

Mauritania small pelagics fishery

MarinTrust whole fish assessment

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Version 2 with pirogue seiners included, March 2025

Version 3 with additional species composition information from 2023 and 2024 incorporated, August 2025

1. Scope

Management Authority	Ministry of Fisheries and the Marine Economy (MPEM)
Main species	sardine (<i>Sardina pilchardus</i>), sardinella (<i>Sardinella maderensis</i>)
Fishery Location	Mauritanian EEZ
Gear type	seine
Fleet	coastal and pirogue seiners

2. Summary / Résumé

Version française ci-dessous

Overall outcome		GAP
Clauses failed		Reason for fail
M1.5.2	Decision-making is transparent and results are publically available	Prior to PAP-PP the basis for decision making was not always transparent – need evidence of PAP-PP being applied
M2.1.2	MCS is able to minimise IUU fishing activity	Concern around compliance of vessels and factories with species composition and quality on board requirements, for example
M2.2.2	No evidence of systematic non-compliance	
M2.3.1	Level of compliance is documented and available	Assessor unclear if this is done
M2.3.2	Fishery provides information and cooperates with management agencies	Concerns around completeness of logbook data, and cooperation of factories with IMROP enumerators
M2.3.3	Clear traceability from vessels to factories	Assessor unclear about system
A3.1	Mechanism to restrict total mortality for each stock	Requires implementation of PAP-PP, and regional cooperation
A3.2	Total removals do not exceed scientific advice	
A3.3	Commercial removals prohibited when biomass is below limit	No such system at present – current limit reference points not suitable for this type of management
A4.1	Stock is at or above the target level	Status of some of the stocks
B	Risk assessment for mullet	No information on stock status at present
E1.1.2	ETP interactions are recorded and reported	Unclear if this is part of logbook or other reporting

E1.1.3	Data provide reliable information about ETP impacts	Observer data may be sufficient but needs analysis
E3.1.3	Data provide reliable information about ecosystem impacts	Research on predator food requirements to be completed
E3.2.1	No negative impact of the fishery on the ecosystem	
E3.3.2	Management measures avoid any ecosystem impact	Awaiting results of predator analysis to evaluate

Résultat		LACUNE
Clauses échoués		Raison de l'échec
M1.5.2	La prise de décision est transparente et les résultats sont accessibles au public	Avant le PAP-PP, la base de prise de décision n'était pas toujours transparente – il faut des preuves de l'application du PAP-PP.
M2.1.2	Le système de SCS est capable de minimiser l'activité de pêche INN	Préoccupation concernant la conformité des navires et des usines aux exigences en matière de composition des espèces et de qualité à bord, par exemple
M2.2.2	Aucune preuve de non-conformité systématique avec les règles de gestion	
M2.3.1	Le niveau de conformité est documenté et disponible	Aucune information
M2.3.2	La pêcherie fournit des informations et coopère avec les agences de gestion	Concernes autour de complétion systématique des journaux de bord, et coopération des usines avec les enquêteurs de l'IMROP
M2.3.3	Traçabilité claire des navires aux usines	Manque d'information sur le système actuel
A3.1	Mécanisme pour limiter la mortalité totale pour chaque stock	Nécessite la mise en œuvre du PAP-PP, et une coopération régionale
A3.2	Le total des prélèvements ne dépasse pas les avis scientifiques	
A3.3	Prélèvements commerciaux interdits lorsque la biomasse est inférieure à la limite	Pas de système de ce type à l'heure actuelle – les référentiels limites actuels ne conviennent pas à ce type de gestion
A4.1	Le stock est égal ou supérieur au point de référence cible	Etat des certains stocks
B	Analyse de risque pour les mulets	Manque d'information sur l'état du stock
E1.1.2	Les interactions ETP sont enregistrées et signalées	Manque d'information sur l'inclusion dans le journal de bord
E1.1.3	Les données fournissent des informations fiables sur les impacts de l'ETP	Les données des observateurs peuvent être suffisantes mais nécessitent une analyse
E3.1.3	Les données fournissent des informations fiables sur les impacts sur les écosystèmes	
E3.2.1	Aucun impact négatif de la pêche sur l'écosystème	Recherche sur les besoins alimentaires des prédateurs à terminer
E3.3.2	Les mesures de gestion évitent tout impact sur l'écosystème	
		En attente des résultats de l'analyse des prédateurs pour évaluer

3. Species composition of fishery

The species composition of the landings by the fishery under assessment is sampled by IMROP at the fishmeal factories. The results of this sampling is given in the table below for 2023. Note that because of the position of Mauritania in relation to different, shifting oceanographic currents and fronts, it is normal and expected that the species composition of the fishery should change by season and from year to year.

