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United Kingdom Annual Report for data collection in the fisheries and aquaculture sectors

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Contents

INTRODUCTION

As an independent coastal State, the UK is responsible for meeting a wide range of domestic and international agreements and commitments which involve the collection of fisheries data. The Fisheries Act 2020 "scientific evidence objective" is that:

- scientific data relevant to the management of fish and aquaculture activities are collected;
- where appropriate, the fisheries policy authorities work together on the collection of, and share, such scientific data, and;
- the management of fish and aquaculture activities is based on the best available scientific advice.

In order to meet the Fisheries Act 2020 scientific evidence objective, and to ensure the continuity and consistency of fisheries data collection in the short-term, the UK is following the data collection requirements of Regulation (EU) 2017/1004 of the European Parliament and of the Council of 17 May 2017 on the establishment of a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy and repealing Council Regulation (EC) No 199/2008 (recast) ' (as amended in retained EU law), hereafter referred to as the Data Collection Framework.

Under the Data Collection Framework, each Fisheries Administration has established a multiannual programme for the collection and management of fisheries data.

This report sets out how the UK has implemented its annual programme under the Data Collection Framework for 2023.

Section 1: Biological Data

Section 1A: Sampling Plan Description for Biological Data from Commercial Catches

<u>Ref Tables</u> 1A, 1B, 1H, 1J, 1K

International and domestic commitments

This forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multiannual programme.

These sampling schemes primarily provide the source data, estimates and indices that relate to the removals (landings and dead discards) by commercial fisheries from UK stocks and are required for international assessments. These data are processed and submitted for use at ICES expert groups and for other RFMO assessments including ICCAT and to the IOTC for some distant water fishing. Bycatch data from the at-sea observer trips are used in national and international assessments on the impact of fishing on protected, endangered, and threatened species. These programmes are also used to derive UK Marine Strategy indicators on current environmental status and provide the source information for national assessments on management measures - for example changes in gear selectivity and impact of the landing obligation.

Key end users

ICES, ICCAT, IOTC, UK Fisheries Administrations

Data collection

The fishing industry activity and sampling activity was affected by the COVID19 pandemic from March 2020. The programmes presented here represents what sampling is currently required irrespective of any COVID19 health and safety restrictions and mitigation measures. Most market and onshore sampling schemes are back up to speed and expected to operate at pre-COVID19 levels in 2023. However, some offshore observer programmes continue to be restricted. Interim methods for collecting the same data have been adopted by administrations where possible, as pilots, and these will be summarised below as they may continue into 2024.

Sampling plan descriptions <u>ALL REGIONS IV, VI, VII, VIII</u>

<u>Northern Ireland sampling schemes: All regions</u>

UK-NIR-Market: "Market sampling schemes undertaken by UK Northern Ireland (AFBI lead)"

NIR-N1: Area frame of sampling main ports with > 90% of landings. Providing access to vessels using otter trawlers, seine netters and dredge. Sampling events identified at random on days ports are active.

NIR-N2: Area frame of peripheral locations with < 10% of landings, active for 45 days a year each. Sampling of these is not currently undertaken.

UK-NIR-Selfsampling: "Fishery self-sampling schemes undertaken by UK Northern Ireland (AFBI lead) "

NIR-N3: A reference fleet of vessels for Nephrops catch sampling through fisher self-sampling. Selected vessels are from main Northern Irish ports. The reference vessels selection is designed to be representative of the entire fleet with systematic rota sampling.

UK-NIR-Observer at Sea: "Observations at sea undertaken by UK Northern Ireland (AFBI lead) "

NIR-N5: List frame of GBN - registered vessels operating out of Northern Irish ports, for use in selecting vessels for at sea sampling of the mid-water trawl fleet segment. Vessels must apply for permit from control authority for any trip. A condition of this permit is a requirement to be observed. Observations are systematically identified to ensure equal coverage.

NIR-N6: List frame of GBN registered vessels operating from Northern Irish ports, with targeted selection of vessels engaged in seasonal queen scallop fishery.

NIR-N9: Unsampled GBN registered restricted to infrequent small-scale fisheries, poly-valet gears and those trips perusing pelagic mid-water fisheries landing into other EU countries.

NIR-N4; NIR-N7; NIR-N10; NIR-N11: List frame of GBN registered vessels operating from Northern Irish ports, with random selection of vessels.

UK-NIR-Processor: "Sampling at fish processors undertaken by UK Northern Ireland (AFBI lead) "

NIR-N8: Samples taken at processors of herring, from identifiable landings

<u>Scotland sampling schemes: All regions</u>

Scottish at-sea sampling

"UK-SCT at-sea catch sampling scheme" code in table 1H

The at-sea sampling design collects biological data for fish species for the otter trawler fleets targeting demersal fish and shellfish. The catch components recorded are landed, unwanted catch and BMS fractions. The trawler fleets sampled account for approximately 91% of the demersal fish species landed and ~ 66% of the total demersal and shellfish landings from the Scottish fleet. The non-sampled components are mainly small, often single manned under 10m vessels operating pots and trap which account for ~ 25% of the landed shellfish

The vessels are divided into 8 sampling strata, based their target species and main operating area: North Sea and West Coast demersal trawlers; and inshore trawlers targeting Nephrops in their predominant Nephrops functional unit (Clyde, Firth of Forth, Moray Firth, North Minch, and South Minch) and offshore trawlers targeting Nephrops (mainly in Fladen)

At-sea observers use a randomised vessel selection form for each scheduled trip. This form consists of a uniquely randomised draw from the sampling frame for the stratum. The observer contacts the vessels in the randomised order, recording the outcome of the contact for each vessel, until a trip is arranged and conducted. Non-response and refusal rates are calculated from the vessel selections forms.

When at-sea, a sample of the unwanted catch and BMS fraction is collected for each haul, usually two mixed species baskets, from which all individuals are identified to species and length measurements are taken. Length stratified collection of age structures is undertaken for 7 predetermined species. For trawlers targeting Nephrops the sampling of Nephrops and fish is by alternate days. Incidental by-catch is recorded for each haul as encountered.

A ratio estimator is used to estimate the total weight and numbers-at-age or length of unwanted catch by species, and bootstrapping is used to estimate corresponding standard errors and confidence intervals for these estimates. Data are stored in the national database and also in spreadsheets and are compiled into a documented R package for analyses. At each stage, rigorous quality checking procedures are followed.

On-shore market sampling

"UK-SCT on-shore market sampling" scheme code in table 1H

The six main Scottish fish markets provide the access points for the landings of demersal species, and collectively account for 68% of the Scottish landings of these species. Non-sampled landings are largely non accessible; a percentage is from foreign or national vessels with point of first sale out with Scotland. A further 16% are sold direct to buyers and don't appear at fish markets. Approximately 65 demersal species are landed into Scotland, of which 45 are sold at the markets, the remainder mainly being relatively small landings of deep-water species. The 6 markets in Scotland are stratified into 4 mainland and 2 Shetland markets. Each stratum is sampled 36 weeks of the year, with one Shetland market and 3 randomly selected mainland market being sampled each week. At the market landings are selected at random using a vessel selection form, on which non-response and refusals are recorded. Vessels are not stratified. The species to sample are selected at random using a species selection form, stratified into common, less common and rare species, in which non-response and refusals are recorded. One box of fish is sampled from each sales category – these boxes are selected at the discretion of the sampler. The lengths of each fish in the box are recorded, and if otoliths are taken, the first otolith from each cm length class is selected. A ratio estimator is used to estimate landed numbers-at-age or length and bootstrapping is used to estimate corresponding standard errors and confidence intervals for these estimates. Data are stored in the national

database and also in spreadsheets and are compiled into a documented R package for analyses. At each stage, rigorous quality checking procedures are followed.

On-shore pelagic sampling

"UK-SCT pelagic onshore" scheme code in table 1H

The pelagic co-sampling sampling design collects biological data for landings of pelagic species. 20 Scottish SPFA vessels participate in this scheme. The main pelagic species are mackerel, herring, and blue whiting, with some horse mackerel and sprat. Landings are stratified by fishery (target species). The landings of these pelagic species caught by other fleets amount to 0.38% of the total pelagic landings by weight.

Each fishing trip is entered into a randomised selection process to determine whether a sample is required. As this process is not automated but carried out in person, some fishing trips are missed for logistical reasons, e.g. at weekends.

One small box of mixed unsorted catch is sampled from each haul of a selected trip on board. The sample frozen by the vessel and collected from the processor for sampling in the laboratory. All fish in the sample are identified and recorded for length. The first individual from each cm length class is selected for the collection of otoliths, and the recording of sex and maturity. A ratio estimator is used to estimate landed numbers-at-age or length and bootstrapping is used to estimate corresponding standard errors and confidence intervals for these estimates. Data are stored in the national database and also in spreadsheets and are compiled into a documented R package for analyses. At each stage, rigorous quality checking procedures are followed.

Shellfish onshore sampling

"UK-SCT on-shore Shellfish sampling" scheme code in table 1H

The onshore shellfish sampling schemes collects biological data on five shellfish species, Nephrops, Scallops, Lobster and two species of Crab (Edible and Velvet).

Two distinct schemes are used on mainland Scotland and on the Shetland Isles. The scheme on mainland Scotland, which includes sampling in the Orkney Islands and the islands off the west of Scotland, is divided into 15 sampling strata, where any and all of the 5 shellfish species encountered will be sampled. The mainland sampling strata are based on the geographical region and contain landing ports and the local processors that receive shellfish landings from these ports. Collectively the scheme has the potential to cover 78% of the shellfish landed into Scotland, the remaining 22% is typically by small, mainly under 10m, vessels landing infrequently into small and often remote ports. Visits to sampling strata are by designated sampling weeks with observer directed sampling to determine locations and opportunities for data collection. There are at present no probability-based selection methods employed, sampling being ad hoc and opportunistic.

Shellfish sampling in Shetland is sub-contracted and the MOU governing its operation sets out target numbers by species of the data to be collected. Data on the landings of 4 species are collected (there are no Nephrops landings into Shetland)

For all individuals the appropriate carapace/shell length measures are taken, for Nephrops sex and breeding condition is recorded, for scallop meat weight.

A ratio estimator is used to estimate landed numbers-at-age or length and bootstrapping is used to estimate corresponding standard errors and confidence intervals for these estimates. Data are stored in the national database and also in spreadsheets and are compiled into a documented R package for analyses, at each stage, rigorous quality checking procedures are followed.

Co-sampling pilot

"UK-SCT co-sampling pilot" scheme code in table 1H

A pilot scheme to collect samples from demersal otter trawlers has been introduced in August 2021. Currently a small selection of vessels from the fleets used in the at-sea observer scheme are trialling the scheme. These fleets are grouped into 3 design strata for the pilot. The vessels follow an agreed protocol to record data from the trip and collect representative samples of either unsorted catch or unwanted catch (depending on the fleet) from selected hauls to bring back for processing onshore by scientists.

English and Welsh sampling schemes: All regions

Schemes are run concurrently to collect size data from all categories of commercial catch. Other data collected is dependent on species but will include age, sex, maturity and weight.

Offshore sampling scheme: UK-E+W Observer at sea

Access to the population is through a regularly updated list frame of fishing vessels, from which a stratified random selection is made for direct observation by Cefas observers. The sampling frame is a virtual frame of all fishing trips of the vessels in the list, which comprises all commercial fishing vessels [registered in E&W]. The list of active vessels is updated quarterly to capture the polyvalent and seasonal nature of regional fisheries.

The overall sampling effort is largely constrained by financial and staff resources – currently ~475 staff days are available for at-sea observer sampling.

The list of vessels in the sampling frame is stratified by coastal region; 2 strata in the North Sea and Eastern Artic and 3 in the North Atlantic and predominant fishing method (nets, trawls, lines, beam trawl and scallop dredge). In addition, some region / fishing method strata are further stratified by vessel LOA (<10m; 10m+). In most regions the nets, trawls and lines are combined into single strata but in some regions where gear specific fisheries are more distinct Nets and Trawl are separated. Beam trawl and Scallop dredge vessels

are also kept distinct but cover all regions - the North Sea and North East Atlantic to capture the nomadic nature of a lot of these vessels.

Some vessels are excluded from the sampling frame

1. vessels less than 7m, excluded for health & safety reasons
2. vessels considered unsafe to take observers for reasons other than size.
3. vessels specialising in fishing methods or target species for which a derogation has been granted:
4. clam, oyster and cockle dredgers
5. some pelagic vessels
6. potting vessels
7. vessels fishing from foreign ports or outside England and Wales. Vessels subject to bilateral agreements to be sampled in another country, or where the metier is effectively sampled by another country.

Teams of regionally based observers work to quarterly targets and use shared drawlists of randomly ordered vessels. Each vessel in turn is approached and non-response and refusals are recorded.

<u>Co-sampling pilot – November 2020 to date</u>

Vessels are selected in the same way from the same strata described above and arrangements are made for the vessel to follow an agreed protocol to record data from the trip and collect representative samples of unwanted catch from selected hauls to bring back for processing ashore by Cefas observers. Not all strata are sampled for logistical reasons and not all the data an observer would normally collect are collected by the industry. This may limit what indices might be derived for some species but the indices required for most of the assessed stocks can be derived from the information collected.

Onshore sampling schemes: UK-E+W Crustacean on shore; UK-E+W Demersal on shore; UK-E+W Pelagic on shore

Target population is all fish and shellfish species landed into England and Wales for which estimates of length and/or age composition for the landed component are required.

Access to the population is through a list frame of fishing ports at which all or a defined proportion of the total landings are accessible at auctions, processors, or other onshore locations, and from which a stratified random selection of ports and days is made for sampling trips by Cefas staff. The overall sampling effort is largely constrained by the financial and staff resources made available for this work – currently ~ 1200 staff days are available for port sampling.

The Primary Sampling Unit (PSU) is a port (or harbour or processor) on a specific day when landed catch is available. Landings into many small ports are transported to neighbouring larger ports where they can be sold by auction. A PSU is therefore a port where landings are available and implicitly includes all satellite ports from which catch is transported. Ports with auctions vary widely in size, from Lowestoft which deals with

irregular infrequent landings from a dispersed fleet of under 10m vessels to Brixham which deals with regular large landings from a large fleet of over 10m vessels and a large fleet of inshore vessels.

The sampling frame is a frame comprising auction ports and ports of sale in England and Wales, and days of the year. The frame excludes the following locations:

1. very small ports, harbours, or other landing sites including beaches, where fish are disposed of locally rather than at auction sites, and where considerable effort would be required to sample very small amounts.
2. ports where access has been denied may be excluded within the frame to capture nonresponse rates and record the potential biases.

The Cefas port sampling programme currently targets three distinct types of fishery, each will effectively have its own separate sampling programme. These are:

1. demersal onshore (including cephalopods and Nephrops)
2. crustacean onshore
3. pelagic

Whilst there is some overlap (many ports land finfish and shellfish), this does not represent overlapping PSUs as each of the three fishery groups is treated as an independent frame with an independent sampling scheme and the access points are often quite distinct.

The list of ports in each of the three sampling frames is stratified by:

1. quarter,
2. coastal region (6 strata) Lists of ports that map closely to ICES divisions, stock boundaries and fleet activities - 1Northeast, 2East, 3Southeast…
3. port "size" based on the relative importance of that port within that region
4. gear group although only 1 or 2 groups may be specific to the frame.
   E1 - Demersal trawlers, netters + liners
   E3 - Pelagic ring netters, liners and trawlers
   E4 - Shellfish pot & trap vessels
   E5 - Beam trawlers
   E6 - Scallop dredgers

On the given day at the auction site a sampler will use a unique randomised list of numbers to select the trip to sample and then a similar list to sample the species available. Non-response rates and refusals will be recorded. The vessel selection scheme works in large auctions but at merchants, staff are often limited to sampling what arrives or is available at the time they are there. Therefore, the port and day selection process differ between regions.

The pelagic scheme includes directed sampling at fish markets and for biological data where scheduled samples are bought from merchants and processors to be sampled remotely.

Onshore self-sampling schemes - UK-E+W Nephrops on shore; UK-E+W Pelagic self-sampling; UK-E+W Scallop self-sampling

Three species specific self-sampling schemes run concurrently with the landings sampling schemes and have been adopted either as the only access to particular fisheries or other biological parameters not available on the market; to guarantee catch samples from domains within other onshore programmes. In the Nephrops scheme and Scallop red bag scheme the vessels are contacted whilst at sea or before heading to sea to bring back samples from particular hauls or areas where they are fishing. The scallop vessels are contacted by their agents if they are seen, on AIS, to be fishing in the required areas.

The pelagic self-sampling is dependent on scheduled sampling by processors and fishers: Fishers in the sardine ringnet fishery and sprat trawl fishery collect logbook data which includes catch and bycatch data for every trip. A vessel-tailored random calendar schedules the collection of length data from a fixed volume of each species.

Processors as part of their normal QA procedures collect individual weights from each sprat and pilchard landing. For a minimum of 2 trips per species per month, length data is also collected by the processors with the weights.

Summary of outcomes and deviations from the workplan

Not all species and parameters of interest from all data sources were included in the submitted and approved WP (Table 1B). These have been added as additional rows (highlighted in grey) at the bottom of the table. AR comments to the right of the table are used to highlight or identify any significant deviations from the planned or expected sampling. Typographical errors in the WP were corrected.

Deviations from planned sampling by Scheme are summarised here by Scotland. These are covered by England, Wales and Northern Ireland by region below with further comment by Scotland on species specific issues.

Scotland

Demersal and Nephrops at-sea sampling scheme

Due to shortages of observer staff, and the requirement to train recently appointed observers, SEDD at-sea trips were limited mainly to inshore *Nephrops* vessels for training purposes. No demersal observer trips were carried out by SEDD staff. SFF observers returned to full random selection of vessels for the demersal and offshore *Nephrops* fleet and carried out the majority of their planned trips for these fleets. Sampling of the inshore fleets fishing in Firth of Forth and Moray Firth. Sampling of the West Coast fleets fishing in North Minch, South Minch and Clyde was less successful, also mainly due to staff resourcing and training issues.

Demersal and Nephrops co-sampling pilots

In Scotland in 2023, the inshore *Nephrops* fleet co-sampling pilot was continued, focusing on the Moray Firth, since it can be difficult to access small vessels in this fleet. These trips were supplemented by observer trips carried out by SFF. Observer coverage resumed in the other inshore *Nephrops* fleets. SFF continued a pilot scheme for co-samples from the demersal and offshore *Nephrops* fleets.

The inshore co-sampling pilot was partially successful, with samples taken in 3 out of 4 quarters. The demersal and offshore *Nephrops* fleets were also successful, but the data have not yet been compiled.

Commercial sampling onshore data:

Onshore demersal commercial sampling trips to North Sea ports on the mainland were reduced by approximately one third in 2023, due to staff resources. Despite this, the planned number of visits to markets was achieved, however these were mainly at Peterhead and Fraserburgh, due to lack of landings at the sites on the West Coast. 20 out of a planned 24 visits to the West Coast were attempted, but only 12 were successful due to lack of landings at the time the sampling was planned.

The strata _NAFC are sampled in the Shetland Isles on contract to MSS. The shellfish achievements were lower than expected but this was mainly due to the fact that fishing is sporadic and often no local vessels were fishing at the time that sampling trips were planned.

Onshore shellfish sampling was undersampled in ICES IV for North East, Eyemouth & Moray Firth and in ICES VI for Mallaig, Campbeltown, Skye and Uist. The North East was undersampled mainly due to staff illness and resourcing issues, however for the other ports, landings were sporadic and the sampling teams were not able to access landings at the time of sampling, despite many attempts. Ports in ICES VI are mainly very distant from base, with approximate driving times of 4-6 hours.

Commercial pelagic sampling:

In this scheme, vessels in the Scottish Pelagic Fishermen's Association, which comprises the majority of the Scottish pelagic fleet, agreed to bring back boxes of frozen fish from each haul of a fishing trip when requested to do so. Fishing trips were monitored by a colleague at SUHI and trips were selected at random. Frozen samples landed on the mainland were defrosted and sampled in the laboratory by staff in MSS, those landed on Shetland were sampled by SUHI staff. Sampling was achieved as planned.

East Arctic, Norwegian Sea and Barents Sea

<u>Scotland</u>

There are very few landings, if any, from areas I, II into Scotland now. In 2023, 7 herring fishing trips landing into Norway were sampled for all biological parameters. The 10 demersal trips, fishing in IIa, landing into mainly West Coast ports were not sampled.

North Sea and Eastern Channel

Scotland

A reduction to the mainland demersal sampling trips was introduced early in 2023 due to resourcing issues. After that, sampling took place largely as planned but with some further resourcing issues due to staff illness etc.

Nephrops norvegicus FU10 – there is an existing derogation in place for FU 10. This is a very small and short-lived fishery where it is difficult to find any landings. Sampling takes place opportunistically.

Lepidorhombus boscii – no samples of commercial landings were possible as *L. boscii* and *L. whiffiagonis* are landed together. None were encountered in the mixed boxes.

Psetta maxima/*Scophthalmus maximus* - Vessels only allow length sampling of turbot due to the value of the fish.

England and Wales

At sea sampling and the onshore demersal and crustacean sampling schemes in England were significantly affected by departures of key sampling staff, freezes and delays in recruitment and inflationary increases in costs. A significant reduction in numbers of trained observers affected achievements both onshore and offshore in both the Northern and Southern regions but particularly onshore and offshore in the North. Recruitment towards the end of 2023 was too late to affect sampling in the remainder of the year. For the offshore programme, a pilot approach using contract observers and full time observers was set up to test that model and ensure that there is sufficient cover for period whilst staff are recruited and trained and beyond – a full review of the staffing and retention strategy will be undertaken in 2024

Recruitment of 4 additional samplers in Q1&2 2024 should result in improvements in both schemes.

Access to reduced landings onshore in the East 2E and Southeast 3SE stratum has not improved since 2022. Effort directed at some of the minor demersal ports in the East had little success and was redirected to major ports to capture data from overlanded minor port landings. Sampling in the South East (3SE) is dependent on access to local markets and merchants premises. Access to merchants is very variable. Supplies of fish to the local market during COVID becoming so restricted that observer and correspondent access to the market was withdrawn indefinitely and is ongoing. New sampling opportunities were sourced during 2022 and the sampling programme for 2023 revised. However, access to merchants in the area continues to be variable and dependant on fishing activity. Consequently sampling opportunities in this area are variable and unpredictable.

Access to landings was further complicated by a significant proportion being overlanded from these ports to Brixham fish market in the Southwest (4W_D2).

Sampling onshore at Brixham market was increased at the start of the 2nd Quarter 2023 to improve sampling coverage and capture their increasing market share of landings overlanded from the other ports in the Southwest and further afield.

In year changes to the offshore observer programme along with co sampling reduced coverage but allowed the sampling of most of the offshore strata to be maintained at a reasonable level. These changes included stopping the sampling of the E+W_NS5: Eastern shrimp beam fleet stratum.

The directed Nephrops catch sampling programme in both the north east 1NE_NEP and north west 6NW_NEP are dependent on maintaining regular visits and good relations with the industry in both areas. Sampling of 6NW_NEP was particularly affected by an increase in the time it took to get dispensations for vessels to land samples a reduction in the activity in the local fishery reducing access and staff changes. Dispensation processes in 2024 have been adjusted to take into account significantly longer processing times and new observer staff are now trained. The decline in activity in the local fishery remains an issue, with activity anticipated to be concentrated to several weeks only in Q2.

Devations from the sampling of particular stocks and parameters:

Anarhichas spp, IV. Sampling these is opportunistic and none were encountered on the trips sampled.

Clupea harengus, IV, VIId. Unable to establish another source for biological (length, age, sex and maturity) samples from the limited activity in the Thames fishery. Landings for other areas within IV, VIId were sampled for length but the future collection of biological data from the Thames fishery is dependent on need, a consistent fishery and establishing access to the catches for sampling. This sampling continues to be under review in 2024.

Nephrops norvegicus, functional units 5 & 6. Sampling FU5 Nephrops is opportunistic, and none were encountered when sampling landings through current access points. The routine monitoring for maturity of FU6 Nephrops was suspended in 2023 pending an animal welfare review.

Pecten maximus, VIId. None encountered on the observer trips sampled and shells continue to be collected for ageing from the self-sampling programme, but ageing has been suspended until sufficient staff are trained and a back log can be cleared.

Polachius virens, IV. Vessels that target or catch these stocks are rarely selected for sampling under the current observer programme. None occurred in those few trips that were sampled in 2023. A pilot for a continuous self-sampling scheme for English vessels targeting this stock in the Northern North Sea started late 2022 and is ongoing.

Selachi, Rajidae, VIId; *Solea solea,* VIId. Only length data collected. For the few VIId ray samples collected only wings showing no sexual characteristics were available. Very few discarded sole were seen and then they were not available to collect age, sex, and maturity data.

Trachurus trachurus, IV, VIId. None encountered in the landings selected for sampling.

North-East Atlantic and Western Channel

<u>Scotland</u> (see general text under North Sea)

Observer sampling was mainly undertaken by the Scottish Fishermen's Federation (SFF).

Deviations from the sampling of particular stocks and parameters:

ICES area Va, Vb

There were very few landings into Scotland from area Vb (Faroe). One observer trip took place and onshore samples were taken from 3 fishing trips.

ICES area VI

Onshore shellfish sampling was undersampled in ICES VI for Campbeltown, Oban, Skye and Uist. These ports are mainly very distant from base and, despite repeated phone calls to offices and processors, the landings were sporadic and often when sampling teams could not attend in time pre-sale. Most journeys necessitated a 4-6 hour drive.

<u>*Clupea harengus*</u> – There is currently no targeted herring fishery in 6aN, however there is a small TAC for this stock, some of which is utilised as scientific quota for the industry scientific herring survey in this area, with samples taken when this scientific quota is caught.

<u>*Sprattus sprattus*</u>, VIa – no fishery in VIa.

<u>*Micromesistius poutassou*</u> – Landings by Scottish vessels are mainly into Ireland. Samples from these are now collected via the pelagic co-sampling scheme.

<u>*Loligo vulgaris*</u> - were not selected for sampling by the 4S system in area VI.

<u>England and Wales</u>

See the general comment in North Sea section about the significant impacts of in year staff changes and increasing costs.

In year changes to the offshore observer programme along with co sampling reduced coverage but allowed achievements for most of the offshore strata to be maintained at a reasonable level. In year changes to the observer programme included stopping the sampling of the Scallop dredge fleet (E+W_Scallop); the original stratum E+W_NA3 changed from over 10m trawlers to include 7m trawlers to improve the coverage of the under 10m trawlers/beamers. The scheduled number of trips for over 10m Beamers and Western over 10m Netters + Liners (E+W_Beam: E+W_NA2) were reduced slightly and the number of trips planned for Western over 7m trawlers (E+W_NA3) and Western under 10m all gears (E+W_NA1) were realigned to account for the shift of activity from one stratum to the other.

Onshore in the West, limited access to landings at 4W_C1 & C2 ports impacted on achievements. Sampling effort was redirected to 4W_C3 ports.

In the Northwest (6NW) declining landings, local sales and loss of key staff affected achievements in this area. Recruitment of additional samplers in the North East, who also cover the North West, will improve target achievement in 2024.

Three sampling staff recruited in the West at the beginning of the year and the contract observers will improve the coverage of both programmes in 2024.

Sampling of 6NW_NEP was particularly affected by an increase in the time it took to get dispensations for vessels to land samples, a reduction in the activity in the local fishery reducing access and staff changes. The dispensation application processes have been adjusted for 2024 to take into account significantly longer processing times and new staff are now trained. The decline in activity in the local fishery remains an issue, with activity anticipated to be concentrated in several weeks only in Q2.

There have been no opportunities to re-establish any catch sampling in Wales since COVID. Those targets and objectives are under review.

Pelagic sampling - The sprat fishery was effectively inactive as the fish were too small to land commercially so no self-sampling was possible. The sampling by the processors of the sardines has increased with their including the length sampling more frequently in their routine QA monitoring.

For the monitoring of small scale pelagic fisheries for biological data (1NA_P3) there has been year on year adjustments to improve the spatial coverage and manage expectation. The revised pilot continued in 2023: each month at two locations length and age data was collected from commercially caught pilchards, horse mackerel and mackerel, for the expected duration of the fishery (July 2023 – February 2024).

Scallop self-sampling - The target of 250 trips for the scallop dredge self-sampling programme which has been running since 2017 remains optimistic, a backlog of samples that could not be processed during COVID and logistical issues collecting samples in 2022 / 2023 limited the number of samples that could be collected and processed. This scheme is under review in 2024.

Deviations from the sampling of particular stocks and parameters:

Gadhus morhua, VIIa. From the at sea sampling trips in VIIa only 1 cod was observed discarded which could have been sampled for sex, age and maturity but for practical reasons was not.

Lophius piscatorius and budegassa, IV, VI. All E&W sampling in area IV are included with the North Sea IV, VIId stock achievements.

Nephrops norvegicus, VI Functional unit 14. The routine monitoring for maturity was suspended in 2023 pending an animal welfare review.

Pecten maximus, VI, VII. Shells continue to be collected for ageing from the self-sampling programme, but ageing has been suspended until sufficient staff are trained and a back log can be cleared.

Reinhardtius hippoglossoides, VI. No landings into England or Wales in 2023. And none occurring in landings selected for sampling.

Scomber scombrus, II, IIIa, IV, V, VI, VII, VIII, IX. Sex and maturity data is no longer collected routinely with length, weight and age as part of the directed Small Scale Pelagic sampling scheme (1NA_P1).

Sprattus sprattus, VII. Self-sampling by fishers and processors was not possible with the fishery inactive. Fish too small to target commercially.

Trachurus trachurus, IIa, IVa, Vb, VIa, VIIa-c, e-k, VIIIabde. Weight data was not collected from the fish sampled for age as part of the directed Small Scale Pelagic sampling scheme (1NA_P1).

Trisopterus spp., all areas. The otoliths collected from *T. luscus* are not aged or used in any routine estimations and assessments so the collection from these species were stopped in 2022.

Northern Ireland

Apparent general deviations from the work plan occur where species that would be sampled if encountered have not been observed in a given sampling scheme, this is not a systematic deviation but reflects fishery characteristics.

The on-shore sampling (NIR-N1) achieved 53% of its target of 53% - it is noted that changing market processes are reducing access to landings as fish/shellfish are commonly sold and transferred directly to transport vehicles in contrast to sales through public / open markets. NIR – N8, which samples from processors onshore continues to report a high sampling achievement (110%). Sampling under schemes NIR-N5, mid-water demersal fleets (achieved 25% of target), this sampling scheme was impacted by a continued decline in reference fleet activity in 2023, in response to changing fisher behavior and socio-economic forces. In total 7 trips were reported by this fleet in 2023 (4 of which were sampled), compared to 69 trips in the reference year (2019). No samples were obtained in NIR-N6, otter trawlers targeting queen scallops, due to very low levels of fishing by the reference fleet (2 trips only). This is an intermittent fishery in Northern Ireland, where fishing levels depend highly on stock levels and socio-economic forces in a given year.

The at-sea programmes NIR-N4, NIR-N7 and NIR-N10; achieved over-target sampling rates.

In the latter part of 2023, the research vessel RV Corystes was unable to enter Republic of Ireland waters due to technical issues with the vessel. This affected four research surveys to varying degrees, and is detailed in Section 1B below.

Deviations from the sampling of particular stocks and parameters:

Aequipecten opercularis, VII Maturity and weight data were not collected for from five individuals on the NIR-Observer at sea sampling program. This species is rarely observed in this sampling program, and maturity and weight data were not recorded for practical reasons.

Aspitrigla cuculus, Lepidorhombus whiffiagonis, Microstomus kitt VIIa Sex, maturity and weight data for these species were not collected on NIGFS Q1. This data is not required for stock assessment.

Gadus morhua VIIa Otolith samples were not taken from 90 fish for which length measurements were taken in the 'UK-NIR – Market sampling' programme, for practical reasons relating to obtaining fish for sale in market.

Melanogrammus aeglefinus, VIIa Maturity samples were not taken for 35 individuals on the of this species on the 'UK-NIR - Self-sampling' programme for practical reasons.

Merlangius merlangus, VIIa Otolith samples of this species were not taken on the 'UK-NIR - Observer at sea' programme, for logistical reasons relating to sample processing at sea. Sufficient otolith samples for assessment of age structure were obtained through the 'NIGFS Q1', 'NIGFS Q4', 'UK-NIR Self-sampling' and 'UWTV (FU15)' programs (total n = 2034).

Pecten maximus, VIIa Age and weight data were not collected for 7 individuals caught on the NIGFS Q1 and NIGFS Q4 surveys. Sufficient samples for assessment of age structure were obtained on surveys targeting shellfish stocks NIKSDS, NSQSS, NCQSS (total n = 1449).

Scophthalmus rhombus or *Zeus faber,* VIIa Sex, maturity and weight data for this species were not collected on NIGFS Q1 or NIGFS Q4. This data is not required for stock assessment.

Nephrops norvegicus, VI Functional unit 14. The routine monitoring for maturity was suspended in 2023 pending an animal welfare review.

Pecten maximus, VI, VII. Shells continue to be collected for ageing from the self-sampling programme, but ageing has been suspended until sufficient staff are trained and a back log can be cleared.

Reinhardtius hippoglossoides, VI. No landings into England or Wales in 2023. And none occurring in landings selected for sampling.

Scomber scombrus, II, IIIa, IV, V, VI, VII, VIII, IX. Sex and maturity data is no longer collected routinely with length, weight and age as part of the directed Small Scale Pelagic sampling scheme (1NA_P1).

Sprattus sprattus, VII. Self-sampling by fishers and processors was not possible with the fishery inactive. Fish too small to target commercially.

Trachurus trachurus, IIa, IVa, Vb, VIa, VIIa-c, e-k, VIIIabde. Weight data was not collected from the fish sampled for age as part of the directed Small Scale Pelagic sampling scheme (1NA_P1).

Trisopterus spp., all areas. The otoliths collected from *T. luscus* are not aged or used in any routine estimations and assessments so the collection from these species were stopped in 2022.

Indian Ocean Western and Eastern

No vessels registered in the UK held a license to fish in the IOTC region in 2023.

Section 1B: Research Surveys at Sea

<u>Ref Tables</u> 1B, 1F, 1G

International and domestic commitments

This fulfils Chapter IV of the multiannual programme. This section lists ongoing fishery independent research surveys at sea grouped by sea region and provides information on objectives, coverage, and coordination supplementary to the survey details provided in Tables 1F and 1G of the Workplan.

These surveys primarily provide population data and indices for UK commercial fish stocks, other species of interest and regional ecosystems required for international stock and ecosystem assessments. Some of these surveys are coordinated internationally at ICES and indices and raw data from some of these surveys are submitted to them, published, and made available through their databases. Environmental data from these surveys are submitted to OSPAR. These surveys are also used to derive UK Marine Strategy indicators for the UK on current environmental status.

Key end users

ICES, OSPAR, UK Fisheries Administrations. Details are provided for each survey in Ref tables and text below.

Data collection

Research surveys undertaken across the UK's Fisheries Administrations are set out in this section.

<u>**Summary of outcomes and deviations from the workplan**</u>

Not all species and parameters of interest from all data sources were included in the submitted and approved WP (Table 1B). These have been added as additional rows (highlighted in grey) at the bottom of the table. AR comments to the right of the table are used to highlight or identify any significant deviations from the planned to expected sampling. Typographical errors in the WP were also corrected.

All planned Scottish, English and Northern Irish surveys were completed, aside from the Scottish blue whiting survey for which no tenders to charter were received. In its stead, Marine Directorate staff participated in other International blue whiting survey efforts. This was not a MEGS nor NSMEGS year, as such no survey took place. Survey timings for some of the Scottish surveys and targets were affected by the availability of MRV Scotia, which was stuck in dry dock due to an incident with another vessel. A total of 38 days were lost from the MRV Scotia survey programme. Some surveys had to be merged or rescheduled as a result. All SIAMISS surveys this year were completed on chartered vessels. Bad weather and/or technical problems restricted the coverage of the English SWECOS and UWTVScallop surveys. Technical issues that stopped the RV Corystes from being able to work in Republic of Ireland (ROI) waters in the latter part of 2023

affected the coverage of the AFBI NI-MIK and the NIGFS Q4 surveys, the latter of which only 61% of grid was covered. However, AFBI were able to arrange for the part of the UWTV (FU15) survey in ROI waters to be completed by the Marine Institute of Ireland RV Tom Crean.

North Sea (ICES areas IIIa, IV and VIId) and Eastern Arctic (ICES Areas I& II)

Summary outcomes

Scottish RV surveys: As a result of the loss of MRV Scotia for a significant time period all *Nephrops* UWTV surveys had to be combined and as a result programs were adjusted to prioritise underwater camera work over trawls to make the most of the limited time available. FU8 Firth of Forth was initially dropped from the merged survey due to time restraints, however this survey area was picked up by MRV Alba Na Mara later in the year.

English RV surveys: No significant deviations from the schedule or workplan. 21 of the 110 TV stations in NTV6 had to be relocated by 1NM to observe exclusion zones relating to underwater features such as cables and pipelines and 1 dropped from the survey as no viable alternative position.

International Bottom Trawl Survey, IBTS Q1; UK Scotland component IV

1. Survey objectives

A pre-recruit survey undertaken during Q1 in the North Sea as one component of the ICES International Bottom Trawl Survey (IBTS). The survey is targeted towards young (1-group) cod, haddock, whiting, saithe, Norway pout, herring, and mackerel by utilising a GOV trawl fitted with an internal 20 mm liner. In addition, pre-metamorphosing herring larvae are sampled at night by deploying a Methot mid-water net.

2. Survey methods

The survey will be undertaken by MRV Scotia. Approximately 57 pseudo-random stations will be surveyed hydrographic information coupled with the deployment of a GOV trawl for 30 minutes within the allocated area plotted below. Numbers at length and age will be acquired for all target species with all other fish species being measured and counted. All marine litter encountered within the bottom trawl or MIK samples will be recorded and weighed.
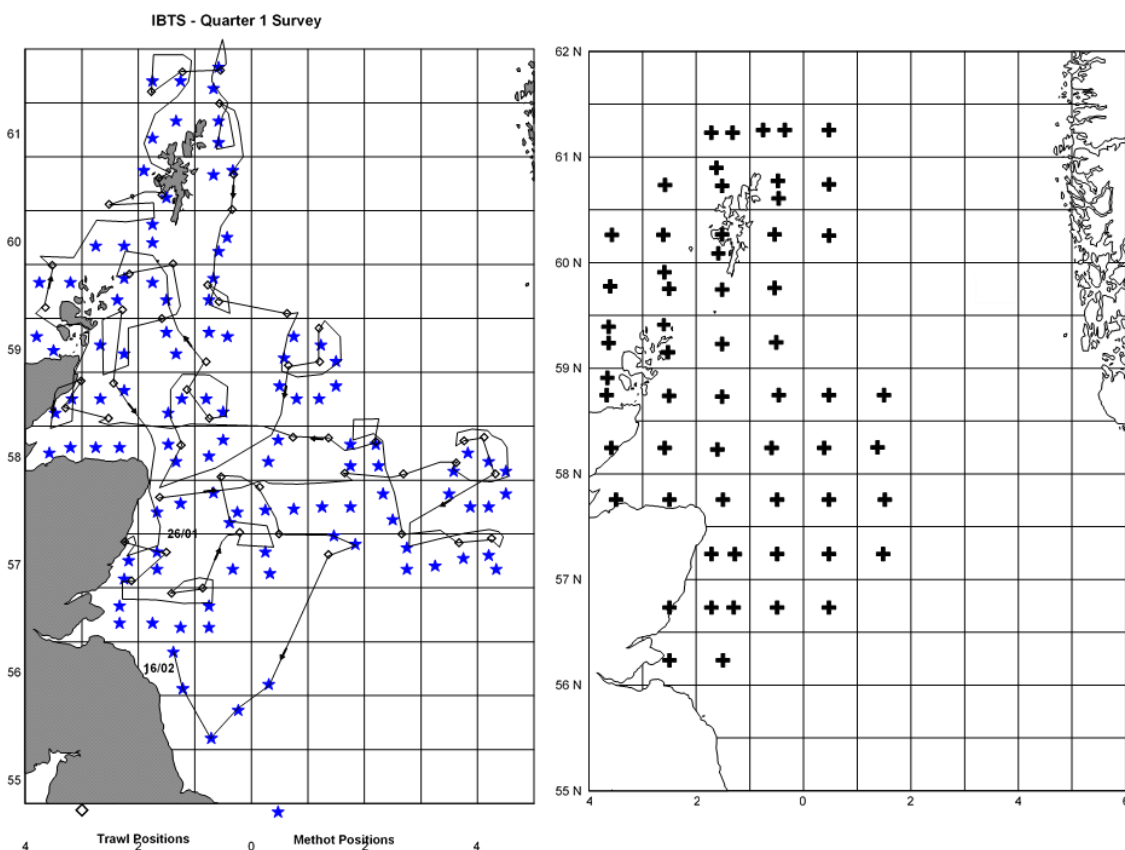
Figure 1. Map showing survey area for IBTS Q1; UK Scotland component

Data will be stored electronically in the Marine Directorate Science FSS system and uploaded to the ICES DATRAS database. Plankton samples (from Methot net) will be stored locally prior to being uploaded to the ICES Egg and Larval Database.

3. For internationally coordinated surveys - Countries/vessels and relevant international group in charge of planning the survey

ICES International Bottom Trawl Survey Working Group IBTSWG

Data used by WGNSSK for assessments.

Svea (Sweden); Dana (Denmark); Scotia (UK-Scotland); Thalassa (France); Tridens (Netherlands); Walther Herwig III (Germany)

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
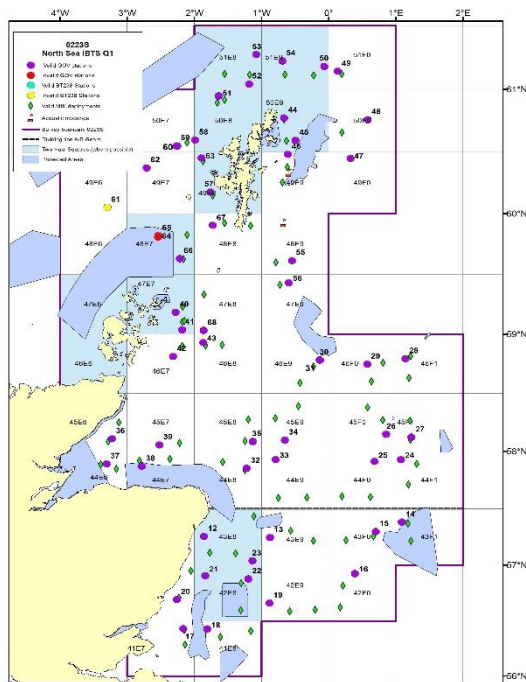
Figure 2. Achieved stations 2023

Outcomes: Over the course of 21 survey days 54 valid fishing hauls were achieved and 2 invalid. MIK sampling was carried out during 48 of the 80 valid MIK trawls for samples of herring/sprat/sardine/lemon sole larvae. The CTD was deployed at 49 out of a possible 52 valid GOV trawl stations. Age at length, sex, maturity and weight data were collected for cod, haddock, whiting, saithe, Norway pout, plaice, herring, mackerel and sprat. Otoliths were also collected for hake for future ageing.

Additional research requests met: All cod were screened for liver worm infection. Stomachs were collected for a number of species. Fish and benthic catches were screened for non-indigenous species and the data were sent to the Cefas coordinator.

Marine litter was classified, quantified and stored and the data sent to DATRAS from where OSPAR can access them. Otolithed individuals of five commercial gadoids were inspected for infection by *L. branchialis.* Genetic samples of hake and anglerfish were taken on behalf of AZTI Genetic Close Kin Analysis (GECKA).

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

International Bottom Trawl Survey Working Group (IBTSWG) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the *IBTS Q1 North Sea* survey

| Type of data collected	Assessment type
Biological sampling	Biological sampling for Annual International Stock assessments (Cod, Haddock, Whiting, Saithe & Norway pout). – used for advice.
Biological sampling	Biological sampling: National assessments (Herring, sprat, Mackerel, Hake & Plaice)
CTD by Haul	CTD by Haul: National and international. Produces qualifiers to link biological and environmental indicators. MSFD
Other fish spp in haul	Other fish species in haul National and international data use. Predator-prey interaction/ecosystem model for biodiversity (Skates, Squalus acanthias, Mustelus asterias and other fish species)
Litter items in trawl	National and international. Anthropogenic monitoring.

International Bottom Trawl Survey, IBTS Q3 (SCO); North Sea; UK Scotland component IV

1. Survey objectives

A pre-recruit survey undertaken during Q3 in the North Sea as one component of the ICES International Bottom Trawl Survey (IBTS). The survey is targeted towards young (0 and 1-group) cod, haddock, whiting, saithe, Norway pout, herring, and mackerel by utilising a GOV trawl fitted with an internal 20 mm liner.

2. Survey methods

Standard Trawl Squares
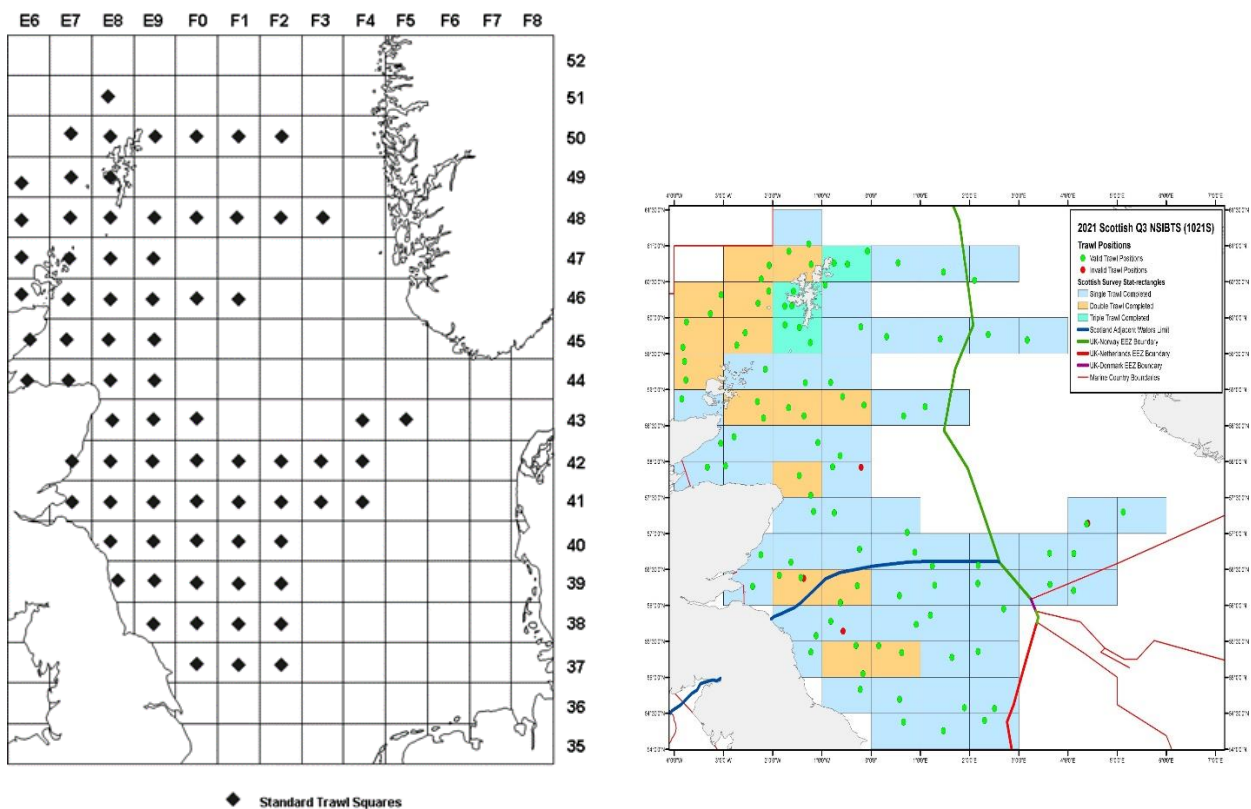
Figure 3. Maps showing positions of survey area for IBTS Q3 (SCO); UK Scotland component IV

The survey will be undertaken by MRV Scotia. Approximately 90 pseudo-random trawl stations will be surveyed for hydrographic information coupled with the deployment of a GOV trawl for 30 minutes within the allocated area plotted below. Numbers at length and age will be acquired for all target species with all other fish species being measured and counted. All marine litter encountered within the bottom trawl will be recorded and weighed.

Data will be stored electronically in the Marine Directorate Science FSS system and uploaded to the ICES DATRAS database.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES International Bottom Trawl Survey Working Group

Data used by WGNSSK for assessments.

Dana (Sweden & Denmark); Walther Herwig III (Germany); Johan Hjort (Norway); CEFAS Endeavour (UK-England); Scotia (UK-Scotland); Norway

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
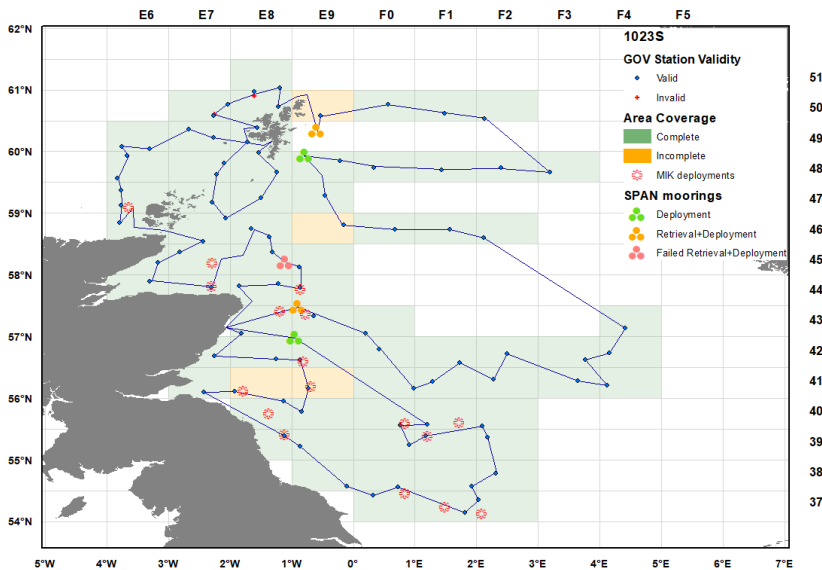
Figure 4. Track of realised stations IBTS Q3 North Sea

Outcomes: Over 21 survey days the GOV trawl was deployed on 88 occasions. A total of 86 valid hauls were achieved and with all the 74 statistical rectangles allocated to Scotland being successfully sampled at least once. 93 species were observed. Age at length, sex and weight data were collected for cod, haddock, whiting, saithe, Norway pout, plaice, herring, mackerel and sprat. Maturities were recorded for non-gadoid species. The CTD was deployed at all 86 valid trawling stations.

