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Global Standard for Responsible Supply
of Marine Ingredients

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Global Standard for Responsible Supply of Marine Ingredients Fishery Assessment Methodology and Template Report V2.0



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Fishery Under Assessment	Sole <i>Soleidae</i> UK & Ireland ICES Divisions IVa-c, VIa, VII.a, b, d-h, j
Date	July 2019
Assessor	Jim Daly

Application details and summary of the assessment outcome				
Name: Bioceval				
Address:				
Country: France		Zip:		
Tel. No.:		Fax. No.:		
Email address:		Applicant Code		
Key Contact:		Title:		
Certification Body Details				
Name of Certification Body:		SAI Global Ltd		
Assessor Name	Peer Reviewer	Assessment Days	Initial/Surveillance/Re-approval	Whole fish/ By-product
Jim Daly	Vito Romito	0.5	Initial	By-product
Assessment Period	2018			

Scope Details	
Management Authority (Country/State)	EU Common Fisheries Policy (CFP)
Main Species	Sole <i>Soleidae</i>
Fishery Location	ICES divisions IV a-c, VI.a, VII.a, b, d-h, j
Gear Type(s)	All, mainly otter and beam trawls
Outcome of Assessment	
Overall Outcome	Pass 6 stocks, fail 1 stock
Clauses Failed	C1.2 (Division VIIa)
Peer Review Evaluation	Pass 6 stocks, fail 1 stock (VIIa)
Recommendation	Approve 6 stocks, fail 1 stock

Assessment Determination

Sole *Solea solea* is managed in European waters under the Common Fisheries Policy (CFP) with annual TACs set and stock assessments undertaken by ICES. Seven stocks fall within the scope of this by-product assessment:

- Subarea IV
- Division VIa (Irish Sea)
- Divisions VII.a, b-c (West of Ireland)
- Division VII d (eastern English Channel)
- Division VII.e (western English Channel)
- Divisions VII.f-g (Bristol Channel, Celtic Sea)
- Divisions VII.h-k (Celtic Sea south, south west of Ireland)

Stocks in Subarea IV and Divisions VIa VII.a and VII.d-k are subject to species-specific management and are assessed under Clause C. With the exception of Division VIIa fishery removals are included in the assessment process and these stocks are considered, in their most recent assessment, to have a biomass above limit reference points. Consequently, they pass clause C but with some caution for Division VIId stock which has been fluctuating between Blim and MSY Btrigger.

In Division VIIa fishery removals are included in the assessment process but the stock biomass is below its limit reference point so it fails clause C 1.2

The stock in Division VII.b-c is subject to some species-specific management including a TAC. However, key elements of the management regime are missing, in particular there is insufficient information to undertake a stock assessment, so this stock is considered further under clause D using a productivity-susceptibility analysis (PSA). This stock passed clause D with medium compliance given the lack of information on stock abundance and exploitation.

Sole is classed as of least concern on the IUCN Red List of Threatened species (European regional assessment undertaken in 2013). It is not listed on CITES (<http://www.iucnredlist.org/details> accessed 04.07.19).

Sole in Subarea IV, VI and Divisions VII b-k are recommended for approval as by-product material under the IFFO RS Standard. Sole from Division VIIa is not recommended for approval. Sole from Division VII b,c passes the Category D assessment.

Peer Review Comments

The Peer Reviewer agrees with the assessor's recommendation that all stocks of sole in Subarea IV, VI and Divisions VII b-k, VII b,c are recommended for approval as by-product material under the IFFO RS Standard. However,

Sole from Division VIIa should not be recommended on that basis that SSB has shown a declining trend since the mid-1980s, and although showing some upward trends in recent years, it has been well below Blim since 2004.

Notes for On-site Auditor

Sole in Division VIIa failed clause C. Consequently they must be separated from other IFFO-RS approved by-product material.

Species-Specific Results

Category	Species	% landings	Outcome (Pass/Fail)	
Category A			A1	
			A2	
			A3	
			A4	
Category B				
Category C	Sole <i>Solea solea</i> IV, VI, VIIb-k	NA	Pass	
Category C	Sole <i>Solea solea</i> VIIa	NA	Fail	
Category D	Sole <i>Solea solea</i> VII b,c	NA	Pass 1 stock	

[List all Category A and B species. List approximate total % age of landings which are Category C and D species; these do not need to be individually named here]

HOW TO COMPLETE THIS ASSESSMENT REPORT

This assessment template uses a modular approach to assessing fisheries against the IFFO RS standard.

Whole Fish

The process for completing the template for a **whole fish** assessment is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table, to determine which categories of species are present in the fishery.
2. ALL ASSESSMENTS: Complete clauses M1, M2, M3: Management.
3. IF THERE ARE CATEGORY A SPECIES IN THE FISHERY: Complete clauses A1, A2, A3, A4 for **each** Category A species.
4. IF THERE ARE CATEGORY B SPECIES IN THE FISHERY: Complete the Section B risk assessment for **each** Category B species.
5. IF THERE ARE CATEGORY C SPECIES IN THE FISHERY: Complete clause C1 for **each** Category C species.
6. IF THERE ARE CATEGORY D SPECIES IN THE FISHERY: Complete Section D.
7. ALL ASSESSMENTS: Complete clauses F1, F2, F3: Further Impacts.

A fishery must score a pass in **all applicable clauses** before approval may be recommended. To achieve a pass in a clause, the fishery/species must meet **all** of the minimum requirements.

By-products

The process for completing the template for **by-product raw material** is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table with the names of the by-product species and stocks under assessment. The ‘% landings’ column can be left empty; all by-products are considered as Category C and D.
2. IF THERE ARE CATEGORY C BYPRODUCTS UNDER ASSESSMENT: Complete clause C1 for **each** Category C by-product.
3. IF THERE ARE CATEGORY D BYPRODUCTS UNDER ASSESSMENT: Complete Section D.
4. ALL OTHER SECTIONS CAN BE DELETED. Clauses M1 - M3, F1 - F3, and Sections A and B do not need to be completed for a by-product assessment.

