

## Data Science and Technology Steering Group EGs Resolutions

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## **Draft Resolutions to be approved**

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### **Working group on machine learning in marine science (WGMLEARN)**

*Expected to be submitted after October 2021 meeting; approval will be sought on the resolutions forum.*

## Resolutions approved in 2021

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### The Workshop on Estimation of Rare Events (WKRARE)

**2021/2/DSTSG04** The **Workshop on Estimation of Rare Events (WKRARE)** chaired by Kotaro Ono\* (Norway) and Ana Cláudia Fernandes\* (Portugal), will meet in Lisbon (possibility for hybrid format) on 3-7 Oct 2022 to:

- a) Explore estimation methods for rare events that can be used to estimate discards and incidental bycatch of rare species ([Science Plan Codes: 3.2 and 3.3](#))
- b) Test the above methods using a simulation framework. ([Science Plan Codes: 3.2 and 3.3](#))
- c) Apply the above methods to contrasting case studies brought to the workshop by participants and discuss outcomes. ([Science Plan Codes: 3.2 and 3.3](#))

WKRARE will report by 31 Dec 2022 (via WGCATCH) to the attention of the DSTSG, ACOM and SCICOM.

### Supporting Information

Priority	This workshop is considered to have a high priority for already established and new commercial fishery and survey sampling programmes. The estimation and documentation of rare-event discards or bycatch obtained from different sampling programs has often been overlooked. There is a growing interest in having information about total removals to detect and manage impacts on stocks and ecosystems and contribute to the long-term sustainability of the fisheries. This interest also overlaps with current ICES effort to move to a more transparent framework for estimating catch parameters (including bycatch), and the development of this workshop has specifically been requested by two ICES working groups: WGCATCH and WGBYC. Indeed, WKRARE can contribute to the objectives of ICES Roadmap for bycatch advice (section 5 i); development of new estimation methods). The aims of this workshop will be to document, test and apply existing methods for estimating rare events, giving also space for improvements, and discuss the outcomes of the different methodologies, and provide tools that can be used in the future.
Scientific justification	Statistically sound sampling schemes are important to obtain fisheries data that reflects the population of interest and thus allow estimation procedures that result in estimates that are approximately unbiased. When sufficient data for a target species is available the estimates for that species are usually considered reliable to use in fishery monitoring. However, for bycatch species that are caught infrequently, the sample sizes may be too small to lead to usable estimates and the increase in the sampling effort required to improve estimates could be infeasible in practice. So for those bycatch species, fishery scientists and ecologists often must make inferences from data with many zero values and high variance. The analysis of such zero-heavy data sets brings unique challenges that are not always met (e.g. not accounting for excess zeros, using models with inappropriate assumptions, methods suitability not fully explored), resulting in biased estimates and incorrect conclusions. The objective of achieving unbiased estimates with reasonable precision for rare-events of bycatch species considerably motivates the effort towards the use of more appropriate analyses, like model-based approaches, to estimate bycatch of rare species as they can potentially provide more accurate results, also reducing the uncertainty. This workshop will document and evaluate existing estimation methods to deal with the above-mentioned issues through the use of simulations. The simulation framework will be based on a spatially explicit population dynamics model coupled with vessel dynamics as in Thorson et al. (2017). The input parameters of the models can be changed to mimic a variety of rare-events scenario. Another objective is to be a hands-on workshop where participants are involved in the application and testing of the methods presented. This will be a substantial step towards a more transparent framework for estimating discard/bycatch of rare species in fisheries data.
Resource requirements	Participants will be requested to bring national examples of data (e.g commercial or survey data) in pre-defined formats (example data format will be sent prior to the meeting), for performing the analyses during the workshop.

	Possible IT resources required for international virtual meeting.
Participants	The target attendance are participants from ICES member countries who are involved in analysis of commercial catch or survey data and are interested in deriving catch estimates for rare species. Participants should have substantial experience in R-scripting and/or statistical survey/catch estimation methods. Possibility of attendance in an hybrid format (i.e. mix of physical/online attendance).
Secretariat facilities	ICES will provide SharePoint access and ICES Secretariat support.
Financial	EU Member States may fund this through their EMFF programme
Linkages to advisory committees	ACOM, SCICOM, DSTSG
Linkages to other committees or groups	WGCATCH, WGBYC, WGRDBESGOV, WGRDBES-EST.
Linkages to other organizations	Regional Coordination Groups, General Fisheries Commission for the Mediterranean

### Working Group on Technology Integration for Fishery-Dependent Data (WGTIFD)

**2021/FT/DSTSG03** The **Working Group on Technology Integration for Fishery-Dependent Data (WGTIFD)**, co-chaired by Brett Alger (United States) and Lisa Borges (Portugal) will work on Terms of Reference (ToRs) and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2022	1) 7-9 June (sub-group meeting) 2) 17-21 October (main meeting)	1) Lisbon, Portugal 2) Galway, Ireland	Interim report by 15 <sup>th</sup> January 2023 to DSTSG	
Year 2023	Oct/Nov 2023	TBD	Interim report by 15 <sup>th</sup> January 2024 to DSTSG	
Year 2024	Oct/Nov 2024	TBD	Final report by 15 <sup>th</sup> January 2025 to DSTSG	

### ToR descriptors

ToR	DESCRIPTION	BACKGROUND	<a href="#">SCIENCE PLAN CODES</a>	DURATION	EXPECTED DELIVERABLES
a	Define vocabulary across electronic technologies (ETs) for fisheries dependent data collection, and develop communication strategies for attracting participation in ET programs	There are a range of terms and applications for ETs, and challenges with gaining participants in ET programs. We developed a glossary of terms in 2019 and examined incentives for attracting participants, this TOR would be a continuation of those previous efforts.	4.1, 4.5	Ongoing	List of updated terms and a communication strategy

b	Inventory the various applications of ETs for reporting and monitoring with an aim to improve collaboration across TIFD members and national fisheries monitoring programs	This TOR will serve as a repository to continually document new and existing ET programs, ETs in development, objectives of the schemes under which they are deployed for management, science, and control, what data are being collected and by whom.	4.1, 4.5	Ongoing	Inventory of various ETs and implementation of ETs in national reporting and monitoring programs
c	Evaluate risks/benefits of ETs across different fisheries and provide specific guidance on developing monitoring tools for specific types of fisheries (e.g., small scale, mid-water trawl, bottom trawl)	New electronic monitoring (EM) programs are being considered in the EU and US across a variety of fishery types. This TOR will examine the current data collection and monitoring approach in specific fisheries (e.g., North Sea pelagic trawl), and utilizing the experience of WGTIFD members, provide guidance of how to develop an EM program.	3.1 3.5, 4.4	Ongoing	Guidelines and best practices on developing monitoring tools for specific types of fisheries
d	Develop and publish a standardized format for data collected and analyzed from EM systems, to include a framework of documenting how the data is collected and flows into the ICES data system to be considered for science advice	This TOR would look to align data collected from EM systems with the ICES data framework, using the data profiling tool, and approval process of integrating new data for science advice. TIFD would develop a draft data format, and consider using a specific EM program's data as a case study to develop a pathway for new EM programs to provide data to ICES.	4.2, 5.1	Year 1-3	Data specification standard in Year 1, Guidelines for integrating EM data into ICES data systems for providing science advice in Year 3
e	Provide guidance and best practices on drafting Statements of Work for different types of EM programs	Governments and their associated monitoring programs often utilize Request for Proposals (RFPs), Statements of Work (SOWs), Call for Tenders (CFT) and other forms of soliciting private companies for products and services. Across the EU and US, this often means that the same set of EM providers are providing responses to RFPs, SOWs, and CFTs that lack specificity and clarity. This TOR will consider different EM program designs and provide recommendations for standardizing RFPs, SOWs and CFTs across the EU and US.	3.1	Year 2	Templates of RFPs, SOWs, CFTs etc. that governments and monitoring programs can use to solicit products and services for the development of an EM pilot project or program.

