IFFO RS Limited

T: +44 (0) 2030 539 195
E: Standards@iffors.com
W: www.iffors.com

Unit C, Printworks | 22 Amelia Street
London, SE17 3BZ | United Kingdom

Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report V2.0

Fishery Under Assessment	**Sprat *Sprattus sprattus* Northeast Atlantic**
Date	**December 2019**
Assessor	**Jim Daly**

Application details and summary of the assessment outcome				
Name: Pelagia				
Address:				
Country: Ireland		**Zip:**		
Tel. No.:		**Fax. No.:**		
Email address:		**Applicant Code:**		
Key Contact:		**Title:**		
Certification Body Details				
Name of Certification Body:		**SAI Global Ltd**		
Assessor	**Peer Reviewer**	**Assessment Days**	**Initial/Surveillance/Re-approval**	**Whole fish/ By-product**
Jim Daly	Vito Romito	0.5	SURV 1	By-product
Assessment Period	2019			

Scope Details		
Management Authority (Country/State)		EU/Common Fisheries Policy
Main Species		Sprat *Sprattus sprattus*
Stocks:	**1**	Sprat (Sprattus sprattus) in Subarea 6 and divisions 7.a–c and 7.f–k (West of Scotland, southern Celtic Seas)
	2	Sprat (Sprattus sprattus) in divisions 7.d and 7.e (English Channel)
	3	Sprat (Sprattus sprattus) in Division 3.a and Subarea 4 (Skagerrak, Kattegat, and North Sea)
Fishery Location		Northeast Atlantic
Gear Type(s)		Pelagic midwater trawl

Outcome of Assessment			
Overall Outcomes:		**Outcome**	**Clause(s) failed**
1	**Sprat (Sprattus sprattus) in Subarea 6 and divisions 7.a–c and 7.f–k**	PASS	NONE
2	**Sprat (Sprattus sprattus) in divisions 7.d and 7. e**	PASS	NONE
3	**Sprat (Sprattus sprattus) in Division 3.a and Subarea 4**	PASS	NONE
Peer Review Evaluation			
Recommendations		**APPROVE Sprat stocks 1) – 3) in the assessment area**	

Assessment Determination
If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in CITES appendices, it cannot be approved for use as an IFFO RS raw material. European Sprat *Sprattus sprattus* does not appear as Endangered or Critically Endangered on IUCN's Red List, nor does it appear in CITES appendices; therefore, the species is eligible for approval for use as IFFO RS raw material. Three stocks form part of this assessment (Northeast Atlantic): 1) Sprat (Sprattus sprattus) in Subarea 6 and divisions 7.a-c and 7.f-k (West of Scotland, southern Celtic Seas) 2) Sprat (Sprattus sprattus) in divisions 7.d and 7.e (English Channel) 3) Sprat (Sprattus sprattus) in Division 3.a and Subarea 4 (Skagerrak, Kattegat, and North Sea) A Category C by-product full re-assessment was undertaken for stock 3) Skagerrak, Kattegat North Sea. For this stock the SAI Global assessment team has verified that removals in the fishery are included in the stock assessment process and biomass reference points have been considered in the latest assessment. For the remaining two stocks the comparative lack of scientific information on the status of the population in the assessment area means that a risk-assessment style approach must be taken. The fishery was assessed using the risk-based Productivity, Susceptibility Analysis (PSA) as per IFFO-RS v 2.0 procedures for Category D species. The stocks have passed this risk-based assessment. Each stock assessed must pass both Clause C1.1 and C1.2 or Clause D of the fisheries assessments. The three sprat stocks assessed are approved by the SAI Global assessment team for the production of fishmeal and fish oil under the IFFO-RS v 2.0 by-products standard.
Peer Review Comments
The Peer reviewer agrees with the PSA assessment findings for the sprat stock 1 and 2 and with the ICES findings for stock 3 (i.e. stocks above Blim). The three sprat stocks assessed should be approved for the production of fishmeal and fish oil under the IFFO-RS v 2.0 by-products standard.
Notes for On-site Auditor

HOW TO COMPLETE THIS ASSESSMENT REPORT

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
Sprat	*Sprattus sprattus*	**Sprat (Sprattus sprattus) in Subarea 6 and divisions 7.a-c and 7.f-k**	N/A	EU/Common Fisheries Policy	D
Sprat	Sprattus sprattus	**Sprat (Sprattus sprattus) in divisions 7.d and 7. e**	N/A	EU/Common Fisheries Policy	D
Sprat	Sprattus sprattus	**Sprat (Sprattus sprattus) in Division 3.a and Subarea 4**	N/A	EU/Common Fisheries Policy	C

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.