By-product approval is awarded on a species-by-species basis. Each by-product species scoring a pass under the appropriate section may be approved against the IFFO RS Standard.

SPECIES CATEGORISATION

The following table should be completed as fully as the available information permits. Any species representing more than 0.1% of the annual catch should be listed, along with an estimate of the proportion of the catch each species represents. The species should then be divided into Type 1 and Type 2 as follows:

- **Type 1 Species** can be considered the ‘target’ or ‘main’ species in the fishery. They make up the bulk of annual landings and are subjected to a detailed assessment.
- **Type 2 Species** can be considered the ‘bycatch’ or ‘minor’ species in the fishery. They make up a small proportion of the annual landings and are subjected to relatively high-level assessment.

Type 1 Species must represent 95% of the total annual catch. Type 2 Species may represent a maximum of 5% of the annual catch (see Appendix B).

Species which make up less than 0.1% of landings do not need to be listed (NOTE: ETP species are considered separately). The table should be extended if more space is needed. Discarded species should be included when known.

The ‘stock’ column should be used to differentiate when there are multiple biological or management stocks of one species captured by the fishery. The ‘management’ column should be used to indicate whether there is an adequate management regime specifically aimed at the individual species/stock. In some cases it will be immediately clear whether there is a species-specific management regime in place (for example, if there is an annual TAC). In less clear circumstances, the rule of thumb should be that if the species meets the minimum requirements of clauses A1-A4, an adequate species-specific management regime is in place.

NOTE: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it **cannot** be approved for use as an IFFO RS raw material. This applied to whole fish as well as by-products.

TYPE 1 SPECIES (Representing 95% of the catch or more)

Category A: Species-specific management regime in place.

Category B: No species-specific management regime in place.

TYPE 2 SPECIES (Representing 5% OF THE CATCH OR LESS)

Category C: Species-specific management regime in place.

Category D: No species-specific management regime in place.

Common name	Latin name	Stock	% of landings	Management	Category
Sole	<i>Solea solea</i>	Subarea IV		EU, CFP	C
		Div. VIa			
		Div. VIId			
		Div. VIIe			
		Div. VIIf-g			
		Div. VII.h-k			
		Div. VII a-c			D

CATEGORY C SPECIES

In a whole fish assessment, Category C species are those which make up less than 5% of landings, but which are subject to a species-specific management regime. In most cases this will be because they are a commercial target in a fishery other than the one under assessment. In a by-product assessment, Category C species are those which are subject to a species-specific management regime, and are usually targeted species in fisheries for human consumption.

Clause C1 should be completed for **each** Category C species. If there are no Category C species in the fishery under assessment, this section can be deleted. A Category C species does not meet the minimum requirements of clause C1 should be re-assessed as a Category D species.

Species Name		Sole <i>Solea solea</i>	
C1	Category C Stock Status - Minimum Requirements		
	C1.1	Sole in Subarea IV, VI and Divisions VII b-k: Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible.	Pass
	C1.2	Sole in Subarea IV, VI and Divisions VII b-k: The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	Pass
	C1.1	Sole in Divison VIIa: Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible.	Pass
	C1.2	Sole in Divison VIIa: The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible.	FAIL
Clause outcome:			PASS/ FAIL
Evidence			
<p>Sole within European waters are managed under the Common Fisheries Policy (CFP) and stock assessments undertaken by ICES. A TAC is set each year and within the scope of this by-product application (ICES Divisions IV.a-c, VI.a, VIIa, b, d-h, j) covers the following areas in 2019 (EU Council Regulation 2019/124):</p> <ul style="list-style-type: none">• Division IIa and Subarea IV• Division V.b and Subareas VI. XII, XIV• Division VIIa ; Division VII.b-c ; Division VII d ; Division VIIe• Division VII.f –g• Division VII.h-k <p>The ICES stock assessment areas are largely consistent with the TAC areas.</p>			
Subarea IV			
<p>The stock assessment is an age-based analytical assessment that uses catches in the model and in the forecast. Input data includes commercial catches (age frequencies from catch sampling), discards and three survey indices (BTS-ISIS Q3, SNS Q3, DFS Q3) (ICES, 2018a). Natural mortality is assumed constant. Maturity-at-age is assumed to be knife-edged (at age 3) and constant over time. Fishery removals of the species in the fishery under assessment are included in the stock assessment process. It passes Clause C1.1.</p>			
<p>The spawning-stock biomass (SSB) has increased since 2007 and has been estimated at above MSY Btrigger since 2012. Fishing mortality (F) has declined since 1997 but is slightly above FMSY in 2016. Recruitment (R) has fluctuated below average without trend since the early 1990s (Figure 1) (ICES, 2018a).</p>			

The stock is considered, in its most recent stock assessment, to have a biomass above the limit reference point. It passes clause C1.2

