

Messina Strait swordfish harpoon fishery

Pre-assessment Report

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2 Glossary

AIS Automatic identification system
CA Consequence Analysis (RBF)
CFP Common Fisheries Policy
CPU Catch per Unit of Effort
CSA Consequence Spatial Analysis (RBF)
EEZ Exclusive Economic Zone
EFCA European Fisheries Control Agency
ETP Endangered, threatened and protected species
EU European Union
FCR Fisheries Certification Requirements
GES Good Environmental Status
GFCM General Fisheries Commission for the Mediterranean
GSA Geographical Sub-Area
HMS Highly Migratory Species
ICCAT International Commission for the Conservation of Atlantic Tunas
LTL Low Trophic Level
MCRS Minimum Conservation Reference Size
MEDAC Mediterranean Advisory Council
MIPAAF Italian Ministry of Agriculture and Forestry
MLS Minimum Landing Size
MSC Marine Stewardship Council
PI Performance indicator
PISG Performance Indicator Scoring Guidepost
PRI Point of Recruitment Impairment
PSA Productivity-Susceptibility Analysis (RBF)
RBF Risk-Based Framework
RFMO Regional Fisheries Management Organisation
SG Scoring Guidepost
SI Scoring Issue
SIC Sites of Important Communities
SPZ Special Protection Zone
SWO Mediterranean swordfish
STECF Scientific, Technical and Economic Committee for Fisheries
TAC Total allowable catch
UoA Unit of Assessment
VME Vulnerable marine ecosystems

3 Executive summary

3.1 Names and brief description of assessors/authors

This MSC pre-assessment report was drafted by the following team:

Assessment Team Members

Lead Assessor, P2, and traceability: Vito Romito

P1 Assessor: Giuseppe Scarcella

P3 was shared among the two assessors

Vito Romito has 10 years of expertise in fisheries certification. He's an ISO14001 Certified Lead Auditor and MSC FCR v.2.0 and FCP v.2.1 approved Fisheries Team Leader for SAI Global with extensive experience in ecosystems effects of fisheries. Vito received a BSc (Honours) in Ecology and a MSc in Tropical Coastal Management from Newcastle University (U.K.), in between which he worked for a year in Tanzania, carrying out comparative biodiversity assessments of pristine and dynamited coral reef ecosystems around the Mafia Island Marine Park. For five years he worked at Global Trust Certification/ later SAI Global as Lead Assessor for all the fishery assessments in Alaska, Iceland and Louisiana. Vito has also carried out several IFFO forage fisheries assessments in Chile, Peru, Europe and other various pre-assessments in Atlantic and Pacific Canada. To date, Vito has headed and conducted dozens of assessments involving 40+ different species including salmonid, groundfish, pelagic, flatfish, crustacean and cephalopod species in Europe, North and South America, and SE Asia. For three years, as a senior fisheries consultant and then manager with RS Standards Ltd., he was involved in the development and testing of a Data Deficient Fisheries framework and v.2.0 fisheries standard for the ASMI Alaska RFM Scheme, and IFFO RS Improver/FIP projects related to South East Asia multispecies bottom trawl fisheries. Vito re-joined the SAI Global Fisheries Team in 2018 and has since been involved as lead assessor and ecosystem expert in MSC and other fisheries assessment projects in the Baltic Sea, Canada, US East Coast, Alaska, Louisiana and Italy.

Dr. Giuseppe Scarcella is an experienced fishery scientist and population analyst and modeller, with wide knowledge and experience in the assessment of demersal stocks. He is author and co-author of more than 30 scientific papers in peer reviewed journals and more than 150 national and international technical reports, most of them focused on the evolution of fish assemblages in artificial habitats and stock assessment of demersal species. He holds a first-class degree in Marine Biology and Oceanography (110/110) from the Università Politecnica delle Marche, Italy, and a Ph.D. in marine Ecology and Biology from the same university, based on a thesis "Age and growth of two rockfish in the Adriatic Sea". In 2008 he was offered a job as project scientist in several research programs about the structure and composition of fish assemblage in artificial reefs, off-shore platform and other artificial habitats in the Italian Research Council – Institute of Marine Science of Ancona (CNR-ISMAR). During the years of employment at CNR-ISMAR he has gained experience in benthic ecology, statistical analyses of fish assemblages' evolution in artificial habitats, fisheries ecology and impacts of fishing activities, stock assessment, otholith analysis, population dynamics and fisheries management. During the same years he attended courses of uni-multivariate statistics and stock assessment. He is also actively participating in the scientific advice process of FAO GFCM in the Mediterranean Sea. At the moment he is member of the Scientific, Technical and Economic Committee for Fisheries for the European Commission (STECF). Giuseppe has been involved in several MSC and RFM assessments globally as a stock assessment expert.

3.2 Brief explanation of the process applied and summary of assessment activities

This MSC pre-assessment was carried out primarily remotely as desktop type assessment. The assessment team organised conference calls with various stakeholders as part of the remote "site visits" portion of the assessment, to collect additional information to what was publicly available and to better understand the dynamics of the fishery.

3.3 Main strengths and weaknesses of the client's operation

Main strengths and weaknesses of the fishery are listed briefly below.

Strengths

- Although the swordfish stock is not at or fluctuating around a level consistent with MSY there is a rebuilding plan in place with the objective to rebuild the stock and reach a biomass corresponding to MSY by 2031, with at least 60% probability.
- There is a TAC in place which is somewhat below the TAC implied by FMSY under the reference case stock assessment model, reflecting the goal of the rebuilding plan.
- Effects on Primary species (i.e. bluefin tuna) are thought to be minimal. Bluefin tuna is managed by ICCAT via TAC.
- No negative effects are thought to exist on vulnerable and ETP species due to the highly selective nature of the harpoon fishery which does not have accidental catches of any type.
- The Messina Strait harpoon swordfish fishery does not have habitat effects of any kind as the harpoon gear used does not come into contact with the seabed.
- Swordfish in the central Mediterranean has been shown to feed on many different species (probably around 60 different species). Because its diet is very diverse and the removals from this fishery are very small, potential effects on prey species through top-down control mechanisms are likely limited. Furthermore, some occasional predation may occur from certain shark species, but this is not considered significant.
- The fishery appears to be managed by a well-structured management system.

Weaknesses

- It is not clear if the HCR ensures that the exploitation rate is reduced as the PRI is approached.
- Main Secondary species include the Mediterranean spearfish. The status of this species appears to be at low risk /vulnerability based on the Productivity Susceptibility Analysis, however, more specific information relating to its management would be required, within the context of this UoA's limited effort.
- Additional enforcement and compliance information is required to demonstrate fishers comply with the management system under assessment. Furthermore, the Client (MSC Italy) has informed the assessment team that some stakeholders (e.g. Oceana) have communicated in various meetings that because the swordfish recovery plan is not transposed directly in Italian legislation (noting however that EU Regulations, unlike Directives, are automatically valid in EU member countries and do not require national transposition¹), a number of enforcement measures relating to the swordfish recovery plan² cannot be implemented.

¹ http://www.epgencms.europarl.europa.eu/cmsdata/upload/09adb8a6-5006-4bfe-9b1e-d9a7afde2be2/EPRS_ATAG_627141_Transposition_implementation_and_enforcement_of_EU_law-FINAL.pdf

² See <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018PC0229>

3.4 Extent to which the fishery is or is not consistent with the MSC Fisheries Standard

The Unit of Assessment (UoA) under consideration here is generally consistent with the requirements of the MSC standard.

More detailed information on the strengths and weaknesses of the fishery has been presented in the following pages and summarized in Table 5.

4 Report details

4.1 Aims and constraints of the pre-assessment

This pre-assessment does not attempt to duplicate a full assessment against the MSC Fisheries Standard. A full assessment involves a group of assessment team members and public consultation stages that are not included in a pre-assessment. A pre-assessment provides a provisional assessment based on a limited set of information provided by the client. In the case of this fishery data availability was generally good although additional information (e.g. full catch information up to 2019, enforcement activities information) could improve the evidence base and increase the provisional score applied.

4.2 Version details

The MSC process applied for this fishery is summarised by the table below.

Document	Version number
MSC Fisheries Certification Process	Version 2.2
MSC Fisheries Standard	Version 2.01
MSC General Certification Requirements	Version 2.4.1
MSC Pre-Assessment Reporting Template	Version 3.2

5 Unit(s) of Assessment

5.1 Unit(s) of Assessment

5.1.1 Determination of fishery's status with respect to scope of the MSC Fisheries Standard

The fishery being assessed here meets the scope requirements in FCP v2.2 7.4:

- The various target species assessed under Principle 1 are neither amphibians, reptiles, birds, nor marine mammals.
- The fishery does not use destructive fishing practices such as poisons or explosives.
- The fishery is not conducted under a controversial unilateral exemption to an international agreement.
- The fishery includes a mechanism for resolving disputes and disputes do not overwhelm the fishery.
- This is not an enhanced fishery, nor an introduced species-based fishery.
- Forced labour requirements have not been verified at this stage.

5.1.2 Possible Unit(s) of Assessment

Included in Table 2 below are possible Unit(s) of Assessment if the fishery were to proceed to full assessment including a justification for choosing them.

UoA 1	Description
Species	Swordfish (<i>Xiphias gladius</i>)
Stock	Mediterranean swordfish
Fishing gear type(s) and, if relevant, vessel type(s)	Harpoons shot from specific "feluche" vessels
Client group	MSC Italy
Other eligible fishers	Not defined
Geographical area	FAO Major Fishing Area 37, Western/Central Mediterranean, GSA 10 and 19, Messina Strait.
Harvest method/gear	Harpoon
Justification for choosing the Unit of Assessment	UoA defined by the Client

6 Traceability

6.1 Traceability within the fishery

Some traceability information for this fishery has been collected through stakeholder interviews.

The Strait of Messina's harpoon fishery is composed by a total of 13-14 boats, 9 operating in Sicily and 4-5 in Calabria. A typical fishing boat is called "passerella" or "feluca", a vessel of about 16 meters long (about 300 HP and 14 GT) with a tall sighting platform on the vessel's mast (25 m above the sea level) where the boat is piloted and fish are sighted, and a plank 20-24 m long extending from the bow for the harpooning operations (bridge). Fishing operations are carried out during the day starting at about 7 a.m till 6 p.m at the latest depending on the abundance of sightings. Since 1902 the local Harbour office of the coast guard regulates this activity. The boats fish into assigned sectors of about 1 km² named "poste". The harpooned fish is hauled on board. A cross is cut onto the fish to differentiate it from swordfish caught in other fisheries, and the harpooned region is removed and kept by the fishermen for food. The product is apparently only sold to and available in the Messina market. Currently, buyers only purchase fish from the harpoon fishery but in the past they also bought fish from other gear types (driftnet fisheries) and areas. The boats do not appear to have a single point of landing.

In addition to the above, we note the following. As part of EU COUNCIL REGULATION (EC) No 1224/2009, Article 58 on traceability³, several requirements apply to Italian fisheries. These traceability requirements include the following:

1. Without prejudice to Regulation (EC) No 178/2002, all lots of fisheries and aquaculture products shall be traceable at all stages of production, processing and distribution, from catching or harvesting to retail stage.
2. Fisheries and aquaculture products placed on the market or likely to be placed on the market in the Community shall be adequately labelled to ensure the traceability of each lot.
3. Lots of fisheries and aquaculture products may be merged or split after first sale only if it is possible to trace them back to catching or harvesting stage.
4. Member States shall ensure that operators have in place systems and procedures to identify any operator from whom they have been supplied with lots of fisheries and aquaculture products and to whom these products have been supplied. This information shall be made available to the competent authorities on demand.
5. The minimum labelling and information requirements for all lots of fisheries and aquaculture products shall include:
 - (a) the identification number of each lot; (b) the external identification number and name of the fishing vessel or the name of the aquaculture production unit; (c) the FAO alpha-3 code of each species; (d) the date of catches or the date of production; (e) the quantities of each species in kilograms expressed in net weight or, where appropriate, the number of individuals; (f) the name and address of the suppliers; (g) the information to consumers provided for in Article 8 of Regulation (EC) No 2065/2001: the commercial designation, the scientific name, the relevant geographical area and the production method; (h) whether the fisheries products have been previously frozen or not.

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32009R1224&from=EN>

6. Member States shall ensure that the information listed in points (g) and (h) of paragraph 5 is available to the consumer at retail sale stage.

7. The information listed in points (a) to (f) of paragraph 5 shall not apply to fisheries and aquaculture products imported into the Community with catch certificates submitted in accordance with Regulation (EC) No 1005/2008.

8. Member States may exempt from the requirements set out in this Article small quantities of products sold directly from fishing vessels to consumers, provided that these do not exceed the value of EUR 50 per day. Any amendment to this threshold shall be adopted in accordance with the procedure referred to in Article 119.

9. Detailed rules for the application of this Article shall be adopted in accordance with the procedure referred to in Article 119.

Table 3. Traceability within the fishery.

Factor	Description
<p>Will the fishery use gears that are not part of the Unit of Certification (UoC)?</p> <p>If Yes, please describe:</p> <ul style="list-style-type: none"> - If this may occur on the same trip, on the same vessels, or during the same season; - How any risks are mitigated. 	No, only harpoons.
<p>Will vessels in the UoC also fish outside the UoC geographic area?</p> <p>If Yes, please describe:</p> <ul style="list-style-type: none"> - If this may occur on the same trip; - How any risks are mitigated. 	No, quite unlikely. The fishery operates in the Messina strait waters. There are effort maps showing the effort distributions of these vessels. There are daily trips.
<p>Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities.</p> <ul style="list-style-type: none"> - Transport - Storage - Processing - Landing - Auction <p>If Yes, please describe how any risks are mitigated.</p>	Buyers in Messina may potentially purchase fish caught by other gears and/or in other areas. This happened in the past although it does not appear to be the case currently. However, the harpooned swordfish is readily distinguishable from other swordfish due to the cross and the section removed where the harpoon hit the fish.
<p>Does transshipment occur within the fishery?</p> <p>If Yes, please describe:</p> <ul style="list-style-type: none"> - If transshipment takes place at-sea, in port, or both; - If the transshipment vessel may handle product from outside the UoC; - How any risks are mitigated. 	No, extremely unlikely.
<p>Are there any other risks of mixing or substitution between certified and non-certified fish?</p> <p>If Yes, please describe how any risks are mitigated.</p>	No, there no other risks aside from those identified above.

7 Pre-assessment results

7.1 Pre-assessment results overview

7.1.1 Overview

The key limitations of this fishery have been briefly summarised in earlier pages. Details resulting from this pre-assessment are shown in the following pages in the form of:

- Recommendations,
- Summary of potential conditions by Principle, and
- Summary of Performance Indicator level scores

7.1.2 Recommendations

Key recommendations resulting from this pre-assessment include:

- The need to increase the availability of catch information and enforcement data for the UoA in question.

7.2 Summary of potential conditions by Principle

Table 4. Summary of potential Performance Indicator level scores.

Principle of the Fisheries Standard	Number of PIs with draft scoring ranges <60
Principle 1 – Stock status	0 PIs scored <60; 2 PIs scored 60-79
Principle 2 – Minimising environmental impacts	0 PIs scored <60; 1 PIs scored 60-79
Principle 3 – Effective management	0 PIs scored <60; 1 PIs scored 60-79

7.3 Summary of Performance Indicator level scores

Table 5. Summary of Performance Indicator level scores.

Performance Indicator	Draft scoring range	Data deficient?
Principle 1 – Stock status		
1.1.1 – Stock status	60 – 79	No
Rationale or key points		
For Mediterranean swordfish the median value of BMSY is equal to 71,319 t (42% of B0) and PRI should be determined as 35,660 t. The current median value (B2018) of the biomass is estimated as 50,692 tons with a lower 95th percentile bound of 22,101 t. Looking at the probability of posterior distribution available in Figure 5 it is possible to infer that the 70th percentile is above the PRI (as ½BMSY). Therefore, it is likely that the stock is above the point where recruitment would be impaired (PRI) and SG 60 is met. However, it is clear that the 80th and 95th percentile are below the PRI (and these are required to meet the SG 80 and 100 thresholds in the standard).		
1.1.2 – Stock rebuilding	≥80	Not applicable.
Rationale or key points		
The rebuilding plan in place (Rec 16-05; ICCAT 2016) has the objective to rebuild the stock and reach a biomass corresponding to a maximum sustainable yield by 2031, therefore, in more than ONE generation time but in less than two (Generation time: 8.9 (6.1 - 13.7) years). The projections of different catch levels based on the output of the production model assessment indicate that TAC equal to 10,500 t would result in stock rebuilding with a 60% probability by the end of the projections period (2028) (ICCAT 2020a; b).		
1.2.1 – Harvest Strategy	≥80	Not applicable.
Rationale or key points		
ICCAT have recently implemented a rebuilding plan for the Mediterranean swordfish, which came into force in 2017 (ICCAT 2016; Rec. 2016-05). The plan is complex, with a wide range of elements (summarised in Section 7.4.1.4). The main measure is the TAC (set below the TAC implied by FMSY), which has been set at 10,500 t in 2017 and over the period 2018-2022 it should be gradually reduced by 3% each year. The plan also contains a series of technical measures; notably minimum size provisions and a series of seasonal closures, as well as a large quantity of provisions for reporting and inspection which are intended to ensure that the TACs and other management measures are respected.		
1.2.2 – Harvest control rules and tools	60 – 79	Not applicable.

Table 5. Summary of Performance Indicator level scores.

Performance Indicator	Draft scoring range	Data deficient?
Rationale or key points		
The HCR target reference point (FMSY) is clearly defined and should ensure that exploitation rate is maintained around BMSY (by way of adjusting exploitation rate to maintain F below FMSY, depending, for example, on future levels of recruitment). However, it is not clear what action should be taken in the event that $F > FMSY$ and F would need to be reduced. There is also an issue with how the HCR operates should the PRI be approached, taking also into account that the PRI is not analytically determined.		
1.2.3 – Information and monitoring	≥80	Not applicable.
Rationale or key points		
There has been significant effort to improve information and monitoring for Mediterranean Swordfish over the last decade; both in terms of monitoring the fishery and in terms of understanding the biology, ecology and dynamics of the stock. The largest majority of the Mediterranean swordfish fisheries statistics and biological information used in the current stock assessment, was revised and updated during the Report of the 2020 ICCAT intersessional meeting of the Swordfish Species Group. However, the stock assessment group in 2020 noted that since the establishment of minimum catching sizes, particularly after the recent increase imposed through Rec. 16-05 the discard levels of undersized swordfish are increasing at least for certain fisheries and are largely dead.		
1.2.4 – Assessment of stock status	≥80	Not applicable.
Rationale or key points		
The stock assessment meeting of 2020 reviewed two XSA runs (constant M with/without discards, SCRS/P/2020/029), two a4a runs (constant M with/without discards, SCRS/P/2020/030), and two JABBA runs (Reference and ASEM models, SCRS/P/2020/028). The JABBA model has been chosen as the reference model to provide the advice and was used perform the projections. The stock assessment models use a wide range of data and provides the required information (F/M _{SY}) for the HCR, giving a range of results for different scenarios.		
Principle 2 – Minimising environmental impacts		
2.1.1 – Primary Outcome	≥80	No
Rationale or key points		
No main primary species have been identified for this UoA. Bluefin tuna has been identified as a minor primary species. From the late 2000s, SSB exhibited a substantial increase through 2015. F _{0.1} was considered a reasonable proxy for FMSY, although it can be higher or lower than FMSY depending on the stock recruitment relationship, which in this case is poorly determined. F _{cur} appears to be clearly below F _{0.1} $F_{cur}/F_{0.1} = 0.34$.		
2.1.2 – Primary Management	≥80	Not applicable.
Rationale or key points		
There are no main primary species. SG 60 and 80 are met by default. In regard to the minor primary species, bluefin tuna, there is a harvest strategy in place for managing it, a TAC. The Committee noted that reported catches are in line with recent TACs.		
2.1.3 – Primary Information	≥80	Not applicable.
Rationale or key points		
The fishery is very selective and data on all target catches are recorded in fisheries logbooks. For bluefin tuna (primary minor) there is quantitative information adequate to estimate the impact of the UoA on minor primary species with respect to status. This data includes, catch, CPUE, biological information including age and length data and survey information.		
2.2.1 – Secondary Outcome	≥80	Yes / No
Rationale or key points		
Mediterranean spearfish was identified as main secondary species and assessed using the Risk Based Framework PSA analysis and achieving an MSC PSA derived score of 91 (i.e. unconditional pass). The sunfish <i>Mola mola</i> was classified as minor secondary species. No information on this stock was available.		
2.2.2 – Secondary Management	60 – 79	Not applicable.
Rationale or key points		
Management measures specific to the Mediterranean spearfish are not present. However, in the context of its capture as associated catch to the Messina Strait swordfish harpoon fishery, the same measures available for swordfish apply to this species also. In brief, these measures include effort limitations in terms of days at sea and number of licenses available. However, further evidence would be required to justify a score of SG 80 for Mediterranean spearfish management in the context of this fishery.		

Table 5. Summary of Performance Indicator level scores.

Performance Indicator	Draft scoring range	Data deficient?
2.2.3 – Secondary Information	≥80	Not applicable.
Rationale or key points		
Catch and CPUE information (e.g. fig. 8 of Romeo et al. 2015) for Mediterranean spearfish is (supposedly) fully available as all fish harpooned in this fishery is recorded in vessel’s logbooks (Teresa Romeo pers. comm.). It’s also likely that weight of each individual and (possibly length) information is also recorded on the logbooks. Along with existing information on number of vessels in the fleet, days fished, effort footprint maps in the Strait of Messina (e.g. see Romeo et al. 2015 and Perzia et al. 2016), we determine that information is adequate to support a (future) partial strategy to manage Mediterranean spearfish. SG 60 and 80 are met.		
2.3.1 – ETP Outcome	≥80	Yes / No
Rationale or key points		
The fishery is very selective and only catches species that it targets with harpoons. There are no significant interactions with vulnerable seabird, marine mammal, turtle or elasmobranch species. The Messina Strait harpoon swordfish fishery does not have impacts on the ETP species component.		
2.3.2 – ETP Management	≥80	Not applicable.
Rationale or key points		
The fishery is very selective and only catches species that it targets with harpoons. There are no significant interactions with vulnerable seabird, marine mammal, turtle or elasmobranch species. The Messina Strait harpoon swordfish fishery does not have impacts on the ETP species component.		
2.3.3 – ETP Information	≥80	Not applicable.
Rationale or key points		
The fishery is very selective and only catches species that it targets with harpoons. There are no significant interactions with vulnerable seabird, marine mammal, turtle or elasmobranch species. The Messina Strait harpoon swordfish fishery does not have impacts on the ETP species component.		
2.4.1 – Habitats Outcome	≥80	Yes / No
Rationale or key points		
The Messina Strait harpoon swordfish fishery does not have habitat effects of any kind as the gear type employed does not come into contact with the seabed.		
2.4.2 – Habitats Management	≥80	Not applicable.
Rationale or key points		
The Messina Strait harpoon swordfish fishery does not have habitat effects of any kind as the gear type employed does not come into contact with the seabed.		
2.4.3 – Habitats Information	≥80	Not applicable.
Rationale or key points		
The Messina Strait harpoon swordfish fishery does not have habitat effects of any kind as the gear type employed does not come into contact with the seabed.		
2.5.1 – Ecosystems Outcome	≥80	Yes / No
Rationale or key points		
The removals from the harpoon fishery only consist of very limited swordfish catches (when compared to the total stock catches). The impacts on associated catches, ETP species and habitats are considered to be negligible to none. Furthermore, the species has been shown to have a very diverse diet (probably around 60 different species based on Romeo et al. 2009 and Romeo et. al. 2011) and potential effects on prey species through top-down control mechanisms are likely quite limited. Also, swordfish is not considered to have any important predator depending on the resource. The UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.		
2.5.2 – Ecosystems Management	≥80	Not applicable.
Rationale or key points		
ICCAT have recently implemented a rebuilding plan for the Mediterranean swordfish, which came into force in 2017 (ICCAT 2016; Rec. 2016-05). The stated goal of Rec. 2016-05 is to reach a biomass corresponding to a maximum sustainable yield by 2031. Rebuilding the stock to BMSY levels will also have effects on associated species in the Mediterranean ecosystem. The plan is complex, with a wide range of elements including a TAC, reduction of TAC over time, minimum size provisions and a series of seasonal closures, as well as a large quantity of provisions for reporting and inspection which are intended to ensure that the TACs and other management measures are respected. Specific to		

Table 5. Summary of Performance Indicator level scores.

Performance Indicator	Draft scoring range	Data deficient?
the harpoon fishery in Messina, this is largely self-regulated by fishermen with rules relating to fishing areas/ sections (called postazioni) and 60 days of fishing a year spanning from the end of April to the end of August. According to the available rebuilding plan in place and the likely limited risk to ecosystem elements, we can determine that there is a partial strategy in place, if necessary, which takes into account available information and is expected to restrain impacts of the UoA on the ecosystem (largely fishing pressure through TAC and other measures) so as to achieve the Ecosystem Outcome 80 level of performance.		
2.5.3 – Ecosystems Information	≥80	Not applicable.
Rationale or key points		
There is abundant information on swordfish catches, biology, diet and ecology, and status. Information is adequate to broadly understand the key elements of the ecosystem and to detect any increase in risk level.		
Principle 3 – Effective management		
3.1.1 – Legal and customary framework	≥80	Not applicable.
Rationale or key points		
There are three jurisdictions of importance to this fishery: the RFMO ICCAT, the EU as the Fishery's Policy maker and Italy as MIPAAF. ICCAT provides the overarching framework to deliver cooperation with all parties to deliver management outcomes for Principle 1 and 2 for Mediterranean swordfish. The European Parliament and the Council have translated the current basis of the multiannual recovery plan for Mediterranean swordfish and amending Council Regulation (EC) No 1967/2006 and Regulation (EU) 2017/2107 of the European Parliament and of the Council laying down management, conservation and control measures applicable in the Convention area of the International Commission for the Conservation of Atlantic Tunas (ICCAT), which has direct effect in the legal order of all member states, Italy included. Through EU cooperation, Italy has been actively participating in data collection, sharing and dissemination of scientific data, scientific assessment of stock status and development of management advice, for the fishery locally.		
3.1.2 – Consultation, roles and responsibilities	≥80	Yes / No Not applicable.
Rationale or key points		
The ICCAT Convention defines the roles and responsibilities of the Commission, of the Secretariat and the Contracting Parties. The ICCAT Manual provides an organigram and explicitly describes the functions, roles and responsibilities of the various ICCAT subsidiary bodies, ICCAT meetings are advertised in advance and the preparatory and final reports are accessible to all. They explain clearly the role and areas of responsibilities. Contributions from stakeholders including environmental NGOs submitted to ICCAT and reports from the press demonstrate how all parties involved in the fishery interact and their roles are well understood. The fishery is also represented at European level, through the Mediterranean Advisory Council (MEDAC) for aspects regarding Principle 2 (non-target species, protected areas, ecosystem change etc.). At the Sicilian level, the Associazione Pescatori Feluche dello Stretto is an association that was formed in May 2018 to better represent the harpoon fishery in the Sicilian context. The association is itself adherent to Confcooperative Fedagripesca Sicilia which itself interfaces with Italian institutions.		
3.1.3 – Long term objectives	≥80	Not applicable.
Rationale or key points		
The long-term objective set out in Article VIII of the ICCAT Convention (ICCAT, 2007) is to maintain the populations of tuna and tuna-like fishes that may be taken in the Convention area at levels which will permit the maximum sustainable catch. For Mediterranean swordfish specifically, Recommendation 16-05 sets the objectives as specified in Principle 1 section to a Recovery Plan sets explicitly the objective of “managing fishing activities by maintaining catches at or below the MSY estimate shall also be supported by a Biomass (SSB) maintained over or at a level of the corresponding BMSY, referring to the SCRS most precautionary MSY estimate.”		
3.2.1 – Fishery specific objectives	≥80	Not applicable.
Rationale or key points		
The overarching objective of ICCAT is to maintain catches of species in their purview at maximum sustainable catch levels (ICCAT, 2007). The Swordfish Recovery Plan sets TAC in accordance with MSY principles and with the aim of the recovery of the stock toward BMSY level. Regarding Principle 2 (and noting the effects of this UoA on principle 1 and 2 and very limited due to limited target stock catches and little to no effects on other additionally targeted species), the Commission adopted a number of resolutions dealing mainly with sharks bycatch, turtles and seabirds. At EU level, the corresponding short and long-term objectives are taken up in the Common Fisheries Policy (CFP) and the various international Conventions that prevail in the Mediterranean Sea and to which the EU and Italy are party.		
3.2.2 – Decision making processes	≥80	Not applicable.

Table 5. Summary of Performance Indicator level scores.

Performance Indicator	Draft scoring range	Data deficient?
Rationale or key points		
<p>The ICCAT Convention (art.3) requires decisions to be taken by a majority of Contracting Parties (CPs), each with one vote. Two thirds of the CPs constitute a quorum, but ICCAT mostly seeks consensus. The Commission receives advice from its Panels and Committees, e.g. scientific advice on issues such as stock status and catch limits comes from the SCRS. Its regular meetings are biennial, with Special meetings the other years as needed. Its main subsidiary bodies, such as the SCRS involved the scientific management advice of Mediterranean swordfish have met every year, or more often for specialized Working Groups.</p>		
3.2.3 – Compliance and enforcement	60 – 79	Not applicable.
Rationale or key points		
<p>Monitoring, control and surveillance in the fishery is conducted by the EU member states through their national enforcement bodies. The European Fisheries Control Agency (EFCA), established in 2005, coordinates the EU member state's fisheries control and inspection activities and provides assistance in the application of the CFP. The Mediterranean is one of the area subject to the Joint Development Plan (JDP) inspection framework of ECFA. ICCAT relies on its Contracting Parties to implement effective sanctions over their flagged vessels. ICCAT can impose trade sanctions and remove, suspend or reduce quota allocated to non-compliant CPCs. The Italian Coastguard manages monitoring control and surveillance of Italian vessels. Relevant statistics on sanctions and inspections are not available for the UoA but only for the whole Italian fleets on "Ecomafie" report 2018. Therefore, it is not possible to demonstrate the efficacy of the MCS mechanism, but it is possible just to infer an expectation of efficacy. Due to the lack of specific evidence or information from stakeholders, we cannot determine, at this stage that there is no evidence of systematic non-compliance.</p>		
3.2.4 – Management performance evaluation	≥80	Not applicable.
Rationale or key points		
<p>ICCAT has mechanisms to evaluate and review all parts of the fishery specific management system through various committees, e.g. the SCRS evaluates scientific research, the COC monitors and evaluates compliance with the Convention and ICCAT Recommendations. ICCAT also conducts independent periodic reviews of its own performance by using external experts. An ad hoc Working Group (ICCAT Doc. No. GEN-001C/ 2017) reports annually (ICCAT, 2017c) on progress achieved by all components of the ICCAT structure following the last external independent Performance Review (Spencer et al., 2016).</p>		

7.4 Principle 1

7.4.1 Principle 1 background

The following information is almost fully based on and reproduced from a stock assessment reports produced by ICCAT available at https://www.iccat.int/Documents/Meetings/Docs/2020/REPORTS/2020_SWO_MED_ENG.pdf (ICCAT 2020a) and in the 2020 SCRS advice to the Commission (https://www.iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf; ICCAT 2020b).

7.4.1.1 Stock Biology and Structure

Swordfish [*Xiphias gladius* (Linnaeus, 1758)] stocks are cosmopolitan, and can be found in the tropical and temperate waters of all the oceans between 45° N and 44° S. They are distributed widely in the Atlantic Ocean and Mediterranean Sea.

