Project UK

**Catch composition for *Nephrops* fisheries in ICES divisions 4a-c, 6a and 7a – Demersal trawls and pots/creel**

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Executive Summary

Cefas was commissioned to contribute to Project UK. The project is facilitated by the Marine Stewardship Council (MSC) and aims to work towards an environmentally sustainable future for UK fisheries. Several fisheries were selected due to their importance for the UK market. One of which is the *Nephrops* fishery in ICES divisions 4a-c, 6a and 7a.

The aim of the study was to compile catch composition profile for each gear type in each *Nephrops* function unit (FU). The catch profile was developed using the official landings database and discards estimates collected by Cefas Observer programme in 2018 and 2019.

Landings, discards, proportion of each species and species category (Primary, Secondary, ‘Out-of-scope or ETP) were tabulated. In this report catch profiles are presented for FU6 – Farn Deeps and FU14 – East Irish Sea because these are the only function units covered by Cefas Observer sampling. The top 20 species (95% of the total catch) for each gear were provided in the report and the complete list of species was provided in excel format, as supplementary material.

In the FU6 – Farn Deeps the average between both years, the main primary species caught by for each gear type included:

* **Otter trawl (OTB\_70-99)**: Norway lobster (*Nephrops norvegicus*, 66%), whiting (*Merlangius merlangus*, 16%) (Table 4).
* **Otter trawl (OTB\_>=100):** Norway lobster (45%), whiting (28%) and haddock (8%).

For pots and creel, the main species landed were secondary species: Edible crab (70%) and European lobster (*Homarus gammarus, 21%*). All primary species landed by pots and creel were minor (i.e. less than 5% of the landiings)

In the FU14 – East Irish Sea the average between both years, the main primary species caught by for each gear type included:

* **Otter trawl (OTB\_70-99)**: Norway lobster (*Nephrops norvegicus*, 66%), whiting (*Merlangius merlangus*, 16%) (Table 4).
* **Otter trawl (OTB\_>=100):** Norway lobster (45%), whiting (28%) and haddock (8%).

For pots and creel, the main species landed was secondary species: Whelk (*Buccinum undatum*, 90%).

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# Introduction

Cefas was commissioned to contribute to Project UK[[1]](#footnote-1).This initiative is a multi-stakeholder engagement process working towards achieving an environmentally sustainable future for UK fisheries by engaging with fisheries selected for their importance to the UK market (in particular UK supermarket chains). The project is facilitated by the MSC and aims to work towards an environmentally sustainable future for UK fisheries. It will do so by determining the environmental performance of key commercial fisheries, demonstrate how sustainability can be enhanced through Fishery Improvement Projects (FIPs) and ultimately achieve MSC certification where possible, and with support of a FIP’s steering group. Several fisheries were selected due to their importance for the UK market. One of which is the *Nephrops* fishery in ICES divisions 4a-c, 6a and 7a.

The aim of the study was to compile and provide catch composition profile for each gear type.

# Material and Methods

## Data sources

The catch profile was developed using the official landings database (IFISH database) and discards data collected by Cefas Observer programme in 2018 and 2019, for demersal trawls and pots/creels, for each *Nephrops* Function unit in ICES divisions 4a-c, 6a and 7a (Table 1). However, in this report we included only catch profiles for FU6 – Farn Deeps and FU14 – East Irish Sea because these are the only function units covered by Cefas Observer sampling. For the remaining FUs, only landings were available and therefore the catch profiles are provided as supplementary material in excel format.

Table 1. List of *Nephrops* Function units in ICES divisions 4a-c, 6a and 7a. In bold function units analysed in this report.

|  |  |  |
| --- | --- | --- |
| ICES division | *Nephrops* FU | Name |
| 4a | FU10 | Noup |
| FU32 | Norway deep |
| FU7 | Fladen Ground |
| FU9 | Moray Firth |
| 4b | FU32 | Norway deep |
| FU33 | Horn's reef |
| FU34 | Davil'Hole |
| FU5 | Botney Cut-Silver |
| **FU6** | **Farn Deeps** |
| FU8 | Firth of Forth |
| 4c | FU5 | Botney Cut-Silver |
| 6a | FU11 | North Minch |
| FU12 | South Minch |
| FU13 | Firth of Clyde |
| 7a | **FU14** | **East Irish Sea** |
| FU15 | West Irish Sea |
| FU19 | Irish Sea, Celtic Sea |

### Cefas Observer programme

The data used for this analysis were collected in the ongoing Cefas Observer (off-shore) programme in 2018 and 2019.

The off-shore programme is randomly stratified by region (landing port location i.e. northeast, east, northwest, south), predominant fishing gear (nets, lines, scallop dredges, beam trawls, otter trawls) and vessel length (7-10m, ≥10m) (Table 1). Within each stratum, vessels are randomly selected using a vessel draw list.

Table 2. Stratification of the current Cefas Observer programme (off-shore).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 7-10m | | | | ≥10m | | | |
|  | Beam | Scallop | Net | Trawl | Beam | Scallop | Net | Trawl |
| Northeast – ICES 4 | All gears | | | | Beam (Shrimp as subset) | Scallop | Net, Trawl & Lines | |
| East – ICES 4 and 7d | All gears | | | | Net, Trawl & Lines | |
| West – ICES 7e-k | All gears | | | | Net | Trawl |
| Northwest – ICES 7a | All gears | | | | Net Trawl & Lines | |

For each stratum, a target number of trips is defined quarterly. The sampling effort allocation to each stratum is based on a number of information sources from the previous year of fishing, distributed in a statistically sound manner. Information on catch (landings and discards) and effort (number and length of fishing trips and number of vessels) are used as equal weights to split the number of sampling days between stratum. The current stratification of the observer programme includes several fleets and fisheries within a stratum, highly variable in terms of gear, mesh size, trip duration, and catch composition.