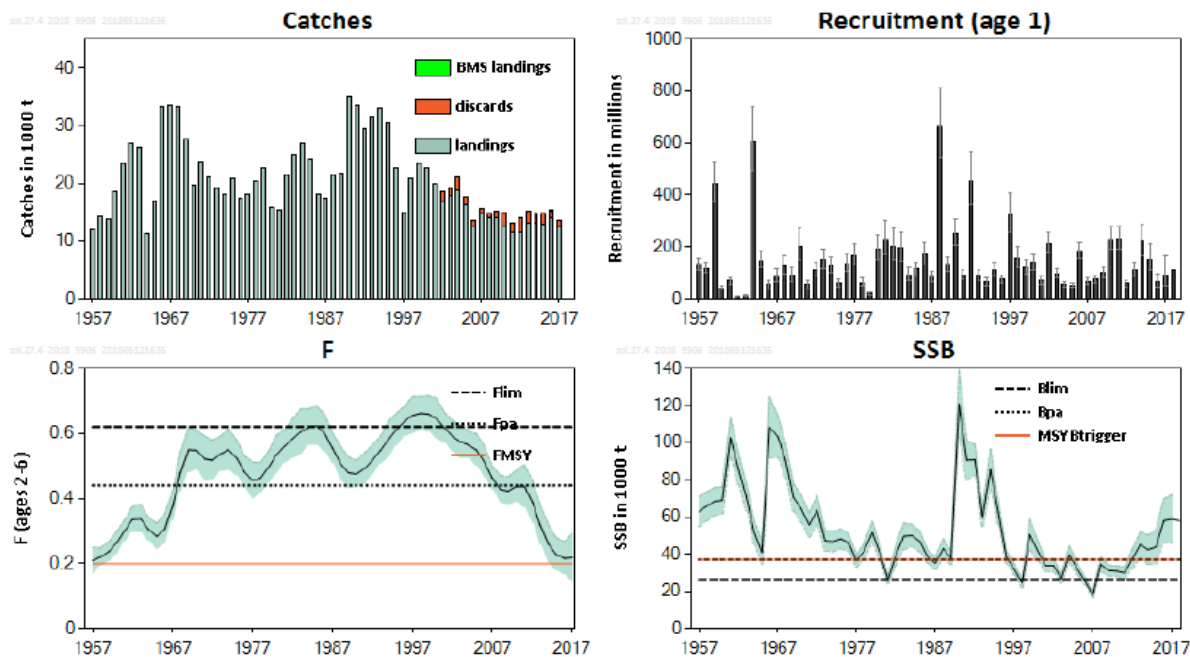


Figure 1. Sole in Subarea IV. Summary of the stock assessment. Discards are only available since 2002. Shaded areas (F, SSB) and error bars (R) indicate $\pm 2 \times$ standard error (approximately 95% confidence intervals. Source: ICES, 2018a.**R2**

Division VIIa (Irish Sea)

The stock assessment is an age-based analytical assessment that uses landings in the model. A discard rate is then applied to calculate catch. Input data includes international landings, ages and length frequencies from catch sampling; one survey index (UK(E&W)- BTS-Q3). **Fishery removals of the species in the fishery under assessment are included in the stock assessment process. It passes Clause C1.1.**

MSY reference points are defined and so are precautionary and limit reference points. Spawning-stock biomass (SSB) has shown a declining trend since the mid-1980s, being well below Blim since 2004. In 2015 SSB increased slightly. The fishing mortality (F) has been declining since the late 1980s and is presently below FMSY. The 2011–2014 recruitments have been the lowest in the time-series (**Figure 2**).

The stock is considered, in its most recent stock assessment, to have a biomass below its limit reference point. It fails clause C.

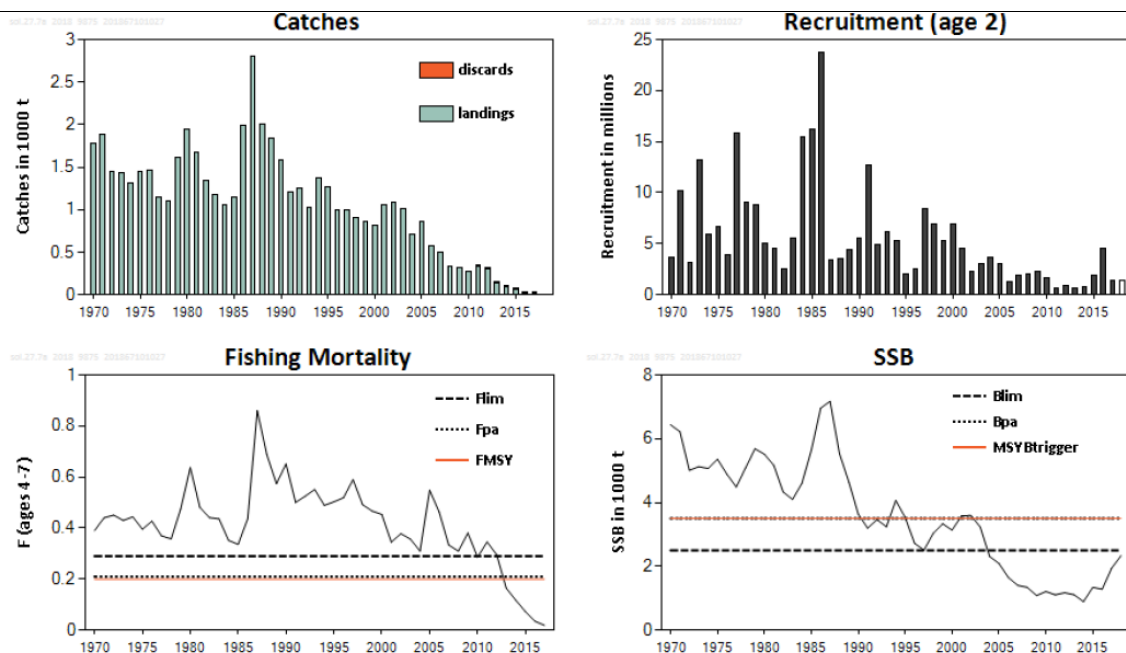


Figure 2. Sole in division VIIa. Summary of stock assessment. Predicted recruitment values are not shaded. Source: ICES, 2016. **R3**

Divisions VII.b-c (West of Ireland)

ICES note that catches in this area are too low to support the collection of the necessary information for an assessment of the stock status. No assessment was undertaken and no reference points are defined for this stock (ICES, 2017b).