Over the range of the swordfish, variation in the distribution by size and sex is evident, both geographically and vertically. Larger individuals are found in deeper colder waters and males are more prevalent in warmer waters than females.

Swordfish mostly spawn in the western warm tropical and subtropical waters throughout the year, although seasonality has been reported in some of these areas. They are found in the colder temperate waters during summer and fall months. Swordfish have been observed spawning in the Atlantic Ocean, in water less than 75 m. Solitary males and females appear to pair up during the spawning season. The most recognized spawning site is in the Mediterranean, off the coast of Italy where in July and August males are observed chasing females. Traditional Atlantic spawning areas are the Gulf of Mexico, south of Sargasso Sea and east of the Antilles in the Straits of Florida, along the southeast coast of the United States, with new spawning areas recently identified between 10° and 15° N and longitudes 30-40° W. Spawning may occur year round however peak activity is between December and July, in water temperatures ranging from 23-26 °C (ICCAT 2007).

Swordfish can reach a maximum weight in excess of 500 kg. Females grow faster than males and reach a larger maximum size. Swordfish are difficult to age, but tagging studies have shown that some swordfish can live up to 15 years. The size at sexual maturity of swordfish varies with location. About 50% of females are considered to be mature by age five, at a length of about 180 cm. The ICCAT Standing Committee for Research and Statistics (hereafter SCRS) has adopted the size at first maturity (L50%) of 179 cm (5 years) for swordfish in the North Atlantic stock. However, the most recent information indicates a smaller length and age at maturity. Males reach maturity one year earlier than females. Reproductive activity of females appears to be related to temperatures in the epipelagic layers and is largely restricted to the warm tropical regions of the western Atlantic (ICCAT 2007).

There is considerable individual variation in fecundity with females carrying from 1 million to 29 million eggs in their gonads. The pelagic eggs are buoyant, measuring 1.6-1.8mm in diameter. Embryonic development occurs during the 2½ days following fertilization. Young swordfish reach about 140 cm LJFL (lower-jaw fork length) by age three. Despite ageing difficulties, growth curves have been developed for both males and females showing sexual-dimorphism in which females at older ages are larger than males. However, the application of these growth relationships to traditional age-structured assessments has been limited because size frequency information is limited to landed fish which are gilled and gutted, thus, the sex is undetermined. Unisex growth curves have been developed; however, their application for assessment purposes is limited.

Larval swordfish feed on copepods, but at an early juvenile age their diet consists almost entirely of fish. Adults feed on a wide variety of prey including groundfish, invertebrates, pelagic and deepwater fish. Adults are believed to feed throughout the water column, and based on recent electronic tagging studies undertake diurnal migrations, rising to the surface mixed layer at night and descending to deeper waters during day to feed on fishes and squids (ICCAT 2007). Smaller prey is generally eaten whole, while larger prey is often

observed with slash marks from the swordfish rostrum. It still remains unclear when and how often the bill is used during feeding (ICCAT 2007). The trophic level is estimated as 4.5 ± 0.2 s.e., based on diet studies.

Swordfish are apex predators, located at the top of the food chain. Predation on swordfish (other than human) is expected to be limited to that on young and infirm swordfish. Swordfish are known to migrate in significant numbers between the relatively hot subtropical waters and the temperate waters of the North and South Atlantic. This has been shown through tagging recoveries where tagged fish were released from Northwest, Northeast and Southwest Atlantic fisheries. Importantly, these tagging programs have not shown extensive movements across the Equator (ICCAT 2007). The results of these programs have not shown the existence of extensive trans-Atlantic migration of this species, but these observations are limited by problems associated with use of conventional tags (ICCAT 2007).

Significant differences in size of initial sexual maturity and growth parameters between the Atlantic and Mediterranean provides evidence of distinct stocks. Recent genetic work indicates there is significant difference in the genetic structure of swordfish between the populations of the four regions: North Atlantic, South Atlantic, Mediterranean and Indian Ocean, with a Mediterranean population significantly distinguished from the others (ICCAT 2007c). However, boundaries between these stocks are not well defined biologically. Areas of mixing of the North and South Atlantic Stock probably occur around latitude 50° N and, perhaps, further north, between 10° and 20° N. In addition, there is evidence to support exchanges between the Mediterranean and Northeast Atlantic. Some consider the area of mixing of these two stocks to be around 10° W (ICCAT 2007). Based on this information, current understanding is that there is a separate Mediterranean group, and separate North and South Atlantic groups. Thus, ICCAT assesses and manages swordfish on three distinct units of management: North Atlantic, South Atlantic and Mediterranean with the North and South stocks separated at 5° North.

Research results have also demonstrated that Mediterranean swordfish compose a unique stock separated from the Atlantic stocks, although there is incomplete information on stock mixing and boundaries. However, mixing between stocks is believed to be low and generally limited to the region around the Straits of Gibraltar.

According to previous knowledge, the Mediterranean swordfish have different biological characteristics compared to the Atlantic stock. The growth parameters are different, and the sexual maturity is reached at younger ages as compared to the Atlantic, although more recent information for the Atlantic indicates that these differences may be smaller than was previously thought. In the Mediterranean, mature females as small as 110 cm LJFL have been observed and the estimated size at which 50% of the female population is mature, occurs at about 140cm. According to the growth curves used by the SCRS in the past for Mediterranean swordfish, these two sizes correspond to 2 and 3.5 year-old fish, respectively. Males reach sexual maturity at smaller sizes and mature specimens have been found at about 90 cm LJFL. Based on the fish growth pattern and the assumed natural mortality rate of 0.2, the maximum yield would be obtained through immediate fishing at age 6, while current catches are dominated by fish less than 4 years-old.

A Workshop on swordfish stock structure took place in Crete in early 2006, in response to Resolution by ICCAT on the clarification of the stock structure and boundaries between the swordfish stocks in the Atlantic [ICCAT, 1999; Res. 99-03], at which 13 scientific documents on swordfish biology were presented. The results of the research presented gave general support to the stock structure currently assumed for Atlantic Swordfish (Mediterranean and North and South Atlantic stocks). The Workshop agreed that the precise delimitation between these three stocks cannot be improved upon without intensified collaborative and multi-disciplinary research. Similarly, the classification of swordfish caught near the boundaries to their stock of origin is subject to uncertainty and cannot be made accurately without intensified collaborative and multi-disciplinary research taking into account fine-scale (e.g., 1° squares) and quarterly sampling strata. The Workshop also noted that while there was some mixing between Atlantic and Mediterranean stocks near the Straits of Gibraltar, there was strong evidence that the Mediterranean is genetically distinct from the Atlantic, Pacific and Indian Ocean stocks (Figure 1).

In the ICCAT convention area, the management units of swordfish for assessment purposes are a separate Mediterranean group, and North and South Atlantic groups separated at 5°N. However, the precise boundaries between stocks are uncertain, and mixing is expected to be highest at the boundary in the tropical zone.

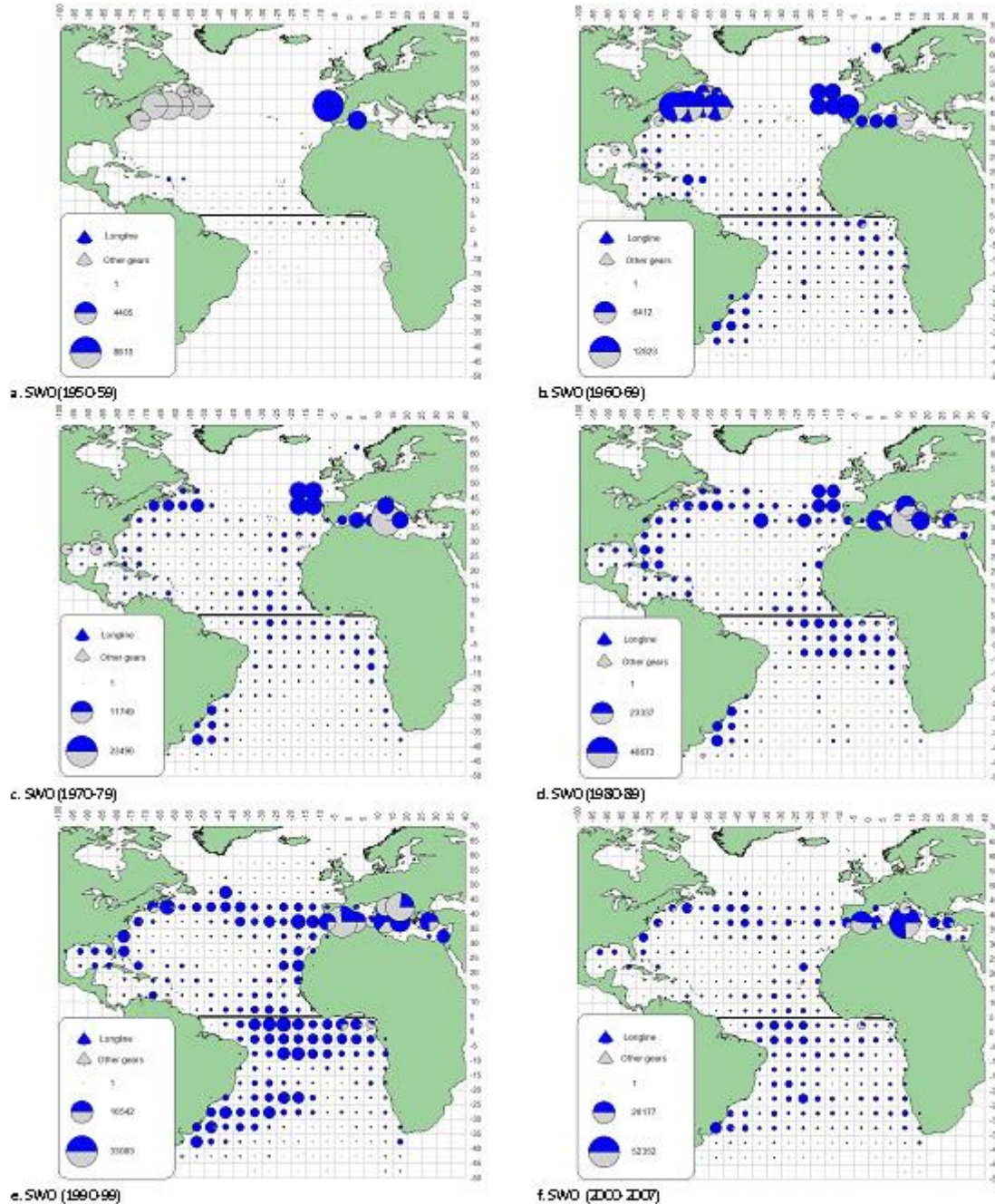


Figure 1 - Geographic distribution of swordfish cumulative catch (t) by gear, in the Convention area, shown on a decadal scale. The more contemporary period (2000 to 2007) is shown on the bottom right. ([firms.fao.org/fi/common/format/popUpImage.jsp?xp_imageid=14166](https://www.firms.fao.org/fi/common/format/popUpImage.jsp?xp_imageid=14166)).

7.4.1.2 Description of the fishery

In the Mediterranean Sea, annual catch levels did not show any particular trend in the decade 2000-2010, fluctuating between 13,000-16,000 t followed by a decreasing pattern in the next period. Those levels are relatively high and similar to those of bigger areas such as the North Atlantic. This could be related to higher recruitment levels in the Mediterranean as compared to the North Atlantic, different reproduction strategies (larger spawning areas in relation to the area of distribution of the stock) and the lower abundance of large pelagic predators (e.g. sharks) in the Mediterranean. Updated information on Mediterranean swordfish catch by gear type is provided in Figure 2. The total 2015 catch is estimated to be around to 10,000 t. The biggest producers of swordfish in the Mediterranean Sea in recent years are EC-Greece, EC-Italy, EC-Spain and Morocco. Furthermore, Algeria, EC-Cyprus, EC-Malta, EC-Portugal, Tunisia and Turkey have fisheries targeting swordfish in the Mediterranean. Minor catches of swordfish have also been reported by Albania, Croatia, EC-France, Japan, and Libya. The ICCAT recognized that there may be additional fleets taking swordfish in the Mediterranean, for example, Egypt, Israel, Lebanon, Monaco and Syria; however, the data are not reported to ICCAT or FAO.

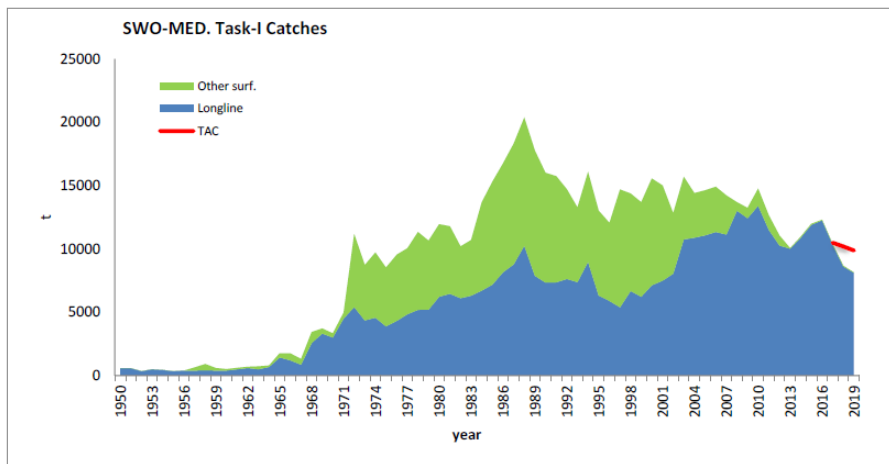


Figure 2 - Estimates of Task I swordfish catches (t) in the Mediterranean by major gear types, for the period 1950-2019, and corresponding annual TACs since 2017 [Rec .16-05]. (Source: https://www.iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf)

Mediterranean swordfish landings showed an upward trend from 1965-1972, stabilized between 1973-1977, and then resumed an upward trend reaching a peak in 1988 (20,365 t; Figure 2). The sharp increase between 1983 and 1988 may be partially attributed to improvement in the national systems for collecting catch statistics. Since 1988, the reported landings of swordfish in the Mediterranean Sea have declined, and in the last decade, they remain mostly around to 10,000-8,000 t.

The main fishing gears used are surface longline and gillnets. Minor catches are also reported from harpoon, trap and recreational fisheries. Surface longlines are used all over the Mediterranean, while gillnets are still used in some areas and there are also countries known to be fishing with gillnets but not reporting their catches. However, following ICCAT recommendations for a general ban of driftnets in the Mediterranean, the gillnet fleet has been decreasing, although the total number of vessels cannot be determined from ICCAT statistics.

Preliminary results of experimental fishing surveys presented during the 2006 SCRS meeting indicated that selectivity of the surface longline targeting swordfish was more affected by the type and size of the bait, the depth of the set and the distance between branch lines rather than the type (circular vs. J-shaped) and the size of the hook. In general, American-style longlines capture less juvenile fish than the traditional

Mediterranean longline gear, while a significant reduction of swordfish catches was found when using circle hooks.

A study based on fisheries data from the eastern Mediterranean (SCRS/2009/144) suggested that there are no major differences in the age selection pattern among American and traditional longlines and confirmed previous findings regarding the higher catch efficiency of the American gear. It has been noted, however, that further studies in other Mediterranean areas are needed to verify that the estimated selection curves are independent of the stock distribution pattern-

A working paper (SCRS/2009/177) that presented an updated analysis of size data from the Moroccan driftnet fishery indicated that the mean size of fish has shown an increasing trend during the last decade owing to the implementation of a national minimum landing size regulation. In addition, the proportion of juveniles (less than 125 cm) in the catches has substantially decreased.

Italy has a long historical tradition in the swordfish fishery which is currently reflected by the development of several fishing strategies and gears in more recent times. As a matter of fact, Italy has an important fleet of longliners which provides the bulk of the catches, while minor catches are obtained by the few harpoon vessels still active in the Strait of Messina, the tuna traps, the purse seines and sport fishery. The structure of the Italian fleet has undergone major changes after the total UN driftnet moratoria to driftnet longer than 2,5km which entered into force in 1992. Italy had the most numerous driftnet fleet in the Mediterranean and it was not easy to apply and enforce the new regulation, due to a strong tradition. The gradual process of fleet dismantling has led to a gradual reduction of fishing units in the period from 1992 to 2002, when, an EU ban to the use of driftnet to catch highly migratory species entered into force Italy has transposed the ICCAT management measures described earlier, with the DM 03 June 2015 and DD of 29 February 2016, establishing measures for the professional longline swordfish fishery including a new list of the authorized vessels, which substantially reduced the number of the licensed boats compared to what was previously reported in the ICCAT database. Also, the recently adopted regulation is more restrictive than recommendations in place in ICCAT. Indeed, vessels are authorised to keep onboard only 2800 hooks maximum also in case of trips longer than two days.

The longline fleet is widespread all over the various seas around Italy, with a higher concentration in the southern Italian regions (over 65% of the fleet). Most of the vessels are small-medium longliners. According to the DD of 29 February 2016 the Italian fleet licensed for the professional swordfish fishery is now made up of 849 boats, mostly small-medium sized units, (45% less than 12 meters LOA and 10 GT, 78% less than 15m LOA), with an average length of 12.5m and 15.6 GT., distributed in a great number of harbours, usually exploiting local fishing grounds. Some of the smaller boats in the list have licenses for different gears (longline, trammel net, bottom gillnet, etc.) and show a strictly seasonal activity, switching from one gear to the other according to the seasons and fishing opportunities. Vessels medium-large in size usually carry out a more focused activity, alternatively targeting swordfish and albacore or bluefin tuna and covering various areas in the Mediterranean Sea. The fishing grounds show moderate yearly variability, depending mostly on oceanographic factors. Some fleets are active all the year round, while the majority of the vessels are active from spring until early autumn.

The longline fishery has changed considerably in the last five years. From 2009-2010, the mesopelagic longline has been gradually introduced in almost all Italian swordfish fleets, which has led to an increase in catches of individuals of larger size and decreases in the catches of juveniles, at least in the first years (see SCRS/2016/120). This new approach is now incorporated in the majority of the Italian longliners that use alternatively surface and meso-pelagic according to the season. The majority of vessels use both gears depending on the sea condition, season and fishing opportunity. The mesopelagic longline gear is set deeper and for longer periods of time compared to the traditional approach for the Italian fisheries and is mainly operated during the summer months due to better weather conditions. Surface longline is easier to manage and faster in the fishing activity (smaller size and shorter soaking time); it can be used by smaller boats and much closer to the coast (fishing in the surface layers) and produces its main effort only during night hours.

This is particularly noteworthy, as these changes in fishing patterns can have implications in the use of catch rates as indices of abundance in the stock assessment.

SCRS/2016/120 presented nominal indices of relative abundance for swordfish caught by the Ligurian longline fishery updated with 2014 and 2015 data. The trend in CPUE for the mesopelagic longline indicates that relative abundance for 2014 has strongly increased from 2013 levels, but dropped during the following season 2015. Average sizes of fish, after the drop of the previous years, remain quite constant. During the winter months fishing is active using the American Type longline: a comparison of the two gears in terms of catches, CPUEs and size frequency distributions is reported.

7.4.1.3 Stock assessment and reference point

Since the 2016 assessment, there have been several changes both in fisheries operations and in the data available as input to the assessment models, which have undergone substantial revisions and the integration of new information. In addition, in 2020 stock assessment a Bayesian surplus production model, using a long series of data (1950-2018), was examined and was chosen for providing the scientific advice for the Mediterranean swordfish stock. Until 2016, advice was based on age structured models which were re-examined again. However, due to lack of indices of abundance for the earlier period, the input data for the age-structured models started in 1985, when the stock was already under high exploitation. From the age-structured models it was estimated that the stock was already overfished in 1985, although total catches had never exceeded MSY estimates from either age-structured or surplus production models prior to 1985. This was considered biologically implausible and it was deduced that these models were unable to properly estimate stock productivity due to data limitations (insufficient data series).

Under different assumptions about reporting levels of undersized fish in the catch, age-structured analysis including data from 1985-2018 indicated that current SSB levels are much lower than those in the 80s, while recruitment shows a declining trend in the last decade. Due to limited data for the earlier period of the fishery (See data catalogue in the 2020 Mediterranean swordfish stock assessment meeting report (Anon 2020), the age structured analysis failed to provide reliable estimates of stock productivity, and conclusions on the state of the stock were based on the surplus production model approach.

Results of the Bayesian surplus production model that used the whole catch series from 1950 to 2018, assuming also discard under-reporting in the last decade, indicated that stock biomass started declining from 1970 onwards, while fishing mortality starting exceeding FMSY in the late 1980's when catches peaked (Figure 3). The stock became overfished in the early 1990's following the full development of the fishery and the relatively high catches observed in middle-late 1980's (see Table 6). The analysis concluded that there is a 41.1% probability that the stock is overfished and overfishing is still occurring (red) and a 45.6% probability

that the stock is overfished but overfishing is not occurring (yellow;

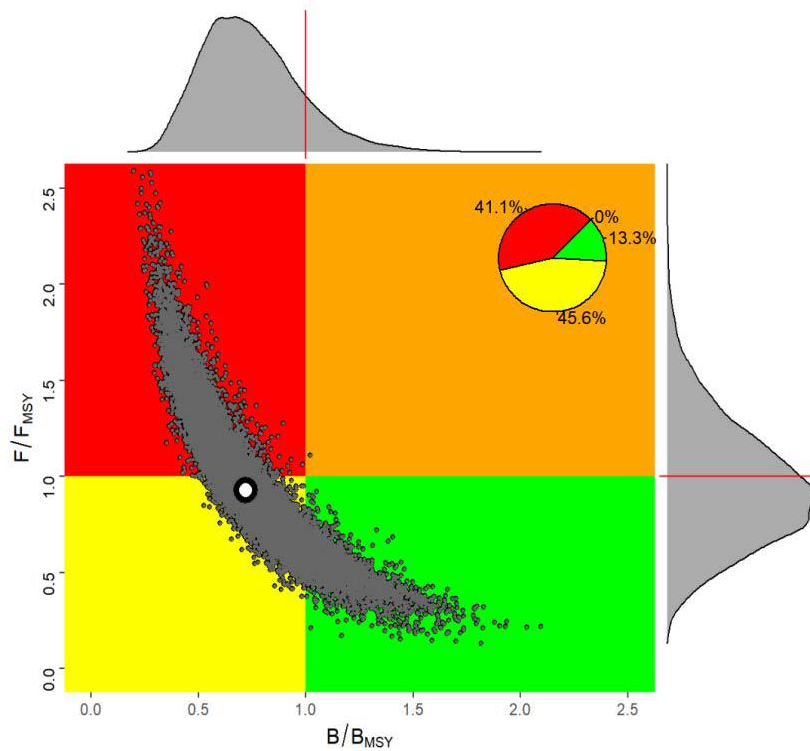


Figure 4).

The Committee again noted the large catches of swordfish less than 4 years old and the relatively low number of large individuals in the catches. Fish less than four years old usually represent more than 70% of the total yearly catches in terms of numbers.

The assessment of Mediterranean swordfish indicates that the stock is most likely overfished and current fishing mortality is just below FMSY levels. The stock has been in overfished state since the early 1990s because of the large catches in the 1980s and the selection pattern which captures many immature fish. Current catches are dominated, in terms of number, by fish less than 4 years old and the highest fishing mortality is corresponding to fish of age 3. Additionally, estimated recruitment has been declining for the last 10 years.

Projections of different catch levels, based on the output of the production model assessment indicate that TAC equal to 10,000 t would result in stock rebuilding with a 60% probability by the end of the projections period (2028). Projections were not carried out beyond 2028 due to uncertainty with the models. Probabilities increase if lower TACs are adopted. Projection results are summarized in Figure 5 and Table 7. It should be noted, however, that these projection estimates are based on the assumption that future stock productivity will be around the average of the whole studied period. The declining recruitment in the most recent years, may indicate that stock productivity has decreased and in that case stock projections may be optimistic and should be interpreted with caution.

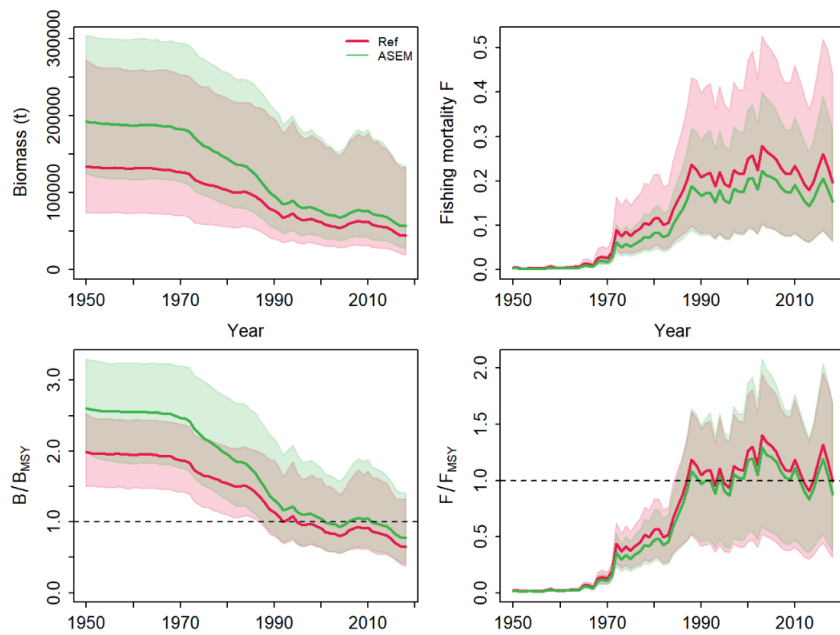


Figure 3 - Trends in biomass and fishing mortality (upper panels) and biomass relative to BMSY (B/B_{MSY}) and fishing mortality relative to FMSY (F/F_{MSY}) (bottom panels) for each scenario from the Bayesian state-space surplus production model fits to Mediterranean swordfish. (Source: https://www.iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf).

Table 6 - Summary of reference points (median and 95% credibility intervals) presented in the form of joint MCMC posteriors of JABBA model runs ('Reference' and 'ASEM' models) for Mediterranean swordfish. (Source: https://www.iccat.int/Documents/Meetings/Docs/2020/REPORTS/2020_SWO_MED_ENG.pdf)

Estimates	Median	Lower 95%CI	Upper 95%CI
B_0	169231	85506	274312
F_{MSY}	0.186	0.116	0.344
B_{MSY}	71319	42562	113758
MSY	13325	10899	17346
B_{2018}	50692	22101	116525
F_{2018}	0.171	0.074	0.393
B_{2018}/B_0	0.312	0.168	0.557
B_{2018}/B_{MSY}	0.719	0.382	1.278
F_{2018}/F_{MSY}	0.929	0.421	1.680

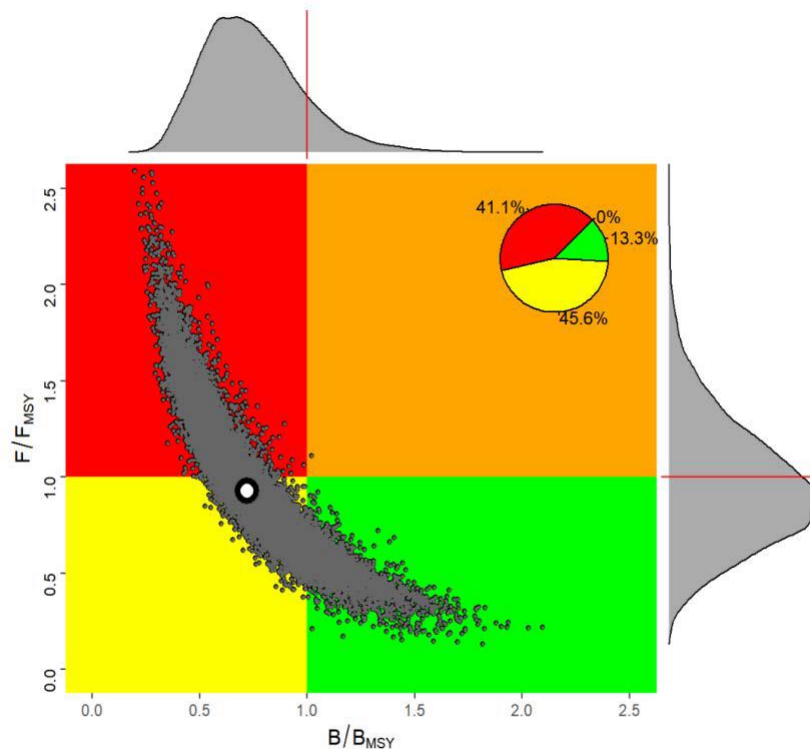


Figure 4 - Kobe phase plot showing the combined posteriors of B_{2018}/B_{MSY} and F_{2018}/F_{MSY} presented in the form of joint MCMC posteriors of JABBA model runs for Mediterranean swordfish. The probability of posterior points falling within each quadrant is indicated in the pie chart. (Source: https://www.iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf).

ICCAT imposed a Mediterranean-wide one-month fishery closure for all gears targeting swordfish in 2008, followed by a two-month closure since 2009 (see 277.4.1.4). Through Recommendations 11-03 and 13-04 the Commission has adopted additional management measures intended to bring the stock back to levels that are consistent with the ICCAT Convention objective. Those measures include an additional one-month closure accompanied by minimum catching size regulations, a list of authorized vessels, specifications on the technical characteristics of the longline gear, and onboard domestic observers on a given percentage of longline vessels. Recently, through Rec. 16-05, which replaced Rec. 13-04, a 15-year recovery plan has been adopted. In addition, increased catching size, and fishing capacity limitations were established, accompanied by TACs (10,500 t in 2017 Rec. 16-05, with a 3% annual reduction over the period 2018-2022) and a seasonal closure of the albacore fishery to reduce juvenile swordfish by-catches. The European Union introduced a driftnet ban for highly migratory species in 2002 and in 2003 ICCAT adopted a recommendation for a general ban of this gear in the Mediterranean [Rec. 03-04]. Rec. 04-12 forbids the use of various types of nets and longlines for sport and recreational fishing for tuna and tuna-like species in the Mediterranean.

After the adoption of the aforementioned ICCAT Recommendations, reported catches have decreased significantly from the 2000s' level, making the catches of the period 2012-2019 among the lowest of the last three decades. In addition, reported catches of undersized swordfish have also decreased more than 50%, compared with the levels of the decade of 2000s. Importantly, based on observations onboard, the recent increase of the minimum catching size from 90 to 100 cm has resulted in discard increases (up to 600%) in some fisheries. Both hooking and post-release mortality are unknown for this stock. However, for the Atlantic very high values of hooking mortality (ranging between 78-88%) have been reported for swordfish less than 125 cm LJFL, and it is possible that similar high values also occur in the Mediterranean. The Committee showed

concern that such discards are not being fully reported and reiterated that all dead discards should be reported in Task I NC for all fisheries. Additionally, they should be included in the analysis of CPUE data trends. The additional measures foreseen under Rec. 16-05 have only recently been adopted and their effects cannot be fully evaluated.

Over the last 50 years stock biomass shows declining trends, starting with the period around 1970-1990, when the fishery was in a strong developing phase. In the following period until about 2010, declining trends were rather modest accompanied by small-scale fluctuations. In the most recent period, the stock biomass has continued to decline. As expected, fishing mortality followed an opposite trend with sharper increases during the 1980s. Current stock biomass is about 30% lower than that corresponding to MSY, while fishing mortality is around FMSY. According to the Commission objectives the stock requires rebuilding and relevant scenarios were simulated assuming different levels of TACs. Analysis indicated that the probability of stock rebuilding by the end of the projection period (2028) is 60% if a TAC equal to 10,000 t is implemented. The probability increases if lower TACs levels are selected. As there are uncertainties on stock productivity, these estimates may be optimistic and should be interpreted with caution.

