Lugo octopus trap fishery

Company	FishFix
Fishery client	Marine Stewardship Council
Assessment Type	Pre-assessment
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Pre-Assessment Report

1 Contents

2 Glossary

AIS	Automatic Identification System
CA	Consequence Analysis
CFP	Common Fisheries Policy
EC	European Commission
EFCA	European Fisheries Control Agency
EMFF	European Maritime and Fisheries Fund
ETP	Endangered, Threatened or Protected species
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
HCR	Harvest Control Rules
ICES	International Council for the Exploration of the Sea
IUU	Illegal, Unreported and Unregulated fishing
MCS	Monitoring, Control and Surveillance
MPA	Marine Protected Areas
MS	EU Member States
MSC	Marine Stewardship Council
NGO	Non-Governmental Organisation
OEL	Onboard Electronic Logbook
PI	Performance Indicator
PO	Producer Organisation
PRI	Point Recruitment is Impaired
PSA	Productivity Susceptibility Analysis
RBF	Risk Based Framework
SI	Scoring Issue
STECF	Scientific, Technical and Economic Committee for Fisheries
TAC	Total Allowable Catch
UoA	Unit of Assessment
UoC	Unit of Certification
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Fish Stocks Agreement
WWF	World Wide Fund for Nature
VME	Vulnerable Marine Ecosystem
VMS	Vessel Monitoring System

3 Executive summary

The Lugo octopus trap fishery pre-assessment was carried out through the Cephs and Chefs (www.cephsandchefs.com/) project funded through the Interreg Atlantic Area Program by the European Regional Development Fund, which aims to develop new markets and products based on cephalopods (squid, octopus, cuttlefish), increase the profitability of the value chain, and help to make fishers more competitive in the Atlantic Area. The pre-assessment was carried out with MSC Fisheries Standard 2.01, with Lisa Borges as expert for P1 and P3 and team leader, and Lucia Revenga as expert for P2. A site visit was conduct to Vigo, Burela and Santiago de Compostela, to carry out interviews of the main stakeholders in this fishery, namely industry associations, scientists, environmental NGOs and government authorities.

The main strengths of the Lugo octopus trap fishery are its low environmental impact, with low number of bycatch species, while the impact on the bottom is low. There is also no indication that the octopus stock, considered at part of ICES division 8c (Galicia management zones B&C combined), is decreasing, while an indicator points to a stable although naturally variable stock.

The fishery has automatically failed 1 PI (<SG60) in Principle 1 and 2 PI (<SG60) in Principle 2. There are additional 10 PIs that scored between SG60-79 and would therefore require conditions to improve. In addition, considering that are several PIs <SG80, the overall scoring of P1 will likely be below SG80 which will result in an overall failure of the fishery. In summary, the fishery has several significant weaknesses and is therefore not consistent with the MSC Fisheries Standard.

4 Resumen ejecutivo

La preevaluación de la pesquería lucense de pulpo con arte de nasa se llevó a cabo a través del proyecto Cephs and Chefs (www.cephsandchefs.com/) financiado a través del Programa Interreg Atlantic Area por el Fondo Europeo de Desarrollo Regional, cuyo objetivo es desarrollar nuevos mercados y productos para cefalópodos (calamar, pulpo, sepia), aumentar la rentabilidad de la cadena de mercado y mejorar la competitividad de los pescadores del Área Atlántica. La preevaluación se llevó a cabo mediante el Estándar de Pesquerías MSC versión 2.01, y contó con Lisa Borges como jefe de equipo y experta en los Principios 1 y 3 (Estado del stock y Gestión de pesquerías), y Lucia Revenga como experta en el Principio 2 (Impactos ambientales). El equipo se desplazó a Vigo, Burela y Santiago de Compostela para realizar entrevistas a los principales actores interesados en esta pesquería, a saber, asociaciones industriales, científicos, ONG medioambientales y autoridades gubernamentales.

Las principales fortalezas de la pesquería lucense de pulpo con arte de nasa son su bajo impacto ambiental, con un bajo número de capturas accesorias así como un mínimo impacto en el fondo marino. Tampoco hay indicios de que el stock de pulpo en parte de la división ICES 8.c (Zonas de gestión de Galicia B&C) esté disminuyendo, mientras que un indicadore apunta a un stock estable aunque naturalmente variable.

La pesquería ha suspendido automáticamente 1 Indicadore de Comportamiento (PI<SG60) en el Principio 1 y 2 Indicadores de Comportamiento (PI<SG60) en el Principio 2. Hay 10 Indicadores de Comportamiento adicionales que obtuvieron puntuaciones entre 60-79 y, por lo tanto, requerirían condiciones de mejora. Además, considerando que para el Principio 1 hay varios Indicadores de Comportamiento con puntuaciones <80, es probable que la puntuación general del Principio 1 esté también por debajo de 80, lo que resultaría en un suspenso general de la pesquería, al no reunir la puntuación necesaria para su certificación MSC. En resumen, la pesquería tiene varias debilidades significativas y, por lo tanto, no es consistente con el Estándar de Pesca MSC.

5 Report details

5.1 Aims and constraints of the pre-assessment

The aim of this pre-assessment is to provide an analysis of the strength and weaknesses of the Lugo octopus trap fishery against the MSC Fisheries Standard 2.01. As with any other pre-assessment, there might be new or additional information that may have been missed that may change the scorings attributed at this time for the fishery.

5.2 Version details

Table I – Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	**Version 2.1**
MSC Fisheries Standard	**Version 2.01**
MSC General Certification Requirements	**Version 2.3**
MSC Pre-Assessment Reporting Template	**Version 3.1**

6 Unit(s) of Assessment

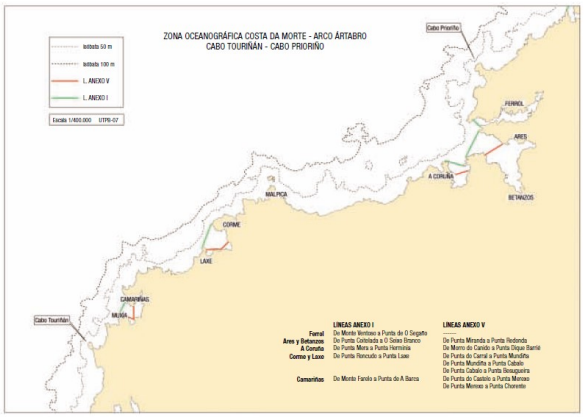
6.1 Unit(s) of Assessment

The Unit of Assessment is all fishing boats using traps fishing for common octopus in the Lugo region, north of Spain. The fishery operates mainly in inshore waters (Galicia jurisdiction), but can also go to offshore waters (national jurisdiction), between maximum 150 meters depth. All traps have bait, mainly horse mackerel, but other species such as mackerel, bogue and sardine have also been used, as well as artificial bait. There are around 1600 vessels with a fishing licence that allows targeting octopus with traps in Galicia, but in reality there are only 600 active vessels for octopus with traps. The maximum number of traps permitted is 550, but commonly only around 350-400 traps are used per vessel, as the maximum allowed is 250 traps per boat with an additional 50 traps per crew, with vessels usually having only two crews (information gathered at site visit).

Table II – Unit(s) of Assessment (UoA)

UoA 1	Description
Species	Common octopus (*Octopus vulgaris*)
Stock	Stock considered at the Arco Ártabro and Arco Cantábrico combined (Galician management zones B&C combined, corresponding to part of ICES division 8.c), northern Galicia, Spain.
Geographical area	Lugo province, northern Galicia, Spain, part of ICES division 8.c
Harvest method / gear	Traps
Client group	All fishing boats using traps fishing for common octopus in the Lugo province, northern Galicia, Spain.
Other eligible fishers	

Justification for choosing the Unit of Assessment	



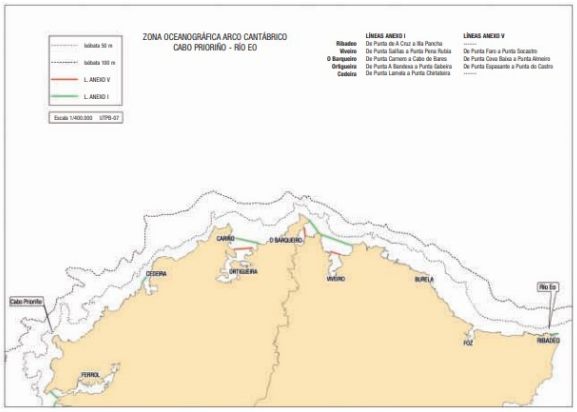


Figure 1 – Map of Arco Ártabro and Cantábrico, northern Galicia, Spain, with the red and green line (annex I and V) delimiting the area where octopus trap fishery may operate (Xunta de Galicia, 2007).

7 Traceability

7.1 Traceability within the fishery

Octopus caught in this fishery is landed and divided by sizes in boxes at the landing site (not at sea). Each box is identified with a code bar that identifies the vessel, and that identification continues until auction. Octopus are always sold fresh, but individual bigger than 2 kg are frozen after being sold, while smaller individuals are sold fresh in fish shops.

Table III – Traceability within the fishery

Factor	Description
Will the fishery use gears that are not part of the Unit of Certification (UoC)? If Yes, please describe: - If this may occur on the same trip, on the same vessels, or during the same season; - How any risks are mitigated.	The vessels using traps may switch fishing gear, but not on the same day and they will not target octopus.
Will vessels in the UoC also fish outside the UoC geographic area? If Yes, please describe: - If this may occur on the same trip; - How any risks are mitigated.	Vessels fishing in the Lugo region are also technically allowed to fish in other areas of Galicia, but they do not.
Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities. - Transport - Storage - Processing - Landing	The trap fishery that targets octopus lands with vessels identifiers. However, the same vessels can target velvet crab with traps, and catch and land octopus. Nevertheless, these vessels have a daily obligation of reporting their fishery activity, i.e. if they are targeting octopus or crab, while they target crab at night. Octopus is also caught by trawl, but these are different vessels and they are not mixed at landing and at auction.

- Auction If Yes, please describe how any risks are mitigated.	
Does transhipment occur within the fishery? If Yes, please describe: - If transhipment takes place at-sea, in port, or both; - If the transhipment vessel may handle product from outside the UoC; - How any risks are mitigated.	Transhipment does not occur in this fishery. It's a local daily fishery, where vessels normally leave at dusk and return at dawn and fish is landed daily. Octopus catches may be transported by van to be auction at a different landing site, but are properly identified with sale notes.
Are there any other risks of mixing or substitution between certified and non-certified fish? If Yes, please describe how any risks are mitigated.	No

8 Pre-assessment results

8.1 Pre-assessment results overview

8.1.1 Overview

The Lugo octopus trap fishery targets a stock that the available relative index of abundance points to a stable population. The fishery is quite selective with no major bycatch species or impacts in the ecosystem. However, a defined HCR and specific short and long-term management objectives are lacking. There is also lack of information regarding bait species and alternative measures to minimise bycatch mortality to enable the scoring of several PIs.

Therefore, when analysing the Lugo octopus trap fishery against the MSC Fisheries Standard 2.01, the fishery automatically failed 1 PI (<SG60) in Principle 1 and 2 PI (<SG60) in Principle 2. There are additional 10 PIs that scored between SG60-79 and would therefore require conditions to improve. In addition, considering that are several PIs <SG80, the overall scoring of P1 will likely be below SG80 which will result in an overall failure of the fishery.

8.1.2 Recommendations

Based on the results summarised above, the following recommendations are made:

- Well-defined Harvest Control Rules need to be developed and implemented
- Stock information and assessment needs to be improved
- Fishery specific short and long-term objectives need to be defined, in accordance with the precautionary approach and maximum sustainable yields policy objectives.
- A review of alternative measures to minimise mortality of unwanted catch is established by the UoA.
- Further information should be collated in relation to bait species, to ensure that the use of bait does not harm or hinder recovery of their stocks of origin.
- Further information on the distribution of traps in the fishing grounds (and the possible setting on seapen and burrowing megafauna communities) and on ecosystem relationships in the UoA region would serve to increase the score of habitat and ecosystem PIs.

8.2 Summary of potential conditions by Principle

Table IV – Summary of Performance Indicator level scores

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

8.3 Summary of Performance Indicator level scores

Table V – Summary of Performance Indicator level scores

Performance Indicator	Draft scoring range	Data deficient?
1.1.1 – Stock status	**<60**	**Yes**
Rationale or key points		
RBF used to derive the score considering a high risk CA a priori.		
1.1.2 – Stock rebuilding	**NA**	**NA**
Rationale or key points		
RBF was used to score P1.1.1		
1.2.1 – Harvest Strategy	**60-79**	**Yes**
Rationale or key points		
There is a harvest strategy and it is responsive to the state of the stock. There is a closed season, minimum size, a regional licencing scheme, gear restrictions and data collection. The harvest strategy elements have worked together in the past when catch rates decreased.		
1.2.2 – Harvest control rules and tools	**60 – 79**	**Yes**
Rationale or key points		
There is a generally understood HCR and stock exploitation is being limited, but the HCR is not well-defined, while there is uncertainty if the HCR is robust and if the required exploitation levels under the HCR are being reached.		
1.2.3 – Information and monitoring	**60 – 79**	**Yes**
Rationale or key points		
There is insufficient information regarding stock structure while there is only one index of abundance.		
1.2.4 – Assessment of stock status	**≥80**	**Yes**
Rationale or key points		
Default score as RBF was used to score PI 1.1.1.		
2.1.1 – Primary Outcome	**60-79**	**No**
Rationale or key points		
According to research, there are no primary species in the catch. The only primary species to consider are bait species. Atlantic horse mackerel is the only main primary species to consider, and the stock size is just		

at B_{lim}, therefore not highly likely to be above PRI.		
2.1.2 – Primary Management	**<60**	**No**
Rationale or key points		
To the team's knowledge there is no review of alternative measures to minimise the mortality of main primary species.		
2.1.3 – Primary Information	**60-79**	**No**
Rationale or key points		
There is uncertainty on the origin and quantity of bait used by the UoA.		
2.2.1 – Secondary Outcome	**≥80**	**No**
Rationale or key points		
According to research, the only main secondary species to consider are *Nassarius* spp species. The species has been scored using the RBF and has obtained a score of >80.		
2.2.2 – Secondary Management	**≥80**	**No**
Rationale or key points		
According to Bañon et al (2018) *Nassarius* spp are always discarded, so there is room for survival of interacted main species.		
2.2.3 – Secondary Information	**≥80**	**No**
Rationale or key points		
Bañon et al (2018) provide detailed information on catch composition by the UoA. Besides, productivity attributes have been found at www.sealifebase.ca and susceptibility attributes have been determined by the team.		
2.3.1 – ETP Outcome	**60-79**	**Yes**
Rationale or key points		
ETP species interacted is *Charonia lampas*. According to Bañon et al (2018) these interactions are low and considered likely not to hinder the recovery of the species.		
2.3.2 – ETP Management	**<60**	**No**
Rationale or key points		
To the team's knowledge there is no review of alternative measures to minimise mortality of ETP species.		
2.3.3 – ETP Information	**≥80**	**No**
Rationale or key points		

Research by Bañon et al (2018) provides sufficient information on expected interactions and mortality levels. This information can be used in the development of management measures or strategies and to assess its effectiveness.		
2.4.1 – Habitats Outcome	**≥80**	**No**
Rationale or key points		
The light nature of the gear does not create irreversible impacts on benthic habitats. This should be verified by local researchers at a full assessment.		
2.4.2 – Habitats Management	**60-79**	**No**
Rationale or key points		
The light nature of the gear and the limitation in the number of traps set by the UoA work as a partial strategy to manage impacts on the seabed. However, VME areas such as seapen and burrowing megafauna communities are not protected effectively.		
2.4.3 – Habitats Information	**≥80**	**No**
Rationale or key points		
Emodnet and OSPAR maps provide sufficient information on the nature of affected habitats.		
2.5.1 – Ecosystems Outcome	**≥80**	**No**
Rationale or key points		
Total removals of octopus in the region are known, and the UoA represents a small fraction of these removals. The role of octopus in the food web structure is also known.		
2.5.2 – Ecosystems Management	**≥80**	**No**
Rationale or key points		
The UoA is managed through the allocation of licences which allow for a certain number of traps to be deployed by each boat. Management measures seem to be enforced adequately.		
2.5.3 – Ecosystems Information	**≥80**	**No**
Rationale or key points		
There is a broad range of information both on the trophic relationships in the area and on the interactions of the UoA on non-target species.		
3.1.1 – Legal and customary framework	**≥80**	**No**
Rationale or key points		
The EU, Spanish and Galician management system exists within an appropriate legal and/or customary framework which ensures that it delivers fisheries sustainability.		
3.1.2 – Consultation, roles and responsibilities	**60 – 79**	**No**
Rationale or key points		

Consultation roles and responsibilities are well defined and clear, but while NGOs are not invited to the co-management process, the management system does not take all relevant information into account and it is not open to all stakeholders.		
3.1.3 – Long term objectives	**≥80**	**No**
Rationale or key points		
There are clear long term precautionary and MSY objectives in the CFP, in the Spanish an Galician fisheries laws.		
3.2.1 – Fishery specific objectives	**60 – 79**	**No**
Rationale or key points		
There are general objectives for the management of Lugo octopus trap fishery. However, there are no specific short-term and long-term objectives.		
3.2.2 – Decision making processes	**60 – 79**	**No**
Rationale or key points		
There are established decision making processes, through the co-management plan, that take important issues into account and use the precautionary approach in decision-making. However, information on the fishery's management action is not available.		
3.2.3 – Compliance and enforcement	**≥80**	**Yes**
Rationale or key points		
The MCS mechanisms that are implemented are effective, while there is no evidence of systematic non-compliance with fisheries management measures.		
3.2.4 – Management performance evaluation	**≥80**	**No**
Rationale or key points		
There are monitoring systems in place, namely of catches (volume and sizes), effort, licences and closed areas, to evaluate the fisheries management system.		

