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Global Standard for Responsible Supply of Marine Ingredients

Fishery Assessment Methodology and Template Report V2.0

Fishery Under Assessment	**Norwegian lobster *Nephrops norvegicus* ICES Subarea 4**
Date	**April 2019**
Assessor	**Jim Daly**

Application details and summary of the assessment outcome				
Name: Pelagia – Killybegs (IE), Grimsby (UK)				
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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	Surveillance 1	By-product
Assessment Period	2018			

Scope Details	
Management Authority (Country/State)	EU
Main Species	Norwegian lobster *Nephrops norvegicus*
Fishery Location	Northeast Atlantic ICES Subarea IV
Gear Type(s)	Demersal trawl, creel.
Outcome of Assessment	
Overall Outcome	Pass
Clauses Failed	None
Peer Review Evaluation	Pass
Recommendation	Approve

Assessment Determination

Norway lobster in European waters are managed under the EU Common Fisheries Policy. Management includes setting of Total Allowable Catches, Minimum Conservation Reference Sizes (MCRS) and the Landing Obligation. Scientific catch advice is provided by ICES, who identify 34 Functional units (FU) for stock assessment purposes. Assessment units considered in this by-product report are as follows:

- **Divisions IVb and IV.c, Functional Unit 5 (central and southern North Sea, Botney Cut-Silver Pit)**
- **Division IVb, Functional Unit 6 (central North Sea, Farne Deeps)**
- **Division IVa, Functional Unit 7 (northern North Sea, Fladen Ground)**
- **Division IVb, Functional Unit 8 (central North Sea, Firth of Forth)**
- **Division IVb, Functional Unit 9 (central North Sea, Moray Firth)**
- **Division IVa, Functional Unit 10 (northern North Sea, Noup)**
- **Division IVb, Functional Unit 34 (central North Sea, Devil's Hole)**

Norway lobster in FUs 6-9 are subject to a species-specific management regime and are assessed under Clause C. Fishery removals of the stock are included in the stock assessment process and in most cases the stocks are considered, in their most recent assessment, to have a biomass above the limit reference point **and so pass clause C.** FU10 has no reference points defined for it but fishery removals are negligible **so it passes clause C.**

Given the lack of key elements of a species-specific management regime in FUs 5 and 34, stocks in these FUs are considered further under clause D using productivity susceptibility analysis (PSA). **The PSA classes Norway lobster as vulnerable so the stocks were assessed further under D4 and both pass.**

In 2017 the EU landing obligation was applied to all catches of Norway lobster fisheries in ICES Subarea IV, with several exemptions. Observations indicate that discarding above the minimum conservation reference size (MCRS) continues and has not changed markedly. Consequently ICES is providing advice for 2019 assuming average discard rates observed over the last three years, which is considered to be a more realistic assumption.

It is proposed (EU 2018) to replace the five existing single-species based multi-annual plans (MAP) (and plans for other demersal species including *Nephrops*) adopted by separate regulations by bringing all multi-annual plans (MAP) for the different demersal stocks into one Regulation. The introduction of this new approach would allow achievement of conservation objectives while, at the same time, permitting elimination of fishing effort limitations meaning that numerous reporting and control obligations would not be required. This will result in a significant reduction of the administrative burden.

Norway lobster is classed as of least concern on the IUCN Red List of Threatened Species (accessed 01.04.19) and is not listed on CITES appendix (http://www.iucnredlist.org/details/169967/0, assessment dates from 2009).

Norway lobster in Subarea IV is approved by the assessment team for the production of fishmeal and fish oil under the IFFO-RS v 2.0 by-products standard.

Peer Review Comments

Norway lobster in European waters are managed under the EU Common Fisheries Policy. Scientific catch advice is provided by ICES, who identify 34 Functional units (FU), seven of which are relevant and considered in this assessment.

FU6, FU7, FU8 and FU9 pass clause C because fishery removals of this stocks are included in the stock assessment process and the stocks are considered, in their most recent assessments, to have a biomass above the limit reference point.

FU10 passes Clause C because fishery removals are considered negligible, averaging about 15 tonnes per year in the past 6 years.