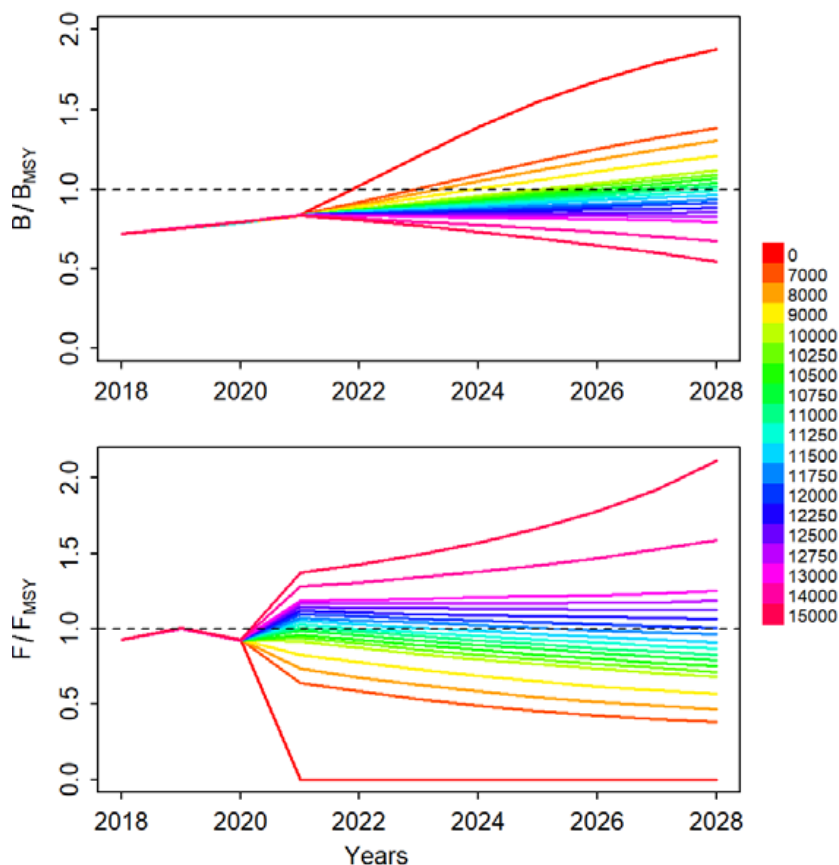


Figure 5 - Trends of projected relative stock biomass (at begin of year, upper panel, B/B_{MSY}) and fishing mortality (at end of year, bottom panel, F/F_{MSY}) of Mediterranean swordfish under different TAC scenarios (0 – 15,000 t), based upon the combined projections of JABBA model runs. Each line represents the median of 30000 MCMC iterations by projected year. (Source: https://www.iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf).

The Committee noted that since the establishment of minimum catching sizes, particularly after the recent size increase imposed through Rec. 16-05 the discard levels of undersized swordfish are increasing at least for certain fisheries and are largely dead. However, discards are not being reported for all fleets. Though an

attempt has been made to statistically estimate discard levels and consider them in stock assessment models, the real volume of total discards is unknown due to this under-reporting. Such under-reporting leads to false estimates of the overall catch volume and consequently bias stock status estimates and projections of future stock size under different management measures.

Table 7 - Estimated probabilities of the Mediterranean swordfish stock (a) being below FMSY (overfishing not occurring), (b) above BMSY (not overfished) and (c) above BMSY and below FMSY (green zone) for a range of fixed total catches (0 – 15,000 t) over the projection horizon 2021-2028 based on joint projection MCMC posteriors of JABBA model runs ('Reference' and 'ASEM' models). (Source: https://www.iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf).

a) Probability that $F \leq F_{MSY}$										b) Probability that $B \geq B_{MSY}$										c) Probability that $F \leq F_{MSY}$ and $B \geq B_{MSY}$									
TAC Year	2021	2022	2023	2024	2025	2026	2027	2028		TAC Year	2021	2022	2023	2024	2025	2026	2027	2028		TAC Year	2021	2022	2023	2024	2025	2026	2027	2028	
0	100	100	100	100	100	100	100	100		0	31	52	71	84	92	96	98	99		0	31	52	71	84	92	96	98	99	
7000	84	87	90	91	93	94	94	95		7000	31	41	51	59	67	72	77	81		7000	31	41	51	59	67	72	77	81	
8000	76	80	83	85	87	88	89	90		8000	31	39	47	55	61	67	71	75		8000	31	39	47	55	61	67	71	75	
9000	68	72	75	77	80	81	82	84		9000	31	38	44	50	56	60	64	68		9000	31	38	44	50	56	60	64	68	
10000	58	62	65	68	70	72	73	74		10000	31	36	41	46	50	53	57	60		10000	31	36	41	46	50	53	57	60	
10250	56	60	62	65	67	69	71	72		10250	31	36	40	45	49	52	55	58		10250	31	36	40	45	49	52	55	58	
10500	54	57	60	62	64	66	68	69		10500	31	35	39	43	47	50	53	56		10500	31	35	39	43	47	50	53	56	
10750	51	54	57	59	61	63	64	66		10750	31	35	39	42	45	48	51	53		10750	31	35	39	42	45	48	51	53	
11000	49	52	55	57	59	60	61	63		11000	31	35	38	41	44	47	49	51		11000	31	34	38	41	44	47	49	51	
11250	47	50	52	54	56	57	58	59		11250	31	34	37	40	43	45	47	50		11250	31	34	37	40	43	45	47	50	
11500	45	47	49	51	53	54	55	56		11500	31	34	37	39	42	44	45	47		11500	30	34	37	39	41	44	45	47	
11750	43	45	47	48	50	51	52	53		11750	31	34	36	38	40	42	43	45		11750	31	33	36	38	40	42	43	45	
12000	41	43	44	46	47	48	49	50		12000	31	33	35	37	39	41	42	43		12000	30	33	35	37	38	40	41	43	
12250	39	40	42	43	44	45	45	46		12250	31	33	35	36	37	38	39	40		12250	30	32	34	35	37	38	39	40	
12500	37	38	39	40	41	42	42	43		12500	31	32	33	35	36	37	38	38		12500	30	31	32	34	35	36	37	38	
12750	35	36	37	38	38	39	39	40		12750	31	32	33	34	35	35	36	36		12750	29	31	32	33	33	34	35	35	
13000	33	34	35	35	36	36	36	36		13000	31	32	33	33	34	34	34	34		13000	29	30	31	31	32	32	33	33	
14000	27	27	27	26	26	26	26	25		14000	31	30	30	29	29	28	28	27		14000	25	25	25	25	25	25	25	24	
15000	22	21	20	20	19	18	18	17		15000	31	29	27	26	24	23	22	21		15000	21	20	20	19	18	18	17	17	

7.4.1.4 Rebuilding plan and management measures

In 2018 the European Commission, who plays a major role in the Mediterranean swordfish fisheries, with around 70% of the total catches, put forward a proposal for the transposition of a multiannual recovery plan for Mediterranean swordfish. Adopted by ICCAT during its 2016 annual meeting as recommendation 16-05 (hereafter the recovery plan), the 15-year recovery plan lays down measures for the conservation of the Mediterranean stock of swordfish, and for the control of fishing activities affecting this stock. Recognizing the overfished status of the swordfish stock over the last 30 years and its current overfishing, the plan aims to reverse this trend and reach a biomass corresponding to a maximum sustainable yield by 2031.

The recovery plan starting in 2017 and continuing through 2031 has the goal of achieving BMSY with at least 60% probability. It has the following conservation measures:

1. **Total Allowable Catch:** for the year 2017, a Total Allowable Catch (TAC) shall be set at 10,500 tons. A specific working group shall, in the context of the establishment of the allocation key, use transparent and objective criteria, including those of an environmental, social and economic nature, and notably take into consideration Resolution by ICCAT on Criteria for the allocation of fishing possibilities [Res. 15-13]. Over the period 2018-2022, the TAC should be gradually reduced by 3% each year.
2. **Capacity limitations:** A capacity limitation shall be applied for the duration of the Recovery plan. In 2017 CPCs shall limit the number of their fishing vessels authorised to fish for Mediterranean swordfish to the average yearly number of their vessels that fished for, retained on board, transhipped, transported, or landed Mediterranean swordfish over the period 2013-2016. However, CPCs may decide to use the number of their vessels that fished for, retained on board, transhipped, transported, or landed Mediterranean swordfish in 2016, if this number is inferior to the average yearly number of vessels over the period 2013-2016. This limit shall be applied by gear type for catching vessels. 10. Starting in 2018, CPCs shall submit their fishing plan to ICCAT by 15 March each year. Such plan shall include detailed information regarding the quota allocated by gear type, including to sport and recreational fisheries (if applicable) and by-catches.

3. Closed fishing season: Mediterranean swordfish shall not be caught (either as a targeted species or as by-catch), retained on board, transhipped or landed during either:
 - a) the period from 1 October to 30 November and during an additional period of one month between 15 February and 31 March,
 - b) or, alternatively, during the period from 1 January to 31 March each year.

In order to protect juvenile swordfish, a closure period shall also apply to longline vessels targeting Mediterranean albacore (*Thunnus alalunga*) from the 1 October to 30 November each year. CPCs shall monitor the effectiveness of the closure periods and shall submit to the Commission, at all relevant information on appropriate controls and inspections to ensure compliance with these measures.

4. Minimum size: only entire specimens of swordfish, without removal of any external part, or gilled and gutted specimens, can be retained on board, landed, transhipped and first transported after landing. In order to protect small swordfish, CPCs shall take the necessary measures to prohibit catching, retaining on board, landing, transporting, storing, selling, displaying or offering for sale Mediterranean swordfish measuring less than 100 cm LJFL or, in alternative, weighing less than 11,4 kg of round weight or 10,2 kg of gilled and gutted weight. Incidental catch of Mediterranean swordfish below the minimum size referred shall not be kept on board the fishing vessel, transhipped, landed, sold, displayed or offered for sale.
5. Technical characteristics of the fishing gear: the maximum number of hooks that can be set or taken on board of vessels targeting swordfish should be fixed at 2500 hooks. A second set of rigged hooks may be allowed on board for trips longer than 2 days provided that it is duly lashed and stowed in lower decks so that it may not readily be used. Hook size should never be smaller than 7 cm of height for fishing targeting swordfish. The length of the pelagic longlines will be of maximum 30 NM (55 km).
6. Sport and recreational fisheries rules: CPCs shall provide to the ICCAT Secretariat the lists of all sport and recreational vessels authorized to catch swordfish in the Mediterranean Sea, at least 15 days before the exercise of the activities. Vessels not introduced on this list shall not be authorized to catch Mediterranean swordfish. Only 'rod and line' vessels shall be authorised for the purpose of sport and recreational fishing for Mediterranean swordfish.

The recovery plan sets also specific control measures as the records of vessels authorized to catch Mediterranean swordfish, regulates the by-catch of Mediterranean swordfish by vessels not authorised to fish actively Mediterranean swordfish, identification of designated ports where fishing vessels shall only land Mediterranean swordfish catches, including by-catches and fish caught in the context of sport and recreational fisheries. Each CPC shall take the necessary measures to control landings of Mediterranean swordfish, and notify these measures to ICCAT when submitting its fishing plan as referred to under paragraph 10 of this recommendation. Transshipment operations at sea of Mediterranean swordfish are prohibited.

The Multi-annual Recovery Plan for Mediterranean swordfish agrees to apply the ICCAT Scheme of Joint International Inspection adopted during its Fourth Regular Meeting. The scheme referred applies in international waters until ICCAT adopts a monitoring, control and surveillance scheme which will include an ICCAT scheme for joint international inspection, based on the results of the Integrated Monitoring Measures Working Group, established by the Resolution by ICCAT for Integrated Monitoring Measures.

The Multi-annual Recovery Plan also put in place the scientific information needed for the evaluation and management of swordfish stock. In particular, CPCs shall take the necessary measures and actions to better estimate: region specific size and age at maturity; habitat use for comparison of the availability of swordfish to the various fisheries, including comparisons between traditional and mesopelagic longlines; the impact of the mesopelagic longline fisheries in terms of catch composition, CPUE series, size distribution of the catches; and monthly estimation of spawner and recruit proportion in the catches. Moreover, specific information on the fishing activity needs to be monitored as: vessel identification; specific information related to fishing

activities, based on sampling or for the whole fleet and by target species and area: Fishing period(s) and total annual number of fishing days of the vessel; geographical areas, by ICCAT statistical rectangles; type of vessel; number of hooks used; number of longline units used; overall length of all longline units for the vessel. Specific data on the catches, in the smallest time-area possible: Size and, if possible, age distributions of the catches, catches and catch composition per vessel and fishing effort (average fishing days per vessel, average number of hooks per vessel, average longline units per vessel, average overall length of longline per vessel).

A scientific observer programme is also implemented which ensures that national scientific observers are deployed on at least 5% of its pelagic longline vessels over 15 m length overall targeting Mediterranean swordfish. Each CPC shall design and implement a methodology to collect the information on the activities of the longline vessels below and up to 15 m length overall. In addition to the requirement of ICCAT Rec. [16-14], scientific observers shall in particular assess and report on the level of discards of undersized swordfish.

The SCRS shall provide in 2019 an updated assessment of the state of the stock on the basis of the most recent data available. It shall assess the effectiveness of this Recovery plan and provide advice on possible amendments of the various measures. SCRS shall advise the Commission on the appropriate characteristics of the fishing gear, the closure period for the sport and recreational fishery, as well as the minimum size to be implemented for Mediterranean swordfish. Based on such scientific advice, by the end of 2019 the ICCAT shall adopt changes of the management framework for swordfish, including the revision of the catch limits and alternative management scenarios, in case this is necessary to comply with the management objectives.

7.4.2 Catch profiles

Catch profiles are reported in **Errore. L'origine riferimento non è stata trovata.**

7.4.3 Total Allowable Catch (TAC) and catch data

There is not Total Allowable Catch (TAC) agreed for the present stock.

TAC	Year	2019	Amount	10,500 t
UoA share of TAC	Year	2019	Amount	NA
UoA share of total TAC	Year	2019	Amount	NA
Total green weight catch by UoC	Year (most recent)	2019	Amount	74 t (average)
Total green weight catch by UoC	Year (second most recent)	2018	Amount	74 t (average)

7.4.4 Principle 1 Performance Indicator scores and rationales

PI 1.1.1 – Stock status

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment			
	Guide post	It is likely that the stock is above the point where recruitment would be impaired (PRI).	It is highly likely that the stock is above the PRI.	There is a high degree of certainty that the stock is above the PRI.
	Met?	Yes	No	No
Rationale				
<p>In the 2020 stock assessment report for Mediterranean swordfish (ICCAT, 2020a; see: https://www.iccat.int/Documents/Meetings/Docs/2020/REPORTS/2020_SWO_MED_ENG.pdf) only BMSY is analytically determined, while PRI is not available. However, according to GSA2.2.3.1 of MSC Fish. Cert. Req. and Guidance v2.0 in the case where BMSY is analytically determined to be greater than 40%B₀, and there is no analytical determination of the PRI, the default PRI should be ½BMSY. This case covers the situation of low productivity stocks, where higher default PRIs may be justified. Therefore, considering the data available in Table 6, the median value of BMSY is equal to 71,319 t (42% of B₀) and PRI should be determined as 35,660 t. The current median value (B₂₀₁₈) of the biomass is estimated as 50,692 tons with a lower 95th percentile bound of 22,101 t. Looking at the probability of posterior distribution available in Figure 4 it is possible to infer that the 70th percentile is above the PRI (as ½BMSY). Therefore, it is likely that the stock is above the point where recruitment would be impaired (PRI) and SG 60 is met.</p> <p>However, it is clear that the 80th and 95th percentiles are below the PRI (and these are required to meet the SG 80 and 100 thresholds in the standard) and SG 80 and 100 are not met.</p>				
b	Stock status in relation to achievement of Maximum Sustainable Yield (MSY)			
	Guide post		The stock is at or fluctuating around a level consistent with MSY.	There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		No	No
Rationale				
<p>The outputs of the JABBA model available in Figure 3 clearly show that the current biomass is below BMSY since the 90s. Therefore SG 80 and 100 are not met.</p>				
References				
ICCAT, 2020a				
Stock status relative to reference points				
	Type of reference point	Value of reference point	Current stock status relative to reference point	
Reference point used in scoring stock relative to PRI (SIa)	½ BMSY	35,660 t	1.42	

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Reference point used in scoring stock relative to MSY (Sib)	BMSY	71,319	0.71
Overall Performance Indicator (PI) Rationale			
Draft scoring range	60-79		
Information gap indicator	Information insufficient to score PI		
Data-deficient? (Risk-Based Framework needed)	No		

PI 1.1.2 – Stock rebuilding

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Rebuilding timeframes			
	Guide post	A rebuilding timeframe is specified for the stock that is the shorter of 20 years or 2 times its generation time . For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the stock.
	Met?	Yes		No
Rationale				
<p>The rebuilding plan in place (Rec 16-05; ICCAT 2016) has the objective to rebuild the stock and reach a biomass corresponding to a maximum sustainable yield by 2031, therefore, in more than ONE generation time but in less than two (Generation time: 8.9 (6.1 - 13.7) years. Estimated as median Ln(3)/K based on 14, https://www.fishbase.se/summary/226).</p> <p>SG 60 is met but not 100.</p>				
b	Rebuilding evaluation			
	Guide post	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, or it is likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe .	There is strong evidence that the rebuilding strategies are rebuilding stocks, or it is highly likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe .
	Met?	Yes	Yes	No
Rationale				
<p>The projections of different catch levels based on the output of the production model assessment indicate that TAC equal to 10,500 t would result in stock rebuilding with a 60% probability by the end of the projections period (2028) (ICCAT 2020a; b). Projections were not carried out beyond 2028 due to uncertainty with the models. Probabilities increase if lower TACs are adopted. Projection results are summarized in Figure 5. It should be noted, however, that these projection estimates are based on the assumption that future stock productivity will be around the average of the whole studied period. The declining recruitment in the most recent years, may indicate that stock productivity has decreased and in that case stock projections may be optimistic and should be interpreted with caution. It is clear that a monitoring of the effectiveness of the rebuilding plan is in place and according to the simulation model it is likely that the stock would rebuild in the timeframe. The evidence of the effectiveness of the monitoring is available from the fact that the catches are below the TAC in 2018 and 2019 and the stock assessment carried out in 2020 clearly showed that the fishing mortality is decreasing and the biomass is stable in such period. Therefore, SG 60 and 80 are fully met.</p> <p>However, taking into account the uncertainty in the future stock productivity it is not possible to conclude that there is a strong evidence that the stock would rebuild in the timeframe. Thus, SG 100 is not met.</p>				

PI 1.1.2	Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe
References	
ICCAT, 2016; ICCAT 2020a; b	
Overall Performance Indicator (PI) Rationale	
Draft scoring range	≥ 80
Information gap indicator	Information sufficient to score PI

PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is expected to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Yes	Yes	No
Rationale				
<p>MSC defines a harvest strategy as ‘the combination of monitoring, stock assessment, harvest control rules and management actions, which may include a management plan or a rebuilding plan and be tested by MSE’ (MSC – MSCI Vocabulary v1.1).</p> <p>ICCAT have recently implemented a rebuilding plan for the Mediterranean swordfish, which came into force in 2017 (ICCAT 2016; Rec. 2016-05). The stated goal of Rec. 2016-05 is to reach a biomass corresponding to a maximum sustainable yield by 2031.</p> <p>The plan is complex, with a wide range of elements (summarised in Section 7.4.1.4). The main measure is the TAC, which has been set at 10,500 t in 2017 and over the period 2018-2022 it should be gradually reduced by 3% each year. This TAC is somewhat below the TAC implied by FMSY (see Table 6) under the reference case stock assessment model, reflecting the goal of the rebuilding plan (Rec. 16-05) which is to achieve BMSY with at least 60% probability. The plan also contains a series of technical measures; notably minimum size provisions and a series of seasonal closures, as well as a large quantity of provisions for reporting and inspection which are intended to ensure that the TACs and other management measures are respected (see discussion in Section 7.4.1.4).</p> <p>Also the rebuilding plan includes a specific provision allowing ICCAT to implement a full review of it, including various provisions for modification of the plan based on new information coming from monitoring and stock assessment. On this basis, the harvest strategy can be said to be responsive to the state of the stock. The plan has been designed as a whole rather than put in place fragmentary. It includes the full range of elements in the MSC definition of a harvest strategy (i.e. monitoring, stock assessment, a harvest control rule and management actions), as well as implementation and enforcement provisions; but not yet an MSE. On this basis, SG60 are 80 met but not SG100.</p>				
b	Harvest strategy evaluation			
	Guide post	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Yes	Yes	No
Rationale				

PI 1.2.1 **There is a robust and precautionary harvest strategy in place**

The stock assessment base case model, with stock projections under different scenarios (see Figure 5) provide evidence that the strategy is achieving its objectives, with F likely to be below FMSY and the biomass likely to be above BMSY under most scenarios. In addition, under the harvest strategy since the recovery plan, the estimated stock size shows a certain stability (Figure 3) and the evidence indicates objective F at MSY is being met in 2018. There is ‘testing’ of the range of harvest strategy elements, including monitoring and stock assessment (e.g. comparison of the output of different models). Thus, SG60 and SG80 are met. In relation to SG100, the uncertainties in the stock assessment do not provide evidence that the plan is ‘clearly’ (i.e. with high certainty) able to maintain the stock at target levels. The harvest strategy has not been fully evaluated and an MSE process is not currently underway. SG100 is not met.

Harvest strategy monitoring			
c	Guide post	Monitoring is in place that is expected to determine whether the harvest strategy is working.	
	Met?	Yes	

Rationale

Monitoring is in place sufficient to evaluate the harvest strategy. Data collection is clearly included in the Rec. 16-05 which also consider the improving of biological information, and both activities were confirmed to be carried out in the last stock assessment report (ICCAT 2020a, b). The stock assessment and other work uses the available data to evaluate the performance of the harvest strategy. For example, size composition of landings as well as abundance is closely monitored. Therefore, because appropriate monitoring is in place that is expected to determine if the harvest strategy is working, SG60 is met

Harvest strategy review			
d	Guide post		The harvest strategy is periodically reviewed and improved as necessary.
	Met?		Yes

Rationale

The rebuilding plan foresees a review in 2019 with an updated assessment of the state of the stock on the basis of the most recent data available, which was carried out in 2020. The review has to assess the effectiveness of plan and provide advice on possible amendments of the various measures. Based on such scientific advice, ICCAT has to adopt changes of the management framework for swordfish, including the revision of the catch limits and alternative management scenarios, in case this is necessary to comply with the management objectives. Therefore, the HS is periodically reviewed and SG 100 is met.

Shark finning				
e	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	NA	NA	NA

Rationale

PI 1.2.1	There is a robust and precautionary harvest strategy in place
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The stock is not a shark. This SI is not applicable.

Review of alternative measures				
f	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	NA	NA	NA

Rationale

Definition of ‘unwanted catch’ (SA3.1.6): the term ‘unwanted catch’ shall be interpreted by the team as the part of the catch that a fisher did not intend to catch but could not avoid, and did not want or chose not to use. According to the last assessment the estimated dead discards represent overall about 12% to 14% between 2008 and 2017 and increased to 24% in 2017-2018, when the current minimum size was implemented of the total long lines catches. However, taking into account the present UoA (harpoon) it is highly unlikely that there would be unwanted catches of target stock. This means that there is no ‘unwanted catch’ – not applicable.

References

ICCAT 2016; ICCAT 2020 a;b

Overall Performance Indicator (PI) Rationale

Information provided in the PI	
Draft scoring range	≥ 80
Information gap indicator	More information about the potential unwanted catch of the target stock will be further explored during the site visit.

PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guide post	Generally understood HCRs are in place or available that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.
	Met?	Yes	No	No
Rationale				
<p>The HCR is based on the management objectives of Rec. 2016-05 with TACs set such that F is below FMSY. The HCR exists in a written form: Rec. 16-05 the swordfish rebuilding plan. There is a clear management objective (BMSY), to be achieved following the HCR (fishing at or less than FMSY). The objective and the HCR is therefore explicitly defined and agreed. In practice, however, the TACs set out in 2016-05 are most likely somewhat below this level and are therefore more conservative (see Table 6).</p> <p>The HCR target reference point (FMSY) is clearly defined and should ensure that exploitation rate is maintained around BMSY (by way of adjusting exploitation rate to maintain F below FMSY, depending, for example, on future levels of recruitment).</p> <p>MSC critical guidance on generally understood vs. well-defined HCRs is as follows (GSA2.5): HCRs should be regarded as ‘well-defined’ in the sense required to achieve an 80 score when they exist in some written form that has been agreed by the management agency, ideally with stakeholders, and clearly state what actions will be taken at what specific trigger reference point levels. HCRs should be regarded as only ‘generally understood’ as required to achieve a 60 score in cases where they can be shown to have been applied in some way in the past, but have not been explicitly defined or agreed.</p> <p>The requirements for a generally-understood HCR at SG60 are clearly met: TACs and other management measures are agreed and applied consistent with the management objective. There is monitoring in place (periodic stock assessments) which allows technical measures to be adjusted based on stock status in relation to objectives, following MSC’s guidance GSA 2.5. The first component of the requirements for a well-defined HCR at SG80 is clearly met: it exists in a written form (2016-05) agreed by ICCAT. In relation to the second part, a large range of actions are stipulated which are consistent with management reference points; however 2016-05 is not specific on future scenarios – i.e. how should these actions be changed in the event that F>FMSY and needs to be reduced? On that basis, it is arguable that the full requirements for a well-defined HCR are not met.</p> <p>There is also an issue with how the HCR operates should the PRI be approached, taking also into account that the PRI is not analytically determined. As is clear from the recent history of the stock it is highly likely that this HCR will maintain the stock far away from the PRI unless there is a catastrophic and long-lasting failure of recruitment for environmental reasons (and this argument applies to any managed fish stock). There are also elements of the harvest strategy that in practice will act to reduce the exploitation rate as biomass declines; such as the MLS (the proportion of the stock above a given size declining as stock biomass declines). There is also a clear process of review and revision of the harvest strategy and the TACs as explained above. For these reasons, the HCR can be ‘expected</p>				

PI 1.2.2 **There are well defined and effective harvest control rules (HCRs) in place**

to reduce the exploitation rate as the PRI is approached’ – SG60 is met. It cannot be argued, however, that the HCR ‘ensures’ that the exploitation rate is reduced as the PRI is approached. SG80 is not fully met.

		HCRs robustness to uncertainty		
b	Guide post		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a wide range of uncertainties including the ecological role of the stock, and there is evidence that the HCRs are robust to the main uncertainties.
	Met?		Yes	No

Rationale

The stock assessment meeting of 2020 reviewed two XSA runs (constant M with/without discards, SCRS/P/2020/029), two a4a runs (constant M with/without discards, SCRS/P/2020/030), and two JABBA runs (Reference and ASEM models, SCRS/P/2020/028). The JABBA model has been chosen as the reference model to provide the advice and was used perform the projections. It is important to stress that such simulations include observation and process errors but is not including unpredictable effects from climate, environmental or anthropogenic non-fishery related factors, which could, for example, lead to periods of low recruitment or growth, high natural mortality or migration. Therefore the HCRs based on the outputs of the JABBA model are taking into account the main uncertainties but not a wide range. Thus SG 80 is met but not 100.

		HCRs evaluation		
c	Guide post	There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Yes	Yes	No

Rationale

The main tool to implement the HCR is TACs, which as noted above are currently at a lower level than MSY. Overall monitoring, reporting and enforcement measures are strict relative to swordfish fisheries. A range of other tools are also in use; i.e. MLS, seasons and requirements on CPCs to manage capacity. Despite uncertainties in the stock assessment and discards estimation, the SCRS appear confident that F is likely to be at FMSY and will likely continue to decrease on the current TAC regime for the next few years. Biomass can be seen to be stable and the fishing mortality is decreasing since the start of the rebuilding plan (2017) in all the stock assessment models and the catches were below the TAC both in 2018 and 2019. Therefore, SG 60 and SG80 are met. SG100 requires that the evidence ‘clearly shows’ that tools are effectively achieving FMSY or below. The stock assessment remains too uncertain to make this statement definitively. SG100 is not met.

References

ICCAT 2016; ICCAT 2020 a;b

Overall Performance Indicator (PI) Rationale

PI 1.2.2	There are well defined and effective harvest control rules (HCRs) in place
Draft scoring range	60-79
Information gap indicator	<p>More information sought</p> <p><i>Information about new HCRs implemented recently that would change the scoring</i></p>

PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue	SG 60	SG 80	SG 100	
a	Range of information			
	Guide post	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Yes	Yes	No

Rationale

There has been significant effort to improve information and monitoring for Mediterranean Swordfish over the last decade; both in terms of monitoring the fishery and in terms of understanding the biology, ecology and dynamics of the stock.

The largest majority of the Mediterranean swordfish fisheries statistics and biological information used in the current stock assessment, was revised and updated during the Report of the 2020 ICCAT intersessional meeting of the Swordfish Species Group (Anon., 2020, in press). During the meeting, a time schedule was established to revise and update some pending datasets foreseeing the estimations of both catch-at-size (CAS) and catch-at-age (CAA) matrices.

The document SCRS/2020/028 presented preliminary estimations of longline (LL) dead discards of undersized fish, obtained using the available size frequencies (T2SZ) of three fleets (EU-España, EU-Greece, EU-Malta) who reported under their T2SZ datasets, fish below the ICCAT minimum size regulation on landings (90 cm in 2014, and updated to 100 cm in 2017).

The observations carried out in the last ten years (2010-2019) in the Ligurian Sea by onboard observers on the Italian longline fishing vessels using the two different gears, mesopelagic longline (LLMESO) and American style longline (LLAM), demonstrate that catches of undersized fish are strictly dependent on gear type, selectivity and seasonality. The size data (T2SZ) available is primarily reported by CPCs, but also includes data from ICCAT special observer programs, sampling initiatives by CPCs, and data recovery projects financed by ICCAT. In relation to the undersized swordfish not reported within the T2SZ datasets to ICCAT, the Group reiterated the need that each CPCs revise those datasets, in particular after 2008, by including the undersized SWO available by gear type.

Task II size samples (T2SZ) and Task II catch-at-size (T2CS) for the Mediterranean swordfish stock have been regularly submitted by the main fishing fleets in the last two decades. Both size datasets (T2SZ, T2CS), have been used in the past (Anon. 2017; Anon 2015), for estimating the overall CAS and CAA matrices.

One new index include the estimated dead discards of the four longline fleets, which assumed the same CAS distribution for the fleets that have reported discards (EU-España, and EU-Greece).

Document SCRS/2020/058 presented an additional list of annotated bibliography related to Italian authors, including the overview of all papers. The full list now includes about 700 papers and the contents can be explored thanks to the annotations. It was discussed the opportunity to move this annotated bibliography to a most advanced database with electronic metadata which is currently already under study. It was also discussed the possibility for having direct links to all documents in pdf, but this will imply a huge workload and important costs, due also to the difficulty of manipulating also historical documents.

PI 1.2.3 **Relevant information is collected to support the harvest strategy**

Document SCRS/2020/074 discussed stage 2 of the gonadal maturity scale for swordfish, a point raised by a presentation (SCRS/P/2020/005) provided in the previous ICCAT Swordfish Species Group intersessional meeting (Anon, 2020 (in press)). The document clarified that all existing gonadal maturity scales, both macroscopic and histological, set stage 2 as developing and never as mature; therefore, the previous studies used consistent classifications.