The catch sampling scheme on each trip is a multi-stage process; discards are recorded for the haul or estimated from a fraction of a haul. Typically, >60% of the hauls are sampled during a specific trip. In each sampled haul, length measurements are recorded for fish, commercial crustaceans and cephalopod species. When it is not possible to sample the whole haul catch (because of large amounts caught), the observer estimates a raising factor (volume measured relative to the total catch) which will be applied to the sub-sample taken and used to estimate the total catch of the haul. For each sampled haul, the following information is also collected: gear type and mesh size, tow duration, shot and haul position, species catch composition and the following catch components: 1) *landings*, for the fraction that is landed, 2) *discards*, for the fraction that is returned back to sea; 3) *landings below minimum size (BMS)*, the fraction below minimum conservation size and 4) *landings used as bait*.

### Official Landings (*IFISH database)*

Landings and effort data are derived from the official national fisheries statistics, recorded under the control regulation. This information is obtained from official logbooks, for vessels ≥ 10 metres, and/or sales slips for vessels under 10 metres.

Landings and effort (number of trips) by rectangle for UK registered vessels are presented in Section 3.1. For the catch profile, only landings from English and Welsh vessels landing in England or Wales were included because only these are included in the Cefas Observer programme sampling frame.

## Estimation of discards

Discards estimates were derived from the Cefas Observer programme, for FU6 and FU14, in 2018 and 2019, for: (i) Otter trawls using 70-99mm cod end mesh size (OTB\_70-99), and (ii) Otter trawls using ≥100mm cod end mesh size (OTB\_>=100) (Table 3). Creel/pots are an important gear used by UK fleets, with the highest number of fishing trips. However, this gear is not covered by Cefas Observer programme.

For each trip, numbers-at-length were raised first to the haul -based on an estimated proportion of the total catch volume sampled- and then to the trip -based on the proportion of sampled hauls and fished hauls-. The length-based data was converted to biomass, using length-weight relationships for each species collected during various scientific trawl surveys (Cefas, unpubl. data).

Trip-raised estimates summed for sampled vessels in each stratum (Year x Gear type x ICES area) were then raised to the total fleet using a ratio (RF) between the reported total fleet landings of species and the estimated landings of species by the sampled vessels:

When no landings were reported, effort (number of days at sea in stratum) was used to raise the discard data:

The ratio factors for each stratum were applied to the number of fish measured at length to estimate the raised number at length.

To overcome the low coverage of the programme and ensure quality of data provided, thresholds were applied, i.e. only discard estimates were provided where 30 fish were measured and 3 trips were sampled in each stratum (Year x Gear type x ICES area).

Table 3. Summary of total number of fishing trips and sampled trips by the Cefas Observer programme in FU6 and FU14.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Year | Gear type | Number of trips sampled | Total number of landing trips |
| FU6 | 2018 | OTB\_70-99 | 28 | 4892 |
| OTB\_>=100 | 4 | 697 |
| Pots/creel | 0 | 16304 |
| 2019 | OTB\_70-99 | 34 | 1012 |
| OTB\_>=100 | 6 | 6753 |
| Pots/creel | 0 | 16176 |
| FU14 | 2018 | OTB\_70-99 | 7 | 639 |
| OTB\_>=100 | 0 | 22 |
| Pots/creel | 0 | 1581 |
| 2019 | OTB\_70-99 | 8 | 416 |
| OTB\_>=100 | 0 | 33 |
| Pots/creel | 0 | 1886 |

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### Catch profiles

To produce the catch profiles for these fisheries it was used the official landings from English and Welsh vessels and the respective discards estimates, using the method described above. Total annual landings for 2018 and 2019 per species and gear type: (i) Otter trawls using 70-99mm cod end mesh size (OTB\_70-99), (ii) Otter trawls using >=100mm, and (iii) pots and creel in FU6 and FU14.

In the report we present the catch profiles for FU6 – Farn Deeps and FU14 – East Irish Sea, which are covered by Cefas Observer programme and for which there are discards estimates. For the other FUs, only landings data are available and the catch profiles are available in the supplementary material provided in excel format.

Each species was categorised according to the MSC fisheries standard in Principle 2: Primary (PI 2.1.1-2.1.3), Secondary (2.2.1 – 2.2.3), Endangered, Threatened or Protected species (ETP) and “out-of-scope” species. Within Principle 2, species are defined as **Primary species** where an analytical stock assessment is available and/or that have management measures and tools in place intended to achieve stock management objectives reflected in either limit or target reference points. Species with a data limited stock (DLS) where management limits or reference points are not in place, are classified as **Secondary species** (unless it is classified as Endangered, Threatened or Protected). Species that are out of scope of the program, but where the definition of ETP species is not applicable were defined as Secondary. **ETP species** were classified according to section SA 3.1.5.2 in MSC Fisheries Standard v2.01[[2]](#footnote-2) and **“out-of-scope”** species included amphibians, reptiles, birds and mammals that arelisted on the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).

The species were also categorised as main or minor, based on the proportion of the total catch (tonnes), using a 5% of total catch threshold or 2% for less resilient species (generally long lived, low fecund species such as most sharks, skates and rays).

The proportion of each species was calculated as the proportion of each species in total (landings + discards (when available).

# Results

## Landings and effort

Figure 1 shows total landings and number of trips per ICES rectangle in each *Nephrops* function unit in ICES divisions 4a-c, 6a and 7a, for each gear type, from UK registered vessels. In the North Sea, most of the landings are coming from FU7 – Fladen Ground and FU 32 - Norwegian Deep from OTB\_>=100, where this gear mainly targets gadoid species. On the other hand, most of effort, in number of trips, are from pots and creel fishery, small scale fishery operating close to shore and targeting mainly crab and lobster.

