

Evaluation of Mauritania coastal fleet small pelagic fishery against MarinTrust standard

Update April 2021

Introduction

The Mauritania coastal small pelagic fishery was evaluated against the MarinTrust standard for sustainable reduction fisheries in 2017, and this provided the basis for a Fishery Improvement Project (FIP – <https://fisheryprogress.org/fip-profile/mauritania-small-pelagics-purse-seine>). However, the fishery has changed significantly since this evaluation, in terms of fleet composition, species composition in the catch and management regime. This document provides an update of the previous analysis, to provide a basis for an update of the FIP workplan.

Landings data and species designations

The MarinTrust standard requires species represented in the landings (up to 99.9% of landings) to be allocated to one of four categories, where the first two categories should make up at least 95% of landings:

- Category A: target species with species-specific management
- Category B: target species without species-specific management
- Category C: non-target species with species-specific management
- Category D: non-target species without species-specific management

The Mauritania small pelagics coastal fishery has changed a great deal over the last decade (since it started), so the proportion of different species in the landings is variable depending on which year is used. For this reason, we are only using the most recent three years of data, which are roughly similar. One major change in 2020, however, was that round sardinella was banned from being landed to fishmeal, resulting in a big decline in its proportion in the landings.

In terms of species-specific management, in general management of the fishery is not on a species-by-species basis but in terms of measures that apply to the fishery (e.g. a group TAC, closed areas, zoning, technical measures etc.). For sardine, there are species-specific measures which apply to other parts of the stock (in southern Morocco). For round sardinella and mullet there are species-specific measures which forbid landing to fishmeal (lettre du MPEM et de la Garde-Côte 372 du 4 février 2020), hence neither can be a target species of the fishery since then. For the other stocks, there are no species-specific measures.

Proportional landings by species and species categorisation is given below, based on data provided by IMROP:

Species	% in landings (data from IMROP)			Category
	2018	2019	2020	
Sardine (<i>Sardina pilchardus</i>)	53	77	71	A
Round sardinella (<i>Sardinella aurita</i>)	43	18	2	C
Flat sardinella (<i>Sardinella maderensis</i>)			10	B
Mackerel (<i>Scomber colias</i>)	2.5	3.6	13	B
Horse mackerel (<i>Trachurus</i> spp.)	1.9	2.4	0	B
Anchovy (<i>Engraulis encrasicolus</i>)	0.1	0.1	0	D
Obo (<i>Ethmalosa fimbriata</i>)	0	0	3	D

Mullet (<i>Mugil</i> sp.)	0	0	1	C
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Assessment update

Management

M1: Management framework	
M1.1	There is an organisation responsible for managing the fishery
Fisheries management is the responsibility of MPEM, who are in charge of overarching policy as well as management decision-making and licencing. IMROP is responsible for data collection and science, and provides advice to MPEM as input to decisions. Monitoring and control is the responsibility of the Garde-Côte.	
M1.2	There is an organisation responsible for collecting data and assessing the fishery
IMROP is responsible for data collection and science at national level. At regional level, CECAF / COPACE conducts stock assessments via its small pelagic working group.	
M1.3	Fishery management organisations are publically committed to sustainability
The Fisheries Policy 2020-24 provides a public statement of commitment to sustainability (e.g. in its Vision Statement).	
M1.4	Fishery management organisations are legally empowered to take management actions
A legal framework for fisheries management is provided by the Code de la Pêche (loi 17-2015) and its décret d'application (2015-159).	
M1.5	There is a consultation process through which fishery stakeholders are engaged in decision-making
Article 20 of the Code de la Pêche requires that decision-making includes a consultation process.	
M1.6	The decision-making process is transparent, with processes and results publically available
Legislation is available on the MPEM website: https://www.peches.gov.mr/-textes-juridiques- . Communication with stakeholders is generally done directly.	