Research results based on genetic studies have demonstrated that Mediterranean swordfish compose a unique stock separated from the Atlantic ones, although there is incomplete information on stock mixing and boundaries. Although mixing between stocks is believed to be low, past biological, genetic and tagging studies have suggested the possible occurrence of mixing between the Mediterranean and North Atlantic stocks, but further studies need to identify the degree of mixing. A brief review of past tagging experiments indicated that the existing results cannot provide robust information about mixing patterns and confirmed that further work is needed on this aspect.

On this basis, it is possible to conclude that there is a sufficient of information available for harvest strategy. Therefore SG 60 and 80 are met.

However, the stock assessment group in 2020 noted that since the establishment of minimum catching sizes, particularly after the recent increase imposed through Rec. 16-05 the discard levels of undersized swordfish are increasing at least for certain fisheries and are largely dead. However, discards are not being reported for all fleets. Though an attempt has been made to statistically estimate discard levels and consider them in stock assessment models, the real volume of total discards is unknown due to this under-reporting. Such under-reporting leads to false estimates of the overall catch volume and consequently bias stock status estimates and projections of future stock size under different management measures. Therefore, SG 100 is not met.

	Monitoring			
b	Guide post	Stock abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Yes	Yes	No

Rationale

During the 2020 Intersessional meeting of the Swordfish Species Group several of the indices of abundance available for the Mediterranean stock was discussed (see section 7.2 in Anon., 2020, in press). Document SCRS/2020/043 presented the standardized index for the EU-Spain longline swordfish 1988 – 2018, operating mainly in the western Mediterranean region. The index used trip-based information of catches and fishing effort collected by observers and fishery reports. The index included factors of area, quarter and their interactions. Diagnostics, fits and results were presented in both numbers and biomass indices, the stock assessment group considered them appropriate and recommended to use the biomass index as the diagnostics indicated better fit overall.

Document SCRS/2020/027 that was presented during the 2020 Intersessional Swordfish Species Group meeting in March (Anon., 2020, in press) was updated for stock assessment meeting. The index for the mesopelagic longline 2010-2019 from the Ligurian Sea was selected as index of abundance for this fishery. The model included the year, month, bait type and soaking time as predictors in the standardization process. Results both in number and biomass indicated a general declining trend in the index since 2010, reaching in 2018 its lowest value.

PI 1.2.3

Relevant information is collected to support the harvest strategy

From the six available standardized indices for the Mediterranean swordfish (Figure 6) only four were used in the assessment: a) the Greek longline index (1987-2018), b) the Italian Ligurian mesopelagic index (2010-2018), c) the Moroccan longline index (2012-2018), and d) the Spanish longline index (1988-2018). Three of these indices were available in both numbers and biomass. Finally, historic indices of abundance used in prior assessments were considered, such as Moroccan gillnet index (1999-2011), the Sicilian longline index (1991-2009), the Sicilian gillnet index (1990-2009), and the Ligurian longline surface index (1990-2009).

It was noted that recent management regulations (minimum size implementations Rec. [13-04], and Rec. [16-05]) may have affected the trend of the indices, as it is likely that discards at sea are not always included in the catch-effort time series. The Group recommended that CPCs intensify their effort to collect information regarding discards of undersize swordfish both within their targeting fisheries as well as from other longline fisheries where juvenile swordfish are reportedly caught, such as the albacore and bluefin tuna longline fisheries.

The catches of the UoA (Harpoon active in the Strait of Messina) are routinely monitored in the framework of the Italian workplan of the data collection. The data of this fishery have been recovered with very detailed logbooks, containing daily records of the fishing activity. The logbooks contain precise and detailed information about the weather conditions, the precise area where the fishery has been carried out, and the weight of each single specimen caught (see ICCAT database for further evidence: <https://www.iccat.int/en/t1.asp>).

Taking into account the availability of the indexes of abundances from commercial CPUE and the detailed monitoring available for the UoA it is possible to conclude that stock abundance and UoA removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and several indicators are available and monitored with sufficient frequency to support the stock assessment and the harvest control rule. Therefore SG 60 and 80 are met.

However, taking into account that discards at sea are not always included in the catch-effort time series it is not possible to conclude that all information required by the harvest control rule is monitored with high frequency and a high degree of certainty. Therefore, SG100 is not met.

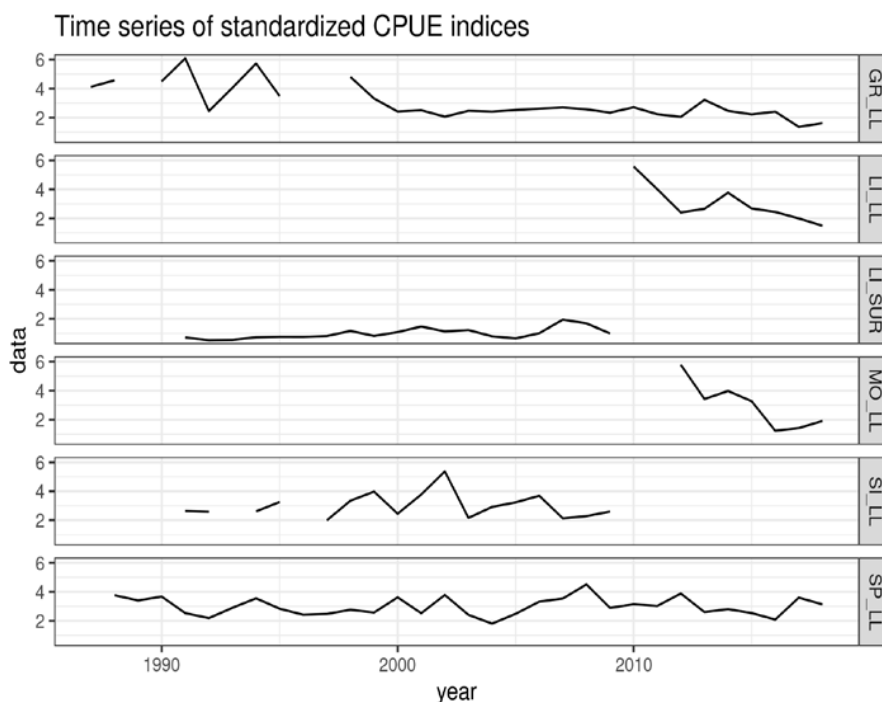


Figure 6 - Time series of scaled standardized CPUE indexes by fleet: GR_LL = Greek longline, SP_LL = Spanish longline, MO_LL = Moroccan longline, LI_LL = Ligurian longline, SI_LL = Sicilian longline, LI_SUR = Ligurian surface longline. (Source: https://www.iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf).

PI 1.2.3		Relevant information is collected to support the harvest strategy		
c	Comprehensiveness of information			
	Guide post		There is good information on all other fishery removals from the stock.	
	Met?		Yes	
Rationale				
According to the evidences available at the ICCAT statistical databases it is clear that good information on all other fishery removals from the stock are available. Also, the rebuilding plan clearly implement measures to reduce the IUU (see Annex 1 of Rec 16-05)				
References				
ICCAT 2013; ICCAT 2016; ICCAT 2020 a;b				
Overall Performance Indicator (PI) Rationale				
Draft scoring range		≥ 80		
Information gap indicator		Information sufficient to score PI		

PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			
	Guide post		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		Yes	No
Rationale				
<p>The stock assessment meeting of 2020 reviewed two XSA runs (constant M with/without discards, SCRS/P/2020/029), two a4a runs (constant M with/without discards, SCRS/P/2020/030), and two JABBA runs (Reference and ASEM models, SCRS/P/2020/028). The JABBA model has been chosen as the reference model to provide the advice and was used to perform the projections. The stock assessment models use a wide range of data, as described in 1.2.3. A range of models were tried, and hence the outcome makes the best use of the available data. It provides the required information (F/MSY) for the HCR, giving a range of results for different scenarios. SG80 is met. The JABBA model does not incorporate elements of the biology of the species (e.g. age/growth, M, size/age at maturity etc.). SG100 is not met.</p>				
b	Assessment approach			
	Guide post	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	Yes	Yes	
Rationale				
<p>FMSY and BMSY reference points are estimated in the framework of JABBA model, but in the past a Y/R model was also used to estimate reference points used in the framework of the XSA. Both sets of reference points are clearly appropriate for the present stock and SG 60 and SG80 are met.</p>				
c	Uncertainty in the assessment			
	Guide post	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Yes	Yes	Yes
Rationale				
<p>The uncertainties in the assessment are highlighted by stock assessment group as well as SCRS; a Kobe plot is provided for the JABBA model with probability distribution (see Figure 4). Projections under the JABBA model are given. The results of alternative models and model settings were extensively considered and discussed during the stock assessment workshop. SG80 is met. Approximate CIs are provided for all parameter estimates from the JABBA</p>				

PI 1.2.4 **There is an adequate assessment of the stock status**

reference case model and the results are provided in a full probabilistic approach (see Table 7). Therefore, SG100 is met.

Evaluation of assessment			
d	Guide post		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?		Yes

Rationale

The stock assessment meeting of 2020 reviewed two XSA runs (constant M with/without discards, SCRS/P/2020/029), two a4a runs (constant M with/without discards, SCRS/P/2020/030), and two JABBA runs (Reference and ASEM models, SCRS/P/2020/028). Therefore, alternative hypotheses and assessment approaches have been rigorously explored. Thus, SG 100 is met.

Peer review of assessment			
e	Guide post		The assessment of stock status is subject to peer review. The assessment has been internally and externally peer reviewed.
	Met?		Yes

Rationale

It is the intent of ICCAT to provide external review as part of their initiative to provide best available science (see Resolution 2011/017). The assessments are conducted by a group of 20-30 scientists of many different nationalities and representing many different countries as well as formal observers (fisherman groups, NGOs). Qualified scientists representing different interest groups are often included within a member state's scientific delegation, as are scientists hired as external reviewers by the member state. Thus, SG80 and SG100 are met.

References

ICCAT 2020 a;b

Overall Performance Indicator (PI) Rationale

Rationale is provided for each Scoring Issue.

Draft scoring range	≥ 80
Information gap indicator	Information sufficient to score PI

7.4.4.1 Reference of Principle 1

ICCAT 1999. Resolution by ICCAT on the Clarification of the Stock Structure and Boundaries Between the Swordfish Stocks in the Atlantic. Resolution 1999-03. (<https://www.iccat.int/Documents/Recs/compendiopdf-e/1999-03-e.pdf>)

ICCAT, 2007. The International Convention for the Conservation of Atlantic Tunas (as amended), The International Convention for the Conservation of Atlantic Tunas. Available at: <http://www.iccat.int/Documents/Commission/BasicTexts.pdf>. ICES.

ICCAT 2013. RECOMMENDATION BY ICCAT FOR THE CONSERVATION OF MEDITERRANEAN SWORDFISH. Rec. 13-04

ICCAT 2016. RECOMMENDATION BY ICCAT REPLACING THE RECOMMENDATION [13-04] AND ESTABLISHING A MULTI-ANNUAL RECOVERY PLAN FOR MEDITERRANEAN SWORDFISH. 9 pp

ICCAT 2020a. REPORT OF THE 2020 ICCAT MEDITERRANEAN SWORDFISH STOCK ASSESSMENT MEETING (Online, 25 May - 2 June 2020). Rec .16-05. 90 pp

ICCAT 2020b. INTERNATIONAL COMMISSION for the CONSERVATION of ATLANTIC TUNAS. 2020 SCRS ADVICE TO THE COMMISSION English version MADRID, SPAIN 2020. 362 pp.

7.5 Principle 2

7.5.1 Principle 2 background

MSC Principle 2

Principle 2 of the MSC standard sets requirements for fishing operations that allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends. Principle 2 is designed to specifically assess the outcome, management and information aspects relating to all the key ecosystem components: primary and secondary species (i.e. unwanted catch that may be managed or unmanaged, respectively), Endangered, Threatened, or Protected (ETP) species, habitats and ecosystems. Each P2 species is considered within only one of the primary species, secondary species or ETP species components. Primary and Secondary Species are accidental or unwanted catches associated with the target fishery. Those making up more than 5% of the overall catch profile of a UoA are classified as Main, while anything below it is classified as Minor. However, if a minor species is defined “less resilient” as per MSC specifications, these species can be classified as Main.

P2 Scoring Elements

The following table presents the scoring elements identified for principle 2.

Table 9. Scoring elements.

Component	Scoring elements	Designation	Data-deficient
e.g. P1, Primary, Secondary, ETP, Habitats, Ecosystems	e.g. species or stock (SA 3.1.1.1)	Main/Minor?	Yes/No?
P2. Secondary species	Mediterranean spearfish <i>Tetrapturus belone</i>	Main	Yes
	Sunfish <i>Mola mola</i>	Minor	Yes
P2. Primary Species	Bluefin tuna <i>Thunnus thynnus</i>	Minor	No
P2. ETP species	None identified	NA	NA
P2. Habitats	None identified	Commonly encountered habitats	NA
	None identified	Minor habitats	NA
	None identified	VMEs	NA

7.5.1.1 Primary and Secondary species

The Messina swordfish harpoon fishery is very selective as only targeted fish are caught. Partly because of this reason and to its history and peculiarity, the fishery has been formally recognised in Regional Sicilian Regulations ARS 09/2019, Article 6⁴, specifically promoting this type of activity as a traditional activity. In addition to swordfish these fishermen are also known to occasionally target other species such as *Tetrapturus belone*, *Mola mola* and *Thunnus thynnus*. Additional details have been provided in further below in this section of the report.

Despite communications with a scientist with apparent access to full catch data for the harpoon fleet in Messina up to 2019, no data was made available in time for the writing of the report. Therefore, the assessment team used catch data from published papers in conjunction with information provided during the remote audit interview by swordfish researcher Teresa Romeo, from the Stazione Zoologica Anton Dohrn.

⁴ http://www.edizionieuropee.it/LAW/HTML/213/si3_09_107.html

Swordfish catch information from stakeholder interviews

In the past 4 years the fishery has caught an average of 140 swordfish per boat, per year, with 9 boats operating in Messina and 4 on the Calabria side of the straight (Teresa Romeo, pers. comm.). The recent (2011-2015) average weight of harpooned swordfish caught in the Strait of Messina is 41 kg, based on data taken from Battaglia et al. 2018⁵.

Hence the approximate total weight caught by the harpoon fishery is 74.6 tonnes per year in the past 5 years.

Di Natale et al. 2005⁶ detailed swordfish catch records based on one very detailed harpoon vessel logbook, containing catch data from 1976 to 2003. This data is presented below.

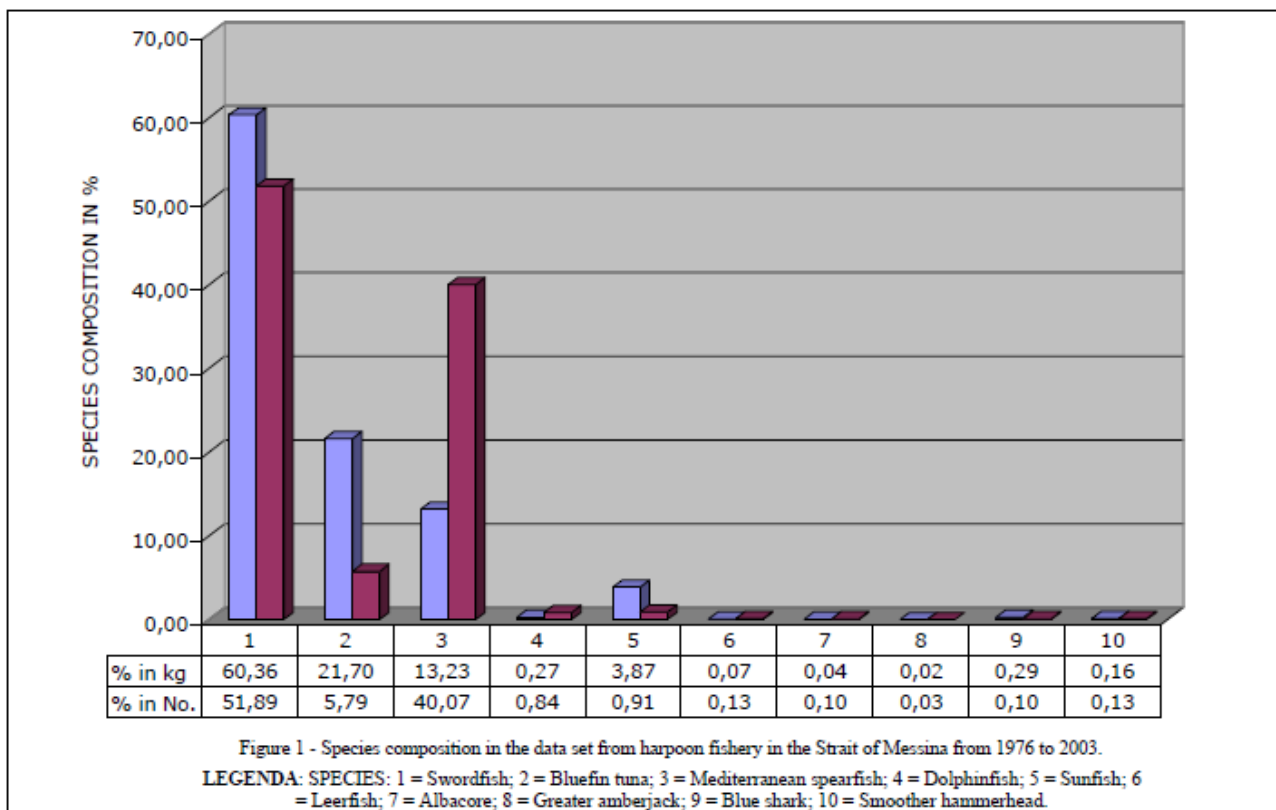


Figure 7. Species composition in the data set from harpoon fishery in the Strait of Messina from 1976 to 2003.

Romeo et al. 2015⁷ also provided some catch data from another vessel for species associated with swordfish catches highlighting that even though species such as *Coryphaena hippurus*, *Lichia amia*, *Mola mola*, *Thunnus alalunga* and *Thunnus thynnus* were occasionally harpooned, Mediterranean spearfish *Tetrapturus belone* was the most commonly caught species along swordfish. More specifically, the authors described that the 2001 fishing season in their dataset was characterized by an exceptional catch of *T. belone*, making up 32% of total catches (in terms of number of specimens), recorded during the sampling period. In terms of CPUE compared to that of swordfish however, results highlight that the catches of this species are important only in GSA 19 (Calabrian side of the Messina Strait), whereas the harpooning of *T. belone* in GSA 10 can be considered rather occasional (0-0.2% of total CPUE in all years except one peak of 4% in 2002). On the other hand, the CPUE of *T. belone* in GSA 19 ranged from 3.8% to 44.4% of total CPUE % (swordfish plus Mediterranean spearfish) between 1999 and 2007.

⁵ <https://www.sciencedirect.com/science/article/abs/pii/S2352485517300592>

⁶ https://www.iccat.int/Documents/CVSP/CV058_2005/n_4/CV058041348.pdf

⁷ <https://www.sciencedirect.com/science/article/abs/pii/S0165783614002276>

During the interview, Teresa Romeo also highlighted that recent bluefin tuna catches by the harpoon fleet have been less than 1 t a year (just over 1% of estimated annual swordfish catch). This appears to coincide with previous TAC availability for tuna. For example, a zero TAC for bluefin tuna was reported in the study by Romeo et al. 2015⁸. We also note that starting 2020, no TAC for bluefin tuna was assigned to the harpoon vessels, the *feluche*, as part of Decree 8120 of the 8th May 2020⁹. This means that the harpoon fishery will have legally caught no bluefin tuna in the 2020 season.

Overall, in the absence of specific data we use all the information presented above and consider the catch percentages provided in Figure 7 for MSC species classification. The only variation to this will be the use of a different bluefin tuna % (i.e. just over 1% of the overall catch profile). Accordingly, the table below lists primary and secondary species associated with swordfish catches.

Table 10. Incidental species catch associated with the Messina Strait swordfish harpoon fishery..

Species	% of total catches	MSC classification
Mediterranean spearfish	13.23%	Main (>5% of catch profile) secondary species (i.e. not subject to stock assessment or reference points-based management ^{10 11}).
Sunfish	3.87%	Minor secondary species (i.e. not subject to stock assessment or reference points-based management ¹²). The species is considered by Fishbase ¹³ to have a medium, minimum population doubling time 1.4 - 4.4 years (tmax = 8 (in captivity); Fec=300 million (batch fecundity). It does not classify as a 'Less resilient' species under MSC requirements.
Bluefin tuna	>1%	Minor primary species (i.e. subject to stock assessment). ¹⁴

Species below 0.5% of the overall catch profile are considered negligible and not discussed further in this report.

Because Mediterranean spearfish is considered a main species a PSA analysis is carried out for this stock, as per MSC requirements. Results of the PSA are shown below.

Table 11. Productivity Susceptibility Analysis (PSA) productivity attributes and scores for Mediterranean spearfish.

Performance Indicator	2.2.1	
Productivity		
Scoring element (species)	Mediterranean spearfish <i>Tetrapturus belone</i>	
	Information source fishbase Life History Tool ¹⁵	
Attribute	Rationale	Score
Average age at maturity	1.1 Estimated from Lm, Linf., K and to.	1
Average maximum age	Life span (approx.): 5.7 years estimated from Linf., K and to.	1
Fecundity	Fecundity for this species is unknown and we borrowed values for a similar species <i>Tetrapturus albidus</i> , known to produce 190,400–596,200 hydrated oocytes per mature female ¹⁶ .	1
Average maximum size	240 cm	2

⁸ <https://www.sciencedirect.com/science/article/abs/pii/S0165783614002276>

⁹ <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/15367>

¹⁰ <https://www.iccat.int/en/assess.html#>

¹¹ https://www.iccat.int/Documents/CVSP/CV076_2019/n_4/CV076040293.pdf

¹² <https://www.iccat.int/en/assess.html#>

¹³ <https://www.fishbase.se/summary/mola-mola>

¹⁴ https://www.iccat.int/Documents/SCRS/ExecSum/BFT_ENG.pdf

¹⁵ <https://www.fishbase.se/summary/Tetrapturus-belone.html>

¹⁶ <https://www.sciencedirect.com/science/article/abs/pii/S0165783608002300>

Table 11. Productivity Susceptibility Analysis (PSA) productivity attributes and scores for Mediterranean spearfish.

Not scored for invertebrates		
Average size at maturity	116 cm	2
Not scored for invertebrates		
Reproductive strategy	Mediterranean spearfish are batch spawners, shedding batches of hydrated oocytes, in separate spawning events, most likely directly into the sea where fertilization occurs ¹⁷ .	1
Trophic level	4.4	3
Density dependence Invertebrates only	NA	

Susceptibility

Fishery		
Only where the scoring element is scored cumulatively	NA – not scored cumulatively	

Attribute	Rationale	Score
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Areal Overlap	Likely less than 10%, this fishery occurs in a very small area of GSA 10 and 19 in the Mediterranean Sea while the spearfish occurs across the Mediterranean Sea with considerable abundance around Italy.	1
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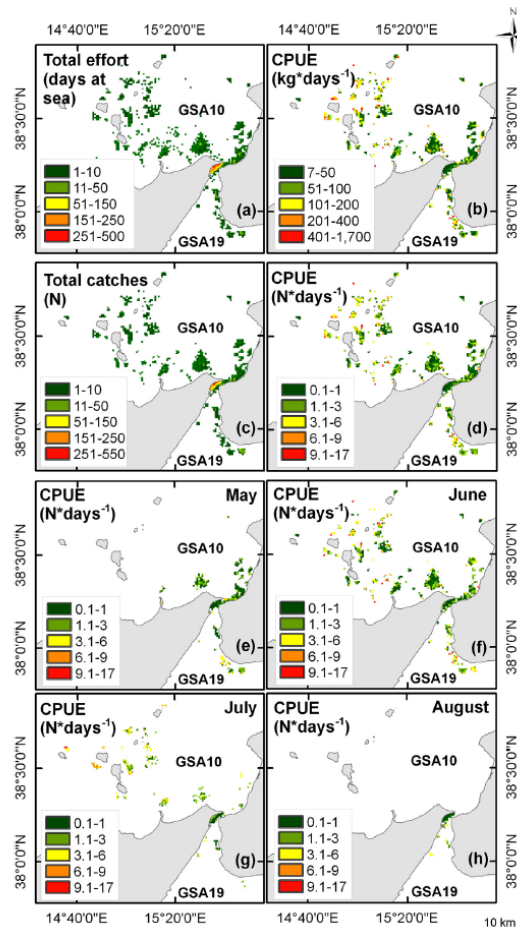


Figure 8. Harpoon caught swordfish maps of spatial distribution of total catches (N), total effort (days at sea) and CPUE (N day⁻¹, kg day⁻¹) recorded in the whole sampling period (2002–2011) and during each month of fishing season (from May to August). Source: Perzia et al. 2016¹⁸

¹⁷ https://www.iccat.int/Documents/SCRS/Manual/CH2/2_1_8_2_MSP_ENG.pdf

¹⁸ <https://www.sciencedirect.com/science/article/abs/pii/S016578361630217X>

Table 11. Productivity Susceptibility Analysis (PSA) productivity attributes and scores for Mediterranean spearfish.

Encounterability	Considering this species is targeted, we consider the encounterability attribute to score high risk.	3
Selectivity of gear type	Individuals < size at maturity are rarely caught. Di Natale et al. 2005 ¹⁹ reports spearfish caught as having a mean weight of 13.6 kg. Given that the length at maturity estimated in Fishbase is 116 cm it's probably likely that individuals < size at maturity are frequently caught.	3
Post capture mortality	Retained species, no individuals are released.	3
Catch (weight) Only where the scoring element is scored cumulatively	No other fisheries	

The results of the PSA are shown below. The species achieves an MSC PSA derived score of 91 (i.e. unconditional pass).

Scientific name	Common name	Species type	Fishery descriptor	Average age at maturity	Average max age	Fecundity	Average max size	Average size at Maturity	Reproductive strategy	Trophic level	Density Dependence	Total Productivity (average)	Availability	Encounterability	Selectivity	Post-capture mortality	Total (multiplicative)	PSA Score	Catch (tons)	Weighting	Weighted Total	Weighted PSA Score	MSC PSA-derived score	Risk Category Name	MSC scoring guideline
Tetrapturus belone	Med. Spearfish	Vertebrate	Harpoon	1	1	1	2	2	1	3		1.57	1	3	3	3	1.65	2.28				91	Low	280	

7.5.1.2 Endangered, Threatened and Protected Species

Based on the MSC v2.01 Fisheries Standard, Endangered, Threatened or Protected (ETP) species are defined as:

1. Species that are recognised by national ETP legislation;
2. Species listed in the binding international agreements given below:
 - a. Appendix 1 of the Convention on International Trade in Endangered Species (CITES), unless it can be shown that the particular stock of the CITES listed species impacted by the UoA under assessment is not endangered.
 - b. Binding agreements concluded under the Convention on Migratory Species (CMS), including:
 - i. Annex 1 of the Agreement on Conservation of Albatross and Petrels (ACAP);
 - ii. Table 1 Column A of the African-Eurasian Migratory Waterbird Agreement (AEWA);
 - iii. Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS);
 - iv. Annex 1, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS);
 - v. Wadden Sea Seals Agreement;
 - vi. Any other binding agreements that list relevant ETP species concluded under this Convention.
3. Species classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).

The fishery is very selective and only catches species that it targets with harpoons. These species have already been identified and assessed in previous sections of this report. There are no significant interactions with vulnerable seabird, marine mammal, turtle or elasmobranch species. The Messina Strait harpoon swordfish fishery does not have impacts on the ETP species component. This has been confirmed through an interview with a stakeholder interview (pers. comm. Teresa Romeo, swordfish expert and researcher, Stazione Zoologica Anton Dohrn). For the same reason, no additional ETP species management or information is required specific to this fishery.

¹⁹ https://www.iccat.int/Documents/CVSP/CV058_2005/n_4/CV058041348.pdf

7.5.1.3 Habitat

The Messina Strait harpoon swordfish fishery does not have habitat effects of any kind as the gear type employed does not come into contact with the seabed. The harpoon is shot and retrieved as the target prey is. This has been confirmed through an interview with a stakeholder interview (pers. comm. Teresa Romeo). For the same reason, no habitat management is required specific to this fishery.

7.5.1.4 Ecosystem

Romeo et al 2015²⁰ indicates that the Italian harpoon fishery for swordfish is carried out in a limited region including the Strait of Messina and the south-eastern Tyrrhenian Sea, one of the most important swordfish spawning areas in the Mediterranean Sea. The Strait of Messina acts as a barrier, between the Ionian Sea and Tyrrhenian Sea. The harpoon fishery is a seasonal practice carried out during diurnal hours by special vessels equipped with a sighting platform (25 m above the sea level), from which the boat is piloted and swordfish are sighted. The areas surround fishery operations can be defined as including the Strait of Messina and the south-eastern Tyrrhenian Sea (from the southern coasts of Calabria to Cape Milazzo and Aeolian Islands). According to the GFCM management units (Resolution GFCM/31/2007/2), these two areas fall within Geographical Sub-Areas (GSA) 19 and 10, respectively. Furthermore, consistently with the MSFD Mediterranean sub-regions, the Strait of Messina belongs to the “Ionian Sea and Central Mediterranean” sub-region, whereas the south-eastern Tyrrhenian Sea belongs to the “Western Mediterranean” sub-region. As already shown by Romeo et al. (2011)²¹, the different physical and oceanographic features of these basins can influence swordfish distribution and behaviour during the harpoon fishing season.

Hydrology

Millisenda et. al. 2014²² highlights that the Strait of Messina is influenced by a peculiar hydrodynamic regime, characterized by a six-hour alternation of northward (from the Ionian to Tyrrhenian seas) to southward tidal currents, with upwelling and down-welling water masses reaching up to 200 cm s⁻¹ speed, which strongly affect the biotic structure and organization of Strait ecosystem. In fact, upwelling systems are one of the most productive marine environments that are characterized by biological richness in all levels of the trophic chain. The hydrodynamic complexity of the Strait ecosystem has a major influence on the horizontal and vertical distribution of the organisms, especially on zooplankton communities. The regular alternation of northern and southern tides, combined with upwelling and downwelling water masses, prevents stratification of the water column. Therefore, the Strait has been compared to an “intermittent pump”, with high inputs of nutrients throughout the autumn and winter seasons, seeding the spring phytoplankton bloom both locally and in adjacent zones.

Diet and Ecology of Swordfish in the Central Mediterranean

Larval swordfish feed on copepods, but at an early juvenile age their diet consists almost entirely of fish. Adults feed on a wide variety of prey including groundfish, invertebrates, pelagic and deepwater fish. Adults are believed to feed throughout the water column, and based on recent electronic tagging studies undertake diurnal migrations, rising to the surface mixed layer at night and descending to deeper waters during day to feed on fishes and squids (ICCAT 2007). Smaller prey is generally eaten whole, while larger prey is often observed with slash marks from the swordfish rostrum. It still remains unclear when and how often the bill is used during feeding (ICCAT 2007). The trophic level is estimated as 4.5 ± 0.2 s.e., based on diet studies.

Swordfish are apex predators, located at the top of the food chain. Predation on swordfish (other than human) is expected to be limited to that on young and infirm swordfish. Some sharks may occasionally prey on swordfish (pers. comm. Teresa Romeo, swordfish expert and researcher, Stazione Zoologica Anton Dohrn). Swordfish are known to migrate in significant numbers between the relatively hot subtropical waters and the

²⁰ <https://www.sciencedirect.com/science/article/abs/pii/S0165783614002276>

²¹ <https://www.tandfonline.com/doi/abs/10.1080/17451000.2010.489615>

²² <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0094600>

temperate waters of the North and South Atlantic. This has been shown through tagging recoveries where tagged fish were released from Northwest, Northeast and Southwest Atlantic fisheries. Importantly, these tagging programs have not shown extensive movements across the Equator (ICCAT 2007). The results of these programs have not shown the existence of extensive trans-Atlantic migration of this species, but these observations are limited by problems associated with use of conventional tags (ICCAT 2007).