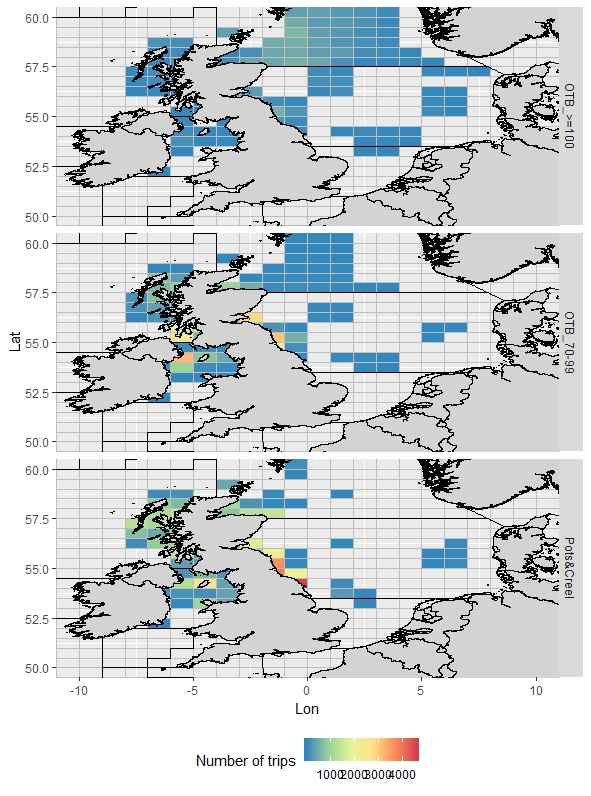
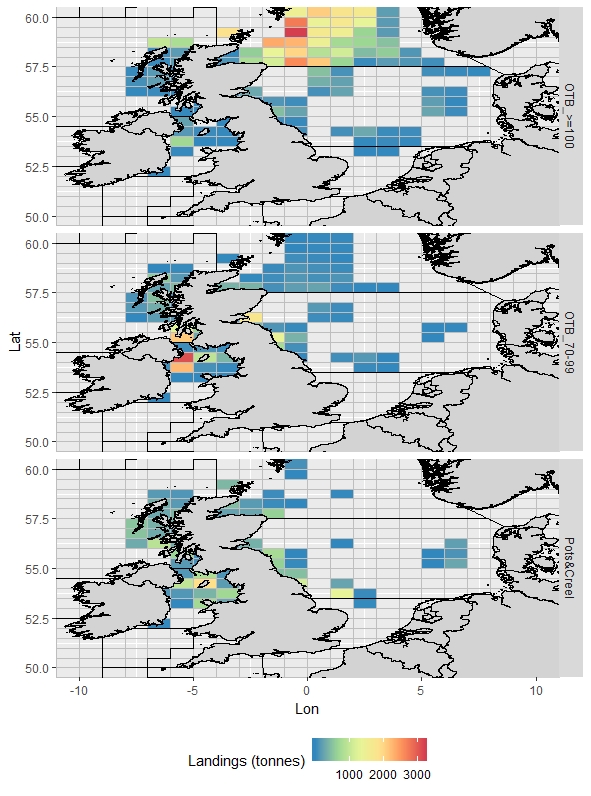


Figure 1. Mean landings (left plot) and number of trips (right plot), by ICES rectangle, by UK registered vessels – OTB\_70-99, OTB\_>=100, and pots/creel, in ICES area 4a-c, 6a and 7a, in 2018 and 2019 (Data source: UK Official landings).

## Catch profile

Landings and discards estimates were combined to produce total catch profile for each gear type and Function unit : FU6 – Farn Deeps and FU14 – East Irish Sea, for 2018 and 2019. However, only landings are available for pots/creel, as these gears are not included in the Cefas Observer programme sampling frame. Summary of the top 20 species (95% of the total catch) for each gear (complete list of species is provided as supplementary material in excel format). Landings profiles for the other function units are provided in the supplementary material in excel format.

### FU6 – Farn Deeps

The average between both years (2018-2019), the main primary species caught by for each gear type included:

* **Otter trawl (OTB\_70-99)**: Norway lobster (*Nephrops norvegicus*, 66%), whiting (*Merlangius merlangus*, 16%) (Table 4).
* **Otter trawl (OTB\_>=100):** Norway lobster (45%), whiting (28%) and haddock (8%).

For pots and creel, the main species landed were secondary species: Edible crab (70%) and European lobster (*Homarus gammarus, 21%*). All primary species landed by pots and creel were minor (i.e. less than 5% of the landiings) (Table 6).

The main secondary species caught by otter trawls using mesh size 70-99mm only included cuckoo ray (less resilient spcies, 2%). The catch profiles for otter trawls using mesh size >=100 did not include any main secondary, all secondary species were minor.

The only ETP species recorded in the landings was the Atlantic halibut, for the three gear types.

### FU14 – East Irish Sea

The average between both years (2018-2019 the main primary species caught by for each gear type included:

* **Otter trawl (OTB\_70-99):** Norway lobster (28%) and European plaice (*Pleuronectes platessa,* 17%) (Table 7).
* **Otter trawl (OTB\_>=100):** Norway lobster (37%) and European plaice (21%) (Table 8).

The main secondary species caught by for each gear type included:

* **Otter trawl (OTB\_70-99):** Small-spotted catshark (*Scyliorhinus canicula*, 18%), queen scallop (*Aequipecten opercularis*, 11%), thornback ray (*Raja clavata,* 10%), common dab (8%) and spotted ray (*Raja montagui,* 3%) and nursehound (2%) (Table 7).
* **Otter trawl (OTB\_>=100):** thornback ray (26%) and small-spotted catshark (8%) (Table 8).

