University of St Andrews

SCOTTISH FISHERMEN'S FEDERATION

Cefas

# UK Bycatch Monitoring Programme

## Report for 2023

UK Centre for Ecology & Hydrology

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Scottish Government
Riaghaltas na h-Alba
Marine Directorate

**Authorship**

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## Executive Summary

This report describes work carried out under the UK Bycatch Monitoring Programme (BMP) during 2023.

The BMP is a consortium based programme consisting of four scientific institutions: the University of St Andrews; the Centre for Environment, Fisheries and Aquaculture Science; the Centre for Ecology and Hydrology; the Scottish Marine Directorate's Science, Evidence, Data and Digital Portfolio, and two fishing industry representative bodies: the National Federation of Fishermen's Organisations and the Scottish Fishermen's Federation. The consortium provides a significant concentration of UK expertise in relevant taxa biology/ ecology, bycatch monitoring, assessment and mitigation, statistical analysis/modelling, data collection technologies, fishing gear technology and broad knowledge of fisheries and environmental policy and management systems.

Approximately 1,300 days at sea and over 3,000 fishing operations, were monitored for Endangered, Threatened and Protected (ETP) species bycatch across a range of demersal and midwater trawl, net, line, purse seine, dredge and pot fisheries during 2023.

Almost 17,000 specimens of species of bycatch relevance were recorded, including twenty marine mammals (4 species), 65 seabirds (7 species), 8086 fish (14 species) and 8532 elasmobranchs (19 species).

Two broad gear groups, pots and demersal trawls/seines, continue to make up the majority (75%) of total UK fishing effort in terms of days at sea. Dredge, line and net fisheries make up about 23% of UK effort. The remaining 2% is accounted for by a mix of hand gathering, pelagic trawls, purse seines/ring nets and miscellaneous gears. Analysis of fishing effort time series data (2009-2022) indicated declines in effort levels across most gear types and areas.

A time-series of data was used, along with fishing effort data for 2023, to produce bycatch mortality estimates for harbour porpoise, common dolphin, seals, common guillemot and great cormorant in static net fisheries using a multi-annual ratio-based approach.

The point estimate for harbour porpoise bycatch in 2023, assuming full compliance by the relevant over 12m netting fleet with ADD requirements was 787 animals (95% CL range 461-1644), and the point estimate, assuming no ADD use, was 1167 animals (95% CL range 649-2073). The point estimate for common dolphin bycatch in 2023 was 338 (95% CL range 202-737). The point estimate for seal bycatch in 2023 was 452 (95% CL range 353-812). The point estimate for guillemot bycatch in 2023 was 1653 (95% CL range 1120-2407). The point estimate for cormorant bycatch in 2023 was 541 (95% CL range 263-1058).

Summaries are provided of ADD compliance activity, historical data collection in net and midwater trawl fisheries, ongoing passive acoustic monitoring to improve knowledge of cetacean bycatch risk and animal density, and BMP contributions to risk and mortality assessments carried out by the International Council for the Exploration of the Sea (ICES).

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## Acronyms used in the report

| | |
|---|---|
| ADD | Acoustic Deterrent Device |
| ASCOBANS | Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic, Irish and North Seas |
| BEAM | Bycatch Evaluation and Assessment Matrix |
| BMP | Bycatch Monitoring Programme |
| CEFAS | Centre for Environment, Fisheries and Aquaculture Science |
| CEH | Centre for Ecology and Hydrology |
| CL | Confidence Limit |
| DaS | Days at Sea |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DCF | Data Collection Framework |
| EC | European Commission |
| EM | Electronic Monitoring |
| EU | European Union |
| ETP | Endangered, Threatened and Protected |
| ICES | International Council for the Exploration of the Sea |
| ICRW | International Convention on the Regulation of Whaling |
| iFish | Integrated Fisheries System Holding |
| LCL | Lower Confidence Limit |
| MD | Marine Directorate |
| MMO | Marine Management Organisation |
| MMPA | Marine Mammal Protection Act |
| MPV | Marine Protection Vessel |
| NFFO | National Federation of Fishermen's Organisations |
| OSPAR | Oslo and Paris Conventions |
| PSG | Project Steering Group |
| SEDD | Scottish Government Science, Evidence, Data and Digital Portfolio |
| SFF | Scottish Fishermen's Federation |
| SMRU | Sea Mammal Research Unit |
| SOI | Scottish Oceans Institute |
| ToR | Term of Reference |
| UCL | Upper Confidence Limit |
| UK | United Kingdom |
| USTAN | University of St Andrews |
| VMS | Vessel Monitoring Systems |
| WG | Working Group |
| WGBYC | Working Group on Bycatch of Protected Species |
| WGFTFB | Working Group on Fishing Technology and Fish Behaviour |

# 1 Introduction.

The UK Bycatch Monitoring Programme (BMP) has been running since the mid 1990's and is a long-term, broadscale, at-sea, fishery dependent data collection programme focussed on the bycatch of Endangered, Threatened and Protected (ETP) marine species, including marine mammals, seabirds and fish. The BMP is funded by the UK Department of Environment, Food and Rural Affairs (DEFRA) and the Scottish Government's Marine Directorate. The programme is designed to meet national and international bycatch monitoring obligations and to improve knowledge of the patterns and scale of ETP species bycatch in UK commercial fisheries, to support Government aspirations for clean, healthy and productive seas, and the sustainable use of its resources.

Work carried out under the BMP during 2023 addressed UK and international monitoring obligations relevant to ETP species bycatch including the UK Fisheries Act 2020, the UK Conservation of Offshore Marine Habitats and Species Regulations 2017, the UK Marine Strategy, the Agreement on the Conservation of Small Cetaceans in the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS), the International Convention on the Regulation of Whaling (ICRW), the Oslo and Paris Conventions (OSPAR) and the United States Marine Mammal Protection Act (MMPA) import provisions.

The BMP is a consortium-based programme, comprising of four scientific institutions and two fishing industry representative organisations. The purpose of this consortium is to bring together a significant concentration of UK scientific expertise in bycatch science, fisheries monitoring, relevant taxa biology and ecology, and industry knowledge to shape the form and future direction of the BMP.

This annual report provides an update on work undertaken within the BMP during the 2023 calendar year. There are sections describing bycatch data collection activities (including a short summary of historical sampling), bycatch observations, UK fishing effort, marine mammal and seabird bycatch estimates, hydrophone deployments, Acoustic Deterrent Device (ADD) compliance activities, and relevant scientific work undertaken by the International Council for the Exploration of the Sea (ICES) during 2023, to which the BMP consortium made significant contributions.

Details of the bycatch estimation procedure used in Section 4 of the report are provided in Annex 1, a map showing the ICES Ecoregions and Divisions is provided in Annex 2 and recently developed ICES ecoregion species reference lists for the Greater North Sea and Celtic Seas ecoregions are provided in Annex 3.

## 1.1 Annual report format.

From 2010 to 2018 all BMP annual reports followed a standardised format which was developed by the European Commission (EC) under European Union (EU) Regulation

812/2004. The standardised reporting format is no longer necessary (see Kingston *et al*, 2021 for details). A new reporting format was developed in 2019, and the same general format has been used for all subsequent reports, but with evolving presentational adjustments to account for the expanding scope of the programme.

# 2 The BMP Consortium.

The BMP consortium consists of four scientific institutions: the Sea Mammal Research Unit / Scottish Oceans Institute at the University of St Andrews (USTAN); the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), the UK Centre for Ecology and Hydrology (UKCEH) and the Marine Directorate of the Scottish Government Science, Evidence, Data and Digital (SEDD) Portfolio that provide impartial scientific oversight and insight, and two fishing industry representative bodies: the National Federation of Fishermen's Organisations (NFFO) and the Scottish Fishermen's Federation (SFF) that provide industry oversight and insight, and direct links to grassroots industry.

Collectively, these organisations provide a unique concentration of expertise in the biology and ecology of relevant taxa (marine mammals, seabirds, elasmobranchs and fish), fisheries sampling design and implementation, data management, statistical analysis and modelling, bycatch mortality and risk assessment, bycatch mitigation, acoustics, Remote Electronic Monitoring (REM), gear technology, fishing effort characteristics and detailed knowledge of fisheries and environmental management systems.

A summary of the main roles and expertise of each of the consortium partners was provided in the BMP report for 2022 (Kingston *et al*, 2026) so is not repeated here.

In addition to ongoing at-sea data collection, several tasks designed to improve understanding of the scale and patterns of ETP species bycatch in UK fisheries are being carried out by the consortium to evaluate sampling designs and protocols (including fishing effort analyses and monitoring gap analyses), assessing the suitability of REM for broadscale, multi-taxa, multi-gear bycatch monitoring, investigating ways to improve current mortality and risk assessment procedures and undertaking bycatch trend analyses. These tasks will be reported on through standalone reports, scientific papers or BMP annual reports as appropriate.

# 3 BMP Data.

## 2.1 Sampling designs and data collection protocols.

Sampling designs (i.e., which fisheries are sampled and at what level) within the USTAN element of the BMP have evolved over time in response to changing legislative and policy needs. Initially the programme focussed mainly on small cetacean bycatch (but bycatch of

other taxa was also recorded), meaning most data collection activities were directed at specific fisheries considered high-risk at that time, such as static net fisheries in the North Sea (ICES Subarea 4) and various midwater trawl fisheries in Subareas 4, 6 & 7 (North Sea, West of Scotland, Celtic Sea/English Channel).

In 2005, phocids, seabirds, marine reptiles and fish/elasmobranch species of conservation interest were formally included in the programme's remit, and routine sampling efforts gradually expanded from static net and pelagic trawl gears to also include longline and ring net/purse seine fisheries. Sampling designs were based on existing legislative drivers, and design alterations were agreed with the BMP Project Steering Group (PSG) before being implemented.

Following the formation of the BMP consortium in 2022, the programme is now accessing and compiling detailed bycatch data from the English (managed by CEFAS) and Scottish (managed by SEDD and implemented by SFF) at-sea catch sampling programmes. The primary aim of these programmes is to collect data on commercial species discard rates for inclusion in fish stock assessments and consequently, the focus is largely on demersal trawl fisheries, although some sampling of static net and line fisheries is undertaken within the English programme. Although sampling designs and data collection protocols in these programmes have not historically been optimised for recording ETP bycatch, work has been ongoing within the UK and through ICES to improve the reliability of bycatch data collection in national catch sampling programmes.

This means, that with the exception of pot/creel fisheries, all major gear groups used by the UK fishing industry are subject to at-sea catch/bycatch data collection. Further work on data collection protocols will continue to improve the reliability of bycatch data collected under the catch sampling programmes, and those data, and data from various electronic monitoring (EM) initiatives that include ETP bycatch recording within their remit, will be incorporated into more comprehensive (i.e., a wider range of species and gears) bycatch assessments going forward.

## 2.2. Historical sampling composition

In this section we present a broad overview of bycatch data collection by vessel size category (<12m and >12m) for the two main gears (midwater trawls and static nets) covered historically by the BMP.

This section has been added in response to a report by Calderan and Leaper (2019) that mistakenly claimed there is "almost no monitoring of under 12m netting vessels" in the UK. The view presented in the report appears to be related to the specific monitoring requirements of the repealed EU Regulation 812/2004, that mainly required monitoring of vessels over 12m. However, Calderan and Leaper (2019) do not consider significant bycatch data collection that has been carried out in the UK inshore netting fleet to meet the

requirements of the EU Habitats Directive (92/43/EEC) pre-Brexit, and which has continued post-Brexit under UK domestic legislation.

For clarification, in Table 1 we present a breakdown of BMP sampling (USTAN element only) by Days at Sea (DaS) for nets (1996-2022) and midwater trawls (1999-2022) by ICES Subarea. Most sampling of midwater trawls (96%) was on vessels >12m which reflects the vessel size composition of the midwater trawl fleet. For nets, 57% of historical sampling occurred largely in inshore waters and on vessels <12m.

***Table 1:*** *Midwater trawl (1999-2022) and net (1996-2022) sampling distribution by vessel size and ICES Subarea.*

| Gear | Size category | Subarea 4 | Subarea 6 | Subarea 7 | Days at Sea | % of sampling |
|---|---|---|---|---|---|---|
| Midwater trawl | <12 | 38 | 28 | 76 | 142 | 4 |
| | >12 | 444 | 436 | 2167 | 3047 | 96 |
| Nets | <12 | 936 | 20 | 2711 | 3667 | 57 |
| | >12 | 588 | 199 | 1931 | 2718 | 43 |

Figure 1 presents a visual representation of the geographical distribution of monitored hauls for net fisheries only, split by vessels size (</>12m).

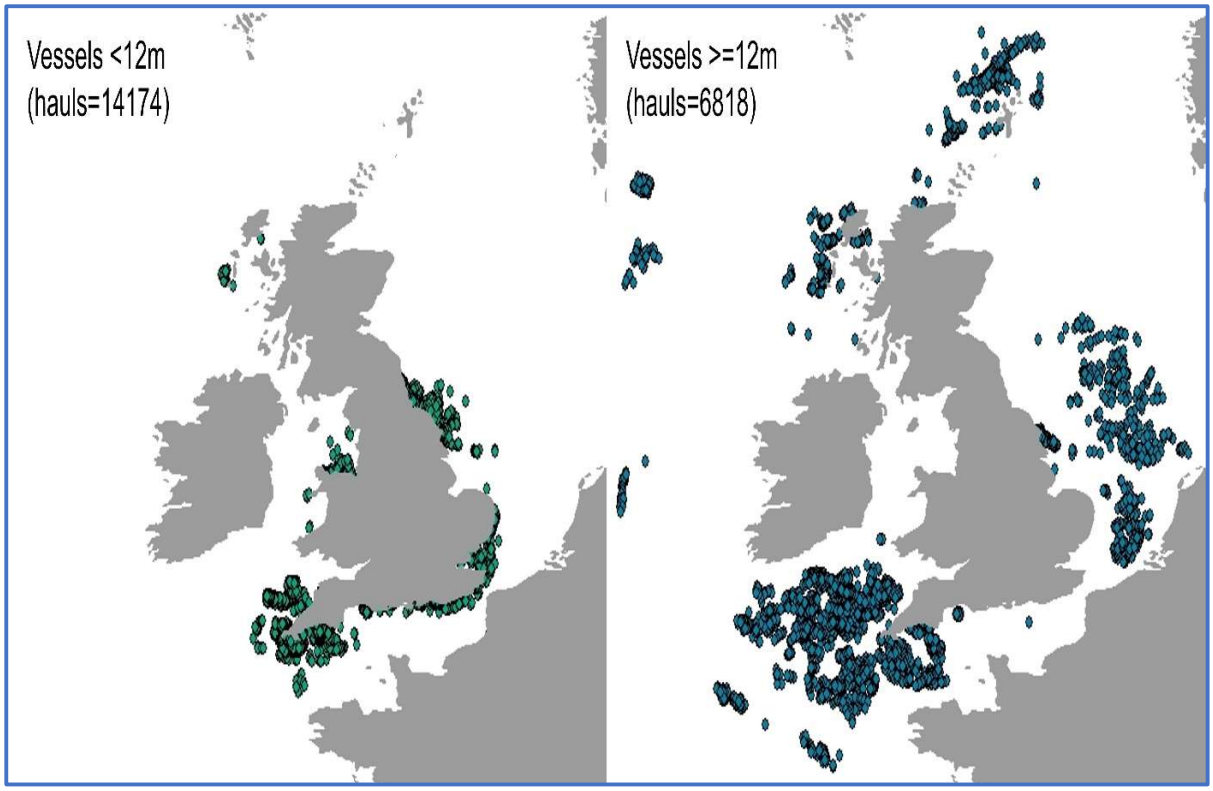


***Figure 1:*** Geographical distribution of sampled net hauls from 1996-2022 by vessel size.

Sampling of the <12m netting fleet is concentrated in the areas of highest inshore netting activity, particularly in the southern North Sea (4c), English Channel (7de) and Bristol (7f) Channel. A significant amount of inshore net sampling was also carried out historically in the central North Sea (4b), but netting effort has declined significantly over the period of the programme and there is currently very little netting effort in that area. A small amount of sampling of inshore netting was previously carried out off the west coast of Scotland (6a). Inshore netting effort in that region is currently very low in comparison to other parts of the UK, but bycatch data collection has recently been reinstated in the area.