The state of the FU5 stock is unknown. Preliminary stock surveys (2010 and 2012) indicate relatively high density compared to neighbouring FUs. The 2012 survey estimate (0.7 *Nephrops* m-2) is relatively high compared with most Norway lobster stocks in the North Sea. Landings per unit of effort (LPUE) from English vessel-directed fisheries shows no trend in abundance over the period 2006-2015, which may suggest that density has remained stable. Based on the available limited information, there appears to be no substantial evidence that the fishery has a significant negative impact on the species. This FU therefore passes clause D.

FU34 is a relatively new FU, designated in 2010. ICES state that the current state of the stock is unknown. The 2015 UWTV survey found mean density to be 0.16 *Nephrops* m^2 which, taking into account ICES findings for FU5, suggests density in FU34 is also relatively high for a North Sea Norway lobster stock. The latest ICES advice for 2017 and 2018, based on the precautionary approach (2014 advice +20%) proposed a total catch of 492 tonnes and implied a harvest rate of 5.92%. The mean survey density indicates the stock declined from 2009 to 2017, while catches decreased from 2009 and then increased to some degree between 2015 and 2017. Based on the available limited information, there does not appear to be substantial evidence that the fishery has a significant negative impact on the species. This FU passes clause D.

The Peer Reviewer agrees that Norway lobster in Subarea IV should be approved by the assessment team for the production of fishmeal and fish oil under the IFFO-RS v 2.0 by-products standard.

Notes for On-site Auditor

Species-Specific Results

Category	Species	% landings	Outcome (Pass/Fail)	
Category A			A1	
			A2	
			A3	
			A4	
Category B				
Category C	Norwegian lobster *Nephrops norvegicus*	NA	Pass (FUs 6-10)	
Category D	Norwegian lobster *Nephrops norvegicus*	NA	Pass (FUs 5, 34)	

[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
Norway lobster	*Nephrops norvegicus*	FUs 6-10		EU, CFP	C
		FUs 5, 34			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		**Norwegian lobster *Nephrops norvegicus Functional Units 6-9***	
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.	Pass
	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.	Pass
		Clause outcome:	**Pass**

Evidence:

A total of 34 Functional units (FU) for assessment purposes are identified by ICES. There is significant disparity between management areas (TACs) and assessment units. Assessment units considered in this by-product report are as follows (**Figure 1**):

- **Divisions IVb and IVc, Functional Unit 5 (central and southern North Sea, Botney Cut-Silver Pit)**
- **Division IVb, Functional Unit 6 (central North Sea, Farne Deeps)**
- **Division IVa, Functional Unit 7 (northern North Sea, Fladen Ground)**
- **Division IVb, Functional Unit 8 (central North Sea, Firth of Forth)**
- **Division IVb, Functional Unit 9 (central North Sea, Moray Firth)**
- **Division IVa, Functional Unit 10 (northern North Sea, Noup)**
- **Division IVb, Functional Unit 34 (central North Sea, Devil's Hole)**