For pots and creel, the main species landed was secondary species: Whelk (*Buccinum undatum*, 90%). All primary species landed by pots and creel were minor (i.e. less than 5% of the landings).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Species FAO code** | **Species common name** | **Discards (tonnes)** | **Landings (tonnes)** | **Proportion** | **Species category** | **Species category (Main/minor)** |
| 2018 | NEP | Norway lobster | 22.1 | 1340.1 | 0.58 | Primary | Target |
| WHG | Whiting | 274.0 | 237.4 | 0.22 | Primary | Main |
| DAB | Common dab | 41.3 | 19.6 | 0.03 | Secondary | Minor |
| RJM | Spotted ray | 45.0 | 0.3 | 0.02 | Secondary | Minor |
| GUX | Gurnards | 19.7 | 25.0 | 0.02 | Secondary | Minor |
| COD | Atlantic cod | 12.4 | 26.2 | 0.02 | Primary | Minor |
| HAD | Haddock | 9.8 | 27.5 | 0.02 | Primary | Minor |
| PLE | European plaice | 15.8 | 15.4 | 0.01 | Primary | Minor |
| LEM | Lemon sole | 19.7 | 9.4 | 0.01 | Secondary | Minor |
| GUU | Tub gurnard | 25.7 | 0.0 | 0.01 | Secondary | Minor |
| CRE | Edible crab | 23.1 | 2.5 | 0.01 | Secondary | Minor |
| LYY | Dragonet | 22.6 | 0.0 | 0.01 | Secondary | Minor |
| ANF | Anglerfishes | 0.9 | 19.0 | 0.01 | Secondary | Minor |
| PLA | American plaice | 9.3 | 3.0 | 0.01 | Secondary | Minor |
| HAL | Atlantic halibut | NA | 10.9 | 0.00 | ETP | Minor |
| NOP | Norway pout | 9.8 | 0.0 | 0.00 | Primary | Minor |
| TUR | Turbot | 0.1 | 9.1 | 0.00 | Primary | Minor |
| POD | Poor cod | 8.8 | 0.0 | 0.00 | Secondary | Minor |
| ENC | Fourbeard rockling | 7.9 | 0.0 | 0.00 | Secondary | Minor |
| MAC | Atlantic mackerel | NA | 7.5 | 0.00 | Primary | Minor |
| 2019 | NEP | Norway lobster | 546.7 | 2965.8 | 0.74 | Primary | Target |
| WHG | Whiting | 200.0 | 242.8 | 0.09 | Primary | Main |
| CRE | Edible crab | 113.5 | 2.7 | 0.02 | Secondary | Minor |
| RJN | Cuckoo ray | 96.3 | 0 | 0.02 | Secondary | Main |
| HAD | Haddock | 43.7 | 44.5 | 0.02 | Primary | Minor |
| COD | Atlantic cod | 36.7 | 23.3 | 0.01 | Primary | Minor |
| GUX | Gurnards | 48.6 | 8.4 | 0.01 | Secondary | Minor |
| DAB | Common dab | 29.6 | 18.0 | 0.01 | Secondary | Minor |
| ANF | Anglerfishes | 4.1 | 34.9 | 0.01 | Secondary | Minor |
| SQC | Common squids | 3.8 | 30.0 | 0.01 | Secondary | Minor |
| PLE | European plaice | 17.2 | 13.5 | 0.01 | Primary | Minor |
| ENC | Fourbeard rockling | 24.7 | 0 | 0.01 | Secondary | Minor |
| GUU | Tub gurnard | 22.2 | 0 | 0.00 | Secondary | Minor |
| PLA | American plaice | 16.3 | 5.1 | 0.00 | Secondary | Minor |
| LEM | Lemon sole | 12.6 | 7.8 | 0.00 | Secondary | Minor |
| HAL | Atlantic halibut | NA | 19.2 | 0.00 | ETP | Minor |
| TUR | Turbot | 1.3 | 11.9 | 0.00 | Primary | Minor |
| WIT | Witch flounder | 10.9 | 1.7 | 0.00 | Primary | Minor |
| LYY | Dragonet | 10.9 | 0 | 0.00 | Secondary | Minor |
| MAC | Atlantic mackerel | 0.2 | 7.9 | 0.00 | Primary | Minor |