8.4 Principle 1

8.4.1 Principle 1 background

The common octopus (*Octopus vulgaris)* is a benthic species distributed widely in temperate and tropical waters. In the northern Spanish continental coast spawning extends from December to September with a unique peak in spring. During the brooding period (up to 4 months depending on water temperature), females almost cease feeding and many die after the hatching of the larvae, while male usually die after spawning. Hatching occurs at the end of summer beginning of autumn and larvae growth is highly influenced by environmental conditions, namely the intensity and frequency of upwelling event. *Octopus vulgaris* has a rapid growth, growing 5% per day after recruitment. It reaches first maturity at about 903 g in males, 1788 g in females in Galicia. It feeds on bivalves and crustaceans (Otero et al., 2007, 2008; Alonso-Fernández et al., 2017; Jereb et al., 2015; FAO, 2019).

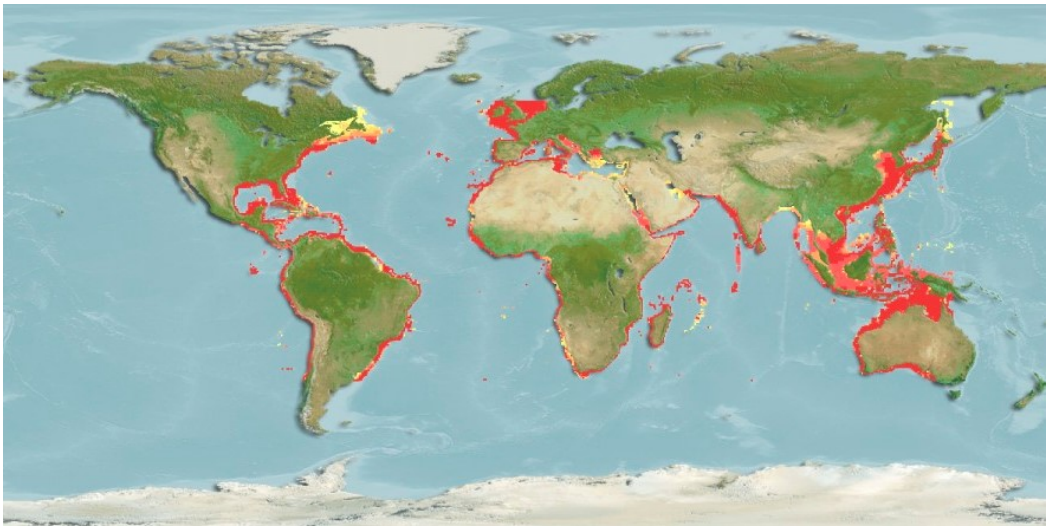


Figure 2 - Global distribution of common octopus (SeaLifeBase, 2019).

Table VI - Species biological attributes for common octopus (Source: https://www.sealifebase.ca/summary/octopus-vulgaris.html, http://www.fao.org/fishery/species/3571/en, Otero et al., 2007, Alonso-Fernández et al., 2017, Jereb et al., 2015).

Species biological attributes			
Species	*Octopus vulgaris*	**Average age maturity**	1.5 years
Reproductive strategy	Demersal egg layer and brooders	**Average maximum age**	2 years
Length of larvae phase	3 months	**Fecundity (No of eggs)**	12,861 - 634,445
Movement of adults	Limited offshore-inshore breeding migration	**Average size at maturity**	903g male; 1788g female
Sediment type	rocky, sandy and muddy bottoms	**Average maximum size**	2/3kg male; 4 kg female
Depth	0-100 m	**Trophic level**	Variable but >3.5

Stock Identity

Octopus can be generally considered panmictic, i.e. where all individuals are potential partners and thus random mating occurs. *Octopus vulgaris* may show some genetic differentiation at a wider geographical scale but at smaller scale regions such as within ICES division 8c or 9a there is no evidence of genetically different populations (Cabranes, et al., 2008; J. Pereira, pers. comm.).

However, the trial co-management plans for the octopus trap fisheries in Galicia (see harvest strategy & control rules section below) are divided between three management areas: Rias Baixas - A, Arco Ártabro - B and C - Arco Cantábrico (Figure 3). These areas divisions are also based on the distinct oceanographic conditions of each area, namely of an area of upwelling, transition, and northern conditions; respectively (information gathered at site visit). These oceanographic zones are characterized by differences in the upwelling strength and timing and primary productivity (Álvarez et al., 2011; 2012 in Bañón et al., 2018).

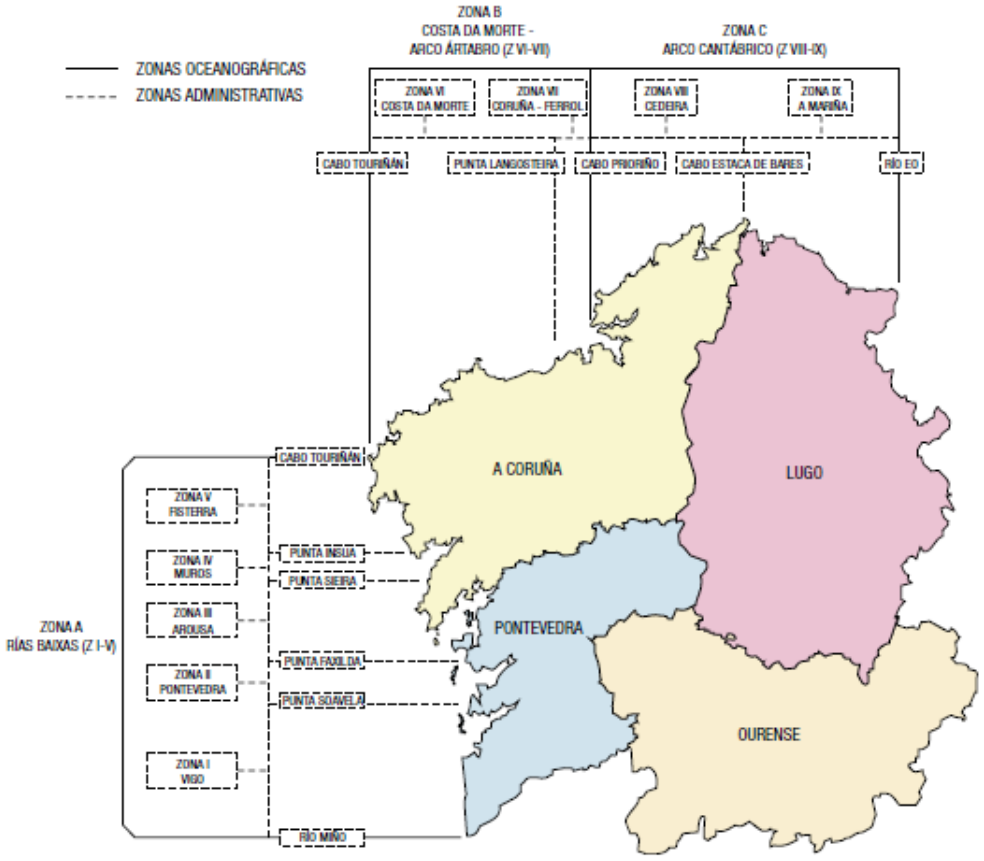


Figure 3 – Map of Galicia with the geographical limits of the nine administrative zones grouped in three zones (Xunta de Galicia, 2007).

In summary, there is some evidence that there is an *Octopus vulgaris* population structure consistent with separation by, if not the three management zones in the Galicia region, at least two (A and B&C) that might reflect different local biogeographical zones. In addition, since there are also three different co-management plans, one per zone, the following P1 assessment is carried out at the Arco Ártabro and Cantábrico, zones B&C combined (part of ICES division 8c) considering that there is one *O. vulgaris* stock.

Stock assessment & status

There has been no attempt to analytically assess the stock of *Octopus vulgaris* in zones B&C combined (part of ICES division 8.c) or even in the Galician part of ICES division 8.c. There is however available a standardised CPUE for the Galician trap fishery (Alonso-Fernández et al., 2019) in the Galician part of ICES division 8.c.which can be considered as a proxy for stock biomass.

Alonso-Fernández et al. (2019) standardized the catch rate of common octopus by modelling the number of individuals caught (N) in each haul where counts were standardized by means of fitting zero-inflated GLMMs to the observer's data. Zero-inflated models are mixture models where a binomial GLM is used to model the probability of measuring a zero, and the count process is modelled by a negative binomial (ZINB) GLM. Models including nested random effects of vessel and fishing trip within vessel. The response variable was modelled as a function of explanatory variables assumed to influence catchability including: soak time (T), year (YR) and month (M) of operation, coastal zone (ZN), sea floor type (SF), haul depth (DP), sea surface temperature (SST), gross register tonnage (GRT), and proportion of soak time at night (ST).

Common octopus abundance was positively related to soak time and sea surface temperature and negatively with haul depth and sea floor type. The standardized index of relative abundance of common octopus showed wide interannual fluctuations but remained relatively stable during the study period and in both the Galician coast of division 8.c and 9.a (the same pattern shown in total landings, Figure 3). Relative abundance of *O. vulgaris* was consistently higher in the Galician coast of ICES 8.c, with both areas of the Galician coast of 8.c and 9.a showing a minimum of abundance in 2005 and 2015 (Figure 4).

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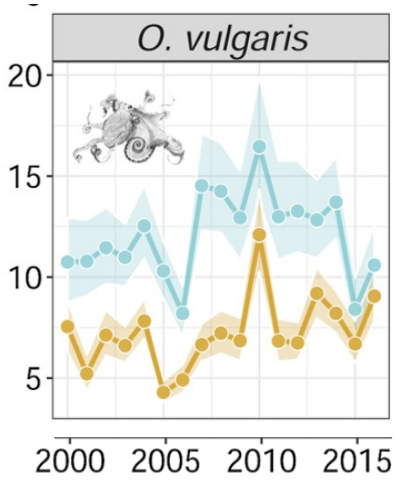


Figure 4 – Time series of the estimated indices of abundance for O*ctopus vulgaris* analysed from 2000 to 2016 in the Galician coast (NE Atlantic). Light blue line indicates the Galician coast of ICES division 8.c, and the orange line shows the Galician coast of ICES division 9.a. Shaded areas represent 95% confidence intervals (uncertainty in the random effects was ignored) (Alonso-Fernández et al., 2019).

Nevertheless, since there is no reference points estimated for the stock, a Risk-Based Framework Assessment was carried out to score PI 1.1.1 assuming a priori a high risk in the Consequence Analysis, and therefore moving directly to the Productivity Susceptibility Analysis. A PSA is designed to show the likely risk posed by the fishery to the population based on the biological characteristics of the stock and the likely susceptibility to capture. However, the results of this pre-assessment are provisional as in an MSC assessment PSA is a participatory analysis achieved by contributions by all stakeholders. When undertaking a PSA in MSC Principle 1, it is important to consider the combined contributions of all fishing gears fishing the target species over the range of the stock. Octopus vulgaris in Galicia is caught predominantly by trap fisheries, but also caught in small quantities with trammel nets and trawlers, between 10% to 20% of total catches (García-Tasende et al., 2009 *in* Bañón et al., 2018).

Table VII - Common Octopus PSA Productivity reasoning and scores (Otero et al., 2007; Jereb et al., 2015; information gathered at site visit).

Productivity	Rationale	Score
Average age at maturity	1.5 years	1
Average maximum age	2 years	1
Fecundity	12,861 - 634,445 eggs	1
Reproductive strategy	Demersal egg layer	2
Trophic level	Variable but >3.5	3
Density dependence	No depensatory or compensatory dynamics demonstrated or likely	2
Total Productivity (average)		1.67

The productivity scores are fixed for the species, regardless of how the species is caught. By contrast the susceptibility scores will be different for each gear type catching the species within the stock area, in this case traps, trammels nets and trawls. In scoring the susceptibility attributes for octopus in Galicia the rationale for the area overlap was that fishing occurs in more than 30% of the stock area. As for encounterability and post capture mortality, were evaluated considering the default score for target species. Selectivity was based on information gathered at site visit that: 750g individuals are frequently caught while individuals of 500g are retained by traps, while for trawl 500g individuals are frequently caught and retained.

Table VIII - Common Octopus PSA Susceptibility reasoning and scores (information gathered at site visit).

Susceptibility	Rationale	Score
Area Overlap	The trap, trammel nets and trawl fisheries operate in an area corresponding to more than 30% of the stock area.	3
Encounterability	High overlap with fishing gear - default score for target species.	3
Selectivity	Individuals < size at maturity are	3

	frequently caught and individuals < half the size at maturity are retained by gear.	
Post capture mortality	Retained species default score.	3

The RBF analysis resulted in an overall score for the PSA of 3.43, which corresponds to a MSC score of 54.

Harvest strategy & control rules

Galicia regional government, Spain and the EU have jurisdiction over the octopus stock in the Galician part of ICES division 8.c. There is a minimum size of 1000 g established at national level (Order 27 July 2012), a licencing scheme for up to 5 fishing gears but only one can be used daily, fishing quota per crew/day and weekend closure to fishing for octopus with traps established at Galician level (Resolution 9 May 2019). Decree 15/2011 also regulates the number of traps allowed per vessel with numbers ranging from 175 traps to a maximum of 550 traps per vessel, depending, among other factors, on the size of the crew. Galician Decree 15/2011 also sets the maximum size of the traps (55 cm length, 35 cm high, and 16 cm opening) together with the areas where these can be allocated (see Annex I and Annex V).

There is also the trial co-management plans for octopus caught with traps in Galicia, one for each management zone A, B and C, which in turns sets the fishing effort allowed for each year and the corresponding closure of the fishery for 1.5 months. The plan is renegotiated every year when the specific dates for the seasonal closure are established, from 17 May till 1 July in 2019 in zone C (Resolution 9 may 2019) for example. During the closed season, the traps are to be removed and brought to port. As the vessels are all less than 12 meters, they have no VMS and have only to report catches in logbooks in paper format.

Finally, there is also the EU Western Waters MAP that establishes fishing capacity levels and a minimum mesh size for trawls targeting fish (Regulation (EU) 2019/472). Trawling is also only permitted at depths higher than 100 metres.

8.4.2 Catch profiles

Common octopus was the most important species for the small sale fisheries sector with an average of around 2 439 tonnes per year between 2000 and 2016 in Galicia (part of ICES division 9.a and 8.c; Alonso-Fernández et al., 2019). Catches in Galician part of ICES division 8.c have been variable annually but have remained relatively stable over the study period at around 800 tonnes annually (Figure 5). *O. vulgaris* is also caught in small quantities with trammel nets and trawlers, between 10% to 20% of total catches (García-Tasende et al., 2009 in Bañón et al., 2018).

