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IFFO RS
Global Standard for Responsible Supply
of Marine Ingredients

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



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Fishery Under Assessment	Whiting <i>Merlangius merlangus</i> (West of Scotland)
Date	February 2020
Assessor	Jim Daly
Stock Pass	ICES Division 6a
Stock Fail	

Application details and summary of the assessment outcome				
Name: FFSkagen and others				
Address:				
Country: Denmark		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	Conor Donnelly	0.5	SURV 2	By-product
Assessment Period	2020			

Scope Details	
Management Authority (Country/State)	Denmark/EU
Main Species	Whiting <i>Merlangius merlangus</i>
Stock:	ICES Division 6a
Fishery Location	West of Scotland
Gear Type(s)	All Compliant Gears
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. Whiting does not appear as Endangered or Critically Endangered on IUCN's Red List, nor does it appear in CITES appendices; therefore, Whiting is eligible for approval for use as IFFO RS by-product raw material.

One stock forms part of this assessment:

- 1) Whiting (*Merlangius merlangus*) in Division 6.a (West of Scotland)

Fishery removals of the stock are considered in the various stock assessment processes so the stock **PASSES** Clause C1.1.

For Whiting in the assessment area Spawning-stock biomass (SSB_{2019} 26,646t) has been increasing since 2010 but remains very low compared to historical estimates and is below Blim (31,900t). Removals are not considered to be negligible therefore, the stock **FAILS** Clause C1.2.

According to IFFO RS procedures a stock that does not meet 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 D3**).

Whiting 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

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
Whiting	<i>Merlangius merlangus</i>	ICES 6a West of Scotland	n/a	EU/Denmark	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		Whiting	<i>Merlangius merlangus</i>
C1	Category C Stock Status - Minimum Requirements		
	C1.1	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.	
	C1.2	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.	
Clause outcome:			FAIL

C1.1

Evidence

This assessment covers Whiting harvested from the West of Scotland (ICES 6a) **Figure 1:**

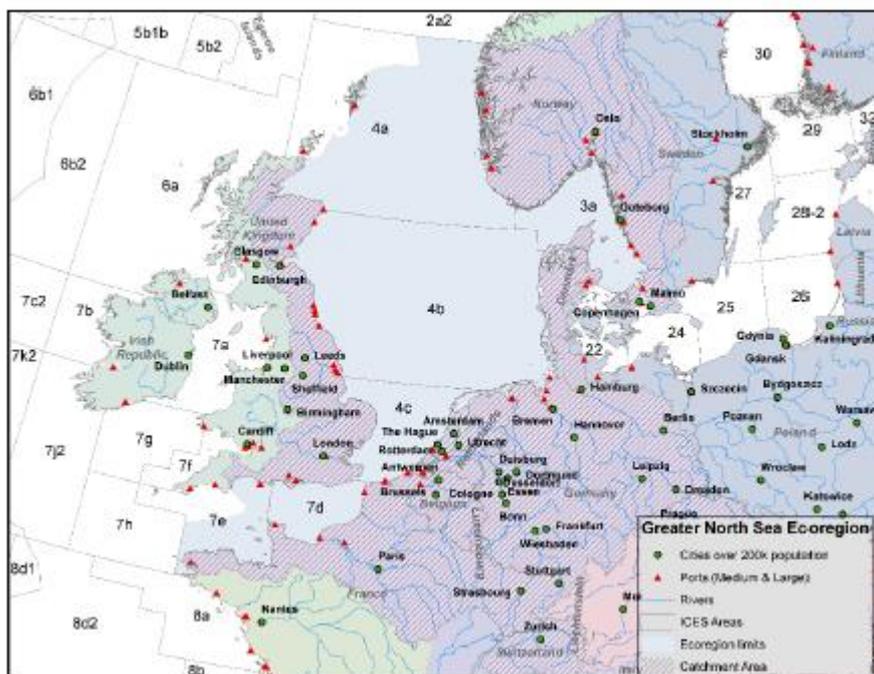


Figure 1: Greater North Sea Ecoregion, including the assessment area **R1**

The assessment is an age-based analytic assessment (TSA) that uses catches in the model and in the forecast. Input data is derived from commercial landings, estimated discards and age composition of catches. Five survey indices are undertaken. Fixed maturity data is derived from

these surveys. Natural mortality estimates are derived from mean weight-at-age (Lorenzen's model) using mean weight data from market sampling and discard observations. Discards and bycatch are included in the assessment. The stock was last benchmarked in 2012.