The situation in 2023 was somewhat different from previous years for various reasons: i) many of the coastal vessels were inactive for much of the year, so the proportion of small pelagic landings from the pirogues was much higher than previously; ii) the proportion of landings going to fishmeal has decreased, since all active factories now have freezer plants, which take priority over fishmeal for most species (e.g. round sardinella may not be landed to fishmeal, but both fleets can land for human consumption). It is important to note that the landings data given below include small pelagics landing both to fishmeal and to human consumption. Since a large (and increasing) proportion of the raw material for fishmeal comes from offcuts and rejects from other processing, it is reasonable to assume that this also reflects the species composition of the fishmeal.

Species		landings 2023 (t)		% landings 2023	
		Pirogues	Coastal	Pirogues	Coastal
Sardine	<i>Sardina pilchardus</i>	34931	18021	25.7	64.2
Sardinella flat	<i>Sardinella maderensis</i>	62381	2164	46.0	7.7
Sardinella round	<i>Sardinella aurita</i>	22966	5565	16.9	19.8
Horse mackerel	<i>Trachurus</i> spp.	5940	1137	4.4	4.1
Anchovy	<i>Engraulis encrasicolus</i>		653		2.3
Mackerel	<i>Scomber colias</i>	724	142	0.53	0.50
Bonga shad (obo)	<i>Ethmalosa fimbriata</i>	8754		6.5	
Other			392		1.4
Total		135697	28075		

Update August 2025: Further sampling data from the factories collected by the FIP in 2023 and 2024 showed a much higher proportion of byproducts (déchets) as raw material for fishmeal than in previous years. Initial analysis of the composition of the déchets for 2023 and 2024 suggests that it was largely made up of mackerel, horse mackerel and mullet (processing waste and offcuts, landings unfit for consumption) (Jeyid 2025). Horse mackerel and mackerel are already included in the analyses below, but mullet needs to be added; hence this update.

4. Species categorisation

The species categories has not changed from version 2 to version 3; i.e. Type 1 species are ‘target’ species and should make up a minimum of 95% of fishery; Type 2 species are non-target. Category A species are Type 1 species with a species-specific management regime, while Category B species are Type 1 species without; Categories C and D are the same for Type 2 species.

The small pelagic stocks have individual stock assessments, so they can be assessed under the requirements for Category A species. Only sardine and flat sardinella are ‘target species’ for fishmeal in the sense that the other species may only enter the fishmeal supply chain if unfit for human consumption. However, all the species which make up >5% of the total annual catch are treated as Type 1. This includes horse mackerel and mackerel, which are <5% in 2023 but were >5% in 2020 and 2021 (mackerel) and 2022 (horse mackerel), and bonga shad (also called obo or ethmalose) because

it makes up a proportion of the catch of the pirogues. (It is a highly coastal species so not present in the zone which is permitted to the larger vessels.) This version also adds mullet, which is a significant element of 'déchets' which together made up >50% of fishmeal raw material in 2024 (Jeyid 2025).

Species categorisation table:

Species		MT category
Sardine (stock C)	<i>Sardina pilchardus</i>	Type 1, Category A
Flat sardinella	<i>Sardinella maderensis</i>	Type 1, Category A
Round sardinella	<i>Sardinella aurita</i>	Type 1, Category A
Mackerel	<i>Scomber colias</i>	Type 1, Category A
European horse mackerel	<i>Trachurus trachurus</i>	Type 1, Category A
Cunene horse mackerel	<i>Trachurus trecae</i>	Type 1, Category A
Bonga shad	<i>Ethmalosa fimbriata</i>	Type 1, Category A
Mullet	<i>Mugil cephalus</i>	Type 1, Category B

As well as these species, there are also some bycatch species present in small quantities, which are noted by the IMROP enumerators who visit the factories for detailed sampling of species composition and size-frequency. The report of this sampling for 2023 and early 2024 (Braham et al. 2024b) mentions the species below. None of these have a stock assessment or management regime so are taken as Type 2, Category D species.

- false scad (*Caranx rhonchus*)
- Atlantic bumper (*Chloroscombrus chrysurus*)
- hairtail (*Trichiurus lepturus*)
- anchovy (*Engraulis encrasicolus*)

5. Assessment

M1. Management Framework

M1.1 There is an organisation responsible for managing the fishery		
M1.1.1	The management and administration organisations within the fishery are clearly identified	Pass
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	Pass
M1.1.3	Fishers have access to information and/or training materials through nationally-recognised organisations	Pass
M1.1.1. Management of fisheries is the responsibility of the Ministry of Fisheries and the Marine Economy (MPEM). Scientific advice is provided by IMROP. Enforcement is the responsibility of the Coast Guard (GCM). Health and sanitary management is the role of ONISPA. M1.1.2. Regulation and administration – MPEM; science and data collection – IMROP; enforcement – GCM. These roles are set out on the MPEM website under the various headings: https://www.peches.gov.mr/index.php?lang=fr. The roles of the various organisations are also clear in the sector strategy (2020-24) (MPEM 2020).		