Table 4. FU 6 – OTB\_70-99 catch profile – Annual landings and discards estimates for otter trawls, in 2018 and 2019, in FU6 (Farn Deeps, ICES division 4b) (Data sources: Official landings database and Cefas Observer programme for discards estimates). NA indicates no discard data available.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Species FAO code** | **Species common name** | **Discards (tonnes)** | **Landings (tonnes)** | **Proportion** | **Species category** | **Species category (Main/minor)** |
| 2018 | WHG | Whiting | 264.8 | 100.0 | 0.36 | Primary | Main |
| NEP | Norway lobster | 0.3 | 336.2 | 0.33 | Primary | Target |
| HAD | Haddock | 43.5 | 89.3 | 0.13 | Primary | Main |
| SCE | Great Atlantic scallop | NA | 39.5 | 0.04 | Secondary | Minor |
| DAB | Common dab | 28.7 | 6.3 | 0.03 | Secondary | Minor |
| LEM | Lemon sole | 17.7 | 4.1 | 0.02 | Secondary | Minor |
| PLE | European plaice | 14.9 | 4.9 | 0.02 | Primary | Minor |
| COD | Atlantic cod | 7.5 | 12.3 | 0.02 | Primary | Minor |
| LYY | Dragonet | 18.7 | 0.0 | 0.02 | Secondary | Minor |
| ANF | Anglerfishes | NA | 9.1 | 0.01 | Secondary | Minor |
| HAL | Atlantic halibut | NA | 8.2 | 0.01 | ETP | Minor |
| GUX | Gurnards | NA | 6.7 | 0.01 | Secondary | Minor |
| SQC | Common squids | 0.8 | 2.5 | 0.00 | Secondary | Minor |
| MAC | Atlantic mackerel | NA | 2.6 | 0.00 | Primary | Minor |
| TUR | Turbot | NA | 1.5 | 0.00 | Primary | Minor |
| RJC | Thornback ray | NA | 1.3 | 0.00 | Secondary | Minor |
| SOL | Common sole | NA | 0.8 | 0.00 | Primary | Minor |
| BLL | Brill | NA | 0.6 | 0.00 | Secondary | Minor |
| WIT | Witch flounder | NA | 0.6 | 0.00 | Primary | Minor |
| MUR | Surmullet | NA | 0.4 | 0.00 | Secondary | Minor |
| 2019 | NEP | Norway lobster | 1.3 | 1095.9 | 0.59 | Primary | Target |
| WHG | Whiting | 292.6 | 82.7 | 0.20 | Primary | Main |
| HAD | Haddock | 35.0 | 39.2 | 0.04 | Primary | Minor |
| PLA | American plaice | 38.3 | 0.0 | 0.02 | Secondary | Minor |
| PLE | European plaice | 25.3 | 8.1 | 0.02 | Primary | Minor |
| GUX | Gurnards | 9.0 | 22.2 | 0.02 | Secondary | Minor |
| COD | Atlantic cod | 21.3 | 8.6 | 0.02 | Primary | Minor |
| HER | Atlantic herring | 28.3 | 0.0 | 0.02 | Primary | Minor |
| SCE | Great Atlantic scallop | NA | 22.2 | 0.01 | Primary | Minor |
| ANF | Anglerfishes nei | 3.5 | 18.4 | 0.01 | Secondary | Minor |
| LEM | Lemon sole | 16.0 | 2.6 | 0.01 | Secondary | Minor |
| ENC | Fourbeard rockling | 15.4 | 0.0 | 0.01 | Secondary | Minor |
| SQC | Common squids | 0.3 | 12.5 | 0.01 | Secondary | Minor |
| GUU | Tub gurnard | 12.4 | 0.0 | 0.01 | Secondary | Minor |
| RJN | Cuckoo ray | 10.3 | 0.7 | 0.01 | Secondary | Minor |
| NOP | Norway pout | 10.9 | 0.0 | 0.01 | Primary | Minor |
| DAB | Common dab | 0.6 | 5.9 | 0.00 | Secondary | Minor |
| LYY | Dragonet | 3.9 | 0.0 | 0.00 | Secondary | Minor |
| HAL | Atlantic halibut | NA | 3.9 | 0.00 | ETP | Minor |
| TUR | Turbot | NA | 2.8 | 0.00 | Primary | Minor |

Table 5. FU 6 – OTB\_>=100 catch profile – Annual landings and discards estimates for otter trawls, in 2018 and 2019, in FU6 (Farn Deeps, ICES 4b) (Data sources: Official landings database and Cefas Observer programme for discards estimates). NA indicates no discard data available.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Species FAO code** | **Species common name** | **Discards (tonnes)** | **Landings (tonnes)** | **Proportion** | **Species category** | **Species category (Main/minor)** |
| 2018 | CRE | Edible crab | NA | 2596.6 | 0.72 | Secondary | Main |
| LBE | European lobster | NA | 709.3 | 0.20 | Secondary | Main |
| NEP | Norway lobster | NA | 119.3 | 0.03 | Primary | Target |
| LIO | Velvet swimcrab | NA | 49.3 | 0.01 | Secondary | Minor |
| COD | Atlantic cod | NA | 36.6 | 0.01 | Primary | Minor |
| WHG | Whiting | NA | 24.6 | 0.01 | Primary | Minor |
| WHE | Whelk | NA | 19.9 | 0.01 | Secondary | Minor |
| SQC | Common squids | NA | 15.0 | 0.00 | Secondary | Minor |
| MAC | Atlantic mackerel | NA | 11.6 | 0.00 | Primary | Minor |
| SCE | Great Atlantic scallop | NA | 8.9 | 0.00 | Primary | Minor |
| HAD | Haddock | NA | 1.5 | 0.00 | Primary | Minor |
| TUR | Turbot | NA | 1.2 | 0.00 | Primary | Minor |
| PLE | European plaice | NA | 1.1 | 0.00 | Primary | Minor |
| HAL | Atlantic halibut | NA | 1.1 | 0.00 | ETP | Minor |
| ANF | Anglerfishes nei | NA | 1.0 | 0.00 | Secondary | Minor |
| LEM | Lemon sole | NA | 1.0 | 0.00 | Secondary | Minor |
| RJC | Thornback ray | NA | 0.8 | 0.00 | Secondary | Minor |
| POL | Pollack | NA | 0.8 | 0.00 | Secondary | Minor |
| BLL | Brill | NA | 0.5 | 0.00 | Secondary | Minor |
| SOL | Common sole | NA | 0.5 | 0.00 | Primary | Minor |
| 2019 | CRE | Edible crab | NA | 2120.6 | 0.67 | Secondary | Main |
| LBE | European lobster | NA | 703.4 | 0.22 | Secondary | Main |
| NEP | Norway lobster | NA | 138.9 | 0.04 | Primary | Target |
| LIO | Velvet swimcrab | NA | 113.0 | 0.04 | Secondary | Minor |
| COD | Atlantic cod | NA | 27.9 | 0.01 | Primary | Minor |
| WHG | Whiting | NA | 17.7 | 0.01 | Primary | Minor |
| SQC | Common squids | NA | 14.9 | 0.00 | Secondary | Minor |
| WHE | Whelk | NA | 10.4 | 0.00 | Secondary | Minor |
| MAC | Atlantic mackerel | NA | 3.1 | 0.00 | Primary | Minor |
| ANF | Anglerfishes | NA | 1.9 | 0.00 | Secondary | Minor |
| SCE | Great Atlantic scallop | NA | 1.2 | 0.00 | Primary | Minor |
| TUR | Turbot | NA | 1.0 | 0.00 | Primary | Minor |
| HAD | Haddock | NA | 0.7 | 0.00 | Primary | Minor |
| CRA | Marine crabs | NA | 0.7 | 0.00 | Secondary | Minor |
| PLE | European plaice | NA | 0.6 | 0.00 | Primary | Minor |
| RJC | Thornback ray | NA | 0.5 | 0.00 | Secondary | Minor |
| LEM | Lemon sole | NA | 0.5 | 0.00 | Secondary | Minor |
| HAL | Atlantic halibut | NA | 0.4 | 0.00 | ETP | Minor |
| SOL | Common sole | NA | 0.4 | 0.00 | Primary | Minor |
| CRG | Green crab | NA | 0.4 | 0.00 | Secondary | Minor |

