anchoveta, with average quarterly catches during fishing periods of 22,000 tonnes. The fishing mortality that allows this management objective (FMSY) was estimated as 0.32 per quarter[1].

Based on the above, the fishery passes Clause A2.2.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

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

Rationale

The most recent stock assessment estimates appropriate levels of fishery removals based on the

current status of the Pacific anchoveta population. This is the second assessment to incorporate several key recommendations from the 2021 Minte-Vera peer review, using comprehensive data spanning from 1995 to 2023[1].

Characteristic of small pelagic species, the anchoveta fishery is essentially based on a single annual cohort. Biomass is constantly fluctuating as each individual grows quickly (from 1 cm to 12 cm in a six-month period), and hatching is not simultaneous. As previously clarified to the assessment team by CeDePesca, the stock assessments are based on a quarterly time unit in recognition of this, and it is not easy to extrapolate this to annual terms. If there were no fishing, a rapid increase in biomass would be seen at the beginning of the year (until May in a normal year), followed by a logarithmic decline due to natural mortality. Fishing mimics that pattern, only accelerating the decline of that cohort until it reaches a CPUE-based threshold. This is why it cannot be managed the same way as longer-lived species, and why it is difficult to define an annual quota equivalent to MSY.

The BRPs for anchoveta are estimated by projecting the biomass quarterly over the long term for different values of average annual fishing mortality. The analysis included daily catch data per vessel to develop a relative abundance index, and modelled population dynamics quarterly for each species, incorporating size composition to detect trends in recruitment and the impacts of fishing mortality[2]. The models were tested under various biological assumptions, including natural mortality, growth, and potential hyper-stability in CPUE data. A spawning biomass equal to 60% of the virgin spawning biomass was used as a proxy for MSY.

In the most recent stock assessment, seven model scenarios were explored to assess structural uncertainty in anchoveta estimates. All scenarios consistently indicated a healthy stock status, with anchoveta biomass well above reference points[2]. The base model was found to have a tendency to underestimate anchoveta biomass by 0.8% and overestimate fishing mortality by 0.9%. However, these bias levels are considered acceptable[3]. Additionally, the 2020 stock assessment confirmed that the stock had never shown signs of overexploitation at that time[4].

Based on the above, the fishery passes Clause A2.3.

References

1. CeDePesca. (2021). Anexo VIII: Minte Vera 2021 revisión evaluación Panamá. https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf
2. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf
3. Carvalho, F., Winker, H., Courtney, D., Kapur, M., Kell, L. T., Cardinale, M., Schirripa, M., Kitakado, T., Yemane, D., Piner, K., Maunder, M., Taylor, I., Wetzel, C., Doering, K., Johnson, K. F., & Methot, R. (2021). Cookbook for using model diagnostics in integrated stock assessments. Fisheries Research, 240, 105959. https://doi.org/10.1016/j.fishres.2021.105959
4. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-

CeDePesca.pdf

A2.4	A2.4 The assessment is subject to internal or external peer review.
Outcome	*Pass*

Rationale

In 2020, the assessment of Pacific anchoveta and Pacific thread herring stocks in the Gulf of Panama was reviewed within the framework of the Gulf of Panama Small Pelagic FIP[1]. The objectives of the review were to:

- To review the mathematical model and the proposed assumptions and hypotheses, as well as their suitability for the stock assessment of anchoveta and thread herring in the Gulf of Panama, considering the biology of the species in question, the intensity and scale of the fishery, and the available data series.
- To review the biological reference points (limit and target) proposed in the stock assessment, as well as their suitability for anchoveta and thread herring stocks in the Gulf of Panama, considering an ecosystem approach.
- To recommend improvements to the stock assessment methodology and alternative hypotheses that could be considered in future iterations.

The resultant short- and medium-term recommendations aim to improve assessment of the stocks. The 2024 stock assessment used recommendations from this review[2].

Based on the above, the fishery passes Clause A2.4.

References

1. CeDePesca. (2021). Anexo VIII: Minte Vera 2021 revisión evaluación Panamá. https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf
2. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

A2.5	A2.5 The assessment is made publicly available.
Outcome	*Pass*

Rationale

The relevant stock assessment and management outcomes can be found on the ARAP and CeDePesca websites, along with other supporting documents[1,2].

The assessment team found it difficult to access additional evidence held by CeDePesca and ARAP.

However, there is evidence that these organisations have previously been forthcoming with this information, and the difficulty is likely a matter of timing.

Based on the information, the fishery passes Clause A2.5.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf
2. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf

A3 Harvest strategy

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

Rationale

Fishing mortality in the fishery is restricted through a number of mechanisms.

The opening of the fishery is carried out by ARAP with consideration of the availability of the resource and the size structure of the target species (Article 15 of Executive Decree No. 107, 2016)[1]. The data used to inform this decision are collected through biological samplings conducted during a pre-season fishing survey, carried out by Albor Tecnológico, with support from the fishmeal and fish oil processing companies, and coordinated by ARAP[2,3].

The fishing season begins when the average size of Pacific anchoveta and Pacific thread herring in each fishing ground exceeds historically accepted sizes, which correspond to the average size at first maturity reported in the literature (12.5 cm for anchoveta and 17 cm for thread herring). The target species sequence in the fishery begins with anchoveta, which is the primary target until July, when spawning is about to reach its peak. From July onwards, thread herring becomes the target species until October, when weekly yields begin to decrease, and the fishery is closed through an ARAP administrative resolution. This management approach is based on scientific reports derived from monitoring and research conducted during the season, as defined by Article 16, Executive Decree No. 107, 2016[1].

Fishing pressure is further restricted by Articles 1 and 3 of Executive Decree No. 107 (2016)[1]. These articles require that all vessels targeting anchoveta, thread herring, or bumper possess and carry a fishing license issued specifically for those species. The total number of licenses available is limited

to a maximum of 20 for large (industrial) vessels and 10 for small vessels. Licensed vessels of any size may only be replaced if completely removed from the fishery, and the new vessel will be issued the same license number as the replaced vessel.

The stock is managed under the Small Pelagic Management Plan (RESOLUCIÓN ADM/ARAP No. 027, 2018)[4]. Hydroacoustic surveys are conducted before the fishing season. The start of the fishing season and the Total Allowable Catch (TAC) are determined based on data collected during these surveys, which usually include biomass estimates and size structure. The main mechanisms by which total removals are restricted are seasonal closures and limitations on the number of fishing licenses. The fishery is closed by the authorities based on monitoring results.

Based on the information, the fishery passes Clause A3.1.

References

1. Food and Agriculture Organization of the United Nations. (n.d.). Ley de pesca y acuicultura de Panamá (LEX-FAOC164002). https://faolex.fao.org/docs/pdf/pan164002.pdf
2. CeDePesca. (2021). Anexo II: Prospección hidroacústica 2021. https://cedepesca.net/wp-content/uploads/2021/08/AnexoII_Prospeccion_hidroacustica_2021.pdf
3. Gaceta Oficial de Panamá. (2025). Gaceta Oficial No. 30268. https://www.gacetaoficial.gob.pa/pdfTemp/30268/111944.pdf
4. Food and Agriculture Organization of the United Nations. (n.d.). Plan de manejo de la pesquería de pequeños pelágicos, anchoveta, arenque y orqueta en el Pacífico de Panamá (Res. ADM/ARAP No.027, 2018). https://faolex.fao.org/docs/pdf/pan180840.pdf

A3.2	**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.**
Outcome	*Pass*

Rationale

Catches of Pacific anchoveta in the last 10 years have been around 45,000 tonnes[1]. As evidenced in the 2024 stock assessment, quarterly FMSY and spawning potential ratio (SPR) have remained below the reference points of 0.32 and 0.6, respectively (Figure 2 and Table 2). The average fishing mortality levels were estimated to be around 10% of FMSY[1].

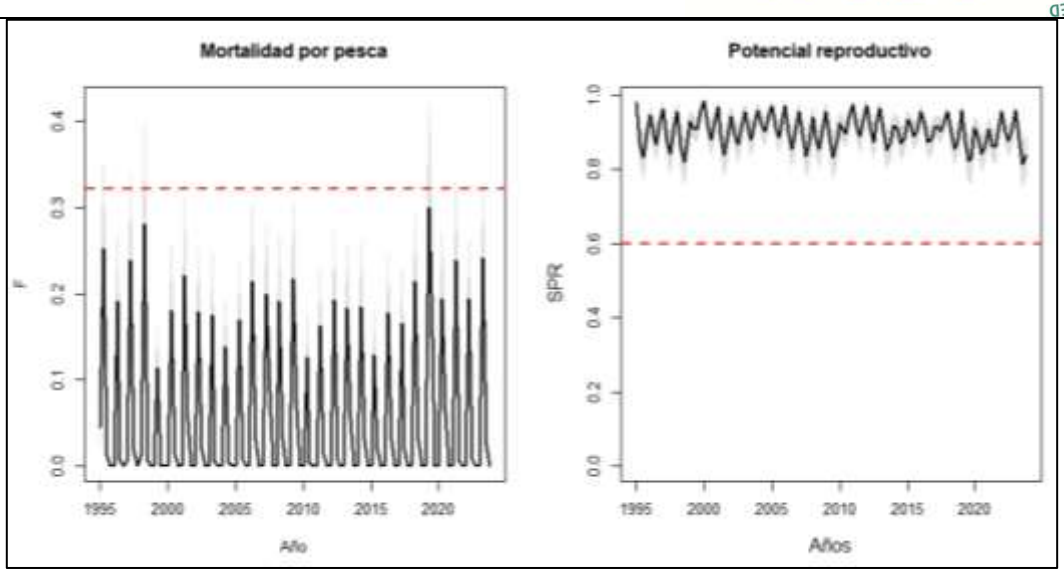

Figure 2. Quarterly variation in fishing mortality of Pacific anchoveta with the red line indicating FMSY = 0.32 and spawning potential ratio potential with the red line indicating SPR = 0.6[1].

Table 2. Estimates of adult biomass, recruitment, fishing mortality, reduction of virgin adult biomass and spawning potential ratio (SPR) of Pacific anchoveta[1].

Año.trimestre	Biomasa (t)	R_R0	Fcr	F_Fmrs	B_Brms	B_B0	SPR
2018.25	211646	0.270	0.210	0.670	1.760	1.050	0.900
2018.50	194331	3.860	0.030	0.090	1.610	0.970	0.860
2018.75	154508	0.800	0.000	0.000	1.280	0.770	0.880
2019.00	272592	3.070	0.000	0.000	2.260	1.360	0.960
2019.25	267037	0.410	0.300	0.930	2.220	1.330	0.870
2019.50	283476	3.120	0.150	0.470	2.350	1.410	0.820
2019.75	251063	1.220	0.000	0.000	2.080	1.250	0.830
2020.00	303837	0.620	0.000	0.000	2.520	1.510	0.910
2020.25	289262	0.590	0.190	0.600	2.400	1.440	0.890
2020.50	212274	0.580	0.060	0.190	1.760	1.060	0.840
2020.75	161823	1.170	0.000	0.000	1.340	0.810	0.860
2021.00	135414	1.290	0.000	0.000	1.120	0.670	0.910
2021.25	133919	1.230	0.240	0.740	1.110	0.670	0.870
2021.50	154933	1.080	0.010	0.020	1.290	0.770	0.860
2021.75	180893	1.510	0.000	0.000	1.500	0.900	0.920
2022.00	190440	1.270	0.000	0.000	1.580	0.950	0.960
2022.25	193741	0.400	0.190	0.600	1.610	0.970	0.900
2022.50	194393	2.340	0.010	0.030	1.610	0.970	0.880
2022.75	168645	1.320	0.000	0.000	1.400	0.840	0.910
2023.00	217864	0.410	0.000	0.000	1.810	1.090	0.960
2023.25	221150	0.340	0.240	0.750	1.840	1.100	0.880
2023.50	163587	0.810	0.030	0.080	1.360	0.810	0.810
2023.75	120852	1.000	0.000	0.000	1.000	0.600	0.840

Based on the information, the fishery passes Clause A3.2.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP

Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

A3.3	**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).**
Outcome	*Pass*

Rationale

The main mechanisms by which total removals are currently restricted are seasonal closures and restrictions on the total number of fishing licences.

The stock is managed under the Small Pelagic Management Plan (RESOLUCIÓN ADM/ARAP No. 027, 2018)[1]. According to the plan, the fishing season typically runs from April to October. During this period, fish migrate to shallower waters, making them more accessible to the fleet. Toward the end of the season, they begin moving away, naturally initiating a fishing pause of about six months while they move to spawning grounds in coastal or shallower areas, during which no fishing activities take place.

As previously discussed, the opening of the fishing season and the setting of the TAC are initiated by ARAP, taking into consideration the availability of the resource and the size structure of the target species (Article 15, Executive Decree No. 107, 2016)[2].

Conversely, the decision to close the season is based on scientific findings gathered during the fishing period and is formalized through a resolution issued by the Directorate General for Fisheries Planning and Management. Pursuant to the management plan, the threshold for closure occurs when CPUE drops below 15% of the initial CPUE or when spawning begins, whichever occurs first[3,4].