M1.1.3. The Federation Nationale de la Pêche (FNP) represents all the components of the sector (other than licensed foreign vessels). Their role is to communicate with the sector, as well as to represent it in government consultations and projects.

M1.2 Fishery management organisations are legally empowered to take management actions		
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	Pass
M1.2.2	Vessels wishing to participate in the fishery must be authorised by the management organisation(s)	Pass
M1.2.3	The management system has a mechanism in place for the resolution of legal disputes	Pass
M1.2.4	There is evidence of the legal rights of people dependent on fishing for food or livelihood	Pass
M1.2.1. The legal framework is set out in law n° 2015-017 – the Code des Pêches Maritimes, plus the décret 2015-159 which applies it. This allows (requires) MPEM to agree policies and management plans, and apply decrets, regulations and circulaires for management of specific fisheries. Legal texts are available on the MPEM website: https://www.peches.gov.mr/?-textes-juridiques-. M1.2.2. The coastal fishery is managed via concessions. For a vessel to participate in the PC small pelagic fishery, it might have signed a concession with MPEM, giving access to the resource in the form of an individual quota (see fisheries management plan (PAP-PP) (MPEM 2022) p.34; Code de la Pêche, Titre II). Artisanal vessels (including the pirogues seiners) must be registered and licensed. Vessels of Senegalese origin may operate in Mauritania under the terms of a fishing agreement, but these vessels must also be licensed. M1.2.3. The Code de la Pêche is detailed in terms of what should be considered a legal infraction and how they are to be dealt with. There is a system of zoning for different fleets and fleet segments which aims to ensure access for the artisanal fishery to inshore resources and avoid inter-fleet conflicts (arrêté 1162/2022). On this basis, we can say that the management system has mechanisms which should avoid legal disputes. M1.2.4. The Code de la Pêche specifies that social and economic issues, and food security, should be taken into account in the allocation of user rights (Article 25). The objective of the zoning system is to ensure sole access for the artisanal fleet to inshore waters. The concession system aims to ensure the fair distribution of each main resource across fleets. There has been a push by MPEM in recent years to ensure a transition from fishmeal to fresh or frozen landings for human consumption, with the aim of ensuring access to fish for the population (e.g. circulaires 15/2022, 26/2022, 1077/2021).		

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

M1.3.1. IMROP is clearly identified as the organisation responsible for scientific data collection and fishery assessment.

M1.3.2. IMROP should provide formal scientific advice to MPEM annually. In addition, IMROP's publications are available on their website (<https://www.imrop.mr/document/>), including the most recent sardinella stock assessment. CECAF scientific reports are also available (<https://www.fao.org/cecaf/publications/ar/>).

M1.3.3. Although IMROP is an organisation which comes under the purview of MPEM, it operates independently. Scientific advice on the small pelagic stocks from CECAF working groups and Scientific Committee is also an independent process, with the participation of IMROP scientists and those representing the other countries in the region.

M1.4 The fishery management system is based on the principles of sustainable fishing and a precautionary approach

M1.4.1	In reaching a determination for M1.4, the assessor should consider if the following is in place: 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	Pass
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The precautionary approach is enshrined in Code de la Pêche (Section 7). There is an overarching fisheries policy (2020-2024) (MPEM 2020) and a management plan for the small pelagic fishery specifically (PAP-PP; MPEM 2022). These set clear management objectives: e.g. from the PAP-PP for the small pelagic fishery (p.15):

- Sustainable exploitation to maintain good stock status
- Maximum economic benefit from the fishery
- Job creation, particularly for those dependent on fisheries
- Contribution of the fishery to food security

M1.5 There is a clearly defined decision-making process which is transparent, with processes and results made publicly available

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	Pass
M1.5.2	The decision-making process is transparent, with results made publicly available	GAP
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	Pass

M1.5.1. The CCNADP (Conseil Consultatif National pour l'Aménagement et Développement des Pêcheries) has a formal consultative role (Code de la Pêche, Section 2). It is not clear that it is consistently active, but met in January 2024 (<https://www.peches.gov.mr/?pv-ccnadb>). There is also a system of more information, individual consultations with the industry on pressing issues (e.g. with the fishmeal factories, 28 April 2023 on quotas and other regulations and some other issues). The FNP represents the fishing industry interests to the administration.

M1.5.2. Despite the above, it is not always the case that decision-making is transparent, although the results of decisions (e.g. Ministry circulaires, regulations etc.) are publically available on the MPEM website, and transmitted to the industry. The direction of regulation change can

sometimes depend on political considerations as much as scientific and industry input – no doubt Mauritania is not alone in this.