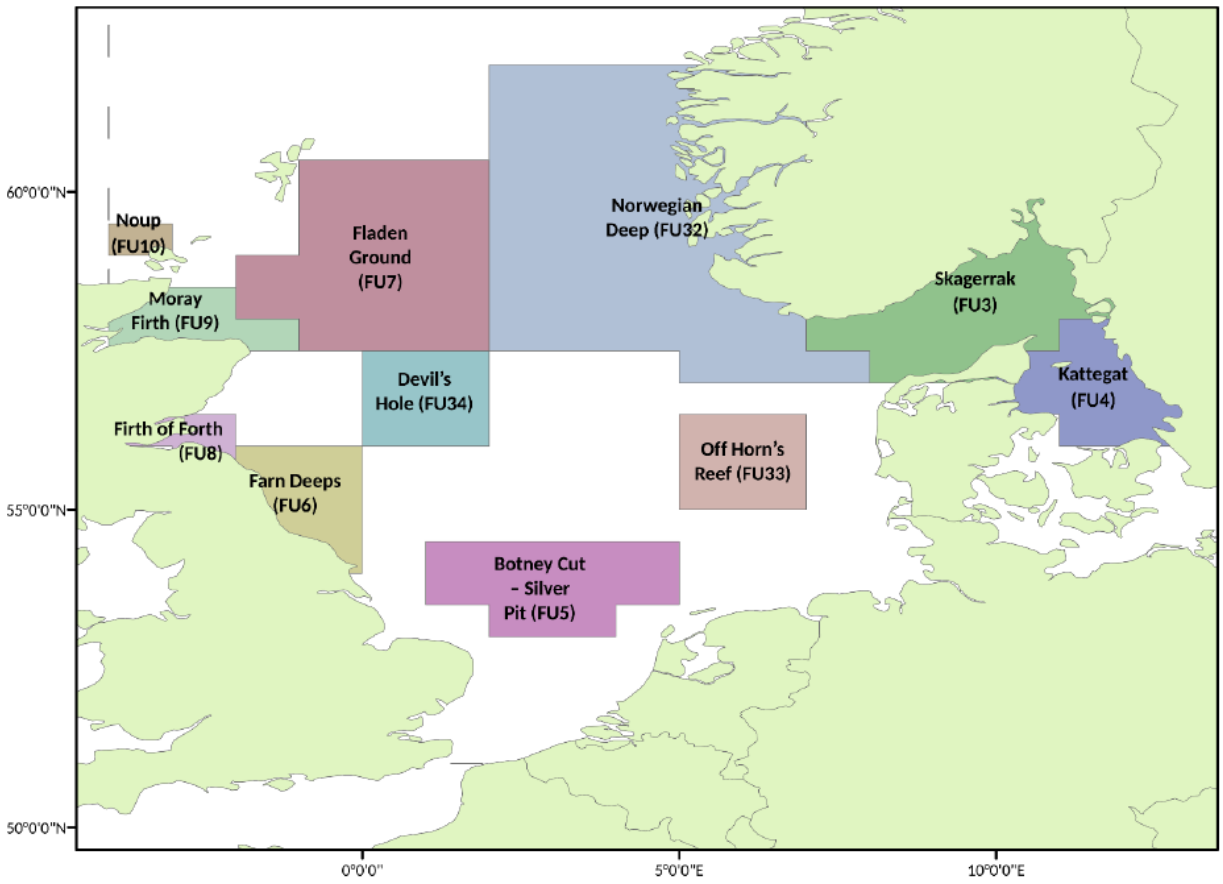

Figure 1. Norway lobster functional units in the North Sea and Skagerrak/Kattegat region**. R1**

Divisions IVb and IVc, Functional Unit 5 (central and southern North Sea, Botney Cut-Silver Pit)
The ICES framework for category 4 Norway lobster stocks was applied (ICES, 2012). The precautionary buffer was last applied in 2016 and has not been reapplied for this advice. The EU MAP for the North Sea is currently being finalized and is not yet adopted. For this stock it is not possible to estimate FMSY ranges, therefore ICES continues to give advice based on the ICES precautionary approach. The scientific information for this stock has improved. However, catch sampling and discard estimates are available for the last three years for the Dutch fleet only, and there is no underwater TV (UWTV) survey since 2012 providing up-to-date information on the stock density. The state of this stock is unknown. Preliminary stock surveys (2010 and 2012) indicate relatively high density compared to neighbouring FUs (ICES 2018).

Given the lack of key elements of a species-specific management regime this stock was considered further under clause D.

Division IVb, Functional Unit 6 (central North Sea, Farne Deeps)
ICES data category 1 stock for which analytical assessment possible. Assessment is an underwater TV survey linked to yield-per-recruit analysis from length data. Input data comprise one survey index (UWTV); length–frequency data from the fishery; commercial catches (international landings and length frequencies from English catch sampling, covering 90% of the landings); maturity data from commercial catch sampling and natural mortalities from Morizur (1982): 0.3 for males and immature females, and 0.2 for mature females for all years.

MSY Btrigger and Fmsy reference points are defined. The stock abundance index has increased since 2015, and currently it is just above MSY Btrigger. Harvest rates have been above the MSY level since 2008 (ICES, 2018).

In order to ensure the stock in Functional Unit (FU) 6 is exploited sustainably, management should be implemented at the functional unit level. Any substantial transfer of the current surplus fishing opportunities from other FUs to FU 6 could rapidly lead to overexploitation (ICES 2018).

The stock abundance index has increased since 2015, and currently it is just above MSY Btrigger. Harvest rates have been mostly above FMSY since the beginning of the time-series, except for the years 2008 and 2017. ICES assesses that fishing pressure on the stock is below FMSY. The results of the 2018 UWTV survey became available in September 2018 and showed a significant increase above the 2017 level. The advice for 2019 has therefore been updated to reflect the most recent data.