M2: Surveillance, control and enforcement	
M2.1	There is an organisation responsible for monitoring compliance with fishery laws and regulations.
The Garde-Côte Mauritanienne (GCM) is responsible for monitoring compliance, including verification of landings and licences, VMS, gear inspections etc. Closed areas such as the PNBA also have their own surveillance system.	
M2.2	There is a framework of sanctions which are applied when laws and regulations are discovered to have been broken.
There is a system of sanctions which are applied; ~2000 sanctions in this fleet in 2017.	
M2.3	There is no substantial evidence of widespread non-compliance in the fishery, and no substantial evidence of IUU fishing.
Some concerns have been raised about compliance in the coastal fleet, including non-respect of zoning, IUU fishing in Moroccan waters, non-compliance with VMS and landings declaration by species. We do not know the extent to which these are substantial problems.	
M2.4	Compliance with laws and regulations is actively monitored, through a regime which may include at-sea and portside inspections, observer programmes, and VMS.
Some elements of the fishery are monitored, such as dockside inspections and weighing of landings and VMS, but some elements are less well monitored, such as catch composition and actions at sea.	

Category A species: Sardine

A1: Data collection	
A1.1	Landings data are collected such that the fishery-wide removals of this species are known
Landings data are collected from three sources: vessel logbooks, portside inspections and data collection in fishmeal factories. The first two are the responsibility of the GCM (with data subsequently passed on to IMROP) and the three is the responsibility of IMROP. IMROP provides a total estimate of catch by species and by fleet.	
A1.2	Sufficient additional information is collected to enable an indication of stock status to be estimated
Although there are concerns raised by CECAF about the quality of catch data from Mauritania (level of sampling), most of the catch on this stock comes from Morocco where good quality data are available. A stock assessment is conducted annually by INRH (Morocco) and the CECAF working group (regional). The most recent assessment was in 2019 (working group did not meet in 2020 due to covid).	

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.
A stock assessment is conducted annually by CECAF (except for 2020 due to covid).	
A2.2	The assessment provides an estimate of the status of the biological stock relative to a reference point or proxy.
The assessment estimates stock status in relation to Bmsy and B0.1 and fishing mortality in relation to Fmsy and F0.1.	
A2.3	The assessment provides an indication of the volume of fishery removals which is appropriate for the current stock status.
The assessment does not estimate directly what the total catch should be, but CECAF provide advice on whether the current level is appropriate or should be reduced. Note that because the environment is very variable (level of upwelling etc.), trends in biomass are not necessarily very well correlated with levels of catch. There is also a direct measure of biomass via periodic acoustic surveys (twice per year in Morocco, less frequently but periodically in Mauritania).	
A2.4	The assessment is subject to internal or external peer review.
The CECAF working group can be argued to provide internal peer review, but there is no formal process of external peer review.	
A2.5	The assessment is made publicly available.
The CECAF reports are available here: http://www.fao.org/fishery/rfb/cecaf/en#Org-Outputs (select Publications)	

A3: Harvest strategy	
A3.1	There is a mechanism in place by which total fishing mortality of this species is restricted.
Both Morocco and Mauritania have similar measures in place: a total TAC for the small pelagic fishery divided into quotas, limited licencing, zoning by vessel type and size and closed areas, as well as some other measures. In Morocco total fishing mortality is restricted, but in Mauritania it is not completely clear that these measures have been able to control effort in this fishery.	

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.	
The stock has been above the target reference point in recent years, so there has not been any specific advice requiring fishery removals to be reduced.		
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).	
This has not happened since the development of this fishery. There are no measures in place which set out what should happen in these circumstances.		

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.	
The stock biomass was estimated by CECAF to be at $\sim 1.5 \times B_{msy}$ (assessment in 2019 for status in 2018) – no assessment in 2020 due to covid.		

Category B species: [Flat sardinella](#), [mackerel](#) and [horse mackerel](#)

Category B species are assessed based on the matrices below, depending on whether there are robust estimates of reference points:

If reference points available:

Biomass is above MSY / target reference point	Pass	Pass	Pass	Fail	Fail
Biomass is below MSY / target reference point, but above limit reference point	Pass, but re-assess when fishery removals resume	Pass	Fail	Fail	Fail
Biomass is below limit reference point (stock is overfished)	Pass, but re-assess when fishery removals resume	Fail	Fail	Fail	Fail
Biomass is significantly below limit reference point (Recruitment impaired)	Fail	Fail	Fail	Fail	Fail
	Fishery removals are prohibited	Fishing mortality is below MSY or target reference point	Fishing mortality is around MSY or target reference point, or below the long-term average	Fishing mortality is above the MSY or target reference point, or around the long-term average	Fishing mortality is above the limit reference point or above the long-term average (Stock is subject to overfishing)

If reference points not available:

$B > B_{av}$ 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

Flat sardinella:

It was not possible to estimate stock status in relation to reference points in 2019 due to lack of data from Senegal, and in 2020 the CECAF working group did not meet due to covid. A quantitative assessment (exploratory SPiCT assessment) exists from 2018 but confidence intervals are so wide as to render it meaningless. Therefore, the second matrix is used.

