

**Public Comment Draft Report**  
**PORTUGUESE SARDINE PURSE SEINE FISHERY**

**Client**

**The National Association of  
Purse Seine Producer Organisations  
(ANOPCERCO)**

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# 1 SUMMARY

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With a site visit in November, 2008, an assessment team comprising Andy Hough (lead assessor), Ian Scott (Project Coordinator & Expert Advisor P3), John Nichols (Expert Advisor P1) and José Vítor de Sousa Vingada (Expert Advisor P2) has undertaken a main assessment of the Portuguese Sardine Fishery according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

Following review of the draft report by the client (May / June, 2009) that led to some changes in the text, the findings of the team were assessed by two peer reviewers (Gus Eltink and Mike Pawson) (July, 2009). The comments and recommendations of the peer reviewers were subsequently reviewed by the team which made various changes to the draft (September 2009).

The single unit of certification under main assessment achieved respective scores for Principles 1, 2 and 3 of 83, 84 and 87. Accordingly, as the fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Performance Indicators, it is recommended that the Portuguese Sardine Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.

The fishery attained a score of below 80 against three PIs. The assessment team has therefore set conditions for continuing certification that the client for certification is required to address. The conditions are applied to improve performance to at least the 80 level within a period set by the certification body that is no longer than the term of the certification.

In addition the assessment team has made two recommendations related to issues identified for individual PIs that achieved a score of 80 or above.

The client in cooperation with IPIMAR and DGPA has considered the conditions and has developed an action plan to meet these in the specified time frame.

## 2 INTRODUCTION

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### 2.1 Report Objective

This report sets out the results of a main assessment of the Portuguese sardine purse seiner fishery against the Principles and Criteria for Sustainable Fishing of the Marine Stewardship Council (MSC).

This is the first draft of the report for consideration by the client.

### 2.2 Fishery Proposed for Certification

The MSC Guidelines to Certifiers specify that a unit of certification (UoC) is "The fishery or fish stock (= biologically distinct unit) combined with the fishing method / gear and practice (= vessel(s) pursuing the fish of that stock)."

The fishery proposed for certification subject of this report is:

**Species:** Sardine (*Sardina pilchardus*)  
**Geographical Area:** Portuguese coast (ICES areas VIIIc & IXa)  
**Method of Capture:** Purse Seine  
**Management System:** EU / Government of Portugal  
**Client Group:** Client nominated vessels

Following consideration, the client has confirmed vessels nominated as part of the UoC will:

1. Hold a coastal vessel licence (i.e. vessels will: be > 9 m overall length (LoA); operate within Portuguese continental waters; and land at any Portuguese port);
2. Possess a valid licence for purse seining;
3. Belong to a Producer Organisation (PO); and
4. Have an 80 % dependency (by weight) on pelagic species as a proportion of annual vessel landings.

These criteria allow for the inclusion of almost all of the vessels that comprise the Portuguese coastal purse seine fleet in the UoC. Excluded are some small coastal vessels (demersal seiners) and any purse seiners not associated with a PO.

### 2.3 Report Structure and Assessment Process

The aims of the assessment are to determine the degree of compliance of the fishery with the MSC Principles and Criteria for Sustainable Fishing, as set out in Section 8 below.

The assessment is based on the Default Assessment Tree, Performance Indicators (PIs) and Scoring Guideposts (SG) – Version 1 that has been implemented on all MSC Assessments and Pre-Assessments from July 21, 2008

This report contains:

- The background to the fishery to provide the reader with information to put the scoring commentary in context;

- The qualifications and experience of the team undertaking the assessment;
- The standard used (MSC Principles and Criteria);
- Details on Stakeholder consultation;
- The methodology used to assess (“score”) the fishery against the MSC Standard;
- A “scoring table” containing the PIs and SGs with related commentary that analyses the fishery in relation to these criteria; and
- The Certification Recommendation, together with any conditions attached to certification, based on the scoring of the fishery.

Drafts of this final report have been reviewed at a number of levels.

1. The initial draft was reviewed by the client with agreed modifications and additions incorporated by the team following appropriate consideration;
2. The second draft was peer reviewed by nominated experts. The comments of the peer reviewers are contained in Annex 2 together with the responses of the certification team and a note of where amendments were made to the draft report on the basis of those comments.
3. This Public Comment Draft Report has now been released on the MSC website (*the current stage of the process*).

## **2.4 Information Sources Used**

In addition to the meetings held during the site visit (see section 9.3 below) a variety of information and reports were used to inform the assessment:

- 1 Aetinape No 60 12/03. Acuerdo sobre las actividad de las flotas española y portuguesa en las aguas de ambos paises. [www.aetinape.com/revista/n60art3.pdf](http://www.aetinape.com/revista/n60art3.pdf)
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- 11 EU COM(2009)163 final Green Paper Reform of the Common Fisheries Policy
- 12 EU Council Regulation (EC) 850/98
- 13 EU: Council Regulation (EC) 2371 / 2002
- 14 EU: Council Regulation (EC) No 744/2008
- 15 EU: Council Regulation (EC) No 104/2000
- 16 EU: [http://ec.europa.eu/fisheries/cfp/control\\_enforcement\\_en.htm](http://ec.europa.eu/fisheries/cfp/control_enforcement_en.htm)
- 17 EU: [http://ec.europa.eu/fisheries/cfp/governance/acfa\\_en.htm](http://ec.europa.eu/fisheries/cfp/governance/acfa_en.htm)
- 18 EU: [http://ec.europa.eu/fisheries/cfp\\_en.htm](http://ec.europa.eu/fisheries/cfp_en.htm)
- 19 EU: <https://stecf.jrc.ec.europa.eu/home>
- 20 FAO: FAO Code of Conduct for Responsible Fisheries  
<http://www.fao.org/fishery/ccrf/2/en>
- 21 FAO: Fishery and Aquaculture Country Profile: Portugal  
[www.fao.org/fi/fcp/en/PRT/profile.htm](http://www.fao.org/fi/fcp/en/PRT/profile.htm)
- 22 FAO: Use of Administrative Sanctions in Fisheries Law  
<http://www.fao.org/docrep/006/y5063e/y5063e04.htm>
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- 30 ICES (2008a). Report of the Working Group on Widely Distributed Stocks (WGWISE). ICES CM 2008/ACOM:13
- 31 ICES (2008b). ICES Advise 2008, Book 7. Sect. 7.4.5
- 32 ICES Website. [www.ICES.dk](http://www.ICES.dk)
- 33 IWC, 1995. IWC Report of the scientific committee. Annex G.

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- 38 MADRP - DGPA July 2007 Programa Operacional Pesca 2007 -13
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58, 1633-1645.

### 3 GLOSSARY OF ACRONYMS USED IN THE REPORT

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ACCOBAMS	Agreement on the Conservation of Cetaceans in the Black Sea,
ACOM	ICES Advisory Committee
ACFM	Advisory Committee for Fisheries Management (ICES)
ANOPCERCO	The National Association of Purse Seine Producer Organisations (Associação Nacional das Organizações dos Produtores da Pesca do Cerco)
ASCOBANS	The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas
BMSY	Biomass Maximum Sustainable Yield
CFP	Common Fisheries Policy
CITES	Convention on International Trade in Endangered Species
CPUE	Catch per Unit Effort
CR	Critically Endangered Species
DCF	Data Collection Framework
DEPM	Daily Egg Production Method
DGPA	General Directorate of Fisheries and Aquaculture (Direção Geral das Pescas e Aquicultura)
EC	European Commission
EEZ	Exclusive Economic Zone
EFF	European Fisheries Fund
ENGOs	Environmental Non Governmental Organisations
ETP	Endangered, Threatened and Protected Species
EU	European Union
F	Fishing Mortality
FCT	Portuguese Foundation for Science and Technology
GRT	Gross Registered Tonnes
HP	Horse Power
IBA	Important Bird Area
ICES	International Council for the Exploration of the Seas
ICRW	International Convention for the Regulation of Whaling
INCB	Institute of Nature Conservation and Biodiversity
INRB /IPIMAR	Instituto Nacional de Recursos Biológicos / IPIMAR
IVQ	Individual Vessel Quota
IWC	International Whaling Commission
LC	Least Concern Species
LoA	Length Overall
MARPOL	International Convention for the Prevention of Pollution From Ships
MCS	Monitoring, Control & Surveillance
MPA	Marine Protected Area
MS	Member State (of the EU)
MSC	Marine Stewardship Council
MSCA	Mediterranean Sea and Contiguous Atlantic area
mt	Metric tonnes

NAMMC	North Atlantic Marine Mammal Commission
nm	Nautical Miles
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PBR	Potential Biological Removal
PI	Performance Indicator
PNAB	National Plan for Biological Sampling
PO	Producer Organisation
PSU	Practical Salinity Units (gram of salt per 1000g of water)
RAC	Regional Advisory Committee (EU)
SARDYN	Sardine dynamics and stock structure in the north-east Atlantic 2002-2006
SG	Scoring Guideposts
SPA	Special Protection Areas
SPEA	Portuguese Society for Bird Studies
SSB	Spawning Stock Biomass
STECF	Scientific, Technical and Economic Committee for Fisheries
TAB	Technical Advisory Board (of MSC)
TAC	Total Allowable Catch
UNCLOS	United Nations Convention on the Law of the Sea
UoC	Unit of Certification
VMS	Vessel Monitoring System
VU	Vulnerable Species
WGMHMSA	Working Group on Mackerel, Horse Mackerel, Sardine and Anchovy
WGWIDE	Working Group on Widely Distributed Stocks
WIBP	Western Iberian Buoyant Plume
ZPE	Zona de Protecção Especial

## **4 BACKGROUND TO THE FISHERY**

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### **4.1 Introduction**

To allow assessment of this UoC within the context of the whole fishery, this section presents background information for the Portuguese sardine fishery, together with, where relevant, non – Portuguese aspects.

The definition of the required level of stock separation for MSC certification is that “*locally implemented management measures alone should be sufficient to ensure the sustainability of the population in the area being certified*”. While the populations found in Portuguese waters may be part of a larger meta-population stretching North as far as the English Channel, evidence suggests that sardine in Atlantic waters off the Iberian Peninsula are manageable as a separate stock. The northern border of the stock was redefined by ICES in 1980 (ICES, 1980) giving rise to what is now known as the Atlanto-Iberian stock delimited by the French Spanish border in the north and the Straits of Gibraltar in the south (ICES Divisions VIIIc and IXa). Accordingly, the Atlanto-Iberian stock shared between Spain and Portugal with a southern limit of 36°N. is the subject of this certification. “Locally implemented” measures include Portuguese / Spanish cooperation in national waters of both (in the north and the south).

The Portuguese fishery for sardine takes place within the inner continental shelf off mainland Portugal (usually 15-70 m depth). The three most important landing harbours - Matosinhos, Peniche and Figueira da Foz - are all located north of Lisbon.

Portuguese research on sardine began in the 1920s. The regular monitoring of the fishery established in the 1950s became systematic in the 1970s, from which time it has been uninterrupted. The Instituto Nacional de Recursos Biológicos (INRB / IPIMAR - the Portuguese National Fisheries Research Institute, part of the State Laboratory of Biological Resources) undertakes sardine monitoring and research in collaboration with Portuguese universities and other European fisheries institutes, mainly within the framework of the International Council for the Exploration of the Sea (ICES) and internationally funded research projects.

### **4.2 Sardine Biology**

The sardine can be found throughout the North Atlantic eastern continental margin from Senegal to the British Isles and in the Mediterranean and adjacent seas (Parrish *et al.*, 1989). It is commercially exploited across its distribution range, with the most important fisheries occurring in upwelling areas.

Sardine is a pelagic fish that forms large schools that off the Iberian Peninsula are distributed along the continental shelf of the Atlantic Ocean in depths ranging between 10 m. and 100 m. - sardine is not normally found off the continental shelf. Schools of juvenile fish tend to be separated from adults and are found closer inshore, typically associated with estuaries and rivers (Cabanas *et al.*, 2007).

The species is eurythermic and euryhaline, inhabiting waters with temperature ranging between 8° C and 22° C and salinity varying between 30 psu and 38 psu (Coombs *et al.*,

2006). Research has shown that while there is an almost continuous distribution, there are separate spawning stocks.

The Atlanto-Iberian stock subject of this certification is distributed throughout ICES Divisions VIIIc and IXa and is the largest and commercially most important one in the north-east Atlantic area. While there are movements of sardine into and out of this stock, in particular to the north in southern Biscay, the extent of these is currently not known. They are not, however, considered to be significant in terms of the discreteness of the stock for assessment and management purposes.

Sardine is a short lived species characterized by its small size, rapid growth and early maturation. In Iberian waters fish above 6 years old are uncommon but older specimens may be found further north, especially in northern Biscay and the English Channel. While fish of 14 years (33cm in length) and 12 years (27cm in length) have been recorded from these two areas respectively, individuals of this age are considered to be unusual. There is also a spatial geographic variation in the growth pattern such that the larger, faster growing, populations occur in the more northern waters (Silva *et al.*, 2008). It is possible that this is the result of a genetically produced adaptation to survival in colder water regimes.

Natural mortality is high and has been estimated at 0.33 across all age groups (Pestana, 1989).

Sardine is classified as an omnivore but it is essentially a passive filter-feeder that can also perform particulate feeding, taking phytoplankton (diatoms) as well as a wide range of zooplankton species including its own eggs (Garrido *et al.*, 2007). It is well adapted to exploit the varying food resources available in upwelling areas (Bode *et al.*, 2004; Somarkis *et al.*, 2006; Garrido *et al.* 2007).

Studies have been carried out to investigate the trophic role of sardine in the ecosystem both as a predator and prey species. It is an important prey species for carnivorous fish and marine mammals in particular the common dolphin (Silva, 1999) and less commonly other species of dolphin and the harbour porpoise.

Sardines begin to mature as 1 year old fish (75 % mature) and are fully mature from 2 years old. They are indeterminate batch spawners producing a large number of eggs in batches spread over many months (Zwolinski *et al.*, 2001). Absolute fecundity is difficult to determine because there is no point in the oocyte maturation cycle at which all potential vitellogenic oocytes are present. The fertilized egg is large (*ca.*1.2 mm in diameter) with a large perivitelline space and small oil globule. The larvae are typical clupeoids in shape and body structure and can be easily identified throughout all life history stages (Russell, 1976).

Sardine egg surveys have revealed that some eggs near hatching were infected with *Ichthyodinium chabelardi*, a protistan endoparasite. Stratoudakis *et al.* (2000) expressed concern that if all parasitized eggs of a cohort were to die as a result of infection, then mortality rates would be similar to those reported for the average daily mortality of sardine eggs and early larvae. The infected eggs were found over a wide area of the spawning distribution and this could be a factor that affects year class strength and subsequent recruitment variability.

In the Atlantic, sardine may be found spawning throughout most of its distribution area, from the Southern Bight of the North Sea through the English Channel (Haynes and Nichols, 1994), Celtic Sea, the Bay of Biscay, Iberian coast to the Mauritanian shelf in the south (Stratoudakis *et al.* 2007).

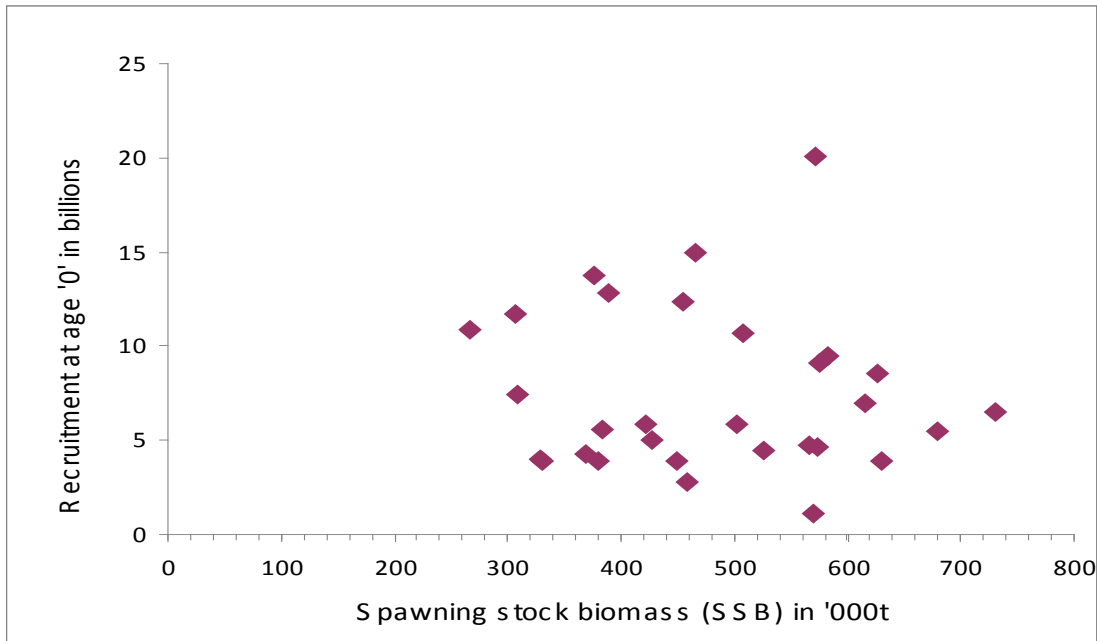
Bernal *et al.*, 2007 report that egg surveys off the European Atlantic coast show that spawning is restricted mainly to the shelf area from the Straits of Gibraltar in the south to Northern Biscay (latitude 47°30'N) in the north, over the temperature range of 12° C - 17° C. There is an almost continuous distribution of spawning apart from persistent gaps at the north western corner of the Iberian Peninsula, at the Spanish / French border in southern Biscay and at the south western end of the peninsula. Analysis of the historic data series shows that the proportion of potential spawning habitat which was actually occupied for spawning changed from 60 % prior to the mid 1990's to just 40 % since then.

Stratoudakis *et al.*, 2007 describe the latitudinal differences in both the timing and duration of spawning which have been found during ichthyoplankton sampling from English Channel, Bay of Biscay and Iberian Peninsula. They found that peak spawning in central and southern Portugal occurred in October / November extending through to April. In northern Portugal peak spawning is from November to February, in western Galicia from January to April and in Biscay from March to May.

In the English Channel as far east as the Bay of the Seine peak spawning occurs in June (Haynes and Nichols, 1994). The seasonal evolution of spawning throughout the species range is thought to be related to water temperature (Coombs *et al.*, 2006).

Large fluctuations in recruitment are typical of many populations of small pelagic species such as sardine. Recruitment in the Atlanto-Iberian stock has seen periods of good recruitment followed by periods of poor recruitment in a cyclical fashion. There was an extended period of 7 years of poor recruitment in the 1990's which led to the spawning stock biomass (SSB) reaching its lowest recorded level in 2001. There was a strong year class in 2000 and one well above average the following year (ICES, 2008a). Since the last strong year class in 2004, recruitment has been well below the long term mean. The 2004 year class was mainly distributed off northwest Iberia and its impact on other areas is dependent on its dispersal. Survival is highly dependent on favourable environmental conditions during the egg and larval phases. The interaction of the various factors which operate during this phase is complex and current knowledge is insufficient to fully understand recruitment variability or to predict it. The historical time series shows no clear relationship between spawning stock size and subsequent recruitment as "0" group fish (Figure 1). Good recruitment has originated from small spawning stocks, such as in 2000, and therefore the level at which recruitment is likely to be impaired cannot at present be determined.

**Figure 1: Atlanto-Iberian Sardine Stock: Recruitment at Age '0' (Billions of Fish) vs Spawning Stock Biomass ('000 mt) (1978 – 2007)**



Source: ICES (2008a)

Poor recruitment in the 1990s raised a series of questions on stock structure and dynamics and led to the EU project SARDYN (Sardine dynamics and stock structure in the north-east Atlantic 2002-2006). Initial European Union (EU) proposals for radical cuts in fleet size were substituted by national plans in Spain and Portugal that introduced significant reductions in effort and limitations on catch.

Stratoudakis *et al* (2003) investigated the distribution of sardine eggs in the waters off Portugal (1985-2000) and found a reduced area with eggs present compared to previous surveys. Northerly winds during winter that favoured coastal upwelling and offshore transport were thought to have contributed.

The effects of ocean currents on small pelagic fish egg / larval dispersal and phytoplankton food items were reviewed by Santos *et al.* (2007). Complementary research activities in recent years, targeted at a greater understanding of sardine dynamics, included: the characterisation of spawning habitat and the impact of local circulation patterns to the survival of early life stages (national projects PELAGICOS, SURVIVAL and PRORECRUIT); the feeding behaviour and the distribution dynamics of adult fish in relation to environmental conditions (projects PELAGICOS and SARDYN); and the acclimation of sardine in captivity for biological experimentation under controlled conditions (project SARCAPT). A new project aiming to characterise the population links between important sardine recruitment areas (northern Portugal and Gulf of Cadiz) and the remaining areas of the stock is currently being evaluated by the Portuguese Foundation for Science and Technology (FCT).

### **4.3 History of the Portuguese Fishery**

The fishery for sardine is one of the oldest in the Iberian Peninsula. The Portuguese fishery can be traced back until Roman times and has been continuous since at least the 14th century. Purse seine fisheries (Parente, 2000; Stratoudakis and Marçalo, 2002; Wise *et al.*, 2007) expanded in the early 20th century, following the introduction of "traineiras"- small wooden vessels that allowed more efficient and cost effective fishing. Steam-driven purse seiners started operating in Portuguese waters during the late 19th century and by the 1920s a large purse seine fleet was active. At its peak, in the 1960s, the size of the fleet reached between 350 and 400 vessels.

### **4.4 Sardine Landings**

In Portugal, sardines are considered the most important marine resource (Stratoudakis and Marçalo, 2002). The majority of the Portuguese sardine landings are made by the purse seine fleet operating to the North of Lisbon (ICES, 2006b), which is an area of high adult abundance, as well as a key recruitment area for the Atlanto-Iberian sardine stock (Carrera and Porteiro, 2003). South of Lisbon commercial catches and estimates from acoustic surveys show that sardine abundance is lower than in the North.

Annual sardine landings of over 50,000 mt have been recorded for over a century, peaking in the 1960s with more than 300 fishing vessels landings in excess of 150,000 mt. Since then landings have reduced, averaging 64,600 mt in the period 1998-2007 (Figure 2).

Recent years have seen the introduction of limits on fishing effort with a consequent gradual reduction in the size of the fleet to the current figure of about 130 purse seiners.

In 2007, total landings from Divisions VIIIc and IXa were 96,469 mt, an increase of 9,500 mt over the previous year (Figure 3). The bulk of landings (99 %) were made by purse-seiners. In Portugal, 2007 landings of 64,500 mt were 9,500 mt higher than 2006 (55,011 mt) as landings from all ICES sub-Divisions in Portuguese waters increased with the exception of the Algarve area (sub-Division IXa south) where they reduced by 1,500 mt (ICES, 2008a). The better performance resulted from improved recruitment from the 2004 year class. In Spain, landings of sardine in 2007 (31,970 mt) were very similar to those in 2006 (32,012 mt) but represented decrease of around 20 % compared to the 39,855 mt recorded in 2005.

### **4.5 Fleet and Gear Description**

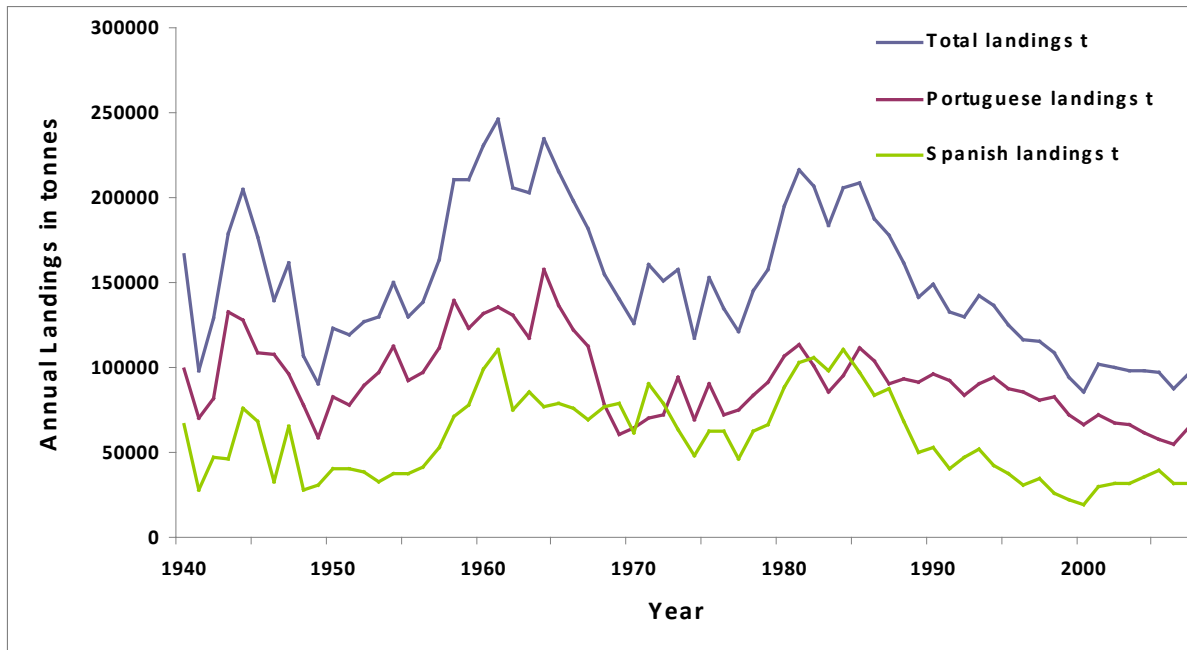
In 2007, active fishing vessels off the Portuguese mainland with purse seine licences included:

- 112 coastal (> 12 m) vessels whose only activity is purse seining;
- 39 coastal vessels that also have other licences; and
- 91 local vessels (< 9 m and only able to navigate close to the home port).

The mean age of the coastal purse seine fleet is > 20 years. Vessels are relatively small with the dimensions of a typical one being:

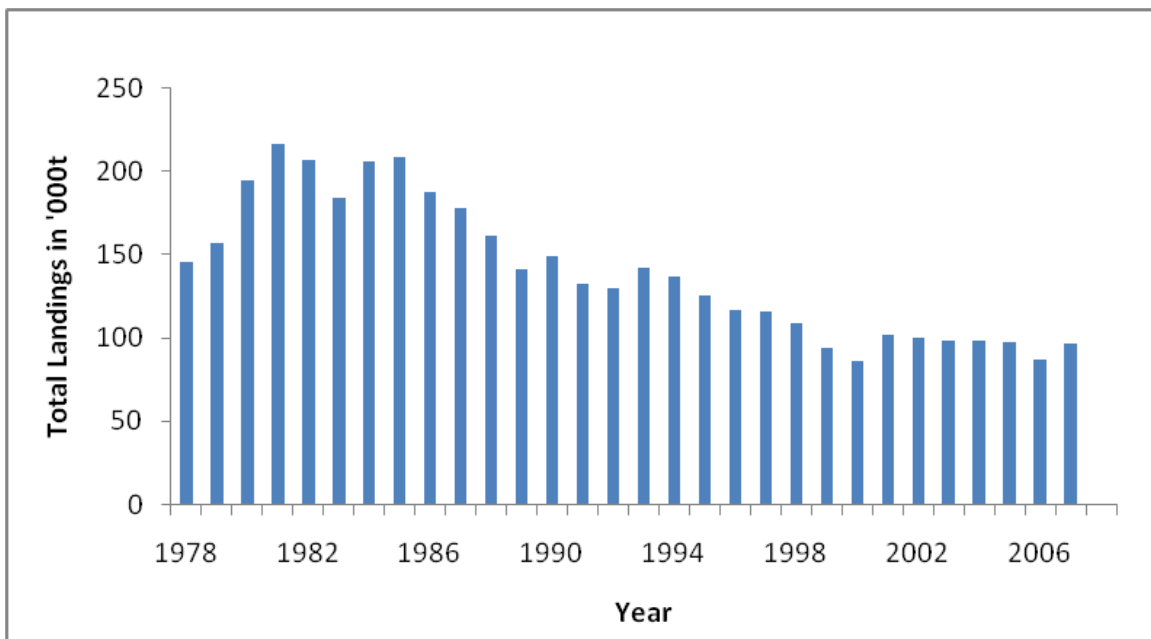
- Overall length - 20 m;
- Beam - 5 m; weight – 50 GRT; and
- Engine power - 300 HP.

**Figure 2: Total landings, Portuguese landings and Spanish landings from ICES Divisions VIIIc and IXa (1940 to 2007) (mt)**



Source: ICES (2008a)

**Figure 3: Sardine - ICES Divisions VIIc & IXa: Total Annual Landings ('000 mt) 1978 - 2007**



Source: ICES (2008a)

The bulk of sardine catches (> 80 %) are taken by the 60 - 70 larger purse seiners (usually 18 m - 27 m and 350 + HP) that target sardine throughout the year. These vessels have a limited pelagic by-catch and almost no demersal by-catch. Practically all belong to POs and are based in Povoia, Matosinhos, Figueira, Peniche, Sines, Portimão and Olhão from where they operate short daily trips (of a few hours).