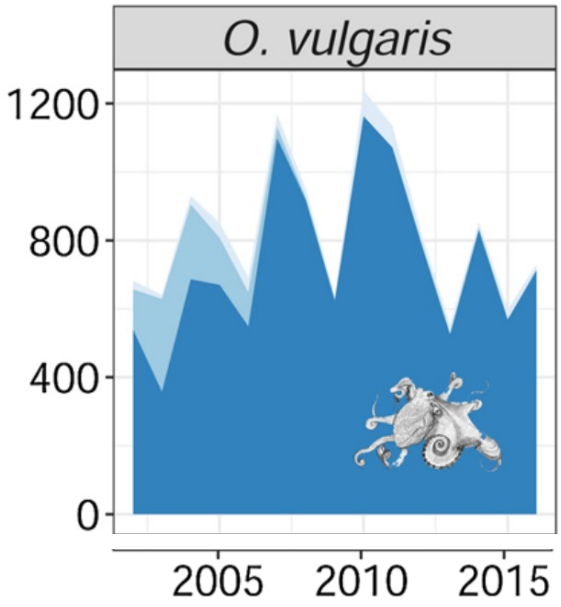


Figure 5 – Time series of landings in Galician (NE Atlantic) fishing ports located in ICES division 8.c. Colour gradient, from dark blue to light blue, represents landings corresponding to: i) the small scale fisheries (SSF) only; ii) the SSF + landings of unknown origin, and iii) total landings (SSF + uncertain + industrial) (Alonso-Fernández et al., 2019).

Table IX – Catch data for trap

Total catch	Year	**2018**	Amount	**X tonnes**
UoA share of total catch	Year	**2018**	Amount	**X tonnes**
Total green weight catch by UoC	Year (most recent)	**2018**	Amount	**X tonnes**
Total green weight catch by UoC	Year (second most recent)	**2017**	Amount	**X tonnes**

8.4.3 Principle 1 Performance Indicator scores and rationales

PI 1.1.1 – Stock status

Risk Based Framework was used to score this PI. Total score was 54. See section 7.3

PI 1.1.2 – Stock rebuilding

Not applicable as RBF was used to score PI1.1.1

PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Common octopus in ICES division 8.c is managed nationally by Spain and regionally by Galicia and supranational by the EU. There are several general regulations in place at EU level to manage Atlantic fisheries (Western Waters Multi-Annual Plan) and regional level (Decree 15/2011and Resolution 9 may 2019) that contain different management measures. There is a closed season, minimum size, a regional licencing scheme, gear restrictions and data collection. Therefore, SG60 is reached. Furthermore, the harvest strategy is responsive to the state of the stock, namely when catch rates decreased in the past, and the elements work together and thus SG80 is reached. However, the harvest strategy is not designed to achieve stock management objectives and SG100 is not met.

b	Harvest strategy evaluation			
	Guide post	The harvest strategy is **likely** to work based on prior experience or plausible argument.	The harvest strategy may not have been fully **tested** but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been **fully evaluated** and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	**Yes**	**No**	**No**
Rationale				

A closed season, a licencing scheme and fishing restriction can work to limit fishing mortality. Furthermore, there is a monitoring scheme for biological data collection and for control purposes. So SG60 is reached. Since relative stock abundance has been relatively stable in recent years evidence exists that the harvest strategy is not hindering recovery but not necessarily achieving its objective and SG80 is not reached. Furthermore, as the harvest strategy has not been fully evaluated SG100 is also not met.

c	Harvest strategy monitoring

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

Rationale

There is monitoring in place to collect data on catches and biological data, although no independent abundance surveys are carried out.

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

Rationale

The harvest strategy whit its annual trial co-management plans is review periodically and thus SG100 is reached.

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

Rationale

Not applicable to this pre-assessment based on catch composition.

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

Rationale

Octopus discarded have very high survival rate from trap fishery.

References

- Alonso-Fernández, A., Otero, J., Bañón, R., et al. 2019. Inferring abundance trends of key species from a highly developed small-scale fishery off NE Atlantic. Fisheries Research 209, 101–116.
- Resolution 9 may 2019 Trial management plan for octopus taken with traps in Galicia
- Galicia Decree 15/2011 which sets allowed fishing gears in the region of Galicia
- Information gathered at the site visit.

Draft scoring range	60-79
Information gap indicator	**More information sought**

PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guide post	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
	Met?	**Yes**	**No**	**No**
Rationale				

There are generally understood HCR in place that may reduce exploitation when the state of the stock approaches its PRI. The HCR takes the form of daily catch limitations per vessels, maximum number of traps allowed per vessels, licencing scheme, minimum size and a closed season. Therefore, SG60 is reached. However, there no well define HCR and SG 80 is not reached.

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

There is no information that the general HCR is likely to be robust to main uncertainties and thus SG80 is not reached.

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

A closed season, a licencing scheme and input and output fishing restriction can be effective in limiting exploitation. Furthermore the stock abundance index has been relatively stable over a 17 year period. Therefore there is some evidence that the tools used are controlling exploitation and SG60 is reached. However, there is uncertainty if the required exploitation levels are being reached and thus SG80 is not reached.

References

- Alonso-Fernández, A., Otero, J., Bañón, R., et al. 2019. Inferring abundance trends of key species from a highly developed small-scale fishery off NE Atlantic. Fisheries Research 209, 101–116.

- Resolution 9 may 2019 Trial management plan for octopus taken with traps in Galicia
- Galicia Decree 15/2011 which sets allowed fishing gears in the region of Galicia

Draft scoring range	60-79
Information gap indicator	**More information sought**

PI 1.2.3 – Information and monitoring

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

There is information on catch from the Galician fisheries and biological data (length, maturity) of the species over the three Galician management zones. However, there isn't sufficient information on stock structure and thus SG80 is not reached.

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

UoA removals are monitored and there is one indicator of stock abundance is available and thus SG60 is reached. As there is only one indicator SG80 is not reached.

c	Comprehensiveness of information			
	Guide post		There is good information on all other fishery removals from the stock.	
	Met?		**Yes**	

Rationale

There is catch information from all gears catching octopus in the Galicia, namely from trawl, gillnets and traps targeting crustaceans and thus SG80 is reached.

References

- Alonso-Fernández, A., Otero, J., Bañón, R., et al. 2019. Inferring abundance trends of key species from a highly developed small-scale fishery off NE Atlantic. Fisheries Research 209, 101–116.

Draft scoring range	60-79
Information gap indicator	**More information sought**
Data-deficient? (Risk-Based Framework needed)	**No**

PI 1.2.4 – Assessment of stock status

Default score of 80 as RBF was used to score PI1.1.1

8.5 Principle 2

8.5.1 Principle 2 background

Landing records only collect information on the landings of octopus and other commercial species when present in the catch. The following Scoring element table has been elaborated with public information gathered by Bañon et al. (2018) who have listed the different species present in the catch of the octopus trap fishery in the coast of Lugo. MSC FS v2.01 SA 3.1.3-3.1.5 criteria has been used to classify them as main or minor, primary, secondary or ETP species.

Table X – Scoring elements

Component	Scoring elements	Designation	Data-deficient
Principle 1	*Octopus vulgaris (*Octopus / Pulpo común)	N/A	No
Primary	*Trachurus trachurus* (Atlantic horse mackerel / Jurel*)*	Main	No
Primary	*Sardina pilchardus (*Sardine / Sardina*)*	Minor	No
Primary	*Scomber scombrus (*Mackerel / Caballa*)*	Minor	No
Secondary	*Nassarius incrassatus* (Thick licked dog whelk / Bucinos de perro)	Main	Yes
Secondary	*Nassarius reticulatus* (Netted dog whelk / Bucinos de perro)	Main	Yes
Secondary	*Necora puber* (Velvet crab / Nécora*)*	Main	Yes
Secondary	*Polybius henslowi* (Henslow swimming crab / Cangrejo patudo)	Minor	Yes
Secondary	Paguridae (Hermit crabs / Cangrejos ermitaños)	Minor	Yes
Secondary	Palaemon spp. (Prawns / gambas)	Minor	Yes
Secondary	Atelecyclus spp. (Crabs / Cangrejos)	Minor	Yes
Secondary	*Scyllarus arctus* (Slipper lobster / Santiaguito*)*	Minor	Yes
Secondary	Galatheoidea (decapods crustaceans)	Minor	Yes
Secondary	*Homarus gammarus (*European lobster / Bogavante*)*	Minor	Yes
Secondary	*Cancer pagurus (*Edible crab / Buey de mar*)*	Minor	Yes
Secondary	*Maja brachydactyla (Maja squinado) (*Spiny spider crab / Centollo*)*	Minor	Yes
Secondary	Asteroidea (Sea star / Estrellas de mar)	Minor	Yes
Secondary	Ophiuroidea (Brittle star / Ofiuras)	Minor	Yes
Secondary	Holothuroidea (Sea cucumber / Holoturias)	Minor	Yes
Secondary	Echinoidea (Sea urchin /Erizos de mar)	Minor	Yes

Secondary	*Conger conger (*European conger / Congrio)	Minor	Yes
Secondary	*Serranus cabrilla (*Comber / Serranus cabrilla*)*	Minor	Yes
Secondary	*Trisopterus luscus (*Pout / Faneca)	Minor	Yes
Secondary	*Gaidropsarus vulgaris* (Three-bearded rockling / Barbada)	Minor	Yes
Secondary	*Coris julis* (Mediterranean rainbow wrasse / Doncella)	Minor	Yes
Secondary	*Parablennius gattorugine (*Tompot blenny / Cabruza)	Minor	Yes
Secondary	*Labrus mixtus* (Cuckoo wrasse / Gallito de rey)	Minor	Yes
Secondary	*Boops boops (*Bogue / Boga)	Minor	Yes
Secondary	*Scomber colias* (Atlantic chub mackerel / Estornino)	Minor	Yes
ETP	*Charonia lampas (*Triton's trumple / Bocina de mar*)*	N/A	Yes

Primary, secondary and ETP species

Lugo trap fishery is an artisanal fleet with vessels <15 m length vessels which do not have an obligation to carry electronic logbook onboard. Certain information on catch composition can be obtained from landing notes, however these notes only collect information on the species actually landed, that is, with commercial value. At present there is no official recording of species in the catch with no commercial value and there is no information on the survival rate after their release.
Bycatch of the octopus trap fishery in the Lugo region has been however studied in detailed by Bañon et al. (2018), who analysed data collected by scientific observers placed in the fishery between 1999 and 2015. This analysis showed that in the Cantabrian Sea (where the UoA takes place), octopus accounted for 77.7% of the catch, with different molluscs, crustaceans, echinoderms and fish accounting for the pending 22% of the catch. No single species meet the requirements to be considered as a main species, since they all accounted for less than 5% of the catch, and only the family group *Nassarius* accounted for more than 5% but it comprises information on different species.

Table XI - Main species by taxonomic groups caught in octopus traps in percentages of biomass of total catch, and the fraction discarded in relation to the total catch of each species or species group. Data from surveyed traps between 1999 to 2015 (table S1, Bañon et al, 2018).

Scientific name	Rías Baixas	Ártabro Gulf	Cantabrian Sea	Total Galicia	Discards
Octopus vulgaris	67.7	71.5	77.7	70.4	26.6
Nassarius spp.	9.5	5.1	5.7	7.9	100
Charonia lampas	0.3	0.9	0.8	0.5	56.8
Rest (# sp.)	<0.1(22)	<0.1(18)	<0.1(8)	<0.1(25)	
Total Mollusca	77.7	77.5	84.3	78.8	34.2
Polybius henslowi	4.5	5.6	4.7	4.8	94.7
Necora puber	2.8	3.9	3.4	3.2	47.7
Paguridae	0.3	0.2	0.1	0.2	100
Palaemon spp.	0.3	0.1	<0.1	0.2	1.1
Atelecyclus spp.	0.3	<0.1	<0.1	0.2	99.6
Scyllarus arctus	0.1	0.4	0.1	0.1	57.7
Galatheoidea	0.1	0.2	0.1	0.1	99.1
Homarus gammarus	0.1	0.3	<0.1	0.1	49.7
Cancer pagurus	0.1	0.2	<0.1	0.1	82.6
Maja brachydactyla	0.1	0.1	<0.1	0.1	96.9
Rest (# sp.)	0.1(13)	<0.1(11)	0.1(7)	0.1(13)	
Total Crustacean	8.9	11.0	8.7	9.3	75.7
Asteroidea	9.0	6.6	3.5	7.5	99.8
Ophiuroidea	0.3	<0.1		0.2	100
Holothuroidea	<0.1	<0.1	<0.1	<0.1	100
Echinoidea	<0.1	<0.1	<0.1	<0.1	100
Total Echinoderm	9.4	6.7	3.5	7.7	99.8
Conger conger	2.0	3.0	0.9	2.1	60.5
Serranus cabrilla	0.4	0.8	2.0	0.8	75.3
Trisopterus luscus	0.6	0.1	<0.1	0.4	14.4
Gaidropsarus vulgaris	0.4	0.3	0.1	0.3	25.2
Coris julis	0.1	0.1	0.1	0.1	40.4
Parablennius gattorugine	0.1	<0.1	<0.1	0.1	100
Labrus mixtus	<0.1	0.1	0.1	0.1	56.3
Rest (# sp.)	0.3 (61)	0.2 (60)	<0.1(23)	0.3(68)	
Total Pisces	4.0	4.8	3.5	4.2	56.7

Other primary and secondary species to be considered are bait species used in the traps. According to Bañón et al (2018), baiting mainly occurs at the harbour before departure. Baits are put into mesh bags and usually consist of fatty fish such as sardine *(Sardina pilchardus*), mackerel (*Scomber scombrus*) or Atlantic horse mackerel (*Trachurus trachurus*), but also many other secondary species such as bogue (*Boops boops*) or Atlantic chub mackerel (*Scomber colias),* among others. Although a single species by trap is frequently used as bait, a mixture of two or three species is also used occasionally. Additionally, manufactured baits have also been used from at least 2010. In 2015, manufactured baits were the most common, occurring in 26% of the sampled traps. Stakeholders met at the site visit mention that baits are generally comprised of Atlantic horse mackerel most often, but also bogue, crabs (*Carcinus maenas*), Atlantic chub mackerel or manufactured bait. In the past sardine was also used as bait but this is no longer in practice.

Given that traps are generally baited and that they do not always catch octopus, it could be expected that the total bait used accounts for more than a 5% of the total catch by the UoA, however with the given data it is difficult to determine if any species used as bait reaches this percentage. Further information is needed on the success of the fishing strategy (quantity of bait needed to fish the same amount of octopus) and as regards the proportion of the different species used as bait.

Primary species

According to ICES 2019 advice for horse mackerel (*Trachurus trachurus*) in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k (the Northeast Atlantic), main primary species for the UoA, the stock and the fishery are very dependent on occasional high recruitments. After a series of low recruitments, the estimates since 2014 are above

average (1983–2018). SSB has been declining since 2006 and has been around B_{lim} since 2015. Fishing mortality has decreased since 2013 but remains above F_{MSY}. ICES advises that when the MSY approach is applied, catches in 2020 should be no more than 83 954 tonnes. ICES assesses that fishing pressure on the stock is above F_{MSY}, between F_{pa} and F_{lim}; spawning stock size is below MSY $B_{trigger}$, between B_{pa} and B_{lim}.

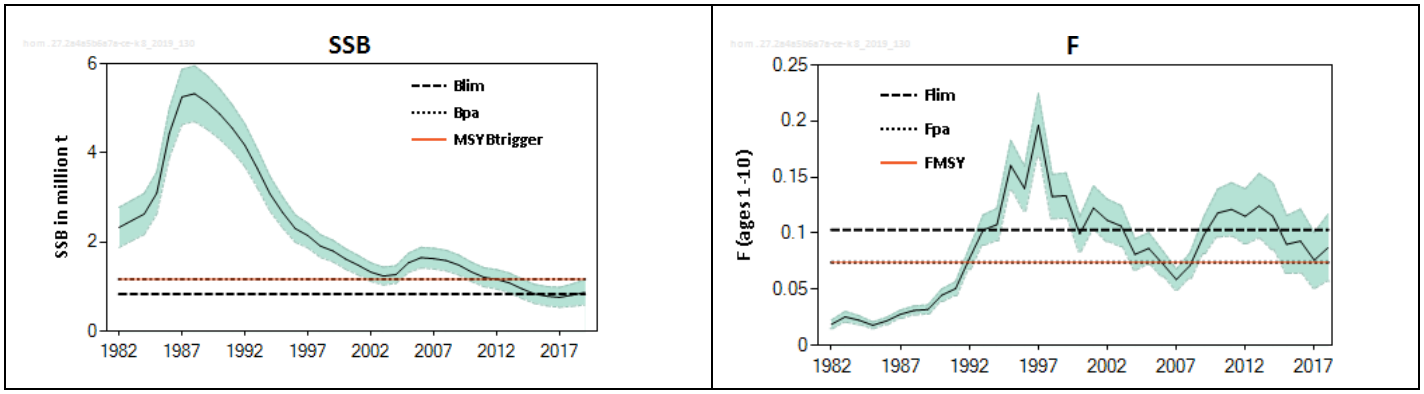


Figure 6 - Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Summary of the stock assessment. Plots show 95% confidence intervals (shaded area). Source: ICES 2019 advice for horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k.