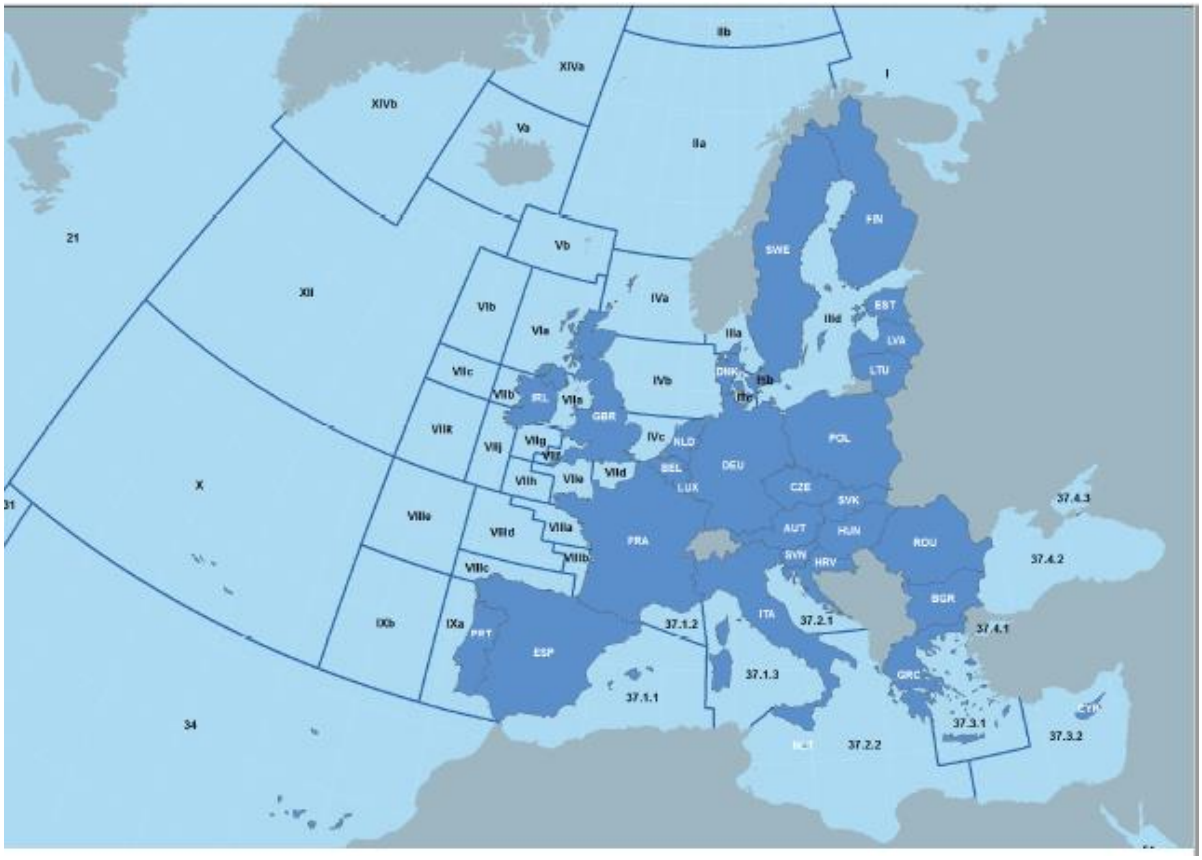
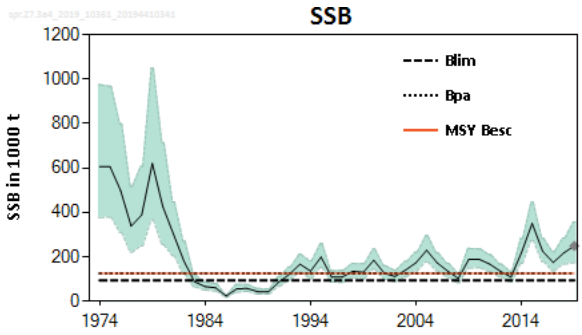
<table>
<tr><td colspan="2">Species Name</td><td colspan="3">Sprat (Sprattus sprattus) in Division 3.a and Subarea 4 (Skagerrak, Kattegat, and North Sea)</td></tr>
<tr><td rowspan="3">C1</td><td colspan="4">Category C Stock Status - Minimum Requirements</td></tr>
<tr><td>C1.1</td><td>Fishery removals of the species in the fishery under assessment are included in the stock assessment process or are considered by scientific authorities to be negligible.</td><td>Division 3.a and Subarea 4</td><td>PASS</td></tr>
<tr><td>C1.2</td><td>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.</td><td>Division 3.a and Subarea 4</td><td>PASS</td></tr>
<tr><td colspan="3">Clause outcome:</td><td colspan="2">See above</td></tr>
<tr><td>C1.1</td><td colspan="4">Evidence:
C1.1:
The assessment covers stocks for which ICES advice is given in the Northeast Atlantic (Figure 1):
 