Fishery removals of this stock are included in the stock assessment process and the stock is considered, in its most recent assessment, to have a biomass above the limit reference point. FU6 passes clause C.

Division IVa, Functional Unit 7 (Northern North Sea, Fladen Ground)
ICES data category 1 stock for which analytical assessment is possible. Assessment is an underwater TV survey linked to yield-per-recruit analysis from length data. Input data comprise commercial catches (international landings, length frequencies from Scottish catch sampling); one survey index (FU 7 UWTV); maturity data from commercial catch sampling and natural mortalities from Morizur (1982): 0.3 for males and immature females, 0.2 for mature females for all years. Data from the latest UWTV survey (June 2018) have been used as the most up-to-date indicator of stock abundance (ICES 2018).

MSY Btrigger and Fmsy reference points are defined. The stock size declined from the highest observed value in 2008 to the lowest abundance estimate in the time-series in 2015. From 2016 the stock size increased and is currently above MSY Btrigger. The harvest rate has declined since 2010 and remains well below Fmsy (ICES, 2018). The results of the 2018 survey showed a significant decrease from the 2017 level. The advice for 2019 has therefore been updated to reflect more recent data. Stock size is still above MSY Btrigger.

Fishery removals of this stock are included in the stock assessment process and the stock is considered, in its most recent assessment, to have a biomass above the limit reference point. FU7 passes clause C.

Division IVb, Functional Unit 8 (Central North Sea, Firth of Forth)
ICES advises that when the proposed EU multiannual plan (MAP) for the North Sea is applied, catches in 2019 that correspond to the F ranges in the MAP are between 2,321 tonnes and 3,569 tonnes. The entire range is considered precautionary when applying the ICES advice rule. In order to ensure the stock in Functional Unit (FU) 8 is exploited sustainably, management should be implemented at the FU level (ICES 2018).

ICES assesses that fishing pressure on the stock is above FMSY and stock size is above MSY Btrigger (**Figure 2, Table 1):**