M1.5.3. Various elements of the management system are subject to review, e.g. the previous policy (2015-19) was reviewed at the end of its operation period (Poseidon 2019), and the development of the current policy (2020-24) preceded by several thematic reviews into fisheries governance (e.g. Cherif et al. 2019). The PAP-PP includes an overview and critique of the current small pelagic management framework. IMROP holds a 'Groupe de Travail' every four years (most recently the 10th GT in Feb. 2023) when external experts are invited to review data and stock assessments (see <https://www.imrop.mr/cycle-des-conferences-du-groupe-de-travail-de-limrop/>). This seems to cover the requirements.

M2. Surveillance, Control and Enforcement

M2.1 There is an organisation responsible for monitoring compliance with fishery laws and regulations		
M2.1.1	There is an organisation responsible for monitoring compliance with specific monitoring, control and surveillance (MCS) mechanisms in place	Pass
M2.1.2	There are relevant tools or mechanisms used to minimise IUU fishing activity	GAP
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	GAP
M2.1.1. The Coast Guard (Garde Côte Mauritanien, GCM) is responsible for fisheries surveillance and monitoring compliance. M2.1.2 and M2.1.3. The GCM has a range of tools at its disposal, including patrol vessels, inspectors at landing sites and VMS. The extent to which these work to reduce IUU fishing activity to an absolute minimum, however, is a bit unclear. The coastal fleet is required to have VMS, submit logbooks in paper or electronic format and land to designated ports to facilitate inspection. There are, however, concerns around the enforcement of some elements of the regulations: for example, the respect of quota allocations to fishmeal factories; the requirement for vessels to handle fish appropriately to ensure it can be fit for human consumption; the ban on targeting some small pelagic species for fishmeal; the ban on catch of courbine, mullet and other demersal species by the coastal seiners; the requirement for 20% of landings to enter the frozen fish supply chain (e.g. arrêtés 643/2021, 1128/2021, 465/2022, circulaire 15 of 15 July 2022). It is currently not totally clear how and whether these regulations are enforced at all times. We are also lacking information on enforcement for the pirogue fleet at present.		

M2.2 There is a framework of sanctions which are applied when infringements against laws and regulations are discovered		
M2.2.1	The laws and regulations provide for penalties or sanctions that are adequate in severity to act as an effective deterrent	Pass
M2.2.2	There is no evidence of systematic non-compliance	GAP
M2.2.1. Sanctions are set out in the Code de la Pêche and for severe infractions can include large fines and/or confiscation of catch, gear or (in extreme cases) the vessel. 'Severe infractions' include among other things operation in a fishery or with gear other than that for which it has a concession, entering closed areas, exceeding quotas, falsifying or failing to provide data and failing to cooperate with control officers. If fully applied one would imagine they would have a strong deterrent effect.		

M2.2.2. As noted above, there is concern that there may be systematic non-compliance with some elements of the regulations around the fishmeal fishery, although there is not firm evidence either way. In the last 3 years or so, the regulation has tended to change abruptly and without warning, which has not helped enforcement and compliance. However, with the PAP-PP in place, management seems to have become more consistent, which it is hoped will help.

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

M2.3.1	The level of compliance is documented and updated routinely, statistically reviewed and available	GAP
M2.3.2	Fishers provide additional information and cooperate with management/enforcement agencies/organisations to support the effective management of the fishery	GAP
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	GAP

M2.3.1. As far as I know, this is not done.

M2.3.2. For the coastal fleet, logbook data is provided by fishers to the GCM and passed on to IMROP. It has recently been evaluated by IMROP and found not to be particularly useful for management, being approximate and not necessarily fully identified to species. IMROP uses total catch estimates from landings (from the Coast Guard) plus species composition data obtained from sampling at landings sites (the industrial and artisanal ports) and at the fishmeal factories. Some but not all of the factories are fully cooperative with IMROP enumerators.

M2.3.3. This is a requirement (e.g. arrêté 465/2022) but unclear if it is always the case in practice.

Species requirements: Category A species

Category A species are sardine, flat sardinella, round sardinella, mackerel, horse mackerel (two species) and bonga shad.

A1. Data collection (Category A species)

A1.1	Landings data are collected such that the fishery-wide removals of this species are known	Pass
A1.2	Sufficient additional information is collected to enable an indication of stock status to be estimated	Pass

A1.1. The coastal vessels are required to complete logbooks, which can be either paper or electronic (the transition to electronic logbooks is not yet complete). These data are provided to IMROP and entered in a database, but are not considered reliable enough for stock assessment. The Coast Guard collect data on total landings at each designated landing port, where IMROP also has enumerators (including in the artisanal port). IMROP enumerators also sample the fish arriving at the factories, for species composition as well as biological data. These data are sufficient to estimate total removals by fleet and by species (see IMROP 2023 - statistical bulletin for 2023).