## 2.3 Sampling during 2023.

Following three years of significantly or partially affected data collection due to the Covid-19 pandemic, in 2023 sampling activities were largely unaffected and access to vessels was consistently good across regions and fisheries.

This section compiles and summarises sampling data from three sources: 1. the USTAN dedicated bycatch programme; 2. the CEFAS and SEDD catch sampling programmes, which routinely collect ETP bycatch data following the EU 2017 Multi-annual Plan under the reformed Common Fisheries Policy, which was transposed into UK law post-Brexit, 3. EM data collected under the Clean Catch programme.

Almost 1300 days at sea of bycatch monitoring were undertaken in 2023 across a wide range of passive and mobile gears. Most data collection was carried out on demersal trawls (61%) including bottom otter trawl, beam trawl and dredge, followed by a mix of inshore and offshore net fisheries (21%), longlines (6.5%), ring nets/purse seine (6%) and midwater trawls (4%). The remaining 1.5% consisted of occasional sampling of handline and pot fisheries.

The inclusion of EM data from the Clean Catch programme has increased monitoring levels in UK net fisheries to about 1.3% of annual effort. Exploratory work is being undertaken to evaluate how these data can be incorporated into bycatch estimation procedures.

Table 2 provides a breakdown of sampling during 2023 by gear type, vessel size and ICES Division.

***Table 2:*** *Sampling during 2023.* *Note: the number of vessels sampled is provided by strata and includes duplicate records for vessels that operated in more than one stratum, meaning the total number (305) is an overestimate of the actual number of different vessels sampled.*

| Metier level 4 | Vessel size | ICES division | No of vessels | No of trips | Days at sea | No of hauls |
|---|---|---|---|---|---|---|
| Nets | < 15m | 7d | 16 | 21 | 21 | 102 |
| | < 15m | 7e | 20 | 22 | 22 | 151 |
| | < 15m | 7f | 3 | 3 | 3 | 11 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | <15 | 7e | 2 | 2 | 2 | 5 |
| | <15 | 7e | 18 | 71 | 71 | 204 |
| | <15 | 7f | 5 | 48 | 51 | 226 |
| | > 15m | 7e | 3 | 3 | 12 | 17 |
| | > 15m | 7f | 1 | 1 | 2 | 2 |
| | > 15m | 7g | 5 | 5 | 19 | 26 |
| | > 15m | 7h | 3 | 3 | 11 | 10 |
| | >15 | 4a | 1 | 1 | 41 | 117 |
| | >15 | 7g | 1 | 3 | 18 | 33 |
| **Handline** | < 15m | 7e | 9 | 9 | 9 | 51 |
| **Longline** | >15 | 4a | 5 | 7 | 67 | 84 |
| | >15 | 6a | 1 | 1 | 5 | 3 |
| | >15 | 7b | 1 | 1 | 11 | 14 |
| **Beam trawl** | </> 15m | 4c | 1 | 1 | 1 | 3 |
| | > 15m | 7e | 18 | 18 | 107 | 273 |
| | > 15m | 7f | 4 | 4 | 23 | 14 |
| | > 15m | 7g | 4 | 4 | 22 | 24 |
| | > 15m | 7h | 7 | 7 | 41 | 51 |
| **Demersal trawl** | < 15m | 4a | 5 | 10 | 13 | 19 |
| | < 15m | 4b | 27 | 31 | 39 | 58 |
| | < 15m | 4c | 7 | 8 | 8 | 40 |
| | <15m | 6a | 3 | 10 | 10 | 22 |
| | < 15m | 7a | 2 | 2 | 2 | 4 |
| | < 15m | 7d | 5 | 6 | 6 | 14 |
| | < 15m | 7e | 20 | 20 | 20 | 48 |
| | < 15m | 7f | 2 | 2 | 2 | 2 |
| | </> 15m | 4b | 7 | 8 | 9 | 12 |
| | </> 15m | 6a | 1 | 1 | 3 | 2 |
| | </> 15m | 7a | 3 | 3 | 7 | 13 |
| | </> 15m | 7d | 1 | 2 | 2 | 3 |
| | </> 15m | 7e | 8 | 8 | 10 | 25 |
| | >15m | 4a | 34 | 84 | 413 | 1091 |
| | > 15m | 4b | 3 | 14 | 20 | 33 |
| | >15m | 5b | 1 | 1 | 3 | 11 |
| | >15m | 6a | 9 | 14 | 25 | 63 |
| | >15m | 6b | 1 | 1 | 8 | 29 |
| **Dredge** | < 15m | 7e | 3 | 3 | 3 | 16 |
| | </> 15m | 7e | 1 | 1 | 1 | 6 |
| **Midwater trawl** | >15 | 4a | 2 | 2 | 9 | 6 |
| | >15 | 6a | 8 | 11 | 41 | 43 |
| | >15 | 7c | 1 | 1 | 4 | 3 |
| **Ring net/purse seine** | </> 15m | 7e | 1 | 1 | 1 | 1 |
| | <15 | 7f | 10 | 11 | 13 | 14 |
| | </> 15m | 7f | 8 | 61 | 62 | 77 |
| | >15 | 7f | 3 | 3 | 4 | 2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Pots** | < 15m | 7e | 1 | 1 | 1 | 33 |
| **Total** | | | **305** | **555** | **1298** | **3111** |

## 2.4 Observed bycatch.

Table 3 details recorded bycatches during 2023 by ICES Division and broad gear type. The species reported are based on the ICES Ecoregion species lists of marine mammals, seabirds, fish and reptiles for the Greater North Sea and Celtic Seas Ecoregions. The relevant lists are provided in Annex 3a and 3b and the full lists for all Ecoregions can be accessed through the ICES Roadmap for bycatch advice on protected, endangered and threatened species (2020). The fish list contains data limited commercial species and ETP species that are protected under national and/or international hard (legislation/directives) and soft (agreements/conventions) law. The ICES species lists are now the standard reference for bycatch data recording and reporting purposes throughout the Northeast Atlantic and were developed to provide consistency across national data collection programmes, to facilitate more comprehensive bycatch assessments, and to support data limited fish stock assessments across the ICES area.

In total, 16,703 specimens of species from the ICES reference lists for the Celtic Seas and Greater North Seas ecoregions were recorded: 21 marine mammals (3 species); 65 seabirds (5 species), 8086 fish (14 species) and 8532 elasmobranchs (17 species).

Within the USTAN element of the BMP, counts and estimated total weights by species are recorded by observers. In some cases, when high numbers of fish or elasmobranchs were caught in a particular fishing operation, only an estimated total weight for that species was recorded. In those instances, the number of individuals is estimated using the mean weight for that species from haul records where both numbers and estimated weights were available.

Within the CEFAS and SEDD/SFF catch sampling programmes, sample level data is presented for fish and elasmobranchs, meaning those data have not been extrapolated beyond sample level for this report.

Within the Clean Catch EM data, complete (100%) video review was conducted, so counts of marine mammal and seabird bycatch represent the full records for monitored fishing operations.

Across the different datasets, eleven common dolphins were recorded bycaught in net and ring net fisheries in the Southwest UK. One unidentified dolphin was also recorded in a net fishery in the Southwest UK. Four grey seals and four harbour porpoises were recorded in static net fisheries, also in the Southwest UK.

Seabird bycatch was recorded in longline and static net fisheries. 35 northern fulmars, one northern gannet, one black-legged kittiwake and one unidentified gull were recorded in the offshore longline fishery in the northern North Sea. Six northern fulmars were recorded in the northern North Sea in the deepwater net fishery for anglerfish that operates mostly on the upper continental slope. Northern fulmars cannot dive to the depths this fishery operates at, so our current understanding is that individuals are occasionally caught while foraging on fish/offal scraps in the nets as the gear is being shot. Four guillemots, one European shag and 16 unidentified seabirds were recorded in net fisheries in the Southwest UK.

Fish bycatch was recorded from a wide range of gears and areas. Most of the fish records are of data limited commercial species but there are several records of the diadromous species allis and twaite shad in demersal trawl and handline fisheries in the Southwest UK. Both species are afforded protection under the Bern Convention (1979) and UK domestic legislation (Wildlife and Countryside Act (1981) and the Conservation of Offshore Marine Habitats and Species Regulations (2017)) but these protections do not apply to accidental capture.

Many of the recorded elasmobranch bycatches were also of data limited commercial species. For species more typically classed as ETP species, there are several records of flapper skate (mostly from around Scotland) and blue skate (mostly from the Southwest UK) in bottom trawl and static net gears, porbeagle sharks and a single basking shark in static net fisheries in the northern North Sea and Celtic Sea, and stingrays and electric rays in bottom trawl fisheries mainly in the English Channel.

***Table 3:*** *Recorded bycatches by species, gear type and ICES Division in 2023. Note: some species presented below are classed as data limited commercial species and are included here to align with the ICES Bycatch Roadmap species lists.*

| Taxon | Common name | Gear | 4a | 4b | 4c | 6a | 6b | 7a | 7b | 7d | 7e | 7f | 7g | 7h | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elasmobranch | Basking shark | Gillnet | | | | | | | | | | | 1 | | **1** |
| | Blackmouth catshark | Bottom trawl | 38 | | | 3 | | | | | | | | | **41** |
| | | Longline | 140 | | | | | | 19 | | | | | | **159** |
| | | Multi-rig otter trawl | | | | 2 | | | | | | | | | **2** |
| | Blonde ray* | Beam trawl | | | | | | | | | 349 | 10 | 3 | | **362** |
| | | Bottom trawl | | 1 | | | | 1 | | | 107 | 16 | | | **125** |
| | | Driftnet | | | | | | | | 1 | 13 | 28 | 115 | | **157** |
| | | Gillnet | | | | | | | | | 15 | 18 | | | **33** |
| | | Multi-rig otter trawl | | | | | | | | | 1 | | | | **1** |
| | Blue shark* | Gillnet | | | | | | | | | | | 6 | | **6** |
| | Blue skate | Beam trawl | | | | | | | | | 19 | | 1 | 40 | **60** |
| | | Bottom trawl | | | | | | | | | 7 | 2 | | | **9** |
| | | Driftnet | | | | | | | | | | | 1 | 36 | **37** |
| | | Gillnet | | | | | | | | | 1 | | 5 | | **6** |
| | | Trammel | | | | | | | | | | | 15 | | **15** |
| | Common stingray | Beam trawl | | | | | | | | | 3 | | | | **3** |
| | | Bottom trawl | | | | | | | | 7 | | | | | **7** |
| | | Multi-rig otter trawl | | | 1 | | | | | | | | | | **1** |
| | Common torpedo ray | Beam trawl | | | | | | | | | | | | 1 | **1** |
| | Cuckoo ray* | Beam trawl | | | | | | | | | 279 | 37 | 75 | 309 | **700** |
| | | Bottom trawl | | 7 | | 1 | | 1 | | | 207 | 21 | | | **237** |
| | | Driftnet | | | | | | | | | 17 | 2 | 17 | 22 | **58** |
| | | Gillnet | | | | | | | | 1 | 35 | | | | **36** |
| | | Multi-rig otter | | 6 | | | | | | | | | | | **6** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | trawl | | | | | | | | | | | | | |
| | Flapper skate | Bottom trawl | 19 | | | 19 | 33 | | | | | | | | **71** |
| | | Gillnet | | | | | | | | | | 1 | | | **1** |
| | | Multi-rig otter trawl | 4 | | | 58 | | | | | | | | | **62** |
| | | Seine | 2 | | | | | | | | | | | | **2** |
| | Marbled electric ray | Beam trawl | | | | | | | | | 41 | | | | **41** |
| | Bull huss* | Beam trawl | | | | | | | | | 8 | 2 | 10 | 3 | **23** |
| | | Bottom trawl | | 3 | | | | 6 | | | 8 | | | | **17** |
| | | Driftnet | | | | | | | | | 13 | 3 | 33 | | **49** |
| | | Gillnet | | | | | | | | 5 | 16 | 24 | 11 | | **56** |
| | | Multi-rig otter trawl | | | | | | | | | 7 | | | | **7** |
| | | Trammel | | | | | | | | | | 1 | | | **1** |
| | Porbeagle shark | Gillnet | 1 | | | | | | | | | | 4 | | **5** |
| | Unidentified shark | Gillnet | | | | | | | | | 2 | | | | **2** |
| | Shagreen ray* | Beam trawl | | | | | | | | | 14 | | | 24 | **38** |
| | | Bottom trawl | 7 | | | 8 | 1 | | | | 1 | | | | **17** |
| | | Driftnet | | | | | | | | | | | | 7 | **7** |
| | Small eyed ray* | Beam trawl | | | | | | | | | 35 | 1 | 17 | | **53** |
| | | Bottom trawl | | | | | | | | 20 | 204 | 27 | | | **251** |
| | | Driftnet | | | | | | | | 10 | 28 | 2 | | | **40** |
| | | Gillnet | | | | | | | | 1 | 4 | 25 | | | **30** |
| | | Multi-rig otter trawl | | | | | | | | | 9 | | | | **9** |
| | | Trammel | | | | | | | | | | 1 | | | **1** |
| | Thornback ray* | Beam trawl | | | | | | | | | 182 | 4 | 3 | | **189** |
| | | Bottom trawl | | 21 | 313 | 27 | | 156 | | 262 | 258 | | | | **1037** |
| | | Dredge | | | | | | | | | 3 | | | | **3** |
| | | Driftnet | | | | | | | | 185 | 171 | | 7 | | **363** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Gillnet | | | | | | | | 65 | 220 | | | | **285** |
| | | Multi-rig otter trawl | | 1 | 519 | | | | | 2 | 10 | | | | **532** |
| | Thorny skate* | Bottom trawl | 1977 | | | 12 | | | | | | | | | **1989** |
| | | Multi-rig otter trawl | 785 | 5 | | | | | | | | | | | **790** |
| | | Seine | 73 | | | | | | | | | | | | **73** |
| | Undulate ray* | Beam trawl | | | | | | | | | 287 | 1 | | | **288** |
| | | Bottom trawl | | | | | | | | 11 | 35 | | | | **46** |
| | | Driftnet | | | | | | | | 33 | 30 | | | | **63** |
| | | Gillnet | | | | | | | | 18 | 1 | | | | **19** |
| | | Multi-rig otter trawl | | | | | | | | | 8 | | | | **8** |
| | Unidentified skate | Gillnet | | | | | | | | | 1 | | | | **1** |
| **Fish** | Atlantic halibut* | Bottom trawl | 1 | 1 | | | | | | | | | | | **2** |
| | | Gillnet | 8 | | | | | | | | | | | | **8** |
| | Allis shad | Handline | | | | | | | | | 5 | | | | **5** |
| | Ballan wrasse* | Beam trawl | | | | | | | | | 2 | | | | **2** |
| | | Bottom trawl | | | | | | | | | 1 | | | | **1** |
| | | Driftnet | | | | | | | | | 5 | | | | **5** |
| | | Gillnet | | | | | | | | | 50 | 172 | | | **222** |
| | | Handline | | | | | | | | | 4 | | | | **4** |
| | Blackbelly rosefish* | Bottom trawl | 768 | | | 252 | 720 | | | | | | | | **1740** |
| | | Longline | 140 | | | 280 | | | 56 | | | | | | **476** |
| | | Multi-rig otter trawl | 615 | 1 | | 3 | | | | | | | | | **619** |
| | | Seine | 6 | | | | | | | | | | | | **6** |
| | Brill* | Beam trawl | | | | | | | | | 556 | 31 | 45 | 31 | **663** |
| | | Bottom trawl | | 48 | | 17 | | 121 | | 2 | 79 | 5 | | | **272** |
| | | Driftnet | | | | | | | | 21 | 27 | | 2 | 1 | **51** |
| | | Gillnet | | | | | | | | 27 | 7 | 1 | | | **35** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Multi-rig otter trawl | 1 | | | | | | | | 27 | | | | **28** |
| | European conger* | Beam trawl | | | | | | | | | 165 | 3 | 9 | 61 | **238** |
| | | Bottom trawl | 32 | | | 4 | | | | 25 | 71 | | | | **132** |
| | | Driftnet | | | | | | | | 1 | 1 | | | | **2** |
| | | Gillnet | | | | | | | | | 1 | 2 | 1 | | **4** |
| | | Longline | 1 | | | | | | 4 | | | | | | **5** |
| | | Multi-rig otter trawl | | | | 2 | | | | | 6 | | | | **8** |
| | | Pots | | | | | | | | | 3 | | | | **3** |
| | Gilthead seabream* | Bottom trawl | | | | | | | | 34 | | | | | **34** |
| | | Multi-rig otter trawl | | | | | | | | 1 | | | | | **1** |
| | John Dory* | Beam trawl | | | | | | | | | 339 | 19 | 31 | 48 | **437** |
| | | Bottom trawl | 3 | 1 | | 2 | | 3 | | | 277 | 31 | | | **317** |
| | | Driftnet | | | | | | | | | 1 | 1 | 4 | 2 | **8** |
| | | Gillnet | | | | | | | | 1 | 15 | 3 | 46 | | **65** |
| | | Handline | | | | | | | | | 2 | | | | **2** |
| | | Multi-rig otter trawl | 1 | | | 14 | | | | | 83 | | | | **98** |
| | | Trammel | | | | | | | | | | | 9 | | **9** |
| | Lumpfish* | Bottom trawl | 2 | | | | | | | | | | | | **2** |
| | Norway redfish* | Bottom trawl | 301 | 2 | | | 1161 | | | | | | | | **1464** |
| | Rabbitfish | Bottom trawl | 47 | | | 122 | | | | | | | | | **169** |
| | Tub gurnard* | Gillnet | 1 | | | | | | | | | 2 | 1 | | **4** |
| | Turbot* | Beam trawl | | | | | | | | | 248 | 6 | 22 | 11 | **287** |
| | | Bottom trawl | | 22 | | | | | | 2 | 16 | 2 | | | **42** |
| | | Driftnet | | | | | | | | | 23 | | 265 | 218 | **506** |
| | | Gillnet | 71 | | | | | | | 3 | 8 | 1 | 2 | 1 | **86** |
| | | Multi-rig otter trawl | 1 | 5 | | | | | | | 13 | | | | **19** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Trammel | | | | | | | | | | | 1 | | **1** |
| | Twaite shad | Multi-rig otter trawl | | | | | | | | | 4 | | | | **4** |
| **Mammal** | Common dolphin | Gillnet | | | | | | | | | 6 | | 4 | | **10** |
| | | Purse seine | | | | | | | | | | 1 | | | **1** |
| | Unidentified dolphin | Gillnet | | | | | | | | | 1 | | | | **1** |
| | Grey seal | Gillnet | | | | | | | | | | 4 | | | **4** |
| | Harbour porpoise | Gillnet | | | | | | | | | | 1 | 3 | | **4** |
| **Seabird** | Black-legged kittiwake | Longline | 1 | | | | | | | | | | | | **1** |
| | Common guillemot | Gillnet | | | | | | | | | | 4 | | | **4** |
| | European shag | Gillnet | | | | | | | | | | 1 | | | **1** |
| | Northern fulmar | Gillnet | 6 | | | | | | | | | | | | **6** |
| | | Longline | 35 | | | | | | | | | | | | **35** |
| | Unidentified gull | Longline | 1 | | | | | | | | | | | | **1** |
| | Northern gannet | Longline | 1 | | | | | | | | | | | | **1** |
| | Unidentified seabird | Gillnet | | | | | | | | | 16 | | | | **16** |
| **Total** | | | **5089** | **124** | **833** | **826** | **1915** | **288** | **79** | **738** | **4711** | **516** | **769** | **815** | **16703** |