Historically, the biomass of the stock has been at or above BMSY (Figure 3).

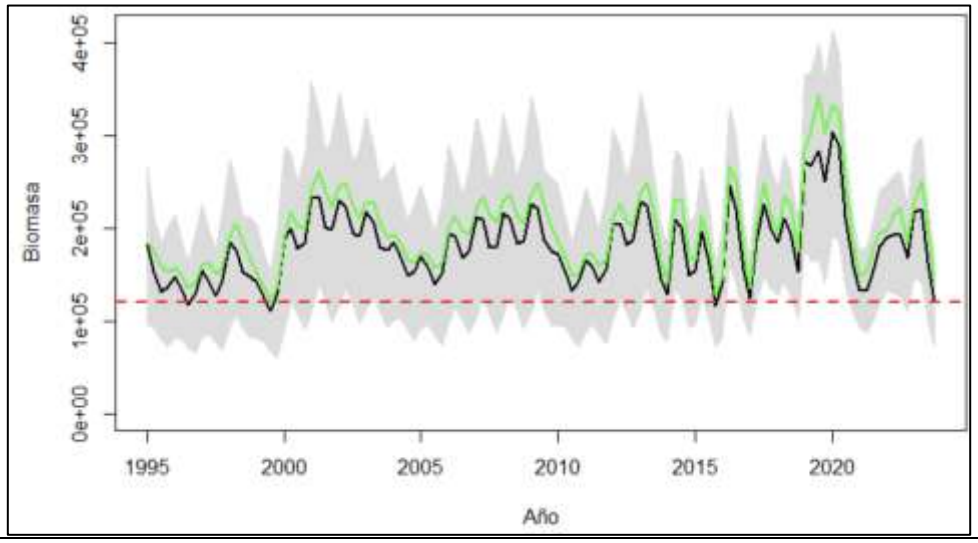

Figure 3. Biomass variation across the years of Pacific anchoveta. Adult biomass (green line), current biomass (black line) and BMSY (red line)[5].

Based on the information, the fishery passes Clause A3.2.

References

1. Food and Agriculture Organization of the United Nations. (n.d.). Plan de manejo de la pesquería de pequeños pelágicos, anchoveta, arenque y orqueta en el Pacífico de Panamá (Res. ADM/ARAP No. 027, 2018). https://faolex.fao.org/docs/pdf/pan180840.pdf
2. Food and Agriculture Organization of the United Nations. (n.d.). Ley de pesca y acuicultura de Panamá (LEX-FAOC164002). https://www.fao.org/faolex/results/details/es/c/LEX-FAOC164002/
3. Food and Agriculture Organization of the United Nations. (n.d.). Plan de manejo de la pesquería de pequeños pelágicos, anchoveta, arenque y orqueta en el Pacífico de Panamá (Res. ADM/ARAP No. 027, 2018). https://faolex.fao.org/docs/pdf/pan180840.pdf
4. Gaceta Oficial de Panamá. (2025, September 24). Gaceta Oficial No. 30372. https://www.gacetaoficial.gob.pa/pdfTemp/30372/114948.pdf
5. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

A4 Stock status

A4.1	**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.**
Outcome	*Pass*	

Rationale

In the two most recent stock assessments, conducted in 2020 and 2024, the target reference point for Pacific anchoveta biomass was determined as a spawning biomass equal to 60% of the virgin spawning biomass, used as a proxy for MSY[1,2]. An initial Blim of 20% of the virgin biomass was established in the 2020 stock assessment, however, the 2021 review considered this level to be insufficiently conservative[2,3]. The assessment team confirmed that a Blim of 50% BMSY (Blim = 0.3 × B0) was used in the 2024 stock assessment (Table 3).

Table 3. Biological reference points for Panama's small pelagic resources. Estimates are quarterly.

	anchoveta	arenque
B_0 (t)	185.538	24.653
PBRO=B_{MSY} = 60%B_0 (t)	111.323	17.792
PBRL=50%B_{MSY} (t)	55.661	7.396
MSY (t)	42.508	8.128
F_{MSY} (1/trim)	0,321	0,071

The 2024 stock assessment concluded that anchoveta biomass was above the reference biomass (BMSY) of 110,000 metric tons. Reproductive potential was estimated at approximately 180,000 tonnes, representing 90% of the adult biomass that would have existed without fishing. The conclusion was that the population was above the reference target and not at risk of overfishing or overexploitation (Figure 4), as supported by the sensitivity analysis of seven alternative models performed in the assessment[1].

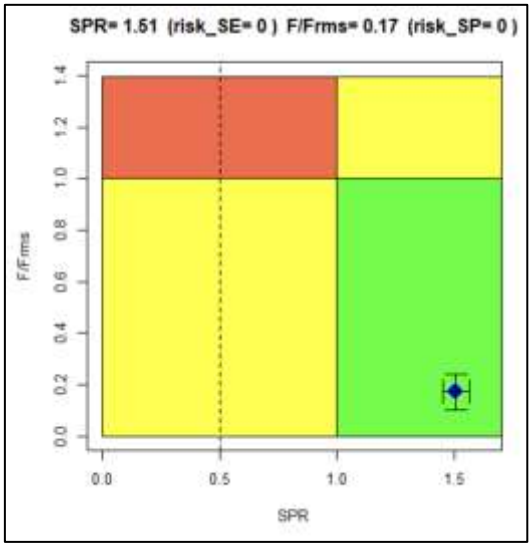

Figure 4. Kobe diagram for Pacific anchoveta (the average value in 2023 is considered)[1].

As previously mentioned, according to the 2025 acoustic cruise, anchoveta biomass was estimated at 84,000 tonnes, which is below the reference biomass[4]. If a Blim of 30% is applied and the reference biomass of 110,000 tonnes from is used, Blim would be 33,000 tonnes[1]. Thus, the stock in 2025 is estimated to be well above the limit reference point, although below the target reference point. Fishery closure is determined by CPUE and the initiation of spawning, and there is evidence that a fall below the limit reference point would result in fishery closure.

The aforementioned population reduction is likely a result of the 2025 Gulf of Panama seasonal upwelling system disruption, which runs from January to April. Evidence of a similar disruption occurring in 2026, at the time of writing, is yet to be seen, however, this should be closely monitored.

Based on the information, the fishery passes Clause A4.1.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-

Informe_EvaluacionStocks_PP_Panama_2024.pdf
2. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf
3. CeDePesca. (2021). Anexo VIII: Minte Vera 2021 revisión evaluación Panamá. https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf
4. Valdez, C., Iriarte, F., Escobar, C., & Fuertes, J. (2024). Evaluación hidroacústica de recursos pelágicos en la Bahía de Panamá a bordo de la E/P Anchovetas II del 15 al 21 de marzo de 2025 (Informe ejecutivo, 45 pp.).

Thread herring (*Opisthonema spp.*)

A1 Data collection

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

Rationale

Landing data in Panama are collected through daily fishing logbooks. The history of the small pelagic fishery dates back to the 1950's, with Pacific anchoveta being the primary species and Pacific thread herring contributing, on average, 25% of landings[1]. However, an applicant, Promarina SA, provided personnel landings data for the 2025 season which suggests a reversal of this trend, with 85% of their landings comprised of thread herring and the remainder anchoveta. Without a complete picture of the fishery, this cannot be stated definitively.

Landings of thread herring fluctuate around 24,000 tonnes, reaching 31,284 tonnes in the 2024 fishing season (Figure 1)[1]. In 2024, data from the period 1995 to 2023 were collated to assess the status of the stock. The most recent complete landings data are from 2024, when they were provided by the MarinTrust applicant in support of the previous assessment.

Based on the information, the fishery passes Clause A1.1.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

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

Outcome	*Pass*

Rationale

As previously mentioned in Section A1.2 (Pacific anchoveta), the most recent 2024 stock assessment considered information such as catch statistics, CPUE data, hydroacoustic estimates, and stock unit and biological parameters[1]. This is the same information used by the previous MarinTrust assessment, as no new information has been released. This information was analysed using an integrated statistical catch-at-age model with length data, the findings of which directly inform management advice and regulations through the General Directorate of Research and Development.

Monitoring and data collection are carried out by ARAP and CeDePesca, with industry support since the mid-nineties. Recently, the fishing companies Promarina and Probasa have financed the development of six acoustic cruises to provide biomass estimates for management recommendations[1].

The stock assessment model showed difficulties in reproducing acoustic survey information, size composition for anchoveta, and biomass for Pacific thread herring[1]. This lack of fit had been previously highlighted in the 2020 assessment[2]. The results indicate that acoustic biomass estimates may be overestimated by 5% for anchoveta and by 20% for thread herring[1]. This is believed to result from the limited survey period (one month per year), which is not standardized, and from major changes in size-specific availability patterns. Efforts to evaluate the optimal timing and strategy for hydroacoustic assessment were confirmed by CeDePesca to the assessment team. However, the greater presence of large individuals during surveys suggests that fishing mortality levels have been low, allowing longer-lived individuals to survive.

Recent data reinforce the utility of these monitoring efforts. According to the 2025 acoustic cruise, anchoveta biomass was estimated at 81,000 tonnes. The stock was composed mainly of adults between 10 cm and 21 cm total length, with a dominant mode at 12 cm[3]. These findings coincide with a disruption of the Gulf of Panama seasonal upwelling system in 2025. This is inconsistent with the previous 40 years and is thought to have had a significant effect on the fishery[4]. Future assessments will need to take the effect of low recruitment levels into account in subsequent years. These findings highlight the need for cautious management but also demonstrate that the monitoring system in place is capable of detecting significant biomass fluctuations and informing responsive measures.

Based on the above, the fishery passes Clause A1.2.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf
2. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B1Stocks_PP_Panama-Canales-

CeDePesca.pdf
3. Valdez, C., Iriarte, F., Escobar, C., & Fuertes, J. (2024). Evaluación hidroacústica de recursos pelágicos en la Bahía de Panamá a bordo de la E/P Anchovetas II del 15 al 21 de marzo de 2025 (Informe ejecutivo, 45 pp.).
4. O'Dea, A., Sellers, A. J., Pérez-Medina, C., Pardo Díaz, J. E., Guzmán-Bloise, A., Pöhlker, C., … & Haug, G. H. (2025). Unprecedented suppression of Panama's Pacific upwelling in 2025. Proceedings of the National Academy of Sciences of the United States of America, 122(36), e2512056122. https://www.researchgate.net/publication/395209131_Unprecedented_suppression_of_Panama's_Pacific_upwelling_in_2025

A2 Stock assessment

A2.1	**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.**
Outcome	*Pass*	

Rationale

As previously mentioned in Section A2.1 (Pacific anchoveta), stock assessments for anchoveta and Pacific thread herring were conducted in 2015, 2016, 2020, and 2024[1,2,3]. In addition, before the annual fishing season, the authorities (ARAP), in collaboration with Albor Tecnológico and CeDePesca, conduct a hydroacoustic survey to assess the status of the stocks (Table 1), and based on that information, a potential catch for the fishing season is estimated.

Data from landings, CPUEs, size classes, and hydroacoustic biomass estimates are complemented by onboard observer data collected during the fishing season, including size, weight, maturity, and CPUEs. These multiple data sources were used in the 2024 stock assessment, with findings directly informing management advice and regulations through the General Directorate of Research and Development[4].

Based on the above, the fishery passes Clause A2.1.

References

1. AquaDocs. (n.d.). AquaDocs repository. https://aquadocs.org/bitstreams/15c12f54-0dfb-441e-b91d-fb39bef49aad/viewer?itemid=f89cfb4f-4ba4-41e6-b3a2-cade1b537076
2. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf
3. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-

content/uploads/2020/03/Informe_Evaluaci%C3%B1Stocks_PP_Panama-Canales-CeDePesca.pdf
4. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

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

Rationale

The BRPs for Pacific thread herring were estimated by projecting biomass quarterly over the long term for different values of average annual fishing mortality. A management objective has been established for these stocks to ensure that at least 60% of the virgin biomass (target reference point) is maintained. Overall, the population fluctuates around 50,000 tonnes, equivalent to 72% of unfished adult biomass for thread herring[1].

Hydroacoustic surveys are conducted before the fishing season to estimate biomass and inform the maximum allowable catch for the season. In the most recent stock assessment, a proxy for MSY was estimated, with a spawning biomass Bmsy of 40,000 tonnes and an MSY per quarter of 8,000 tonnes for thread herring. The fishing mortality that achieves this management objective was estimated as FMSY of 0.071 per quarter[1].

Based on the above, the fishery passes Clause A2.2.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

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

Rationale

The most recent stock assessment estimates appropriate levels of fishery removals based on the current status of the Pacific thread herring population. This is the second assessment to incorporate several key recommendations from the 2021 Minte-Vera peer review, using comprehensive data spanning 1995 to 2023[1].

