OSPAR request to generate swept-area and abundance index outputs for all otter and beam trawl surveys in the Northeast Atlantic and regional seas based on DATRAS data as input to OSPAR common indicator

Advice summary

ICES considers that the online database of scientific trawl surveys contained in DATRAS is a valuable resource and advises that it be used in biodiversity assessments and for the calculation of OSPAR common indicators FC1, FC2, FC3, and FW3 for the QSR 2023.

ICES provides, as downloadable products, the code and data products requested by OSPAR to calculate swept-area for all relevant hauls in DATRAS surveys and to calculate annual estimates of abundance indices of 50 species or species groups in OSPAR regions II, III, and IV identified by ICES as sensitive.

ICES considers that these estimates are currently the best available information for calculating OSPAR common indicators relating to the biodiversity of fish communities and the status of marine foodwebs.

ICES notes that DATRAS is regularly updated with submissions from reporting national institutes. For new analyses or assessments, ICES advises that the latest updates of DATRAS be used when applying the codes provided in this advice. As ICES updates the *swept area assessment outputs*, these can be downloaded from DATRAS.

Request

ICES is requested to generate products from the DATRAS database that can be used by OSPAR in updating common indicator assessments for fish and foodwebs.

Component 1: Swept-area estimates for all hauls in the DATRAS database.

Component 2: Annual estimates of abundance of all species identified as sensitive in the current list from WGBIODIV 2020. This should be split into two:

a. Estimates from existing ICES assessments enter as 3rd party assessments;
b. Where no ICES assessments currently exist, survey-based indices should be available as ICES data products.

The outputs need to be appropriate to use in OSPAR common indicators.

The full text of the request is in the Annex.

Elaboration on the advice

Component 1: swept-area estimates for all hauls in the DATRAS database

Swept-area based estimates are used to calculate ecological indicators for the biodiversity of fish communities and the status of foodwebs. OSPAR's indicators cover its regions II, III, and IV; therefore, OSPAR requested that the output addresses data from surveys in all these areas. The swept-area output produced in this advice is based on the 19 surveys used in previous OSPAR work (Moriarty *et al.*, 2017) along with additional surveys available via DATRAS[1]; the full list is shown in Table 1. The additional surveys include beam trawl surveys and also the Baltic International Trawl Survey for the hauls that are performed within OSPAR Region II.

[1] https://datras.ices.dk/Data_products/Download/Download_Data_public.aspx.

Table 1 List of individual surveys used to produce the new swept-area products.

DATRAS identifier	Country	Quarter	Years	Gear type
BTS	UK-England	1	2006–2020	Beam
BTS	International	3	1985–2020	Beam
BTS	UK-England	4	2006–2013	Beam
BTS-VIII	France	4	2011–2020	Beam
DYFS*	International	3+4	2002–2020	Beam
SNS*	Netherlands	3+4	2002–2020	Beam
NS-IBTSQ1	International	1	1967–2021	Demersal (GOV)
NS-IBTSQ3	International	3	1991–2020	Demersal (GOV)
SWC-IBTS/SCOWCGFS	UK-Scotland	1	1985–2020	Demersal (GOV)
SWC-IBTS/SCOWCGFS*	UK-Scotland	4	1990–2020	Demersal (GOV)
EVHOE	France	4	1997–2020	Demersal (GOV)
FR-CGFS	France	4	1998–2020	Demersal (GOV)
IE-IGFS	Ireland	4	2003–2020	Demersal (GOV)
NIGFSQ1	Northern Ireland	1	2006–2020	Demersal (ROT)
NIGFSQ4*	Northern Ireland	4	2006–2020	Demersal (ROT)
PT-IBTS*	Portugal	4	2002–2018	Demersal (NCT)
ROCKALL/SCOROC*	UK-Scotland	3	1999–2020	Demersal (GOV)
SP-ARSAQ1*	Spain	1	1996–2020	Demersal (BAK)
SP-ARSAQ4*	Spain	4	2002–2020	Demersal (BAK)
SP-NORTH*	Spain	3+4	1990–2020	Demersal (BAK)
SP-PORC	Spain	3+4	2001–2020	Demersal (BAK)
BITSQ1	International	1	1996–2020	Demersal (TV)
BITSQ4	International	4	1999–2020	Demersal (TV)

*Surveys for some years in the time-series were either not performed or are missing from DATRAS.

The data on the hauls performed in all the surveys in Table 1 are available and downloadable via the ICES DATRAS webpage[2]. These data are regularly updated by reporting national institutes and the data downloaded from DATRAS and used to calculate the swept-area in this advice is date stamped and available in the data outputs linked to this advice (ICES, 2021a, 2021b).

Crucial information for calculating swept-area in each and every haul is not always collected or reported. It is therefore necessary to fill in missing values to allow these calculations. The steps taken to do this differ between surveys using beam trawl gear and those using demersal trawl gear (Figure 1).

[2] https://datras.ices.dk/Data_products/Download/Download_Data_public.aspx.