In a study by Romeo et al. 2009²³ resource partitioning between the Mediterranean spearfish (*Tetrapturus belone*) and the swordfish (*Xiphias gladius*) was analysed. The contents of 53 *T. belone* and 95 *X. gladius* non-empty stomachs were analysed from specimens caught in the central Mediterranean Sea (Strait of Messina), from 2004 to 2006, by the harpoon fishery. *Xiphias gladius* preyed mainly on teleosts and cephalopods, which represented 59% and 39.1%, respectively, of the total preyed items in terms of % index of relative importance (IRI). Key results from this study are reproduced below.

Table 12. Per cent frequency of occurrence (%F), per cent abundance (%N), percentage by weight (%W) and index of relative importance (IRI) for prey types of *Xiphias gladius* and *Tetrapturus belone*.

Taxa	Species prey	<i>X. gladius</i>				<i>T. belone</i>			
		%F	%N	%W	%IRI	%F	%N	%W	%IRI
Cephalopoda									
Onychoteuthidae	<i>Anastrotheuthis lichtensteini</i>	2.11	0.46	0.04	0.04				
	<i>Anastrotheuthis lichtensteini</i> (beak)	6.32	1.07						
Ancistrocheiridae	<i>Anastrocheirus lesueri</i>	1.05	0.05	0.00	0.00	5.66	1.33	0.01	0.16
Und. Cephalopods (beaks)		31.58	6.86			3.77	1.00		
Und. Cephalopods		28.42	5.54	4.60	11.39	1.89	0.33	0.01	0.01
Und. Cephalopods (eyes)		34.74	17.28						
Chiroteuthidae	<i>Chiroteuthis veranyi</i>	2.11	0.10	0.31	0.03				
	<i>Chiroteuthis veranyi</i> (beak)	7.37	0.91						
Octopodidae	<i>Eledone cirrhosa</i> (beak)	1.05	0.05						
Histioteuthidae	Histioteuthidae	4.21	0.56	0.35	0.15				
	Histioteuthidae (beak)	15.79	3.40			1.89	0.33		
	<i>Histioteuthis bonnellii</i> (beak)	10.53	1.27			5.66	2.00		
Ommastrephidae	<i>Illex coindetii</i>	17.89	1.17	7.97	6.46	5.66	1.67	3.12	0.58
	<i>Illex coindetii</i> (beak)	20.00	3.00			9.43	3.67		
	<i>Ommastrephes bartramii</i> (beak)	2.11	0.36						
	<i>Todarodes sagittatus</i>	24.21	2.29	19.75	21.08				
	<i>Todarodes sagittatus</i> (beak)	30.53	8.79			3.77	1.00		
Und. Ommastrephidae		1.05	0.10	1.34	0.06				
Octopoteuthidae	<i>Octopoteuthis</i> cfr. <i>scicula</i> (beak)	1.05	0.05						
Onychoteuthidae	<i>Onychoteuthis banksi</i>	3.16	0.56	0.00	0.07				
Und. Teuthoidea		3.16	0.15	1.04	0.15				
Und. Teuthoidea (beak)		2.11	1.47						
Thysanoteuthidae	<i>Thysanoteuthis rhombus</i> (beak)	1.05	0.15			1.89	0.33		
Tremoctopodidae	<i>Tremoctopus violaceus</i>					1.89	0.33	0.16	0.02
	<i>Tremoctopus violaceus</i> (beak)	3.16	0.20			7.55	4.33		
Chondrichthyes									
Selachioidei		1.05	0.05	0.67	0.03				
Crustacea									
Und. Amphipoda		1.05	0.05	0.00	0.00				
Und. Aristeidae		1.05	0.05	0.10	0.01				
Und. Calanoida		1.05	0.20	0.00	0.01				
Und. Crustacea		3.16	1.58	0.00	0.20				
Und. Euphausiidae		2.11	6.40	0.08	0.54				
Und. Hyperiidea		1.05	0.20	0.00	0.01				
Und. Isopoda		2.11	0.10	0.00	0.01				
Hydrozoa									
Diphyidae		3.16	2.95	0.01	0.37	1.89	1.67	0.00	0.07
Osteichthyes									
Belonidae	<i>Belone belone</i>	3.16	0.15	1.27	0.18	33.96	23.00	31.40	39.60
	<i>Belone svetovidovi</i>					1.89	0.33	0.14	0.02
	<i>Belone</i> spp.					7.55	5.33	2.26	1.23
Carangidae	<i>Seriola dumerili</i>					1.89	0.33	0.36	0.03
	<i>Trachinotus ovatus</i>	1.05	0.15	3.05	0.13				
	<i>Trachurus trachurus</i>	1.05	0.05	0.01	0.00				
	<i>Trachurus</i> spp.	4.21	0.25	5.17	0.90	3.77	1.00	0.56	0.13
Caproidae	<i>Capros aper</i>	1.05	0.05	0.54	0.02				
Centracanthidae	<i>Spicara smaris</i>	1.05	0.10	0.12	0.01				
	<i>Spicara</i> spp.	1.05	0.05	0.02	0.00				
Clupeidae	<i>Alosa</i> spp.					3.77	1.67	1.43	0.25
	<i>Sardina pilchardus</i>	3.16	0.51	1.14	0.21	1.89	0.33	0.01	0.01
	<i>Sardinella aurita</i>	13.68	1.88	7.79	5.23	32.08	15.67	37.49	36.55
Coriphaenidae	<i>Coryphaena hippurus</i>					5.66	1.33	8.29	1.17
Engraulidae	<i>Engraulis encrasiolus</i>					11.32	11.00	5.89	4.10
Gonostomatidae	<i>Gonostoma denudatum</i>	2.11	0.10	0.19	0.02				
Und. Myctophidae		2.11	0.20	0.13	0.03				
Und. Paralepididae		4.21	0.66	0.71	0.23				
	<i>Paralepis coregonoides</i>	1.05	0.05	0.05	0.00				
	<i>Paralepis speciosa</i>	1.05	0.51	0.20	0.03				
	<i>Sudis hyalina</i>	3.16	0.30	0.75	0.13				
Scombridae	<i>Scomber japonicus</i>	1.05	0.05	1.56	0.07	3.77	0.67	1.48	0.17

²³ <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/abs/evaluation-of-resource-partitioning-between-two-billfish-tetrapturus-belone-and-xiphias-gladius-in-the-central-mediterranean-sea/46470E57A7A304E42BC43EDB7E66223D>

	<i>Scomber scombrus</i>	1.05	0.05	2.03	0.09				
Und. Scombridae		1.05	0.05	0.27	0.01	3.77	0.33	2.02	0.19
Scomberesocidae	<i>Scomberesox saurus</i>					7.55	1.67	1.84	0.57
Sparidae	<i>Boops boops</i>	2.11	0.10	0.05	0.01				
	<i>Oblada melanura</i>					1.89	0.33	0.22	0.02
Sphyraenidae	<i>Sphyraena sphyraena</i>	1.05	0.05	0.06	0.00				
Trichiuridae	<i>Lepidopus caudatus</i>	23.16	4.67	28.63	30.48				
Und. teleostea		32.63	6.61	9.98	21.38	32.08	18.67	3.30	15.11
Und. teleostea eyes		18.95	10.98						
Und. otoliths		4.21	3.76						
Tunicata									
Salpidae		4.21	1.22	0.04	0.21	1.89	0.33	0.00	0.01

Swordfish perform vertical excursions, reaching depths up to 800 m during daylight and remaining near the surface at night. Their diel vertical excursions are usually discontinuous and frequently interrupted by vertical rises. In a study on cephalopods diet in large fish predators in the Central Mediterranean Sea including swordfish, bluefin and yellow fine tuna, and Mediterranean spearfish by Romeo et. al. 2011²⁴, the highest number of different cephalopods prey species (20) was recorded in swordfish stomachs. This indicates that *X. gladius* can be considered the most efficient “cephalopod collector” that probably relates to the species’ hunting behaviour during large vertical migrations. Both epipelagic and deep-water were recorded in its diet. The intake of cephalopod prey species that follow a diel vertical migration pattern seems to be important for all predators except for *T. belone*.

Effects of the fishery on ecosystem structure and function

To better evaluate the potential effect of this fishery on ecosystem structure and function we have considered the following elements:

1. Unwanted or associated catches (Primary and Secondary species). There are small catches of (wanted) associated species that the Messina harpoon fishermen may target to supplement swordfish catches (e.g. Mediterranean spearfish, sunfish). Due to the limited tonnage caught, the overall removals and therefore, effects on those species are considered small to negligible. There are no unwanted catches in this fishery.
2. ETP species interactions. No negative effects are thought to exist on vulnerable and ETP species due to the highly selective nature of the harpoon fishery which does not have accidental catches of any type.
3. Habitats. There are no habitat effects since the harpoon gear does not encounter the seabed.
4. Overall removal of swordfish from the ecosystem. The harpoon fishery in the Messina Strait removes about 74.6 tonnes of swordfish a year. Considering that only one swordfish stock is believed to occur in the whole Mediterranean basin, and that removals by the main gear types, principally longline gear, consisted of an average of 10,000 tonnes a year in the past 5 years²⁵, the removals of the harpoon fishery only consist of 0.7% of total removals. These amounts are very small and are not likely to significantly affect other species that may depend on swordfish.
5. Swordfish predators. Swordfish is not considered to have any important predator being an apex predator itself (aside from humans). Some occasional predation may occur from certain shark species but this is not considered significant.
6. Prey of swordfish. Swordfish in the central Mediterranean has been shown to feed on many different species including cephalopods and fish species (probably around 60 different species based on Romeo et al. 2009²⁶ and Romeo et. al. 2011²⁷). Because its diet is very diverse and the removals of this fishery are very small, potential effects on prey species through top-down control mechanisms²⁸ are likely limited.

²⁴ <https://link.springer.com/article/10.1007/s10152-011-0270-3>

²⁵ https://iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf

²⁶ <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/abs/evaluation-of-resource-partitioning-between-two-billfish-tetrapturus-belone-and-xiphias-gladius-in-the-central-mediterranean-sea/46470E57A7A304E42BC43EDB7E66223D>

²⁷ <https://link.springer.com/article/10.1007/s10152-011-0270-3>

²⁸ <https://www.sciencedirect.com/science/article/abs/pii/S0924796315001074>

7.5.1.5 Principle 2 References

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7.5.2 Principle 2 Performance Indicator scores and rationales
PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guide post	Main primary species are likely to be above the PRI. OR If the species is below the PRI, the UoA has measures in place that are expected to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are highly likely to be above the PRI. OR If the species is below the PRI, there is either evidence of recovery or a demonstrably effective strategy in place between all MSC UoAs which categorise this species as main , to ensure that they collectively do not hinder recovery and rebuilding.	There is a high degree of certainty that main primary species are above the PRI and are fluctuating around a level consistent with MSY.
	Met?	NA	NA	NA

Rationale

No main primary species have been identified for this UoA. As per MSC interpretation (<https://mscportal.force.com/interpret/s/article/P2-species-outcome-PIs-scoring-when-no-main-or-no-minor-or-both-PI-2-1-1-1527262009344>) if the fishery has no main primary species, scoring issue (a) is not applicable.

b	Minor primary species stock status			
	Guide post			Minor primary species are highly likely to be above the PRI. OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.
	Met?			Yes

Rationale

Bluefin tuna has been identified as a minor primary species. The ICCAT 2019 SCRS report²⁹ highlighted that the Standing Committee on Research and Statistics (SCRS) recommended to provide a stock assessment in 2020 as the basis for 2021 TAC advice, by simply updating the VPA for both West and East and Stock Synthesis for the West based on data up to 2018.

The 2017 assessment results from the VPA base case, indicated that the spawning stock biomass (SSB) peaked in the mid-1970s after increasing initially and then declined until 1991 and remained steady up to the mid-2000s. From

²⁹ https://www.iccat.int/Documents/SCRS/ExecSum/BFT_ENG.pdf

PI 2.1.1

The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI

the late 2000s, SSB exhibited a substantial increase through 2015. The estimated fishing mortality rates on the younger ages (i.e., average F for ages 2 to 5) displayed a continuous increase until the late 1990s and then showed a sharp decline to reach very low levels after the late 2000s. For oldest fish (F at plus group for ages 10 and older) since 2008, there has been a rapid decrease in F10+, as already noted in the previous assessments, which related regulations, i.e. the drastic reduction of TAC.

F0.1 was considered a reasonable proxy for FMSY, although it can be higher or lower than FMSY depending on the stock recruitment relationship, which in this case is poorly determined. However, given the uncertainties about future recruitment, estimates of biomass base reference points were unreliable. In addition to those uncertainties, the current perception of the stock status was also closely related to the assumptions made about stock structure and migratory behaviour, which remain poorly known. Nonetheless, compared to 2014 the extra data now available do better confirm recent stock increase though the level of increase remains difficult to quantify. Fcur appears to be clearly below F0.1 $F_{cur}/F_{0.1} = 0.34$. Information on fishing mortality, biomass and recruitment is shown below.

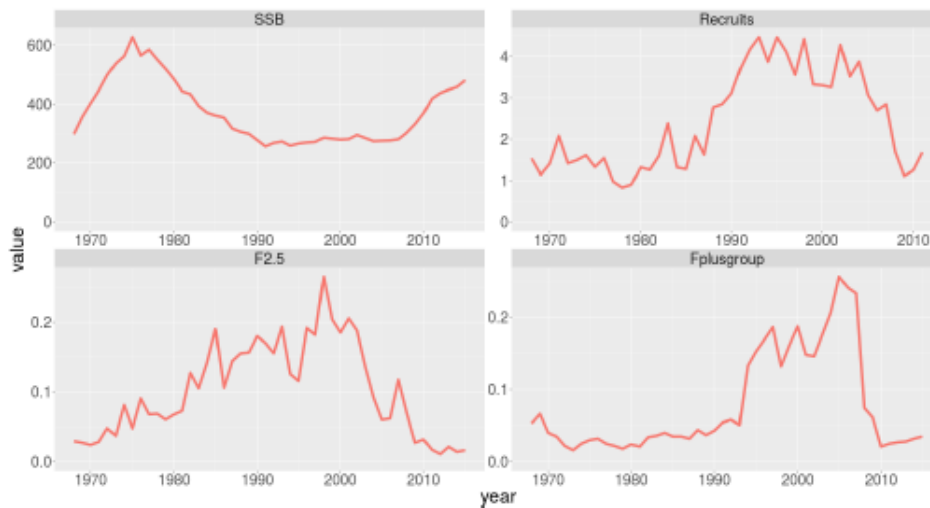


Figure 9. Spawning stock biomass (in thousand metric ton), recruitment (in million), and fishing mortality (average over ages 2 to 5, and 10+) estimates from VPA base run from the 2017 stock assessment for the period between 1968 and 2015. The last four years recruitments (2012-2015) are not shown because they are poorly estimated.

Minor primary species are highly likely to be above the PRI. **SG 100 is met.**

References

Please refer to the references and footnotes provided here and throughout the P2 background section.

Overall Performance Indicator (PI) Rationale

Rationale is provided for each Scoring Issue.

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI
Data-deficient? (Risk-Based Framework needed)	No

PI 2.1.2 – Primary species management strategy

PI 2.1.2 There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch

Scoring Issue	SG 60	SG 80	SG 100
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a	Management strategy in place			
	Guide post	There are measures in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a partial strategy in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a strategy in place for the UoA for managing main and minor primary species.
	Met?	Yes	Yes	Yes

Rationale

There are no main primary species. SG 60 and 80 are met by default.

In regard to the minor primary species, bluefin tuna, there is a harvest strategy in place for managing it, a TAC. The Committee noted that reported catches are in line with recent TACs. However, the Committee was informed of the existence of unquantified illegal catches of unknown magnitude. The combination of size limits and the reduction of catch has certainly contributed to a rapid increase of the abundance of the stock. The fishery indicators in the latest assessment³⁰ did not indicate a reason to alter current management advice.

There is a strategy in place for the UoA for managing main and minor primary species. SG 100 is met.

b	Management strategy evaluation			
	Guide post	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Yes	Yes	No

Rationale

There are no main primary species. SG 60 and 80 are met by default.

Regarding bluefin tuna testing of the strategy through an MSE is planned but yet to occur. More specifically, the primary focus of the SCRS for the past year has been on the Management Strategy Evaluation (MSE). The Committee is of the opinion that the MSE process is likely the best means of developing management advice robust to the complexities of bluefin tuna including stock mixing, environmental variability and other uncertainties that affect

³⁰ https://www.iccat.int/Documents/SCRS/ExecSum/BFT_ENG.pdf

PI 2.1.2 There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch

current assessment advice. The Committee has made progress in developing operating models (OMs), addressing data and coding issues, and initial development of candidate management procedures. Nonetheless, after examining the diagnostics from the conditioned OMs, the Committee has concluded that additional technical work is needed to improve some important aspects of the OMs and that it cannot yet recommend a final reference set of OMs. Therefore, the MSE process will not be completed in time for the 2020 Commission meeting to provide TAC advice for 2021-2023 based on a management procedure. Accordingly, the Committee recommended moving to “option B”, extending the MSE process for another year with a goal of completing the MSE process in time for the 2021 Commission meeting to provide TAC advice for 2022-2024 as outlined in the revised roadmap.³¹

SG 100 is not met.

Management strategy implementation				
c	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).
	Met?		Yes	Yes

Rationale

There are no main primary species. SG 80 is met by default.

In regard to the minor primary species, bluefin tuna, there is a harvest strategy in place for managing it, a TAC. The Committee noted that reported catches are in line with recent TACs. However, the Committee was informed of the existence of unquantified illegal catches of unknown magnitude. The combination of size limits and the reduction of catch has certainly contributed to a rapid increase of the abundance of the stock. The fishery indicators in the latest assessment³² did not indicate a reason to alter current management advice. There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a). Please refer also to Figure 9 provided in PI 2.1.1. for biomass and fishing mortality trends. **SG 100 is met.**

Shark finning				
d	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	NA	NA	NA

Rationale

As per MSC requirements, if the primary species is a shark, the team shall score scoring issue (d) (following SA2.4.3–SA2.4.7) to ensure that shark finning is not being undertaken in the UoA. This SI is not applicable to this UoA since no identified primary species is a shark.

Review of alternative measures				
e	Guide post	There is a review of the potential effectiveness and	There is a regular review of the potential effectiveness	There is a biennial review of the potential effectiveness

³¹ https://www.iccat.int/Documents/SCRS/ExecSum/BFT_ENG.pdf

³² https://www.iccat.int/Documents/SCRS/ExecSum/BFT_ENG.pdf

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
		practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	NA	NA	NA
Rationale				
The fishery under assessment does not discard any species as any targeted individual is caught and landed. This scoring issue is not applicable.				
References				
Please refer to the references and footnotes provided here and throughout the P2 background section.				
Overall Performance Indicator (PI) Rationale				
Rationale is provided for each Scoring Issue.				
Draft scoring range		≥80		
Information gap indicator		Information sufficient to score PI		
Data-deficient? (Risk-Based Framework needed)		No		

PI 2.1.3 – Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
Information adequacy for assessment of impact on main primary species				
a	Guide post	Qualitative information is adequate to estimate the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is adequate to assess the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is adequate to assess with a high degree of certainty the impact of the UoA on main primary species with respect to status.
	Met?	Yes	Yes	Yes
Rationale				
The fishery is very selective and data on all target catches are recorded in fisheries logbooks (pers. comm. Teresa Romeo, Stazione Zoologica Anton Dohrn). There are no main primary species. SG 60, 80 and 100 are met by default.				
Information adequacy for assessment of impact on minor primary species				
b	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			Yes
Rationale				
For bluefin tuna (primary minor) there is quantitative information adequate to estimate the impact of the UoA on minor primary species with respect to status. This data includes, catch, CPUE, biological information including age and length data and survey information ³³ . For status information please refer to Figure 9. SG 100 is met.				
Information adequacy for management strategy				
c	Guide post	Information is adequate to support measures to manage main primary species.	Information is adequate to support a partial strategy to manage main primary species.	Information is adequate to support a strategy to manage all primary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?			

³³ https://www.iccat.int/Documents/SCRS/DetRep/BFT_SA_ENG.pdf

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Met?	Yes	Yes	No	
Rationale				
There are no main primary species. SG 60 and 80 are met by default. For bluefin tuna, the available information is considered to be adequate to support a strategy, but we note that the SCRS is aware of the existence of unquantified illegal catches of unknown magnitude ³⁴ . This could affect status information and related management decisions. SG 100 is not met.				
References				
Please refer to the references and footnotes provided here and throughout the P2 background section.				
Overall Performance Indicator (PI) Rationale				
Rationale is provided for each Scoring Issue.				
Draft scoring range	≥80			
Information gap indicator	Information sufficient to score PI			
Data-deficient? (Risk-Based Framework needed)	No			

³⁴ https://www.iccat.int/Documents/SCRS/ExecSum/BFT_ENG.pdf

PI 2.2.1 – Secondary species outcome

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guide post	<p>Main secondary species are likely to be above biologically based limits.</p> <p>OR</p> <p>If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.</p>	<p>Main secondary species are highly likely to be above biologically based limits.</p> <p>OR</p> <p>If below biologically based limits, there is either evidence of recovery or a demonstrably effective partial strategy in place such that the UoA does not hinder recovery and rebuilding.</p> <p>AND</p> <p>Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.</p>	<p>There is a high degree of certainty that main secondary species are above biologically based limits.</p>
	Met?	NA – PSA used	NA – PSA used	NA – PSA used
Rationale				
Mediterranean spearfish was identified as main secondary species and assessed using the Risk Based Framework PSA analysis and achieving an MSC PSA derived score of 91 (i.e. unconditional pass).				
b	Minor secondary species stock status			
	Guide post			<p>Minor secondary species are highly likely to be above biologically based limits.</p> <p>OR</p> <p>If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species</p>
	Met?			No
Rationale				

PI 2.2.1	The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit
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The sunfish *mola mola* was classified as minor secondary species. No information on this stock was available. We cannot determine that minor secondary species are highly likely to be above biologically based limits. SG 100 is not met.

References

Please refer to the references and footnotes provided here and throughout the P2 background section.

Overall Performance Indicator (PI) Rationale
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Rationale is provided for each Scoring Issue.

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI
Data-deficient? (Risk-Based Framework needed)	Yes

PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a partial strategy in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a strategy in place for the UoA for managing main and minor secondary species.
	Met?	Yes	No	
Rationale				
<p>In the context of this PI (MSC FCP v2.1; Table SA8: Principle 2 Phrases): <i>A “partial strategy” represents a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically.</i></p> <p>Management measures specific to the Mediterranean spearfish are not present. However, in the context of its capture as associated catch to the Messina Strait swordfish harpoon fishery, the same measures available for swordfish apply to this species also. In brief, these measures include effort limitations in terms of days at sea and number of licenses available. The fishery is fully self-regulated and fishermen operate within specific “poste” or sections of the coast. There are 9 boats operating in Messina and 4 on the Calabria side of the straight. No TAC is available for swordfish at the moment, however, fishermen fish for 60 days a year on average and monitoring of this fleet is continuous and full catch data is available (Teresa Romeo, pers. comm.), although complete catch information was not provided in time for this assessment. Also, swordfish cannot be fished between the 1st October and the 30th of November (please refer to Table 3 of Battaglia et al. 2018³⁵ for a list of main international and Italian regulations and management actions regarding Mediterranean swordfish stock and related fishing activities). Considering these effort limits we can say that there are measures in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery. SG 60 is met.</p> <p>However, further evidence would be required to justify a score of SG 80 for Mediterranean spearfish management in the context of this fishery. SG 80 is not met.</p>				
b	Management strategy evaluation			
	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or	There is some objective basis for confidence that the measures/partial strategy will work, based on some	Testing supports high confidence that the partial strategy/strategy will work, based on information directly

³⁵ <https://www.sciencedirect.com/science/article/abs/pii/S2352485517300592>

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
		comparison with similar UoAs/species).	information directly about the UoA and/or species involved.	about the UoA and/or species involved.
	Met?	Yes	No	
Rationale				
<p>Considering the effort related management measures highlighted in scoring issue a, and considering the low vulnerability score derived from the Productivity Susceptibility Analysis these measures are considered likely to work, based on plausible argument (e.g. there is an overall limited effort and the spatial overlap of this fishery with Mediterranean spearfish is limited). SG 60 would be met.</p> <p>However, further evidence would be required to justify a score of SG 80 for Mediterranean spearfish management in the context of this fishery. SG 80 is not met.</p>				
Management strategy implementation				
c	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Yes	No
Rationale				
<p>There is some evidence to argue that swordfish fishery measures are implemented successfully. The number of vessels that fish the resource is limited, as well as their days at sea. Between 2002 and 2012, Romeo et al. 2015³⁶ provided a figure (i.e. Figure 3 in that study) showing stable number at sea day in both the fishery occurring in GSA 10 and 19. Such measures would also be applicable to effort exerted on Mediterranean spearfish. SG 80 is met.</p> <p>However, we cannot determine that this constitutes clear evidence for partial/strategy implementation since the available management measures apply indirectly to spearfish. SG 100 is not met.</p>				
Shark finning				
d	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	NA	NA	NA
Rationale				
<p>As per MSC requirements, if the secondary species is a shark, the team shall score scoring issue (d) (following SA2.4.3–SA2.4.7) to ensure that shark finning is not being undertaken in the UoA. This SI is not applicable to this UoA since no identified secondary species is a shark.</p>				
Review of alternative measures to minimise mortality of unwanted catch				
e	Guide post	There is a review of the potential effectiveness and	There is a regular review of the potential effectiveness	There is a biennial review of the potential effectiveness

³⁶ <https://www.sciencedirect.com/science/article/abs/pii/S0165783614002276>

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
		practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species.	and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species and they are implemented as appropriate.	and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all secondary species, and they are implemented, as appropriate.
	Met?	NA	NA	NA
Rationale				
The fishery under assessment does not discard any species as any targeted individual is caught and landed. This scoring issue is not applicable.				
References				
Please refer to the references and footnotes provided here and throughout the P2 background section.				
Overall Performance Indicator (PI) Rationale				
Rationale is provided for each Scoring Issue.				
Draft scoring range		60-79		
Information gap indicator		<i>More information about spearfish management in the context of this UoA is required.</i>		
Data-deficient? (Risk-Based Framework needed)		No		

PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species		
Scoring Issue		SG 60	SG 80	SG 100
Information adequacy for assessment of impacts on main secondary species				
a	Guide post	Qualitative information is adequate to estimate the impact of the UoA on the main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and adequate to assess with a high degree of certainty the impact of the UoA on main secondary species with respect to status.
	Met?	Yes	Yes	No
Rationale				
Mediterranean spearfish was identified as main secondary species and assessed using the Risk Based Framework PSA analysis and achieving an MSC PSA derived score of 91 (i.e. unconditional pass).				
Information adequacy for assessment of impacts on minor secondary species				
b	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			No
Rationale				
<i>Mola mola</i> was identified as minor secondary species but no readily available information appears to be available to estimate the impact of the UoA on minor secondary species with respect to status. SG100 is not met.				
Information adequacy for management strategy				
c	Guide post	Information is adequate to support measures to manage main secondary species.	Information is adequate to support a partial strategy to manage main secondary species.	Information is adequate to support a strategy to manage all secondary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective .
	Met?	Yes	Yes	No
Rationale				

PI 2.2.3 Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species

Catch and CPUE information (e.g. fig. 8 of Romeo et al. 2015³⁷) for Mediterranean spearfish is (supposedly) fully available as all fish harpooned in this fishery is recorded in vessel’s logbooks (Teresa Romeo pers. comm.). It’s also likely that weight of each individual and (possibly length) information is also recorded on the logbooks. Along with existing information on number of vessels in the fleet, days fished, effort footprint maps in the Strait of Messina (e.g. see Romeo et al. 2015 and Perzia et al. 2016³⁸), we determine that information is adequate to support a (future) partial strategy to manage Mediterranean spearfish. **SG 60 and 80 are met.**

However, evidence is lacking that information is adequate to support a strategy to manage all secondary species and evaluate with a high degree of certainty whether the strategy is achieving its objective. SG 100 may not be met.

References

Please refer to the references and footnotes provided here and throughout the P2 background section.

Overall Performance Indicator (PI) Rationale

Rationale is provided for each Scoring Issue.

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI
Data-deficient? (Risk-Based Framework needed)	No

³⁷ <https://www.sciencedirect.com/science/article/abs/pii/S0165783614002276>

³⁸ <https://www.sciencedirect.com/science/article/abs/pii/S016578361630217X>

PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
Effects of the UoA on population/stock within national or international limits, where applicable				
a	Guide post	Where national and/or international requirements set limits for ETP species, the effects of the UoA on the population/ stock are known and likely to be within these limits.	Where national and/or international requirements set limits for ETP species, the combined effects of the MSC UoAs on the population /stock are known and highly likely to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a high degree of certainty that the combined effects of the MSC UoAs are within these limits.
	Met?	NA	NA	NA
Rationale				
The fishery is very selective and only catches species that it targets with harpoons. There are no significant interactions with vulnerable seabird, marine mammal, turtle or elasmobranch species. The Messina Strait harpoon swordfish fishery does not have impacts on the ETP species component. This scoring issue is not applicable.				
Direct effects				
b	Guide post	Known direct effects of the UoA are likely to not hinder recovery of ETP species.	Direct effects of the UoA are highly likely to not hinder recovery of ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species.
	Met?	NA	NA	NA
Rationale				
Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.				
Indirect effects				
c	Guide post		Indirect effects have been considered for the UoA and are thought to be highly likely to not create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the UoA on ETP species.
	Met?		NA	NA
Rationale				
Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.				
References				
Please refer to the P2 Background Section.				
Overall Performance Indicator (PI) Rationale				

PI 2.3.1	The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species	
Rationale is provided for each Scoring Issue.		
Draft scoring range	≥80	
Information gap indicator	Information sufficient to score PI.	
Data-deficient? (Risk-Based Framework needed)	No	

PI 2.3.2 – ETP species management strategy

PI 2.3.2		<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> - meet national and international requirements; - ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species</p>		
Scoring Issue		SG 60	SG 80	SG 100
Management strategy in place (national and international requirements)				
a	Guide post	There are measures in place that minimise the UoA-related mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	NA	NA	NA
Rationale				
The fishery is very selective and only catches species that it targets with harpoons. There are no significant interactions with vulnerable seabird, marine mammal, turtle or elasmobranch species. The Messina Strait harpoon swordfish fishery does not have impacts on the ETP species component. For the same reason, ETP species specific management measures are not explicitly required. This scoring issue is not applicable.				
Management strategy in place (alternative)				
b	Guide post	There are measures in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a strategy in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a comprehensive strategy in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.
	Met?	NA	NA	NA
Rationale				
Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.				
Management strategy evaluation				
c	Guide post	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the measures/strategy will work, based on information directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	NA	NA	NA

PI 2.3.2	<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> - meet national and international requirements; - ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species</p>
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Rationale

Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.

Management strategy implementation				
d	Guide post		There is some evidence that the measures/strategy is being implemented successfully.	There is clear evidence that the strategy/comprehensive strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) or (b).
	Met?		NA	NA

Rationale

Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.

Review of alternative measures to minimize mortality of ETP species				
e	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	Met?	NA	NA	NA

Rationale

Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.

References

Please refer to the P2 Background Section.

Overall Performance Indicator (PI) Rationale

Rationale is provided for each Scoring Issue.

