



RESPONSIBLE
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IFFO RS
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	Herring <i>Clupea harengus</i> West of Scotland, West of Ireland
Date	April 2020
Report Code	2020-65
Assessor	Jim Daly
Stock Pass	ICES Divisions 6.a and 7.b-c
Stock Fail	

Application details and summary of the assessment outcome				
Name: Pelagia				
Address:				
Country: UK, 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	Re-approval	By-product
Assessment Period	2020			

Scope Details	
Management Authority (Country/State)	EU/Common Fisheries Policy
Main Species	Herring <i>Clupea harengus</i>
Stock:	ICES Divisions 6.a and 7.b-c
Fishery Location	West of Scotland, West of Ireland
Gear Type(s)	Pelagic midwater trawls
Outcome of Assessment	
Peer Review Evaluation	AGREE
Recommendation	APPROVE

Assessment Determination

If any species is categorised as Endangered or Critically Endangered on IUCN's Red List, or if it appears in the CITES appendices, it cannot be approved for use as IFFO RS raw material. Herring does not appear as Endangered or Critically Endangered on IUCN's Red List, nor does it appear in CITES appendices; therefore, Herring is eligible for approval for use as IFFO RS by-product raw material.

One stock forms part of this assessment:

1) West of Scotland, West of Ireland ICES Divisions 6.a and 7.b–c

ICES cannot assess the stock and exploitation status relative to MSY and PA reference points, because those reference points are undefined. According to IFFO RS procedures a stock that does not meet the minimum requirements of a Category C assessment (Clauses C1.1; C1.2) should be re-assessed as Category D.

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 species has passed this risk-based assessment (**Table D1**).

1) Herring is **APPROVED** by SAI Global assessors in the assessment area for the production of fishmeal and fish oil under the current IFFO RS v 2.0 by-products standard.

Peer Review Comments

The peer reviewer notes that West of Scotland, West of Ireland herring has passed the Productivity and Susceptibility Analysis, and agrees that should be approved for the production of fishmeal and fish oil under the current 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
Herring	<i>Clupea harengus</i>	ICES Divisions 6.a and 7.b-c	N/A	EU/CFP	D

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:	Herring <i>Clupea harengus</i>		
	Productivity Attribute		Value	Score
	Average age at maturity (years)*		1.8	1
	Average maximum age (years)		6.9	1
	Fecundity (eggs/spawning) *		59,700	1
	Average maximum size (cm)		45	1
	Average size at maturity (cm)		16.7	1
	Reproductive strategy		Egg scatterers	1
	Mean trophic level		3.4	3
	Average Productivity Score			1.29
	Susceptibility Attribute		Value	Score
	Overlap of adult species range with fishery (Figure 3)		<25%	1
	Distribution		Not used	-
	Habitat:		Not used	-
	Depth range Low overlap with demersal trawl gear		(0-200m)	3
	Selectivity		>2 times mesh	3
Post-capture mortality		Short tows	2	
Average Susceptibility Score			2.25	
PSA Risk Rating (From Table D3)			PASS	

* Fishbase life history tool (**Figure 2**)

Evidence:

Herring from Divisions 6.a and 7.b-c ((West of Scotland, West of Ireland) is assessed (**Figure 1**):