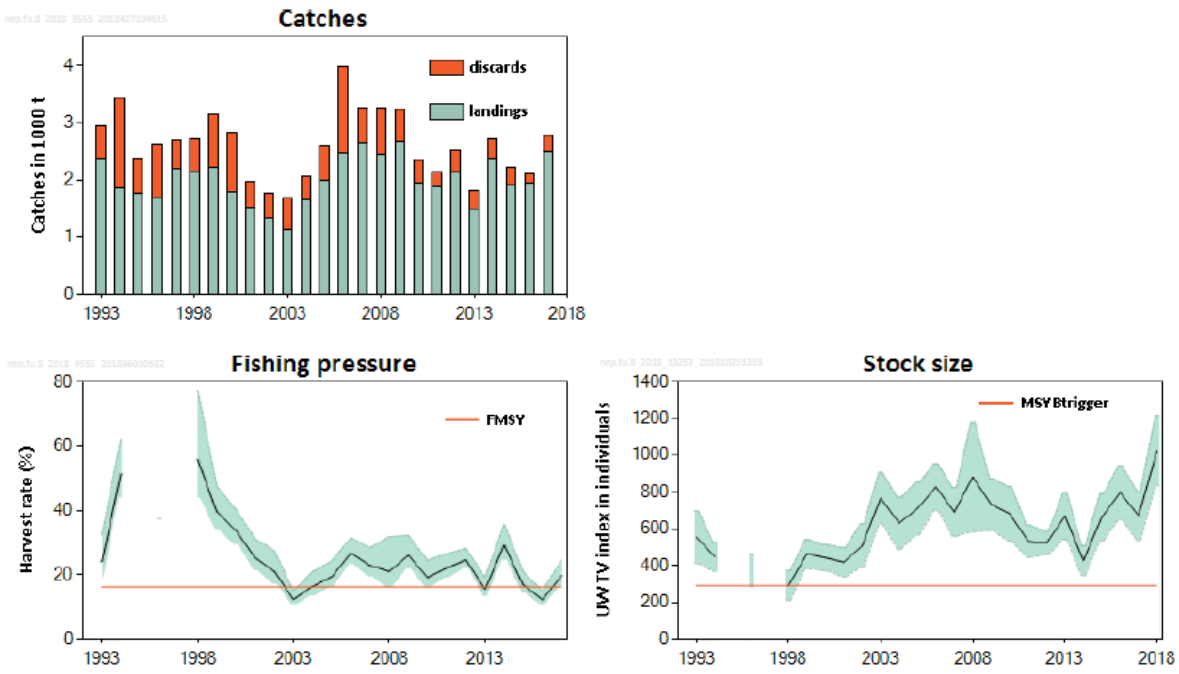

Figure 2: Norway lobster in Division 4.b, Functional Unit 8. Summary of the stock assessment. Long-term trends in catches, harvest rate, and underwater TV survey (UWTV) abundance (for animals greater than 17 mm carapace length) - used as F and SSB proxies. Orange lines show proxies for MSY Btrigger and FMSY. UWTV abundance is estimated by average densities per stratum area. Shaded areas for abundance are ±2 standard deviations (approximately 95% confidence intervals). Confidence intervals for harvest rates are derived from the confidence intervals for abundance**...**

R1

Table 1 Norway lobster in Division 4.b, Functional Unit 8. State of the stock and fishery relative to reference points.

R1

		Fishing pressure				Stock size			
		2015	2016	2017		2016	2017	2018	
Maximum sustainable yield	F_{MSY}	✗	✓	✗	Above	MSY $B_{trigger}$	✓	✓	Above trigger
Precautionary approach	F_{pa},F_{lim}	?	✓	?	Undefined	B_{pa},B_{lim}	✓	✓	Above possible reference points
Management plan	F_{MGT}	✗	✓	✗	Above	B_{MGT}	✓	✓	Above

The underwater TV (UWTV) surveys have been conducted for this stock since 1993, with a continuous annual series available since 1998. Data from the latest UWTV survey (June 2018) have been used as the most up-to-date indicator of stock abundance.

Input data comprise commercial catches (international landings, length frequencies from Scottish catch sampling); one survey index (FU 8 UWTV); maturity data from commercial catch sampling and natural mortalities from Morizur (1982): 0.3 for males and immature females, 0.2 for mature females for all years.

MSY Btrigger and Fmsy reference points are defined. The stock size is above MSY Btrigger and has been for most of the time-series (dating from 1993). The harvest rate is varying and is now below Fmsy. The stock size has been above MSY Btrigger for most of the time-series (2018).

Fishery removals of this stock are included in the stock assessment process and the stock is considered, in its most recent assessment, to have a biomass above the limit reference point. FU8 passes clause C.

Division IVb, Functional Unit 9 (central North Sea, Moray Firth)

MSY Btrigger and Fmsy reference points are defined. The stock has been above MSY Btrigger for the entire time-series. The harvest rate has fluctuated around Fmsy and is now just below (ICES, 2018):