Table 6. FU 6 – Pots and creel catch profile – Annual landings and discards estimates for pots and creel, in 2018 and 2019, in FU 6 (Farn Deeps, ICES 4b) (Data sources: Official landings database). NA indicates no discard data available.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Species FAO code** | **Species common name** | **Discards (tonnes)** | **Landings (tonnes)** | **Proportion** | **Species category** | **Species category (Main/minor)** |
| 2018 | NEP | Norway lobster | 0.2 | 252.9 | 0.35 | Primary | Target |
| PLE | European plaice | 102.0 | 42.5 | 0.20 | Primary | Main |
| QSC | Queen scallop | NA | 122.3 | 0.17 | Secondary | Main |
| RJC | Thornback ray | 25.9 | 78.5 | 0.15 | Secondary | Main |
| SYC | Small-spotted catshark | 12.9 | 38.9 | 0.07 | Secondary | Main |
| BLL | Brill | NA | 14.9 | 0.02 | Secondary | Minor |
| WHG | Whiting | 4.2 | 0.4 | 0.01 | Primary | Minor |
| SOL | Common sole | 1.4 | 2.4 | 0.01 | Primary | Minor |
| ANF | Anglerfishes | NA | 3.4 | 0.00 | Secondary | Minor |
| TUR | Turbot | NA | 3.3 | 0.00 | Secondary | Minor |
| COD | Atlantic cod | NA | 2.2 | 0.00 | Primary | Minor |
| DGH | Dogfishes and hounds | NA | 1.7 | 0.00 | Secondary | Minor |
| MSF | Mediterranean scaldfish | 1.5 | 0 | 0.00 | Secondary | Minor |
| GUX | Gurnards | NA | 1.4 | 0.00 | Secondary | Minor |
| HAD | Haddock | NA | 1.0 | 0.00 | Primary | Minor |
| SCE | Great Atlantic scallop | NA | 0.7 | 0.00 | Primary | Minor |
| LEM | Lemon sole | NA | 0.7 | 0.00 | Secondary | Minor |
| WIT | Witch flounder | NA | 0.6 | 0.00 | Primary | Minor |
| DAB | Common dab | 0.4 | 0.0 | 0.00 | Secondary | Minor |
| SQC | Common squids | NA | 0.4 | 0.00 | Secondary | Minor |
| 2019 | SYC | Small-spotted catshark | 322.0 | 37.8 | 0.29 | Secondary | Main |
| NEP | Norway lobster | 0.7 | 255.6 | 0.20 | Primary | Target |
| DAB | Common dab | 200.5 | 0.0 | 0.16 | Secondary | Main |
| PLE | European plaice | 131.3 | 33.8 | 0.13 | Primary | Main |
| RJC | Thornback ray | 5.3 | 52.1 | 0.05 | Secondary | Main |
| QSC | Queen scallop | NA | 49.9 | 0.04 | Secondary | Minor |
| RJM | Spotted ray | 34.2 | 0 | 0.03 | Secondary | Main |
| SYT | Nursehound | 22.5 | 0 | 0.02 | Secondary | Main |
| WHG | Whiting | 18.7 | 0.0 | 0.01 | Primary | Minor |
| GUX | Gurnards | 11.5 | 1.4 | 0.01 | Secondary | Minor |
| LYY | Dragonet | 12.3 | 0 | 0.01 | Secondary | Minor |
| BLL | Brill | 0.1 | 11.9 | 0.01 | Secondary | Minor |
| CRE | Edible crab | 9.6 | 0 | 0.01 | Secondary | Minor |
| SOL | Common sole | 0.8 | 6.3 | 0.01 | Primary | Minor |
| DGH | Dogfishes and hounds | NA | 6.9 | 0.01 | Secondary | Minor |
| GUU | Tub gurnard | 6.7 | 0.0 | 0.01 | Secondary | Minor |
| COD | Atlantic cod | 2.8 | 3.1 | 0.00 | Primary | Minor |
| HAD | Haddock | 3.2 | 0.4 | 0.00 | Primary | Minor |
| ANF | Anglerfishes | 0.8 | 2.8 | 0.00 | Secondary | Minor |
| TUR | Turbot | NA | 2.7 | 0.00 | Secondary | Minor |