f	Provide recommendations on how to utilize EM for monitoring bycatch of protected, endangered and threatened species (PET) in different fisheries	Most stock assessments for protected and endangered species remain poor due to the limited availability of information. This has started to impact seafood import/export, by requiring countries to better document their fishery impacts on PET bycatch. It is expensive to deploy observers for rare events, and it remains challenging to use EM for monitoring PET bycatch in some fisheries. This TOR would examine the data gaps for assessing bycatch and provide recommendations for implementing EM to collect and analyze data for PET bycatch monitoring	3.1, 3.2, 6.2	Year 2	Best practices and recommendations for designing a data collection program using EM for protected and endangered species
g	Develop and publish recommendations for interoperability of EM systems, raw data, and other appropriate guidance for ensuring that EM systems and programs can integrate across governance, fisheries, and EM systems	Raw file types and data collected from EM systems are diverse, making it difficult for programs to utilize multiple EM providers or for governance to exchange information. This TOR will improve the interoperability of information collected from EM systems and include coordination with EM service providers	3.1, 4.1	Year 3	Standardized interchange format and exchange process of raw information collected from EM systems.

### Summary of the Work Plan

	The completion of our TORs will be dependent on the mode of our meetings, in-person, virtual, or hybrid. Because TIFD has become such a large group, spread across 10 or more time zones, there are certain TORs more suitable for dedicated in-person meetings vs others more appropriate for virtual meetings. We intend on developing intercessional meetings to focus on specific TORs, to supplement progress made in the annual meetings, as a way to mitigate the loss of in-person meetings.
Year 1	Produce an annual overview of the working group's progress
Year 2	Produce an annual overview of the working group's progress
Year 3	Produce a final report on the working group's progress and completed TORs.

### Supporting information

Priority	Fisheries stakeholders, managers, and scientists are looking to improve the timeliness, quality, cost effectiveness, and accessibility of fishery-dependent data by integrating technology into fishery reporting and monitoring programs. Remote electronic monitoring (REM), electronic reporting (ER), and other data collection tools have clear potential to meet these challenges. We believe that ICES can provide a forum for exchanging information to share relevant technical applications and policy development to harmonize how data is collected and used for fisheries management and science.
Resource requirements	Each participant of the working group is expected to provide their own travel resources, however, with the expectation of needing to host hybrid meeting (virtual and in-person), ICES may need to provide some resources to allow for remote participants.
Participants	The development and implementation of electronic technologies is a growing topic of interest, with programs in every Region in the United States and the EU. We reached over 60 members in the first 3 years of the working group, we expect that it could grow.
Secretariat facilities	None.
Financial	No financial implications.

Linkages to ACOM and group under ACOM	Data Science and Technology Steering Group
Linkages to other committees or groups	WGMLEARN, WGCATCH, WGFAST, PGDATA WGSFD, WKSEATEC, WKDSG, ICES Data Centre, DIG
Linkages to other organizations	

### Working Group on SmartDots Governance (WGSMART)

**2021/FT/DSTSG02** The **Working Group on SmartDots Governance**<sup>1</sup> (WGSMART), chaired by Karen Bekaert (2022–2024) (Belgium) and Julie Coad Davies (2022) (Denmark) and TBD (2023–2024) will meet intersessionally, 4 times per year via WebEx and physically once per year, to work on ToRs and generate deliverables as listed in the Table below.

	<u>WEBEX MEETING DATES</u>	<u>MEETING DATES AND VENUE</u>	<u>REPORTING DETAILS</u>	<u>COMMENTS (CHANGE IN CHAIR, ETC.)</u>
<b>Year 2022</b>	1) 10 February 2) 21 April 3) 8 September 4) 1 December	24-25 October ICES headquarters	E-evaluation	Julie Coad Davies to chair
<b>Year 2023</b>	1) 9 February 2) 13 April 3) 7 September 4) 30 November	24-25 October ICES headquarters	E-evaluation	XXX to chair
<b>Year 2024</b>	1) 1 February 2) 11 April 3) 12 September 4) 28 November	22-23 October ICES headquarters	Final report by TBD to DSTSG	XXX to chair

WGSMART will report on its activities by the March SCICOM meeting the following year to DSTSG and DIG.

### ToR descriptors

<u>TOR</u>	<u>DESCRIPTION</u>	<u>BACKGROUND</u>	<u>SCIENCE PLAN CODES</u>	<u>DURATION</u>	<u>EXPECTED DELIVERABLES</u>
<b>a</b>	Oversee the evaluation of user feedback related to maintenance and developments and advise on the interpretation and prioritisation of recommendations and requests addressed to WGSMART	SmartDots is an operational tool that aims to improve the overall quality of biological data delivered to assessment EG's. The tool is operational and an integral part of the ICES QAQC for aging many fish species for which ICES provides advice, a procedure largely under	3.1, 4.1	3 years/ Generic ToR	A prioritised list of SmartDots related expert group recommendations with a proposed annual work plan to address issues and implement maintenance and improvements to SmartDots.

<sup>1</sup> <http://ices.dk/marine-data/tools/Pages/smardots.aspx>

		the guidance of WGBIOP. Evaluation and prioritisation of recommendations and requests will be an ongoing task.			
<b>b</b>	Oversee the implementation of development requests addressed to WGS MART	Developments are ongoing with all SmartDots modules and based on user requirements and feedback. WGS MART will implement these developments in line with recognised quality assurance procedures.	3.1, 4.1	3 years/Generic ToR	Additional software modules with features designed in accordance with recognised quality assurance procedures.
<b>c</b>	Elaborate a forward plan for the sustainability of SmartDots as a platform	To achieve a continuous quality, SmartDots needs to be developed in line with end users needs. This development requires an input of resources; knowledge, expertise, manpower and funding over a period of time which extends beyond the initial phase. A workplan with clear objectives and milestones can only be successfully implemented when the availability of such resources is clear.	4.4, 3.6	3 years/ Generic ToR	A workplan outlining what resources are required for development, support, training and dissemination of relevant information. An estimated budget including identified funding resources.
<b>d</b>	Oversee development of user guidance and training in SmartDots	As SmartDots develops overtime a range of users will require various levels of training including step by step user manuals, tutorials and possibly workshops. Documentation of guidelines and procedures in line with WGBIOP will also be necessary. Outreach activities will be required.	3.1, 4.1	3 years/ Generic ToR	Annually updated training documentation. Workshops with specific goals proposed and planned where necessary. Relevant fora for dissemination investigated and outreach activities planned.



