

Briefing report to DAERA

Sustainability of the Northern Ireland *Nephrops* Fishing Fleet - an analysis of the balance between fishing capacity and fishing opportunities

September 2016

**Authours: Dr Aurelia Samuel, Dr Diane
Burgess, Dr Mathieu Lundy and Dr Elias
Mulugeta**

1 Background

The sustainability of the Northern Ireland Sea fishing industry is determined by its ecological, economic, and social dimensions. For a fishing fleet to be sustainable, the fleet must be able to produce a profit (economic performance) from their level of fishing effort in which the amount of fish caught does not have a deleterious effect on future fish stocks. In recent years, depleted stocks have become the subject of emergency measures and recovery plan proposals (MMO, 2015). In response, the Common Fisheries Policy of the European Union (CFP) has introduced a number of measures to enhance the sustainability of the fish stocks. These include:

- (1) Restricting the maximum amount of fish that can be landed within a fishery (Total Allowable Catch - TAC);
- (2) Fishing only from sustainable fish stocks: These are stocks that have been scientifically assessed as being able to replenish themselves for a given level of fishing effort and are therefore not at risk of being depleted¹;
- (3) Introducing a landing obligation - from the 1st of January 2016, all fish caught must be landed (rather than discarded² overboard) subject to catch limits or quotas. This only applies to *Nephrops*, cod and haddock.

In particular, Article 22 of Regulation 1380/2013 of the European Parliament and the Council on the Common Fisheries Policy stated:

“Member States are required to put in place measures to adjust the fishing capacity of their fleets to the fishing opportunities over time with the objective of achieving a stable and enduring balance between them (COM, 2014).”

Member States are required to demonstrate progress towards achieving this balance by reporting annually to the EU Commission on the status of this balance, measured against indicators proposed in EU guidelines. As part of the DARD commissioned Evidence and Innovation call of 2015-6, PMB 2 (Social and Economic Structure of Rural Areas), DARD Research Project 15/2/06 “Sustainability of the Northern Ireland *Nephrops* Fishing Fleet - an analysis of the balance between fishing capacity and fishing opportunities” was commissioned to assess whether or not the fishing capacity of the *Nephrops* sector is in balance with fishing opportunities. This is the first balance assessment to be undertaken within Northern Ireland.

¹Stocks which are not fished over the maximum sustainable yield (MSY), where Maximum sustainable yield (MSY) is defined as the largest average yield (catch) that can theoretically be taken from a species’ stock over an indefinite period under constant environmental conditions.

² Discarding is the practice of returning unwanted catches to the sea, either dead or alive, either because they are too small; the fishing vessel has no quota for that fish species; or because of certain catch rules (Seafish, 2015b).

A balance analysis was undertaken on fleet segments³ to determine whether the capacity of the fleet is in balance with fishing opportunities. According to Article 22 of Regulation 1380/2013 of the European Parliament and the Council on the Common Fisheries Policy, a fleet segment is not in balance with the fishing opportunities available to that segment when either:

- The fleet segment is fishing an unsustainable fish stock and is still making profit;

Or

- The fleet segment is fishing a healthy stock (at sustainable fishing levels) and is not profitable, both in the short and long term;

Or

- The fleet segment is fishing an unsustainable fish stock and is not profitable, both in the short and long term.

Following guidelines set by the European Commission, a balance assessment will provide a platform for policy makers to make informed decisions regarding the structure of a fishing fleet. This assessment has been undertaken at the UK level for all fisheries by the Marine Management Organisation (MMO) and for Member States by the Joint Research Centre (JRC) of the European Commission (CapacityReport, 2015). The UK fleet Capacity report found that none of the fleet segments can be conclusively defined as being out of balance. However, three appeals to DARD in the last 6 years requesting financial assistance for the Northern Ireland *Nephrops* fleet (DARD comm. 2015), indicates that a potential imbalance exists within the Northern Ireland fleet. Therefore, this study looked specifically at the Northern Ireland *Nephrops* fishing fleet to identify any regional variations and imbalances.

In addition to determining the balance for the *Nephrops* fleet, the project also briefly reviewed (1) the relevant policy situation; (2) the associated current and future challenges faced by the *Nephrops* fishing sector and (3) provided an overview of the structure of the Northern Ireland *Nephrops* fleet.

³ where a fleet segment is a group of vessels with the same length class and pre-dominant fishing gear/technology

2 Nephrops sector in Northern Ireland

The Norway lobster, *Nephrops norvegicus* (L.), also called the prawn, Dublin Bay prawn, langoustine, scampi or *Nephrops* is a pale orange crustacean that can grow up to 25 cm in length (9 -10 in) but is often much smaller. It is found in the North-eastern Atlantic Ocean and North Sea as far north as Iceland and northern Norway, and south to Portugal and Morocco (Figueiredo and Thomas, 1967).