Table 7. FU 14 – OTB\_70-99 catch profile – Annual landings and discards estimates for otter trawls, in 2018 and 2019, in FU 14 (East Irish Sea) (Data sources: Official landings database and Cefas Observer programme for discards estimates). NA indicates no discard data available.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Species FAO code** | **Species common name** | **Discards (tonnes)** | **Landings (tonnes)** | **Proportion** | **Species category** | **Species category (Main/minor)** |
| 2018 | NEP | Norway lobster | NA | 6.0 | 0.60 | Primary | Target |
| RJC | Thornback ray | NA | 2.3 | 0.22 | Secondary | Main |
| PLE | European plaice | NA | 1.0 | 0.09 | Primary | Main |
| BLL | Brill | NA | 0.2 | 0.02 | Secondary | Minor |
| TUR | Turbot | NA | 0.1 | 0.01 | Secondary | Minor |
| SYC | Small-spotted catshark | NA | 0.1 | 0.01 | Secondary | Minor |
| GUX | Gurnards | NA | 0.1 | 0.01 | Secondary | Minor |
| COD | Atlantic cod | NA | 0.1 | 0.01 | Primary | Minor |
| LEM | Lemon sole | NA | 0.1 | 0.01 | Secondary | Minor |
| HAD | Haddock | NA | 0.1 | 0.01 | Primary | Minor |
| SOL | Common sole | NA | 0.0 | 0.00 | Primary | Minor |
| ANF | Anglerfishes | NA | 0.0 | 0.00 | Secondary | Minor |
| CSH | Common shrimp | NA | 0.0 | 0.00 | Secondary | Minor |
| MUL | Mullets nei | NA | 0.0 | 0.00 | Secondary | Minor |
| JOD | John dory | NA | 0.0 | 0.00 | Secondary | Minor |
| POK | Saithe | NA | 0.0 | 0.00 | Secondary | Minor |
| WIT | Witch flounder | NA | 0.0 | 0.00 | Secondary | Minor |
| LBE | European lobster | NA | 0.0 | 0.00 | Secondary | Minor |
| WHG | Whiting | NA | 0.0 | 0.00 | Primary | Minor |
| BSS | European seabass | NA | 0.0 | 0.00 | Secondary | Minor |
| 2019 | PLE | European plaice | NA | 7.2 | 0.32 | Primary | Main |
| RJC | Thornback ray | NA | 6.9 | 0.30 | Secondary | Main |
| NEP | Norway lobster | NA | 3.4 | 0.15 | Primary | Target |
| SYC | Small-spotted catshark | NA | 3.3 | 0.15 | Secondary | Main |
| BLL | Brill | NA | 0.8 | 0.04 | Secondary | Minor |
| COD | Atlantic cod | NA | 0.4 | 0.02 | Primary | Minor |
| SOL | Common sole | NA | 0.2 | 0.01 | Primary | Minor |
| GUX | Gurnards | NA | 0.1 | 0.01 | Secondary | Minor |
| ANF | Anglerfishes | NA | 0.1 | 0.00 | Secondary | Minor |
| HAD | Haddock | NA | 0.1 | 0.00 | Primary | Minor |
| TUR | Turbot | NA | 0.0 | 0.00 | Secondary | Minor |
| LBE | European lobster | NA | 0.0 | 0.00 | Secondary | Minor |
| FLE | European flounder | NA | 0.0 | 0.00 | Secondary | Minor |
| POL | Pollack | NA | 0.0 | 0.00 | Secondary | Minor |
| LEM | Lemon sole | NA | 0.0 | 0.00 | Secondary | Minor |
| WHG | Whiting | NA | 0.0 | 0.00 | Primary | Minor |
| WIT | Witch flounder | NA | 0.0 | 0.00 | Secondary | Minor |
| LIN | Ling | NA | 0.0 | 0.00 | Secondary | Minor |
| HKE | European hake | NA | 0.0 | 0.00 | Primary | Minor |
| MUL | Mullets | NA | 0.0 | 0.00 | Secondary | Minor |