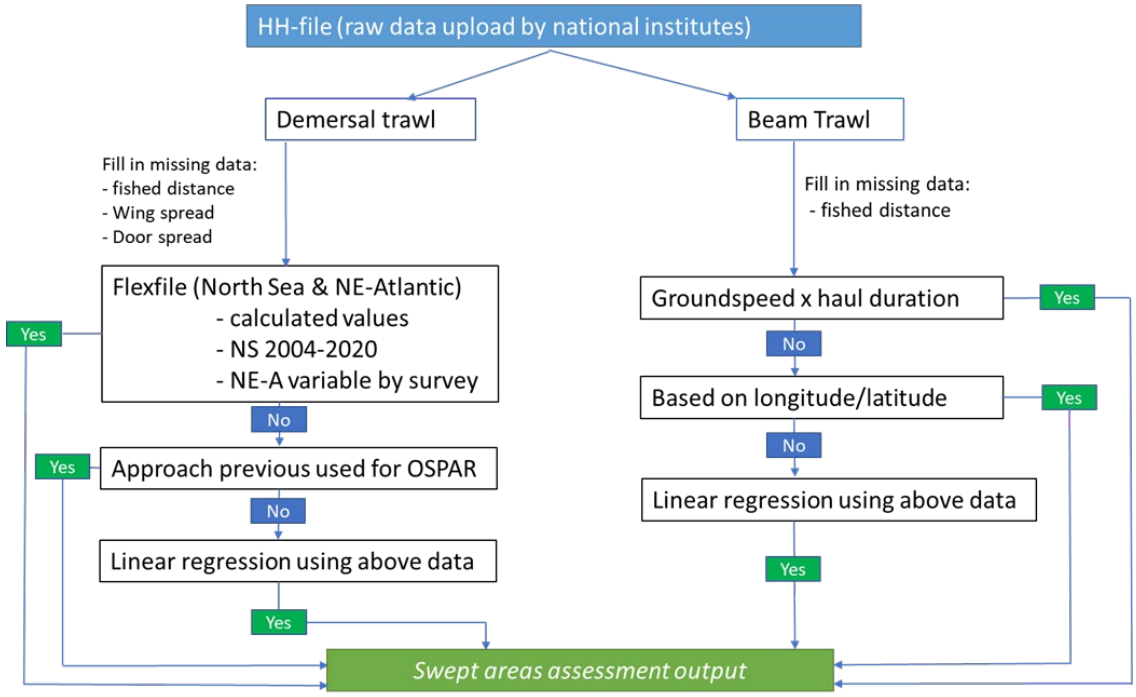

Figure 1 **Scheme of the steps taken to calculate the swept-area.**

Beam trawl gears have a fixed width (ICES, 2021c), and the actual width of the used beam trawl is reported in the "Gear" column of the HH-files. As the width is fixed, the only other parameter needed to calculate swept-area for beam trawls is the distance fished. This distance may be missing for some hauls in DATRAS and needs to be estimated.

Demersal trawls do not have a fixed width as the doors of the gear move further apart (door spread) with increasing water depth. Increasing door spread results in an increase of the horizontal net opening (wing spread) and a reduction in the vertical net opening. Therefore, in addition to fished distance, door and wing spread may also need to be estimated where these values are not reported by national institutes. Some fish species tend to be herded towards the net opening by the doors while other species do not. To account for this behavioural difference, two swept areas can be calculated for demersal trawls, one based on door spread and the other on wing spread. The swept-area based on door spread should be used for species that are herded towards the net opening, while wing spread should be used for the other species. Both values can be measured using net geometry sensors although such sensors are not used in all cases. As the relationship between door and wing spread can be modelled, information on one allows the other to be estimated. In cases where both are missing, ICES used country- and/or vessel-specific algorithms. These algorithms were reviewed and updated during WKSAE-DATRAS and are available as a DATRAS Procedure Document (ICES, 2021d). The process of estimating the distance fished for demersal trawls uses the same steps as described for the beam trawl surveys.

ICES created a separate product, the FlexFile, containing the calculated values (Figure 1). The FlexFile is downloadable via DATRAS. A time-stamped version of the FlexFile used to prepare this advice is stored and available in ICES (2021a). Unfortunately, not all countries have been able to clean their data or provide their algorithms and, as a result, the FlexFile still has missing values. In addition, this FlexFile only contains information for a time-series that is shorter than the times-series that could be used in OSPAR assessments. Therefore, ICES used the original OSPAR product which calculated the missing values as described in Moriarty *et al*. (2017) to infill additional data in the FlexFile. The updated new release of the code is available on GitHub[3] under *Component1_SweptArea/data*.

Finally, linear regressions were used (ICES, 2021e) on the available parameters to fill in the last missing values (Figure 1). The resulting data product is downloadable from the DATRAS webpage[4] (see *SweptAreaAssessmentOutput* and *SensitiveSpeciesAbundanceIndices*) and can also be found in the Component 1 data output (ICES, 2021a).

[3] https://github.com/ices-taf/2021_2007-35_SpecialRequest.
[4] https://datras.ices.dk/Data_products/Download/Download_Data_public.aspx.

Information on the herding effect is limited; however, based on available information, ICES concluded that only one of the sensitive species identified in this advice (halibut) is considered to be a herding species. Therefore, ICES only used the swept-area based on the wing spread.

The combination of these steps results in a final data product: the *swept area assessment output*, downloadable from DATRAS as a time-stamped product. DATRAS is regularly updated with submissions from the reporting national institutes. For new analyses or assessments, ICES advises that the latest updates of the HH-files and the FlexFile be used to create the swept-area output using the codes developed by ICES and available on GitHub[5].

As ICES updates swept-area estimates, the final product can be downloaded from DATRAS[6].

Component 2: annual estimates of abundance of all species identified as sensitive

Identification of sensitive species

ICES considers that sensitivity should be an inherent trait of a species and hence species should be listed in all areas where they occur unless there is clear evidence that the species in some areas are less sensitive to fishing. ICES identified 140 species or species groups considered to be sensitive in the OSPAR area together with the number of hauls in which the species was observed. This list was reduced to 50 (Table 2) when species with low occurrence (occurrence in less than 100 hauls in all DATRAS data) were excluded. The list does not differentiate between commercial and non-commercial species and includes valuable bycatch species, target species and those which are caught but discarded.

Table 2 Sensitive species individually examined to determine which approach should be used to produce the abundance indices.