The BRPs for thread herring are estimated by projecting biomass quarterly over the long term for different values of average annual fishing mortality. The analysis included daily catch data per vessel to develop a relative abundance index and modelled population dynamics quarterly for each species, incorporating size composition to detect trends in recruitment and the impacts of fishing mortality[2]. The models were tested under various biological assumptions, including natural mortality, growth, and potential hyper-stability in CPUE data. A spawning biomass equal to 60% of the virgin spawning biomass was used as a proxy for MSY.

In the most recent stock assessment, seven model scenarios were explored to assess structural uncertainty in thread herring estimates. All scenarios consistently indicated a healthy stock status, with thread herring biomass above reference points in recent years[2]. The base model was found to have a tendency to underestimate thread herring biomass by 13% and overestimate fishing mortality by 8%. However, these bias levels are considered acceptable[3]. Additionally, the 2020 stock assessment confirmed that at the time, the stock had never shown signs of overexploitation[4].

Based on the above, the fishery passes Clause A2.3.

References

1. CeDePesca. (2021). Anexo VIII: Minte Vera 2021 revisión evaluación Panamá. https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf
2. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf
3. Carvalho, F., Winker, H., Courtney, D., Kapur, M., Kell, L. T., Cardinale, M., Schirripa, M., Kitakado, T., Yemane, D., Piner, K., Maunder, M., Taylor, I., Wetzel, C., Doering, K., Johnson, K. F., & Methot, R. A. (2021). Cookbook for using model diagnostics in integrated stock assessments. Fisheries Research, 240, 105959. https://doi.org/10.1016/j.fishres.2021.105959
4. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf

A2.4	**A2.4 The assessment is subject to internal or external peer review.**
Outcome	*Pass*

Rationale

In 2020, the assessment of Pacific anchoveta and Pacific thread herring stocks in the Gulf of Panama was reviewed within the framework of the Gulf of Panama Small Pelagic FIP[1]. The objectives of the review were to:

- To review the mathematical model and the proposed assumptions and hypotheses, as well as their suitability for the stock assessment of anchoveta and thread herring in the Gulf of Panama, considering the biology of the species in question, the intensity and scale of the fishery, and the

available data series.
- To review the biological reference points (limit and target) proposed in the stock assessment, as well as their suitability for anchoveta and thread herring stocks in the Gulf of Panama, considering an ecosystem approach.
- To recommend improvements to the stock assessment methodology and alternative hypotheses that could be considered in future iterations.

The resultant short- and medium-term recommendations aim to improve assessment of the stocks. The 2024 stock assessment used recommendations from this review[2].

Based on the above, the fishery passes Clause A2.4.

References

1. CeDePesca. (2021). Anexo VIII: Minte Vera 2021 revisión evaluación Panamá. https://cedepesca.net/wp-content/uploads/2021/08/Anexo-VIII.-Minte_Vera_2021_Revision_evaluacion_Panama.pdf
2. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

A2.5	**A2.5 The assessment is made publicly available.**
Outcome	*Pass*

Rationale

The relevant stock assessment and management outcomes can be found on the ARAP and CeDePesca websites, along with all other supporting documents[1,2].

The assessment team found it difficult to access additional evidence held by CeDePesca and ARAP. However, there is evidence that these organisations have previously been forthcoming with this information, and the difficulty is likely a matter of timing.

Based on the information, the fishery passes Clause A2.5.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf
2. CeDePesca. (2020). Informe de evaluación de stocks de pequeños pelágicos en Panamá – Canales. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf

A3 Harvest strategy

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

Rationale

Fishing mortality in the fishery is restricted through a number of mechanisms.

The opening of the fishery is carried out by ARAP, taking into consideration the availability of the resource and the size structure of the target species (Article 15, Executive Decree No. 107, 2016)[1]. Data to inform this decision are collected through biological samplings carried out in a pre-season fishing survey, conducted by Albor Tecnológico, with support from the fishmeal and fish oil processing companies, and coordinated by ARAP[2].

The fishing season starts when the average size of Pacific anchoveta and Pacific thread herring specimens in each fishing ground exceeds historically acceptable sizes, which coincide with the average size at first maturity reported in the literature (12.5 cm for anchoveta and 17 cm for thread herring). The target species sequence is such that anchoveta is the first target species until July, when spawning is about to reach its peak. From July onwards, thread herring becomes the target species until October, when weekly yields begin to decrease, and the fishery is closed through an ARAP administrative resolution. This follows scientific reports based on monitoring and research conducted during the fishing season, as defined by Article 16, Executive Decree No. 107, 2016[1].

Fishing pressure is restrained by Articles 1 and 3 of Executive Decree No. 107, 2016[1]. These articles require that all vessels targeting anchoveta, thread herring, or bumper must possess and carry a fishing license issued specifically for those species. The total number of licenses available is a maximum of 20 for large (industrial) vessels and 10 for small vessels. Licensed vessels of any size may only be replaced if completely removed from the fishery, and the new vessel is issued the same license number as the replaced vessel.

The stock is managed under the Small Pelagic Management Plan (RESOLUCIÓN ADM/ARAP No. 027, 2018)[3]. Hydroacoustic surveys are conducted before the fishing season. The opening of the fishing season and the Total Allowable Catch (TAC) are set based on the data collected during the survey, which typically include biomass estimates and size structure. The main mechanisms by which total removals are currently restricted are seasonal closures and restrictions on total fishing licenses. The fishery is closed by the authorities based on ongoing monitoring of the fishery.

Based on the information, the fishery passes Clause A3.1.

References

1. Food and Agriculture Organization of the United Nations. (n.d.). Ley de pesca y acuicultura

de Panamá (pan164002). https://faolex.fao.org/docs/pdf/pan164002.pdf
2. CeDePesca. (2021). Anexo II: Prospección hidroacústica 2021. https://cedepesca.net/wp-content/uploads/2021/08/AnexoII_Prospeccion_hidroacustica_2021.pdf
3. Food and Agriculture Organization of the United Nations. (n.d.). Plan de manejo de la pesquería de pequeños pelágicos, anchoveta, arenque y orqueta en el Pacífico de Panamá (pan180840). https://faolex.fao.org/docs/pdf/pan180840.pdf

A3.2	**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.**
Outcome	*Fail*

Rationale

The trajectory of quarterly fishing mortality shows that it has varied seasonally. The fishing mortality at the maximum sustainable level was estimated at FMSY = 0.071[1]. As shown in Figure 5 and Table 4, fishing mortality has exceeded FMSY several times in the past, surpassing 10%. Landings have also exceeded the MSY on several occasions (Figure 6).

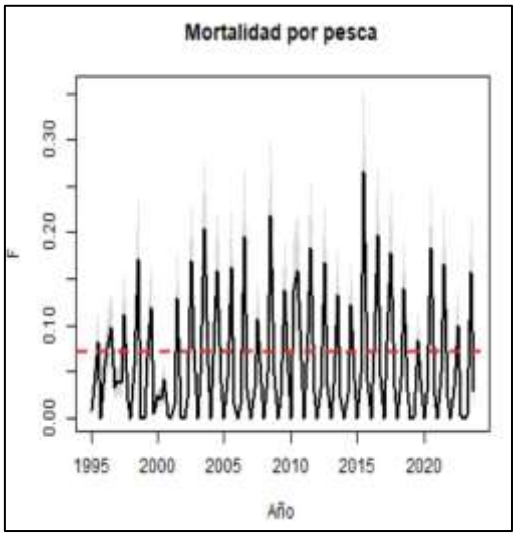

Figure 5. Quarterly variation in fishing mortality of Pacific thread herring. The red line indicates the FMSY = 0.071[1].

Table 4. Estimates of adult biomass, recruitment, fishing mortality, virgin adult biomass reduction, and reproductive potential ratio of Pacific thread herring[1].

Año.trim	Biomasa	R_R0	Fcr	F_Fmrs	B_Brms	B_B0	SPR
2018.25	50319	0.990	0.040	0.610	1.240	0.740	0.670
2018.50	50716	1.580	0.140	1.950	1.250	0.750	0.660
2018.75	50949	1.600	0.030	0.400	1.260	0.750	0.650
2019.00	54681	0.770	0.000	0.000	1.350	0.810	0.690
2019.25	58532	0.660	0.000	0.020	1.440	0.870	0.730
2019.50	60243	0.760	0.080	1.170	1.490	0.890	0.740
2019.75	61470	0.810	0.040	0.590	1.520	0.910	0.740
2020.00	63854	0.810	0.000	0.000	1.580	0.950	0.760
2020.25	63572	0.810	0.030	0.380	1.570	0.940	0.780
2020.50	55710	0.810	0.180	2.570	1.370	0.820	0.730
2020.75	48491	0.710	0.020	0.350	1.200	0.720	0.680
2021.00	46757	0.770	0.000	0.000	1.150	0.690	0.700
2021.25	45379	0.740	0.050	0.680	1.120	0.670	0.710
2021.50	41163	0.960	0.170	2.330	1.020	0.610	0.670
2021.75	38128	1.210	0.020	0.310	0.940	0.560	0.650
2022.00	38547	1.080	0.000	0.000	0.950	0.570	0.680
2022.25	39194	1.080	0.030	0.450	0.970	0.580	0.710
2022.50	38881	1.940	0.100	1.400	0.960	0.580	0.710
2022.75	40569	1.430	0.000	0.040	1.000	0.600	0.720
2023.00	45355	2.200	0.000	0.000	1.120	0.670	0.770
2023.25	50902	0.750	0.000	0.040	1.260	0.750	0.810
2023.50	53725	0.740	0.160	2.220	1.330	0.800	0.790
2023.75	56720	0.910	0.030	0.410	1.400	0.840	0.760

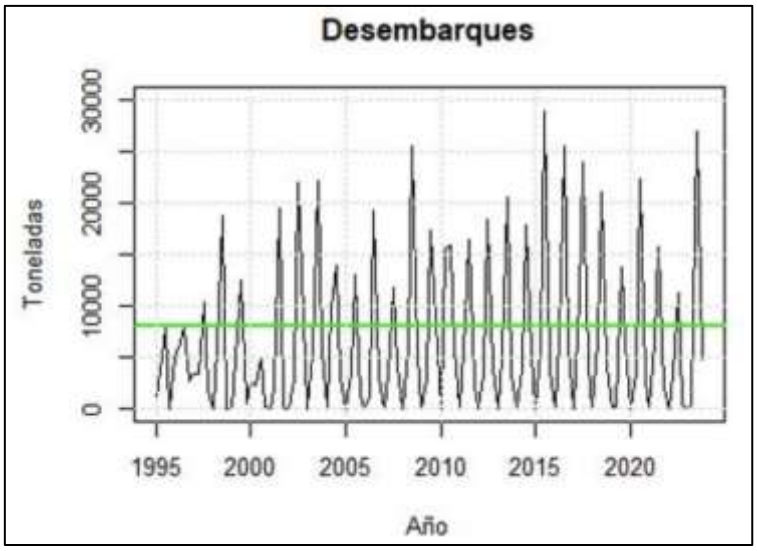

Figure 6. Quarterly landings of Pacific thread herring from 1995–2023. The green line corresponds to the MSY = 8,000 tonnes.

Based on the information, the fishery fails Clause A3.2 and will be assessed under Category B.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf

A3.3	**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).**
Outcome	*Pass*

Rationale

The main mechanisms by which total removals are currently restricted are seasonal closures and restrictions on total fishing licenses.

The stock is managed under the Small Pelagic Management Plan (Resolution ADM/ARAP No. 027, 2018)[1]. According to the plan, the fishing season typically runs from April to October. During this period, fish migrate to shallower waters, making them more accessible to the fleet. Toward the end of the season, they begin moving away, naturally initiating a fishing pause of about six months while they head to spawning grounds in coastal or shallower areas, during which no fishing activities take place.

As previously discussed, the opening of the fishing season and its TAC is initiated by ARAP, taking into consideration the availability of the resource and the size structure of the target species (Article 15, Executive Decree No. 107, 2016)[2].

Conversely, the decision to close the season is based on scientific findings gathered during the fishing period and is formalized through a resolution issued by the Directorate General for Fisheries Planning and Management. Pursuant to the management plan, the threshold for closure is when the average size of Pacific thread herring catches falls below 17 cm[1]. Some fishery closures have been established based on this criterion, for example, in 2022 and 2024 through Resolution DGOMI 271/2022 and Resolution DGOMI 357/2024, respectively[2,3]. In other cases, closures were related to increases in fishing effort and landings, such as in 2023 through Resolution DGOMI 453/2023[4].

Although the regulations and management plan do not explicitly state that the fishery would be closed if the stock falls below the limit reference point or proxy, the stock has never reached this limit. There is evidence that management authorities have been actively monitoring the fishery and implementing closures based on the status of the stock, fishing effort, and landings, which suggests that appropriate actions would be taken if biomass fell below the limit reference point.

Based on the information, the fishery passes Clause A3.3.