** Typically considered data limited commercial species.*

# 3 Fishing Effort Data.

## 3.1 Fishing effort data collection.

In the UK, fishing effort data describing the scale and geographic distribution of fishing activity are collected by three main methods: 1 - Vessel Monitoring Systems (VMS) for vessels over 12m, 2 - official logbooks / e-logs for vessels over 10m, and 3 - sales notes and the Catch App for vessels under 10m.

Logbook and sales note records are held together in the UK Integrated Fisheries System Holding (iFish) database. iFish currently provides the most complete and useful fishing effort dataset for assessing patterns and trends in fishing activity and for compiling fishing effort data for use in the production of broadscale bycatch estimates.

## 3.2 Summary of UK fishing effort.

Figure 2 shows the annual UK fishing effort by broad gear type for 2018 to 2023 in terms of recorded DaS. According to the official statistics, total UK fishing effort in 2023 was 322,992 DaS. This represents a 2% decrease from 2022 and a 14% decrease since 2018.

The majority of UK fishing effort is carried out by demersal trawls/seines and pot fisheries. These two gear groups consistently account for about 75% of total UK effort (33% and 42% respectively in 2023). Dredges (8.5%), lines (handlines and longlines – 7.5%) and nets (static and drift – 6.5%) make up a further 22.5% of total effort. The remaining 2.5% of effort is accounted for by a mix of hand gathering (1.1%), pelagic trawls (0.7%), purse seine/ring nets (0.25%) and miscellaneous gears (0.45%).

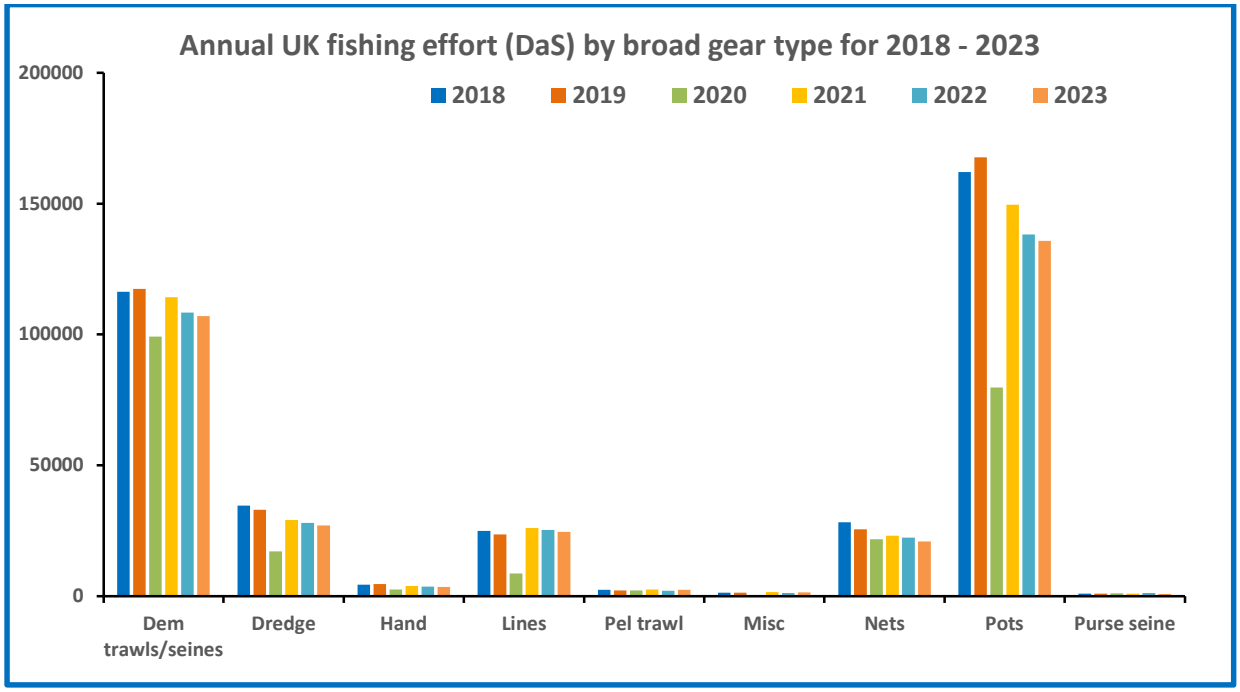


***Figure 2:*** UK fishing effort for 2018 - 2023 by broad gear type**.**

Figure 3 provides a breakdown of 2023 UK fishing effort by ICES Division for the main gear types sampled under the BMP.

Demersal trawl, seine and dredge fisheries are widespread and accounted for 134,000 DaS in 2023. The highest concentrations of effort are found in the Northern (4a) and Central (4b) North Sea, West of Scotland (6a), Irish Sea (7a) and English Channel (7de). Lower effort levels occur in most other ICES Divisions around the UK.

Static net fisheries accounted for about 21,000 DaS in 2023 and are concentrated largely in ICES Subarea 7. According to the official data the highest netting effort occurs in Divisions 7de (Eastern and Western English Channel). However, the fleet operating in 7d is known to be highly polyvalent (i.e., many boats use a mix of gear types) and informal discussions with industry members in the area, and unusual entries in the official effort and landings statistics, suggest that there may be some overestimation error contained in the netting statistics for that area. Significant amounts of netting effort also occurred in 7f (Bristol Channel) and 4c (Southern North Sea), with lower levels in the Northern and Central North Sea (4ab), Rockall (6b), Irish Sea (7a) and Southwest Approaches (7g-k).

Pelagic trawl effort occurs mainly in the Northern North Sea (4a) and West of Scotland (6a) with lower levels evident in other divisions of Subarea 7.

Longline effort is concentrated in the Northern North Sea (4a) and West of Scotland (6a). This offshore fishery targets hake and sometimes ling on the offshore shelf, shelf break and upper continental slope. Smaller amounts of offshore longline effort also occur on the Great Sole Bank (Gran Sol) region (7j). Low level longlining by smaller inshore vessels occurs in the Southern North Sea (4c) and Eastern English Channel (7d).

Ring net effort is largely confined to the Southwest UK. This fishery mostly targets pilchard off the south coast of Cornwall in Divisions 7ef. A short purse seine fishery is also undertaken in Scottish waters (4a) targeting mackerel during autumn.

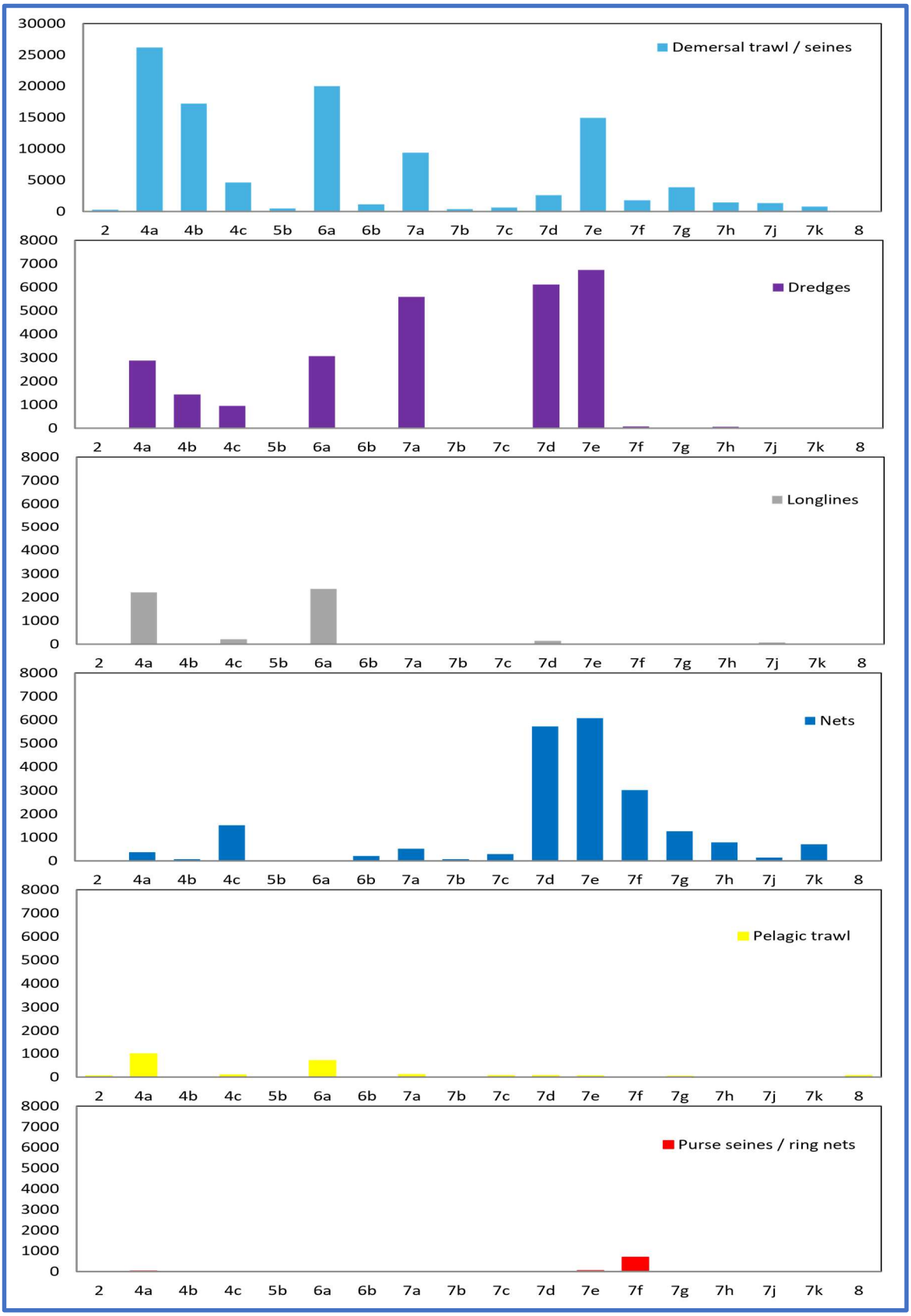


***Figure 3:*** 2023 fishing effort by ICES Division for the main gears sampled within the BMP. Note: the y-axis scale for Demersal trawls/seines (max 30,000 DaS) is different to the scale for all other gears (max 8,000 DaS).

To explore longer term trends in UK fishing effort to support sampling design considerations, inform fishery bycatch risk profiles and help validation of effort statistics, a detailed analysis of historical fishing effort datasets is being undertaken. As a preliminary update, DaS effort trends (all gears combined) by ICES Division for the period 2009 to 2022 are presented in Figure 3.

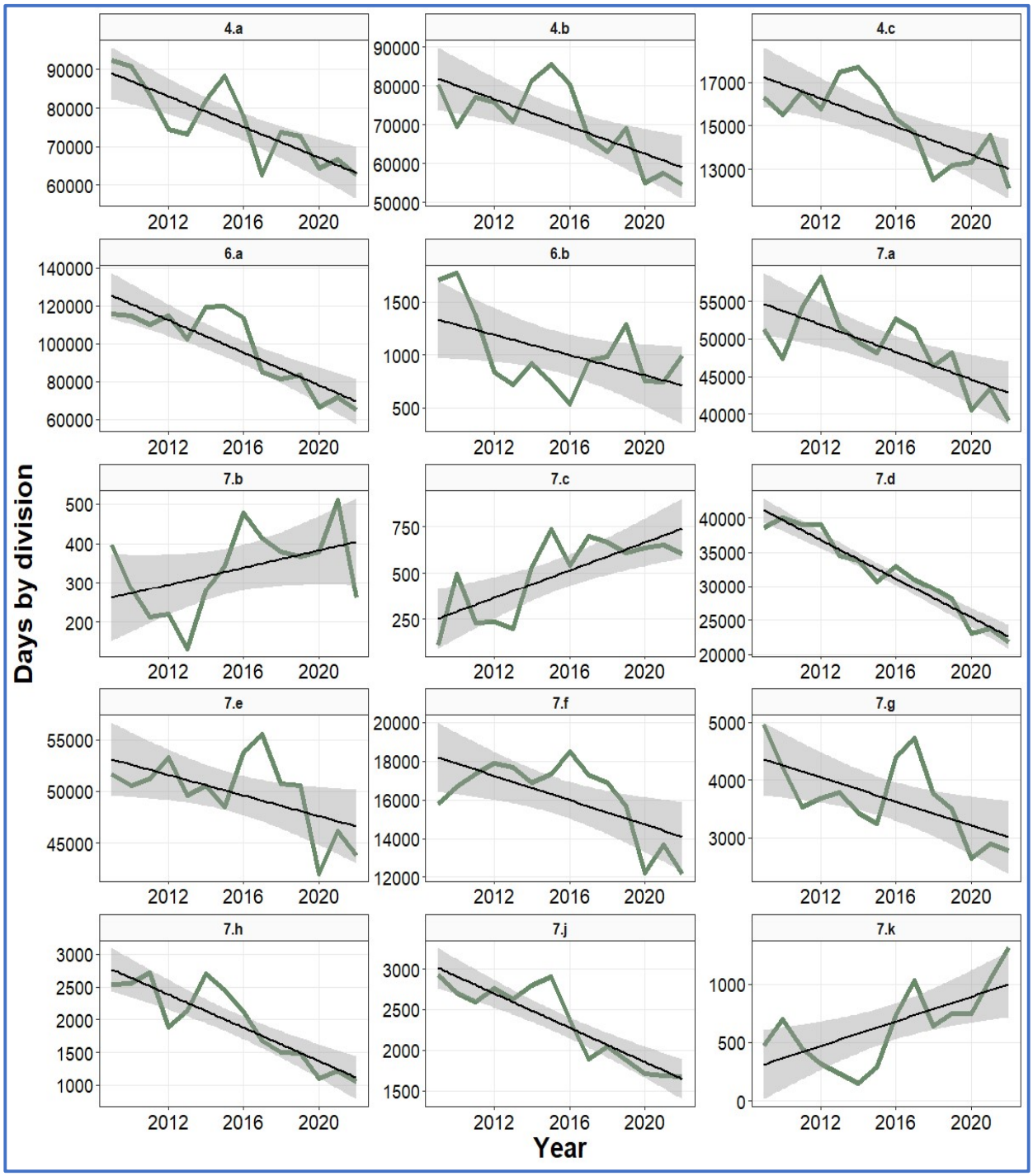


***Figure 4***: Fishing effort trends (DaS) for all gears combined by ICES Division from 2009-2022. Note: y-axis scales vary by Division.