Due to mechanical faults with the plankton winch MIK sampling was cut short during the first half of the cruise and was unable to continue until after the mid-cruise break, as such only limited coverage was achieved. A total of 17 MIK hauls were undertaken over the course of the survey.

Additional research requests met: Marine litter was classified, quantified and stored. Data were uploaded to DATRAS & OSPAR can access them, as required.

Retained small/juvenile fish samples from around the outer Moray Firth, Tay and Forth areas and looking at non-breeding season ecology of guillemots and razorbills - *Marine Directorate as partner of SCOTMER project.*

Genetic samples retained from hake and anglerfish encountered looking at population structure of these species within the Northeast Atlantic – *GIFAMAN project.*

Samples retained of selected prey species from trawl stations within the Moray Firth Area to progress ongoing work into feeding ecology of Minke Whales using stable isotope of prey species – *Exeter University.*

SPAN acoustic moorings – 5 were successfully deployed and 2 retrieved.

Gelatinous zooplankton were identified, weighed and quantified. Fish and benthic catches were screened for non-indigenous species & results sent to Cefas (coordinator). Many fish species were retained for Aberdeen University MSc course and haddock were retained for MSC dissention practical training. Whiting were retained for genetic sampling (AFBI).

Whole mackerel frozen to investigate variations in field metabolic rate proxy using sagittal otoliths. 3 sets of 30 fish collected from geographically distinct areas – *Southampton University.*

All shelled molluscs retained for the Mackay reference collection.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

International Bottom Trawl Survey Working Group (IBTSWG) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the *IBTS Q3 North Sea* survey

| Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (Cod, Haddock, Whiting, Saithe & Norway pout). – used for advice
Biological sampling	Biological sampling National assessments (Herring, sprat, Mackerel, Hake & Plaice)
Other fish spp in haul	National and international. Predator-prey interaction/ecosystem model for biodiversity (Skates, Squalus acanthias, Mustelus asterias and other fish species).
CTD by haul	Produces qualifiers to link biological and environmental indicators. MSFD
Litter items in trawl	National and international. Anthropogenic monitoring.

International Bottom Trawl Survey, IBTS Q3 (ENG); UK England component IV

1. Survey objectives

The survey provides estimates of abundance of recruiting year classes and CPUE-at-age series for cod, haddock, whiting, saithe and Norway pout to the North Sea and Skagerrak Demersal Working Group (WGNSSK). These are used for tuning purposes.

2. Survey methods

The survey will be conducted on the RV Cefas Endeavour. A total of 77 prime stations over 30 days are planned in area IV between 51 to 62 deg. N, and between 4 deg. W to 8 deg. E. All fish caught will be identified to species and measured. Age samples and biological parameters will be taken from all target species and species listed in DCR Appendix VII. Benthic by-catch information is collected at each station. Hydrographic data will be collected at two stations per day. Any anthropogenic waste material will be recorded and weighed.
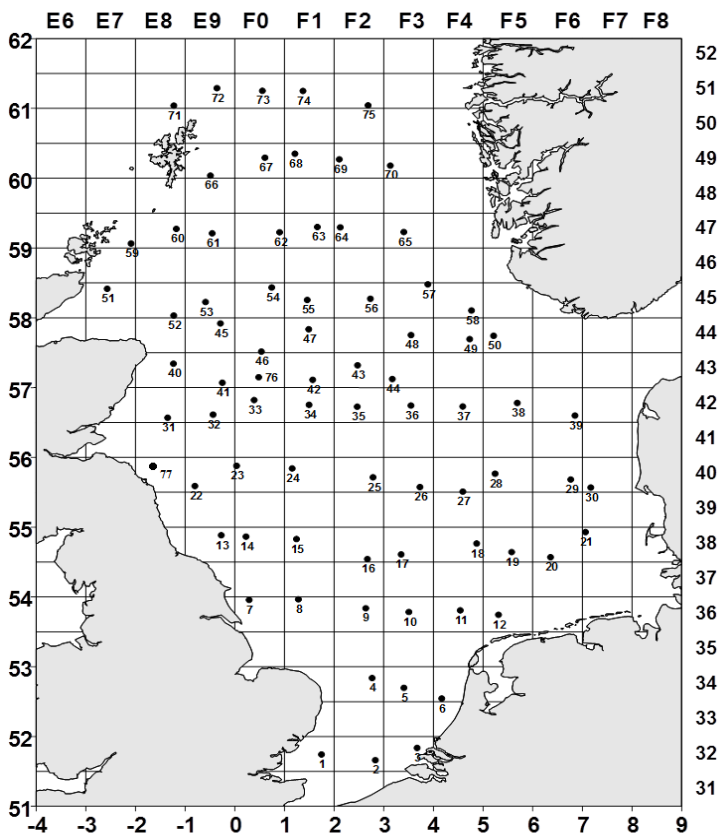
Figure 5. Map showing positions of survey stations IBTS Q3 (ENG); UK England component IV

The resultant data will be input to a Cefas surveys database (FSS) using the Cefas Fisheries Electronic Data Capture (FEDC) System. All data will also be transmitted to ICES for input to the DATRAS database.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES International Bottom Trawl Survey Working Group IBTSWG;

Data used by WGNSSK for assessments.

Svea (Sweden); Dana (Denmark); Scotia (UK-Scotland); Thalassa (France); CEFAS Endeavour (UK-England); Walther Herwig III (Germany)

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
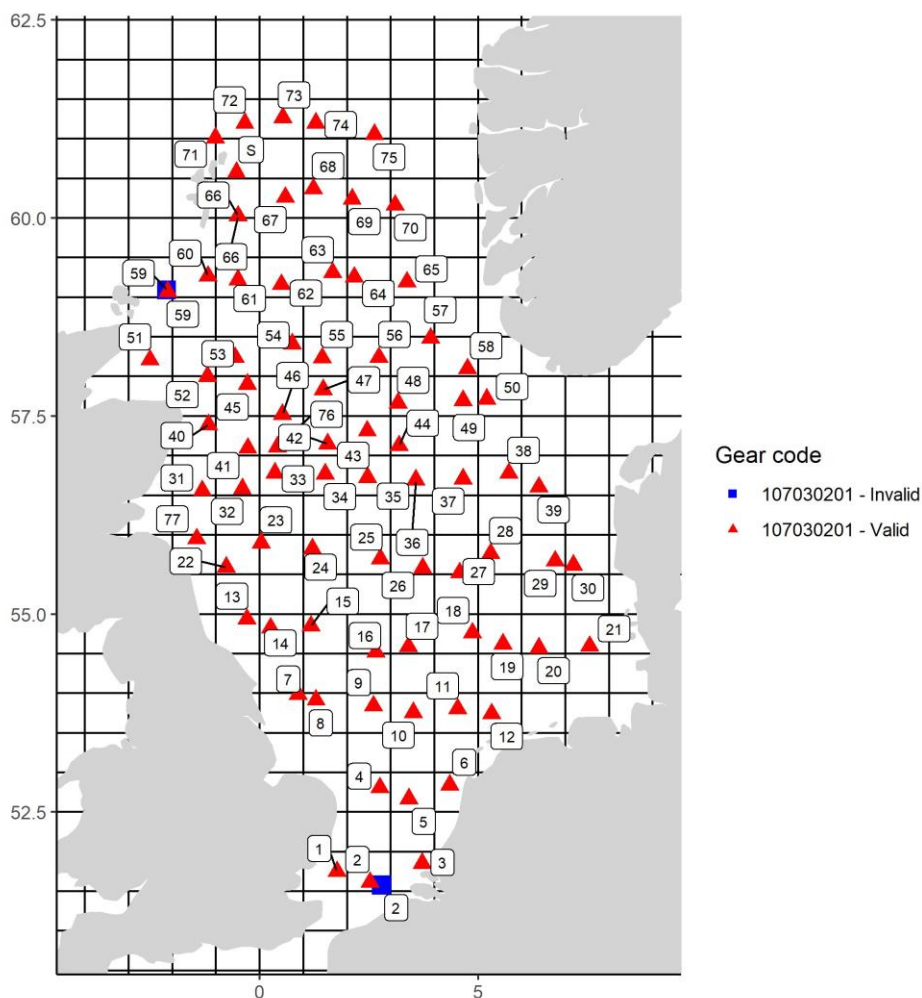
Figure 6. IBTS Q3 2023 completed survey area

Outcomes: All 77 prime stations were completed over 28 days as planned, this is despite four survey days lost to technical issues and gear damage. In addition, a further two stations were completed on behalf of GB-SCOTLAND as requested by the IBTS Q3 survey co-ordinator.

Additional research requests met: Eight of thirteen additional survey aims were completed, including collection of chlorophyll samples for nutrient testing, genomic sampling to improve methodology for assessment of data-limited stocks and providing additional information on jellyfish to continue a dataset populated since 2012.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

International Bottom Trawl Survey Working Group (IBTSWG) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The UK-England IBTS Q3 survey data feeds into Indices, spatial and temporal changes in the distribution and relative abundance of fish and fish assemblages for the relevant species to assessment Working Groups (WGs) and science groups. The UK-England Norway pout age data is the only survey data used for this assessment whereas for all other stocks the IBTS Q3 data is combined from all contributors. In addition to this, CTD (temperature and salinity) data are collected but these are not used in the assessments. Marine litter and additional biological data from the surface and seabed at each trawling station were collected.

Main uses of the of the data collected from the *CEnd 12/23* survey

Type of data collected	Assessment type
Biological sampling	Stock assessments WGNSSK, WGEF +
Biological sampling	National assessments, HAWG
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators.
Other fish spp in haul	National and international. Predator-prey interaction/ecosystem model for biodiversity (Skates, *Squalus acanthias, Mustelus asterias* and other fish species).
Litter items in trawl	National and international. Anthropogenic monitoring – used in regional and environmental planning.

### North Sea Beam Trawl Survey, BTS; Q3 Southern North Sea; UK England component IV

1. Survey objectives

To provide estimates of abundance of recruiting year classes and CPUE-at-age series for plaice and sole to the North Sea and Skagerrak Demersal WG

(WGNSSK). These are used for tuning purposes.

2. Survey methods

The survey will be conducted on the RV Cefas Endeavour. A total of 85 prime stations over 14 days are planned, and all fish caught will be identified to species and measured. Age samples and biological parameters will be taken from all target species and species listed under Appendix VII of the DCR which are caught. Benthic by-catch information is collected at each station. Hydrographic data will be collected at a minimum of two stations per day. Any anthropogenic waste material will be recorded and weighed.
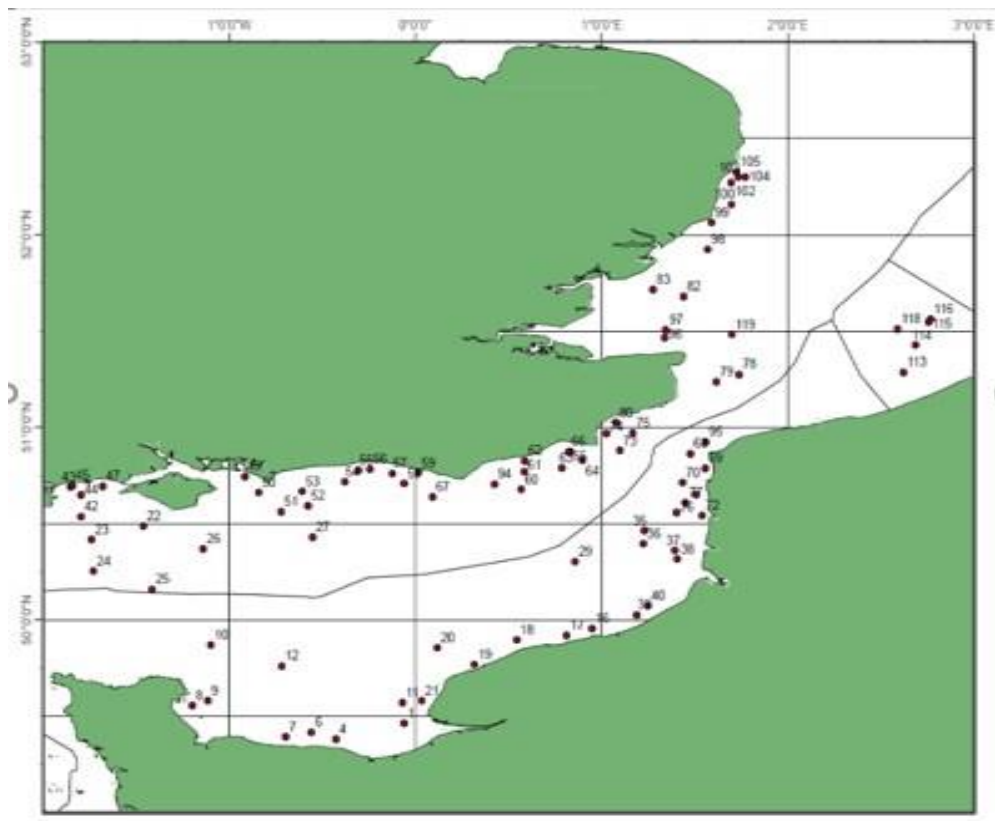
Figure 7. Map showing positions of survey stations BTS, Southern North Sea; UK England component IV

The resultant data will be input to a Cefas surveys database (FSS) using the Cefas Fisheries Electronic Data Capture (FEDC) System. All data will also be transmitted to ICES for input to the DATRAS database.

3. Participating Countries/vessels and the relevant international group in charge of planning the survey - internationally coordinated surveys

Standardised and agreed methodologies are coordinated at Beam Trawl Working Group (WGBEAM) to assure independent indices for each national survey.

Data used by WGNSSK for assessments.

No other countries/vessels participate in this survey.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
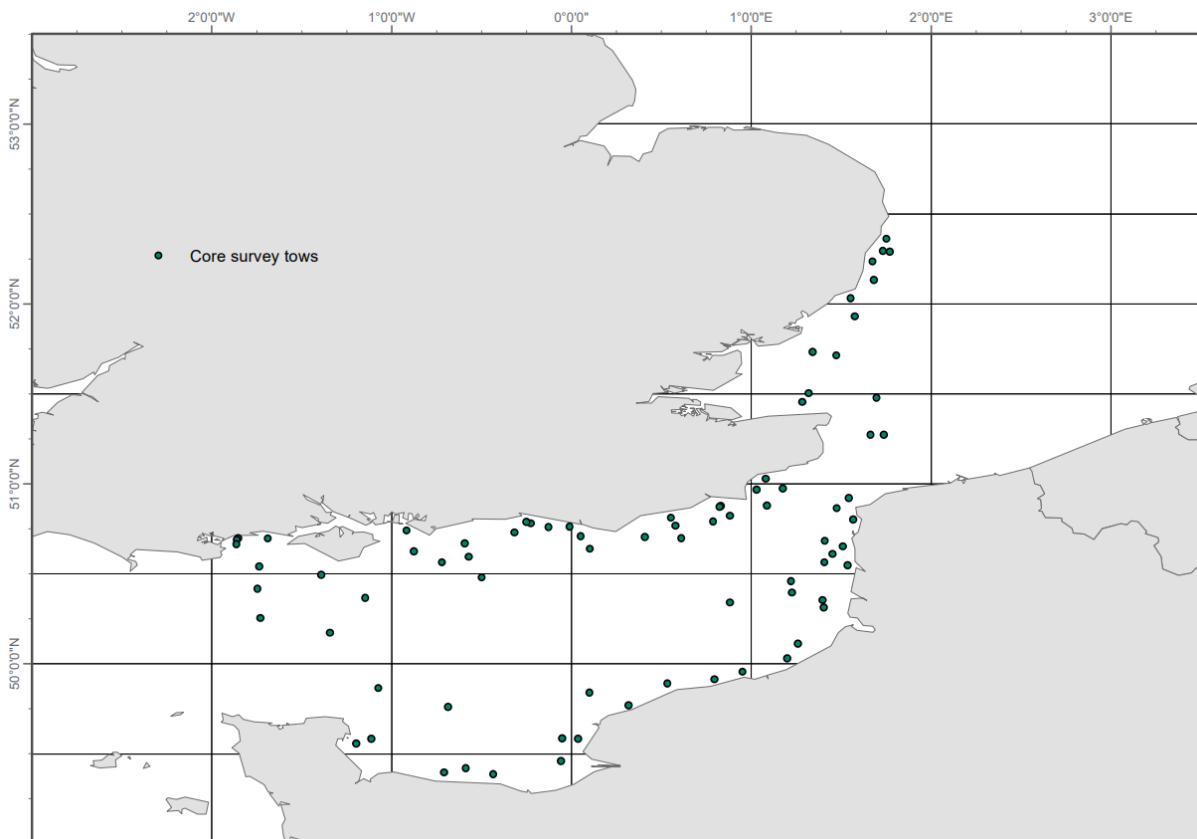
Figure 8. North Sea Q3 BTS completed survey area

Outcomes: All 79 primary stations were completed over the 14-day survey period. Eighteen hauls were reduced below the standard 30-minute duration due to a history of large sediment or epibenthic catches, or presence of commercial static gear. One haul was deemed invalid and repeated for a successful sample. Additional sites in Belgium waters could not be completed due to time constraints.

Additional research requests met: Ten of the eleven additional survey aims were completed, including collection of chlorophyll samples for nutrient testing.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination

group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Beam Trawl Surveys (WGBEAM) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The UK-England BTS Q3 survey data feeds into indices, spatial and temporal changes in the distribution and relative abundance of fish and fish assemblages for the relevant species to assessment Working Groups (WGs) and science groups. In addition to this, CTD (temperature and salinity) data are collected, but these are not used in the assessments. Marine litter and additional biological data from the surface and seabed at each trawling station were collected.

Main uses of the of the data collected from the *BTS Q3* survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (sole, plaice, spotted ray, LSD and smoothhound). – used for advice
Biological sampling	National assessments
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators.
Other fish spp in haul	National and international. Predator-prey interaction/ecosystem model for biodiversity (Skates, *Squalus acanthias, Mustelus asterias* and other fish species).
Litter items in trawl	National and international. Anthropogenic monitoring – used for regional and environmental planning.

International Ecosystem Survey in Nordic Seas (IESNS) – Atlanto-Scandian Herring/Norwegian Spring Spawning Herring (ASH/NSSH).

International Ecosystem Survey in Nordic Seas in the Northeast Atlantic covering the distribution of the herring stock, where Cefas, England will conduct the southern element (during May). The UK will contribute to this survey by conducting a 12 day survey in the eastern portion of the Norwegian Sea/northern North Sea (south of 62°N).

1.Survey objectives

To carry out annual herring (ASH/NSSH) acoustic surveys (ICES) for the purposes of determining the size, distribution, and migrations of the herring stock for input to the annual stock assessment of this herring stock. In addition, this survey will collect adult fish samples, by trawling to characterise the herring stock (biological characteristics) and for the purposes of identifying which stocks are in the survey area. This survey also contributes to a recruitment index for blue whiting. Additional sampling of the hydrographic conditions and plankton abundance in the area are used to monitored and investigate the how the distribution and migration of herring and other pelagic fishes are influenced by environmental conditions.

The survey estimates are submitted annually to the ICES Working Group on Widely distributed Stocks (WGWIDE) for inclusion in the assessment of ASH/NSSH.

2. Survey methods

The survey will be conducted on the MFV Resolute. In 2023 the acoustic survey will be conducted between 59°N and 62°N and 4.5°E and 9°W in the northern North Sea and eastern Norwegian Sea See Figure 5), the exact sample coverage by the UK will be determined though consultation with ICES WGIPS and the survey co-ordinator. Abundance will be determined using internationally accepted acoustic methodologies and protocols and biological samples will be collected using a trawl. The survey will be conducted using the ICES protocols adopted for the IESNS (see ICES 2015).
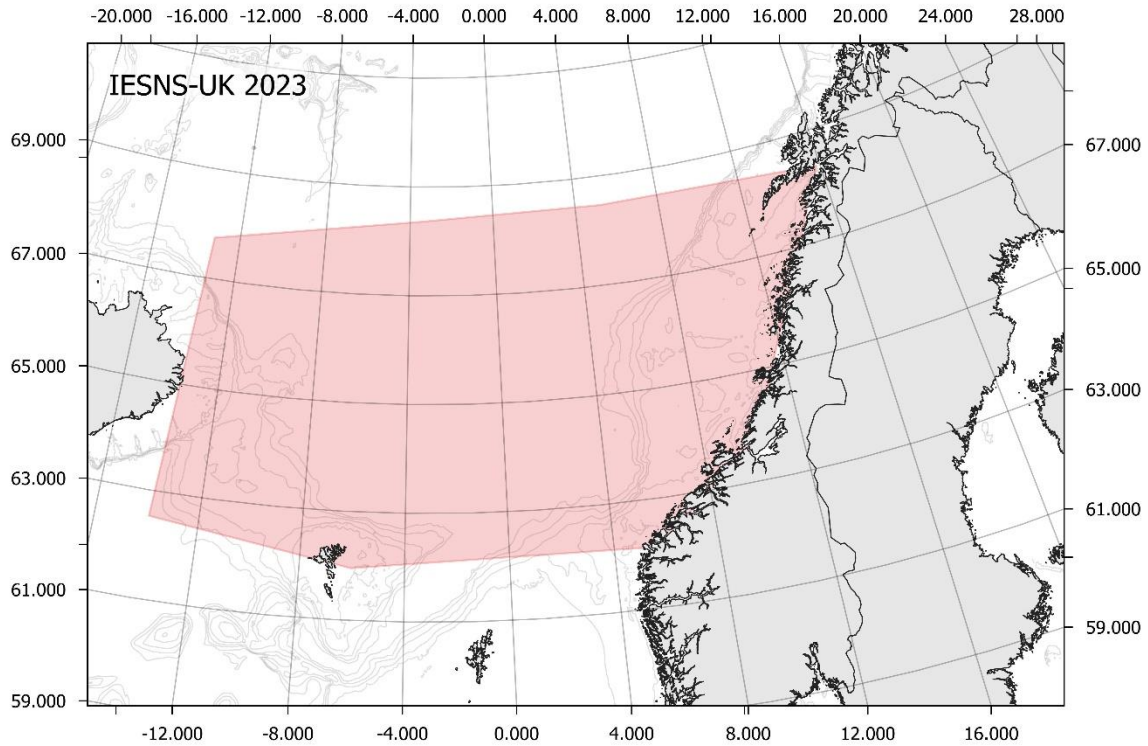
Figure 8. Map showing 2023 acoustic survey coverage with actual Cefas coverage within the highlighted area (outlined in red) to be determined.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Other countries participating in the international survey are the EU-Denmark, Norway, Faroe Islands, and Iceland. The international ICES planning group for this survey is ICES WGIPS (the working group of international pelagic surveys).

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
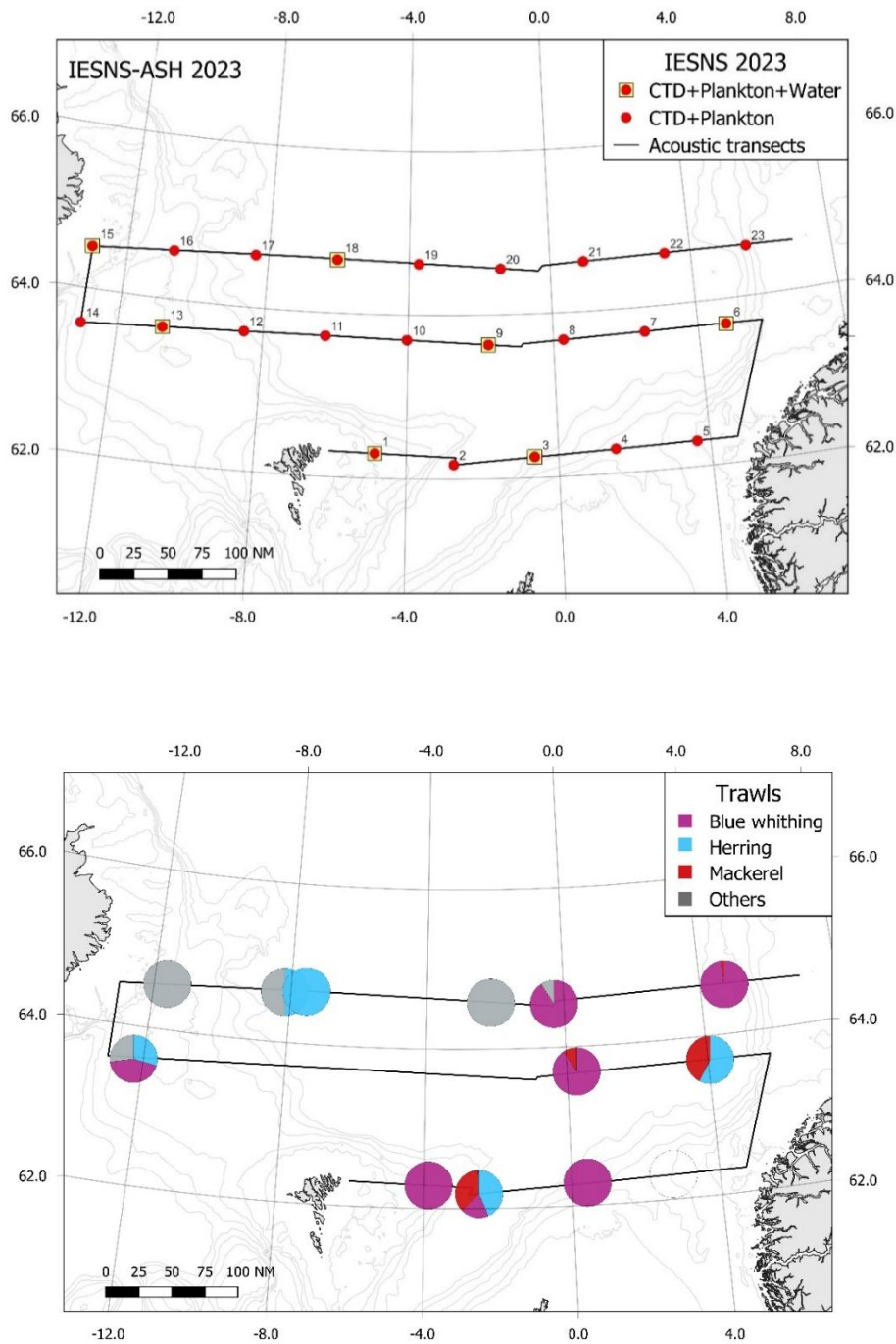
Figure 9. UK-IESNS 2023 completed survey area with survey transects (black lines), location of plankton and CTD stations (top) and trawl stations (bottom) with relative catch composition

Outcomes: In total 3 acoustic transects were completed covering a total of 1,345 nm of acoustic sampling unit. A total of 13 pelagic trawls were carried out to provide ground-truth information about species and size composition and to collect biological information. All trawls were all successful except for trawl 19 where no fish were caught. In addition, CTD and plankton sampling were performed on 20 fixed stations. Surface waters in the northern and western part of the survey area were colder than the south-eastern area where a cold temperature front was detected. Surface salinity was similar for most of the survey area

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except for the area close to the Norwegian coast where lower salinity was recorded. The zooplankton biomass (m g dry weight m^{-2}) distribution in the upper 200 m was calculated. The highest zooplankton biomass was found in the Iceland Sea in an area that overlaps with the cold water front. Herring was primarily distributed around a small area 100 nm east of the Icelandic coast. This area was characterised by the presence of a cold water patch and by the highest plankton biomass measured on the whole survey. Herring aggregations consisted of small aggregations distributed near the surface during the night and at a depth ranging from 100 to 250 during daylight hours. Herring size ranged from 27.5 to 38 cm with a modal length of 32.7 cm (n = 244 fish measured). The age 6 year-class was the most abundant year-class in the area (n = 145 aged fish). Blue whiting was mainly distributed in the western part of the survey area and on a small area east of the Icelandic coast. Blue whiting aggregations primarily consisted of continuous and dense layers distributed between 200-400 m depth in the water column. Blue whiting size ranged from 17.5 to 34.5 cm with an overall average size of 23.5 cm (n = 636 fish measured). The total biomass estimate was 449,656 t (northern stratum: 261,872 t, southern stratum: 187,784 t) and a total number of 6.4 billion. 2-years-old was the most abundant age class observed in the catches (n = 333 aged fish). Mackerel was caught in only 3 trawls on the western part of the survey area. The size ranged from 26 to 41 cm with an overall average of 35.2 cm (n = 244 fish measured) (Figure 10). 3-years-old was the most abundant age class observed in the catches (n = 107 aged fish). No further quantitative information can be drawn from these data as this survey was not designed to monitor mackerel.

Additional research requests met: Genetic samples of herring were collected as part of an international initiative and will help distinguish between the different herring stocks which mix in the survey area. Genetic samples were processed and will be contributed to the international database.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

For the full survey report, please see Supplementary Document 2 at https://doi.org/10.17895/ices.pub.23607303

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The biomass estimated for herring during the survey feeds into the stock assessment of the NSSH (Norwegian Spring Spawning Herring). Blue whiting biomass is used as a recruitment index within the stock assessment of the blue whiting stock in subareas 27.1–9, 12, and 14 (Northeast Atlantic). Both stocks are assessed within the ICES WGWIDE.

Mackerel egg Survey (triennial), NSMEGS; North Sea, England component IV.

International Mackerel Egg Survey in the North East Atlantic and North Sea which Cefas, England will conduct the North element along with Norway (May/June). This is a triennial survey with the UK contribution starting in 2022. The UK will contribute to this survey by conducting a 24 day survey in the North Sea. There is no survey planned for 2023 with the next planned for 2025.

1.Survey objectives

To carry out mackerel egg surveys (ICES Triennial Survey) within allocated sampling periods of the   MEGS survey plan in the North Sea carrying out analysis of mackerel eggs and larvae on survey.

To collect adult fish samples, by trawling and/or rod/line fishing, for atresia and fecundity samples for later analysis.

2. Survey methods

Egg survey will be conducted between 53˚N and 62˚N in the North Sea, actual area to be confirmed based on the area covered in 2021 by The Netherlands and Denmark. The sample coverage by the UK will be determined based on a collaborative plan for coverage between Norway, Denmark, and the UK. Samples will be collected using a Gulf VII plankton sampler and samples will be analysed on board for mackerel eggs and larvae. Fishing will take place to collect fecundity samples using either rod/lines or a pelagic net. Methods for survey design and sampling will follow processes outlined in ICES SISP6 – MEGS V2.2

Figure 10. Map showing positions of survey stations NSMEGS; North Sea, England component IV
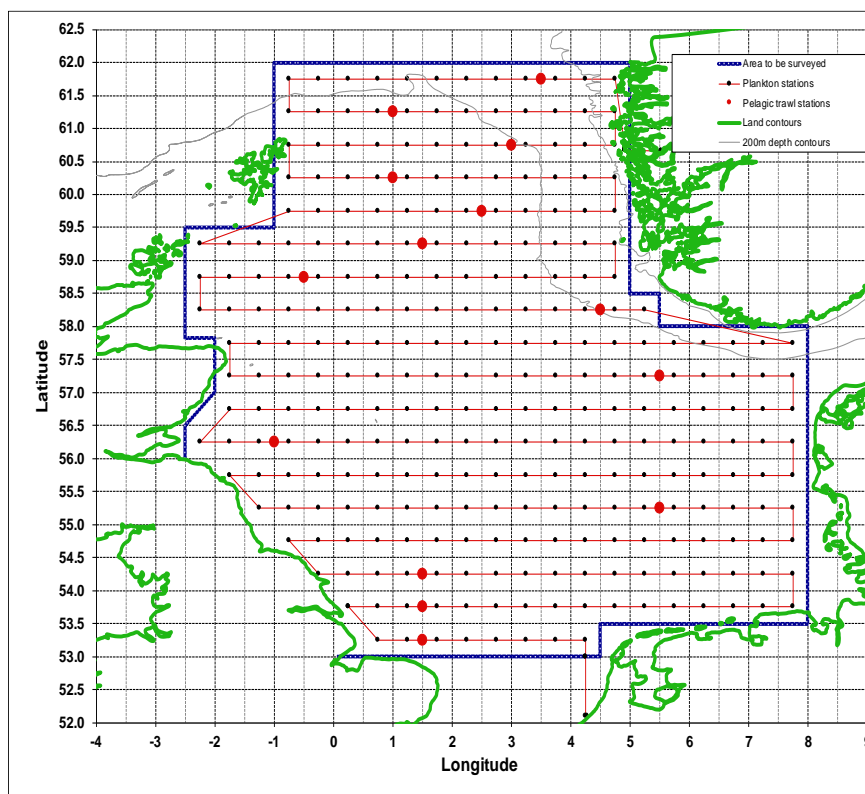
3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Other countries participating in international survey are Portugal, Spain (IEO), Germany, Netherlands, Spain (AZTI), Norway, Ireland, Scotland, Faroe Islands, with just Norway, England (Cefas) and Denmark conducting the survey in the North Sea. The international ICES planning group for this survey is WGMEGS (the working group on mackerel and horse mackerel egg surveys).

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Outcomes: Not a survey year.

Additional research requests met: N/A

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Mackerel and Horse Mackerel Egg Surveys (WGMEGS) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The data collected will be used by the Working Group on Mackerel and Horse Mackerel Egg Surveys (WGMEGS), the Working Group on Widely Distributed Stocks (WGWIDE), and more broadly by the Working Group on Atlantic Fish Larvae and Eggs Surveys (WGALES).

Main uses of the of the data collected from the *NSMEGS* survey

| Type of data collected	Assessment type
Biological sampling	Mackerel
Biological sampling	N/A
CTD by Haul	N/A
Other fish spp in haul	N/A
Litter items in trawl	N/A

Herring Acoustic Survey, HERAS. UK Scotland component IV; ICES Q2/3 Coordinated Acoustic Survey in the Skagerrak and Kattegat, the North Sea, West of Scotland, and the Malin Shelf area; Areas III, IV, VIa, VIIb

1. Survey objectives

To conduct an acoustic survey to estimate the abundance and distribution of herring in the north western North Sea. The results will be combined with those of Germany, Netherlands, Norway & Denmark to produce an age disaggregated abundance index for North Sea herring. Data collected west of the 4-degree line will be combined with those of Ireland to provide the same for 6a.

2. Survey methods

Scotia will undertake an extended acoustic survey by following a pattern of parallel transects running east to west. It is projected that in excess of 2250 nautical miles will be surveyed at four different frequencies (18, 38, 120 and 200 kHz). A pelagic trawl will be deployed approximately 38 times to 'ground truth' the acoustic data and provide biological samples of herring and sprat. This survey now extends into ICES area VIa, as indicated on the map.
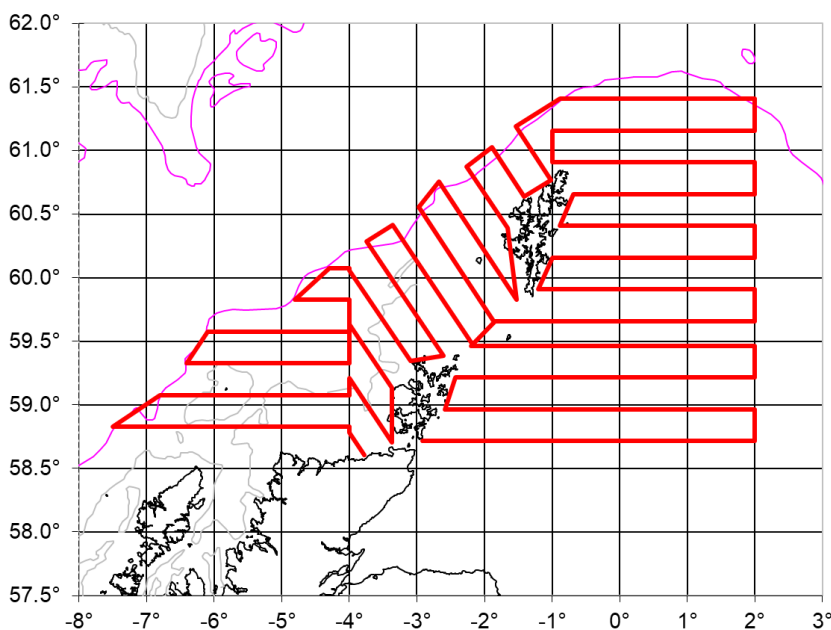
Figure 11. Map showing North Sea and North Atlantic herring acoustic survey transects NHAS; UK Scotlad component IV, VIa

All acoustic data will be stored in databases at MSS as well as the ICES acoustic database. Subsequent post survey analysis will be provided to the relevant ICES working groups.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES Working Group on International Pelagic Surveys WGIPS

Data are used in stock assessments

Celtic Explorer (Ireland); Scotia (UK-Scotland); G.O. Sars (Norway); Tridens (Netherlands); Solea (Germany); Dana (Denmark)

The coverage of the west of Scotland is shared by UK Scotland (MSS) and Ireland (Marine Institute)

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
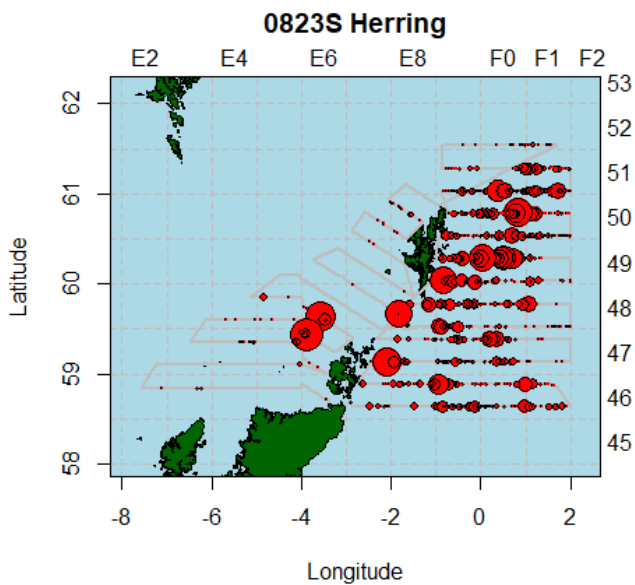
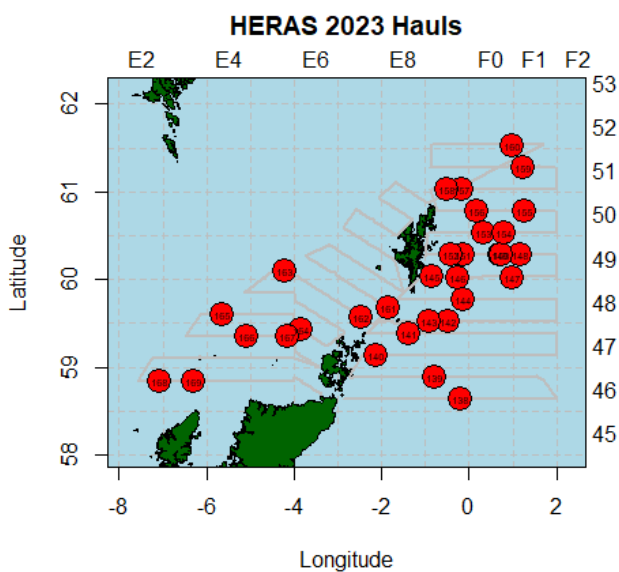**Figure 12. Herring Acoustic survey cruise track 2023**

Figure 13. Herring Acoustic survey Fishing hauls 2023

Outcomes: 22 days survey were achieved plus 32 fishing hauls and 2234 Nmi track covered. 8587 herring were recorded for length and 2383 herring were sampled for other bio parameters – age, weight, sex and maturity.

A total of 34 vertical hydro dips were carried out over the survey area. Data collection parameters were conductivity, temperature, and oxygen. Water samples were collected at the surface for all dips for calibration of salinities.

Additional research requests met: Herring muscle tissue collected for collaborative studies between Marine Institute, Ireland and MSS - (stock structure). Genetic samples were retained from larger hauls for genetic /stock id.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on International Pelagic Surveys (WGIPS) (figshare.com)

Herring Assessment Working Group for the Area South of 62° N (HAWG) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the *Herring Acoustic* survey

| Type of data collected	Acoustic
Biological sampling of herring and sprat	International stock assessment of herring and sprat – HAWG. Used for advice. Also used by WGIPS
Acoustic data	integrated ecosystem assessment – used for advice
Bio-genetic data & morphometrics of herring for stock separation	National investigations into stock separation. Biological sampling – length, weight, sex, maturity, age
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators.
Litter items in trawl	National and international. Anthropogenic monitoring.

Nephrops UWTV survey (FU6), NTV6; UK England, IVb, Farne Deeps.

1. Survey objectives

To obtain estimates of distribution and abundance of Nephrops in the Farne Ground using underwater television. This survey will be conducted by RV Endeavour undertaking one extensive survey on the Farne Deep Grounds. To conform with the list of mandatory surveys under the Data Collection Framework in which separate surveys are listed for these functional units, the physical survey will be FU6.

2. Survey methods

It is planned to complete 110 TV Survey Stations. Additionally, information on swathe data and water samples was also collected.
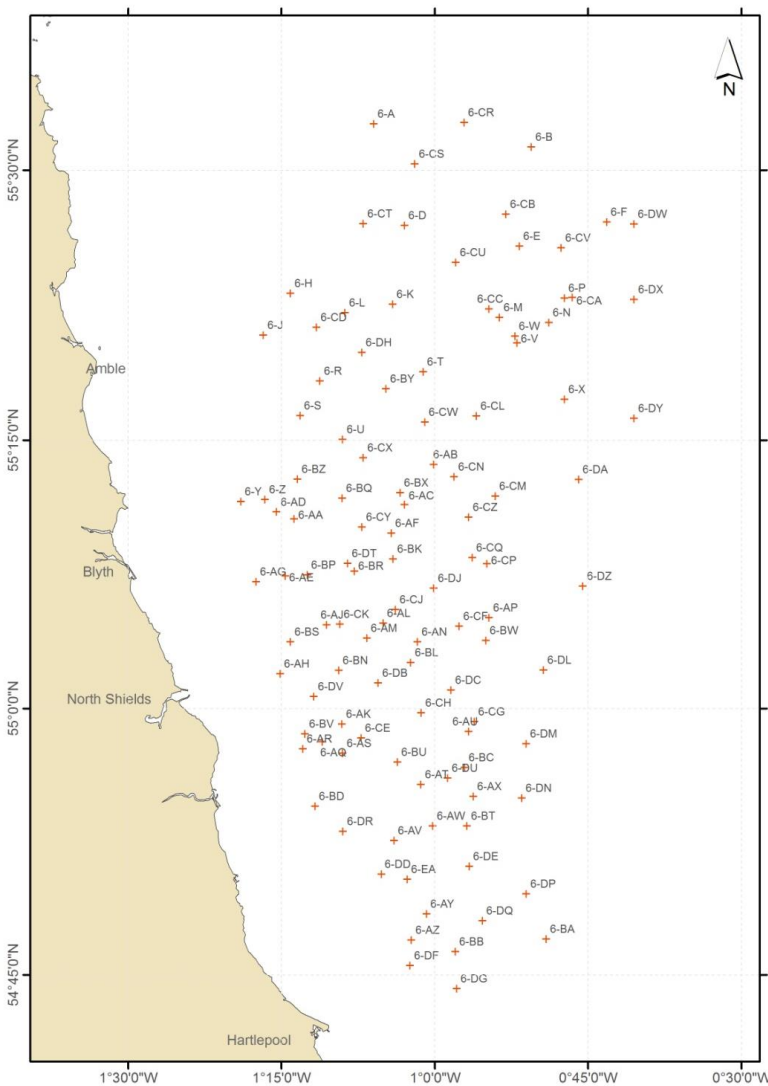
Figure 14. Map showing the location of the surveyed area NTV6; UK England, Farne Deeps

Video recordings are stored in DVD format and other data in an ACCESS database (WGNEPS is currently seeking to develop an international UWTV database and English data will be transmitted to it when/if it is developed). Video recordings will be analysed,

and the results conveyed to the ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK).

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES Working Group on Nephrops Surveys (WGNEPS). Data are used in functional unit assessments

Although Nephrops UWTV surveys are coordinated via WGNEPS, the surveys are generally carried out by individual countries sampling Functional Units in their own 'back yards' rather than defining multi-vessel surveys across entire sea areas.

No other countries/vessels participate in this survey of this FU.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
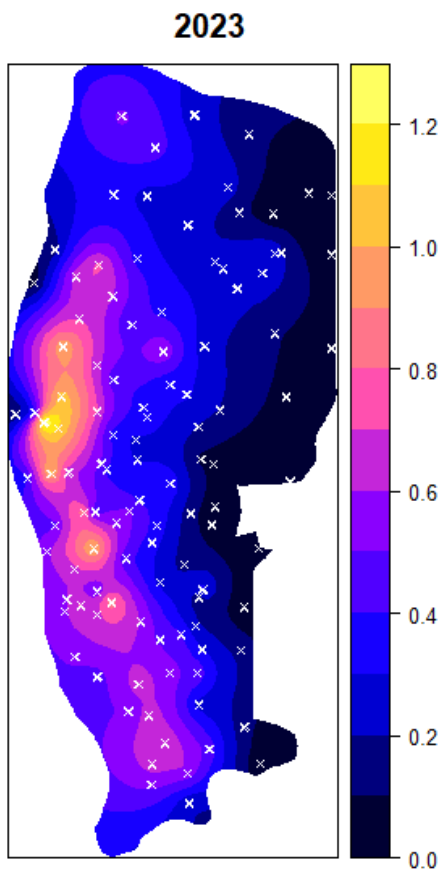
Figure 15. Surveyed area in Functional Unit 6 Geostatistical output for 2023 showing map of Nephrops density distribution (Abundance in millions and density colour scale in numbers m2)

Outcomes: The primarily objective was achieved, with 109 of 110 TVID stations of the standard survey grid successfully surveyed in the Farn Deeps (FU6) with the UWTV camera sledge.

21 stations were relocated (by up to 1 nautical mile) in order to observe exclusion zones relating to underwater features such as cables and pipelines. 1 further station, 6-W, was abandoned as no reasonable new position could be identified due to this station's initial proximity to station 6-V.

Additional research requests met:

Chlorophyll samples were collected twice daily at dawn and dusk using the surface water flow pipe.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

ICES Working Group on Nephrops Surveys (WGNEPS; https://ices-library.figshare.com/articles/report/Working_Group_on_Nephrops_Surveys_WGNEPS_outputs_from_2022_meeting_/22211161).

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The UK-England Nephrops norvegicus TV survey data is used to generate abundance estimates, feeding into the stock assessment for the FU6 stock and used at the ICES Working Group for the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK).

Main uses of the of the data collected from the survey

| Type of data collected	Assessment type
Biological sampling	No biological sampling in relation to *Nephrops* stock assessments is carried out as part of the UWTV survey
Biological sampling	No trawling is carried out
CTD by Haul	No other species are being sampled
Other fish spp in haul	No litter is being sampled
Litter items in trawl	

Nephrops UWTV survey (FU7), NTV7; UK Scotland, IVa, Fladen Ground and (FU34), NTV34, IVa, Devil's Hole

1. Survey objectives

To obtain estimates of distribution and abundance of Nephrops burrows in the Fladen Ground using underwater television. This survey will be conducted by Scotia undertaking one extensive survey that includes FU7 & FU34 in the North Sea (IVa) and FUs11-13 in the North Atlantic (VIa). To conform with the list of mandatory surveys under the Data Collection Framework in which separate surveys are listed for these functional units, the physical survey will be divided into two and reported separately by FU7& FU34 and FU11-13.

2. Survey methods

It is planned to complete 70 TV tracks and 2 fishing hauls in FU7 and 10 TV tracks and 1 fishing haul in FU34. Additionally, information on size at maturity will be obtained.
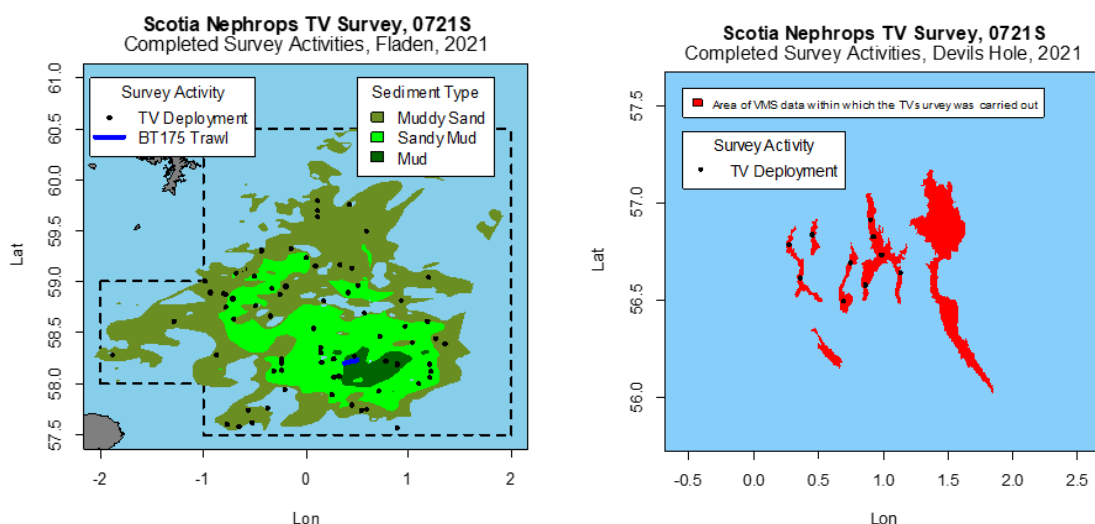
Figure 16. Plots of the Fladen & Devil's Hole grounds showing the location of the TV survey sites (in black) and the trawl (in blue), within the extent of muddy sediments.

Video recordings are stored in DVD format and other data in an ACCESS database (WGNEPS is currently seeking to develop an international UWTV database and Scottish data will be transmitted to it when/if it is developed). Video recordings will be analysed, and the results conveyed to the ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK).
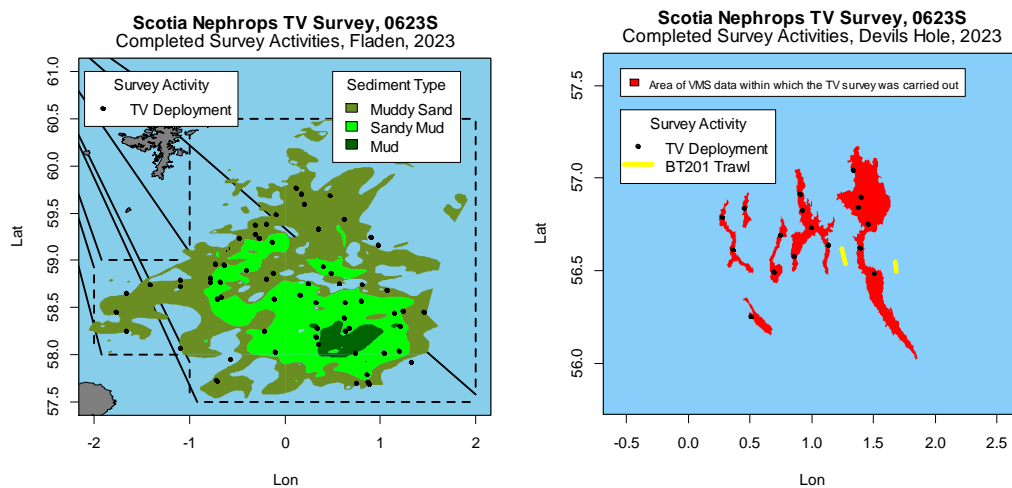
3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES Working Group on Nephrops Surveys (WGNEPS). Data are used in functional unit assessments

Although Nephrops UWTV surveys are coordinated via WGNEPS, the surveys are generally carried out by individual countries sampling Functional Units in their own 'back yards' rather than defining multi-vessel surveys across entire sea areas.