### Summary of the Work Plan

In addition to the ongoing maintenance and improvements by the end of year three we aim to have; maturity and ichthyoplankton modules available in the software with user interfaces that match the age reading module but with module specific features, the corresponding data output and reporting modules fully operational, user manuals updated in line with all developments made.

<b>Year 1</b>	ToR a) and b) will be addressed in quarterly WebEx meetings. ToR c) and d) will be discussed during WGBIOP and addressed at the annual meeting.
<b>Year 2</b>	ToR a) and b) will be addressed in quarterly WebEx meetings. ToR c) and d) will be discussed during WGBIOP and addressed at the annual meeting.
<b>Year 3</b>	ToR a) and b) will be addressed in quarterly WebEx meetings. ToR c) and d) will be discussed during WGBIOP and addressed at the annual meeting.

### Supporting information

<b>Priority</b>	
<b>Resource requirements</b>	A commitment of time from the members of the group consistent with progressing actions identified in the quarterly meetings
<b>Participants</b>	Chair of WGBIOP needs to be an active member, one member from each country from the core development group (BE, DK, NO), ICES Secretariat as hosts of International SmartDots, other WGBIOP and WGALES members as need be.
<b>Secretariat facilities</b>	Community Sharepoint site, Remote meeting facilities
<b>Financial</b>	No financial implications
<b>Linkages to ACOM and groups under ACOM</b>	This is an integral component to the overall Quality Assurance framework (of Advice) that ACOM together with the Coordination group are describing
<b>Linkages to other committees or groups</b>	There is a very close working relationship with WGBIOP. There is a strong linkage to DIG as the main umbrella for data/software governance structures.
<b>Linkages to other organizations</b>	EU Commission has partially funded SmartDots and is therefore following its progress, GFCM in the Mediterranean also has interest in this system

### Working Group on the Joint Cetacean Data Programme (WGJCDP)

2021/FT/DSTSG01 A Working Group on the Joint Cetacean Data Programme (WGJCDP), chaired by Nikki Taylor\*, United Kingdom, will work on ToR and generate deliverables as listed in the Table below.

JCDP information: <https://jncc.gov.uk/our-work/joint-cetacean-data-programme/>

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2022	April/May	TBC (covid-dependant)	Interim report by date to DSTSG ( <i>tbd</i> )	To follow the WGMME, a start-up meeting to adopt the ToR and workplan for the group
Year 2023	February/March	TBC (covid dependant)	Interim report by date to DSTSG ( <i>tbd</i> )	

Year 2024	February/March	To coordinate with the WGMME	Final report by <i>date</i> to DSTSG
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### ToR descriptors

TO R	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
	This should capture the objectives of the ToR	Provide very brief justification, e.g. advisory need, links to Science Plan and other WGs	Use codes ( <i>max 3 per ToR</i> )	1, 2 or 3 years	Specify what is to be provided, when and to whom
a	Establish a governance framework, setting out a forward-looking plan for JCDP, including responsibilities, priorities, processes, and resources	The governance group will be responsible for oversight of the JCDP; proactively maintaining dataflow in and out of the JCDP, and ensuring the supporting information in the ICES portal and web hub remains current and supports the JCDP objectives.	3.2; 3.5	Ongoing	Publication and public launch of the JCDP Data Portal Web hub (currently hosted by JNCC)
b	Review the JCDP data holdings in terms of standardisation, data quality and number of datasets, with regards to production of high-quality outputs using the ICES governance evaluation.	The Group will be responsible for the reputation of the JCDP, ensuring standardised, quality assured data are held within the JCDP and the database becomes a widely used high-quality data source.	3.5	Annual	Report on the number of survey datasets submitted and the number of contributing organisations. Governance evaluation template
c	Identify proactive methods of promotion of the JCDP Data Standard across data collectors involved, and those not yet engaged with the JCDP to drive standardisation and subsequent compatibility for analyses.	The JCDP Data Standard has been developed to improve the standard of data across all data collectors, and enable collation of existing and new datasets to facilitate access of these data to increase the evidence base.	3.2; 3.5; 3.6	Ongoing	Publication and launch of new and updated data products derived from JCDP datasets
d	Development of analyses and data products derived from the JCDP to contribute to assessment and reporting requirements and research and policy priorities, as agreed by the Group, and in collaboration with WGMME.	The JCDP aims to standardise and mobilise data from multiple sources to improve capacity to complete robust analyses of trends in abundance and distribution, in support of commitments to reporting under OSPAR, ACSOBANS, EU Directives and National	4.2; 6.1; 6.4	Ongoing	Annual reporting on the use of and publication from the JDCP dataset

		legislative needs.			
e	Review use of the JCDP datasets, provide a platform for end user feedback and promote high-quality science	The JCDP aims to be a source of high-quality outputs, either developed by the governance group or by other users. A watching brief of data uses, and promotion of good examples will support the reputation of the JCDP and assist with growth into a globally renowned resource.	3.6	Ongoing	End-user feedback platform Annual reporting on the use of and publication from the JCDP dataset

### Summary of the Work Plan

Year 1	Formation of the governance group; review of the JCDP objectives and strategy; adoption of the WGJCDP ToR; review of JCDP data holdings; development of analyses and data product plans based on identified need with partner groups such as WGMME; OSPAR; ASCOBANS and other end users.
Year 2	Critical review of the progress against project objectives; development and dissemination of data outputs; further development of data analyses and products.
Year 3	Critical review of the progress against project objectives; updating, development and dissemination of data outputs. Further development of data analyses and products.

### Supporting information

Priority	The activities of this Group will lead development of analyses and data products from the growing JCDP dataset, to answer research and policy questions regarding trends in cetacean abundance and distribution. The group will champion standardisation and mobilisation of data in support of innovative analyses to underpin high-priority assessment and reporting need across the North-East Atlantic region and beyond.
Resource requirements	The group will require some support from the ICES secretariat in facilitating meetings and communication.
Participants	The Group will likely be attended by approx 20–25 members and guests.
Secretariat facilities	Provision and support of communication services such as WebEx, as required.
Financial	No financial implications.
Linkages to SCICOM and groups under SCICOM	SCICOM is the parent committee and this Group will communicate with SCICOM as required, where opportunity to support SCICOM requests are apparent.
Linkages to other committees or groups	There will be a very close working relationship with WGMME, and to a lesser degree, WGBYC where relevant.
Linkages to other organizations	Given the data holdings, it is expected there will be close links with other organisations such as OSPAR, NAMMCO and ASCOBANS in terms of data exchange and communication regarding analysis and data product requirements.