Table XII - Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. State of the stock and fishery relative to reference points. Source: ICES 2019 advice for horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k.

	Fishing pressure					Stock size				
		2016	2017	2018			2017	2018	2019	
Maximum sustainable yield	F_{MSY}	✗	✗	✗	Above	MSY $B_{trigger}$	✗	✗	✗	Below trigger
Precautionary approach	F_{pa},F_{lim}	o	o	o	Increased risk	B_{pa},B_{lim}	✗	✗	o	Increased risk
Management plan	F_{MGT}	–	–	–	Not applicable	B_{MGT}	–	–	–	Not applicable

ICES provides advice for the sardine stock in Iberian waters. According to ICES 2019 advice for sardine (*Sardina pilchardus*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters), the biomass of age 1 and older fish has remained below B_{lim} since 2011. Recruitment has been low since 2005. Fishing mortality is the lowest in the time-series but still above F_{MSY}. ICES assesses that fishing pressure on the stock is above F_{MSY}, below F_{pa}, and below F_{lim}. Biomass 1+ is below MSY $B_{trigger}$, B_{pa}, and B_{lim}. When the MSY approach is applied, catches in 2020 should be no more than 4 142 tonnes.

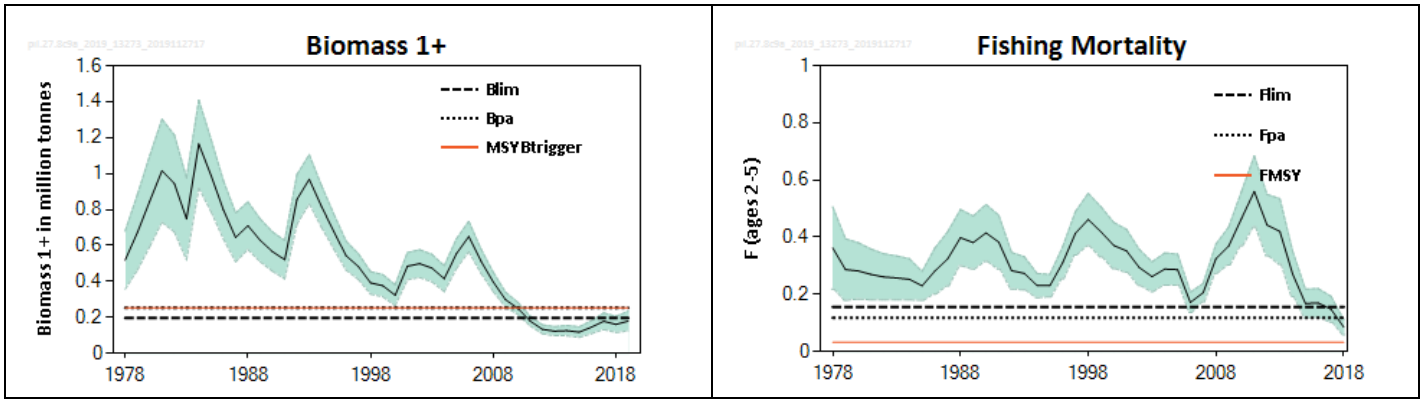


Figure 7 - Sardine in divisions 8.c and 9.a. Summary of the stock assessment. Assumed recruitment is unshaded. Fishing mortality and biomass are shown with 95% confidence intervals. The reference points have been revised (ICES, 2019a) and correspond to a low productivity regime since 2006. Source: ICES 2019 advice for sardine in divisions 8.c and 9.a.

Table XIII - Sardine in divisions 8.c and 9.a. State of the stock and fishery relative to reference points. Source: ICES 2019 advice for sardine in divisions 8.c and 9.a.

	Fishing pressure				Stock size			
	2016	2017	2018		2017	2018	2019	
Maximum sustainable yield	F_{MSY}	✗	✗	✗ Above	MSY $B_{trigger}$	✗	✗	✗ Below trigger
Precautionary approach	F_{pa},F_{lim}	✗	○	✓ Harvested sustainably	B_{pa},B_{lim}	✗	✗	✗ Reduced reproductive capacity
Management plan	F_{MGT}	–	–	– Not applicable	B_{MGT}	–	–	– Not applicable

Regarding mackerel, ICES 2019 advice for mackerel (*Scomber scombrus*) in subareas 1–8 and 14, and in Division 9.a (the Northeast Atlantic and adjacent waters), states that the spawning-stock biomass (SSB) is estimated to have increased since 2007, reaching a maximum in 2014, and has been declining since then. It has, however, remained above MSY $B_{trigger}$ since 2008. The fishing mortality (F) has declined since 2003 but is estimated to have remained above F_{MSY}. There has been a succession of large year classes since 2001, with year classes since 2011 estimated to be above average. ICES assesses that fishing pressure on the stock is above F_{MSY} and below F_{pa} and F_{lim}; the spawning-stock size is above MSY $B_{trigger}$, B_{pa}, and B_{lim}. ICES advises that when the MSY approach is applied, catches in 2020 should be no more than 922 064 tonnes.

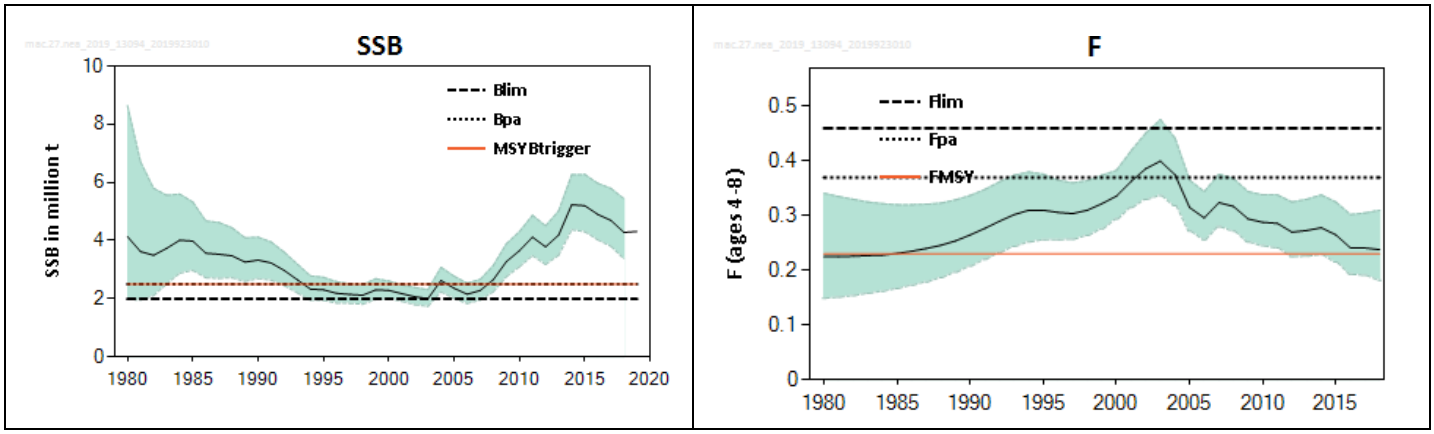


Figure 8 - Mackerel in subareas 1–8 and 14, and in Division 9.a. Summary of the stock assessment. Confidence intervals (95%) are included in the fishing mortality and spawning-stock biomass plots.

Table XIV - Mackerel in subareas 1–8 and 14, and in Division 9.a. State of the stock and fishery relative to reference points.

	Fishing pressure				Stock size			
	2016	2017	2018		2017	2018	2019	
Maximum sustainable yield	F_{MSY}	✗	✗	✗ Above	MSY $B_{trigger}$	✓	✓	✓ Above trigger
Precautionary approach	F_{pa},F_{lim}	✓	✓	✓ Harvested sustainably	B_{pa},B_{lim}	✓	✓	✓ Full reproductive capacity
Management plan	F_{MGT}	–	–	– Not applicable	B_{MGT}	–	–	– Not applicable

Secondary species

On a precautionary approach *Nassarius* species could be considered as main secondary species. However, according to Bañón et al (2018), the group of different species of the *Nassarius* genus accounts for a 5.8% of the octopus trap catch, but there is no information on if any single species of this family would reach the 5% threshold level to be considered as a main species under the MSC standard. According to the World Register of Marine Species (WoRMS: http://www.marinespecies.org/aphia.php?p=taxlist) there are more than 800 species of this genus. Bañón et al (2018) remark that when sampling octopus traps, for some abundant invertebrate species such as gastropod molluscs such as *Nassarius* spp, it is not possible to identify, count and weight every single one; thus, in those cases, total weight is estimated and species are binned into higher taxonomic levels. Given the uncertainty on records and the high number of *Nassarius* species, it is unlikely that any single species would make up to a 5% of the catch. Sealifebase website (https://www.sealifebase.ca/speciesgroup/index.php?group=mollusks&c_code=724&action=list&page=2) lists 7

Nassarius species as being native to Spain. These are *Nassarius corniculum, Nassarius cuvierii, Nassarius gibbosulus, Nassarius incrassatus, Nassarius lima, Nassarius mutabilis* and *Nassarius reticulatus*. However only *Nassarius incrassatus* and *Nassarius reticulatus* are found in Atlantic waters. These species have been considered as main secondary species for the purpose of this assessment and have been scored using the RBF framework.

Other authors in previous papers (Arnáiz et al. 2007) have also identified velvet crab (*Necora puber)* as a main secondary species in the UoA, with catch ratios rising a 5.48% of the total catch (see Table XIII below. The UoA corresponds to Areas VIII-IX). Although this information is older and different to that published by Bañon et al 2018, on a precautionary approach the assessment team has decided to assess velvet crab as a main secondary species. Velvet crab is managed through specific management plans directed to the velvet crab trap fishery. There is no information on the biological limits of the stock and it has been assessed using the RBF.

Table XV – Catch composition at the Galician octopus trap fishery (adapted from Arnáiz et al., 2007).

Octopus vulgaris Galicia		**Galicia**		**Areas I-V (Rías Baixas)**		**Areas VI-VII (Costa da Morte)**		**Areas VIII-IX (Arco Cantábrico)**	
Spanish name	**Scientific name**	**nº (%)**	**peso (%)**	**nº (%)**	**peso (%)**	**nº (%)**	**peso (%)**	**nº (%)**	**peso (%)**
Pulpo	*Octopus vulgaris*	35,89	86,74	31,25	87,16	38,77	84,93	53,13	88,22
Cuernos	*Charonia spp.*	1,51	1,15	0,87	0,75	2,07	1,44	3,58	2,01
Others (N speceis)		0,057	0,008(17)	0,06	0,009(13)	0,08	0,012(6)	0,01	0,001(3)
Total Molluscs		37,46	87,9	32,18	87,92	40,92	86,38	56,72	90,23
Nécora	*Necora puber*	19,21	4,69	16,94	4,29	22,01	5,02	24,9	**5,48**
Santiaguiño	*Scyllarus arctus*	3,01	0,26	1,95	0,17	5,66	0,47	2,96	0,23
Camarones	*Palaemon spp.*	22,23	0,26	30,1	0,39	13,33	0,14	1,02	0,007
Buey	*Cancer pagurus*	0,38	0,2	0,33	0,2	0,65	0,31	0,1	0,05
Centolla	*Maja squinado*	0,5	0,2	0,49	0,22	0,49	0,15	0,55	0,2
Bogavante	*Homarus gammarus*	0,25	0,17	0,19	0,17	0,39	0,27	0,26	0,14
Others (N species)		0,61	0,044(6)	0,81	0,075(4)	0,41	0,006(4)	0,01	0,001(1)
Total Crustaceans		46,19	5,82	50,81	5,51	42,94	6,37	29,8	6,11
Congrio	*Conger conger*	0,97	3,21	0,9	3,07	1,3	4,42	0,63	1,77
Cabrilla	*Serranus cabrilla*	4,74	0,91	3,24	0,74	6,81	1,15	8,02	1,1
Faneca	*Trisopterus luscus*	3,32	0,59	4,75	0,94	1,42	0,24	0,07	0,013
Barbada común	*Gaidropsarus vulgaris*	1,6	0,62	1,63	0,77	1,79	0,53	1,12	0,26
Julia	*Coris julis*	1,5	0,27	1,59	0,32	1,18	0,21	1,67	0,2
Cabruza/rabosa	*Parablennius gattorugine*	1,18	0,15	1,67	0,23	0,5	0,07	0,18	0,022
Others (N species)		3,03	0,524(49)	3,24	0,54(42)	3,14	0,62(37)	1,78	0,31(22)
Total Fish		16,35	6,28	17,02	6,61	16,14	7,25	13,48	3,66

As regards minor secondary species listed in the Scoring element table, MSC interpretation website allows for an All or none approach to score them at SG100. Given the high number of minor secondary species in the catch, and the little information available on their biology and stock status, the team has taken this All or none approach and considered that they do not meet the requirements at SG100 (PI 2.2.1, Sib).

ETP species

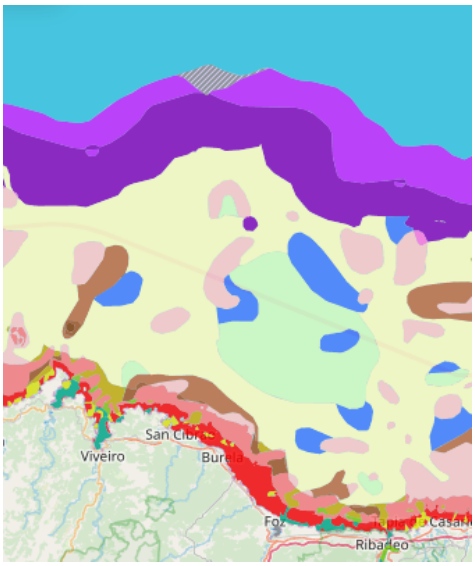
As regards interactions with ETP species, *Charonia lampas* accounts for a 0.8% of the catch of octopus traps in the coast of Lugo. According to Bañón et al 2018, the species is discarded 56% of the times is taken. It is expected that the species has a high survival post-releasement rate, however the team could not find any evidence of this.

The species is protected by Spanish Real Decreto 139/2011 and by Galician Decreto 167/2011. The complete list of protected species in the region can be found in Real Decreto 139/2011, which lists the wild species with species protection and the Spanish catalogue of endangered species and in Galician Decreto 167/2011, (which modifies Decreto 88/2007) which establishes the Galician catalogue of endangered species. No other species listed as bycatch in Bañon et al 2018 is protected by these regulations, and therefore are not considered as ETP species.

Habitats

Emodnet map on seabed habitat types shows that common habitats in waters affected by the UoA are sandy and muddy grounds, with small patches of rocky areas. OSPAR map of vulnerable habitats in the coast of Lugo shows that there are seapens and burrowing megafauna patches in the UoA fishing grounds. While there are no specific restrictions for the UoA fishing grounds, there is a MPA in Estaca de Bares, protected under the Birds Directive: “Espacio marino de Punta de Candelaria-Ría de Ortigueira-Estaca de Bares”

The fishery has limited and non-permanent impact on the seafloor, however further quantification on the traps set in each area would facilitate estimating the UoA area affected by the fishing gear.