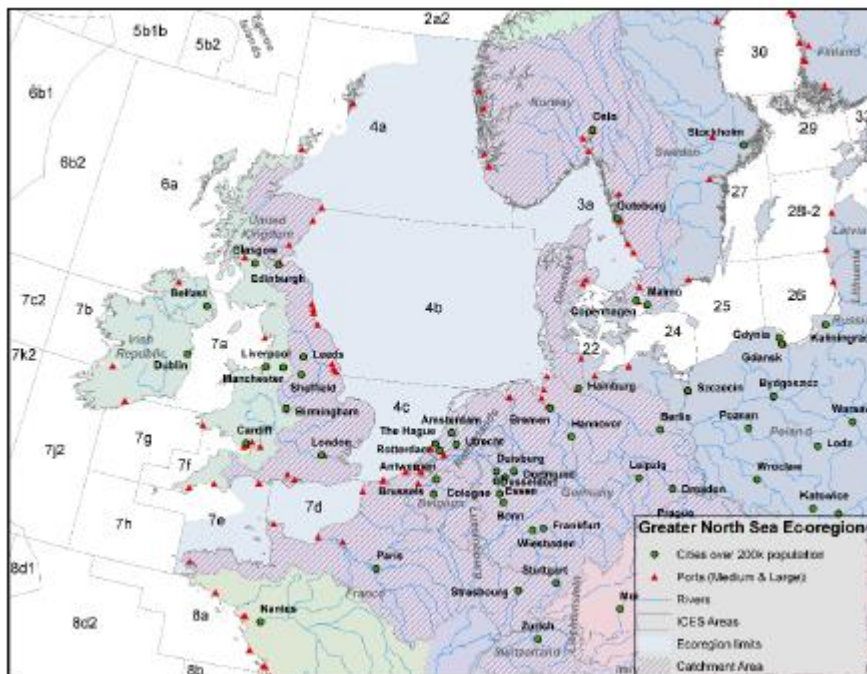
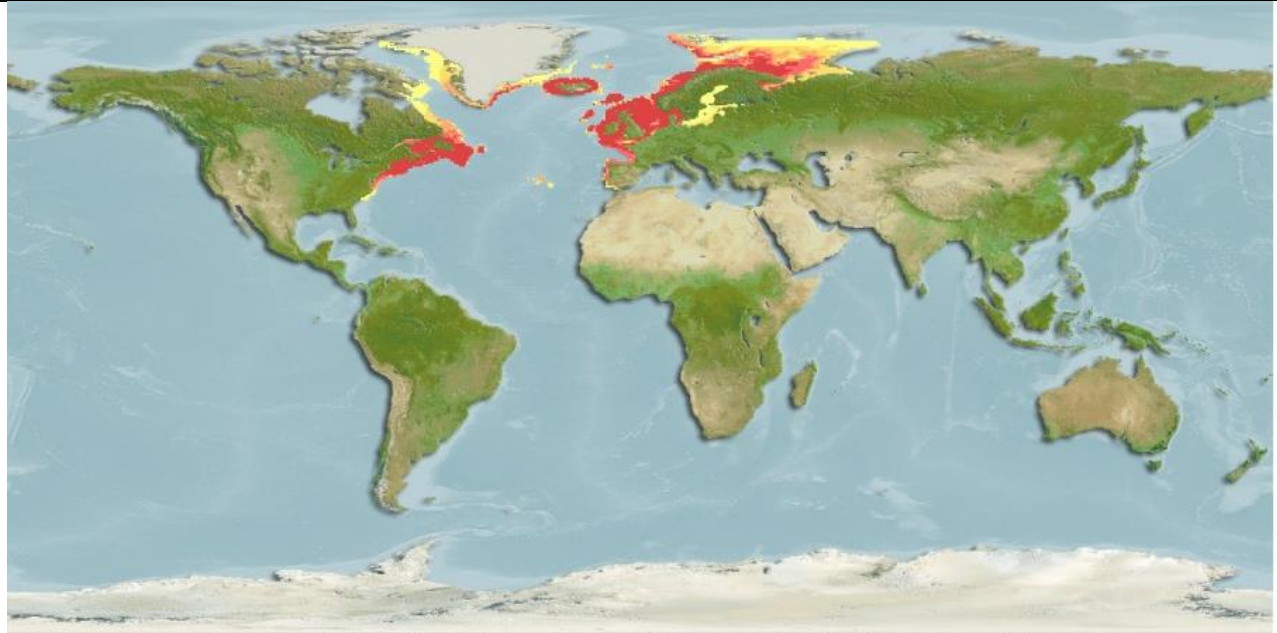


Figure 1 Map of the assessment area (ICES 6a, 7b-c: West of Scotland, West of Ireland) **R1**