No other countries/vessels participate in the survey of these FUs.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

a) **Fladen FU7 2023**
b) **Devil's Hole FU34 2023**

Figure 17. Realised stations for a) NTV7 Fladden and b) Devils hole

Outcomes: Fladen - 70 TV deployments and 62 sediment sampling were successful. No trawling took place on the survey due to the impact of merging surveys and limited time.

Devil's Hole - 17 tv stations were completed and 16 sediment samples collected. 2 trawls were successfully undertaken.

Additional research requests met: None.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Nephrops Surveys (WGNEPS; outputs from 2022 meeting) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the Nephrops tv survey

| Type of data collected	Assessment type
UWTV stations for Nephrops burrows.	Annual international Stock assessments – used for advice
Occurrence of benthic fauna	Used by external units for species spatial analysis.
Sediment samples (from all stations)	Analysed for particle size analysis: relationship between particle size and nephrops burrow density and changes over time.
Litter items in trawl	Litter items in trawl National and international. Anthropogenic monitoring.

Nephrops UWTV survey, NTV8, NTV9; UK Scotland, IVa FU8&9; Moray Firth & Firth of Forth

1. Survey objectives

To obtain estimates of the distribution and abundance of Nephrops burrows in the Firth of Forth, and the Moray Firth using underwater cameras.

2. Survey methods

The survey will be carried out on MRV Alba-na-Mara. It is planned to complete 45 TV tracks and 2 fishing hauls in each of FU8 and FU9 (total 90 tv and 4 hauls) on this combined survey. Additionally, information on size at maturity will be obtained.
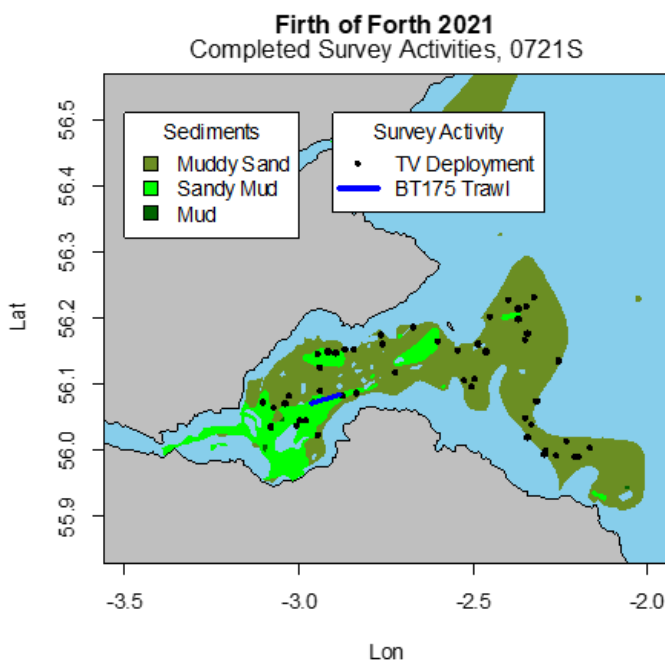
Figure 18. Map showing the location of the Firth of Forth TV survey sites (in black) and the trawl (in blue), within the extent of muddy sediments.

Moray Firth 2021
Completed Survey Activities, 0721S
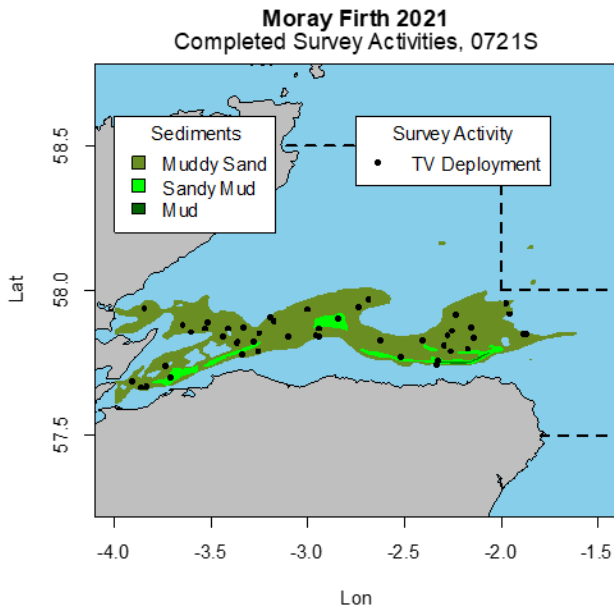
Figure 19. Map showing the location of the surveyed area in the Moray Firth showing the location of the TV survey sites (in black), within the extent of muddy sediments.

Video recordings are stored in DVD format and other data in an ACCESS database (WGNEPS is currently seeking to develop an international UWTV database and Scottish data will be transmitted to it when/if it is developed). Video recordings will be analysed, and the results conveyed to the ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK).

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES Working Group on Nephrops Surveys (WGNEPS)

Data are used in functional unit assessments

Although Nephrops UWTV surveys are coordinated via WGNEPS, the surveys are generally carried out by individual countries sampling Functional Units in their own 'back yards' rather than defining multi-vessel surveys across entire sea areas.

No other countries/vessels participate in the surveys of these FUs.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
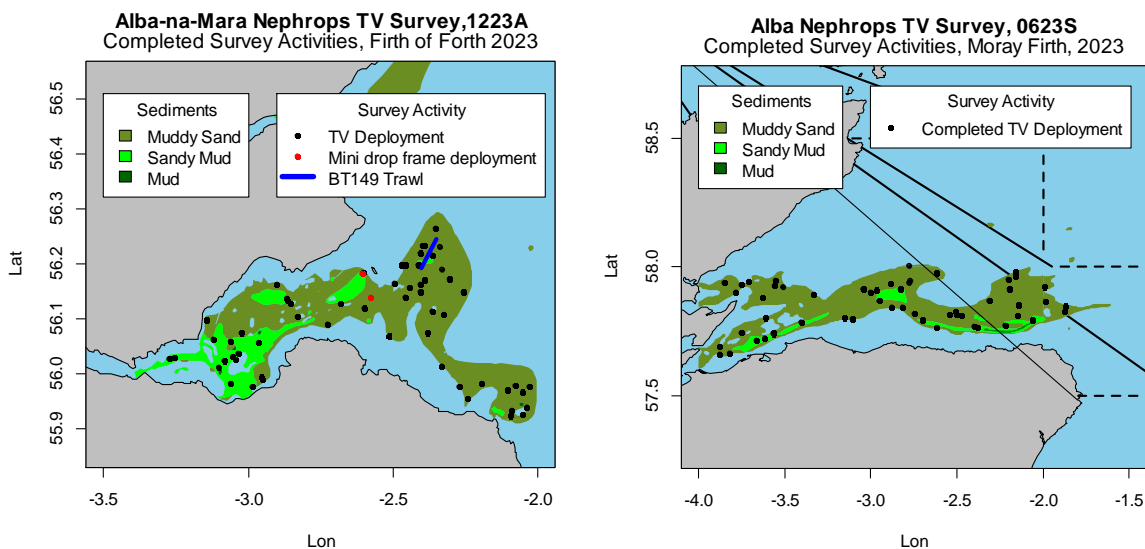
a) Firth of Forth FU8 2023 **b) Moray Firth FU9 2023**

Figure 20. Realised stations for a) NTV8 Firth of Forth and b) NTV9 Moray Firth 2023

Outcomes: All planned *Nephrops* UWTV surveys were merged as a result of vessel availability. Due to time restraints FU8 was initially dropped from the survey, however sampling was picked up later in the year on MRV Alba Na Mara. Sampling was still completed within the planned sampling period.

FU8 - 59 tv stations were successful and 46 sediment samples were collected, with 1 trawl completed.

FU9 - The Moray Firth FU9 completed 55 deployments & collected 48 sediment samples. No trawling was undertaken.

Additional research requests met: None.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Nephrops Surveys (WGNEPS; outputs from 2022 meeting) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the Nephrops tv survey

Type of data collected	Assessment type
UWTV stations for Nephrops burrows.	Annual international Stock assessments – used for advice
Occurrence of benthic fauna	Used by external units for species spatial analysis.
Sediment samples (from all stations)	Analysed for particle size analysis: relationship between particle size and nephrops burrow density and changes over time.
Litter items in trawl	Litter items in trawl National and international. Anthropogenic monitoring.

North Sea sandeel survey, NSSS; UK Scotland component Area IV (Firth of Forth & Turbot Bank)

1. Survey objectives

To determine the abundance, length and age of sandeels (Ammodytes marinus) in the sediment in regions east of Scotland covering the Firth of Forth and Turbot bank areas. (ICES IVa).

The AWG splits the North Sea into 7 distinct management areas, 5 of which are commercially fished. Scotland samples SA 4.

2. Survey methods

MRV Alba na Mara will use a modified scallop dredge with 6" teeth, camera trolley with light source and DST logger (temperature and depth). The areas will be surveyed by camera and the dredge deployed 70-75 times to catch samples for biological parameters. Sediment is collected at each station.

TV data are stored in DVD format and other data are stored in data banks at Marine Directorate (MSS).

Subsequent post survey analysis and age data will be provided to ICES HAWG.
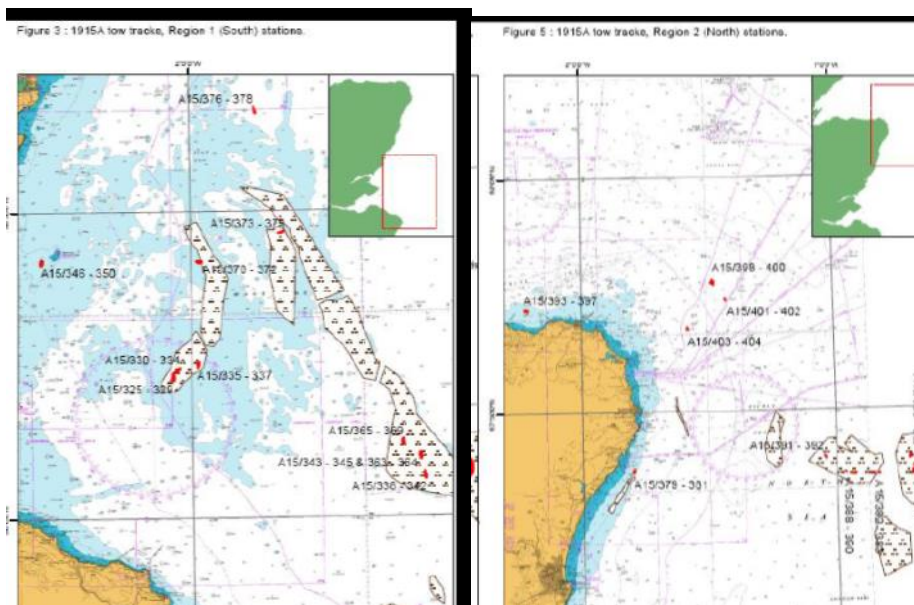
**Figure 21. Maps showing the location of the surveyed area NSSS; UK Scotland component Area IV**

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES Herring Assessment Working Group (HAWG).

UK (Scotland) data will be amalgamated with survey data provided by Denmark and Norway.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
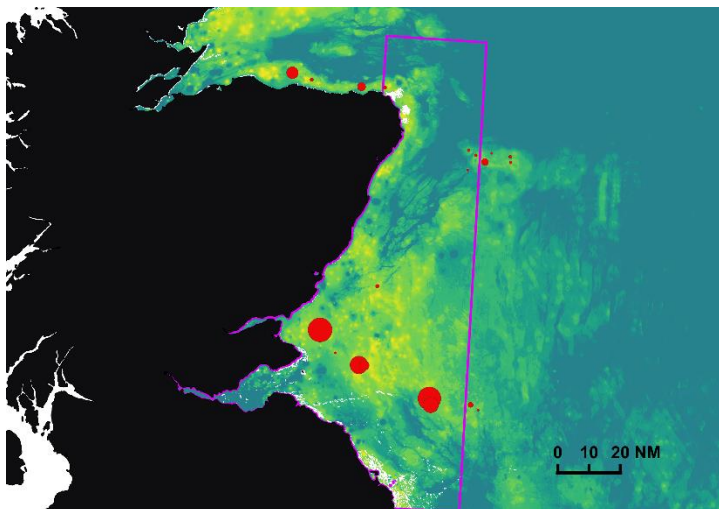
Figure 22. Sandeel achieved stations 2023

Outcomes: 19 days and 63 dredge hauls were completed, 60 of which were valid. 563 sandeels were biologically sampled and ages determined at sea (390 Firth of Forth, 133 Moray Firth and 40 Turbot bank).

Additional research requests met: Samples of sandeel and other fish bycatch (species known as seabird prey) were collected and frozen for further analyses.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Herring Assessment Working Group for the Area South of 62° N (HAWG) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the *Sandeel North Sea* survey

Type of data collected	Assessment type
Biological sampling	Annual international indices for the assessment of sandeels (area IV) – used for advice

|	Length, age, weight, sex, maturity
Litter items in trawl	National and international. Anthropogenic monitoring.

Solent bass trawl survey, SBTS; England, VIId

1.Survey objectives

To provide estimates of abundance of recruiting year classes and CPUE-at-age series for sea bass from a commercial trawler for provision to the Celtic Seas Ecoregion Working Group (WGCSE). These are used for tuning purposes.

2. Survey methods

A standard grid of stations are fished annually. Age samples and biological parameters will be taken from all target species.
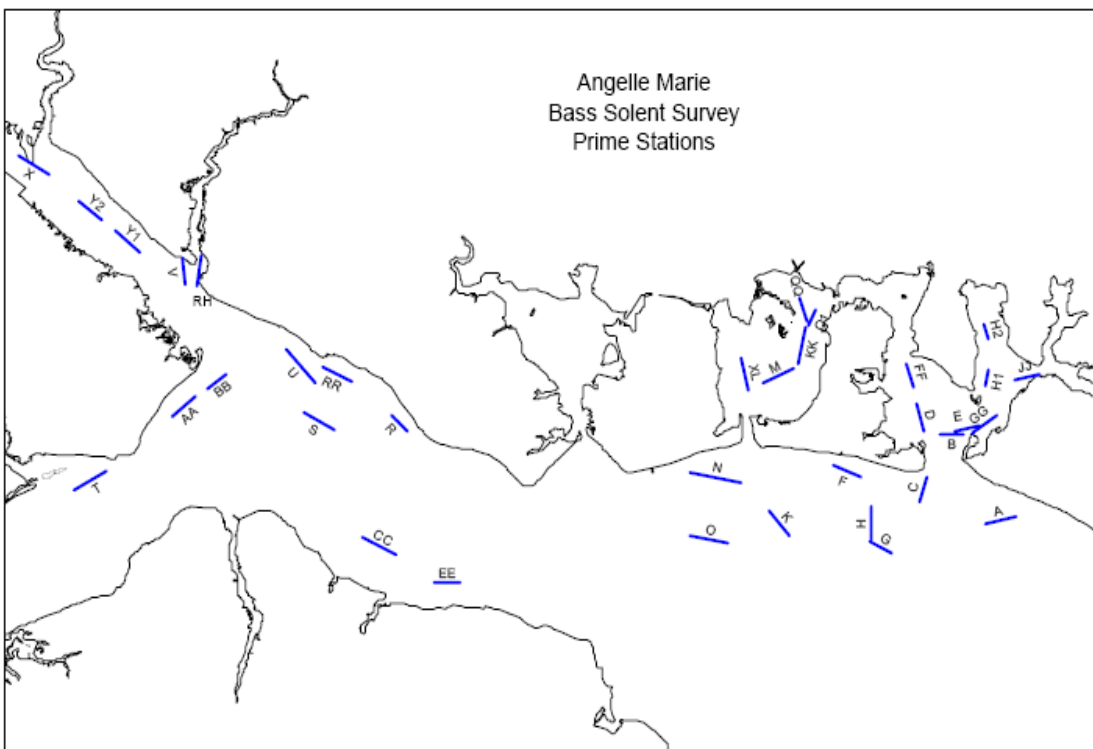
Figure 23. Map showing positions of trawl stations SBTS; UK England, VIId

The resultant data will be input to a Cefas surveys database (FSS).

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

N/A

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
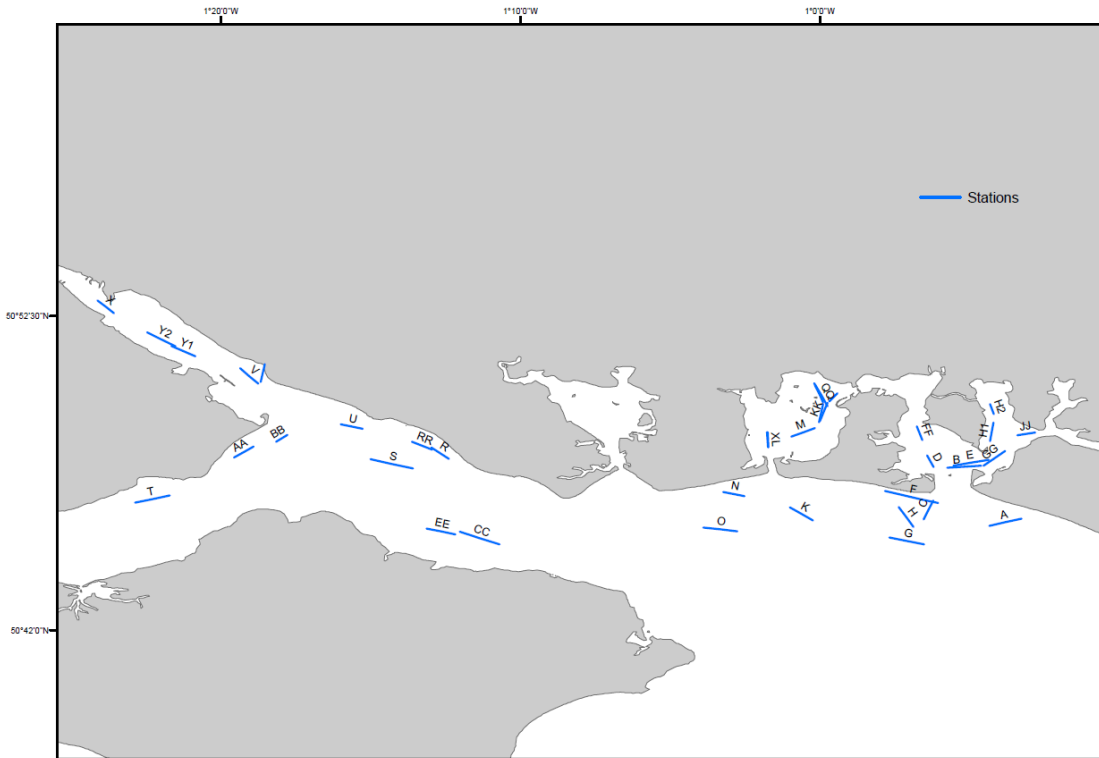
Figure 24. SBTS 2023 completed survey area

Outcomes: All 35 planned stations were sampled. Bass were caught at 26 of the 35 stations fished. Fish at ages 2–4 that are included in the abundance index were taken at 25 of the 35 stations. A total of 414 bass were caught on valid tows, 383 within the harbours and 31 outside.

Additional research requests met: N/A

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

N/A

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The data from this survey are currently included in the assessment of the sea bass stock carried out since 2012 by the International Council for the Exploration of the Sea (ICES)

Main uses of the of the data collected from the *SBTS* survey

| Type of data collected	Assessment type
Biological sampling	International assessment
Biological sampling	N/A
CTD by Haul	N/A
Other fish spp in haul	N/A
Litter items in trawl	N/A

Eastern Channel & North Sea scallop dredge survey, EECSDS; England, VIId, IVb

1. Survey objectives

To obtain estimates of distribution and harvestable biomass of King Scallop in the Eastern English Channel and North Sea. This survey will be conducted annually each September by a chartered commercial vessel using both commercial and modified dredges on exploited grounds described by historic VMS data. The data are the primary input to the annual scallop stock assessments published on the government website in April each year.

2. Survey methods

Approximately 22 tows are carried out in the North Sea and a further 71 tows are carried out in the Eastern Channel (total 94). The survey methodology continues to undergo evolution with redefinition of the assessment areas and exploited beds expected to change with the fishery. The survey is a swept area method relying on substrate specific gear efficiency estimates to convert survey catch rates to density on the seabed. Harvestable biomass is estimated from the size distributions of the catch using L-W factors. NB. Exploitation levels are presented in the annual stock assessment as the total realised or estimated removals as a proportion of the estimated harvestable biomass.
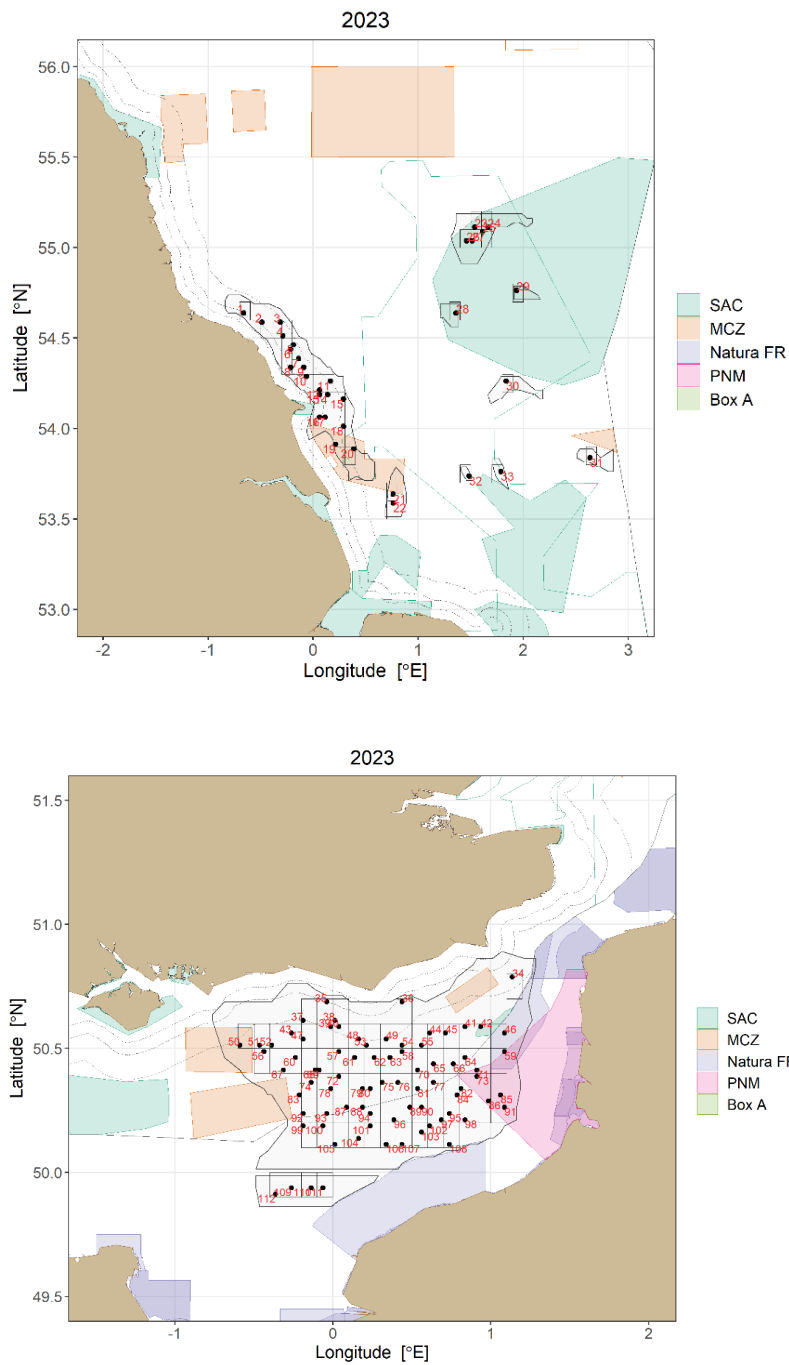
Figure 25. Proposed survey sites in the North Sea (33 stations) and Eastern Channel (79 stations) EECSDS; UK England, VIId, IVb. N.B. Survey sites in the French EEZ and Central North Sea are subject to permissions and may not be carried out.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

The survey is not internationally coordinated but results are presented, and methodology periodically reviewed by ICES Working Group on scallops (WGScallop).

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
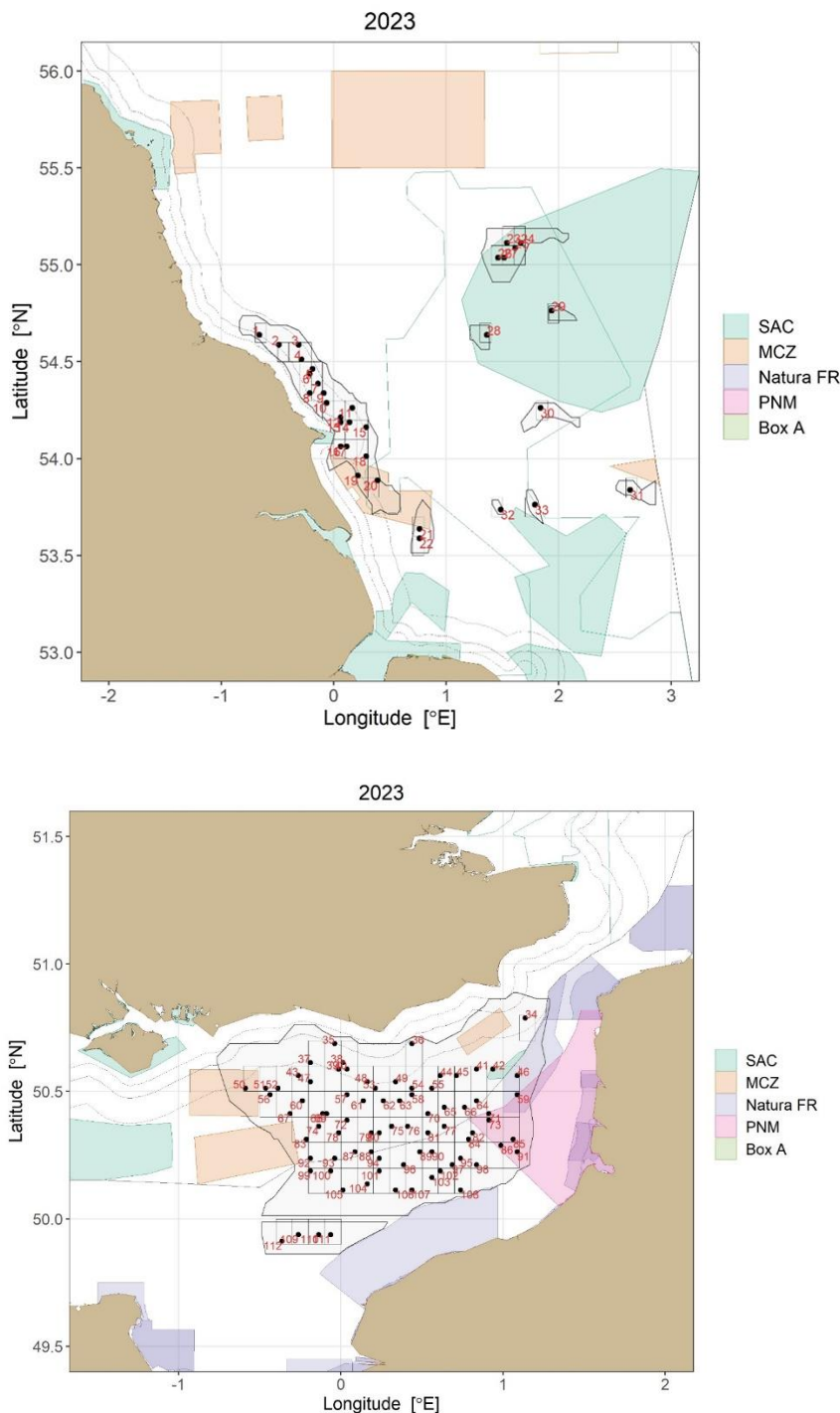
Figure 26. EECDS completed survey area

Outcomes: In the North Sea, ICES Division 27.4.b, two stations were missed due to the presence of static gear. In total, 20 of the 22 planned stations were surveyed.

In the Eastern English Channel, ICES Division 27.7.d, one station was missed due to the presence of static gear. In total, 77 of the 78 planned stations were surveyed.

Catches were enumerated at each site. At each site, samples of the commercial and undersized scallops were measured.

Note: Only stations 1-22 are routinely surveyed in the North Sea. The others in the dogger bank area (stations 23-33) are mapped but not routinely surveyed, although they will be in 2024.

Additional research requests met: Shell damage data and images captured.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Results were presented at the 2022 ICES Scallop Assessment Working Group (WGScallop): https://ices-library.figshare.com/articles/report/Scallop_Assessment_Working_Group_WGScallop_outputs_from_2023_meeting_/25249255

The latest annual assessment report is available from the UK Government Publishing website: [Assessment of king scallop stock status around the English coast - GOV.UK (www.gov.uk)](www.gov.uk)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The annual dredge surveys are the primary basis for stock assessments. Abundance estimates, in connection with international landings, are used to establish exploitation rates. Size sampling data are used in spawner-per-recruit models to establish MSY-proxy biological reference points for harvest rates. Realised harvest rates can then be compared with reference points to assess whether regional commercial exploitation is sustainable.

East Coast Scallop Dredge Survey, ECSS; UK Scotland, ICES area IVa

1. Survey objectives

The objectives of the East Coast king scallop survey are:

- to carry out a survey of scallop stocks around the East coast of Scotland.
- to age, measure and assess shell damage on all scallops caught.
- to collect information on by-catch of other commercial fish and shellfish species.
- to identify and quantify numbers of starfish species in all dredge tows.
- to collect frozen whole scallops for heavy metal testing as part of the OSPAR assessment of hazardous substances in the marine environment.
- to record and retain marine litter obtained during the dredging process (for MSFD).

2. Survey methods

The commercial fishery for the king scallop (Pecten maximus) is the second most valuable shellfish fishery in Scotland. Dredge surveys of the major scallops grounds around Scotland have been carried out annually by Marine Directorate Science (MSS) since the mid-1990's. The scallop survey data are used in the regional stock assessments.

The survey gear on the starboard side consists of six standard commercial spring-loaded Newhaven type dredges (75 cm wide, 9 tooth bar, 80 mm internal diameter belly rings). The port side has six smaller configured sampling dredges (75 cm wide, 11 tooth bar, with 60 mm internal diameter belly rings). At each station (Figure 1) the dredges are towed at ~2.5 knots for 30 minutes and all king scallops caught are aged, measured (length to the 0.5 cm below) and damage assessed. All bycatch is identified, measured, sexed where appropriate and damage assessed. All starfish are identified and damage assessed.

The survey is planned for May/June, lasting approximately 20 to 23 days. There are 110 fixed stations to select from, weather dependent.
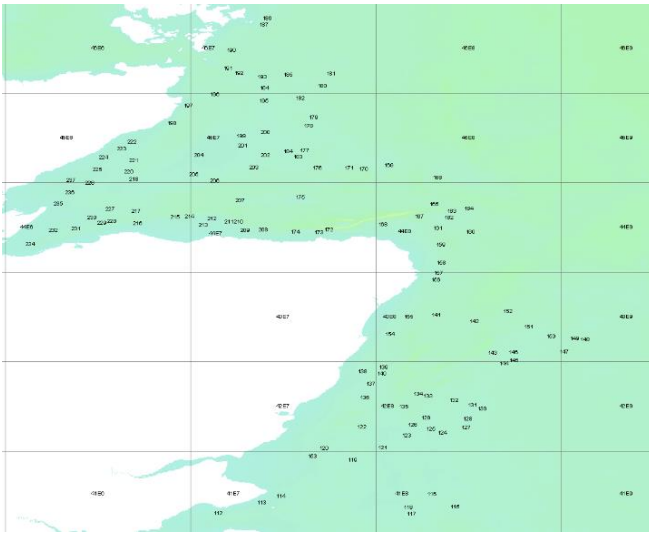
Figure 27. Map of scallop dredge stations; UK Scotland, IVa

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Not internationally coordinated. Data are used in national stock unit assessments

Scallop survey data are discussed and detailed at ICES WGSCALLOP.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
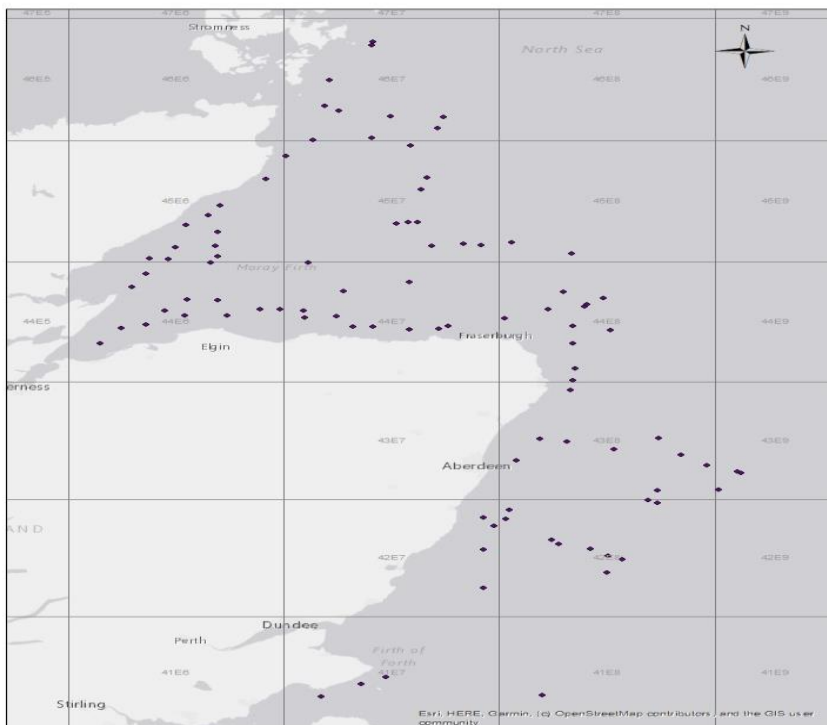
Figure 28. ECSS completed survey area

Outcomes: 97 dredge trawl stations were completed. One and a half days were lost to bad weather. 11281 scallops were biologically sampled as well as bycatch species: including plaice (163), red whelk (160) and Brown crab (142). 2448 starfish were identified to species. Also dabs, rays, whelks, plaice, queen scallops and lemon sole were measured and recorded.

Additional research requests met: Scallops were collected for heavy metal testing as part of the OSPAR assessment of hazardous substances in the marine environment and for genetic material to assess connectivity among scallop grounds in Shetland.

Marine litter was recorded and retained.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available online.

Scallop Assessment Working Group (WGScallop; Outputs from 2023 meeting) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the East Coast (Scotland) scallop survey

Type of data collected	Assessment type
Biological sampling	National assessment. Length, age, meat weight. Shell damage.
Other fish spp in haul	National assessment and long-term trends.
Litter items in trawl	National and international. Anthropogenic monitoring.

Shetland Scallop Dredge Survey, SHETSS; UK Scotland, ICES area IVa

1. Survey objectives

The objectives of the North Sea Shetland king scallop survey are:

- to carry out a survey of scallop stocks around the Shetland Islands.
- to age, measure and assess shell damage on all scallops caught.
- to collect information on by-catch of other commercial fish and shellfish species.
- to identify and quantify numbers of starfish species in all dredge tows.
- to collect frozen whole scallops for heavy metal testing as part of the OSPAR assessment of hazardous substances in the marine environment.
- to record and retain marine litter obtained during the dredging process (for MSFD).

2. Survey methods

The commercial fishery for the king scallop (Pecten maximus) is the second most valuable shellfish fishery in Scotland. Dredge surveys of the major scallops grounds around Scotland have been carried out annually by Marine Directorate Science (MSS) since the mid-1990's. The scallop survey data are used in the regional stock assessments.

The survey gear on the starboard side consists of six standard commercial spring-loaded Newhaven type dredges (75 cm wide, 9 tooth bar, 80 mm internal diameter belly rings). The port side has six smaller configured sampling dredges (75 cm wide, 11 tooth bar, with 60 mm internal diameter belly rings). At each station (Figure 16) the dredges are towed at ~2.5 knots for 30 minutes and all king scallops caught are aged, measured (length to the 0.5 cm below) and damage assessed. All bycatch is identified, measured, sexed where appropriate and damage assessed. All starfish are identified and damage assessed.

The survey is planned for January, lasting approximately 15 days. There are 45 fixed stations to select from, weather dependent.
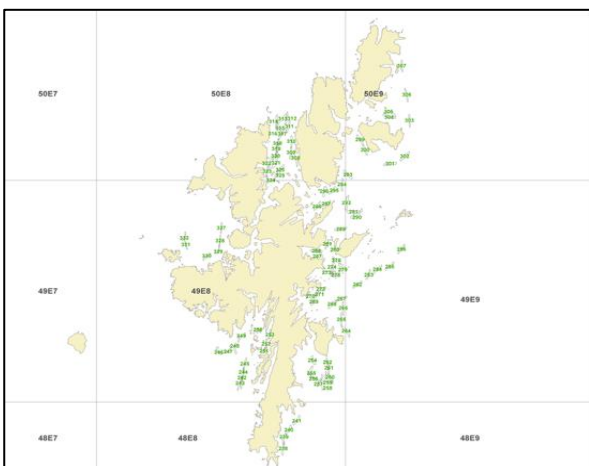

Figure 29. Map of scallop dredge stations; UK Scotland, IVa (Shetland)

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Not internationally coordinated. Data are used in national stock unit assessments

Scallop survey data are discussed and detailed at ICES WGSCALLOP.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
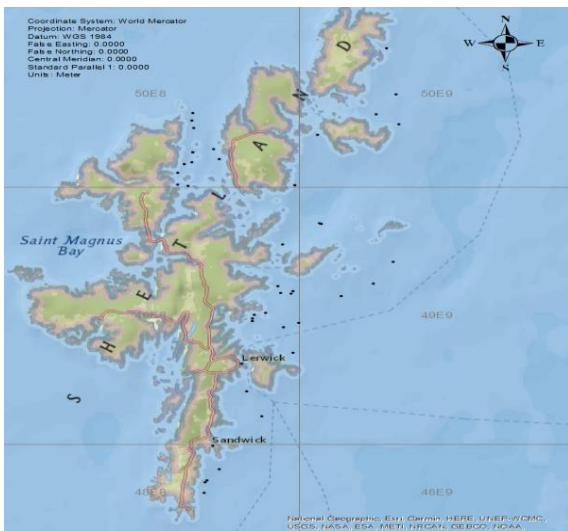
Figure 30. Completed survey area

Outcomes: 41 stations were fished. Five full days were lost due to extremely bad weather in January. 7985 scallops were sampled for biological parameters. A bycatch of queen scallops (129), red whelks (205) & common whelks (91) were measured. 3401 starfish were identified to species and crabs, witch, dogfish, plaice, rays, dragonets were measured.

Additional research requests met: Scallops were collected for metal testing (OSPAR) and for genetic material to assess connectivity among scallop grounds in Shetland. Marine litter was recorded and retained.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Scallop Assessment Working Group (WGScallop; Outputs from 2023 meeting) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the Shetland scallop survey

Type of data collected	Assessment type
Biological sampling	National assessment. Length, age, meat weight. Shell damage.
Other fish spp in haul	National assessment and long-term trends.
Litter items in trawl	National and international. Anthropogenic monitoring.

North Sea (ICES areas IIIa, IV and VIId) and Eastern Arctic (ICES Areas I& II) and North Atlantic (ICES Areas V-XIV and NAFO areas)

Summary outcomes

Scottish RV surveys: IBWS did not take place during 2023. Despite Marine Directorate (MD) advertising for a charter vessel, no vessels tendered for the contract. MD staff instead contributed to two other International surveys.

English RV surveys: UWTVScallop equipment failure cut short the completion of the 7.e.F. grid but good progress was made within the time available. The completion of this area will be scheduled for 2024.

Blue whiting survey, IBWSS; International Blue whiting spawning stock survey Areas I, II, III, IV, VI.

In 2023 UK-Scotland plans to undertake a 15 day blue whiting survey. Discussions with WGIPS and the other countries are continuing to finalise the area to be covered by Scotland.

Procurement difficulties may prevent this survey going ahead in 2023. Should the survey not proceed Marine Directorate will supply staff to assist with the international survey effort.

1. Survey objectives

An acoustic survey of blue whiting spawning biomass in the northeast Atlantic

2. Survey methods

Figure 17 shows a map of the full survey area historically covered by the Dutch and Irish.
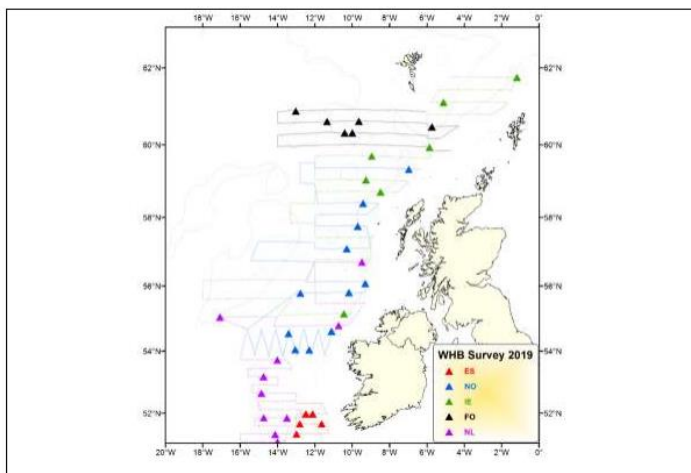
Figure 2. 2019 Blue whiting survey cruise track by nation and trawl stations (triangle).

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey.

Figure 32. Indicative survey area anticipated based on 2019 survey effort. Precise survey plans for future years are currently under development.

UK Scotland is expected to cover part of the cruise area shown above.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES Working Group on International Pelagic Surveys

UK Scotland; Fritjof Nansen (Russia); Celtic Explorer (Ireland); Magnus Heinason (Faroe Islands); Tridens (Netherlands); G.O. Sars (Norway)

Until 2021 the UK (Scotland) made a financial contribution to the international blue whiting spawning stock survey, co-funding the Dutch and Irish parts of the survey (i.e., the EU participants) and also provided one member of staff to participate in the survey.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Outcomes: This survey did not take place during 2023. Despite Marine Directorate (MD) advertising for a charter vessel, no vessels tendered for the contract. MD staff contributed to other International surveys.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

N/A

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the blue whiting survey

Type of data collected	Assessment type
Biological sampling	Any data collected would have been used in Annual international indices for the assessment of blue whiting and used for advice

Scottish Irish Anglerfish Megrim Industry Science Survey - SIAMISS UK Scotland IVa, VIa, VIb

1. Survey objectives

The main objective of the survey is to estimate the distribution, abundance, length structure and biomass of anglerfish and megrim stocks in ICES divisions 27.4.a, 27.6.a, 27.6.b. In addition, information is collected on cod and some skate species. Otoliths are collected for anglerfish and cod. The survey is conducted annual each April.

2. Survey methods

Historically, the Scottish component of the survey has been undertaken in partnership with industry, using MRV Scotia, and chartered demersal trawlers, each covering part of the survey area. In 2023 the aim is that alongside Scotia, a Scottish industry vessel will also be present to participate in the survey, providing additional coverage in Scottish waters of 27.4.a and 27.6.a (North of 58°N), although this is still to be confirmed.

A minimum of 88 one-hour trawl hauls is planned throughout the survey using a bespoke anglerfish trawl, Jackson BT195. The net will be deployed down to a maximum 1000m in the Atlantic and 500m in the North Sea. From each haul full biological sampling will be recorded for Lophius spp. Lepidorhombus spp, cod, and some rarer skate species will be sub sampled, if and when time is available, on Scotia, all other species will be measured for length. Sampling protocols were agreed between MSS scientists and representatives from the fishing industry who specifically target Lophius. These protocols also follow the IBTS guidelines.
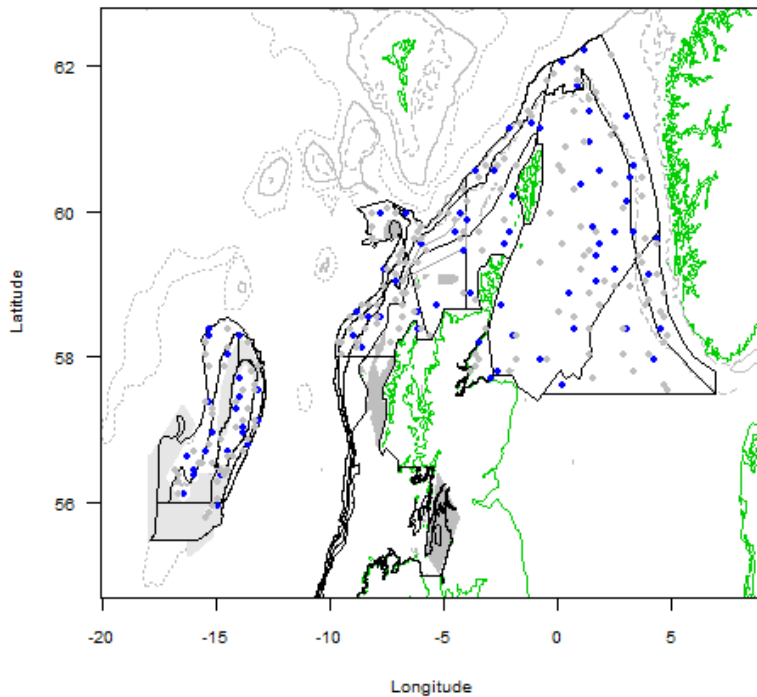
Figure 31. Map showing the SIAMISS survey areas and planned stations for Scotia in 2023.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey.

The survey is coordinated with the Scottish fishing industry and with Ireland. Ireland has surveyed 27.6.a South of 58°N since 2017 with Celtic Explorer. Scotland surveys 27.4.a, 27.6.a North of 58°N and 27.6.b. There is no official international coordination group, but the protocols follow IBTSWG guidelines.

Data are held in the Marine Directorate Science FSS database and used at ICES WGCSE to assess anglerfish and megrim stocks.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
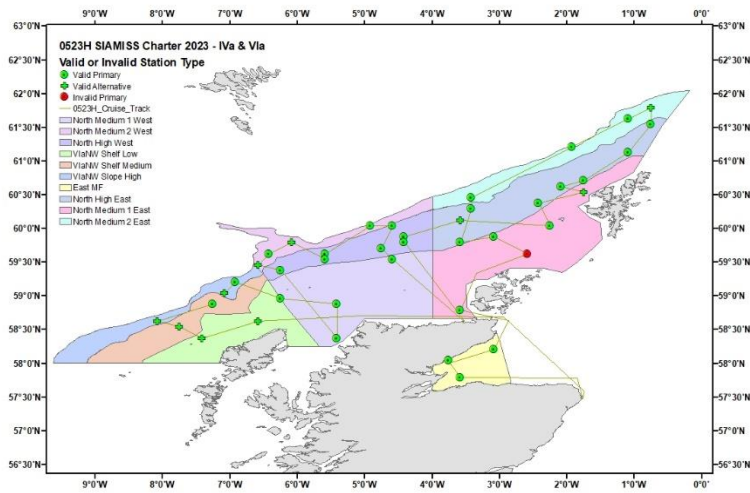
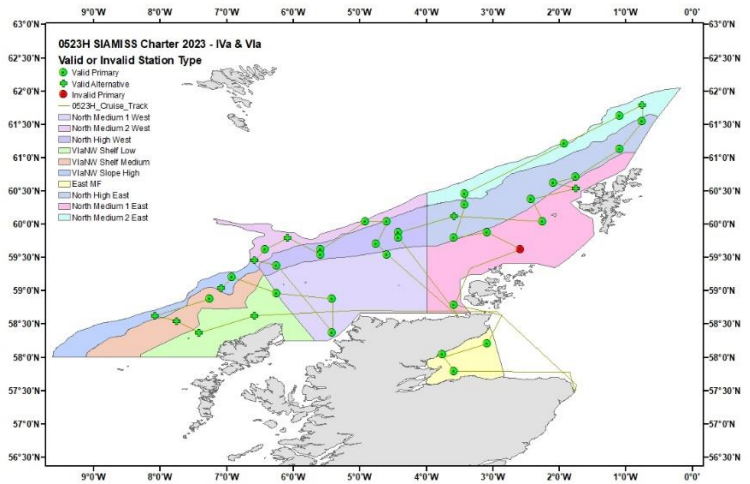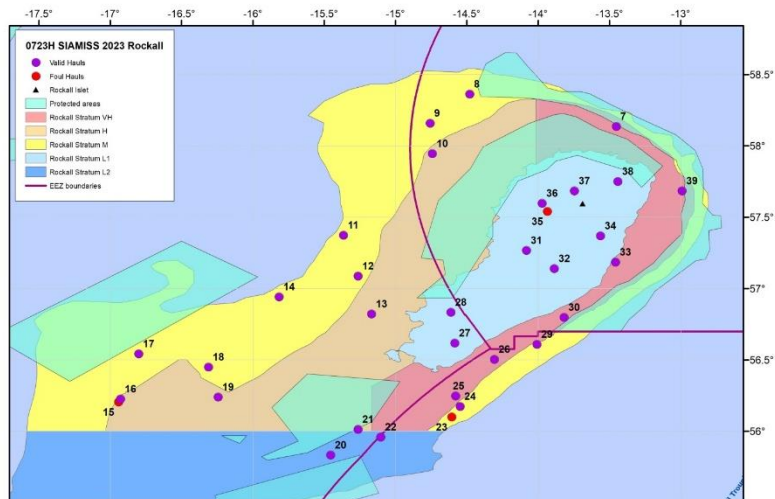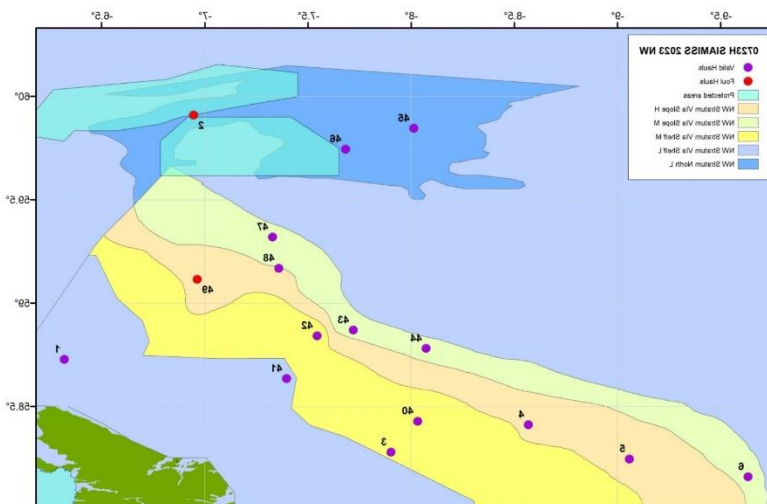**Figure XX. SIAMISS survey 1, IVa and VIa achieved stations.**

Figure XX. SIAMISS survey 2, IVa achieved stations.