Light blue: Abyssal
Dark blue patches: Offshore circalittoral mixed sediment
Grey: Lower bathyal sediment or Lower bathyal rock and biogenic reef
Light purple: Lower bathyal sediment
Dark purple: Upper bathyal sediment
Light yellow: Offshore circalittoral sand
Dark yellow: Infralittoral sand
Light brown: Circalittoral sand
Dark brown: Offshore circalittoral coarse sediment
Light green: Offshore circalittoral mud
Dark green: Infralittoral mud
Light pink: Offshore circalittoral rock and biogenic reef
Pink: Upper bathyal rock and biogenic reef
Dark pink: Circalittoral rock and biogenic reef
Red: Infralittoral rock and biogenic reef

Figure 9 - Distribution of common habitats in the coast of Lugo. https://www.emodnet-seabedhabitats.eu/access-data/launch-map-viewer/

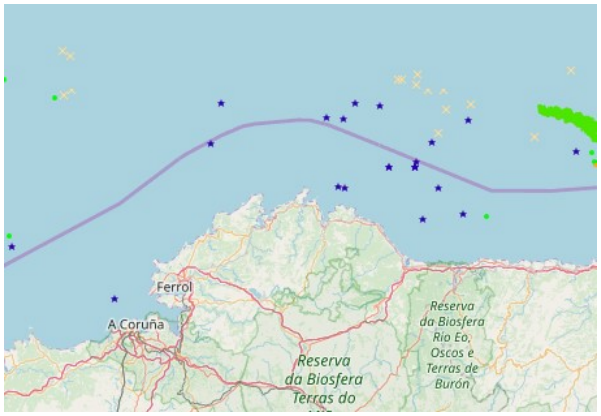


Figure 10 - Location of OSPAR vulnerable habitats in the coast of Lugo. https://odims.ospar.org/maps/1313

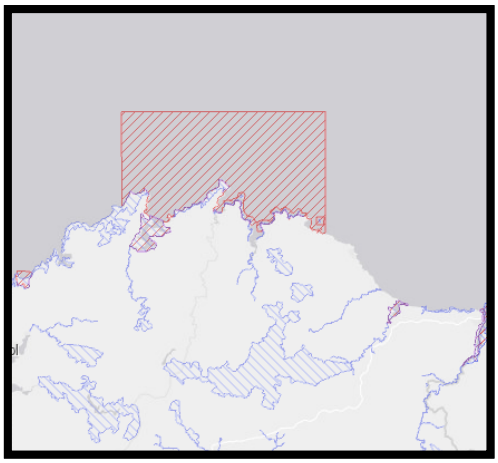


Figure 11 - MPAs in the UoA: Birds Directive: "Espacio marino de Punta de Candelaria-Ría de Ortigueira-Estaca de Bares". https://natura2000.eea.europa.eu/#

Ecosystem

The ecosystem in the coast of Lugo is studied by different research institutions, including CSIC, IEO and Vigo University. The team could not find any specific ecosystem model for the coast of Lugo although is aware of an ecopath modelling of Ria de Arousa (Outeiro et al, 2018: https://doi.org/10.1016/j.aquaculture.2018.06.043) which concluded that Ría de Arousa can be considered as a mature ecosystem relative to other coastal and estuarine ecosystems.

8.5.1 Principle 2 Performance Indicator scores and rationales

PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guide post	Main primary species are **likely** to be above the PRI. OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI. OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.
	Met?	**Yes**	**No**	**No**
Rationale				

The only main primary species to consider is Atlantic horse mackerel. The species is frequently used as bait in the trap fishery, however there is no quantification on the amount of horse mackerel used or to the proportion of the catch it represents. On a precautionary approach the team has considered the species as a main primary species, although a better quantification of the horse mackerel used as bait by the UoA may change this approach.

According to ICES 2019 advice for Horse mackerel (*Trachurus trachurus*) in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k (the Northeast Atlantic), the stock and the fishery are very dependent on occasional high recruitments. After a series of low recruitments, the estimates since 2014 are above average (1983–2018). SSB has been declining since 2006 and has been around B_{lim} since 2015. Fishing mortality has decreased since 2013 but remains above F_{MSY}. ICES advice on fishing opportunities ICES advises that when the MSY approach is applied, catches in 2020 should be no more than 83 954 tonnes. ICES assesses that fishing pressure on the stock is above F_{MSY}, between F_{pa} and F_{lim}; Spawning stock size is below MSY $B_{trigger}$, between B_{pa} and B_{lim}.

Given that spawning stock size is at B_{lim} the team considers that it is likely that the stock is above PRI, however this situation may change in the future since the species is very dependent on occasional high recruitments. SG60 is met. Since the stock is just at B_{lim} and spawning stock size is below MSY $B_{trigger}$, the stock is not highly likely to be at levels above PRI nor fluctuating at a level consistent with MSY. SG80 is not met.

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

	Met?			**No**

Rationale

Minor primary species to consider are sardine and mackerel, also used as bait but less frequently.

According to ICES 2019 advice for sardine (*Sardina pilchardus*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters), the biomass of age 1 and older fish has remained below B_{lim} since 2011. Recruitment has been low since 2005. Fishing mortality is the lowest in the time-series but still above F_{MSY}. ICES assesses that fishing pressure on the stock is above F_{MSY}, below F_{pa}, and below F_{lim}. Biomass 1+ is below MSY $B_{trigger}$, B_{pa}, and B_{lim}. When the MSY approach is applied, catches in 2020 should be no more than 4 142 tonnes.

Therefore, the sardine stock is not highly likely to be at levels above PRI. While it is expected that the amount of sardine used as bait is very low, especially when compared to the allocated TAC, the lack of quantification prevents the fishery from meeting the requirements at SG100, since there is no evidence that the UoA is not hindering the recovery of the sardine stock. SG100 is not met for sardine.

Regarding mackerel, ICES 2019 advice for mackerel (*Scomber scombrus*) in subareas 1–8 and 14, and in Division 9.a (the Northeast Atlantic and adjacent waters), states that the spawning-stock biomass (SSB) is estimated to have increased since 2007, reaching a maximum in 2014, and has been declining since then. It has, however, remained above MSY $B_{trigger}$ since 2008. The fishing mortality (F) has declined since 2003 but is estimated to have remained above F_{MSY}. There has been a succession of large year classes since 2001, with year classes since 2011 estimated to be above average. ICES assesses that fishing pressure on the stock is above F_{MSY} and below F_{pa} and F_{lim}; the spawning-stock size is above MSY $B_{trigger}$, B_{pa}, and B_{lim}. ICES advises that when the MSY approach is applied, catches in 2020 should be no more than 922 064 tonnes. Therefore, and according to ICES advice, the mackerel stock is highly likely to be above the PRI, since the SSB is above MSY $B_{trigger}$. SG100 is met for mackerel.

References

- Stakeholders meetings.
- ICES 2019 advice for sardine (*Sardina pilchardus*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters). http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/pil.27.8c9a.pdf
- ICES 2019 advice for Horse mackerel (*Trachurus trachurus*) in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k (the Northeast Atlantic)
- ICES 2019 advice for mackerel (*Scomber scombrus*) in subareas 1–8 and 14, and in Division 9.a (the Northeast Atlantic and adjacent waters)
- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. 2018. The traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S0165783618301413?via%3 Dihub

Overall Performance Indicator (PI) Rationale	
Draft scoring range	**60-79**
Information gap indicator	**More information sought**
Data-deficient? (Risk-Based Framework needed)	**No**

PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a **strategy** in place for the UoA for managing main and minor primary species.
	Met?	Y	N	N
Rationale				

The only main species to consider is horse mackerel, which is used as bait by the UoA. There is no quantification of the bait used by the UoA, so on a precautionary approach the species has been considered as main for this preassessment.

According to ICES 2019 advice for horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k (the Northeast Atlantic) SSB has been around Blim since 2015 and is at present at levels between Bpa and Blim. ICES advice on fishing opportunities is that when the MSY approach is applied, catches in 2020 should be no more than 83 954 tonnes.

Horse mackerel is subject to TAC. For horse mackerel in division 8.c (where the UoA takes place), the 2020 TAC followed the management strategy of the Pelagic Advisory Council, which recommended a reduction of 41% in 2020 (TAC of 11 179 tons) when compared to the 2019 TAC (18 858 tons). While it is expected that the horse mackerel used as bait comes from fresh fish landed in the area there is no confirmation on this, and horse mackerel used as bait could come from other areas with different management measures. The horse mackerel stock is not subject to any EU multiannual management plan.

Given the mentioned information, the team considers that there are measures in place (such as the TAC) that are expected to maintain the stock to levels which are likely to be above the PRI. Moreover, since SSB is at levels just above B_{lim}, the stock is considered to be at present at levels above PRI. SG60 is met.

Given the uncertainties on the origin of the horse mackerel used as bait or on the quantities used by the UoA, the team is not in a position to determine if there is a partial strategy to maintain the stock at levels which are highly likely to be above PRI. At present the SSB is just above B_{lim}. On a precautionary approach the team concludes that SG80 is not met, although further information on the quantity of horse mackerel used as bait or on the origin of horse mackerel itself could bring this score to higher levels.

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

The only primary species to consider are bait species. Horse mackerel consider as a main primary species since according to stakeholders and Bañón et al (2018) the species is frequently used as bait (however there are no estimations on the amount used annually by the UoA). Sardine and mackerel are considered as minor primary species as again according to stakeholders and Bañón et al (2018) these species are only used as bait sporadically.

The 3 species are subject to TAC in the UoA fishing grounds (although confirmation would be needed that the bait species come from local fresh fish suppliers and not from frozen importers). Specifically, horse mackerel and mackerel are at levels above PRI, while the sardine stock is at levels below PRI. According to stakeholder comments the sardine (minor primary species) was used as bait in the past but is not representative any longer.

Given that horse mackerel stock is at levels above PRI the team considers that there is some objective basis of confidence that the management measures applying to main primary species will work, as they are doing so effectively in maintain the stock at levels above PRI. Besides, it is not expected that the amount of horse mackerel used as bait by the UoA is representative in relation to the amount of horse mackerel taken by other fisheries in the area.SG60 and SG80 are met. Further information on the amount of the different species used as bait would be needed in order to confirm this scoring.

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

The TAC and quota system has been implemented for many years now in the EU. SG80 is met. The fact that SSB for horse mackerel is at levels above PRI serves as evidence that the measures are working effectively in maintaining the stock at levels consistent with MSC requirements. However, since these measures have not been considered as a partial strategy (given the uncertainties on the origin of horse mackerel used as bait) the requirements at SG100 are not met. In any case, is worth mentioning that the UoA does not catch any primary species at all and only uses it as bait.

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

There are no sharks in the catch composition by the UoA. This SI is not applicable.

e	Review of alternative measures			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	**No**	**No**	**No**
Rationale				

There is no unwanted catch of primary species. However, there is UoA related mortality of unwanted catch in the form of bait used. To the team's knowledge, there is no review of the potential effectiveness and practicality of alternative measures (such as the use of artificial bait) to minimise UoA related mortality of primary species. SG60 is not met.

References

- ICES 2019 advice for sardine (*Sardina pilchardus*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters). http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/pil.27.8c9a.pdf
- ICES 2019 advice for Horse mackerel (*Trachurus trachurus*) in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k (the Northeast Atlantic)
- ICES 2019 advice for mackerel (*Scomber scombrus*) in subareas 1–8 and 14, and in Division 9.a (the Northeast Atlantic and adjacent waters).
- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. T2018. he traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S0165783618301413?via%3Dihub

Overall Performance Indicator (PI) Rationale

Draft scoring range	**<60**
Information gap indicator	**More information sought**

PI 2.1.3 – Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. **OR** **If RBF is used to score PI 2.1.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. **OR** **If RBF is used to score PI 2.1.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.
	Met?	**Yes**	**No**	No
Rationale				

Main primary species to consider is horse mackerel used as bait. There is qualitative information which is adequate to estimate the impact of the UoA on main primary species with respect to status. There is ICES advice on the stock for the UoA fishing grounds (although confirmation is needed on the origin of horse mackerel used as bait). Given that horse mackerel is not taken by the UoA but only used as bait, the team considers that the requirements at SG60 are met.

Some estimations could be made in relation to the amount of bait used by the UoA, and what percentage of it is horse mackerel. This information, together with ICES advice, would be sufficient to meet the requirements at SG80 and SG100. Until this information is not calculated the requirements of SG80 and SG100 are not met.

b	Information adequacy for assessment of impact on minor primary species			
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			**No**
Rationale				

Minor primary species to consider are sardine and mackerel which are used as bait. As described in SIa, there is need of quantitative estimations of bait used by the UoA in order to meet the requirements at SG100. At present SG100 is not met.

c	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** primary species.	Information is adequate to support a **strategy** to manage **all** primary species and evaluate with a **high degree of certainty** whether the

				strategy is achieving its objective.
	Met?	**Yes**	**No**	**No**

Rationale

There is comprehensive research undertaken by Bañón et al (2018) showing that no primary species are taken as catch by the UoA. However certain species, such as horse mackerel, mackerel and sardine are used as bait and therefore considered under PI 2.1.1. Nevertheless, there is scientific information on the status of the different stocks provided by ICES. But at present there is no information on the amount of the different species used as bait by the UoA. In any case, it is expected that these amounts will be small when compared to the total landings of the different stocks by other fisheries.

The team considers that present information is adequate to support measures to manage main primary species (horse mackerel). SG60 is met. Given the uncertainties on the amount of horse mackerel, mackerel and sardine used by the UoA, together with the uncertainties of the origin of the stocks (which are expected to be of local origin but confirmation is needed), the requirements at SG80 and SG100 are not met.

References

- ICES 2019 advice for sardine (*Sardina pilchardus*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters). http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/pil.27.8c9a.pdf
- ICES 2019 advice for Horse mackerel (*Trachurus trachurus*) in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k (the Northeast Atlantic)
- ICES 2019 advice for mackerel (*Scomber scombrus*) in subareas 1–8 and 14, and in Division 9.a (the Northeast Atlantic and adjacent waters).
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Overall Performance Indicator (PI) Rationale	
Draft scoring range	**60-79**
Information gap indicator	**More information sought**

PI 2.2.1 – Secondary species outcome

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Scoring Issue		SG 60	SG 80	SG 100
	Main secondary species stock status			
a	Guide post	Main secondary species are **likely** to be above biologically based limits. OR If below biologically based limits, there are **measures** in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits. OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are **considerable**, there is either **evidence of recovery** or a, **demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are above biologically based limits.
	Met?	**Yes**	**Yes**	**No**
Rationale				

According to Bañon et al (2018), main secondary species to consider are *Nassarius incrassatus* and *Nassarius reticulatus* and are always discarded. Arnáiz et al (2007) also identify velvet crab (*Necora puber*) as a main secondary species. These species have been scored using the RBF framework and obtained a score above 80 (see Appendix 7.3). While there isn't sufficient information to determine if the species are likely to be above biologically based limits, there is a demonstrably effective strategy in place followed by fishermen at the UoA, since these species are generally discarded (100% of the times for Nassarius spp and 53% of the times for velvet crab) and there is a high chance of post-releasement survival. SG60 and SG80 are met. Since biological based limits for the species are unknown SG100 is not met.

	Minor secondary species stock status			
b	Guide post			Minor secondary species are highly likely to be above biologically based limits. OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			**No**

Rationale

Bañon et al (2018) list minor secondary species affected by the UoA. It is uncertain if these species are above or biologically based limits and while it is expected that the quantity of individuals affected by the UoA would not hinder recovery of these species, there is no evidence of such. SG100 is not met.

References

- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. 2018. The traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S0165783618301413?via%3Dihub
- Arnáiz R (dir. y coord.). 2007. La Pesca de Pulpo Común (*Octopus vulgaris*) con nasas en la costa Gallega (1994-2004). Los Recursos Marinos de Galicia. Serie Técnica número 6. Xunta de Galicia.

Overall Performance Indicator (PI) Rationale	
Draft scoring range	**>80**
Information gap indicator	**More information sought**
Data-deficient? (Risk-Based Framework needed)	**Yes**

PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Main secondary species are *Nassarius incrasatus, Nassarius reticulatus* and velvet crab (*Necora puber)*. Although not formally, there is a strategy preventing damage to these species, which consists on the releasement of the species soon after the catch (as described by Bañon et al. (2018) discarding rates for *Nassarius* spp reach a 100% while velvet crab is only discarded 50% of the times taken). The trial management plan for octopus caught with traps in Galicia limits the landing of non-fish species taken by traps to less than 10% in weight of the allowed maximum daily catch of octopus. However according to research undertaken by Bañon et al 2018 these limits do not seem to be ever met (so that catch of unwanted non-fish species would be much lower). This measure, together with the effort limitations directed to the fishery in relation to the number of traps set, is considered sufficient to keep the species at outcome levels above 80, as shown in RBF results (Appendix 7.3).

Specifically, for velvet crab (with lower discard ratios), the stock is managed through Decreto 15/2011 of the Galician regional government, which sets limits to the target velvet crab fishery. The team considers that given these measures (effort limitations, discard procedure and Decreto 15/2011 managing velvet crab fishery) there is a partial strategy for managing main secondary species. The requirements at SG60 and SG80 are met. Since the releasement strategy is not always applied to all minor secondary species and post releasement survival rate can vary depending on the species, the team considers that the requirements at SG100 are not met for all minor secondary species.