Table 8. FU 14 – OTB\_>=100 catch profile – Annual landings and discards estimates for otter trawls, in 2018 and 2019, in FU 14 (East Irish Sea) (Data sources: Official landings database and Cefas Observer programme for discards estimates). NA indicates no discard data available.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Species FAO code** | **Species common name** | **Discards (tonnes)** | **Landings (tonnes)** | **Proportion** | **Species category** | **Species category (Main/minor)** |
| 2018 | WHE | Whelk | NA | 1789.4 | 0.89 | Secondary | Main |
| CRE | Edible crab | NA | 107.1 | 0.05 | Secondary | Main |
| LBE | European lobster | NA | 51.1 | 0.03 | Secondary | Minor |
| RAZ | Solen razor clams | NA | 46.3 | 0.02 | Secondary | Minor |
| RJC | Thornback ray | NA | 10.1 | 0.01 | Secondary | Minor |
| PLE | European plaice | NA | 2.0 | 0.00 | Primary | Minor |
| CPR | Common prawn | NA | 1.5 | 0.00 | Secondary | Minor |
| SYC | Small-spotted catshark | NA | 1.3 | 0.00 | Secondary | Minor |
| SCE | Great Atlantic scallop | NA | 0.6 | 0.00 | Primary | Minor |
| POL | Pollack | NA | 0.2 | 0.00 | Secondary | Minor |
| NEP | Norway lobster | NA | 0.1 | 0.00 | Primary | Target |
| COD | Atlantic cod | NA | 0.1 | 0.00 | Primary | Minor |
| LIO | Velvet swimcrab | NA | 0.0 | 0.00 | Secondary | Minor |
| CSH | Common shrimp | NA | 0.0 | 0.00 | Secondary | Minor |
| BLL | Brill | NA | 0.0 | 0.00 | Secondary | Minor |
| SOL | Common sole | NA | 0.0 | 0.00 | Primary | Minor |
| TUR | Turbot | NA | 0.0 | 0.00 | Secondary | Minor |
| ANF | Anglerfishes | NA | 0.0 | 0.00 | Secondary | Minor |
| SQC | Common squids | NA | 0.0 | 0.00 | Secondary | Minor |
| 2019 | WHE | Whelk | NA | 1877.5 | 0.90 | Secondary | Main |
| RAZ | Solen razor clams | NA | 80.6 | 0.04 | Secondary | Minor |
| LBE | European lobster | NA | 69.0 | 0.03 | Secondary | Minor |
| CRE | Edible crab | NA | 48.6 | 0.02 | Secondary | Minor |
| RJC | Thornback ray | NA | 7.6 | 0.00 | Secondary | Minor |
| CPR | Common prawn | NA | 0.8 | 0.00 | Secondary | Minor |
| PLE | European plaice | NA | 0.3 | 0.00 | Primary | Minor |
| LIO | Velvet swimcrab | NA | 0.1 | 0.00 | Secondary | Minor |
| SYC | Small-spotted catshark | NA | 0.1 | 0.00 | Secondary | Minor |
| FLE | European flounder | NA | 0.0 | 0.00 | Secondary | Minor |
| POL | Pollack | NA | 0.0 | 0.00 | Secondary | Minor |
| COD | Atlantic cod | NA | 0.0 | 0.00 | Primary | Minor |
| BLL | Brill | NA | 0.0 | 0.00 | Secondary | Minor |
| NEP | Norway lobster | NA | 0.0 | 0.00 | Primary | Target |
| SOL | Common sole | NA | 0.0 | 0.00 | Primary | Minor |
| BSS | European seabass | NA | 0.0 | 0.00 | Secondary | Minor |
| GUX | Gurnards | NA | 0.0 | 0.00 | Secondary | Minor |
| MUR | Surmullet | NA | 0.0 | 0.00 | Secondary | Minor |
| TUR | Turbot | NA | 0.0 | 0.00 | Secondary | Minor |

Table 9. FU 14 – Pots and creel catch profile – Annual landings and discards estimates for pots and creel, in 2018 and 2019, in FU 14 (East Irish Sea) (Data sources: Official landings database). NA indicates no discard data available.

# Discussion

The data used in this study to provide catch profiles for demersal trawls and pots/creel in each *Nephrops* function unit in ICES divisions 4a-c, 6a and 7a, are based on the reported landings by species and estimated discards from Cefas Observer programme. However, Cefas Observer programme only covers FU6 – Farn Deeps (ICES 4b) and FU14 – East Irish Sea (ICES 7a). The catch profiles for each gear were based on English and Welsh vessels. Each gear type showed the expected catch profile.

Cefas Observer programme does not include pots and creel in its sampling frame and therefore there are no discard estimates for these gears. The *Nephrops* otter trawls 70-99mm (TR2) in the Farn Deeps is the main fishery sampled by the Cefas Observer programme in the North Sea. It is considered to be well sampled and representative of the fishing activity and, therefore, the discards estimates are considered reliable. On the other hand , OTB\_>=100 (TR1) is considerably less sampled and the discards estimates showed higher variability.

In the Irish Sea, otter trawls 70-99mm (TR2) is the main fishery sampled by the Cefas Observer programme. However, is less sampled than TR2 in the North Sea and data showed high variability. For the main species caught in this fishery, Norway lobster (primary species), thornback ray (secondary species), European plaice (primary species), the programme’s sampling level is considered adequate for the fishery in FU14. However, the Cefas Observer programme does not cover the fisheries in other FUs in the Irish sea (FU15 – West Irish Sea), which is included in the AFBI (Northern Ireland Agri-Food and Biosciences Institute) Observer programme. *Nephrops* landings from FU14 only represent less than 4% of the total *Nephrops* landings from other FUs in the Irish sea (ICES advice 2020). Therefore the catch profiles presented in this report are solely representative for FU14 and should not extrapolated for other FUs.

Cefas Observer programme did not have any recorded for “out-of-scope” species for the period between 2018-2019 for this fishery. This sampling programme follows the EU Data Collection Framework (DCF), in which the main objective is to collect data on discards and biological data for the main commercial species. Although, Member States are required to record data on incidental bycatch of all birds, mammals and reptiles and protected and rare fish species, the DCF sampling programmes were not designed with that specific purpose, and for this reason, it may not be statistically valid to provide estimates of catch for these species based on data collected by these programmes. Due to the random design of the sampling procedure and low coverage of the programme, rare species, such as some species of elasmobranchs may not be effectively sampled. The raising of bycatch/discard data of this type to estimate catches of ETP at fleet level may lead to biased estimates with very low precision. There is a need to develop directed studies to monitoring ETP bycatch and rare species, and to develop statistically sound sampling programmes with this objective in mind.

There are limitations with the data used from the Cefas Observer programme, due to the random design of the sampling procedure and low coverage of the programme, and as consequence, frequently leads to one fishing trip being sampled for a specific year, area and gear combination, which is not sufficient to provide reliable estimates. To overcome the insufficient sampling effort and ensure quality of data provided, thresholds were applied. While for the data rich stocks, the application of thresholds might not have an impact; for the data limited stocks and rare species was not possible to provide discard estimates. The coverage and data collected could be improved with the use of new technologies (e.g. REM) and/or fishing industry collected and providing catch data.

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1. <https://www.projectukfisheries.co.uk> [↑](#footnote-ref-1)
2. https://www.msc.org/docs/default-source/default-document-library/for-business/program-documents/fisheries-program-documents/msc-fisheries-standard-v2-01.pdf?sfvrsn=8ecb3272\_19 [↑](#footnote-ref-2)