The *Nephrops* sector in Northern Ireland includes vessels which are both (1) administrated in Northern Ireland (according to the MMO register) and (2) mainly engages in fishing for *Nephrops*. The *Nephrops* sector in Northern Ireland fish mainly in the Irish and West of Scotland (WoS) seas as revealed by the MMO landings data (MMO 2014:2015). These seas are divided into different fishing areas under the International Council for the Exploration of the Sea (ICES). The greatest concentration of current effort (i.e. number of days spent fishing at sea) is in the Sub-area VII fishing area which covers the Irish Sea, as can be seen in Figure 1. This is closely followed by fishing in Sub-area VIa which covers the West of Scotland Sea. Sub-areas VIa and VII are further divided into three (11-13) and seven (14-22) Functional Units (FUs) for *Nephrops* respectively as shown in Table 1. In terms of ports (where the fleets are located and fish caught is landed), the *Nephrops* fleet are mainly located in County Down's three fishing villages of Portavogie, Kilkeel and Ardglass (Allen, 2013).

Figure 1: *Nephrops* fishing areas: ICES fishing areas amended from: (<http://www.gov.scot/Publications/2010/09/15155811/48>)

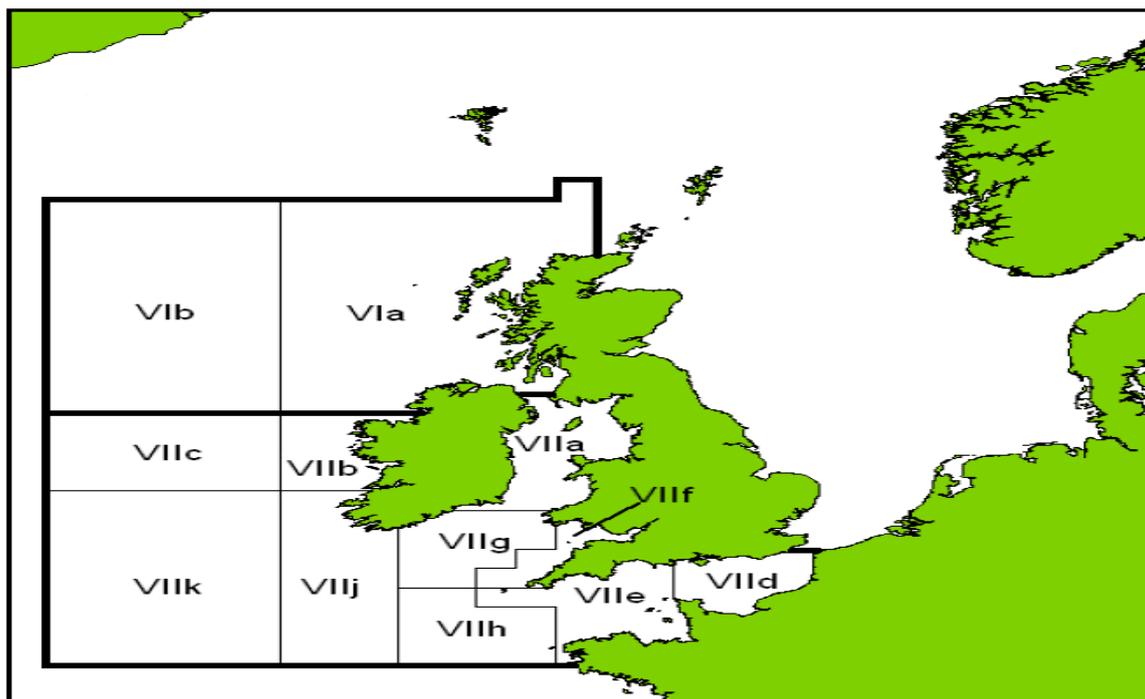


Table 1: Functional units for *Nephrops* in Sub-areas VIa and VII.

FU no	Name	ICES Divisions
11	North Minch (West of Scotland)	VIa
12	South Minch (West of Scotland)	VIa
13	Firth of Clyde (West of Scotland)	VIa
14	Irish Sea East	VIIa
15	Irish Sea West	VIIa
16	Porcupine Bank	VIIb,c,j,k
17	Aran Grounds	VIIb
19	Ireland SW and SE coasts	VIIa,g,j
20-21	Celtic Sea – Labadie	VIIg,h
22	Celtic Sea – the Smalls	VIIg,f

While the Northern Ireland *Nephrops* fleet comprised 43% of all the Northern Ireland fishing fleet, it delivered only 37% of the economic value of total landings. *Nephrops* landings represented 91% of the total value of this fleet in 2014. The *Nephrops* fleet

in Northern Ireland also catches other fish species such as herring, haddock, plaice, pollack, cod, sole, whiting and mackerel as by-catches⁴.