Fishery removals of this stock cannot be calculated and there is insufficient information to undertake a stock assessment. It is considered further under clause D.

Division VII d (eastern English Channel)

The stock assessment is an age-based analytical assessment that uses catches in the model and in the forecast. Input data includes commercial catches: international landings and discards, ages and length frequencies from catch sampling by métier; 3 survey indices (UK(E&W)-BTS ,UK(E&W)-YFS, and FR-YFS); 3 commercial indices (BE-CBT (from 2004 onwards), FR-COT and UK(E&W)-CBT) (ICES, 2017c). **Fishery removals of the species in the fishery under assessment are included in the stock assessment process. It passes Clause C1.1.**

MSY reference points are defined and so are precautionary and limit reference points. The spawning-stock biomass (SSB) has been fluctuating between B_{lim} and MSY Btrigger. Fishing mortality (F) has been decreasing since 2014 and is below FMSY in 2016. Recruitment has been fluctuating without trend and was at the lowest of the time-series in 2012–2016, with the exception of 2015 (**Figure 3**) (ICES, 2018c).

The stock is considered, in its most recent stock assessment, to have a biomass above the limit reference point. It passes clause C1.2 with some caution given stocks have been fluctuating below MSY Btrigger.

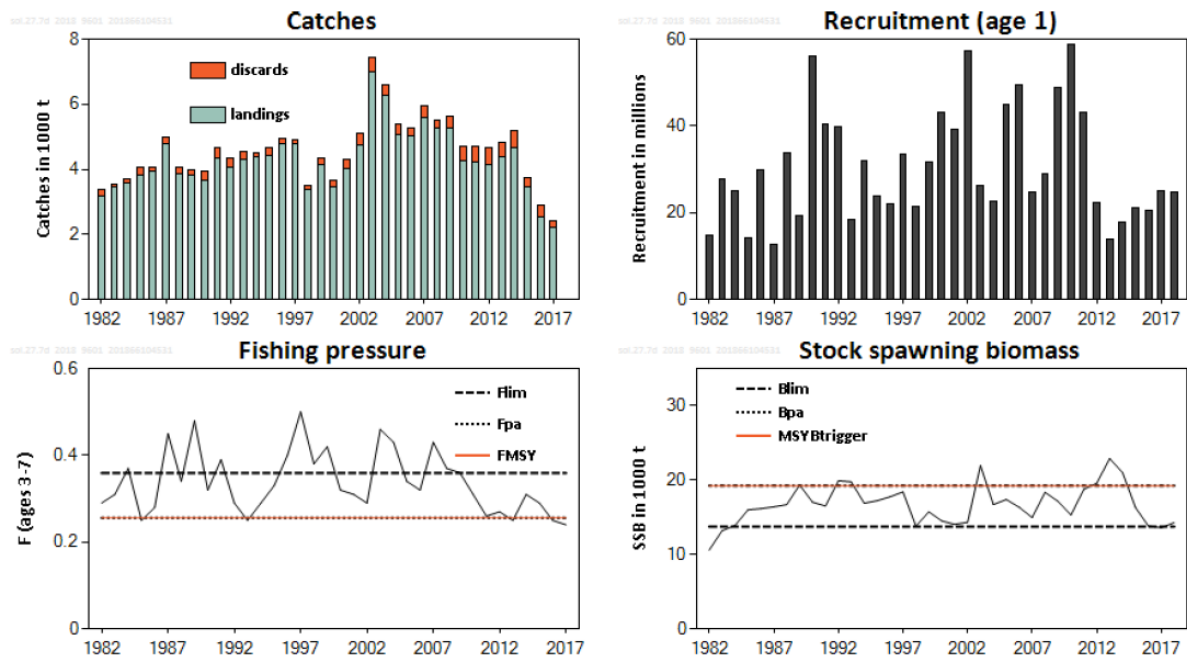


Figure 3. Sole in Division VIIId. Summary of the stock assessment. Predicted recruitment values are not shaded. **R4**

Division VIIe (Western English Channel)

The stock assessment is an age-based analytical assessment that uses landings in the model and discards are then included to calculate a catch forecast. Input data includes catch-at-age data; two survey indices (UK-FSP and Q1SWBeam) and two commercial tuning fleets (UK-CBT-late and UK-COT) (ICES, 2018d).

MSY reference points are defined and so are precautionary and limit reference points. Fishing mortality (F) has been below FMSY since 2009. Spawning-stock biomass (SSB) has been above MSY Btrigger since 1999. Recruitment (R) has been variable without an overall trend (**Figure 4**) (ICES, 2018d).

Fishery removals of this stock are included in the assessment process and it is considered, in its most recent stock assessment, to have a biomass above the limit reference point. It passes clause C.