References

1. Food and Agriculture Organization of the United Nations. (n.d.). Plan de manejo de la pesquería de pequeños pelágicos, anchoveta, arenque y orqueta en el Pacífico de Panamá (Res. ADM/ARAP No. 027, 2018). https://faolex.fao.org/docs/pdf/pan180840.pdf
2. Food and Agriculture Organization of the United Nations. (n.d.). Ley de pesca y acuicultura de Panamá (LEX-FAOC164002). https://www.fao.org/faolex/results/details/es/c/LEX-FAOC164002/

3. vLex Panamá. (n.d.). Resolución N° DGOMI-271-2022: Por la cual se establece el cierre de la temporada de pesca del arenque (Opisthonema spp.). https://vlex.com.pa/vid/resolucion-n-dgomi-271-916534580
4. vLex Panamá. (n.d.). Resolución N° DGOMI-357-2024: Por la cual se establece el cierre de la temporada de pesca del arenque (Opisthonema spp.). https://vlex.com.pa/vid/resolucion-n-dgomi-357-1061198654
5. Food and Agriculture Organization of the United Nations. (n.d.). Gaceta Oficial Digital No. 29928-A: Resolución DGOMI No. 453-2023 (cerrando temporada de pesca del arenque). https://faolex.fao.org/docs/pdf/pan223224.pdf

A4 Stock status

A4.1	**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.**
Outcome	*Pass*	

Rationale

The 2024 stock assessment concluded that Pacific thread herring biomass was above the reference biomass (BMSY). The reproductive potential was estimated at approximately 70% of the adult biomass that would have existed without fishing. The assessment indicated an overfishing risk of around 10% and a zero risk of overexploitation (Figure 7), as revealed by the sensitivity analysis of seven alternative models performed in the last stock assessment[1].

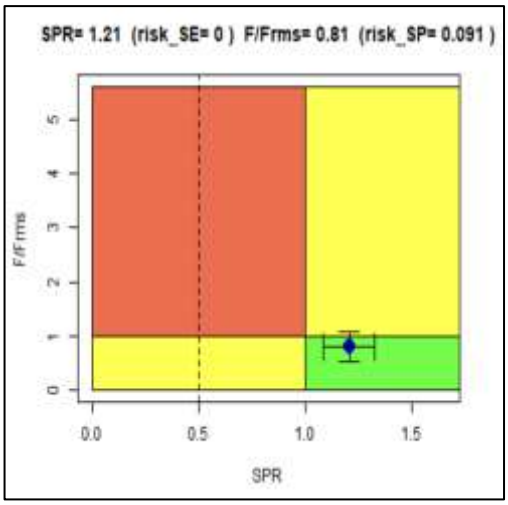

Figure 7. Kobe diagram for Pacific thread herring (the average value in 2023 is considered)[1].

According to the 2025 acoustic cruise, thread herring biomass at the end of March 2025 was 81,000 t[2]. Thus, the stock is above the target reference point of 43,000 tonnes (BMSY).

Based on the information, the fishery passes Clause A4.1.

References

1. CeDePesca. (2025). Evaluación de los stocks de anchoveta (Cetengraulis mysticetus) y arenque (Opisthonema spp.) en el Golfo de Panamá, 1995–2023 (V1 Informe de Evaluación Stocks PP Panamá 2024). https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf
2. Valdez, C., Iriarte, F., Escobar, C., & Fuertes, J. (2024). Evaluación hidroacústica de recursos pelágicos en la Bahía de Panamá a bordo de la E/P Anchovetas II del 15 al 21 de marzo de 2025 (Informe ejecutivo, 45 pp.).

Category B species

Category B species are assessed using a risk-based approach.

2.2. The risk matrix in Table B(a) shall be used when assessing a Category B species when estimates of Fishing mortality (F), Biomass (B) and reference points are available.

2.3. The risk matrix in Table B(b) shall be used when assessing a Category B species when no reference points are available.

B1	**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).**
Table used B(a) or B(b)	B(a)
Outcome	*Pass*

Rationale

In the most recent stock assessments, conducted in 2020 and 2024, the target reference point for biomass was determined as a spawning biomass equal to 60% of the virgin spawning biomass, used as a proxy for MSY[1,2]. The 2024 assessment concluded that Pacific thread herring biomass was above the reference biomass (BMSY) of 40,000 tonnes. The reproductive potential was estimated at approximately 50,000 tonnes, or 72% of the adult biomass that would have existed without fishing. According to the most recent acoustic cruise, thread herring biomass at the end of March 2025 was estimated at 81,000 tonnes, well above the reference biomass[3].

The fishing mortality that allows the management objective was estimated as FMSY = 0.071, and average fishing mortality levels for thread herring corresponded to approximately 50% of FMSY[1]. The Kobe diagram showed that the overfishing risk was close to 10%, while the overexploitation risk was zero (Figure 7).

Therefore, based on the 2025 acoustic cruise, thread herring biomass is above the MSY/target reference point, and according to the 2024 stock assessment, fishing mortality was below FMSY.

Based on this information, the fishery passes Clause B1, Table B(a).
References 1. https://cedepesca.net/wp-content/uploads/2025/05/V1-Informe_EvaluacionStocks_PP_Panama_2024.pdf 2. https://cedepesca.net/wp-content/uploads/2020/03/Informe_Evaluaci%C3%B3nStocks_PP_Panama-Canales-CeDePesca.pdf 3. Valdez, C., Iriarte, F., Escobar. C., Fuertes, J. 2024. "EvaluaciV≥n HidroacvʃsticaV de recursos pelV°gicos en la BahV≠a de PanamV° a bordo de la E/P Anchovetas II del 15 al 21 de marzo de 2025". Informe ejecutivo, 45 pp.

Category C species

2.4. All clauses must be met for a species to pass the Category C assessment.

2.4.1. Where a species fails this Category C clause, it should be assessed as a Category D species instead, except if there is evidence that the species is currently below the limit reference point.

C1.1	**C1.1 Fishery removals of the species in the fishery under assessment are included in the stock assessment process OR are considered by scientific authorities to be negligible.**
Outcome	Choose an item.
Rationale	
References	

C1.2	**C1.2 The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.**
Outcome	Choose an item.
Rationale	
References	

Category D species

Category D species are assessed against a risk-based approach.

2.5. The Productivity-Susceptibility Analysis (PSA) in Table D(a) shall be used when assessing Category D species.
2.6. Table D(b) shall be used to calculate the overall PSA risk rating for the Category D species.
2.7. Should the PSA indicate a high risk, further assessment shall be completed against the requirements in Table D(C).

Productivity Susceptibility Analysis (PSA) and scores

Table D(a) provides detailed values and scores for the species productivity and susceptibility attributes and attributes, the assessor shall use Table D(a) to the PSA table.
Table D(b) is used to calculate the overall PSA risk rating for the Category D species.

Species name	Pacific bumper (*Chloroscombrus orqueta*)	
Productivity attributes	**Value**	**Score**
Average age at maturity	<2 years	1
Average maximum age	<10 years	1
Fecundity	Unknown	/
Average maximum size	30 cm	1
Average size at maturity	12.4 cm (*Chloroscombrus chrysurus* proxy)	1
Reproductive strategy	Broadcast spawner	1
Mean Trophic Level (MTL)	2.5	1
Density dependence (to be used when scoring invertebrate species only)	/	/
Susceptibility attributes		
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	<10% overlap. Pacific bumper are widely distributed and can be found as far north as San Pedro, USA (33°N) and Peru (18°S) in the south, out to as far west as 122°W. The species is found in coastal marine and brackish waters, including lagoons with mangroves. This area significantly exceeds that of the fishery.	1
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	High overlap with fishing gear. Pacific bumper are demersal and the fishery occurs inshore, principally over mud flats.	3

Selectivity of gear type: Potential of the gear to retain species	Precautionary (no information found)	3
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	Retained	3
Average productivity score		1
Average susceptibility score		2.5
PSA risk rating (from Table D(b))		Pass
Compliance rating		Pass

- Froese, R., & Pauly, D. (Eds.). (n.d.). Chloroscombrus orqueta (Pacific bumper). FishBase. https://fishbase.se/summary/1937
- Froese, R., & Pauly, D. (Eds.). (n.d.). Chloroscombrus chrysurus (Atlantic bumper). FishBase. https://www.fishbase.se/summary/Chloroscombrus-chrysurus
- AllFishes.org. (n.d.). Bumper (Atlantic bumper / Pacific bumper). https://allfishes.org/fishes/marine/bumper-atlantic-bumper-pacific

Species name	Peruvian mojarra (*Diapterus peruvianus/ brevirostris)*	
Productivity attributes	**Value**	**Score**
Average age at maturity	<2 years	1
Average maximum age	6 years	1
Fecundity	16,695 - 807,954 (twice yearly)	1
Average maximum size	35 cm	1
Average size at maturity	13.53 – 13.68	1
Reproductive strategy	Broadcast spawner	1
Mean Trophic Level (MTL)	3.7	3
Density dependence (to be used when scoring invertebrate species only)	/	/
Susceptibility attributes		
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	10-30% overlap. Peruvian mojarra are widely distributed and can be found as far north as USA (32°N) and Peru (13°S) in the south, out to as far west as 114°W. The species is found in coastal marine and brackish waters, including lagoons with mangroves. This area exceeds that of the fishery.	2
Encounterability: The position	High overlap with fishing gear.	3

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	Peruvian mojarra are common in coastal waters with adults found over soft bottoms of deeper waters.	
Selectivity of gear type: Potential of the gear to retain species	Precautionary (no information found)	3
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	Retained	3
Average productivity score		1.28
Average susceptibility score		2.75
PSA risk rating (from Table D(b))		Pass
Compliance rating		Pass

- Global Science Research Journals. (n.d.). Reproduction of Diapterus brevirostris (Percoidei: Gerreidae) in the Mexican Pacific Coast. https://www.globalscienceresearchjournals.org/articles/reproduction-of-diapterus-brevirostris-percoidei-gerreidae-in-the-mexican-pacific-coast.pdf
- Froese, R., & Pauly, D. (Eds.). (n.d.). Diapterus peruvianus (Peruvian mojarra). FishBase. https://fishbase.se/summary/SpeciesSummary.php?ID=10430&AT=Peruvian+mojarra

Species name	Mexican barracuda (*Sphyraena ensis*)	
Productivity attributes	**Value**	**Score**
Average age at maturity	2 years (*Sphyraena argentea* proxy)	1
Average maximum age	14 years (*Sphyraena viridensis* proxy)	2
Fecundity	42,000 - 484,000 (*Sphyraena argentea* proxy)	1
Average maximum size	127 cm	2
Average size at maturity	37.9 cm (L50)	1
Reproductive strategy	Broadcast spawner	1
Mean Trophic Level (MTL)	4.0	3
Density dependence (to be used when scoring invertebrate species only)	/	/
Susceptibility attributes		
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	10-30% overlap. Mexican barracuda are distributed from Mexico to Ecuador. The species is found in coastal	2

	marine and brackish waters, including lagoons with mangroves. This area exceeds that of the fishery.	
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	Medium overlap with fishing gear. Pelagic, neritic species.	2
Selectivity of gear type: Potential of the gear to retain species	Precautionary (no information found)	3
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	Retained	3
Average productivity score		1.57
Average susceptibility score		2.5
PSA risk rating (from Table D(b))		Pass
Compliance rating		Pass

- Serras-Soler, J., Ben Souissi, J., Ksouri, H., Zouiten, C., & Vossoughi, S. (n.d.). Age, growth and mortality of the yellowmouth barracuda Sphyraena viridensis (Sphyraenidae) from eastern coasts of Algeria. Journal of the Marine Biological Association of the United Kingdom. https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/abs/age-growth-and-mortality-of-the-yellowmouth-barracuda-sphyraena-viridensis-sphyraenidae-from-eastern-coasts-of-algeria/044BF6542872E3A038CFCA350CD47304
- Venegas, S., & Israel, J. (n.d.). Reproductive biology of the Mexican barracuda Sphyraena ensis (JORDAN & GILBERT, 1882) (PERCIFORMES: SPHYRAENIDAE) on the coast of San Blas, Nayarit, Mexico. Repositorio Institucional, Universidad de Chile. https://repositorioslatinoamericanos.uchile.cl/handle/2250/7789927
- Froese, R., & Pauly, D. (Eds.). (n.d.). Sphyraena ensis (Pacific barracuda). FishBase. https://fishbase.se/summary/Sphyraena-ensis
- California Department of Fish and Wildlife. (n.d.). Pacific barracuda: The species. https://marinespecies.wildlife.ca.gov/pacific-barracuda/the-species/
- Zavala-Lea, A., et al. (2018). Reproductive aspects of Sphyraena ensis (Perciformes: Sphyraenidae) [Unpublished manuscript/PDF].