The assessment estimates trends in B and F , with B stable or gradually declining and F increasing from ~2009 relative to the previous average. It is therefore likely that $F > F_{av}$, while B is not likely to be $> B_{av}$, hence the score is **Fail**.

Mackerel:

CECAF were able to apply several assessment models to the mackerel stock in 2019, providing several estimates of stock status in relation to reference points. Therefore the first matrix is used.

All three models (Schaefer dynamic production model, ICA and XSA) estimate that $B > B_{0.1}$ and the Schaefer model estimates that $B > B_{msy}$ (the other two models do not estimate MSY reference points). The Schaefer model puts F slightly above the target level ($F_{0.1}$ and F_{msy} ; $F/F_{target} = 1.14$ and 1.26) but the other two models estimate that F is below the target level ($F/F_{0.1}$: ICA: 0.7, XSA: 0.84). Overall, we can conclude that fishing mortality is around the target level, hence the score is **Pass**.

Horse mackerel:

There are two species of horse mackerel (*Trachurus trachurus* and *T. trecae*) which are not easily distinguished in catch statistics. CECAF, however, is able to evaluate these stocks based on data from the Russian fleet fishing under licence in the region. The same models were applied as for mackerel, but only the Schaefer model results are presented in the 2019 report. Therefore the first matrix is used.

For *T. trachurus*, the working group estimates that B is slightly below the target level (83% of $B_{0.1}$ and 91% of B_{msy}) while F is slightly above (107% of F_{msy} and 119% of $F_{0.1}$). Therefore the score is **Fail**.

For *T. trecae*, the working group estimates that B is around the target level (94% of $B_{0.1}$ and 104% of B_{msy}) while F is below (72% of F_{msy} and 80% of $F_{0.1}$). Therefore the score is **Pass**.

Category C species: Round sardinella

C1: Stock status		
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.	
Removals of round sardinella by this fishery have declined dramatically since the ban on landing it to fishmeal in Feb. 2020. A stock assessment is conducted by the CECAF working group, most recently in 2018, and includes data from Mauritania, including this fishery.		
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.	
The stock biomass was estimated by CECAF to be at $\sim 0.25 * B_{msy}$ (very uncertain; assessment in 2018 for status in 2017) – no assessment in 2019 due to lack of data nor in 2020 due to covid. Although landings of this species declined massively in 2020, we do not yet have complete evidence that they are and will remain negligible.		

Category C species: Mullet

C1: Stock status		
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.	
We do not have good data for removals of mullet by this fishery before 2020. Mullet is an important species in the artisanal fishery, but we do not know if there is a stock assessment process and if so what data are included.		

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.	
Unknown.		

Category D species: Anchovy

Category D species are evaluated based on a modified productivity/susceptibility analysis, scored as per the scoring tables provided by MarInTrust.

Productivity Attribute	Value	Data quality	Score	Data source
r	0.59	2	3	FishBase
maximum age	3 years	1-2	3	CECAF
maximum size	20 cm	1	3	FishBase
vB growth coefficient (k)	1.39	1-2	3	CECAF
M	1.35	1-2	3	CECAF
fecundity	~10000 eggs per gram body weight per year	2	3	Motos 1996
breeding strategy (parental investment)	0	1	3	
recruitment pattern	highly variable in this region	1	2	CECAF
age at maturity	1 year	1-2	3	IUCN
trophic level	3.1	1-2	2	FishBase
Overall			2.8	
Susceptibility Attribute	Value	Data quality	Score	Data source
management strategy	Stock targeted if available; biomass mainly in Morocco where there is reactive management	1	2	INRH
areal overlap	< 25%	1	1	CECAF
geographical concentration	> 50%	1	1	IUCN
vertical overlap	> 50%	2	3	CECAF
fishing rate relative to M	variable; assume >1	5	3	
SSB or other proxy	Morocco acoustic survey suggests biomass roughly at average of time series from 1995; assume ~50%B ₀	3	1	INRH
seasonal migrations	Do not affect fishery much	2	2	
behavioural response to gear	Does not affect fishery much	3	2	
morphology affecting capture	Moderate selectivity (smaller than other small pelagics and minimum mesh size in place)	3	2	
post-release survival	Not released	1	3	
desirability / value	Moderate	3	2	
fishery impact on EFH	No impact	1	1	
Overall			1.9	PASS