A1.2. Each of these species has a stock assessment conducted by the CECAF small pelagics north working group every year, as well as by IMROP. These take into account the migratory nature of these stocks, incorporating data from other countries in the region, according to the stock distribution. The results of the most recent stock assessments can be found in CECAF (2023) and

for the sardinella species in Braham et al. (2024). Summary results for CECAF 2024 are also now available and have been added, including for the bonga shad.

A2. Stock assessment		
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	Pass
A2.2	The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy	Pass
A2.3	The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status	Pass
A2.4	The assessment is subject to internal or external peer review	Pass
A2.5	The assessment is made publicly available	Pass
A2.1. An assessment of all these stocks is conducted annually by the CECAF working group (CECAF 2023). These take into account all the available information, including removals from all the countries in the region, as well as biological data. The availability of different types of data determine the type of assessment conducted. A2.2. CECAF uses $B_{0.1}$ and $F_{0.1}$ as its main reference points; generally considered an appropriate target where MSY reference points are not suitable or cannot easily be estimated (as here). The 2023 CECAF working group was not able to estimate stock status in relation to reference points for the sardinella species, but further work by the same team, presented in Braham et al. (2024) applied two models to estimate stock status in relation to B_{msy} and F_{msy} for both these stocks. A2.3. CECAF categorise each stock as either i) not fully exploited, ii) fully exploited or iii) overexploited; i.e. either recent removals (estimated as the average over the last 5 years) i) can be cautiously increased, ii) should not be increased, or iii) should be reduced. A2.4. The CECAF working group consists of scientists from across the region, and assessments are presented and then commented and worked on together, providing internal peer review. The CECAF Scientific Sub-Committee also reviews each working group report (e.g. CECAF 2022). The sardinella assessments in Braham et al. (2024) were published in a peer-reviewed journal. A2.5. CECAF publications are available on the FAO website, albeit sometimes with a long delay (https://www.fao.org/cecaf/publications/ar/). Braham et al. (2024) is available on the IMROP website (https://www.imrop.mr/document/) or by request to the authors.		

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

A3.1. Mauritania has mechanisms which limit total removals of small pelagics, including the concession system, limits on the number of fishmeal factories (currently a freeze on new factories), catch / processing limits, a ban on targeting round sardinella and some other species for fishmeal and zoning to restrict fishing areas for the seiners. These all work to prevent uncontrolled exploitation, and have worked to reduce the exploitation rate on, for example, round sardinella. For the stocks shared with Morocco (sardine, most importantly), similar mechanisms are in place, and these have worked to maintain the shared sardine stock (stock C) in good condition for a good decade. For the stocks shared with countries to the south, however, in particular the sardinella stocks, the lack of control mechanisms in these countries makes it difficult to restrict total fishing mortality.

A3.2. In the CECAF report we can compare removals across the whole subregion in the most recent year (2022) to the average of the last five years, to evaluate recent trends. The sardine stock is considered by CECAF to be underexploited. The two sardinella stocks are considered overexploited (also by Braham et al. 2024 on balance of probability). The catch data show that while catch of round sardinella has reduced across the region (2022 catch only one third of the recent annual average), catch of flat sardinella has not. The two horse mackerel stocks and the mackerel stock are estimated to have a biomass roughly at the target level ($B_{0.1}$) with fishing mortality lower and recent catch levels appropriate. So this requirement is scored as a gap in relation to flat sardinella specifically.

A3.3. There is no policy or mechanism at present for prohibiting commercial fishery removals.

A4. Stock status

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	GAP
CECAF 2023 / Braham et al. 2024 (stock status in 2022): Sardine stock C: $B_{2022}/B_{0.1}$ estimated at 1.4 and $F/F_{0.1}$ at 0.47 - Pass Sardinella aurita: B_{2022}/B_{msy} estimated at 0.1 and F/F_{msy} at 2.5 (JABBA) – GAP S. maderensis: B_{2022}/B_{msy} estimated at 0.25 and F/F_{msy} at 11 (JABBA) – GAP Mackerel: $B_{2022}/B_{0.1}$ estimated at 1.15 (Biodyn) or 0.98 (XSA) and $F/F_{0.1}$ at 0.92 (Biodyn) or 0.85 (XSA) - Pass Trachurus trachurus: $B_{2022}/B_{0.1}$ estimated at 1.0 and $F/F_{0.1}$ at 0.55 - Pass T. trecae: $B_{2022}/B_{0.1}$ estimated at 1.1 and $F/F_{0.1}$ at 0.52 – Pass CECAF 2024 (stock status in 2023): Sardine stock C: $B_{2023}/B_{0.1}$ estimated at 0.71 and $F/F_{0.1}$ at 0.98 – GAP (borderline? fishing mortality remains appropriate) Sardinella aurita: B_{2023}/B_{msy} estimated at 0.21 (JABBA) or 0.14 (SPiCT) and F/F_{msy} at 2.0 (JABBA) or 1.57 (SPiCT) – GAP S. maderensis: B_{2023}/B_{msy} estimated at 0.32 (JABBA) or 0.41 (SPiCT) and F/F_{msy} at 3.73 (JABBA) or 2.26 (SPiCT) – GAP Mackerel: $B_{2023}/B_{0.1}$ estimated at 1.05 (Biodyn) or 1.09 (XSA) and $F/F_{0.1}$ at 0.93 (Biodyn), 0.89 (XSA) or 1.03 (LCA) - Pass Trachurus trachurus: $B_{2023}/B_{0.1}$ estimated at 1.47 and $F/F_{0.1}$ at 0.97 - Pass T. trecae: $B_{2023}/B_{0.1}$ estimated at 1.17 and $F/F_{0.1}$ at 0.46 – Pass		