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

PI 2.3.3 – ETP species information

PI 2.3.3	Relevant information is collected to support the management of UoA impacts on ETP species, including: <ul style="list-style-type: none"> - Information for the development of the management strategy; - Information to assess the effectiveness of the management strategy; and - Information to determine the outcome status of ETP species 		
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Scoring Issue	SG 60	SG 80	SG 100
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Information adequacy for assessment of impacts			
a	Guide post	Qualitative information is adequate to estimate the UoA related mortality on ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for ETP species.	Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.
Met?	NA	NA	NA

Rationale

The fishery is very selective and only catches species that it targets with harpoons. There are no significant interactions with vulnerable seabird, marine mammal, turtle or elasmobranch species. The Messina Strait harpoon swordfish fishery does not have impacts on the ETP species component. For the same reason, ETP species specific information to inform status and management performance is not explicitly required. This scoring issue is not applicable.

Information adequacy for management strategy			
b	Guide post	Information is adequate to support measures to manage the impacts on ETP species.	Information is adequate to measure trends and support a strategy to manage impacts on ETP species.
Met?	NA	NA	NA

Rationale

Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.

References

PI 2.3.3	<p>Relevant information is collected to support the management of UoA impacts on ETP species, including:</p> <ul style="list-style-type: none"> - Information for the development of the management strategy; - Information to assess the effectiveness of the management strategy; and - Information to determine the outcome status of ETP species
Please refer to the P2 Background Section.	
Overall Performance Indicator (PI) Rationale	
Rationale is provided for each Scoring Issue.	
Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

PI 2.4.1 – Habitats outcome

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates			
Scoring Issue		SG 60	SG 80	SG 100	
a	Commonly encountered habitat status				
	Guide post	The UoA is unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	
	Met?	NA	NA	NA	
Rationale					
The Messina Strait harpoon swordfish fishery does not have habitat effects of any kind as the gear type employed does not come into contact with the seabed.					
b	VME habitat status				
	Guide post	The UoA is unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	
	Met?	NA	NA	NA	
Rationale					
Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.					
c	Minor habitat status				
	Guide post			There is evidence that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.	
	Met?			NA	
Rationale					
Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.					
References					
Please refer to the P2 Background Section.					

PI 2.4.1	The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates
Overall Performance Indicator (PI) Rationale	
Rationale is provided for each Scoring Issue.	
Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI
Data-deficient? (Risk-Based Framework needed)	No

PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
	Met?	NA	NA	NA
Rationale				
The Messina Strait harpoon swordfish fishery does not have habitat effects of any kind as the gear type employed does not come into contact with the seabed. For the same reason, no habitat management is required specific to this fishery.				
b	Management strategy evaluation			
	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some objective basis for confidence that the measures/partial strategy will work, based on information directly about the UoA and/or habitats involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or habitats involved.
	Met?	NA	NA	NA
Rationale				
Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.				
c	Management strategy implementation			
	Guide post		There is some quantitative evidence that the measures/partial strategy is being implemented successfully.	There is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		NA	NA
Rationale				
Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.				
d	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
	Guide post	There is qualitative evidence that the UoA complies with its management requirements to protect VMEs.	There is some quantitative evidence that the UoA complies with both its management requirements	There is clear quantitative evidence that the UoA complies with both its management requirements

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats		
			and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	NA	NA	NA
Rationale				
Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.				
References				
Please refer to the P2 Background Section.				
Overall Performance Indicator (PI) Rationale				
Rationale is provided for each Scoring Issue.				
Draft scoring range		≥80		
Information gap indicator		Information sufficient to score PI		
Data-deficient? (Risk-Based Framework needed)		No		

PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	<p>The types and distribution of the main habitats are broadly understood.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.</p>	<p>The nature, distribution and vulnerability of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.</p>	<p>The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.</p>
	Met?	NA	NA	NA
Rationale				
The Messina Strait harpoon swordfish fishery does not have habitat effects of any kind as the gear type employed does not come into contact with the seabed. For the same reason, no habitat specific information to inform status and management performance is not explicitly required.				
b	Information adequacy for assessment of impacts			
	Guide post	<p>Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.</p>	<p>Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.</p>	<p>The physical impacts of the gear on all habitats have been quantified fully.</p>
	Met?	NA	NA	NA
Rationale				

PI 2.4.3	Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat
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Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.

c	Monitoring			
	Guide post		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.
	Met?		NA	NA

Rationale

Please refer to the statement of no impact provided under scoring issue (a). This scoring issue is not applicable.

References

Please refer to the P2 Background Section.

Overall Performance Indicator (PI) Rationale

Rationale is provided for each Scoring Issue.

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI
Data-deficient? (Risk-Based Framework needed)	No

PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guide post	The UoA is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Yes	Yes	Partial
Rationale				
Effects of the fishery on ecosystem structure and function				
To better evaluate the potential effect of this fishery on ecosystem structure and function we have considered the following elements:				
<ol style="list-style-type: none"> Unwanted or associated catches (Primary and Secondary species). There are small catches of (wanted) associated species that the Messina harpoon fishermen may target to supplement swordfish catches (e.g. Mediterranean spearfish, sunfish). Due to the limited tonnage caught, the overall removals and therefore, effects on those species are considered small to negligible. There are no unwanted catches in this fishery. ETP species interactions. No negative effects are thought to exist on vulnerable and ETP species due to the highly selective nature of the harpoon fishery which does not have accidental catches of any type. Habitats. There are no habitat effects since the harpoon gear does not come into contact with the seabed. Overall removal of swordfish from the ecosystem. The harpoon fishery in the Messina Strait removes about 74.6 tonnes of swordfish a year. Considering that only one swordfish stock is believed to occur in the whole Mediterranean basin, and that removals by the main gear types, principally longline gear, consisted of an average of 10,000 tonnes a year in the past 5 years³⁹, the removals of the harpoon fishery only consist of 0.7% of total removals. These amounts are very small and may not significantly affect other species that may depend on swordfish. Swordfish predators. Swordfish is not considered to have any important predator being an apex predator itself (aside from humans). Some occasional predation may occur from certain shark species but this is not considered significant. Prey of swordfish. Swordfish in the central Mediterranean has been shown to feed on many different species including cephalopods and fish species (probably around 60 different species based on Romeo et al. 2009⁴⁰ and Romeo et. al. 2011⁴¹). Because its diet is very diverse and the removals of this fishery are very small, potential effects on prey species through top-down control mechanisms⁴² are likely limited. 				
The UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. SG 60 and 80 would be met, and potentially part of SG 100 as the information provided could be seen at least as partial evidence.				

³⁹ https://iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf

⁴⁰ <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/abs/an-evaluation-of-resource-partitioning-between-two-billfish-tetrapturus-belone-and-xiphias-gladius-in-the-central-mediterranean-sea/46470E57A7A304E42BC43EDB7E66223D>

⁴¹ <https://link.springer.com/article/10.1007/s10152-011-0270-3>

⁴² <https://www.sciencedirect.com/science/article/abs/pii/S0924796315001074>

PI 2.5.1	The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function	
References		
Please refer to the footnotes in the text and the P2 Background Section.		
Overall Performance Indicator (PI) Rationale		
Rationale is provided for each Scoring Issue.		
Draft scoring range	≥80	
Information gap indicator	Information sufficient to score PI	
Data-deficient? (Risk-Based Framework needed)	No	

PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue	SG 60	SG 80	SG 100	
a	Management strategy in place			
	Guide post	There are measures in place, if necessary which take into account the potential impacts of the UoA on key elements of the ecosystem.	There is a partial strategy in place, if necessary, which takes into account available information and is expected to restrain impacts of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a strategy that consists of a plan , in place which contains measures to address all main impacts of the UoA on the ecosystem, and at least some of these measures are in place.
	Met?	Yes	Yes	No

Rationale

The MSC Standard defines a partial strategy and a strategy as follows:

- A “*partial strategy*” represents a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically.
- A “*strategy*” represents a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity and cultural context of the fishery and should contain mechanisms for the modification of fishing practices in the light of the identification of unacceptable impacts.

ICCAT have recently implemented a rebuilding plan for the Mediterranean swordfish, which came into force in 2017 (ICCAT 2016; Rec. 2016-05)⁴³. The stated goal of Rec. 2016-05 is to reach a biomass corresponding to a maximum sustainable yield by 2031. Rebuilding the stock to BMSY levels will also have effects on associated species in the Mediterranean ecosystem. The plan is complex, with a wide range of elements (summarised in Section 7.4.1.4) including a TAC, reduction of TAC over time, minimum size provisions and a series of seasonal closures, as well as a large quantity of provisions for reporting and inspection which are intended to ensure that the TACs and other management measures are respected (see discussion in Section 7.4.1.4). Specific to the harpoon fishery in Messina, this is largely self-regulated by fishermen with rules relating to fishing areas/ sections (called postazioni) and 60 days of fishing a year spanning from the end of April to the end of August. The fishery has been formally recognised in Regional Sicilian Regulations ARS 09/2019, Article 6⁴⁴, specifically promoting this type of activity as a traditional activity.

In addition to the above and in order to better evaluate the potential effect of the UoA on key elements of the ecosystem we have considered the following elements:

1. Overall removal of swordfish from the ecosystem. The harpoon fishery in the Messina Strait removes about 74.6 tonnes of swordfish a year. Considering that only one swordfish stock is believed to occur in the whole Mediterranean basin, and that removals by the main gear types, principally longline gear, consisted of an

⁴³ https://ec.europa.eu/fisheries/swordfish-new-step-towards-recovery-mediterranean_da

⁴⁴ http://www.edizionieuropee.it/LAW/HTML/213/si3_09_107.html

PI 2.5.2 **There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function**

average of 10,000 tonnes a year in the past 5 years⁴⁵, the removals of the harpoon fishery only consist of 0.7% of total removals. These amounts are very small and may not significantly affect other species that may depend on swordfish.

2. Swordfish predators. Swordfish is not considered to have any important predator being an apex predator itself (aside from humans). Some occasional predation may occur from certain shark species but this is not considered significant.
3. Prey of swordfish. Swordfish in the central Mediterranean has been shown to feed on many different species including cephalopods and fish species (probably around 60 different species based on Romeo et al. 2009⁴⁶ and Romeo et. al. 2011⁴⁷). Because its diet is very diverse and the removals of this fishery are very small, potential effects on prey species through top-down control mechanisms⁴⁸ are likely limited.

According to the available rebuilding plan in place and the likely limited risk to ecosystem elements, we can determine that there is a partial strategy in place, if necessary, which takes into account available information and is expected to restrain impacts of the UoA on the ecosystem (largely fishing pressure through TAC and other measures) so as to achieve the Ecosystem Outcome 80 level of performance. **SG 60 and 80 may be met.**

However, we also note that that the harpoon fishery is not yet managed through TAC, although that may be implemented in the near future (pers. comm. Teresa Romeo, swordfish expert and researcher, Stazione Zoologica Anton Dohrn). Accordingly, we cannot conclude that there is a strategy that consists of a plan, in place which contains measures to address all main impacts of the UoA on the ecosystem, and at least some of these measures are in place. SG 100 may not be met.

Management strategy evaluation				
b	Guide post	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ ecosystems).	There is some objective basis for confidence that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.	Testing supports high confidence that the partial strategy/ strategy will work, based on information directly about the UoA and/or ecosystem involved.
	Met?	Yes	Yes	No

Rationale

As indicated in scoring issue a and based on the likely limited ecosystem risks resulting from this UoA, we can say that there is some objective basis for confidence that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved. This is because the removals of the harpoon fishery only consist of very limited swordfish removals (when compared to the total stock catches), and because the species has been shown to have a very diverse diet (probably around 60 different species based on Romeo et al. 2009 and Romeo et. al. 2011) whereby potential effects on prey species through top-down control mechanisms are likely quite limited. Furthermore, swordfish is not considered to have any important predator depending on the

⁴⁵ https://iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf

⁴⁶ <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/abs/an-evaluation-of-resource-partitioning-between-two-billfish-tetrapturus-belone-and-xiphias-gladius-in-the-central-mediterranean-sea/46470E57A7A304E42BC43EDB7E66223D>

⁴⁷ <https://link.springer.com/article/10.1007/s10152-011-0270-3>

⁴⁸ <https://www.sciencedirect.com/science/article/abs/pii/S0924796315001074>

PI 2.5.2 There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function

resource. **SG 60 and 80 would be met.** However, for the same issues identified in scoring issue a we cannot determine that SG 100 would be met.

Management strategy implementation				
c	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a).
	Met?		Yes	No

Rationale

As indicated in scoring issue a and based on the likely limited ecosystem risks resulting from this UoA, we can say that there is some there is some evidence that the measures/partial strategy is being implemented successfully. Specific to the harpoon fishery in Messina, this is largely self-regulated by fishermen with rules relating to fishing areas/ sections (called postazioni) and 60 days of fishing a year spanning from the end of April to the end of August. The fishery has been formally recognised in Regional Sicilian Regulations ARS 09/2019, Article 6⁴⁹, specifically promoting this type of activity as a traditional activity. We also note the existence of a rebuilding plan from ICAAT⁵⁰. There is some evidence that the measures/partial strategy is being implemented successfully. **SG 80 would be met.** However, we also note that the harpoon fishery is not yet managed through TAC, although that may be implemented in the near future (pers. comm. Teresa Romeo, swordfish expert and researcher). Hence, there is no clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a). SG 100 may not be met.

References

Please refer to the footnotes in the text and the P2 Background Section.

Overall Performance Indicator (PI) Rationale

Rationale is provided for each Scoring Issue.

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI
Data-deficient? (Risk-Based Framework needed)	No

⁴⁹ http://www.edizionieuropee.it/LAW/HTML/213/sj3_09_107.html

⁵⁰ <https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=CELEX:32019R1154&from=ES>

PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	Information is adequate to identify the key elements of the ecosystem.	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Yes	Yes	

Rationale

Diet and Ecology of Swordfish in the Central Mediterranean

Larval swordfish feed on copepods, but at an early juvenile age their diet consists almost entirely of fish. Adults feed on a wide variety of prey including groundfish, invertebrates, pelagic and deepwater fish. Swordfish are apex predators, located at the top of the food chain. Predation on swordfish (other than human) is expected to be limited to that on young and infirm swordfish. Some sharks may occasionally prey on swordfish (pers. comm. Teresa Romeo, swordfish expert and researcher, Stazione Zoologica Anton Dohrn). In a study by Romeo et al. 2009⁵¹ resource partitioning between the Mediterranean spearfish (*Tetrapturus belone*) and the swordfish (*Xiphias gladius*) was analysed. The contents of 53 *T. belone* and 95 *X. gladius* non-empty stomachs were analysed from specimens caught in the central Mediterranean Sea (Strait of Messina), from 2004 to 2006, by the harpoon fishery. *Xiphias gladius* preyed mainly on teleosts and cephalopods, which represented 59% and 39.1%, respectively, of the total preyed items in terms of % index of relative importance (IRI). In another study on cephalopods diet in large fish predators in the Central Mediterranean Sea including swordfish, bluefin and yellow fin tuna, and Mediterranean spearfish by Romeo et al. 2011⁵², the highest number of different cephalopods prey species (20) was recorded in swordfish stomachs. This indicates that *X. gladius* can be considered the most efficient “cephalopod collector” that probably relates to the species’ hunting behavior during large vertical migrations. Both epipelagic and deep-water were recorded in its diet. The intake of cephalopod prey species that follow a diel vertical migration pattern seems to be important for all predators except for *T. belone*.

At the wider, Mediterranean level, ICCAT’s Standing Committee on Research and Statistics (SCRS) has a Sub-Committee on Ecosystems, which according to its Terms of Reference, aims to serve as the scientific cornerstone in support of an Ecosystem Approach to Fisheries (EAF) in ICCAT. It also has several species groups, including a Sharks Group that meets intersessionally and carries out stock assessments and ecological risk assessments (ERAs). To facilitate the implementation of Ecosystem-Based Fisheries Management (EBFM) the Sub-Committee on Ecosystems has developed an indicator-based ecosystem report card. A main objective of this new tool is to improve dialogue between scientists and managers and increase the awareness of the state of the different ecosystem components managed by ICCAT. Key objectives of the 2020 meeting⁵³ were to review progress on indicators for the Ecosystem Report Card and to review and discuss key issues related to Bycatch. The indicators reviewed at the meeting included retained and assessed species, marine mammals, trophic relationships and food web, environment, fishing pressure, marine turtles and seabirds.

ICCAT adopted its 2015-2020 Science Strategic Plan (SSP) for the functioning and orientation of the SCRS in 2014⁵⁴. The plan sets out a Mission, a Vision, Goals, Objectives and Strategies to achieve each goal as well as measurable targets. Before its adoption, it was presented to the First Meeting of the Standing Working Group to Enhance

⁵¹ <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/abs/an-evaluation-of-resource-partitioning-between-two-billfish-tetrapturus-belone-and-xiphias-gladius-in-the-central-mediterranean-sea/46470E57A7A304E42BC43EDB7E66223D>

⁵² <https://link.springer.com/article/10.1007/s10152-011-0270-3>

⁵³ https://www.iccat.int/Documents/Meetings/Docs/2020/REPORTS/2020_SC_ECO_ENG.pdf

⁵⁴ <https://www.iccat.int/en/StrategicPlan.html>

PI 2.5.3 **There is adequate knowledge of the impacts of the UoA on the ecosystem**

Dialogue between Fisheries Scientists and Managers (SWGSM) in 2014 (ICCAT, 2018). The SSP aims to improve data collection and analyses relating to Principle 1 (stock assessment, uncertainties and management advice for BFT-e) and Principle 2 (bycatch species, habitats, ecosystems) and encourages an open dialogue between the SCRS and Working Groups, the Commission and stakeholders (through the Standing Working Group to Enhance Dialogue between Fisheries Scientists and Managers (SWGSM) including the wider scientific community.

Information is adequate to broadly understand the key elements of the ecosystem. **SG 60 and 80 would be met.**

Investigation of UoA impacts				
b	Guide post	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and some have been investigated in detail.	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and have been investigated in detail.
	Met?	Yes	Yes	No

Rationale

Effects of the fishery on ecosystem structure and function

To better evaluate the potential effect of this fishery on key ecosystem element affecting structure and function we note the following:

1. Overall removal of swordfish from the ecosystem. The harpoon fishery in the Messina Strait removes about 74.6 tonnes of swordfish a year. Considering that only one swordfish stock is believed to occur in the whole Mediterranean basin, and that removals by the main gear types, principally longline gear, consisted of an average of 10,000 tonnes a year in the past 5 years⁵⁵, the removals of the harpoon fishery only consist of 0.7% of total removals. These amounts are very small and may not significantly affect other species that may depend on swordfish.
2. Swordfish predators. Swordfish is not considered to have any important predator being an apex predator itself (aside from humans). Some occasional predation may occur from certain shark species but this is not considered significant.
3. Prey of swordfish. Swordfish in the central Mediterranean has been shown to feed on many different species including cephalopods and fish species (probably around 60 different species based on Romeo et al. 2009⁵⁶ and Romeo et. al. 2011⁵⁷). Because its diet is very diverse and the removals of this fishery are very small, potential effects on prey species through top-down control mechanisms⁵⁸ are likely limited.

Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and **some** have been investigated in detail. **SG 60 and 80 may be met.** However, not all elements have been investigated in details and SG 100 may not be met.

Understanding of component functions				
c	Guide post		The main functions of the components (i.e., P1 target	The impacts of the UoA on P1 target species, primary,

⁵⁵ https://iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf

⁵⁶ <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/abs/an-evaluation-of-resource-partitioning-between-two-billfish-tetrapturus-belone-and-xiphias-gladius-in-the-central-mediterranean-sea/46470E57A7A304E42BC43EDB7E66223D>

⁵⁷ <https://link.springer.com/article/10.1007/s10152-011-0270-3>

⁵⁸ <https://www.sciencedirect.com/science/article/abs/pii/S0924796315001074>

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem	
		species, primary, secondary and ETP species and Habitats) in the ecosystem are known .	secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are understood .
	Met?	Yes	no

Rationale

Effects of the fishery on ecosystem structure and function

To better evaluate the potential effect of this fishery on ecosystem structure and function we have considered the following elements:

1. Unwanted or associated catches (Primary and Secondary species). There are small catches of (wanted) associated species that the Messina harpoon fishermen may target to supplement swordfish catches (e.g. Mediterranean spearfish, sunfish). Due to the limited tonnage caught, the overall removals and therefore, effects on those species are considered small to negligible. There are no unwanted catches in this fishery.
2. ETP species interactions. No negative effects are thought to exist on vulnerable and ETP species due to the highly selective nature of the harpoon fishery which does not have accidental catches of any type.
3. Habitats. There are no habitat effects since the harpoon gear does not come into contact with the seabed.
4. Overall removal of swordfish from the ecosystem. The harpoon fishery in the Messina Strait removes about 74.6 tonnes of swordfish a year. Considering that only one swordfish stock is believed to occur in the whole Mediterranean basin, and that removals by the main gear types, principally longline gear, consisted of an average of 10,000 tonnes a year in the past 5 years⁵⁹, the removals of the harpoon fishery only consist of 0.7% of total removals. These amounts are very small and may not significantly affect the target stock or other species that may depend on swordfish.
5. Swordfish predators. Swordfish is not considered to have any important predator being an apex predator itself (aside from humans). Some occasional predation may occur from certain shark species but this is not considered significant.
6. Prey of swordfish. Swordfish in the central Mediterranean has been shown to feed on many different species including cephalopods and fish species (probably around 60 different species based on Romeo et al. 2009⁶⁰ and Romeo et. al. 2011⁶¹). Because its diet is very diverse and the removals of this fishery are very small, potential effects on prey species through top-down control mechanisms⁶² are likely limited.

The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are known. **SG 80 may be met.** However, we note that data sent to the EU regarding catches of swordfish is regarded by some to be somewhat of an underestimate of true catches deriving from longline and drift gillnets operating in the Mediterranean (pers. comm. Teresa Romeo). During the 2020 stock assessment activities⁶³ for swordfish, concerns were also raised due to under-reporting discards of undersized swordfish, which leads to false estimates of the overall catch volume and consequently bias stock status estimates and projections of future stock size under different management scenarios. According to this SG 100 may not be met.

d Information relevance

⁵⁹ https://iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf

⁶⁰ <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/abs/an-evaluation-of-resource-partitioning-between-two-billfish-tetrapturus-belone-and-xiphias-gladius-in-the-central-mediterranean-sea/46470E57A7A304E42BC43EDB7E66223D>

⁶¹ <https://link.springer.com/article/10.1007/s10152-011-0270-3>

⁶² <https://www.sciencedirect.com/science/article/abs/pii/S0924796315001074>

⁶³ https://www.iccat.int/Documents/SCRS/SCRS_2020_Advice_ENG.pdf

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem		
	Guide post		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Yes	No

Rationale

As explained in scoring issue c adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred and **SG 80 would be met**. However, we note some uncertainties around total catches of swordfish and the effects that this may have on other ecosystem component and elements. Accordingly, SG 100 may not be met.

	Monitoring			
e	Guide post		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?		Yes	No

Rationale

Swordfish catches are collected for this fishery and more widely across the Mediterranean Sea and distributed to the EU and ICAAT annually to enable monitoring of fishing efforts and effects on the resource, which in turn may affect other ecosystem components. Adequate data continue to be collected to detect any increase in risk level. **SG 80 would be met**. However, due to some uncertainties relating to underestimation of catches and the overall adequateness of information we cannot determine that information is adequate to support the development of strategies to manage ecosystem impacts. SG 100 may not be met.

References

Please refer to the footnotes in the text and the P2 Background Section.

Overall Performance Indicator (PI) Rationale

Rationale is provided for each Scoring Issue.

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI
Data-deficient? (Risk-Based Framework needed)	No

7.6 Principle 3

7.6.1 Principle 3 background

7.6.1.1 Jurisdiction and legal framework

The SWO is a highly migratory species and there are several key jurisdictions of relevance, listed in Table 13. ICCAT is the regional fisheries management organisation (RFMO) which provides the management framework, translated into European legislation as part of the Common Fisheries Policy (CFP) and which has direct effect in all EU member States. Italy is the UoA vessels' country of registration (Flag State) and the Port State.

Table 13 - Jurisdictions involved in the fishery's management system

Jurisdiction	Key instruments
RFMOs	<u>ICCAT</u> for the protection of tuna, tuna-like and associated species: SWO Recovery Plan (Rec. 16-05), with conservation and management measures (CMM); Vessel registers (fishing and carriers); VMS; inspections. <u>GFCM</u> (General Fisheries Commission for the Mediterranean) is the competent RFMO for the Mediterranean area where the fishery is taking place, for the management of species stocks other than those covered by ICCAT.
European union	European Union: translation of ICCAT Recommendations into the CFP, which has direct effect in the Italian legal system; SWO recovery plan, Habitat and Biodiversity protection (Marine Framework Strategy Directive, marine spatial planning); Research programmes; fisheries monitoring control and surveillance (MCS) through the European Fisheries Control Agency (EFCA). Mediterranean Advisory Council (MEDAC) Working Group 2: Large Pelagic Fishes (BFT-e - SWO-MED and other species managed by ICCAT)
Flag State: Italy	<i>Ministero delle Politiche Agricole Alimentari e Forestali (MIPAAF)</i> , SWO specific provisions (see Decree GU n.70 del 24-3-2018), MCS, quota allocation, IUU-specific and other Flag State Measures (FSM), limited entry vessel licensing and vessel quota systems, individual fish tail tags for BFT and SWO; limited fishing season and area; specific reporting obligations, including landing of catch at specific times, derogation and special provisions for undersize fish, no discards.

ICCAT

The International Commission for the Conservation of Atlantic Tunas is the Regional Fisheries Management Organisation (RFMO) in charge of tuna, tuna-like and associated species targeted by the fishery. The International Convention for the Conservation of Atlantic Tunas is the formal document that establishes the international legal and administrative structure for the management of tuna and tuna-like stocks (ICCAT, 2007). Under the Convention, the Contracting Parties and Cooperating non-Contracting Parties, Entities, and Fishing Entities (CPCs) undertake to collaborate and carry out studies on target fish stock biology, abundance and data collection and analyses on current conditions and trends of target fish stocks and other fish species caught incidentally, such as sharks.

Ahead of working group scientific meetings, the Commission may take the initiative or act on the proposal of an appropriate Panel and, "on the basis of scientific evidence, make recommendations designed to maintain the populations of tuna and tuna-like fishes that may be taken in the Convention area at levels which will permit the maximum sustainable catch" (art. VIII).

Recommendations become effective for all Contracting Parties (CPs) six months after its notification from the Commission, unless a majority of CPs raise an objection, and only for CPs that have not raised an objection if at least one fourth of the CPs have objected (within a set period of 60 days+). Recommendations may include set expiry dates. Recommendations concern management measures of the target species, Mediterranean swordfish (SWO, Principle 1), of associated species (Principle 2) as well as data collection, research and compliance (Principle 3).

The Commission holds a regular meeting every two years and special meetings as needed. The last (26th) Regular Meeting of the Commission was held in Mallorca, Spain, 18-25 November 2019). Following its regular meetings, ICCAT issues a Biennial Report, which contains the Report of the Regular Meeting and the reports of meetings of the Panels, Standing Committees and Sub-Committees, as well as some of the Working Groups. It also includes a summary of the activities of the Secretariat and the Annual Reports of the Contracting Parties of the Commission and Observers, relative to their activities in tuna and tuna-like fisheries in the Convention area. All reports are available from the ICCAT website.

The SWO stock has been managed by ICCAT through a Recovery Plan for initiated in 2016. The plan fixes annual total allowable catches (TACs), which are then distributed on the basis of established national shares. For the years 2017-2020 TACs were set at: 10,500 t with a possibility of annual TACs reviews by the Commission, based on the advice of the SCRS. For Europe, the corresponding quota allocations were 7,410.48 t in 2017 and 7,118.17 t in 2018 (see: https://ec.europa.eu/fisheries/swordfish-new-step-towards-recovery-mediterranean_en).

ICCAT decisions become active 6 months after being accepted. The relevant decision are listed in **Errore. L'origine riferimento non è stata trovata..**

Table 14- Active ICCAT Resolutions, Recommendations and other Decisions for SWO

Year	Reference Key	Management Measures
Swordfish (Principle 1)		
2003	[03-04]	Recommendation by ICCAT relating to Mediterranean swordfish
2016	[16-05]	Recommendation by ICCAT replacing the Recommendation [13-04] and Establishing a Multi-annual Recovery Plan for Mediterranean Swordfish
By-catch species, habitats and ecosystems (Principle 2)		
2005	[05-08]	Resolution by ICCAT on circle hooks
2017	[17-07]	Recommendation by ICCAT amending the recommendation 14-04 by ICCAT to establish a multi-annual recovery plan for Bluefin Tuna in the eastern Atlantic and Mediterranean.
2016	[16-12]	Recommendation by ICCAT on Management Measures for the Conservation of Atlantic Blue Shark Caught in Association with ICCAT Fisheries
2016	16-13	Recommendation by ICCAT on Improvement of Compliance Review of Conservation and Management Measures regarding Sharks Caught in Association with ICCAT Fisheries
Monitoring, Compliance, Management planning (Principle 3)		
2008	[08-09]	Recommendation by ICCAT to Establish a Process for the Review and reporting of Compliance Information
2012	[11-13]	Recommendation by ICCAT on the Principles of decision-making for ICCAT Conservation and Management measures
2011	[11-17]	Resolution by ICCAT on Best Available Science
2015	[15-11]	Resolution by ICCAT Concerning the Application of an Ecosystem Approach to Fisheries Management
2015	[15-12]	Resolution by ICCAT Concerning the Use of a Precautionary Approach in Implementing ICCAT Conservation and Management Measures
2015	[15-13]	Resolution by ICCAT on Criteria for the Allocation of Fishing Possibilities
2016	[16-15]	Recommendation by ICCAT on Transshipment
2008	[08-09]	Recommendation by ICCAT to Establish a Process for the Review and reporting of Compliance Information
2012	[11-13]	Recommendation by ICCAT on the Principles of decision-making for ICCAT Conservation and Management measures

2018	[18-10]	Recommendation by ICCAT concerning minimum standards for VMS in the ICCAT Convention area (VMS for vessels >15mLOA no later than 1 January 2020)
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GFCM

The General Fisheries Commission for the Mediterranean (GFCM) is the competent RFMO for the Mediterranean and Black Sea area where the fishery is taking place, for the management of species stocks other than those covered by ICCAT. The GFCM has a strong focus on small-scale fisheries (SSF) of which this fishery is an example. The EU and Italy are both contracting parties. The GFCM has adopted binding recommendations regarding the conservation of sharks and rays as well as access to information and data related to monitoring, control and surveillance and regional marking of fishing gear, which are relevant for Principle 2 and Principle 3 indicators.

European Union

The European CFP (EU, 2013) limits the EU fishing capacity (vessel numbers) and production-catching quotas for SWO as part of its international obligations to ICCAT (EU, 2015). To take part in the Italian SWO fishery, a European fishing authorisation is required and frames the current limited entry system for all EU member states. Every year, the European Union presents its fishing plan for the coming season at the ICCAT Panel 2 meeting. For 2018, the EU representative noted that the comments received on its 2017 plan had been taken into account in the drafting of the 2018 plan and noted a need to clarify any obligation to report discards of fish below minimum size under the new management plan (ICCAT, 2016). EU representative also noted that all ICCAT Recommendations had been transposed into European law (see EU (2016) or Rec. 17.07), and that the transposition of the adopted Multi-Annual management Plan Recommendation 18-02 will soon follow. Within this multi-annual framework, member states' shares of the EU TAC share are defined annually, together with additional EU-specific technical measures and provisions.