Species name	Pacific harvestfish (*Prepilus medius*)	
Productivity attributes	**Value**	**Score**
Average age at maturity	<2 years	1
Average maximum age	2 years (*Peprilus burti* proxy)	1
Fecundity	Unknown	/

Average maximum size	31.6 cm	1
Average size at maturity	12 – 13 cm (*Peprilus triacanthus* and *burti* proxy, respectively)	1
Reproductive strategy	Broadcast spawner	1
Mean Trophic Level (MTL)	4.0	3
Density dependence (to be used when scoring invertebrate species only)	/	/
Susceptibility attributes		
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	<10% overlap. Pacific harvestfish are widely distributed and can be found as far north Mexico and Peru in the south, including the Galapagos Islands. Occurs near the surface of coastal water to over bottom of continental shelf. This area significantly exceeds that of the fishery.	1
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	Medium overlap with fishing gear. Neritic species (1).	2
Selectivity of gear type: Potential of the gear to retain species	Precautionary (no information found)	3
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	Retained	3
Average productivity score		1.33
Average susceptibility score		2.25
PSA risk rating (from Table D(b))		Pass
Compliance rating		Pass

- Froese, R., & Pauly, D. (Eds.). (n.d.). Peprilus medius (Pacific harvestfish). FishBase. https://www.fishbase.se/summary/Peprilus-medius.html
- Smithsonian Tropical Research Institute. (n.d.). Peprilus paru (a harvestfish species). Smithsonian Tropical Research Institute Fish Database. https://biogeodb.stri.si.edu/sftep/en/thefishes/species/2280
- Froese, R., & Pauly, D. (Eds.). (n.d.). Peprilus burti (Gulf butterfish). FishBase. https://www.fishbase.se/summary/Peprilus-burti

- Froese R., & Pauly, D. (Eds.). (n.d.). Peprilus triacanthus (Atlantic harvestfish). FishBase. https://www.fishbase.se/summary/Peprilus-triacanthus

Species name	Hairfin lookdown, Jorobado antena (*Selene brevoortii*)	
Productivity attributes	**Value**	**Score**
Average age at maturity	<5 years	1
Average maximum age	<10 years	1
Fecundity	Unknown	/
Average maximum size	38 cm	1
Average size at maturity	13 cm (*Selene setapinnis* proxy)	1
Reproductive strategy	Broadcast spawner	1
Mean Trophic Level (MTL)	3.8	3
Density dependence (to be used when scoring invertebrate species only)	/	/
Susceptibility attributes		
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	10-30% overlap. Hairfin lookdown are distributed from Mexico to Ecuador. The species is found in shallow coastal waters in small schools near the bottom. This area exceeds that of the fishery.	2
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	Medium overlap with fishing gear. Demersal species.	2
Selectivity of gear type: Potential of the gear to retain species	Precautionary (no information found)	3
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	Retained	3
Average productivity score		1.33
Average susceptibility score		2.5
PSA risk rating (from Table D(b))		Pass
Compliance rating		Pass

- Froese, R., & Pauly, D. (Eds.). (n.d.). Selene brevoortii (Atlantic moonfish). FishBase.

https://fishbase.se/summary/Selene-brevoortii#:~:text=Size%20/%20Weight%20/%20Age,55763

- Virginia Institute of Marine Science. (n.d.). Atlantic moonfish (Species of Interest). https://www.vims.edu/research/units/programs/multispecies_fisheries_research/speciesofinterest/atlantic-moonfish.php

Species name	Panama longfin herring, sardina machete (*Odontognathus panamensis*)	
Productivity attributes	**Value**	**Score**
Average age at maturity	<5 years	1
Average maximum age	<10 years	1
Fecundity	Unknown	/
Average maximum size	17 cm (1,2)	1
Average size at maturity	~9–14 cm	1
Reproductive strategy	Broadcast spawner	1
Mean Trophic Level (MTL)	3.8	3
Density dependence (to be used when scoring invertebrate species only)	/	/
Susceptibility attributes		
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	10-30% overlap. Panama longfin herring are distributed from El Salvador to Panama. The species is found in found inshore, perhaps entering estuaries. This area exceeds that of the fishery.	2
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	Medium overlap with fishing gear. Pelagic, neritic species.	2
Selectivity of gear type: Potential of the gear to retain species	Precautionary (no information found)	3
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	Retained	3
Average productivity score		1.33
Average susceptibility score		2.5

PSA risk rating (from Table D(b))	Pass
Compliance rating	Pass

- Froese, R., & Pauly, D. (Eds.). (n.d.). Odontognathus panamensis (Panama longjaw). FishBase. https://www.fishbase.se/summary/Odontognathus-panamensis
- Smithsonian Tropical Research Institute. (n.d.). Strongylura notata (species profile). https://biogeodb.stri.si.edu/sftep/en/thefishes/species/522
- National Oceanic and Atmospheric Administration. (n.d.). Pacific herring. https://www.fisheries.noaa.gov/species/pacific-herring

Species name	White mullet, lisa (*Mugil curema*)	
Productivity attributes	**Value**	**Score**
Average age at maturity	2.6 years	1
Average maximum age	18.7 years	2
Fecundity	>20,000	1
Average maximum size	91 cm	1
Average size at maturity	21.63 cm	1
Reproductive strategy	Broadcast spawner	1
Mean Trophic Level (MTL)	2.0	1
Density dependence (to be used when scoring invertebrate species only)	/	/
Susceptibility attributes		
Areal overlap (availability): Overlap of the fishing effort with a species concentration of the stock	10-30% overlap. White mullet are globally distributed but on the Eastern Pacific are distributed from the Gulf of California to Chile. The species is found in sandy coasts and littoral pools but also in muddy bottoms of brackish lagoons and estuaries. This area exceeds that of the fishery.	2
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	Medium overlap with fishing gear. Neritic species.	2
Selectivity of gear type: Potential of the gear to retain species	Precautionary (no information found)	3
Post-capture mortality (PCM):	Retained	3

The chance that, if captured, a species would be released and that it would be in a condition permitting subsequent survival		
Average productivity score		1.14
Average susceptibility score		2.5
PSA risk rating (from Table D(b))		Pass
Compliance rating		Pass

- Froese, R., & Pauly, D. (Eds.). (n.d.). Mugil curema (white mullet). FishBase. https://www.fishbase.se/summary/mugil-curema.html
- Ibáñez Aguirre, A. L., Castellanos-Juárez, M., Mendoza-Carranza, M., Pacheco-Almanzar, E., & Álvarez-Hernández, S. H. (2025). Reproducción de la liseta, Mugil curema (Actinopterygii: Mugilidae), en lagunas costeras del sur del Golfo de México. HIDROBIOLÓGICA, 35(2). https://hidrobiologica.izt.uam.mx/index.php/revHidro/article/view/1783
- Ruiz-Ramírez, S., Molina-Arenas, E., Lucano-Ramírez, G., Aguilar-Betancourt, C., Flores-Ortega, J. R., Kosonoy-Aceves, D., & González-Sansón, G. (2017). Reproductive aspects of Mugil curema (Mugiliformes: Mugilidae) in the Barra de Navidad coastal lagoon, Jalisco, Mexico. Latin American Journal of Aquatic Research, 45(2), 443–456. https://doi.org/10.3856/vol45-issue2-fulltext-19
- Quiñonez-Velázquez, C., & López-Olmos, J. (2011). Juvenile growth of white mullet Mugil curema (Teleostei: Mugilidae) in a coastal lagoon southwest of the Gulf of California. Latin American Journal of Aquatic Research, 39(1), 25–32. https://doi.org/10.3856/vol39-issue1-fulltext-3

Further assessment for Category D species

Should the PSA indicate a high risk, further assessment shall be completed against the requirements D1 and D2 – Table D(c).

D1	**D1. The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.**
Outcome	Choose an item.
Rationale	
References	

D2	**D2. There is no substantial evidence that the fishery has a significant negative impact on the species.**
Outcome	Choose an item.
Rationale	
References	

Ecosystem requirements

This section, or module, assesses the impacts that the fishery under assessment may have on key ecosystem components: ETP species, habitat and the wider ecosystem.

3.1. All ecosystem criteria must be met (pass) for a fishery to pass the Ecosystem Requirements.

3.1.1. The sub-criteria offer a structured evidence base to demonstrate that the fishery sufficiently meets the ecosystem criteria, it is not expected that sub-criteria are assessed independently of the main criterion.

E1 Impact on Endangered, Threatened or Protected species (ETP species)

E1.1	**E1.1 Information on interactions between the fishery and ETP species is collected.** *In reaching a determination for E1.1, the assessor should consider if the following is in place:*	
	E1.1.1 ETP species which may be directly affected by the fishery have been identified.	
	E1.1.2 Interactions between the fishery and ETP species are recorded and reported to management organisations.	
	E1.1.3 Collection and analysis of ETP information is adequate to provide a reliable indication of the impact the fishery has on ETP species.	
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

In Panama, interactions with Endangered, Threatened, and Protected (ETP) species are monitored by the On-Board Observer Programme (OBOP). The programme was originally established in 2013 and jointly managed by Promarina and CeDePesca[1]. It was formally adopted in 2016 under Executive Decree No. 107, mandating a minimum permanent coverage of 20% of operational vessels within the small pelagics fishery[2].

Data on interactions with ETP species are recorded throughout the fishing season, from the time the purse seine is deployed until the catch is taken to the warehouse. Observers identify the species, count the number of individuals per species, and record whether the individuals that interacted with the fishing gear were released alive or injured.

During the 2024 fishing season, which ran from 21 April to 17 October 2024, 70 trips and 276 hauls were monitored (Table 5 and Figure 8)[3]. Although the management plan sets a 20% coverage

objective for operational vessels within the small pelagics fishery, it is unclear from the data provided what proportion of vessels or fishing trips this observer effort represents.

Table 5. Fishing trips observer by the OBOP in 2024[3].

Viajes de Pesca monitoreados	Abr	May	Jun	Jul	Ago	Sep	Oct	Total
	9	16	12	10	13	12	6	78
Embarcación	Lances monitoreados por embarcación por mes							Total de lances por embarcación
Bayano VII	34	39						73
Bayano VIII					11	15	11	37
Anchovetas				4				4
Anchovetas II	11		14	2	35	26		88
Celia M.	12			4			9	25
Ing. Vayarino			11					11
Isla Melones		8		5				13
Isla Santhelmo		7						7
La Maestra			5	3				8
Los Farallones							2	2
Promar							3	3
Tabor						5		5
Total Mensual	**57**	**54**	**30**	**18**	**46**	**46**	**25**	**276**

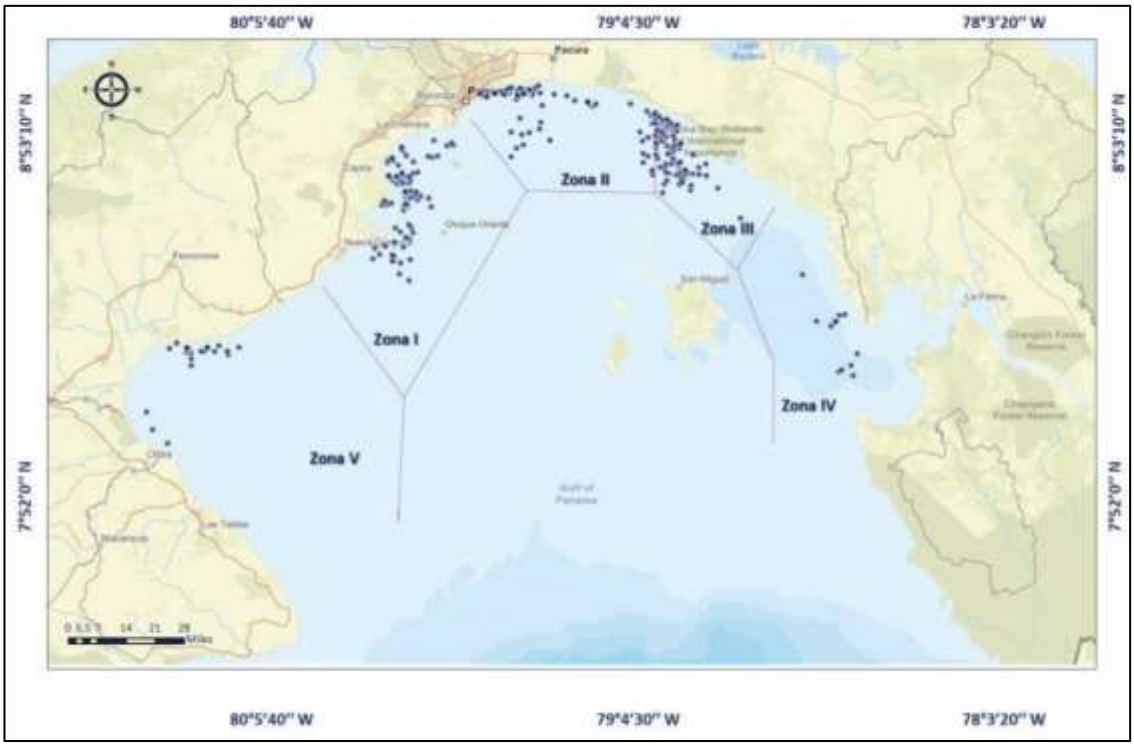

Figure 8. Fishing sets observed by the OBOP during the 2024 fishing season[3].

Based on the above, the fishery passes Clause E1.1.

References

1. CeDePesca. (n.d.). Panamanian small pelagics: Fishery Improvement Project. https://cedepesca.net/prome/panamanian-small-pelagics/
2. Autoridad de los Recursos Acuáticos de Panamá. (2016). Decreto Ejecutivo 107 de 2016. http://www.viceipup.up.ac.pa/cidim/files/ARAP-Decreto-Ejecutivo-107-de-2016.pdf
3. CeDePesca. (2025). Informe técnico programa privado de observadores a bordo: Pesquería de pequeños pelágicos de Panamá. Temporada 2024 (50 pp.).