Category D species: Obo

Productivity Attribute	Value	Data quality	Score	Data source
r	0.93	2	3	FishBase
maximum age	5 years	1-2	3	IUCN
maximum size	35 cm	1	3	IUCN
vB growth coefficient (k)	0.46	1-2	3	CECAF
M	1.2 (Niger delta)	3	3	IUCN
fecundity	16,000-52,000 (Ghana)	2	3	IUCN
breeding strategy (parental investment)	0	1	3	
recruitment pattern	no evidence that strongly variable	5	2	CECAF
age at maturity	1 year	1-2	3	IUCN
trophic level	2.5	1-2	2	FishBase
Overall				
Susceptibility Attribute	Value	Data quality	Score	Data source
management strategy	Mainly targeted in Senegal and countries to the south, where limited monitoring and poor management	2	3	INRH
areal overlap	< 25%	1	1	CECAF
geographical concentration	> 50%	1	1	IUCN
vertical overlap	Mainly coastal so no access for this fleet; assume < 25 %	2	1	CECAF
fishing rate relative to M	F very high on large individuals and close to Fmax	1-2	3	CECAF
SSB or other proxy	Considered overexploited	1-2	3	CECAF, IUCN
seasonal migrations	Do not affect, as far as we know	5	2	
behavioural response to gear	Does not affect, as far as we know	5	2	
morphology affecting capture	Should be moderate to high selectivity	5	3	
post-release survival	Not released	1	3	
desirability / value	Moderate	3	2	
fishery impact on EFH	None	1	1	
Overall			2.08	PASS

Further impacts

F1: Impacts on ETP species	
F1.1	Interactions with ETP species are recorded.
No	
F1.2	There is no substantial evidence that the fishery has a significant negative effect on ETP species.
Given the nature of the fishery (seine fishery) impacts are probably limited, but there is no good evidence either way.	
F1.3	If the fishery is known to interact with ETP species, measures are in place to minimise mortality.

The Code de la Pêche forbids deliberate or accidental capture of a range of ETP species including cetaceans, seabirds and seals. There are measures in place to protect these species, notably the PNBA and the area at Cap Blanc to protect monk seals.

F2: Impacts on habitats		
F2.1	Potential habitat interactions are considered in the management decision-making process.	
Part of the rationale for the zoning approach is to ensure that vessels are fishing at an appropriate depth for the gear, in order not to impact habitats. The PNBA protects a large area of important habitat for birds, juvenile fish and other species.		
F2.2	There is no substantial evidence that the fishery has a significant negative impact on physical habitats.	
Given the nature of the gear and the habitats in the area, habitat impacts from this fishery are not likely.		
F2.3	If the fishery is known to interact with physical habitats, there are measures in place to minimise and mitigate negative impacts.	
Interactions are not likely, and there are measures in place as described above.		

F3: Ecosystem impacts		
F3.1	The broader ecosystem within which the fishery occurs is considered during the management decision-making process.	
Protection of the wider ecosystem is an important component of the fisheries policy 2020-24, and management tends to consider the fishery overall rather than stock by stock. However, there is no quantitative estimate of ecosystem parameters such as the food requirements of predators (cetaceans, seabirds etc.) which can be taken into account in management decision-making. An ecosystem model is in development but the ecosystem is exceptionally complex.		
F3.2	There is no substantial evidence that the fishery has a significant negative impact on the marine ecosystem.	
There is no substantial evidence that the ecosystem is at risk from this fishery, based on an ecosystem model and other information about ecosystem dynamics. The most significant problem for the ecosystem is the overfishing of key stocks (sardinella species in particular) but this takes place mainly further south.		
F3.3	If one or more of the species identified during species categorisation plays a key role in the marine ecosystem, additional precaution is included in recommendations relating to the total permissible fishery removals.	
As noted above, recommendations from CECAF tend to be qualitative and precautionary.		