In most divisions UK effort has steadily declined since 2009, with the only exceptions in the relatively low effort divisions 7bck (west and southwest of Ireland). Significant decreases are evident across the high effort divisions where UK fishing effort is concentrated.

Fishing effort levels are influenced by various environmental, regulatory and economic factors and further analysis will evaluate the finer details of these broad trends by specific gear type, examine possible explanatory factors and may consider other effort metrics for passive gears for which DaS is not always an accurate descriptor of true fishing effort.

# 4 Marine Mammal and Seabird Bycatch Estimates in Static Net Fisheries.

## 4.1 Estimation methodology.

Broadscale bycatch mortality estimates in UK net fisheries for harbour porpoise and common dolphin (the two most frequently bycaught cetacean species in UK fisheries) have been produced annually since 2007 using data collected under the BMP. In 2011, bycatch estimates for seals (grey and harbour seal species combined but most bycatch observations are of grey seal) were also calculated and have also been produced annually since then. Occasional marine mammal bycatch is recorded from other gear types and for other species, but because of the limited number of records the data are insufficient to calculate reliable bycatch rates, so mortality estimates are not currently produced for those metier/species combinations.

For seabirds, preliminary estimates for a variety of gears/species were produced using BMP data in 2019 (Northridge *et al*, 2020) and specifically for the UK offshore longline fishery in 2023 (Kingston *et al*, 2023). To build on those intermittent assessments, in this report we have included new static net estimates for two seabird species, guillemot and cormorant, using the same approach that is used for marine mammal bycatch estimation. The intention is to produce estimates for those two seabird species on an annual basis and explore ways of expanding routine estimations to other species and gear types.

Currently, bycatch estimates are produced using a ratio-based approach. A brief description of the methodology is provided in this section, along with bycatch estimates for harbour porpoise, common dolphin, seals, guillemot and cormorant in 2023. A more detailed description of the estimation procedure is provided in Annex 1.

The assessment approach involves the estimation of metier specific bycatch rates (number of individuals bycaught per unit of fishing effort) and associated confidence intervals from sampling data. Bycatch rates are then extrapolated to the total fishing effort by metier (ICES Division/gear type combination) for the relevant year, to produce metier specific bycatch

mortality estimates and upper and lower confidence intervals. Metier specific estimates are then summed to provide a total mortality estimate for UK net fisheries. Non-UK effort is not currently considered in the assessment. We also present the one-sided upper 90% confidence limit to provide guidance on how likely the estimate is to be above some pre-specified level, such as a mortality threshold or reference point.

The calculation of bycatch rates uses a multi-annual approach, whereby sampling efforts over multiple years are combined to calculate underlying rates. This approach has been developed to help produce more robust mortality estimates across metiers even when overall sampling levels might be considered low. The method is also used in other countries (e.g., Iceland, USA) and by ICES. The method has the important benefit that bycatch rates can be calculated for metiers that may not have been sampled, or were sampled but no bycatch was recorded, in a particular calendar year. Consequently, more complete mortality estimates can be produced then would be the case if just a single year's sampling data was used in the production of annual estimates. This multi-annual approach is most appropriate for species that do not tend to exhibit large annual fluctuations in population abundance or bycatch rates over the medium term. Moyes *et al* (2025) indicated that underlying bycatch rates for harbour porpoise and common dolphin have been changing over the last 10 years. This finding has prompted ongoing work within the BMP to explore new methodological approaches that more fully incorporate annual and seasonal trends in bycatch rates.

The stratification system used to produce bycatch estimates involves seven different net metiers. This system has been specifically developed within the BMP for the UK netting situation where a wide variety of different net types are used to target many different species. The system is more detailed than the metier levels 4 or 5 that are often used in ICES bycatch assessments and better reflects the heterogeneity of UK net fisheries.

The seven basic metiers used in the analysis are:

**Drift Oth** - bottom drift nets for demersal species.

**Drift Pel** - surface or midwater drift nets for small pelagic species.

**Gill** - heavy twine gillnets typically used for larger gadoids (cod, pollack etc).

**Gill Hake** - heavy twine gillnets designed specifically to target hake.

**Gill Light** - light twine gillnets typically used for smaller species (red mullet, bass, whiting etc).

**Gill Light Flatfish** - light twine nets designed to target small flatfish (dover sole, plaice etc).

**TangTram** - large mesh, heavy twine tangle and trammel nets designed to target large fish (anglerfish, turbot etc) and shellfish (spider crab, crayfish etc).

The time periods used in the calculation of bycatch rates vary by species and metier and the reasons for this are explained fully in Annex 1. Harbour porpoise rates are calculated using

data from 2010 onwards, except for Gill Hake where data from 2005 onwards are used. Rates are also calculated separately for hauls where ADDs were used optimally and for hauls were ADD use was suboptimal or they were not used. This allows estimation of the likely bycatch reduction associated with ADD use in the over 12m netting fleet. For common dolphin, seals, guillemot and cormorant data from 2005 onwards are used in the calculation of bycatch rates because of low bycatch records for these species in several metiers. No distinction is currently made between hauls with or without ADDs when calculating common dolphin, seal and seabird bycatch rates, but recent work (Moyes *et al*, 2025) indicated that seal bycatch rates may be influenced by the presence of ADDS. Work is underway to incorporate ADD effects on seal bycatch in future assessments.

## 4.2 Marine mammal bycatch estimates.

### 4.2.1 Harbour porpoise (*Phocoena phocoena*).

***Table 4:*** *Estimated number of harbour porpoises bycaught in UK net fisheries in 2023 by metier, assuming no ADD use. Estimates rounded to nearest integer.*

| Metier | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| Drift Oth | 10 | 1 | 37 | 27 |
| Drift Pel | 8 | 1 | 28 | 20 |
| Gill | 84 | 39 | 159 | 132 |
| Gill Hake | 306 | 169 | 505 | 435 |
| Gill Light | 355 | 143 | 727 | 595 |
| Gill Light Flatfish | 24 | 1 | 136 | 95 |
| TangTram | 380 | 295 | 481 | 445 |
| **Total** | **1167** | **649** | **2073** | **1749** |

***Table 5:*** *Estimated number of harbour porpoises bycaught in UK net fisheries 2023 by ICES Division, assuming no ADD use. Estimates rounded to nearest integer.*

| ICES Division | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| 4a | 74 | 58 | 94 | 87 |
| 4b | 4 | 2 | 6 | 5 |
| 4c | 90 | 61 | 137 | 123 |
| 6a* | 0 | 0 | 0 | 0 |
| 6b | 12 | 9 | 15 | 14 |
| 7a | 19 | 9 | 37 | 31 |

| | | | | |
|---|---|---|---|---|
| 7c | 3 | 2 | 4 | 3 |
| 7d | 151 | 93 | 258 | 224 |
| 7e | 324 | 224 | 487 | 432 |
| 7f | 214 | 154 | 308 | 277 |
| 7g | 179 | 105 | 287 | 250 |
| 7h | 81 | 50 | 125 | 110 |
| 7j | 15 | 10 | 22 | 20 |
| 8a | 1 | 1 | 1 | 1 |
| **Total** | **1167** | **778** | **1781** | **1577** |

** There was no record of netting activity in 6a in 2023, therefore the best estimate is zero.*

***Table 6:*** *Estimated number of harbour porpoises bycaught in UK net fisheries in 2023 by metier, assuming full ADD compliance. Estimates rounded to nearest integer.*

| **Metier** | **Estimated annual bycatch** | **Two-Sided 95% LCL** | **Two-Sided 95% UCL** | **One-sided 90% UCL** |
|---|---|---|---|---|
| Drift Oth | 10 | 1 | 37 | 27 |
| Drift Pel | 8 | 2 | 22 | 17 |
| Gill | 75 | 43 | 133 | 114 |
| Gill Hake | 40 | 7 | 271 | 175 |
| Gill Light | 355 | 184 | 625 | 534 |
| Gill Light Flatfish | 24 | 2 | 108 | 78 |
| TangTram | 275 | 222 | 448 | 394 |
| **Total** | **787** | **461** | **1644** | **1339** |

***Table 7:*** *Estimated number of harbour porpoises bycaught in UK net fisheries 2023 by ICES Division, assuming full ADD compliance. Estimates rounded to nearest integer.*

| **ICES Division** | **Estimated annual bycatch** | **Two-Sided 95% LCL** | **Two-Sided 95% UCL** | **One-sided 90% UCL** |
|---|---|---|---|---|
| 4a | 8 | 2 | 107 | 76 |
| 4b | 4 | 2 | 6 | 5 |
| 4c | 90 | 61 | 137 | 123 |
| 6a***** | 0 | 0 | 0 | 0 |
| 6b | 1 | 0 | 18 | 12 |
| 7a | 19 | 9 | 37 | 31 |
| 7c | 0 | 0 | 3 | 2 |
| 7d | 151 | 93 | 258 | 224 |
| 7e | 298 | 201 | 457 | 407 |

| | | | | |
|---|---|---|---|---|
| 7f | 177 | 123 | 267 | 240 |
| 7g | 26 | 7 | 143 | 103 |
| 7h | 11 | 2 | 66 | 44 |
| 7j | 2 | 0 | 10 | 7 |
| 8a | 0 | 0 | 2 | 1 |
| **Total** | **787** | **500** | **1511** | **1275** |

** There was no record of netting activity in 6a in 2023, therefore the best estimate is zero.*

Four metiers (Drift Oth, Drift Pel, Gill Light, Gill Light Flatfish) are not typically associated with over 12m vessels. As ADD use is not mandated for vessels under 12m there is little data showing how ADD use affects bycatch rates in those particular metiers. This means our normal estimation procedure produces very wide confidence intervals because of the very limited occasions ADDs are used in those metiers. This is a statistical artifact associated with few observed hauls with ADDs and creates a false impression of high uncertainty. Instead, as in previous years, we used a more conservative but plausible approach where we assume bycatch rates in hauls with and without ADDs in those four metiers are the same. This has the effect of significantly reducing the uncertainty associated with the overall estimate, but the estimate may be biased slightly high because we know that ADD use reduces harbour porpoise bycatch in other metiers.

The total metier-based point estimate for harbour porpoise bycatch in 2023, assuming full compliance by the over 12m fleet with the ADD requirements under retained Regulation 2019/1241, was 787 (95% CL range 461-1644), and the metier-based point estimate assuming no ADD use was 1167 (95% CL range 651-2094). This suggests that full ADD compliance in 2023 would have reduced total mortality in UK net fisheries by 380 harbour porpoises or 33% of the total estimated mortality (for all metiers/vessel sizes) if no ADDs were used.

The largest estimated metier specific reduction (306 to 40 porpoises or 87% reduction) associated with ADD use was in the Gill Hake metier which mainly involves vessels over 12m operating in areas where ADDs are required.

96% of harbour porpoise bycatch was estimated to occur in four metiers: TangTram; Gill Hake (assuming no ADD use); Gill and Gill Light. The three other metiers (Drift Oth; Drift Pel and Gill Light Flatfish) had comparatively low bycatch estimates and account for the 4% of total estimated mortality.

95% of harbour porpoise bycatch was estimated to occur in ICES Divisions 7defgh (English Channel & Celtic Sea), 4a (Northern North Sea) and 4c (Southern North Sea).

Recent work using the BMP dataset (Moyes *et al*, 2025) indicated that porpoise bycatch rates have been declining and common dolphin rates have been increasing since about 2015. These trends may indicate changes in abundance, regional distribution shifts or

animal and/or fishery behavioural changes but suggest that methodological alterations that better incorporate temporal trends would improve current estimations, particularly for those two species. Work is currently underway to develop and test a new analytical methodology to address this.

### 4.2.2 Common dolphin (*Delphinus delphis*).

***Table 8:*** *Estimated number of common dolphins bycaught in UK net fisheries in 2023 by metier. Estimates rounded to nearest integer.*

| Metier | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| Drift Oth | 0 | 0 | 14 | 9 |
| Drift Pel | 0 | 0 | 10 | 6 |
| Gill | 19 | 8 | 50 | 39 |
| Gill Hake | 125 | 73 | 201 | 174 |
| Gill Light | 33 | 1 | 184 | 129 |
| Gill Light Flatfish | 0 | 0 | 65 | 41 |
| TangTram | 161 | 120 | 213 | 195 |
| **Total** | **338*** | **202** | **737** | **593** |

** Minor differences between metier and division total estimates are due to rounding effects.*

***Table 9:*** *Estimated number of common dolphins bycaught in UK net fisheries 2023 by ICES Division. Estimates rounded to nearest integer.*

| ICES Division | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| 4a | 32 | 23 | 42 | 38 |
| 4b | 1 | 0 | 2 | 1 |
| 4c | 20 | 13 | 41 | 35 |
| 6a* | 0 | 0 | 0 | 0 |
| 6b | 5 | 4 | 7 | 6 |
| 7a | 2 | 1 | 10 | 7 |
| 7c | 1 | 1 | 2 | 1 |
| 7d | 30 | 19 | 82 | 66 |
| 7e | 79 | 54 | 148 | 125 |
| 7f | 58 | 41 | 96 | 84 |
| 7g | 73 | 45 | 114 | 100 |
| 7h | 32 | 20 | 49 | 43 |
| 7j | 6 | 4 | 9 | 8 |

| | | | | |
|---|---|---|---|---|
| 8a | 1 | 0 | 1 | 1 |
| **Total** | **340**** | **225** | **603** | **515** |

** There was no record of netting activity in 6a in 2023, therefore the best estimate is zero.*

*** Minor differences between metier and division total estimates are due to rounding effects.*

The total metier-based point estimate for common dolphin bycatch in 2023 was 338 (95% CL range 202-737). Most estimated bycatch (85%) occurred in two metiers (TangTram & Gill Hake) with the remaining 15% in the Gill and Gill Light metiers.

Estimated bycatch was mainly concentrated in ICES Divisions 7e-g (Western English Channel and Celtic Sea). The estimated bycatch of 20 individuals in 4c (southern North Sea) is likely an overestimate (due to an analytical artefact), as this species in rarely found in that area. The same may apply to 7d but likely to a lesser extent.

The 2023 estimates do not incorporate any effect of ADDs on common dolphin bycatch rates because it has not been fully quantified yet but work by Moyes *et al (*2025) indicated that there might be some reduction in estimated rates associated with ADD use.

The Moyes *et al* (2025) paper also found evidence of increasing trends in common dolphin bycatch rates since 2015, which is only partially incorporated into the current multi-annual approach that uses a mean bycatch rate estimated over several years. This means that there may be some systematic underestimation for this species in the current assessment. Work is ongoing to develop an analytical methodology that better reflects temporal changes in underlying bycatch rates.