## Resolutions approved in 2019/2020

### Working Group on Fisheries Acoustics, Science and Technology (WGFAST)

**2019/FT/EOSG09** A Working Group on Fisheries Acoustics, Science and Technology (WGFAST), chaired by J. Michael Jech, USA, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2020	22 April	Online meeting	Interim report by 22 May 2020 to ACOM-SCICOM	Michael Jech takes over as chair
Year 2021	19-23 April	Online meeting	Interim report by 30 June 2021 to ACOM-SCICOM	
Year 2022	25-28 April	Dakar, Senegal	Final report by 30 June 2022 to ACOM-SCICOM	

### ToR descriptors

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
a	Collate information on acoustic related research and surveys, and interactions with ecosystem and assessment expert groups.	a) Science Requirements b) Advisory Requirements A summary of the information will be presented in the final report	3.1, 3.2, 3.4	3	
b	Review presented recent work within the topics: “Acoustic methods to characterize populations, ecosystems, habitat, and behaviour”; “Acoustic characterization of marine organisms”; and “Emerging technologies, methodologies, and protocols”. Provide guidance by identifying: (1) where training opportunities could be developed; and (2) gaps in knowledge and challenges that should be prioritized by the community.	Create a venue for informing the group members on recent activities and seeking input to further development. An overview of the different contributions and guidance will be presented in the annual report	3.3, 4.1, 4.4	1, 2, 3	
c	Organize a conference session on integrating fisheries acoustics with ecosystem assessment		3.1, 3.2, 4.1	2 or 3	

	and monitoring at an international scientific meeting such as ASC.				
<b>d</b>	Develop, and maintain acoustic metadata and data format conventions and coordinate with acoustic survey groups.	Data format conventions for acoustic metadata and data are required for efficient data interchange and processing of acoustic data, but are lacking in the fisheries acoustics field. CRR 341 (2018) and SISP 4 (2016) have partially addressed this need, but further types of data and acoustic equipment need to be supported.	3.2, 3.5, 4.2	1, 2, 3	Updated metadata convention publication (new guide/handbook series)  Revised sonar-netcdf4 convention publication that includes echosounder data (new guide/handbook series)
<b>e</b>	Develop and recommend procedures for collecting and processing quality acoustic data in inclement weather.	Acoustic data are collected from a variety of vessels that respond to inclement weather in diverse ways. Procedures are needed to provide quality control for data collected in inclement weather to stock assessment.	3.3, 3.6	1	CRR; recommendations on methodology improvements to acoustic survey coordination groups to implement on surveys and update SISPs

### Summary of the Work Plan

<b>Year 1</b>	Produce the annual overview of recent developments within the field. Produce an ICES CRR recommending procedures for collecting and processing quality acoustic data in inclement weather. Develop and maintain metadata and acoustic data formats.
<b>Year 2</b>	Produce the annual overview of recent developments within the field. Propose a conference session at an international scientific meeting. Develop and maintain metadata and acoustic data formats.
<b>Year 3</b>	Produce the annual overview of recent developments within the field. Collate information on acoustic related research and surveys. Develop and maintain metadata and acoustic data formats. Publish new guides with updated metadata convention and revised sonar-netcdf4 convention publication that includes echosounder data.

### Supporting information

<b>Priority</b>	Fisheries acoustics and complementary technologies provide the necessary tools and methods to implement the ecosystem approach to fisheries management within ICES and research into their application and further development is vital.
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<b>Justification for venue 2022 (in non-ICES member country)</b>	WGFAST has a long and rich history of collaborating with our West African partners, and hosting a meeting in Senegal will facilitate the participation of scientists from Africa (particularly West Africa and the south Mediterranean area), improve the exchange of science and communication on Fisheries Acoustics, Science and Technology between European and African colleagues, and promote the UN Ocean decade initiative. We expect to recruit several new members to WGFAST and even at higher levels, gain new "observatory" countries for ICES in Africa.
<b>Resource requirements</b>	No new resources will be required. Having overlaps with the other meetings of the Working, Planning, Study and Topic Groups increases efficiency and reduces travel costs.
<b>Participants</b>	The Group is normally attended by some 60-100 members and guests.
<b>Secretariat facilities</b>	None.
<b>Financial</b>	No financial implications.
<b>Linkages to ACOM and groups under ACOM</b>	Stock assessment groups using acoustic abundance indices.
<b>Linkages to other committees or groups</b>	The work in this group is closely aligned with complementary work in the FTFB Working Group. The work is of direct relevance to a number of data collection and coordination groups within EOSG (e.g. WGIPS, WGBITS, WGISUR)
<b>Linkages to other organizations</b>	The work of this group is closely aligned with similar work in FAO, the Acoustical Society of America, the South Pacific Regional Fisheries Management Organization, the Commission for the Conservation of Antarctic Marine Living Resources, and the American Fisheries Society.

### Working Group on DATRAS Governance (WGDG)

**2019/FT/EOSG06** The **Working Group on DATRAS Governance (WGDG)**, chaired by Ingeborg de Boois, Netherlands, will meet by web conference, four times per year and may also meet physically once per year, to work on ToRs and generate deliverables as listed in the Table below.

	<b>Meeting dates</b>	<b>Venue</b>	<b>Reporting details</b>	<b>Comments (change in Chair, etc.)</b>
Year 2020	26 September 2019 17 December 2019 <b>18+25 May 2020</b>	Online meetings Copenhagen, Denmark (during DIG)	E-evaluation	
Year 2021	10 November 2020 28 January 2021 <b>20 April 2021</b>	Online meetings	E-evaluation	
Year 2022	22 September 2021 21 January 2022 <b>19 May 2022</b>	Online meetings Copenhagen, Denmark (during DIG)	Final report by 30 June to DSTSG and DIG	

## ToR descriptors

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
a	Further evolve the framework on the governance of DATRAS	DIG had provided a governance framework to review a database in the broadest sense of the word. Transparency about the status of the ICES databases is crucial to maintain and improve the quality of the databases and the data.	3.2, 4.1, 4.2	Generic ToR	A functional and efficient framework with clear responsibilities and tasks for the governance of DATRAS.
b	Oversee and advise on the interpretation and prioritisation of recommendations from expert groups addressed to DATRAS	Three different groups (IBTSWG, WGBIFS, WGBEAM) currently provide the survey information directly to DATRAS, and some groups use the DATRAS format as a starting point for data submission (e.g. WGIPS). Overview of the general issues and developments is crucial to maintain the system effectively.	3.2, 4.1, 4.2	Generic ToR	A table of prioritised requests from data providers and data users for consideration by the data centre for improvements and updates to the data services on trawl and litter data based on the ICES data infrastructure.
c	Facilitate common functionality in terms of data providers and data user across different surveys to improve upload efficiency and allow broader perspectives (covered by more than one survey) can be effectively addressed.	Alignment over the surveys will facilitate automation processes at the submitter's side, and provide the opportunity to increase the information provided in the sets that have been in DATRAS from the start.	3.2, 4.1, 4.2	Generic ToR	
d	Provide a platform for end user feedback to the DATRAS system, as well as feedback on the outcomes of those suggestions.	A database filled by a significant number of institutes and used by many people and (stock) assessment groups needs to be kept up to date with respect to user requirements without ad-hoc solutions for everyone.	3.2, 4.1, 4.2	Generic ToR	Links to TOR b providing the input for that task in future.