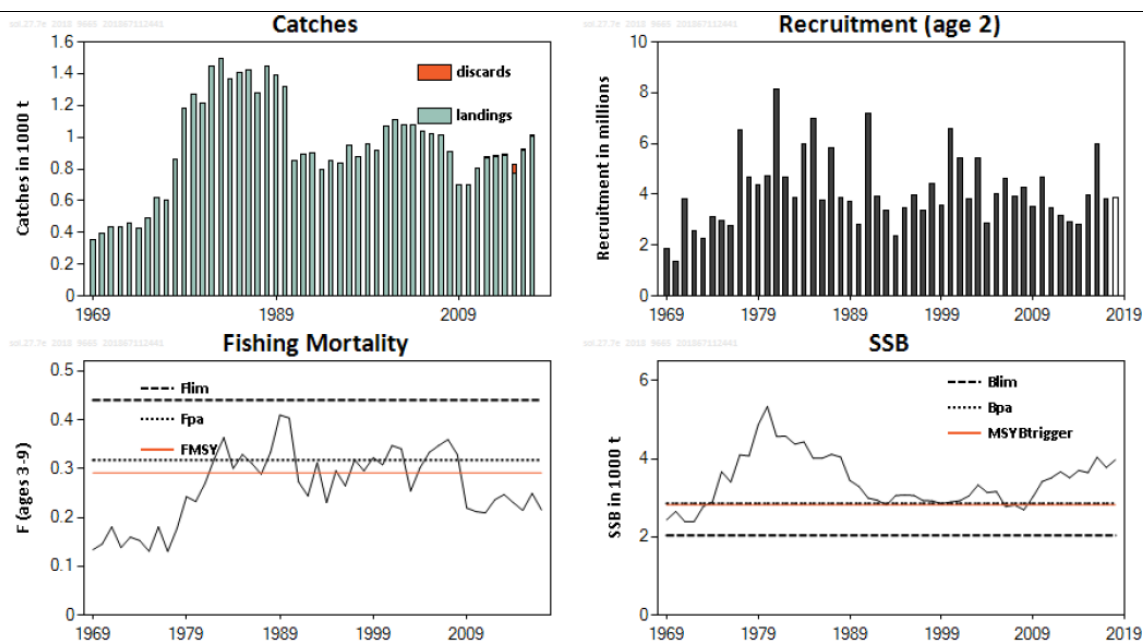


Figure 4. Sole in Division VIIe. Summary of the stock assessment. ICES estimated catches, recruitment, fishing mortality, and spawning-stock biomass from the summary stock assessment. Assumed recruitment values are not shaded. Discard estimates are only available from 2012 onwards. Source: ICES, 2018d. **R5**

Divisions VII.f-g (Bristol Channel, Celtic Sea)

The stock assessment is an age-based analytical assessment that uses landings in the model and discards are then included to calculate a catch forecast. Input data comprises international landings, ages and length frequencies from catch sampling by métier; one survey index (UK(E&W)-BTS-Q3); three commercial indices (BE-CBT, BE-CBT2, and UK(E&W)-CBT) (1991-2012) and maturity data from a combined-sex maturity (ICES, 1998) (ICES, 2017e).

MSY reference points are defined and so are precautionary and limit reference points. The spawning-stock biomass (SSB) has been above MSY Btrigger since 2001. Fishing mortality (F) has been at or above FMSY since 2009. The 2015 and 2016 recruitment are estimated to be well above average (**Figure 5**) (ICES, 2018e).

Fishery removals of this stock are included in the assessment process and it is considered, in its most recent stock assessment, to have a biomass above the limit reference point. It passes clause C.

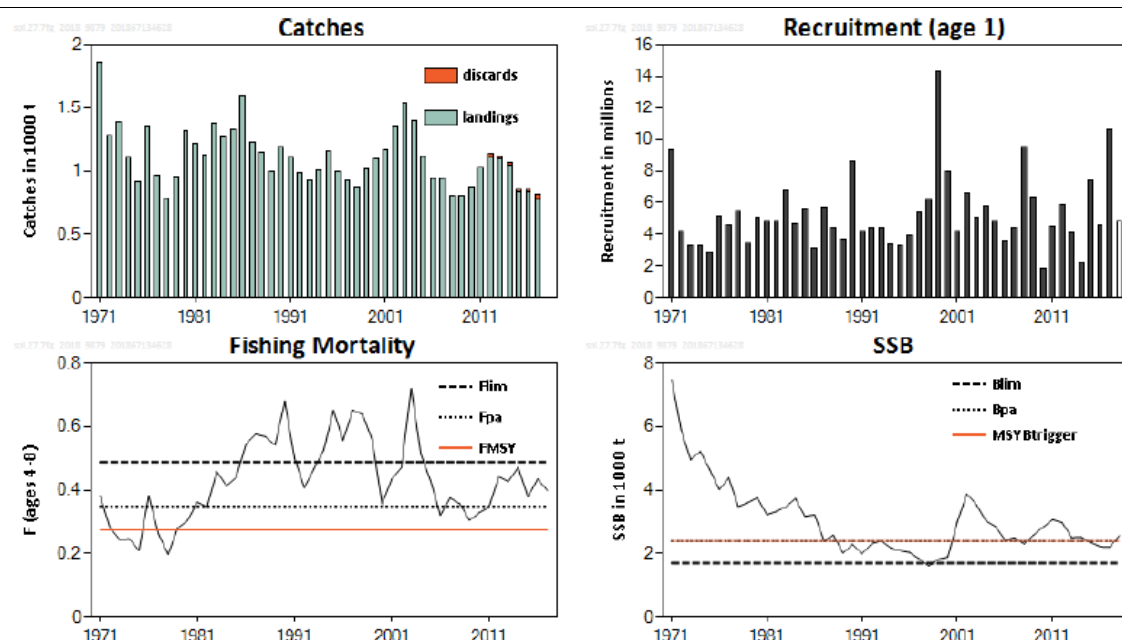


Figure 5. Sole in divisions VII.f and VII.g. Summary of the stock assessment. Assumed recruitment values are not shaded. Source: ICES, 2018e. **R6**

Divisions VIIh-k (Celtic Sea south, south west of Ireland)

The assessment is trends based because the available landings-at-age data do not cover the whole area and fishery. Furthermore, ICES note that there is a lack of reliable information on younger fish, no fishery-independent information on abundance, and a tendency for the assessment to underestimate stock size and overestimate fishing mortality. The assessment is carried out on the landings in Divisions VII.j and VII k but is also considered representative for Division VII.h. The advice does take into account the landings from Division VI.h (ICES, 2018f).