Bonga shad: : B_{2023}/B_{msy} estimated at 0.37 (JABBA) or 0.07 (LBB) and F/F_{msy} at 2.55 (JABBA) - GAP

Species requirements: Category B species

In this assessment, mullet (*Mugil cephalus*) is a Category B species.

Where reference points are not available, the table below is used as a risk analysis for the stock. Currently, the assessor has no information on the biomass of mullet, so the stock scores as a FAIL. If it turns out that information is available, this analysis will be updated.

$B > B_{av}$ and $F < F_{av}$	Pass	Pass	Pass	Fail
$B > B_{av}$ and F or F_{av} unknown	Pass	Pass	Fail	Fail
$B = B_{av}$ and $F < F_{av}$	Pass	Pass	Fail	Fail
$B = B_{av}$ and F or F_{av} unknown	Pass	Fail	Fail	Fail
$B > B_{av}$ and $F > F_{av}$	Pass	Fail	Fail	Fail
$B < B_{av}$	Fail	Fail	Fail	Fail
B unknown	Fail	Fail	Fail	Fail
Resilience	High	Medium	Low	Very Low

Species requirements: Category D species

Category D species are:

- false scad (*Caranx rhonchus*)
- Atlantic bumper (*Chloroscombrus chrysurus*)
- hairtail (*Trichiurus lepturus*)
- anchovy (*Engraulis encrasicolus*)

Only minor changes have been made to the analysis for Category D species between the MarinTrust standard versions 2.2 and 3. The analysis is via a risk assessment based on the productivity of the species and its susceptibility to the fishery, as per the tables below. The conclusion is that the risk to these species is low.

Species name	<i>Caranx rhonchus</i>		
Productivity			
Attribute	Rationale		Score
Average age at maturity	Maturity reached on average in the second year of life, i.e. between 1 and 2 years (Overko 1979)		1

Average maximum age	Sampling in the Eastern Central Atlantic (this region) gives an estimate of at least five years (Overko 1979); probably less than 10 but assume 10-25 to be precautionary	2
Fecundity	0.5-1 million eggs depending on the size of the female (Overko 1979)	1
Average maximum size	Up to 60 cm is possible (Smith-Vaniz et al. 2015a)	1
Average size at maturity	12-18 cm (1-2 years) (Overko 1979), but for Mauritania Smith-Vaniz et al. (2015a) estimate 23 cm	1
Reproductive strategy	Broadcast spawner	1
Trophic level	Predator – 3.6 according to FishBase	3
Productivity score		1.43
Susceptibility		
Attribute	Rationale	Score
Areal Overlap	Present along the whole African Atlantic coast from Morocco to Angola, also the Mediterranean. Considered widespread and common in the region and throughout its range (Smith-Vaniz et al. 2015a).	1
Encounter-ability	Can be benthic or pelagic and schooling, generally in shallower water (30-50m)	2
Selectivity of gear type	Non-selective gear type	3
Post capture mortality	Unclear; a school encircled by mistake might be released but there is no information on the mortality associated with this	3
Susceptibility score		2.25
PSA risk rating		Pass

Species name	<i>Chloroscombrus chrysurus</i>	
Productivity		
Attribute	Rationale	Score
Average age at maturity	Estimated by de Queiroz et al. (2018) at about 3 years	1
Average maximum age	Estimated by de Queiroz et al. (2018) at about 9 years; scoring medium risk by precaution as this estimate is uncertain and from the western Atlantic	2