### 4.2.3 Seals (*Halichoerus grypus* and *Phoca vitulina*).

***Table 10:*** *Estimated number of seals bycaught in UK net fisheries in 2023 by metier. Estimates rounded to nearest integer.*

| **Metier** | **Estimated annual bycatch** | **Two-Sided 95% LCL** | **Two-Sided 95% UCL** | **One-sided 90% UCL** |
|---|---|---|---|---|
| Drift Oth | 0 | 0 | 14 | 9 |
| Drift Pel | 0 | 0 | 10 | 7 |
| Gill | 15 | 3 | 43 | 33 |
| Gill Hake | 0 | 0 | 28 | 18 |
| Gill Light | 0 | 0 | 122 | 76 |
| Gill Light Flatfish | 18 | 0 | 98 | 68 |
| TangTram | 419 | 350 | 497 | 470 |
| **Total** | **452*** | **353** | **812** | **681** |

** Minor differences between metier and division total estimates are due to rounding effects.*

***Table 11:*** *Estimated number of seals bycaught in UK net fisheries in 2023 by ICES Division. Estimates rounded to nearest integer.*

| ICES Division | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| 4a | 81 | 67 | 96 | 91 |
| 4b | 1 | 0 | 1 | 1 |
| 4c | 42 | 34 | 62 | 56 |
| 6a* | 0 | 0 | 0 | 0 |
| 6b | 13 | 11 | 16 | 15 |
| 7a | 2 | 2 | 8 | 6 |
| 7c | 2 | 2 | 3 | 3 |
| 7d | 65 | 48 | 125 | 106 |
| 7e | 137 | 113 | 196 | 178 |
| 7f | 84 | 70 | 117 | 106 |
| 7g | 11 | 9 | 27 | 21 |
| 7h | 11 | 9 | 17 | 15 |
| 7j | 1 | 1 | 3 | 2 |
| 8a | 1 | 1 | 1 | 1 |
| **Total** | **451**** | **367** | **672** | **601** |

** There was no record of netting activity in 6a in 2023, therefore the best estimate is zero.*

*** Minor differences between metier and division total estimates are due to rounding effects.*

The metier-based point estimate for seal bycatch in 2023 was 452 (95% CL range 353-812). The latest estimates indicate that 93% of seal bycatch occurs in the TangTram metier. Spatially, bycatch is mainly concentrated in ICES Divisions 7d-f (English Channel and Bristol Channel) with relatively high levels also estimated in the northern and southern North Sea (4ac). The same metier and spatial patterns were evident in previous assessments.

The 2023 estimates do not consider possible effects of ADDs on seal bycatch rates but a paper by Moyes *et al* (2025), using data from the BMP, indicated that seal bycatch rates may be higher when ADDs are used. The possible effect of ADD use on resulting seal bycatch estimates is currently being investigated and will be incorporated into future assessments.

### 4.3 Trends in marine mammal bycatch estimates.

The estimates presented in Tables 4-11 are based on data collected from almost 16,000 monitored hauls since 2005 (common dolphin, seals, harbour porpoise "Gill Hake" metier) and from over 9,000 monitored hauls since 2010 (harbour porpoise all other metiers). This large dataset, combined with the analytical approach used, provides the most complete broadscale bycatch mortality estimates available for these species for UK net fisheries.

The multi-annual approach used means that inter-annual differences in recorded bycatch rates are essentially smoothed out over a longer period. This means that trends in mortality estimates over time are driven mainly by reported fishing effort levels rather than by changes in observed bycatch rates, though both elements influence the annual estimates to some degree because the data used to estimate bycatch rates incrementally grows as more data is collected.

Bycatch estimates and confidence intervals from 2013 to 2023 are plotted in Figures 5-7 to provide an indication of the likely trajectory of total bycatch mortality for each species over that period. The reducing uncertainty through the time series is due partly to the cumulative increase in the number of monitored hauls used in the bycatch rate estimation process, and from 2018 onwards, also from the use of a new method (see Annex 1 for details) for calculating confidence intervals.

The annual mortality estimates for harbour porpoise (assuming full ADD compliance) have decreased by approximately 50% since 2013 (Figure 5). This partly reflects the general pattern of gradually decreasing netting effort over the period but is also influenced by reducing bycatch rates since about 2014 as identified by Moyes *et al* (2025).

Common dolphin mortality estimates have been relatively stable over the period (Figure 6). The generally increasing trend in common dolphin bycatch rates since about 2014 (Moyes et al, 2025) appears to be offset, at least to some degree, by the decreasing trend in netting effort over the same period.

Annual seal bycatch estimates since 2013 are variable (Figure 7), though there is an indication of increasing mortality up to 2016 and generally decreasing total mortality since then. The work by Moyes *et al* (2025) did not identify any clear change in underlying seal bycatch rates over the period so patterns in seal bycatch estimates are largely driven by changes in fishing effort, particularly in the TangTram metier, in which the majority of seal bycatch occurs.

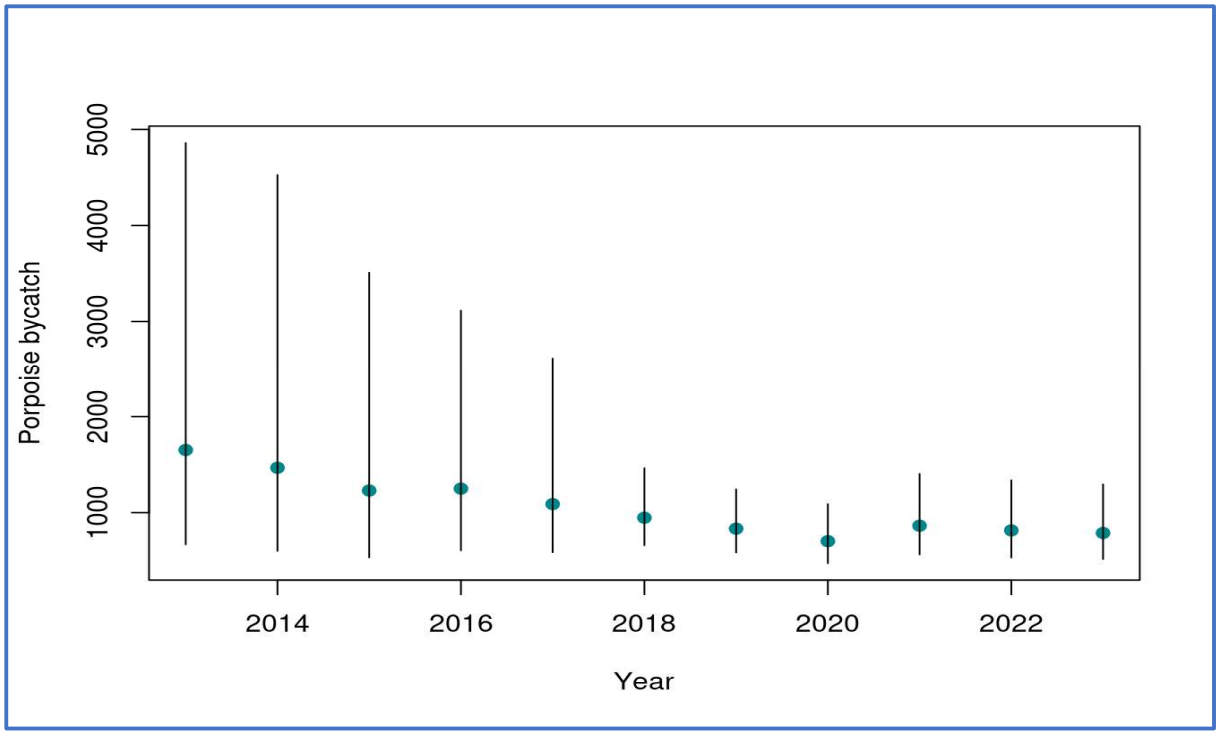


***Figure 5***: Harbour porpoise bycatch estimates from 2013 – 2023 (note: the reduced uncertainty evident since 2018 is related to a new method (see Annex 1) for calculating the confidence intervals).

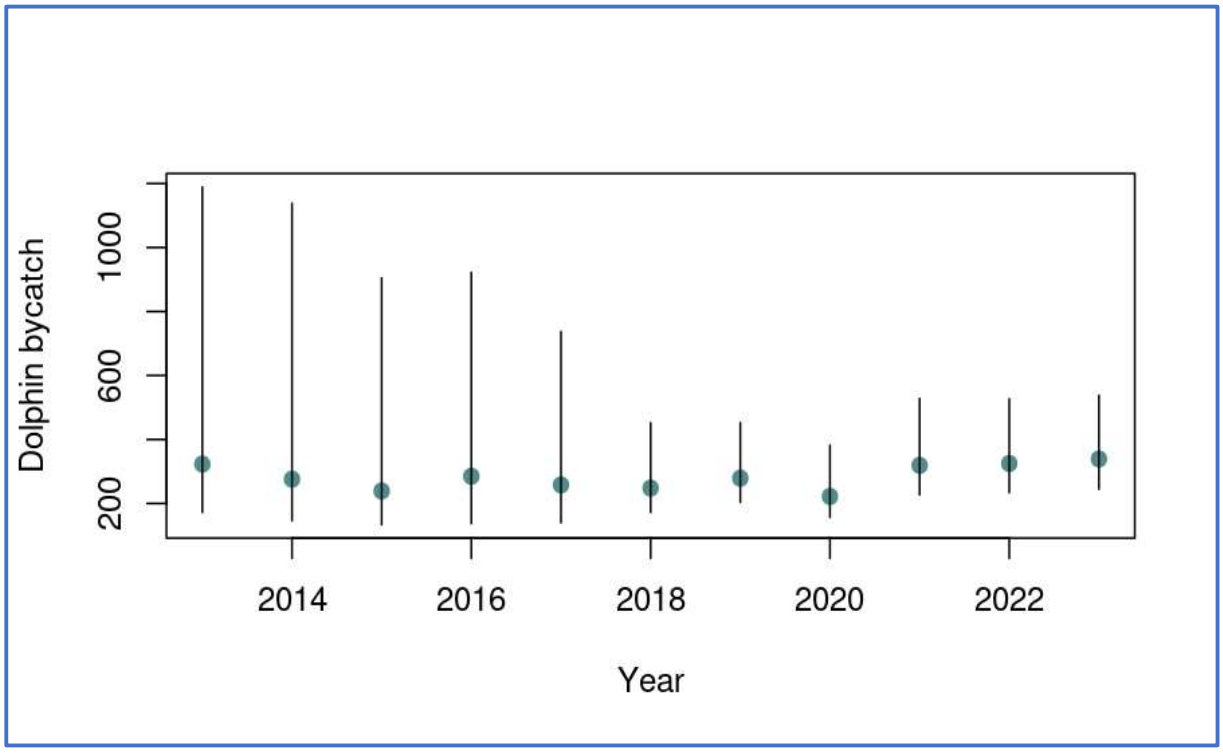


***Figure 6***: Common dolphin bycatch estimates from 2013 – 2023 (note: the reduced uncertainty evident since 2018 is related to a new method (see Annex 1) for calculating the confidence intervals).

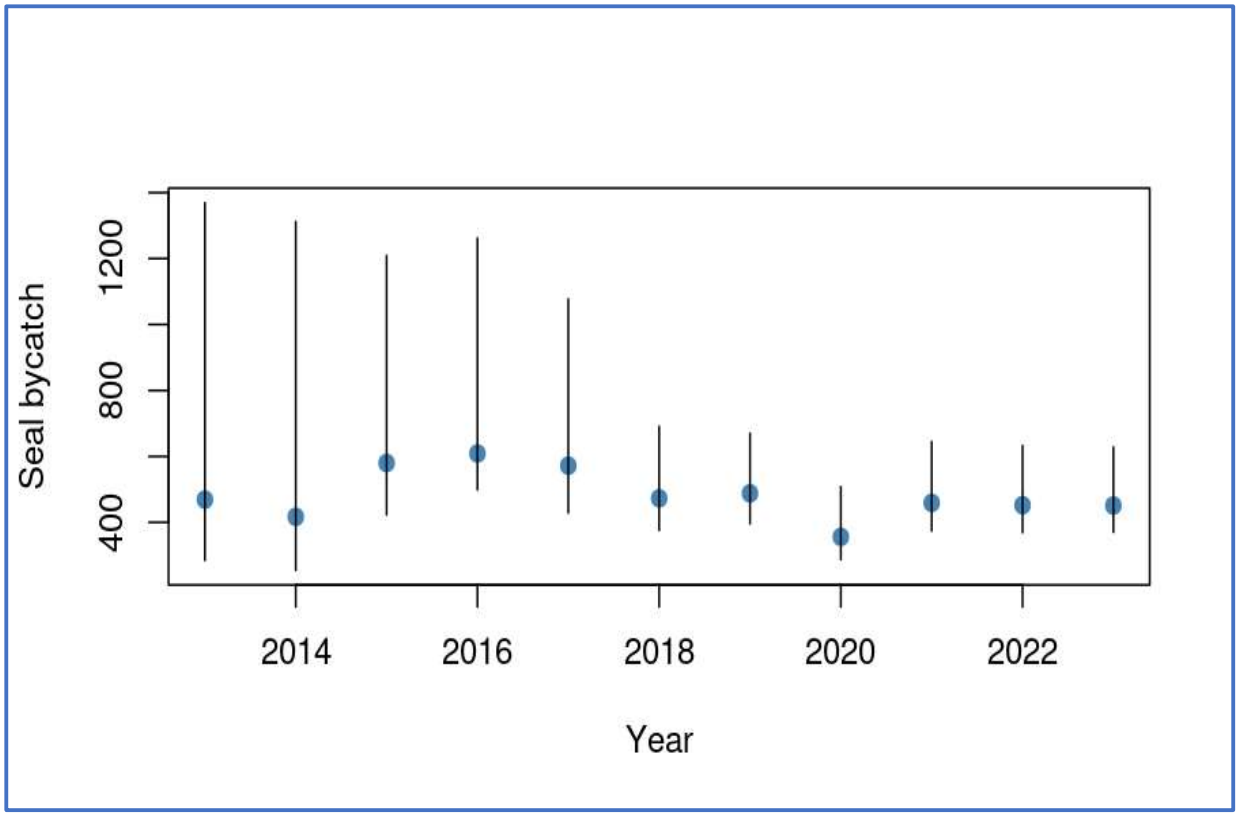


***Figure 7***: Seal bycatch estimates from 2013 – 2023 (note: the reduced uncertainty evident since 2018 is related to a new method (see Annex 1) for calculating the confidence intervals).

## 4.4 Seabird bycatch estimates.

Preliminary seabird bycatch estimates were previously produced using BMP data for some species/gear combinations, including static nets, and published in a report by Northridge *et al*, 2020. Due to data limitations for some species, the estimates for net fisheries were stratified into inshore (<10m vessels) and offshore (>10m vessels) fisheries and so only provided a broad overview of the possible scale of seabird bycatch in UK net fisheries. In this report we have produced new estimates for two seabird species, common guillemot and great cormorant, for which there were sufficient data to apply the same methodology as is routinely used for estimating marine mammal bycatch. These new estimates are more refined than the Northridge *et al* (2020) estimates because they incorporate more detailed gear type (metier) information within the estimation procedure and the estimates are also presented at ICES division scale.

