**Mauritania small pelagics fishery**

**MarinTrust whole fish assessment**

Jo Gascoigne, May 2024

## 1. Scope

| | |
|---|---|
| Management Authority | Ministry of Fisheries and the Marine Economy (MPEM) |
| Main species | sardine (*Sardina pilchardus*), sardinella (*Sardinella maderensis*) |
| Fishery Location | Mauritanian EEZ |
| Gear type | seine |
| Fleet | pêche cotière (PC) |

## 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 | Stock status of sardinella stocks (other stocks OK) |
| E1.1.2 | ETP interactions are recorded and reported | Unclear if this is part of logbook |
| 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 stocks de sardinelles (autres stocks OK) |
| 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 | Recherche sur les besoins alimentaires des prédateurs à terminer |
| E3.2.1 | Aucun impact négatif de la pêche sur l'écosystème | |
| 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 2019-2022. 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.

| Species | | % of landings by PC fleet | | | |
|---|---|---|---|---|---|
| | | **2019** | **2020** | **2021** | **2022** |
| Sardine | *Sardina pilchardus* | 76.5 | 62.2 | 71.4 | 64.9 |
| Flat sardinella | *Sardinella maderensis* | 5.0 | 19.7 | 13.5 | 21.5 |
| Round sardinella | *Sardinella aurita* | 12.5 | 7.2 | 2.3 | 5.5 |

| | | | | | |
|---|---|---|---|---|---|
| Mackerel | *Scomber colias* | 3.6 | 9.0 | 9.0 | 1.9 |
| Horse mackerel | *Trachurus* spp. | 2.4 | 1.9 | 3.9 | 6.3 |

## 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 the fishery since the other species may only enter the fishmeal supply chain if unfit for human consumption. However, they have all made up >5% of the total annual catch in some years, they are all treated as Type 1.

Species categorisation table:

| **Species** | | **MT category** |
|---|---|---|
| Sardine (stock C) | *Sardina pilchardus* | Type 1, Category A |
| Flat sardinella | *Sardinella maderensis* | Type 1, Category A |
| Round sardinella | *Sardinella aurita* | Type 1, Category A |
| Mackerel | *Scomber colias* | Type 1, Category A |
| European horse mackerel | *Trachurus trachurus* | Type 1, Category A |
| Cunene horse mackerel | *Trachurus trecae* | Type 1, Category A |

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 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).

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 |

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-ccnadp). 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 it's 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. Regarding the PC fleet specifically, they are 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.

| 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.<br><br>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.<br><br>M2.3.2. 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 in the fishmeal factories. Some but not all of the factories are fully cooperative with IMROP enumerators.<br><br>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 and horse mackerel (two species)

| 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 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. 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).

| 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 Bmsy and Fmsy 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) where 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 | GAP |

| | | |
|---|---|---|
| | 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 | |
| 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 |

Sardine stock C: $B_{2022}/B_{0.1}$ estimated at 1.4 and $F/F_{0.1}$ at 0.47 (CECAF 2023) - Pass
Sardinella aurita: B2022/Bmsy estimated at 0.1 and F/Fmsy at 2.5 (JABBA) (Braham et al. 2024) – GAP
S. maderensis: $B_{2022}$/Bmsy estimated at 0.25 and F/Fmsy at 11 (JABBA) (Braham et al. 2024) – 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) (CECAF 2023) - Pass
Trachurus trachurus: $B_{2022}/B_{0.1}$ estimated at 1.0 and $F/F_{0.1}$ at 0.55 (CECAF 2023) - Pass
T. trecae: $B_{2022}/B_{0.1}$ estimated at 1.1 and $F/F_{0.1}$ at 0.52 (CECAF 2023) - Pass

**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 | *Caranx rhonchus* | |
|---|---|---|
| **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 | *Chloroscombrus chrysurus* | |
|---|---|---|
| **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 | *Trichiurus lepturus* | |
| **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 | *Engraulis encrasicolus* | |
| **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 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 clifftop monitoring programme in 2018, so it cannot be definitively confirmed.

| 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 does 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.<br><br>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 |
| 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 |
| E2.3.2 | The measures are considered likely to prevent the fishery from having a significant negative impact on marine habitats | Pass |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| E3.3.2 | The measures are considered likely to prevent the fishery from having a significant negative impact on marine ecosystems | GAP |
| 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.<br><br>E3.3.2. Unclear for the moment. | | |

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