Figure XX. SIAMISS survey three, VIb achieved stations

FigureXX. SIAMISS survey three, VIa achieved stations

Outcomes: Three surveys were completed utilising charter vessels. The first survey covered areas IVa and VIa, completing 43 trawls (including 2 invalid). The second survey covered area IVa, completing 50 hauls. 49 trawls were deployed during the third survey, with 44 valid, covering areas VIa and VIb. Age at length, sex, maturity and weight data were collected for all anglerfish, megrim and cod. Length, weight and sex were recorded for elasmobranchs before returning to the sea alive.

Additional research requests met: None.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group for the Celtic Seas Ecoregion (WGCSE) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the SIAMISS survey

Type of data collected	Assessment type
Biological sampling	International stock assessments of Lophius piscatorius, Lophius budegassa and Lepidorhombus whiffiagonis - WGCSE

Biological sampling of cod, Dipturus(batis) flossada and Dipturus intermedia	National assessment
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators.
Other fish spp in haul	National assessment and trends
Litter items in trawl	National and international. Anthropogenic monitoring.

Triennial Mackerel/Horse Mackerel Egg Survey, MEGS; UK Scotland component Areas VI to IX

In 2022 UK-Scotland undertook 3 MEGS surveys and the intention is that, for the next survey in 2025, Scotland will again undertake 3 dedicated MEGS surveys.

Although the maps shown below correspond to 2019 surveys, they broadly mirror the likely extent of the coverage for the 3 planned MEGS surveys in 2025.

1. Survey objectives

To carry out mackerel and horse mackerel egg surveys (ICES Triennial Survey) within allocated sampling periods of the 2025 MEGS survey plan along the NE Atlantic shelf. To collect adult fish samples, by trawling, for atresia and fecundity analysis back at the laboratory.
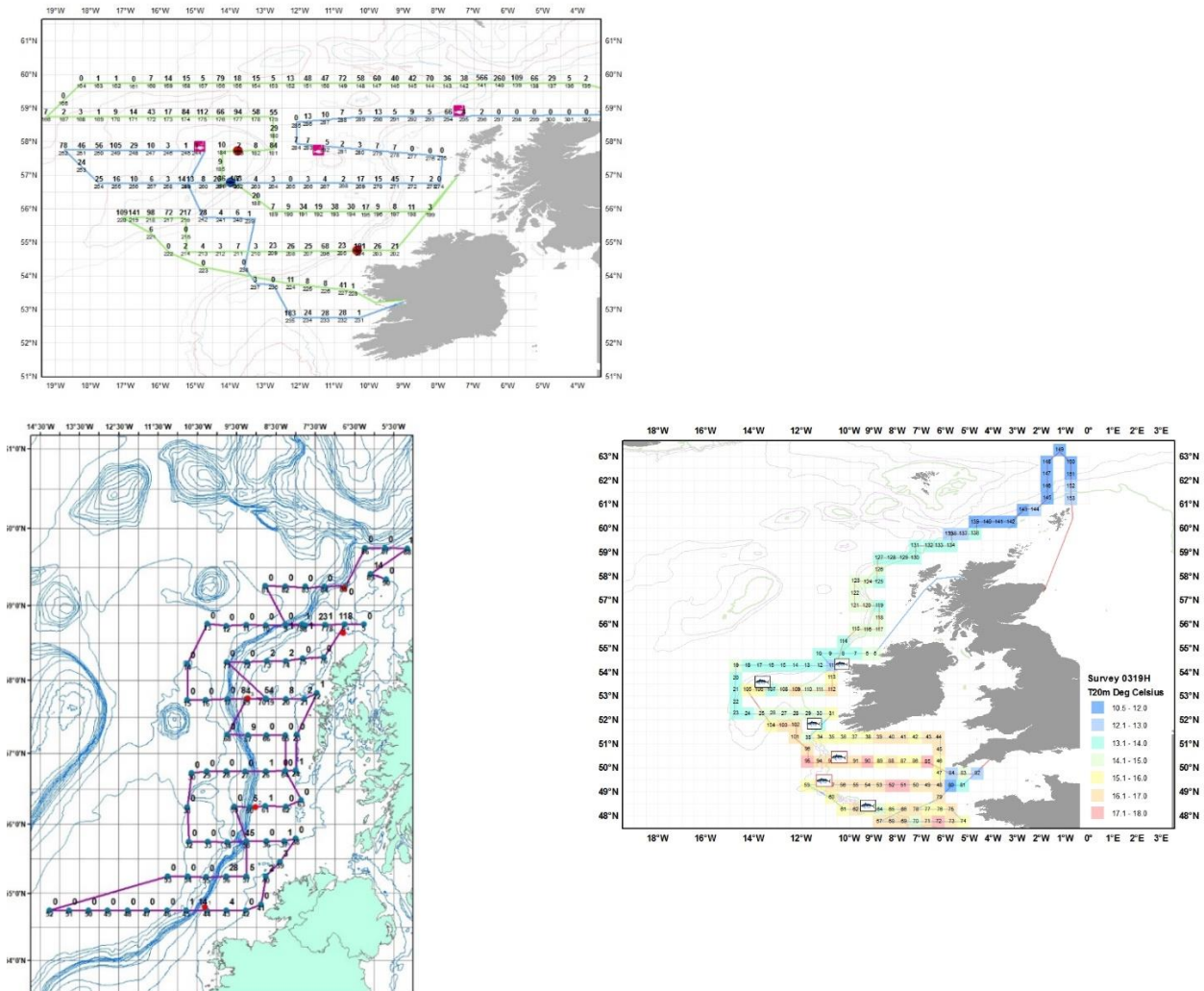

Figure 32. Maps showing positions of survey and track for the 2019 surveys undertaken in (clockwise from top right) April, May and July and reflect the expected periods and areas to be completed during the 2025 MEGS survey programme; MEGS; UK Scotland

2. Survey methods

The Egg survey will be conducted between 36˚N and 66˚N in the Northeast Atlantic, and will be broadly based on the area covered by the MEGS survey in 2022. UK-Scotland will almost certainly be allocated the same areas as previously albeit precise areas to be sampled will be provided by the MEGS survey coordinator during the WGMEGS survey planning meeting in 2024. Samples will be collected using a Gulf VII plankton sampler and samples will be analysed on board for mackerel and other target species of eggs. Fishing will take place to collect fecundity samples using either a pelagic net or rod and lines. Methods for sampler deployment and sample processing will adhere closely to those outlined in ICES SISP6 – MEGS V2.2

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey.

Working Group on Mackerel and Horse Mackerel Egg Surveys (WGMEGS).

Scotland, Portugal, Spain, Germany, Netherlands, England (in the North Sea), Ireland, Faroes, Iceland

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Outcomes: Not a survey year.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Widely Distributed Stocks (figshare.com)

Working Group on Mackerel and Horse Mackerel Egg Surveys (WGMEGS) (figshare.com)

WGALES (ices.dk)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the *Mackerel Egg triennial* survey(s)

Type of data	Assessment type

Biological sampling of Mackerel and horse mackerel	International stock assessment
Mackerel and horse mackerel egg production	Stock assessment - Calculation of the spawning stock biomass estimate for NEA mackerel and annual egg production index for western horse mackerel. Used by WGWIDE & WGMEGS
CTD by Haul	Gulf deployment is part of the MEGS egg survey protocol and are incorporated (using the 20m depth temperature) directly into the egg production estimates for both mackerel and western horse mackerel
Other fish species eggs	Abundance data on other species of eggs including hake, ling, boarfish, pearlfish and anchovy. Now uploaded to the ICES egg and larval database

Deepwater Survey, DEEPWATER; UK Scotland VIa; Deepwater slope west of the Hebrides and Rosemary Bank

1. Survey objectives

To map the composition, distribution and abundance of continental slope species including invertebrates on the deep-water slope west of the Hebrides and Rosemary Bank to depths of 2000m. In addition, samples (genetics and otoliths) will be collected for key species for population studies.

This is a biennial survey, with surveys taking place in odd-numbered years (i.e., 2019, 2021, 2023).

2. Survey methods

Approximately 35 deep-water trawl hauls will be carried out at depths between 500m and. Catch rate and length-frequency distribution for all fish species are collected and adjusted to a standardised trawl-haul duration. Temperature at depth is collected to characterise the species' environment. Benthic invertebrates are sorted quantified and recorded from trawl hauls.
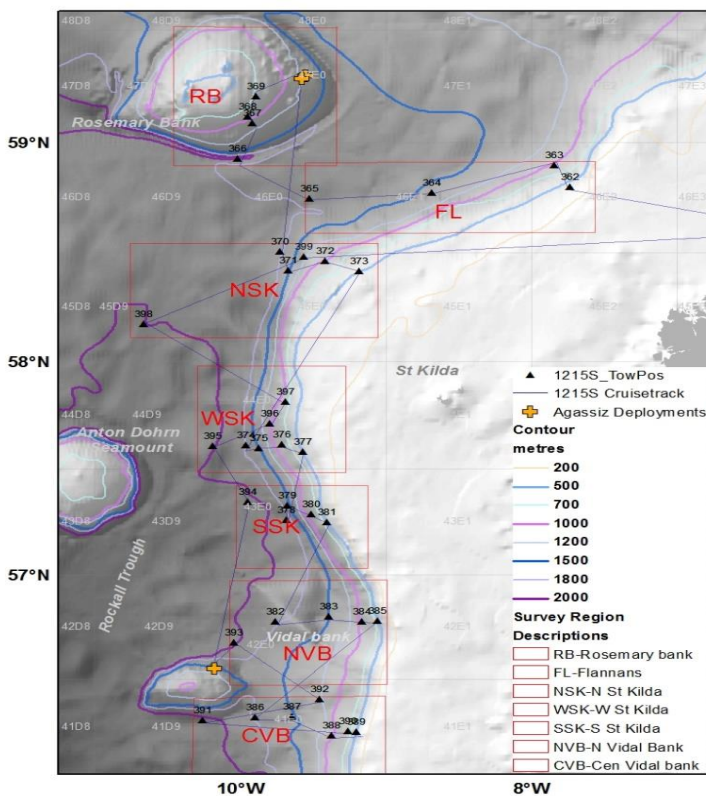
Figure 33. Map showing positions of survey stations DEEPWATER; UK Scotland VIa; Deepwater slope west of the Hebrides and Rosemary Bank

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey.

Data are held in the Marine Directorate FSS database system as well as being reported to the ICES Deepwater Working Group (WGDEEP) in the form of abundance/biomass indices that feed into the assessment process for several commercial deep-water species. VME data collected from this survey are also routinely submitted to the ICES Working Group on Deepwater Ecology (WGDEC).

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
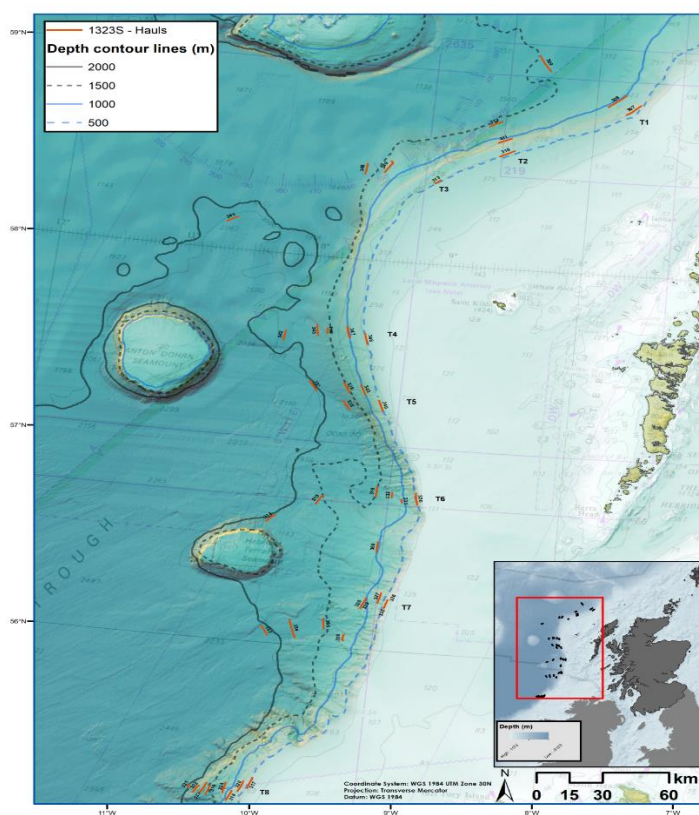
Figure XX. Deepwater survey trawl stations.

Outcomes: Over 17 survey days, a total of 44 trawls were undertaken, with 42 valid hauls and 2 invalid hauls. CTD data were successfully collected at 42 of 44 hauls.

All catch, fish and benthos were screened as far as possible for the presence of non-indigenous species. VME indicator species were documented. All marine litter picked up in the trawl was classified, quantified recorded then photographed and retained for appropriate disposal ashore.

Additional research requests met: Tissue, dermis, vertebrae and complete stomachs including contents were collected from a range of species for investigations into population genomics and parasite load in collaboration with Nord University, Bodø, Norway.

Collection of tissue samples / mucus swabs from elasmobranch species for genomic sequencing.

Tissue samples and reference specimens of Geodia megastrella and Geodia atlantica were collected for molecular study (MD/University of Uppsala)

Tissue samples along with reference specimens of Umbellula "huxleyi", Umbellula sp, Pseudumbellula sp, Anthoptilum grandiflorum, Anthoptilum sp and Distichoptilum sp were collected for molecular study (MD/University of Seville).

Malacostraca: Amphipoda and Isopoda: All specimens were treated with RNA later and frozen in support of a long-term project studying proteins in deep sea-adapted crustacea (University of Aberdeen).

All shelled molluscs were retained frozen for identification and distribution mapping by D. Mackay.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources (WGDEEP)

Working Group on Deep-Water Ecology (WGDEC)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the survey

Type of data collected	Assessment type
Biological sampling of all deepwater species caught	International assessments of deepwater species.
Benthos data	International assessment - data used by WGDEC. Environmental indicator.
Litter items in the trawl	National and international. Anthropogenic monitoring.

Scallop UWTV Survey, UWTVScallop; UK England, IVb, VIId, VIIe-g; Bristol Channel and Western approaches; Eastern English Channel; North Sea

1. Survey objectives

Carry out UWTV survey for scallop in undredged areas for biomass estimates to be used in English Scallop assessment and advice for the UK Fisheries Management Plans.

2. Survey methods

The survey is undertaken in the second quarter. Sea areas are surveyed on a rotational basis. Within each bed to be surveyed, stations are set using randomised algorithms (see map). Some additional stations are placed in dredged areas to allow direct comparison with the dredge surveys results (WECSDS, EECSDS). Video footage is saved in high definition and duplicate/triplicate counts undertaken to assess scallop abundance on footage. The STR SeaSpyder drop frame camera system consists of HD video and stills capability attached to surface via optical fibre umbilical. The drop frame is towed with the tide at 0.4 knots approximately 0.5m off the seabed for 20 minutes at each site. Different camera systems can also be fitted to available frame and trialled at selected sites (Rayfin, RFID etc).
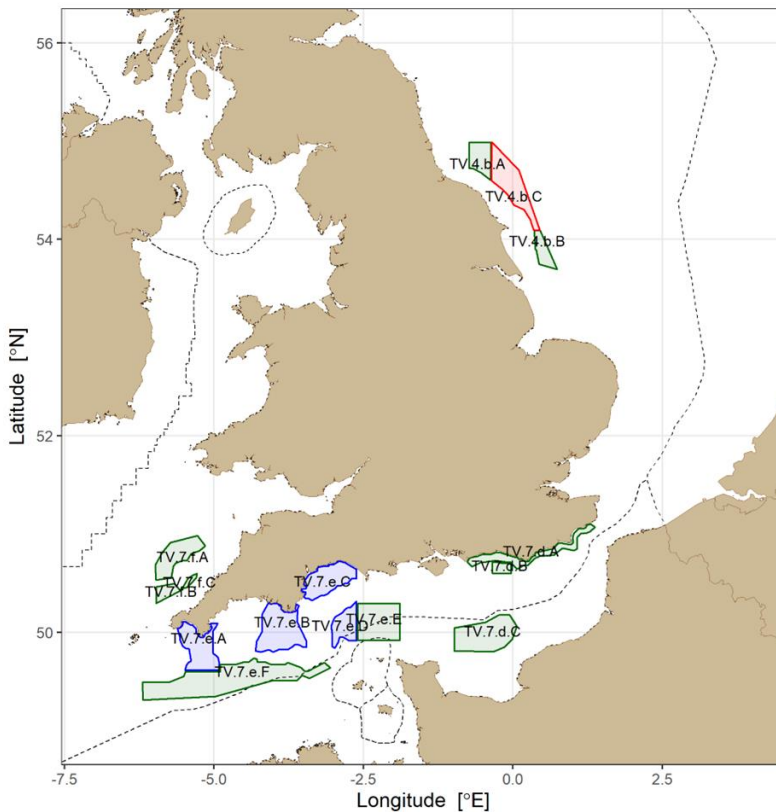
Figure 34. Overview of undredged areas suitable for UWTVScallop; UK England, IVb, VIId, VIIe-g

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Not internationally coordinated. Data are used in national stock unit assessments

Scallop UWTV surveys are discussed and detailed at ICES WGSCALLOP. Surveys are generally carried out by independent countries for fisheries within their EEZ with cooperation when undredged areas extend into neighbouring countries waters.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
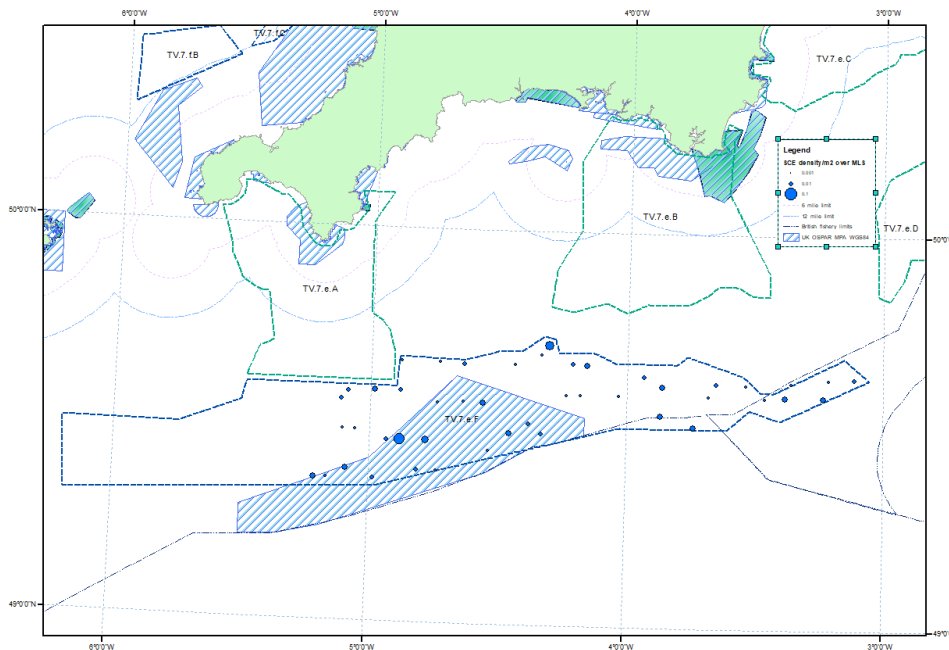
Figure 35 UWTV Scallop map showing the a) the location of the realised stations in 7.e.F. (numbers per m2 over MLS (100 mm W. Channel) and b) scallop densities.

Un-Dredged Zone	Number of Transects	Mean Density	Min Density	Max Density	Number of Zero Counts
TV.7.e.F (2023)	51	1.31	0	9.39	7

Table 41b: Summary of survey results. (Densities numbers per 100 m^2).

Outcomes (including deviations): The 2023 survey had equipment failures which cut short the completion of the 7.e.F. grid but good progress was made within the time available. The completion of this area will be scheduled for 2024.

Additional research requests met:

 NA

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

The scallop underwater video survey is coordinated via the king scallop assessment Project Steering Board, including Defra and Industry representatives. Results were presented at the 2023 ICES Scallop Assessment Working Group (WGScallop); ICES. 2023. Scallop Assessment Working Group (WGScallop 2023). The latest annual assessment report is available from the UK Government Publishing website: [Assessment of king scallop stock status around the English coast - GOV.UK (www.gov.uk)](www.gov.uk)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The UK-England Pecten Maximus UVS survey data is used to generate abundance estimates in un-dredged areas and feeds into the annual scallop stock assessment for English waters.

North Atlantic (ICES Areas V-XIV and NAFO areas)

Summary outcomes

Scottish RV surveys, ICES areas VI: *Nephrops norvegicus* FU11-13 – All Nephrops UWTV surveys had to be combined into one survey as a result of MRV Scotia being stuck in dry dock for an extended period, due to an incident with another vessel. Despite this, all planned stations in FU11-13 were sampled.

English RV surveys, ICES areas VII: The SWECOS survey coverage was limited to 75% of the stations due to loosing 4 days to technical issues and weather. The Western Channel was successfully covered but only 22 out of the planned 50 stations in the Celtic sea were fished. On the Western Channel & Bristol Channel scallop dredge survey (WECSDS)14 planned dredge stations in the Bristol Channel were not fished due to unfavourable conditions - bad weather combined with spring tides.

Northern Ireland RV surveys, areas VII: In the latter part of 2023, the research vessel RV Corystes was unable to enter Republic of Ireland waters due to technical issues with the vessel. This affected four research surveys to varying degrees; Northern Irish MIK net survey (NI-MIK), the Spawning/Pre-spawning Herring Acoustic Survey (NIR-AS), the Northern Irish UWTV survey (UWTV (FU15)) and the Northern Irish Quarter 4 Groundfish Survey (NIGFS Q4). The Northern Irish MIK net survey (NI-MIK), completed 91% of its plankton targets and 89% of its MIK net targets. The missed area includes an area of nursery grounds for gadoids in the Irish Sea. The NIR-AS survey, was only slightly impacted as only a small portion of the planned survey transects are in ROI waters, both targets (nautical miles and number of tows) were still met despite this disruption. For UWTV (FU 15), approximately 1/3 of stations are within ROI waters. UWTV footage of these stations was recorded on AFBI's behalf by the Marine Institute of Ireland, and footage was returned to AFBI staff for processing and analysis. Including this footage, 96 of 100 stations were covered. The remaining 4 stations could not be surveyed safely, due to the presence of static fishing gear in the area and poor weather conditions. For NIGFS Q4 survey, a large proportion of the stations occur in ROI waters, and only 61% of the target number of fish hauls could be conducted.

Scottish West Coast Groundfish Survey, Quarter 4, SCOWCGFS-Q4; Western waters; UK Scotland component VIa, VIIb

1. Survey objectives

A young fish survey undertaken during Q4 in ICES subarea 6A as one component of the ICES western waters bottom trawl surveys. The survey is targeted towards young (0 and 1-group) cod, haddock, whiting, saithe and Norway pout, herring, and mackerel by utilising a GOV trawl fitted with an internal 20 mm liner.

2. Survey methods

The stratified random design survey will be undertaken by MRV Scotia. Approximately 60 to 62 random stratified stations will be surveyed for hydrographic information coupled with the deployment of a GOV trawl for 30 minutes. Station locations are randomly distributed among 11 sampling strata and the age length data generated is used to produce age disaggregated abundance indices for several target species. Numbers at length and age are acquired for all target species with all other fish species being measured and counted. A separate stratum in subarea VII exists specifically to provide abundance information on juvenile mackerel for the assessment process.
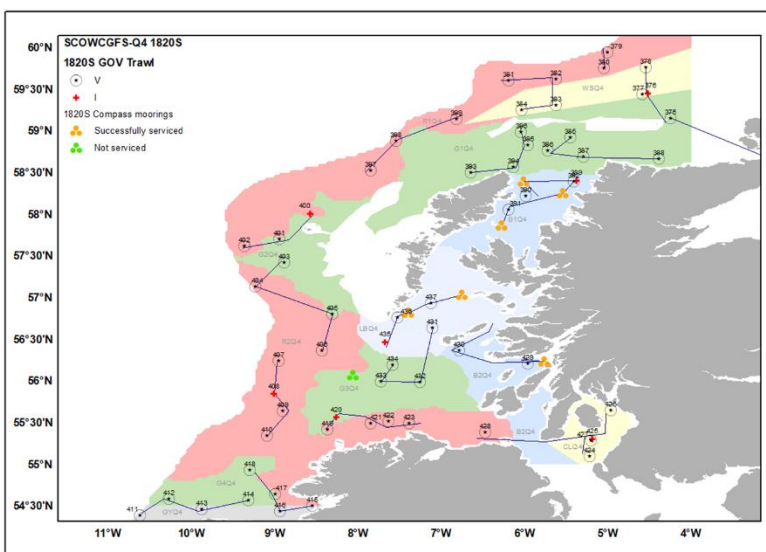
Figure 36. Map showing survey strata and positions for SCOWCGFS-Q4; Western waters; UK Scotland component VIa, VIIb

Data will be stored electronically in the Marine Directorate Science FSS system and uploaded to the ICES DATRAS database.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES International Bottom Trawl Survey Working Group

Data used by WGCSE for assessments.

Scotia (UK-Scotland); Corystes (UK-Northern Ireland); Celtic Explorer (Ireland); Thalassa (France); Miguel Oliver (Spain); Noruega (Portugal)

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Figure 37. IBTS Q4 North Atlantic surveyed area

Outcomes: 24 days and 63 valid hauls (including 4 foul) were completed. Length, weight, age & sex were recorded for gadoid species plus maturity for pelagic species. Length, weight, & sex plus external maturity was recorded for elasmobranchs. The CTD was deployed at 51 out of a possible 59 valid GOV trawl stations. Fish and benthic catches were screened for non-indigenous species with data sent to the Cefas coordinator. Marine litter was classified, quantified and stored. Data were uploaded to DATRAS.

Additional requests: Genetic samples were collected from Hake, Anglerfish and Anchovy to investigate population structure of these species within the Northeast Atlantic – GECKA/GIFAMAN project. No Pilchards were observed.

Genetic samples were collected from all Cod sampled for biological data to further studies on stock identification.

All trawl caught gelatinous zooplankton were identified to species (where possible), weighed and quantified.

All molluscs and gastropods observed during the survey were retained for identification ashore for population mapping.

Compass Project – 6 acoustic moorings were retrieved & 8 re-deployed.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

International Bottom Trawl Survey Working Group (IBTSWG) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the *IBTS Q1 North Sea* survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (Cod, Haddock, Whiting, Saithe & Norway pout). – used for advice Length, age, weight, sex, maturity
Biological sampling	Biological sampling for National assessments (Herring, sprat, Mackerel, Hake & Plaice)
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators. MSFD
Other fish spp in haul	National and international. Predator-prey interaction/ecosystem model for biodiversity (Skates, Squalus acanthias, Mustelus asterias and other fish species).
Litter items in trawl	National and international. Anthropogenic monitoring.

Scottish West Coast Groundfish Survey, Quarter 1, SCOWCGFS-Q1; Western waters; UK Scotland component (VIa)

1. Survey objectives

A young fish survey undertaken during Q1 in subarea 6A. The survey is targeted towards young 1- 2 group cod, haddock, whiting, saithe, Norway pout, herring, and mackerel by utilising a GOV trawl fitted with an internal 20 mm liner. Identical in design to the SCOWCGFS-Q4 survey albeit the strata differ slightly reflecting the seasonal changes in abundance observed for target species.

2. Survey methods

The stratified random design survey will be undertaken by MRV Scotia. Approximately 60 to 62 random stratified stations will be surveyed for hydrographic information coupled with the deployment of a GOV trawl for 30 minutes. Station locations are randomly distributed among 11 sampling strata and the age length data generated is used to produce age disaggregated abundance indices for several target species. Numbers at length and age are acquired for all target species with all other fish species being measured and counted.
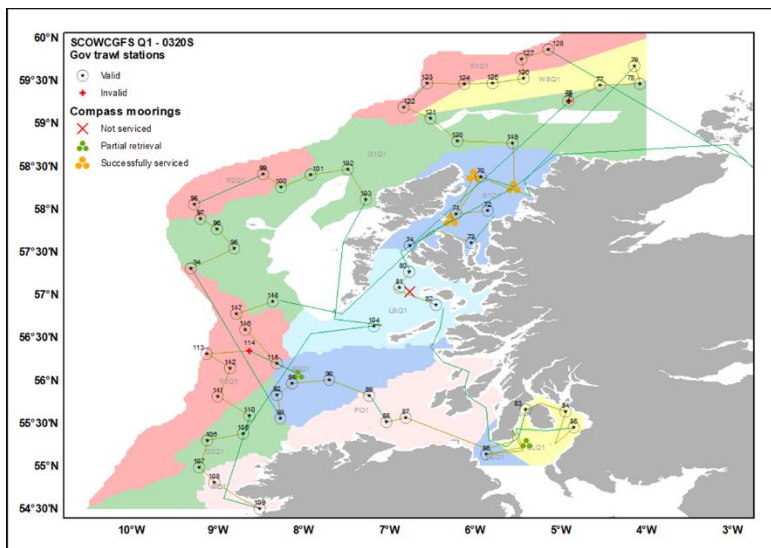
Figure 38. Map showing survey strata and positions for SCOWCGFS-Q1; Western waters; UK Scotland component (VIa)

Data will be stored electronically in FSS database within MSS and then uploaded to ICES DATRAS database.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES International Bottom Trawl Survey Working Group- Data used by WGCSE for assessments.

Scotia (UK-Scotland); Corystes (UK-Northern Ireland); Spain (Miguel Oliver)

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
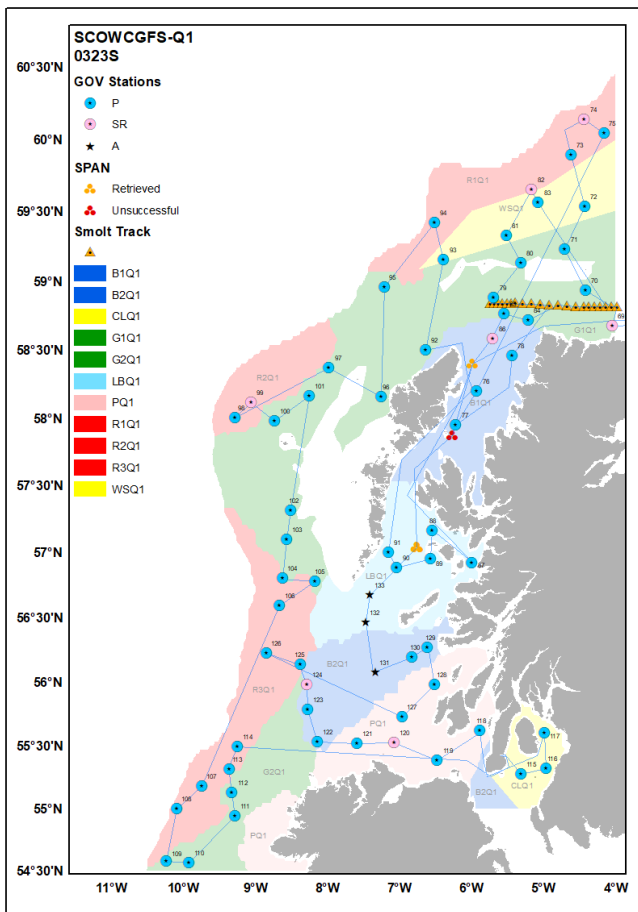
Figure 39. A map of SCOWCGFS-Q1; Western waters; UK-Scotland component (VIa) trawl stations.

Outcomes: A total of 65 stations were sampled during the survey. Length, weight, age & sex were recorded for gadoid species plus maturity for pelagic species. Length, weight, & sex plus external maturity was recorded for elasmobranchs. The CTD recorder was successfully deployed on 62 of the 65 trawl stations. Fish and benthic catches were screened for non-indigenous species with data sent to the Cefas coordinator. Marine litter was classified, quantified and stored. Data were uploaded to DATRAS.

SPAN Acoustic moorings – 4 moorings were successfully retrieved, whilst 5 moorings were also successfully deployed.

MSS/AST Smolt tracking moorings – 21 tag receiver moorings were successfully deployed.

Additional requests: Genetic tissue samples for Anglerfish and hake from area ICES subarea 6A – *Gecka project.*

Whole juvenile mackerel retained for investigations into variations in field metabolic rate (FMR) proxy using sagittal otoliths – *Clive Trueman* (Southampton University).

Pelagic fish sample collection – Retention of 7 kg each of mackerel and herring from the Minch area for environmental monitoring (CRCE Scotland, Glasgow).

Retention of Phakellid and Craniella sponges. Collaborative phylogenic study between MSS and the Natural History Museum.

Bobtail squid identification. All bobtail squid (Sepiolida) caught frozen for identification at Naturalis Biodiversity Centre, Leiden.

5 litre sample of raw offshore sub-surface (<10 m) water to serve as an inoculum in experiments. *Heriot Watt University.*

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (Cod, Haddock, Whiting, Saithe & Norway pout). – used for advice Length, age, weight, sex, maturity
Biological sampling	Biological sampling for National assessments (Herring, sprat, Mackerel, Hake & Plaice)
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators. MSFD
Other fish spp in haul	National and international. Predator-prey interaction/ecosystem model for biodiversity (Skates, Squalus acanthias, Mustelus asterias and other fish species).
Litter items in trawl	National and international. Anthropogenic monitoring.

Irish Sea, Bristol Channel and Celtic Sea Beam Trawl Survey, ISBCBTS; 3rd quarter, UK England VIIa,f,g

1.Survey objectives

To provide estimates of abundance of recruiting year classes and CPUE-at-age series for plaice, sole, cod and haddock to the Celtic Seas Ecoregion Working Group (WGCSE). These are used for tuning purposes.

2. Survey methods

The survey will be conducted on the RV Cefas Endeavour. A total of 108 stations have been planned over 20 days. Age samples and biological parameters will be taken from all target species and all species listed under Appendix VII of the DCR which are caught. Benthic by-catch information is collected at each station. Hydrographic data will be collected at a minimum of two stations per day. Any anthropogenic waste material will be recorded and weighed.
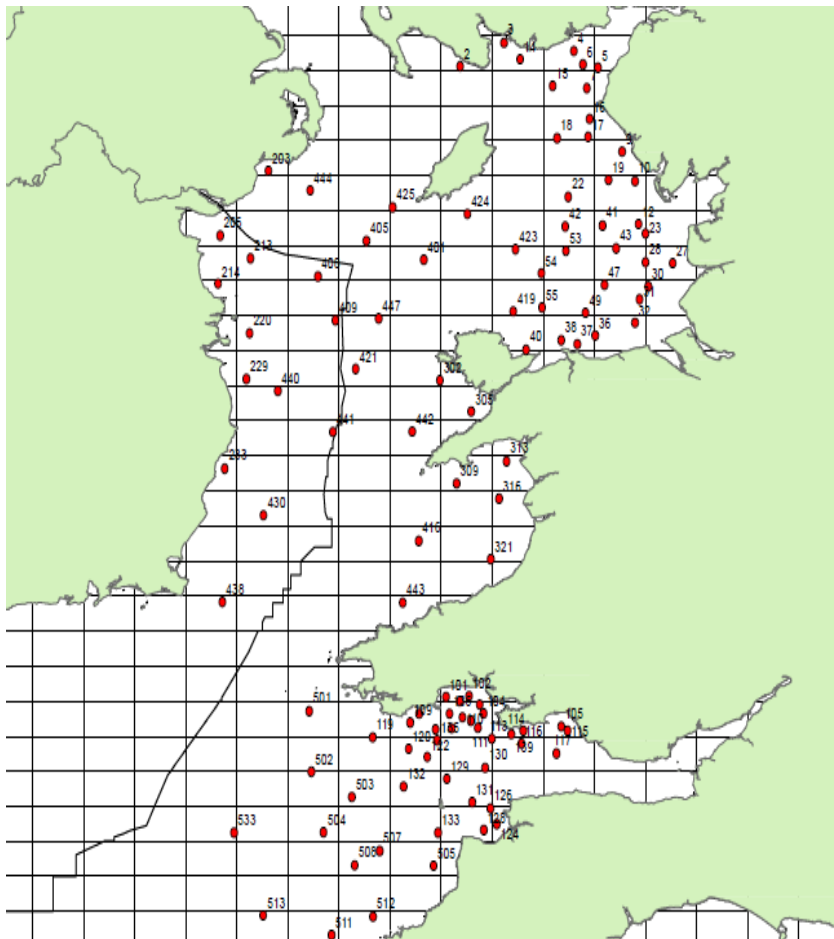
Figure 40. Map showing positions of survey stations ISBCBTS; Western waters; 3rd quarter, UK England VIIa,f,g

The resultant data will be input to a Cefas surveys database (FSS) using the Cefas Fisheries Electronic Data Capture (FEDC) System. All data will also be transmitted to ICES for input to the DATRAS database.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Standardised and agreed methodologies are coordinated at Beam Trawl Working Group (WGBEAM) to assure independent indices for each national survey.

Data used by Celtic Seas Ecoregion Working Group (WGCSE) for assessments.

No other countries/vessels participate in this survey.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Figure 41. ISBCBTS Q3 2023 completed survey area

Outcomes: All 108 prime stations were successfully completed in the twenty-day survey. Twenty-four of these were below the standard 30-minute tow duration due to a history of large sediment or epibenthic catches, or presence of commercial static gear restricting fishing. One station had to be moved due to a marker buoy deployed on the tow position.

Additional research requests met: Seven of twelve additional survey aims were completed, including collection of water samples for caesium and tritium analysis, genomic sampling to improve the methodology of sampling data-limited species and chlorophyll sampling for nutrient analysis.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Beam Trawl Surveys (WGBEAM) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The UK-England ISBCBTS Q3 survey data feeds into Indices, spatial and temporal changes in the distribution and relative abundance of fish and fish assemblages for the relevant species to assessment Working Groups (WGs) and science groups. In addition to this, CTD (temperature and salinity) data are collected, but not these are not used in the assessments. In connection with the EU Data Collection Framework (DCF) marine litter and additional biological data from the surface and seabed at each trawling station were collected.

Main uses of the of the data collected from the *ISBCBTS Q3* survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (sole, plaice, cod, haddock, whiting, various skates and rays, LSD, nurse-hound and smoothhound). – used for advice
Biological sampling	National assessments
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators.
Other fish spp in haul	National and international. Predator-prey interaction/ecosystem model for biodiversity (Skates, *Squalus acanthias, Mustelus asterias* and other fish species).
Litter items in trawl	National and international. Anthropogenic monitoring – used in regional and environmental planning.

Spawning/Pre-spawning Herring acoustic survey, NIR-AS; UK Northern Ireland VIa, VIIa

1. Survey objectives

The primary objective is to estimate the distribution, abundance and population structure of herring and sprat in the Irish Sea by echo-integration and targeted midwater trawling in the Irish Sea (VIIa) and west of Scotland (VIa). A secondary objective is to conduct visual Marine Mammal Observation (MMO) and when possible Passive Acoustic Monitoring (PAM) of cetacean species to obtain the data required to determine species occurrence, density estimates and identify important habitats

2. Survey methods

The survey will be carried out in two phases whereby phase one will occur in the North Channel, western Irish Sea, North Wales coast and eastern Irish Sea (VIIa) and phase 2 will occur Survey of Scottish (VIa) and Manx coastal waters. Sampling will be carried out on a systematic grid of stations covering the spawning grounds and surrounding regions in the NE and NW Irish Sea. A total of approximately 1200 nautical miles are planned to be surveyed by eco-integration using a Simrad EK-60 echosounder (see below). Additional pelagic trawls (approx. 24) are to be carried out to obtain corresponding samples to validate estimates from acoustic data. Species compositions and length frequencies will be recorded from all trawl catches. Samples of up to 50 herring will be taken from each catch for recording of age and other biological parameters. Length-weight parameters will be estimated for fish species contributing significantly to the acoustic integrals. An additional intensified grid may be surveyed around the Isle of Man to investigate the effect of the timing of the spawning migration if timing allows.

Survey manual:

http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20(IPS).pdf
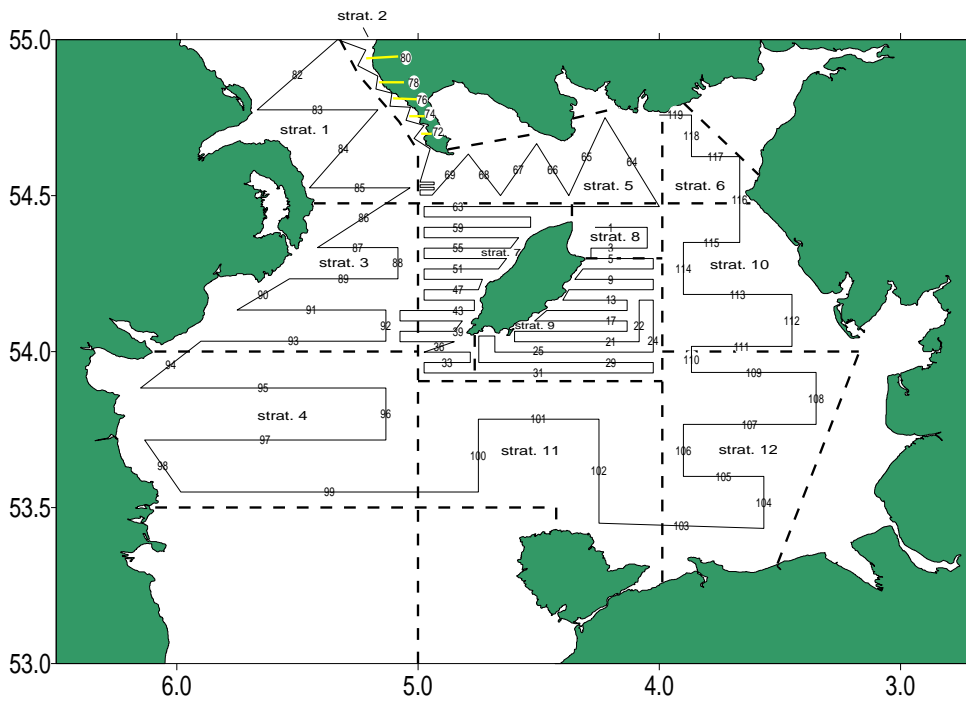
Figure 42. Transects and stratum boundaries for the NIRS-AS; Northern Irish Spawning/pre-spawning Herring Acoustic Survey

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

The survey is coordinated by ICES WGIPS. At present the survey in this area is only conducted onboard the RV Corystes (UK-Northern Ireland).

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
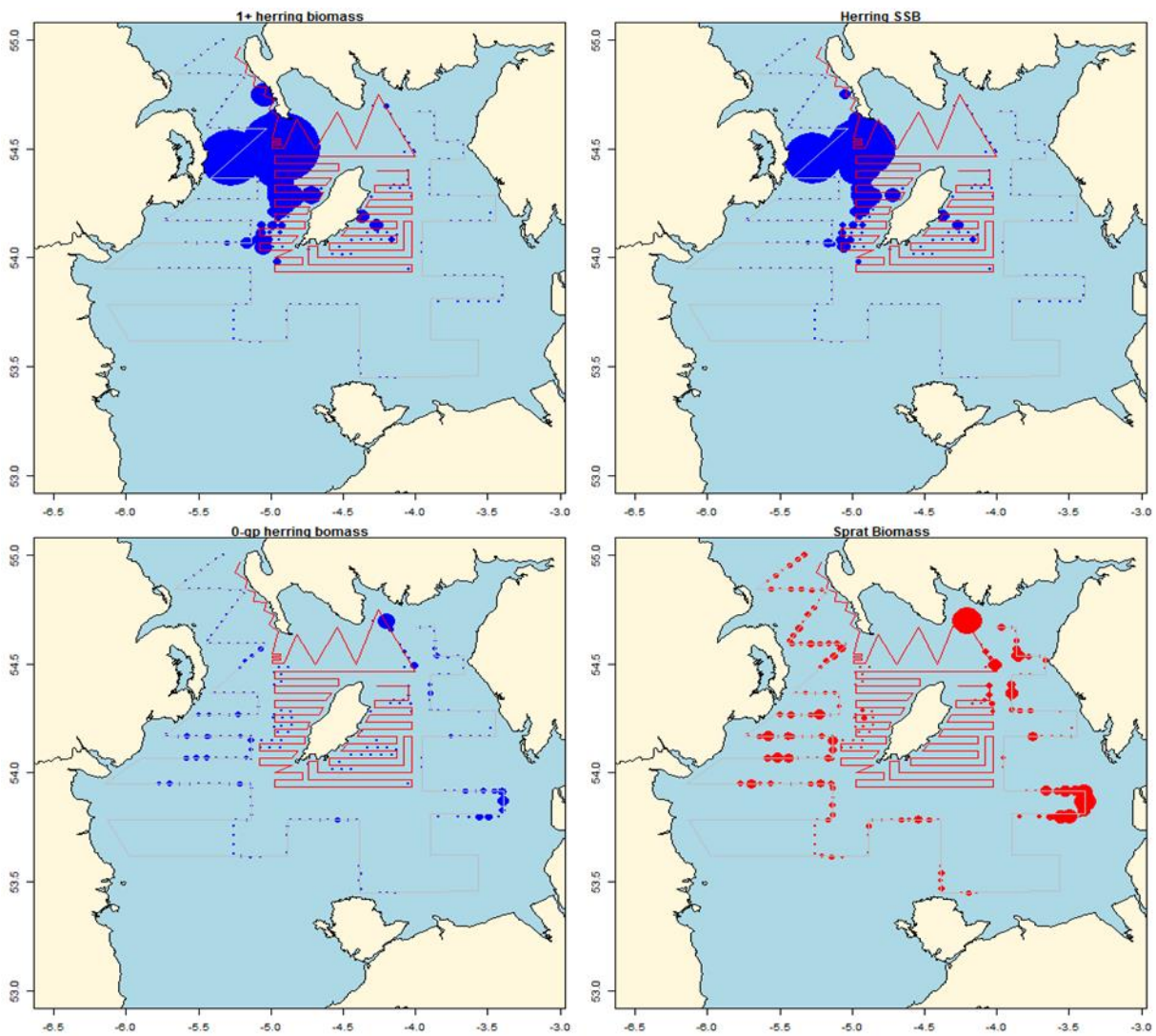
Figure 43. Transects and acoustic targets for the Northern Irish Spawning/pre-spawning Herring Acoustic Survey

Outcomes:

Survey completed at planned time, and targets of nautical miles and number of tows met. However, in the latter part of 2023 the RV Corystes was unable to enter Republic of Ireland (ROI) waters, and therefore transects in the south-west of the planned survey route were shortened. This impacted only a small portion of the planned survey transects, see figure above.

Additional research requests met:

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination

group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

https://ices-library.figshare.com/articles/report/Working_Group_on_International_Pelagic_Surveys_WGIPS_/25965769

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the NIR-AS

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (herring and sprat). – used for advice
Biological sampling	National assessments
CTD	National and international. Produces qualifiers to link biological and environmental indicators.
Litter items in trawl	National and international. Anthropogenic monitoring.

Nephrops UWTV survey (offshore), UWTV (FU11-13); UK-Scotland, VIa FU11-13; North Minch, South Minch, Clyde Sea, Stanton Bank

1. Survey objectives

To obtain estimates of distribution and abundance of Nephrops burrows in functional units to the west of Scotland using underwater television. This survey will be conducted by Scotia undertaking one extensive survey that includes both FUs11-13 (VIa) and FU7 / FU34 (IVa). To conform with the list of mandatory surveys under the Data Collection Framework in which separate surveys are listed for these functional units, the physical survey will be divided into two and reported separately by FU11-13 and FU7.

2. Survey methods

It is planned to complete 120 TV tracks and 3 fishing hauls. Additionally, information on size at maturity will be obtained.
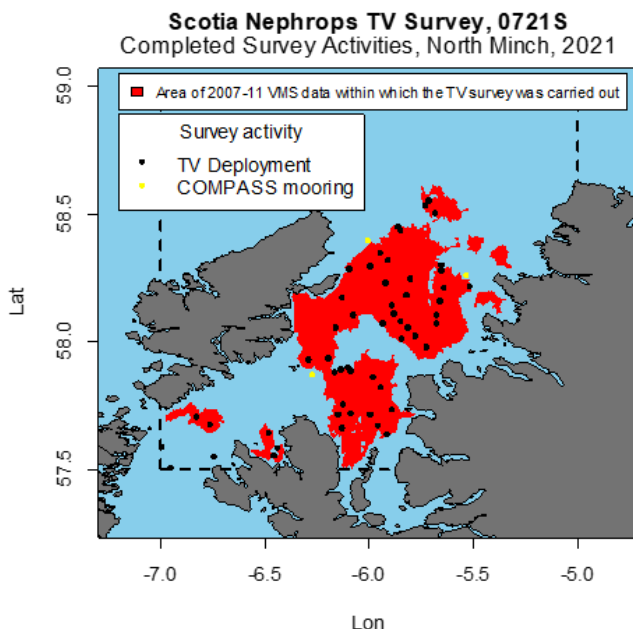
Figure 44. Map showing the location of the TV survey sites (in black) carried out during survey UWTV FU11-13 North Minch, within the extent of the study area based on 2007-2011 VMS data. The yellow icons represent the locations where moorings forming part of the COMPASS project were first recovered and replacement devices were deployed.
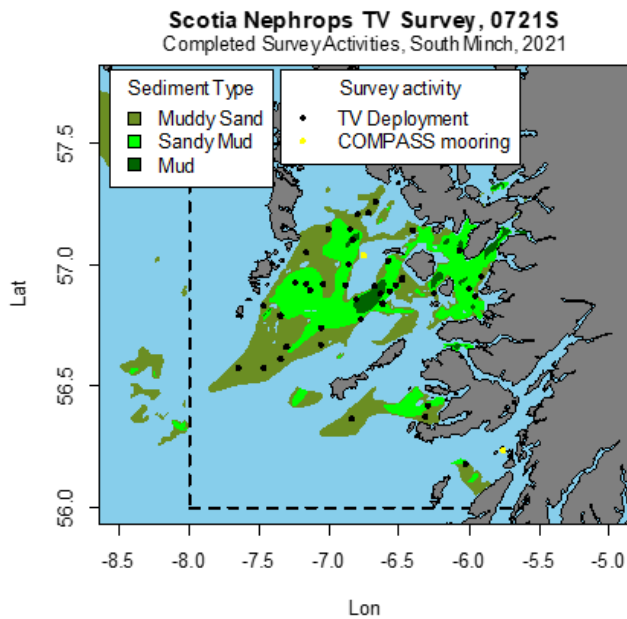
Figure 45. Map showing the location of the TV survey sites (in black) carried out during survey UWTV FU11-13, UK Scotland, South Minch, within the extent of the muddy sediments as described by BGS. The yellow icons represent the locations where moorings forming part of the COMPASS project were first recovered and replacement devices were deployed.
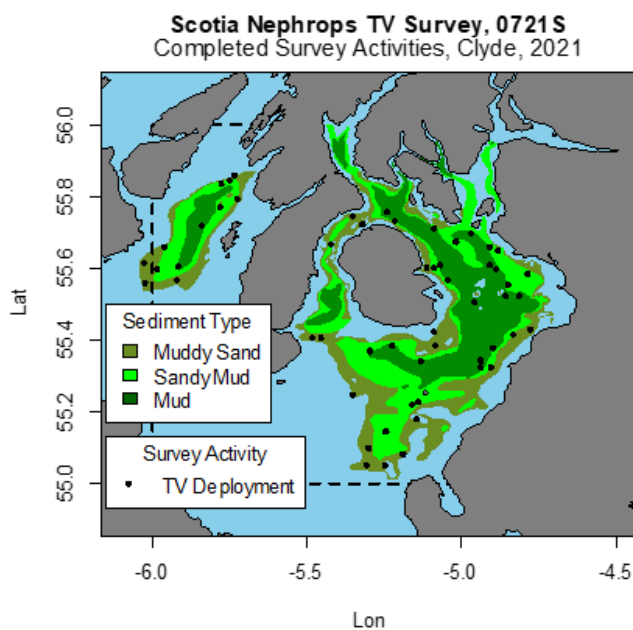
Figure 46. Map showing the location of the surveyed area showing the location of the TV survey sites (in black) carried out during survey UWTV (FU11-13); UK Scotland, Clyde and Sound of Jura, within the extent of the muddy sediments as described by BGS. The yellow icon represents the location where a mooring forming part of the MarPAMM project was recovered.