Stratoudakis & Marcalo (2002) provide a description of purse seine operations. There are noticeable differences in vessel characteristics between ports and regions, the newer, larger, better equipped vessels being found in northern Portugal (where weather conditions are more adverse). Fishing is usually close to the home port, on short (daily) trips where the net is set once or twice, usually around dawn.

A large part of a typical fishing trip is spent searching with the fish-finding equipment (echo-sounder and sonar) for dense fish marks. Once schools of pelagic fish have been detected, large nets (up to 800 m long and 400 m deep) are set rapidly with the help of an auxiliary vessel (6–7 m long), and hauled in a largely manual operation involving all members of the crew (15–20 persons).

## 5 ADMINISTRATIVE CONTEXT

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Portugal has been a member state (MS) of the EU since 1986 and its marine fisheries are subject to the regulations and practices embodied in the Common Fisheries Policy (CFP). The scope of the CFP includes the conservation, management and exploitation of living aquatic resources in Community waters, with a policy objective being the sustainable exploitation of those resources in the context of sustainable development, taking account of the environmental, economic and social aspects in a balanced manner.

The principal CFP regulation is Reg (EEC) 2371 / 2002 that sets out the strategic aims of the CFP and enables the Council of Ministers, or in certain cases the Commission, to make more detailed Regulations covering such as monitoring, control and surveillance (MCS), fleet structure, technical conservation, marketing and TACs.

In terms of conservation and sustainability of the fish resources this:

- Adopted recovery plans and management plans;
- Established targets for the sustainable exploitation of stocks;
- Limited catches;
- Fixed the number and type of fishing vessels authorised to fish;
- Limited fishing effort;
- Adopted technical measures, including:
  - fishing gear (nature, number, size, usage, allowable retained catch);
  - spatial and temporal closures;
  - minimum sizes;
  - interactions of the fishery with other elements of the ecosystem;
  - incentives, including to promote more selective or low impact fishing; and
  - pilot projects on alternative types of fishing management techniques.

In terms of adjusting fishing capacity it:

- Defined the need to balance fishing capacity and fishing opportunities;
- Allowed for modernisation (safety on board, working conditions, hygiene and product quality) where this does not increase catching capacity;
- Introduced reference levels for fleet capacity in MS;
- Prohibited any increase in fleet capacity from January 1, 2003; and
- Established a Fishing Fleet Register.

In terms of MCS it provided for:

- Vessels: control mechanisms; licenses; VMS (vessels > 15 m); log books; and observers / inspectors.
- Markets: sales through registered auctions or registered buyers; registration of all first time buyers; sales notes / invoices; documentation; and traceability.
- MS responsibility: ensure effective control, inspection and enforcement of the rules of the CFP; provide sufficient resources for effective MCS; implement effective control mechanisms; and employ effective sanctions against infringements.

- EC responsibility: evaluate and control the application of the rules of the CFP by the Member States, and facilitate coordination and cooperation between them.

As highlighted in the recent Green Paper (April 2009) the next reform of the CFP will have to ensure that structural deficiencies of the EU fishing industry are addressed while ensuring safeguards against any unwanted side effects of the reform. It should promote and facilitate the restructuring and modernisation of the European industry, help it improve its long-term economic viability and avoid artificially maintaining overcapacity.

Apart from fisheries, other EU legislation dealing with habitats and species protection is relevant to fisheries management and to fishermen.

The European Commission (EC) relies extensively on advice from ICES in preparing the TAC regulation. Scientific research and assessment is carried out by ICES working groups (see below). The assessments are reviewed and evaluated by the ICES ACOM which provides advice on the status of target and non-target stocks to the EC. ICES advice, via Commission proposals, informs the annual EU Council of Ministers regulation establishing management measures, in particular TAC's and quotas.

The Portuguese sardine fishery is managed through the CFP's EC Regulation (2371/2002) that is transposed into national legislation. As with EU policy and as stated in Decree-Law No. 383/98 (see below), Portuguese fishery law is based on the FAO Code of Conduct for Responsible Fishing.

At government level, responsibility for implementing domestic fisheries policy lies with the Ministry of Agriculture, Rural Development and Fisheries and is delegated to the Deputy State Secretary for Fisheries. Within the 3rd Community Support Framework a new type of organisational structure for the management, monitoring, evaluation and inspection of initiatives launched under the Operational Programme for Fisheries (MARE) was established by Legislative Decree No. 54-A/2000 of 7 April 2000.

As described by the Food and Agricultural Organisation (FAO) "the main institution responsible for fisheries management is the Directorate-General of Fisheries and Aquaculture (DGPA), in association with the Assistant-Secretariat of State and the Ministry of Agriculture, Fisheries and Forests. INRB-IPIMAR as well as the Producer Organizations and Shipowners Associations, are consulted and have an advisory role in the decision-making process. INRB-IPIMAR is also responsible for fish stock assessments within ICES and the Northwest Atlantic Fisheries Organization (NAFO) frameworks. INRB-IPIMAR uses information collected during research surveys and in fishing ports, and also the catch statistics provided by DGPA. At a national level, INRB-IPIMAR has also the role of proposing technical measures to protect and maintain fish stocks".

Portuguese fisheries administrations are responsible for a range of management and regulatory duties, including management of fleet activity, management of the national quota, monitoring and control of all fisheries occurring within national jurisdiction, collection, collation and transmitting of key fishery data, and undertaking a range of scientific monitoring and development work.

The management of the sardine fishery in Portugal is based on authority derived from the following principal acts and policy documents.

- Decree-Law No. 278/87 of 7 July, as amended by Decree-Law No. 218/91 of 17 June and Decree-Law No. 383/98 of 27 November, provides the legal basis for capture fishery and aquaculture activity, and established licensing, fishing and aquaculture operational areas, technical measures, TACs, quotas and definitions of vessels and gears, as well as the institutions responsible for inspection.
- Decree No. 43/87 of 17 July, as amended by Decree No. 3/89 of 28 January, Decree No. 28/90 of 11 September, Decree No. 7/2000 of 30 May and Decree No.15 / 2007 regulates and defines national measures to implement the above Decrees-Law. It define gear, vessels, operational areas and technical measures such as mesh size, minimum landing size or weight, maximum percentages of by-catch, minimum percentages of target species catches, etc.
- Decree No. 305/89 of 21 April, as amended by Regulation (Portaria) No. 1102-B/2000 of 22 November, regulates and defines fishing licences.
- Regulation No. 281-B/97 of 30 April establishes a policy to protect the sardine resource.
- Decree-Law No. 140/99 of 24 April provides the legal basis for the implementation of Natura 2000 at a national level.
- Decree-Law No. 224/2000 of 9 September establishes the MARE programme.
- Regulation No. 236/2000 of April 28 establishes sardine fishery management measures for the following season (see below).
- Regulation No. 1102 – G – 2000 of November 22 defines the nature of purse seine gear as modified by Regulation No. 397 – 2007 (see below).
- Regulation No. 543-B/2001 of 30 May established sardine fishery management measures for the following season (see below).
- Regulation No. 951/2001 of 6 August, as amended by Regulation No. 1273/2001 of 13 November defines the measures to support the vessels and fishers that operated under the EU-Morocco fisheries agreement.
- Regulation No. 123-B/2002 of 8 February established sardine fishery management measures for the following season (see below).
- Regulation No. 184/2003 of February 21, 2003 established sardine fishery management measures for the following season (see below).
- Regulation No. 1423-A/2003 of December 31, 2003 established sardine fishery management measures for the following season (see below).

Within the framework of participatory and co-responsible resource management, the fisheries authority and POs have ensured the control and surveillance of sardine fishing effort. The National Association of Purse Seine Producer Organisations<sup>1</sup> (ANOPCERCO) and its members represent the majority of the pelagic fishing fleet, with 10 vessels not members (as of November 2008). The POs continue to implement local rules in the management of the fisheries, with informal quotas, closed seasons and a limit on the number of fishing days. In general terms, fishers in each harbour belong to a specific PO. When vessels visit other harbours they must respect the rules of that harbour.

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<sup>1</sup> Associação Nacional das Organizações dos Produtores da Pesca do Cerco

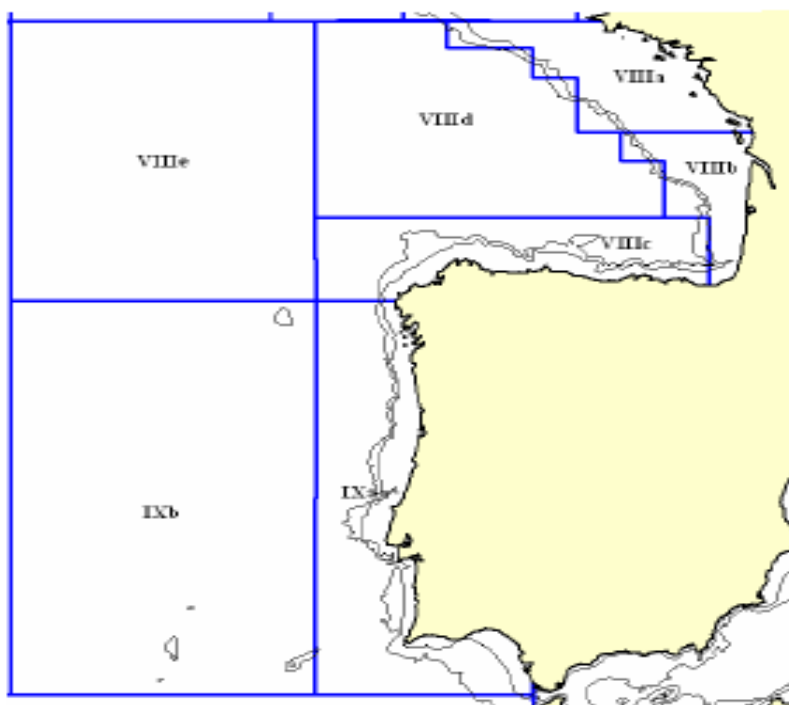
## 6 STOCK ASSESSMENT

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### 6.1 Management Unit

The management unit is the sardine stock occurring in ICES Divisions VIIIc and IXa (covering the Cantabrian Sea, the Portuguese coast and the Gulf of Cadiz) (Figure 4).

**Figure 4: ICES Fishing Areas VIII & IX**



Source: AZTI

### 6.2 Assessments and Stock Status

ICES assesses the stocks found in Atlantic waters of the Iberian Peninsula (ICES Divisions VIIIc and IXa). Until 2007, the assessment was carried out by the ICES Working Group on Mackerel, Horse Mackerel, Sardine and Anchovy (WGMHMSA) which covered sardine and the four other pelagic species in European waters. In 2008 the competent working group became WGWIDE (ICES, 2008a) that assesses widely distributed stocks (including the Norwegian spring spawning herring and blue whiting but excluding anchovy), while in 2009 sardine assessment was rejoined with anchovy assessment in a new Working Group (WG ANSA) that meets in the summer (June).

Responsibility for the provision of data on the sardine stock to the working group and carrying out the assessment lies with representative scientists from Spain and Portugal. As an integral part of the working group process the draft stock assessment is initially examined and reviewed by other group members before going to ICES advisory committee (ACOM) for formal review and acceptance.

Following the standard practice for all ICES assessment working groups, a full benchmark assessment of the sardine stock is followed by three or four years of annual update

assessments which do not include full exploration of the data and model. There is, however, provision for any assessment to be quickly upgraded to “benchmark” should a need arise. The 2008 sardine assessment was an update; the last benchmark assessment was in 2005 and the next one is due in 2010 or 2011.

The model now used for the assessment is the AMCI model (Skagen, 2005) which integrates different sources of information. This is considered to be more appropriate for the sardine stock than the ICA model (Patterson and Melvin, 1996) previously used and commonly used for other pelagic species assessed by ICES.

The basic data required by the model and used in the 2008 assessment were:

- The catch in numbers at age and mean weight at age provided by both Spain and Portugal from comprehensive sampling of the landings on a quarterly basis for each ICES sub-Division in the whole area. Data from 1978-2007 were used.
- Maturity and stock weights at age available from biological sampling from the midwater trawl hauls carried out during the Spanish and Portuguese acoustic surveys. These data sets are updated annually.
- Natural mortality which is assumed as a constant, 0.33, over all age groups (Pestana, 1989).
- Combined Spanish and Portuguese acoustic surveys: (i) age disaggregated indices from the Spanish March survey covering Division VIIIc and sub-Division IXaN; and (ii) the Portuguese March survey, covering the remainder of Division IXa, added together without weighting, for the years 1996 to 2008.
- SSB estimates from the DEPM egg surveys providing age aggregated estimates of spawning stock biomass from the egg survey series covering the whole spawning area of the stock from the survey years 1997, 1999, 2002 and 2005.

A full description of the assessment in 2008, which includes details of the model conditions and estimated parameters used, can be found in the working group report (ICES, 2008a) which is available on the ICES website ([www.ICES.dk](http://www.ICES.dk)).

Results from the 2008 assessment are comparable with the previous year and statistical analysis does not indicate any serious concerns regarding the validity of the current input data.

The Spanish and Portuguese landings data are considered by ICES to be well estimated and a fair reflection of the actual catches. Other than the targeted purse seine fishery, sardine is taken in other fisheries, mainly by trawlers that are permitted to have up to 10 % of sardine as a by-catch. Catches by these vessels are small and are well estimated.

Discards in the purse seine fleets may happen for three reasons: (i) the capture of an unacceptable mix of species; (ii) a catch above the daily vessel quota; or (iii) the catch of sardines that are too small for the market. While there are no reliable estimates of sardine discards through slippage from the purse seine they are considered to be small. Modern acoustic equipment using multi frequency sonar has a better ability to differentiate between species and sizes and so reduces the risk of catching unsuitable fish. On the site visit to three Portuguese landing ports, the certification team were informed that to avoid discarding vessels will transfer excess catch to another vessel. To improve catch data, Portugal has just started an observer programme which has the full cooperation of the industry.

The effect of capture and subsequent release of sardine from a purse seine has been studied by Marçalo *et al.*, (2006), which indicated the likelihood of stress related mortality. Recent experimental work (Marçalo *et al.*, 2008) indicated the possibility of a high survival for sardine slipped from a purse seine, provided that this is done soon after the seine has been lightly pursed. This is contrary to previous assumptions that most slipped fish will subsequently die, which is the perception of Portuguese fishermen who met with the assessment team on site visits.

Biological sampling of the landings (length, weight, sex, age and maturity) by both Spain and Portugal fully complies with the EU Directive requirements. In 2007, sampling in both countries covered all landings.

Fishery independent abundance estimates are available from acoustic surveys and the triennial egg survey. The acoustic surveys are carried out in both Spanish and Portuguese waters in spring and provide age disaggregated estimates of total stock biomass. The surveys cover the whole stock area and there is an overlap in the two countries sampling at the national boundary in the north. Estimates are subsequently used as an index in the assessment model. Statistical estimates of the precision of the resultant indices are calculated.

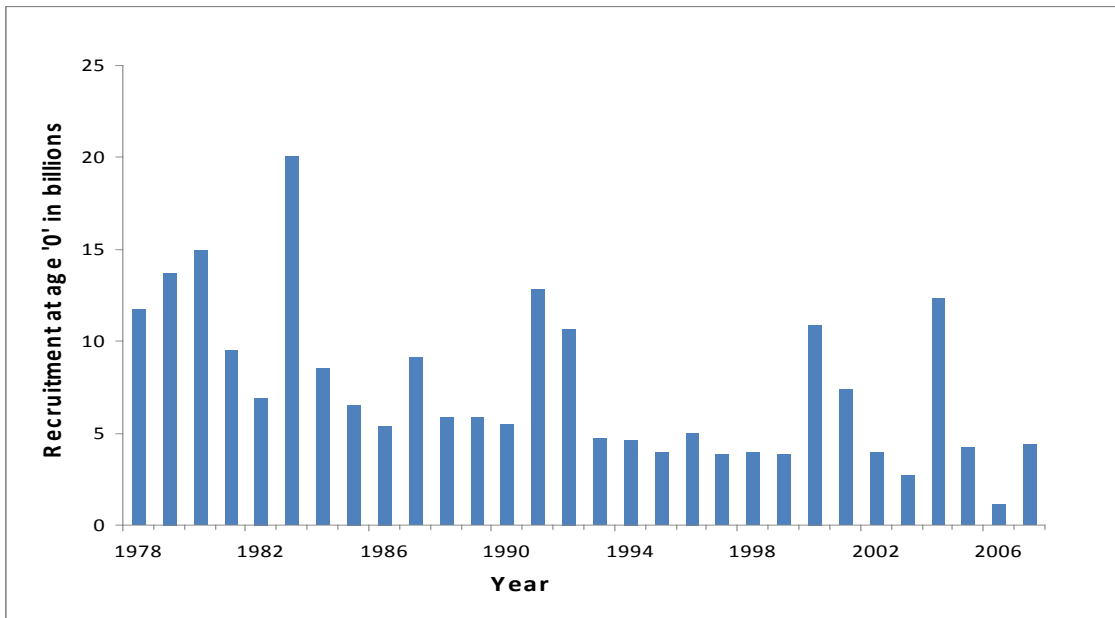
The triennial egg survey carried out by Spain and Portugal covers the whole spawning area of the Atlanto - Iberian stock. The survey is carried out on the basis of the daily egg production method (DEPM) designed for species whose absolute fecundity is indeterminate. The egg survey provides an age aggregated relative index of SSB and is used to tune the assessment. Egg surveys of the area were carried out between 1983 and 1997, with some being part of the international triennial mackerel and horse mackerel survey. Sardine data from the earlier surveys are not included in the assessment as these did not fully cover sardine spawning area and they were not carried out as daily egg production method surveys for sardine.

There is an additional Portuguese acoustic survey in November which is used to corroborate the estimation of recruitment, at age zero, generated by the assessment. Figure 5 shows the fluctuations in recruitment since 1978 which may be characterised as occasional large year classes followed by periods of average (7.5 billion) or below average recruitment. This pattern has been apparent in recent years with the good year classes of 2000, 2001 and 2004 preceded and followed by below average year classes. The 2006 year class is the poorest in the historical time series.

The major uncertainties considered in the assessment relate to the extent of sardine migration, particularly of older fish, across the northern boundary in southern Biscay, the weighting and inter-calibration of the Spanish and Portuguese acoustic surveys and the selection of the older age groups in the fishery. Statistical estimates of the precision of egg survey estimates of SSB are incorporated into the indices used in the assessment model.

Driven by the low recruitment since 2004, SSB decreased from 570,171 mt in 2006 to 526,457 mt in 2007. Early indications are that the 2008 year class is below average which has been confirmed by preliminary results from the Portuguese autumn acoustic survey. The spawning stock is currently above the long term average of 480,000 mt but short term predictions indicate that it is set to fall below that level in 2008 (Figure 6).

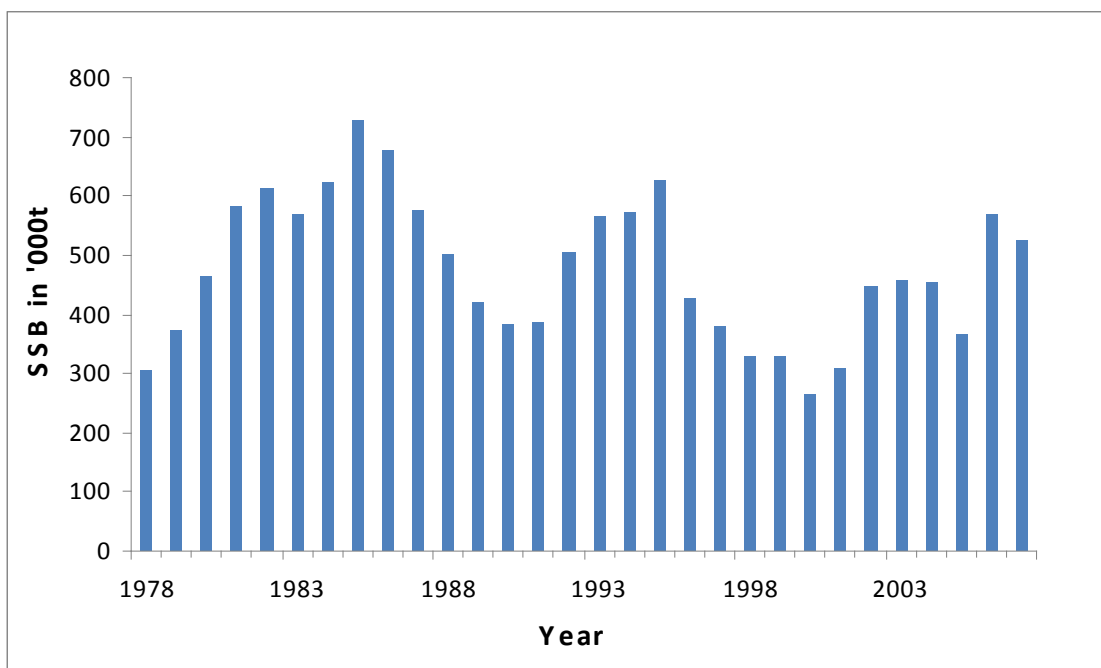
**Figure 5: Atlanto - Iberian Sardine Stock: Estimates of Recruitment (1978 to 2007)**



Note: Mean annual recruitment for that period is 7.5 billion fish at age '0'.

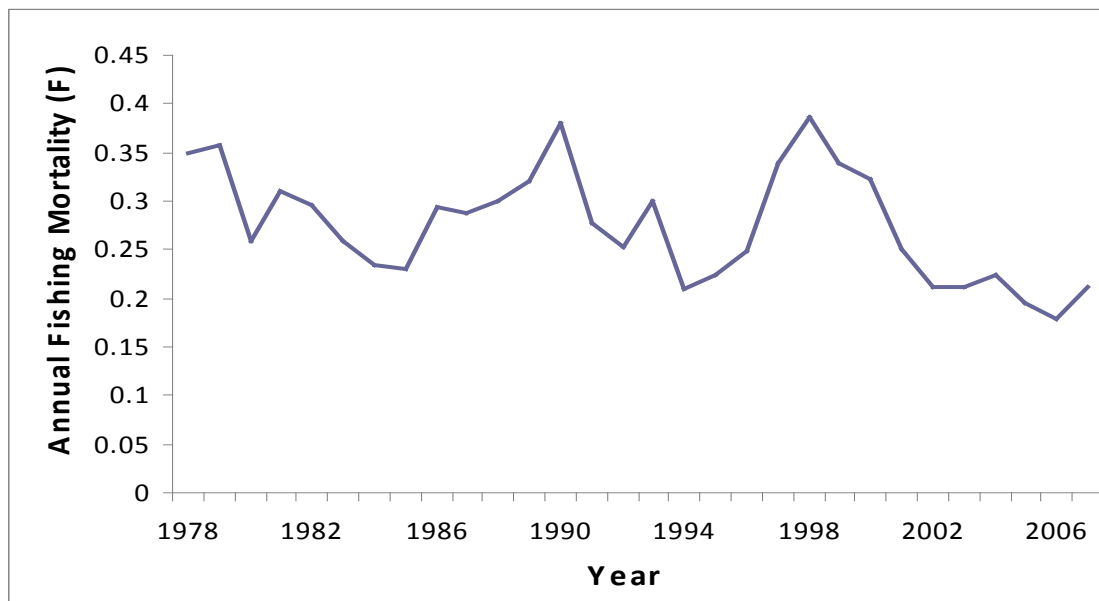
Source: ICES (2008a)

**Figure 6: Atlanto-Iberian Sardine: Spawning Stock Biomass ('000 mt) (1978 to 2007)**



Source: ICES (2008a)

**Figure 7: Atlanto-Iberian Sardine Stock: Annual fishing mortality (F) (1978 – 2007)**



Source: ICES (2008a)

An increase of 18 % in fishing mortality, based on age groups 2-5, from  $F = 0.18$  in 2006 to  $F = 0.21$  in 2007 reflected the increase in catches and declining stock abundance. Nevertheless fishing mortality is still at a historically low level (Figure 7).

Based on recent poor recruitment levels, and the continuing low fishing mortality rate observed in 2007, SSB was predicted to further decrease to 460,632 mt in 2008 and decrease again to around 373,000 mt in 2009 and 359,000 mt in 2010. Statistical analysis of 100 replicates, using the bootstrapping technique, shows that both SSB and  $F$  are estimated with reasonable and consistent precision. Retrospective analysis of the estimates of SSB and  $F$  show reasonable agreement although SSB in 2007 was 8% lower than the predicted value with  $F$  being 8% higher.

### **6.3 Management Advice**

Advice on the status of this stock is provided annually by ACOM. The advice for 2009 (ICES, 2008b) emphasises that, in the absence of formally defined reference points for either fishing mortality or spawning biomass, the status of the stock cannot be evaluated in these terms. They also confirm that there are no specific management objectives for this stock and there is no TAC. Almost all the catches are taken by Spanish and Portuguese purse seiners in targeted human consumption fisheries. All the fisheries comply with the statutory regulations on minimum mesh size (16 mm) and minimum landing size (11cm length).

Different unilateral management measures have been enforced by the two countries since 1997. In Spain, a maximum allowable catch of 7,000 kg per fishing day and a five fishing-days/week limitation in effort is regulated. In Portugal management measures include an overall limitation in the number of fishing days (180 days per year and a weekend ban) and a yearly quota for all POs. Some organisations have distributed this quota in daily catch limits by vessel which were imposed for the first time in 1999. In both Spain and Portugal there are

vessel licensing schemes to limit participation in the fishery and there are also some closed areas.

In managing their separate fisheries there is consultation between Spain and Portugal based on the annual advice on maximum catch levels from ACOM. Since 2003 this advice has been based on a status quo fishing mortality which ACOM then relate this to a predicted catch. ICES considers that the effects of the management measures taken by Spain and Portugal are uncertain but may well have proved beneficial in contributing to the decline in fishing mortality in recent years.

ACOM (2009) concludes that as the current level of fishing mortality ( $F = 0.21$ ) does not appear to have been detrimental to stock development it could be used as a guide for management of the stock. This would result in a catch of 71,000 mt in 2009 compared to the predicted catch for 2008 of 78,000 mt.

ACOM advises that development of a long term management plan for this stock would result in improved management. Any plan would have to take due account of the observed recruitment dynamics of this species and its effect on fluctuating SSB levels and provide adequate protection for the stock. A formal plan, which was flexible enough to take into account these natural fluctuations, would prove useful in stabilising catches which appears to be the desire of stakeholders, not only in Portugal but also in Spain.

## 7 ECOSYSTEM CHARACTERISTICS

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### 7.1 Introduction

The Iberian Peninsula is situated at the northernmost limit of the Northern Atlantic Upwelling Region. Off western Iberia, while upwelling favourable winds occur more consistently between April and October (Fiúza *et al.*, 1982), short upwelling episodes may occur all year round (Santos *et al.*, 2004). Along the western Portuguese continental shelf, water characteristics show a gradual north / south trend, with colder, less saline and nutrient richer in the north and warmer, saltier and nutrient poorer waters in the south (Peliz and Fiúza, 1999). In the northern coast, a low salinity buoyant plume (the Western Iberian Buoyant Plume - WIBP) is recurrently observed in the inner-shelf owing to the higher freshwater runoff in the North Western Iberian Peninsula. The WIBP has been identified as an important feature for retention and growth of early stages of small pelagic fish (Santos *et al.*, 2004). Also, due to enrichment from river runoff, productivity in coastal waters of the northern Portuguese shelf is relatively high during winter, contrasting with the more oligotrophic conditions in the narrower continental shelf to the south of Lisbon (Peliz and Fiúza, 1999). The whole western Portuguese continental shelf is also rich in temporary oceanographic events that reshape and confound the large-scale oceanographic patterns described above (Relvas *et al.*, 2007).

Considering the geomorphology of the shelf and historical records of sardine distribution four distinct areas can be defined.

- The Northern region, from the northern Portuguese border to the Nazaré Canyon, is characterized by a wide (50 km - 60 Km) soft-bottom continental shelf with intense freshwater runoff, mainly from the rivers Minho, Douro and Mondego.
- The Central region from the Nazaré Canyon to the Setúbal Canyon is characterized by a wide promontory of rocky bottom at its northernmost section followed by a relatively narrow shelf influenced by river runoff from the Tagus and Sado estuaries.
- The Southern region, extending south of Sado river to Cape São Vicente, is characterized by a narrow (25 Km), rocky-bottom and a steep continental shelf with little influence from river runoff.
- Finally, in the Algarve region the shelf presents a reduced slope extending to an extremely sharp edge at about 100 m -130 m depth, defined by a sudden step down to a depth of 700 m.

Small pelagic fish (such as sardines) play a key ecological role in coastal ecosystems, transferring energy from plankton to upper trophic levels (Cury *et al.*, 2000). Due to their relatively low position in the marine food web, together with a short life-span and a reproductive strategy based on the production of a large quantity of pelagic eggs over an extended spawning season, these fishes are highly dependent on the fluctuation of several environment variables (Bakun, 1996). Furthermore, they can be responsible for several cascade effects along the trophic chain.