### 4.4.1 Common guillemot (*Uria aalge*).

***Table 12:*** *Estimated number of guillemots bycaught in UK net fisheries in 2023 by metier. Estimates rounded to nearest integer.*

| Metier | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| Drift Oth | 64 | 38 | 101 | 88 |
| Drift Pel | 48 | 28 | 75 | 66 |
| Gill | 600 | 501 | 712 | 673 |
| Gill Hake | 15 | 2 | 55 | 41 |
| Gill Light | 598 | 356 | 939 | 819 |
| Gill Light Flatfish | 176 | 84 | 323 | 271 |
| TangTram | 152 | 111 | 202 | 184 |
| **Total** | **1653*** | **1120** | **2407** | **2142** |

** Minor differences between metier and division total estimates are due to rounding effects.*

***Table 13:*** *Estimated number of guillemots bycaught in UK net fisheries in 2023 by ICES Division. Estimates rounded to nearest integer.*

| ICES Division | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| 4a | 31 | 23 | 41 | 37 |
| 4b | 15 | 13 | 18 | 17 |
| 4c | 201 | 163 | 250 | 234 |
| 6a* | 0 | 0 | 0 | 0 |
| 6b | 5 | 4 | 7 | 6 |
| 7a | 35 | 23 | 51 | 45 |
| 7c | 1 | 1 | 1 | 1 |
| 7d | 350 | 263 | 471 | 430 |
| 7e | 617 | 502 | 767 | 718 |
| 7f | 336 | 272 | 420 | 392 |
| 7g | 24 | 15 | 46 | 38 |
| 7h | 36 | 30 | 47 | 43 |
| 7j | 1 | 1 | 3 | 2 |
| 8a | 0 | 0 | 1 | 1 |
| **Total** | **1652**** | **1310** | **2123** | **1964** |

** There was no record of netting activity in 6a in 2023, therefore the best estimate is zero.*

*** Minor differences between metier and division total estimates are due to rounding effects.*

The metier-based point estimate for guillemot bycatch in 2023 was 1652 individuals (95% CL range 1120-2407). The estimates indicate that over 70% of guillemot bycatch occurs in two metiers, Gill and Gill Light. Spatially, approximately 80% of guillemot bycatch is estimated to occur in the English Channel (7de) and Bristol Channel (7f). The latest point estimate is lower than previous estimates produced by Northridge *et al* (2020), which indicated that guillemot bycatch in static nets was in the region of 2500 individuals per year. The lower current estimates are likely driven by a combination of factors including a more refined stratification approach, additional monitoring data used in bycatch rate estimation, and extrapolation of rates to more recent fishing effort data.

### 4.4.2 Great cormorant (*Phalacrocorax carbo*)

***Table 14:*** *Estimated number of cormorants bycaught in UK net fisheries in 2023 by metier. Estimates rounded to nearest integer.*

| Metier | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| Drift Oth | 0 | 0 | 14 | 9 |
| Drift Pel | 0 | 0 | 10 | 7 |
| Gill | 45 | 21 | 84 | 70 |
| Gill Hake | 0 | 0 | 28 | 18 |
| Gill Light | 397 | 206 | 691 | 587 |
| Gill Light Flatfish | 53 | 11 | 154 | 117 |
| TangTram | 46 | 25 | 77 | 66 |
| **Total** | **541** | **263** | **1058** | **874** |

***Table 15:*** *Estimated number of cormorants bycaught in UK net fisheries in 2023 by ICES Division. Estimates rounded to nearest integer.*

| ICES Division | Estimated annual bycatch | Two-Sided 95% LCL | Two-Sided 95% UCL | One-sided 90% UCL |
|---|---|---|---|---|
| 4a | 9 | 5 | 15 | 13 |
| 4b | 3 | 2 | 4 | 4 |
| 4c | 53 | 32 | 88 | 77 |
| 6a* | 0 | 0 | 0 | 0 |
| 6b | 2 | 1 | 3 | 2 |
| 7a | 19 | 10 | 33 | 28 |
| 7c | 0 | 0 | 1 | 0 |
| 7d | 130 | 75 | 220 | 191 |

| | | | | |
|---|---|---|---|---|
| 7e | 203 | 123 | 327 | 284 |
| 7f | 113 | 67 | 183 | 160 |
| 7g | 6 | 4 | 22 | 16 |
| 7h | 3 | 2 | 10 | 8 |
| 7j | 0 | 0 | 1 | 0 |
| 8a | 0 | 0 | 0 | 0 |
| **Total** | **541** | **321** | **907** | **783** |

** There was no record of netting activity in 6a in 2023, therefore the best estimate is zero.*

The metier-based point estimate for cormorant bycatch in 2023 was 541 individuals (95% CL range 263-1058). Approximately 75% of cormorant bycatch was estimated to occur in the Gill Light metier. Spatially, over 80% of cormorant bycatch was estimated to occur in the English Channel (7de) and Bristol Channel (7f). The latest estimate is higher than previous estimates produced by Northridge *et al* (2020), which indicated cormorant bycatch was approximately 300 individuals per year.

Work by Northridge *et al* (2023) indicated seasonal patterns in guillemot and cormorant bycatch rates, with higher frequencies generally occurring during the winter period. Methodological developments are being explored that will better incorporate seasonality into the bycatch estimation procedure. This should help further refine routine seabird bycatch estimates going forward and will help support the development of targeted mitigation if required.

# 5 Acoustic Deterrent Devices.

## 5.4 Acoustic deterrent device legislation.

The use of ADDs in some net fisheries was mandated under EC Regulation 812/2004 from 2004 until July 2019 when Regulation 812/2004 was repealed. The ADD requirements were then moved into the new Technical Conservation Measures Regulation (2019/1241) which was transposed into UK law prior to the UK withdrawing from the EU on the 31st January 2020. The areas and fisheries covered by the regulations remained the same throughout these changes and those relevant to UK fisheries are shown in Table 16 (overleaf). The requirements only apply to vessels over 12m.

***Table 16:*** *Fisheries in which use of ADDs is mandatory under 2019/1241 (Annex XIII).*

| Area | Gear |
|---|---|
| ICES subarea 4 and ICES division 3a (only from 1 August to 31 October) | Any bottom-set gill net or entangling net, or combination of these nets, the total length of which does not exceed 400 m<br><br>Any bottom-set gillnet or entangling net ≥ 220 mm |
| ICES divisions 7e, 7f, 7g, 7h and 7j | Any bottom-set gill net or entangling net |
| ICES division 7d | Any bottom-set gill net or entangling net |

## 5.5 Vessels required to use ADDs.

Based on official logbook records for 2023, twenty UK registered vessels over 12m worked in areas where the use of ADDs is required. Fifteen vessels worked in relevant ICES Divisions within Subarea 7 and five vessels worked in Subarea 4.

## 5.6 Monitoring ADD efficacy.

During 2023 ongoing monitoring of ADD effectiveness in bycatch reduction terms was required under EU Regulation 2019/1241 (Annex XIII, Part A, (1.3)) which was transposed into UK law post Brexit. Monitoring is carried out under the BMP where a proportion of overall netting targets are directed at fisheries where ADD use is mandatory. In addition to standard bycatch monitoring an additional element of this sampling is to collect data to support periodic assessments to check if ADDs are maintaining previously observed bycatch reduction rates for harbour porpoise and to assess effects on other species as data permits.

The most recent assessment of ADD efficacy was carried out by Moyes *et al* (2025). The analysis revealed that the presence of ADDs reduced bycatch rates of harbour porpoise by about 75%, an indication of a small (statistically insignificant) reduction in the bycatch rates of common dolphin, and a statistically significant increase (more than doubling) in seal bycatch rates in relevant fisheries.

Ongoing work is focussing on understanding if the result for seals is driven by localised patterns or is widespread, and what level of additional seal mortality is related to ADD use.

## 5.7 ADD compliance activities.

Fishing vessel compliance with the ADD requirements of Regulation 2019/1241 are carried out by the Marine Management Organisation (MMO) in English and Welsh waters and by

the Marine Directorate (MD) in Scottish waters. ADDs are not required in Northern Irish waters.

Although not a formal part of the BMP contract, here we provide short summaries received from the MMO and MD on ADD compliance activities carried out during 2023.

In 2023 the MMO carried out five shore-side inspections of over 12m netting vessels. All vessels were UK registered. Compliance issues were noted on two of the vessels, however no mention was made of ADDs in any of the port inspection reports. Fourteen at-sea inspections were carried on over 12m netting vessels involving five UK registered vessels, eight French vessels and a Spanish vessel. Two of the five inspections of UK vessels mentioned assessment of ADD compliance, with one fully compliant and the other receiving verbal advice regarding non-functioning ADDs on nets. Of the eight French netters inspected, one report mentioned testing the ADDs, with verbal advice given for one ADD on the net not working. The inspection of the Spanish netter reported that their ADDs were compliant.

In Scottish waters, Marine Directorate's Marine Protection Vessels (MPVs) completed six at-sea inspections on gillnet vessels. These were all west of Shetland with no infringements detected.

The main concentration of gillnet effort in Scottish waters continues to be along the continental shelf edge west and northwest of the Shetland Isles.

# 6 Passive Acoustic Monitoring (PAM)

Understanding drivers of small cetacean bycatch is complicated by the nature of these events which mainly occur below the sea surface, making direct observation challenging. Bycatch is also generally a rare occurrence, meaning the probability of directly observing bycatch events through continuous monitoring of individual animals or specific sections of net is extremely low. This limits current understanding of the behavioural and environmental parameters that contribute to bycatch risk. PAM technologies can help fill these knowledge gaps by collecting data in harsh environments and over longer time periods than would be possible using direct human observation.

Small cetaceans use sophisticated biosonar (echolocation) to interpret their surroundings and forage for prey. This acoustic activity means PAM devices can be used to monitor animal presence and behaviour near fishing gear. PAM is particularly effective for dolphin and porpoise species because they echolocate almost continuously to navigate and detect prey, but PAM can also be used for other sound producing species (e.g., some species of fish). PAM provides a practical, non-invasive method to investigate the environmental and behavioural context behind cetacean interactions with fishing gears. For example, PAM can inform on whether animals are foraging and/or communicating in the vicinity of the gear or

are simply transiting through the area, analysis of animal detections can be used to estimate the relative density of animals near nets and link that to bycatch risk, and broadband recorders also provide useful contextual insights about the background soundscape.

The BMP has been supporting the deployment of PAM technologies on fishing nets to improve understanding of how animal density and behaviour affect bycatch risk. Two approaches are being used:

1. Single channel SoundTraps (ST300HF, Ocean Instruments Ltd) are being regularly deployed by BMP observers on actively fishing nets.
2. More complex four channel SoundTrap arrays (ST4300, Ocean Instruments Ltd) with bespoke sensor packages developed at the University of St Andrews, are being deployed on actively fishing nets by specially trained BMP observers and researchers.

The four-channel system is designed to track the three-dimensional movements of cetaceans around nets (or other fishing gears) and provides detailed data on an animals physical and acoustic behaviour near the fishing gear. Configuration and deployment of these devices is quite involved and creates some interference with normal fishing routines. Consequently, deployments can only be undertaken by fully trained fisheries observers or researchers. Full details of this system are presented in Macauley *et al* (2022).

Single channel devices are simpler to deploy and shooting and hauling operations are largely unaffected by the deployment of these devices. Typically, a single device is attached with a short strop to the float line of the net and suspended above the gear using a small float. The devices are recovered and data downloaded after each deployment.

Up to 2023, 111 single channel deployments have been carried out on 95 net hauls (occasionally two devices were deployed on long net fleets). 81 deployments produced high quality acoustic recordings. Some deployments were compromised due to technical issues or very high background noise levels that precluded cetacean detection. Figure 8 (overleaf) shows the location of deployments to date in the Southwest UK.

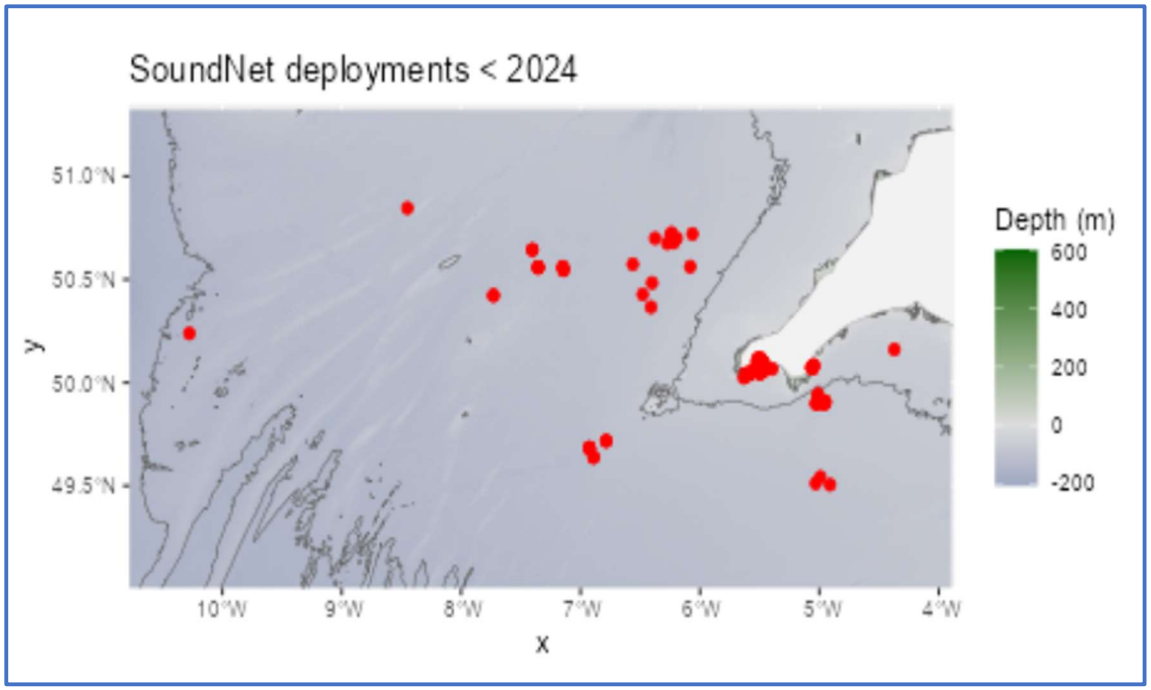


***Figure 8:*** Single channel SoundTrap deployments up to 2023.

Data from 20 deployments have so far been manually annotated by an experienced acoustician using click detection modules in PAMGuard (Gillespie *et al*, 2026). The rate of false positives appears to be positively correlated with ambient noise levels. Porpoise and dolphins were recorded in about 30% of the analysed deployments. It was not possible to speciate the dolphins but for now we assume most are common dolphins given these are the most abundant dolphin species in the current study area.

As this dataset increases, it will improve understanding of how environmental variables influence detection rates and inferred bycatch risk. This will require detailed analysis of environmental and operational parameters against cetacean detection rates. Detection rates will also be used to explore correlations with bycatch events and possible patterns of habitat use, and identify potential periods/areas of elevated bycatch risk to support targeted bycatch management strategies.

# 7 Other related work using BMP data and input.

During 2023 the BMP contributed data and staff time to several ICES initiatives related to ETP species bycatch monitoring, assessment and mitigation in the Northeast Atlantic. A short summary of each is provided below.

## 7.1 ICES Working Group on Bycatch of Protected Species (WGBYC).

WGBYC was established in 2007 and collates and analyses data from the Northeast Atlantic, Baltic Sea, Mediterranean Sea, and Black Sea on fishing effort, bycatch monitoring and mitigation efforts, and undertakes regular bycatch mortality and risk assessments for protected and sensitive species including marine mammals, seabirds, turtles and rare fish. The BMP has contributed data to WGBYC annually since 2007 and BMP staff have been active members and/or working group chairs throughout WGBYCs existence.

In 2023, the BMP, the UK national at-sea Data Collection Framework (DCF) programmes for England and Scotland (managed by CEFAS & the Scottish Marine Directorate) and the MMO provided data relating to fishing effort, sampling effort and bycatch events during 2022 in response to the 2023 WGBYC data call. The UK data call submission to WGBYC is coordinated by BMP staff and consisted of over 7,000 metier-based fishing effort records for multiple gears (totalling over 326,000 DaS), 214 metier-based monitoring records (totalling over 1000 monitored DaS) and 900 metier-based bycatch records (totalling over 12,000 marine mammal, seabird and fish specimens).

The international scale of the data acquired by WGBYC means that bycatch can be considered at geographic scales that are demographically appropriate, because many ETP species populations are highly mobile and/or have wide distributions.