Video recordings are stored in DVD format and other data in an ACCESS database (WGNEPS is currently seeking to develop an international UWTV database and Scottish

data will be transmitted to it when/if it is developed). Video recordings will be analysed, and the results conveyed to the ICES Working Group on Celtic Seas Ecoregion (WGCSE).

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES Working Group on Nephrops Surveys (WGNEPS)

Data are used in functional unit assessments

Although Nephrops UWTV surveys are coordinated via WGNEPS, the surveys are generally carried out by individual countries sampling Functional Units in their own 'back yards' rather than defining multi-vessel surveys across entire sea areas.

No other countries/vessels participate in the survey of these FUs.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Figure 47. FU11 North Minch 2023
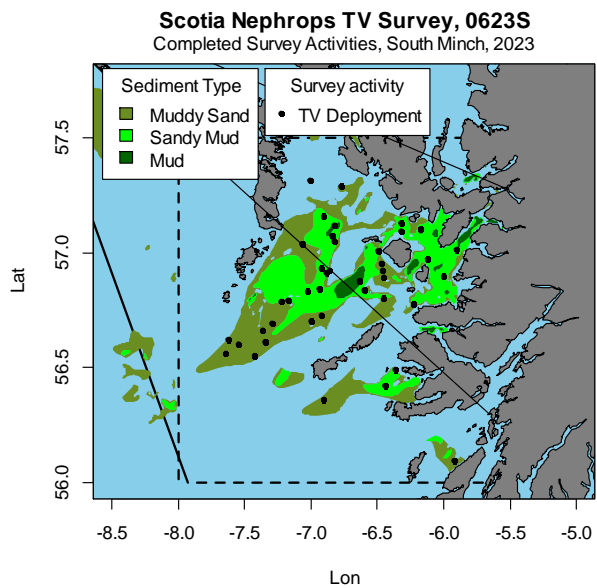
Figure 48. FU12 South Minch 2023
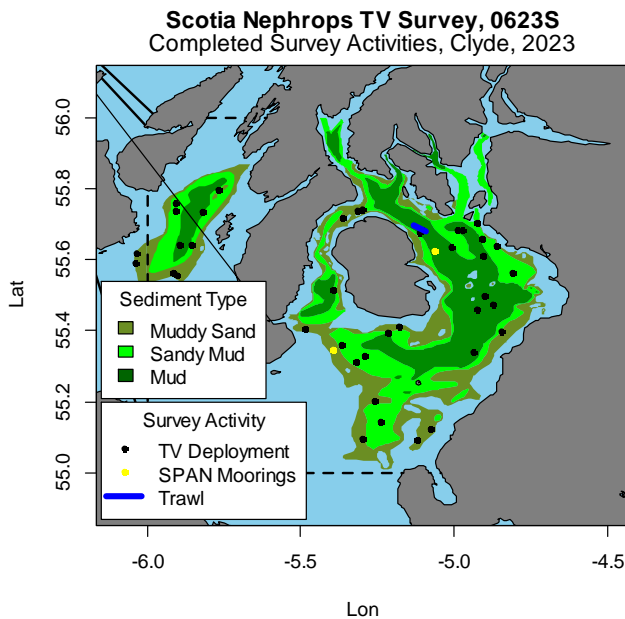
Figure 49. FU13 Clyde 2023

Outcomes: 48 TV stations and 45 sediment samples collected from the North Minch (FU 11). One fishing trawl was undertaken in the North Minch.

41 TV stations and 32 sediment samples collected from the South Minch (FU 12).

30 TV stations and 27 sediment samples collected from the Clyde (FU 13). In addition, 10 TV stations were completed in the Sound of Jura with 10 sediment samples collected. One fishing trawl was undertaken in the Clyde.

The Nephrops UWTV surveys were affected by the loss of Scotia as it was held in dry dock following an incident with another vessel. This meant that all survey areas were combined into one trip – apart from the Firth of Forth which was sampled on a later survey. TV surveying was prioritised over trawls.

Additional research requests met: It was aimed to retrieve 3 passive acoustic mooring and deploy a further 6 as part of the COMPASS project. All 6 moorings were successfully deployed, however it was only possible to retrieve one of the three moorings.

Any marine litter caught in trawls was recorded.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Nephrops Surveys (WGNEPS; outputs from 2022 meeting) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the UWTV *Nephrops* survey

Type of data collected	Assessment type
UWTV stations for Nephrops burrows.	Annual international Stock assessments – used for advice
Biological sampling	NA
Occurrence of benthic fauna	Used by external units for species spatial analysis.
Sediment samples (from all stations)	Analysed for particle size analysis: relationship between particle size and Nephrops burrow density and changes over time.

Nephrops UWTV Irish Sea, UWTV (FU14); UK Northern Ireland Eastern Irish Sea, VIIa

1. Survey objectives

To investigate the distribution, biology, and population structure of Nephrops (Nephrops norvegicus) in the eastern Irish Sea, using underwater television.

2. Survey methods

The Nephrops UWTV (FU 14) will take place in the Eastern Irish Sea (see below) during the last week in July. The total duration of the cruise is planned to be 3 days. In FU 14 the aim is to complete 38 camera tracks. The camera tracks will be of 15 minutes duration whereby within each minute the number of Nephrops burrows will be counted by a minimum of two experienced surveyors.

Figure 50. Map showing the survey area and stations UWTV (FU14); UK Northern Ireland Eastern Irish Sea, VIIa

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

The survey is coordinated by ICES WGNEPS. At present the survey is conducted onboard the RV Corystes (UK-Northern Ireland).

No other countries/vessels participate in the survey of this FU.

Staff exchange occurs from the Irish Marine Institute and the Agri-food and Bioscience Institute. Staff from the Marine Institute provides technical and physical support during the UWTV stage of the survey.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Figure 51. FU14 East Irish Sea 2023, showing distribution on UWTV trawls (in black), heatmap colours show predicted density of *Nephrops* burrows. Number below image is the predicted abundance of *Nephrops in millions.*

Outcomes: Survey completed as planned

Additional research requests met: NA.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

2023 WGNEPS Working Group report not yet published by ICES.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the UWTV *Nephrops* survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (*Nephrops*). – used for advice
Biological sampling	National assessments
CTD	National and international. Produces qualifiers to link biological and environmental indicators.

Nephrops UWTV Irish Sea, UWTV (FU15); UK Northern Ireland, Western Irish Sea, VIIa

1. Survey objectives

To investigate the distribution, biology, and population structure of Nephrops (Nephrops norvegicus) in the western Irish Sea, using underwater television.

2. Survey methods

The Nephrops UWTV (FU 15) will occur in the Western Irish Sea (see below) during the last week in July. The UWTV phase of the survey is planned to last 7 days. In FU15 the aim is to complete 100 camera tracks. The camera tracks are planned for 15 minutes whereby within each minute the number of Nephrops burrows are counted by a minimum of two experienced surveyors. A trawling phase of the survey is planned to last 5 days with 24 trawl stations to be sampled using a commercial Nephrops otter-trawl with 70mm mesh net and 45mm cod end for a 30-60 minute tows at fixed-position stations to investigate the distribution, biology, and population structure of Nephrops in the western Irish Sea. The trawl catch will be sorted and quantified at the species level, and length compositions to be recorded for all species. Data on Nephrops is to be collected by sex and maturity stage. Additional data on epibenthos will be recorded using a small beam trawl.

Figure 52. Map showing the survey area and UWTV stations UWTV (FU15); UK Northern Ireland Western Irish Sea, VIIa
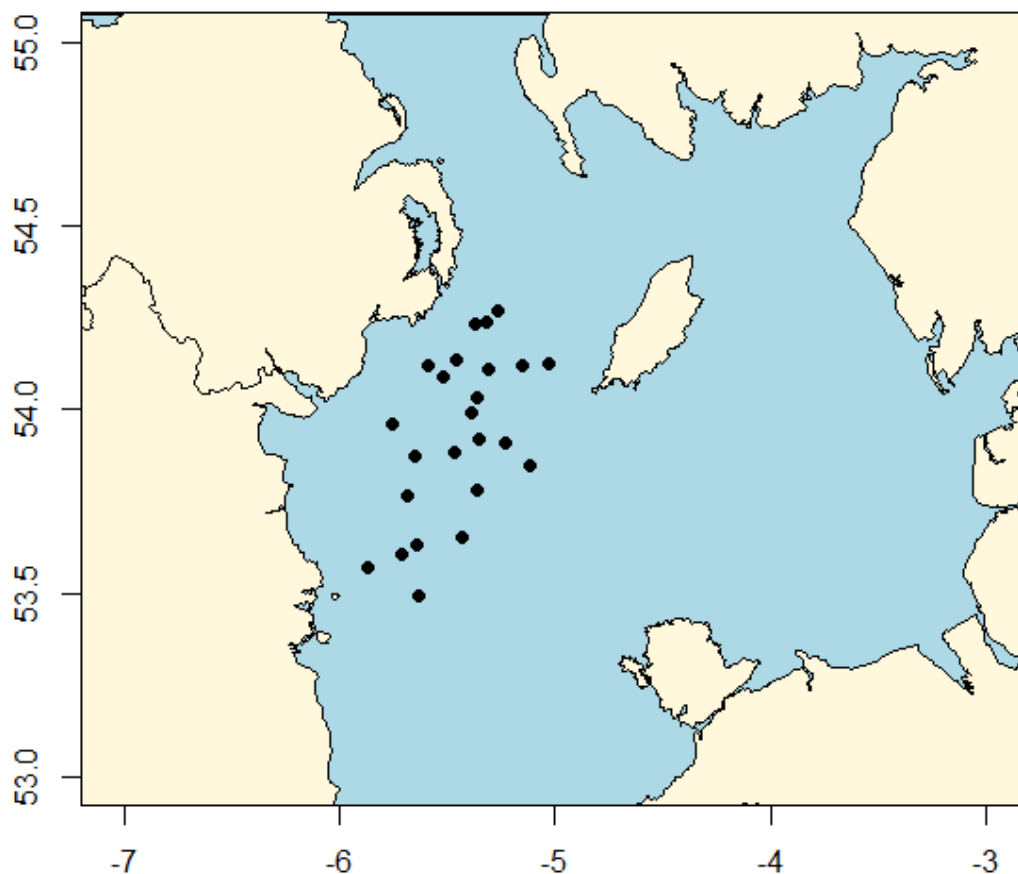
Figure 53. Map showing the trawl stations UWTV (FU15); UK Northern Ireland Western Irish Sea, VIIa

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

The survey is coordinated by ICES WGNEPS. At present the survey is conducted onboard the RV Corystes (UK-Northern Ireland).

No other countries/vessels usually participate in the survey of this FU.

Staff exchange occurs from the Irish Marine Institute and the Agri-food and Bioscience Institute. Staff from the Marine Institute provides technical and physical support during the UWTV stage of the survey.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
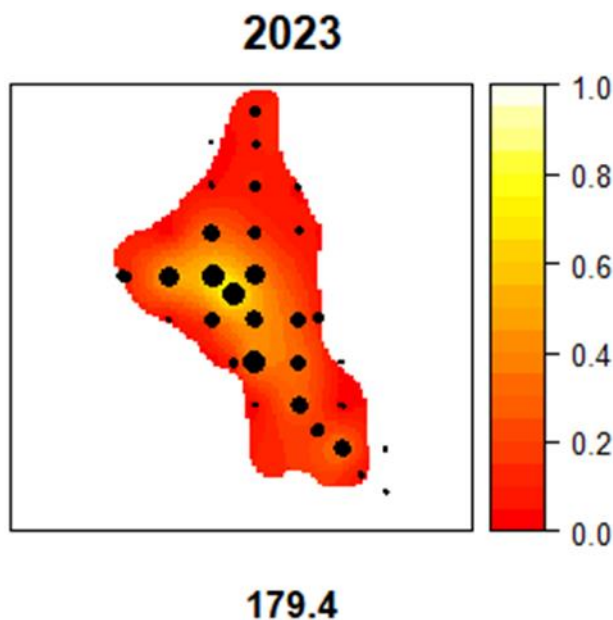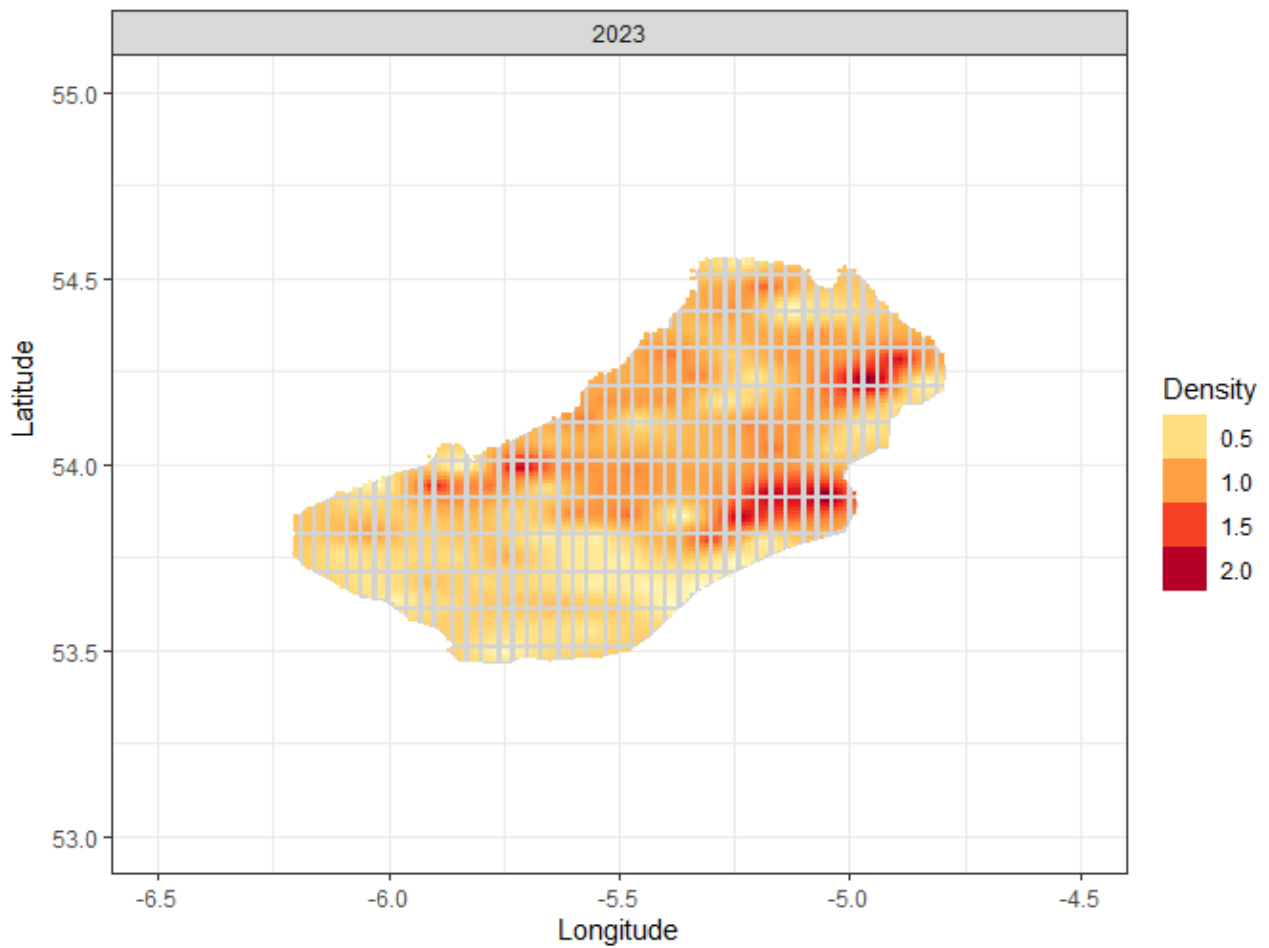
Figure 54. Map showing the survey area and UWTV stations UWTV (FU15); UK Northern Ireland Western Irish Sea, VIIa 2023 Colours indicate predicted densities of *Nephrops* burrows
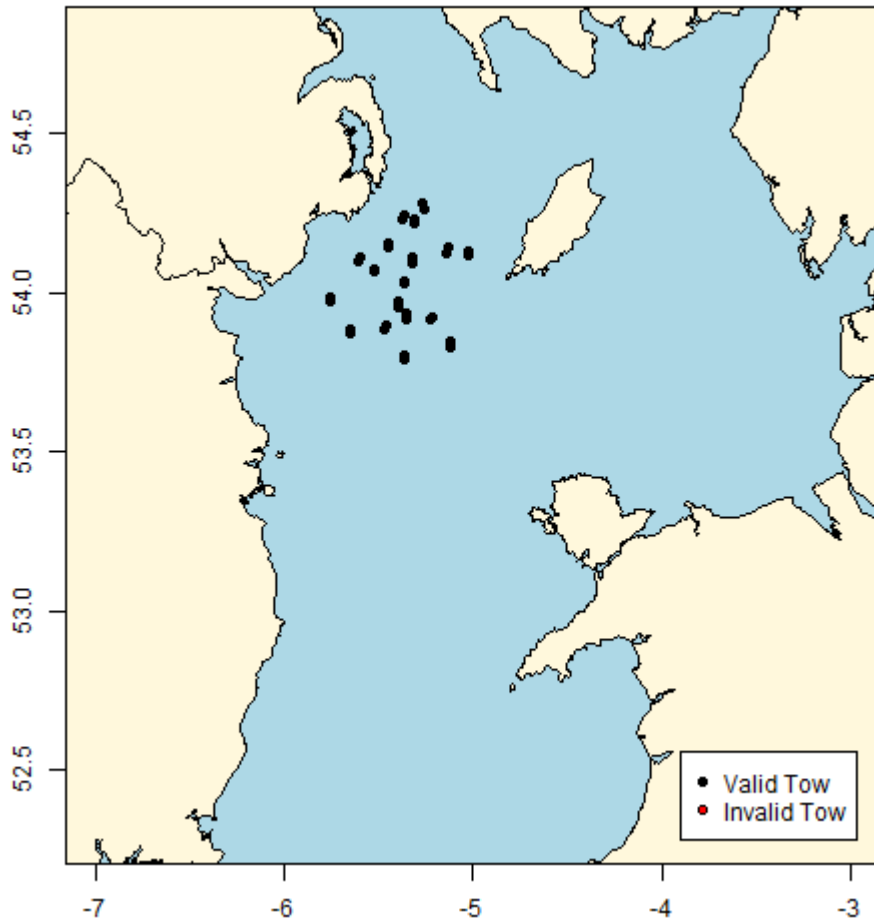
Figure 55. Map showing the trawl stations UWTV (FU15); UK Northern Ireland Western Irish Sea, VIIa 2023

Outcomes:

In the latter part of 2023, the RV Corystes was unable to enter Republic of Ireland (ROI) waters due to technical issues relating to the vessel. In UWTV (FU 15), approximately 1/3 of stations are within ROI waters. UWTV footage of these stations was recorded on AFBI's behalf by the Marine Institute of Ireland onboard the RV Tom Crean. UWTV footage was returned to AFBI staff for processing and analysis, including this footage, 96 of 100 stations were covered. The remaining 4 stations could not be surveyed safely, due to the presence of static fishing gear in the area and poor weather conditions.

Additional research requests met: NA

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Nephrops Surveys - WGNEPS (ices.dk)

2023 WGNEPS Working Group report not yet published by ICES.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the FU15 Trawl and UWTV - FU15 survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (Nephrops). – used for advice
Biological sampling	National assessments
CTD	National and international. Produces qualifiers to link biological and environmental indicators.
Biological parameters	Nephrops sex ratio and length.
Benthic species	Catch composition
Litter items in trawl	National and international. Anthropogenic monitoring.

Rockall Haddock survey, SCOROC - Q3; UK Scotland component Rockall (VIb)

1. Survey objectives

To carry out a bottom trawl survey of haddock on the Rockall Plateau to depths of 350m. Temperature and salinity profiles are collected at selected stations as well as biological samples (genetics and otoliths) of other key species for population studies (haddock, mackerel, whiting, cod, saithe, skates/rays)

2. Survey methods

The survey design is random stratified with the survey divided into 4 depth strata bounded overall by the 350m depth contour. The survey excludes two areas that lie largely within this zone. Both are North East Atlantic Fisheries Commission (NEAFC) closures designed to protect vulnerable marine ecosystems (VMEs). 45 30-minute trawl hauls are planned.
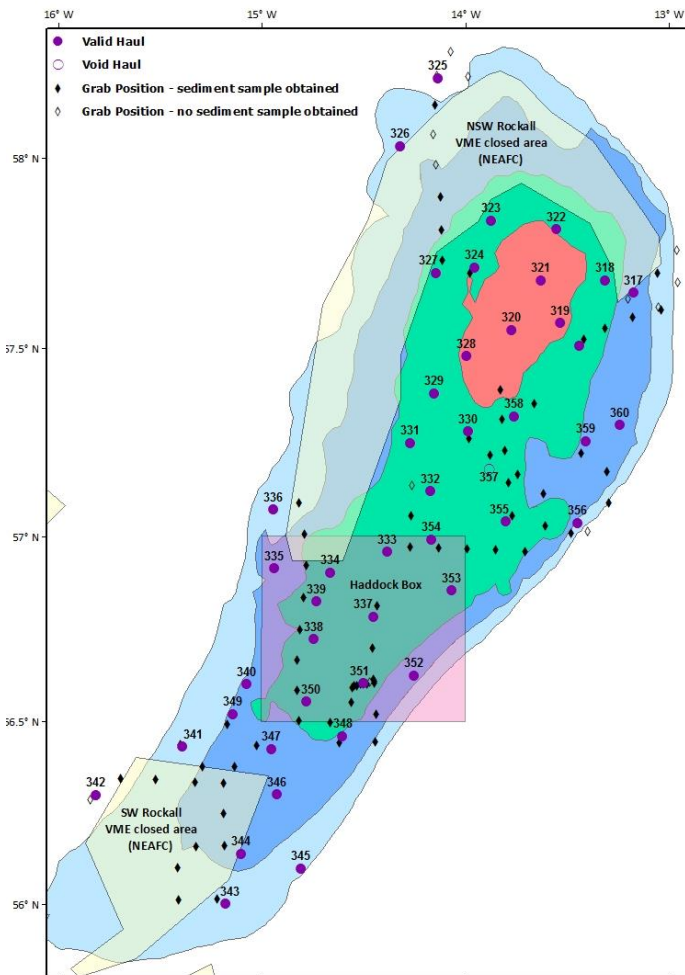
Figure 56. Map showing positions of survey stations SCOROC Q3; UK Scotland component Rockall (VIb)

Data will be stored electronically within FSS database at MSS prior to be uploaded to the ICES DATRAS database.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

ICES International Bottom Trawl Survey Working Group. Data sent to WGCSE and for assessments.

Scotia (UK-Scotland); Vizcondede Eza (Spain)

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
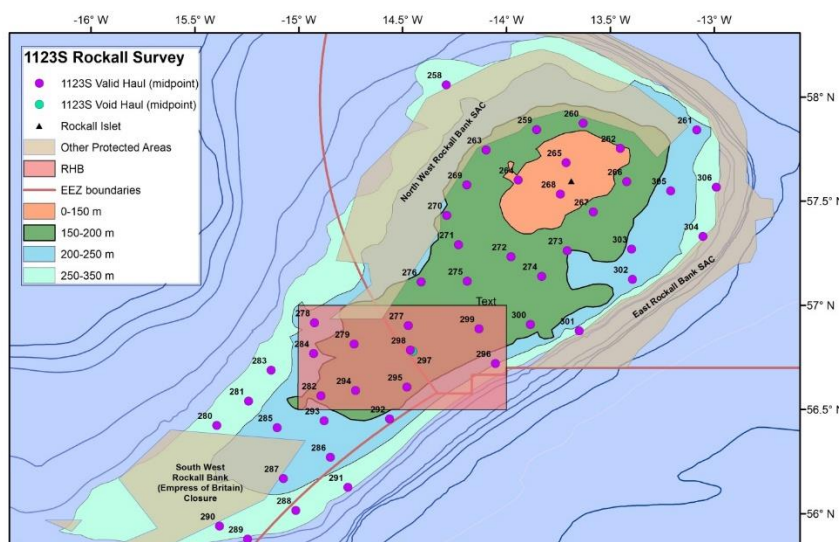
Figure 57. SCOROC realised survey area 2023

Outcomes: 14 days and 47 (46 valid) fishing hauls were achieved. The CTD was deployed at a subset of 27 trawl stations. Length, age, sex and weights were collected for all species with external maturities estimated for elasmobranchs before returning them to the sea, alive.

All marine litter picked up in the trawl was classified, quantified and recorded. Data were uploaded to DATRAS.

All fish and macrobenthos were screened for non-indigenous species.

Additional research requests met: A subset of VME macrobenthos indicator species were recorded for submission to ICES in advance of WGDEC 2024.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination

group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

International Bottom Trawl Survey Working Group (IBTSWG) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the Rockall survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (Haddock, Cod in VIb) – used for advice
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators. MSFD
Other fish spp in haul	National and international. Predator-prey interaction/ecosystem model for biodiversity (Skates, Squalus acanthias, Mustelus asterias and other fish species).
Litter items in trawl	National and international. Anthropogenic monitoring.

Western Channel Beam Trawl Survey, VIIe, 1st quarter, SWECOS; UK England, Ecosystem survey VIIe,f,g,h,j

1. Survey objectives

To provide estimates of abundance of recruiting year classes and CPUE-at-age series for plaice and sole to the Celtic Seas Ecoregion Working Group (WGCSE). These are used for tuning purposes. As the Celtic Sea time series grows, further species tuning indices will be provided to assessment WGs.

2. Survey methods

The survey will be conducted on the RV Cefas Endeavour. A total of 131 stations have been planned over 30 days. Age samples and biological parameters will be taken from all target species and all species listed under Appendix VII of the DCR which are caught. Benthic by-catch information is collected at each station. Hydrographic data will be collected at a minimum of two stations per day. Any anthropogenic waste material will be recorded and weighed.
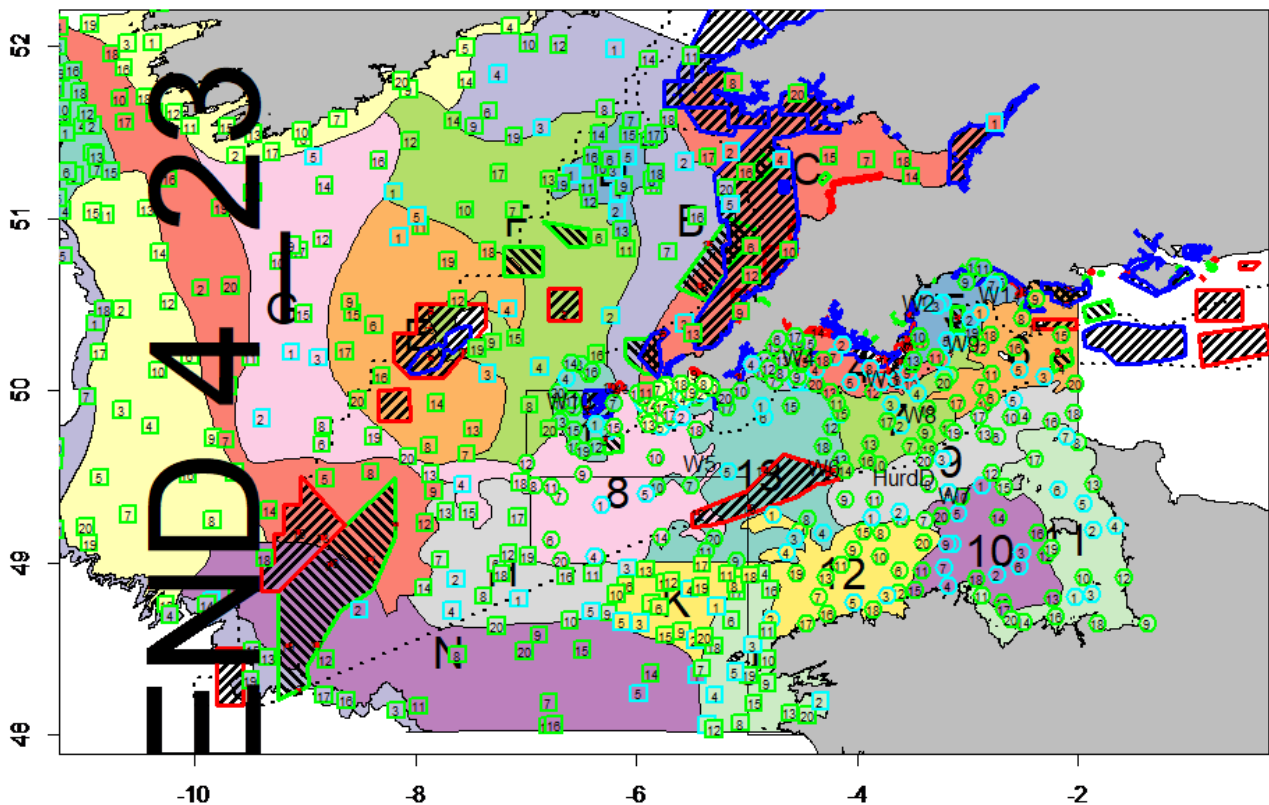
Figure 58. Map showing positions of example survey stations SWECOS; UK England, Ecosystem survey VIIe,f,g,h,j

The resultant data will be input to a Cefas surveys database (FSS) using the Cefas Fisheries Electronic Data Capture (FEDC) System. All data will also be transmitted to ICES for input to the DATRAS database.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Standardised and agreed methodologies are coordinated at Beam Trawl Working Group (WGBEAM) to assure independent indices for each national survey.

Data used by Celtic Seas Ecoregion Working Group (WGCSE) for assessments.

No other countries/vessels participate in this survey.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Figure 59. SWECOS 2023 completed survey area

Outcomes: A total of 77 out of 81 planned tows over 24 survey days at sea in the western Channel survey area were successfully fished along with 22 out of a planned 50 tows in the Celtic Sea. The reduced days working on the survey (4 days in port for technical issues and days due to poor weather) led to the loss of 4 tows in the western Channel and 28 tows in the Celtic Sea. However, following survey design of completing stations in

numerical order reduces the number of valid tows in the Celtic Sea to 18 valid tows, with the remaining 4 tows to be considered as 'additional'.

Additional research requests met: Thirteen of the seventeen additional aims were completed, these included collecting water samples for caesium and tritium analysis, providing additional information on data-limited species and collection of a zooplankton sample to maintain a long-standing time series of sampling in the target area.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Working Group on Beam Trawl Surveys (WGBEAM) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The UK-England Q1SWECOS Q1 survey data feeds into Indices, spatial and temporal changes in the distribution and relative abundance of fish and fish assemblages for the relevant species to assessment Working Groups (WGs) and science groups. In addition to this, CTD (temperature and salinity) data are collected, but not these are not used in the assessments. In connection with the EU Data Collection Framework (DCF) marine litter and additional biological data from the surface and seabed at each trawling station were collected.

Main uses of the of the data collected from the *SWECOS* survey

| Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (sole and plaice). – used for advice
Biological sampling	National assessments
CTD by Haul	National and international. Produces qualifiers to link biological and environmental indicators.
Other fish spp in haul	National and international. Predator-prey interaction/ecosystem model for biodiversity (Skates, *Squalus acanthias, Mustelus asterias* and other fish species).
Litter items in trawl	National and international. Anthropogenic monitoring – used in regional and environmental planning.

Quarter 1 Irish Sea Groundfish Survey, NIGFS Q1; Northern Ireland, VIIa

1. Survey objectives

The Northern Irish Groundfish Survey (NIGFS Q1) Irish Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIIa. The primary species of interest are cod, haddock and whiting, herring, and plaice.

2. Survey methods

The survey will be carried out in the Irish Sea (see below) and aims to depart at the start of March with a duration of 23 days (weather dependent). A target of 62 stations of fixed positions are towed using a rock-hopper otter trawl with a 17m footrope fitted with 250 mm non-rotating rubber discs. The survey is divided in strata defined by length and substratum. Scanmar sensors were fitted to gear and trawl parameters recorded. In addition, temperature and salinity are recorded at each station. The species composition of each catch is to be recorded by total weight of species caught and length frequencies recorded for all species. Dependent of the number of individual fish caught all samples of cod, haddock, herring, and whiting have length, weight, sex, and maturity recorded and otoliths are to be obtained for aging. If the number of individual fish is large, an appropriate sub-sample should be taken. The biological samples of code and herring may be further analysed for parasite burden.

Survey manual:

http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP1-IBTSVIII.pdf
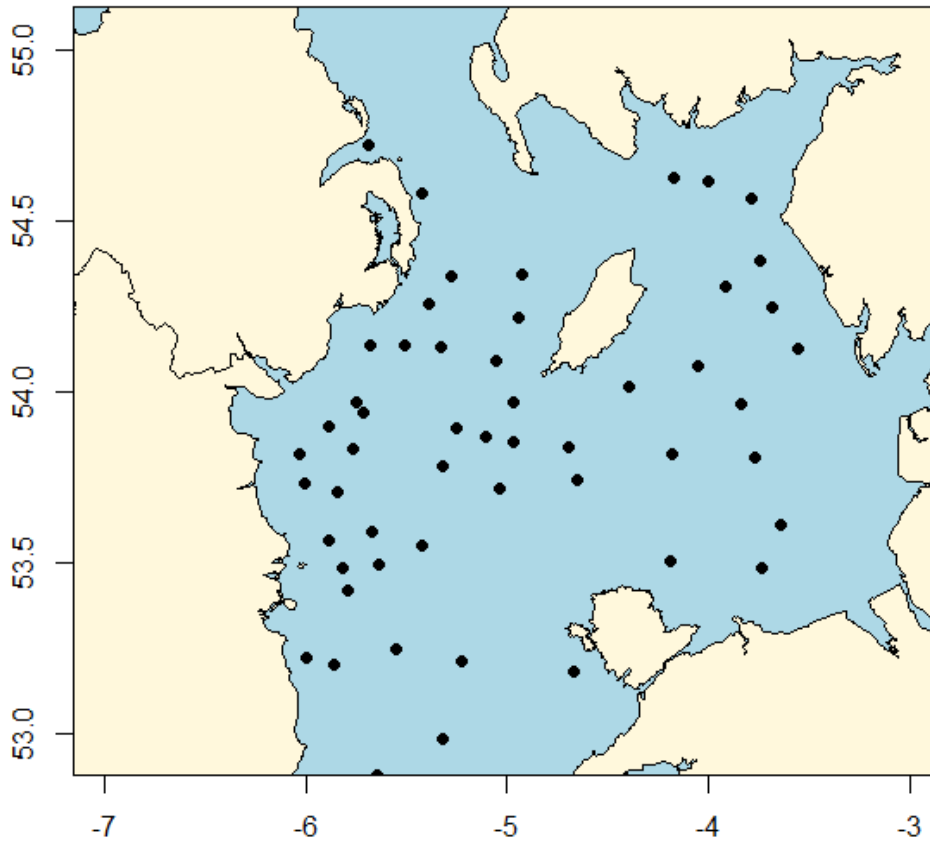
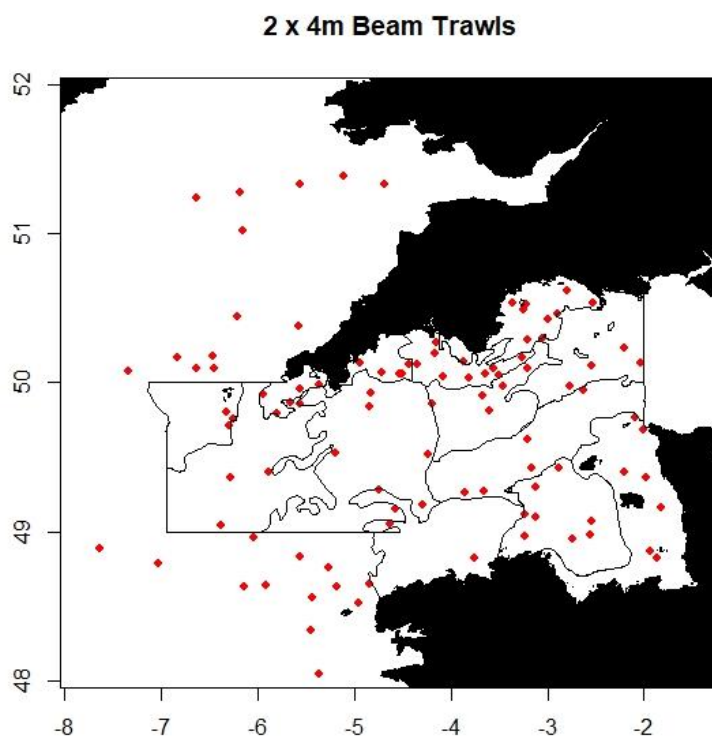**Figure 60. Map showing positions of trawl stations NIGFS Q1; Northern Ireland, VIIa.**

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

The survey is coordinated by ICES IBTSWG. At present the survey is conducted onboard the RV Corystes.

Scotia (UK-Scotland); Corystes (UK-Northern Ireland); Celtic Explorer (Ireland); Thalassa (France); Miguel Oliver (Spain); Noruega (Portugal)

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
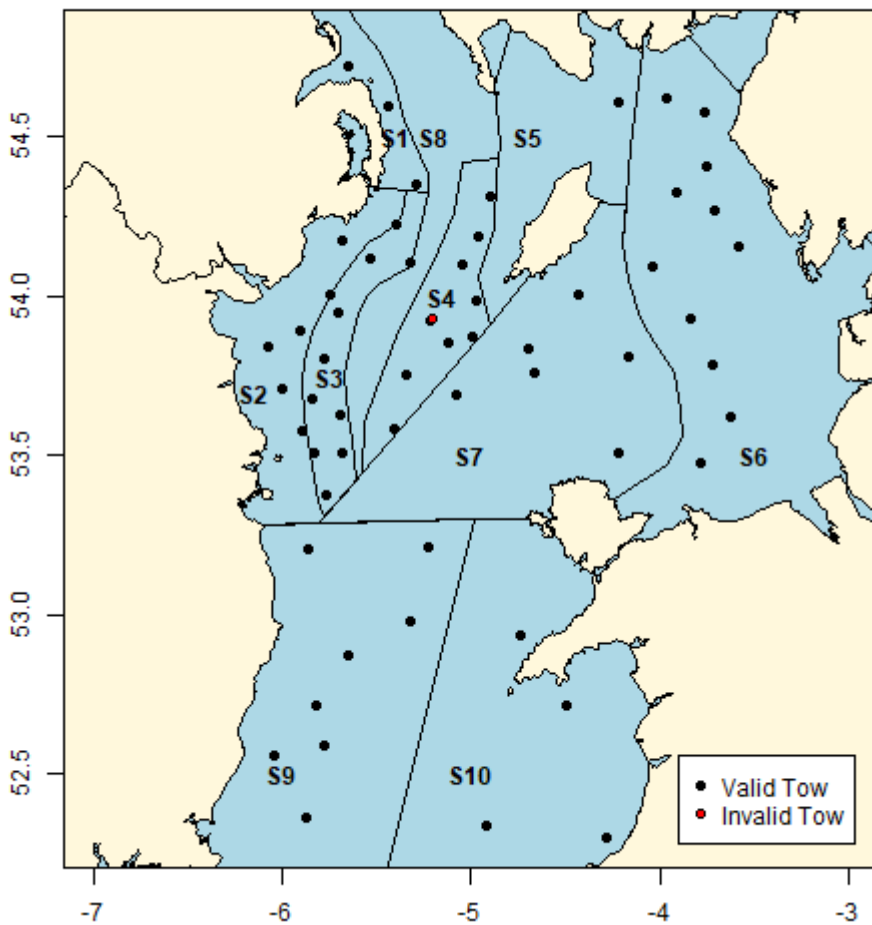
Figure 61. Map showing positions of trawl stations NIGFS Q1; Northern Ireland, VIIa.

Outcomes: 58 of 62 stations sampled.

Additional research requests met: Stomach samples were collected from the following species to contribute to ecosystem modelling and of the Irish Sea region, cod, haddock, whiting, hake, monkfish, *Nephrops* and common dragonets. Genetic samples were collected for analyses from cod, sprat, whiting and herring.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

IBTSWG (ices.dk)

Report of the 2024 meeting of the ICES International Bottom Trawl Survey Working group not yet published by ICES.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the NIGFS Q1 survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (cod, haddock, plaice, whiting, sole). – used for advice
Biological sampling	National assessments
All species in catch	Length and weight - Catch composition and biodiversity indicators
Litter items in trawl	National and international. Anthropogenic monitoring.

Quarter 4 Irish Sea Groundfish Survey, NIGFS Q4; Northern Ireland, VIIa

1. Survey objectives

The Northern Irish Groundfish Survey (NIGFS Q4) Irish Sea survey aims to collect data on the distribution and relative abundance, and biological information of commercial fish in VIIa. The primary species of interest are cod, haddock and whiting, herring, and plaice.

2. Survey methods

The survey will be carried out in the Irish Sea (VIIa; see below) and aims to depart at the start of March with a duration of 19 days (weather dependent). A target of 62 stations of fixed positions are to be towed using a rock-hopper otter trawl with a 17m footrope fitted with 250 mm non-rotating rubber discs. The survey will be divided in strata defined by length and substratum. Scanmar sensors will be fitted to gear and trawl parameters recorded. In addition, temperature and salinity are to be recorded at each station. The species composition of each catch will be recorded by total weight of species caught and length frequencies recorded for all species. Dependent of the number of individual fish caught all samples of cod, haddock, herring, and whiting will have length, weight, sex, and maturity recorded and otoliths obtained for aging. If the number of individual fish is large, an appropriate sub-sample should be taken. The biological samples of cod and herring may be further analysed for parasite burden.

Survey manual:

http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP1-IBTSVIII.pdf
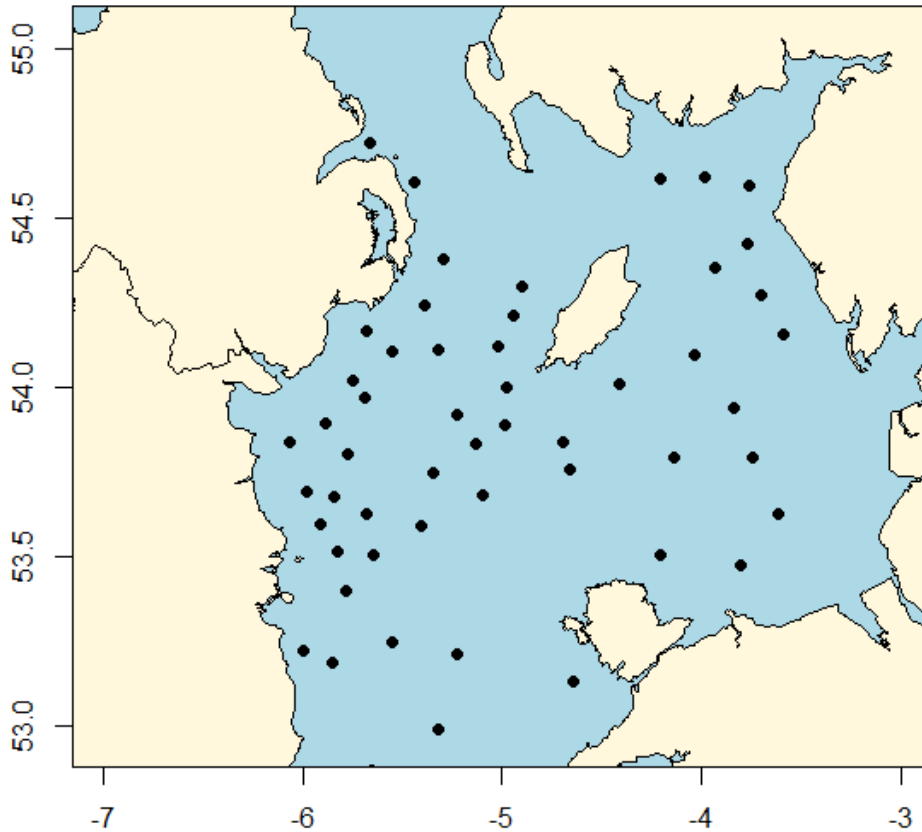
Figure 62. Map showing positions of trawl stations NIGFS Q4; Northern Ireland, VIIa.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

The survey is coordinated by ICES IBTSWG. At present the survey is conducted onboard the RV Corystes. Scotia (UK-Scotland); Corystes (UK-Northern Ireland); Celtic Explorer (Ireland); Thalassa (France); Miguel Oliver (Spain); Noruega (Portugal)

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
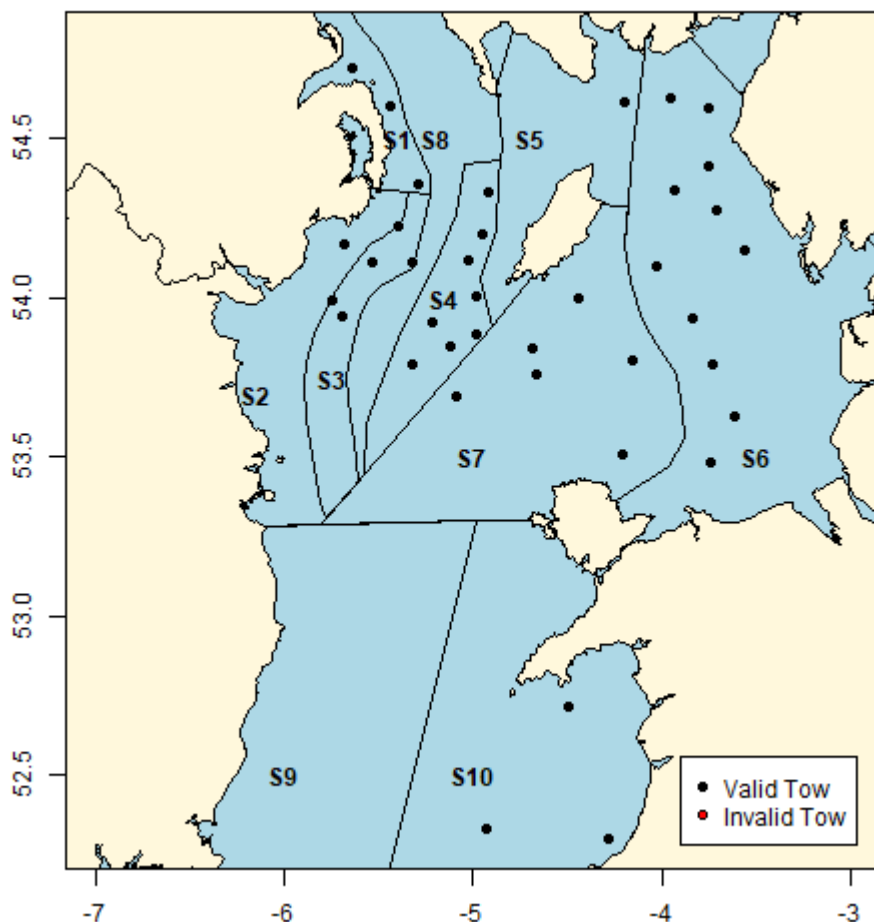
Figure 63. Map showing positions of trawl stations NIGFS Q1; Northern Ireland, VIIa.

Outcomes: The in the latter part of 2023 the RV Corystes was unable to enter Republic of Ireland (ROI) waters due to technical issues relating to the vessel. For NIGFS Q4 survey, a large proportion of the stations occur in ROI waters, and only 61% (38/61) of the target number of fish hauls could be conducted.

Additional research requests met: Stomach samples were collected for ecosystem modelling from cod, hake, *Nephrops* and whiting. Whiting samples were collected for contaminant analysis. Fin clips of spurdog were collected for further analysis, on request from DAERA.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

IBTSWG (ices.dk)

Report of the 2024 meeting of the ICES International Bottom Trawl Survey Working group not yet published by ICES.

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the NIGFS Q4 survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (cod, haddock, plaice, whiting, sole). – used for advice
Biological sampling	National assessments
All species in catch	Length and weight - Catch composition and biodiversity indicators
Litter items in trawl	National and international. Anthropogenic monitoring.

Northern Irish MIK net survey, NI-MIK; Northern Ireland, VIIa

1. Survey objectives

The objectives of the NI-MIK survey are:

- to investigate the distribution and abundance of juvenile gadoids in management area VIIa(N).
- to collect zooplankton, fish larvae and environmental data using the GulfVII.
- to monitor jellyfish abundance in the Irish Sea survey area.