### Summary of the Work Plan

<b>Year 1</b>	Work on all terms of reference in four 1.5 hour skype meetings, provide oral report to data and information group (DIG)
<b>Year 2</b>	Work on all terms of reference in four 1.5 hour skype meetings, provide oral report to data and information group (DIG)
<b>Year 3</b>	Work on all terms of reference in four 1.5 hour skype meetings, provide oral report to data and information group (DIG), evaluate the relevance and functioning of the group

### Supporting information

<b>Priority</b>	High. WGDG works to align DATRAS for the different surveys, evaluate the database for the Data and Information Group (DIG) and oversee future development of DATRAS. These tasks are well aligned with ICES strategic plan to continue to build our capacity and expertise in managing, analysing, and interpreting data to support science and advice.
<b>Resource requirements</b>	A commitment of time from the members of the group consistent with progressing actions identified in the quarterly meetings
<b>Participants</b>	Members of ICES Data Centre involved in DATRAS developments, chair with a direct link with (=participating in) DIG, representatives of survey groups submitting data to DATRAS (currently WGBIFS, IBTSWG, WGBEAM)
<b>Secretariat facilities</b>	Community Sharepoint site, Remote meeting facilities.
<b>Financial</b>	No financial implications.
<b>Linkages to ACOM and groups under ACOM</b>	This is an integral component to the overall Quality Assurance framework (of Advice) that ACOM together with the Coordination group are describing
<b>Linkages to other committees or groups</b>	There is a very close working relationship with the fish trawl survey groups. There is a strong linkage to DIG as the main umbrella for data/software governance structures.
<b>Linkages to other organizations</b>	No

### Working Group on Recreational Fisheries Surveys (WGRFS)

2019/2/EOSG07 The **Working Group on Recreational Fisheries Surveys (WGRFS)**, chaired by Estanis Mugerza\*, Spain, and [chair]\*, [country], will work on ToRs and generate deliverables as listed in the table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2020	15–19 June 2020	Online meeting	Interim report by 01 November 2020 to EOSG	Keno Ferter's 3 year term as chair ends. Incoming chair in 2021: Estanis Mugerza
Year 2021	14–18 June 2021	Online meeting	Interim report by 01 November 2021 to DSTSG	Kieran Hyder's 3 year term as chair ends. Incoming chair in 2022: TBD
Year 2022	13–17 June 2022	TBD	Final report by 01 November 2022 to DSTSG	



## ToR descriptors

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
<b>a</b>	Collate and review quality of national estimates of recreational catch and effort, catch-and-release impacts, and socio-economic benefits for candidate stocks, identify significant data gaps in coverage and species, and support the ICES TAF.	Most countries are engaged in data collection. This activity collates national participation, catch and socio-economic data sets together, understands the quality of data, and highlights where new data are needed. This is important for supporting the ICES TAF.	5.4	Regular activity in each year, with specific intersessional tasks to develop new approaches.	Report WG perspectives and publication of scientific papers
<b>b</b>	Assess the validity of traditional knowledge, new survey designs, novel methods (e.g. citizen science, apps), and innovative statistical methods for data provision.	Recreational data can be collected in many ways, with different associated biases. This supports improvement of analysis of existing surveys and understanding the utility of new methods. This will lead to the most robust and broad evidence-base to underpin assessment and advice.	3.1, 3.2, 3.3, 3.6, 4.1, 4.3, 5.4	Regular activity in each year	Report WG perspectives and publication of scientific papers
<b>c</b>	Provide guidance to ICES and respond to ad hoc requests from ACOM on the availability of data, design of data collection programs, data storage systems, use of data in assessments, and catch allocation.	Recreational catches are not included in many assessments and data collection is limited to a few species. This activity supports data collection requirements, access to data and methods needed. This will facilitate embedding recreational fisheries into fisheries management.	3.1, 3.2, 3.3, 3.6, 5.1	Regular activity in each year, with specific intersessional tasks to develop new approaches.	Report WG perspectives and publication of scientific papers
<b>d</b>	Develop approaches for regional data collection programmes that generate robust data for end users and support the ICES TAF.	Regionalisation is an important goal, but implementation is unclear. This is a challenge for recreational fisheries due to the different actors, gears and survey instruments. This will underpin generation of transparent and robust regional data to support end users needs.	3.1, 3.2, 3.3, 3.6,	Regular activity in each year.	Report WG perspectives and publication of scientific papers

e	Evaluate the use of economic (e.g. impact, valuation), social (e.g. governance, behaviour, welfare, health), and communication (e.g. participatory process, messaging) to support the assessment and management of recreational fisheries.	Recreation fisheries have broad benefits and behavioural responses are difficult to predict due to diverse motivations. Hence, understanding of the human dimension is needed. This develops understanding of the data and methods needed for comanagement to ensure engagement in the process.	7.1, 7.4, 7.6	Regular activity in each year, with specific intersessional tasks to develop new approaches.	Report WG perspectives and publication of scientific papers
f	Review outcomes of the workshops organized by the group.	Recreational fisheries is a diverse topic, so not all aspects can be addressed at WGRFS. A number of workshops on specific topic have been done (e.g. WKHDR) or are in the workplan (e.g. inclusion in assessment). This reviews outcomes of the workshops and the implications for recreational fisheries.	5.4, 7.1, 7.4	Activity-dependent on workshop	Report WG perspectives and publication of scientific papers

### Summary of the work plan

Year 1	<ol style="list-style-type: none"> <li>1) Establish intersessional groups and leads within WGRFS to progress key tasks including governance, survey design, quality and analysis, regional coordination, data storage, catch-and-release impacts, novel methods, assessment and catch allocation, human dimensions, and communication. (a, b, c, d, e)</li> <li>2) Plan at least three WGRFS publications within the period 2020-22. (a, c, e, f)</li> <li>3) Update the existing quality assessment tool (QAT) and embed this in the TAF (a,d).</li> <li>4) Evaluate the quality of up to three national survey programmes using the QAT. (a)</li> <li>5) Investigate animal welfare issues related to recreational fisheries (e.g. catch and release) and identify how these could impact management. (a)</li> <li>6) Assess the impact of recreational fisheries on a broad range of stocks using data from the pilot studies. (a, c, d)</li> <li>7) Create a framework for inclusion of recreational data in stock assessments and scope a workshop to design approaches. (a, c, d)</li> <li>8) Collate advances in survey methods that could be used to improved national approaches. (b)</li> <li>9) Develop a solution for storage of data within RDBES and agree with ICES. (c, d, f)</li> <li>10) Review existing governance structures and develop understanding of 'world class' recreational fisheries management that could be embedded in a future revision of the CFP. (e)</li> <li>11) Review outcomes from WKHDR and agree approach for inclusion of angler behaviour in future surveys. (f)</li> </ol>
Year 2	<ol style="list-style-type: none"> <li>1) Evaluate the outcomes from the intersessional work and agree approach for the next year. (a, b,</li> </ol>