## **7.2 By-catch – Retained Species and Discard Species**

### **7.2.1 Overview**

By-catch consists of the incidental catch of non-target species that may or may not be landed. Cetacean, seabirds and marine turtles that form part of the by-catch are considered separately in section 7.3.

### **7.2.2 Data Collection**

By-catches of commercial species are landed and counted against specific quotas. Quantities are registered by both the PO's and DOCAPESCA and this provides a basis for estimating the landings of by-catch per species.

As stipulated by the Data Collection Framework (DCF), since 2004-2005 the purse seine is one of the fishing gears that have observers on board. However, the level of sampling is low, with 2 trips per month for the whole purse seine fleet. Some research programs have localized observer campaigns that also collect data on by-catch (Stratoudakis & Marçalo 2002).

Due to limited observer coverage, there is some uncertainty about the data and subsequent estimates. As noted above, it has been thought that there is a high mortality of fish after they have been slipped. IPIMAR is monitoring the situation in cooperation with some PO's in order to understand mortalities and associated factors, with the aim of recommending ways to reduce fish mortality after slipping.

Presently, the acoustic surveys performed by IPIMAR are targeting all pelagic species in order to produce sufficient data to ensure their correct management (both target and by-catch retained species).

### **7.2.3 Demersals**

The sardine fishery is legally limited to a demersal by-catch of 20 % of total landings, so there is a clear management strategy in place to control the capture of by-caught species. In the past, only at the point of capture, the crew was able to identify the exact composition of the school of fish. Now, the majority of boats are becoming better equipped and the capacity to accurately target schools of sardine is increasing.

### **7.2.4 Pelagics**

Purse seine fisheries for sardine have a limited and legally regulated pelagic by-catch and practically no demersal by-catch. Sardine is the target species (> 70% of landings). Chub mackerel (*Scomber japonicas*) (5,000 mt -10,000 mt), horse mackerel (*Trachurus trachurus*) (3,000 mt – 6,000 mt) and anchovy (*Engraulis encrasicolus*) (500 mt – 1,000 mt), form the bulk of the landed pelagic by-catch with the first two species being 5% of the total landings of sardine. Horse mackerel and IXa anchovy stocks are subject to ICES assessment. The abundance and range of the chub mackerel stock is expanding and is subject to catch monitoring.

According to the ICES Advise Book (ICES 2008), there was a declining trend in the catch of horse mackerel from the early 1960s until the early 1990s, but since then it has been relatively stable. The SSB has increased since 2003 while fishing mortality has been stable (between  $F = 0.3$  and  $F = 0.4$ ) since 1999. The 2004 year-class was above average and this

may have driven an increase in SSB. The recent level of catches does not seem to be detrimental to the stock. ICES recommended that catches in 2009 should not exceed the recent average catch of 25,000 mt. The by-catch of this species by the purse-seine fleet corresponds to 12 % to 24 % of the total catches in the IXa horse mackerel stocks ( $\pm$  50 % of the Portuguese catches).

With respect to anchovy, ICES (2008) recommended that catches should be restricted to 4,800 mt (the mean catch in the period 1988 – 2006). This level should be maintained until the stock's response to the fishery is known. The catches attributed to purse-seiners correspond to 10 % to 21 % of the total catches of IXa anchovy stocks. Most of the fishery for this stock takes place in sub-Division IXa South (Gulf of Cadiz). Fleets in the northern part of Division IXa occasionally target anchovy when it is abundant.

To satisfy market demand, presently almost all of the pelagic by-catch is landed. When there is strong abundance the slipping of by-catch species may be higher even though PO's have developed a market for the retained species.

### **7.2.5 Other Species**

Other species caught during purse seine net fishing for Sardine are: Pout (*Trisopterus luscus*); Triggerfish (*Balistes carolinensis*); Thickback sole (*Microchirus* spp.); Garfish (*Belone belone*); Ray (*Raja* spp.); Conger eel (*Conger conger*); Bogue (*Boops boops*); Mackerel (*Scomber scombrus*); Gurnard (*Lepidotrigla* spp.); and Squid (*Loligo* spp.). It is important to emphasise that the proportion of these species in catches is very low (Stratoudakis & Marçalo 2002), although to the south there is more pelagic by-catch.

Due to lack of market demand, seasonal high catches of pelagic crab (*Polybius henslowi*) are discarded alive. It is assumed that their survival rate is high.

## **7.3 ETP Species**

### **7.3.1 Overview**

The distribution of sardines along the Portuguese coast overlaps that of several ETP species (defined in the EU Habitats Directive, Bern Convention, Bonn Convention and the Portuguese Red Data Book).

Four of the 19 species of cetaceans found in Portuguese continental waters overlap with sardine fisheries: Harbour Porpoise (*Phocoena phocoena*); Common Dolphin (*Delphinus delphis*); Bottlenose Dolphin (*Tursiops truncatus*); and Minke Whale (*Balaenoptera acutorostrata*). According to the Portuguese Red Data Book (Cabral *et al* 2005), the Harbour Porpoise and the Minke Whale are vulnerable species (VU) whereas the Common Dolphin and the Bottlenose Dolphin are Least Concern species (LC).

With respect to marine birds, the diversity of species occurring in the Portuguese coast is relatively high with more than 50 marine bird species recorded and there is some overlap between in their distribution and that of sardine. Along the Portuguese coast, two migratory species of marine turtle are found: the loggerhead sea turtle (*Caretta caretta*) and the leatherback turtle (*Dermochelys coriacea*). Both are listed as Not Evaluated (NE) in the Portuguese Red Data Book (Cabral *et al* 2005).

In addition, several shark species presently listed as threatened can also be found in

Portuguese waters. There are, however, no present or historical records of shark captures.

It is within this context that we review the interaction of the Portuguese purse seine sardine species with ETP species.

### **7.3.2 Management Responsibilities**

Management of ETP species is mainly the responsibility of the Institute of Nature Conservation and Biodiversity (ICNB). In Portugal the capture and commercialization of ETP species is forbidden by several international directives and convention agreements (the Bern Convention, Bonn Convention, the CITES Agreement, Habitats Directive and the Birds Directive, MARPOL, UNCLOS).

It is illegal to capture, transport, kill and commercialize any species of marine mammal in the Portuguese waters (Decreto Lei n.º 263/81). Also, Portugal is a party to other agreements and conventions that protect marine mammals either directly or indirectly (OSPAR, The Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS), ACCOBAMS, ICRW).

NAMMCO (the North Atlantic Marine Mammal Commission), IWC and ICES have recommended that member countries, including Portugal, should monitor and report by-catches of marine mammals and seabirds. As an EU member, Portugal is obliged to collect scientific data to evaluate the levels of cetacean by-catch by the Portuguese fishing fleet (European Council Regulation 812/2004). According to this regulation, the presence of independent observers is compulsory on fishing boats larger than 15 m. By-catch data for smaller boats may be obtained from scientific studies and pilot-projects. Part of this obligation is presently under evaluation in the SAFESEA Project.

Portugal does not send participants to ICES Study Group for Bycatch of Protected Species (SGBYC) and does not send data on bycatches of protected species to SGBYC. Data on the total bycatch of cetaceans in all international fisheries could be used to evaluate the impact on these populations instead of carrying out an evaluation of impact by a single fleet. However, the use of total by-catch of cetaceans in international fisheries is not applicable to Portugal as compared to Northern Europe its fleet is completely different (the proportion of artisanal boats in Portugal in relation to trawlers is much more significant than in other countries) as is the cetacean population structure and diversity. In the northern seas the harbour porpoise is the dominant species, while in Iberian waters the dominant species is the common dolphin. So, the extrapolation of by-catch effects from other scenarios is very risky.

With respect to the lack of Portuguese participants in SGBYC we make a recommendation that Portugal does participate and send data. Data on the evaluation of by-catch has been available since 2000 for central of Portugal. However, as these estimates are based on stranded animals evaluations as opposed to on-board observers, there is some difficulty for the Portuguese State to assume the derived by-catch values, which show that dead animals due to by-catch present an annual fluctuation between 19 % and 55% of the total stranded animals.

The allocation of measures to estimate the extent of the problem is very important but such measures have never been implemented by the authorities. To date the only effort to allocate measures to evaluate this problem has been done by POs and NGOs.

Monitoring of marine ETP species in Portugal is also a concern. Until 2007, there was a marked lack of information on the abundance of these species and consequently on the evaluation of by-catch, but a project is now underway to improve data (the Marine IBA's Life project from SPEA and the SafeSea Project from the Minho University is cooperating with two PO's from the north of Portugal).

### **7.3.3 Common Dolphin**

In the ASCOBANS region, a large European Survey (SCANS-II), recently included marine mammals within Portuguese waters in its coverage. The survey found that Iberian coastal areas host one of the largest concentrations of Common dolphins in Europe with an abundance estimate of 24,904 individuals (a density of 0.18 animals per km<sup>2</sup>).

Studies addressing cetacean by-catch are still very scarce. Ferreira (2007) suggests that a large number of cetaceans are a by-catch in several fishing gears, with alarming values for common dolphin and harbour porpoise (see below). This same study found that 55 % of the cetacean mortality in the centre of Portugal, between Furadouro and S. Pedro de Muel is the result of unintentional by-catch. Between 1990 and 1999, a similar analysis made in Galician waters (López *et al.* 2002) revealed that 19.8 % of the stranded Common Dolphins and 11 % of the stranded Bottlenose Dolphins presented signs of unintentional by-catch. A study based on inquiries (López *et al.* 2003) showed that 764 Common Dolphins and 53 Bottlenose Dolphins were captured in different fishing gears over a year.

This removal exceeds the sustainable Potential Biological Removal (PBR) for these populations, which should be less than 2 % of the best population estimates for the region (IWC 1995 and López *et al.* 2003). According to IWC (1995) the anthropogenic removal rate of any cetacean population should not exceed half the maximum net growth rate of the population. According to the ASCOBANS, in general an anthropogenic removal of more than 2 % of the best available population estimate was an "unacceptable interaction". Particularly for harbour porpoises, a removal rate of 1.7% in any population was considered unsustainable and a cause for concern.

The by-catch of Common Dolphin occurs throughout the year with a peak in spring and with a second smaller peak in late autumn. Harbour Porpoise by-catch occurs evenly distributed throughout the year and a tendency for a higher capture of immature individuals has been suggested (Silva and Sequeira 2003 and Ferreira 2007).

Ferreira (2007) found a positive relation between strandings and landings made by trawlers and boats using gillnets whereas no relation was found between cetacean strandings and purse-seine landings.

In Galician waters, Common Dolphins are captured in several gears such as gillnets, longlines, cables of traps, trawler nets, and purse-seiners (López *et al.* 2003). In Portugal, gillnets represent the main gear capturing Common Dolphins (Silva & Sequeira 2003). López (2003) found that stranded animals correspond to 14 % of the total number of by-caught cetaceans. Thus, it was possible to estimate that over 600 cetaceans (457 Common Dolphins and 107 Harbour Porpoises) were captured in fisheries between Furadouro and S. Pedro de Moel during one year (Ferreira 2007).

In spite of the high number of by-catch events in regions in Portuguese waters, purse-seiners targeting sardines are expected to have relatively infrequent interactions with ETP species.

Those with Common Dolphin were recorded during an observer program (Wise *et al.* 2005, Wise *et al.* 2007). Small cetaceans were observed to sink, gather or disperse schools of fishes and damage gear. Nonetheless, mean CPUE and fishing effort values did not change significantly in the presence of dolphins. Furthermore, during the same observer programme no by-catch events were ever recorded (Wise *et al.* 2005, Wise *et al.* 2007).

Information gathered from observer programs and voluntary declaration of ETP by-catch events (based on on-board log books provided by the SafeSea Project) in 30 purse-seiners revealed 140 by-caught animals, with an estimated mortality of 30 % (most animals were released alive) (Ferreira pers. comm., based on recent surveys from SafeSea Project). Extrapolation of this data to the whole fleet indicates that there is an annual by catch of about 528 dolphins by purse seiners with about 157 mortalities. The PBR of 0.63 % is well below the maximum rate. With respect to other by-caught species the PBR is very low (< 0.1%) or it is not possible to calculate the PBR.

### **7.3.4 Other Dolphins & Minke Whales**

While the most captured species is the Common Dolphin, two events involved Bottlenose Dolphins, one event involved a Risso's dolphin (*Grampus griseus*) and another involved Minke Whales. Vessel skippers are pro-active, looking to release by-caught animals by lowering the floaters or by opening the net (Ferreira pers. comm.). Some by-catch events end with the safe release of all involved animals, but sometimes a few die (especially newborns or juveniles). By-catch events seem to occur more frequently during night-time fisheries or foggy days (Ferreira pers. comm.) when visibility is restricted.

As the common dolphins by-catch in Purse-seiners is below the PBR, the same is assumed for Minke whales and Bottlenose dolphins.

### **7.3.5 Harbour Porpoise**

The harbour porpoise is declining in the Iberian Peninsula due to several reasons and research data indicates that by-catch is only a small part of the problem.

The ASCOBANS survey (see above) revealed that the southern areas of Europe (Iberian Peninsula and south of France) present the lowest abundances of harbour porpoise - 2,765 individuals (a very low density of 0.012 animals per km<sup>2</sup>). Recently Fontaine *et al.* (2007 and in preparation) pointed out that the Iberian population of harbour porpoise is very small (between 790 and 1,350 individuals) and that it has been isolated from the rest of the Northern Atlantic population over the last 300 years. Accordingly, the Harbour porpoise is considered the most threatened cetacean in Portuguese waters.

Since 2000, there is no evidence of a Harbour porpoise by-catch in purse seines off central Portugal (Ferreira 2007), despite the fact that in the past this species was frequently caught in Sardine fisheries. This is considered to be due to:

1. The habitat of harbour porpoise, in central Portugal, denotes a tendency for an intense use of areas until the 20-meter bathymetric with an evident concentration of sightings between 5 and 10 meters. This is a forbidden zone for purse-seiners;
2. Harbour porpoises in Portugal are considered shy and elusive, not inclined to approach boats and bow ride. In fact, the results from boat observers always refer that porpoises are detected far from the boats and swimming away from them. Therefore it

is very difficult that purse-seiners capture porpoises.

3. In Iberian waters, the porpoise feeds mainly on small shoaling fishes from both demersal and pelagic habitats (scad, sandeels and *Trisopterus* sp). These species are less frequent in the pelagic environment where purse-seiners capture sardines, so once again the probability of a by-catch in a purse-seiner is very low.

Therefore, purse-seine fishing does not seem to be the most damaging fishery to marine mammals and appears not to be a threat to marine mammals.

### **7.3.6 Marine Seabirds**

A large number of the bird species occurring along the Portuguese coast are in low numbers and are considered vagrant or occasional in the areas of sardine fisheries. There is, however, a clear tendency for an overlap between some marine bird species and sardines, particularly considering those species that depend on sardines as a food resource. The ETP marine bird species that might be influenced by the sardine fisheries are: the Cory's Shearwater (*Calonectris diomedea*); the Common Scoter (*Melanitta nigra*); Madeiran storm petrel (*Oceanodroma castro*); European Shag (*Phalacrocorax aristotelis*); the Balearic Shearwater (*Puffinus mauretanicus*); the Little Tern (*Sterna albifrons*); the Portuguese breeding population of Common Guillemot (*Uria aalge*); and the Northern Gannet (*Morus bassanus*). The Cory's Shearwater, the European Shag, the Madeiran storm petrel and the Little Tern are vulnerable species (VU) according to the Portuguese Red Data Book (Cabral *et al* 2005). The Common Scoter is listed as Endangered (EN) and the Balearic Shearwater together with the Portuguese breeding population of Common Guillemot are listed as Critically Endangered (CR). The Northern Gannet is listed as a Least Concern (LC) species although the very high abundance of juveniles / immature individuals emphasises the Portuguese coast as an important feeding area for this species (Petronilho *et al* 2004, Ramírez *et al.* 2008).

The scenario for marine bird by-catch in Portuguese waters remains under evaluation. Several reports and research indicate that marine bird interactions with fisheries produce high mortality rates. Indeed, interactions might be the main cause of death for some species like the Balearic Shearwater in Atlantic waters (Oró *et al* 2004). However, these reports are not based on monitoring campaigns. In Portugal, to-date the only activity to monitor bird by-catch until now was by a stranding network performing beached bird surveys that covered  $\pm$  200km of coast in the centre of Portugal. Between 2004 and 2007, the 367 live strandings recorded mainly resulted from interactions with fishing gears. The highest numbers of interactions with fisheries were recorded for Atlantic Gannets, Balearic Shearwaters, Guillemots and Seagulls.

Presently, there is an ongoing effort to evaluate the by-catch of marine birds by the SafeSea Project and SPEA (Portuguese Society for Bird Studies). Methods include questionnaires, independent observers and voluntary declaration schemes. Preliminary data (Ferreira pers. comm.), points out that negative interaction (capture, injury and death) of marine birds may occur during sardine fisheries. A large number of marine birds follow purse seiners to catch discards or accidentally slipped fish. Some marine birds were observed diving and catching the fish during the closing and drying of the net (Ferreira pers. comm.). It is, however, assumed that those events are not recurrent. Fishermen were frequently observed releasing marine birds caught in nets during the drying operations. Large mortalities were reported for some events (in one case  $\pm$  200 Balearic Shearwaters). These events are rare and the cause of death is drowning due to entanglement in the nets during the washing of the gear.

In comparison to other fisheries (including ghost fishing), purse-seine fishing does not seem to be one of the most damaging to marine birds and it appears clear that this gear is not a threat to marine birds.

### **7.3.7 Turtles**

Loggerhead sea turtle is considered endangered by the IUCN, while the leatherback turtle is considered critically endangered. In the case of loggerhead sea turtle this status was attributed in 1996 and the IUCN web page notes that the status requires updating.

It is not possible to have a conservation status for the North Atlantic as a whole, because the population status in the European coasts is completely different from those found in Western Atlantic.

With respect to mainland Portugal, INCB considers that these two species have a marginal occurrence and assumes that neither of them needs a formal conservation status evaluation. In the case of the loggerhead sea turtle, the majority of records correspond to juvenile animals that are migrating southwards. In the case of the leatherback turtle the majority of records correspond to adults migrating to breeding areas. However, the data available on these two species does not allow any characterization of their conservation status. Accordingly, one must assume the IUCN conservation status.

Observer and research programmes have not reported unintentional by-catch of any species of marine turtles in Portuguese waters. The majority of reported by-catch is associated with gillnets and longlines (Bragança 2007).

## **7.4 Habitat**

The Portuguese continental ecosystem is well studied by several governmental organizations (mainly IPIMAR and the Instituto Hidrográfico) and Universities, covering several aspects of its biology, ecology and geology. Knowledge is continuously updated with information on oceanography, plankton, fish distribution and abundance, and the interactions between these fish components gathered during annual research survey cruises. Certain types of data - notably those related to fisheries, physical oceanography, plankton and nutrients - have been collected for several years. Other studies, including ecotoxicology, sediment chemistry, hazardous algal blooms in coastal waters and benthos surveys tend to be more localized and performed less regularly.

Information on the geographic distribution of particularly vulnerable habitats is being gathered using sonar, dredging and benthic sampling programmes performed by fisheries and oceanographic institutions.

Programmes such as the Marine IBAS Life project (SPEA) and the SafeSea project (University of Minho) contribute with inputs to the designation of Important Bird Areas (IBAs) and significant areas for cetaceans. The integration of all data will allow the definition of Marine Protected Areas (MPAs) in the near future.

SPEA is proposing four marine IBAs in Portuguese continental waters: PTM001 – Figueira da Foz (1076 km<sup>2</sup>); PTM002 – Berlengas (2073 km<sup>2</sup>); PTM003 – Cabo Raso (589 km<sup>2</sup>) and PTM004 – Ria Formosa (199 km<sup>2</sup>). With the exception of PTM04 (which is very close to the shore) all the other IBA's overlap, in some extent, with the sardine fishery area. PTM01 was

designated in an area with a very intense sardine fishing effort associated with the Figueira da Foz fishing harbour. PTM02 was designated near the Peniche fishing harbour, also considered an important fishing area for sardines. Part of this IBA occurs in deeper waters not used by purse-seiners, although a significant part overlaps with the important sardine fishing areas. PTM03 was designated near Cascais. This is not an important sardine fishing area and so the risk of interactions in this region is very low.

Portuguese nature conservation plans (e.g. in accordance with EU Directives such as the Habitats Directive and Water Framework Directive) provide *de facto* environmental objectives. Presently there are two Natural Parks that include part of the marine habitat as protected areas (Parque do Litoral Norte and Parque Natural da Arrábida / Parque Marinho do Professor Luís Saldanha). Several Natura 2000 sites also include marine habitats. Some of these were defined around habitats associated with the shoreline and reefs near the coast while others, such as the Berlengas “Zona de protecção especial” (ZPE) refer to the islands and the marine environment that surrounds them.

The distribution of fishing vessels is recorded via vessel monitoring systems (VMS), although fishing effort is not necessarily recorded, particularly in relation to specific habitat types. VMS is required for boats > 15 m and logbooks record fishing locations and effort. This information allows evaluation of the fisheries’ use of critical habitats.

The impact of purse-seiner activity on habitats is limited as they operate and in open water and only impact water column habitat. These impacts were assessed by Stratoudakis *et al.* (2003b) and were considered localised in time and space. The increment of nutrients in the water column occurs mainly during the drying of the net and is the result of the combined effect of skin abrasion, regurgitation of stomach contents and forced evacuation of partly digested food.

As this fishery is not permitted within ¼ mile from the shore and in depths below 20 m, contact with the seabed and subsequent impacts on its habitats and capture of demersal species is very rare. Gear loss can potentially be caused by an excessive catch (especially if small sardines are caught) or due to technical problems during the fishery. As gear has a relatively high monetary value when it is lost the position is recorded and it is subsequently retrieved. Abandoned purse-seine gear has limited capacity to continue fishing it fully functions only when used at the surface. Gear drift due to bottom currents may occur although displacement should be limited because of the gear’s weight. Therefore, some localised damage of benthic structure and communities may occur. However, anecdotal information gained on the site visit indicated that gear loss is minimal.

## **7.5 Ecosystem Impacts**

Portuguese waters are presently monitored in some detail by several organizations. Annual acoustic surveys, in accordance with a National Plan for Biological Sampling (PNAB), have been continuous since 1995 (except 2004). In Portuguese waters, until 2008 these were supplemented by an autumn recruitment survey. Knowledge is continuously updated using available information on oceanographic data, plankton, fish distribution and abundance. Other data necessary to understand the functionality of marine ecosystems are also collected on regular basis. Presently there is a large research effort to fully understand potential impacts of fisheries upon the ecosystem, especially in respect to higher trophic level groups, such as marine birds, mammals and fish predators.

The impact of commercial sardine fishing upon the ecosystem is not yet fully understood and impacts of possible stock depletion on ecosystem processes (e.g. predator prey relationships) have not been examined. The relationship between sardines and their predators needs to be modelled, especially because diet studies (Silva 1999) have suggested that sardines might be a critical prey species to marine mammals. The same may be true for some bird species that depend upon pelagic fishes in their early development stages.

Information presently available suggests that the removal of sardines at current levels is not likely to have a significantly large impact on the Western Iberian food web. However, this has not been examined taking into account multispecies models.

The historical sardine abundance fluctuations are not associated with significant impacts on the ecosystem. Munilla *et al* (2007) hypothesised that fisheries might have produced indirect impacts on the Portuguese guillemot breeding population. This hypothesis was, however, based on a high level of uncertainty and should be considered unlikely to create unacceptable impacts.

## **8 FISHERY MANAGEMENT**

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### **8.1 The Legal Framework**

#### **8.1.1 Regulations**

See section 4 (above).

#### **8.1.2 Dispute Resolution**

EU MS are bound by the CFP with regulations incorporated into National Laws through primary and secondary legislation. Any disputes between MS and the EC are resolved in the Council of Ministers. The possibility exists for legal action to be taken against the Council of Ministers in the European Court of Justice.

At the national level Formal procedures apply for the resolution of disputes through the national court systems.

Within the Portuguese fisheries sector there is a range of mechanisms through which problems can be raised and disputes debated. These include non-governmental bodies, especially the POs.

#### **8.1.3 Compliance with Judicial Decisions**

There is no evidence to suggest that the fishing industry (public and private sectors) does not comply / would not comply with judicial decisions.

### **8.2 Legal Rights & Consultation, Roles & Responsibilities**

The rights of people dependent upon fishing are set out in EC and national law and in recent decades there has been substantial study of fishery dependency within specific areas of the EU.

With regard to the Portuguese sardine fishery no major conflicts have been recorded.

ITQs in the sardine fishery have been considered and discounted as authorities are concerned about the concentration of fishing rights and their impact on economically dependent fishers and their communities. The past allocation of quota between POs was based on historical performance. Boat shifting between POs would take their quota. Transfer of quota between POs was possible.

Extensive consultative processes are in place at European and MS levels to debate policy, plans and management, and recent years have seen the introduction of more formal procedures to consult with a wider stakeholder community. At the European level, key institutions are the ACOM and the RACs.

As detailed in Section 4 (above) there is a clear division of responsibilities between the main actors in Portuguese fisheries management. *Inter alia*, the National Strategy and associated Operational Plan cover structural, management, economic dependency and environmental factors. Planning and implementation follow a rigorous approach to stakeholder consultation. Fishery Management Plans (FMPs) fully take into account identified levels of dependency as do other development planning procedures such as the Operational Plan for Portuguese implementation of the European Fisheries Fund (EFF) (MADRP – DGPA, 2007). Policies

and implementation strategies are subject to wide consultation before ratification, and prescribed monitoring and evaluation processes after ratification.

The national consultation procedures combine information bulletins and workshops on current issues and regular formal and informal meetings between administrators, researchers and key stakeholders. For example, the dissemination of research findings on the status of the sardine resource takes place in workshops presented by IPIMAR biologists to stakeholders.

### **8.3 Management Policy: Long Term Objectives**

Article 1 of Decree – Law 383/ 1998 states that the objective of the law is to regulate marine fishing and mariculture so as to ensure through the definition of adequate measures the long term conservation and preservation to allow sustainable use of Portuguese maritime resources for both commercial and non – commercial use.

### **8.4 Incentives for Sustainable Fishing**

The 2002 revision of the CFP (Reg (EEC) 2371 / 2002), brought to an end subsidies that contributed to unsustainable fishing e.g. to increase capacity and to compensate for low catches. Any subsidies that were made available would have to be cleared with the EC under the EC State Aid rules.

However, as in other MS, the Portuguese industry does not pay directly for management or science and this may be considered as a subsidy. In addition, concern has been expressed by some (e.g. environmental NGOs) that financial support through EC's structural funds made available to the fishery sector through the Financial Instrument for Financial Guidance (FIFG) and the replacement EFF constitute a subsidy. This interpretation is not supported by the EC and MS governments.

Apart from EFF, financial assistance to the Portuguese fishing sector includes exemption of fuel excise tax, EC subsidy on withdrawals (up to 18 % of the catch can be withdrawn / carried over for a minimum of 5 days (EC 104 / 2000 Common Organisation of the Markets)), and the potential for aid for temporary cessation of activities.

### **8.5 The Management System for the Sardine Fishery**

#### **8.5.1 Regulation**

In the past, DGPA has considered that the sardine fishery has functioned effectively according to traditional practises with consequent limited need for direct government intervention. At the same time, when there have been indications that stock abundance is declining then DGPA has introduced management measures that emphasise the preference to manage inputs rather than outputs (through TACs and quotas). Accordingly, in response to stock weakness at the end of the 1990s, the Ministry of Agriculture, Rural Affairs and Fisheries introduced a number of measures. These were initially contained in Regulation No. 236/2000 of April 28 and subsequently maintained in 2001 (Regulation No. 543-B/2001 of May 30), 2002 (Regulation No. 123-A/2002 of February 8) and 2003 (Regulation No. 184/2003 of February 21).

The measures introduced in 2000 were:

1. There was a limit on the number of fishing days per week, with no direct<sup>2</sup> fishing allowed for one day;<sup>3</sup>
2. The annual number of fishing days was limited to 180;
3. Vessel owners (or their representative PO) had to present a three-monthly fishing plan followed by a monthly report on fishing activity undertaken in the previous month;
4. POs administered the limit on days fished;
5. Individual POs were allocated landings quotas;<sup>4</sup>
6. If a vessel changed PO, the allocation to the POs concerned would change to reflect the average annual landings of that vessel over the previous two years;
7. DGPA could establish individual quotas for non-PO members based on the catch of the previous two years;
8. The daily catch limits imposed by individual POs on their members would also apply to non members in the same harbour;
9. The limit on catch of non target species was 10 % of the total catch;
10. Landings had to be verified by DOCAPESCA; and
11. The quotas established for POs and non members could were transferable to the extent that total catch did not go above the global annual catch limit.

Following a more favourable stock assessment, Regulation No. 1423-A/2003 of December 31, 2003 refined the approach.