E1.2	**E1.2 The fishery has no significant negative impact on ETP species.** *In reaching a determination for E1.2, the assessor should consider if the following is in place:*
	E1.2.1 The information collected in relation to E1.1.3 indicates that the fishery does not have a significant negative impact on ETP species.
Outcome	*Pass*

Rationale

No fundamental changes have occurred since the last re-approval assessment.

There is clear evidence of interactions with ETP species, however, the overall impact is low. During the 2024 fishing season, interactions with at least one species of seabird were recorded in 83% of sets[1]. In 12% of sets, no interactions were recorded, and in the remaining 5%, observations could not be carried out due to evening hauls or environmental conditions[1].

For seabirds, approximately 61,972 individuals were observed, grouped into four species and three undetermined taxa[1]. Most interactions resulting in injury involved *Pelecanus occidentalis*, with 38 individuals reported dead (Table 6). However, this species and all others are listed as Least Concern[2,3,4,5].

Table 6. Record of sea-coastal bird interactions observed by the OBOB of the small pelagic fishery in the Gulf of Panama during the 2024 season[1].

SPECIES	Swimming or Flying Around the Boat	Resting on the Boat	Attacking the School to Feed and Escaped Unharmed	Dead	Released Uninjured	Released with Minor Injuries	Released with Serious Injuries	Total Individuals	Frequency of Occurrence
Pelecanus occidentalis	26110	596	5790	58	25	9	1	32589	77.8%
Fregata magnificens	12229	1487	2512	1	1			16231	84.7%
Phalacrocorax brasilianus	6290	16	1935	3	2			8305	46.7%
Leucophaeus atricilla	1900	10	1060					2960	10.7%
Unidentified Gull – *Larus* spp.	778	63	635					1413	10.8%
Phalacrocorax spp.	365	50	59					424	5.4%
Unidentified Gull	40		10					50	0.8%
Total Individuals	47712	2099	12062	62	27	9	1	61972	

A total of 36 individual sharks were recorded by scientific observers (Figure 9), with the most representative species being scalloped hammerhead (*Sphyrna lewini*) with 18 individuals, bonnethead (*Sphyrna corona*) with 10, *Carcharhinus spp.* with 4, smalltail (*Carcharhinus porosus*) with 1, and Atlantic nurse shark (*Ginglymostoma cirratum*) with 1[1]. The scalloped hammerhead, bonnethead, and smalltail shark are all listed as Critically Endangered by the IUCN, while the Atlantic nurse shark is listed as Vulnerable[6,7,8,9].

The fate of sharks caught during the 2024 fishing season (Figure 10), aggregated across size classes, indicates that all smalltail sharks were returned, almost all (~91%) scalloped hammerheads were returned, and the largest proportion of bonnetheads were also returned (~40%). Some sharks are retained for human consumption; however, these catch numbers are low. Given the practice of retaining sharks, this should be closely monitored in future reports in case capture incidents increase. At current levels of capture, it is unlikely that the fishery has a significant negative impact on these species' populations.

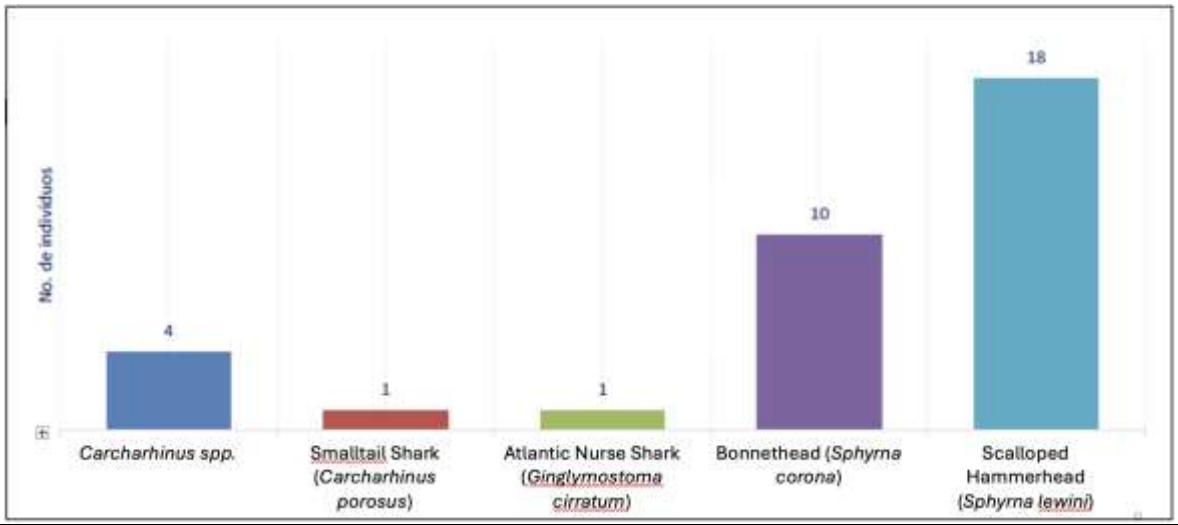

Figure 9. Number of individuals recorded per species of sharks during the execution of the OBOP of the small pelagic fishery in the Gulf of Panama in the 2024 seasons[1].

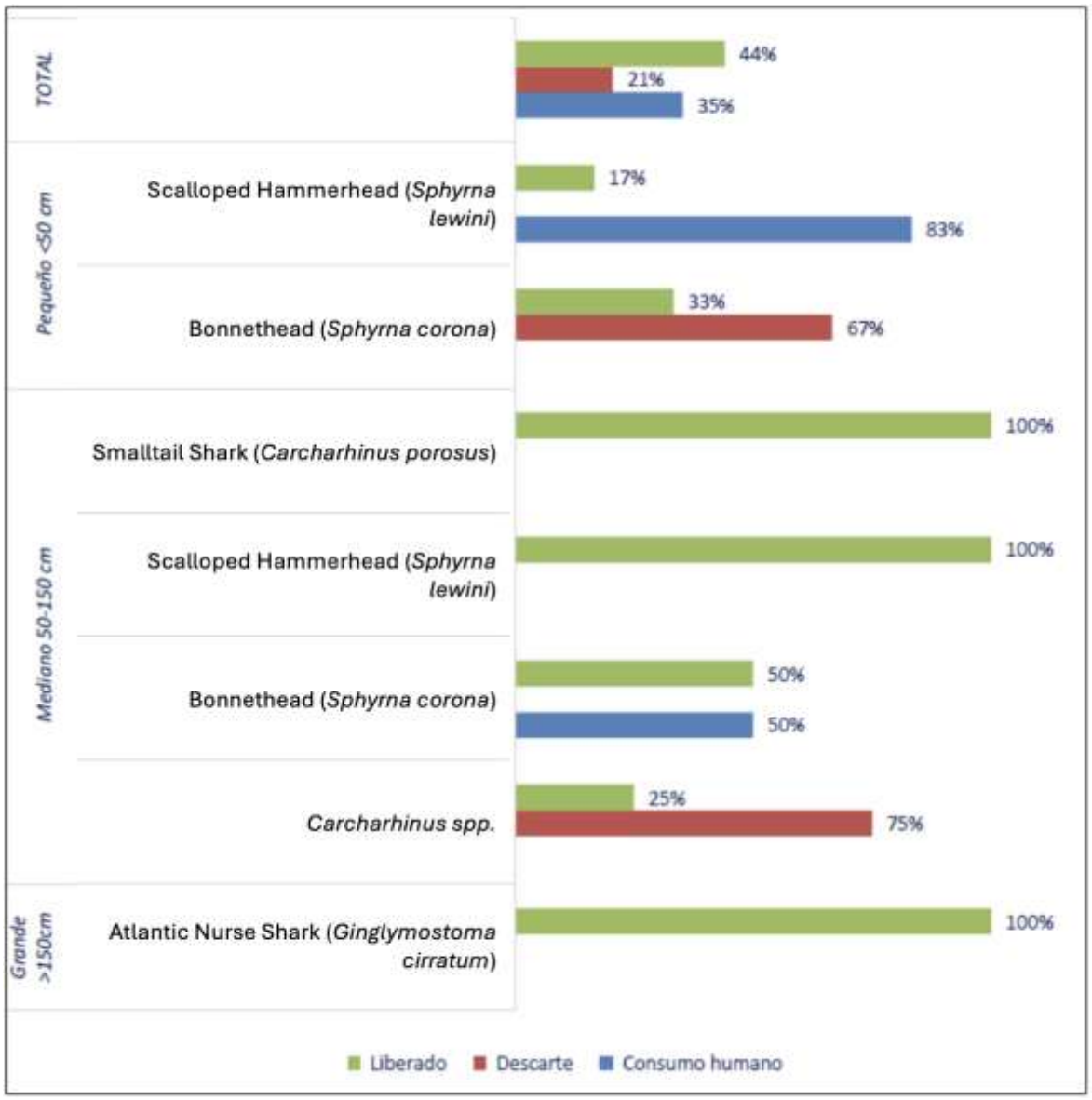

Figure 10. Fate and sizes of the shark species caught during the 2024 fishing season. Green colours represented the released specimens, red, the discarded and blue the ones used for human consumption[1].

No interactions with turtles or marine mammals were reported by the OBOP in 2024.

Based on the above, the fishery passes Clause E1.2.

References

1. CeDePesca. (2025). Informe técnico programa privado de observadores a bordo: Pesquería de pequeños pelágicos de Panamá. Temporada 2024 (50 pp.).
2. International Union for Conservation of Nature. (n.d.). Chelidonichthys lucerna. IUCN Red List

of Threatened Species. https://www.iucnredlist.org/fr/species/22733989/132663224
3. International Union for Conservation of Nature. (n.d.). Pomadasys kaakan. IUCN Red List of Threatened Species. https://www.iucnredlist.org/fr/species/22697724/168982712
4. International Union for Conservation of Nature. (n.d.). Otolithes ruber. IUCN Red List of Threatened Species. https://www.iucnredlist.org/fr/species/22696773/133550739
5. International Union for Conservation of Nature. (n.d.). Lutjanus fulviflamma. IUCN Red List of Threatened Species. https://www.iucnredlist.org/fr/species/22694455/132552784
6. International Union for Conservation of Nature. (n.d.). Bagre panamensis. IUCN Red List of Threatened Species. https://www.iucnredlist.org/fr/species/39385/2918526
7. International Union for Conservation of Nature. (n.d.). Cynoscion squamipinnis. IUCN Red List of Threatened Species. https://www.iucnredlist.org/fr/species/44591/124434064
8. International Union for Conservation of Nature. (n.d.). Opisthonema libertate. IUCN Red List of Threatened Species. https://www.iucnredlist.org/fr/species/144136822/3094594
9. International Union for Conservation of Nature. (n.d.). Opisthonema oglinum. IUCN Red List of Threatened Species. https://www.iucnredlist.org/fr/species/144141186/3095153

E1.3	**E1.3 There is an ETP management strategy in place for the fishery.** *In reaching a determination for E1.3, the assessor should consider if the following is in place:*	
	E1.3.1	There are measures applied to the fishery which are designed to manage the impacts of the fishery on ETP species.
	E1.3.2	The measures are considered likely to achieve the objectives of regional, national and international legislation relating to ETP species.
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

Panama has made concerted efforts to manage the impacts of the fishery on ETP species.

To reduce the impacts of fisheries on sea turtles, Panama adopted the Declaration of the Inter-American Commission for the Protection and Conservation of Sea Turtles (CIT), which prohibits the retention of these species (via Law No. 8 of 4 January 2008)[1]. In addition, several Wildlife Refuge Areas have been established to protect sea turtle nesting sites, including Isla Caña, La Barqueta Beach, and La Marinera Beach, among others. These species are released alive when caught.

Since 2022, the "National Plan to Reduce the Incidental Catch of Seabirds in Panamá" has been in place[2]. Crew members try to avoid catching birds, and when caught, the birds are released as soon as possible. Marine coastal bird workshops have also been conducted with fishermen to raise awareness of the impacts on these species and how to minimize them[3].

For elasmobranch species, several workshops have been conducted in this fishery to improve data collection on interactions and the release of bycatch specimens. Stakeholders in the fishery have also signed a voluntary Code of Conduct, which includes objectives to comply with laws and

regulations to protect ETP species and to release them promptly. According to information provided, the combination of observer education, workshops, and the Code of Conduct meant that in 2019 the majority of scalloped hammerhead bycatch was released alive (approximately 58%)[4]. Furthermore, a collaboration agreement has recently been established by Promarina with a shark specialist to launch a shark monitoring and release project to further improve these numbers[5]. There is also an ongoing study to identify zones and time periods where bycatch is higher, to evaluate whether avoiding these areas during the fishing season, or even creating a protected area, would be effective. However, the available information does not indicate that spatial or seasonal measures would currently minimize the impact on this species.