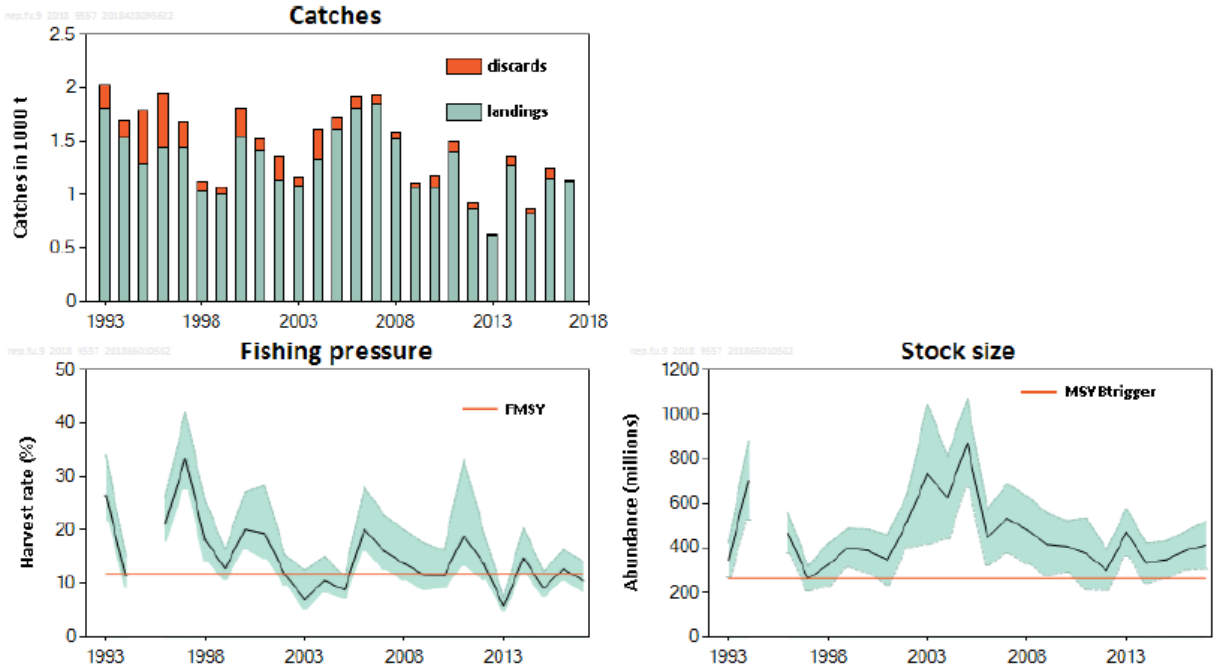

Figure 3 Norway lobster in Division 4b, Functional Unit 9. Summary of the stock assessment. Long-term trends in catches, harvest rate (used as an F proxy), and underwater TV survey (UWTV) abundance (for animals greater than 17 mm). Orange lines show proxies for MSY Btrigger and FMSY. Shaded areas for harvest rate and abundance correspond to approximate 95% confidence intervals. Harvest rates prior to 2006 may be unreliable due to underreporting of landings. **R1**

ICES assesses that fishing pressure on the stock is below FMSY and stock size is above MSY Btrigger. The stock has been above MSY Btrigger for the entire time-series. The harvest rate has fluctuated around FMSY and is now just below.

Fishery removals of this stock are included in the stock assessment process and the stock is considered, in its most recent assessment, to have a biomass above the limit reference point. FU9 passes clause C.

Division IVa, Functional Unit 10 (Northern North Sea, Noup)

Data limited assessment method was used (ICES category 4 stock). Input data comprise habitat extent, mean size, occasional UWTV surveys (incomplete time-series 1994, 1999, 2006, 2007, 2014); commercial catches are not included in the assessment but are available for monitoring (international landings, length frequencies from Scottish catch sampling) and one survey index (UWTV survey – limited time-series).

No reference points were derived. The underwater TV (UWTV) surveys in FU10 been conducted sporadically and indicated that the density is relatively low (0.13 *Nephrops* m−2). Landings are at a historical minimum. ICES in 2018 advises that when the precautionary approach is applied, catches in each of the years 2019 and 2020 should not exceed 48 tonnes.

Fishery removals are considered negligible, averaging about 15 tonnes per year in the past 6 years. Therefore FU10 passes clause C.

Nephrops has been assessed by IUCN as a species of least concern (accessed 01.04.2019).

References

R1 ICES Advice: (2018):

- Norway lobster (June 2018) (*Nephrops norvegicus*) in divisions 4.b and 4.c, Functional Unit 5 (central and southern North Sea, Botney Cut-Silver Pit) http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/nep.fu.5.pdf

- Norway lobster (Nov 2018) (*Nephrops norvegicus*) in Division 4.b, Functional Unit 6 (central North Sea, Farn Deeps) http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/nep.fu.6.pdf

- Norway lobster (Nov 2018) (*Nephrops norvegicus*) Division 4.a, Functional Unit 7 (northern North Sea, Fladen Ground) http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/nep.fu.7.pdf

- Norway lobster (Nov 2018) (*Nephrops norvegicus*) Division 4.b, Functional Unit 8 (central North Sea, Firth of Forth) http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/nep.fu.8.pdf

- Norway lobster (June 2018) (*Nephrops norvegicus*) Division 4.b, Functional Unit 9 (central North Sea, Moray Firth) http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/nep.fu.9.pdf

- Norway lobster (June 2018) (Nephrops norvegicus) Division 4.a, Functional Unit 10 (northern North Sea, Noup) http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/nep.fu.10.pdf

R2 EU 2016: Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on establishing a multi-annual plan for demersal stocks in the North Sea and the fisheries exploiting those stocks and repealing Council Regulation (EC) 676/2007 and Council Regulation (EC) 1342/2008. COM(2016) 493 final. 23 pp. https://eur-lex.europa.eu/resource.html?uri=cellar:9aa2aaae-5956-11e6-89bd-01aa75ed71a1.0008.02/DOC_1&format=PDF.