	c, d, e, f)
	<ol style="list-style-type: none"> <li>2) Review national programmes including assessment of quality of up to three programmes and provide feedback on tasks requested by ICES. (a)</li> <li>3) Assess the potential of novel survey methods to deliver recreational fisheries data (e.g. citizen science approaches, smartphone apps, traditional knowledge). (b)</li> <li>4) Develop a framework for allocation of catches between sectors based on a review of existing systems and provide best-practice guidance. (c,d)</li> <li>5) Develop MSE approaches to assess the impact of uncertainty in recreational catches on assessment and regional sampling programme. (d).</li> <li>6) Review and share methods for engaging with stakeholders and the potential for participatory approaches. (e)</li> <li>7) Assess outcomes of workshop on inclusion of recreational data in stock assessments. (f)</li> </ol>
Year 3	<ol style="list-style-type: none"> <li>1) Evaluate the outcomes from the intersessional work and agree approach for the next year. (a, b, c, d, e)</li> <li>2) Review national programmes including assessment of quality of up to three programmes and provide feedback on tasks requested by ICES. (a)</li> <li>3) Evaluate post-release mortality estimates, potential sublethal effects, and reasonable extrapolations across species and fisheries for inclusion in stock assessments. (a)</li> <li>4) Assess novel approaches for surveys (e.g. combining probabilistic and non-probabilistic sampling) and analysis methods (e.g. treatment of outliers, machine learning). (b)</li> <li>5) Assess the potential for impact of climate change on species caught by recreational fisheries and how that could impact on DCF and regional species requirements. (c, d)</li> <li>6) Review the potential for food safety and human health issues from consumption of recreational caught fish (e.g. environmental toxins). (e)</li> <li>7) Evaluate progress against three year plan and develop new ToRs. (a, b, c, d, e, f)</li> </ol>

### Supporting information

Priority	High—the biological, social and economic impact of recreational fisheries is becoming increasing recognised and needs to be included in the fisheries assessment and management processes.
Resource requirements	None.
Participants	The WG is normally attended by around 40 members and chair-invited experts.
Secretariat facilities	Normal backstopping support in the organization of the group.
Financial	None.
Linkages to ACOM and groups under ACOM	ACOM, WGBFAS, WGEEL, WGBAST, WGCSE, WGNSSK, WGBIE, WGMEDS, and benchmarks workshops for stocks that have recreational catches.
Linkages to other committees or groups	PGDATA, WGCATCH,.
Linkages to other organizations	<ul style="list-style-type: none"> <li>• EC, STECF, Regional Coordination Groups, Advisory Councils.</li> <li>• WECAFC/OSPESCA/CRFM/CFMC/MEDAC Working Group on Recreational Fisheries.</li> <li>• Many linkages to (inter)national angling associations, since WGRFS members estimate national marine recreational catches.</li> <li>• Links to broader organizations with interests in angling and fisheries management including EIFACC and FAO.</li> </ul>

### Working Group on the Acoustic Trawl Data Portal Governance (WGAcousticGOV)

**2019/FT/EOSG15** The Working Group on Acoustic Trawl Data Portal Governance (WGAcousticGov), chaired by Ciaran O'Donnell (Ireland), will meet by web conference, four times per year and may meet physically once per year, to work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2020	14 September & 10 December	Online meetings	E-evaluation	
Year 2021	1) 25 February - Q1 2) 20 May - Q2 3) 23 September - Q3 4) 9 December - Q4	Online meetings	E-evaluation	
Year 2022	1) 22 February - Q1 2) 27 May - Q2 3) 27 September – Q3 4) December - Q4	Online meetings	Interim report by September to DSTSG	

WGAcousticGov will report on its activities by the March ACOM and SCICOM meetings in the form of a business report the following year to DSTSG and WGFAST.

### ToR descriptors

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
<b>a</b>	Establish a governance framework setting out a forward looking plan, including objectives of the Acoustic Trawl Data Portal, responsibilities, processes and resources.	In order to successfully develop and maintain a workplan for the Acoustic Trawl Data Portal, it is necessary to first establish a vision for the future supported by guidelines on project management, handling of feedback, task prioritisation and expected resource availability.	3.2, 4.1, 4.2	3 years/ Generic ToR	The WGAcousticGov manifesto: Mission statement on the direction of the Acoustic Trawl Data Portal development and overarching short to medium terms goals. Guidelines on how to prioritise Definition of resources available Definition of responsibilities.
<b>b</b>	Provide a platform for end user feedback to the the Acoustic Trawl Data Portal according to the groups guidelines.	The Acoustic Trawl Data Portal should be developed to meet the requirements of end users and thus needs to be responsive to user feedback.	3.2, 4.1, 4.2	3 years/ Generic ToR	A github site to allow users to submit feedback and requests. Provide an annual workplan, with an

		To achieve a long-term stability, availability and quality, the Acoustic Trawl Data Portal development requires a workplan with clear objectives and milestones. This can only be successfully implemented when resource requirements have been estimated and the availability of resources is known.			agreed and prioritised list of Acoustic related expert group recommendations along with suggested resource allocation, budget estimates and feasibility estimates.
c	Coordinate and advise on the interpretation and prioritisation of recommendations, the groups guidelines and requests addressed to the Acoustic Trawl Data Portal.	The project planning cycle needs to be responsive (more than one meeting a year) in order to the Acoustic Trawl Data Portal development effectively. Although there is an annual plan, short term priorities must be evaluated against resource availability and needs of the ICES advice processes that vary through the year.	3.2, 4.1, 4.2	3 years/ Generic ToR	
d	Coordinate the development of user guidance and training for the Acoustic Trawl Data Portal.	As the Acoustic Trawl Data Portal develops over time a range of users will require various levels of training including step by step user manuals, tutorials and workshops. Documentation of guidelines and procedures will also be necessary. Outreach activities will be required.	3.2, 4.1, 4.2	3 years/ Generic ToR	Annually updated training documentation. Workshops with specific goals proposed and planned where necessary. Relevant fora for dissemination investigated and outreach activities planned.

**Summary of the Work Plan**

<b>Year 1</b>	First meeting to establish ToRs a) and b) will be conducted via WebEx and followed by subsequent quarterly WebEx meetings in 2020 dealing with ToR c) and d). First physical meeting has not been determined and will most likely not take place in 2020 due to COVID-19 travel restrictions.
<b>Year 2</b>	ToRs c) and d) will be addressed in quarterly WebEx meetings, with the potential annual meetings intended to coincide with WGFASST for prioritising ToR b), with potential review of ToR a).

<b>Year 3</b>	ToRs c) and d) will be addressed in quarterly WebEx meetings, with the potential annual meetings intended to coincide with WGFAST for prioritising ToR b), with potential review of ToR a).
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### Supporting information

<b>Priority</b>	High priority
<b>Resource requirements</b>	No additional resource requirement for ICES. A commitment of time from the members of the group consistent with progressing actions identified in the quarterly meetings
<b>Participants</b>	Survey planning groups; WGIPS, WGBIFS, WGACEGG, WGIDEEPS, expert groups WGFAST and WGFTFB and assessment working groups; WGWIDE, HAWG and WGHANSA. One or more members from each WG representing data providers, data users and relevant expert groups. ICES Secretariat and other related EG members as need be.
<b>Secretariat facilities</b>	Community Sharepoint site, Remote meeting facilities
<b>Financial</b>	No financial implications
<b>Linkages to ACOM and groups under ACOM</b>	This is an integral component to the overall Quality Assurance Framework (of Advice) that ACOM together with the Coordination group are describing
<b>Linkages to other committees or groups</b>	There is a strong linkage to DIG as the main umbrella for data/software governance structures.
<b>Linkages to other organizations</b>	NOAA via participation by members of WGFAST have expressed interest in joining the group system.