2. Survey methods

The survey will take place in the Irish Sea (VIIa) between May-June lasting approximately 19 days, split across two phases. A grid of approximately 122 stations will be sampled with the high-speed plankton sampler (GulfVII) and 90 stations using the MIK net. MIK net sampling during the hours of darkness (sunset to sunrise). The nets are to be deployed to ~5m off the seabed. The deployment of the MIK net will be controlled using the Scanmar catch control system and towed at approximately 3knots. The GulfVII being towed at between 3-4knts. A member of the scientific staff will monitor the deployment of the MIK net and will require communication with the winch man from the bridge (VHF).
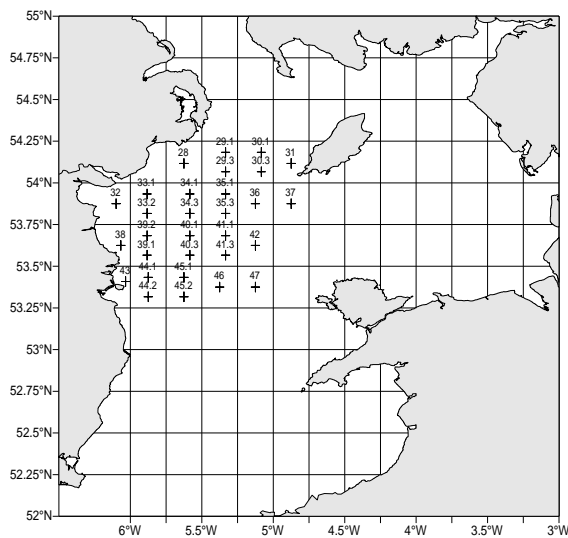
Figure 64. MIK net sampling stations NI-MIK phase i.
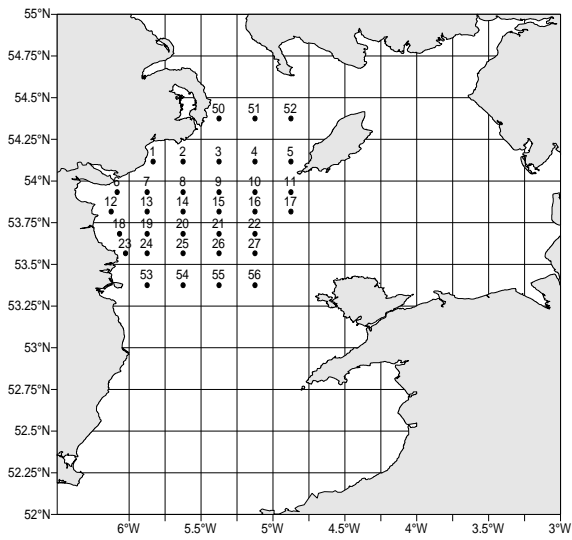
Figure 65. GULFVII sampling stations NI-MIK phase i
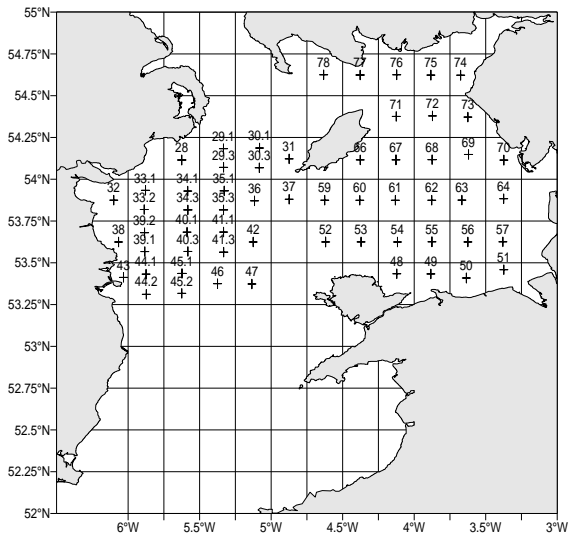
Figure 66. MIK sampling stations for NI-MIK phase ii.
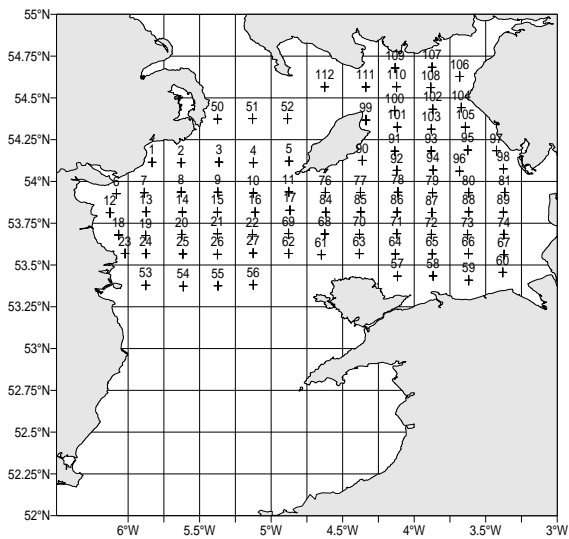
Figure 67. GulfVII sampling stations for NI-MIK phase ii

3. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
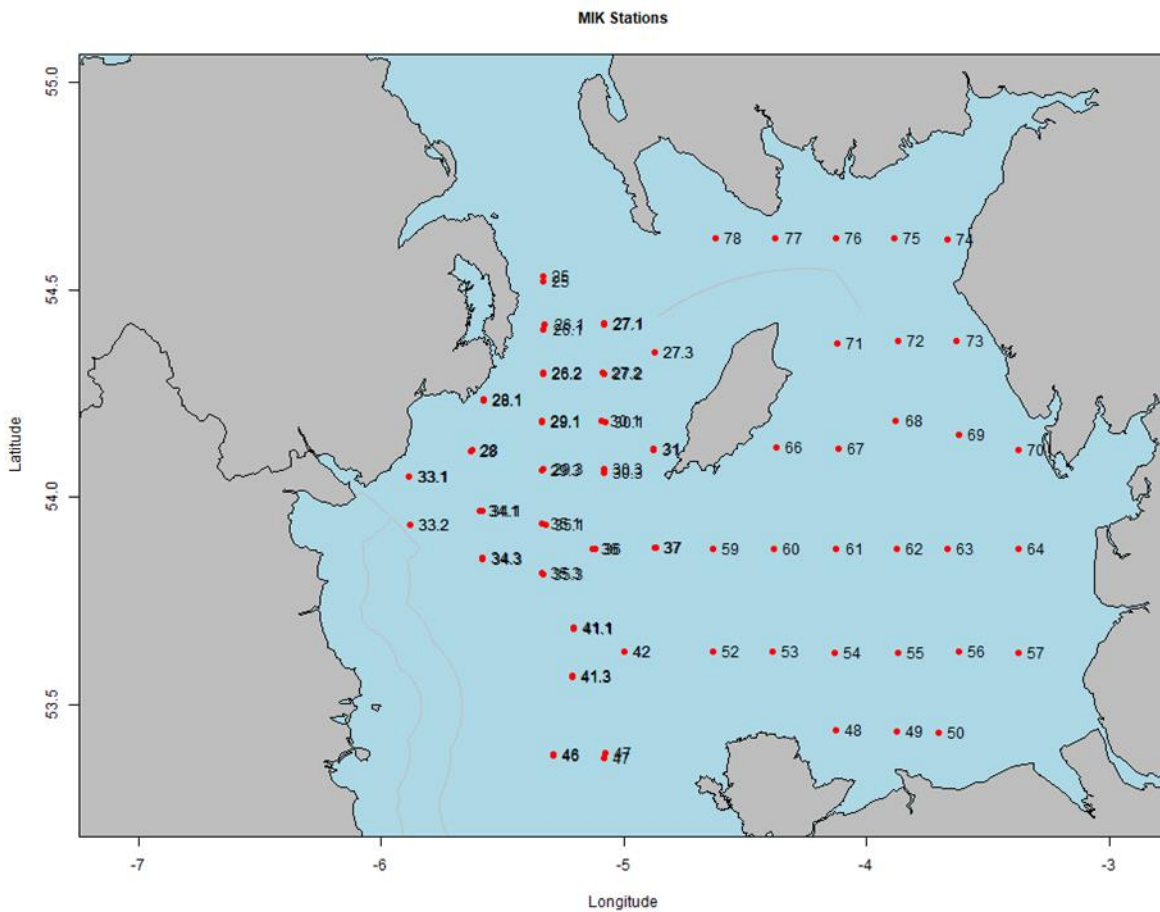
Figure 68. MIK net stations completed during 2023. Note that stations west of IOM sampled in phases i and ii.
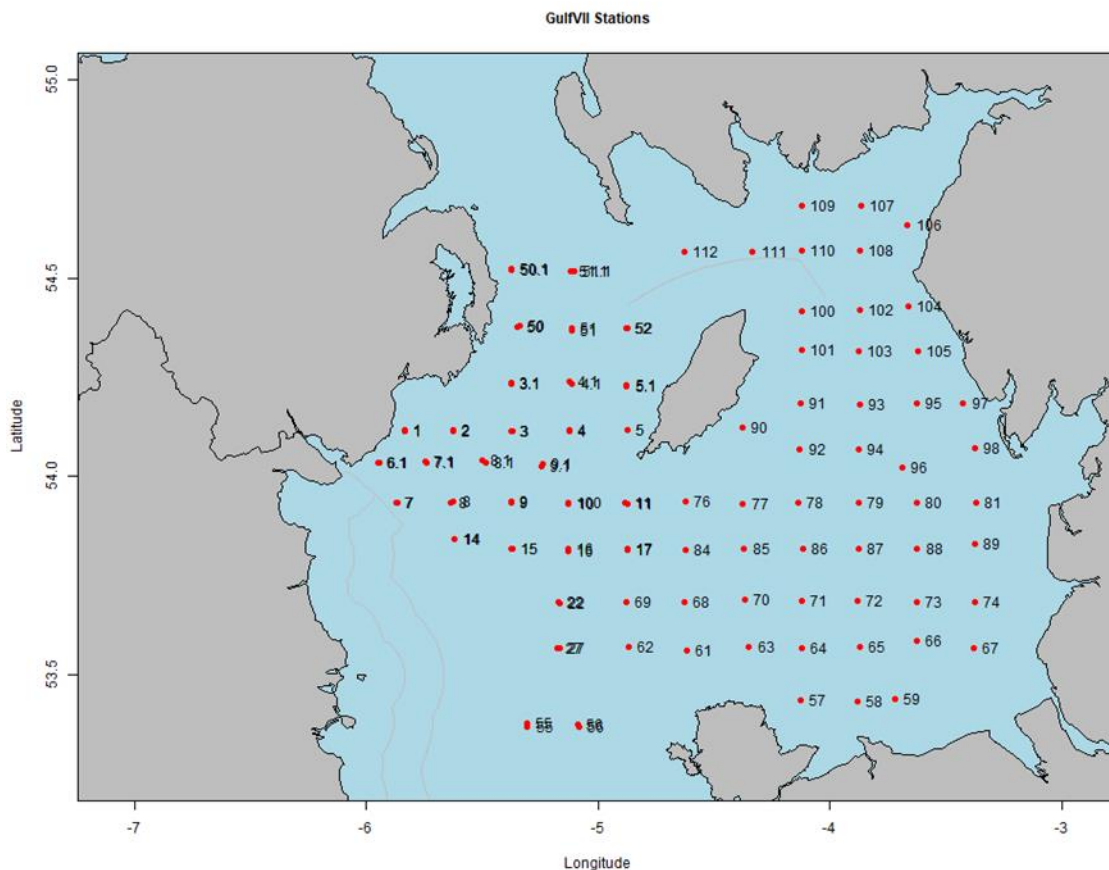
Figure 69. GulfVII stations completed during 2023. Note that stations west of IOM sampled in phases i and ii.

Outcomes: The Northern Irish MIK net survey (NI-MIK), completed 91% of its plankton targets and 89% of its MIK net targets. Due to technical issues relating to the vessel, the RV Corystes was unable to enter Republic of Ireland (ROI). The missed area includes a significant area of the known nursery grounds for gadoids in the Irish Sea.

Additional research requests met: NA

4. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the MIK Net survey

Type of data collected	Assessment type
Biological sampling	Annual international Stock assessments (haddock, and whiting). – used for advice
All planktonic species in catch	Identified and enumerated
Litter items in trawl	National micro-plastic sampling scheme

Irish Sea queen scallop survey, ISQSS; Northern Ireland, VIIa

1. Survey objectives

The objectives of the VIIa queen scallop survey are:

- to obtain information on spatial patterns of abundance of different size-classes of queen scallops in the Irish Sea and off the north coast;
- to collect biological information from queen scallops and scallops by area, including tissue samples;
- to collect information on by-catch species;
- to collect additional biological information on fish species.

2. Survey methods

The survey will occur at the end of June lasting approximately 4 days. A total of 30 stations will be selected at random from a fixed grid 0.03* 0.03 decimal degrees. The number of stations within strata selected will be from a function of historic queenie fishery within that strata and strata area. In addition, it is planned that 7 tows will take place using four dredges towed abreast, the outer dredges were as used by the commercial vessels for targeting queen scallops (width = 725 mm). The inner dredges were as used to target king scallop (width = 745 mm). These dredges will be selected based expert judgement from the camera tows.

At all stations the camera and sledge will be deployed. Film data from 15-minute tows at each station will be stored on DVDs. A USBL system is also to be used to enable the course taken by the sledge during tows to be tracked. This information is an essential input to calculation of the area of seabed swept during each tow.

All catch will be processed separately from the each of the dredge types. Length frequencies of all queen scallops will be taken and two from each length class (0.5cm) retained for biological sampling - length, breadth, and abductor muscle and gonad weights. Length frequencies of all finfish bycatch and counts of benthos are also to be recorded.

3. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
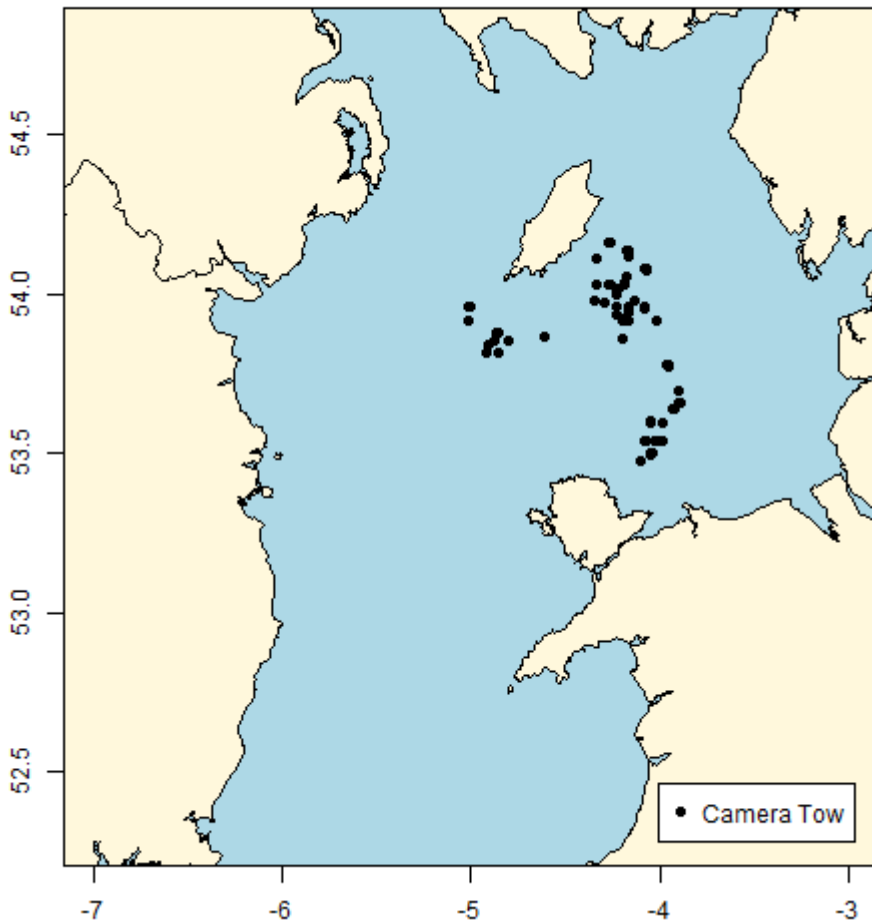
Figure 70. Indicative stations surveyed within the Irish Sea area of the ISQSS; UK Northern Ireland, VIIa survey.

Outcomes: Survey completed to plan. 43 UWTV stations were sampled, with reactive fishing hauls conducted at 8 stations.

4. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

These Scallop surveys are not internationally coordinated but results and methods are reviewed and published by ICES (WGSCALLOP)

https://ices-library.figshare.com/articles/report/Scallop_Assessment_Working_Group_WGScallop_outputs_from_2023_meeting_/25249255

Main uses of the of the data collected from the ISQSS survey

Type of data collected	Assessment type
Biological sampling	Annual national stock assessment of queen scallop
Biological sampling	National assessments
All species in catch	Identified and enumerated
Litter items in trawl	Litter monitoring

VIa queen scallop survey, NCQSS; Northern Ireland, VIa

1. Survey objectives

The objective of the VIa queen scallop survey are:

- to obtain information on spatial patterns of abundance of different size-classes of queen scallops;
- to collect biological information from queen scallops and scallops by area, including tissue samples;
- to collect information on by-catch species;
- to collect additional biological information on fish species.

2. Survey methods

The survey is planned for the start of July lasting approximately 6 days. A total of 40 stations are planned to be selected at random from a fixed grid 0.03* 0.03 decimal degrees. The number of stations within strata will be a function of historic queenie fishery within that strata and strata area. In addition, it is planned that 10 tows will take place using four dredges towed abreast, the outer dredges were as used by the commercial vessels for targeting queen scallops (width = 725 mm). The inner dredges were as used to target king scallop (width = 745 mm). These dredges will be selected based expert judgement from the camera tows.

At all stations the camera and sledge will be deployed. Film data from 15-minute tows at each station to be stored on DVDs. A USBL system is to be used to enable the course taken by the sledge during tows to be tracked. This information is an essential input to calculation of the area of seabed swept during each tow.

All catch should be processed separately from the each of the dredge types. Length frequencies of all queen scallops are to be taken and two from each length class (0.5cm) retained for biological sampling - length, breadth, and abductor muscle and gonad weights. Length frequencies of all finfish bycatch and counts of benthos will be recorded.

3. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
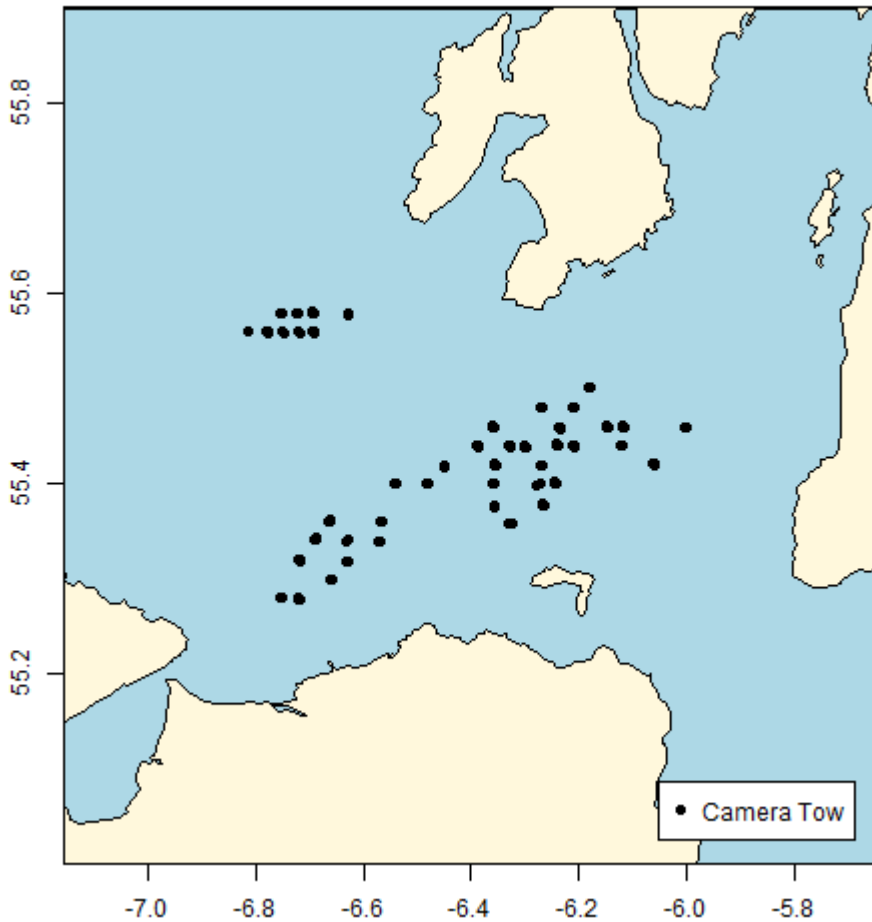
Figure 71. Stations surveyed within the North Coast area of the NCQSS; UK Northern Ireland, VIa survey. Stations surveyed by UWTV, red - exploratory stations; black – core fishery area stations.

Outcome:

47 UWTV stations were surveyed, with reactive trawl/dredge samples taken at 10 stations.

4. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

These Scallop surveys are not internationally coordinated but results and methods are reviewed and published by ICES (WGSCALLOP)

https://ices-library.figshare.com/articles/report/Scallop_Assessment_Working_Group_WGScallop_outputs_from_2023_meeting_/25249255

Main uses of the of the data collected from the NCQSS survey

Type of data collected	Assessment type
Biological sampling	Annual national stock assessment of queen scallop
Biological sampling	National assessments
All species in catch	Identified and enumerated
Litter items in trawl	Litter monitoring

VIa & VIIa Scallop survey, NIKSDS; Northern Ireland, VIa and VIIa

1. Survey objectives

The aim of the survey is to assess the scallop (Pecten maximus) grounds off the County Down coast and collect the following scallop data:

- catch per unit effort.
- scallop age composition
- weight, height, and length of individual scallops.
- abductor muscle and gonad weights.
- scallop shell samples were retained for morphometric study.

Identify and quantify macrofauna associated with scallops.

Collect samples of scallop abductor muscle and gonad for contaminant analysis.

2. Survey methods

The scallop survey will occur in mid-February for duration of approx. 5 days (weather dependent). 35 stations of fixed position are to be dredged using a beam with four 2-foot dredges and from the starboard trawl winch on 24mm warp. A fine mesh (<10mm) liner will be attached to one dredge to retain small benthic fauna. Catches are to be sorted and the associated fauna identified and counted. Scallops are to be weighed and shell length and height measured. Meat yield will be determined by measurement of the abductor muscle and gonad weight. Shells are to be aged by examination of growth bands on the flat shell and flat shells are retained for microscopic examination of hinge ligament scars after the cruise.

3. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
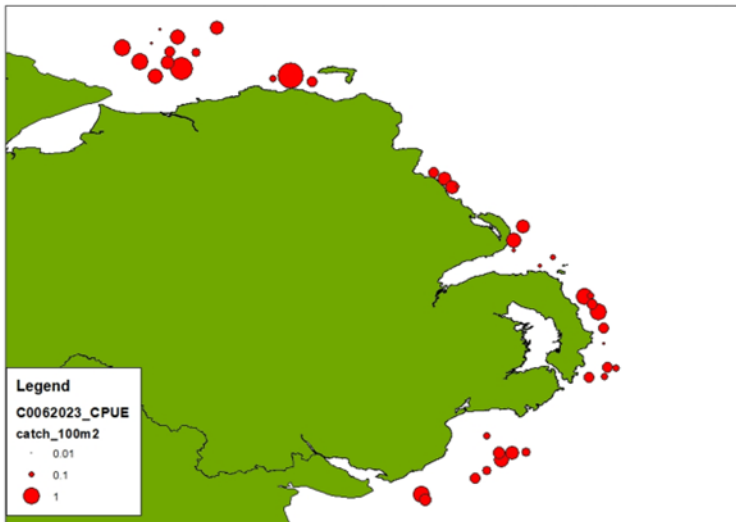
Figure 72. Location of stations (red dots) for dredging in the NIKSDS; UK Northern Ireland, VIa and VIIa survey. The size of dots represents the CPUE of king scallops at each station.

Outcome: Survey completed as planned, 42 dredge samples.

4. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

These Scallop surveys are not internationally coordinated but results and methods are reviewed and published by ICES (WGSCALLOP)

https://ices-library.figshare.com/articles/report/Scallop_Assessment_Working_Group_WGScallop_outputs_from_2023_meeting_/25249255

Main uses of the of the data collected from the NCQSS survey

Type of data collected	Assessment type
Biological sampling	Annual national stock assessment of Atlantic scallop
Biological sampling	National assessments
All species in catch	Identified and enumerated
Litter items in trawl	Litter monitoring

Western Channel Celtic Sea Pelagic survey, PELTIC; UK England and Wales, VIIe, VIIf, VIIg

1. Survey objectives

To carry out an acoustic survey to estimate the abundance and distribution of the small pelagic fish community (sprat, sardine, anchovy, mackerel, horse, mackerel) in the western English Channel and eastern Celtic Sea (ICES area VIIe,f and g; the "Mackerel Box"). This survey provides the only fishery independent data for these species in the area. Estimates of the abundance of sprat are presented at HAWG to feed into the stock assessment of sprat in VIIde; age disaggregated sardine abundances, requested by ICES under WKSAR and are provided to WGHANSA and used in support of the stock assessment of ICES area VII sardine; northern anchovy data will also be presented at WGHANSA although no stock assessment currently exists. Additional abundance data on mackerel, horse mackerel, boarfish and herring are calculated and may be used as (recruitment) indices.

To provide the associated environmental and ecological context for the estimates, other relevant sampling methodologies will be integrated to better understand the effect of such processes. These will inform not only on the development of future stock dynamics of the survey's target species but will also help to develop a better understanding how the pelagic processes affect particularly demersal species surveyed in the area by other surveys.

The plan is to add an additional seven days to the survey to explore the northern-most boundary of key pelagic fish resources in the study area, specifically sardine.

Since 2020 the PELTIC survey has been extended into Welsh waters; previously the survey was for English waters only.

2. Survey methods

Approximately 2200 nautical miles will be surveyed with ~40 ad hoc pelagic trawl operations to ground-truth acoustic data and collect biological samples. All fish and cephalopods caught will be identified to species and measured. Age samples and biological parameters will be taken from all target species (sprat, sardine, mackerel, anchovy, horse mackerel, herring, boar fish, blue whiting, garfish, and saury pike) and species listed under Appendix VII of the DCR which are caught.

Sardine eggs and larvae from 90 plankton stations, will be counted, staged, and aged and presented to WGACEGG to establish spawning areas and estimate sardine SBB. Meso zooplankton samples and vertical profiles of temperature and salinity are collected at the same 90 stations. Further discrete samples for phyto-and micro zooplankton, as well as oceanographic data (including chlorophyll and nutrients), will be collected at a subset of 40 of those fixed primary stations, which, combined with continuous sub-surface oceanographic sampling, provide an ecological context of the observations. In addition, these environmental data are used to monitor the ecosystem health under OSPAR and

MSFD descriptors. Seabirds and marine mammal observations are recorded along transects by observers.

Data will be held in a surveys database at CEFAS and provided in summarised form to WGACEGG and WGIPS. Fisheries acoustic data, partitioned by species and, where possible, age and length categories will be stored in formats coordinated by WGIPS and WGACEGG and made available to ICES through the respective working group databases.

Pelagic trawl catch data will be recorded using the CEFAS Electronic Data Capture system. Oceanographic data and outcome of plankton samples analysis will be stored in the Cefas Data Repository, linked to the survey.
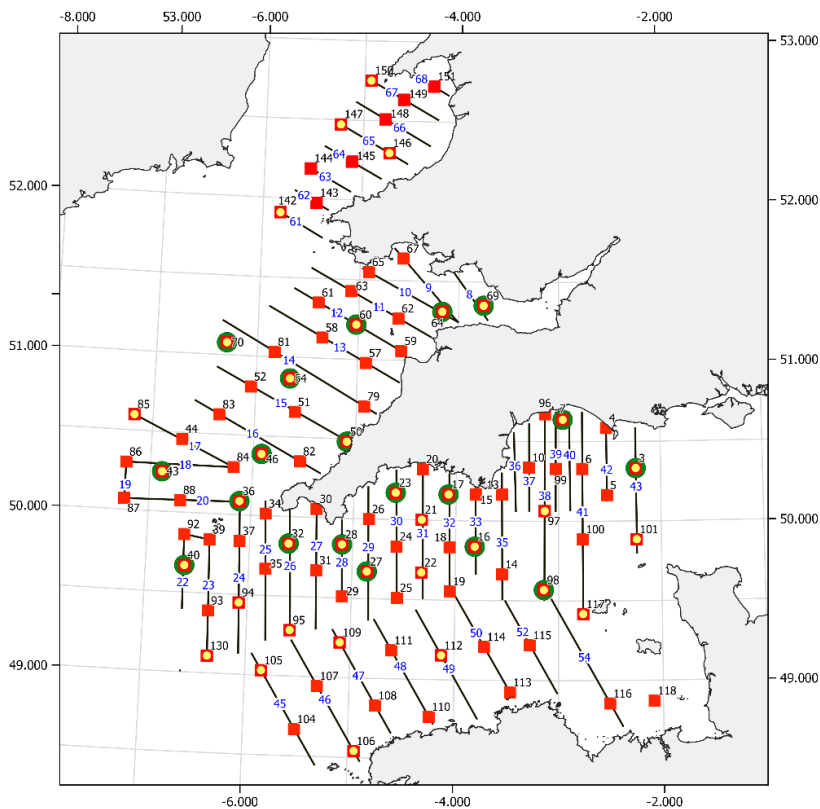
Figure 73. PELTIC; UK England, VIIe, VIIf, VIIg; 4th Quarter (English Integrated Pelagic Survey). Acoustic transects (black lines), zooplankton stations (red boxes) and Rosette stations (yellow) high priority stations in green. Recent extension into Cardigan included.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

WGACEGG: Working Group on Acoustic and Egg surveys for Sardine and Anchovy in ICES Areas VII, VIII and IX

WGIPS: Working Group on International Pelagic Surveys

No other countries/vessels participate in this survey.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
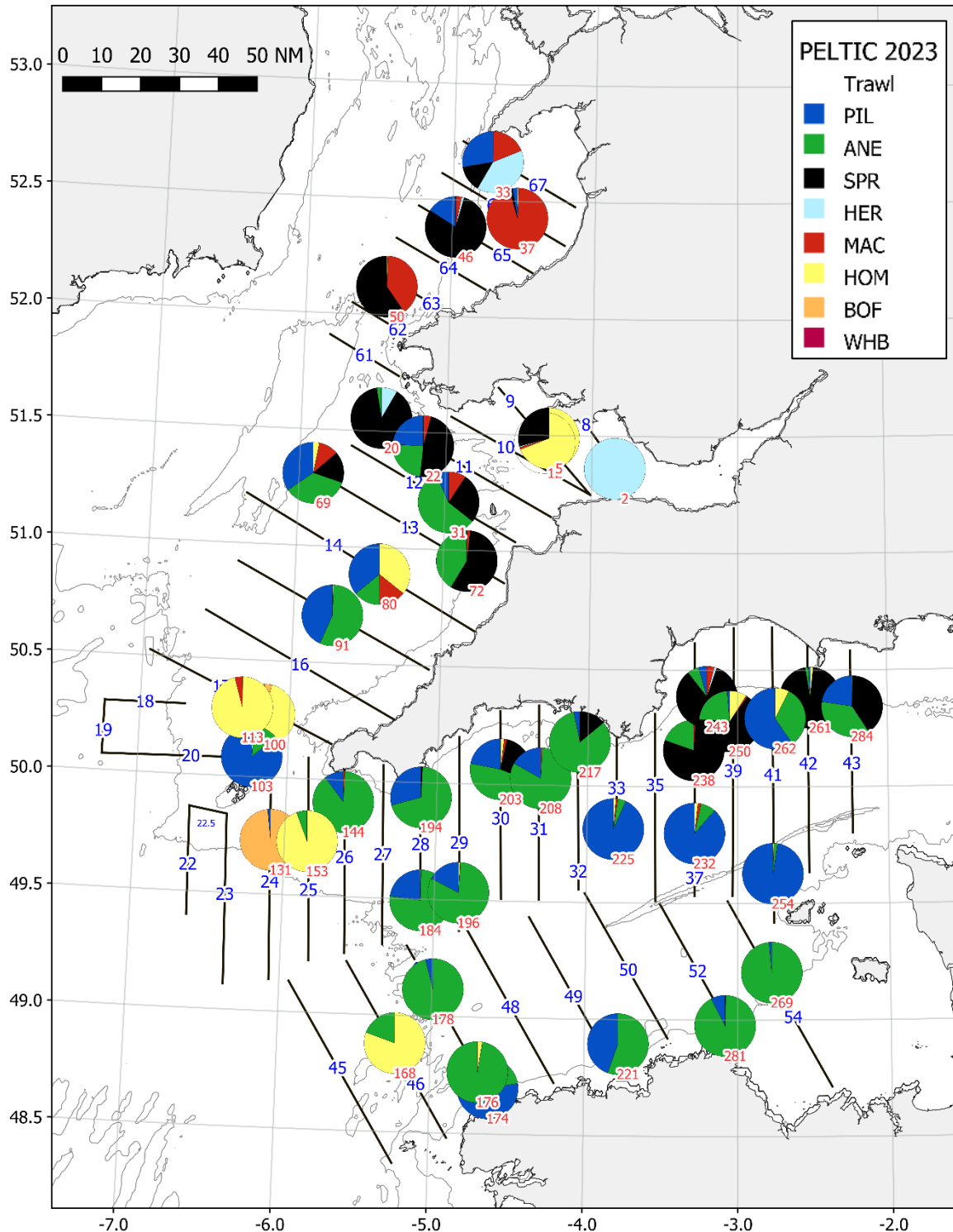
Figure 74 Overview map of the adjusted PELTIC23 survey area achieved. Acoustic transects (black lines) and Trawl stations (pies) with relative catch composition by key species. Three

letter codes: PIL=sardine, ANE=anchovy, SPR=sprat, HER=herring, MAC=mackerel, HOM= horse mackerel, BOF= boarfish, WHB= Blue whiting.

Outcomes: The 2023 PELTIC survey was successfully completed, with all transects covered and all plankton and CTD stations sampled. Oceanographic conditions confirmed that 2023 was more than 2 degrees warmer compared to the time-series average. Sprat biomass in the Western Channel stratum, used for the assessment (sprat 27.7de) was 61,270 (CV 0.53) which was the second highest since 2016, superseded only by the exceptional biomass of 2021. Sprat was again the most abundant small pelagic fish species in Cardigan Bay with a biomass of 15,475 t (CV 0.33), which was lower than previous estimates. Another recruitment pulse was observed in the data, with 0-group sprat making up a large component of the population. As in previous years, the highest quantities were found in Lyme Bay, although high numbers of sprat were also found further west, around Eddystone.

Sardine total biomass was the highest of the time series at 456,482 t (CV 0.19). Sardine was widely distributed as in previous years although this year two main hotspots were observed, one around the Isles of Scilly and one south of the southwestern point of Cornwall. These included the largest sardines in the survey area and the large numbers of eggs found in plankton samples at both sites suggested these were primarily spawning aggregations. Higher than usual numbers also found in the Bristol Channel and in Cardigan Bay. Biomass in the latter area was on order of magnitude higher than previously observed at 4,921 t (CV 0.29). Some of the smallest sardines were found in French waters.

Anchovy biomass in 2023 was 243,392 t (CV 0.22), approximately five times the previous highest estimate (2021), continuing an increasing trend. While some of the highest densities were found in the Eddystone Bay, anchovy was widespread throughout the survey area, including in the Bristol Channel. As was observed in 2019 and 2020, in 2023 again large numbers of surface and mid-water schools of juvenile anchovy were found off the Brittany coast, from the Isle of Ouessant in the west to the Channel Islands in the east of the survey. These fish are most likely Bay of Biscay fish moving into the Channel.

Most notable observations with regards to the top predators were the good numbers of bluefin tuna and numerous but small pods of common dolphins. Gannet numbers were still low, most likely to due bird flu but five species of shearwater were reported with particularly Great and Cory's most notable.

Additional research requests met: Biological data (some or all of the following parameters: size, weight, age and maturity) of the following data-limited species were collected: 6 European seabass; 2 John dory; 5 black seabream; 47 saury pike. eDNA samples were collected at 19 stations. In total, 14 samples of 25-50 whole specimens of small pelagic fish (3 species) were collected from 8 different stations for micro-litter analysis. *Alloteuthis* sp. were collected from 7 different stations. A total of 48 body length (and associated total length) were collected for saury pike. ESAS observers successfully collected mammal and bird information but with primary focus on the critically endangered Balearic shearwater for a joint Cefas-JNCC-Marinelife project.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Further information on the survey can be found on the British Oceanographic Data Centre (BODC) website
https://www.bodc.ac.uk/resources/inventories/cruise_inventory/report/18271/

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The UK-England PELTIC acoustic survey data feeds into the stock assessment for the 27.7d e sprat stock and 27.7 sardine stock. In addition, nutrient and chlorophyll data are collected which feed into eutrophication monitoring programmes (OSPAR, MSFD). CTD (temperature and salinity) data are collected, but these are not used in the assessments although used for validation of satellite products. In connection with the EU Data Collection Framework (DCF) marine litter and additional biological data from the surface and seabed at each trawling station were collected.

Type of data collected	Assessment type
Acoustic Biological sampling	Stock assessments: Sprat 27.7de (HAWG); sardine 27.7 (WGHANSA)
Biological sampling	National assessments - anchovy, herring, horse mackerel, Mackerel, boarfish
CTD by Haul	National and international. Eutrophication monitoring. Produces qualifiers to link biological and environmental indicators
Other fish spp in haul	National and international. Data limited species including seabass, john dory
Litter items in trawl	National and international. Anthropogenic monitoring.
Marine mammals and bird	Balearic shearwater in national assessment of potential MPA; national: bluefin tuna; predator-prey assessments

Western Channel Sole and Plaice Industry survey, WCSPI; England VIIe (Formerly a Fisheries Science Partnership Survey)

1.Survey objectives

To provide estimates of abundance of recruiting year classes and CPUE-at-age series for plaice, sole from a commercial beam trawler for provision to the Celtic Seas Ecoregion Working Group (WGCSE). These are used for tuning purposes.

2. Survey methods

A standard grid of stations are fished annually over two surveys (usually), one in the east of VIIe and the other in the west. Age samples and biological parameters will be taken from all target species.

The resultant data will be input to a Cefas surveys database (FSS) FSP version.
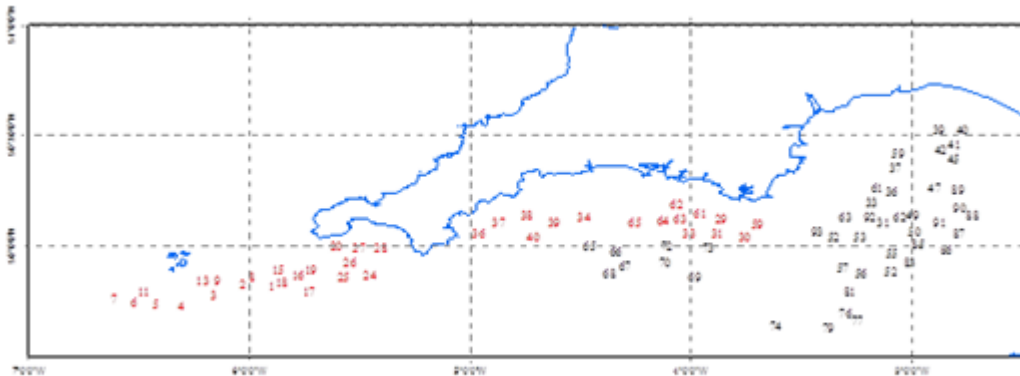
Figure 75. Map showing positions of survey stations WCSPI; UK England VIIe

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

N/A

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
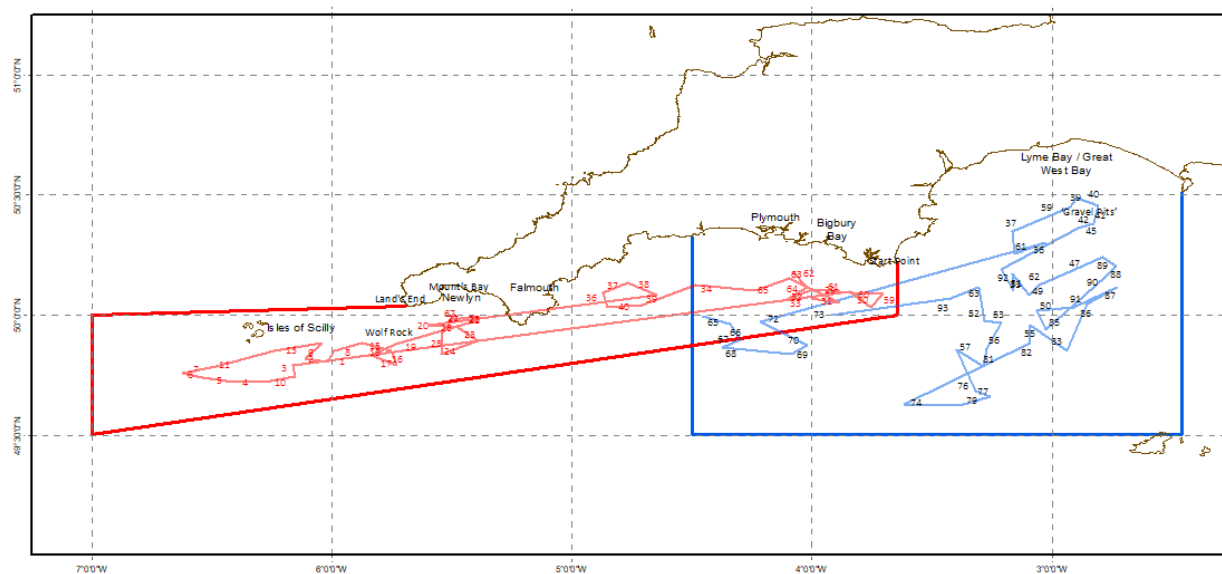
Figure 76. WCSPI completed survey area

Outcomes: The survey was successfully completed within the time-window for the survey-series, with the eastern leg undertaken first (16–21 August) followed by the western leg (20–27 September). All 90 stations targeted for the survey (45 for the eastern leg; 45 for the western leg) were successfully sampled without major incident, although some deviations were necessary at specific stations. The tow duration at four of the western leg prime stations had to be reduced from the standard 60-minute tow duration due to lack of daylight, and one prime station had to be moved slightly to avoid static gear.

Additional research requests met: NA

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

The survey is coordinated at ICES WGBEAM (Working Group on Beam Trawl Surveys (WGBEAM) (figshare.com)).

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The survey provides estimates of abundance of year classes and catch per unit effort (CPUE)-at-age for sole (*Solea solea*) and plaice (*Pleuronectes platessa*) for submission to

the ICES Working Group for the Celtic Seas Ecoregion (WGCSE). These are used for tuning purposes in the stock assessments.

Main uses of the of the data collected from the survey

Type of data collected	Assessment type
Biological sampling	Assessment type
Biological sampling	Collected for sole and plaice
CTD by Haul	Not deployed
Other fish spp in haul	All fish species measured (subsampled where necessary)
Litter items in trawl	Data not collected

Western Channel & Bristol Channel scallop dredge survey, WECSDS; UK England, VIIe, VIIf.

1. Survey objectives

To obtain estimates of distribution and harvestable biomass of King Scallop in the Western English Channel and Approaches to the Bristol Channel. This survey will be conducted annually each May by a chartered commercial vessel using both commercial and modified dredges on exploited grounds described by historic VMS data. The data are the primary input to the annual scallop stock assessments published on the government website in April each year.

2. Survey methods

Approximately 135 stations are carried out in the Western Channel and a further 15 stations are carried out in the Approaches to the Bristol Channel (total 150). The survey methodology continues to undergo evolution with redefinition of the assessment areas and exploited beds expected to change with the fishery. The survey is a swept area method relying on substrate specific gear efficiency estimates to convert survey catch rates to density on the seabed. Harvestable biomass is estimated from the size distributions of the catch using Length and Weight (L-W) factors. NB. Exploitation levels are presented in the annual stock assessment as the total realised or estimated removals as a proportion of the estimated harvestable biomass.
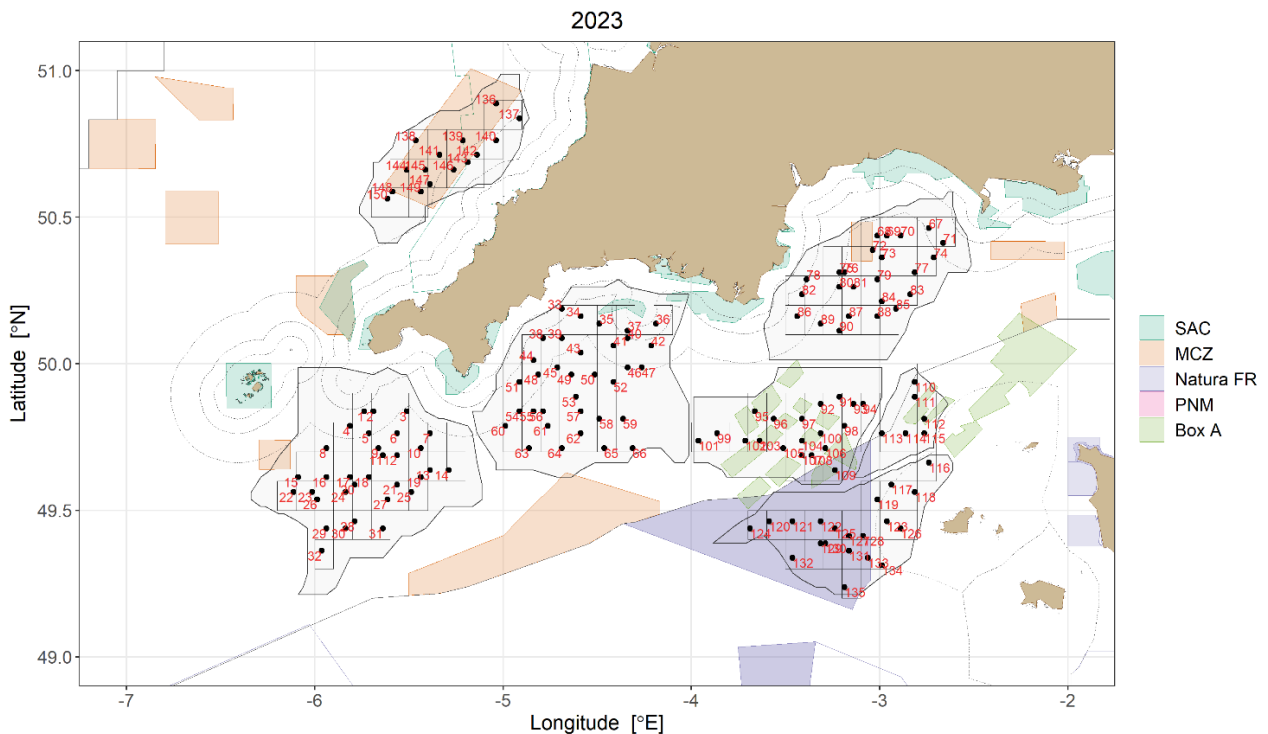
Figure 77. showing the proposed survey sites in the Western English Channel (135 stations) and Approaches to the Bristol Channel (15 stations) WECSDS; UK England, VIIe, VIIf.

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

The survey is not internationally coordinated but results are presented, and methodology periodically reviewed by ICES Working Group on scallops (WGScallop).

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
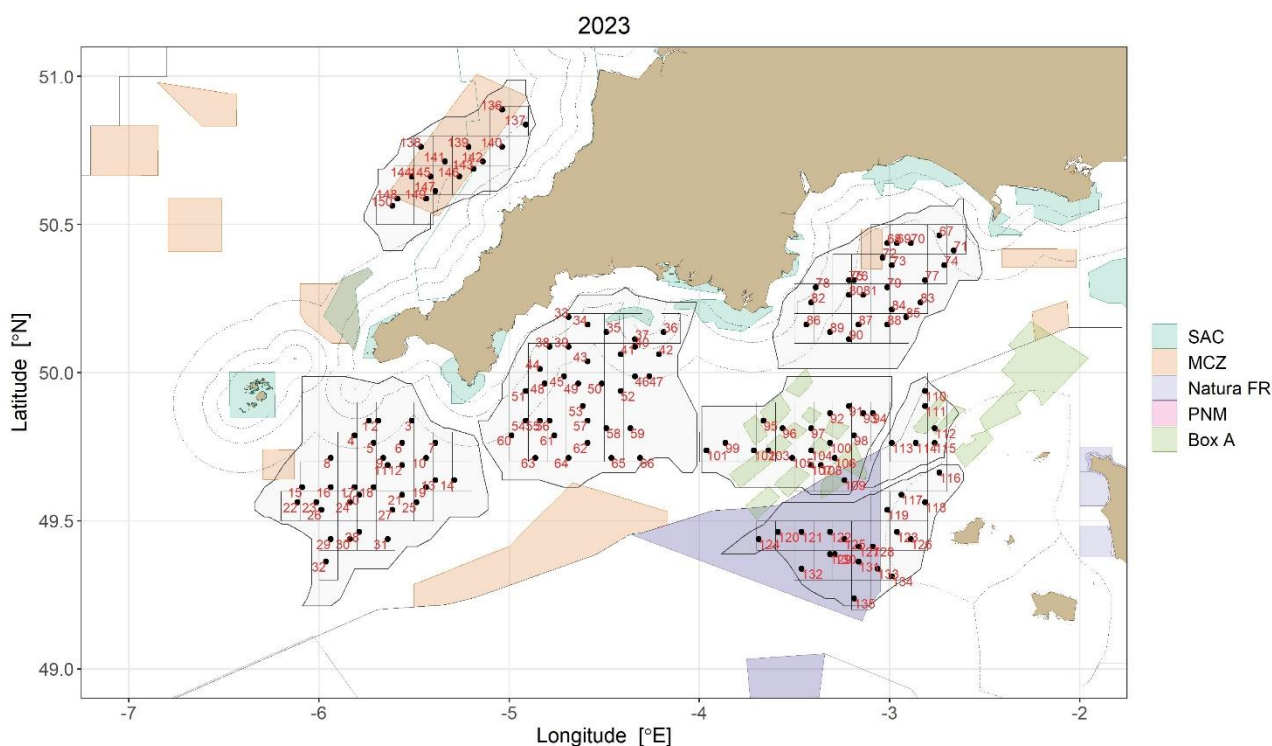
Figure 78. Surveyed areas in the Western English Channel (136 stations) and Approaches to the Bristol Channel (14 stations, cancelled) WECSDS; UK England, VIIe, VIIf.

Outcomes (including deviations): In the Western English Channel, ICES Division 27.7.e, all of the 136 planned stations were surveyed.