As part of the EU CFP-specific institutions (i.e.: European Union, EU Council of Ministers, EU Parliament, EU Agencies), the Mediterranean Advisory Council (MEDAC) provides a fisheries and aquaculture specific forum for stakeholders, professionals, scientists, environmental NGOs, to prepare "opinions on fisheries management and socio-economic aspects in support of the fisheries sector in the Mediterranean, to be submitted to the Member States and the European institutions in order to facilitate the achievement of the objectives of the CFP. MEDAC also proposes technical solutions and suggestions, such as joint recommendations (ex. Art. 18 Reg. 1380/2013) at the request of the Member States." Of relevance to this fishery, for example, the MEDAC submitted a contribution to the Regional Plan of Action on small-scale fisheries (SSF), related to management measures, data, and scientific research in March 2019. The MEDAC has also been represented at the FAO Fish Forum 2018 and the GFCM 42th Commission meeting and at the EFCA Advisory board and consultation meeting on the EU Control System.

Italy

The MIPAAF is the Central Government Ministry that is responsible for managing fishing activity in Italy. The "Direzione generale della pesca marittima e dell'acquacoltura" (hereafter PEMAC) is part of this ministry and is responsible for carrying out this task.

In Italy no legal or natural persons are allowed to engage in commercial fishing without the preliminary registration in the Fishing Company Register. Crew members are also registered in the Seamen Register and ships are recorded in apposite Vessels Register. This obligatory recording regime came from the Navigation Code, Presidential Decree No. 328/1952 of 1952, Law No. 963/1965 of 1965, and Presidential Decree No. 1639/1968 of 1968.

MIPAAF is the competent authority for Monitoring, Control and Surveillance (hereafter MCS).

In order to register, professional seamen must satisfy the following statutory requirements:

- a) they must show that fishing is their sole or principal source of income; and
- b) they must demonstrate that they have acquired adequate professional knowledge and skills to conduct commercial fishing operations (training course).

Currently this regime is confirmed by the context of the new Legislative Decree 153/2004. The registers are kept by the local offices of the Ministry of Transport (Comando Generale delle Capitanerie di Porto or Coast Guard Authorities) located along the Italian coastline.

The Italian fishery sector itself is organized within co-operatives, many of which are also Producer Organisations (an EU-recognized marketing body that often also acts as a representative of its members). Federpesca and Federcoopesca are umbrella bodies that represent these numerous sector organisations at a national level and are members of MEDAC.

7.6.1.2 Consultation, Roles and Responsibilities, Dispute resolution, Respects for rights

ICCAT

The ICCAT Convention and basic texts (ICCAT, 2007) define the roles and responsibilities of the Commission and its subsidiary bodies, of the Secretariat and the Contracting Parties (CPCs). The ICCAT Convention (Article XI) states that the Commission may invite any appropriate international organization and any non-member Government that is a member of the UN or of any Specialized Agency to send observers to meetings of the Commission and its subsidiary bodies. ICCAT Commission meetings provide the consultative mechanism for the currently 52 CPCs to agree management measures and share information through annual national reports. Annual reports include feedback on technical measures, local knowledge and other matters pertinent to management to be reviewed in Commission meetings and included in its reports. The ICCAT Manual (ICCAT, n.d.) provides an organisational chart and explicitly describes the functions, roles and responsibilities of the various ICCAT subsidiary bodies.

ICCAT has a tradition of making decisions by consensus and resolving disputes informally. This is evident in ICCAT species Panel 2, for example, where issues and concerns raised by individual CPCs and the Commission are aired in an effort to avoid disputes. In cases where disputes cannot be avoided, the ICCAT Convention provides a process of objection allowing individual Contracting Parties to withdraw from endorsing and implementing an ICCAT recommendation (ICCAT Convention Article VIII). This procedure has been used infrequently in the course of ICCAT's history; 12 times since 1969, with 7 of these being objections raised by two member states with respect to their bluefin tuna allocation (Spencer et al., 2016). Nevertheless, ICCAT has recognised the need for a more formal dispute settlement procedure and a Working Group on Convention Amendment (WGCA) was tasked with looking at this issue in 2012 (one of the priority matters listed in the Annex 1 of ICCAT Recommendation 12-10). The latest WGCA meeting in 2018 noted some progress on the issue although, not yet some points of disagreement remain, such as whether dispute settlement procedures would be compulsory or not and whether procedures could only be instituted jointly by all parties to a dispute or, instead, by a single or number of Contracting Parties. At this stage, after incorporating all agreed revisions, the WGCA Chair noted that there was agreement in principle on the text of Article VIII bis and to retain Annex 1. These proposals are finalised would need to be officially incorporated into the ICCAT's Convention to be final (ICCAT, 2018c). The new provisions will then need to be tested and proven effective as the need arises. Regarding fishing rights, ICCAT includes a specific Recommendation on "Criteria for the Allocation of Fishing Possibilities" or national (CPCs) quota allocations (ICCAT, 2015a). Among these criteria, the interests of artisanal, subsistence, small-scale coastal fishers, coastal fishing communities, coastal states and regions dependent on fishing, as well as the right to fish on the high seas are recognised. For SWO, the same formal commitment to established rights holds. For example, several CPCs expressed concerns (based on 2005 quotas / catch levels) that certain specific needs had not been met and dissatisfaction with their quota for 2018. These were considered by Panel 2, to allow adjustments to the 2019 and 2020 quotas for those CPCs, using some of the reserved quotas, with an agreement that the allocation keys would be re-considered in 2020.

European Union and Italy

The roles and responsibilities are well known with the EU-CFP system for SWO. Institutions have been working together across member states and EU, for all quota-managed shared fisheries, and closely with ICCAT since

the Recovery Plan. For this fishery, stakeholders are represented through the Italian delegate at all relevant working groups and meetings of the Advisory Council MEDAC, and on ICCAT and GFCM EU-delegations. In accordance with Article 17 of Regulation (EU) No 1380/2013, when allocating the fishing opportunities for bluefin tuna and swordfish stocks available to them, Member States shall use transparent and objective criteria, including those of an environmental, social and economic nature, and shall also endeavour to distribute national quotas fairly among the various fleet segments giving special consideration to traditional and artisanal fishing, and to provide incentives to Union fishing vessels deploying selective fishing gear or using fishing techniques with reduced environmental impact (EU Reg 2017-2017 Art 43). The process takes time, but it is transparent and considered to be effective.

7.6.1.3 Long-term objectives

ICCAT

The long-term objective set out in Article VIII of the ICCAT Convention is to “maintain the populations of tuna and tuna-like fishes that may be taken in the Convention area at levels which will permit the maximum sustainable catch”. There is no mention of the precautionary approach in the Convention text as it stands but it is explicitly mentioned since the ICCAT’s 2015 adoption of two resolutions consistent with the UN Fish Stock Agreement and the FAO Code of Conduct for Responsible Fisheries, that when making recommendations pursuant to Article VIII of the Convention, the Commission should:

- Apply an ecosystem-based approach to fisheries management (Resolution 15-11) (ICCAT, 2015b), and
- Use a precautionary approach in implementing ICCAT conservation and management measures (Resolution 15-12) (ICCAT, 2015b), in accordance with relevant international standards.

Clear long-term objectives to guide management consistent with MSC Principles and Criteria and the precautionary approach, are explicit within ICCAT’s management policy.

For Principle 1, the objective of ICCAT’s Recovery Plan for Mediterranean swordfish (Rec.16-05) since 2017 has been to recover by 2022 and maintain the Spawning Stock Biomass (SSB) over or at a level corresponding to B_{MSY} and to manage fishing activities by maintaining catches at or below the most precautionary MSY estimate of the SCRS. The overarching objective of ICCAT is to maintain catches at maximum sustainable levels (ICCAT, 2007). For the short-term and specifically for SWO, this was translated - with CPCs’ commitment - into drastic reductions in fishing mortality in support of the Recovery Plan. The Recovery Plan has been effective enough in meeting its objectives considering the catches were below TAC in 2017 and 2018. The agreement on a reduced TAC, reducing fishing capacity and fishing plans, together with country-specific quota allocations would result in a recovery of the stock ahead, showing that the objectives were both well-defined and measurable.

European Union and Italy

The Italian legislation refers to the EU Common Fisheries Policy (CFP) and its clearly stated objectives (CFP Regulation 1380/2013 Article 2):

1. The CFP shall ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits, and contributing to the availability of food supplies.
2. The CFP shall apply the precautionary approach to fisheries management and shall aim to ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels, which can produce the maximum sustainable yield. In order to reach the objective of progressively restoring and maintaining populations of fish stocks above biomass levels capable of producing maximum sustainable yield, the maximum sustainable yield exploitation rate

shall be achieved by 2015 where possible and, on a progressive, incremental basis at the latest by 2020 for all stocks.

3. The CFP shall implement the ecosystem-based approach to fisheries management so as to ensure that negative impacts of fishing activities on the marine ecosystem are minimised and shall endeavour to ensure that aquaculture and fisheries activities avoid the degradation of the marine environment.

4. The CFP shall contribute to the collection of scientific data.

5. The CFP shall, in particular:

- gradually eliminate discards, on a case-by-case basis, taking into account the best available scientific advice, by avoiding and reducing, as far as possible, unwanted catches, and by gradually ensuring that catches are landed;
- where necessary, make the best use of unwanted catches, without creating a market for such of those catches that are below the minimum conservation reference size;
- provide conditions for economically viable and competitive fishing capture and processing industry and land-based fishing related activity;
- provide for measures to adjust the fishing capacity of the fleets to levels of fishing opportunities consistent with paragraph 2, with a view to having economically viable fleets without overexploiting marine biological resources;
- promote the development of sustainable Union aquaculture activities to contribute to food supplies and security and employment;
- contribute to a fair standard of living for those who depend on fishing activities, bearing in mind coastal fisheries and socio-economic aspects;
- contribute to an efficient and transparent internal market for fisheries and aquaculture products and contribute to ensuring a level-playing field for fisheries and aquaculture products marketed in the Union;
- take into account the interests of both consumers and producers;
- promote coastal fishing activities, taking into account socio-economic aspects;
- be coherent with the Union environmental legislation, in particular with the objective of achieving a good environmental status by 2020 as set out in Article 1(1) of Directive 2008/56/EC, as well as with other Union policies.

Regarding Principle 2, the EU Birds and Habitats Directives provisions have been transposed in the Italian legislation, and so have the long-term objectives of the EU's Marine Strategy Framework Directive (MSFD), to develop a regional seas approach to managing the marine environment. The overall marine good environmental status (GES) for Descriptor 3 is that "Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock." The types of measures proposed to achieve GES from fisheries impacts include input controls, output controls and spatial and temporal restrictions on economic activities. The Criteria and methodological standards for Descriptor 3 of the MSFD are laid down in the Annex of Commission Decision (EU) 2017/848 (including fishing mortality, spawning stock biomass, age and size distribution). The Action Plan is being finalised for the Mediterranean sub-region with the adoption of a programme of measures and is expected to be finalised in 2020.

Italian legislation incorporates the EU Fisheries and Environment policies overarching objectives. For Principle 1, the long-term objective is the sustainable management of fisheries resources to be at MSY.

7.6.1.4 Fishery-specific objectives

The fishery targets the Mediterranean swordfish (SWO) in the Messina Strait (**Errore. L'origine riferimento non è stata trovata.**). The Strait of Messina's harpoon fishery is composed by a total of 13-14 boats, 9

operating in Sicily and 4-5 in Calabria. A typical fishing boat is called “passerella”, a vessel of about 16 meters long (about 300 HP and 14 GT) with a tall sighting platform on the vessel’s mast (25 m above the sea level) where the boat is piloted and fish are sighted, and a plank 20-24 m long extending from the bow for the harpooning operations (bridge). Fishing operations are carried out during the day starting at about 7 a.m till 6 p.m at the latest depending on the abundance of sightings. Since 1902 the local Harbour office of the coast guard regulates this activity. The boats fish into assigned sectors of about 1 km² named "poste". 8 fishing sectors divide the coast between Messina and Torre Faro where the boats operate (**Errore. L'origine riferimento non è stata trovata.**).

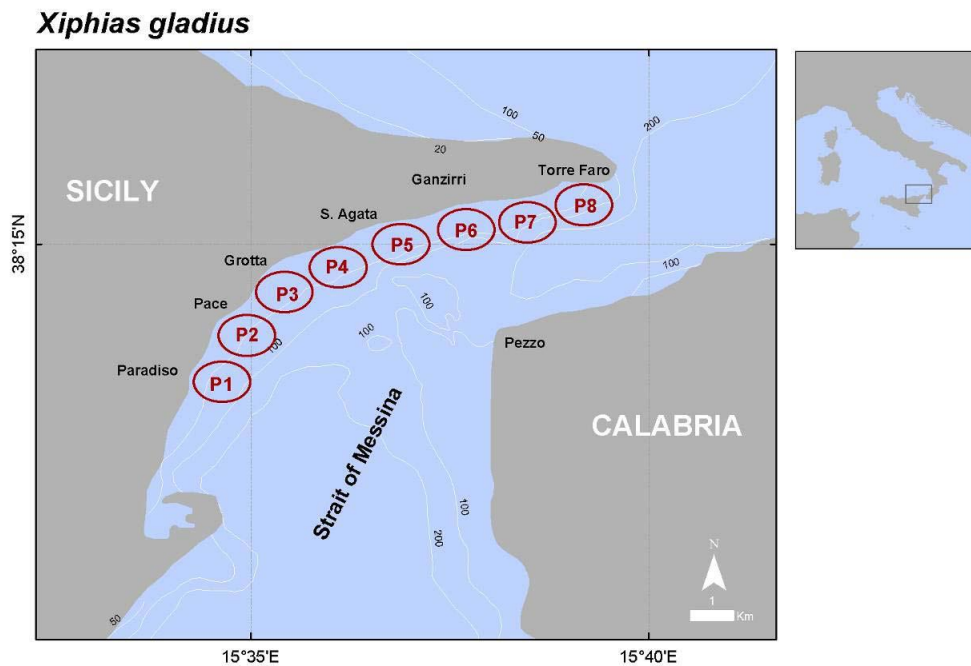


Figure 10 - Location of sectors (poste) in the Strait of Messina for harpoon swordfish fishery. Source: Romeo et al., 2008.

For the fishery specifically, all ICCAT recommendations apply in the European legislation, which had the same objectives as ICCAT in its Recovery Plan, and now in the Multi-Annual Management Plan.

The Italian legislative system is based on the same SWO specific Rebuilding Plan, by direct effect or through additional provisions, with additional provisions such as to support social benefits from small-scale fisheries (SSF) and for the protection and sustainable management of marine biodiversity through national parks and reserves.

The local fisheries management objectives are, for the stakeholder institutions involved in the fishery’s management at local level, to abide by the recovery plans as translated into Italian legislation for Mediterranean waters.

7.6.1.5 Fishery-specific decision-making processes

The fishery consists of Italian-registered vessels. The Italian decision-making processes are nested under those of the EU-CFP, themselves subject to the agreed results of ICCAT’s deliberations. The Italian system has several layers from national to regional.

ICCAT

Decisions regarding the SWO stock management taken by the Commission are based on scientific advice provided by the Standing Committee on Research and Statistics (SCRS) and its working groups to evaluate fishing mortality and resulting stock status. The SCRS proposed a Total Allowable Catch (TAC) set at 10,500 t undermining the success of the recovery plan (Rec. 16-05). The ICCAT website provides a comprehensive and easy access to ICCAT's documents and reports. Minutes of meetings and the preamble to ICCAT's Recommendations refer to the fishery-specific objective and the precautionary approach.

Another issue of relevance is a lack of transparency in decision-making relating to the allocation of fishing opportunities noted by some CPCs. This matter has been noted by the Ad Hoc Working Group on the follow up of the 2nd ICCAT Performance Review (ICCAT, 2017a) and Panel 2, and is scheduled to be thoroughly analysed by 2020 when allocations keys will be re-examined (ICCAT, 2017b).

The ICCAT Secretariat is accessible to stakeholders and supports direct enquiries through its website and to locate relevant ICCAT documents.

Europe Union and Italy

Once the ICCAT Recommendation stipulating the EU share of the TAC is accepted, the EU publishes its allocation between member states and gear. The Italian government department (PEMAC), in concertation with relevant stakeholders, publishes detailed allocations and fishing plans. The Fishing Plans are established using a precautionary approach and best available information. Annually, the PEMAC publishes a list of the vessels that have – and those that have applied and have not – obtained a SWO fishing permit. Interested parties may obtain comprehensive information on the wider small-scale Italian fishery's performance and management actions in the Mediterranean, through the CRPMEMs, the CNPMEM and the EU Fishery Council MEDAC, which describes how the management system responded to findings and recommendations emerging from research, monitoring, evaluation and review activity. Formal reporting specifically for the UoA vessels performance may only be available on request, because of the small number of vessels.

7.6.1.6 Fishery-specific compliance and enforcement

There are four levels to the fishery's compliance system that correspond to each jurisdictional level:

- The ICCAT –RFMO Joint Scheme of International inspections (Annex 7 of Rec. 14-04) and annual Compliance Committee (COC) reporting obligation;
- The limited entry system of European fishing permits for the SWO fishery, fixed vessel quota allocations and the European CFP Monitoring, Control and Surveillance (MCS) arrangements and coordination of all member states through the European Fisheries Control Agency (EFCA) and its BFT Joint Deployment Plan (JDP) in the Mediterranean (and the Atlantic);
- The Italian flag state arrangements, which include quota allocation conditional on the owner/operator+vessel application having the necessary permit, the annual permit itself being contingent on compliant vessel gear characteristics and on the vessel owner and crew being up to date with the professional organisation and social security payments.

ICCAT

As with other RFMOs, ICCAT relies on its Contracting Parties to implement management measures, through their annual fishing plans and other control measures, which are set out and monitored annually through Panel 2. The ICCAT Convention does not explicitly provide ICCAT with competence related to monitoring, control and surveillance (MCS), but there is a large number of reporting and inspections obligations, which are monitored by the Conservation and Management Measures Compliance Committee (COC). CPCs' annual reports to the COC have five sections:

- Annual fisheries information;

- Research and statistics;
- Compliance with reporting requirements under ICCAT conservation and management measures;
- Implementation of other ICCAT Conservation and Management Measures; and
- Difficulties encountered in implementation of and compliance with ICCAT conservation and management measures.

Annual COC reports are publicly available on ICCAT’s website, associated with the reporting for each Commission meeting.

ICCAT’s MCS system has been greatly strengthened over recent years, with coordinated inspection and data entry and validation systems that allow near real-time and at least daily updates at all levels (ICCAT, 2016b). Catch certification or catch document schemes encouraged in the FAO’s International Plan of Action on IUU Fishing have been fully implemented for swordfish fisheries. ICCAT has also integrated all key Port State Measures (PSM) requirements in its recommendations established or interventions undertaken by port states which a foreign fishing vessel must comply with or is subjected to as a condition for use of ports within the port state. National PSM would typically include requirements related to prior notification of port entry, use of designated ports, restrictions on port entry and landing/transshipment of fish, restrictions on supplies and services, documentation requirements and port inspections, as well as related measures, such as IUU vessel listing, trade-related measures and sanctions. Many of these measures have in recent years seen their inclusion and development in international instruments, including as part of the EU-CFP.

Europe

The EU jurisdiction prevails through the European CFP reporting and compliance obligations to ICCAT, to which EU member States are held through their national administrations. The EU signed the UN Agreement on Port State measures (PSM) to prevent and deter IUU fishing at its onset in 2009 and published its IUU Regulation (Regulation (EC) No.1005/2008 mandatory catch documentation on 1 January 2010. The PSM Agreement entered into force on 5th June 2016, therefore IUU-control procedures adopted by ICCAT CPCs for bluefin tuna are integrated; this includes inspections in port and at sea, including the High Seas, under the European Fisheries Control Agency (EFCA, 2017, 2020) Eastern Atlantic/Mediterranean Bluefin Tuna Joint Deployment Plan (JDP).

The new EU specific control and inspection programme (EU, 2018b) which came into force on 1st January 2019, aims to strengthen existing provisions in all member states (EU, 2014). Notably, it introduces target inspection benchmarks, to conduct on a yearly basis, 60% of total inspections at sea (excluding aerial surveillance) and 60% of total inspections at landing (inspections in ports and before first sale) shall be conducted on “fishing vessels belonging to the fleet segments in the two highest risk level categories, ensuring that both these fleet segments are adequately and proportionally covered”.

Italy

Italian-registered fishing vessels and crew are regularly controlled by Italian authorities for their compliance with administrative obligations, in particular regarding maritime safety, and any risks to the marine environment.

The Italian Coast Guard is delegated responsibility by MIPAAF for fisheries control at sea and on land. It works with the local and national agencies to apply these controls (e.g. with the financial ministry and police to progress prosecutions). On MCS, the Coastguard works with EFCA control authorities to implement joint deployment plans such as those for specific fisheries (e.g. Blue Fin Tuna) or more generally (Mediterranean). It operates the National Fishery Control Centre (Centro Controllo Nazionale Pesca - CCNP); in Rome and 15 regional offices, each with their own assets for aerial, sea and land-based inspections. For fisheries in GSA 10, the Italian Coastguard carries out aerial surveillance, sea-based inspections and port inspections with resources targeted using a risk analysis approach. Statistics on inspections and infringement are not available for the present UoA but only for the whole Italian fleet (see Ecomafie Report 2018 - <https://www.legambiente.it/rapporto-ecomafia/>).

In recent years inspectors have remained on board to contribute to the scientific information for the fishery. By inspectors also observing hauls, this has improved the sampling levels in the quantification of discards as per DCF commitments.

7.6.1.7 Fishery-specific monitoring and management performance evaluation

ICCAT

There are internal and external reviews and evaluations of the fishery's management system and components at all key levels as follows.

The performance of ICCAT has been independently evaluated twice. The second Performance Review (ICCAT, 2016a) issued recommendations that are examined by all components of the ICCAT structure, and progress reported is monitored and summarised annually by an ad hoc Working Group (ICCAT, 2017b). ICCAT's results in terms of stock health for SWO are closely monitored, and analyses are discussed in WG, SCRS and Commission meetings, and also scrutinised and commented upon throughout the year by environmental NGOs with ICCAT Observer status and published in peer-reviewed scientific papers.

European Union and Italy

As a CPC, the EU reports to ICCAT annually on its implementation of active recommendations, on the basis of its member states' reports. EU institutions representatives and scientists contribute to all relevant ICCAT bodies and meetings, as evidenced by the report contents and participants lists.

Key CFP institutions and components such as the EFCA (Blomeyer and Sanz, 2017), the Fisheries Control Regulation, or the European Maritime and Fisheries Fund are evaluated separately, including public consultations.

The Italian government's performance in terms of compliance with ICCAT's recommendation and reporting obligation is published every year, as part of the EU CPC reporting obligations, to ICCAT's Compliance Committee (COC) and Panel 2.

7.6.2 Principle 3 Performance Indicator scores and rationales

PI 3.1.1 – Legal and/or customary framework

PI 3.1.1	The management system exists within an appropriate legal and/or customary framework which ensures that it: <ul style="list-style-type: none"> - Is capable of delivering sustainability in the UoA(s); - Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework 		
Scoring Issue	SG 60	SG 80	SG 100
	Compatibility of laws or standards with effective management		
a	Guide post There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
Met?	Yes	Yes	No
Rationale			
<p>There are three jurisdictions of importance to this fishery: the RFMO ICCAT, the EU as the Fishery’s Policy maker and Italy as MIPAAF.</p> <p>The focus of this PI is on whether there is an appropriate and effective legal and/or customary framework that is capable of delivering sustainability in the UoA(s) in accordance with P1 and P2.</p> <p>At the national level an assessment will need to be made for the UoA(s) to provide evidence that there are national laws agreements and policies governing the actions of the authorities and actors involved in managing the UoA and that that effective regional and/or international cooperation creates a comprehensive cooperation under the obligations of UNCLOS Articles 63(2), 64, 118, 119, and UNFSA Article 8.</p> <p>Fishing for tuna and tuna like species, both on the high seas and in zones of national jurisdiction, is governed by the International Conventions on the Conservation of Atlantic Tuna (ICCAT) of 1966. The Commission is established under the Convention and is tasked to co-ordinate scientific research and make recommendations designed to maintain populations of such species at levels which will permit maximum sustainable yield. The Convention requires that Contracting Parties provide “available statistical, biological and other scientific information the Commission may need for the purposes of this Convention” and to “undertake to collaborate with each other with a view to the adoption of suitable effective measures to ensure the application of the provisions of this Convention and in particular to set up a system of international enforcement to be applied to the Convention area,” other than area within national jurisdiction. Each year, the Commission adopts a number of Recommendations for the management of stocks, e.g., catch quotas and minimum sizes for a given stock. ICCAT Recommendations are binding only insofar as the CPCs agree to implement them domestically. Each recommendation becomes effective for all CPCs six months after the date of the notification from the Commission.</p> <p>The most relevant international legislation is the Law of the Sea 1982 Convention and the Fish Stocks Agreement 1995. The purpose of the 1995 UN Fish Stocks Agreement (UNFSA) is to facilitate the implementation of certain provisions of the 1982 Convention concerning the conservation and management of straddling fish stocks and highly migratory fish stocks. The Agreement complements the 1993 FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (1993 FAO Compliance Agreement) and the 1995 FAO Code of Conduct for Responsible Fisheries. This legislation and guidance require co-</p>			

PI 3.1.1	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> - Is capable of delivering sustainability in the UoA(s); - Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework
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operation among states through international institutions where appropriate, and in the case of Atlantic tunas, ICCAT performs this function. UNFSA is particularly important in the case of highly migratory species as addressed by ICCAT, since this is a focus of this legislation.

Duties similar to those elaborated in UNFSA are also set out in article 8 of the FAO Code of Conduct for Responsible Fisheries (CCRF). While CCRF is not binding, it does set out best practice and therefore provides a broad structure through which fisheries can be evaluated.

Although ICCAT pre-dates much of the relevant international legislation on the management of fisheries, it is compliant with that legislation and sets out to meet the requirements of those laws relevant to the management of shared stocks.

The European Parliament and the Council have translated the current basis of the multiannual recovery plan for Mediterranean swordfish and amending Council Regulation (EC) No 1967/2006 and Regulation (EU) 2017/2107 of the European Parliament and of the Council laying down management, conservation and control measures applicable in the Convention area of the International Commission for the Conservation of Atlantic Tunas (ICCAT), which has direct effect in the legal order of all member states, including Italy. Following the adoption of ICCAT Rec. 16-05 setting out the details of the multi-annual recovery plan for Mediterranean swordfish that was implemented in 2017. The ICCAT Rec. 16-05 is fully transposed in Italian national decree (e.g.: <http://www.federpesca.it/decreto-23-febbraio-2018-misure-tecniche-per-la-pesca-del-pesce-spada-nel-mediterraneo/>; DECRETO 23 febbraio 2018 Misure tecniche per la pesca del pesce spada nel Mediterraneo. (18A01960) (GU n.70 del 24-3-2018)) .

Although the EU could take over a year in transposing the recovery/management plan, it adopts annually a Regulation fixing fishing possibilities (TACs) and other provisions (including those from ICCAT) for the following fishing season (see as examples Annex ID of Council Regulations (EU) for the TACs of 2018 and 2019 (EU, 2018a, 2019a)). The provisions adopted by ICCAT usually apply from the following fishing season through different provisions at EU and Member State level, even before its official date of entry into force at ICCAT level.

The EU Common Fisheries Policy provides a framework for organized cooperation between EU member states, including Italy, and internationally, since 1957. Through EU cooperation, Italy has been actively participating in data collection, sharing and dissemination of scientific data, scientific assessment of stock status and development of management advice, for the fishery locally.

SG60 and SG80 are met for ICCAT, Europe and Italy, however ICCAT recommendations are not binding to all, SG100 is not met. Also, a large proportion of CPCs (Contracting Parties to the Convention) to ICCAT have not ratified the UNFSA. These articles underpin the MSC P&C, and therefore failure to ratify the UNFSA does suggest that the state may not have acceded to these principles, and other evidence in each case should be sought. Any fishery operating within the jurisdiction of a state which has not ratified the UNFSA will need to demonstrate through other means that the laws it is applying are entirely consistent with the MSC P&C. Otherwise ICCAT sanctioned fisheries should meet the SG80, but the lack of binding procedures prevent the fisheries meeting SG100.

		Resolution of disputes		
b	Guide post	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been

PI 3.1.1	The management system exists within an appropriate legal and/or customary framework which ensures that it:			
	<ul style="list-style-type: none"> - Is capable of delivering sustainability in the UoA(s); - Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework 			
			that is appropriate to the context of the UoA.	tested and proven to be effective.
	Met?	Yes	Yes	No

Rationale

ICCAT has a tradition of making decisions by consensus and resolving disputes informally, e.g. ICCAT members discuss issues in species panels, approving panel reports and raising relevant issues at Commission sessions providing a full airing of concerns in an effort to avoid disputes. However, in cases where disputes cannot be settled, the ICCAT Convention provides a process of objection allowing individual Contracting Parties (CPs) to withdraw from endorsing and implementing an ICCAT recommendation (ICCAT, 2007) Convention Article VIII (2,3)). The procedure has been used infrequently (12 times between 1969 and 2015), with 9 objections raised by two ICCAT CPs with respect to their bluefin tuna allocation. **SG60 is met.**

ICCAT’s Conservation and Management Measures Compliance Committee (COC) monitors compliance with the Convention and ICCAT recommendations, which are binding insofar as the Contracting Parties agree to implement them domestically. The COC has the potential to address disputes over implementation of ICCAT recommendations but was found to be generally ineffective by ICCAT’s Independent Review Panel (Spencer et al., 2016). ICCAT recognised the need for a more formal dispute settlement procedure, and the matter has been progressing slowly according to the Working Group on Convention Amendment (CWG). The latest CWG report has now agreed on proposals, which will need to be incorporated into the ICCAT’s Convention to be final before they can be tested and proven effective as the need arises (ICCAT, 2018c). In addition, it is worth noting that “it is, at least in theory, possible for international disputes to be resolved through the International Court of Justice (ICJ) or through the International Tribunal for the Law of the Sea (ITLOS) if they cannot be resolved in more efficient ways. This recourse is most likely to be used by states which have ratified the UNFSA, in which such a provision is made. Therefore, where a fishery is not under the jurisdiction of a state which has ratified UNFSA, it may be questioned how effective this option would be. For states which have ratified UNFSA, it is likely this mechanism would be transparent and effective (Medley et al., 2019, 2020).” The EU ratified the UNFSA in 1998, **therefore SG80 is met.**

The Mediterranean swordfish management system also includes dispute resolution mechanisms at EU and national levels. For matters between EU member states, the European Court of Justice (ECJ) may be used, which has been done over the years when all conciliation avenues have been exhausted. The process takes time, but it is transparent and considered to be effective.