Species	Considerations	Assessment source
Amblyraja radiata	GAM model. The existing stock assessment uses only two surveys and has lower temporal coverage.	WKABSENS
Anarhichas lupus	No existing abundance assessment	WKABSENS
Anguilla Anguilla	Existing stock assessment integrates other sources of information than DATRAS. Indices derived from DATRAS analyses are forwarded to WGEEL.	WGEEL (ICES, 2020a)
Argyrosomus regius	No existing abundance assessment	WKABSENS
Brosme brosme	Existing stock assessment integrates other sources of information than DATRAS. Indices derived from DATRAS analyses are forwarded to WGDEEP.	WGDEEP (ICES, 2019a)
Chelidonichthys lucerna	No existing abundance assessment	WKABSENS
Chimaera monstrosa	No existing abundance assessment	WKABSENS
Conger conger	No existing abundance assessment	WKABSENS
Coryphaenoides rupestris	No existing abundance assessment except in Division 3.a. Difficult to discern from the sparse data whether 3.a is a separate population.	WKABSENS
Cyclopterus lumpus	No existing abundance assessment	WKABSENS
Dasyatis pastinaca	No existing abundance assessment	WKABSENS
Dipturus batis complex	No existing abundance assessment	WKABSENS
Etmopterus spinax	No existing abundance assessment	WKABSENS

[5] https://github.com/ices-taf/2021_2007-35_SpecialRequest.
[6] https://datras.ices.dk/Data_products/Download/Download_Data_public.aspx.

Species	Considerations	Assessment source
Gadus morhua	Full stock assessments used	WGNSSK (ICES, 2020b), WGCSE (ICES 2020c, 2020d), WGBFAS (ICES,2019b)
Galeorhinus galeus	No existing abundance assessment	WKABSENS
Galeus melastomus	Existing stock assessments use selected DATRAS data only. Limited evidence of separate populations.	WKABSENS
Helicolenus dactylopterus	No existing abundance assessment	WKABSENS
Hexanchus griseus	No existing abundance assessment	WKABSENS
Hippocampus hippocampus	No existing abundance assessment	WKABSENS
Hippoglossus hippoglossus	No existing abundance assessment	WKABSENS
Lampetra fluviatilis	No existing abundance assessment	WKABSENS
Lepidorhombus whiffiagonis	Full stock assessments used	WGBIE (ICES, 2020e,2020f)
Leucoraja circularis	No existing abundance assessment	WKABSENS
Leucoraja fullonica	No existing abundance assessment	WKABSENS
Leucoraja naevus	Existing stock assessments use selected DATRAS data only. Limited evidence of separate populations.	WKABSENS
Lophius budegassa	Existing stock assessment integrates other sources of information than DATRAS. Indices derived from DATRAS analyses are forwarded to WGBIE and WGCSE	WGBIE (ICES, 2020g, 2020h), WGCSE (ICES, 2020i)
Lophius piscatorius	Existing stock assessment integrates other sources of information than DATRAS. Indices derived from DATRAS analyses are forwarded to WGBIE	WGBIE (ICES, 2020j, 2020k)
Merluccius merluccius	Existing stock assessment integrates other sources of information than DATRAS.	WGBIE (ICES,2019c, 2019d)
Molva dypterygia	Existing stock assessment integrates other sources of information than DATRAS.	WGDEEP(ICES, 2019e, 2020l)
Molva macrophthalma	No existing abundance assessment	WKABSENS
Molva molva	Existing stock assessment integrates other sources of information than DATRAS.	WGDEEP (ICES, 2019f, 2021f)
Mustelus spp.	Existing stock assessments use selected DATRAS data only. Limited evidence of separate populations.	WKABSENS
Phycis blennoides	Existing stock assessment integrates other sources of information than DATRAS.	WGDEEP (ICES, 2020m)
Pollachius pollachius	No existing abundance assessment	WKABSENS
Pollachius virens	Existing stock assessment integrates other sources of information than DATRAS.	WGNSSK (ICES, 2020n)
Raja brachyura	Existing stock assessments use selected DATRAS data only. Limited evidence of separate populations.	WKABSENS
Raja clavate	Existing stock assessments use selected DATRAS data only. Limited evidence of separate populations.	WKABSENS
Raja microocellata	Existing stock assessments use selected DATRAS data only.	WKABSENS
Raja montagui	Existing stock assessments use selected DATRAS data only. Limited evidence of separate populations.	WKABSENS
Raja undulata	Existing stock assessments use selected DATRAS data only.	WKABSENS

Species	Considerations	Assessment source
Scophthalmus maximus	Existing stock assessments used in the North Sea, the Channel and Skagerrak, GAMs elsewhere.	WGNSSK (ICES, 2020o), WKABSENS
Scophthalmus rhombus	Existing stock assessments used in the North Sea, the Channel and Skagerrak, GAMs elsewhere.	WGNSSK (ICES, 2020p), WKABSENS
Scyliorhinus canicula	Existing stock assessments use selected DATRAS data only.	WKABSENS
Scyliorhinus stellaris	Existing stock assessments use selected DATRAS data only.	WKABSENS
Sebastes mentella	Existing stock assessments used	NWWG (ICES, 2018a, 2018b)
Sebastes norvegicus	Existing stock assessments used	NWWG (ICES, 2018c)
Sebastes viviparus	No existing abundance assessment	WKABSENS
Squalus acanthias	Existing stock assessments used	WGEF (ICES, 2020q)
Torpedo marmorata	No existing abundance assessment	WKABSENS
Zoarces viviparus	No existing abundance assessment	WKABSENS

Abundance assessment

ICES examined each of the species listed in Table 2 individually to determine which approach should be used to produce the abundance indices. Of the 50 species and species groups listed, 16 are subject to ICES stock assessments and are already classified into areas assessed and stock codes and are referenced to the latest ICES advice available at the time of WKABSENS (Table 3). The stock assessments of these species typically have a shorter temporal coverage than these survey-based abundance estimates. For these species both assessment and survey-based abundance estimates were included in the data with the source identified—on GitHub[7] under *Component2_AbundanceIndex* and in the Component 2 data output (ICES, 2021b).