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

There is direct information on the UoA as collected by observers between 1999-2915 and analysis by Bañon et al. (2018). Besides, marine gastropods are known to survive after a short time outside the water. The high discard rate of *Nassarius* spp, together with high survival rates provide some objective basis for confidence that the partial strategy will work for main secondary species. SG60 and SG80 are met. The lack of testing prevents the UoA from meeting the requirements at SG100.

c	Management strategy implementation

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

Rationale

Research undertaken by Bañon et al. (2018), based on data collected by observers rom 1999-2015, serve as evidence that the releasement strategy is implemented successfully at least in relation to main secondary species (*Nassarius* spp.). SG80 is met. However, this partial strategy is not implemented for all minor secondary species and there is no evidence as regards if it is achieving its objective as set out in scoring issue a. SG100 is not met.

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

Rationale

There are no sharks in the catch composition by the UoA. This SI is not applicable.

e	Review of alternative measures to minimise mortality of unwanted catch			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	**Yes**	**Yes**	**No**

Rationale

There is no mortality of unwanted main secondary species. SG80 is met by default. There are however other minor secondary species to take into consideration. To the team's knowledge there is no formal review of alternative measures to minimise UoA related mortality of minor secondary species. SG100 is not met.

References

- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. 2018. The traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S0165783618301413?via%3Dihub

Overall Performance Indicator (PI) Rationale	
Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
	Met?	**Yes**	**Yes**	**No**
Rationale				

RBF was used to score PI 2.2.1. Main secondary species are *Nassarius incrasatus, Nassarius reticulatus* and velvet crab *(Nécora puber)*. There is qualitative (such as identification of the species, areal and vertical distribution of the species, maximum size) and quantitative information (percentage of the catch (5%) in relation to main secondary species. Although limited, this information has been adequate to assess productivity and susceptibility attributes for main secondary species (SG 60 and SG80 are met). Given that RBF was used to score PI 2.2.1 SG100 cannot be met by default.

b	Information adequacy for assessment of impacts on minor secondary species			
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			**No**
Rationale				

There isn't sufficient information on the status of the different minor species and therefore the requirements at SG100 are not met.

c	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	Met?	**Yes**	**Yes**	**No**

Rationale

Main secondary species to consider are *Nassarius incrasatus* and *Nassarius reticulatus*. According to Bañon et al. (2018) these species are always discarded. Although information on the stocks of these species is limited, there is sufficient information on the UoA strategy to minimise mortality of these species. SG60 and SG80 are met. Given the high number of minor secondary species and the limited information on their stock status it is not possible to evaluate with a high degree of certainty if the strategy is achieving its objective for all minor secondary species. SG100 is not met.

References

- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. 2018. The traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S0165783618301413?via%3Dihub

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

PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guide post	Where national and/or international requirements set limits for ETP species, the **effects of the UoA** on the population/ stock are known and **likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, the **combined effects of the MSC UoAs** on the population /stock are known and **highly likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** are within these limits.
	Met?	**NA**	**NA**	**NA**
Rationale				

To the team's knowledge, there are no set limits for ETP species. This SI is N/A.

b	Direct effects			
	Guide post	Known direct effects of the UoA are likely to not **hinder recovery** of ETP species.	Direct effects of the UoA are **highly likely** to not **hinder recovery** of ETP species.	There is a **high degree of confidence** that there are no **significant detrimental direct effects** of the UoA on ETP species.
	Met?	**Yes**	**No**	**No**
Rationale				

According to Bañon et al. (2018) research on catch composition by the octopus traps in the coast of Lugo, *Charonia lampas* is the only ETP species present in the catch. The species accounts for an 0.8% of the catch of octopus traps in the coast of Lugo. Again, according to Bañón et al 2018, the species is discarded 56% of the times is taken (given that the species is edible, it is expected that when not discarded the species is landed). It is expected that the species has a high survival post-releasement rate, however the team could not find any evidence of this. It is expected that there might be other ETP species in the area (such as marine mammals or seabirds) however interactions with these other ETP species is not expected and has not been recorded in the 15-year observer research analysed by Bañon et al. (2018).

Charonia lampas is protected by Spanish Real Decreto 139/2011 and by Galician Decreto 167/2011, but these regulations do not set limits as such on unintentional interactions with the species.

Given the low proportion of *Charonia lampas* in the catch (0.8% in the coast of Lugo) and the fact that it is discarded 56% of the times, the team considers that direct effects are likely to not hinder recovery of *Charonia lampas*. SG60 is met. The team is not in a position to determine if the direct impact of the UoA is highly likely to not hinder the recovery of the species. SG80 and SG100 are not met.

c	Indirect effects			
	Guide post		Indirect effects have been considered for the UoA and are thought to be **highly likely** to not create unacceptable impacts.	There is a **high degree of confidence** that there are no **significant detrimental indirect effects** of the UoA on ETP species.
	Met?		**Yes**	**No**
Rationale				

Indirect effects would be those related to the trophic chain and prey availability or seabed disturbance. Given that *Charonia lampas* does not feed on octopus and that seabed disturbance is short term, the team considers that indirect effects are highly likely not to create unacceptable impacts. SG80 is met. Further information on such interactions and effects is needed to support the SG100 score. SG100 is not met.

References

- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. 2018. The traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S0165783618301413?via%3Dihub

Draft scoring range	**60-79**
Information gap indicator	**Information sufficient to score PI.**
Data-deficient? (Risk-Based Framework needed)	**No**

PI 2.3.2 – ETP species management strategy

PI 2.3.2		The UoA has in place precautionary management strategies designed to: - meet national and international requirements; - ensure the UoA does not hinder recovery of ETP species. Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guide post	There are **measures** in place that minimise the UoA-related mortality of ETP species, and are expected to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be **highly likely to achieve** national and international requirements for the protection of ETP species.	There is a **comprehensive strategy** in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to **achieve above** national and international requirements for the protection of ETP species.
	Met?	**NA**	**NA**	**NA**
Rationale				

Since there are no national or international requirements for the protection of ETP species this SI is N/A. See SIb.

b	Management strategy in place (alternative)			
	Guide post	There are **measures** in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.
	Met?	**Yes**	**No**	**No**
Rationale				

The team is not aware of any specific measures to ensure that the UoA is not hindering the recovery of ETP species. The only measure worth mentioning is the fishing strategy itself which allows for limited interaction with these species, and the releasement (only 56% of the times) of the interacted ETP *Charonia lampas*.

Further information and management measures directed to ensure that these limited interactions do not hinder ETP species is needed in order to justify higher scores. SG80 and SG100 are not met.

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

Rationale

The low number of interactions as reported by Bañon et al. (2018) and the possibility of post-releasement survival provide and objective basis for confidence that the measure. The fishing strategy itself and the releasement of interacted individuals) will work in not hindering ETP species. SG80 is met. Further information on the survival rate and the estimation of the biomass interacted and total *Charonia lampas* biomass in the area would serve to support with high confidence that the strategy will work. SG100 is not met.

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

The measures (which include the use of light gears, the limitation on the number of traps deployed and the releasement of unwanted catch) are implemented successfully, as confirmed by fishermen and shown in Bañon et al (2018). SG80 is met. However, there is room for uncertainty in relation on why *Charonia lampas* is discarded only 56% of the time instead of 100%, and what is the effect of this to the *Charonia lampas* biomass in the area. At present it is not possible to determine if the measures mentioned above are achieving its objective of not hindering recovery and rebuilding of ETP species. SG100 is not met.

e	Review of alternative measures to minimize mortality of ETP species			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	Met?	**No**	**No**	**No**
Rationale				

To the team's knowledge, there is no review of measures to minimise UoA related mortality of ETP species. SG60 is not met.

References

- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. 2018. The traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S0165783618301413?via%3Dihub

Draft scoring range	**<60**
Information gap indicator	**More information sought**

PI 2.3.3 – ETP species information

PI 2.3.3		**Relevant information is collected to support the management of UoA impacts on ETP species, including:** - **Information for the development of the management strategy;** - **Information to assess the effectiveness of the management strategy; and** - **Information to determine the outcome status of ETP species**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts			
	Guide post	Qualitative information is **adequate to estimate** the UoA related mortality on ETP species. **OR** **If RBF is used to score PI 2.3.1 for the UoA:** Qualitative information is **adequate to estimate productivity and susceptibility** attributes for ETP species.	Some quantitative information is **adequate to assess** the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. **OR** **If RBF is used to score PI 2.3.1 for the UoA:** Some quantitative information is **adequate to assess productivity and susceptibility attributes** for ETP species.	Quantitative information is available to assess with a high degree of certainty the **magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status** of ETP species.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Research undertaken by Bañon et al. (2018) provides qualitative and some quantitative information adequate to estimate the UoA related mortality on ETP species. SG60 is met. Such information can be used to determine whether the UoA may be a threat to protection and recovery of the ETP species, by estimating total interactions by the whole UoA. SG80 is met. This information is however not enough to assess with a high degree of certainty the magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species. SG100 is not met.

b	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage the impacts on ETP species.	Information is adequate to measure trends and support a **strategy** to manage impacts on ETP species.	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.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Available information on proportion (0.8%) or number of expected interactions and identification of affected species (*Charonia lampas*) is adequate to support measures to manage the impacts on ETP species. SG60 is met. The 15 year comprehensive recording on catch composition (which served as a base to Bañon et al. (2018) paper) could serve to measure trends on these interactions and to support a strategy to manage impacts on the species. SG80 is met. The lack of information on survival rates of released *Charonia lampas* or on the biomass of the species prevent the UoA from achieving SG100, since it is not possible to determine with a high degree of certainty whether the strategy (or measures) are achieving its objective. SG100 is not met.

References

- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. 2018. The traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S01657836183014 13?via%3Dihub

Draft scoring range	**>80**
Information gap indicator	**Information sufficient to score PI.**

PI 2.4.1 – Habitats outcome

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guide post	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	Met?	**Yes**	**Yes**	**No**
Rationale				

According to “Emodnet seabed habitat types” common encountered habitats in the UoA fishing grounds is sand and muddy grounds, with small patches of rocky areas (which are assessed as minor habitats in Sic). Given the light nature of the fishing gear (traps) the team considers that it is highly unlikely that the UoA would reduce the structure and function of common encountered habitats to a point where there would be serious or irreversible harm. SG60 and SG80 are met. Further information on the estimation of number of traps used by the total UoA together with research on the impact by the fishing gear would be needed in order to achieve a higher score. At present SG100 is not met.

b	VME habitat status			
	Guide post	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	**Yes**	**Yes**	**No**
Rationale				

According to OSPAR broad scale map on the location of declining habitats in Lugo waters, there are some patches of seapens and burrowing megafauna in the coast of Lugo. It is expected that the light nature of the fishing gear contributes to avoid any reduction in the structure and function of VME habitats to a point where there would be serious or irreversible harm SG60 and SG80 are met. The lack of such evidence prevents the UoA from achieving SG100.

c	Minor habitat status			
	Guide post			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	Met?			**No**
Rationale				

Minor habitats are rocky areas. As above, evidence in form of research would be needed to support a SG100 score. While it is highly unlikely that the UoA would reduce structure and function of minor habitats to a point of serious or irreversible harm due to the light nature of the fishing gear, evidence is needed in order to meet the SG100 requirements. At present SG100 is not met.

References

- Seabed habitat maps
- OSPAR maps
- MPA maps

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

PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a **partial strategy** in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a **strategy** in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
	Met?	**Yes**	**Yes**	**No**
Rationale				

The trial management plan for octopus taken with traps in Galicia regulates the number of traps allowed per vessel with numbers ranging from 175 traps per vessel to a maximum of 550 traps per vessel, depending, among other factors, on the size of the crew. Galician Decree 15/2011 which sets allowed fishing gears in the region of Galicia establishes the maximum size of the traps (with a maximum length of 55 cm) together with the areas where these can be allocated (see Annex I and Annex V). On a practical standard, fishing with traps is allowed in all waters with the exception of harbours or river mouths. While there are no specific restrictions for the UoA fishing grounds, there is a MPA in Estaca de Bares, protected under the Birds Directive: “Espacio marino de Punta de Candelaria-Ría de Ortigueira-Estaca de Bares”. There are no other MPAs in the fishing grounds of the UoA.

The fishery has limited and non-permanent impact on the seafloor, however further quantification on the actual number of traps set in the UoA would facilitate estimating the UoA area affected by the fishing gear. The light nature of the fishing gear (causing no irreversible harm to the seafloor and allowing for a PI 2.4.1 score of 80) and the restrictions in relation to the number of traps in the UoA serve to justify that there is a partial strategy in place. SG60 and SG80 are met. The team is not aware of any strategy to manage the impact of all fisheries on habitats. SG100 is not met.

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

There is evidence (enforcement by the Fisheries Inspection department and background literature on benthic impacts by fishing traps (see Shester, et al 2011)) that the partial strategy (which includes measures such as use of light gears, together with some minor area restrictions) is implemented successfully. SG80 is met. However, there is room for uncertainty in relation to the impact that the UoA may cause on seapen and burrowing megafauna communities present in the UoA fishing grounds. SG100 is not met.

c	Management strategy implementation			
	Guide post		There is **some quantitative evidence** that the measures/partial strategy is being implemented successfully.	There is **clear quantitative evidence** that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).

	Met?		**Yes**	**No**
Rationale				

There is evidence (enforcement by the Fisheries Inspection department and background literature on benthic impacts by fishing traps (see Shester, et al 2011)) that the partial strategy (which includes measures such as use of light gears, together with some minor area restrictions) is implemented successfully. SG80 is met.
However, there is room for uncertainty in relation to the impact that the UoA may cause on seapen and burrowing megafauna communities present in the UoA fishing grounds. SG100 is not met.

d	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
	Guide post	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is **some quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	**Yes**	**No**	**No**
Rationale				

According to OSPAR maps, there are small patches of seapens and burrowing megafauna overlapping the UoA fishing grounds. To the team's knowledge, there are no specific management requirements afforded for the protection of these VMEs neither by management authorities nor by other MSC/non-MSC fisheries. According to MSC FCS v2.1 GSA3.14.4, at SG60 it is expected that the UoA avoids all areas closed by its management entity (none) and those closed by the UoA's own move-on rules. Given this, the team considers that the requirements at SG60 are met.

According to MSC FCS v2.1 GSA3.14.4, at the SG80 level should include verified electronic data or some other method of external verification (e.g., observer coverage, inspections) consistent with the scale and intensity of the UoA to confirm that management requirements are applied effectively, while at the SG100 level should include verified electronic data and some other method of external verification consistent with the scale and intensity of the UoA to confirm that management requirements are applied effectively. The expectation at the SG80 and SG100 levels is that the UoA additionally respects the areas closed by all MSC UoAs and non-MSC fisheries to ensure the cumulative protection of VMEs. The team considers that the requirements at SG80 and SG100 are not met.

References

- Emodnet, Ospar and MPA maps.
- Resolution 9 may 2019 Trial management plan for octopus taken with traps in Galicia
- Galicia Decree 15/2011 which sets allowed fishing gears in the region of Galicia
- Shester, G.G., Hopkins, F.M. Conservation challenges for small-scale fisheries: Bycatch and habitat impacts of traps and gillnets. Marine Station of Stanford University, 120 Ocean View Blvd., Pacific Grove, CA 93950-3024, USA. Biological Conservation. Volume 144, Issue 5, May 2011, Pages 1673-1681. https://www.sciencedirect.com/science/article/abs/pii/S0006320711000930?via%3Dihub

Draft scoring range	**60-79**
Information gap indicator	**Information sufficient to score PI**

PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	The types and distribution of the main habitats are **broadly understood**. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

Emodnet and OSPAR maps provide information on the nature, distribution and vulnerability of all habitats affected by the UoA, at a level of detail relevant to the scale and intensity of the UoA. SG60 and SG80 are met. The occurrence of VMEs habitats is recorded in OSPAR maps, showing small patches of seapen and burrowing megafauna overlapping the UoA fishing grounds. SG100 is met.

b	Information adequacy for assessment of impacts			
	Guide post	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	The physical impacts of the gear on all habitats have been quantified fully.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Information provided by Emodnet and Ospar maps, together with the light nature of the gear, are enough to broadly understand the nature of the main impacts of the gear on main habitats, including spatial overlap of habitat with fishing

activity. SG60 is met. The area covered by the UoA fishing grounds, and the number of licences together with the estimation of traps deployed by each boat can provide information on the spatial extent of interaction and the timing and location of the fishing gear, by estimations of area of seafloor covered by traps in the UoA. SG80 is met. Since there is no quantification of the physical impacts of the fishing gears on all habitat types, SG100 is not met.

c	Monitoring			
	Guide post		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.
	Met?		**Yes**	**No**

Rationale

There is research in the area undertaken by different institutions, such as IEO, CSIC and University of Vigo, including a regular update of Emodnet maps every few years. This research should serve to detect any increase in the risk to main habitats. SG80 is met. The team is not aware of if changes in all habitat distributions over time are measured. SG100 is not met.