The total catch of *Nephrops* declined from 2012 with a corresponding fall in economic value. In 2012 the catch was 9,000 tonnes which was worth £21 million which declined to 7,900 tonnes and £18 million respectively in 2014. This decline can be attributed to a number of reasons which include: (1) the 9% reduction in the total UK TAC of *Nephrops* set by the EU's Fisheries Council Ministers in 2014 for Area VII and (2) a reduction in fleet size, capacity and engine power between 2012 and 2014.

2.1 Fleet Segmentation

Segments for the Northern Ireland *Nephrops* fleet were derived following the grouping method applied in the UK fleet capacity report which grouped vessels based on the region, fishing technology or gears used in catching fish (e.g. Demersal Trawlers) and vessel lengths (CapacityReport, 2015). There are eight segments defined for the Northern Ireland *Nephrops* fishing fleet which are:

- **NIDTSVL2440** - Northern Ireland (NI) Demersal Trawlers (DTS) with vessel length of 24-40 meters (VL2440);
- **NIDTSVL1824** - Northern Ireland (NI) Demersal Trawlers (DTS) with vessel length of 18-24 meters (VL1824);
- **NIDTSVL1218** - Northern Ireland (NI) Demersal Trawlers (DTS) with vessel length of 12-18 meters (VL1218);
- **NIDTSVL1012** - Northern Ireland (NI) Demersal Trawlers (DTS) with vessel length of 10-12 meters (VL1012);
- **NIDTSVL0010** - Northern Ireland (NI) Demersal Trawlers (DTS) with vessel length of under 10 meters (VL0010);
- **NIDRBVL1218** - Northern Ireland (NI) Dredgers (DRB) with vessel length of 12-18 meters (VL1218);
- **NIFPOVL0010** - Northern Ireland (NI) vessels using pots and/or traps (FPO) with vessel length of under 10 meters (VL0010) and;
- **NIFPOVL1012** - Northern Ireland (NI) vessels using pots and/or traps (FPO) with vessel length of 10-12 meters (VL1012).

The distribution of vessels across the segments is shown in Table 2 below. It is important to note that values for segments NIDRBVL1218, NIDTSVL2440, NIFPOVL0010 and NIFPOVL1012 are not reported either due to the AFBI-DARD-Seafish confidentiality agreement which required more than five vessels to be within

⁴ By-catches non-target species that are caught while fishing for target species such as *Nephrops*.

a segment⁵ or the lack of data. Therefore, values and indicators were reported for NIDTSVL0010, NIDTSVL1012, NIDTSVL1218 and NIDTSVL1824.

In 2014, 43% (i.e. 114 out of 267 vessels) of all the active fishing vessels administered within Northern Ireland were part of the *Nephrops* fleet. This represents a slight reduction from 47% (i.e. 126 out of 276 vessels) in 2012, with a corresponding 9% decline both in engine size and volume (i.e. tonnage) capacities⁶ since 2012 and an 8% decline in the number of days spent at sea (effort). This decline can be due to difficulties resulting from high fuel costs, low *Nephrops* prices and poor weather preventing vessels from going to sea.

In 2014, segments with larger vessels between 12 and 24 meters (m) made up the majority of the fleet, with 69% of the vessels and 89% of the catch. The dominance of these segments reduced from 2012 when they comprised 77% of all the vessels in the fleet (as highlighted in Table 2), with a corresponding loss of 11% of engine size and volume (i.e. tonnage) capacities and a 29% reduction in the number of days spent at sea (effort).

In contrast, the segment concerned with vessels under 10m has seen a 24% increase in the number of vessels; and corresponding increases of 26% in engine size; 46% in tonnage and a 32% increase in effort.

⁵The assessment was also undertaken at the sub-segment level in which segments were further broken down into fishing areas (e.g. AreaVIIA) and engine power (measured in kilowatts) to obtain sub-segments (e.g. NIAreaVIIADTSVL1824>250kW⁵). However, the vessels in most of the sub-segments were fewer than 5 vessels with incomplete data for all three years (i.e. 2012 to 2014) and hence, were not reported.

⁶ These are the physical dimension (size) of fishing vessels measured in terms of volume (i.e. gross tonnage - GT), or – in terms of engine power terms – kilowatts (kW) for Northern Ireland vessels.