Proxy MSY reference points are defined and also precautionary and limit reference points. The spawning-stock biomass (SSB) shows an increasing trend since the mid-2000s and is above MSY Btrigger since 2015. Fishing mortality shows a declining trend and has been below FMSY since 2012. Recruitment has fluctuated without trend over the time-series (**Figure 6**) (ICES, 2018f).

Fishery removals of this stock are included in the assessment process and it is considered, in its most recent stock assessment, to have a biomass above the limit reference point. It passes clause C.

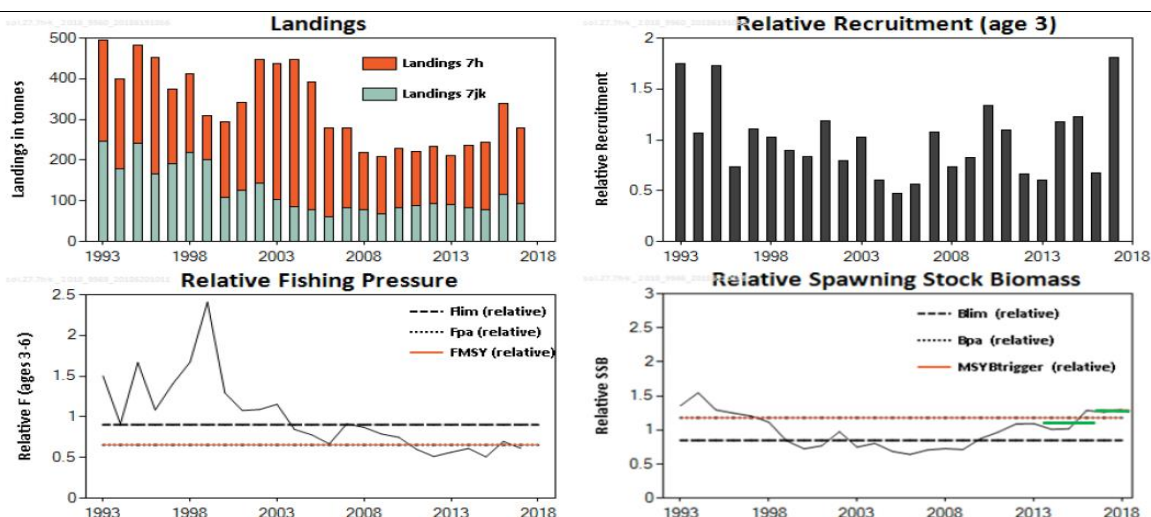


Figure 6. Sole in Divisions VII h–k. Summary of the stock assessment, based on divisions VIIj and VIIk. The landings are for the full stock area (Divisions VII h–k), only landings from divisions VIIj and VIIk are used in the assessment. Recruitment, F, and SSB values are relative to the average of the time-series. Dashed lines denote the average of relative SSB of the respective year ranges. Source: ICES, 2018f.**R7**

References

R1 COUNCIL REGULATION (EU) 2018/120 of 23 January 2018 fixing for 2018 the fishing opportunities for certain fish stocks and groups of fish stocks, applicable in Union waters and, for Union fishing vessels, in certain non-Union waters, and amending Regulation (EU) 2017/127.

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R0120&from=EN>

R2 ICES, 2018a. ICES Advice on fishing opportunities, catch, and effort Greater North Sea Ecoregion. Sole (*Solea solea*) in Subarea IV (North Sea). Version 2: 6 December 2017. DOI: 10.17895/ices.pub.3528

<http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/sol.27.4.pdf>

R3 ICES 2018 Sole (*Solea solea*) in Division VII a (Irish Sea):

<http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/sol.27.7a.pdf>

R4 ICES, 2018c. ICES Advice on fishing opportunities, catch, and effort Greater North Sea Ecoregion. Sole (*Solea solea*) in Division VII d (eastern English Channel).

<http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/sol.27.7d.pdf>

R5 ICES, 2018d. ICES Advice on fishing opportunities, catch, and effort Celtic Seas and Greater North Sea ecoregions. Sole (*Solea solea*) in Division VIIe (western English Channel).

<http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/sol.27.7e.pdf>

R6 ICES 2018 Advice on fishing opportunities, catch, and effort Celtic Seas ecoregion. Sole (*Solea solea*) in Divisions VIIf and VIIg (Bristol Channel, Celtic Sea).

<http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/sol.27.7fg.pdf>

R7 ICES 2018 Advice on fishing opportunities, catch, and effort Celtic Seas ecoregion. Sole (*Solea solea*) in Divisions VII h and VII k: <http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/sol.27.7h-k.pdf>

R8 ICES 2018 Advice on fishing opportunities, catch, and effort Celtic Seas ecoregion. Sole (*Solea solea*) in Division VIa:

CATEGORY D SPECIES

In a whole fish assessment, Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. In a by-product assessment, Category D species are those which are not subject to a species-specific management regime. In both cases, the comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

The process for assessing Category D species involves the use of a Productivity-Susceptibility Analysis (PSA) to further subdivide the species into ‘Critical Risk’, ‘Major Risk’ and ‘Minor Risk’ groups. If there are no Category D species in the fishery under assessment, this section can be deleted.