For the species for which abundance is not regularly assessed by ICES, abundance indices were estimated from survey catches listed in DATRAS. ICES describes the steps taken to estimate the number caught per haul of each of the sensitive species listed in Table 2 (ICES, 2021g). To derive abundance observations per unit of area, the *swept areas assessment output* was merged with the survey catch data (downloadable from DATRAS as exchange data .HL files). A time-stamped HL-file of the selected species used in this advice is available in the data output for component 2 (ICES, 2021b). The codes used to produce the indices are available on GitHub under *Component2_AbundanceIndex*.

Although ICES does not recommend using survey indices in years where upper confidence levels exceed three times the abundance index, these are still included in the data products (ICES, 2021b).

Table 3 ICES assessed stocks by area, stock codes and reference of advice used for abundance estimates.

Species	Area assessed (stock code)	Assessment used
Anguilla anguilla	North Sea and "elsewhere" (ele.27.37.nea)	ICES (2020a)
Brosme brosme	Wide (usk.27.3a45b6a7.912b)	ICES (2019a)
Gadus morhua	Greater North Sea (cod.27.47d20)	ICES (2020b)
	Celtic Seas, Greater North Sea, and Oceanic Northeast Atlantic (cod.27.7e–k)	ICES (2020r)
	Celtic Seas (cod.27.6a)	ICES (2020c)
	North Sea (cod.27.21)	ICES (2019b)
	Celtic Seas (cod.27.7a)	ICES (2020d)
Lepidorhombus whiffiagonis	Bay of Biscay and the Iberian Coast, Celtic Seas, Greater North Sea and Oceanic Northeast Atlantic (meg.27.7b–k8abd)	ICES (2020e)

[7] https://github.com/ices-taf/2021_2007-35_SpecialRequest.

Species	Area assessed (stock code)	Assessment used
	Bay of Biscay and Iberian Coast (meg.27.8c9a)	ICES (2020f)
Lophius budegassa	Greater Northern Sea, Celtic Seas, and Bay of Biscay and Iberian Coast (ank.27.78abd)	ICES (2020h)
	Celtic Seas, Greater North Sea, and Oceanic Northeast Atlantic (anf.27.3a46)	ICES (2020i)
	Bay of Biscay and the Iberian Coast (ank.27.8c9a)	ICES (2020g)
Lophius piscatorius	Celtic Seas, Greater North Sea, and Oceanic Northeast Atlantic (anf.27.3a46)	ICES (2020i)
	Bay of Biscay and the Iberian Coast, Celtic Seas, Greater North Sea, and Oceanic Northeast Atlantic (mon.27.78abd)	ICES (2020j)
	Bay of Biscay and the Iberian Coast, Celtic Seas, Greater North Sea, and Oceanic Northeast Atlantic (mon.27.8c9a)	ICES (2020k)
Merluccius merluccius	Bay of Biscay and the Iberian Coast (hke.27.3a46–8abd)	ICES (2019d)
	Bay of Biscay and the Iberian Coast (hke.27.8c9a)	ICES (2019c)
Molva dypterygia	Arctic Ocean, Greenland Sea, Icelandic Waters, Norwegian Sea and Oceanic Northeast Atlantic (bli.27.5a14)	ICES (2019e)
	Celtic Seas and Faroes grounds (bli.27.5b67)	ICES (2020l)
Molva molva	Celtic Seas, Faroes, Icelandic Waters, and Oceanic Northeast Atlantic (lin.27.5b)	ICES (2021f)
	Northeast Atlantic and Arctic Ocean (lin.27.3a4a6–91214)	ICES (2019f)
Phycis blennoides	Northeast Atlantic (gfb.27.nea)	ICES (2020m)
Pollachius virens	Celtic Seas, Faroes, and Greater North Sea (pok.27.3a46)	ICES (2020n)
Scophthalmus maximus	Greater North Sea (tur.27.4)	ICES (2020s)
	Greater North Sea (tur.27.3a)	ICES (2020o)
Scophthalmus rhombus	Celtic Seas and Greater North Sea (bll.27.3a47de)	ICES (2020p)
Sebastes mentella	Greenland Sea and Oceanic Northeast Atlantic (reb.27.14b)	ICES (2018a)
	Arctic Ocean, Greenland Sea, Icelandic Waters, Norwegian Sea and Oceanic Northeast Atlantic ecoregions (reb.27.5a14)	ICES (2018b)
Sebastes norvegicus	Arctic Ocean, Celtic Seas, Faroes, Greenland Sea, Icelandic Waters, Norwegian Sea, and Oceanic Northeast Atlantic (reg.27.561214)	ICES (2018c)
Squalus acanthias	Northeast Atlantic and adjacent seas (Widely distributed) (dgs.27.nea)	ICES (2020q)

Basis of the advice

The advice is based on data freely available for download from the ICES DATRAS database portal[8] and in the reports of the WKSAE-DATRAS and WKABSENS workshops (ICES, 2021e, 2021g).

Quality and consistency of the DATRAS database

Reporting national institutes initially check data prior to submission to ICES in a specific format. A further screening process is applied by ICES before the data are accepted and incorporated into the DATRAS database. An additional control of the most recently added data is done yearly by the respective survey coordination groups. The full screening process is valid only for data from 2004 onwards meaning that some of the more historical data have not been subject to the same level of quality assurance. More detailed descriptions of the surveys, data flows, and quality assurance processes are available in the WKSEA and WKABSENS reports (ICES, 2021e, 2021g) and from the DATRAS database portal.

Identification of sensitive species

ICES reviewed the list produced by the Workshop on Fish of Conservation and Bycatch Relevance (WKCOFIBYC; ICES, 2021h) based on species listed in scientific literature, in hard and/or soft legislation, and as threatened by IUCN. Some species were listed in some areas only.