References

Emodnet, Ospar and MPA's maps.

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

PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guide post	The UoA is **unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is **highly unlikely** to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	**Yes**	**Yes**	**No**
Rationale				

The ecosystem in the coast of Lugo is studied by different research institutions, including IEO, CSIC and University of Vigo. The team could not find any specific ecosystem model for the coast of Lugo although is aware of an Ecopath modelling of Ria de Arousa (Outeiro et al, 2018: https://doi.org/10.1016/j.aquaculture.2018.06.043) which concluded that Ría de Arousa can be considered as a mature ecosystem relative to other coastal and estuarine ecosystems.

Although not specific to the Lugo region, the food-web structure in the Gulf of Cadiz (also in the Atlantic Ocean) has been described with the Ecopath and Ecosim model, were 43 functional groups were included, including common octopus in the region (with a trophic level of 3,92). The Gulf of Cadiz EwE study reveals that the main trophic flows are determined by the interaction between detritus, phytoplankton and micro- and mesozooplankton. Rose shrimp (*Parapenaeus longirostris*), cephalopods and dolphins present important overall effects as keystone species on the rest of the groups (Torres, 2013).

The low impact nature of the fishing gear and the limited interactions with non-targeted species serve to support that the UoA unlikely to disrupt the key elements underlying ecosystem structure and function. SG60 is met. Torres (2013) highlights the important role of octopus in the trophic chain. Removals of octopus are controlled both by maximum landings and by maximum number of deployed traps. These restrictions are reviewed annually (in the trial management plan for octopus taken with traps in the region of Galicia) and this revision takes into consideration the annual variations on octopus biomass. Given the present management of the fishery, the team considers that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm. SG80 is met. Evidence of this is needed to meet the SG100 requirements.

References

- Torres, M.A. Modelización ecológica del Golfo de Cádiz: Relaciones tróficas, análisis de la estructura de la comunidad e impacto de la pesca en el ecosistema. Tesis doctoral. Universidad de Cádiz. 2013.
- Torres et al (2013). Food-web structure of and fishing impacts on the Gulf of Cadiz ecosystem (South-western Spain). Ecological Modelling 265, 26-44. https://doi.org/10.1016/j.ecolmodel.2013.05.019

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

PI 2.5.2 – Ecosystem management strategy

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

The UoA (and other fisheries in the area) is managed through licences which serve to regulate fishing effort. Removal of octopus by the UoA (and by other fisheries) can be estimated through the landing notes. There are also some area restrictions in the Rias. These measures constitute a partial strategy which is expected to restrain impacts of the UoA on the ecosystem. SG60 and SG80 are met. As certain impacts of the fishery are not yet addressed (such as the use of bait species which are not highly likely above biological based limits and the presence of overlapping VMEs) SG100 is not met.

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

Effort regulations are considered likely to work, as they should work effectively in preventing the fishery from over exploitation or from causing ecosystem impacts to other species. SG60 is met. These regulations are reviewed annually in the form on updates of the Trial management Plan for octopus taken with traps in the region of Galicia. This annual review provides some objective basis for confidence that the partial strategy will work, as is based on information directly about the UoA. SG80 is met. The trial management plan has been in place for several years so far. Updated information on stock biomass and trends after the implementation of management measures could serve as testing that the partial strategy will work. At present SG100 is not expected to be met due to the lack of testing and to the lack of specific management measures for certain UoA impacts (such as the election of the bait used and the protection of VMEs in the UoA fishing grounds).

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

	Met?		Yes	No
Rationale				

The trial management plan for octopus has been implemented for several years so far. According to interviewed stakeholders, there are no major concerns as regards the accomplishment of these regulations by the UoA. SG80 is met. In order to meet the SG100 requirements further information is needed as regards the achievement of its objective as set out in scoring issue a (which includes all main impacts of the UoA). SG100 is not met.

References

Stakeholder comments

- Torres, M.A. Modelización ecológica del Golfo de Cádiz: Relaciones tróficas, análisis de la estructura de la comunidad e impacto de la pesca en el ecosistema. Tesis doctoral. Universidad de Cádiz. 2013.
- Torres et al (2013). Food-web structure of and fishing impacts on the Gulf of Cadiz ecosystem (South-western Spain). Ecological Modelling 265, 26-44. https://doi.org/10.1016/j.ecolmodel.2013.05.019

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

PI 2.5.3 – Ecosystem information

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

The ecosystem in the coast of Lugo is studied by different research institutions, including IEO, CSIC and University of Vigo. The team could not find any specific ecosystem model for the coast of Lugo although is aware of an Ecopath modelling of Ria de Arousa (Outeiro et al, 2018: https://doi.org/10.1016/j.aquaculture.2018.06.043) which concluded that Ría de Arousa can be considered as a mature ecosystem relative to other coastal and estuarine ecosystems.

The team considers that the information provided by the different research institutions, together with the Ecopath model for Ria de Arousa provide adequate information to identify and broadly understand the key elements of the ecosystem. SG60 and SG80 are met.

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

Information provided by Bañon et al (2018) on the bycatch by the UoA, Outeiro et al (2018) on the Ria de Arousa ecosystem, provide sufficient information on the expected main impacts of the UoA on key ecosystem elements. SG60 and 80 are met. However further information is needed as regards the uncertainties on impacts on primary (bait), secondary and ETP species, together with seapen and burrowing megafauna VMEs. SG100 is not met.

c	Understanding of component functions			
	Guide post		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	Met?		**Yes**	**Yes**
Rationale				

Research information in the area is adequate to know and understand the main functions of the different components of the ecosystem. SG80 is met. Specifically, the impacts of the UoA on target, primary, secondary, ETP species and

habitats are identified. This has been done by research undertaken by Bañon et al (2018). The ecopath model for the Ria de Arousa (Outeiro et al 2018) serves to understand the main functions of these components in the ecosystem. SG100 is met.

d	Information relevance			
	Guide post		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
	Met?		**Yes**	**Yes**
Rationale				

The broad range of information collected by the different scientific institutions working in the area, together with the Ria de Arousa ecopath model showing trophic relations ships between the different species and the research on interactions of the UoA with non-target species is more than adequate to allow the main consequences for the ecosystem to be inferred, as regards both its components and elements. SG80 and SG100 are met.

e	Monitoring			
	Guide post		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?		**Yes**	**Yes**
Rationale				

Research institutions, including IEO, CSIC and Vigo University conduct and ongoing research in the area, collecting data which would serve to detect any increase in risk level (SG80 is met) and providing information (related to stock status of different species, identification of benthic habitats, identification of trophic roles, identification of physic and chemical changes in the water column) which would be adequate to support the development of strategies to manage ecosystem impacts. SG100 is met.

References

- Torres, M.A. Modelización ecológica del Golfo de Cádiz: Relaciones tróficas, análisis de la estructura de la comunidad e impacto de la pesca en el ecosistema. Tesis doctoral. Universidad de Cádiz. 2013.
- Torres et al (2013). Food-web structure of and fishing impacts on the Gulf of Cadiz ecosystem (South-western Spain). Ecological Modelling 265, 26-44. https://doi.org/10.1016/j.ecolmodel.2013.05.019
- Bañón, R., Otero J., Campelos-Álvarez, J.M., Garazo, A., Alonso-Fernández, A. 2018. The traditional small-scale octopus trap fishery off the Galician coast (Northeastern Atlantic): Historical notes and current fishery dynamics. Fisheries research 206: 115-128. https://www.sciencedirect.com/science/article/abs/pii/S0165783618301413?via%3Dihub
- Outeiro, L., Byron, C., Angelini R. 2018. Ecosystem maturity as a proxy of mussel aquaculture carrying capacity in Ria de Arousa (NW Spain): A food web modelling perspective. Aquaculture Volume 496, Pages 270-284. https://doi.org/10.1016/j.aquaculture.2018.06.043

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

8.6 Principle 3

8.6.1 Principle 3 background

European Union

European fisheries are managed through the European Union Common Fisheries Policy (CFP). The CFP started in 1983 and is reviewed every 10 years, with the most recent review coming into force in 1 January 2014 (Regulation (EU) No 1380/2014). This newly reviewed legislation aims to ensure that "fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits, and of contributing to the availability of food supplies."

Other EU environmental legislation and international agreements that are applicable to habitats and species protection, but which are also relevant to fisheries activities are: the Marine Strategy Framework Directive (2008/56/EC) which obliges achieving a good environmental status by 2020; the Bird and Habitat Directives on the conservation of natural habitats providing the basis for the Natura 2000 networks; EC Regulation 812/2004 laying down measures concerning incidental catches of cetaceans; ASCOBANS (Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas); CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora); and finally the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention).

National

At a national level, individual Member States are responsible for implementing the CFP and other EU legislation and agreements. EU fisheries legislation is transposed directly to national legislation, while environmental and other agreements are transposed by primary and secondary national legislation, enacted in accordance with the EU legislation.

Competence for octopus fishing in the waters inside 6nm lies within the Galician Government since Article 148.1.11.a of the Spanish Constitution provides for the exclusive competence of the Autonomous Communities for fisheries in internal waters, shellfish harvesting and aquaculture. The main fisheries law in Galicia is Law 11/2008 (modified by Law 6/2009) and Decree 15/2011 that regulates the fishing activity and the fishing gears allowed in Galicia.

A Member State may take non-discriminatory measures to conserve and manage fish stocks, as well as maintain or improve the conservation status of marine ecosystems within 12 nautical miles of its baselines, as long as the EU has not adopted specific measures addressing conservation and management in that area or specifically addressing the problem identified by the Member State concerned. The Member State measures must be compatible with the objectives set out in CFP Article 2 and must be at least as stringent as the measures under Union law.

The octopus trap fishery in the Lugo province is managed through the following measures nationally: there is a minimum size of 1 kg, a licencing scheme, fishing quota per crew/day and weekend closure to fishing. There are also a maximum number of traps allowed per vessel, with numbers ranging from 175 traps to a maximum of 550 traps per vessel, depending, among other factors, on the size of the crew. There is also a maximum size of the traps, and areas where these can be deployed.

Finally, there is the trial co-management plan for octopus caught with traps in Galicia, which in turns sets the fishing effort allowed for each year and the corresponding closure of the fishery for 1.5 months. The plan is renegotiated every year when the specific dates for the seasonal closure are established, from 17 May till 1 July in 2019 (Resolution 9 may 2019).

Consultation, roles and responsibilities

The Ministry of Agriculture, Food, and the Environment (MAGRAMA), and its General Secretariat for Fishing are the main government department for the management of Spanish fisheries and the implementation of the Common Fisheries Policy.

The main institutions involved in management of the Lugo octopus trap fishery are:

- European Commission DG MARE – responsible for drafting European legislation on the management of European fisheries in accordance with the Common Fisheries Policy.
- The Ministry of Agriculture, Food, and the Environment (MAGRAMA) and its General Secretariat for Fishing are responsible for the overall management of Spanish fisheries.
- Conselleria do Mar, Xunta de Galicia and its Dirección Xeral de Pesca, Acuicultura e Innovación Tecnolóxica (responsible for management) and Dirección Xeral de Desenvolvemento Pesqueiro

(responsible for observers program and catch data analysis from artisanal fisheries) are responsible for the overall management of Galician fisheries.

- International Council for the Exploration of the Sea, ICES – provides the forum for consolidation of scientific work undertaken by scientists in participating national institutions (through relevant Expert Groups), and the delivery of advice on how best to manage fish stocks.
- European Commission's Scientific, Technical and Economic Committee for Fisheries, STECF – the fisheries scientific committee of the European Commission providing advice to the Commission on all aspects of fisheries science and economics.
- Instituto Español de Oceanografía - IEO, responsible for octopus trawl fisheries sampling and advice.
- Instituto de Investigaciones Marinas de Vigo – CSIC, carries out analysis on octopus biology and artisanal fisheries.
- The South Western Advisory Council (SWAC), established in the 2002 CFP reform to increase stakeholders participation in the management of south western European fisheries. It includes representatives of the fisheries sector and other groups (including environmental NGOs).

All of these institutions have well established protocols covering their purpose, roles, operation, representation, consultation, and decision-making process, as well as for communicating policy, plans, decisions, and other information. Their roles are well understood and the interaction between them works effectively.

The co-management plan was initially discussed at length with the fishing industry, and is since agreed annually by consensus, through regular meetings between managers and industry where management measures are discussed and agreed. The fishing industry is informed of changes proposed by the administration, and is also consulted on changes they may propose. However, NGOs have not participated in the initial process and are not consulted in the annual discussions of the management plan (information gathered at site visit).

Long term and specific objectives for the fishery

The CFP has specific precautionary and MSY objectives to reach sustainable fisheries, namely to recover stocks biomass above maximum sustainable yield and reach MSY exploitation rates by 2015 where possible and, on a progressive, incremental basis at the latest by 2020 for all stocks.

The EU Marine Strategy Directive (Directive 2008/56/EC) also commits Members States to further foster the integration of environmental concerns into other relevant policies, such as the CFP, in order to achieve ‘good environmental status’ in the marine environment, through the development and implementation of national level policies based on an ecosystem approach.

Regarding the management of the octopus trap fishery (Principle 1) and its impact on ecosystem (Principle 2), the management system is in general less developed and less comprehensive when compared to other fish stocks. The co-management plan refers to the general objectives of Law 11/2008, namely the conservation, the management and sustainable and responsible exploitation of marine living resources, but does not define specific targets.

Control, enforcement, and compliance

The overall CFP requirements for Monitoring, Control and Surveillance (MCS) are enshrined in the Fisheries Control Regulation (Council Regulation (EC) 1224/2009). The specifications of the EU MCS systems (operational procedures) are well developed, are in place, and are applied in a clear and transparent way.

Spain is a Member State of the European Union, therefore its fisheries are subject to the principles and practices of the CFP, including its MCS systems. However, control and enforcement activities are an exclusive national competence. The Subdirección General de Guardacostas of the Galicia Regional Government is responsible for monitoring, enforcement and inspection under the co-management plan. There is clear system of monitoring quota uptake, based on paper logbooks for vessels over 9 meters, cross referenced with sales notes.

Overall there is some degree of confidence in the enforcement system and there is no evidence of systematic non-compliance. However, there are reports of octopus catches sold outside the auction system (less than 10%) but increases when the value per kg is low and for individuals under minimum size (information gathered at site visit).

8.6.2 Principle 3 Performance Indicator scores and rationales

PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: - Is capable of delivering sustainability in the UoA(s); - Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework		
Scoring Issue		SG 60	SG 80	SG 100
a	Compatibility of laws or standards with effective management			
	Guide post	There is an effective national legal system **and a framework for cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and **binding procedures governing cooperation with other parties** which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

European fisheries are managed through the European Union Common Fisheries Policy (CFP). The CFP has specific precautionary and MSY objectives to reach sustainable fisheries in the context of ecosystem based management, and therefore has management outcomes consistent with MSC principles 1 and 2. Spain has enacted the CFP and has set management objectives in line with its principles. SG60 and SG80 are reached. Also, Spain as part of the EU is under binding procedures governing cooperation with other Member States and other parties and thus SG100 is also met.

b	Resolution of disputes			
	Guide post	The management system incorporates or is subject by law to a **mechanism** for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a **transparent mechanism** for the resolution of legal disputes which is **considered to be effective** in dealing with most issues and that is appropriate to the context of the UoA.	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**.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Disputes between Member States and the European Commission are resolved in the Council of Ministers, while legal disputes between European Institutions and with EU governments can be taken to the Court of Justice of the European Union. Nationally, the resolution of legal disputes is made through the Spanish judicial system. In the event of a fisheries infringement, the Regional Government passes the details to the public prosecutor who will then decide the value of the fine. Fishers, or industry representatives, can appeal to the full judicial process. Therefore SG60 and SG80 are met. However, there is no information that the system has been tested and proven to be effective and thus SG100 is not met.

c	Respect for rights			
	Guide post	The management system has a mechanism to **generally**	The management system has a mechanism to **observe** the	The management system has a mechanism to **formally**

		respect 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.	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.	**commit** to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	**Yes**	**Yes**	**Yes**

Rationale

The EU CFP, national and regional legislation, and its management system has a mechanism to formally commit to the legal rights of people depending their livelihoods from fishing and thus SG 60, 80 and 100 are met.