Productivity and susceptibility ratings are calculated using a process derived from the APFIC document “Regional Guidelines for the Management of Tropical Trawl Fisheries, which in turn was derived from papers by Patrick *et al* (2009) and Hobday *et al* (2007). Table D1 should be completed for each Category D species as follows:

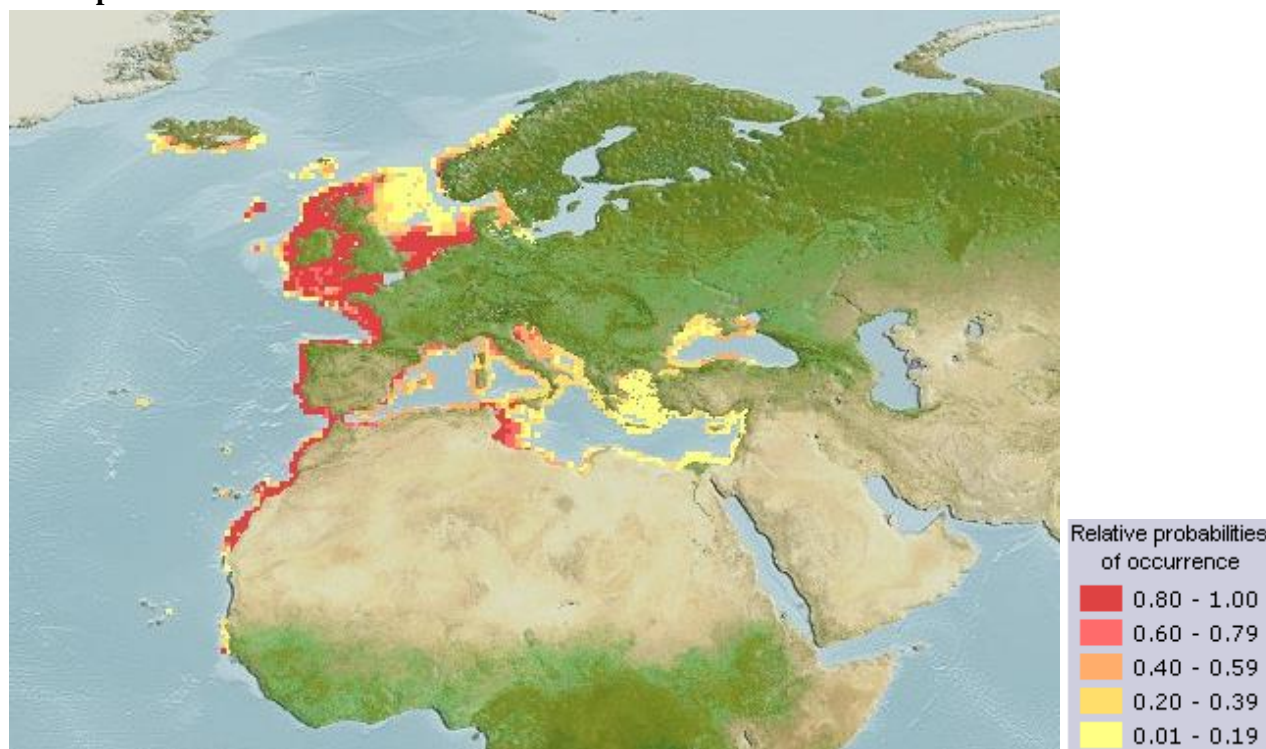
- Firstly, the best available information should be used to fill in values for each productivity and susceptibility attribute.
- Table D2 should be used to convert each attribute value into a score between 1 and 3.
- The average score for productivity attributes and the average for susceptibility attributes should be calculated.
- Table D3 should be used to determine whether the species is required to meet the requirements of Table D4. A species which does not need to meet the requirements of D4 is automatically awarded a pass.
- Table D4 should be used to assess those species indicated by Table D3 to determine a pass/fail rating.
- Any Category D species which has been categorised by the IUCN Red List as Endangered or Critically Endangered, or which appears in the CITES appendices, automatically results in a fail.

D1	Species Name:	Sole <i>Solea solea</i> in Divisions VII b-c (West of Ireland)	
	Productivity Attribute	Value	Score
	Average age at maturity (years)	2.7	2
	Average maximum age (years)	13.5	2
	Fecundity (eggs/spawning)	100,000-150,000	1
	Average maximum size (cm)	50.25	1
	Average size at maturity (cm)	26.45 (TL)	1
	Reproductive strategy	Open water / substratum egg scatterers	1
	Mean trophic level	3.2	2
	Average Productivity Score		1.43
	Susceptibility Attribute	Value	Score
	Overlap of adult species range with fishery	>50% of stock occurs in area fished	3
	Distribution	Not score if overlap attribute scored	
	Habitat	Demersal	3
	Depth range	0-150m, usually 10-60m	3
	Selectivity	Up to 4m length	3

	Post-capture mortality	Most dead or retained	3
	Average Susceptibility Score		3
	PSA Risk Rating (From Table D3)		Pass
	Compliance rating		Medium

References

Overlap attribute:



Reviewed distribution maps for *Solea solea* (Common sole), with modelled year 2100 native range map based on IPCC A2 emissions scenario. www.aquamaps.org, version of Aug. 2016. Web. Accessed 27 Apr. 2018

Other attributes:

R8 Fishbase: <http://www.fishbase.org/summary/solea-solea.html>

Compliance:

Medium compliance rating given lack of information on stock abundance and exploitation (beyond official landings statistics).

Standard clauses 1.3.2.2

Table D2 - Productivity / Susceptibility attributes and scores.

Productivity attributes	Low productivity/ High risk	Medium productivity/ Medium risk	High productivity/ Low risk
	Score 3	Score 2	Score 1
Average age at maturity (years)	>4	2 to 4	<2
Average maximum age (years)	>30	10 to 30	<10
Fecundity (eggs/spawning)	<1 000	1 000 to 10 000	>10 000
Average maximum size (cm)	>150	60 to 150	<60
Average size at maturity (cm)	>150	30 to 150	<30
Reproductive strategy	Live bearer, mouth brooder or significant parental investment	Demersal spawner "berried"	Broadcast spawner
Mean trophic level	>3.25	2.5–3.25	<2.5