Although the fishery is managed at EU-level, some prerogatives remain with the member states, in particular the allocation of quota. Dispute mechanisms are transparent, and considered to be appropriate and effective, as opportunities for SSF appear to have been increased for 2019. **SG80 is met.** However, it is not clear if the system has been tested for effectiveness. SG100 is not met.

c	Respect for rights			
	Guide post	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing

PI 3.1.1	<p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> - Is capable of delivering sustainability in the UoA(s); - Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework 			
		for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	manner consistent with the objectives of MSC Principles 1 and 2.	for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Yes	Yes	No

Rationale

ICCAT Resolution 15-13 deals specifically with “Criteria for Allocation of Fishing Possibilities” to CPCs and recognises priority interests of artisanal, subsistence, small-scale coastal fishers, coastal fishing communities, coastal states and regions dependent on fishing for the stocks, and fisheries on the High Seas, together with the economic and/or social importance of the fishery for qualifying participants whose fishing vessels have habitually participated in the fishery in the Convention area (ICCAT, 2015c). For ICCAT contracting parties, a Resolution is not binding, therefore there is no commitment at that level, **only SG60 and SG80 are met.**

The CFP Basic Regulation (1380/2013) recognizes the importance of small-scale fisheries (recital.4). The present rules restricting access to resources within the 12 nautical mile zones of Member States are also noted “to benefit conservation by restricting fishing and also preserving traditional fishing activities on which the social and economic development of certain coastal communities is highly dependent”, and “Member States should endeavour to give preferential access to small-scale, artisanal or coastal fishermen” (recital 19). Article 17 of the CFP deals specifically with "Criteria for the allocation of fishing opportunities by Member States") and states that "When allocating the fishing opportunities available to them, as referred to in Article 16, Member States shall use transparent and objective criteria including those of an environmental, social and economic nature. The criteria to be used may include, inter alia, the impact of fishing on the environment, the history of compliance, the contribution to the local economy and historic catch levels.”

However, the system of quota allocation is usually contested because it did not go back in time enough, which was not possible because of a lack of reliable statistics. Therefore, SSF is usually questioning the quota available (especially for bluefin tuna) and SG 100 is not met.

References

ICCAT, 2007, 2015, 2016, 2018c; Spencer et al., 2016; EU, 2018a, 2019a, 2019b; Medley et al., 2019, 2020

Draft scoring range

≥80

Information gap indicator

Information sufficient to score PI

PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	Roles and responsibilities			
	Guide post	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood .	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Yes	Yes	Yes
Rationale				
<p>The ICCAT Convention defines the roles and responsibilities of the Commission, of the Secretariat and the Contracting Parties. The ICCAT Manual provides an organigram and explicitly describes the functions, roles and responsibilities of the various ICCAT subsidiary bodies, SG60 is met. ICCAT meetings are advertised in advance and the preparatory and final reports are accessible to all. They explain clearly the role and areas of responsibilities. Contributions from stakeholders including environmental NGOs submitted to ICCAT and reports from the press demonstrate how all parties involved in the fishery interact and their roles are well understood.</p> <p>The fishery is also represented at European level, through the Mediterranean Advisory Council (MEDAC) for aspects regarding Principle 2 (non-target species, protected areas, ecosystem change etc.). In particular for the swordfish fishery, MEDAC provided opinion as reported in https://www.europarl.europa.eu/doceo/document/B-8-2016-1399_EN.html.</p> <p>At the Sicilian level, <i>Associazione Pescatori Feluche dello Stretto</i> is an association that was formed in May 2018 to better represent the harpoon fishery in the Sicilian context. The association is itself adherent to Confcooperative Fedagri Pesca Sicilia which itself interfaces with Italian institutions (pers. comm. Teresa Romeo, swordfish expert and researcher, Stazione Zoologica Anton Dohrn).</p> <p>It is apparent that the functions, roles and responsibilities of all those involved in management are clearly defined and are well understood in all areas. SG60, SG80 and SG100 would be met at national and European levels.</p>				
b	Consultation processes			
	Guide post	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used .

PI 3.1.2	The management system has effective consultation processes that are open to interested and affected parties The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
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	Met?	Yes	Yes	No
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Rationale

ICCAT has a procedure for regularly obtaining data, and monitoring data and catches from fishing activity in particular. Member countries have the responsibility to provide data required by ICCAT. ICCAT holds a plenary meeting every two years, and the ICCAT specialised working groups (comprised of scientists from the contracting parties) hold annual technical meetings. Data from the contracting parties and input from the specialist working groups provide the basis for ICCAT’s advice. “Local knowledge” at the international level is assumed to refer to national information and experience.

Consideration of the information obtained is demonstrated in the Europeans and other CPCs annual reports (see: JRC annual reports database and RCM Large Pelagics) and discussions the ICCAT Panel 2, WG and biennial Commission reports, which also explain how the information is used or not for stock assessment.

However, the Second Independent Review of ICCAT (Spencer et al. 2016) recommended a better balance of scientists with knowledge of the fishery and modelling expertise be sent to the assessment meetings of the SCRS and that ICCAT develops specific mechanisms to ensure that more scientists with knowledge of the fisheries participate in stock assessment meetings and are directly involved in assessment teams. Guidelines and Criteria for Granting Observer Status at ICCAT Meetings (Ref. 05-12) set the stage for NGO and parties’ participation as observers at ICCAT meetings. Both the 1st and 2nd Independent Reviews (Hurry et al. 2008; Spencer et al. 2016) recommended improvements to allowing NGO participation; however Spencer et al. noted that considerable improvements have been made: The ICCAT website contains a wealth of information and seems in general updated, even though its user friendliness could be improved. The ICCAT Secretariat is currently considering ways to re-structure the website. Access to ICCAT’s statistical databases is provided on ICCAT’s website, subject to the ICCAT Rules and Procedures on Data Confidentiality. ICCAT has in practice been reasonably transparent because the documents of the Annual ICCAT Meeting and many other ICCAT meetings are publicly available. Nevertheless, for some other meetings - including scientific meetings - only the meeting agenda and logistics information are publicly available while access to documents is password-protected. Commission Circulars are only available to CPCs by means of a password-protected part of the ICCAT Website, which is very common practice among RFMOs.

The management system demonstrates consideration of the information obtained. The scientific reports state exactly what information is being used, how it is used, and justification is provided for all information which is rejected. SG 60 and 80 are met. However, information used by management other than the scientific information is not so clearly reported. Although much of this information can be inferred from various sources, it is not necessarily clear how different sources of information are weighted. This includes information on compliance, economics and social issues Therefore, these fisheries do not meet SG100 because the management system cannot demonstrate in all cases consideration of all the information or explain how it uses information in decisions.

		Participation		
c	Guide post		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Yes	Yes

PI 3.1.2	<p>The management system has effective consultation processes that are open to interested and affected parties</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p>
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Rationale

Consultation occurs at several levels within the management system. Consultation at the international level is formalized, and there are well-developed mechanisms for the seeking and consideration of appropriate information. At the national and fishery level the opportunity for interested parties to be involved in management varies. The opportunity to become a Contracting Party or Co-operating Non-contracting Party is open to all, including non-states. ICCAT has taken and continues to take steps to encourage states to become Contracting Parties, and for Non-Contracting Parties to co-operate with ICCAT’s conservation measures. The success is demonstrated by the increase in membership over the last few decades and the high level of participation.

The Working Group on Convention Amendment (successor to Working Group on the Future of ICCAT) is actively discussing how participation can be improved, for example through capacity building and assistance to developing states and facilitation of non-party participation. The increasing number and active participation of members demonstrates the success of the success of ICCAT in providing access. While some improvements of opportunities for NGO participation have been recommended (Spencer et al. 2016), ICCAT has made considerable progress in this regard.

The Commission may be joined by any government that is a member of the United Nations (UN) and that is a member of a Specialized Agency of the United Nations. In addition, any inter-governmental economic integration organization constituted by States that have transferred to it competence over the matters governed by the ICCAT Convention can join, such as the EU. To become a Contracting Party, an instrument of adherence to the ICCAT Convention must be deposited with the Director-General of the Food and Agriculture Organization of the United Nations (FAO). Membership becomes effective on the date that the instrument is deposited. In addition, the Commission can also grant the special status of a Co-operator, who has many of the same rights and obligations that Contracting Parties have. The procedures and criteria for attaining this status are clearly laid out in a 2003 Rec. 03-20.

An applicant for Cooperating non-Contracting Party, Entity or Fishing Entity Status is required to confirm its commitment to respect the Commission’s conservation and management measures and inform ICCAT of the measures it takes to ensure compliance by its vessels with ICCAT conservation and management measures. It is important to note that the provision of information forms an important part of the decision to award this status. The Commission's Permanent Working Group for the Improvement of ICCAT Statistics and Conservation Measures (PWG) is responsible for reviewing requests for Cooperating Status and for recommending to the Commission whether or not an applicant should receive Cooperating Status. However, the requirements state that this provision should not allow over-capacity from elsewhere or legitimize IUU activity.

ICCAT facilitates effective engagement of its stakeholders. ICCAT also provides training and support to States lacking the capacity in areas of data management and fisheries science, which facilitates effective and full involvement in its activities. Additionally, ICCAT meetings are open to stakeholders such as NGOs and fisher-groups upon registration requiring some administrative cost.

Therefore, there is sufficient evidence that, at the international level, ICCAT meets SG80 and SG100.

References

ICCAT, 2005, 2007, Spencer et al., 2016; Medley et al., 2019, 2020

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

PI 3.1.3 – Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are explicit within and required by management policy.
	Met?	Yes	Yes	Yes
Rationale				
<p>The long-term objective set out in Article VIII of the ICCAT Convention (ICCAT, 2007) is to maintain the populations of tuna and tuna-like fishes that may be taken in the Convention area at levels which will permit the maximum sustainable catch. There is no mention of the precautionary approach in the Convention but Resolution 15-11 states that the “Commission should apply an ecosystem-based approach to fisheries management” and Resolution 15-12 states that “when making recommendations pursuant to Article VIII of the Convention, the Commission should apply a precautionary approach, in accordance with relevant international standards.” Furthermore, Recommendation 11-13 "on the principles of decision making for ICCAT conservation and management measures", recalls that "that management decisions should be based upon scientific advice and consistent with the precautionary approach" and aim to support its application (ICCAT, 2018d).</p> <p>For Mediterranean swordfish specifically, Recommendation 16-05 sets the objectives as specified in Principle 1 section to a Recovery Plan sets explicitly the objective of “managing fishing activities by maintaining catches at or below the MSY estimate shall also be supported by a Biomass (SSB) maintained over or at a level of the corresponding BMSY, referring to the SCRS most precautionary MSY estimate.”</p> <p>The European Common Fisheries Policy (CFP) sets out clear objectives ((EU, 2013a) CFP Regulation 1380/2013 Article 2): 1. To ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits, and contributing to the availability of food supplies ; 2. To apply the precautionary approach to fisheries management, and aim to ensure that exploitation of living marine biological resources restores and maintains populations of harvested species above levels, which can produce the maximum sustainable yield. In order to reach the objective of progressively restoring and maintaining populations of fish stocks above biomass levels capable of producing maximum sustainable yield, the maximum sustainable yield exploitation rate shall be achieved by 2015 where possible and, on a progressive, incremental basis at the latest by 2020 for all stocks ; and 3. To implement the ecosystem-based approach to fisheries management so as to ensure that negative impacts of fishing activities on the marine ecosystem are minimised, and shall endeavour to ensure that aquaculture and fisheries activities avoid the degradation of the marine environment. SG60 and SG80 are met.</p> <p>Regarding Principle 2, the EU Marine Strategy Framework Directive (MSFD – Dir 2008/56/EC of 17 June 2008 establishing a framework for community action in the field of marine environmental policy) sets out clear the objectives, including for the Mediterranean Sea marine sub-region, where the fishery is based. The MSFD Descriptor 3 relates specifically to the reduction of ecosystem impacts from fishing activities. The MSFD relies on EU member states to establish and implement a programme of measures devised on the basis of the precautionary principle to reach Good Environmental Status by 2020 at the latest.</p> <p>For the overarching objectives of the reformed CFP and those of the EU/Italian policies, SG100 is also met.</p>				

PI 3.1.3	The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach
References	
ICCAT, 2005, 2018d, 2018h; EU, 2013a	
Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Objectives , which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery-specific management system.	Short and long-term objectives , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.	Well defined and measurable short and long-term objectives , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.
	Met?	Yes	Yes	No
Rationale				
<p>The overarching objective of ICCAT is to maintain catches of species in their purview at maximum sustainable catch levels (ICCAT, 2007). The Swordfish Recovery Plan sets TAC in accordance with MSY principles and with the aim of the recovery of the stock toward BMSY level. Regarding Principle 2 (and noting the effects of this UoA on principle 1 and 2 and very limited due to limited target stock catches and little to no effects on other additionally targeted species), the Commission adopted the Resolution by ICCAT on Atlantic Sharks (Resolution 01-11), the Recommendation by ICCAT Concerning the Conservation of Sharks caught in association with fisheries managed by ICCAT (Rec. 04-10) (ICCAT, 2018d), the Supplemental Recommendation by ICCAT concerning Sharks (Rec. 07-06), including the obligation of CPCs to annually report Task I & II data for sharks in accordance with ICCAT data reporting procedures and the Recommendation by ICCAT on the Development of Harvest Control Rules and of Management Strategy Evaluation (Rec. 15-07) for commercially exploited species and catch avoidance and survival estimation for released sharks. Catch limits have been set for Blue shark (<i>Prionace glauca</i>) (Rec 16-12) (ICCAT, 2018g). Similarly, for ETP species, ICCAT has developed explicit policy objectives to avoid catches and data collection binding recommendations to that effect e.g. REC 10-09 regarding sea turtles (ICCAT, 2010); 11-09 regarding seabirds (ICCAT, 2011a); there are also two (non-binding) resolutions regarding Co-operation with CITES: 93-08 and 93-09 (ICCAT, 1993a, 1993b), SG60 and SG80 are met.</p> <p>At EU level, the corresponding short and long-term objectives are taken up in the Common Fisheries Policy (CFP) and the various international Conventions that prevail in the Mediterranean Sea and to which the EU and Italy are party. These objectives are also explicit and clearly set, to minimise all impacts in the short-term and ensure that the fishery remains sustainable in the long-term, in the fishery specific Good Practice Guide. Overall, it cannot be said that all objectives are well defined and measurable for P2 species. Although objectives are well-defined and measurable for the target species (and bluefin tuna) caught by the fishery, this is not yet the case for non-target species (even if negligible), for which objectives are set to avoid interactions or mitigate their impacts, but without specifics being defined. SG100 is not met</p>				
References				
ICCAT, 2007, 2018d				
Draft scoring range		≥80		
Information gap indicator		Information sufficient to score PI		

PI 3.2.2 – Decision-making processes

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery		
Scoring Issue		SG 60	SG 80	SG 100
Decision-making processes				
a	Guide post	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Yes	Yes	
Rationale				
<p>ICCAT’s principle objective is to maintain fish stocks at levels that will permit the maximum sustainable catch. The ICCAT Convention (art.3) requires decisions to be taken by a majority of Contracting Parties (CPs), each with one vote. Two thirds of the CPs constitute a quorum, but ICCAT mostly seeks consensus. The Commission receives advice from its Panels and Committees, e.g. scientific advice on issues such as stock status and catch limits comes from the SCRS. Its regular meetings are biennial, with Special meetings the other years as needed. Its main subsidiary bodies, such as the SCRS involved the scientific management advice of Mediterranean swordfish have met every year, or more often for specialized Working Groups.</p> <p>The last Performance Review (Spencer et al., 2016) noted that “The desire to manage on a consensus basis is laudable, but approaches may have to change bearing in mind there are 52 CPs now in ICCAT. In the view of the Panel, the pursuit of the consensus objective has often led to either the postponement of decisions, the change in proposals from a legally binding recommendation to a non-legally binding resolution, or continued deferral of decision-making on the adoption of measures.” As reported by the Work of the Ad Hoc Working Group on Follow up of the Second ICCAT Performance Review (ICCAT, 2017j) work is on-going to improve this and other points of governance. Nevertheless, decision-making processes are well-established and, for the Mediterranean swordfish fishery, have shown in recent years that they can result in measures and strategies to achieve the fishery-specific objectives (catch below TAC and F at FMSY in 2018).</p> <p>The European Union is an ICCAT CP. It has a mechanism in place to translate ICCAT’s recommendation (for example Rec. 16-05 for the SWO recovery Plan) as soon as adopted into a Regulation of the European Parliament and the Council (of EU Fisheries Ministers) (i.e. REGULATION (EU) 2019/1154 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 relating to a multiannual recovery plan for Mediterranean swordfish and amending Regulation (EC) no. 1967/2006 of the Council and Regulation (EU) 2017/2107 of the European Parliament and of the Council https://eur-lex.europa.eu/legal-content/IT/TXT/PDF/?uri=OJ:L:2019:188:FULL&from=EN). EU Regulations have direct effect in the member states legal order. ICCAT Recommendations are normally implemented at CP level from the following fishing season through different legal provisions, but the transposition process of the Recovery/Management plan into EU law usually takes more than one year. In 2018 the EU Commission has approved a proposal to transpose into EU legislation stronger measures to help the recovery of the Mediterranean swordfish. Therefore, also at EU level SG60 and 80 are met.</p>				
Responsiveness of decision-making processes				
b	Guide post	Decision-making processes respond to serious issues identified in relevant	Decision-making processes respond to serious and other important issues identified in	Decision-making processes respond to all issues identified in relevant research,

PI 3.2.2	The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery
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		research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Yes	Yes	No

Rationale

As the Mediterranean swordfish stock became alarmingly over-exploited, existing decision-making processes proved ineffective for some years. Since the Recovery Plan in 2016, which marked a large decrease in fishing capacity and improved monitoring as needed, through ICCAT’s decision-making processes, it seems that ICCAT has responded to serious and other important issues identified in relevant research, monitoring and consultation, **SG60 is met**. The 2016 ICCAT Performance Review concluded that progress is still needed generally regarding timeliness and transparency. The ICCAT experience on bluefin tuna in the last 10 years is an example that, with the correct synergy between CPCs and with the ICCAT secretariat, such challenges can be addressed and overcome. As such, it is an example to other RFMOs faced with major conservation challenges.” (ICCAT, 2016a). **SG80 is met**. ICCAT is increasingly focusing on the Swordfish and bluefin tuna fisheries impacts on non-target species, but not all issues relevant to this fishery are directly addressed at this level. The Italian local decision-making processes for this fishery is not clearly defined. However, since the REC. 16-05 the Italian administration clearly enforced the licences and vessel quota (see Decreto Direttoriale n. 3992; Decreto 29 settembre 2016; <https://www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/10631>; and <https://www.google.com/search?client=firefox-b-d&q=decreto+MIPAAF+pesca+pesce+spada>; DECRETO 23 febbraio 2018 Misure tecniche per la pesca del pesce spada nel Mediterraneo. (18A01960) (GU n.70 del 24-3-2018), and Regulation EU 2019/1154 of 20th of June 2019)), which are awarded according to clear management rules to achieve fishery-specific objectives. For decisions relating to P2, there are established processes both at EU, Mediterranean and Italian levels (MEDAC, GFCM, MPA networks, MSFD) for debating and setting local and national fisheries regulations for temporal and seasonal closures, gear use, protected species. However, since P1 and P2 aspects are not considered in a comprehensive programme of measures and especially at local level not all issues are addressed. SG100 is not met.

Use of precautionary approach				
	c	Guide post	Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Yes	

Rationale

ICCAT's decisions are based on the best available scientific information and science (ICCAT, 2011b), and for Mediterranean swordfish, the precautionary approach is used by SCRS, Panel 2 and other WG as evidenced by the choice of TAC, which is slightly more conservative (lower) than would be implied by the HCR, because ICCAT decided that increases should be incremental. This response to uncertainty represents a precautionary approach. The scientific advice is followed by the ICCAT Commission as clearly stated in the recommendations and management measures. The precautionary approach and use of best available information are also evident in the decisions that

PI 3.2.2 The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery

are made at European level and implemented at national and local levels, as evident from the national and EU annual fishing plans. **SG80 is met.**

Accountability and transparency of management system and decision-making process				
d	Guide post	Some information on the fishery’s performance and management action is generally available on request to stakeholders.	Information on the fishery’s performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on the fishery’s performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Yes	Yes	No

Rationale

The ICCAT website provides an easy and full access to the set of documents produced by the Commission and its subsidiary bodies in three languages (Spanish, English and French), **SG60 is met.** The preamble to ICCAT Recommendations generally describes the mandate within which ICCAT is acting, the reason(s) why management measures are necessary and elements of research or other information that provide reasons for why action is or is not being taken (see Rec 18-02). ICCAT reports the decisions taken by the Commission in its biennial reports including stock assessment, justification for existing or new management measures and CPCs annual reports, all posted on the ICCAT website.

Interested parties may obtain comprehensive information on the wider small-scale Italian fishery’s performance and management actions, through the EU Fishery Council MEDAC, which describes how the management system responded to findings and recommendations emerging from research, monitoring, evaluation and review activity, **SG60 and SG80 are met.** However, formal reporting specifically for the UoA fishery’s performance is not available. SG100 is not met.

Approach to disputes				
e	Guide post	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Yes	Yes	No

Rationale

PI 3.2.2	The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery
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ICCAT’s bodies (Commission, SCRS, Species Panels, WG) regularly meet and provide opportunities for discussion and airing of any possible concerns (see Compliance Committee – COC reports). These and the consensus favoured decision-making process effectively avoid the risk of legal challenges. In cases when disputes cannot be settled, the ICCAT Convention provides a process for Contracting Parties to object and withdraw from endorsing and implementing an ICCAT Recommendation (ICCAT Convention art. VIII). However, following the last performance Review (Spencer et al., 2016) Art. VIII of the Convention is currently redrafted to clarify dispute resolution procedures. Until then, Recommendations are not always adopted rapidly as a result. The European and Italian management systems have well-established decision-making mechanisms for administrative and legal appeals and legal and other frameworks respond to judicial decisions in a timely fashion. Legal and administrative sanctions, when they arise may also be enforced locally, through disciplinary actions enforceable immediately. **SG 60 and 80 are met.**

However, there is no evidence to conclude that management system or fishery acts proactively to avoid legal disputes, SG100 is not met.

References

Spencer et al., 2016; EU, 2017; ICCAT, 2017c, 2018d

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

PI 3.2.3 – Compliance and enforcement

PI 3.2.3	Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with		
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Scoring Issue	SG 60	SG 80	SG 100
MCS implementation			
a	Guide post Monitoring, control and surveillance mechanisms exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
Met?	Yes	Yes	No

Rationale

The 2nd Performance Review found that “ICCAT does not possess sufficient mechanisms for effective at-sea monitoring of fishing operations for most stocks, with the exception of eastern bluefin tuna...” (ICCAT, 2017j). For the fishery, the Italian control system coordinates the control of all Italian-registered fishing vessels, and through the European Fisheries Control Agency (EFCA), establishes a risk-based inspection regime of catching activities at sea. Landings of Mediterranean swordfish are also tightly controlled by the Italian Fisheries authorities (PEMAC). The fishing trip total fish weight is first estimated on logbook and declared to the authorities upon returning to port, and confirmed for each fish weighed upon landings as it is tagged. Individual fish weight and tag numbers are indicated on the catch certificate which accompanies the fish until its last part is sold. We also note EU Regulation 2018/1986 of 13 December 2018⁶⁴ where enforcement conditions and requirements of the EU Joint Development Plan were extended from bluefin tuna to swordfish. The authorities involved in the on-land monitoring and control system include the Guardia Costiera, Guardia di Finanza, Customs, and the Police, who may inspect docked vessels, vehicles, and the premises of processors, fishmongers and restaurants. **SG60 and SG80 are met.** However, the MCS system for swordfish and probably bluefin tuna in the Mediterranean cannot be seen as comprehensive at present. SG100 is not met.

Sanctions			
b	Guide post Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
Met?	Yes	Yes	No

Rationale

ICCAT relies on its Contracting Parties to implement effective sanctions over their flagged vessels. ICCAT can impose trade sanctions and remove, suspend or reduce quota allocated to non-compliant CPCs. This happened with several EU countries with purse seiner fleets and tuna-farms in the past, **SG60 is met.** In Italy, sanctions may be administrative or criminal or both, depending on the type and severity of non-compliance. Even though recent instances of non-compliance do not concern this UoA, sanctions consistently applied by EU member states in recent years seem to have provided effective deterrence in the EU capture fisheries. Obligations and controls have been

⁶⁴ <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32018D1986>

PI 3.2.3	Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with
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recently increased through the EFCA Joint Development Plan surveillance of tuna farm transfers and also of the recreational fishers. Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence. **SG80 is met.** However, there is not enough evidence to substantiate meeting the requirements of SG 100.

		Compliance		
c	Guide post	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Yes	No	No

Rationale

Taking into account the data available from Romeo et. to the. (2008) and Di Natale et al. (2005), the current UoA complies with the management system as, due to the low number of vessels and the peculiarities of these fishery, it is possible to consider that fishermen provide relevant information for management, such as the quantity of their catches through logbooks. **SG 60 is met.** However, there is not direct evidence of compliance as we have not received compliance information for the fishery in question and have not been able to meet staff from the Guardia Costiera to discuss the UoA's compliance with existing fishery rules.

Furthermore, the Client (MSC Italy) has informed the assessment team that some stakeholders (e.g. Oceana) have communicated in various meetings that because the swordfish recovery plan is not transposed directly in Italian legislation (noting however that EU Regulations, unlike Directives, are automatically valid in EU member countries and do not require national transposition⁶⁵), a number of enforcement measures relating to the swordfish recovery plan⁶⁶ cannot be implemented.

Overall, due to the lack of enforcement information specific to the fishery under assessment from the Guardia Costiera, we cannot determine that some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery. SG 80 is not met.

		Systematic non-compliance		
d	Guide post		There is no evidence of systematic non-compliance.	
	Met?		Yes	

Rationale

From the ICCAT perspective, there is no evidence of systematic non-compliance. Presently, no amount of unreported catches have been included in the models used by SCRS although this assumption does not rule out the risk of IUU catches. A large number of Monitoring, Control and Surveillance (MCS) components and partners come together

⁶⁵ http://www.epgencms.europarl.europa.eu/cmsdata/upload/09adb8a6-5006-4bfe-9b1e-d9a7afde2be2/EPRS_ATAG_627141_Transposition_implementation_and_enforcement_of_EU_law-FINAL.pdf

⁶⁶ See <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018PC0229>

PI 3.2.3	Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with
<p>including a widespread application of the Port State Measures Agreement (PSMA) in the Mediterranean, the electronic catch reporting for swordfish, and the activities of the EU Fisheries Control Agency (EFCA). Even though some risks of systematic non-compliance exist, they are not suspected for this fishery. A score of SG80 is likely met in the fishery.</p>	
References	
<p>EFCA, 2017, 2020; ICCAT, 2017c, Romeo et al. 2008; Di Natale et al. 2005</p>	
Draft scoring range	60-79
Information gap indicator	<p>More information sought <i>Information about the UoA compliance level is needed</i></p>

PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate some parts of the fishery-specific management system.	There are mechanisms in place to evaluate key parts of the fishery-specific management system.	There are mechanisms in place to evaluate all parts of the fishery-specific management system.
	Met?	Yes	Yes	No
Rationale				
<p>ICCAT has mechanisms to evaluate and review all parts of the fishery specific management system through various committees, e.g. the SCRS evaluates scientific research, the COC monitors and evaluates compliance with the Convention and ICCAT Recommendations. ICCAT also conducts independent periodic reviews of its own performance by using external experts (Spencer et al., 2016). The management systems that apply to the fishery, the EU and Italian policies and specific swordfish management measures, are regularly evaluated, SG60 is met. However, for the Mediterranean where the fishery is taking place, the evaluations are focused on bluefin tuna, swordfish and other species with EU quota or international management plans. The Marine Strategy Framework Directive local strategy and programme of measures for the region is not yet finalized, and until implemented, most likely in 2022, only SG80 is met.</p>				
b	Internal and/or external review			
	Guide post	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Yes	Yes	No
Rationale				
<p>ICCAT regularly reviews the fishery specific management system internally through different committees, SG60 is met. Its Conservation and Management Measures Compliance Committee (COC) monitors and evaluates compliance with the Convention and ICCAT’s Recommendations. An ad hoc Working Group (ICCAT Doc. No. GEN-001C/ 2017) reports annually (ICCAT, 2017c) on progress achieved by all components of the ICCAT structure following the last external independent Performance Review (Spencer et al., 2016). SG 60 and 80 are met. However, presently, the regular internal and external reviews concern only the swordfish and bluefin tuna, for P2-related fisheries management aspects, external reviews conducted remain occasional. SG100 is not met.</p>				
References				
Spencer et al., 2016; ICCAT 2017c				
Draft scoring range		≥80		
Information gap indicator		Information sufficient to score PI		

7.6.2.1 Reference of Principle 3

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8 Appendices

8.1 Assessment information

8.1.1 Small-scale fisheries

The table below presents information on the percentage of vessels <15m in length and on the fishing activity within 12 nautical miles from the shore.

Table 15. Small-scale fisheries.

Unit of Assessment (UoA)	Percentage of vessels with length <15m	Percentage of fishing activity completed within 12 nautical miles of shore
13 vessels	None. Vessels are on average 16 m long.	Unknown

8.2 Evaluation processes and techniques

8.2.1 Site visits

The assessment team organised conference calls as part of the remote “site visits” envisioned for this project to collect information about this fishery and to better frame the pre-assessment. A series of calls took place between September and November 2020. We note that representatives of the Ministry/Coast Guard did not make themselves available for this pre-assessment. Also, we did not manage to meet with fishery representatives or fishermen. A meeting with the following stakeholders was held.

Table 16. Itinerary of meetings with organizations and people consulted remotely.

Meeting	Date	Meeting	Attendants	Expertise
1	16/11/2021	General Fisheries Commission for the Mediterranean (GFCM) - RFMO	Paolo Carpentieri	Survey and bycatch expert
			Elisabetta Morello	Fishery resources officer
			Vito Romito	Lead Assessor (P2 and P3) – Global Trust Certification (GTC)
			Giuseppe Scarcella	Assessor (P1 and P3) – GTC Contracted Expert
			Ilaria Vielmini	Client – MSC Italy
2	17/11/2020	WWF Italy / Mediterranean Advisory Council MEDAC	Alessandro Buzzi	WWF Fisheries Manager / MEDAC vice Chairmen
			Vito Romito	Lead Assessor (P2 and P3) – Global Trust Certification (GTC)
3	11/12/2021	Stazione Zoologica Anton Dohrn / Research	Teresa Romeo	Researcher and swordfish expert
			Vito Romito	Assessor (P1 and P3) – GTC Contracted Expert
			Ilaria Vielmini	Client – MSC Italy

8.2.2 Recommendations for stakeholder participation in full assessment

As well as recommending the same people interviewed during the pre-assessment, the assessment team recommends that the following additional stakeholders be interviewed:

1. Harpoon fishermen from Messina and Reggio Calabria
2. Swordfish buyers
3. MIPAAF
4. Coast Guard
5. Federpesca and/or Federcoopescas
6. Other experts/researchers to deal with potential issues relating to associated species catches

8.3 Risk-Based Framework outputs

8.3.1 Productivity Susceptibility Analysis (PSA)

Please refer to the Mediterranean spearfish PSA shown in the Principle 2 Background Section, Table 11.

9 Template information and copyright

This document was drafted using the 'MSC Pre-Assessment Reporting Template v3.2'. Note amendments have been made to formatting in order to comply with SAI Global's corporate identity; however, content and structure follow that of the original template.

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Template version control		
Version	Date of publication	Description of amendment
1.0	15 August 2011	Date of first release
1.1	31 October 2013	Updated in line with changes to CR v1.3
2.0	08 October 2014	Confirmed background sections (Section 3) as optional (use of 'may' statements). Modified Table 6.3 to create a simplified scoring sheet to be completed in place of full evaluation tables Made amendments to PIs based on Fishery Standard Review changes (e.g. removed original PIs 1.1.2, 3.1.4 and 3.2.4).
2.1	9 October 2017	Inclusion of optional full evaluation tables
3.0	17 December 2018	Release alongside Fisheries Certification Process v2.1
3.1	29 March 2019	Minor document changes for usability
3.2	25 March 2020	Release alongside Fisheries Certification Process v2.2.

A controlled document list of MSC program documents is available on the [MSC website \(www.msc.org\)](http://www.msc.org).

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