Table 2: Number of active vessels in Northern Ireland *Nephrops* fleet segment.

Fleet Segment	2012	2013	2014
NIDTSVL0010	14 (11%)	13 (11%)	17 (15%)
NIDTSVL1012	8 (6%)	7 (6%)	7 (6%)
NIDTSVL1218	41 (33%)	35 (30%)	30 (26%)
NIDTSVL1824	55 (44%)	54 (47%)	49 (43%)
Total of all <i>Nephrops</i> fleet⁷	126	115	114
Northern Ireland active vessels⁸	276	285	267
Proportion of <i>Nephrops</i> fleet	47%	40%	43%

2.2 The future of the fleet

Prior to January 2016, quotas applied to fish landed, not fish caught. Therefore, the Northern Ireland *Nephrops* fleet were able to discard by-catch species such as whiting, irrespective of Minimum Conservation Reference sizes or TAC limits. However, once the landing obligation is fully implemented by 2019, recent analysis by Seafish (2015a, 2015b) indicated that a potential impact could be an early closure of the Northern Ireland *Nephrops* fisheries before all annual *Nephrops* is exhausted. This would be the case where:

- (1) The current fishing behaviours does not change and;
- (2) *Nephrops* vessels cannot avoid by-catch of species, such as whiting. This will lead to an early closure of *Nephrops* fishing if the TAC of by-catches are met first or;
- (3) Quota swaps between choke⁹ species and species for which quota is available are insufficient to allow continued fishing activity.

Under this scenario, the landings of *Nephrops* would most likely decrease. This highlights the potential challenges facing the fishing industry to remain viable. Changing behaviour, such as avoiding fishing in areas or seasons when high by-catch rates are observed, may be insufficient to reduce the by-catch volumes below agreed catch limits. The full impact of this policy will only be captured by further research on balance indicators when data for 2016 onwards becomes available and response by the fishing fleet to the new policy is observed.

⁷ Total includes vessels which are not reported.

⁸ Using MMO data

⁹ A choke species is a term used to describe species with a low quota that can cause a vessel to stop fishing even if it still have quota for other their target fisheries (e.g. *Nephrops*)

3 Findings of the balance analysis

The following indicators were calculated according to the 2014 Balance Indicator Guidelines produced by the Scientific, Technical and Economic Committee for Fisheries (STECF) to assess the balance between fishing capacity and fishing opportunities (COM, 2014):

- Biological indicators (BI):
 - Sustainable Harvest indicator (SHI)
 - Stocks at risk Indicator (SAR)
 - Number of overharvested stocks indicator (NOS)
 - Economic Dependency indicator (EDI).

These were used to assess whether fleet segments are relying on overfished stocks or involved in causing a high biological risk to a depleted stock;

- Economic indicators (EI):
 - Net Profit margin (NPm)
 - Ratio between current revenue (CR) and break even revenue (BER).

These were used to assess whether fleet segments are economically sustainable in the long term¹⁰ or able to cover their costs in the short term;

- Vessel Use Indicator (VUI) –
 - Vessel use ratio (VUR) indicator

This was used to assess the use of the vessels in a fleet segment.

The key conclusions on the balance indicators for the Northern Ireland *Nephrops* fleet segments:

Assessing the segments of the Northern Ireland *Nephrops* fishing fleet revealed a mixed picture regarding the sustainability of the industry. The 2014 guidelines set by the Expert Working Group of the Scientific, Technical and Economic Committee for Fisheries (STECF) advised that all indicators should be used in combination to draw conclusions on imbalance for each fleet segment (COM, 2014). Therefore, only the four fleet segments with complete information for all the indicators across the three consecutive years were compared:

- *Segment* with vessels under 10m showed an imbalance for both the SHI and VURmax indicators, but this was not supported by the SAR indicator or economic indicators (NPm and CR/BER).

¹⁰ Long term economic sustainability was not calculated in this study due to missing data.

This fleet segment represents the smallest vessels, fished from unsustainable fish stocks¹¹ which was profitable in the short term. These unsustainable fish stocks include stocks of the following species: cod; hake; sole; mackerel and *Nephrops*.

- *Segment* with vessels between 10 and 12m was in 'balance' based on **all** the indicators.

The fleet segment based on vessels between 10 and 12m was the only fleet that fished from a sustainable fish stocks which was profitable in the short term.

- *Segment* with vessels between 12 and 18m showed an imbalance for the SHI indicator, but this was not supported by SAR, VURmax or economic indicators (NPm and CR/BER).