Abundance estimates

ICES explored different approaches to analysing survey catch rates (e.g. binomial models, GAM, VAST) to estimate abundance estimates of sensitive species (Section 4 in ICES [2021g]). ICES decided to use the GAM approach as this was sensitive to catch rates beyond presence/absence and was able to estimate indices with uncertainties within a reasonable time frame. Two different GAM models were estimated, one (GAM+) included a random ship/gear effect, whereas the other (GAM) did not. The model with lowest AIC was used except where the CV of the GAM+ model exceeded one. In this case, the simpler GAM model was used instead. This threshold resulted in the recommendation of the simpler GAM for 18 stocks (Table 2). ICES notes that time and computational limitations were considered when choosing the statistical model to calculate abundance estimates and acknowledges that other statistical models can be used.

Species with existing ICES stock assessments and the ICES working groups that provide these assessments are identified in Table 2. The abundance estimates for these species were retrieved from Stock Assessment Graphs (SAG) and are shown in Table 11 in Annex 2 of WKABSENS (ICES, 2021g). For the species for which abundance is not regularly assessed by ICES, estimated abundance indices are used and are shown in Tables 1–10 in Annex 2 of WKABSENS (ICES, 2021g).

[8] https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx.

Sources and references

ICES. 2018a. Beaked redfish (*Sebastes mentella*) in Division 14.b, demersal (Southeast Greenland). *In* Report of the ICES Advisory Committee, 2018. ICES Advice 2018, reb.27.14b. https://doi.org/10.17895/ices.pub.4416.

ICES. 2018b. Beaked redfish (*Sebastes mentella*) in Subarea 14 and Division 5.a, Icelandic slope stock (East of Greenland, Iceland grounds). *In* Report of the ICES Advisory Committee, 2018. ICES Advice 2018, reb.27.5a14. https://doi.org/10.17895/ices.pub.4424.

ICES. 2018c. Golden redfish (*Sebastes norvegicus*) in subareas 5, 6, 12, and 14 (Iceland and Faroes grounds, West of Scotland, North of Azores, East of Greenland). *In* Report of the ICES Advisory Committee, 2018. ICES Advice 2018, reg.27.561214. https://doi.org/10.17895/ices.pub.4417.

ICES. 2019a. Tusk (*Brosme brosme*) in subareas 4 and 7–9, and in divisions 3.a, 5.b, 6.a and 12.b (Northeast Atlantic). *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, usk.27.3a45b6a7-912b. https://doi.org/10.17895/ices.advice.4823.

ICES. 2019b. Cod (*Gadus morhua*) in Subdivision 21 (Kattegat). *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, cod.27.21. https://doi.org/10.17895/ices.advice.4745.

ICES. 2019c. Hake (*Merluccius merluccius*) in divisions 8.c and 9.a, Southern stock (Cantabrian Sea and Atlantic Iberian waters). *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, hke.27.8c9a. https://doi.org/10.17895/ices.advice.4760.

ICES. 2019d. Hake (*Merluccius merluccius*) in subareas 4, 6, and 7, and in divisions 3.a, 8.a–b, and 8.d, Northern stock (Greater North Sea, Celtic Seas, and the northern Bay of Biscay). *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, hke.27.3a46-8abd. https://doi.org/10.17895/ices.advice.4759.

ICES. 2019e. Blue ling (*Molva dypterygia*) in Subarea 14 and Division 5.a (East Greenland and Iceland grounds) *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, bli.27.5a14. https://doi.org/10.17895/ices.advice.4812.

ICES. 2019f. Ling (*Molva molva*) in subareas 6–9, 12, and 14, and in divisions 3.a and 4.a (Northeast Atlantic and Arctic Ocean) *In* Report of the ICES Advisory Committee, 2019. ICES Advice 2019, lin.27.3a4a6–91214. https://doi.org/10.17895/ices.advice.4815.

ICES. 2020a. European eel (*Anguilla Anguilla*) throughout the natural range. . European eel (Anguilla anguilla) throughout its natural range. *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, ele.2737.nea. https://doi.org/10.17895/ices.advice.5898.

ICES. 2020b. Cod (*Gadus morhua*) in Subareas 4, Division 7.d, and Subdivision 20 (North Sea, eastern English Channel, Skagerrak). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, cod.27.47d20. https://doi.org/10.17895/ices.advice.5891.

ICES. 2020c. Cod (*Gadus morhua*) in Division 6.a (West of Scotland). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2019, cod.27.6a. https://doi.org/10.17895/ices.advice.6106.

ICES. 2020d. Cod (*Gadus morhua*) in Division 7.a (Irish Sea). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, cod.27.7a. https://doi.org/10.17895/ices.advice.7570.

ICES. 2020e. Megrim (*Lepidorhombus whiffiagonis*) in divisions 7.b–k, 8.a–b, and 8.d (west and southwest of Ireland, Bay of Biscay). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, meg.27.7bk8abd. https://doi.org/10.17895/ices.advice.5860.

ICES. 2020f. Megrim (*Lepidorhombus whiffiagonis*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, meg.27.8c9a. https://doi.org/10.17895/ices.advice.5861.

ICES. 2020g. Black-bellied anglerfish (*Lophius budegassa*) in divisions 8.c and 9.a (Cantabrian Sea, Atlantic Iberian waters). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, ank.27.8c9a. https://doi.org/10.17895/ices.advice.5923.

ICES. 2020h. Black-bellied anglerfish (*Lophius budegassa*) in Subarea 7 and divisions 8.a–b and 8.d (Celtic Seas, Bay of Biscay). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, ank.27.78abd. https://doi.org/10.17895/ices.advice.5922.

ICES. 2020i. Anglerfish (*Lophius budegassa, Lophius piscatorius*) in subareas 4 and 6, and in Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, anf.27.3a46. https://doi.org/10.17895/ices.advice.5926.