### Working Group on Spatial Fisheries Data Governance (WGSFDGOV)

**2019/FT/HAPISG08** A Working Group on Spatial Fisheries Data Governance (WGSFDGOV), chaired by Christian von Dorrien, Germany, will be established and will meet 4 times per year via WebEx and may meet physically once per year in association with DIG, to work on ToRs and generate deliverables as listed in the Table below.

	<b>WEBEX Meeting dates</b>	<b>Meeting dates and Venue</b>	<b>Reporting details</b>	<b>Comments (change in Chair, etc.)</b>
<b>Year 2020</b>	1) 4 February - Q1 2) 28 May - Q2 3) 2 September - Q3 4) 10 December - Q4	Online meetings	E-evaluation	
<b>Year 2021</b>	1) 25 February - Q1 2) 23 June - Q2 3) 3 September - Q3 4) 9 December - Q4	Online meetings	Interim report to DIG and DSTSG	
<b>Year 2022</b>	1) 21 January - Q1 2) 28 June - Q2 3) TBD - Q3 4) TBD - Q4	Dates and venue as DIG	Final report by DATE to DIG and SCICOM	

**ToR descriptors**

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
a	Establish a governance framework setting out a forward looking plan, including objectives of the Acoustic Trawl Data Portal, responsibilities, processes and resources.	In order to successfully develop and maintain a workplan for the Acoustic Trawl Data Portal, it is necessary to first establish a vision for the future supported by guidelines on project management, handling of feedback, task prioritisation and expected resource availability.	3.2, 4.1, 4.2	3 years/ Generic ToR	The WGAcousticGov manifesto: Mission statement on the direction of the Acoustic Trawl Data Portal development and overarching short to medium terms goals. Guidelines on how to prioritise Definition of resources available Definition of responsibilities.
b	Based on the guidelines established in ToR A: Provide a platform for user feedback to the VMS and Logbook DB. Feedback will be compiled by WGSpatialFisheriesDataGov and appropriate actions to be taken with assigned responsibilities and resource requirements will be listed and prioritised.	The VMS DB should develop to meet the requirements of a broad range of users and thus needs to be responsive to user feedback. Feedback will be collected and organised using GitHub and the traditional recommendations system from ICES reports. To achieve a long-term stability, availability and quality, the VMS and Logbook DB development requires a workplan with clear objectives and milestones. This can only be successfully implemented when resource requirements have been estimated and the availability of resources is known.	4.2, 5.4	3 years/ Generic ToR	A GitHub site allowing users to submit feedback and requests. Provide an annual workplan, with an agreed and prioritised list of VMS DB related EG recommendations along with suggested resource allocations, budget estimates and feasibility estimates.
c	Using the guidelines established in ToR A and the feedback captured in ToR B: Oversee and advise on the interpretation and prioritisation of recommendations and	The project planning cycle needs to be responsive (more than one meeting a year) in order to manage the the VMS and Logbook DB development effectively. Although there	3.2, 3.5,	3 years/ Generic ToR	Establish and maintain a project board on GitHub to manage tasks. Review project plan and agree on tasks to be completed.

	requests addressed to the VMS and Logbook DB.	is an annual plan, short term priorities must be evaluated against resource availability and needs of the ICES advice processes that vary through the year.			Review new tasks for addition to the workplan, or for consideration for the next annual workplan.
<b>d</b>	Oversee development of data submitter guidance and training for VMS and Logbook DB.	Data submitters require various levels of training including step by step user manuals, tutorials and workshops. Maintenance of documentation of guidelines and procedures will also be necessary.	3.2, 3.5	3 years/ Generic ToR	Annually updated training documentation and workflow. Workshops with specific goals proposed and planned where necessary.

### Summary of the Work Plan

<b>Year 1</b>	First meeting to establish ToRs a) and b) will be a physical meeting to be followed by quarterly WebEx meetings dealing with ToR c) and d). First annual meeting intended to coincide with DIG for prioritising ToR b) and review of ToR a)
<b>Year 2</b>	ToRs c) and d) will be addressed in quarterly WebEx meetings, with the potential annual meetings intended to coincide with DIG for prioritising ToR b), with potential review of ToR a)
<b>Year 3</b>	ToRs c) and d) will be addressed in quarterly WebEx meetings, with the potential annual meetings intended to coincide with DIG for prioritising ToR b), with potential review of ToR a)

### Supporting information

<b>Priority</b>	High priority.
<b>Resource requirements</b>	A commitment of time from the members of the group consistent with progressing actions identified in the quarterly meetings.
<b>Participants</b>	DIG and WGSFD representatives, one member each representing data submission, data policy and data use. ICES Secretariat and other related EG members as need be.
<b>Secretariat facilities</b>	Standard (Sharepoint site, remote meeting facilities)
<b>Financial</b>	No financial implications.
<b>Linkages to ACOM and groups under ACOM</b>	This database is an integral component of many groups and products created by ICES EGs, such as Fisheries overviews, WKTRADE, WGBEDPRES, etc..
<b>Linkages to other committees or groups</b>	There is a strong linkage to WGSFD as the group which has coordinated the VMS and logbook data call and quality control of data submissions and products. There is also a strong linkage to DIG as the main umbrella for data/software governance structures.
<b>Linkages to other organizations</b>	OSPAR, HELCOM, RCG, NAFO.



### Working Group on Commercial Catches (WGCATCH)

2016/2/SSGIEOM23 A Working Group on Commercial Catches (WGCATCH), chaired by Estanis Mugerza (Spain) and Liz Clarke\* (UK), and will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2020	09-13 November	Online meeting	Interim report by 15 January to EOSG	Estanis Mugerza (Spain) is new co-chair for 2020-2022; Kirsten Birch Håkansson (Denmark) ends 3-yr term as chair; new co-chair will be appointed
Year 2021	8-12 November	Online meeting	Interim report by 15 January to DSTSG	Liz Clarke (UK) is new co-chair for 2021-2023.
Year 2022	To be determined	To be determined	Final report by 31 January to DSTSG	Estanis Mugerza (Spain) ends 3-yr term as co-chair; new co-chair will be appointed

### ToR descriptors

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
a	Review and update guidelines and best-practices for implementation of statistically sound catch sampling and estimation thereof.	<p>Many ICES member states are moving towards more probabilistic catch sampling designs. For consistent data use in time series it is necessary to document these changes and to update guidelines and procedures, particularly in regard to practical sampling issues that make a strict probabilistic approach unfeasible as demonstrated by case studies. The update will revise the survey designs classes for catch-sampling programs (WKPICS) in the light of the RDBES and couple it with basic design-based estimation.</p> <p>With ICES moving to a transparent framework for estimating catch parameters, and thereby putting more focus on estimation, good guidelines are needed to support this transition.</p> <p>There is also an increasing need to design commercial sampling programmes in multi-purpose context, to answer the multiple end-users needs. WGCATCH</p>	3.1, 3.2, 3.3, 3.5, 3.6	3 years	<ul style="list-style-type: none"> <li>Based on real case studies produce a Cooperative Research Report (CRR) with updated guidelines for on-shore and off-shore sampling of commercial catches (2022).</li> <li>Develop 3 workshops on estimation <ul style="list-style-type: none"> <li>Ratio estimations, WKRATIO (2021)</li> <li>Post-stratification, WKPOST (2021)</li> <li>Estimation of rare species or events, WKRARE (2022)</li> </ul> </li> <li>Based on WKRATIO produce a Cooperative Research Report (CRR) with best practice guidelines for choosing</li> </ul>