C1.2

Evidence:

Spawning-stock biomass (SSB₂₀₁₉ 26,646t) has been increasing since 2010 but remains very low compared to historical estimates and is below Blim (31,900t) (**Figure 2**):

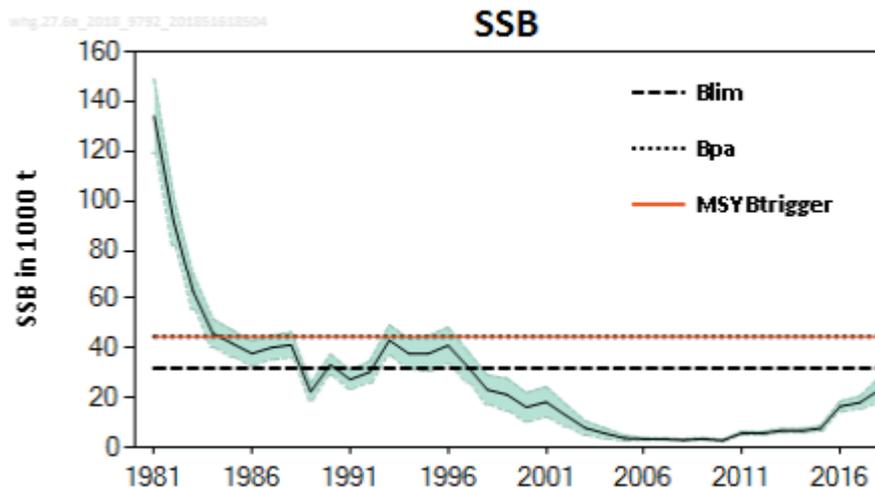


Figure 2: Whiting in Division 6.a. Observed catches and summary of stock assessment (weights in thousand tonnes). Shaded areas correspond to two standard errors. **R2**

Given continued high discards and low TAC this stock could become a major “choke species” for the Division 6.a Nephrops fishery in the context of the landing obligation.

References

R1 MAP 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 ICES Advice (2019) Whiting (*Merlangius merlangus*) in Division 6.a (West of Scotland) <http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/whg.27.6a.pdf>

R3 ICES. 2012. Report of the Benchmark Workshop on Western Waters Round fish (WKROUND), 22-29 February 2012, Aberdeen, UK. ICES CM 2012/ACOM:49. 283 pp.

R4 Fishbase Whiting: <https://www.fishbase.in/Summary/SpeciesSummary.php?ID=29&AT=Whiting>

Standard clauses 1.3.2.2

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.

Evidence for Table D1:

* *Fishbase R4*; ** *Fishbase Life History Tool Figure 3*

D1	Species Name:	Whiting <i>Merlangius merlangus</i>	
	Productivity Attribute	Value	Score
	Average age at maturity (years)	**2	2
	Average maximum age (years)	*20	2
	Fecundity (eggs/spawning)	*>10,000	1
	Average maximum size (cm)	*91.5	2
	Average size at maturity (cm)	*27.8	1
	Reproductive strategy	**Egg Scatterers	1
	Mean trophic level	*4.4	3
	Average Productivity Score		1.71
	Susceptibility Attribute	Value	Score
	Overlap of adult species range with fishery	*<25% in area fished	1
	Distribution	Not used	-
	Habitat	Not used	-
	Depth range	*10-200m	3
	Selectivity	*>x2 mesh	3
	Post-capture mortality	*Dead	3
	Average Susceptibility Score		2.5
	PSA Risk Rating (From Table D3)		PASS