- Point 3: days fished and catch per month were be reported to DGPA in the first week of the following month.
- Point 5: the allocations were maintained and were transferable.
- Points 7, 8 & 11 above were changed:
  - the daily landing limit for non associated vessels was fixed at 3.7 mt per day;
  - allocations to non associated boats could not be transferred; and
  - daily limits established by POs were applicable to non-associated boats and where these existed they replaced the daily limit above (3.7 mt).
- Limits defined in Points 2 & 5 were maintained.

Since 2003, the perception has been that stock status and associated harvest rates were at a sustainable level and the management plan has not been modified with their use falling into abeyance. As of November 2008, however, with a recurrence of the concern over SSB and associated annual catch levels, the Portuguese fisheries administration has been reviewing a reintroduction of the measures.

## **8.5.2 Fishery Management Measures**

### **Vessel Licenses**

In November, 2008 the number of vessels with a license for purse seine was:

- LoA < 9 m. – 52 vessels
  - 1 exclusively licensed for purse seine;

<sup>2</sup> Non directed fisheries were allowed up to a maximum of 10 % of total catch.

<sup>3</sup> From north of parallel 39°55'4" N from midnight Saturday to midnight Sunday; between 39°55'4" N and 37°26'5" N from midday Saturday to midday Sunday; south of 37°26'5" N from 18.00 h. Saturday to 18.00 h. Sunday.

<sup>4</sup> Vianapesca – 3,000 mt; Apropesca – 1,800 mt; Propeixe - 20,950 mt; Centro Litoral O.P. – 6,800 mt; Fenacoopescas – 6,500 mt; Opcentro – 9,000 mt; Sesibal – 7,800 mt; Barlapescas – 9,332 mt; Coopalgarvia – 6,870 mt; Olháopesca – 2,780 mt; Capa – 168 mt

- 3 with license for purse seine and bottom long lines; and
- 48 for purse seine and other gears.
- LoA  $\geq$  9 m. < 12 m. – 41 vessels
  - 3 exclusively licensed for purse seine;
  - 4 with license for purse seine and bottom long lines; and
  - 34 for purse seine and other gears.
- LoA  $\geq$  12 m. – 121 vessels
  - 46 exclusively licensed for purse seine;
  - 32 with license for purse seine and bottom long lines; and
  - 43 for purse seine and other gears.

### **Gear Regulations**

The use of fishing gear is regulated by DGPA. As defined by Regulation No. 1102 – G – 2000 of November 22 governing purse seiner gear as modified by Regulation No. 397 – 2007:

- Article 7. Purse seiners<sup>5</sup> can fish sardine (*Sardina pilchardus*),<sup>6</sup> chub mackerel (*Scomber japonicus*),<sup>7</sup> atlantic mackerel (*Scomber scombrus*),<sup>8</sup> bogue (*Boops boops*),<sup>9</sup> European anchovy (*Engraulis encrasicolus*)<sup>10</sup> and jack mackerel (*Trachurus spp.*).<sup>11</sup> There can be a catch of other species; spotted mackerel (*Scomberomorus spp.*), Atlantic bonito (*Sarda sarda*), trigger fish (*Balistes spp.*), garfish (*Belone belone*), mullets (*Mugil spp.*, *Liza spp.*, *Chelon spp.*) and bluefish (*Pomatomus saltatrix*).
- Article 8. The minimum mesh size is 16 mm.
- Article 9. Maximum net dimensions are regulated according to the size of vessel.<sup>12</sup>
- Article 10. Fishing is not allowed by purse seiner within  $\frac{1}{4}$  mile from the coast and at depths of < 20 m. between  $\frac{1}{4}$  mile and 1 mile from shore.<sup>13</sup>

### **Other Regulations**

- All fish must go for direct human consumption.
- Trawler caught sardine must be < 10 % sardine.
- Trawlers must work > 6 miles from the coast.
- Weekend closure of 48 hours (this period need not be weekend but this approach links in with labour laws).
- Log books provide daily register of landings for all vessels > 10 m
- All landings must be sold through auction and supported by DOCAPESCA sales notes.

<sup>5</sup> The law established 3 types – the American type; the South African lampara and Mediterranean lampara.

<sup>6</sup> Sardinha

<sup>7</sup> Cavala

<sup>8</sup> Sarda

<sup>9</sup> Boga

<sup>10</sup> Bigueirão

<sup>11</sup> Carapau

<sup>12</sup> Boats < 11 m. 300\*60; > 11 m. < 13.5 m 500\*90; >13.5 m. <21.5 m. 700\*120; >21 m. 800\*150.

<sup>13</sup> There is an exception to take account of local conditions for Nazaré .

### **8.5.3 Monitoring, Control & Surveillance**

#### **System**

Under the CFP national fisheries administrations are responsible for a range of management and regulatory duties covering: fleet activity; national quota; monitoring and control of all fisheries occurring within national jurisdiction; the collection, collation and transmitting of key fishery data; and undertaking scientific monitoring and development work.

Fishery inspection duties in Portugal are headed by the Directorate General of Fisheries mainly through the Fisheries Inspectorate, with actions coordinates with the Marine Police, the Navy, DOCAPESCA and Food Safety inspectors.

There is a wide range of monitoring of fisheries activity at a number of levels, including: data collection on vessels (vessel register); fleet activity (days at sea, VMS); catches (through scientific observer programmes); and operating economics (costs and earnings surveys). Following the DCR (data collection regulation), since 2004-2005 the purse seine is one of the gears that has observers on board. However, the level of sampling is extremely low, with 2 trips per month across the country (i.e. 24 trips observed per year) compared to a total number of trips estimated to be between 20,000 and 25,000.

All fish must pass through auction and be accompanied by sales note issued by DOCAPESCA. In the case of sardine a sample is landed at auction. It is understood that the level of informal landings (i.e. by licensed or non-licensed vessels at unofficial landing places) is small.

#### **Sanctions**

Decree-Law No. 383/98 amended Decree-Law No. 278/87 establishing offences and penalties for illegal activities in fishing and mariculture. Its objective is to guarantee the conservation and preservation, management and sustainable exploitation of marine resources. As detailed by the FAO, “besides fines, a wide range of additional sanctions may be imposed, such as confiscation of catches and gear and suspension of licences. However, in case of voluntary payment of the fine, no additional sanctions can be levied. Where infringements are committed in the Portuguese territorial waters, the harbour authorities are competent to issue sanctions. In all other cases, the power to do so lies with the Fisheries Inspectorate. The fisheries law sums up the elements to take into consideration when determining the level of the fine, such as the seriousness of the infringement, the economic benefits derived from it, and the previous record of the offender. Reportedly, decisions of the harbour authorities may be appealed to the Maritime Court and decisions of the Fisheries Inspectorate to the general courts. The procedure in these courts follows the general rules of criminal procedure”.

#### **Compliance**

There are no indications of meaningful level of non-compliance.

### **8.5.4 Trans Boundary Issues**

The report by Aetinape (2003) reports on the agreements between Portugal and Spain to allow access of fishing vessels of each country into the waters of the other. For the northern frontier, the Acuerdo Fronterizo del Río Miño provides for access by 18 purse seiners of each

country, while for the southern frontier 7 purse seiners are allowed under the Acuerdo de Pesca Fronterizo del Guadiana. Activities in the waters of each country are subject to the national regulations. The authorities exchange a list of vessels every two weeks while each year there are two official meetings between the national fishery administrations to discuss control and stock management. It was reported that Portugal does not avail itself of the fishing opportunities in the north (Pers. Comm. Edgar Afonso).

## **9 OTHER FISHERIES RELEVANT TO THIS ASSESSMENT**

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Spanish fisheries exploit the same stock. Some of the Portuguese fleet may not be in the unit of certification but will still be fishing the same stock.

As noted above, sardine is the target species but other pelagics are a landed bycatch. The Horse mackerel and IXa anchovy stocks are subject to ICES assessment. The abundance and range of the Chub mackerel stock is expanding and is subject to catch monitoring. Other species are caught during purse seine net fishing for Sardine.

## 10 STANDARD USED

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The MSC Principles and Criteria for Sustainable Fisheries form the standard against which the fishery is assessed and are organised in terms of three principles. Principle 1 addresses the need to maintain the target stock at a sustainable level; Principle 2 addresses the need to maintain the ecosystem in which the target stock exists, and Principle 3 addresses the need for an effective fishery management system to fulfil Principles 1 and 2 and ensure compliance with national and international regulations. The Principles and their supporting Criteria are presented below.

Consideration of each principle is with reference to a number of PIs which are scored according to the approach established by MSC in the Default Assessment Tree. A brief introduction to the PIs is provided below; scoring is covered in Section 11.

**Principle 1: A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.**

The intent of this principle is to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. Thus, exploited populations would be maintained at high levels of abundance designed to retain their productivity, provide margins of safety for error and uncertainty, and restore and retain their capacities for yields over the long term.

### Criteria

1. The fishery shall be conducted at catch levels that continually maintain the high productivity of the target population(s) and associated ecological community relative to its potential productivity.
2. Where the exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level consistent with the precautionary approach and the ability of the populations to produce long-term potential yields within a specified time frame.
3. Fishing is conducted in a manner that does not alter the age or genetic structure or sex composition to a degree that impairs reproductive capacity.

Principle 1 PIs focuses on two key aspects of a fishery's performance - the current status of the target stock resource and a precautionary and effective harvest strategy. There is consideration of the specific tools, measures and strategies that are being used to manage the impact of the fishery on the target species.

There are two primary PIs and one supplementary PI covering the current status of the target stock resource. These express the concept that: (i) sustainability of target stocks comes from management behaviour that increases the probability that exploited biomass fluctuates around the  $B_{MSY}$  target;<sup>14</sup> and (ii) decreases the probability that it will drop significantly towards the point where recruitment becomes impaired.

Four PIs assess the performance of the harvest strategy (HS). In addition to a PI that considers the overall performance of the harvest strategy, three others consider key elements

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<sup>14</sup> Or a higher target if this is warranted from a consideration of the trophic inter-dependencies of the target species.

of harvest strategies: the control rules and tools in place; the information base and monitoring; and the assessment method.

**Principle 2: Fishing operations should 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.**

The intent of this principle is to encourage the management of fisheries from an ecosystem perspective under a system designed to assess and restrain the impacts of the fishery on the ecosystem.

#### Criteria

1. The fishery is conducted in a way that maintains natural functional relationships among species and should not lead to trophic cascades or ecosystem state changes.
2. The fishery is conducted in a manner that does not threaten biological diversity at the genetic, species or population levels and avoids or minimises mortality of, or injuries to endangered, threatened or protected species.
3. Where exploited populations are depleted, the fishery will be executed such that recovery and rebuilding is allowed to occur to a specified level within specified time frames, consistent with the precautionary approach and considering the ability of the population to produce long-term potential yields.

Principle 2 is divided into five Components that cover the range of potential ecosystem elements that may be impacted by a fishery: retained by-catch; discarded by-catch; ETP species; habitats and; ecosystem i.e. broader ecosystem elements such as trophic structure and function, community composition and biodiversity.

Consideration of the impact of the fishery on all Principle 2 components may include unobserved mortality where these are appreciable e.g. illegal fishing, unregulated catches and ghost fishing.

Each of the five components comprises three PIs:

- An ‘Outcome’ PI considers the status of the impact or the risk that the fishery poses to that Component;
- A ‘Management Strategy’ PI considers the basis, reliability and implementation of the management strategy for the Component; and
- An “Information” PI considers the nature, extent, quality and reliability of the monitoring and information that is relevant to developing and implementing the management strategy and measuring the outcomes of the strategy.

**Principle 3: The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.**

The intent of this principle is to ensure that there is an institutional and operational framework for implementing Principles 1 and 2, appropriate to the size and scale of the fishery.

## A. Management System Criteria

1. The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.

The management system shall:

2. Demonstrate clear long-term objectives consistent with MSC Principles and Criteria and contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information, including local knowledge. The impact of fishery management decisions on all those who depend on the fishery for their livelihoods, including, but not confined to subsistence, artisanal and fishing-dependent communities shall be addressed as part of this process.
3. Be appropriate to the cultural context, scale and intensity of the fishery – reflecting specific objectives, incorporating operational criteria, containing procedures for implementation and a process for monitoring and evaluating performance and acting on findings.
4. Observe the legal and customary rights and long term interests of people dependent on fishing for food and livelihood, in a manner consistent with ecological sustainability.
5. Incorporates an appropriate mechanism for the resolution of disputes arising within the system<sup>15</sup>.
6. Provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing.
7. Act in a timely and adaptive fashion on the basis of the best available information using a precautionary approach particularly when dealing with scientific uncertainty.
8. Incorporate a research plan – appropriate to the scale and intensity of the fishery – that addresses the information needs of management and provides for the dissemination of research results to all interested parties in a timely fashion.
9. Require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted.
10. Specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
  - a) setting catch levels that will maintain the target population and ecological community's high productivity relative to its potential productivity, and account for the non-target species (or size, age, sex) captured and landed in association with, or as a consequence of, fishing for target species;
  - b) identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas;
  - c) providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames;
  - d) mechanisms in place to limit or close fisheries when designated catch limits are reached;
  - e) establishing no-take zones where appropriate.

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<sup>15</sup> Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

11. Contains appropriate procedures for effective compliance, monitoring, control, surveillance and enforcement which ensure that established limits to exploitation are not exceeded and specifies corrective actions to be taken in the event that they are.

## B. Operational Criteria

Fishing operation shall:

1. Make use of fishing gear and practices designed to avoid the capture of non-target species (and non-target size, age, and/or sex of the target species); minimise mortality of this catch where it cannot be avoided, and reduce discards of what cannot be released alive.
2. Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas.
3. Not use destructive fishing practices such as fishing with poisons or explosives;
4. Minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch etc.
5. Be conducted in compliance with the fishery management system and all legal and administrative requirements.
6. Assist and co-operate with management authorities in the collection of catch, discard, and other information of importance to effective management of the resources and the fishery.

The intent of Principle 3 is to ensure that there is an institutional and operational framework, appropriate to the size and scale of the fishery, for implementing Principles 1 and 2.

There are two Components:

- “Governance and Policy” considers:
  - the legal and/or customary framework that overarches the fishery, and possibly other fisheries under the same management framework; and
  - the consultation processes and policies, as well as the articulation of the roles and responsibilities of people and organizations within the overarching management system and other overarching policies supporting fisheries management.
- “Fishery Specific Management System” focuses on the management system directly applied to the fishery undergoing assessment. Performance indicators under this Component consider:
  - the fishery-specific management objectives;
  - the decision-making processes in the relevant fishery;
  - the fishery’s compliance and enforcement system and implementation; and
  - research planning and monitoring and evaluation of the performance of the fishery management system.

# **11 BACKGROUND TO THE EVALUATION**

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## **11.1 Evaluation Team**

### **Lead Assessor - Dr Andrew Hough**

Andy has a PhD in marine ecology from the University of Wales, Bangor and fourteen years post-doctoral experience in commercial marine and coastal environmental management projects. He is manager of Moody Marine operations within Moody International Certification with particular responsibility for the implementation of MSC Certification procedures and development of MSC methodologies. Andy has been the lead assessor on the majority of Moody Marine MSC pre assessments and main assessments.

### **Project Coordinator & Expert Advisor P3 - Ian Scott**

Ian is a fisheries consultant specialising in fisheries certifications, fisheries policy and fishery management issues with over 20 years experience in the fishery sector. In the past 18 months he has advised the Governments of Montenegro and Serbia on fisheries policy, including fisheries management, fleet development, the need for scientific research and fishery related environmental issues. Recently he has co-prepared fisheries management plans for Turkey, Serbia and Montenegro. To date, Ian has undertaken a number of pre-assessments for Moody Marine and is an auditor of the MSC chain of custody. He is engaged on two other main assessments.

### **Expert Advisor P1 - John Nichols**

John is a retired UK government fisheries biologist with 42 years research experience in plankton ecosystems in the North Atlantic. His experience includes: being a member of: (i) ICES working groups on herring, mackerel, horse mackerel, sardine and anchovy assessments; and mackerel and horse mackerel egg surveys; and (ii) ICES study groups on herring larval surveys and plankton sampling; responsibility for numerous research vessel surveys for fish stock assessment purposes, including egg surveys, and participation in a number of MSC main assessments including PFA North Sea Herring, Hastings Fleet Dover sole, herring and mackerel fisheries and SW mackerel fishery re-assessment.

### **Expert Advisor P2 - José Vítor de Sousa Vingada**

José is currently Associate Professor, Biology Department at the University of Minho, specialized in animal ecology, biodiversity, eco-toxicology and conservation and management of living resources. His experience includes the coordination of several census programs related with the estimation of abundances of marine birds and cetaceans; use of marine animals as bio-indicators of ocean contamination; evaluation of protected species by-catch by the Portuguese fisheries; evaluation of the relation between purse-seine fisheries and cetaceans; coordination of a marine animal stranding network and rehabilitation centre; and evaluation of the impact of beach purse-seine fisheries on harbour porpoises. He is presently responsible for a research project, in cooperation with two of the largest Portuguese Fishing associations, financed by the Norwegian Financial Mechanism that aims to evaluate the abundances of cetaceans in Portuguese waters and relate its occurrence with fisheries efforts; evaluate the levels of accidental by-catch of cetaceans, marine birds and marine turtles by the Portuguese fisheries and test the use of deterrent devices (pingers and acoustic nets) in order to evaluate its efficiency in reducing by-catch.

## **11.2 Previous Certification Evaluations**

The fishery has not been previously assessed against the MSC standard.

## **11.3 Inspections of the Fishery**

Inspection of the fishery focused on the practicalities of fishing operations, the mechanisms and effectiveness of management agencies, environmental issues and the scientific assessment of the fisheries.

Meetings were held as follows (tables 1 & 2).

**Table 1: Site Visit: Schedule**

<b><u>Day</u></b>	<b><u>Date</u></b>	<b><u>Place</u></b>
Sunday	02/11/2008	Team Arrival
Monday	03/11/2008	Meetings Lisbon
Tuesday	04/11/2008	Meetings Figueira, Matosinhos
Wednesday	05/11/2008	Meetings Peniche
Thursday	06/11/2008	Meetings Lisbon
Friday	07/11/2008	Report Preparation
Saturday	08/11/2008	Report Preparation
Sunday	09/11/2008	Report Preparation
Monday	10/11/2008	Meetings Lisbon, Team departure

**Table 2: Site Visit: Persons Met**

<b>Name</b>	<b>Affiliation</b>	<b>Place</b>	<b>Date</b>	<b>Key Issues</b>
Afonso, Edgar	Biologist, DGPA	Lisbon	10/11/08	Law, MCS
Andrade, Joana	Marine & IBAs Prog., SPEA	Lisbon	10/11/08	Ecosystem
Borges, Henrique	Fishing Skipper	Figueira	10/11/08	Fishing
Coimbra, Bruno	Gialmar, Prod. Dir.	Figueira	10/11/08	Fish sourcing
Da Mata, Agostinho	Propeixe, Manager	Matosinhos	10/11/08	Management
Da Silva, Sergio	Poveira (Fish Cannery)	Peniche	10/11/08	Fish sourcing
Dicasto, Manuela	Division Chief, DGPA	Lisbon	06/11/08	Law, MCS
Duque, Luis	Gialmar, Com. Man.	Figueira	06/11/08	Fish sourcing
Farinha, Sandra	ANOPCERCO	Figueira	06/11/08	Data
Gonçalves, José Carlos	Vianapesca, Manager	Matosinhos	06/11/08	Management
Leite, Jose	Vianapesca, Manager	Matosinhos	06/11/08	Management
Luzu, Ricardo	ESI, Portugal	Peniche	06/11/08	Fish sourcing
Maia, Ruben	A.N.I.P	Peniche	06/11/08	Management
Melo, Castro	ANICP, Secc. Gen.	Peniche	05/11/08	Management
Nogueira, Vitor	DOCAPESCA	Figueira	05/11/08	Market data
Nunes, Manuela	Biologist, ICNB	Lisbon	10/11/08	Ecosystem
Ramirez, Ivan	Marine IBA's Co-Ord, SPEA	Lisbon	10/11/08	Ecosystem
Ramirez, Manuel	Ramirez (Fish Canner)	Peniche	10/11/08	Fish sourcing
Rodrigues, Francisco	ESI, Portugal	Peniche	10/11/08	Fish sourcing
Sequeira, Marina	Biologist, ICNB	Lisbon	10/11/08	Ecosystem
Silva, Alexandra	IPIMAR, Researcher	Matosinhos	04/11/08	Resource Data
Silva, Alexandra	IPIMAR, Researcher	Peniche	05/11/08	Resource Data
Silva, Alexandra	IPIMAR, Researcher	Lisbon	10/11/08	Resource Data
Stratoudakis, Yorgos	IPIMAR, Researcher	Lisbon	03/11/08	Resource Data
Stratoudakis, Yorgos	IPIMAR, Researcher	Matosinhos	04/11/08	Resource Data
Stratoudakis, Yorgos	IPIMAR, Researcher	Peniche	05/11/08	Resource Data
Stratoudakis, Yorgos	IPIMAR, Researcher	Lisbon	10/11/08	Resource Data
Miguel Lé, Antonio	PO Manager	Figueira	04/11/08	Management
	Apropesca, Manager	Matosinhos	04/11/08	Management

## 12 STAKEHOLDER CONSULTATION

### 12.1 Stakeholder Consultation

A total of 11 stakeholders were identified by Moody Marine to be informed directly by email of the progress of the main assessment. In addition, each was invited to meet with the audit team during the site visit and / or present written submissions. Information was also made publicly available at the following stages of the assessment (Table 3).

**Table 3: Timeline for Public Dissemination of Information on the Certification Process**

<b>Date</b>	<b>Purpose</b>	<b>Media</b>
07.08.08	Announcement of assessment / Assessment Timeline	Notification on MSC website
17.09.08	Notification of Assessment Team nominees	Notification on MSC website
29.09.08	Notification of intent to use MSC Default Assessment Tree	Notification on MSC website
29.09.08	Notification of assessment visit and call for meeting requests	Notification on MSC website
03.10.08	Announcement of assessment / Assessment Timeline Notification of Assessment Team nominees Notification of intent to use MSC Default Assessment Tree Notification of assessment visit and call for meeting requests	Direct E-mail
14.10.08	Notification of Portugal Purse Seine Unit of Certification	Notification on MSC website
20.10.08	Notification of Portugal Purse Seine Unit of Certification	Direct E-mail
02.11.08/ 10.11.08	Assessment visit	Meetings
28.11.08	Notification of Proposed Peer Reviewers	Direct E-mail Notification on MSC website
	Notification of Public Draft Report	Direct E-mail Notification on MSC website
	Notification of Final Report	Direct E-mail Notification on MSC website

### 12.2 Stakeholder Issues

Prior to the site visit stakeholders did not identify any specific issues in relation to the certification of the Portuguese sardine fishery. There was no feedback on the default assessment tree or the nominated team. The team met with those who expressed an interest and these provided valuable background information, with the points of view expressed being fully taken into account by the assessment team in preparation of the report.

## **13 OBSERVATIONS AND SCORING**

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### **13.1 Introduction to Scoring Methodology**

The MSC Principles and Criteria set out the requirements of certified fishery. These Principles and Criteria have been developed into a standard (Fishery Assessment Methodology) assessment tree - Performance Indicators and Scoring Guideposts - by the MSC, which is used in this assessment.

The Performance Indicators (PIs) have been released on the MSC website. In order to make the assessment process as clear and transparent as possible, each PI has three associated Scoring Guideposts (SGs) which identify the level of performance necessary to achieve 100, 80 (a pass score), and 60 scores for each PI; 100 represents a theoretically ideal level of performance and 60 a measurable shortfall.

For each PI, the performance of the fishery is assessed as a “score”. In order for the fishery to achieve certification, an overall weighted average score of 80 is necessary for each of the three Principles and no Indicator should score less than 60. As it is not considered possible to allocate precise scores, a scoring interval of five is used in evaluations. As this represents a relatively crude level of scoring, average scores for each Principle are rounded to the nearest whole number.

Scores for the Portuguese Sardine Fishery are presented in the scoring table (Appendix A), together with related comments.

## **14 LIMIT OF IDENTIFICATION OF LANDINGS FROM THE FISHERY**

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### **14.1 Traceability**

As detailed above, catches are recorded by the skipper and entered into vessel logbooks. These may be subject to at-sea inspections by the Coastguard. All landings are recorded by vessel and they have to pass through a formal auction where DOCAPESCA provides a sales note that must accompany the product during transportation. These sales notes are used to provide landing statistics. In addition, individual POs maintain a data on the landings of individual vessels.

No fish is processed at sea and it is considered that the level of informal landings (i.e. by licensed or non-licensed vessels at unofficial landing places) is extremely small.

The coordination of MCS activities is coordinated by the Directorate General of Fisheries.

Following landing sardine is purchased by a range of buyers – fish freezers, fish canners and fish wholesalers, including buying agents for both groups. If the amount of fish landed is greater than market demand, the fish may be frozen for subsequent sale.

### **14.2 Eligibility to enter Chain of Custody**

Chain of Custody should commence following sale at a formal auction of product landed by an eligible vessel.

### **14.3 Target Eligibility Date**

Please note, the target eligibility date for product from the fishery (as and when certified) to bear the MSC label is the date of certification. This is subject to change following discussion between the client and the major buyers.

## **15 ASSESSMENT RESULTS**

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### **15.1 Scoring: Performance Indicators**

The scores for each PI are presented in Table 4 that also shows the weighting as defined by the MSC for the default assessment tree.

### **15.2 Scoring: Principles**

The Performance of the Fishery in relation to MSC Principles 1, 2 and 3 is:

Principle 1 - Target Species	83
Principle 2 - Ecosystem	84
Principle 3 - Management	87

### **15.3 Certification Determination**

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any Performance Indicators. **It is therefore recommended that the Portuguese Sardine Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries.**

### **15.4 Conditions**

As a standard requirement of the MSC certification methodology, the fishery shall be subject to (as a minimum) annual surveillance audits. These audits shall be publicised and reports made publicly available.

The fishery attained a score of below 80 against three PIs. The assessment team has therefore set conditions for continuing certification that the client for certification is required to address. The conditions are applied to improve performance to at least the 80 level within a period set by the certification body but no longer than the term of the certification.

As a standard condition of certification, the client shall develop an “Action Plan” for Meeting the Conditions for Continued Certification, to be approved by Moody Marine.

The conditions are associated with three key areas of performance of the fishery. The Conditions, associated timescales and relevant Scoring Indicator are set out below.

**Table 4: Performance Indicators: Weightings and Scoring Table**

1	Outcome	0.5	1.1.1	Stock status	0.25	90	22.50	
			1.1.2	Reference points	0.25	80	20.00	
			1.1.3	Stock rebuilding			0.00	
	Management	0.5	1.2.1	Harvest strategy	0.125	70	8.75	
			1.2.2	Harvest control rules & tools	0.125	70	8.75	
			1.2.3	Information & monitoring	0.125	95	11.88	
			1.2.4	Assessment of stock status	0.125	90	11.25	
2	Retained species	0.2	2.1.1	Outcome	0.0667	80	5.34	
			2.1.2	Management	0.0667	80	5.34	
			2.1.3	Information	0.0667	85	5.67	
	Bycatch	0.2	2.2.1	Outcome	0.0667	80	5.34	
			2.2.2	Management	0.0667	80	5.34	
			2.2.3	Information	0.0667	80	5.34	
	ETP species	0.2	2.3.1	Outcome	0.0667	80	5.34	
			2.3.2	Management	0.0667	80	5.34	
			2.3.3	Information	0.0667	80	5.34	
	Habitats	0.2	2.4.1	Outcome	0.0667	100	6.67	
			2.4.2	Management	0.0667	100	6.67	
			2.4.3	Information	0.0667	90	6.00	
	Trophic function	0.2	2.5.1	Outcome	0.0667	80	5.34	
			2.5.2	Management	0.0667	85	5.67	
			2.5.3	Information	0.0667	85	5.67	
	3	Governance and policy	0.5	3.1.1	Legal & customary framework	0.125	100	12.50
				3.1.2	Consultation, roles & responsibilities	0.125	100	12.50
				3.1.3	Long term objectives	0.125	80	10.00
3.1.4				Incentives for sustainable fishing	0.125	90	11.25	
Fishery specific management system		0.5	3.2.1	Fishery specific objectives	0.1	60	6.00	
			3.2.2	Decision making processes	0.1	85	8.50	
			3.2.3	Compliance & enforcement	0.1	100	10.00	
			3.2.4	Research plan	0.1	80	8.00	
			3.2.5	Management performance evaluation	0.1	80	8.00	

### **15.4.1 Condition 1**

#### **Relevant Scoring Indicators**

The following is the narrative used for the first scoring element of SG 80 of PI 1.2.1 (Harvest Strategy: There is a robust and precautionary harvest strategy in place):

- The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.

#### **Action Required**

- Prescribed target and limit reference points are reflected in a harvest strategy that is developed as part of a formal approach to fisheries management planning (see conditions 2 and 3).

#### **Timescale**

- It is recognised that the process of establishing formal target and limit reference points is dependent on the activities of Portuguese fishery scientists working in collaboration with their peers within the ICES system and this may lead to a long gestation period in the change in the approach to fishery management. However there should be a programmed approach so that by the third annual audit there should be documented evidence that reference points have been agreed by independent scientists and have been used in determining management advice at national level?