As of January 2026, Panama has maintained a zero commercial export quota on the of CITES listed sharks and rays[6]. The aim being to reduce pressure from international trade, prevent overexploitation, and allow time to strengthen scientific information, population monitoring systems, control mechanisms, and traceability[6].

Based on the above, the fishery passes Clause E1.3.

References

1. Autoridad de los Recursos Acuáticos de Panamá. (2008). Ley No. 8 de 4 de enero de 2008 que aprueba la Convención Interamericana para la Protección y Conservación de las Tortugas Marinas, suscrita en Caracas, Venezuela el 1 de diciembre de 1996. https://arap.gob.pa/wp-content/uploads/2015/05/ley-2008-8.pdf
2. Inter-American Tropical Tuna Commission. (2022). Plan nacional para reducir la captura incidental de aves marinas. https://www.iattc.org/GetAttachment/531065c8-d28b-48f8-9675-08d4eb7d587b/PAN-C11-02_Aves-marinas.pdf
3. CeDePesca. (n.d.). Panamanian small pelagics: Fishery Improvement Project. https://cedepesca.net/proyectos/panamanian-small-pelagics/
4. Archer, M., & Peacock, S. (2021). Panama small pelagic fishery MarinTrust: Application — Additional evidence in support of full fishery approval (10 pp.). Prepared by RS Standards on behalf of CeDePesca.
5. Crespo, J. P. (2024). MarinTrust Standard V2: Whole fish fishery assessment, WF20, Pacific thread herring and anchoveta (Cetengraulis mysticetus and Opisthonema spp.), FAO77. https://www.marin-trust.com/sites/marintrust/files/approved-raw-materials/WF20%20MarinTrust%20V2.0%20Wholefish%20fishery%20assessment_Pacific%20anchoveta_v5.PR_JPC_Final_MTPR%20addressed%20%281%29.pdf
6. Ministerio de Ambiente de Panamá (MiAMBIENTE). (2026). Panamá prohíbe exportaciones de tiburones y rayas a partir del 1 de enero de 2026. https://miambiente.gob.pa/panama-prohibe-exportaciones-de-tiburones-y-rayas-a-partir-del-1-de-enero-2026

E2 Impact on the habitat

E2.1	**E2.1 Information on interactions between the fishery and marine habitats is collected.** *In reaching a determination for E2.1, the assessor should consider if the following is in place:*	
	E2.1.1	Habitats which may be directly affected by the fishery have been identified, including any habitats which may be particularly vulnerable.
	E2.1.2	Information on the scale, location and intensity of fishing activity relative to habitats is collected.
	E2.1.3	Collection and analysis of habitat information is adequate to provide a reliable indication of the impact the fishery has on marine habitats.
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

The Pacific anchoveta occurs inshore, principally over mudflats[1]. Pacific thread herring is also a coastal pelagic fish, found over soft substrates near the surface in both coastal and offshore waters[2]. Consequently, the fishery operates in coastal areas where the gear could potentially impact the seabed. Interactions with the seabed are monitored and reported by the observer program[3]. As shown in Figure 11, interactions mainly occurred over areas of mud and fine sand, and the impact of the gear on these habitats is expected to be low.

By design, the gear is not intended to come into contact with the seabed and is therefore not considered to significantly impact the marine habitat. Given the extensive body of evidence supporting this conclusion for pelagic purse seine fisheries generally, it is highly unlikely that this fishery differs in this regard.

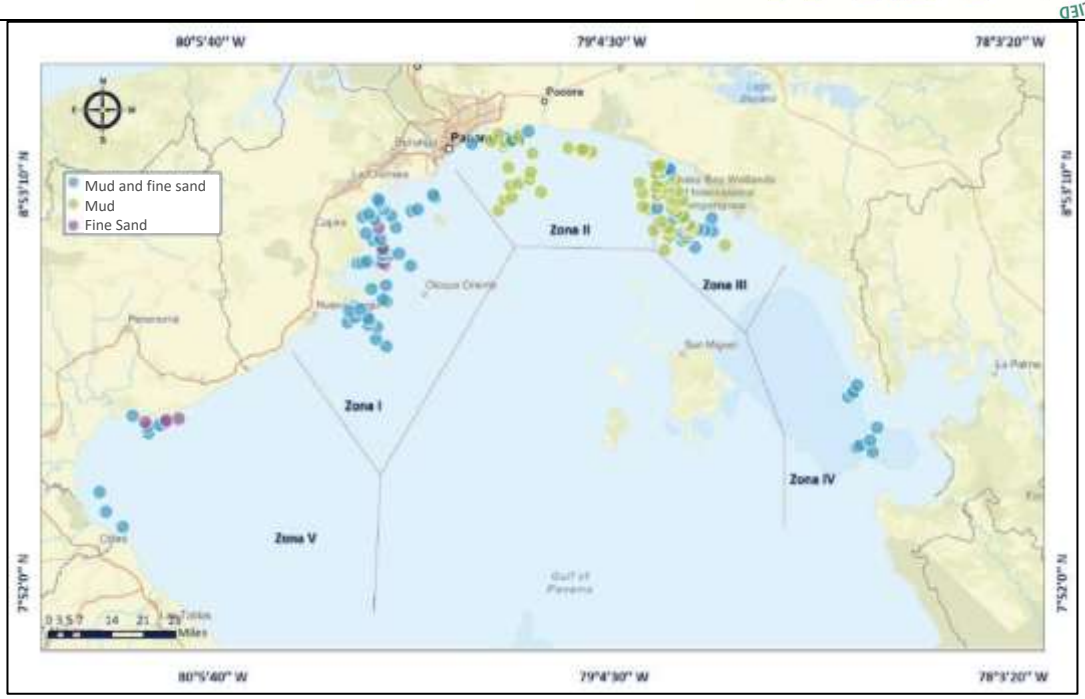

Figure 11. Interactions with the seabed during the 2024 fishing season[3].

Based on the above, the fishery passes Clause E2.1.

References

1. Di Dario, F. (2020). Cetengraulis mysticetus. The IUCN Red List of Threatened Species, 2020, e.T183878A102902497. https://doi.org/10.2305/IUCN.UK.2020-1.RLTS.T183878A102902497
2. Cotto, A., Medina, E., & Bernal, O. (2010). Opisthonema libertate. The IUCN Red List of Threatened Species, 2010, e.T183662A8154151. https://doi.org/10.2305/IUCN.UK.2010-3.RLTS.T183662A8154151.en
3. CeDePesca. (2025). Informe técnico programa privado de observadores a bordo: Pesquería de pequeños pelágicos de Panamá. Temporada 2024 (50 pp.).

E2.2	**E2.2 The fishery has no significant impact on marine habitats.** *In reaching a determination for E2.2, the assessor should consider if the following is in place:*
	E2.2.1 The information collected in relation to E2.1.3 indicates that the fishery does not have a significant negative impact on marine habitats.
Outcome	*Pass*

Rationale

No fundamental changes have occurred since the last re-approval assessment.

Purse seines are designed to catch shoals of pelagic species and are operated in the water column without contacting the seabed. However, as this fishery occurs in coastal areas, purse seines

targeting Pacific anchoveta and Pacific thread herring may occasionally come into contact with the seabed[1]. The fishery mainly operates over mud, where impacts are minimal, and a number of no-take zones have been established to protect vulnerable habitats in the area, such as mangroves[2]. Therefore, the physical impacts of this pelagic fishery are considered insignificant.

Based on the above, the fishery passes Clause E2.2.

References

1. CeDePesca. 2025. INFORME TvâCNICO PROGRAMA PRIVADO DE OBSERVADORES A BORDO. Pesquería de Pequeños Pelágicos de Panamá. Temporada 2024. CeDePesca. 50 pp
2. CeDePesca 2015. Small Pelagic Fishery in Panama, Stock Assessment and Recommendations for a Management Plant.24 pp.

E2.3	**E2.3 There is a habitat management strategy in place for the fishery.** *In reaching a determination for E2.3, the assessor should consider if the following is in place:*	
	E2.3.1	There are measures applied to the fishery which are designed to manage the impact of the fishery on marine habitats.
	E2.3.2	The measures are considered likely to prevent the fishery from having a significant negative impact on marine habitats.
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

A number of no-take zones have been implemented in Panama to protect mangroves and river mouths[1]. The use of VMS on industrial vessels is now mandatory, which has improved compliance with these spatial measures. Furthermore, fishers reportedly avoid using purse seines in areas with hard bottoms to prevent gear damage.

Panama is also the first Latin American country to achieve over 50% ocean protection, with 54.33% of its waters under protection[2,3], exceeding the 30% target for 2030 set out in the United Nations Kunming-Montreal Global Biodiversity Framework[4].

Based on the above, the fishery passes Clause E2.3.

References

1. CeDePesca. (2015). Small pelagic fishery in Panama: Stock assessment and recommendations for a management plan (24 pp.).
2. Parliamentarians for Global Action. (n.d.). Panama strengthens protection of its oceans. https://www.pgaction.org/news/panama-oceans-protection.html
3. Todd, R. (n.d.). Panama and illegal, unreported and unregulated (IUU) fishing.

https://raytodd.blog/wp-content/uploads/2025/11/panama-iuu-fishing.pdf
4. The Nature Conservancy. (n.d.). What is 30x30? https://www.nature.org/en-us/what-we-do/our-priorities/protect-water-and-land/land-and-water-stories/committing-to-30x30/

E3 Impact on the ecosystem

E3.1	**E3.1**	**Information on the potential impacts of the fishery on marine ecosystems is collected.** *In reaching a determination for E3.1, the assessor should consider if the following is in place:*
	E3.1.1	The main elements of the marine ecosystems in the area(s) where the fishery takes place have been identified.
	E3.1.2	The role of the species caught in the fishery within the marine ecosystem is understood, either through research on this specific fishery or inferred from other fisheries.
	E3.1.3	Collection and analysis of ecosystem information is adequate to provide a reliable indication of the impact the fishery has on marine ecosystems.
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

Small pelagic fish population dynamics are strongly influenced by environmental conditions that affect prey availability, natural mortality, growth, recruitment success, and availability to the fishery and predators. In recognition of this, ARAP conducts regular surveys to assess the status of the target species, while fisheries observers collect data on bycatch and monitor the status of species potentially affected by the fishery.

Due to their ecological role, small pelagic fish are a crucial food source for top predators such as large fish, marine mammals, and seabirds[1,2]. In addition to being prey, they also consume significant amounts of phytoplankton and zooplankton, positioning them as important consumers at mid-trophic levels[1,3]. These species form a key link in pelagic food webs by transferring energy from primary producers to higher trophic levels. Their abundance and feeding behaviour allow them to influence both the productivity of organisms below and above them in the trophic chain[4,5]. On average, small pelagic fishes support 22 % of seabird biomass, 15 % of mammal biomass, and 34 % of total fishery catches[6].

Pacific anchoveta occurs inshore, principally over mud flats, and forms large schools. Juveniles feed primarily on diatoms, and also on silico-flagellates, dinoflagellates, and small crustaceans. Adults feed mainly on benthic diatoms and are oviparous, with pelagic larvae. In Panama, this species is

associated with upwelling events in the Gulf of Panama and migrates to shallower waters between February and April[7]. Pacific thread herring is a coastal pelagic fish found over soft substrates near the surface in both coastal and offshore waters. It forms dense schools and feeds on phytoplankton[8]. Small pelagic species play a key role in the general health of marine ecosystems, as they feed on plankton and serve as prey for other fish, birds, reptiles, and marine mammals.

The on-board observer program currently in place collects data on ETP and habitat interactions, which is used to assess the impact of the fishery on these ecosystem components. Evidence shows that the fishery has a low impact on both[9].

The cruises conducted before the opening of the fishing season collect oceanographic and biological data to estimate the biomass and distribution of small pelagic fish through acoustic surveying, sample fishing, and oceanographic studies. In the most recent cruise report, principal component analyses suggested that anchoveta is more dependent on water column characteristics, while thread herring is more responsive to bathymetric factors and proximity to the coast. Furthermore, anchoveta was observed to prefer warmer, saline waters, while thread herring is more sensitive to thermal changes, which could influence its distribution and abundance[10].

The Gulf of Panama seasonal upwelling system is a consistent source of cool, nutrient-rich waters. However, in 2025, this upwelling did not occur, inconsistent with the previous 40 years. The consequences are thought to be significant, and the effects on the fishery and ecosystem more generally will need to be considered in future assessments[11].

Based on the above, the fishery passes Clause E3.1.