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 2) Distribution	>50% of stock occurs in the area fished Only in the country/ fishery	Between 25% and 50% of the stock occurs in the area fished Limited range in the region	<25% of stock occurs in the area fished Throughout region/ global distribution
Encounterability	1) Habitat 2) Depth range	Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom) High overlap with trawl fishing gear (20 to 60 m depth)	Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs) Medium overlap with trawl fishing gear (10 to 20 m depth)	Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic) 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

Whiting: Global Distribution Attribute

Add your observation in [Fish Watcher](#)
[Native range](#) | [All suitable habitat](#) | [Point map](#) | [Year 2100](#)



Reviewed map
Merlangius merlangus AquaMaps Data sources: GBIF OBIS

Figure 3: Whiting global distribution R4

Whiting: Life History Tool

Life History Data on *Merlangius merlangus* Whiting

Family:	Gadidae Cods and haddocks	
Max. length (Lmax):	<input type="text" value="91.5"/> cm TL	
L infinity (Linf):	= <input type="text" value="42.7"/> cm <input type="text" value="TL"/> <input type="button" value="Recalculate"/>	
K:	<input type="text" value="0.34"/> /year $\phi' =$ <input type="text" value="2.79"/> Median ϕ' value with related Linf. and K.	<input type="button" value="Recalculate"/> Growth & mortality data
to:	<input type="text" value="-0.44"/> years Estimated from Linf and K.	
Natural mortality (M):	<input type="text" value="0.47"/> s.e. <input type="text" value="0.31"/> - <input type="text" value="0.71"/> /year Estimated from Linf., K and annual mean temp. = <input type="text" value="9.0"/> °C	<input type="button" value="Recalculate"/>
Life span (approx.):	<input type="text" value="8.4"/> years Estimated from Linf., K and to. Max. age & size data	
Generation time:	<input type="text" value="2.9"/> years Estimated from Lopt, Linf., K and to.	
Age at first maturity (tm):	<input type="text" value="2.0"/> years Estimated from Lm, Linf., K and to.	
L maturity (Lm):	<input type="text" value="24.3"/> s.e. <input type="text" value="18.2"/> - <input type="text" value="32.6"/> cm <input type="text" value="TL"/> Estimated from Linf. Maturity data	
L max. yield (Lopt):	<input type="text" value="29.2"/> s.e. <input type="text" value="n.a."/> - <input type="text" value="n.a."/> cm <input type="text" value="TL"/> Estimated from Linf., K and M.	
Length-weight:	<input type="text" value="42.7"/> cm <input type="text" value="TL"/> <input type="button" value="=>"/> <input type="text" value="572.5"/> g (wet weight) $W =$ <input type="text" value="0.0067"/> * $L \wedge$ <input type="text" value="3.02480"/>	<input type="button" value="Recalculate"/> Length-weight data
Nitrogen & protein:	Weight <input type="text" value="573"/> (g) => whole-body nitrogen (N) <input type="text" value="15.5"/> (g) => whole-body crude protein <input type="text" value="96.9"/> (g)	<input type="button" value="Recalculate"/>
Reproductive guild:	nonguarders: open water/substratum egg scatterers Reproduction	
Fecundity:	<input type="text" value="330,693"/> [<input type="text" value="109,358"/> - <input type="text" value="1,000,000"/>] Estimated as geometric mean. Fecundity	
Relative Yield per Recruit (Y'/R):	Estimate Y'/R from M/K, Lc/Linf and E. Lc= <input type="text" value="17.1"/> cm <input type="text" value="TL"/> E= <input type="text" value="0.50"/> /year Emsy <input type="text" value="0.60"/> /year Eopt <input type="text" value="0.54"/> /year Fmsy <input type="text" value="0.71"/> /year Fopt <input type="text" value="0.55"/> /year	<input type="button" value="Recalculate"/>
Exploitation:	Z= <input type="text"/> F= <input type="text"/> E= <input type="text"/> Estimate Z, F, E from Lc, Lmean, Linf, K, M Lc = <input type="text" value="17.1"/> cm <input type="text" value="TL"/> Lmean = <input type="text"/> cm <input type="text" value="TL"/>	<input type="button" value="Recalculate"/>

Figure 3: Whiting Life History R4