References

- Information gathered at the site visit.
- Galicia Law 11/2008
- Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC.

Draft scoring range	**≥80**
Information gap indicator	**More information sought**

PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		**The management system has effective consultation processes that are open to interested and affected parties** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**		
Scoring Issue		SG 60	SG 80	SG 100
a	Roles and responsibilities			
	Guide post	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **generally understood**.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for key areas** of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are **explicitly defined and well understood for all areas** of responsibility and interaction.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

The major institutions involved in the management of the Lugo octopus trap fishery are well known and their functions and roles are explicitly defined and well understood. Therefore SG100 is reached.

b	Consultation processes			
	Guide post	The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that **regularly seek and accept** relevant information, including local knowledge. The management system demonstrates consideration of the information and **explains how it is used or not used**.
	Met?	**Yes**	**No**	**No**
Rationale				

At European level there are several consultation processes that include local knowledge to inform management system, namely through the ACs and different industry associations and environmental organisations, that meet regularly. At national level, the co-management plan annual process constitutes a regular consultation process. And thus SG 60 is met. However, this consultation process does not include other interested stakeholders such as environmental NGOs that may hold relevant information. In fact, between 2015 and 2017 two workshops were organised by an NGO were several recommendations were presented to improve the fishery, but none were followed trough in the co-management plan. Therefore SG80 is not reached.

c	Participation			
	Guide post		The consultation process **provides opportunity** for all interested and affected parties to be involved.	The consultation process provides **opportunity and encouragement** for all interested and affected parties to be involved, and **facilitates** their effective engagement.
	Met?		**No**	**No**

Rationale

As environmental NGOs are not invited and do not participate in the co-management process SG80 and SG100 are not met.

References

- Information gathered at the site visit.
- Galicia Law 11/2008
- Resolution 9 may 2019
- Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC.

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

PI 3.1.3 – Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are **implicit** within management policy.	**Clear** long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are **explicit** within management policy.	**Clear** long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **explicit** within **and required by** management policy.
	Met?	**Yes**	**Yes**	**Yes**

Rationale

The CFP has clear precautionary and MSY long term objectives, while the Spanish and Galicia fisheries law is in accordance with these objectives. In addition, the EU Marine Strategy Directive (Directive 2008/56/EC) also commits Members States to further foster the integration of environmental concerns into other relevant policies, such as the CFP, in order to achieve 'good environmental status' in the marine environment.

References

- Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC.
- Resolution 9 may 2019 Trial management plan for octopus taken with traps in Galicia
- Galicia Decree 15/2011 which sets allowed fishing gears in the region of Galicia
- Galicia Law 11/2008

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

PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific management system.	**Short and long-term objectives**, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.	**Well defined and measurable short and long-term objectives**, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **explicit** within the fishery-specific management system.
	Met?	**Yes**	**No**	**No**

Rationale

There are general sustainability objectives in the trial co-management plan for the Lugo octopus trap fishery, in line with Galicia Law 11/2008 and thus SG60 is reached. However, and although the CFP and MSFD, national and regional general fisheries and environmental law has specific precautionary and MSY objectives, these have not been translated into specific short-term and long-term objectives in the trial co-management plan. The fishery specific management system includes input limits (licences, maximum number of traps deployed, number of fishing days, daily quotas) but these are not necessarily consistent with MSY or environmental objectives. Therefore SG80 is not reached.

References

- Information gathered at the site visit.
- Resolution 9 may 2019 Trial management plan for octopus taken with traps in Galicia
- Galicia Decree 15/2011 which sets allowed fishing gears in the region of Galicia
- Galicia Law 11/2008

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

PI 3.2.2 – Decision-making processes

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guide post	There are **some** decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are **established** decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	**Yes**	**Yes**	
Rationale				

There are some decision-making processes in place through the EU CFP and its implementation and thus SG60 is met. There are also established decision making processes through the co-management plan process, namely regular meetings between Galicia regional government and industry where management measures are discussed and agreed and thus SG80 is also met.

b	Responsiveness of decision-making processes			
	Guide post	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.	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.	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.
	Met?	**Yes**	**Yes**	**No**
Rationale				

At EU there is a decision making process that responds to serious issues such as the poor state of a stock, or of the systematic non-compliance for example of the Landing Obligation. There is also a decision-making process nationally and regionally and SG60 is met. The system responds to other important issues such as the reduction of octopus catches or lower prices and thus SG80 is also met. However, the decision-making process does not respond to all issues identified, namely the exclusion of particular stakeholders and thus SG100 is not met.

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

The decision-making process at EU level uses the precautionary approach, while the management proposed by stakeholders and embedded in regional law also use the precautionary approach and were based on the best available scientific information and thus SG80 is met.

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

Information on stock sustainability and on the fishery is available publicly trough public technical papers produced by Xunta de Galicia or trough scientific papers, and some explanations are provided to stakeholders why some management measures are proposed. Thus SG60 is met. However, there are no minutes of the co-management plan meetings, while some decisions are taken without explanations to all stakeholders SG80 and SG100 are not met.

	Approach to disputes			
e	Guide post	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

The co-management framework, and the possibility of the discussion of management measures, proactively avoids legal disputes. The Lugo trap fishery also has a culture of avoiding conflict and is actively engaged in the co-management process. Therefore SG100 is reached.

References

- Information gathered at the site visit.
- Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC.
- Galicia Law 11/2008
- Resolution 9 may 2019 Trial management plan for octopus taken with traps in Galicia
- Galicia Decree 15/2011 which sets allowed fishing gears in the region of Galicia

Draft scoring range	**60-79**
Information gap indicator	**More information sought**

PI 3.2.3 – Compliance and enforcement

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

MCS system exists and is implemented in the fishery and has demonstrated an ability to enforce relevant management measures. For example, the limitation of the number of traps per crew and vessel has de facto limited the total of number of traps used in the fishery, while illegal selling of octopus catches has decreased considerably. Thus SG60 and SG80 are met. However, while there is octopus sold outside the auction houses SG100 is not met.

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

Sanctions exist in the Spanish and Galicia law and there is evidence that they are applied for example in cases of landings of undersize octopus and thus SG60 is met. There is also evidence that sanctions are consistently applied and SG80 is met. However, as landings of undersize individuals occur somewhat frequently or are sold illegally SG100 is not met.

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

There is a high degree of confidence that some management measures are comply with, such as the number of traps per vessels and the daily quota. The fishery also provides information on catches and effort therefore SG0 and SG80

are reached. However, as the minimum size or the obligation to sell at auction are not always respected, SG100 is not met.

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

Rationale

In the past there were indications that black landings, sold outside the auction house, were frequent and a significant level of catches was sold illegally. However, the majority of stakeholders interviewed in the site visit, although acknowledging the issue in the past, referred that it has improved significant and is now limited. Therefore the assessment team concluded that there is no evidence of systematic non-compliance and thus SG80 is reached.

References

Information gathered at the site visit.

Draft scoring range	**≥80**
Information gap indicator	**More information sought**

PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.
	Met?	**Yes**	**Yes**	**No**
Rationale				

There are mechanisms in place to evaluate key parts of the fishery specific management system, namely monitoring of catches (volume and sizes), effort, licences and closed areas. SG 60 and 80 is met. However, it is unclear if all parts of the management system are evaluated and thus SG100 is not reached.

b	Internal and/or external review			
	Guide post	The fishery-specific management system is subject to **occasional internal** review.	The fishery-specific management system is subject to **regular internal** and **occasional external** review.	The fishery-specific management system is subject to **regular internal and external** review.
	Met?	**Yes**	**Yes**	**No**
Rationale				

The process of co-management constitutes a process of regular (annually) internal review of the fishery specific management measures, such as the length of the closed season or the number of permitted traps. SG60 and SG80 are therefore reached. However, there is no information that the fishery-specific management system is subject to regular external review and thus SG100 is not met.

References

- Information gathered at the site visit

Draft scoring range	**≥80**
Information gap indicator	**More information sought**

9 Appendices

9.1 Assessment information

9.1.1 Small-scale fisheries

Table XVI – Small-scale fisheries

Unit of Assessment (UoA)	Percentage of vessels with length <15m	Percentage of fishing activity completed within 12 nautical miles of shore
Lugo octopus trap fishery	100%	80-90%

9.2 Evaluation processes and techniques

9.2.1 Site visits

The site visit was carried out by Lisa Borges between the 10-12 December 2019, with the participation of Alberto Martin and Alberto Garazo from MSC, and included a visit to the port of Burela, and interviews (in person) with the following stakeholders:

- Cofraria of Burela
- Dirección Xeral de Pesca, Acuicultura e Innovación Tecnolóxica, Conselleria do Mar, Xunta de Galicia, Santiago de Compostela
- Instituto de Investigaciones Marinas de Vigo – CSIC, Vigo
- WWF Spain

9.2.2 Recommendations for stakeholder participation in full assessment

All stakeholders contacted in this pre-assessment should participate in a full assessment, jointly with additional fishers Cofrarias and the Dirección Xeral de Desenvolvemento Pesqueiro of Conselleria do Mar of Xunta de Galicia.

9.3 Risk-Based Framework outputs

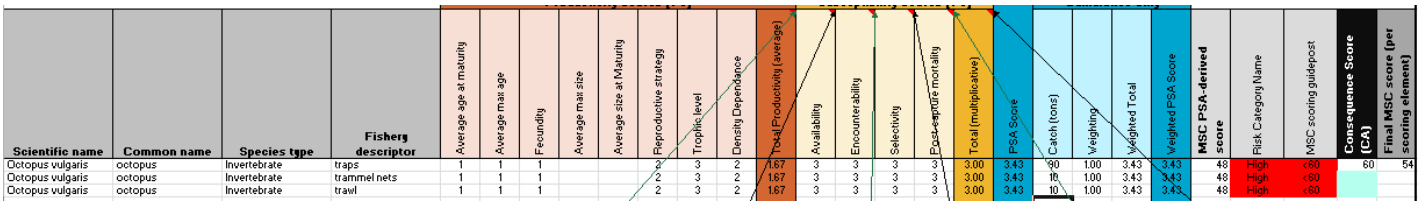
9.3.1 Consequence Analysis (CA)

Since there is no reference points for the stock of octopus in Galicia zones B&C a Risk Based Assessment was carried out to score PI 1.1.1 assuming a priori a high risk in the Consequence Analysis and conducting PSA directly.

9.3.2 Productivity Susceptibility Analysis (PSA)

Table X – PSA productivity attributes and scores		
Performance Indicator	1.1.1	
Productivity		
Scoring element (species)	Common octopus (*Octopus vulgaris*)	
Attribute	Rationale	Score
Average age at maturity	1.5 years	**1**
Average maximum age	2 years	**1**
Fecundity	>20.000 eggs per year	**1**
Average maximum size Not scored for invertebrates		**NA**
Average size at maturity Not scored for invertebrates		**NA**
Reproductive strategy	Demersal egg layer	**2**
Trophic level	>3.5	**3**
Density dependence Invertebrates only	No depensatory or compensatory dynamics demonstrated or likely	**2**
Susceptibility		
Fishery Only where the scoring element is scored cumulatively	Trap, trammel nets and trawl	
Attribute	Rationale	Score
Areal Overlap	The trap, trammel and trawl fisheries operate in an area corresponding to more than 30% of the stock area.	**3**
Encounterability	High overlap with fishing gear - default score for target species.	**3**
Selectivity of gear type	Individuals < size at maturity are frequently caught and individuals < half the size at maturity are retained by gear.	**3**
Post capture mortality	Retained species default score.	**3**
Catch (weight) Only where the scoring	Trap 90%, trammel nets 5% and trawl 5%	**NA**

element is scored cumulatively		



Scientific name	Common name	Species type	Fishery descriptor	Average age at maturity	Average max age	Fecundity	Average max size	Average size at Maturity	Reproductive strategy	Trophic level	Density Dependance	Total Productivity (average)	Availability	Encounterability	Selectivity	Post-capture mortality	Total (multiplicative)	PSA Score	Catch (tons)	Weighting	Weighted Total	Weighted PSA Score	MSC PSA-derived score	Risk Category Name	MSC scoring guidepost	Consequence Score (CA)	Final MSC score (per scoring element)
Octopus vulgaris	octopus	Invertebrate	traps	1	1	1			2	3	2	1.67	3	3	3	3	3.00	3.43	90	1.00	3.43	3.43	48	High	<60	60	54
Octopus vulgaris	octopus	Invertebrate	trammel nets	1	1	1			2	3	2	1.67	3	3	3	3	3.00	3.43	18	1.00	3.43	3.43	48	High	<60		
Octopus vulgaris	octopus	Invertebrate	trawl	1	1	1			2	3	2	1.67	3	3	3	3	3.00	3.43	10	1.00	3.43	3.43	48	High	<60		

Table XVII – PSA productivity attributes and scores		
Performance Indicator	2.2.1	
Productivity		
Scoring element (species)	*Nassarius* spp (*Nassarius incrassatus* and *Nassarius reticulatus*)	
Attribute	Rationale	Score
Average age at maturity	Unknown	**3**
Average maximum age	Unknown	**3**
Fecundity	Unknown	**3**
Average maximum size Not scored for invertebrates		**NA**
Average size at maturity Not scored for invertebrates		**NA**
Reproductive strategy	Spawner (from https://www.sealifebase.ca/summary/Nassarius-incrassatus.html and https://www.sealifebase.ca/summary/Nassarius-reticulatus.html)	**1**
Trophic level	2,6 for *Nassarius incrasatus* (from https://www.sealifebase.ca/summary/Nassarius-incrassatus.html). Although unknown, a similar trophic level is expected for *Nassarius reticulatus*	**1**
Density dependence Invertebrates only	Unknown	**3**
Susceptibility		
Fishery Only where the scoring element is scored cumulatively	Traps	
Attribute	Rationale	Score
Areal Overlap	Distribution of *Nassarius incrasatus* and *Nassarius reticulatus* stocks: Coastal areas of Eastern Atlantic, from Norway to Morocco, but also Mediterranean Sea. Distribution of the UoA: Coast of Lugo, Spain. The assessment team has considered that areal overlap is less than 10% of the distribution of *Nassarius incrasatus* and *Nassarius reticulatus* stocks.	**1**

Encounterability	The species lives in waters between 3 and 30 m. The UoA takes place in waters up to 100 m depth. Since *Nassarius* spp are benthic species and UoA traps are placed at the seafloor, there is a high overlap with the fishing gear.	**3**
Selectivity of gear type	Gear size is regulated with a minimum of mesh size set at 10 mm and a maximum of 160 mm in funnel diameter (Bañon et al., 2018). Size of the species at maturity is uncertain. Maximum size of *Nassarius incrasatus* is 15 mm. Maximum size of *Nassarius reticulatus* is 35 mm. The selectivity of the fishing gear is unknown. On a precautionary approach the team considers that: – Individuals < size at maturity are frequently caught – Individuals < half the size at maturity are retained by gear.	**3**
Post capture mortality	Individuals are discarded onboard. Given that the UoA takes place in shallow waters and that gastropods can resist outside of the sea for a certain time, there is a high chance that if released the species would survive	**1**
Catch (weight) Only where the scoring element is scored cumulatively		**NA**

PSA NAssarius spp				Productivity Scores [1-3]									Susceptibility Scores [1-3]					Score	Cumulative only						
Scientific name	Common name	Species type	Fishery descriptor	Average age at maturity	Average max age	Fecundity	Average max size	Average size at Maturity	Reproductive strategy	Trophic level	Density Dependance	Total Productivity (average)	Availability	Encounterability	Selectivity	Post-capture mortality	Total (multiplicative)		Catch (tons)	Weighting	Weighted Total	Weighted PSA Score	MSC PSA derived score	Risk Category Name	MSC scoring guidepost
Nassarius spp.	Dog whelk	Invertebrate	Trap	3	3	3			1	1	3	2,33	1	3	3	1	1,20	2,62					81	Low	≥80

10 References

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11 Template information and copyright

This document was drafted using the ‘MSC Pre-Assessment Reporting Template v3.1’.

Template version control

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

A controlled document list of MSC program documents is available on the MSC website (msc.org)

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