Resolution approved on ACOM-SCICOM approval forum 23 April 2021

WKSAE-DATRAS - Workshop on the production of swept area estimates for all hauls in DATRAS for biodiversity assessments

2020/WK/EOSG05 The **Workshop on the production of swept area estimates for all hauls in DATRAS for biodiversity assessments** (WKSAE-DATRAS), chaired by Kai Wieland*, Denmark, will be established and meet online 31 May–4 June 2021 to:

a) Harmonize the selection on surveys and time series available in DATRAS for biodiversity assessments by:
    i. Checking and validating the calculations of missing data of the variables related to the swept-area effort estimates by some countries/countries in need;
    ii. Proposing common strategies to reduce missing data in the crucial variables for biodiversity assessments;
    iii. Defining common calculations, when possible, across surveys and countries, and perform a quality check against the observations from the most recent year(s);
    iv. Building on previous work (WKSABI) to define species groups for which the swept-area estimates should be based on door spread or wing spread and those for which swept-area may not be used;
b) Develop a script to calculate swept-area indices for biodiversity assessments;
c) Calculate swept-area indices and create a data product as input to OSPAR common indicators for fish and food webs;
d) Update the DATRAS calculation document to include reference to the new data product and fields used for biodiversity assessments.

In the first part of the workshop, national experts and members of survey groups together with the ICES Data Centre will work to clean up the data (obtain and validate missing algorithms) for the agreed NE Atlantic bottom and beam trawl surveys and time series (see Table 1 in supporting information).

WKSAE-DATRAS will report [day][month] 2021 for the attention of the Advisory Committee and the Ecosystem Observation Steering Group.

Supporting information

Priority	High, in response to a special request from OSPAR to provide swept area outputs for all otter and beam trawl surveys in the North East Atlantic and regional seas based on DATRAS. The outputs of this workshop will feed directly into the ICES advisory process and the advice will be used by OSPAR to update the common indicators FC1, FC2, FC3, FW3 for the QSR 2023.

Scientific justification

Data from groundfish surveys intended to sample commercial fish species populations to support formal stock assessments under the European Union's Common Fisheries Policy (CFP) can also be used to monitor and assess the status of the broader fish community to support the implementation of ecosystem-based management (EBM).

A suite of indicators has already been developed (see: OSPAR IA 2017 for methods) that require swept-area (tonnes per km^2) including the Large Fish Indicator for demersal fish, Typical Length of fish communities, Mean Maximum Length of fish communities, and Mean Trophic Level of marine predators. This workshop focuses on the generation of swept area indices to support OSPAR common indicators for fish biodiversity (FC1, FC2, FC3) and foodwebs (FW3). Central to this will be agreement on time series and surveys to be included and develop a script package that can fill in missing data.

The following supporting material is provided to guide implementation of ToRs a-e:

Term of Reference a)

Standard data collected on the selected surveys from Table 1 will include the fields in Table 2 and Table 3.

Table 1. Surveys considered in the OSPAR Groundfish Survey Assessment data products for IA2017 that will inform Tor a) (from "Derivation of Groundfish Survey Monitoring and Assessment Data Products for the Northeast Atlantic Area" in 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

ICES performs a quality check of the data before it is accepted and incorporated in the database for data from 2004 onwards. Some survey time series extend back to the 1960s and this historic data have not been subject to the same level of quality control. WKSAE_DATRAS will develop swept area estimates for data from 2004 onwards and discuss potential adjustments and work required to include data before 2004 at a later stage.

With regards to the status of data available, WKSAE_DATRAS will evaluate progress with data cleanup and algorithm development for the estimation of missing values for the different surveys initiated back in 2013 (IBTSWG 2013) with the support of the ICES Data Centre and propose common strategies to reduce missing data in the crucial variables.

Scientific justification (continued)

The tables below will inform the fields required for each survey:

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

Field	Unit	Description
HaulID		Unique haul identifier (SurveyAcronym/Ship/Year/HaulNo)[1] (*H*)
SpeciesSciName		Unique species name for each species sampled across the NE Atlantic[2] (*S*)
FishLength(cm)	cm	Integer numbers indicating fish length to the 'cm below'[3] (*L*)
IndivFishWght(g)	g	Estimated weight of individual fish of specified species and length[4] ($W_{S,L}$)
Number		Total number of fish of specified species and length in the catch[5] ($N_{S,L,H}$)
DensAbund(N_sqkm)	km^{-2}	Abundance density estimate[6,8] ($D_{nos,S,L,H} = N_{S,L,H} / A_{H,WING}$)
DensBiom(kg_Sqkm)	kg km^{-2}	Biomass density estimate[7,8] ($D_{biom,S,L,H} = (N_{S,L,H} \times W_{S,L}) / A_{H,WING}$)

Term of Reference b)

The data collected comprises the number of each species of fish sampled in each trawl, measured to defined length categories. By dividing these species catch numbers-at-length by the area swept on each sampling occasion, the catch data are converted to standardised estimates of fish density-at-length, by species, at each sampling location i.e the data product. The DATRAS Specification Document will be updated with output product information, other methodologies, quality standards:

https://www.ices.dk/data/Documents/DATRAS/NS-IBTS_swept_area_km2_algorithms.pdf

Term of Reference c)

A script (with 10 components) was developed to prepare the data for indicator assessments for OSPAR IA2017. The script repository is available here:

https://github.com/MarineScotlandScience/MSFD-QA-GFSM-A-DP

The relevant components of this script package to fill in missing data will be used as a basis for developing an R script according to ICES processes and standards with agreement among the workshop participants.

Term of Reference d)

WKSEA_DATRAS will use the latest FlexFile data product from DATRAS download. FlexFile data product is the combination of exchange file and swept area parameter. The FlexFile contains the calculated wing spread, door spread, and distance for those data where this parameter is missing.

Resource requirements	ICES Data Centre, Secretariat and the advisory process.
Participants	The participation should reflect the diverse scientific competence needed to fulfil the objectives of the workshop. If requests to attend exceed the meeting capacity available, ICES reserves the right to allocate participants based on the experts' relevant qualification. Participation of stakeholders is not committed.
Secretariat facilities	Remote meeting assistance will be facilitated for the dates of the workshop. Also, assistance from the ICES Data Centre and Advisory Department will be provided.
Financial	Covered by OSPAR special requests to ICES.
Linkages to advisory committees	Direct link to ACOM.
Linkages to other committee or groups	EGs coordinating surveys in DATRAS (IBTSWG, BIFS, WGMAL, WGNSSK, WGCSE, WGBEAM).
Linkages to other organizations	OSPAR.