### **15.4.2 Condition 2**

#### **Relevant Scoring Indicators**

The following is the narrative used for the three elements of SG 80 of PI 1.2.2 (Harvest control rules and tools: There are well defined and effective harvest control rules in place)

- Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached.
- The selection of the harvest control rules takes into account the main uncertainties.
- Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules

#### **Action Required**

- There needs to be formal definition of harvest control rules within the context of a more formal continuous approach to management of the Portuguese sardine fishery.

#### **Timescale**

- To ensure that, as a minimum, this performance indicator achieves the 80 scoring guidepost it is required that:
  - By the first annual audit there is documented evidence that the policy options for harvest control rules have been outlined and discussed with stakeholders.
  - By the second annual audit there is documented evidence that an agreed policy document has been approved for incorporation into national regulations.

- By the fourth annual audit that policy changes have been formally accepted by the relevant Ministries, with clear evidence of the implementation of the agreed harvest control rules.

### **15.4.3 Condition 3**

#### **Relevant Scoring Indicators**

The following is the narrative used for SG 80 of PI 3.2.1 (Fishery - specific objectives):

- 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's management system.

#### **Action Required**

- The approach to management of the Portuguese sardine fishery should be formalised with a clear statement of the long and short term objectives for the fishery that direct the design and implementation of policy that may be considered as proactive rather than reactive and incorporates an operational framework that requires the use of the resource to be responsible and sustainable (see condition 2).

#### **Timescale**

- To ensure that, as a minimum, this performance indicator achieves the 80 scoring guidepost it is required that:
  - By the first annual audit there is documented evidence that the policy options for policy development have been outlined and discussed with stakeholders.
  - By the second annual audit there is documented evidence that an agreed policy document has been approved for incorporation into national regulations.
  - By the fourth annual audit that policy changes have been formally accepted by the relevant Ministries, with clear evidence that the objectives have been used in the development of policy related to the management of the sardine fishery.

## **15.5 Recommendations**

1. As highlighted in scoring comment PI 2.3.1, it is recommended that a greater nationwide effort should be implemented as regards on-board observers to evaluate by-catch of ETP species.
2. As highlighted in scoring comment PI 2.3.3, it is recommended that Portugal becomes involved in the ICES Study Group for Bycatch of Protected Species by sending participants and providing data on bycatches of protected species.

## **16 CLIENT ACTION PLAN**

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The client action plan in response to the three conditions is contained in Appendix 3.

<b>SCORING CRITERIA</b>	<b>SCORING GUIDEPOST 60</b>	<b>SCORING GUIDEPOST 80</b>	<b>SCORING GUIDEPOST 100</b>
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**Appendix 1: Scoring Table**

<b>Principle 1</b>	<b>A fishery must be conducted in a manner that does not lead to over-fishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.</b>		
<b>1.1</b>	<b>Management Outcomes:</b>		
<b>1.1.1</b>	<p><b>Stock Status:</b> The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing</p>	<p>It is likely that the stock is above the point where recruitment would be impaired.</p>	<p>It is highly likely that the stock is above the point where recruitment would be impaired.</p> <p>The stock is at or fluctuating around its target reference point.</p>
			<p>There is a high degree of certainty that the stock is above the point where recruitment would be impaired.</p> <p>There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years.</p>
<b>Scoring Comments</b>			
<p>There is no clear relationship between SSB and recruitment in the historic time series, nor does the time series indicate any point below which recruitment is likely to be impaired. The lowest SSB in the 30 year time series was in 2000 (266,000 mt) and it produced a year class which was well above the long term mean. This lowest observed level of SSB can therefore be considered as a precautionary implicit biomass limit point. Sardine is a short lived species in which the SSB is clearly driven by fluctuations in recruitment that tends to peak every 4 to 7 years, followed two years later by highs in SSB. The last strong year class was in 2004 and its influence is now beginning to decline. ICES estimated the spawning stock biomass in 2007 to be 'high' (526,000 mt) which is well above the long term average of 480,000 mt. The highest SSB in the 30 year time series was in 1985 (730,000 mt) and followed a very large recruitment in 1983. SSB has declined since 2006 and is predicted to further decline in 2008 and 2009 unless there is improved recruitment in 2008. The estimation of SSB is considered to be reliable with adequate fishery independent data to support it.</p>			
<b>Score: 90</b>			
SSB in 2007 was estimated at 526,000 mt therefore there is a high degree of certainty that the stock is above the implicit biomass limit point at which there is no			

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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appreciable risk that recruitment would be impaired. A surrogate biomass for maximum sustainable yield could be considered to be twice the implicit biomass limit. (532,000 mt). The SSB is currently around that level and the long term mean is 480,000 mt therefore the stock is at or fluctuating around this implicit target reference point  $B_{MSY}$  even though this point has not yet been formally defined.. Therefore all the 80 SG criteria are met and the first half of the SG 100 criteria therefore a score of 90 is allocated.

**Audit Trace References**

ICES (2008a); ICES (2008b)

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.1.2	<p><b>Reference Points:</b> Limit and target reference points are appropriate for the stock.</p>	<p>Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.</p>	<p>Reference points are appropriate for the stock and can be estimated.</p> <p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.</p> <p>The target reference point is such that the stock is maintained at a level consistent with <math>B_{MSY}</math> or some measure or surrogate with similar intent or outcome.</p> <p>For low trophic level species, the target reference point takes into account the ecological role of the stock.</p>	<p>Reference points are appropriate for the stock and can be estimated.</p> <p>The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of relevant precautionary issues.</p> <p>The target reference point is such that the stock is maintained at a level consistent with <math>B_{MSY}</math> or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.</p>
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**Scoring Comments**

Formal reference points for SSB and fishing mortality have yet to be defined for this stock. There is an implied generic reference point which is the lowest SSB in the time series (266,000 mt) and one which produced recruitment above the long term mean. Furthermore, there is no evidence of any impaired recruitment in the current 30 year time series. Stock productivity has been high with mean landings over the past thirty years of 140,000 mt. The highest annual landing of 216,000 mt was recorded in 1981, with a low of 86,000 mt in 2000. Landings in 2007 were 96,500 mt. In the absence of a formal management plan an implicit limit reference point, based on the lowest observed SSB, is entirely appropriate for this short lived, lower trophic level, species.

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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A default assumption for a precautionary level biomass limit point is 50 % of the maximum sustainable yield biomass ( $B_{msy}$ ). In this context the implicit limit reference point would be generated from a  $B_{msy}$  of 532,000 mt which is very close to the estimated SSB in 2007, but above the long term mean of 480,000 mt.

Fishing mortality has been decreasing since 1998 and is now considered to be low. This, however, is likely to increase in the short term as the catch is more or less constant as dictated by market demand. Current levels of fishing mortality do not appear to be detrimental to the development of the stock and as a consequence current F levels could be considered to be precautionary and used as a reference point. Scientific sampling of the catches show no changes over time to either the genetic structure or sex composition of the stock.

The implicit and estimated reference points that form the basis of the current management strategy are based on reasonable assumptions related to the stock. There is no evidence that current harvest rates (removing less than 20% of the adult stock (ages2-5) annually) have any detrimental effect on the ecological role of sardine as a prey species for other fish or marine mammals.

**Score: 80**

All the 80 SG criteria are met but because the reference points are implicit and are not yet formally defined none of the 100SG criteria are met. Therefore a score of 80 is allocated.

**Audit Trace References**

ICES (2008a); ICES (2008b); Site Visit (November 2008).

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.1.3	<p><b>Stock Rebuilding:</b> Where the stock is depleted, there is evidence of stock rebuilding.</p>	<p>Where stocks are depleted rebuilding strategies which have a reasonable expectation of success are in place.</p> <p>Monitoring is in place to determine whether they are effective in rebuilding the stock within a specified timeframe.</p>	<p>Where stocks are depleted rebuilding strategies are in place.</p> <p>There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe.</p>	<p>Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the shortest practicable timeframe.</p>
<b>Scoring Comments</b>				
Not applicable.				
<b>Score:</b>				
Not applicable				
<b>Audit Trace References</b>				
PI 1.1.1				

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>1.2</b>	<b>Harvest Strategy (management)</b>			
<b>1.2.1</b>	<p>Harvest Strategy: There is a robust and precautionary harvest strategy in place</p>	<p>The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.</p> <p>The harvest strategy is likely to work based on prior experience or plausible argument.</p> <p>Monitoring is in place that is expected to determine whether the harvest strategy is working.</p>	<p>The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.</p> <p>The harvest strategy may not have been fully tested but monitoring is in place and evidence exists that it is achieving its objectives.</p>	<p>The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points.</p> <p>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.</p> <p>The harvest strategy is periodically reviewed and improved as necessary.</p>

**Scoring Comments**

Although there is no formal management plan in place for this fishery the harvest strategy is clearly based on practical experience of the past performance of the fishery. There is a vessel licensing scheme which demonstrably prevents any increase in capacity. The fishery has always been effort controlled, driven mainly by market demand and this has worked successfully for the Portuguese purse seine fleet over at least the last ten years. As an example, after a period of low recruitment in the 1990's, and a consequent decline in SSB, in 1998 a plan was put in place which limited the daily catch of the fleet and the number of days at sea (to 180) while recognising the voluntary seasonal closure of the fishery for two winter months. These measures were in addition to the statutory minimum mesh size and minimum landing size and regulations dictating the dimensions of the net. The annual plans evolved over time in response to the actual situation in the fishery, with the most recent measures implemented in 2004. The plan, including its voluntary elements, was effective in controlling catches until further good recruitment into the fishery resulting from the 2000 and 2004 year classes. Since 2004 and following stock recovery, formal management planning lapsed but it has still been used by POs to modulate supply in relation to demand. In that context the strategy, together with Spanish regulatory measures (a maximum daily catch of 7 mt per boat and 5 day fishing week), have helped ensure that landings from the whole stock in ICES Divisions VIII and IXa have been

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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maintained at levels and below the ACOM advisory limits since 2003. After a further period of poor recruitment dating from 2004, there are now plans to re-introduce a formal plan for the Portuguese purse seine fleet, not as an emergency measure, but in response to the current development of the stock.

The harvest strategy described above has not been fully and rigorously tested but practical experience has shown that it does work to achieve a reasonable control of the harvest following periods of low recruitment to the stock. Stable catches with limited inter-annual variation would appear to be an objective of both Portuguese and Spanish stakeholders.

**Score: 70**

All elements meet the SG 60 requirement and part of the SG 80 requirement is are met. However, while the elements of the harvest strategy work together towards achieving management objectives, these are not fully reflected in the target and limit reference points. A score of 70 is awarded. As this score is below 80, a condition to certification has been raised (Condition 1). Once this condition has been satisfied the score for this PI will increase to 80 or above.

**Audit Trace References**

ICES (2008a); ICES (2008b); Site Visit (November 2008).

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.2.2	Harvest control rules and tools: There are well defined and effective harvest control rules in place	Generally understood harvest control rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached. There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. The selection of the harvest control rules takes into account the main uncertainties.  Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules	Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. The design of the harvest control rules take into account a wide range of uncertainties.  Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
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**Scoring Comments**

First and foremost there is no overarching control rule based on a TAC for the two countries, Portugal and Spain, which exploit the stock in ICES Divisions VIII and IXa. There is however advice from ICES which includes predicted catch levels corresponding to the ACOM recommendations. This advice has been followed in the past by both Spain and Portugal and used to determine potential annual catch levels for each country.

Regulations imposed by Spain to control its harvest consist of fleet size and net dimension control plus a limit of 5 days at sea in the fishery with a daily landings limit of 7,000 kg per vessel. These regulations appear to have been effective in limiting the catch by Spanish vessels, which have remained consistent with the fluctuations in SSB over at least the last ten years.

The implementation and operation of the purse seine fleet management plan by Portugal, described in 1.2.1 above, has been seen to work by adequately restricting the harvest through effort control during periods of low recruitment. In the context of a fisher for short lived pelagic species, this approach appears appropriate and can be seen to have worked in maintaining SSB above a level at which there is any sign of impaired recruitment. The flexible plan is also consistent with the scale and cultural context of the fishery which supports coastal communities through high employment both at sea and on shore. The plan provides for an early response to changes in stock status in order to ensure stability and a sustainable harvest. This is strongly driven by the need to maintain regular supplies to both the fresh and canning markets and to maintain employment. However the rules to control harvest in the Portuguese fishery are not well

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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defined and operation of parts of the plan appear to be of an *ad hoc* nature, and dependant on the state of the stock. Nevertheless a traditional harvest control rule based on a rigid TAC is considered by industry, management and national fisheries scientists to be undesirable and counter-productive. Because of the special dynamics of the sardine it is recognised that a management plan requires an innovative approach which recognises current practice, rather than resorting to conventional solutions.

**Score: 70**

The fishery meets all of the 60 SG components and some of the 80 SG components wholly or in part and so a score of 70 is awarded. As this score is below 80, a condition to certification has been raised (Condition 2). Once this condition has been satisfied the score for this PI will increase to 80 or above.

**Audit Trace References**

ICES (2008a); ICES (2008b); Site Visit (November 2008).

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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1.2.3	<p><b>Information / monitoring:</b> Relevant information is collected to support the harvest strategy</p>	<p>Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.</p> <p>Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.</p>	<p>Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.</p> <p>Stock abundance and fishery 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.</p> <p>There is good information on all other fishery removals from the stock.</p>	<p>A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly relevant to the current harvest strategy, is available.</p> <p>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 the inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.</p>
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**Scoring Comments**

Distribution of sardine in the north East Atlantic covers a wide area extending from Mauritania in the south to the central North Sea in the north. It also occurs in the Mediterranean. Research has shown that, although there is a continuum in the distribution, there are distinct breaks in terms of spawning areas with separate spawning stocks identifiable. The current certification process relates to the Atlanto-Iberian stock which is distributed throughout ICES Division VIIIc and IXa. While it is accepted that there are movements of sardine into and out of this area and the extent of such movements is not known, they are not considered to be significant in terms of stock discreteness. Based on the EU directive for sampling levels, scientific sampling and monitoring of landings is carried out at all major landings ports and Spain and Portugal achieve 100% coverage in terms of sampling for length, weight, sex, age and maturity. ICES does not report any problems with biological sampling data for sardine and is confident that landings are not significantly under reported. The biological data are sufficient to provide an annual update on the age, size and sex composition of the stock. Genetic studies have also been carried out as part of the international SARDYN project on

sardine dynamics.

National biological sampling programmes provide an annual surveillance of any changes in the proportions of maturity at age and in the distribution of juvenile and mature fish. Spatial patterns in growth rates have been observed with a tendency for the larger, faster growing, populations to occur further north. There is also a tendency for older fish to migrate northwards resulting in few fish above 6 years old in Portuguese waters.

There is no clear relationship between spawning stock size and recruitment as '0' groups. The time series does however show signs of density dependant recruitment at high SSB which could be generated by the cannibalism known to occur in this species. Sardine are indeterminate spawners producing batches of vitellogenic, hydrated eggs over an extended spawning season which may last from October through to April. This information is vital for the fishery independent egg survey estimate of spawning biomass, and is obtained concurrently during the triennial egg surveys.

The composition of the Portuguese purse seine fleet which targets sardine is well described in terms of vessel size, capacity and dimensions of the net used. All the vessels are licensed to take part in the fishery and no new licences are issued although agreed exchanges can be made. Landings of sardine are well estimated from this fleet and ICES considers the landings data to be a fair reflection of the actual catch. Some sardines are taken in non targeted fisheries, mainly by trawlers which are permitted to have up to 10 % of sardine by-catch. The landings by these vessels are small and are well recorded. Similarly reliable landings data is also supplied for the Spanish fleets targeting sardine and those which take sardine as a by-catch.

Discarding of sardine is considered to be small although there are no direct observations currently available. Discarding could occur in purse seines as a result of undersized fish, quota excess and undesirable species / sizes mixtures). Modern acoustic equipment has reduced the risk of such occurrences and if too many fish are taken there is some evidence (site visit) that vessels will pass the excess over to another vessel rather than discard the catch. Recent experimental work carried out by IPIMAR in Lisbon has indicated the possibility of a high subsequent survival of sardine slipped from a purse seine provided that this is done soon after the seine has been lightly pursed. This is contrary to previous assumptions that most pursed fish will subsequently die which is still the perception within the fleet (site visit).

Fishery independent abundance estimates are available from acoustic surveys and the triennial egg survey. The acoustic surveys are carried out in both Spanish and Portuguese waters in spring and provide age disaggregated estimates of total stock biomass. Statistical estimates of the precision of the resultant estimates are calculated. The triennial egg survey carried out by Spain and Portugal covers the whole spawning area of the Atlanto-Iberian stock. The survey is carried out on the basis of the daily egg production method (DEPM) designed for species whose absolute fecundity is indeterminate. The egg survey provides an age aggregated index of spawning stock biomass and is used to tune the assessment.

There is a considerable fund of scientific knowledge about the sardine throughout its whole area of distribution generated mainly by the international SARDYN project. The project was designed to fill in the gaps in knowledge and was driven particularly by the low SSB and recruitment observed during the 1990's. As a

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result there is now a greater understanding, for example, of stock structure spatially, oceanographic influences on population mixing and the discreteness of spawning areas. The project also included genetic studies, morphometrics and otolith chemistry. Several studies have been carried out to examine the role of environmental variables in relation to sardine distribution, migration, spawning, and recruitment. Environmental effects, in relation to the high recruitment variability, tend to be weak or difficult to explain and often an apparent relationship, for example an upwelling index, eventually breaks down.

Studies have also been carried out to investigate the trophic role of sardine in the ecosystem both as a predator and prey species. The species is classified as omnivorous, feeding on a wide size range of species from phytoplankton to small zooplankton. It is also an important prey species for carnivorous fish and marine mammals in particular the common dolphin, and less commonly the harbour porpoise and other species of dolphin.

**Score: 95**

All of the SG80 components are met, one of the SG100 components is met in full, and the other SG100 is met in part, the score allocated is therefore 95.

**Audit Trace References**

Bernal *et al.* (2007); Bode *et al.* ((2004); Coombs *et al.* (2006); Garrido *et al.* (2007); Haynes and Nichols (1994); ICES (2008a); Marcola *et al.* (2006; 2008); Silva (1999); Silva *et al.* (2008); Somarakis *et al.* (2006); Stratoudakis *et al.* (2003); Stratoudakis *et al.* (2007); Zwolinski *et al.* (2001); Site Visit (November 2008).

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1.2.4	<p><b>Assessment of stock status:</b> There is an adequate assessment of the stock status</p>	<p>The assessment estimates stock status relative to reference points.</p> <p>The major sources of uncertainty are identified.</p>	<p>The assessment is appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points.</p> <p>The assessment takes uncertainty into account.</p> <p>The stock assessment is subject to peer review.</p>	<p>The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.</p> <p>The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.</p> <p>The assessment has been internally and externally peer reviewed.</p>
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**Scoring Comments**

Explicit reference points are not identified for this stock although, as explained in section 1.2.2 above, implicit reference points for biomass can be identified. Current fishing mortality is low and has not lead to an SSB at which recruitment is observed to decline. Although there are no explicit management objectives for this stock the advice provided by ICES takes the above factors into account and provides a predicted catch corresponding to that advice..

The ICES assessment working group carries out an assessment of this stock every year. A benchmark assessment was last carried out in 2005 and this was followed by annual update assessments. The 2008 assessment was an update assessment during which no data or model exploration was carried out. The next benchmark assessment is due in 2010 or 2011. The model now used for the assessment is the AMCI model (Skagen, 2005) a model integrating difficult sources of information. This is considered to be more appropriate for the sardine stock than the ICA model previously used and commonly employed for other pelagic species assessed by ICES. The assessment is based on the combined Spanish and Portuguese spring acoustic surveys (1996-2008) the DEPM egg survey series (1997,1999, 2002 and 2005) and catch at age data from the fishery from 1978-2007. The Portuguese acoustic survey in November is used to corroborate the estimate of recruitment which is generated by the assessment. The main uncertainties considered in the assessment relate to the extent of sardine migration, particularly of older fish, across the northern boundary in southern Biscay, weighting and inter-calibration of the Spanish and Portuguese acoustic surveys and

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the selection of the older age groups in the fishery. Statistical estimates of the precision of egg survey estimates of SSB are incorporated into the assessment model.

The working group's annual assessment is reviewed internally by ACOM and rigorously scrutinised by experts on that committee before advice is issued on the status of the stock. That advice is in turn reviewed by the scientific and technical committee of the EU (STECF). The 2007 working group report was also reviewed by a special ICES review group which made recommendations for the next benchmark assessment.

The 2007 assessment reported that landings had increased slightly from 87,023 mt in 2006 to 94,469 mt in 2007. There was a consequent increase in fishing mortality, based on age groups 2 - 5, from  $F = 0.18$  in 2006 to  $F = 0.21$  in 2007 which remains low in a historical context. SSB was also seen to decrease from 570,000 mt in 2006 to 526,000 mt in 2007 driven by low recruitment since 2004. Results from the 2008 assessment are comparable with the previous year and statistical analysis does not indicate any serious concerns regarding the validity of the current input data. SSB is predicted to further decrease by 30 % in 2009 based on fishing mortality observed in 2007. Statistical analysis of 100 replicates, using the bootstrapping technique, shows that both SSB and F are estimated with reasonable and consistent precision. Retrospective analysis of the estimates of SSB and F show reasonable agreement although SSB in 2007 was 8 % lower than the predicted value with F being 8 % higher.

ACOM advise that a long term management plan for this stock would result in improved management. Any plan would have to take due account of the observed recruitment dynamics of this species and its effect on fluctuating SSB levels and provide adequate protection for the stock. A formal plan, which is flexible enough to take into account these natural fluctuations, would prove useful in stabilising catches

**Score: 90**

All of SG80 components are met and all of the SG100 components are met entirely or in part. A score of 90 is therefore allocated.

**Audit Trace References**

ICES (2008a); ICES (2008b).

<b>SCORING CRITERIA</b>	<b>SCORING GUIDEPOST 60</b>	<b>SCORING GUIDEPOST 80</b>	<b>SCORING GUIDEPOST 100</b>
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<b>Principle 2</b>	<b>Fishing operations should 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</b>		
<b>2.1</b>	<b>Retained non-target species</b>		
<b>2.1.1</b>	<p><i>Status:</i> The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species.</p>	<p>Main retained species are likely to be within biologically based limits or if outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species.</p> <p>If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery.</p>	<p>Main retained species are highly likely to be within biologically based limits, or if outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding.</p>
			<p>There is a high degree of certainty that retained species are within biologically based limits.</p> <p>Target reference points are defined and retained species are at or fluctuating around their target reference points.</p>

**Scoring Comments**

Only two of the non target species contribute > 5% to total retained landings - chub mackerel (*Scomber japonicas*) and horse mackerel (*Trachurus trachurus*). However, while the retained by-catch of anchovy (*Engraulis encrasicolus*) is below 5 % it should be considered as a main retained species because of the present stock management issues. Landings of horse mackerel and anchovy are in line with ICES recommendations. While official reference points for either SSB or F are not defined for these two stocks, implied generic limit reference-point are based on the average amount of landings in pre-defined years. Presently, there are no catch quotas for the main retained species (chub mackerel) and it is assumed that the stock is growing. There is no evidence that the by-catch in the sardine fishery is causing serious or irreversible harm to the sustainability of horse mackerel and anchovy stocks.

**Score: 80**

The SG80 component is met. While there is no evidence of the fishery causing serious or irreversible harm to the three stocks, this is not known with a high degree of certainty. In addition, target reference points are not defined for any of the three main retained species. A score of 80 is therefore allocated.

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<b>Audit Trace References</b>
ICES 2007; ICES 2008b, Stratoudakis & Marçalo 2002, Site Visit (November 2008).

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2.1.2	<p><b>Management strategy:</b> There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species.</p>	<p>There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a partial strategy in place, if necessary that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding.</p> <p>There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.</p> <p>There is some evidence that the partial strategy is being implemented successfully.</p>	<p>There is a strategy in place for managing retained species.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work.</p> <p>There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring.</p> <p>There is some evidence that the strategy is achieving its overall objective.</p>
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**Scoring Comments**

Permitted by-catch levels in the sardine purse seine fishery are subject to regulation that allows for a maximum of 20 %. While at the present time there is no formal management plan in place for the sardine fishery, it is clear that the harvest strategy is based on the practical experience of the performance of the fishery. The vessel-licensing scheme demonstrably limits effort and exercises firm control over any retained species landings. As with sardines, landings of by-catch species are driven mainly by market demand in the context of availability and management measures.

**Score: 80**

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All SG80 components are met due to the partial strategy (practical experience of managing the fishery) and given experience to date there is confidence that this will work and it has been implemented successfully. A score of 80 is therefore allocated.

**Audit Trace References**

ICES 2007; ICES 2008b, Stratoudakis & Marçalo 2002, Site Visit (November 2008);

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<p><b>2.1.3</b></p>	<p><b>Information monitoring:</b> Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species.</p>	<p>Qualitative information is available on the amount of main retained species taken by the fishery.</p> <p>Information is adequate to qualitatively assess outcome status with respect to biologically based limits.</p> <p>Information is adequate to support measures to manage main retained species.</p>	<p>Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.</p> <p>Information is sufficient to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a partial strategy to manage main retained species.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).</p>	<p>Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.</p> <p>Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.</p> <p>Information is adequate to support a comprehensive strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.</p> <p>Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.</p>
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**Scoring Comments**

Both DOCAPESCA and POs currently record landings of by-catch species with this data sent daily to the General Directorate of Fisheries and Aquaculture (DGPA) that discounts the quantities against established quotas. This information is used when assessing fishing mortality on the by catch species. The

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distribution and ecology of the main retained species is well established and monitored by the IPIMAR. The monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species, but the lack of reference points for the by-catch species creates difficulties in verifying the consequences for the status of the affected populations. In accordance with the Data Collection Regulation (DCR), since 2004-2005 purse seine is one of the gears with on-board observers. It is recommended that a greater effort should be implemented in respect to on-board observers.

**Score: 85**

Therefore, all the SG80 components are met and a one at the SG100 level. The score allocated is therefore 85.

**Audit Trace References**

ICES 2007; ICES 2008b, Stratoudakis & Marçalo 2002, Site Visit (November 2008).

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<b>2.2</b>	<b>Discarded species (also known as “bycatch” or “discards”)</b>		
<b>2.2.1</b>	<p><i>Status</i> The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups.</p>	<p>Main bycatch species are likely to be within biologically based limits, or if outside such limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.</p> <p>If the status is poorly known there are measures or practices in place that are expected result in the fishery not causing the bycatch species to be biologically based limits or hindering recovery.</p>	<p>Main bycatch species are highly likely to be within biologically based limits or if outside such limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.</p> <p>There is a high degree of certainty that bycatch species are within biologically based limits.</p>

**Scoring Comments**

As a result of technological improvements that allow a more precise recognition of the potential catch, purse-seine fisheries targeting sardines are becoming highly mono-specific. Nevertheless incidental capture of other species does occur. While market demand for by-catch species reduces the need to discard, some does occur in years of high productivity, especially for chub mackerel (*Scomber japonicas*). Most discards take place through slipping i.e. the fish is released before being taken on-board. There is no data on the survival of discarded by-caught fish. Boat captains assume high mortality rates.

Pelagic crab (*Polybius henslowi*) is the only by-catch species that is never landed. The major part of the catch of this species is discarded alive and there is an expected high survival rate.

**Score: 80**

Given the mono-specific nature of the purse seiner operation, the limited amount of discards and the current status of chub mackerel it is considered that the fishery meets the single element of SG80

**Audit Trace References**

Stratoudakis & Marçalo 2002; Site Visit (November 2008).

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2.2.2	<p><b>Management strategy:</b> There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations.</p>	<p>There are measures in place, if necessary, which are expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.</p> <p>The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a partial strategy in place, if necessary, for managing bycatch that is expected to maintain main bycatch species at levels which are highly likely to be within biologically based limits or to ensure that the fishery does not hinder their recovery.</p> <p>There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or the species involved.</p> <p>There is some evidence that the partial strategy is being implemented successfully.</p>	<p>There is a strategy in place for managing and minimising bycatch.</p> <p>The strategy is mainly based on information directly about the fishery and/or species involved, and testing supports high confidence that the strategy will work.</p> <p>There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.</p>
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**Scoring Comments**

Presently, by-catch levels are clearly defined by regulations governing sardine and purse-seine fisheries, with the maximum proportion of retained by-catch being 20%. The sardine fishery targets only pelagic species with fishing effort related to market demand. Only pelagic crabs are discarded alive. However, this cannot be regarded as a full strategy as there is no indication of the mitigating measures that may be taken if concern arises about the status of the stock of the by-catch species. Neither is the strategy based on information directly about the fishery, rather it is a “blanket” regulation. Given that the by-catch stocks appear to be healthy there is some evidence to suggest that this partial strategy is being implemented successfully.

**Score: 80**

Therefore, all of the SG80 components are met and the score allocated is 80.