Figure 1: Sub-areas and Divisions of FAO fishing areas 27 and 37 including the Northeast Atlantic R1</td></tr>
</table>

	1) Sprat (Sprattus sprattus) in Subarea 6 and divisions 7.a-c and 7.f-k (West of Scotland, southern Celtic Seas): ICES cannot assess the stock and exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because reference points are undefined. The fisheries assessment was undertaken using the risk-based Productivity-Susceptibility Analysis (PSA) approach for Category D species. **2) Sprat (Sprattus sprattus) in divisions 7.d and 7.e (English Channel)** ICES cannot assess the stock and exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because reference points are undefined. The fisheries assessment was undertaken using the risk-based Productivity-Susceptibility Analysis (PSA) approach for Category D species. **3) Sprat (Sprattus sprattus) in Division 3.a and Subarea 4 (Skagerrak, Kattegat, and North Sea)** Input data has been derived from commercial catches (international landings, ages and length frequencies from catch sampling), three survey indices (IBTS Q1&Q3, HERAS), constant maturity based on long-term average from IBTS Q1 survey (ICES, 2018a), and natural mortalities from the multispecies model (ICES, 2017). Discarding has been assumed negligible since 2016. The latest benchmark was performed in 2018 (ICES, 2018). Fishery removals of the species in the fishery under assessment are included in the stock assessment process the stock does **PASS** C1.1
C1.2	**3) Sprat (Sprattus sprattus) in Division 3.a and Subarea 4 (Skagerrak, Kattegat, and North Sea)** Spawning-stock biomass (SSB 248,824t, July 2019) has been above MSY Bescapement (125,000t) (and $B_{LIM\ 94,000}$t) since 2013 **(Figure 2**):  **Figure 2**: Sprat in Division 3.a and Subarea 4. Summary of the stock assessment. SSB for July of given year; predicted values for SSB are shown as an unshaded bar and a grey diamond. **R4** Therefore, this stock is considered, in its most recent stock assessment, to have a biomass above the limit reference point; the stock does **PASS** C1.2.

References

R1 Sub-areas and Divisions of FAO fishing areas 27 and 37:
https://ec.europa.eu/fisheries/sites/fisheries/files/docs/body/fishing_areas_en.pdf
R2 ICES Advice (2019) Sprat (Sprattus sprattus) in Subarea 6 and divisions 7.a-c and 7.f-k (West of Scotland, southern Celtic Seas):
http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2019/2019/spr.27.67a-cf-k.pdf
R3 ICES Advice (2019) Sprat (Sprattus sprattus) in divisions 7.d and 7.e (English Channel)
http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2019/2019/spr.27.7de.pdf
R4 ICES Advice (2019**)** Sprat (Sprattus sprattus) in Division 3.a and Subarea 4 (Skagerrak, Kattegat, and North Sea):
http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2019/2019/spr.27.3a4.pdf

R5 ICES (2018): Report of the Benchmark Workshop on Sprat (WKSPRAT 2018), 5–9 November 2018, ICES HQ, Copenhagen, Denmark. ICES CM 2018/ACOM:35. 60 pp.