Life History Data on *Clupea harengus* Atlantic herring

Family:	Clupeidae Herrings, shads, sardines, menhadens													
Max. length (Lmax):	45.0 cm SL													
L infinity (Linf):	= 28.3 cm TL ▼	<input type="button" value="Recalculate"/>												
K:	0.41 /year $\emptyset' = 2.52$ Median \emptyset' value with related Linf. and K.	<input type="button" value="Recalculate"/> Growth & mortality data												
to:	-0.41 years Estimated from Linf and K.													
Natural mortality (M):	0.60 s.e. 0.40 - 0.91 /year Estimated from Linf., K and annual mean temp. = 9.0 °C	<input type="button" value="Recalculate"/>												
Life span (approx.):	6.9 years Estimated from Linf., K and to. Max. age & size data													
Generation time:	2.3 years Estimated from Lopt, Linf., K and to.													
Age at first maturity (tm):	1.8 years Estimated from Lm, Linf., K and to.													
L maturity (Lm):	16.8 s.e. 12.5 - 22.5 cm TL Estimated from Linf. Maturity data													
L max. yield (Lopt):	19.0 s.e. n.a. - n.a. cm TL Estimated from Linf., K and M.													
Length-weight:	28.3 cm ▼ => 149.7 g (wet weight) $W = 0.0062 * L^{\wedge} 3.01900$	<input type="button" value="Recalculate"/> Length-weight data												
Nitrogen & protein:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Weight 150 (g)</td> <td>=> whole-body nitrogen (N) 3.9 (g)</td> </tr> <tr> <td></td> <td>=> whole-body crude protein 24.3 (g)</td> </tr> </table>	Weight 150 (g)	=> whole-body nitrogen (N) 3.9 (g)		=> whole-body crude protein 24.3 (g)	<input type="button" value="Recalculate"/>								
Weight 150 (g)	=> whole-body nitrogen (N) 3.9 (g)													
	=> whole-body crude protein 24.3 (g)													
Reproductive guild:	nonguarders: open water/substratum egg scatterers Reproduction													
Fecundity:	[no value (min.)-59,700] Estimated as geometric mean. Fecundity													
Relative Yield per Recruit (Y'/R):	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">0.0457</td> <td colspan="2">Estimate Y'/R from M/K, Lc/Linf and E.</td> </tr> <tr> <td></td> <td>Lc = 11.3 cm TL</td> <td>E = 0.50 /year</td> </tr> <tr> <td></td> <td>Emsy 0.60 /year</td> <td>Eopt 0.54 /year</td> </tr> <tr> <td></td> <td>Fmsy 0.90 /year</td> <td>Fopt 0.70 /year</td> </tr> </table>	0.0457	Estimate Y'/R from M/K, Lc/Linf and E.			Lc = 11.3 cm TL	E = 0.50 /year		Emsy 0.60 /year	Eopt 0.54 /year		Fmsy 0.90 /year	Fopt 0.70 /year	<input type="button" value="Recalculate"/>
0.0457	Estimate Y'/R from M/K, Lc/Linf and E.													
	Lc = 11.3 cm TL	E = 0.50 /year												
	Emsy 0.60 /year	Eopt 0.54 /year												
	Fmsy 0.90 /year	Fopt 0.70 /year												
Exploitation:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Z =</td> <td colspan="2">Estimate Z, F, E from Lc, Lmean, Linf, K, M</td> </tr> <tr> <td>F =</td> <td>Lc = 11.3 cm TL</td> <td></td> </tr> <tr> <td>E =</td> <td>Lmean =</td> <td>cm TL</td> </tr> </table>	Z =	Estimate Z, F, E from Lc, Lmean, Linf, K, M		F =	Lc = 11.3 cm TL		E =	Lmean =	cm TL	<input type="button" value="Recalculate"/>			
Z =	Estimate Z, F, E from Lc, Lmean, Linf, K, M													
F =	Lc = 11.3 cm TL													
E =	Lmean =	cm TL												
Resilience / productivity:	High; decline threshold 0.99 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):	1.80 /year Lr = 11.3 cm TL Estimated from Fmsy at Lc = length of recruitment (Lr).	<input type="button" value="Recalculate"/>												
Main food:	mainly animals (troph. 2.8 and up)													
Trophic level:	3.4 +/- s.e. 0.13 Estimated from diet data. Diet													
Food consumption (Q/B):	10.10 times the body weight per year Food consumption													

Figure 2: Herring Life History tool R2



Note: Distribution range colours indicate degree of suitability of habitat which can be interpreted as probabilities of occurrence.

Figure 3: Herring *C. harengus* Global Distribution **R2**

References:

R1 Greater North Sea Ecoregion: ICES Ecosystem Overviews (37pp Dec 2019):

http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2019/2019/EcosystemOverview_GreaterNorthSea_2019.pdf

R2 Fishbase: Herring *C. harengus*

<https://www.fishbase.in/Summary/SpeciesSummary.php?ID=24&AT=hERRING>

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