Fecundity	Unclear but where present larvae are highly abundant (e.g. >80% of carangid larvae in the Gulf of Mexico are this species), suggesting highly fecund (Smith-Vaniz et al. 2015b)	1
Average maximum size	30 cm (Smith-Vaniz et al. 2015b)	1
Average size at maturity	10-15 cm (FishBase)	1
Reproductive strategy	Broadcast spawners	1
Trophic level	3.5 according to FishBase	3
Productivity score		2.25
Susceptibility		
Attribute	Rationale	Score
Areal Overlap	Present along the whole African Atlantic coast from Mauritania to Angola, plus Cape Verde, possibly also Morocco and Spain, also in the Western Atlantic and Caribbean from the USA to Uruguay. In Eastern Central Atlantic considered common and locally abundant (Smith-Vaniz et al. 2015b). Inhabits shallow water, including estuaries and mangroves (Banc d'Arguin closed area likely main habitat in Mauritania), so overlap with fishery likely to be limited.	1
Encounter-ability	School close to surface	3
Selectivity of gear type	Non-selective gear type	3
Post capture mortality	Unclear; a school encircled by mistake might be released but there is no information on the mortality associated with this	3
Susceptibility score		2.5
PSA risk rating		Pass

Species name	<i>Trichiurus lepturus</i>	
Productivity		
Attribute	Rationale	Score
Average age at maturity	Estimated at ~2 years (Collette et al. 2015)	1

Average maximum age	Estimated in Australia at 8 years (Clain et al. 2023)	1
Fecundity	4,000 - 150,000 eggs per spawn depending on female size (Collette et al. 2015)	1
Average maximum size	This is a long, narrow fish, which can get up to more than 2m long (Collette et al. 2015, FishBase), although up to a metre is more common (IUCN).	2
Average size at maturity	60-70 cm (Collette et al. 2015), or up to a metre according to FishBase	2
Reproductive strategy	Broadcast spawner	1
Trophic level	4.4 (FishBase)	3
Productivity score		1.57
Susceptibility		
Attribute	Rationale	Score
Areal Overlap	Global distribution but presumably a number of different populations. In the eastern Atlantic from the southern UK all the way to South Africa, in coastal waters. It is considered common and locally abundant throughout its range.	1
Encounter-ability	Non-schooling species, present close to the bottom or in the water column, particularly at thermal fronts where small pelagics may also congregate.	2
Selectivity of gear type	Non-selective gear type	3
Post capture mortality	Unclear	3
Susceptibility score		2.25
PSA risk rating		Pass

Species name	<i>Engraulis encrasicolus</i>	
Productivity		
Attribute	Rationale	Score
Average age at maturity	~1 year (CECAF 2021)	1

Average maximum age	3 years (CECAF 2021)	1
Fecundity	7,000 – 21,000 depending on female size (El Qendouci et al. 2020)	1
Average maximum size	17 cm estimated by CECAF from sampling in Morocco (CECAF 2021)	1
Average size at maturity	10-11 cm estimated from Morocco (El Qendouci et al. 2020)	1
Reproductive strategy	Broadcast spawners	1
Trophic level	3.1 according to FishBase	2
Productivity score		1.14
Susceptibility		
Attribute	Rationale	Score
Areal Overlap	In the eastern Atlantic, from the North Sea and UK to Mauritania, which is at the extreme southern edge of its range. Also the Mediterranean.	1
Encounter-ability	School close to surface	3
Selectivity of gear type	Non-selective gear type	3
Post capture mortality	Probably retained if caught	3
Susceptibility score		2.5
PSA risk rating		Pass

E1. Impact on ETP species

E1.1 Information on interactions between the fishery and ETP species is collected		
E1.1.1	ETP species which may be directly affected by the fishery have been identified	Pass
E1.1.2	Interactions between the fishery and ETP species are recorded and reported to management organisations	GAP
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	GAP
There is an observer programme which deploys scientific observers on board the coastal vessels, albeit not with high frequency. 7 recent reports (2023) plus a synthesis report for 2020 (Souleimane et al. 2020) do not signal any interactions with ETP species (in contrast to the Russian pelagic trawlers, where some ETP interactions are noted). (The synthesis reports for 2021-22 are		

not considered here because they do not mention ETP species, which may mean none were observed, or may mean that they were not recorded.) Although observer data are limited, it is sufficient to infer that ETP interactions with the fishery are at least rare. Observer deployment is, however, too sparse to be described as 'reliable' and not sufficient to ensure that all interactions would be recorded. It is unclear at present whether it is part of the logbook, and if so whether it is systematically completed.

The NGO (Najah) who manage the monk seal exclusion zone at Cap Blanc have noted in the past some negative interactions between the monk seals and coastal seiners who were fishing illegally in the closed zone (monitoring data up to 2018, presented at FIP meeting, August 2023). However, stakeholder consensus, including the Coast Guard, is that this closure is now better enforced (the revised zoning keeps the vessels further offshore and away from this area), and that this no longer happens. Unfortunately, however, the NGO ceased their cliff-top monitoring programme in 2018, so it cannot be definitively confirmed. The NGO was clear that the pirogues are not a threat to the monk seals, and have documented interactions where the seals are allowed free access to the net as it is being hauled.