ICES. 2020j. White anglerfish (*Lophius piscatorius*) in Subarea 7 and in divisions 8.a–b and 8.d (southern Celtic Seas, Bay of Biscay). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, mon.27.78abd. https://doi.org/10.17895/ices.advice.5925.

ICES. 2020k. White anglerfish (*Lophius piscatorius*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, mon.27.8c9a. https://doi.org/10.17895/ices.advice.5924.

ICES. 2020l. Blue ling (*Molva dypterygia*) in subareas 6–7 and Division 5.b (Celtic Seas and Faroes grounds). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, bli.27.5b67. https://doi.org/10.17895/ices.advice.5819.

ICES. 2020m. Greater forkbeard (*Phycis blennoides*) in subareas 1–10, 12, and 14 (the Northeast Atlantic and adjacent waters). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, bsf.27.nea. https://doi.org/10.17895/ices.advice.5821.

ICES. 2020n. Saithe (*Pollachius virens*) in subareas 4 and 6, and in Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, pok.27.3a46. https://doi.org/10.17895/ices.advice.5830.

ICES. 2020o. Turbot (*Scophthalmus maximus*) in Division 3.a (Skagerrak and Kattegat). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, tur.27.3a. https://doi.org/10.17895/ices.advice.6102.

ICES. 2020p. Brill (*Scophthalmus rhombus*) in Subarea 4 and divisions 3.a and 7.d–e (North Sea, Skagerrak and Kattegat, English Channel). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, bll.27.3a47de. https://doi.org/10.17895/ices.advice.5832.

ICES. 2020q. Spurdog (*Squalus acanthias)* in subareas 1–10, 12, and 14 (the Northeast Atlantic and adjacent waters). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, dgs.27.nea. https://doi.org/10.17895/ices.advice.5820.

ICES. 2020r. Cod (*Gadus morhua*) in divisions 7.e–k (western English Channel and southern Celtic Seas). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, cod.27.7e–k. https://doi.org/10.17895/ices.advice.5892.

ICES. 2020s. Turbot (*Scophthalmus maximus*) in Subarea 4 (North Sea). *In* Report of the ICES Advisory Committee, 2020. ICES Advice 2020, tur.27.4. https://doi.org/10.17895/ices.advice.5914.

ICES. 2021a. Data for the OSPAR request to generate swept area and abundance index outputs—Data outputs Component 1. https://doi.org/10.17895/ices.data.8286.

ICES. 2021b. Data for the OSPAR request to generate swept area and abundance index outputs—Data outputs Component 2. https://doi.org/10.17895/ices.data.8287.

ICES. 2021c. Working Group on Beam Trawl Surveys (WGBEAM). ICES Scientific Reports, 3:46. 89 pp. https://doi.org/10.17895/ices.pub.8114.

ICES. 2021d. North Sea and Northeast Atlantic IBTS swept area calculation algorithms. DATRAS Procedure Document. 1.4 Swept Area based calculations, July 2021. Available at https://www.ices.dk/data/Documents/DATRAS/SweptAreaKm2_algorithm_document.pdf.

ICES. 2021e. Workshop on the production of swept-area estimates for all hauls in DATRAS for biodiversity assessments (WKSAE-DATRAS).ICES Scientific Reports. 3:74. 77 pp. https://doi.org/10.17895/ices.pub.8232.

ICES. 2021f. Ling (*Molva molva*) in Division 5.b (Faroes grounds). *In* Report of the ICES Advisory Committee, 2021. ICES Advice 2021, lin.27.5b. https://doi.org/10.17895/ices.advice.7788.

ICES. 2021g. Workshop on the production of abundance estimates for sensitive species (WKABSENS). ICES Scientific Reports. 3:96. 115 pp. https://doi.org/10.17895/ices.pub.8299.

ICES. 2021h. Workshop on Fish of Conservation and Bycatch Relevance (WKCOFIBYC). ICES Scientific Reports. 3:57. 125 pp. https://doi.org/10.17895/ices.pub.8194.

Moriarty, M., Greenstreet, S. P. R. and Rasmussen, J. 2017. Derivation of Groundfish Survey Monitoring and Assessment Data Products for the Northeast Atlantic. Scottish Marine and Freshwater Science, Vol. 8 No. 16: 240 pp. https://doi.org/10.7489/1984-1.

Recommended citation: ICES. 2021. OSPAR request to generate swept-area and abundance index outputs for all otter and beam trawl surveys in the Northeast Atlantic and regional seas based on DATRAS data as input to OSPAR common indicator. *In* Report of the ICES Advisory Committee, 2021. ICES Advice 2021, sr.2021.10. https://doi.org/10.17895/ices.advice.8300. The electronic data outputs can be accessed at https://doi.org/10.17895/ices.data.8286 and https://doi.org/10.17895/ices.data.8287.