R3 Nephrops IUCN Redlist: https://www.iucnredlist.org/search?taxonomies=107878&searchType=species

R4 ICES. 2012. ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. 42 pp.

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.
- 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:**	**Norwegian lobster *Nephrops norvegicus* FUs 5, 34**	
	Productivity Attribute	**Value**	**Score**
	Average age at maturity (years)	2.0	2
	Average maximum age (years)	22	2
	Fecundity (eggs/spawning)	735	3
	Average maximum size (cm)	10-20	1
	Average size at maturity (cm)	3.62	1
	Reproductive strategy	Eggs laid and carried	2
	Mean trophic level	3.3	3
		Average Productivity Score	**2**
	Susceptibility Attribute	**Value**	**Score**
	Overlap of adult species range with fishery	>50% of stock occurs in area fished	3
	Distribution	Not scored if overlap scored	
	Habitat	Benthic	3
	Depth range	20-800m, usually 200-600m	1
	Selectivity	Up to 4m length	3
	Post-capture mortality	Most dead or retained	3
		Average Susceptibility Score	**3**
		PSA Risk Rating (From Table D3)	**D4**
		Compliance rating	
References			

R5 Sigurvin Bjarnason, 2016. *Age and growth of the Norway lobster (Nephrops norvegicus) in Icelandic waters*, Master's thesis, Faculty of Life and Environmental Sciences, University of Iceland, pp. 68. https://skemman.is/bitstream/1946/24865/1/MS_ritgerd_Sigurvin_Nephrops_.pdf

R6 Trophic level

Oakley (1978) cited in: Jiming, Y. A (1982). Tentative Analysis of the Trophic Levels of North Sea Fish. Mar. Ecol. Prog. Ser. Vol 7: 247-252.
http://www.int-res.com/articles/meps/7/m007p247.pdf