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 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:	**Sprat *Sprattus sprattus* Sprat (Sprattus sprattus) in Subarea 6, divisions 7.a-c; 7.f-k and Sprat (Sprattus sprattus) in divisions 7.d and 7. e**		
	Productivity Attribute		**Value**	**Score**
	Average age at maturity (years)		*2.6	2
	Average maximum age (years)		*9.4	1
	Fecundity (eggs/spawning)		*8,700-46,600	1
	Average maximum size (cm)		*16	1
	Average size at maturity (cm)		*10.9	1
	Reproductive strategy		*Egg scatterers	1
	Mean trophic level		*3	2
		Average Productivity Score		**1.29**
	Susceptibility Attribute		**Value**	**Score**
	Overlap of adult species range with fishery (**Figure 3**)		>50% stock in area fished	3
	Distribution		No data required	-
	Habitat		Not used	-
	Depth range: mid-water pelagic unlikely to encounter demersal gear		10-150m	1
	Selectivity		Up to 4m	3
	Post-capture mortality: Short tows		Alive when hauled	2
		Average Susceptibility Score		**2.25**
		PSA Risk Rating (From Table D3)		**PASS**

References

D1 FISHBASE Search: *Sprattus sprattus*: http://www.fishbase.org/Reproduction/Maturity List (accessed 10.12.19)

* Life history tool Table 1 **D1**

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

Figure 3 Sprat distribution North Sea; Skagerrak and Kattegat **D1**

Table 1: Sprat *sprattus sprattus* Life History Data **D1**

Life History Data on *Sprattus sprattus*
European sprat

Family:	Clupeidae Herrings, shads, sardines, menhadens	
Max. length (Lmax):	16.0 cm SL	
L infinity (Linf):	= 17.5 cm TL	Recalculate
K:	0.30 /year Ø' = 1.96 Median Ø' value with related Linf. and K.	Recalculate Growth & mortality data
to:	-0.64 years Estimated from Linf and K.	
Natural mortality (M):	0.59 s.e. 0.39 - 0.89 /year Estimated from Linf., K and annual mean temp. = 13.0 °C	Recalculate
Life span (approx.):	9.4 years Estimated from Linf., K and to. Max. age & size data	
Generation time:	3.6 years Estimated from Lopt, Linf., K and to.	
Age at first maturity (tm):	2.6 years Estimated from Lm, Linf., K and to.	
L maturity (Lm):	10.9 s.e. 8.1 - 14.6 cm TL Estimated from Linf. Maturity data	
L max. yield (Lopt):	10.6 s.e. n.a. - n.a. cm TL Estimated from Linf., K and M.	
Length-weight:	17.5 cm TL => 27.4 g (wet weight) W = 0.0064 * L ^ 2.92100	Recalculate Length-weight data
Nitrogen & protein:	Weight 28 (g) => whole-body nitrogen (N) 0.7 (g) => whole-body crude protein 4.2 (g)	Recalculate
Reproductive guild:	nonguarders: open water/substratum egg scatterers Reproduction	
Fecundity:	20,135 [8,700-46,600] Estimated as geometric mean. Fecundity	
Relative Yield per Recruit (Y'/R):	0.0290 Estimate Y'/R from M/K, Lc/Linf and E. Lc= 7.0 cm TL E= 0.50 /year Emsy 0.64 /year Eopt 0.57 /year Fmsy 1.05 /year Fopt 0.78 /year	Recalculate
Exploitation:	Z= F= E= Estimate Z, F, E from Lc, Lmean, Linf, K, M Lc = 7.0 cm TL Lmean = cm TL	Recalculate
Resilience / productivity:	Medium; decline threshold 0.95 Vulnerable to extinction if decline in biomass or numbers exceeds threshold over the longer of 10 years or 3 generations.	
Intrinsic rate of increase (rm):	2.10 /year Lr = 7.0 cm TL Estimated from Fmsy at Lc = length of recruitment (Lr).	Recalculate
Main food:	mainly animals (troph. 2.8 and up)	
Trophic level:	3.0 +/- s.e. 0.07 Estimated from food data. Food	