References

1. Cury, P., Bakun, A., Crawford, R. J. M., Jarre-Teichmann, A., Quinones, R., Shannon, L. J., & Verheye, H. M. (2000). Small pelagics in upwelling systems: Patterns of interaction and structural changes in 'wasp-waist' ecosystems. ICES Journal of Marine Science, 57, 603–618.
2. Ouled-Cheikh, J., Gimenez, J., Albo Puigserver, M., Navarro, J., & others. (2022). Trophic importance of small pelagic fish to marine predators of the Mediterranean Sea. Marine Ecology Progress Series, 696, 169–184.
3. Smith, A. D. M., Brown, C. J., Bulman, C. M., Fulton, E. A., & others. (2011). Impacts of fishing low-trophic level species on marine ecosystems. Science, 333, 1147–1150.
4. Rice, J. (1995). Food web theory, marine food webs, and what climate change may do to northern marine fish populations. Publications Speciales Canadian Scientific Halieutique et Aquatique, 121, 561–568.
5. Cury, P. M., Boyd, I. L., Bonhommeau, S., Anker-Nilssen, T., & others. (2011). Global seabird response to forage fish depletion — One-third for the birds. Science, 334, 1703–1706.
6. Ruzicka, J., Chiaverano, L., Coll, M., Garrido, S., & others. (2024). The role of small pelagic fish in diverse ecosystems: Knowledge gleaned from food-web models. Marine Ecology Progress Series, 741, 7–27. https://doi.org/10.3354/meps14513
7. Di Dario, F. (2020). Cetengraulis mysticetus. The IUCN Red List of Threatened Species, 2020, e.T183878A102902497. https://doi.org/10.2305/IUCN.UK.2020-1.RLTS.T183878A102902497.en
8. Cotto, A., Medina, E., & Bernal, O. (2010). Opisthonema libertate. The IUCN Red List of Threatened Species, 2010, e.T183662A8154151. https://doi.org/10.2305/IUCN.UK.2010-3.RLTS.T183662A8154151.en

9. CeDePesca. (2025). Informe técnico programa privado de observadores a bordo: Pesquería de pequeños pelágicos de Panamá. Temporada 2024 (50 pp.).
10. Valdez, C., Iriarte, F., Escobar, C., & Fuertes, J. (2024). Evaluación hidroacústica de recursos pelágicos en la Bahía de Panamá a bordo de la E/P Anchovetas II del 15 al 21 de marzo de 2025 (Informe ejecutivo, 45 pp.).
11. O'Dea, A., Sellers, A. J., Pérez-Medina, C., Pardo Díaz, J. E., Guzmán-Bloise, A., Pöhlker, C., … & Haug, G. H. (2025). Unprecedented suppression of Panama's Pacific upwelling in 2025. ResearchGate. https://www.researchgate.net/publication/395209131_Unprecedented_suppression_of_Panama's_Pacific_upwelling_in_2025

E3.2	**E3.2 There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.** *In reaching a determination for E3.2, the assessor should consider if the following is in place:*	
	E3.2.1 The information collected in relation to E3.1.3 indicates that the fishery does not have a significant negative impact on marine ecosystems.	
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

There is no evidence that the fishery has a significant negative impact on the marine ecosystem. Where there is an impact, or the potential for one, Panama implements adequate measures to mitigate it.

In 2005–2006, the Smithsonian Tropical Research Institute (STRI) and the Audubon Society of Panama carried out a survey of marine and wading birds in the Gulf of Panama, estimating the total bird population in the area at more than 50,000 individuals belonging to 20 species, with the pelican being the predominant species. The study indicated that interactions between the small pelagic fishery and seabirds during the nesting and feeding periods were low due to the restricted coastal area of operation of the fishery relative to the birds' feeding season. The study concluded: "there is no evidence in the long run of declining marine or wading birds in the Gulf of Panama", and fishing was not listed among the potential threats[1].

The on-board observer program currently in place collects data on ETP and habitat interactions, which are used to assess the impact of the fishery on these ecosystem components. Evidence shows that the fishery has a low impact on both[2]. Bycatch of other species is also low, not exceeding 2%.

Based on the above, the fishery passes Clause E3.2.

References

1. Angehr, G. R., & Kushlan, J. A. (2007). Seabird and colonial wading bird nesting in the Gulf of Panamá. Waterbirds, 30, 335–357. https://doi.org/10.1675/1524-4695(2007)30[335:SACWBN]2.0.CO;2
2. CeDePesca. (2025). Informe técnico programa privado de observadores a bordo: Pesquería de pequeños pelágicos de Panamá. Temporada 2024 (50 pp.).

E3.3	**E3.3 There is an ecosystem management strategy in place for the fishery.** *In reaching a determination for E3.3, the assessor should consider if the following is in place:*	
	E3.3.1	There are measures applied to the fishery which are designed to manage the impacts of the fishery on marine ecosystems.
	E3.3.2	The measures are considered likely to prevent the fishery from having a significant negative impact on marine ecosystems.
Outcome	*Pass*	

Rationale

No fundamental changes have occurred since the last re-approval assessment.

In March 2021, a new fisheries law, Law No. 204/2021, was approved in Panama. Article 8 of the law lists the main objectives, including the application of the ecosystem approach to the regulation of fishing activities in the country. In 2023, Executive Decree No. 13 regulated Law No. 204/2021 and reinforced the ecosystem approach as one of its guiding principles[1,2]. The decree also established general guidelines for the National Plan for the Conservation and Management of Fisheries and Aquaculture, as well as the National Fisheries and Aquaculture Policy, both of which must follow the ecosystem approach in accordance with Articles 7 and 2, respectively.

The stock assessments of Pacific anchoveta and Pacific thread herring use a precautionary biomass target of 60% of the virgin spawning stock biomass. This target accounts for the key ecological role of these species, as their position in the trophic chain requires a greater biomass escape compared to demersal species[3]. The species' ecological importance is considered when recommending total permissible fishery removals.

The pre-season cruises integrate biological and oceanographic data to inform the design of effective management strategies, ensuring the sustainability and viability of these fisheries[4].

Based on the above, the fishery passes Clause E3.3.

References

1. Autoridad de los Recursos Acuáticos de Panamá. (n.d.). Decreto Ejecutivo Nº 13: Reglamenta la Ley Nº 204 de 2021 que regula la pesca y la acuicultura en la República de Panamá y dicta otras disposiciones. https://www.fao.org/faolex/results/details/en/c/LEX-FAOC223225
2. Autoridad de los Recursos Acuáticos de Panamá. (2021). Ley 204/2021 que regula la

pesca y acuicultura en la República de Panamá y dicta otras disposiciones. https://cedepesca.net/wp-content/uploads/2021/08/Panama-Ley-dePesca-2021.pdf
3. CeDePesca. (2025). Informe técnico programa privado de observadores a bordo: Pesquería de pequeños pelágicos de Panamá. Temporada 2024 (50 pp.).
4. Valdez, C., Iriarte, F., Escobar, C., & Fuertes, J. (2024). Evaluación hidroacústica de recursos pelágicos en la Bahía de Panamá a bordo de la E/P Anchovetas II del 15 al 21 de marzo de 2025 (Informe ejecutivo, 45 pp.).

Annex 1: External Peer Review report

Assessment and determination summary

Fishery name	**Panama – Pacific Anchoveta (Cetengraulis mysticetus) and Pacific Thread Herring (Opisthonema spp.) – FAO 77**
MarinTrust report code	**WF20**
Type 1 species (common name, Latin name)	*Pacific anchoveta (Cetengraulis mysticetus) Pacific thread herring (Opisthonema spp.) (note: it is a complex of at least 3 different species)*
Fishery location	*Area FAO 77, Eastern Central Pacific, Panama (Gulf of Panama)*
Gear type(s)	*Purse seine*
Management authority (country/state)	*Aquatic Resources Authority of Panama (Autoridad de los Recursos Acuáticos de Panamá - ARAP) Panamá*
Certification Body recommendation	*Approved*
FAPRG reviewer recommendation	Agree with CB determination

Summary of peer review outcomes

Summary *Provide any information about the fishery that the reviewers feel is significant to their decision. This summary is used by the Certification Body in the Fishery Assessment Report.*
The surveillance report is very well writen and evidenced throughout. The assessment of the Panamanian Pacific anchoveta and Pacific thread herring purse seine fishery confirms that both target stocks are sustainably managed and meet all MarinTrust requirements, with anchoveta meeting Category A requirements and thread herring passing under Category B. Minor bycatch species, each representing less than 5% of the catch, were mostly appropriately assessed under Category D, and ecosystem impacts—including interactions with ETP species and habitats—were found to be low. Management measures, stock assessments, and monitoring frameworks were judged robust and effective. Based on the evidence presented, the peer reviewer agrees with the assessment's conclusions and supports the continued approval of this fishery.
General comments on the draft report provided to the peer reviewer
None

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

1. Has the fishery assessment been fully completed, using the recognised MarinTrust fishery assessment methodology and associated guidance?	Yes
2. Does the Species Categorisation section of the report reflect the best current understanding of the catch composition of the fishery?	See notes
3. Are the scores in the following sections consistent with the MarinTrust requirements (i.e. do the scores reflect the evidence provided)?	Yes
Section M – Management Requirements	Yes
Category A Species	Yes
Category B Species	Yes
Category C Species	See notes
Category D Species	Yes
Section E – Ecosystem Impacts	See notes

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. Has the fishery assessment been fully completed, using the recognised MarinTrust fishery assessment methodology and associated guidance?	Yes
Generally the report is written with the MT guidance in mind and is very detailed, where herring failed Cat A it subsequently was scored against Cat B and passes these requirements. The catch catergorisation looks appropriate however the auditor should check the catergorisation of Pacific Bumper. The remaining scoring justifications are clear and well evidenced, there are only a few points of minor clarification.	
Certification Body response	
All comments addressed in the report	

2. Does the species categorisation section of the report reflect the best current understanding of the catch composition of the fishery?	Yes
Catch catergorisation looks appropriate and is based on up-to-date catch data however; M1.1 the text says there are management measures in place for Pacific bumper; so	

shouldn't it be scored as a cat C species?
Certification Body response
Pacific bumper is managed by ARAP under the 2018 management plan for the small pelagic fishery in Panama, which also includes Pacific anchoveta and Pacific thread herring (ADM/ARAP No. 027 of 2018)13. However, no reference points have been established and no stock assessments have been conducted; therefore, a robust management regime cannot be considered to be in place. Accordingly, although Pacific bumper is included within the management plan, it is most appropriately assessed as a Category D species.

3. Is the scoring of the fishery consistent with the MarinTrust requirements, and clearly based on the evidence presented in the assessment report?	Yes
The scoring is consistent with the MT requirements and well evidenced throughout, links are up-to-date and working.	
Certification Body response	

3a. Are the “Category A Species” scores clearly justified?	Yes
Yes, Cat A species (and subsequent scoring of thread herring under Cat B) is well evidenced. Both Pacific anchoveta and Pacific thread herring were evaluated using the latest 2024 stock assessment and 2025 hydroacoustic survey, supported by established management plans and documented fishery closures. Pacific anchoveta qualified as a Category A species, with biomass consistently above BMSY and fishing mortality far below FMSY, indicating no risk of overfishing despite a recent biomass decline linked to weakened upwelling. Pacific thread herring initially did not meet Clause A3.2 due to past fishing mortality exceeding FMSY, but when reassessed under Category B, it met all requirements: biomass remained above target levels and current fishing mortality was below FMSY. Together, these results justify the scoring outcomes for both species.	
Certification Body response	

3b. Are the “Category B Species” scores clearly justified?	Yes
See above.	
Certification Body response	

3c. Are the “Category C Species” scores clearly justified?	No
As above: M1.1 the text says there are management measures in place for Pacific bumper; so shouldn't it be scored as a cat C species?	
Certification Body response	
Pacific bumper is managed by ARAP under the 2018 management plan for the small pelagic fishery in Panama, which also includes Pacific anchoveta and Pacific thread herring (ADM/ARAP No. 027 of 2018)13. However, no reference points have been established and no stock assessments have been conducted; therefore, a robust management regime cannot be considered to be in place. Accordingly, although Pacific bumper is included within the management plan, it is most appropriately assessed as a Category D species.	

3d. Are the “Category D Species” scores clearly justified?	Yes
Pacific bumper, Peruvian mojarra, Mexican barracuda, Pacific harvestfish, Hairfin lookdown, Panama longfin herring, and White mullet species are assessed as Category D and meet the requirements for a Productivity-Susceptibility Analysis (PSA). THe tables seem accurate and references provided with working links.	
Certification Body response	

Are the scores in “Section M – Management Requirements” clearly justified?	Yes
The management scoring justifications are expetionally written and well evidenced - no comments.	
Certification Body response	

Are the scores in “Section E – Ecosystem Impacts” clearly justified?	Yes
There are only a few points of clarification to strenghten the scoring rationales and to ensure low-impact as suggested: E1.1 I think this information is generic to all industrial fisheries? If so, how do they ensure adequate sampling of different fishing operations and that this fishery is adequately covered within the 20% observer target. Is that table 5? E1.2 for the critically endangered shark species; point to other fisheries is not evidence of no impact. Auditor could reference species populations levels, survival rates, and release rates (as done for scallops hammered in the next SI). This can be set in the context of total removals but even 4 individuals could make a big difference.	

Figure 9 and 10 can we have the common names in the figures? Common names are used in the scoring rationale, or put their Latin names after so you can match up with information in the figures. E2.1 are their available habitat maps to overlay occurrences of interaction with the seabed?
Certification Body response

Optional: General peer reviewer comments on the draft report
Certification Body response
All comments from the Peer reviewer has been addressed