R7 Overlap attribute

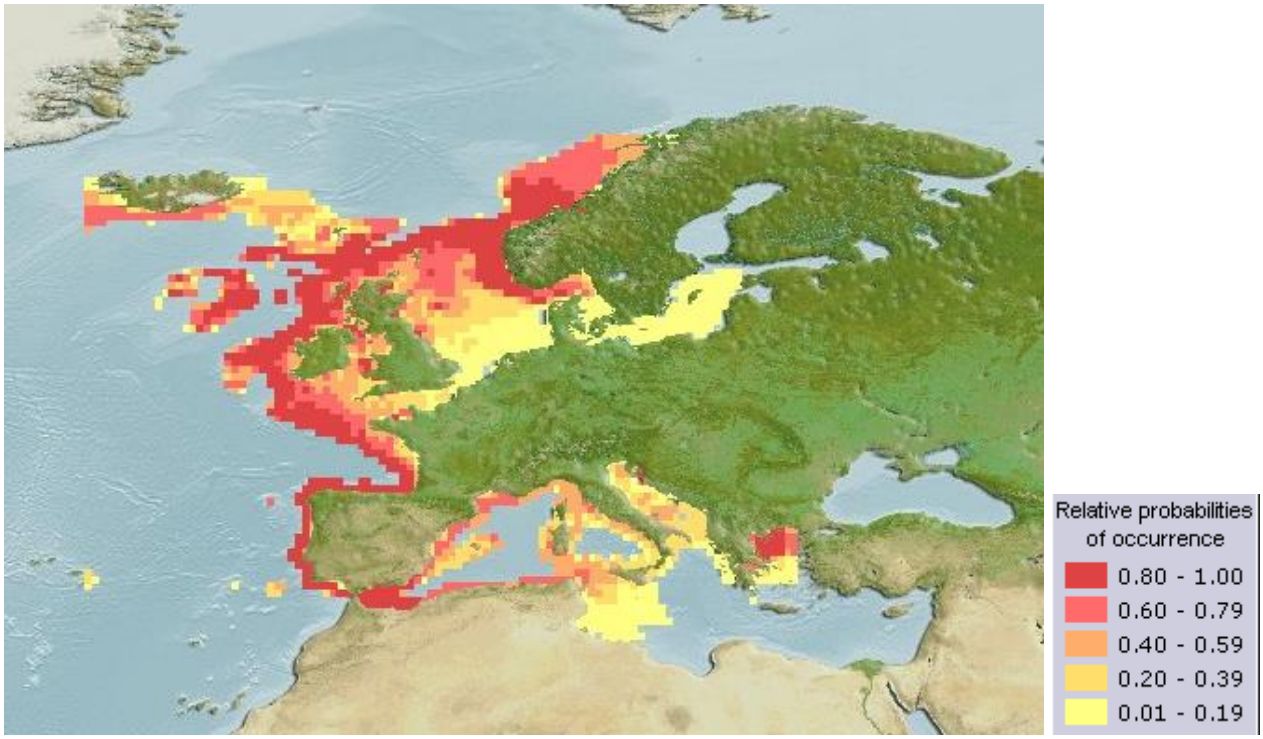

Figure 4 Computer generated distribution maps for *Nephrops norvegicus* (Norway lobster), with modelled year 2100 native range map based on IPCC A2 emissions scenario. Source www.aquamaps.org, (Aug 2016).

R7 Other attributes

http://www.sealifebase.org/summary/Nephrops-norvegicus.html

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	Norway lobster *Nephrops norvegicus* FUs 5, 34	
	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.	Pass
	D4.2	There is no substantial evidence that the fishery has a significant negative impact on the species.	Pass
Outcome:			**Pass**

Evidence

As noted in clause C, these FUs are managed under the CFP with management measures in place including a TAC (Subarea IV; Division IIa), although the management area and assessment areas do not align which risks unsustainable levels of fishing. A Minimum Conservation Reference Size (MCRS) has also been set (EU: 25mm; Denmark, Sweden and Norway: 32mm). In 2016 the landing obligation was introduced in Subarea IV for *Nephrops* 80-99mm trawl fisheries. ICES provides catch advice.

FU5

ICES (2018) advice: The state of this stock is unknown. Preliminary stock surveys (2010 and 2012) indicate relatively high density compared to neighbouring FUs. The 2012 survey estimate (0.7 *Nephrops* m-2) is relatively high compared with most Norway lobster stocks in the North Sea. Landings per unit of effort (LPUE) from English vessel-directed fisheries shows no trend in abundance over the period 2006-2015, which may suggest that density has remained stable. Sensitivity analyses show that if the density is lower than 0.6 *Nephrops* m-2, the harvest rates would be higher than the upper bound of ICES advice, 7.5%" (which is based on the lower boundary of MSY harvest rates estimated for other FUs, ranging between 7.5 and 16%).

ICES note that given the paucity of metrics available for monitoring stock development, the exploitation of this stock should be monitored closely. However, based on the available limited information, there appears to be no substantial evidence that the fishery has a significant negative impact on the species. **This FU therefore passes clause D.**

FU34

This is a relatively new FU, designated in 2010. ICES state that the current state of the stock is unknown. The 2015 UWTV survey found mean density to be 0.16 *Nephrops* m^2 which, taking into account ICES findings for FU5 above, suggests density in FU34 is also relatively high for a North Sea Norway lobster stock.

The latest ICES advice for 2017 and 2018, based on the precautionary approach (2014 advice +20%) proposed a total catch of 492 tonnes and implied a harvest rate of 5.92%. The mean survey density indicates the stock declined from 2009 to 2017, while landing decreased from 2009 but then increased again between 2015-2017. ICES (2018) advises that when the precautionary approach is applied, catches in each of the years 2019 and 2020 should not exceed 315 tonnes.

Based on the available limited information, **there does not appear to be substantial evidence that the fishery has a significant negative impact on the species. This FU passes clause D**.

References R8 ICES, 2018. ICES, WGNSSK Report 2018: http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGNSSK/12-WGNSSK%202018-Section%2010_Nephrops%20in%203a.pdf
Standard clause 1.3.2.2

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 rm. 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 approached used in Version 1 of the IFFO RS Standard, in which up to 5% of the raw material could be comprised of 'unassessed' species.