Annex

OSPAR request to ICES

Requesting organisation	OSPAR
Committee making the request	BDC
Contact within Secretariat	Lena Avellan (lena.avellan@ospar.org)
Content contact person	Christopher Lynam, Maurice Clarke
Request announced	
Request received	[Completed by ICES - date]
Request question/ title	[clear and descriptive title or request title] Swept area and abundance index outputs for all otter and beam trawl surveys in the Northeast Atlantic and regional seas based on DATRAS data as input to OSPAR common indicators
Request code (client)	2021/x
Detail of request	[Articulate the question] ICES is requested to generate products from the DATRAS database that can be used by OSPAR in updating common indicator assessments for fish and foodwebs. The outputs need to be appropriate for use in OSPAR common indicators. Both component 1 and 2 below are requested, but if there is a need to prioritise component 1 is a priority and component 2 of secondary importance Component 1. Swept area estimates for all hauls in the DATRAS database a. A script (with 10 components) was developed to prepare the data for indicator assessments for the OSPAR IA2017. The relevant components of this script-package to infill missing data (on haul duration, trawl groundspeed, towed distance, depth, net opening, sweep length, and equations to determine Wingspread and Doorspread values) and quality check supplied depth and taxonomic records should be used to inform the outputs which ICES would prepare. The script repository is available here: https://github.com/MarineScotlandScience/MSFD-QA-GFSM-A-DP and this release has 10 assets: 10_kNN_Bio_DP_11-05-2017.R 7_Species_QA_09-05-2017.R 9_Baseline_Bio_10-05-2017.R 8_Haul_DP_02-05-2017.R 6_Haul_QA_13-04-2017.R 5_Define_Survey_Standards_13-04-2017.R 4_Cleaning_Raw_Data_10-04-2017.R 2_Loading_Data_06-04-2017.R Source code (zip) Source code (tar.gz) b. The indicators cover OSPAR Regions II, III and IV, and thus the outputs would need to address data from surveys in all these areas and, at the least, include those surveys and years of data listed in Table 1. Fields required for each survey (Table 2 and 3) would follow the example of the current dataproduct used by OSPAR. The "DATRAS Specification Document" should also be updated to include reference to the new dataproduct and fields. Any outputs that it would be possible to generate for Regions I and V would be welcome. The common indicators are not applied fully in these Regions (using only Rockall Bank and Porcupine Bank surveys in region V) see Table 1, however any information would be valuable for an overall QSR 2023 assessment. Table 1: Surveys considered in the OSPAR Groundfish Survey Assessment data products for IA2017 (from "Derivation of Groundfish Survey Monitoring and Assessment Data Products for the Northeast Atlantic Area" https://data.marine.gov.scot/sites/default/files//SMFS%200816.pdf)

Survey Acronym	Previous name(s)	Country	Years of Data	Vessels	Quarter	Gear Type	Subregion	Data Source
GNSIntOT1	Q1 IBTS	International	1983-2016	Multiple ships	1	Otter (GOV)	Greater North Sea	DATRAS
GNSIntOT3	Q3 IBTS	International	1998-2016	Multiple ships	3	Otter (GOV)	Greater North Sea	DATRAS
GNSFraOT4	FR CGFS	France	1988-2015	Thalassa II, Gwen Drez	4	Otter (GOV)	Greater North Sea	DATRAS
CSScoOT1	SWC Q1 IBTS	Scotland	1985-2015	Scotia II, Scotia III	1	Otter (GOV)	Celtic Seas	DATRAS
CSScoOT4	SWC Q3 IBTS	Scotland	1985-2015	Scotia II, Scotia III	4	Otter (GOV)	Celtic Seas	DATRAS
CSIreOT4	IE IGFS	Ireland	2003-2015	Celtic Explorer	4	Otter (GOV)	Celtic Seas	DATRAS
CSNIrOT1	Q1 NIGFS	Northern Ireland	1992-2015	Corystes	1	Otter (ROT)	Celtic Seas	NDB 92-07, DATRAS 08-15
CSNIrOT4	Q4 NIGFS	Northern Ireland	1992-2015	Corystes	4	Otter (ROT)	Celtic Seas	NDB 92-07, DATRAS 08-15
CS/BBFraOT4	EVHOE	France	1997-2014	Thalassa II	4	Otter (GOV)	Celtic Seas, Bay of Biscay	DATRAS (Cors. NDB)
BBIC(s)SpaOT1	SP-ARSA	Spain	1993-2014	Cornide de Saavedra, F de P Navarro	1	Otter (BACA)	Bay of Biscay and Iberian Coast	NDB
BBIC(n)SpaOT4	SP-North	Spain	1990-2014	Cornide de Saavedra, F de P Navarro	4	Otter (BACA)	Bay of Biscay and Iberian Coast	NDB
BBIC(s)SpaOT4	SP-ARSA	Spain	1997-2014	Cornide de Saavedra, F de P Navarro	4	Otter (BACA)	Bay of Biscay and Iberian Coast	NDB
BBICPorOT4	PT-IBTS	Portugal	2001-2011	Capricornio, Noruega	4	Otter (NCT)	Bay of Biscay and Iberian Coast	DATRAS
WAScoOT3	Rockall	Scotland	1999-2015	Scotia II, Scotia III	3	Otter (GOV)	Wider Atlantic	DATRAS
WASpaOT3	PS-PORC	Spain	2001-2014	Vizconda de Eza	3	Otter (PBACA)	Wider Atlantic	DATRAS
GNSNetBT3	BTS	The Netherlands	1987/1996-2015	Isis, Tridens II	3	Beam (8m)	Greater North Sea	DATRAS
GNSEngBT3	BTS	England	1990-2015	Carhelmar, Corystes, Endevour	3	Beam (4m)	Greater North Sea	DATRAS
GNSGerBT3	BTS	Germany	2002-2015	Solea I, Solea II	3	Beam (7m)	Greater North Sea	DATRAS
CSEngBT3	BTS/VIIa	England	1993-2014	Corystes, Endevour	3	Beam (4m)	Celtic Seas	DATRAS

Table 2 Sampling information in new product (from "Derivation of Groundfish Survey Monitoring and Assessment Data Products for the Northeast Atlantic Area" https://data.marine.gov.scot/sites/default/files//SMFS%200816.pdf)