<b>SCORING CRITERIA</b>	<b>SCORING GUIDEPOST 60</b>	<b>SCORING GUIDEPOST 80</b>	<b>SCORING GUIDEPOST 100</b>
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<b>Audit Trace References</b>
Stratoudakis & Marçalo 2002, Site Visit (November 2008).

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<p><b>2.2.3</b></p>	<p><b>Information monitoring</b></p> <p>Information on the nature and amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch.</p>	<p>Qualitative information is available on the amount of main bycatch species affected by the fishery.</p> <p>Information is adequate to broadly understand outcome status with respect to biologically based limits.</p> <p>Information is adequate to support measures to manage bycatch.</p>	<p>Qualitative information and some quantitative information are available on the amount of main bycatch species affected by the fishery.</p> <p>Information is sufficient to estimate outcome status with respect to biologically based limits.</p> <p>Information is adequate to support a partial strategy to manage main bycatch species.</p> <p>Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy).</p>	<p>Accurate and verifiable information is available on the amount of all bycatch and the consequences for the status of affected populations.</p> <p>Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.</p> <p>Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective.</p> <p>Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.</p>
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**Scoring Comments**

Through observer-based studies, log books and landings data in addition to experience in the fishery, a level of qualitative and quantitative information is available on the amount of main bycatch species affected by the fishery, although the level of discards is uncertain. Such information is sufficient to estimate outcome status with respect to biologically based stocks and provide support for a partial strategy. The data that continues to be collected is sufficient to detect any increased risk to the main by-catch species. However, given uncertainty about discards it cannot be considered that there is accurate and verifiable information available on the amount of by-catch, and this does not allow a high degree of certainty on other SG 100 components. Currently, it is not possible to

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assess on-going mortalities to all by-catch species.

**Score: 80**

Therefore, all of the SG80 components are met and the score allocated is therefore 80.

**Audit Trace References**

Stratoudakis & Marçalo 2002, Site Visit (November 2008).

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>2.3</b>	<b>Endangered, Threatened and Protected (ETP) species</b>			
<b>2.3.1</b>	<p><b>Status:</b> The fishery meets national and international requirements for protection of ETP species.</p> <p>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.</p>	<p>Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.</p> <p>Known direct effects are unlikely to create unacceptable impacts to ETP species.</p>	<p>The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species.</p> <p>Direct effects are highly unlikely to create unacceptable impacts to ETP species.</p> <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p>	<p>There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species.</p> <p>There is a high degree of confidence that there are no significant detrimental effects (direct and indirect) of the fishery on ETP species.</p>

**Scoring Comments**

Cetaceans. Some by-catch events are reported by observers, inquiry programs and by voluntary declaration schemes. The mortality associated with by-catch events is low and frequently all by-caught animals survive. In comparison to other fisheries, the purse-seine has very few impacts and removal rates are below the PBR set at 2% of the Iberian populations.

Marine birds. The lack of a PBR for seabirds does not allow for full identification and evaluation of any potential issue. Inquiries, independent observers and voluntary declaration of by-catch are already in place in some POs. Data remains scarce, but by-catch associated with mortality seems to be low. The level of by-catch produced by purse seiners compared with that by other fisheries or due to ghost fishing seems to be low. Unusual events are associated with purse seiners especially during net washing procedures but impacts recorded until now are not considered unacceptable. Munilla *et al* (2007) hypothesised that fisheries might have produced indirect impacts on the Portuguese guillemots breeding population. However, this hypothesis was based on a high level of uncertainty and should be considered unlikely to create unacceptable impacts.

Marine Turtles. There is no evidence or report of a by-catch event associated with sardine fisheries using purse-seiners.

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Threatened marine species. There is no evidence of any by-catch of threatened marine species (such as basking sharks).

It is recommended that a greater nationwide effort should be implemented as regards on-board observers to evaluate by-catch of ETP species. Present efforts are geographically restricted and in cooperation with only a few POs.

**Score: 80**

Cetaceans. The main impact of the UoC is on common dolphin; there is limited potential for interaction with other cetaceans. Concerning common dolphin it is considered that it meets all three elements of SG80.

Marine Birds. Given the lack of information, the UoC meets the first element of SG60 but as neither direct or indirect effects are highly unlikely to have unacceptable impacts, the UoC also meets the second and third elements of SG80 – leading to an overall “score” of 70.

Marine Turtles. For these species the UoC meets the two elements of SG 100.

This provides for an overall score of 80.

**Audit Trace References**

Bragança 2007, Cabral *et al* 2005, Ferreira 2007, IWC 1995, López *et al.* 2002, López (2003), López *et al.* (2003), Munilla *et al* (2007), Petronilho *et al* 2004, Silva & Sequeira 2003, Ramírez *et al.* 2008, Wise *et al* 2007, Scans report (<http://biology.st-andrews.ac.uk/scans2/index.html>), Site Visit (November 2008).

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<p><b>2.3.2</b></p>	<p><b>Management strategy</b></p> <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> <li>- meet national and international requirements;</li> <li>- ensure the fishery does not pose a risk of serious or irreversible harm to ETP species;</li> <li>- ensure the fishery does not hinder recovery of ETP species; and</li> <li>- minimise mortality of ETP species.</li> </ul>	<p>There are measures in place that minimise mortality, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>The measures are considered likely to work, based on plausible argument (eg general experience, theory or comparison with similar fisheries/species).</p>	<p>There is a strategy in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, that is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</p> <p>There is an objective basis for confidence that the strategy will work, based on some information directly about the fishery and/or the species involved.</p> <p>There is evidence that the strategy is being implemented successfully.</p>	<p>There is a comprehensive strategy in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, that is designed to achieve above national and international requirements for the protection of ETP species.</p> <p>The 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.</p> <p>There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is evidence that the strategy is achieving its objective.</p>
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**Scoring Comments**

Portugal has ratified a number of conventions on species protection and management, including the Convention on Biological Diversity, Bern, Bonn and CITES Conventions, which establish overarching objectives for ETP species conservation. Furthermore, the Portuguese Red Data Book List was recently reviewed. If issues relating to ETP species were to be identified, various mechanisms are available internationally and within EU jurisdiction to initiate proper action. These include: (i) ASCOBANS that sets the 1.7 % maximum allowed removal rate for harbour porpoises; (ii) the EC Habitats Directive that provides protection for key habitats and species; (iii) Biodiversity Action Plans that provide action plans for the protection of key and threatened species and habitats; and (iv) the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area.

Therefore the fishery needs only to continue *status quo* management operations to continue to have no impact (FAM v1 7.1.26).

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<b>Score: 80</b>
Therefore all the SG80 components are met.
<b>Audit Trace References</b>
Bragança 2007, Cabral <i>et al</i> 2005, Ferreira 2007, IWC 1995, López <i>et al.</i> 2002, López (2003), López <i>et al.</i> (2003), Munilla <i>et al</i> (2007), Petronilho <i>et al</i> 2004, Silva & Sequeira 2003, Wise <i>et al</i> 2007, Scans report ( <a href="http://biology.st-andrews.ac.uk/scans2/index.html">http://biology.st-andrews.ac.uk/scans2/index.html</a> ); Site Visit (November 2008).

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<p><b>2.3.3</b>     <i>Information monitoring</i> /</p> <p>Relevant information is collected to support the management of fishery impacts on ETP species, including:</p> <ul style="list-style-type: none"> <li>- information for the development of the management strategy;</li> <li>- information to assess the effectiveness of the management strategy; and</li> <li>- information to determine the outcome status of ETP species.</li> </ul>	<p>Information is adequate to broadly understand the impact of the fishery on ETP species.</p> <p>Information is adequate to support measures to manage the impacts on ETP species</p> <p>Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.</p>	<p>Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts.</p> <p>Sufficient data are available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.</p>	<p>Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.</p> <p>Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.</p> <p>Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species</p>
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**Scoring Comments**

Marine mammals. The ICNB and some organizations maintain a stranding network that produces information on the level of by-catch in Portuguese waters. In addition to this network, the SafeSea Project is evaluating the level of by-catch using inquiries, independent observers and a voluntary declaration mechanism. With respect to abundances, a major international survey was conducted in 2005 (SCANS II) to estimate those of harbour porpoises and other small cetaceans. Portuguese waters were included in this survey for the first time. A large-scale monitoring program (SafeSea) is presently estimating abundances of cetaceans in Portuguese coastal waters, using methodologies similar to those used in SCANS II.

Marine birds. Different research teams and organizations monitor marine birds. Marine IBAs are already identified and soon will be publicly presented by SPEA. SPAs are under evaluation. A comprehensive monitoring programme for seabirds based on ship surveys will be maintained by SPEA in cooperation with

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IPIMAR and other organizations. The SafeSea Project will perform more localized surveys in cooperation with some POs. Trophic ecology studies in marine birds and evaluation of their relation with fish stocks are being initiated.

Marine turtles. Presently, there is a lack of monitoring projects in Portuguese coastal waters. Mortality and incidental by-catch are being evaluated based on stranding surveillance programmes and voluntary declaration programs with some POs.

Other species (e.g. sharks). Presently, there are no monitoring projects in Portuguese coastal waters.

Accordingly, the majority of ETP species that may interact directly or indirectly with the fishery are identified. Independent organizations (sometimes in cooperation with POs) monitor their populations and threats to them. In addition, the measures necessary to promote their conservation are presently identified.

Given the status of the various initiatives, information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species, and if so, to measure trends and support a full strategy to manage impacts. However, as yet one cannot state that there would be a high degree of certainty in quantitative estimates. Similarly, as yet there is not a high degree of certainty that information is adequate to support a comprehensive strategy with associated evaluation. Nor can it be claimed that there is verifiable information on ALL impacts. Additionally, Portugal does not send participants to the ICES SGBYC and does not send data on bycatches of protected species to SGBYC.

**Score: 80**

Therefore, all of the SG80 components are met and the score allocated is therefore 80.

**Audit Trace References**

Bragança 2007, Cabral *et al* 2005, Ferreira 2007, IWC 1995, López *et al.* 2002, López (2003), López *et al.* (2003), Munilla *et al* (2007), Petronilho *et al* 2004, Silva & Sequeira 2003, Ramírez *et al.* 2008, Wise *et al* 2007, Scans report (<http://biology.st-andrews.ac.uk/scans2/index.html>), Site Visit (November 2008).

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2.4	<b>Strategies have been developed within the fisheries management system to address and restrain any significant negative impacts of the fishery on the ecosystem</b>		
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2.4.1	<i>Status</i> The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
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**Scoring Comments**

The only impacts of the gear are produced on the water column and assessment (Stratoudakis *et al.*, 2003b) considered these to be low. Permanent loss of purse seine gear is not common and ghost fishing is not an issue. Critical and important habitats for sardines and ETP marine species are presently being assessed and a low impact of sardine purse-seiners on such habitats is assumed. On that basis it is considered that there is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.

**Score: 100**

Therefore, all the SG100 components are met and a score of 100 allocated.

**Audit Trace References**

Stratoudakis *et al.*, 2003b, SPEA (2008); Site Visit (November 2008).

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<p><b>2.4.2</b></p>	<p><b>Management strategy</b></p> <p>There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types.</p>	<p>There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.</p> <p>The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats).</p>	<p>There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.</p> <p>There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or habitats involved.</p> <p>There is some evidence that the partial strategy is being implemented successfully.</p>	<p>There is a strategy in place for managing the impact of the fishery on habitat types.</p> <p>The strategy is mainly based on information directly about the fishery and/or habitats involved, and testing supports high confidence that the strategy will work.</p> <p>There is clear evidence that the strategy is being implemented successfully, and intended changes are occurring. There is some evidence that the strategy is achieving its objective.</p>
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**Scoring Comments**

Presently, the regulations governing sardine and purse-seine fisheries impose a restriction on fishing areas. This fishery is prohibited within ¼ of mile of the shore and in depths below 20 m. Consequently, the risk of potential negative impact is significantly decreased.

Accordingly the strategy for managing the impact of the fishery on habitat types is to maintain the *status quo*. Such a strategy is based on the real character of the fishery. Given the lack of impact the evidence suggests that the strategy is achieving its objectives.

**Score: 100**

Therefore, all the SG100 components are met and a score of 100 allocated.

**Audit Trace References**

Stratoudakis *et al.*, 2003b; Site Visit (November 2008).

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<p><b>2.4.3</b></p>	<p><b>Information monitoring</b> /</p> <p>Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types.</p>	<p>There is a basic understanding of the types and distribution of main habitats in the area of the fishery.</p> <p>Information is adequate to broadly understand the main impacts of gear use on the main habitats, including spatial extent of interaction.</p>	<p>The nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery.</p> <p>Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear.</p> <p>Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p>	<p>The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.</p> <p>Changes in habitat distributions over time are measured.</p> <p>The physical impacts of the gear on the habitat types have been quantified fully.</p>
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**Scoring Comments**

Purse seine have limited to no impact on habitat, accordingly it may be considered that the nature, distribution and vulnerability of all main habitat types in the fishery area are known at a level of detail relevant to the scale and intensity of the fishery and sufficient data is available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent, timing and location of use of the fishing gear. The physical impacts of the gear on the habitat types have been quantified fully.

**Score: 90**

Therefore, all the SG80 components are met and one of SG100. Accordingly a score of 90 allocated.

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<b>Audit Trace References</b>
Stratoudakis <i>et al.</i> , 2003b; Site Visit (November 2008).

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<b>2.5</b>	<b>Ecosystem</b>			
<b>2.5.1</b>	<p><i>Status</i> The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function.</p>	<p>The fishery is <u>unlikely</u> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>	<p>The fishery is <u>highly unlikely</u> to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.</p>	<p>There is <u>evidence</u> that the fishery 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.</p>

**Scoring Comments**

The importance of sardines in Iberian water trophic chain is well established. The key impact is considered to be the removal of target species biomass. Based on historical data, there is some uncertainty on possible trophic impacts upon marine birds and other ETP species, but highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible damage. It is recommended that in the future some research and monitoring programs dedicate their efforts to understanding possible impacts of pelagic fish dynamics upon ETP species.

**Score: 80**

SG80 is fully achieved. There is no evidence to support the SG100 due to the lack of fully detailed studies and the complexity in understanding the data already available. A score of 80 is allocated.

**Audit Trace References**

Munilla *et al* 2007, Silva 1999; Site Visit (November 2008).

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<p><b>2.5.2</b></p>	<p><b>Management strategy</b></p> <p>There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function.</p>	<p>There are measures in place, if necessary, that take into account potential impacts of the fishery on key elements of the ecosystem.</p> <p>The measures are considered likely to work, based on plausible argument (eg, general experience, theory or comparison with similar fisheries/ecosystems).</p>	<p>There is a partial strategy in place, if necessary, that takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.</p> <p>The partial strategy is considered likely to work, based on plausible argument (eg, general experience, theory or comparison with similar fisheries/ecosystems).</p> <p>There is some evidence that the measures comprising the partial strategy are being implemented successfully.</p>	<p>There is a strategy that consists of a plan, containing measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</p> <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p> <p>The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.</p> <p>There is evidence that the measures are being implemented successfully.</p>
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**Scoring Comments**

The partial strategy is implemented through plans that have brought about a significant effort reduction. Historically, catch has been below the maximum level attainable within the context of MSY and in turn this has restrained the impact of the fishery on the ecosystem. Based on experience in other fisheries this strategy is considered likely to work and the policy is being implemented successfully. There is, as yet, no indication that a full strategy is in development. The fishery needs to continue *status quo* management operations to limit impact.

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<b>Score: 85</b>
The SG80 components are all met, and one of the SG100 components, and so a score of 85 is allocated
<b>Audit Trace References</b>
Site Visit (November 2008).

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<p><b>2.5.3</b></p>	<p><b><i>Information monitoring</i></b> /</p> <p>There is adequate knowledge of the impacts of the fishery on the ecosystem.</p>	<p>Information is adequate to identify the key elements of the ecosystem (e.g. trophic structure and function, community composition, productivity pattern and biodiversity).</p> <p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.</p>	<p>Information is adequate to broadly understand the functions of the key elements of the ecosystem.</p> <p>Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, but may not have been investigated in detail.</p> <p>The main functions of the Components (i.e. target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.</p> <p>Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.</p> <p>Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p>	<p>Information is adequate to broadly understand the key elements of the ecosystem.</p> <p>Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.</p> <p>The impacts of the fishery on target, Bycatch, Retained and ETP species and Habitats are identified and the main functions of these Components in the ecosystem are understood.</p> <p>Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.</p> <p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p>
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<b>Scoring Comments</b>
The position of sardines within the food web is reasonably well described and the amount of studies addressing this subject is growing. The main functions of the various components in the ecosystem are known and sufficient information is available on their impacts on the fishery. The main impact of the fishery on key ecosystem elements may be inferred from existing information. However, this data needs to be fully integrated in order to understand how the whole ecosystem is functioning (multi-species modelling is needed). A strategy based on maintaining the <i>status quo</i> is considered sufficient. Adequate monitoring information has been obtained to support the development of strategies to manage ecosystem impacts.
<b>Score: 85</b>
All of the SG80 components and one of the SG100 components are met. A score of 85 is awarded.
<b>Audit Trace References</b>
Site Visit (November 2008).

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<b>Principle 3</b>	<b>The fishery is subject to an effective management system that respects local, national and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable</b>			
<b>3.1</b>	<b>Governance and Policy</b>			
<b>3.1.1</b>	<p><b>Legal and/or customary framework</b></p> <p>The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> <li>- Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2;</li> <li>- Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and</li> <li>- Incorporates an</li> </ul>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.</p> <p>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.</p> <p>The management system has a mechanism to generally respect the legal rights created explicitly or</p>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>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 that is appropriate to the context of the fishery.</p> <p>The management system or fishery is attempting to comply in a timely fashion with binding judicial decisions arising from any legal challenges.</p> <p>The management system has a mechanism to observe the legal rights created explicitly or established by</p>	<p>The management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.</p> <p>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 tested and proven to be effective.</p> <p>The management system or fishery acts proactively to avoid legal disputes or rapidly implements binding judicial decisions arising from legal challenges.</p> <p>The management system has a mechanism to formally commit to the legal rights created explicitly or</p>

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	appropriate dispute resolution framework.	established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	established by custom on people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
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**Scoring Comments**

Management of the stock falls under the jurisdiction of the EU and Portuguese national authorities.

The EC approach to fisheries management system follows the 1995 FAO Code of Conduct for Responsible Fisheries which sets out the principles and international standards of behaviour for responsible practices with a view to ensuring the effective conservation, management and development of living aquatic resources, with due respect for the ecosystem and biodiversity. In addition, the EC is a signatory to other international conventions related to the fishing sector including ratification of the UNCLOS. It is a member of 11 international organisations, while having observer status on three others. The Portuguese sardine fishery itself is consistent with EU regulations that are incorporated into Portuguese national legislation and the base regulation (Decree – Law 383 / 1998) explicitly refers to the FAO Code of Conduct.

Under this system fisheries management is explicit in guiding fishers’ activity: licensing regulates who can fish; gear restrictions impact how they can fish; catch limits stipulate how much they may fish; and closed areas define where they may fish. There is a clear allocation of responsibilities within the management system and the sanctions for infractions of the regulations are clearly established. In sum, the management system is generally consistent with local, national or international laws or standards that are aimed at achieving sustainable fisheries in accordance with MSC Principles 1 and 2.

The audit team is not aware of any disputes that have arisen in the Portuguese fisheries. However, with EU legislation formally enacted through primary and secondary legislation it is anticipated that disputes may be resolved through the Portuguese national courts. In the end resort, parties may take legal action through the Council of Ministers in the European Court of Justice. It is the case that the Portuguese authorities look to be proactive in the resolution of disputes and thus potential conflicts are resolved before they reach the courts.

There are no questions or issues within an assessment about the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

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Score: 100
On the basis of the foregoing, the fishery meets all four elements that comprise SG100 and a score of 100 is allocated.
Audit Trace References
Site visit meetings; FAO Code of Conduct for Responsible Fisheries; <a href="http://www.europarl.europa.eu/factsheets/4_2_4_en.htm">http://www.europarl.europa.eu/factsheets/4_2_4_en.htm</a> ; Ministry of Agriculture, Rural Affairs and Fish Decreto-Lei n.º 383/98 (November 27, 2003).

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<p><b>3.1.2</b></p>	<p><b>Consultation, roles and responsibilities</b></p> <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>	<p>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.</p> <p>The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.</p>	<p>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.</p> <p>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.</p> <p>The consultation process provides opportunity for all interested and affected parties to be involved.</p>	<p>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.</p> <p>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.</p> <p>The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.</p>
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**Scoring Comments**

The management process comprises the well defined interaction of a number of factors:

- the European Union which (i) establishes policy on issues ranging from conservation to structural financial aid; (ii) monitors performance; and (iii) sets quotas on advice from STECF,
- the Government of Portugal that (i) implements EU regulations with changes to its own national legislation as required; (ii) administers the different fisheries; (iii) is responsible for MCS; (iv) negotiates with other countries on trans – boundary stocks; (v) reports to Brussels on its actions, procedures and results; (vi) supports the research efforts needed to undertake stock evaluations (mainly, but not exclusively, IPIMAR); and (vii) establishes policy for other areas cross cutting with the fisheries sector e.g. environment, spatial planning, regional development, social issues and gender.

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- Stakeholders mainly belonging to a number of POs grouped together in the umbrella organisation ANOPCERCO that implement formal Portuguese management measures as well as having their own internal regulations that are mainly driven by market conditions; and
- ICES has responsibility for evaluating fish stocks in cooperation with national scientists in order to present specific advice through ACOM to STECF.

The functions, roles and tasks of each are explicitly defined and well understood for all areas of responsibility and interaction.

As a general observation, over recent years stakeholder consultation has become one of the pivotal points of EC policy. The formation of the AFCM and RACs by Council Regulation (EC) No 2371 / 2002 formalised consultative procedures at the Community level. An example of the level of consultation is the EC request for inputs on development of the modernised CFP to be established from 2012 through the recently released green paper. There have been issues on the final policy outcomes of some EC fisheries legislation, e.g. ENGOs regarding the compatibility of Council Regulation (EC) No 2371 / 2002 with Natura 2000. The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

At the national level, the Portuguese fisheries administration seeks to consult with stakeholders at all levels of the decision making process, especially in the development of management measures. There are examples of management measures being adapted to local conditions (e.g. closed season, fishing days and closed areas). Consultation is both formal and informal, with regular meetings between the fisheries administration and research institutes with relevant stakeholders. In sum, there is wide debate on fisheries policy and the consideration of stakeholder views is explicit. Accordingly, the consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.

**Score: 100**

On the basis of the foregoing, this PI meets the three elements that comprise SG 100; accordingly a score of 100 is allocated.

**Audit Trace References**

Site visit meetings; EU: [http://ec.europa.eu/fisheries/cfp\\_en.htm](http://ec.europa.eu/fisheries/cfp_en.htm); EU: Council Regulation (EC) 2371 / 2002; MADRP - DGPA July 2007 Plano Estratégico Nacional para a Pesca 2007 -13; MADRP - DGPA July 2007 Programa Operacional Pesca 2007 -13; Ministry of Agriculture, Rural Affairs and Fish Decreto-Lei n.º 383/98 (November 27, 2003); Ministry of Agriculture, Rural Affairs and Fish Regulation # 1423-A/2003 (December 31, 2003); Ministry of Agriculture, Rural Affairs and Fish Regulation # 184/2003 (February 21, 2003); OECD Country Note on National Fisheries Management Systems: Portugal [www.oecd.org/dataoecd/10/8/34431028.pdf](http://www.oecd.org/dataoecd/10/8/34431028.pdf)

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3.1.3	<p><b>Long term objectives</b></p> <p>The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach.</p>	<p>Long-term objectives to guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are implicit within management policy.</p>	<p>Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy.</p>	<p>Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.</p>
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**Scoring Comments**

EU fisheries policy has clear long term objectives based on the FAO Code for Responsible Fishing that are consistent with MSC Principles and Criteria and the precautionary approach. So much is clear from the preamble to Council Regulation (EC) No 2371 / 2002. The issue with EC fisheries is not so much the policy – rather its practical application and the success achieved in meeting objectives across the whole range of fisheries found in the waters of EU MS and in international waters fished by vessels flagged in EU MS. As pointed out by the Green Paper the current reality in EU fisheries is “overfishing, fleet overcapacity, heavy subsidises, low economic resilience and decline in the volume of fish caught by European fishermen. The current CFP has not worked well enough to prevent those problems”.

As noted in Decree-Law No. 383/98, the Portuguese Constitution confers upon the State the responsibility to promote the rational use of natural resources by protecting renewal capacity and ecological stability, in compliance with the principle of intergenerational solidarity (article 66.º, n.º 2, line d). OECD reports “because data are inadequate, with no scientific studies to back up the various management options, resource management over the past few years has been governed by the precautionary approach”.

The overall objectives of Portuguese fisheries policy are encapsulated in the National Strategy document (2007) required from MS as part of the application for EFF funds.

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<b>Score: 80</b>
<p>On the basis of the foregoing, and given that this performance indicator deals <i>only</i> with the high or broad management policy, the auditors conclude that clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy. The score allocated is 80.</p>
<b>Audit Trace References</b>
<p>FAO: FAO Code of Conduct for Responsible Fisheries <a href="http://www.fao.org/fishery/ccrf/2/en">http://www.fao.org/fishery/ccrf/2/en</a>; EU: Council Regulation (EC) 2371 / 2002; MADRP - DGPA July 2007 Plano Estratégico Nacional para a Pesca 2007 -13; MADRP - DGPA July 2007 Programa Operacional Pesca 2007 -13; Ministry of Agriculture, Rural Affairs and Fish Decreto-Lei n.º 383/98 (November 27, 1998); Ministry of Agriculture, Rural Affairs and Fish Regulation # 1423-A/2003 (December 31, 2003); Ministry of Agriculture, Rural Affairs and Fish Regulation # 184/2003 (February 21, 2003); OECD Country Note on National Fisheries Management Systems: Portugal <a href="http://www.oecd.org/dataoecd/10/8/34431028.pdf">www.oecd.org/dataoecd/10/8/34431028.pdf</a></p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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3.1.4	<p><b>Incentives for sustainable fishing</b></p> <p>The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing.</p>	<p>The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2.</p>	<p>The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that negative incentives do not arise.</p>	<p>The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.</p>
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**Scoring Comments**

Current Portuguese policy is not in favour of transferable rights in fisheries due to concern about the possible social and regional implications of a potential concentration in ownership. Despite the lack of IVQs, it may be considered that the management practised engenders a sense of ownership in the resources and provides an incentive to Portuguese fishermen to nurture the stocks to provide long term sustainability. The stewardship is exemplified by the effectiveness of PO regulations that limit the days at sea and landings on any particular day. At the same time, it should be noted that such positive behaviour is largely a response to market conditions as opposed to concern over the strength of stocks. Equally though, in the past when the Portuguese administration has responded to concern about the resource, the majority of fishers have supported the prescribed measures.

The level of research conducted by IPIMAR has led to a positive benefit to fishers who are better informed of the status of the stocks and the reasons behind any changes in policy, with consideration of a number of options. Informed decision taking provides the basis for a workable mechanism designed to better manage the resource. Fishers themselves feel they are more broadly involved in the management process.

As a MS of the EU the Portuguese fishing sector is able to receive financial aid under various structural packages – formerly FIFG that was replaced in 2007 by the EFF. As acknowledged in the Green Paper in the past such financial aid including state measures “often contradicts with CFP objectives, in particular the need to reduce overcapacity, and has sometimes appeared as compounding structural problems rather than helping to solve them”. As the Green Paper goes on to note “The 2002 reform of the CFP made important progress in the right direction by removing some of the financial support that directly contributed to over capacity and over investment”. Total Portuguese spending on the fisheries sector under the EFF regulation will amount to €325 million over the 7 years of the

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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programme with €67 million allocated to Priority Axis 1 i.e. “measures are particularly aimed at permanent cessation of activity of fishing vessels, improvements of safety on board, working conditions, product quality, energy efficiency, the selectivity of fishing gear and facilitating the entry of young fishers into the sector”. The Portuguese government, in common with other EU MS has allowed some fuel subsidies with relief from excise tax.

Under the EU system, MS are required to regularly review management policy to ensure that they do not contribute to unsustainable fishing practices. Most notable is the annual review by ICES of the sardine stocks in Divisions VIIIc and IXa that includes sections on management objectives and management considerations. However, the auditors are unaware of any approach that explicitly considers incentives in a regular review of management policy or procedures to ensure that they do not contribute to unsustainable fishing practices.

**Score: 90**

On the basis of the foregoing, the fishery achieves all of SG 80 and part of SG 100. The allocated score is therefore 90.

**Audit Trace References**

[http://ec.europa.eu/fisheries/press\\_corner/press\\_releases/2008/com08\\_04\\_en.htm](http://ec.europa.eu/fisheries/press_corner/press_releases/2008/com08_04_en.htm); EU COM(2009)163 final Green Paper Reform of the Common Fisheries Policy; ICES (2008b). ICES Advise 2008, Book 7; MADRP - DGPA July 2007 Programa Operacional Pesca 2007 -13

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>3.2</b>	<b>Fishery- specific management system</b>			
<b>3.2.1</b>	<b>Fishery- specific objectives</b> The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's 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's 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's management system.