Susceptibility attributes		High susceptibility/ High risk	Medium susceptibility/ Medium risk	Low susceptibility/ Low risk
		Score 3	Score 2	Score 1
Availability	1) Overlap of adult species range with fishery	>50% of stock occurs in the area fished	Between 25% and 50% of the stock occurs in the area fished	<25% of stock occurs in the area fished
	2) Distribution	Only in the country/fishery	Limited range in the region	Throughout region/global distribution
Encounterability	1) Habitat	Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom)	Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs)	Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic)
	2) Depth range	High overlap with trawl fishing gear (20 to 60 m depth)	Medium overlap with trawl fishing gear (10 to 20 m depth)	Low overlap with trawl fishing gear (0 to 10 m, >70 m depth)
Selectivity		Species >2 times mesh size or up to 4 m length	Species 1 to 2 times mesh size or 4 to 5 m length	Species <mesh size or >5 m length
Post capture mortality		Most dead or retained Trawl tow >3 hours	Alive after net hauled Trawl tow 0.5 to 3 hours	Released alive Trawl tow <0.5 hours

Note: Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

D3		Average Susceptibility Score		
		1.00 – 1.75	1.76 – 2.24	2.25 – 3.00
Average Productivity Score	1.00 – 1.75	PASS	PASS	PASS
	1.76 – 2.24	PASS	PASS	TABLE D4
	2.25 – 3.00	PASS	TABLE D4	TABLE D4

D4	Species Name		
	Impacts On Species Categorised as Vulnerable by D1-D3 - Minimum Requirements		
	D4.1	The potential impacts of the fishery on this species are considered during the management process, and reasonable measures are taken to minimise these impacts.	
	D4.2	There is no substantial evidence that the fishery has a significant negative impact on the species.	
			Outcome:
Evidence			
References			
<i>Standard clause 1.3.2.2</i>			

SOCIAL CRITERION

In addition to the scored criteria listed above, applicants must commit to ensuring that vessels operating in the fishery adhere to internationally recognised guidance on human rights. They must also commit to ensuring there is no use of enforced or unpaid labour in the fleet(s) operating upon the resource.

Appendix A - Determining Resilience Ratings

The assessment of Category B species described in this assessment report template utilises a resilience rating system suggested by the American Fisheries Society. This approach was chosen because it is also used by FishBase, and so the resilience ratings for many thousands of species are freely available online. As described by FishBase, the following is the process used to arrive at the resilience ratings:

“The American Fisheries Society (AFS) has suggested values for several biological parameters that allow classification of a fish population or species into categories of high, medium, low and very low resilience or productivity (Musick 1999). If no reliable estimate of r_m (see below) is available, the assignment is to the lowest category for which any of the available parameters fits. For each of these categories, AFS has suggested thresholds for decline over the longer of 10 years or three generations. If an observed decline measured in biomass or numbers of mature individuals exceeds the indicated threshold value, the population or species is considered vulnerable to extinction unless explicitly shown otherwise. If one sex strongly limits the reproductive capacity of the species or population, then only the decline in the limiting sex should be considered. We decided to restrict the automatic assignment of resilience categories in the Key Facts page to values of K , t_m and t_{max} and those records of fecundity estimates that referred to minimum number of eggs or pups per female per year, assuming that these were equivalent to average fecundity at first maturity (Musick 1999). Note that many small fishes may spawn several times per year (we exclude these for the time being) and large live bearers such as the coelacanth may have gestation periods of more than one year (we corrected fecundity estimates for those cases reported in the literature). Also, we excluded resilience estimates based on r_m (see below) as we are not yet confident with the reliability of the current method for estimating r_m . If users have independent r_m or fecundity estimates, they can refer to Table 1 for using this information.”

Parameter	High	Medium	Low	Very low
Threshold	0.99	0.95	0.85	0.70
r_{max} (1/year)	> 0.5	0.16 – 0.50	0.05 – 0.15	< 0.05
K (1/year)	> 0.3	0.16 – 0.30	0.05 – 0.15	< 0.05
Fecundity (1/year)	> 10,000	100 – 1000	10 – 100	< 10
t_m (years)	< 1	2 – 4	5 – 10	> 10
t_{max} (years)	1 - 3	4 – 10	11 – 30	> 30

Taken from the FishBase manual, “Estimation of Life-History Key Facts”:

<http://www.fishbase.us/manual/English/key%20facts.htm#resilience>

Appendix B – Background on the 5% catch rule

The proposed fishery assessment methodology uses a species categorisation approach to divide the catch in the assessment fishery into groups. These groups are:

- **Category A:** “Target” species with a species-specific management regime in place.
- **Category B:** “Target” species with no species-specific management regime in place.
- **Category C:** “Non-target” species with a species-specific management regime in place.
- **Category D:** “Non-target” species with no species-specific management regime in place

The distinction between 'target' and 'non-target' species is made to enable the assessment to consider the impact of the fishery on all the species caught regularly, without requiring a full assessment be conducted for each. Thus 'target' species are subjected to a more detailed assessment, while 'non-target' species are considered more briefly. For the purposes of the IFFO RS fishery assessment, 'target' and 'non-target' species are defined by their prevalence in the catch, by weight. Applicants must declare which species are considered 'target' species in the fishery, and the combined weight of these must be at least 95% of the annual catch. The remaining 5% can be made up of 'non-target' species. Note also that ETP species are considered separately, irrespective of their frequency of occurrence in the catch.

The proposed use of 5% as a limit for 'non-target' species is one area in which feedback is being sought via the public consultation. The decision to propose a value of 5% ensures consistency with other fishery assessment programmes, such as the MSC which uses 5% to distinguish between 'main' and 'minor' species (see MSC Standard, SA3.4 and GSA3.4.2); and Seafood Watch, which uses 5% when defining the 'main' species for the assessment (see Seafood Watch Standard, Criterion 2). The value is also consistent with the approach used in Version 1 of the IFFO RS Standard, in which up to 5% of the raw material could be comprised of 'unassessed' species.