Regarding dolphins, concerns have been raised regarding the humpback dolphin (*Sousa teuszii*) because of its rarity and known vulnerability to interactions with fishing nets. However, it appears to be gillnets which are the risk, not seiners.

E1.2 The fishery has no significant negative impact on ETP species		
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	Pass
All the available information suggests that the fishery (coastal or pirogues) do not interact with any ETP species, although work needs to continue to make the information more robust.		

E1.3 There is an ETP management strategy in place for the fishery		
E1.3.1	There are measures applied to the fishery which are designed to manage the impacts of the fishery on ETP species	Pass
E1.3.2	The measures are considered likely to achieve the objectives of regional, national and international legislation relating to ETP species	Pass
The nature of the gear makes avoiding ETP interactions relatively straightforward (they will not be swept up as in a trawl and can escape or be released from the seine without difficulty). But the key measures which protect ETP species are the area closures – the Cap Blanc exclusion zone for the monk seals, plus the Parc National de Banc d'Arguin (PNBA) for a range of species, including birds, green turtles, dolphins and endangered elasmobranchs. These closures can be enforced via VMS and seem to be working to ensure that the fishery is not interacting with ETP species.		

E2. Impact on the habitat

E2.1 Information on interactions between the fishery and marine habitats is collected		
E2.1.1	Habitats which may be directly affected by the fishery have been identified, including any habitats which may be particularly vulnerable	Pass
E2.1.2	Information on the scale, location and intensity of fishing activity relative to habitats is collected	Pass
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	Pass

E2.1.1. Since the gear is pelagic, and the zoning keeps the vessels in deeper water, there should be no habitat interactions. The observer reports do not mention any obviously demersal species.

E2.1.2 and E2.1.3. The spatial footprint of fishing activity and the zones where it can occur, is known, but this is not particularly relevant to habitats since there are as far as we can tell no interactions with the seabed.

E2.2 The fishery has no significant impact on marine habitats

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	Pass
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The nature of the gear, the location of the target species in the water column and the zoning system combine to ensure that there are no interactions with the seabed.

E2.3 There is a habitat management strategy in place for the fishery.

E2.3.1	There are measures applied to the fishery which are designed to manage the impact of the fishery on marine habitats	Pass
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E2.3.2	The measures are considered likely to prevent the fishery from having a significant negative impact on marine habitats	Pass
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The zoning and closures do this job, although that is not what they are designed for.

E3. Impact on the ecosystem

E3.1 Information on the potential impacts of the fishery on marine ecosystems is collected

E3.1.1	The main elements of the marine ecosystems in the area(s) where the fishery takes place have been identified	Pass
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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	Pass
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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	GAP
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E3.1.1. There has been considerable research on the Mauritanian and regional marine ecosystem over the years, since it is highly productive and plays an important role in the regional economy as well as climate regulation and carbon dynamics. In summary, Mauritania sits at the confluence of warm currents flowing north from the Gulf of Guinea, and the cold Canary current flowing south from Morocco, with a strong but highly mobile oceanographic front in between. Upwelling is also a feature of the system, and is particularly strong in the north of Mauritania and south of Morocco, becoming more irregular and seasonal further south. Regular ecosystem monitoring by INRH in Morocco, as well as through national and international (FAO Nansen and Russian) research cruises in Mauritania, have tracked the oceanography, plankton and benthos over many years and continue to monitor the biomass of small pelagics, the impact of climate change and other elements of the ecosystem.

E3.1.2. Small pelagics play a keystone role in the ecosystem, making up a large proportion of the fish biomass and acting as prey species for a wide range of predators, including fish and various ETP species.

E3.1.3. The impact of the fishery (reduction in biomass compared to the unfished level) can be estimated from the stock assessments (see above). Work is ongoing to estimate the prey

requirements of different groups, in order to evaluate the impact of the removal of small pelagics by the fishery on these taxa.

E3.2 There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem

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	GAP
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We can probably not yet be confident about that.

E3.3 There is an ecosystem management strategy in place for the fishery

E3.3.1	There are measures applied to the fishery which are designed to manage the impacts of the fishery on marine ecosystems	Pass
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E3.3.2	The measures are considered likely to prevent the fishery from having a significant negative impact on marine ecosystems	GAP
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E3.3.1. There are a range of measures which act to try and mitigate any ecosystem impacts, including the closures (PNBA notably); the zoning, which aims to prevent the fishery from targeting juveniles, and to protect some part of the biomass of flat sardinella, as well as to protect artisanal fishers; and the various measures (concessions, catch limits) which limit capacity and effort and hence (indirectly) removals.

E3.3.2. Unclear for the moment.

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