This fleet segment which comprised of vessels between 12 and 18m, fished from unsustainable fish stocks which was profitable in the short term. These unsustainable fish stocks include stocks of the following species: cod; hake; sole; seabass; haddock; whiting; herring; mackerel and *Nephrops*.

- *Segment* with vessels between 18-24m, showed an imbalance for both the SHI and VURmax indicators, but this was not supported by the SAR indicator or economic indicators (NPm and CR/BER).

This fleet segment represents the largest vessels, fished from unsustainable fish stocks which was profitable in the short term. These unsustainable fish stocks include stocks of the following species: cod; hake; sole; seabass; haddock; whiting; mackerel and *Nephrops*.

Using the proposed biological indicators (i.e. NOS and EDI) showed that:

- *Segment* with vessels under 10m showed an imbalance for both the EDI and VURmax/VUR₂₂₀ indicators, but this was not supported by the NOS, SAR or economic indicators (NPm and CR/BER).
- *Segment* with vessels between 18 and 24m showed an imbalance for the EDI, NOS and VURmax/VUR₂₂₀ indicators, but this was not supported by the SAR or economic indicators (NPm and CR/BER).

Again, these fleet segments which represent the smallest and the largest vessels, fished from unsustainable fish stocks which was profitable in the short term. These unsustainable fish stocks include stocks of cod, sole, whiting and *Nephrops*.

According to the 2014 guidelines, a fleet segment can only be identified as being imbalanced if an imbalance is found for all respective indicators. Therefore,

¹¹ This relates to overfishing for stocks that are over the maximum sustainable yield.

notwithstanding methodological uncertainties due to a lack of data this study cannot conclude that any of the Northern Ireland *Nephrops* fleets are 'out of balance/imbalance' (i.e. unsustainable) based on the combination of all indicators.

Another key conclusion was that while the segment with vessels between 18 and 24m was sustainable as a whole (based on the economic indicator - CR/BER), one of its sub-segments that fished in the Irish Sea of Area VIIA using an engine power greater than 250kW was unsustainable (i.e. sub segment NIAreaVIIADTSVL1824>250kW). This implies that there are individual vessels in segment NIDTSVL1824 which were not making profit in the short term.

Reporting balance indicators at the fleet segment level as required by the EU guidelines, concealed sub-segments within a fleet that were not making profit and/or were fishing from unsustainable stocks.

Figure 2: Combined indicators for the Northern Ireland *Nephrops* fleets using VURmax (with proposed biological indicators).

<i>Fleet segment</i>	<i>NOS</i>	<i>EDI</i>	<i>SAR</i>	<i>NPm</i>	<i>CR/BER</i>	<i>VURmax</i>
NIDTSVL0010	Green	Red	Green	Green	Green	Red
NIDTSVL1012	Green	Red	Green	Green	Green	Green
NIDTSVL1218	Red	Red	Green	Green	Green	Green
NIDTSVL1824	Red	Red	Green	Green	Green	Red

Green indicates balance

Red Indicates imbalance

Note: NOS-Number of overharvested stocks indicator; EDI-Economic Dependency Indicator; SAR-Stocks at risk Indicator; NPm-Net Profit margin; CR-Current revenue; BER-Breakeven revenue, and VURmax-vessel utilisation ratios using the maximum number of days at sea.

References

- ALLEN, M. 2013. Overview of the sea fishing sector in Northern Ireland - Spring 2013. *Research and Information Service Briefing Paper*.
- CAPACITYREPORT 2015. UK Fleet Capacity Report 2014. *UK Fleet Capacity Report 2014*.
- COM 2014. Guidelines for the analysis of the balance between fishing capacity and fishing opportunities according to Art 22 of Regulation(EU) No1380/2013 of the European Parliament and the Council on the Common Fisheries Policy. *Communication from the Commission to the European Parliament and the Council*

FIGUEIREDO, M. J. & THOMAS, H. J. 1967. On the biology of the Norway lobster, *Nephrops norvegicus* (L.). *Journal du Conseil*, 31, 89 – 101.

MMO 2014. UK Sea Fisheries Statistics 2013. *National Statistics*. Marine Management Organisation.

MMO 2015. UK Sea Fisheries Statistics 2014. *National Statistics*. Marine Management Organisation.

SEAFISH 2015a. Landing Obligation Economic Impact Assessment (EIA): Interim Report One : Choke Analysis. *In*: RUSSELL, J., CURTIS, H., ROD, C., METZ, S. & MARDLE, S. (eds.). Seafish.

SEAFISH 2015b. Landing Obligation Economic Impact Assessment (EIA): Interim Report Two - Scenario Analysis. *In*: RUSSELL, J., MARDLE, S. & CURTIS, H. (eds.). Seafish