Field		Unit	Description
HaulID	A27		Unique haul identifier (SurveyAcronym/Ship/Year/HaulNo)[1] (*H*)
Survey-Acronym	A13		Unique survey identifier (SubregionCountryGearTypeQuarter: e.g. GNSNedBT3)
Ship	A4		Unique vessel identifier (e.g. SCO3: *Scotia* III)
GearType	A4		Unique gear type code (BT = Beam Trawl, OT = Otter Trawl)
Gear	A6		Unique gear code (e.g. GOV = Grande Oerverture Verticale)
YearShot	S		Year that gear was shot[2]
MonthShot	S		Month that gear was shot[2]
DayShot	S		Day that gear was shot[2]
TimeShot	S	GMT	Time that gear was shot (in format HHMM)[3]
HaulDur(min)	S	min	Duration of fishing operation[4]
ShootLat(decdeg)	N	Deg.	Latitude in decimal degrees of the haul shoot position[5]
ShootLong(decdeg)	N	Deg.	Longitude in decimal degrees of the haul shoot position[5]
ICESStSq	A12		ICES statistical rectangle where gear was shot
SurvStratum	A12		Stratum tag for stratified surveys[6]
Depth(m)	N	m	Depth tag assigned to the haul[7]
Distance(km)	N	km	Tow distance[8] ($d_{H,TOW}$)
WingSpread(m)	N	m	Mean distance between the wings during fishing operation[9,12] ($d_{H,WING}$)
DoorSpread(m)	N	m	Mean distance between the doors during fishing operation[10,13] ($d_{H,DOOR}$)
NetOpen(m)	N	m	Mean head-line height above seabed during fishing operation[11,14] ($d_{H,HEIGHT}$)
WingSwptArea(sqkm)	N	km^2	Area of seabed swept by the net[15] ($A_{H,WING} = d_{H,TOW} \times d_{H,WING}$)
WingSwptVol_CorF	N		Multiplier ($1 / d_{H,HEIGHT}$): converts to 'density by wing-swept volume'[16]
DoorSwptArea_CorF	N		Multiplier ($d_{H,WING} / d_{H,DOOR}$): converts to 'density by door-swept area'[17]
DoorSwptVol_CorF	N		Multiplier ($d_{H,WING} / (d_{H,DOOR} \times d_{H,HEIGHT})$): converts to 'density by door-swept volume'[18]

Table 3 Biological information in the new product (from "Derivation of Groundfish Survey Monitoring and Assessment Data Products for the Northeast Atlantic Area" https://data.marine.gov.scot/sites/default/files//SMFS%200816.pdf)

	<table><tr><th>Field</th><th>Unit</th><th>Description</th></tr><tr><td>HaulID</td><td></td><td>Unique haul identifier (SurveyAcronym/Ship/Year/HaulNo)[1] (*H*)</td></tr><tr><td>SpeciesSciName</td><td></td><td>Unique species name for each species sampled across the NE Atlantic[2] (*S*)</td></tr><tr><td>FishLength(cm)</td><td>cm</td><td>Integer numbers indicating fish length to the 'cm below'[3] (*L*)</td></tr><tr><td>IndivFishWght(g)</td><td>g</td><td>Estimated weight of individual fish of specified species and length[4] ($W_{S,L}$)</td></tr><tr><td>Number</td><td></td><td>Total number of fish of specified species and length in the catch[5] ($N_{S,L,H}$)</td></tr><tr><td>DensAbund(N_sqkm)</td><td>km^{-2}</td><td>Abundance density estimate[6,8] ($D_{nos,S,L,H} = N_{S,L,H} / A_{H,WING}$)</td></tr><tr><td>DensBiom(kg_Sqkm)</td><td>kg km^{-2}</td><td>Biomass density estimate[7,8] ($D_{biom,S,L,H} = (N_{S,L,H} \times W_{S,L}) / A_{H,WING}$)</td></tr></table> Component 2: Annual estimates of abundance of all species identified as sensitive in the current list from WGBIODIV 2020. This should be split into two: c. Estimates from existing ICES assessments enter as 3rd party assessments (including reference points) d. Where no ICES assessments currently exist, survey based indices should be available as ICES data products.
Data Outputs	[Completed by OSPAR Data Team – Expected data outputs/location/format] A new public dataproduct available at: https://datras.ices.dk/Data_products/Download/Download_Data_public.aspx that contains swept area estimates by haul for every otter and beam trawl survey with complete data available on DATRAS
Supplementary information	[Supplementary information to assist in the interpretation of the advice; e.g. for an advice request to review a report or publication, provide the list of authors to ICES to avoid proposed reviewers having any conflicts of interest.] Further detail on the Derivation of Groundfish Survey Assessment Data Products are available here: https://data.marine.gov.scot/sites/default/files//SMFS%200816.pdf and here "Manual for Version 3 of the Groundfish Survey Monitoring and Assessment Data Product" https://data.marine.gov.scot/sites/default/files//SMFS%200818_0.pdf https://data.marine.gov.scot/dataset/manual-version-3-groundfish-survey-monitoring-and-assessment-data-product CEMP Guideline: Combined guideline for the common indicators FC1, FC2, FC3 and FW3 for fish and foodwebs (OSPAR Agreement 2018-05) [https://www.ospar.org/documents?v=38999] The latest assessments of the relevant indicators were conducted for the OSPAR Intermediate Assessment 2017 and are available in OAP. Additional notes on the scripts designed to derive the OSPAR dataproduct are available on the github release page: https://github.com/MarineScotlandScience/MSFD-QA-GFSM-A-DP/releases/tag/V3
Intended use of the request output	The outputs will be used to update the common indicators FC1, FC2, FC3, FW3 for the QSR 2023. These indicator assessments are planned to be completed during an OSPAR workshop to be hosted in Bremerhaven, Germany (date tbc, anticipated in June 2021). In the long-term, this advice request would be a step towards enabling regular updating of OSPAR indicators based on information held in DATRAS.
Planning ICES	[completed by ICES]
Request (budget) accepted	[completed by ICES]
ICES contact person	[completed by ICES]

WG(s) involved	[completed by ICES]
Preparation timing	[completed by ICES]
Review group	[completed by ICES]
Advice drafting group	[completed by ICES]
ACOM WebEx	[completed by ICES]
Release date	[completed by ICES]