In the Approaches to the Bristol Channel, ICES Division 27.7.f, all of the 14 planned stations were not surveyed due to poor weather paired with the spring tide producing unfavourable fishing conditions.

Catches were enumerated at each site. At each site, samples of the commercial and undersized scallops were measured.

Additional research requests met: None.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Results were presented at the 2023 ICES Scallop Assessment Working Group (WGScallop): https://ices-library.figshare.com/articles/report/Scallop_Assessment_Working_Group_WGScallop_outputs_from_2023_meeting_/25249255

The latest annual assessment report is available from the UK Government Publishing website: http:///Assessment of king scallop stock status around the English coast - GOV.UK (www.gov.uk)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

The annual dredge surveys are the primary basis for stock assessments. Abundance estimates, in connection with international landings, are used to establish exploitation rates. Size sampling data are used in spawner-per-recruit models to establish MSY-proxy biological reference points for harvest rates. Realised harvest rates can then be compared with reference points to assess whether regional commercial exploitation is sustainable.

West Coast Scallop Dredge Survey, WCSS; UK Scotland, ICES area VIa

1. Survey objectives

- to carry out a survey of scallop stocks around the West coast of Scotland.
- to age, measure and assess shell damage.
- to collect information on by-catch of other commercial fish and shellfish species.
- to identify and quantify numbers of starfish species.
- to collect frozen whole scallops for heavy metal testing as part of the OSPAR assessment of hazardous substances in the marine environment.
- to record and retain marine litter obtained during the dredging process (for MSFD).

2. Survey methods

The commercial fishery for the king scallop (Pecten maximus) is the second most valuable shellfish fishery in Scotland. Dredge surveys of the major scallops grounds around Scotland have been carried out annually by Marine Directorate Science (MSS) since the mid-1990's. The scallop survey data are used in the regional stock assessments.

The survey gear on the starboard side consists of six standard commercial spring-loaded Newhaven type dredges (75 cm wide, 9 tooth bar, 80 mm internal diameter belly rings). The port side has six smaller configured sampling dredges (75 cm wide, 11 tooth bar, with 60 mm internal diameter belly rings). At each station (Figure 46) the dredges are towed at ~2.5 knots for 30 minutes and all king scallops caught are aged, measured (length to the 0.5 cm below) and damage assessed. All bycatch is identified, measured, sexed where appropriate and damage assessed. All starfish are identified, and damage assessed.

The survey is planned for around April, lasting approximately 20 days. There are 100 fixed stations to select from and the survey fishes as many of them as time and weather allow. The planned target may potentially be reduced due to impact of wind farms.
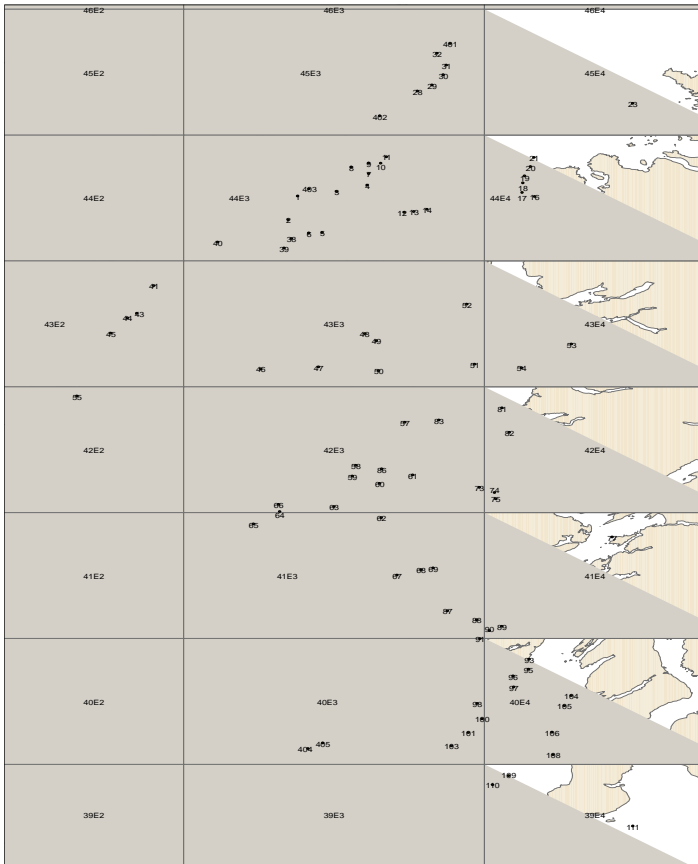
Figure 79. Map of scallop dredge stations; UK Scotland, VIa

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Not internationally coordinated. Data are used in national stock unit assessments

Scallop survey data are discussed and detailed at ICES WGSCALLOP.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.
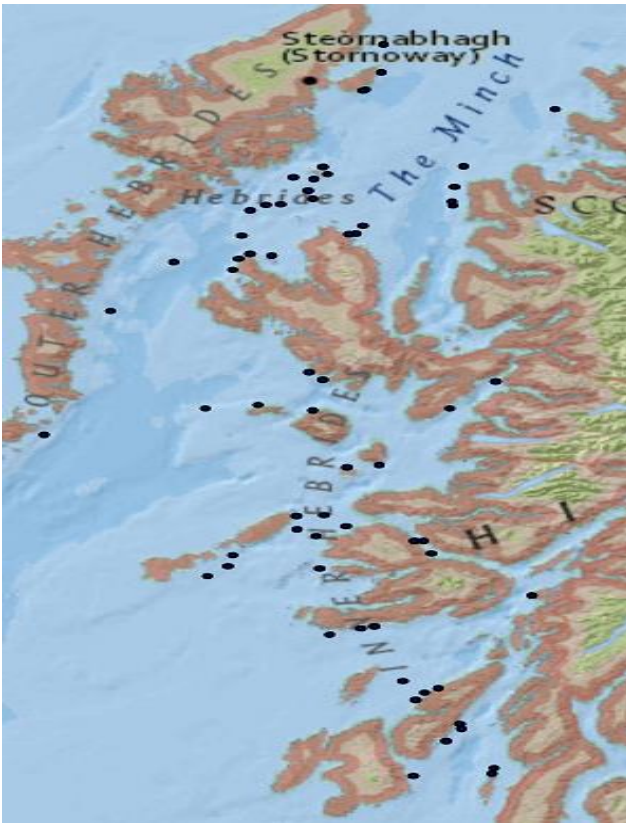
Figure 80. WCSS completed survey area

Outcomes: 11398 scallops were caught, measured, aged and assessed for shell damage. 382 other bycatch species were measured e.g. brown crab, whelk, several species of rays, monkfish, queen scallops, dabs, gurnards, clams, lemon sole and plaice.

3541 starfish were identified and recorded.

Additional research requests met: Scallops were retained for heavy metal and organic contaminants testing.

Marine litter was recorded and retained, for disposal.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

Scallop Assessment Working Group (WGScallop; Outputs from 2023 meeting) (figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

 Main uses of the of the data collected from the *West of Scotland scallop* survey

Type of data collected	Assessment type
Biological sampling of king scallops	National assessment. Length, age, meat weight. Shell damage.
All other fish, crustacean and cephalopod species encountered	National assessment and long-term trends.
Litter items in trawl	National and international. Anthropogenic monitoring.

Clyde Scallop Dredge Survey, CLYDESS; UK Scotland, ICES area VIa

1. Survey objectives

- to carry out a survey of scallop stocks in the Clyde region.
- to age, measure and assess shell damage.
- to collect information on by-catch of other commercial fish and shellfish species.
- to identify and quantify numbers of starfish species.
- to collect frozen whole scallops for heavy metal testing as part of the OSPAR assessment of hazardous substances in the marine environment.
- to record and retain marine litter obtained during the dredging process (for MSFD).

2. Survey methods

The commercial fishery for the king scallop (Pecten maximus) is the second most valuable shellfish fishery in Scotland. Dredge surveys of the major scallops grounds around Scotland have been carried out annually by Marine Directorate Science (MSS) since the mid-1990's. The scallop survey data are used in the regional stock assessments.

The survey gear on the starboard side consists of six standard commercial spring-loaded Newhaven type dredges (75 cm wide, 9 tooth bar, 80 mm internal diameter belly rings). The port side has six smaller configured sampling dredges (75 cm wide, 11 tooth bar, with 60 mm internal diameter belly rings). At each station (Figure 47) the dredges are towed at ~2.5 knots for 30 minutes and all king scallops caught are aged, measured (length to the 0.5 cm below) and damage assessed. All bycatch is identified, measured, sexed where appropriate and damage assessed. All starfish are identified, and damage assessed.

The survey is planned for around October, lasting approximately 14 days. There are currently 45 fixed stations to select from.

Figure 81. Map of scallop dredge stations; UK Scotland, VIa (Clyde)

3. For internationally coordinated surveys, describe the participating Countries/vessels and the relevant international group in charge of planning the survey

Not internationally coordinated. Data are used in national stock unit assessments

Scallop survey data are discussed and detailed at ICES WGSCALLOP.

4. Graphical representation (map) showing the position (location) of the realized samples. Provide maps presenting the spatial distribution of the main sampling types obtained during the survey.

Figure 82. Clyde scallop survey stations.

Outcomes: One day of this survey was lost to bad weather and the presence of creels in the area impacted the number of stations sampled. Also work time was shortened due to the need to work in daylight (to ensure good visibility). 43 stations were fished from a planned 45. 3896 scallops were caught and sampled for biological parameters (higher than the 2022 catches). Bycatches of 764 individuals (excluding starfish) were recorded. This included brown & velvet crabs, queen scallops, rays, whelks and dragonets. 2101 starfish (10 species) were recorded. Shell damage was noted.

Additional research requests met: Scallops were retained for heavy metal and organic contaminants testing.

Marine litter was recorded and retained, for disposal.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group. Provide a hyperlink to the meeting report from the body coordinating the survey (ICES, MEDITS coordination group, MEDIAS coordination group etc.). For non-international coordinated surveys, refer to any status report (e.g. Cruise report) if available on line.

[Scallop Assessment Working Group (WGScallop; Outputs from 2023 meeting) (figshare.com)](figshare.com)

6. List the main use of the results of the survey (e.g. indices, abundance estimates, and environmental indicators). Specify in which context the results are used (on routine basis), both on an international as well as on a national context.

Main uses of the of the data collected from the *Clyde scallop* survey

Type of data collected	Assessment type
Biological sampling of king scallops	National assessment. Length, age, meat weight. Shell damage
All other fish, crustacean and cephalopod species encountered	National assessment and long-term trends.
Litter items in trawl	National and international. Anthropogenic monitoring.

Section 1C: Marine Recreational Fisheries

<u>Ref Table</u> 1C

International and domestic commitments

This fulfills paragraph 2 point (a) (iv) of Chapter III of the multiannual programme.

Sea angling data are needed to support local, national, and regional management of fish stocks, environmental protection, marine spatial planning, development of the blue economy, and physical health and wellbeing. Data on recreational fishing contributes to the 'scientific evidence objective' of the Fisheries Act 2020.

Marine recreational fisheries (MRF) are now embedded in UK fisheries management through the Fisheries Act (2020), alongside the provision for funding for development. Biological, social, and economic data on recreational fisheries are used to inform Fisheries Management Plans, which in turn supports the objectives of the Fisheries Act. In addition, the UK provides data to ICES annually on the numbers and tonnages of recreational catches of cod, seabass, pollack, salmon, eels, elasmobranchs and highly migratory species in the North and Celtic Seas.

Key end users

ICES

Data collection

The sections below set out the sampling plans for 2023 for each of the countries including proposed approaches, PSU, and proposed sample sizes by region.

<u>**England**</u>

In 2023, England will continue to use the offsite diary approach outlined which was established between 2016 and 2022. This is used to estimate the participation, effort catches, and economic impacts of MRF in the UK. This is done through the sea angling panel (www.seaangling.org) which combined two surveys:

- An existing nationwide survey of UK residents (Watersports Participation Survey) is used to estimate fishing effort in terms of how many people go recreational sea fishing, and how often they use different methods.
- A nationwide panel of sea anglers is recruited and use a bespoke diary app and online tool to record all their sea angling activities and catches during the year, from which the average catch per unit effort is calculated.

The Watersports Participation Survey is likely to be an online survey of 12,000 individual in a marketing panel, which provides numbers, locations and demographic information on the sea angling population. The diary panel is a multispecies survey, with numbers and sizes of all species retained and released recorded, along with trip information (e.g. location, date, weather etc.) and characteristics of the angler (e.g. age, gender). The results from

the two surveys are combined and raised to the whole population correcting for differences in avidity and platform, then estimates at individual ICES areas are generated. The associated errors are also calculated to give an idea of the uncertainty that can be accounted for when using the data. These are used to support stock assessments for sea bass and cod.

The target population is sea anglers of 16 years or older in England as this is the main form of MRF in the UK. Individual anglers are the PSU, of which there are around 556,250 (average 2016-19). The target is to collect data from at least 350 diarists that fish in the North Sea (4.a, 4.b, 7.d) and 1,100 fishing in the Celtic Seas (7.a, 7.e, 7.f, 7.g, 7.h) (see Table 1C). For species with sufficient data, the numbers and / or tonnages of fish retained and released will be estimated along with associated levels of precision. These will be reported and provided to ICES as part of the development of the draft data set for inclusion in the pilot MRF data tool for ICES Regional Database & Estimation System (RDBES).

Estimates of catches and releases are similar across the timeseries with reasonable precision, but generally both catches and release rates were higher than an onsite survey conducted in 2012. Further work will be done to assess bias and test the sensitivity of the results to analytical approach.

Scotland

The diverse and dispersed nature of sea angling in Scotland makes it difficult and expensive to generate data with an appropriate level of precision to support end users and decision making within Scotland. Marine Directorate will consider the best way forward to generate more robust data on recreational fishing, keeping in mind the limited available resources. No survey of sea angling will be done in Scotland in 2023.

Wales

Recreational sea angling provides significant health, wellbeing, social and community benefits, raises environmental awareness, and has a positive economic impact on coastal communities in Wales. There is growing awareness of the potential impacts of recreational sea angling on fish populations and fisheries management. Wales recognises the importance of collecting sea angling data to ensure the best available evidence is used to support decision-making. This is through a continued contribution to the Sea Angling Diary programme, employing the same approach as outlined for England. Individual anglers are the PSU, of which there are around 72,250 (average 2016-19) in Wales. The target is to collect data from at least 206 diarists from Wales that fish in the Celtic Seas (7.a, 7.f, 7.g) (Table 1C). This proposed sampling rate may change as discussion around the Sea Angling Diary programme develop and subject to constraints around resourcing.

Northern Ireland

Data and feedback from the UK wide sea angling scheme undertaken in 2016 to 2021 has demonstrated that recruiting sufficient diarist, routinely angling in Northern Ireland has been difficult. The resultant low numbers of diarists have meant that it has been difficult to

ensure catch estimates with the appropriate level of precision. No formal sampling of sea angling will be carried out in Northern Ireland in 2023.

Summary of outcomes and deviations from the workplan

1. Description of the target population

The target population and the elements of this target population accessibility, are defined and described in this section.

The target population is anyone over the age of 16 that has been sea angling in England and Wales.

2. Type of survey

This section provides more information on the design and methodology or type of survey provided in Table 1C.

The Sea Angling Diary programme, initiated in 2016, aims to estimate the number of sea anglers, the frequency of their fishing activities, their catches, and the associated social and economic benefits. Data integration is achieved by combining outputs from two surveys: one involving 12,000 individuals, which provides estimates of angler numbers and characteristics; and another that engages sea anglers as 'citizen scientists' to report their catches via the Sea Angling Diary. These data are then combined to account for variations in angler demographics, enabling the calculation of the quantity and tonnage of fish retained and released by sea anglers in the UK. Since 2016, over 5,000 sea anglers have provided data on over 48,000 fishing sessions and 362,000 catch records from 216,000 hours of angling activity.

To estimate participation and effort among UK sea anglers, additional questions were integrated into the Watersports Participation Survey (WPS) of 12,000 residents. Due to COVID-19 restrictions, traditional face-to-face survey methods used from 2016 to 2019 were replaced with an online panel in 2020. The shift to an online format yielded significantly higher estimates than previous iterations of the survey, likely due to methodological differences. Consequently, the 2020 results were excluded from trend analysis to maintain consistency in the dataset. This adjustment is further discussed in the data analysis and processing section.

3. Data Quality

Regular data quality assessments are conducted at multiple stages throughout the data collection process to ensure accuracy and reliability. Initially, data entry protocols include validation rules that flag entries of fish exceeding the length of the current British angling record by more than 10%, which helps in identifying potentially erroneous submissions of unusually large fish. Additionally, monthly follow-ups via text messages and phone calls with diarists facilitate data completeness and allow for verification of atypical catch records, such as unusually large quantities or sizes of fish, or species caught outside their

typical geographic range. When feasible, photographic evidence of large catches is reviewed to further validate the records.

4. Data Analysis and processing (including reference to the estimation procedure relative to survey design)

Due to methodological changes in the Watersports Participation Survey (WPS) post-COVID, which produced substantially different results from previous methods, a model-based approach was developed to extrapolate the number of anglers and the catches and tonnage of fish caught. The detailed modelling process is described in Hyder et al. (2024), and summarized below and in Figure 83.

To estimate the number of anglers from the WPS data, a Bayesian Bernoulli model was developed. This model predicts the probability of a person within a demographic stratum being an angler. The probabilities are then applied to the total population within each stratum, derived from the UK census, to estimate the total number of anglers. Furthermore, a Bayesian lognormal model was used to estimate the number of days fished per person from the total number of days reported in the WPS. This model aids in calculating: (1) the total number of days fished; and (2) the distribution of the number of fishing days per year among anglers, which is required as the primary sampling unit for the catch survey is an angler-year rather than an angler-trip, but the frequency of fishing significantly influences catch volumes and thus is required for predicting catches.

For extrapolating catch data from the diary survey, entries from diarists reporting less than six months of data, including months explicitly stated as non-fishing periods, were excluded. Catch data were aggregated annually by diarist, species, and whether the catch was kept or returned. A Bayesian zero-inflated negative binomial model was then fitted to predict catch rates per angler, accounting for overdispersion and excess zeros. To address the bias introduced by diarists with anomalously high catches, diarist IDs were included as random effects in the model and removed from the model predictions to ensure estimates reflected the average catch rate across all anglers.

Additionally, a Bayesian lognormal model was applied to the sea angling diary data to estimate the average weight of fish caught, incorporating all diarist data regardless of data completion status as this model focuses on predicting the average weight of individual fish rather than the total tonnage caught by an angler. Similar to the catch rate model, diarist IDs were treated as random effects to reduce the impact of outliers. Model predictions of average fish weight were then multiplied by the total number of fish caught to estimate the total tonnage of fish caught.

As the extrapolation procedure operates within a Bayesian framework, the posterior distributions from each model can be easily combined. This integration facilitates the estimation of 95% credible intervals that account for the survey error introduced by both the WPS and diary surveys.
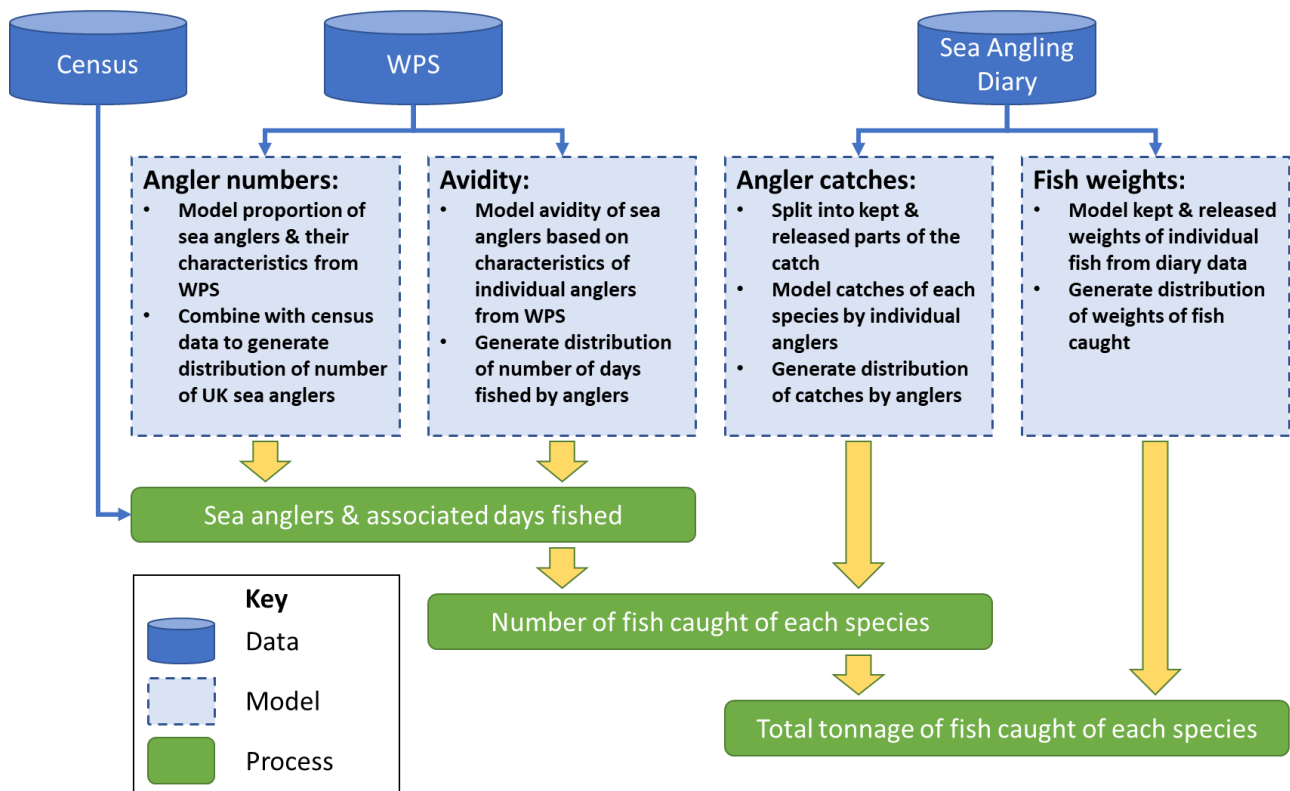
Figure 83: The sea angling diary survey model-based survey extrapolation procedure for England and Wales.

Section 1D: Anadromous and Catadromous Species Data Collection in Freshwater

Ref Table 1D

International and domestic commitments – overview

This fulfills paragraph 2 points (b) and (c) of Chapter III of the multiannual programme.

All the governments and intergovernmental commissions requesting and receiving scientific advice from ICES have signed international agreements under the United Nations Convention on the Law of the Sea (UNCLOS). This binds the UK to collect and share fisheries data to support fisheries assessment and management of highly migratory fish stocks. Additionally, the UK's Memorandum of Understanding (MoU) with ICES requires UK to provide relevant data for ICES to undertake stock assessment and provide advice relating to the North Atlantic and its adjacent seas, including advice on fishing opportunities for diadromous fishes. The UK is also a signatory to the Convention of the North Atlantic Salmon Conservation Organization (NASCO), established in 1984, with the aim to conserve and rationally manage Atlantic salmon through international cooperation. NASCO obtains scientific advice for the management of salmon stocks and fisheries from ICES.

Key end users

ICES, NASCO

Salmon

International obligations and temporal frequency of reporting

Data required to meet international commitments for the assessment and management of North Atlantic salmon fall into two categories:

3. data requested annually by the ICES Working Group on North Atlantic Salmon (WGNAS) to undertake an international stock assessment and support reporting to NASCO; and
4. data requested annually by NASCO to inform management.

Some of these are reported as raw data, while others are derived from collected data and reported as such.

ICES requirements

Annual data calls from ICES via the WGNAS require river-specific, regional, or national totals of the following:

- retained catch: reported retained catches of salmon by sea age class (one-sea-winter (1SW) and multi-sea-winter (MSW)) in numbers and weight for commercial and recreational fisheries by location (coastal, estuarine, riverine);

- released catch: the same format as retained;
- unreported catch estimate: the same format as above, for fish retained and released;
- compilation of tags released;
- production of farmed and ranched salmon: weight.

Other information reported to the WGNAS includes:

- fishing effort statistics;
- Catch Per Unit Effort (CPUE);
- exploitation rate indices;
- Conservation Limits (CL): expressed as the numbers of eggs deposited, and annual compliance – the numbers of rivers meeting or exceeding the CL;
- marine return rates for wild and hatchery smolts, reported separately for 1SW and MSW salmon, at monitored sites;
- smolt production at monitored sites.

Other data required by ICES to undertake the stock assessment include information on the biological characteristics of salmon (such as age distribution, sex ratio, and fecundity), and timing of return provided on a periodic basis.

In addition, time-series of data (e.g., returning stock estimates, counts of adult returns, and marine return rates) are needed for the NASCO Framework of Indicators (FWI) and requested through the WGNAS from jurisdictions with timely access to such series.

NASCO requirements

All data reported to ICES are used in the ICES' Scientific Advice to NASCO. However, the UK also reports some data directly to NASCO in the Annual Progress Reports (APR) for the three UK 'jurisdictions' of England & Wales (combined), Scotland and Northern Ireland. This includes:

- progress reports on actions to deliver the objectives of 'jurisdiction's' Implementation Plans (IP) and notification of any changes to the IPs;
- catches (caught and retained in tonnes) for riverine, estuarine and coastal waters;
- unreported catch estimates (tonnes) for riverine, estuarine, and coastal waters;
- number and percentage of salmon caught and released in recreational fisheries.

Designation of waterbodies

Stock assessment methods designate the rivers monitored for salmon: 64 principal salmon rivers across England and Wales; 16 primary salmon rivers across Northern Ireland; and 173 assessment areas (individual rivers, Special Areas of Conservation (SACs), and in some cases groups of between 2 and 6 rivers where fishery catch cannot be assigned to individual rivers) in Scotland.

Data collection

Data collection is managed through separate agencies in the four administrations so there are variations among the specific methods used.

All commercial (net and fixed engine) fisheries for Atlantic salmon (and sea trout) in England and Wales are licenced and operate mandatory carcass tagging and daily catch reporting (logbook) systems. No killing of salmon in commercial fisheries has been permitted since the introduction of national byelaws in England in 2019 and in Wales in 2020. In Scotland, salmon fishery statistics (monthly numbers and total weights of 1SW and MSW salmon) are obtained from proprietors or occupiers of fisheries under legal provisions. There are currently no commercial salmon fisheries in Northern Ireland.

Recreational (rod) fisheries in England and Wales are also licenced and are monitored through obligatory catch returns. In Scotland, salmon fishery statistics (monthly numbers and total weights of 1SW and MSW salmon retained and released) are obtained from proprietors or occupiers of fisheries under legal provisions. In Northern Ireland, any salmon landed must be carcass tagged and rod catch data are collected through a tag return scheme for retained and released fish.

Juvenile abundance surveys for salmon (and trout), both fry and parr, are carried out annually using electrofishing methods. These provide numbers per unit area, individual lengths and age composition, the latter based on ageing from scales for a subsample of catches and/or size-frequency distributions. Outputs are used to evaluate recruitment at site, subcatchment or whole catchment scales, complementing measures of adult stock performance and informing environmental management in rivers. In England and Wales, annual electrofishing surveys comprise (i) a 'temporal' component of fixed sites distributed among all principal salmon rivers and sampled every year and (ii) a 'spatial' element sampling additional sites on targetted catchments on a (6-year) rolling programme basis.

Information on smolt production and marine return rates is collected using in-river traps and mark-recapture methods. Smolt trapping provides catch per unit effort (time) data, alongside individual fish lengths and scale-based age reading from a subsample to update age-length keys. Smolt trapping occurs on the River Dee (Wales), Tamar (England), the Aberdeenshire Dee (Scotland), and the River Bush (Northern Ireland).

Information on the number of adult salmon returning to rivers is collected through fixed traps, electronic counters or derived from rod catches raised by exploitation rates (derived from trap and counter data), and individual lengths, weights and ages are collected from representative biological samples of the adult run on each trapped river. Adult traps operate on the Dee (Wales), Tamar, Lune (England), Bush (Northern Ireland) and on two upper tributaries of the Aberdeenshire Dee (Scotland).

Eels

International obligations and temporal frequency of reporting

ICES requests information on eel stock parameters from countries within the geographic range of the European eel (North Atlantic, Baltic and Mediterranean Seas, and inland waters) via the Working Group of Eels (WGEEL). This generally includes responding to an annual Data Call with, in addition to a number of ad hoc requests, annual updates on:

- commercial landings by Eel Management Unit (EMU), life stage (yellow, silver eels) and habitat type (fresh, transitional, coastal and marine waters): provided in weights;
- recreational landings by EMU, life stage and habitat type: provided in weights;
- other landings (transport/relocation operations) by EMU, life stage and habitat type: provided in weights;
- aquaculture production per EMU and life stage: provided in weights;
- releases (which includes restocking) by EMU, stage and habitat type: provided in numbers and weights;
- time series of glass and yellow eel recruitment derived from fisheries, or fisheries-independent surveys and associated biological characteristics (e.g., length, weight);
- time series of yellow eel abundance (standing stock) and associated biological characteristics (e.g., length, weight, age, sex ratio);
- times series of silver eel escapement and associated biological characteristics (e.g., length, weight, age, sex ratio);
- other biological sampling to inform biological characteristics (e.g., length, weight, age, sex ratio);
- eel quality data (e.g., muscle lipid content, *Anguillicola* proportion etc.) associated with glass, yellow and silver eel time series and other biological sampling (optional for now).

The associated country report submitted to WGEEL includes the summary of all the data provided, explanation on the collection methods and management, as well as additional information on habitat quantity and quality, other non-fisheries sources of mortality, a section on diseases, parasites, pathogens and contaminants and update on any new emerging threats and opportunities.

Since 2007, countries are also required to provide biomass and mortality indicators every three years, which include the following:

- B_0: the amount of silver eel biomass that would have existed if no anthropogenic influences had impacted the stock;
- $B_{current}$: the amount of silver eel biomass that currently escapes to the sea to spawn;
- B_{best}: the amount of silver eel biomass that would have existed if no anthropogenic influences had impacted the current stock;
- $\sum F$: the fishing mortality rate, summed over the age-groups in the stock;
- $\sum H$: the anthropogenic mortality rate outside the fishery, summed over the age-groups in the stock;

- ∑A: the sum of all anthropogenic mortalities, i.e. ∑A = ∑F + ∑H.

Designation of waterbodies

There are 15 EMUs, including one shared with the Republic of Ireland. Most EMUs have been set at the River Basin District (RBD) level, as defined under the Water Framework Directive.

Data collection

Data collection is managed through separate agencies in the four administrations so there are variations among the specific methods used.

Commercial fisheries for eels (recruits, yellow and silver eels) in England is legally required to report catch quantities (weight), effort as days fished, the location and type of water fished. No data are collected on other biological characteristics: maturity and fecundity are not applicable for juvenile life stages exploited and other characteristics are not required for national stock assessments. Catches from the commercial fishery in Lough Neagh (Northern Ireland) are reported to AFBI/DAERA by the Lough Neagh Fishermen's Co-operative Society Ltd. Weekly sampling of 20 yellow eel over 20 weeks (May to September), and 100 silver eel over a 12 week period, provide age and length, weight, fat content, sex, age, stomach contents, and parasite load. Sex ratio of the silver eel population is estimated from size grading the catch into boxes of small (male) and large (female) eels. There are no commercial fisheries for eel in Scotland. The commercial fishery in Wales was closed in 2021.

There are no recreational landings of eel across the UK, and any eel that are caught by recreational fisheries must be returned alive to the water.

The abundance of recruits is estimated from traps in four EMUs (Scotland, Anglian, Thames, South-west) yielding numbers or batch weights of glass eel/elvers and numbers and lengths of yellow eel; from a time-series of CPUE from the commercial fishery in England (Severn); from dragnet surveys twice monthly from March/April to July/August in Northern Ireland (River Bann; Strangford Lough) yielding numbers per kg and length frequencies from 50 juveniles per sample.

The abundance of standing stock is collected from electrofishing surveys across the majority of the EMUs (apart from NI EMUs). Sites are fished every 1 to 3 years, depending on programme specification, and provide numbers per unit area, length frequency distribution and estimated individual weights.

Information on the numbers or weight, and sex ratio of silver eels, is collected annually from 3 EMUs using commercial catch sampling (Northern Ireland), downstream traps (Scotland) or electronic counters (England, numbers only), and once in every EMP reporting period (in accordance with the EU Withdrawal Act in relation to Article 9 of Regulation No. EC 1100/2007) for the remaining 12 EMUs using model-based estimates

derived from yellow eel abundance surveys. The model-based methods are described in the 2021 EMP Progress Report to Defra, at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1042262/Implementation_of_UK_Eel_Management_Plans_2017_to_2020.pdf.

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Summary of outcomes and deviations from the workplan

Were the planned number achieved?

No.

Reason for non-conformity and actions to avoid deviations.

More details of under sampling eel and salmon and reasons for this are detailed in Table 1D.

The reasons for non-conformity can be aggregated into four classes and explanations for how future deviations may be avoided for each are as follows:

i.   Resource constraints and unsuitable weather conditions

There were fewer yellow eel and salmon fry/parr electrofishing surveys in 7 out of the 10 planned regions in England and Wales mainly because of unfavourable weather conditions (high temperatures and flows) and concerns for fish welfare, as well as due to resource constraints.

Action: New staff are being recruited and trained to be available for future surveys. Incomplete surveys may be revisited in the future as resources allow. However, it is difficult to predict weather impacts on sampling programmes, thus some under-reporting is expected in the future as a result.

ii.   Fish counters not operational or unreliable

Less sites were sampled for returning salmon adults in England and Scotland due to fish counters not operating adequately, mainly as a result of flood or storm damage.

Action: Counter repairs to be undertaken in the future.

iii.   Low fish numbers

There were fewer returning adult salmon sampled for ageing (scales) in England due to reduced salmon runs.

Action: This is not possible to predict or mitigate for.

iv.   Mistakes in the Work Plan

Rows 21, 26, 49 & 65: There were mistakes in the original Work Plan regarding the number of sites to be sampled and tagging complications to be reported.

Row 16: There are no more commercial glass eel fisheries authorised in GB_NorW.

Row 61: There were more licences issued for catching adult salmon in England than initially estimated in the original Work Plan.

Action: The future Work Plan will be updated to correct the above-mentioned mistakes. It is important to note that the planned number of surveys for eels and salmon in England vary across years and are generally finalised in the autumn of the preceding year, after the UK Work Plan is agreed, thus some errors are to be expected in the future.

Additional remarks

There were few opportunities for additional sampling for yellow eel and salmon fry/parr in England, as well as for salmon fry/parr in Northern Ireland and Scotland due to favourable conditions (Rows 36, 60, 71 & 79), thus set targets were surpassed.

Several rows relate to activity planned for 2024 so are not covered in this report

Section 1E: Level of Fishing and Impact of Fisheries on Biological Resources and Marine Ecosystem

Ref Table 1E

International and domestic commitments

This fulfills paragraph 3 point (c) of Chapter III of the multiannual programme for "collection of data to assess the impact of United Kingdom fisheries on marine ecosystems within and outside United Kingdom waters".

Data collection activity covers three main aspects:

a) incidental bycatch of Protected, Endangered and Threatened Species (PETS);
b) data to assess the impact of fisheries on marine habitats;
c) impact of fisheries on biological resources and marine ecosystem.

Incidental bycatch

Key end users

ICES WGBYC, UK fisheries policy teams for US MMPA Compliance, UK Marine Strategy for populating D1 indicators, UK marine conservation policy.

Data collection

A variety of at sea observer schemes and on shore sampling schemes are operated across the UK FAs and record data on the incidental bycatch of many of the species listed in Table 1E of the MAP. The coverage by geographical area and species group achieved by these schemes is detailed in Table 1F along with the primary drivers and end users for the schemes.

In addition the "UK Bycatch monitoring programme" is coordinated and run by the Sea Mammal Research Unit of St Andrew's University focussing on the collection of data on bycatch of seabirds and marine mammals. This scheme forms part of the UK Marine Strategy Part 2 (monitoring programmes) contributing to indicators for Descriptor 1 (biodiversity) for seals, cetaceans and birds and helps to meet statutory obligations and supports the implementation of the UK plan of action on seabird bycatch.

It should be noted that in 2021 there was a review of UK bycatch monitoring programmes for fisheries exporting products to the USA for a comparability test against the requirements of the USA Marine Mammal Protection Act. There is now a mandatory requirement under fishing vessel licence conditions, whereby fishers will need to report any bycatch of marine mammals to the MMO, within 48 hours of the end of the fishing trip.

<u>Impact of fisheries on marine habitats</u>

Key end user

UK Marine Strategy.

Data collection

Both benthic and pelagic habitats have the potential to be impacted by some of the pressures arising from fishing activity, with work under the UK Marine Strategy identifying that the extent of pressures such as seabed abrasion is significant in UK waters. Much of the assessment of impact of fishing is therefore derived from existing data on the distribution of marine habitats from historical and inferred habitat mapping and data collection on fishing activity (See Section 2: Fishing Activity Data). This allows an inferred assessment of the extent of seabed habitat disturbance from (most) fishing activities with significant seabed contact, including bottom / beam trawling which are reported in the UK Marine Strategy assessment.

Direct data collection on the status of marine habitats subjected to pressures from fishing are limited in scope and have tended to be focussed on the monitoring for the UKs Marine Protected Area networks. Both the UK and Scottish MPA monitoring strategies have data collection objectives to determine the impact or recovery of benthic habitats associated with changes in pressures from activities such as fishing as management measures changed in order to achieve specific conservation objectives of protected features. These studies (Type 3 monitoring in these strategies) are extremely expensive to undertake often require long time series to detect change and typically involve detailed underwater observation of habitat state and extent or expensive infaunal analyses of sediment

samples to detect changes in diversity of associated communities. As a result these studies cover only a portion of the UK fishing footprint and are not indicative of wider scale impacts on the diversity of marine habitats in UK seas.

Given the lack of data on wide scale impact of fishing on sea bed habitat quality a review is considered appropriate.

<u>Impact of fisheries on biological resources and marine ecosystem</u>

Key end users

UK Marine Strategy, OSPAR

Data collection

Many of the pressures arising from fishing activity (capture fisheries at sea) have the potential to impact on different receptors in marine ecosystems. The primary biological resource of concern are the populations of targeted and bycaught fish species themselves.

Many of the surveys at sea undertaken annually and detailed elsewhere in this workplan (Table 1G) provide data used to assess the status of fish and cephalopods both as a biological resource (through the international stock assessment processes) and as an important component of the marine ecosystem, biodiversity and food webs.

As detailed in UK Marine Strategy Part 2 (monitoring programmes) the data collected from the surveys in Table 1G are used to populate biodiversity and foodweb indicators (Descriptors 1 and 4) for the fish community (not just the commercially important species) and reported as part of the UK Marine Strategy reporting cycle as well as in national and international marine status assessments (OSPAR QSR, SMA 2020 etc).

Our understanding of marine foodwebs is important both for stock assessments of commercial fisheries, but also for wider assessments of the status of our seas under the Marine Strategy (Descriptor 4). Much of our current understanding is based on historical sampling of stomach contents from fish sampled during the course of previous surveys of the type detailed in 1G. These data are approaching 20 years old and may no longer reflect changes in our marine food webs over that time. There is a clear need to collect more data in this area and there are national and international efforts to aggregate currently available data and plan further data collection to improve our evidence in this area. These plans will not be fully formed by the time of publication of this workplan.

Fishing activity exerts a variety of other pressures that have the potential to impact on other receptors in marine ecosystems and many of the existing monitoring programmes under UK Marine Strategy part 2 are focussed on monitoring the status of those receptors. The relationship between these pressures and the status of receptors will not be well established in all cases. Some examples are given below.

Pressures   **Receptors and monitoring programmes in UK MS**

Resuspension sediments	Pelagic habitat Descriptor 1
Marine Litter	Marine Litter monitoring Descriptor 10
Underwater Noise	Noise monitoring for Descriptor 11

Summary of outcomes

Scottish data on observed PETS species, 2023

All observed species in catches are recorded. Listed below are the identified species.

Species	Latin Name	Area	Number	Trips
Thorny skate	Amblyraja radiata	4	2840	54
Thorny skate	Amblyraja radiata	6	12	1
Atlantic wolffish	Anarhichas lupus	4	21	8
Rabbit fish	Chimaera monstrosa	4	47	2
Rabbit fish	Chimaera monstrosa	6	122	3
Conger eel	Conger conger	4	32	5
Conger eel	Conger conger	6	6	3
Lumpfish	Cyclopterus lumpus	4	2	2
Common skate	Dipturus intermedius	4	25	11
Common skate	Dipturus intermedius	6	131	18
Longnose skate	Dipturus oxyrinchus	4	12	1
Velvetbelly lantern shark	Etmopterus spinax	4	3	2
Blackmouth catshark	Galeus melastomus	4	38	2
Blackmouth catshark	Galeus melastomus	6	3	2
Bluemouth rockfish	Helicolenus dactylopterus	4	1395	52
Bluemouth rockfish	Helicolenus dactylopterus	6	975	9
Atlantic halibut	Hippoglossus hippoglossus	4	1	1
Shagreen ray	Leucoraja fullonica	4	7	4
Shagreen ray	Leucoraja fullonica	6	9	2
Sandy ray	Leucoraja circularis	4	5	3
Sandy ray	Leucoraja circularis	6	1	1
Turbot	Scophthalmus maximus	4	6	4
John Dory	Zeus faber	4	4	4
John Dory	Zeus faber	6	14	4

Northern Irish data on observed PETS species

All observed species in catches are recorded. Sampling programmes are designed to assess catches of fish, both target and non-target species. All observed species observed in catches are recorded. Sampling schemes are primarily designed to assess the catch of fish, both target and non-target species. In most fishing operations only the catch in the cod end can be sampled due to the catch processing procedures by fishers' onboard vessels, meaning that engagement in nets of interaction with other parts of the net cannot be observed. In fisher self-sampling schemes it is highly likely that large size bycatch will not be retained in the sample, due to the logistical restrictions of 'bagging' a catch sample.

Sampling Type	Species name	No of fish	No. Of samples

NIR - N1	Squalus acanthias	18	1
NIR - N3	Galeus melastomus	1	1
NIR - N3	Raja clavate	16	13
NIR - N3	Squalus acanthias	259	31
NIR - N4	Dipturus batis	7	4
NIR - N4	Galeus melastomus	14	5
NIR - N4	Mustelus asterias	3	1
NIR - N4	Raja clavate	329	33
NIR - N4	Squalus acanthias	1280	45
NIR - N5	Raja clavate	153	3
NIR - N5	Squalus acanthias	441	3
NIR - N7	Squalus acanthias	1	1
Research Cruise	Dipturus batis	3	2
Research Cruise	Galeorhinus galeus	6	5
Research Cruise	Galeus melastomus	2	2
Research Cruise	Mustelus asterias	234	44
Research Cruise	Raja clavate	360	58
Research Cruise	Squalus acanthias	1464	49

English and Welsh data on observed PETS species

Scheme	WP_Region	PetGroup	Species	No. Samples	No. Fish
Offshore	**North Sea and Eastern Channel**	Bony fish	*Hippoglossus hippoglossus*	1	1
			Sebastes viviparus	2	2
			Antimora rostrata	1	1
		Cartilaginous fishes	*Galeorhinus galeus*	1	1
			Mustelus asterias	52	153
			Raja clavata	115	1374
			Raja montagui	22	54
			Raja undulata	34	63
	North-East Atlantic and Western Channel	Bony fish	*Alosa alosa*	1	5
			Alosa fallax	2	8
		Cartilaginous fishes	*Dipturus batis*	53	136
			Galeorhinus galeus	14	33
			Mustelus asterias	157	716
			Mustelus mustelus	16	60
			Raja clavata	179	1104
			Raja montagui	188	740
			Raja undulata	125	372
			Squalus acanthias	62	275
			Lamna nasus	3	3
		Mammals	*Delphinus delphis*	2	2
			Phocoena phocoena	1	1

Ashore	**North Sea and Eastern Channel**	Bony fish	*Hippoglossus hippoglossus*	1	1
		Cartilaginous fishes	*Dipturus batis*	1	1
			Raja clavata	14	173
			Raja montagui	4	12
			Squalus acanthias	2	9
	North-East Atlantic and Western Channel	Bony fish	*Alosa fallax*	1	4
		Cartilaginous fishes	*Galeorhinus galeus*	4	7
			Mustelus asterias	16	143
			Raja clavata	12	210
			Raja montagui	25	337
			Raja undulata	4	10
			Squalus acanthias	26	721

The number of samples provided for both schemes in the table above relates to the number of trips/landings in which they were recorded although for the offshore trips the data is available by haul. This table still refers to the list of protected species published in in table 1D of the retained DCF regulation. ICES has since published a defined list of protected, endangered and threatened species (WKCOFIBYC CSL (Annex 2 table) and RAL & RBL (Annex 3 table))

Protocol:

The at-sea protocol requires the collection of data on all species of fish (bony and cartilaginous) encountered although the discarded component for some of the trawl stratum is subsampled which means that the coverage cannot guarantee to capture all occurrences of small rare fish species in the catch.

All captures of mammals and seabirds are recorded but only ~20 of the trips in the North Sea on netters and liners are dedicated to capturing sightings of Mammals and any fallout from the nets as they come on board.

A new observer database has been developed which includes recording information on the sampling of different phases of the fishing operation and catch processing – monitoring for dropouts, opening of the codend and the status/condition of the PET species when it is returned to sea which will help better identify true zeroes. This new system went live in September 2023.

The co-sampling approach introduced in 2021 during COVID is less reliable for rare occurrences. Not all unwanted catch is brought ashore, large, live or protected species are recorded by the skipper and returned over the side. The co-sampling is only used in 3 fisheries now but for logistical reasons, fewer hauls are sampled for the longer trips.

All observers are required to record all occurrences of fish species, and mammals and seabirds in the catch. Only commercial molluscs and crustaceans are recorded as yet. A change in procedure is required to capture all occurrences of some of the crustacean and mollusc species listed in table 1D of the retained regulation.

Onshore, only commercial bycatch is seen but any part of the landings from any vessel selected for sampling has a chance of being selected for sampling.

All data collected onshore and offshore are recorded in the national GARi system and SFS Observer DB.

Section 1F: Data Quality - Biological Data Collection

To achieve and maintain a high standard of data quality, a framework for data collection planning is formally adopted by the UK Fisheries Science and Evidence Steering Group and coordinated by the UK Data Coordination Group.

Within this process a multiannual programme for data collection is set out by all UK partners. The work plan is reviewed by the UK Fisheries Science Advisory Panel and signed off by Minsters across the Fisheries Administrations before the work plan is formally adopted.

Achievement toward the plan is annually reviewed with deviations explained and justified as per the process outlined in the Introduction. If necessary this reporting allows future plans to be adapted and provides end-users with an understanding of the underlying data quality.

The process of planning, reviewing and reporting provides the core data quality assurance process to ensure appropriate and suitable data is collected to meet the requirements of end-users.

Structures are in place to ensure data quality control through the adoption of Standard Operating Procedures including the use of internationally coordinated and approved sampling methods and best practice methods for data recording.

Data submission to international databases ensures that data structure, mandatory variables and metadata conform to agreed standards.

The aim of the data collection programme is to ensure appropriate data is available to inform science and policy end-users. Through these end-user structures feedback and review of data quality is provided with respect to appropriateness of data to inform policy and fishery stakeholders.

In the case that issues are identified these are taken into account when setting out the Work Plan or through changes in the Standard Operating Procedures for data collection.

Section 2: Economic and Social Data

Section 2A: Population Segments for Collection of Economic and Social Data for Fisheries

Ref Table 2A

International and domestic commitments

This fulfils paragraph 5 points (a) and (b) of Chapter III of the multiannual programme.

Economic and social data on the UK fisheries sector is collected by Seafish Economics on behalf of the UK government and devolved administrations. The economic data collected annually (time series go back to 2005) forms a basis for the UK fishing fleet economic monitoring and future policy development.

The data collected is used:

- for monitoring purposes (e.g. monitoring of the 'national benefit objective' defined in the UK Fisheries Act 2020);
- for modelling that forms the basis for a variety of impact assessments work streams, such as analysis of financial implications of TACs and quota negotiations with the EU and Norway, impact assessments of past and future fisheries management plans and fleet/area/stock specific policies;
- to inform bio-economic models, spatial area closures, business decisions and financial support measures;
- to contribute economic dimension to balance analyses between fishing opportunities and capacity;
- to conduct other fleet specific and area specific analyses (including analyses published by international organisations, such as ICES, FAO and OECD);
- to inform industry and governmental steering and advice groups

The data is available online for public through Fleet Enquiry Tool published by Seafish.

Key end users

ICES, FAO, OECD

Data collection

Data sources

The UK has chosen to carry out an annual survey in order to collect much of the economic data required, however the response to the survey is entirely voluntary. A short questionnaire is carried out by field researchers and then followed up by request for vessel accounts from vessel owners. These accounts provide the main source of data for most of the economic variables.

Data from accounts is combined with data on transversal variables to ensure consistency

between the different sets of data and to minimize the complexity of the economic survey.

The UK combines numerous sources of data collection in order to fulfil MAP obligations. Administrative sources (Fleet register, logbooks and sales notes as well as Individual Quota Allocation Register) are used in combination with face to face interviews carried out by field researchers and accounts collection at the end of financial year. Some data sources are used in combination (questionnaires / accounts and administrative methods) using calculation. For the list of data sources see Table 2A.

Data types

For all UK administrative sources the information is available at Census level. For most of the economic variables and employment (FTE), Non-Probability Sample Survey is used. The survey is implemented in 2 steps: face-to-face interviews in ports followed by phone or e-mail contact at a later date in the year when accounts are available. Based on previous experience this approach is the most efficient method for collecting a sufficient sample size to generate estimates for every vessel on the UK Vessel Register. Collaboration between the MMO, Government and Industry bodies such as Seafish and POs enables the UK to achieve response rates at an acceptable level.

Flexibility is important during the survey as parts of the UK catching sector can occasionally be difficult to meet face-to-face due to the nature of the work and in some cases questionnaires are completed over the phone or by e-mail. Face-to-face interviews are preferable to ensure the quality, robustness and legibility of any data collected.

Sampling frame and allocation scheme

The sampling frame to be used will be the UK fishing fleet register on 31 December including all vessels active during the year. Involvement in the survey is voluntary. As such it involves a degree of self-selection and is not a true random sample of the fleet.

In order to ensure that adequate levels of involvement are achieved, a key aspect of the contact with fishermen is that as well as seeking permission to contact their accountants direct for the required information, agreement is also sought for such access to their financial data to be allowed for subsequent years. As such, the sample for each segment can include some elements of a cohort analysis. It is thought that the benefits of this approach in terms of both ensuring a good level of response for each segment and generating time series information on individuals offsets the introduction of a potential bias from the use of a non-random sampling approach.