**Scoring Comments**

As pointed out by ICES, there are no management objectives for this stock and there is no TAC. While Portuguese regulations (e.g. No. 281B / 1998 and No. 236 / 2000) established fairly extensive management measures, these were in response to a potentially critical stock situation for sardine and were not part of an explicit management policy. Implicit objectives appear to be (i) maintaining the traditional character of fisheries with concentration on small units of production to maximise regional and local benefits from fish catching and related processing; and (ii) maintaining the catch at level commensurate with market needs – mainly through a stable demand for canning and seasonal fresh consumption. Such an approach has led to no formal management approach to the sardine fishery since the last regulation (No. 1423-A/2003). PO regulations are designed to maintain short term supply in line with market demand rather than concern about resource status.

Given the nature of the sardine fishery where catches are market driven, it may be argued that the fishery is self regulating. This may, however, lead to problems, especially with a small pelagic species with cyclical variations in the SSB. In terms of resource management, the policy is reactive rather than proactive; despite indications over a prolonged period that the sardine resource appears to be in cyclical decline the need for, and the design, of measures remains under consideration (April, 2009).

**Score: 60**

On the basis of the foregoing the UoC meets the single element of SG60. As no short term and long term objectives have been explicitly defined for the fishery the UoC does not meet the single element of SG80. As this score is below 80, a condition to certification has been raised (Condition 3). Once this condition has been satisfied the score for this PI will increase to 80 or above.

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>Audit Trace References</b>
Ministry of Agriculture, Rural Affairs and Fish Decreto-Lei n.º 383/98 (November 27, 2003); Ministry of Agriculture, Rural Affairs and Fish Regulation # 1423-A/2003 (December 31, 2003); Ministry of Agriculture, Rural Affairs and Fish Regulation # 184/2003 (February 21, 2003); ICES (2008b). ICES Advise 2008, Book 7.

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<p><b>3.2.2</b></p>	<p><b>Decision-making processes</b></p> <p>The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives.</p>	<p>There are informal decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.</p>	<p>There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</p> <p>Decision-making processes use the precautionary approach and are based on best available information.</p> <p>Explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p>	<p>There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.</p> <p>Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.</p> <p>Decision-making processes use the precautionary approach and are based on best available information.</p> <p>Formal reporting to all interested stakeholders describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p>
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<p><b>Scoring Comments</b></p> <p>The decision making process for the sardine fishery is established and it does result in measures and strategies to achieve the fishery specific objectives. Essentially, it is based on response to important issues identified by research and monitoring on the background of established management measures (licenses, log books capacity limitations) supported by informal measures maintained by stakeholders in order to maintain market equilibrium. Accordingly, Regulation No. 236 / 2000 was a reasoned response to a decline in stock abundance that was maintained in the three following years. Given the nature of the fishery that is largely based on a well defined market demand, in years of strong abundance it has not been the practice to maintain management measures as the fishery has</p>
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SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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been largely self regulating. However, it is questionable as to whether the decision making process is timely – due to the consultative process followed by the need to promulgate new regulations as required with the inevitable delays. As the decisions are not taken within the context of a fisheries management plan (whether that be species specific or ecosystem based) it is questionable whether decisions take account of the wider implications. Where taken, decisions are based on the precautionary approach with a need to maintain the medium to long term catch at a level that satisfies the needs of on-shore processors and thus safeguarding employment and income in both the at-sea and on-shore sectors. Through stakeholder meetings explanations are provided for any actions or lack of actions, however there appears to be no formal reporting on how the management system responded to findings and recommendations.

**Score: 85**

Accordingly, the fishery meets the first and third elements of SG100 and the fourth element of SG80. A number of issues need to be assessed for the second element of each SG – given question marks about the timeliness of the approach and the consideration of the wider implications, it may be concluded that this element only achieves a score of 60. Overall, a score of 85 is awarded.

**Audit Trace References**

Site visit meetings

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<p><b>3.2.3</b></p>	<p><b>Compliance and enforcement</b></p> <p>Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with.</p>	<p>Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.</p> <p>Sanctions to deal with non-compliance exist and there is some evidence that they are applied.</p> <p>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.</p>	<p>A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.</p> <p>Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.</p> <p>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.</p> <p>There is no evidence of systematic non-compliance.</p>	<p>A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.</p> <p>Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.</p> <p>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.</p> <p>There is no evidence of systematic non-compliance.</p>
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**Scoring Comments**

The EU requires that MS develop an enforcement capacity that ensures compliance with the various regulations. Through the system of fishery inspectors, market inspectors and the navy, together with the monitoring of activity by POs a comprehensive MCS system has been established. The reported lack of infringements testifies that this system has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules. It is reported that where there are infractions these are applied, with the potential for loss of license being an effective deterrent. Accordingly, there is a high degree of confidence that the fishers comply and indeed participate in management of the sardine fishery, with no evidence of systematic non-compliance.

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<b>Score: 100</b>
On the basis of the foregoing, the fishery meets all four elements that comprise SG 100 and this score is allocated for this PI.
<b>Audit Trace References</b>
Site visit meetings

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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3.2.4	<p><b>Research plan</b></p> <p>The fishery has a research plan that addresses the information needs of management.</p>	<p>Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.</p> <p>Research results are available to interested parties.</p>	<p>A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.</p> <p>Research results are disseminated to all interested parties in a timely fashion.</p>	<p>A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.</p> <p>Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.</p>
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**Scoring Comments**

**Research requirements.** Fundamental research requirements for the stock assessment are developed by the ICES Working Group. Several research programmes are also underway in relation to the fishery and these identify further research needs. ICES reports are widely disseminated.

**Research planned/underway.** Several programmes have been initiated in response to identified research needs. These include:

- Sardine dynamics and stock structure in the north-east Atlantic (SARDYN);
- The characterisation of spawning habitat and the impact of local circulation patterns to the survival of early life stages (national projects PELAGICOS, SURVIVAL and PRORECRUIT);
- The feeding behaviour and the distribution dynamics of adult fish in relation to environmental conditions (projects PELAGICOS and SARDYN);
- The acclimation of sardine in captivity for biological experimentation under controlled conditions (project SARCAPT). This will lead to further work on survival post slippage; and
- A candidature for a new project aiming to characterise sardine dynamics at and around recruitment areas is currently being evaluated by the Portuguese Foundation for Science and Technology (FCT).

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<p>All results are widely disseminated.</p> <p><b>Other relevant research.</b> Some work on the sardine stock and biology has been undertaken by Portuguese and international Universities. This is taken into account by scientists at ICES and IPIMAR.</p>
<p><b>Score: 80</b></p>
<p>All the SG 80 elements are met.</p>
<p><b>Audit Trace References</b></p>

SCORING CRITERIA	SCORING GUIDEPOST 60	SCORING GUIDEPOST 80	SCORING GUIDEPOST 100
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<p><b>3.2.5</b></p>	<p><b>Monitoring and management performance evaluation</b></p> <p>There is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives.</p> <p>There is effective and timely review of the fishery-specific management system.</p>	<p>The fishery has in place mechanisms to evaluate some parts of the management system and is subject to occasional internal review.</p>	<p>The fishery has in place mechanisms to evaluate key parts of the management system and is subject to regular internal and occasional external review.</p>	<p>The fishery has in place mechanisms to evaluate all parts of the management system and is subject to regular internal and external review.</p>
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**Scoring Comments**

As required by the EU all elements of the management system are under review. Regular meetings are held between administrators, scientists and stakeholders to evaluate the situation in the fishery and to assess whether or not management measures need to be strengthened or introduced. On an annual basis, ICES reviews the management measures in force and their level of effectiveness. However, given the lack of a comprehensive and on-going approach to Portuguese management of the sardine fishery, it must be considered that review is only of key parts as opposed to all parts. The definition of a formal Fisheries Management Plan would allow for on-going and regular review of the key parameters.

**Score: 80**

The fishery meets the single element of SG80.

**Audit Trace References**

## **Appendix 2: Peer Review Reports**

## **Peer Review 1: Guus Eltink**

### 1 Introduction

The report summarizes in a comprehensive and competent way all available information relevant for assessing the Portuguese Sardine Purse Seine Fishery in relation to the MSC standard. There are no substantial comments to be made on the background information presented for the biology of the target species and the fishery.

Main comment is made on the management of the sardine fishery. Furthermore comment is made on Performance Indicators on ETP species because of the high scores while high incidental bycatches of cetaceans are taken in this sardine purse seine fishery. Below the comments is given by section and for Table 4 of the scoring table.

I have also made changes in the text in ‘Track Changes’ which are mainly typing errors. This file has been sent to the project leader of the MSC Assessment team.

#### Moody Response

*The proposed changes have been incorporated into the report.*

### 2. Glossary of acronyms

ACMF should be ACFM

#### Moody Response

*Changed to ACFM*

DGPA General Directorate of Fisheries and Aquaculture (Direcção Geral das Pescas e Aquicultura) <I suggest to add the Portuguese name for it in order to make it evident that this is a Portuguese governmental organisation>.

#### Moody Response

*Portuguese name added to the glossary*

Insert also: PSU Practical Salinity Units (gram of salt per 1000g of water)

#### Moody Response

*PSU added to the Glossary*

Insert also: WGWIDE Report of the Working Group on Widely Distributed Stocks

#### Moody Response

*WGWIDE added to the Glossary*

### 3. Main Text

3.1 Introduction “evidence suggests that sardine in Atlantic waters off the Iberian Peninsula are manageable as a separate stock”. It might be useful to have a reference added to this sentence.

#### Moody Response

*A reference to ICES 1980 and a further explanation has been added.*

3.2 Sardine biology. Below Figure 2 is mentioned “Source ICES”. I suggest replacing this by: “Source ICES, 2008a”, because the information is from WGWIDE 2008. The same applies also to Figures 3, 4, 6, 7 and 8.

Moody Response

All Figure references amended accordingly.

3.4 Sardine landings The legend of Figure 3 is mentioning the unit of “1000mt” but this should be “mt”.

Moody Response

Amended

3.5 Fleet and Gear description “active fishing vessels on the Portuguese mainland” should be replaced by: “active fishing vessels off the Portuguese mainland”

Moody Response

Correction made

5.2 Assessments and Stock Status From 2004/2005 onwards observers have carried out discard trips on board of the Portuguese sardine purse seine fleet. Instead of an extensive description of possible discards in the sardine purse seine fishery it would have been more informative if a table would have been included with the bycatch species and their relative weight compared to total catch and sardine catch based on these observer trips. This would immediately show all bycatch species and their relative importance as discards in the sardine fishery.

Figure 5 is showing the ICES areas VIII and IX, divided in ICES Divisions, VIIIa,b,c,d,e. In the text of the report is referred to ICES sub-Divisions. It might be useful to include also a map with these sub-Divisions of Divisions VIIIc and IXa, because these are not available on the ICES website.

Moody Response

*This section is dealing only with the discarding of sardine and that is adequately covered without a table. Discarding of other species is covered in section 6.2. A suitable map has not been identified.*

6.3 ETP species. The evaluators of the MSC assessment report conclude that the sardine purse-seine fishery does not seem to be the most damaging fishery to marine mammals and appears not to be a threat to marine mammals. However they report that the whole sardine purse seine fleet catches annually about 528 dolphins with about 157 mortalities. With such a high number of incidental bycatches of cetaceans it is remarkable that the evaluators score respectively 95, 95 and 100 for Performance Indicators 2.3.1-3. Based on these high scores no conditions are mentioned in section 14.3 regarding cetacean bycatches, which however are highly needed. Reducing the score below 80 would allow to include conditions.

Moody Response

*The bycatch number is based on two studies, one of them using on-board observers and interviews performed in 2003 (Wise et al 2005, Wise et al 2007) and a more recent study associated with an ongoing large project on bycatch monitoring and implementation of mitigation measures (SafeSea project).*

*In the first study, the observers made 48 trips and 36 interviews. Despite the large number of cetacean observations, the number of interactions during the fishing activity was low and no cetacean catch was recorded. In the interviews (used to obtain data concerning the days without observers) it was possible to record 3 by-catch events with 8 dolphins captured resulting in one death.*

*The SafeSea project is an ongoing project between Minho University, a Portuguese NGO and*

two Producer Organizations (PO's) that belong to AnopCerco. This project is using a different monitoring system. Firstly, a large-scale survey is being done covering almost all types of fisheries in all harbours in the North and Centre of Portugal. Secondly, an on-board observer program is being implemented in purse-seiners and gillnetters. Finally, some boats recommended by the PO's have on-board voluntary declaration log-books and the boats from Figueira da Foz are legally authorized to land by-caught animals, allowing researchers to access the fresh carcasses.

At the time of the MSC field evaluation, the SafeSea project was only beginning. The data presented in the MSC assessment was given by Marisa Ferreira (coordinator of the by-catch monitoring at the SafeSea Project) and it was preliminary unpublished data. It was based on 30 interviews to boat captains in the centre and North of Portugal. Presently, the SafeSea project has accomplished 62 interviews to purse-seiners and the results confirm those presented in the MSC assessment.

Despite the capture of 528 dolphins (157 dead common dolphins), one must take into consideration several important aspects:

1. The majority of by-catch events involve common dolphins and mortality was reported only for this species. The Scans project assumes that the European population of common dolphins has more or less 63 366 animals (ocean areas until 200 meters bathymetric). The Southern Atlantic strata (Portugal, Spain and south of France) is the area with the highest abundance estimates accounting for 24 904 animals in the coastal region.
2. Recent genetic studies have indicated that the Iberian population of common dolphins also include animals from Azores and Madeira (offshore waters). Based on this assumption, the actual Iberian population is much larger than the values indicated by Scans. Therefore, assuming that the total Iberian population should also include the offshore animals, the real PBR values are lower than the presented in the MSC assessment report. Presently, only the Scans estimates are available for Portugal and so the PBR obtained should be used with caution.
3. In the MSC assessment it was estimated that one boat captures 4.06 animals, with an estimated death of 1.2 common dolphins per boat per year. So, considering the size of the fleet, the time spent at sea and the size of the common dolphin population, this is not a very high mortality number.
4. The frequency of by-catch events per boat is low because most of them are multiple by-catches, with 3 to 20 animals in one net set.
5. Efforts are being made to reduce the problem. However, these efforts are being implemented only in the centre and north of Portugal and it will be some time before visible results are obtained.

On the basis of the PR comments the score has been reviewed and adjusted and led to the raising of a condition.

As an EU member, Portugal is obliged to collect scientific data to evaluate the levels of cetacean by-catch by the Portuguese fishing fleet (European Council Regulation 812/2004). According to this regulation, the presence of independent observers is compulsory on fishing boats larger than 15 m. Based on the high number of cetacean bycatches the National Association of Purse Seine Producer Organisations (ANOPCERCO) should also allow observers on board on purse seiners smaller than 15m and ANOPCERCO should fully cooperate in the collection of cetacean bycatch data from all sardine purse seiners. ANOPCERCO should also develop methods to reduce the number of these incidental

bycatches (either by technical methods or by avoiding areas/seasons when incidental bycatches of cetaceans are high).

Moody Response

*Under EC Reg. 812/2004 Portuguese Authorities are only obliged to monitor gillnet boats larger than 12 m. Purse-seiners are not included in the recommendations made to Portugal. However, the necessary protocols for gill netters have not been implemented.*

*Some PO's established work programmes covering by-catch issues in 2003/2004, when they allowed ETP observers on board and are testing mitigation measures, such as good practice manuals and pingers. They are also involved in a large project that was recently submitted to financing (Life+ funds) to evaluate this problem and promote solutions in all Portuguese fisheries.*

According to the report of the ICES Study Group for Bycatch of Protected Species (SGBYC) < ICES CM 2009/ACOM:22 and ICES CM 2008/ACOM:48> Portugal does not send participants to SGBYC and Portugal does not even send data on bycatches of protected species to SGBYC. The total bycatch of cetaceans in all international fisheries should be used to evaluate the impact on these populations instead of carrying out an evaluation of impact by a single fleet. If bycatches of cetaceans are to be reduced, it is important to develop some allocation measures that will enable managers to determine the extent to which by-catches in any of these national fisheries involved needs to be reduced (WGBYC, 2008).

Moody Response

*The following has been added to the text*

*“Portugal does not send participants to ICES Study Group for Bycatch of Protected Species (SGBYC) and does not send data on bycatches of protected species to SGBYC. Data on the total bycatch of cetaceans in all international fisheries could be used to evaluate the impact on these populations instead of carrying out an evaluation of impact by a single fleet.*

*The use of total by-catch of cetaceans in international fisheries is not applicable to Portugal as compared to Northern Europe its fleet is completely different (the proportion of artisanal boats in Portugal in relation to trawlers is much more significant than in other countries) as is the cetacean population structure and diversity. In the northern seas the harbour porpoise is the dominant species, while in Iberian waters the dominant species is the common dolphin. So, the extrapolation of by-catch effects from other scenarios is very risky.*

*With respect to the lack of Portuguese participants in SGBYC we make a recommendation that Portugal does participate and send data. Data on the evaluation of by-catch has been available since 2000 for central of Portugal. However, as these estimates are based on stranded animals evaluations as opposed to on-board observers, there is some difficulty for the Portuguese State to assume the derived by-catch values, which show that dead animals due to by-catch present an annual fluctuation between 19 % and 55% of the total stranded animals.*

*The allocation of measures to estimate the extent of the problem is very important but such measures have never been implemented by the authorities. To date the only activity has been by POs and NGOs.*

The MSC assessment report states that the potential biological removal (PBR) of 0.63 % is well below the maximum rate without providing any reference or any explanation how this number of 0.63% is calculated and without mentioning that this number is for common dolphin. It would therefore be helpful if more information would be provided in the report for also non-experts e.g. by presenting in a table for each species the population size, the

maximum annual potential biological removal (PBR) in number cetaceans that can be removed without causing a threat to this population, the number of individuals caught of this population by the total international fleet and for comparison also the actual number of dead individuals calculated from the Portuguese sardine purse seine fleet. This table can also show the PBR of 2% (or 1.7% in the case of harbour porpoise) in comparison to e.g. the 0.63% that represents the actual biological removal from the population. Please provide whenever possible references for the numbers presented.

Moody Response

*The PBR estimates refer to common dolphin, as stated in the text “As the common dolphins by-catch in Purse-seiners is below the PBR, the same is assumed for Minke whales and Bottlenose dolphins.” Also, all reported by-catch events involving bottlenose dolphins, risso’s dolphins and minke whales, have resulted in live releases, so it is not possible to estimate PBR, because there were no deaths.*

*The PBR was based on the mortality estimates during one year, using interviews to 30 purse-seiners and then extrapolating that information to the entire purse seine fleet. This data indicates 528 by-caught animals with 157 deaths. To estimate the PBR we assumed that the common dolphin Iberian population includes 24 904 animals (based on Scans data).*

*A table (see below) could only be produced for common dolphin and harbour porpoise, because we only have abundance estimates for these two species. The PBR for the other species (in 2007/2008) was zero, because no mortality events were reported.*

<i>Cetacean Species</i>	<i>Population abundance in the Southern strata of the Scans</i>	<i>Maximum Annual PBR*</i>	<i>Mortality by the purse-seine fleet**</i>	<i>PBR attributed to purse-seiners %</i>
<i>Common dolphin</i>	<i>24 904</i>	<i>498.08 (2%)</i>	<i>157</i>	<i>0.63</i>
<i>Harbour porpoise</i>	<i>2 650</i>	<i>45.05 (1.7%)</i>	<i>0</i>	<i>0</i>

*\*Number of dead cetaceans based on a PBR of 2 % for the common dolphin and 1.7% for the harbour porpoise.*

*\*\* Data estimated for 2007/2008 for the entire fleet*

The MSC assessment report states: “Since 2000, there is no evidence of a Harbour porpoise by-catch in purse seines off central Portugal (Ferreira 2007), despite the fact that in the past this species was frequently caught in Sardine fisheries. Therefore, purse-seine fishing does not seem to be the most damaging fishery to marine mammals and appears not to be a threat to marine mammals.” This strong decrease in bycatch of harbour porpoise (already for more than 300 years a separate population in Iberian waters) apparently indicates that the harbour porpoise is already more or less extinct in Portuguese waters probably because of all types of fisheries including the sardine purse seine fishery. Not catching any harbour porpoise in the sardine purse seine fisheries at present does not mean that the sardine purse seine fishery is not a threat to this population. Especially now at low stock abundance it is a threat (as was proven by high bycatches in earlier years). It is not an excuse that other fishing gears are more of a threat. This could imply to lower the score and to include a condition regarding the bycatch of ETP species.

Moody Response

*See the addition to the text as noted in the comments of the second peer reviewer. On the basis of the low probability of harbour porpoise by catch in the Portuguese purse seine sardine fishery, we do not consider this lowered the score.*

The following recommendation is more or less hidden at the end of the scoring comment of

PI 2.3.1: “It is recommended that a greater nationwide effort should be implemented as regards on-board observers to evaluate by-catch of ETP species”. This recommendation deserves to be repeated in a new section 14.4 Recommendations.

Moody Response

*Recommendation added (Section 15.4).*

4 Comments on Table 4 regarding Performance Indicators:

PI 1.1.2 The 60 SG is met: Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category. However, of the 80 SG the reference points are appropriate for the stock and can be estimated is not met, because there are no formal reference points for this stock. Therefore, a score lower than 80 would be expected.

Moody Response

*Whilst there are no formally defined reference points for the stock an implicit biomass limit reference point has been established at the lowest observed biomass in the time series and at this point there has been no evidence of impaired recruitment. Linked to this implicit limit reference point a surrogate biomass for maximum sustainable yield can be reasonably implied based on MSC guidance in the Fisheries Assessment Methodology. In recent years the biomass has been at or around this level of 532,000 mt. Because the reference points are implicit and not yet formally defined we accept that the score for this PI should be reduced to 80.*

PI 1.2.1-2 This sardine stock is fished by only two countries. However, there is no agreed common harvest strategy. Each country has its own different set of measures mainly to reduce effort and closed areas. There is no common harvest strategy in case of severe stock reduction. Also a long term management plan is lacking. The evaluation team states that this so called Portuguese harvest strategy has worked for the last 10 years. However, during this period F has only been decreasing. How well it will work in the following years is uncertain because the recruited year classes 2006 and 2007 are the weakest in the time series and there is no strong year class since 2004 (information from ICES advice 2009). Fishing mortality is likely to increase rapidly in an effort controlled fishery, when SSB is decreasing.

Moody Response

*The informal common harvest strategy operated between Spain and Portugal has worked well in the past and has been firmly based on the ACOM advice and the predicted catch since 1999. Since 2003 the actual total catch has been lower than the ACOM predicted value because of the catch constraints imposed by each country. There are no compelling reasons for believing that the strategy will not continue to be effective in the future, even during periods of poor recruitment which have occurred in the past.*

For a short lived species like sardine the key element in the harvest control rule should be the estimate of 0-group recruitment at the end of the year to determine for the next year a possible combination of TAC, effort control, area/season closure. In the main text of the report is mentioned that an additional Portuguese acoustic survey is carried out in November which is used for the estimation of 0-group recruitment. However, in the report it is not explained how different levels of recruitment and SSB result in different levels of effort reduction. The report indicates that this might be based on *ad hoc* collective decisions taken by DGPA, INIP and the PO's. The scores of 75 and 70 are likely to be too high in the absence of a well tested harvest strategy and long term management plan. These scores are expected to be too high especially because the main shortcoming in the MSC sardine assessment is that

mainly the Portuguese management measures have been evaluated, while for Principle 1 the harvest strategy for the whole sardine population should have been evaluated (the only text on Spanish management measures is that they limit the fishing licences and have a maximum allowable catch of 7,000 kg per fishing day and a 5 – fishing - days week limitation in effort). A combination of both the Portuguese and Spanish management measures should be evaluated to check whether the combination of these can be regarded as a reliable alternative kind of harvest strategy to ensure that the productive capacities of resources are maintained at high levels and are not sacrificed in favour of short term interests. The only text in the report (section 5.3) on joint management is: “In managing their separate fisheries there is consultation between Spain and Portugal based on the annual advice on maximum catch levels from ACOM. ICES considers that the effects of the management measures taken by Spain and Portugal are uncertain but may well have proved beneficial in contributing to the decline in fishing mortality in recent years“. Also the last paragraph of section 5.3 of the report refers to this shortcoming: “ACOM advises that development of a long term management plan for this stock would result in improved management. Any plan would have to take due account of the observed recruitment dynamics of this species and its effect on fluctuating SSB levels and provide adequate protection for the stock. A formal plan, which was flexible enough to take into account these natural fluctuations, would prove useful in stabilising catches which appears to be the desire of stakeholders, not only in Portugal but also in Spain“.

#### Moody Response

*It is accepted by all parties that the management arrangements for this stock need to be reviewed and established in the form of a long term management plan. The scores for these two PIs have generated a condition which requires that a formal long term management plan will eventually be in place. This will follow on from the formal definition of limit and target reference points which should form the basis of a formalised harvest strategy for the stock. It should be noted that, based on ACOM advice a predicted catch is provided and that is shared between the two participating countries. This is an important element of the current harvest strategy and has been effective in controlling the catch and fishing mortality since 1999. Because some elements of the harvest strategy are voluntary we have reduced the score for PI 1.2.1 from 75 to 70.*

PI 1.2.4 According SG80 the assessment should be appropriate for the stock and for the harvest control rule, and is evaluating stock status relative to reference points. A score of 95 is high in the absence of a harvest strategy of the two countries participating in this fishery and only generic reference points.

#### Moody Response

*This PI is mainly about the quality of the stock assessment and whether it is appropriate for the species and whether uncertainty is taken into account. Although there are currently no explicit objectives for the management of this stock, ICES does nevertheless provide advice in relation to fishing mortality and provides guidance for sustainable management in the form of a predicted catch related to the advice. This is an important element of a harvest strategy which has been working well since 1999. Over that period the annual catch by Portugal and Spain has been close to or less than the predicted catch based on the advice.*

*Taken all these factors into account we accept that the score may be slightly too high and have reduced it to 90*

PI 2.3.1-3 See extensive comments above on ETP species (section 6.3).

#### Moody Response

*The scores 2.3.1 / 2.3.2 / 2.3.3 have been reviewed and amended as considered appropriate, with a redrafting of the associated comments.*

PI 3.1.4 The scoring comment is: “On the basis of the foregoing, the fishery achieves part of SG 100 and part of SG 90. The allocated score is therefore 90”. This should probably be: On the basis of the foregoing, the fishery achieves all of SG 80 and part of SG 100. The allocated score is therefore 90.

*Moody Response*

*Amended*

## Peer Review 2: Mike Pawson

This review is in three parts, commenting on the presentation, accuracy and interpretation of the information and evidence used as a basis for the assessment of the above fishery, on the scoring table, and on the overall recommendation for certification including the suitability of the attached conditions. Throughout, I have identified the section(s) of the report at which my comments are aimed, and have not commented where I am content with the information provided or the conclusions reached.

Presentation. The presentation of information in this report is a little uneven, in that there is a great amount of detail in Section 3.2 Sardine Biology, but which largely omits any evidence why the sardine population in ICES Divisions could be regarded as a separate biological stock,

### Moody Response

*The report is provided for a wide cross section of readership and we consider the details of sardine biology to be an important part of the scene setting for our report. Some of our readers will not be familiar with the sardine in NW European waters.*

and no information in 3.5 Fleet and Gear Description on the fishing gear and its operation in the UoC.

### Moody Response

*Information added to the report.*

Some of these deficiencies are remedied in the Scoring Table comments, which are comprehensive and generally explain well the basis for the scores given. The long list of acronyms used in the report could usefully be restricted to real acronyms so that unnecessary terms (e.g. EN, NE, which only occur once, and have other meanings) and misunderstandings (e.g. mt not MT = metric tonnes) are avoided.

### Moody Response

*Amended*

1. Introduction. Fishery Proposed for Certification; note that the relevant area is the Portuguese coast, ICES Divisions VIIIc and IXa, which should be checked throughout.

### Moody Response

*Amended*

3.1 Background to the Fishery: there is a lack of evidence provided that the required level of stock separation for MSC certification is actually met within the sardine population found in Divs VIIIc and IXa, and this has implications for the assessment which assumes that the recruitment and SSB dynamics are linked (though they do not appear to have a relationship that ICES is prepared to use to define biological reference points). It is, therefore, important to provide the information that suggests that “sardine in Atlantic waters off the Iberian Peninsula are manageable as a separate stock”, that “there are separate spawning stocks”, and that the movements of sardine into and out of this stock (especially fish > 6years old) are not

“considered to be significant in terms of the discreteness of the stock for assessment and management purposes” (see under 3.2 Sardine biology).

Moody Response

*A reference to ICES 1980 and a further explanation of stock discreteness has been added in section 3.1.*

Figure 1 purports to show the sardine distribution in the North Atlantic and Mediterranean, presumably by the red-shaded area, but what does pink indicate and is there any evidence of sardine in Norwegian and Icelandic waters?

Moody Response

*The figure has been omitted. No suitable replacement has been identified.*

A chart showing sardine spawning areas and names of sea areas used in the text would be useful.