In 2023, WGBYC met at the AZTI laboratory in Sukkarieta, Spain. The meeting was attended by 36 scientists from multiple ICES member countries and chair-invited experts from non-ICES countries. The WG addressed eight ToRs:

a) Review and summarize information submitted through the annual bycatch data call and other means for assessment of protected/sensitive species bycatch;

b) Collate and review information from WGFTB national reports, other ICES WGs and recent published documents relating to implementation of protected/sensitive species bycatch mitigation measures and summarize recent and ongoing bycatch mitigation trials;

c) Consider the quality of data available for use in the estimation of bycatch rates of protected species through a Bycatch Evaluation and Assessment Matrix, BEAM, to underpin assessments on the bycatch range (minimum/maximum) as appropriate, and where possible, to identify likely conservation level threats;

d) For high priority species, for which the bycatch rates and associated markers of sustainability are unavailable, highlight the types of fishing gears and fishing activities which pose the greatest risk to these species;

e) Review ongoing monitoring of different taxonomic groups in relation to spatial bycatch risk and fishing effort to inform coordinated sampling plans;

f) Coordinate with other ICES WGs to ensure complete compilation of data on protected species bycatch from multiple sources and to develop and improve on methods for bycatch monitoring, research and assessment as outlined in the ICES Roadmap for bycatch advice on protected, endangered and threatened species (Intersessional);

g) Continue, in cooperation with the ICES Data Centre to develop, improve, populate and maintain the WGBYC and RDBES databases on bycatch monitoring and fishing effort in ICES and Mediterranean waters through formal data calls (Intersessional).

h) Produce first drafts of the advice for the i) recurrent advice request from the European Commission, and ii) relevant ICES Fisheries Overviews (Intersessional).

### 7.1.1 Summary of work within relevant WGBYC ToRs:

Of most relevance to this annual report was the work carried out under ToR C (Point 1 below), ToR D (point 2) and ToR E (point 3). Several analyses were undertaken. A short summary is provided below (full details are presented in ICES 2024):

1. WGBYC further expanded the Bycatch Evaluation and Assessment Matrix (BEAM) approach which was first developed in 2022 and is designed to quantitatively assess population impacts of bycatch across the full range of relevant taxa by considering various criteria, including data availability, quality and representativity, within group expertise and the existence of management/conservation thresholds or reference points. The BEAM approach underpins the requirement of the agreement between ICES and DGMARE for the provision of annual advice on bycatch. Estimated bycatch mortality ranges, by ecoregion and gear type, were produced for several mammal, seabird, turtle and fish species listed on the EU priority species list and the ICES Roadmap for Bycatch Advice ecoregion species list.
2. WGBYC developed a new semi-quantitative, repeatable methodology for evaluating bycatch risk for high priority data limited species for which reliable quantitative assessments cannot currently be carried out using the BEAM approach. WGBYC proposed a process where taxa specific experts contribute biological, demographic and distribution data to metadata tables which are combined with bycatch and fishing effort data to inform risk matrices to evaluate bycatch risk by species, gear type, area and inform on potential population impact.
3. A risk-based approach to highlight potential monitoring gaps and support the development of coordinated sampling designs was expanded and provided

important insights into which métiers may currently be under-sampled by existing at-sea data collection programmes with respect to ETP species bycatch.

## 7.2 ICES Workshop on Mitigation Measures to Reduce Bycatch of Short-beaked Common Dolphins in the Bay of Biscay (WKEMBYC2).

Following a special request from DG MARE to ICES, the Workshop on mitigation measures to minimize bycatch of short-beaked common dolphins in the Bay of Biscay (WKEMBYC2) was established. WKEMBYC2 was tasked with updating and revaluating bycatch estimates and mitigation scenarios previously proposed in the ICES special request advice in 2020 (ICES, 2020).

The workshop was given three terms of reference:

a) consider recent data (2019-2021) on bycatch of short-beaked common dolphins in commercial fisheries and total fishing effort in the Bay of Biscay and off the Iberian coast to estimate bycatch mortality. Estimates will be based on at-sea observer schemes as well as from reverse drift modelling of strandings.

b) evaluate the scenarios that consider the application of specific bycatch mitigation measures and the proposed management objectives as previously recommended in the ICES special request advice. Results from the mitigation trials should be taken into account in scenario development and recommendations as appropriate.

c) For each scenario tested in the ICES special request advice (*eu.2020.04)*, revisit and if necessary, update i) relative risk of not achieving the specific management objective, and ii) comment on the scenario risk, as previously documented in the ICES special request advice (ICES, 2020*)*.

### 7.2.1 Summary of work within WKEMBYC2.

The workshop updated background information and analyses for common dolphin bycatch in the Bay of Biscay that was originally carried out during the emergency measures workshop (WKEMBYC) in 2020 (ICES 2020).

New bycatch estimates were produced using at-sea monitoring data and strandings data from 2019-2021 (ICES 2023). The overall estimate based on monitoring data was 5938 (95% CI 3081-9700) and the estimate from strandings data was 9040 (95% CI 6640-13300).

Two threshold/reference point approaches were considered for comparing against bycatch estimates. Firstly, Potential Biological Removal (PBR) values were the same as those used in 2020; with common dolphin abundance estimated to be 634 286 (CV=0.307) for the European Atlantic Assessment Unit, and PBR for the population estimated at 4926 individuals per year. The management objective of PBR is to ensure that “a population will

remain at, or recover to, its maximum net productivity level (typically 50% of the populations carrying capacity), with 95% probability, within a 100-year period". Secondly, a modified PBR (mPBR) value of 985 was also used. This is a more conservative threshold that is based on the management objective of ensuring "a population should be able to recover to or be maintained at 80% of carrying capacity, with probability 0.8, within a 100-year period".

Total estimated (point value) mortality from at-sea monitoring and strandings exceeded both threshold values. Therefore, a series of bycatch mitigation scenarios, that were first developed in WKEMBYC, were used to see how different combinations of spatio-temporal restrictions and ADD use might reduce bycatch to below threshold levels whilst minimising impacts on the fishing industry.

Based on the at-sea monitoring mortality estimate of 5938 individuals, a combination of ADD use in two metiers (OTM/PTB) and at least a 4-week closure during winter was sufficient to bring mortality below the PBR value of 4926. To bring mortality below mPBR (985) more stringent measures including a full three-month closure from January to March, and a further month closure in July or August was required.

Based on the strandings mortality estimate of 9040 individuals, a minimum 6-week closure during the peak winter season combined with ADD use in relevant metiers could reduce mortality below the PBR threshold (4926). None of the tested scenarios provided sufficient bycatch reduction to bring mortality below the mPBR threshold of 985.

The workshop also recommended a series of monitoring actions to improve monitoring, data analysis, mitigation and assessment of the Northeast Atlantic common dolphin.

## 7.3 ICES Workshop on Sea Bird Bycatch Monitoring in the NEAFC Regulatory Areas (WKBB).

In 2021, ICES received a special request for advice from the North-East Atlantic Fisheries Commission (NEAFC) on seabird bycatch in the NEAFC regulatory areas (RAs). Data scoping exercises conducted by ICES in 2021, 2022, and 2023 on the availability of bycatch and fisheries data in the region concluded that existing data limitations prevented quantitative analyses of seabird bycatch mortality in the NEAFC RAs. Consequently, WKBB was convened to carry out a bycatch risk-based approach to support recommendations for the scope and implementation of a pilot monitoring programme that would improve the evidence base on seabird bycatch in NEAFC waters.

The workshop compiled fishing effort and seabird distribution data from two seabird tracking datasets to estimate the spatiotemporal overlap between different seabird species and commercial fishing activities (ICES, 2023b). A bycatch risk assessment method called

ByRA, which was originally developed for assessing marine mammal bycatch risk, was adapted and used to estimate risk scores and map high-risk areas for 20 seabird species.

Findings indicated four distinct bycatch risk “hotspots” related to a mix of gear types in ICES Sub-divisons 1.a, 2.a.1, 6.b.1 and 7.k.1.

A series of monitoring recommendations were provided for the NEAFC authorities.

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# Annexes

## Annex 1: Bycatch estimation procedure

Observations of marine mammal, seabird and sensitive fish species bycatch made during 2022 were added to an annual data series that began in 2000. These incremental annual observations help to refine our understanding of the bycatch process by improving sampling coverage in the various net fisheries, seasons and areas fished by UK vessels. The precision of bycatch estimates is thereby improved, while trends and changes in bycatch rates over time can be examined. The pooled observations made over several years are used to provide a best estimate of the bycatch rate (number of animals bycaught per haul) and associated confidence intervals by fishery stratum (metiers). We then use official logbook and landings data from the most recent year (2022) to estimate fishing effort for the same metiers. Finally, we apply the calculated multi-annual bycatch rate by metier to the fishing effort estimate for that metier to generate mortality estimates for the most recent year. The production of regular estimates of total annual bycatch has so far been confined to three species/groups of mammals (harbour porpoise, common dolphin and seals), pending a more in-depth analysis of data quantity and the statistical distribution of bycatch events for other species/taxa.

**Preliminary data exploration and preparation**

As in previous years, an initial analysis was conducted on observations from over 15,000 sampled static net hauls since 2000, over 2000 of which had one or more ADDs in place. Observations of 'pingered' hauls (mostly using the ADD model DDD-03L) began in 2008, but it is important to note that not all "pingered" hauls observed since then were equipped in accordance with current operating guidelines, whereby any part of a net should be no more than 2 km from a DDD-03 pinger.

Analyses have suggested that there may have been higher porpoise bycatch rates, over a range of net fleet lengths, prior to 2010 so we have only used the more recent years' data (from 2010) to calculate porpoise bycatch estimates for all metiers, except for hake netting where recent data with net fleets without pingers are limited, and the full dataset (from 2005) therefore provides a more robust estimate of bycatch rates in fleets without ADDs.

Ideally, we would use net fleet length as an explanatory variable in predicting the overall bycatch per metier per year, as this variable has previously been shown to have a significant effect on bycatch rates. However, net fleet length is not a mandatory field in the official logbook and landings data collection process, and we therefore use a metier approach (based on general net type and most landed species), along with ICES Division as the two primary strata for bycatch estimation.

To estimate total bycatch, we need to extrapolate the number of animals bycaught per haul from our observations to the entire fleet, so we use the observer data to estimate the mean

number of hauls per day for unobserved vessel trips. This is done by trip length category and metier as there are significant differences in the operational characteristics between metiers, and because a statistical analysis of the number of hauls per day by metier suggests that there is also significant difference in the number of hauls per day between single day trips and multiday trips. Multi-day trips tend to result in fewer hauls per day because more time is generally spent steaming to and from fishing grounds and because net fleet lengths are generally substantially longer in most offshore metiers than in inshore fisheries where single day trips are typical.

Further modelling by vessel and landing characteristics would be required to incorporate net fleet length into our bycatch estimation. For this analysis we effectively assume that net fleet lengths are the same within a metier regardless of vessel size category. *A strong caveat here is that subsequent bycatch estimates will likely underestimate bycatch from larger offshore vessels and overestimate it for smaller inshore vessels.*

**Calculation of rates and estimates**

Bycatch rates are calculated for all species using the observed bycatch per haul rates by metier, by ADD presence (for harbour porpoise only), and by vessel size category (over 12 m and under 12 m). Binomial confidence limits were calculated using the F-distribution (exact or Clopper-Pearson) method in R. This method is known to be conservative (i.e., it produces intervals that may be wider than necessary), but other less conservative methods produce confidence intervals with zero width when no bycaught animals are observed.

Harbour porpoise rates are estimated under two scenarios, first on the assumption that no boats were using ADDs in 2022 (the baseline scenario) by using only observations made on observed hauls without ADDs, and secondly, assuming all vessels over 12 m in length were using ADDs (regardless of mesh size or net length). The second scenario is the 'best case' assumption that all vessels have fully complied with ADD use requirements and the calculated rate is based on observations on vessels over 12 m in length where ADDs were used correctly. For four metiers (Drift Oth, Drift Pel, Gill Light and Gill Light Flatfish) the no ADD rate is used for both elements because the number of observed hauls with ADDs in these metiers is very low because they are mostly prosecuted by under 12m vessels, and this leads to very wide confidence intervals for these metiers when assuming ADD presence.

The standard error (a measure of the precision of the estimate) and the upper and lower 95% 2-sided confidence limits for the rates are calculated. We also calculate and present the one-sided upper 90% confidence limit which is useful if we ask the question how likely the rate is to be above some pre-specified level.

The bycatch rates for each metier are then applied to the fleet estimates of the number of hauls per day to estimate the total bycatch by metier and area, assuming no ADDs are in use. This is done separately for each ICES division, and the area values are then summed across divisions to obtain an estimate of overall bycatch by metier. Confidence intervals are

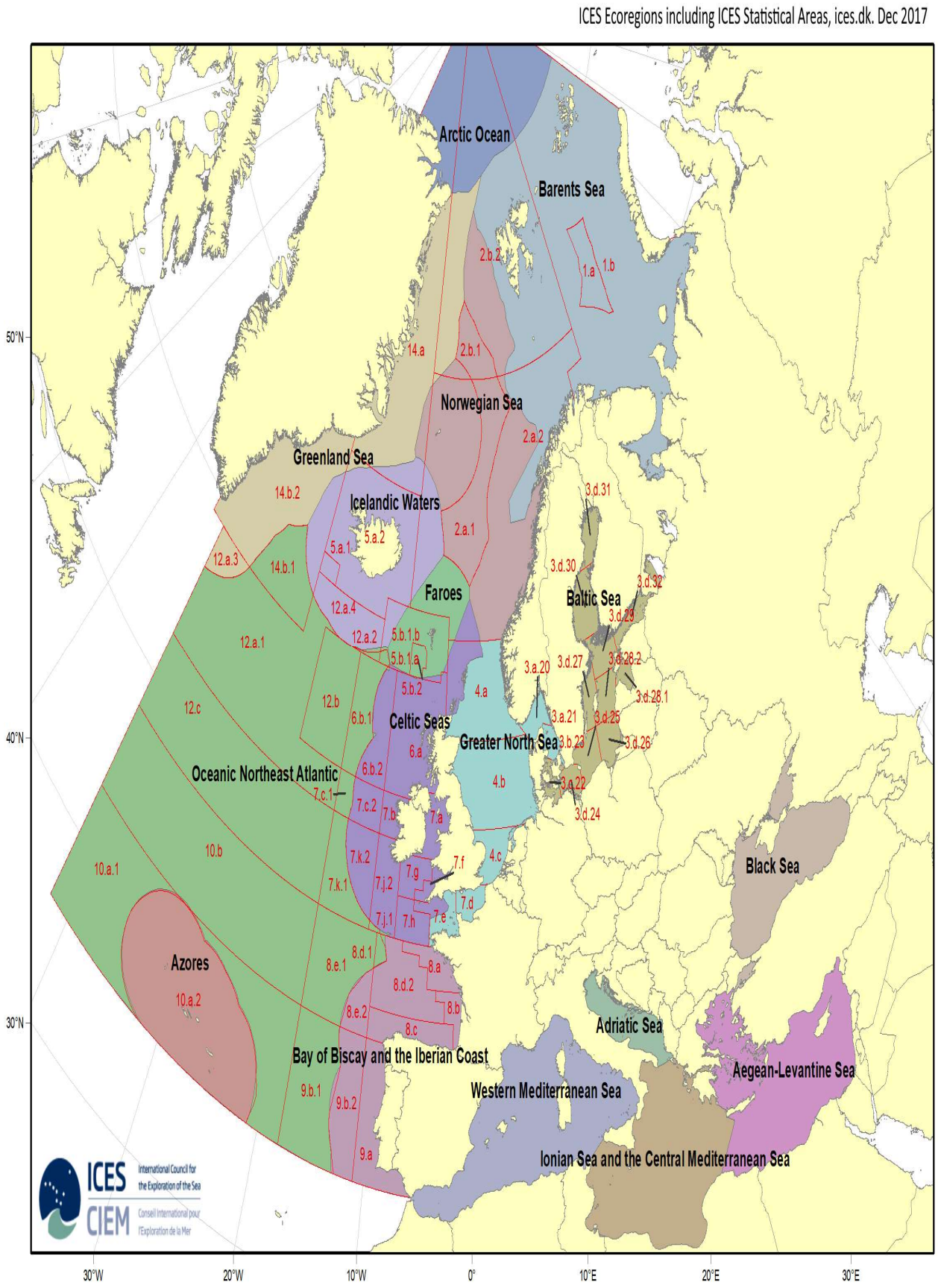
derived by multiplying the confidence limits around the bycatch rates by the estimated number of hauls that were not observed in each metier and adding on any observed bycatch. This approach does not account for uncertainty in estimating the number of hauls per metier.