The target for the economic data survey is to cover 10% of active fleet in a sample, however intensity of sampling depends on the fleet segment and number of vessels in the fleet, therefore in cases of small inshore (<10 m vessels) fishing fleet the planned sample rate is 5% for main economic indicators and 2.5% for balance sheet related indicators, while for bigger boats (segments including vessles >24 m vessels) planned sample rate is 20% for main cost and income variables and 10% for balance sheet and capital related indicators. For further details about the sample per vessel groups see Table 2A.

Estimation procedures

The estimation procedures are implemented on the level of a more precise variables list and national fleet segments, which are defined based on gear used, target species, area and engine power/vessel size. In total 21 costs items are extracted from the accounts and estimated for each vessel based on models, which combine administrative sources with segment sample. Estimation procedures for different variables and variable groups are presented below.

Costs and earnings:

Within defined Seafish fleet segments individual costs and earnings items from the collected vessel financial accounts (the segment sample) are added together to create a 'combined segment sample cost structure'. The sum of each cost item in the 'combined segment sample cost structure' is calculated for each vessel within a segment as a proportion of the sum of fishing income available for all vessels from the administrative sources.

Fuel costs and crew share costs are calculated differently from other costs. To calculate fuel costs, we use the capacity (VCUs) and fishing effort (days at sea) of each vessel to estimate its fuel consumption in litres, which is then combined with the average annual red diesel price (excluding duty) to calculate the fuel cost estimates for each vessel.

To calculate crew share costs, we allocate a minimum £100 per day in instances where the actual observed amount within the 'combined segment sample cost structure' is lower.

Following the calculation of fuel cost and crew share, we apply the proportions from all the other costs within the 'combined segment sample cost structure' to the official declared fishing income for each vessel within each fleet segment. We estimate costs and earnings for all vessels involved in the fishery (with recorded landings/catches) during the year.

Engaged crew:

Estimation of engaged crew is based on the survey data collected from vessel owners during face to face interviews, combined with data collected by the Marine Management Organisation. This provides details on the number of engaged crew, both full-time and part-time. With this sample information we then estimate total engaged crew based on the physical characteristics of the individual vessel and the vessel's level of activity. Once the total engaged crew is estimated for all types of vessel in the UK fleet, we estimate Full Time Equivalent (FTE) jobs based on hours worked collected during the face to face survey (an FTE is assumed to be 2,000 hours worked a year).

Value of physical capital:

The UK intends to follow the methods for calculation of the value of physical capital as given in the report of the study N° FISH/2005/03 on the evaluation of the capital value, investments and capital costs in the fisheries sector. Sample data from vessel accounts will provide a depreciated value for the sample fishing vessel. This sample data can then

be applied at a DCF segment level to the entire fleet based on a value per vessel capacity unit to estimate physical capital values.

Subsidies on investment:

The data is directly obtained from Administrative sources, linked to vessel owners or their vessels and aggregated to the level required

Employment by education level and nationality

Following the pilot study conducted in 2017, the data collection of social indicators for fleet was added to fleet survey as additional tables to the first phase of the data collection when interviews are performed in the ports. The data will be collected for the same reference year as when the questionnaire is used. The methodologies used to choose sampling frame and allocation scheme will be the same as for the economic fleet survey. The data collection of social indicators will be conducted in 2021, afterwards the data collection exercise is expected to be in 2024 but may be earlier depending on Departmental evidence needs.

Data quality

The quality of estimates after application of data estimation procedures recorded and applied in STATA statistical software are then evaluated by set of quality checks developed. The quality checks include check of codification, consistency of the time series, check of sample for extreme values (visualised in Tableau) and other using different outputs and visualisations in Excel and Tableau. There are also visualisations and checkes developed in R if required.

The majority of the economic data will be collected by a probability sample survey and estimated based on Value of landings using models as described above. For these data, bias will be assessed by calculation of coverage rate, response rate and variability in terms of CV.

For more information on Fleet economic data collection and estimation procedures see [UK Economic Fleet Estimates and Fleet Enquiry Tool - Methodology Report, Seafish, 2020.](#)

Summary of outcomes and deviations from the workplan

1.   **Deviations from Work Plan methodology for selection of data source**

List the deviations (if any) from the methodology used to select data source compared to what was planned in the Work Plan and explain the reasons for the deviations.

No deviations.

      Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid the deviations in the future and when these actions are expected to produce effect. If there are no deviations, then this section can be skipped.

No actions needed.

2.   Deviations from Work Plan methodology to choose type of data collection

List the deviations (if any) from the methodologies to choose type of data collection scheme compared to what was planned in the Work Plan and explain the reasons for the deviations.

No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid the deviations in the future and when these actions are expected to produce effect. If there are no deviations, then this section can be skipped.

No actions needed.

3.   Deviations from Work Plan methodology regarding sampling frame and allocation scheme

List the deviations (if any) from the methodologies used regarding sampling frame and allocation scheme compared to what was planned in the Work Plan and explain the reasons for the deviations.

No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid the deviations in the future and when these actions are expected to produce effect. If there are no deviations, then this section can be skipped.

No actions needed.

4.   Deviations from Work Plan methodology used for estimation procedures

List the deviations (if any) from the methodologies used for estimation procedures compared to what was planned in the Work Plan, and explain the reasons for the deviations.

No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid the deviations in the future and when these actions are expected to produce effect. If there are no deviations, then this section can be skipped.

Not applicable.

5.   Quality assurance

5.1 Sound methodology

Briefly describe if the data collection follow methodologies, guidelines and best practices agreed in expert groups and whether methodologies are documented and are made publicly available.

The methodology is provided and published in a separate report [UK Economic Fleet Estimates and Fleet Enquiry Tool - Methodology Report](#).

5.2. Accuracy and reliability

For additional information, briefly describe how raw data inputs, intermediate results and outputs are regularly assessed and validated and how errors are identified, documented and dealt with.

The quality checks are implemented at different levels:

- As part of data cleaning procedures (after field work is implemented – logical checks, consistency checks and format checks)
- As part of accounts collection (during accounts entry phase) – logical checks
- As part of sample check (check for variability of sampled indicators, fish price checks, etc.)
- As part of output check (time series consistency checks and visualisation of the results)

All checks are documented either through the procedures, or through R scripts and Tableau dashboards.

5.3. Accessibility and Clarity

- Are methodological documents publicly available? (Y)
- Are data stored in databases? (Y)
- Where can methodological and other documentation be found?
  - *Provide the web link, if documentation is publicly available:*

Section 2B: Aquaculture Data

Ref Table 2B

International and domestic commitments

This fulfils paragraph 6 points (a), (b) and (c) of Chapter III of the multiannual programme

The UK's international reporting obligations cover a range of aquaculture variables:

- **FAO**: Production (tonnes) and value (£) by production system and species; Production from hatcheries & nurseries (numbers) by species; Structure of the aquaculture sector
- **FAO-OECD**: No. of employees, by gender and employment status
- **OIE:** Production (tonnes) by species groups; Number of authorised farm sites
- **NASCO**: For relevant species: Production (tonnes) & Production from hatcheries & nurseries (numbers); Containment failure / Escapes (number, events); Escapees in wild populations; Production/ trade by (sterile) genotype; Benthic monitoring.
- **ICES**: For relevant species: Production (tonnes)
- **OSPAR**: For marine net pens: Medicines or treatments administered by type (g); Fish farm annual emissions; Feed inputs

Domestic commitments for collection of UK aquaculture variables reflect retained EU law:

- **food supply variables:** Production (tonnes) and value (£) by species inc. Caviar production (tonnage) and value (£) by species
- **employment variables:** No. of employees, by Gender and FTE
- **economic variables**: Number of enterprises (by number of employees); Other income (£); Personnel costs (£); Value of unpaid labour (£); Energy costs (£); Livestock costs (inc wild inputs) (£); Feed costs (£); Repair and maintenance costs (£); Other operating costs (£); Operating subsidies (£); Subsidies on investments (£); Consumption of fixed capital (£); Total value of assets (£); Financial income (£); Financial expenditures (£); Net investments (£); Debt (£); Weight livestock input (inc wild inputs) (kg); Weight fish feed input (kg); Number of hours worked by employees and unpaid workers (no.)
- **social variables**: Unpaid labour (No.); Employment by age (No.); Employment by education level (No); Employment by nationality (No); Employment by employment status (owner/employer) (No).
- **environmental variables**: Medicines or treatments administered by type (g); Mortalities (%)

Further Economic variables of potential interest to domestic end-users are calculable from those collected: mean wage (gross), total income, total operating costs, Gross Value Added (GVA), Operating Cash Flow (OCF), Earnings Before Interest and Taxes (EBIT), net profit, capital productivity (%), Return On Investment (ROI) (%), Future Expectations Indicator (FEI) (%), Labour productivity, GVA to revenues (GVA margin), Operating cash flow margin (OCF margin), EBIT margin, Net profit margin, Employees per enterprise, Part-time share, Unpaid share

End-users

International end-users as above include FAO, OECD, OIE, NASCO, ICES and OSPAR.

Domestic end-users range across:

- Government departments: Defra, Department for International Trade, Scottish Government Marine Analytical Unit, Welsh Assembly Government
- Government agencies: Cefas, MMO, VMD, EA, SEPA
- local authorities / councils
- Non-departmental public bodies: Seafish, Seafood 2040
- wider stakeholders: Aquaculture industry including trade associations, certifiers, consultants, farmers; Academia and researchers; Environmental NGOs; Journalists.

Data collection

UK aquaculture population: The UK has a diverse aquaculture sector, with demographic differences between the DAs. The MSS, Cefas and DAERA-NI Fish Health Inspectorates (FHIs) have conventionally been the main regulators collecting aquaculture data for statistical purposes for Scotland, England and Wales, and Northern Ireland respectively. These bodies authorise "Aquaculture Production Businesses" (APBs) and maintain public registers under aquatic animal health legislation. The UK aquaculture population therefore reflects the APBs on these registers.

Segmentation: Segmentation refers to how the aquaculture population is divided into sub-populations for collection and/or reporting of data, i.e., the degree of splitting (or clumping) based on species and culture technique. Simplified segmentation for UK aquaculture is indicated in the table below.

Segmentation of UK aquaculture. Species within each segment indicated, with the identifier "nei" (=not elsewhere identified) used to report uncertain species mixes, hybrids, and anonymise confidential production by grouping.

UKMAP segment	Species included	Notes
Salmon	Atlantic salmon	Split by freshwater and seawater for census data collected in Scotland
Trout	Rainbow trout Sea (brown) trout Arctic char Salmonids nei	Split by freshwater and seawater for census data collected in Scotland

Marine finfish	Atlantic halibut Ballan wrasse Lumpfish Marine fishes nei	
Finfish net-pens in seawater		For reporting of environmental data (mortality and medicinal treatment)
Temperate freshwater finfish	Common carp Cyprinids nei Freshwater fishes nei	Could include sturgeon (caviar) if fledging industry develops. Potential for further inclusion (or new segment) for ornamental fish
Heated RAS (Recirculation Aquaculture System)	Nile tilapia Whiteleg shrimp	To differentiate warm-water species cultured for human consumption
Crustaceans – temperate species	European lobster	
Mussel	Sea mussels nei Common edible cockle	Cockle included as species harvested by mussel enterprises
Oyster	Pacific cupped oyster European flat oyster Northern quahog (=Hard clam) Japanese carpet shell (=Manila clam)	Clams included as species harvested by oyster enterprises
Other molluscs	Great Atlantic scallop Queen scallop	

Data collection methods: Data collection is based on self-reporting by industry. Data provision is largely voluntary as there are no legal requirements for enterprises/farms to provide requested data. (The exceptions are for some Environmental data, and in NI where Section 11(2) of the Fisheries Act (Northern Ireland) 1966, as amended, includes a condition in culture licences that the Holder: keeps a record of inputs and outputs of fish or shellfish, the quantity and value of sales, and provides the information on request). Methods for collecting the data include:

- administrative records – held for all members of the population/segment
- census (survey) - all members of the population/segment are sampled by data collectors
- self-reporting census - all members of the population/segment are required to report data under authorisation requirements (i.e., some Environmental variables)
- (sample) survey - a proportion of the population/segment is sampled by data collectors
- expert opinion
- calculation – quantitative estimation using other variables

Census and survey data are collected by a variety of methods – postal questionnaire, during on-site health inspections, emails, app reporting and via telephone. Responses are encouraged by routine data collection and by follow-up contact. The bodies responsible for data collection are indicated in Figure 48.
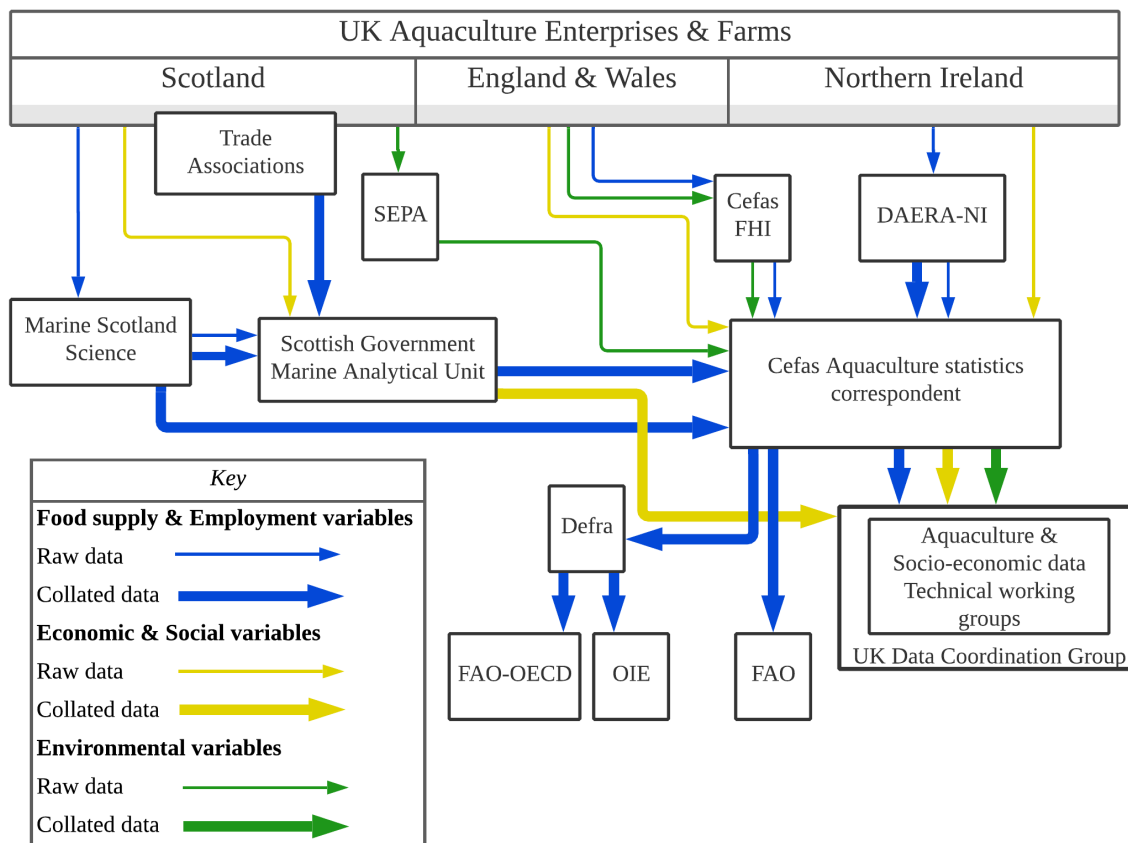
Figure 84. Pathways for the collection of raw data and collated data (statistics) for the main UK aquaculture data requirements, illustrating the bodies involved.

Data quality

Personnel: Regional (DA) data are collected and collated by MSS, MAU, Cefas and DAERA. Staff involved in data collection, entry, collation and work-up: undergo mandatory annual training in Information Protection; use appropriate software, with restricted access to maintain confidentiality of individual enterprises; are trained, experienced, engaged and have a good knowledge of the aquaculture industry. Data are manually checked for anomalies at data entry and collation stages by experienced operators with knowledge of individual enterprises and by comparison to previous years' data. Anomalous and missing values are queried with the enterprises or farms.

Estimation procedures:

- expert opinion (trade associations, traders, individual operators for low volume species) is used to estimate average annual Unit values (£/tonne) which vary temporally and geographically. Independent estimates are derived for the three UK regions (Scotland, Northern Ireland, England, and Wales) which show consistency. Production value (£) per species is imputed from the weight of sales (tonnes) and Unit value (£/tonne).
- employment data collected in the separate DA censuses differ between the three regions and are not fully aligned with FTE and employment status requirements.

FTE estimates for Scotland and Northern Ireland are based upon segment statistics for part-time workers in England and Wales.

- where Economic variable survey responses for Weight (Livestock input, Sales) are given by number and stage rather than weight, conversions are used (Salmon egg = 0.16 g, rainbow trout egg = 0.1 g; brown/sea trout egg = 0.08 g; "Fry" = 2 g, "Fingerling" = 25 g, Smolt" = 80 g).
- where DA/UK totals are calculated from sample survey data, estimates are derived by scaling-up using segment census totals.

<u>Generic governance</u>

- achievement toward the plan is annually reviewed with deviations explained and justified. If necessary, this reporting allows future plans to be adapted and provides end-users with an understanding of the underlying data quality.
- the process of planning, reviewing, and reporting provides the core data quality assurance process to ensure appropriate and suitable data is collected to meet the requirements of end-users.
- structures are in place to ensure data quality control through the adoption of Standard Operating Procedures including the use of internationally coordinated and approved sampling methods and best practice methods for data recording.
- data submission to internationally databases ensures that data structure, mandatory variables and metadata conform to agreed standards.
- the aim of the data collection programme is to ensure appropriate data is available to inform science and policy end-users. Through these end-user structures feedback and review of data quality is provided with respect to appropriateness of data to inform policy and fishery stakeholders.
- in the case that issues are identified these are taken into account when setting out the work-plan or through changes in the Standard Operating Procedures for data collection.

Summary of outcomes and deviations from the workplan

Aquaculture data collection activities in 2023 are described below.

1. Data requirements for reporting year (Programme Year, PY 2023)

In 2018, DCF aquaculture data requirements expanded from just Economic variables to include Social and Environmental variables. The variables and collection periodicity have been maintained via retained legislation and UKMAP. Aquaculture data requirements are for Yr-2, i.e. in 2023 data representing the UK aquaculture industry in 2021 were required for Economic variables, as indicated below via shading.

Variable category	Summary of variables	Collection frequency	PY2018 (2016 data)	PY2019 (2017 data)	PY2020 (2018 data)	PY2021 (2019 data)	PY2022 (2020 data)	PY2023 (2021 data)
Economic (Food supply)	Production volume,	Annual	✓	✓	✓	✓	✓	✓

	price & value							
Economic (Employ-ment)	Employee numbers	Annual	✓	✓	✓	✓	✓	✓
Economic (Other)	Enterprise, cost, income & capital variables	Annual	✓	✓	✓	✓	✓	✓
Social	Employee age, nationality, education	Triennial	✓			✓		
Environ-mental	Medicinal treatment use; Mortality	Biennial	✓		✓		✓	

2. Methodology for data collection

2.1 UK aquaculture population and segmentation: As described in the work-plan, the (meta-) population for which data are collected reflects "Aquaculture Production Businesses" (APBs) authorised under Aquatic Animal Health regulations. These regulations require aquaculture operations to be authorised by the regional competent authorities for finfish and shellfish health. There are three separate bodies covering England-Wales, Scotland, and Northern Ireland, which have a full overview of farm sites and businesses. The legislative term APB refers to aquaculture farms (= sites = holdings) rather than (commercial) businesses ($\approx$ Enterprises). Segmentation refers to the splitting of the UK aquaculture population into segments (= aquaculture sectors) for collation of statistics. Both the population and segmentation remained as planned.

2.2 Data sources: The sources of data were as planned, i.e. self-reporting by aquaculture operators. It should be noted that aquaculture enterprises often operate more than one farm (=APB). Production and Environmental data are collected at APB (farm) level, while Employment and Economic data are collected at Enterprise level. For continuity in reporting, the accompanying Table 2B "frame populations" refers to numbers of enterprises for all Economic (Production, Employment and other Economic) data, but number of farms for Environmental data.

2.3 Data collection methods: Data collection proceeded as planned, with a variety of methods used for the different variables by different organisations across DAs (summarised below).

		Segment	Data collector (& Data collection method)

Variable category	Summary of variables		Scotland	England-Wales	Northern Ireland
Economic (Food supply)	Production volume	All	MSS (Census)	Cefas (Census)	DAERA-NI (Census)
	Production price (£/tonne)	All	MAU (Expert opinion)	Cefas (Expert opinion; Web-search)	DAERA-NI (Census; Expert opinion)
	Structure/size of aquaculture facilities	All	MSS (Administrative records; Census)	Cefas (Administrative records; Census)	DAERA-NI (Administrative records; Census)
Economic (Employment)	No. of employees	All	MSS (Census)	Cefas (Census)	DAERA-NI (Census)
Economic (Other)	Enterprise, cost, income and capital variables	Salmon, Trout, Mussel	MAU (Sample survey)	Cefas (Sample survey)	Cefas (Sample survey)
Environmental	Medicinal treatment use	Finfish seawater net-pens	SEPA (Census)		
		Finfish		Cefas (Census)	
	Mortality	Finfish seawater net-pens	SEPA (Census)		

2.4 Sampling frames: For most categories of variable (Economic food supply & employment, Environmental), data collection is long-standing and classed as a census survey as it encompasses the whole population. Collection of the Other Economic (and Social) data differs, being via sample surveys of a proportion of the population. Without a legal requirement to supply data, responses are based on goodwill and Enterprises that choose to respond are self-selecting. The survey has evolved to focus on the three main segments of UK aquaculture - salmon, trout and mussel. All commercial salmon enterprises are included in the sample survey. For the trout and mussel segments, main producers are selected (indicated from production data gathered in the census); experience shows that these enterprises are more likely to respond and supply the range of data required. All other segments fell below the threshold of 10% of aquaculture production by volume and value and were not included in the sample survey for Other Economic data.

Species segment	2021 production volume		2021 production value	
	tonnes	**%**	**GB£**	**%**
Salmon	205,393	86%	£1,065,989,670	91%
Trout	14,278	6%	£58,455,170	5%
Mussel	12,223	5%	£11,821,080	1%
All others	7,375	3%	£30,667,362	3%
Total	**239,269**	**100%**	**£1,166,933,182**	**100%**

2.5 Estimation procedures: Census returns approach 100%; for the few operations that do not respond to the censuses despite follow-up chasing, missing data are estimated

based on historical evidence and knowledge of the sites. Production (farm gate) price (£/tonne) is a difficult variable to sample, varying with market demand, seasonality and product quality. A variety of methods are therefore used to estimate representative figures. Total value (£ ≈ Gross sales) is then imputed per species [Production volume (tonnes) x Production price (£/tonne)]. To generate the Other Economic variables, estimates for the three sampled segments are based on extrapolation of the sample totals, using the proportion of relevant census totals (production volume, production value, employment).

3. Deviations from the Work Plan and actions

Data collection is routine and proceeded as required. It should be noted that when the 2023 Work Plan was "rolled over", some information within *Table2B_Pop_segments_aquacu* was not updated: column G "*Data year (WP yr-2)*"; Column I "*Previous data year*"; Column J "*Planned sample rate %*". Also, for row 9 [*Input to capture-based aquaculture volume (tonnes) and unit value (£/tonne)*] the planned sample rate (100 %) is incorrect and should be NA as data on mussel inputs are provided by DAERA for Northern Ireland mussel seed fishery rather than sampling. The correct information for 2023 is noted within the Annual Report Table Column Q "*AR comment*".

The only deviation from requirements to note was for the sample survey for Other Economic data: Sample rate (i.e. the % of enterprises within a segment for which data were received) was lower than planned for Salmon (19% v 28%), but as planned for Trout (7% v 7%) and Mussel (8% v 6%). This survey, initiated in 2013 to avoid disallowance penalties, initially suffered from a poor response rate (% of questionnaires returned; ≠ sample rate for a sample survey) and incomplete responses. To improve response rates and the quality of data received, in 2015 it was changed to focus on the three main segments of UK aquaculture, and for trout and mussel just the main producers considered better able to supply the data required and bear the burden of responding. This approach did initially improve response rate (from 13% in 2014 to 47% in 2016), but it has since decreased (to 26% overall) despite routine follow-up chasing. Although the sample rate was lower than planned, the proportion of aquaculture production sampled remained substantial (see below under Accuracy and reliability). Actions have been taken to encourage responses, e.g.: change to electronic (Excel/email) submission rather than mailed paper questionnaires; Marine Directorate surveying Scottish Enterprises; emphasising UK (rather than EU) requirements and data use in covering communications. The collection of Economic (and Social) data is recognised as an area for attention (see below).

4. Quality assurance

4.1 Methodology: Aquaculture data collection in 2023 continued with established methods, that have been used to supply data to FAO, Eurostat and JRC/STECF for periods spanning years to decades. UK data collection methods were presented at the DCF Expert Working Group Workshop on Aquaculture Data Collection (Gdynia, 2015) and follow standard practices. The methods and questionnaires used for the production and employment census surveys in Scotland are published ([finfish](), [shellfish]()) and generate

Official Statistics. The method used for Other Economic data survey in Scotland is [published](#) and generate Official Statistics in Development.

4.2 Personnel: Aquaculture data collection in 2023 was delivered by organisations and staff familiar with the data and data collection. Since 2021, the sample survey within Scotland for Other Economic data has been conducted by Scottish Government, rather than Cefas. This was considered appropriate: Scottish enterprises may be more likely to respond, and Scottish Government are familiar with the data as a main user for generation of [Marine Economic Statistics](#).

4.3 Accuracy and reliability: All data are self-reported by aquaculture operators. Validation is based upon coherence with previous years' data and statistics. Data are examined for anomalies at data entry and collation stages using automated and manual checks by experienced operators with knowledge of the industry and statistical requirements. Such quality assurance checks for individual enterprise returns include use of concurrently collected data. For example, for Other Economic data: weight variable data (on livestock input, fish feed, and sales) are used to assess cost/income variable data, and Food Conversion Ratio is calculated as a further check; employee variable data (FTE, hours and personnel costs) are assessed by normalising against data on the number of employees. Anomalous and missing values are queried with the enterprises or farms.

- The annual censuses collect data on production volumes (by species), systems, employment, and enterprises (wrt number of employees). These data are considered accurate and reliable.
- Census data on FTE were only collected for England-Wales. For Scotland and Northern Ireland, employment status (Full-time, Part-time, Casual for Scottish shellfish only) is used to estimate FTEs using annual census data for England-Wales; such estimates are considered good.
- Production (Farm gate) prices (£/tonne) are based on expert estimates from producers and producer organisations. Independent estimates across the DAs show coherence.
- The Other Economic variables were collected by sample survey (salmon all active commercial enterprises; trout & mussel – main producers). The accuracy of resulting statistics depends upon the scaling factors, i.e. the multipliers applied to sample totals to extrapolate population estimates. Scaling factors depend upon the proportion of the whole segment that the respondents represent, rather than achieved sample rates. In 2023, the achieved sample rates were 19%, 7% and 8% for salmon, trout and mussel segments respectively, but the respondents represented higher proportions of production volumes (i.e. 68%, 9% and 19%). Indicative scaling factors were therefore 1.5, 11.6 and 5.1 respectively, although it should be noted these vary within a segment in relation to the specific variable (i.e. whether scaled by production value, volume or employment) and any missing values within responses. It should also be noted that the same Enterprises typically respond each year, providing consistency.

4.4 Accessibility and Clarity: Although details of APBs are available on public registers ([Scotland](#); [Northern Ireland](#); [England-Wales)](#) it must be recognised that most of the (raw) data collected are confidential. Splitting of collated statistics by species, segments and/or

DA can result in confidentiality issues where the associated number of Enterprises is limited, which then prevents dissemination (e.g. halibut production in Scotland).

UK production and employment statistics are collated from the raw data and reported annually to FAO/OECD for publication (FAO Yearbook of Fishery and Aquaculture Statistics | Coordinating Working Party on Fishery Statistics (CWP) | Food and Agriculture Organization of the United Nations; FishStatJ Database). Seafish also publish headline UK figures. Historical UK statistics (up to EU-exit) are also available in EU (Eurostat, STECF) databases, and biennial JRC/STECF reports. For Scotland, aquaculture statistics are published (finfish reports, finfish data, shellfish reports, shellfish data, economic reports). For England, Wales and Northern Ireland, statistics can be supplied upon request. Improved accessibility is recognised as a development area (see below).

5. Potential areas for development action

In 2023, an aquaculture data and statistics "taskforce" was established with representatives across DAs and organisations [MMO, Defra, Seafish, Marine Directorate, SEPA, Cefas, DAERA-NI, AFBI-NI, WAG]. The initial task-force objective was to provide information to Defra to produce a "data map" (illustrating the flow of data from collection, through storage and processing to use) aimed at supporting reformation, modernisation, planning and meeting Fisheries Act 2020 objectives. Ten on-line meetings (full and partial membership) were held in 2023. The taskforce also discussed refinement of the Other Economic variables to address the decline in responses to the sample survey; however, it was agreed that the status quo would be maintained for the immediate future.

In 2024, it is planned for the aquaculture taskforce to become an aquaculture sub-group of the Data Collection Group, and terms of reference have been drafted. Potential development areas for this sub-group to take forward include:

- Domestic repatriation of EU functions, i.e. analysis, reporting, publication, curation, independent quality assurance. These functions will need to meet expectations for UK Official Statistics.
- Review of variable requirements and collection methods for the Other Economic variables to improve response rates. Potential options include: increasing the number of trout and mussel enterprises sent the questionnaire; refining the variables (while meeting user needs and maintaining continuity) to reduce the burden and thereby encourage responses; demonstrate the merit of the data to industry via bespoke feedback and/or improved accessibility; focus on enterprises with a track-record of supplying data to ensure comparable (relative) time series.
- Timeliness. The established data collection schemes and the DCF/UKMAP requirements for Yr-2 data do not match international reporting obligations which request UK production and employment for Yr-1 (necessitating interim submission of Yr-2 as estimates).
- Independent sources could be investigated for validation purposes and for potential overlap/expansion of DCF/UKMAP aquaculture statistics; e.g. ONS employment statistics; ONS Economic statistics; EA salmonid and freshwater fisheries statistics;

VMD Veterinary Antimicrobial Sales; MMO Sea Fisheries Statistics for wild inputs (wrasse, mussel seed); Several and Hybrid Order production.

- Curation of UK Economic data could include recalculation of historical data currently published by STECF/JRC (in € and not corrected for inflation to "real" values).

- User requirements for additional variables could be considered; e.g. Defra's Animal Welfare Committee requested statistics on numbers of individual finfish (rather than tonnages) of fish slaughtered in the UK; the Defra 25 Year Environment Plan Outcome Indicator Framework requires environmental, social and economic sustainability statistics for aquaculture.

- Additional data collection schemes need to be implemented if statistics on the emerging seaweed segment are required. The current aquaculture population does not include UK seaweed farms, being based around aquatic animal health regulation.

- The aquaculture population could be standardised across the UK. The aquaculture industry differs across the UK, and the authorisation of APBs differs between DAs. For example, in Scotland data non-commercial salmonid conservation enterprises fall outside the APB population, whereas these are included in England-Wales and Northern Ireland.

- Segmentation could be reviewed to ensure it is fit for UK and international reporting purposes, comparable and future-proofed. Current segmentation was adapted from Table 9 of Commission Delegated Decision (EU) 2019/910 to provide coherence with previously reported UK statistics, and existing data collection schemes. However, UKMAP will need to develop statistics for each DA (as well as the UK combined), and this segmentation differs to that used for collation within Scotland and Northern Ireland.

- Production price (£/tonne) is a key variable, and the current estimation method could be reviewed.

- The structure/size of facilities variable could be evaluated. Although these statistics are requested by FAO (and Regulation (EC) No 762/2008 revoked), the classification of facility type and the diverse units for quantification (length, volume, area) make the variable of limited value. Indeed, neither FAO nor Eurostat publish submitted statistics, and the latter organisation indicated dropping the variable from a revised regulation.

- The censuses collecting employment data via differ between DAs and are not fully aligned with UKMAP/DCF nor FAO-OECD requirements in terms of FTE and categories (Full-time, part-time, Occasional) necessitating some estimation.

Section 2C: Population Segments for Collection of Economic and Social Data for the Processing Industry

Ref Table 2C

International and domestic commitments

This fulfils footnote 6 of paragraph 1.1(d) of Chapter III of the multiannual programme.

Economic data on the UK seafood processing sector is collected by Seafish Economics on behalf of the UK government and devolved administrations. These data are used to:

- produce analysis and evidence in the form of Seafish's suite of economic reports
- support Seafish economists and economists in Fisheries Departments in the provision of expert advice to decision makers from industry and government
- feed into government analysis and evidence to support policy decisions

The data are publicly available through the online Processing Enquiry Tool published by Seafish.

Key end users

UK Fisheries Administrations

Data Collection

Methodologies used to choose the different sources of data

The definition of processing enterprise is as set out in the retained DCF legislation. There exist a number of data sources that include relevant data on UK seafood processing companies including the Food Standard Agency database. The definitions of what constitutes a processing enterprise contained in these sources differs from that of the retained DCF. However, these databases provide a starting point for an annual census of all UK processing sites, and allows the UK seafood processing industry to be defined as per the requirements of the DCF.

The census provides a list of processing sites that derive more than 50% of turnover from processing activities. This list is used to inform which companies to contact to request financial data, which are collected through a questionnaire or through the submission of financial accounts. These accounts are seen as the most reliable data source for estimating the performance of the sector. Further financial data is extracted from public records available on Companies House.

Data on number of persons employed, national FTE, and number of enterprises are also collected during the annual census.

Methodologies used to choose the different types of data collection

Due to the large number of potential processing sites identified, face to face interviews

would be prohibitively expensive and time consuming. A telephone census is used to gather data on the types of activities taking place at different sites and total number of employees. On occasion, face to face interviews are carried out with the largest sites to confirm the accuracy of the data and to gather further data on what is driving trends.

Participation in the survey is entirely voluntary in the UK. In the event that we are able to contact a company but they will not provide data, we will use previous survey data (if available) combined with our own expertise to create estimates. If we cannot contact a company which is reported to be trading but for which we have no previous survey response, we estimate the FTEs for the reference year based on a combination of Seafish expertise and other available sources such as published accounts or data from a relevant trade association.

Financial data is collected via questionnaire or hard copies of accounts. For larger enterprises these accounts are publicly available, guaranteeing a robust sample size.

Methodologies used to choose sampling frame and allocation scheme

For the census the Seafish processing database (containing data from all previous surveys) is used as a starting point. Before starting the census, this list is cross-referenced with the Food Standards Agency database and Companies House register, and sense checked by Seafish colleagues. Further to this, contact is made with all sites listed as processors in the Food Standards Agency database and any new sites identified by experts in the Seafish economics team or Seafish regional teams.

The financial survey is a non-probability sample survey. Involvement in the survey is voluntary. As such, it involves a degree of self-selection and is not a true random sample of the sector. A high percentage of the largest processing companies in terms of turnover are included in the sample due to the availability of data from published financial accounts.

Methodologies used for estimation procedures

The data collection phase of the project leads to the creation of a sample of completed financial survey questionnaires and published accounts. Where both survey and published accounts data are available for particular variables, the survey data supersede officially published figures. The merging of survey and published accounts is also supplemented by extensive checks to ensure compatibility in terms of variable definitions.

Once the financial datasets are merged, estimates are made at the company level for all firms in the population (aside from those already in the sample) by applying sample averages on a per-FTE basis. Company FTEs are calculated as the sum of the relevant site(s) FTEs using site ownership data (for the relevant year).

Data quality

The quality of estimates after undergoing the estimation procedures (in Stata and R statistical software) are then evaluated by a set of quality checks.

For the data collected, bias will be assessed by calculation of coverage rate, response rate, and measures of variability.

Further information can be found in the Seafood Processing Methodology Report. This is a short report which describes the methods used to collect and produce seafood processing industry performance statistics (6th edition). [Seafood Processing Methodology Report — Seafish](#)

Summary of outcomes and deviations from the workplan

1.   Deviations from Work Plan methodology for selection of data source

List the deviations (if any) from the methodology used to select data source compared to what was planned in the Work Plan and explain the reasons for the deviations.

No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid the deviations in the future and when these actions are expected to produce effect. If there are no deviations, then this section can be skipped.

No actions needed.

2.   Deviations from Work Plan methodology to choose type of data collection

List the deviations (if any) from the methodologies to choose type of data collection scheme compared to what was planned in the Work Plan and explain the reasons for the deviations.

No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid the deviations in the future and when these actions are expected to produce effect. If there are no deviations, then this section can be skipped.

No deviations.

3. **Deviations from Work Plan methodology regarding sampling frame and allocation scheme**

List the deviations (if any) from the methodologies used regarding sampling frame and allocation scheme compared to what was planned in the Work Plan and explain the reasons for the deviations.

No deviations.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid the deviations in the future and when these actions are expected to produce effect. If there are no deviations, then this section can be skipped.

No actions needed.

4. **Deviations from Work Plan methodology used for estimation procedures**

List the deviations (if any) from the methodologies used for estimation procedures compared to what was planned in the Work Plan, and explain the reasons for the deviations.

The estimation procedures are in line with the plan.

Actions to avoid deviations

Briefly describe the actions that will be considered / have been taken to avoid the deviations in the future and when these actions are expected to produce effect. If there are no deviations, then this section can be skipped.

No actions needed.

5. **Quality assurance**

5.1 Sound methodology

Briefly describe if the data collection follow methodologies, guidelines and best practices agreed in expert groups and whether methodologies are documented and are made publicly available.

The data collection methodology is reported through the Seafood Processing Methodology Report (6th edition)

5.2. Accuracy and reliability

For additional information, briefly describe how raw data inputs, intermediate results and outputs are regularly assessed and validated and how errors are identified, documented and dealt with.

The data are checked on a several levels:

6. Logical and consistency checks during the census data cleaning procedures
7. Sample variability checks
8. Output consistency checks and time series assessment (visual and through Processing Enquiry Tool dashboards)

All procedures are documented in the supporting methodological documentation. Errors are recorded.

5.3. Accessibility and Clarity

- Are methodological documents publicly available? (Y)
- Are data stored in databases? (Y)
- Where can methodological and other documentation be found?
  - *Provide the web link, if documentation is publicly available*

Seafood Processing Methodology Report (6th edition)

Section 3: Fishing Activity Data

Fishing Activity Variables Data Collection Strategy

<u>Ref Table</u> 3A

International and domestic commitments

This fulfils paragraph 4 of Chapter III of the multiannual programme

Fishing activity or Transversal Data consists of information on the activity of the UK fishing fleet and that of non-UK vessels operating in UK waters or landing into UK ports. The scope of the data is as recorded, reported and transmitted under the Control Regulation, Regulation No. (EC) No 1224/2009 as (as amended in retained EU law). This includes landings, fishing effort, vessel monitoring, and fleet capacity information collected and processed by officials of the various Fisheries Administrations in the UK, namely the Marine Management Organisation, Marine Directorate, DAERA, the Welsh Government and Fisheries Departments in Jersey, Guernsey and the Isle of Man.

Key end users

Transversal data contributes to a number of elements of the UK's data collection plan including assessing the impacts of fisheries on the marine ecosystem, determining fishing mortality for stock assessment purposes and providing variables required for raising biological samples from fishing vessels to the fleet level. Additionally, the data contributes to economic assessments of the performance of the UK fishing fleet.

Data collection legislation requires data to be made available in the form of primary data to the national institutions implementing the work plans. Within the UK, data users include biologists in CEFAS, AFBI, the Welsh Government and the Marine Directorate; economists in the Seafish Industry Authority (Seafish) and UK Fisheries Departments and analysts in other Government agencies including the Marine Management Organisation and the JNCC.

Data are supplied to international organisations for stock assessment and management purposes, most importantly the International Council for the Exploration of the Sea, ICES and to other Regional Fisheries Management Organisations (RFMOs) including NEAFC, NAFO, IOTC, HELCOM, OSPAR and ICCAT. The information is also widely used to support the development of new and revision of existing fisheries policies within the UK. The data are also made available within the public domain for the use of those with an interest in identifying and assessing the types and levels of fishing activity.

Data Collection

Fishing Effort

For over 10m vessels the three key official documents (logbooks, landings declarations and sales notes) are the key source for transversal variables. For effort variables, the

logbook is the principal source of data. Administration systems have been developed such that for any particular fishing gear reported on the logbook there are several associated effort elements that may be optionally reported by fishermen on their logbook, and then captured in the data entry process. These additional effort variables, when combined with system variables automatically generated when the data is entered (e.g. days of fishing activity) and when the activity of vessels are linked to the vessel capacity data, allow the required variables to be derived. For towed gears such as demersal trawls, details of the number of hauls and length of time for the haul are optionally collected. For beam trawl gear additional information may be provided on the length of the beam used. For towed lines details of the numbers of lines, hauled, and numbers of hooks per line may be provided.

For the 10 metre and under fleet during 2005 the UK introduced a system requiring the registration of buyers and sellers of fish at the point of first sale, and an associated requirement for all such sales to have sales notes reported and provided to fisheries authorities within 48 hours of the sale. More information on this change is available on-line at: [Buyers and sellers of first-sale fish - GOV.UK (www.gov.uk)](https://www.gov.uk)

Data from sales notes are captured as part of the UK integrated data systems that have been put in place, with data collected for sales related to all UK vessels, be they under or over 10 metres in length. When the sales note related to activity by 10 metre and under vessels are entered onto data capture systems, estimates of the associated fishing effort are entered at the same time. The use of the data reported on sales notes replaced the historic system of using the knowledge of local data collectors on the activity of the local small fleets and their usual patterns of effort, and of evidence of the observed fish landings seen at local fish markets. The requirement in the UK is for sales notes for all such landings by these smaller vessels to be reported to fisheries authorities, and as such the results are regarded as providing a complete and exhaustive source of information.

In addition to sales notes as mentioned above, many 10m and under vessels also provide voluntarily logbooks and landings declarations covering their activity. For example, those that operate as members of Producer Organisations were generally required to complete such documentation as part of their being able to fish against the allocations of quota given to such groups in the UK. Additionally, those involved in shellfish fishing activity were also required to report their activity in the form of monthly diaries of activity and landings. This information is all received at local port offices around the coast for entry onto computer systems. These local offices carry out local enforcement functions such as licensing, vessel and market inspections etc. As such they have a detailed knowledge of the vessels that operate in their local area.

From 2019 the Marine Management Organisation and the Welsh and Isle of Man Governments have been gradually introducing a requirement for under-10 metre licensed fishing vessels owners/skippers to record their catch for each fishing trip they make via an app, website or customer contact centre. The requirement to submit this data became mandatory in February 2022. This new capability will deliver assurance and market confidence that we have sufficient data to meet sustainability goals. The data required by

the record has been designated to provide a clearer picture of the activity of the under-10 metre fleet to and complement the data collected through sales notes. Work is also underway to introduce satellite monitoring of the Under 12 m fleet (I-VMS/Inshore VMS). More information on this is provided below.

Landings

Data on landings by 10m and over vessels are derived from the combination of the logbook, landing declarations and sales notes. These provide the key details on the species, presentation, weight and value of fish being landed that is entered onto computer systems at local port offices or via electronic transmission.

Landed weights are used as the data are entered, with live-weights calculated as the products of the landed weight and the appropriate conversion factors for that species and presentation of fish involved. The total landed weight of each species is taken from the landing declaration. Harmonised conversion factors for certain key species and presentations as set out in Commission Regulation 409/2009 are used where they exist or otherwise national conversion factors are applied.

Sales notes information give the details of the breakdown of the landed weight of each species in term of each presentation (and grade) sold. This proportionate breakdown is then applied to the total weight for each species so that the total live weight equivalent of the total landed weight is then allocated across the presentation types seen for the landing.

For vessels of 10m and under overall length, the source of data on landings is as detailed in the section on fishing effort above. A similar process is used as for over 10 vessels, with the exception that in most cases the landed weight of fish is derived from the quantities of landed weight of fish reported in sales notes rather than landings declarations. The same conversion factors as used for over 10m vessels are then applied to the details of species, landed weight and presentation from sales notes to give live weight equivalents of the landed weight.

Average prices for each species are calculated on the basis of live-weight quantities. This effectively weights the overall price thus calculated to the most prevalent presentation used for landings each species for both over 10m vessels and 10m and under vessels.

Fleet Capacity

In the UK, the Marine and Coastguard Agency's Registry of Shipping and Seamen (RSS) and the corresponding registries in the Channel Islands and Isle of Man collect and maintain information on registered fishing vessels including their gross tonnage and their maximum continuous engine power (MCEP) as defined in EU Council Regulation 2930/86, as amended by Council Regulation 3259/94. These data are made directly available to Fisheries Departments by electronic transfer.

The bulk of the UK fishing fleet are registered and operate from the UK mainland and are thus registered by the UK who operate the UK Register of Shipping and Seamen. More

information on their procedures can be found on-line at: [UK Ship Register](#)

Data quality assurance procedures are built into the registration process. For example, every UK fishing vessel must be surveyed before it can be registered. The general principle followed is for this to be carried out by specially employed surveyors from the RSS, but in certain circumstances an external surveyor may be allowed. This survey process includes the validation of the physical measurements and capacity of the vessel both in tonnage and engine power terms.

Fleet management measures in the UK are carried out primarily through the licensing regime administered by Fisheries Administrations. This seeks to control both the overall capacity of the UK fishing fleet and, critically, access to the various fishing opportunities available to UK vessels. The quota and effort uptake by industry groups is monitored on a regular basis through the use of internal management reports in the UK.

Vessel Monitoring Data

Vessel Monitoring System (VMS)

The Vessel Monitoring System (VMS) is a system of satellite tracking using transmitters on board fishing vessels and records the location, speed and heading of a vessel. The system is a legal requirement under EC Regulation No. 2244/2003 (as amended in retained EU law) and Scottish Statutory Instrument (SI) 392/2004. VMS has been used as a monitoring system for UK vessels of 12 metres and over since 2013. Information must be transmitted once every two hours. There are reciprocal agreements with EU countries and third countries such as Norway and Faroes as well as Regional Fisheries Management Organisations (RFMOs) such as NEAFC, where the requirement to position-report is once every hour. The satellite tracking device installed on UK vessels is configured to automatically change the reporting frequency when a vessel enters and exits these areas.

The UK and EU member states have established 'Fisheries Monitoring Centres' (FMCs) to monitor the activities of their flag fishing vessels wherever they may be and fishing vessels within their waters. In the UK, FMC responsibilities are discharged collectively by Marine Directorate, the Marine Management Organisation (MMO - England) and the Department of Agriculture, Environment and Rural Affairs (DAERA - Northern Ireland).

Inshore VMS (I-VMS)

Following industry consultation on proposals to introduce I-VMS, MMO has been preparing industry for the introduction of legislation making it a requirement for licensed under-12 metre commercial vessels operating in English waters to report their location details into the UK VMS Hub.

MMO has completed a type-approval programme and has already successfully rolled- out devices to over 80% of the English under-12 metre fleet. The Statuary Instrument (SI) is expected to be implemented in 2024, subject to parliamentary process.

Scotland is also developing their inshore fleet electronic monitoring through a

modernisation programme with three priority areas. These priority areas are to be developed over time. Current coverage of the inshore fleet with electronic monitoring is limited to pilot study subsets led by University of St Andrews.

Priorities:

Scallop dredge fleet – SIFIDS (Scottish Inshore Fisheries Integrated System).

Under-12 metre static gear fleet – OHIFP (Outer Hebrides Inshore Fisheries Project).

Under-12 metre trawl fleet – to be developed.

A pilot study was conducted within the Northern Irish inshore fleet to explore a potential vessel activity monitoring and electronic catch reporting system. In March 2022, DAERA consulted on proposals for all fishing vessels under 12 metres to have an inshore VMS and is intending to phase in this requirement from 2024.

Since 2012 it has been a requirement for all vessels operating in the Welsh scallop fishery to use VMS reporting at 10-minute intervals. In February 2022, Welsh Government introduced I-VMS requirements for all licensed under-12 metre fishing vessels operating in the Welsh zone. Vessels are required to use IVMS to report every 10 minutes.

GeoFISH

There is an important spatial dimension to fishing, driving the need for reliable data on fishing activity and landings at a fine spatial resolution. Such data is a key part of the evidence needs for UK fisheries and marine policy-making as well as to meet international reporting requirements. Data that flows directly from fisheries management systems, including logbooks, sales notes and landing declarations, does not provide activity and landings data at a sufficiently fine spatial resolution. However, high-resolution spatial data can be produced by linking VMS satellite tracking data with logbook activity and landings data at a vessel and trip level. Cefas has been using a recognised method for linking these data that has been applied to the UK over 12m fleet. This is managed and stored in a database known as Geofish. Work is still in progress including on quality assurance of the data, providing access to users and meeting the needs for accessible documentation on the underlying methods. When complete Geofish should represent a single, definitive data source for spatial landings data.

Data processing, storage and quality control

The UK maintains the following databases containing primary data meeting both management and control and wider analytical requirements:

- an integrated UK database exists (known as IFISH) where primary data related to individual trips by UK registered vessels and foreign vessels landing in the UK (species landed weight by presentation, dates, fishing locations, landing port, gear type, mesh size, fishing effort etc.) is stored. This system came into operational use by fisheries administrations in the UK in 2006. It brings together data from the three key administrative data sources - the official logbooks, landings declaration and sales notes - into a centralised data repository. Individual databases also continue to be maintained in England & Wales, Northern Ireland and Scotland, as the data entry for this information is primarily carried out at local port offices around the coast of the UK – this allows for their local knowledge to play a part in the validation of data reported by fishermen.
- the UK fishing vessel register, which maintains a complete and regularly updated list of vessels and associated attributes and is used for providing capacity data.
- the UK Vessel Monitoring System (VMS), which records satellite tracking information for vessels required to provide such data.
- MCSS (Monitoring Control and Surveillance System). This has now been superseded by a new Mobile Working System in England and Wales.

The measures for control on the reporting of data on fishing activity provided by EU legislation are enforced through the activity carried out by officials within each of the UK fisheries administrations to ensure compliance with these reporting requirements. Where issues are identified with the data, either with the data being reported by individual fishing vessel owners/operators or individual merchants, or where the control regime itself is thought to have weaknesses, additional activities may be carried out to strengthen or supplement the existing reporting systems. In such cases, care is taken to ensure that there is no excessive or inappropriate additional reporting burden placed on those involved in the fishing industry.

Together these activities help to ensure that the data are considered fit for purpose - in terms of coverage and accuracy - as the key source of information with which officials and the industry can manage fishing activity. This includes activities such as the monitoring and management of the uptake of landings against the level of available fish quotas, and also the monitoring of activity by individual fishing vessels to ensure they comply with the limits on fishing effort as set out by various effort control regimes.

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