Moody Response

*See above.*

It is not clear why the paragraph on infection of sardine eggs with *Ichthyodinium chabelardi* is included, especially as there is no evidence that this could be a significant factor in recruitment variability.

Moody Response

*It is an interesting piece of biology and describes a factor which could affect subsequent survival and year class strength. Factors which contribute to recruitment variability in marine fishes are not well known and to ignore one potential factor in our report would be wrong.*

3.4 Sardine landings: Figure 4 is not really needed, since it just repeats part of Figure 3 and the relevant details are spelt out in the text.

Moody Response

*The figure has been kept in the report as it covers a shorter period than Figure 3 and annual levels are much easier to differentiate.*

3.5 Fleet and Gear Description: there is no description of the gear used and its operation (including slipping and discarding practices), which is required particularly in order to evaluate criteria in Principle 2.

Moody Response

*Text has been added.*

5.2 Assessments and Stock Status: in describing the basic data used in the assessment, it appears that the Spanish and Portuguese acoustic surveys provide data on maturity and stock weights at age, in which case these surveys must include fishing to obtain biological information. Is this the case, and what gear is used? This is also relevant to the acoustic surveys performed by IPIMAR to collect data on target and by-catch retained pelagic species to ensure their correct management, or are the species

distinguished acoustically?

Moody Response

*The ICES WG report (2008a) provides comprehensive details of all the acoustic surveys. They do indeed involve a comprehensive series of midwater trawl hauls although the report gives no further description of the gear. Text has been added to the report to make it clear that the biological data comes from midwater trawl hauls carried out during each of the acoustic surveys.*

You state that recruitment at age zero is evaluated through an additional Portuguese acoustic survey in November, but does Figure 6 show the fluctuations in recruitment generated from acoustic survey data or the catch-at-age assessment, or a combination?

Moody Response

*The ICES reports are rather vague on this topic referring only to the acoustic survey data on recruitment being used to “corroborate” or “support” the data from the assessment. The data used in Figure 6 comes directly from the ICES (2008a) stock assessment summary and we believe those to be data generated by the catch at age assessment.*

Note that in the whole of this section there is no mention of biological reference points, and that 5.3 Management Advice states that, “in the absence of formally defined reference points for either fishing mortality or spawning biomass, the status of the stock cannot be evaluated in these terms----- there are no specific management objectives for this stock”. This has important implications for scoring against Principle 1. Since there is no TAC, upon what basis is annual advice on maximum catch levels given by ACOM?

Moody Response

*This point will be covered further under scoring. The ACOM advice is given in the form of advice about fishing mortality. Since 2003 that advice has been for no increase in  $F$  which in 2002 was 0.21. ACOM then go on to provide a predicted catch based on status quo  $F$ . Since 2003 the actual catch taken by both countries has remained below the ACOM predicted catch. We have added further explanation in section 5.3.*

6.3 ETP species: although neither loggerhead sea turtle nor leatherback turtle may be listed as Not Evaluated in the Portuguese Red Data Book, their conservation status is certainly evaluated for the N Atlantic as a whole.

Moody Response

*The following has been added to the text (Section 7.3) “Loggerhead sea turtle is considered endangered by the IUCN, while the leatherback turtle is considered critically endangered. In the case of loggerhead sea turtle this status was attributed in 1996 and the IUCN web page notes that the status requires updating.*

*It is not possible to have a conservation status for the North Atlantic as a whole, because the population status in the European coasts is completely different from those found in Western Atlantic.*

*With respect to mainland Portugal, the INCB considers that these two species have a marginal occurrence and assumes that neither of them needs a formal conservation status*

*evaluation. In the case of the loggerhead sea turtle, the majority of records correspond to juvenile animals that are migrating southwards. In the case of the leatherback turtle the majority of records correspond to adults migrating to breeding areas. However, the data available on these two species does not allow any characterization of their conservation status. Accordingly, one must assume the IUCN conservation status”.*

You note that the Iberian population of harbour porpoise is very small, is claimed to have been isolated from the rest of the Northern Atlantic population over the last 300 years, and is therefore considered the most threatened cetacean in Portuguese waters. Also that the ASCOBANS considered a removal rate of 1.7% for harbour porpoises in any population is unsustainable and a cause for concern. Could the lack of evidence of a harbour porpoise by-catch in purse seines off central Portugal since 2000, despite the fact that this species was frequently caught in sardine fisheries in the past, be because the local population has been severely reduced? It may be considered that the lack of evidence of a harbour porpoise by-catch in purse seines off central Portugal since 2000, despite the fact that in previous years, this species was frequently caught in sardine fisheries in the past, is due to local populations having been severely reduced.

#### Moody Response

*The following has been added to the text (Section 7.3) to cover the comments of both peer reviewers.*

*“The harbour porpoise is declining in the Iberian Peninsula due to several reasons and research data indicates that by-catch is only a small part of the problem”.*

*“This is considered to be due to:*

- 1. The habitat of harbour porpoise, in central Portugal, denotes a tendency for an intense use of areas until the 20-meter bathymetric with an evident concentration of sightings between 5 and 10 meters. This is a forbidden zone for purse-seiners;*
- 2. Harbour porpoises in Portugal are considered shy and elusive, not inclined to approach boats and bow ride. In fact, the results from boat observers always refer that porpoises are detected far from the boats and swimming away from them. Therefore it is very difficult that purse-seiners capture porpoises.*
- 3. In Iberian waters, the porpoise feeds mainly on small shoaling fishes from both demersal and pelagic habitats (scad, sandeels and *Trisopterus* sp). These species are less frequent in the pelagic environment where purse-seiners capture sardines, so once again the probability of a by-catch in a purse-seiner is very low”.*

*In conclusion, the reviewer’s comment is correct (i.e. any by-catch that might occur presently is critical). However, the probability of by-catch in the Portuguese purse seine sardine fishery is considered low.*

With respect to birds, you report occasional large mortalities (in one case  $\pm$  200 Balearic Shearwaters), but note that these events are rare, and that purse-seine fishing appears not to be a threat to marine birds. There appears to be considerable uncertainty in reaching this conclusion, since you note that the only reported monitoring of bird by-catch in Portugal to-date has been through beached bird surveys.

### Moody Response

*On the contrary, we note that the scenario is of high uncertainty. By-catch of seabirds is not well evaluated, despite the fact that beached bird surveys and data from marine animals rehabilitation centres indicate that between 60 % and 70% of the animals found had negative interactions with fishing gears (mainly gill-nets and long-line interactions). Presently, several monitoring efforts are being implemented to evaluate this problem, but to-date there is not enough data to make any analysis. However, considering the reports of a very small number of on-board observer trips it appears that sardine fisheries attract a high number of seabirds when nets are being hauled, even though the reported cases of mortality are once again very low.*

6.4 Habitat: do any of the four proposed marine IBAs in Portuguese continental waters overlap the sardine fishery area?

### Moody Response

*Yes. The following has been added to the text:*

*“With the exception of PTM04 ( which is very close to the shore) overlap the sardine fishery area. PTM01 was designated in an area with a very intense sardine fishing effort associated with the Figueira da Foz fishing harbour. PTM02 was designated near the Peniche fishing harbour, also considered an important fishing area for sardines. Part of this IBA occurs in deeper waters not used by purse-seiners, although a significant part overlaps with the important sardine fishing areas. PTM03 was designated near Cascais. This is not an important sardine fishing area and so the risk of interactions in this region is very low”.*

7.5.3 Monitoring, Control and Surveillance: you note that, under the data collection regulation, 24 purse seine trips have been observed each year since 2004-2005, but it would be useful to know how many trips are made annually to put this level of sampling into perspective.

### Moody Response

*Text added*

7. Scoring Table, Appendix 1 and supporting comments in section 7.2

1.1.1. Stock status and 1.1.2. Reference points. you state that there is a high degree of certainty that the stock is above the “implicit biomass limit point” (which is not even implied in the assessment report) and that there is no appreciable risk that recruitment would be impaired (which could be the case). It is not clear whether the implication that the generic limit reference point is the lowest SSB in the time series, nor that a surrogate biomass for the target reference point (the maximum sustainable yield biomass,  $B_{msy}$ ) can be considered to be twice this biomass limit, arise in this assessment report or is part of the Portuguese management strategy for sardine, If these “implicit biomass and target reference points” are being used in management, why is this discussion not included in the stock assessment or management advice parts of the report? Nevertheless, the stock biomass does appear to be above the point where recruitment would be impaired due to reduced reproductive capacity (1.1.1).

### Moody Response

*Formal reference points are not yet being used in management although they are under discussion within ICES. Our use of the implicit biomass reference point based on the lowest SSB in the time series and a point, at which no impairment to recruitment was observed, is justified by reference to MSC Fisheries Assessment Methodology guidance on PI 1.1.1. In that guidance it is stated that “to judge stock status, a reference point below which no impaired recruitment has been observed is preferred to a biomass limit reference point because management decision rules may vary in their application of limit reference points”. Based on the same MSC guidance the assessment team have also made a reasonable assumption about Bmsy being approximately double the level below which impaired recruitment has not been observed A score of 90 is therefore justified.*

Where is the evidence from scientific sampling of the catches that the genetic structure or sex composition of the stock has not changed over time?

Moody Response

*It appears that the PR is referring to the comments on the scoring of PI 1.2.3. Genetic studies were carried out as a part of the SARDYN project referred to in the text and in the scoring comments. The sex composition of the stock is monitored annually as a part of the assessment process and the data are available in each of the annual working group reports.*

Unless limit and target reference points have been set, a score of 90 is far too high for 1.1.2 since none of the 80 SG or 100 SG criteria are met. There is no evidence presented that reference points have been identified or are used in giving advice, either in Portugal or by ICES. Condition 1 and the relevant text recognise this.

Moody Response

*Whilst there are no formally defined reference points for the stock an implicit biomass limit reference point has been established at the lowest observed biomass in the time series and at this point there has been no evidence of impaired recruitment. Linked to this implicit limit reference point a surrogate biomass for maximum sustainable yield can be reasonably implied. In recent years the biomass has been at or around this level of 532,000t (i.e. twice the biomass limit level). Because the reference points are implicit and not yet formally defined we accept that the score for this PI should be reduced to 80*

1.2.3. Information/monitoring: you state that sardine are indeterminate spawners producing batches of eggs over a spawning season that may last from October to April, and that this information is vital for the fishery-independent egg survey estimate of spawning biomass. Do the triennial egg surveys cover all the spawning area and season, or are assumptions made about seasonal egg production that enable a shorter survey to be carried out, for example?

Moody Response

*Spain and Portugal carry out separate triennial egg surveys based on the daily egg production method (DEPM) appropriate only for indeterminate or batch spawners. These surveys are not a part of the triennial mackerel and horse mackerel egg surveys, indeed they are carried out in different years. The DEPM only requires one survey covering the whole of the spawning area. During this survey, spawning females are sampled from over the whole area in order to estimate both batch size and frequency. The last DEPM survey was carried out in 2008 and should be reported in the 2009 WGANSAs report*

1.2.4 Assessment of stock status: the last paragraph “ACOM advise that .... both Portuguese and Spanish stakeholders.” does not belong here. This criterion is not about plans or management, just the assessment.

Moody Response

*Yes we agree that this is a mistake and it has been moved to PI 1.2.1 under Harvest Strategy.*

2.1.1. Status of retained non-target species. You state that there is a high degree of certainty that retained species are within biologically-based limits, but that target reference points are not defined for the three main retained species, and therefore allocate a score of 85. This contrasts with higher marks given for sardine at 1.1.1 and 1.1.2, where there are also no defined reference points.

Moody Response

*The score has been reviewed and amended to 80.*

2.1.2. Management Strategy. It is difficult to see how a score as high as 90 can be allocated given the comments above, and that no information is provided about stock status of nearly all other species taken by the UoC.

Moody Response

*The score has been reviewed and amended to 80.*

2.2.1. Discarded species, status. Neither of the main species said to be discarded, chub mackerel and pelagic crab, has any information on stock status, so how can the SG100 component be met in full? All you can say is that their status is poorly known, but the fishery is unlikely to be causing the by-catch species to be depleted (60+?).

Moody Response

*The score has been reviewed and amended to 80.*

2.3.1 Status of ETP species. Sufficient information is presented to suggest that the effects of the fishery are not known (only inferred), though they may be within limits of national and international requirements for protection of ETP species. On this basis, and given the apparent depleted state of harbour porpoise in Portuguese waters, it seems overoptimistic to suggest that all SG80 components are satisfied; and a score of 95 seems too high. This also applies to 2.3.3 Information/monitoring, where the SG80 components are not all satisfied, and a score of 80 seems too high, since little data are available specifically for pure seining.

Moody Response

*With respect to the depleted state of the harbour porpoise, it was already point out that its decline is not associated with purse-seine fisheries. This species used to be captured by purse-seiners in a period when fishing practices and environmental concerns were completely different. The lack of a continuous monitoring effort is true, but it is also true that two independent studies (one by Wise et al 2007 with field efforts in 2003/2004 and one ongoing project), both with the support and cooperation of PO's, have produced similar results and similar conclusions. In both studies there were no observed or declared harbour porpoise captures.*

*The score for 2.3.1 has been reviewed and amended to 80.*

*The score for 2.3.2 has been reviewed and amended to 80.*

*With respect to Information / monitoring, this fishery has been monitored in detail since 2008 with about 50 % of the fleet covered using several methodologies to evaluate by-catch and so future information and monitoring is ensured.*

3.2.4. Research plan. I agree that all the SG 80 elements are met and, if there was an explicit plan, this score would be much higher, since the relevant projects are in place.

Moody Response

None

**Certification Recommendation**

Though I consider that some of the marks awarded are too high, and that there is a lack of information presented on some aspects (stock identity, fishery operation, biological reference levels), I agree with your assessment that the overall Performance of the fishery would pass in relation to MSC Principles 1, 2 and 3, and that the Portuguese Sardine Fishery be certified according to the Marine Stewardship Council Principles and Criteria for Sustainable Fisheries. The Conditions and actions required seem appropriate and reflect the concerns raised in the report, and in my review. In relation to Condition 1, however, there is some confusion as to whether target and limit reference points already exist and are used in management of the Portuguese sardine fishery. If they do (or are implicit), there must be a reason why the responsible ICES Working Group has not adopted them (even if ACOM do not give formal management advice for sardine). It seems to me that requiring documented evidence that agreed reference points have been agreed by the relevant ICES WG by the second annual audit is outside the competence or control of the UoC, as is requiring that formal reference points have been used in determining management advice at EU, ICES and national levels by year three. Would it not be sufficient to require documented evidence that reference points have been agreed by independent scientists and have been used in determining management advice at national level?

Moody Response

*See responses to other comments above. The condition has been changed to reflect this comment.*

## Appendix 3: Client Action Plan

### PORTUGUESE SARDINE PURSE SEINE FISHERY – Client Action Plan

#### Background

Based on the preliminary assessment report and the three conditions raised by the Moody assessment team, the client (ANOPCERCO) invited other interested parties (client support group: ANICP and MCM Select Foods; Portuguese Fisheries Research Institute: IPIMAR; and Portuguese Fisheries Administration: DGPA) for a meeting on 17/7/2009 at Matosinhos, Portugal to decide on the appropriate course of action for the fulfilment of the requirements for MSC certification. In this meeting it was decided:

- The action plan will be drafted and put in action within a framework of cooperation among the client and client support group, the Portuguese administration and the Portuguese fisheries research Institute;
- Given the nature of the three conditions (all linked to management: objectives, policy and advice), the action plan should be developed in a way to attack simultaneously the three problems, rather than defining a separate course of action for each;
- Given the need for regular interaction among fishing sector, industry, scientists and administration in the execution of the action plan, the process will be iterative (i.e. development->discussion->agreement->refinement->discussion...);
- There is a need to articulate internationally within the geographical area of the stock not only in terms of stock assessment, but also in terms of long-term management options for the fishery (beyond the requirement of the assessment team).

#### State of the art

Identification of appropriate reference points (RPs): Work to develop precautionary reference points and harvest rules for sardine was initiated by IPIMAR and was discussed by the ICES assessment group (WGANSA) this year (ICES 2009). The possibility to derive reference points from the stock-recruitment relationship and from the yield per recruit curve was addressed. The option of  $F_{0.1}$  was however abandoned, given the lack of a clear relation between SSB and recruitment and the uncommon yield per recruit curve (providing an  $F_{0.1} = 0.5$ , well above the maximum historical  $F$ ). In the context of harvest control rules, a limit reference point in terms of biomass is the most important. However, shrinkage of the area of distribution, in particular sardine disappearance from Galician waters, may be suggested as an additional criterion, because this may signal a reduced stock and may represent an unwanted state of stock dynamics.

Exploration of harvest control rules (HCRs): Simple HCRs, assuming  $Blim = Bloss$ , and considering both catch (TAC) and  $F$  control of the fishery were also explored in a simulation framework (software F-PRESS) and the impact of alternative recruitment assumptions was addressed. Reference points for sardine management should be considered in the context of HCR development. Therefore, the action plan for the development of reference points and HCRs will go hand in hand.

Management objectives for the fishery: In a series of meetings among ANOPCERCO, IPIMAR and the national administration during 2009, general consensus was reached that

that the existing regulation framework (dated back to 2003) is outdated and needs amendment and adaptation to the current situation of the fishery and the resource. There has been intense dialogue for the preparation of a new (more restrictive for 2009) regulation, but it has not been possible so far to publish the new regulation (mainly due to questions raised by the legal department of DGPA). During this discussion, economical, environmental and social objectives were identified by all participants that will need to be refined and formalised in future meetings, where the transformation industry objectives should also be considered.

### **Condition requirements (from assessment report)**

#### Actions required

- PI 1.2.1 (condition 1): Prescribed **target and limit reference points** are reflected in a **harvest strategy** that is developed as part of a formal approach to fisheries management planning (see conditions 2 and 3).
- PI 1.2.2 (condition 2): There needs to be **formal definition of harvest control rules** within the context of a more formal **continuous approach to management** of the Portuguese sardine fishery.
- PI 3.2.1 (condition 3): The approach to management of the Portuguese sardine fishery should be formalised with a **clear statement of the long and short term objectives** for the fishery that direct the **design and implementation of policy that may be considered as proactive** rather than reactive and incorporates an operational framework that requires the use of the resource to be responsible and sustainable (see condition 2).

#### Timescale

- First annual audit: Documented evidence that the policy options for harvest control rules have been outlined and discussed with stakeholders (condition 2); Documented evidence that the policy options for policy development have been outlined and discussed with stakeholders (condition 3).
- Second annual audit: Documented evidence that an agreed policy document has been approved for incorporation into national regulations (condition 2); Documented evidence that an agreed policy document has been approved for incorporation into national regulations (condition 3).
- Third annual audit: Documented evidence that reference points have been agreed by independent scientists and have been used in determining management advice at national level (condition 1);
- Fourth annual audit: Policy changes have been formally accepted by the relevant Ministries, with clear evidence of the implementation of the agreed harvest control rules (condition 2); Policy changes have been formally accepted by the relevant Ministries, with clear evidence that the objectives have been used in the development of policy related to the management of the sardine fishery (condition 3).

It is recognised that the process of establishing formal target and limit reference points is dependent on the activities of Portuguese fishery scientists working in collaboration with their peers within the ICES system and this may lead to a long gestation period in the change in the approach to fishery management. However the client must display a programmed approach to the development of these reference points.

## Additional recommendations

3. As highlighted in scoring comment PI 2.3.1, it is recommended that a greater nationwide effort should be implemented as regards on-board observers to evaluate by-catch of ETP species.
4. As highlighted in scoring comment PI 2.3.3, it is recommended that Portugal becomes involved in the ICES Study Group for Bycatch of Protected Species by sending participants and providing data on bycatches of protected species.

## Proposed actions, calendar and deliverables

### Up to the first annual audit (early/mid 2011)

1 – Partner actions: Formation of Working Group to supervise the implementation of the action plan (all partners); Definition of terminology for development of long term management plan (IPIMAR in English, ANOPCERCO to translate in Portuguese); Identification of short and long terms objectives desirable for the Portuguese purse seine fishery for sardine (each partner separately); Use national and international experience and information to outline candidate reference points and HCRs and explore within a simulation framework (IPIMAR).

2 – National interactions: Partner meetings to discuss management objectives (catch levels, limits to catch variation between years, need to incorporate economic, social and ecological objectives), candidate reference points (limit and/or target), candidate HCRs, type of control of the fishery (quota, effort, technical measures, etc); IPIMAR and DGPA establish contacts with conservation institutions (e.g. ICNB, SPEA, SPVV) to explore ways to improve the nationwide monitoring of purse seine fishery/marine mammal and seabird interactions.

3 – International interactions: ANOPCERCO and IPIMAR (through INTERREG project GEPETO, if approved) promote similar discussion within the RAC.S (involvement of Spanish stakeholders); IPIMAR participate in international meetings to get perspective of management plans being developed for small pelagics in other fisheries or parts of the world. IPIMAR present and discuss work on RPs and HCRs to the ICES WGANSAs meeting in June 2010 and participate in the definition of the calendar and terms of reference for the next benchmark assessment of sardine (likely to be held in early 2012).

### Deliverables:

- Document defining the participation and describing the intended action of the **Working Group** responsible to implement the Action Plan related to the Portuguese sardine MSC certification (partnership internal document);
- Document with definition of **terminology** used for the development of a long term management plan for sardine (partnership internal document);
- Document describing the short and long terms economic, ecological and social **objectives** of the industry (fishing and transformation sector), research and administration (partnership internal document).
- Document presenting **options for RPs** relevant for use in management advice and results of HCRs under simulation scenarios for the Atlanto-Iberian stock of sardine (Working Document to present to WGANSAs 2010 and result of WG discussion in the actual WG report);

- Document describing the **actions taken** by ANOPCERCO to facilitate the implementation of the action plan during the first reporting period (ANOPCERCO internal document).

Up to the second annual audit (early/mid 2012)

1 – Partner actions: Compilation of document on reconcilable management objectives and policy options for Portuguese sardine, taking into account international agreements binding for Portugal (DGPA); Contribution of proposals for RPs and HCRs to the benchmark WK (IPIMAR); Supervise compliance to agreed – informal - measures (ANOPCERCO).

2 – National interactions: Partner to finalise document on management objectives and policy guidelines, review simulation results on harvest policy options and related policy alternatives, discuss results of benchmark assessment and explore lines for definition of national regulations; ANOPCERCO facilitate observations on board member vessels and provide voluntary information of skippers on interactions with seabirds and marine mammals.

3 – International interactions: Participation in the benchmark assessment of sardine (IPIMAR, likely in early 2012); Advance case study for sardine management plan within GEPETO (if approved) or RAC.S (ANOPCERCO, IPIMAR); Explore possible Portuguese participation to the ICES Study Group for Bycatch of Protected Species (IPIMAR to promote but not to assume).

Deliverables:

- Document on reconcilable **management objectives**, refined and extended to include **policy guidelines** (DGPA coordinated policy document).
- Document evaluating input data, assessment procedure, reference points and HCRs (Working Document to present to the benchmark assessment of sardine in a workshop to be especially organised by ICES, likely in early 2012; results of assessment in respective ICES WK report);
- Document describing the actions taken within ANOPCERCO to facilitate the implementation of the action plan during the second reporting period (ANOPCERCO internal document).

Up to the third annual audit (early/mid 2013)

1 – Partner actions: National request to ICES/STECF/RAC.S to evaluate HCRs for the Atlanto-Iberian stock of sardine (DGPA and eventually ANOPCERCO through RAC.S); Publish work on RPs and HCRs (IPIMAR); Draft regulation document for the management of sardine fishery (DGPA); Supervise compliance to agreed – informal - measures (ANOPCERCO).

2 – National interactions: Meetings to reach agreement for the draft regulation document; Propose possible mitigation measures to reduce interactions of marine mammals and seabirds with the purse seine fishery.

3 – International interactions: Propose management plan for the Atlanto-iberian stock of sardine.

Deliverables:

- Peer reviewed public document to demonstrate the **reference points** agreed to form the base for sardine management advice in Portugal (ICES report or other scientific publication);
- Document describing the actions taken by ANOPCERCO to facilitate the implementation of the action plan during the third reporting period (ANOPCERCO internal document).

Up to the fourth annual audit (early/mid 2014)

1 – Partner actions: Publish regulation document for the management of sardine fishery (DGPA); Supervise compliance to published regulations (ANOPCERCO).

2 – National interactions: Meetings to reach agreement for the regulation document to be published and to evaluate its performance after publication and application; Evaluate the potential implications of an international management plan to existing national policy options; Test and evaluate mitigation measures to reduce interactions of marine mammals and seabirds with the purse seine fishery.

3 – International interactions: Complete management plan for the Atlanto-iberian stock of sardine.

Deliverables:

- Regulation document indicating the management objectives, policy options and control measures taken annually to guarantee that the fishing activity is performed in a responsible and sustainable manner (Portuguese legislation document);
- Document describing the added knowledge and measures taken to mitigate the problem of interactions between marine mammals, seabirds and the Portuguese purse seine fishery (IPIMAR and ANOPCERCO);
- Document describing the actions taken by ANOPCERCO to facilitate the implementation of the action plan during the fourth reporting period (ANOPCERCO internal document).

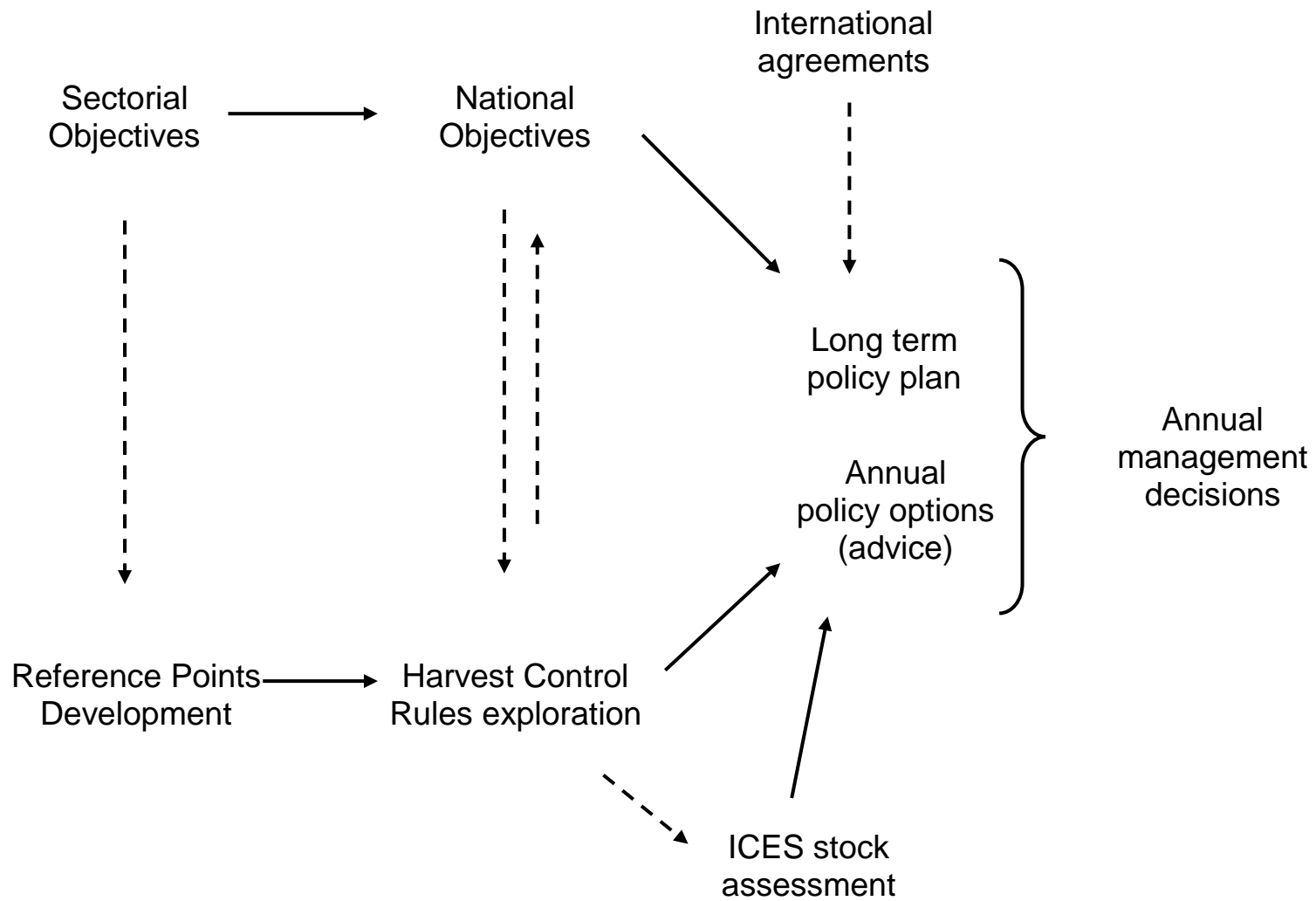


Figure: Flowchart describing the conceptual evolution of the main activities of the action plan leading to the formation of a **long term management plan** for the Portuguese purse seine fishery of sardine and its annual implementation