To produce the total bycatch estimate, the estimates for each metier are simply summed. Two measures of uncertainty are calculated. Firstly, the coefficient of variation (CV) which is the standard error divided by the estimate. The standard error is derived by summing the squared metier specific standard errors and taking the square root of the sum. Secondly, the 95% confidence interval is obtained from the metier-specific confidence intervals using the PropImp method of Newcombe (2011). This method for calculating confidence intervals was also used in the 2018, 2019, 2020 and 2021 estimates and leads to less uncertainty. We have not recalculated the uncertainty around the 2012 – 2017 estimates using the new method.

Bycatch estimates by ICES Division are also calculated and presented but these are based on stratified observations by metier and vessel size alone, and not by incorporating division level bycatch rates, because in several area/metier combinations there are too few observations to calculate robust rates.

*Another important caveat is therefore that these estimates make assumptions about bycatch rates across areas that are likely to be biased*. For example, if bycatch rates in 7d, where sampling has been limited, are systematically higher or lower than in other parts of Subarea 7, this will not be reflected in the extrapolated totals. In the absence of precise estimates of bycatch in several areas, we have estimated bycatch totals based on the best *available* data, while recognising that there are likely to be biases associated with these estimates.

## Annex 2 – Map of ICES Ecoregions and ICES Divisions in the Northeast Atlantic.



## Annex 3. ICES species reference lists for the Greater North Sea and Celtic Seas eoregions.

**3a: Greater North Sea.**

| Scientific name | Common name |
|---|---|
| *Aythya ferina* | Common pochard |
| *Aythya fuligula* | Tufted duck |
| *Aythya marila* | Greater scaup |
| *Somateria spectabilis* | King eider |
| *Somateria mollissima* | Common eider |
| *Melanitta fusca* | Velvet scoter |
| *Melanitta nigra* | Common scoter |
| *Clangula hyemalis* | Long-tailed duck |
| *Bucephala clangula* | Common goldeneye |
| *Mergellus albellus* | Smew |
| *Mergus merganser* | Goosander |
| *Mergus serrator* | Red-breasted merganser |
| *Gavia stellata* | Red-throated diver |
| *Gavia arctica* | Black-throated diver |
| *Gavia immer* | Great northern diver |
| *Fulmarus glacialis* | Northern fulmar |
| *Puffinus griseus* | Sooty shearwater |
| *Puffinus gravis* | Great shearwater |
| *Puffinus puffinus* | Manx shearwater |
| *Podiceps grisegena* | Red-necked grebe |
| *Podiceps cristatus* | Great crested grebe |
| *Podiceps auritus* | Horned grebe |
| *Podiceps nigricollis* | Black-necked grebe |
| *Morus bassanus* | Northern gannet |
| *Phalacrocorax aristotelis* | European shag |
| *Phalacrocorax carbo* | Great cormorant |
| *Fulica atra* | Eurasian coot |
| *Rissa tridactyla* | Black-legged kittiwake |
| *Larus ridibundus* | Black-headed gull |
| *Hydrocoloeus minutus* | Little gull |
| *Ichthyaetus melanocephalus* | Mediterranean gull |
| *Larus canus* | Common gull |
| *Larus marinus* | Great black-backed gull |
| *Larus hyperboreus* | Glaucous gull |
| *Larus glaucoides* | Iceland gull |
| *Larus argentatus* | Herring gull |
| *Larus fuscus* | Lesser black-backed gull |
| *Stercorarius skua* | Great skua |
| *Stercorarius parasiticus* | Arctic skua |
| *Alle alle* | Little auk |

| | |
|---|---|
| *Uria lomvia* | Brünnich's guillemot |
| *Uria aalge* | Common guillemot |
| *Alca torda* | Razorbill |
| *Cepphus grylle* | Black guillemot |
| *Fratercula arctica* | Atlantic puffin |
| *Phocoena phocoena* | Harbour porpoise |
| *Tursiops truncatus* | Common bottlenose dolphin |
| *Stenella coeruleoalba* | Striped dolphin |
| *Delphinus delphis* | Common dolphin |
| *Lagenorhynchus albirostris* | White-beaked dolphin |
| *Leucopleurus acutus* | Atlantic white-sided dolphin |
| *Grampus griseus* | Risso's dolphin |
| *Orcinus orca* | Killer whale |
| *Globicephala melas* | Long-finned pilot whale |
| *Hyperoodon ampullatus* | Northern bottlenose whale |
| *Mesoplodon bidens* | Sowerby’s beaked whale |
| *Physeter macrocephalus* | Sperm whale |
| *Megaptera novaeangliae* | Humpback whale |
| *Balaenoptera acutorostrata* | Common minke whale |
| *Balaenoptera borealis* | Sei whale |
| *Balaenoptera physalus* | Fin whale |
| *Halichoerus grypus* | Grey seal |
| *Phoca vitulina* | Harbour seal |
| *Lampetra fluviatilis* | River lamprey |
| *Petromyzon marinus* | Sea lamprey |
| *Hexanchus griseus* | Bluntnose sixgill shark |
| *Galeus melastomus* | Blackmouth catshark |
| *Scyliorhinus stellaris* | Greater-spotted dogfish |
| *Centroscyllium fabricii* | Black dogfish |
| *Etmopterus princeps* | Great lanternshark |
| *Etmopterus spinax* | Velvet belly lanternshark |
| *Scymnodon ringens* | Knifetooth dogfish |
| *Somniosus microcephalus* | Greenland shark |
| *Oxynotus paradoxus* | Sailfin roughshark |
| *Deania calcea* | Birdbeak dogfish |
| *Tetronarce nobiliana* | Atlantic torpedo ray |
| *Torpedo marmorata* | Marbled electric ray |
| *Dipturus intermedius* | Flapper skate |
| *Dipturus nidarosiensis* | Norwegian skate |
| *Dipturus oxyrinchus* | Long-nosed skate |
| *Leucoraja circularis* | Sandy ray |
| *Leucoraja fullonica* | Shagreen ray |
| *Raja microocellata* | Small-eyed ray |
| *Raja undulata* | Undulate ray |
| *Rajella fyllae* | Round skate |

| | |
|---|---|
| *Rajella lintea* | Sailray |
| *Dasyatis pastinaca* | Common stingray |
| *Myliobatis aquila* | Common eagle ray |
| *Chimaera monstrosa* | Rabbitfish |
| *Acipenser sturio* | Atlantic sturgeon |
| *Conger conger* | Conger eel |
| *Alosa alosa* | Allis shad |
| *Alosa fallax* | Twaite shad |
| *Coregonus spp. (incl. maraena and oxyrhinchus)* | Whitefish |
| *Salmo trutta* | Sea trout |
| *Brama brama* | Atlantic pomfret |
| *Hippocampus guttulatus* | Long-snouted seahorse |
| *Hippocampus hippocampus* | Short-snouted seahorse |
| *Pomatoschistus microps* | Common goby |
| *Pomatoschistus minutus* | Sand goby |
| *Hippoglossus hippoglossus* | Atlantic halibut |
| *Mola mola* | Ocean sunfish |
| *Sparus aurata* | Gilthead seabream |
| *Sciaena umbra* | Brown meagre |
| *Umbrina cirrosa* | Shi drum |
| *Labrus bergylta* | Ballan wrasse |
| *Lycodes esmarkii* | Esmark's eelpout |
| *Zoarces viviparus* | Eelpout |
| *Anarhichas lupus* | Atlantic wolffish |
| *Anarhichas minor* | Spotted wolffish |
| *Helicolenus dactylopterus* | Blackbelly rosefish |
| *Sebastes mentella* | Beaked redfish |
| *Sebastes norvegicus* | Golden redfish |
| *Sebastes viviparus* | Norway redfish |
| *Chelidonichthys lucerna* | Tub gurnard |
| *Cyclopterus lumpus* | Lumpfish |
| *Zeus faber* | John Dory |
| *Cetorhinus maximus* | Basking shark |
| *Squatina squatina* | Angel shark |
| *Dermochelys coriacea* | Leatherback turtle |
| *Caretta caretta* | Loggerhead turtle |
| *Lepidochelys olivacea* | Olive ridley turtle |
| *Lepidochelys kempii* | Kemp's ridley turtle |
| *Chelonia mydas* | Green sea turtle |
| *Eretmochelys imbricata* | Hawksbill turtle |

**3b: Celtic Seas**

| Scientific name | Common name |
|---|---|
| *Aythya ferina* | Common pochard |
| *Aythya fuligula* | Tufted duck |
| *Aythya marila* | Greater scaup |
| *Somateria mollissima* | Common eider |
| *Melanitta fusca* | Velvet scoter |
| *Melanitta nigra* | Common scoter |
| *Clangula hyemalis* | Long-tailed duck |
| *Bucephala clangula* | Common goldeneye |
| *Mergus serrator* | Red-breasted merganser |
| *Gavia stellata* | Red-throated diver |
| *Gavia arctica* | Black-throated diver |
| *Gavia immer* | Great northern diver |
| *Fulmarus glacialis* | Northern fulmar |
| *Calonectris borealis* | Cory's shearwater |
| *Puffinus griseus* | Sooty shearwater |
| *Puffinus gravis* | Great shearwater |
| *Puffinus puffinus* | Manx shearwater |
| *Puffinus mauretanicus* | Balearic shearwater |
| *Podiceps grisegena* | Red-necked grebe |
| *Podiceps cristatus* | Great crested grebe |
| *Podiceps auritus* | Horned grebe |
| *Podiceps nigricollis* | Black-necked grebe |
| *Morus bassanus* | Northern gannet |
| *Phalacrocorax aristotelis* | European shag |
| *Phalacrocorax carbo* | Great cormorant |
| *Fulica atra* | Eurasian coot |
| *Rissa tridactyla* | Black-legged kittiwake |
| *Xema sabini* | Sabine's gull |
| *Larus ridibundus* | Black-headed gull |
| *Hydrocoloeus minutus* | Little gull |
| *Ichthyaetus melanocephalus* | Mediterranean gull |
| *Larus canus* | Common gull |
| *Larus marinus* | Great black-backed gull |
| *Larus hyperboreus* | Glaucous gull |
| *Larus glaucoides* | Iceland gull |
| *Larus argentatus* | Herring gull |
| *Larus michahellis* | Yellow-legged gull |
| *Larus fuscus* | Lesser black-backed gull |
| *Stercorarius skua* | Great skua |
| *Stercorarius pomarinus* | Pomarine skua |
| *Stercorarius parasiticus* | Arctic skua |
| *Stercorarius longicaudus* | Long-tailed kua |

| | |
|---|---|
| *Alle alle* | Little auk |
| *Uria aalge* | Common guillemot |
| *Alca torda* | Razorbill |
| *Cepphus grylle* | Black guillemot |
| *Fratercula arctica* | Atlantic puffin |
| *Phocoena phocoena* | Harbour porpoise |
| *Tursiops truncatus* | Common bottlenose dolphin |
| *Stenella coeruleoalba* | Striped dolphin |
| *Delphinus delphis* | Common dolphin |
| *Lagenorhynchus albirostris* | White-beaked dolphin |
| *Leucopleurus acutus* | Atlantic white-sided dolphin |
| *Grampus griseus* | Risso's dolphin |
| *Orcinus orca* | Killer whale |
| *Globicephala melas* | Long-finned pilot whale |
| *Ziphius cavirostris* | Cuvier's beaked whale |
| *Hyperoodon ampullatus* | Northern bottlenose whale |
| *Mesoplodon bidens* | Sowerby's beaked whale |
| *Physeter macrocephalus* | Sperm whale |
| *Megaptera novaeangliae* | Humpback whale |
| *Balaenoptera acutorostrata* | Common minke whale |
| *Balaenoptera borealis* | Sei whale |
| *Balaenoptera physalus* | Fin whale |
| *Balaenoptera musculus* | Blue whale |
| *Halichoerus grypus* | Grey seal |
| *Phoca vitulina* | Harbour seal |
| *Lampetra fluviatilis* | River lamprey |
| *Petromyzon marinus* | Sea lamprey |
| *Hexanchus griseus* | Bluntnose sixgill shark |
| *Chlamydoselachus anguineus* | Frilled shark |
| *Galeus murinus* | Mouse catshark |
| *Apristurus laurussonii* | Iceland catshark |
| *Apristurus spp.* | Deep-water catshark |
| *Sphyrna zygaena* | Smooth hammerhead |
| *Sphyrnidae* | Hammerhead sharks |
| *Centroscyllium fabricii* | Black dogfish |
| *Etmopterus princeps* | Great lanternshark |
| *Etmopterus spinax* | Velvet belly lanternshark |
| *Centroscymnus crepidater* | Longnose velvet dogfish |
| *Scymnodon ringens* | Knifetooth dogfish |
| *Somniosus microcephalus* | Greenland shark |
| *Oxynotus paradoxus* | Sailfin roughshark |
| *Deania calcea* | Birdbeak dogfish |
| *Tetronarce nobiliana* | Atlantic torpedo ray |
| *Torpedo marmorata* | Marbled electric ray |
| *Amblyraja radiata* | Starry ray |

| | |
|---|---|
| *Dipturus intermedius* | Flapper skate |
| *Dipturus nidarosiensis* | Norwegian skate |
| *Dipturus oxyrinchus* | Long-nosed skate |
| *Rajella bathyphila* | Deep-water ray |
| *Rajella fyllae* | Round skate |
| *Rajella lintea* | Sailray |
| *Dasyatis pastinaca* | Common stingray |
| *Myliobatis aquila* | Common eagle ray |
| *Chimaera monstrosa* | Rabbitfish |
| *Hydrolagus mirabilis* | Large-eyed rabbitfish |
| *Rhinochimaera atlantica* | Atlantic longnose chimaera |
| *Acipenser sturio* | Atlantic sturgeon |
| *Synaphobranchus kaupii* | Kaup's arrowtooth eel |
| *Conger conger* | Conger eel |
| *Alosa alosa* | Allis shad |
| *Alosa fallax* | Twaite shad |
| *Coregonus spp. (excluding C. oxyrhinchus)* | Whitefish |
| *Salmo trutta* | Sea trout |
| *Mora moro* | Common mora |
| *Molva macrophthalma* | Spanish ling |
| *Brama brama* | Atlantic pomfret |
| *Hippocampus guttulatus* | Long-snouted seahorse |
| *Hippocampus hippocampus* | Short-snouted seahorse |
| *Gobius cobitis* | Giant goby |
| *Gobius couchi* | Couch's goby |
| *Pomatoschistus microps* | Common goby |
| *Pomatoschistus minutus* | Sand goby |
| *Scophthalmus maximus* | Turbot |
| *Scophthalmus rhombus* | Brill |
| *Hippoglossus hippoglossus* | Atlantic halibut |
| *Mola mola* | Ocean sunfish |
| *Polyprion americanus* | Wreckfish |
| *Epigonus telescopus* | Black cardinal fish |
| *Dicentrarchus punctatus* | Spotted seabass |
| *Sparus aurata* | Gilthead seabream |
| *Sciaena umbra* | Brown meagre |
| *Labrus bergylta* | Ballan wrasse |
| *Zoarces viviparus* | Eelpout |
| *Anarhichas lupus* | Atlantic wolffish |
| *Anarhichas minor* | Spotted wolffish |
| *Helicolenus dactylopterus* | Blackbelly rosefish |
| *Sebastes mentella* | Beaked redfish |
| *Sebastes viviparus* | Norway redfish |
| *Scorpaena scrofa* | Red scorpionfish |
| *Chelidonichthys lucerna* | Tub gurnard |

| | |
|---|---|
| *Cyclopterus lumpus* | Lumpfish |
| *Alepocephalus bairdii* | Baird's slickhead |
| *Zeus faber* | John Dory |
| *Cetorhinus maximus* | Basking shark |
| *Squatina squatina* | Angel shark |
| *Dermochelys coriacea* | Leatherback turtle |
| *Caretta caretta* | Loggerhead turtle |
| *Lepidochelys olivacea* | Olive ridley turtle |
| *Lepidochelys kempii* | Kemp's ridley turtle |
| *Chelonia mydas* | Green sea turtle |
| *Eretmochelys imbricata* | Hawksbill turtle |