		<p>will continue to propose and endorse WK with the aim of a future optimization at national/stock/regional levels. WKRARE will be planned together with WGBYC.</p> <p>There are increasing examples of the use of other data sources (e.g. grading machines, EM technology) that could be used in estimation. Therefore, there is need to develop guidelines on how QA data and how to combine different data sources. This needs to be developed in cooperation with WGTIFD.</p>			and using ration estimators (2022)
<b>b</b>	<p>Review developments in sampling and estimation practices of catch, effort, length and age distributions and other biological parameters of small scale fisheries</p>	<p>WGCATCH continues to review developments for collection of transversal variables (landings, discards and PETS by species, fishing effort) and biological data, length and age distributions, other biological parameters) in small-scale fisheries (SSF) to ensure that the collection of fishing data from SSF across ICES member countries are sufficient, harmonised and comparable and to improve their effectiveness.</p> <p>During its term the WG will focus mainly on five? aspects: 1) evaluate the implementation of guidelines for transversal variables and continue the development of quality indicators and quality checking methodologies ; 2) document sampling effort and develop guidelines for biological data ( length and age distribution, other biological parameters) sampling on SSF; 3) knowledge-sharing on how to improve data collection for SSF (e.g. add a social dimension to understand how to improve data collection, assess the usefulness of sampling approaches, use of new technologies), 4) analysis of the catch fraction of the SSF to evaluate the impact in the populations of different target species and 5) continue to work</p>	3.1, 3.2, 3.3, 3.5, 3.6	3 years	<ul style="list-style-type: none"> <li>• Update and refine risk assessment for transversal data quality methodology developed in 2018/2019 (comparison with Large Scale Fleets and scientific estimates) – 2020</li> <li>• Document sampling effort of biological data on SSF – 2020</li> <li>• Develop guidelines for SSF biological data sampling. 2021-2022</li> <li>• Peer-review publication on SSF- 2020</li> <li>• Continue to develop best practices guidelines on sampling and census data for SSF transversal variables-and evaluate its implementation 2020-2022</li> </ul>

		on the proper integration of SSF data with their specificities into the RDBES database			
c	Review developments in sampling and estimation of incidental by-catch of Protected, Endangered and Threatened Species (PETS) and other rare species and ensure that database structures support the implementation of the appropriate estimation procedures.	The sampling and estimation of incidental catches of PETS and other rare species in commercial fisheries has been a long-term ICES concern. WGBYC and WGCATCH are two ICES EGs involved in data compilation and estimation of such rare events and impacts and have been collaborating closely to ensure that by-catch is properly sampled and estimated in national sampling programmes. To improve collaboration between the two groups, WGBYC members participated in the last WGCATCH meeting to reviewed best practices for sampling protocols for incidental by-catches. The <a href="#">roadmap for ICES bycatch advice</a> describes the science needs, and a path for ICES to strengthen its advice on incidental bycatch. WGCATCH has a important role in the roadmap by developing sampling protocols for estimating PET bycatch risk and by improving data availability and quality (e.g. through monitoring). Further work still to be developed particularly in relation to estimation procedures for rare species and ensure the incidental bycatches are included in the RDBES.	3.1, 3.2, 3.3, 3.5, 3.6	3 years	<ul style="list-style-type: none"> <li>• Continue to support RDBES development to ensure by-catch data is included in the RDBES (2020-2022). Annual reporting.</li> <li>• Review bycatch estimations of PETS and rare species by other expert groups (2020-2021). Annual reporting.</li> <li>• Report on - and support on board sampling practices at national institutes with regard to PETS (2020-2022). Annual reporting.</li> <li>• Report on - and support redesign of national databases with regard to PETS (2020-2022). Annual reporting.</li> <li>• Update the inventory of sampling programmes by ICES member countries where bycatches of protected, endangered, and threatened species (PETS) are recorded that was initiated at WKPETSAMP in 2018.</li> </ul>
d	Review and collaborate with SCRDB on design-based sampling and estimation.	The RDBES is the practical tool for ICES to ensure the quality and transparency of commercial catch data. WGCATCH has always supported the development of the RDB and now the RDBES. It's knowledge and expertise on the underlying sampling designs are critical to the appropriate use and implementation of the estimation procedures required by the ICES advisory process. The ICES Data Centre and SCRDB have requested 'WGCATCH to continue	3.2, 3.3, 3.6	Routine ToR	Address specific recommendations from the SCRDB and RDBES associated working groups

		advising RDBES development and ensuring the development encompasses statistically sound sampling schemes and proper methods of estimation’.			
e	Collaborate in the advisory process, liaising with assessment groups and benchmarks on commercial catch issues	Commercial catch data is a major input to ICES stock assessments. The accuracy of commercial catch data is highly dependent on the quantity and quality of the sampling and estimation carried by at national level and stock coordination level. WGCATCH is the ICES EG that deals with sampling design, estimation and quality of commercial catch data that is provided to the assessment process by the national authorities. It is a key-player in informing on the quality of the time series used and suggesting improvements to sampling and estimation methods. Over 2020-22, WGCATCH will work with the ACOM legacy groups and Fisheries Resources Steering Group (FRSG) to have a more active participation in the assessment and benchmark processes.	3.1, 3.2	Routine ToR	<ul style="list-style-type: none"> <li>Address specific recommendations from assessment expert groups in relation to commercial catch data to be used/ revised in future benchmarks</li> <li>Actively seek involvement in a review and updated of the current benchmark process for data compilation of commercial catch data, so these take recent WGCATCH findings into account</li> </ul>
f	Collaborate with other ICES groups dealing with other aspects of catch data (e.g., WGBIOP, WGRFS, PGDATA, WGTIFD, WGBYC), , RCGs (LM) and commercial catch focused external projects.	WGCATCH links with ACOM, SCICOM, EOSG, EGs under EOSG (e.g., PGDATA, WGBIOP, WGRFS) and the ICES secretariat to inform on guidelines on quality and quantity of catch data. WGCATCH further links and obtains information from research projects that address sampling and estimation of commercial catches	3.1, 3.2	Routine ToR	

### Summary of the Work Plan

YEAR 1	ToR a)	<ul style="list-style-type: none"> <li>Intersessional identify relevant topics   contents for commercial sampling guidelines and come up with a framework for having ready-available and updated</li> </ul>
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guidelines. Liase with PGDATA, RDBES core group and ICES data centre in the process and take the work done by former WK's into account

- Identify practical issues with sampling of commercial catches, focusing on sampling of unsorted catches (sampling of e.g. small pelagic, fish for reduction, fish pumped into factories and processors), start solving the issues and develop tools for identification of issues. Start to develop the guidelines based on these issues, solutions and tools.
- Agree on ToRs for the post stratification WK in 2021 (WKPOST).
- Review the R-packages developed for optimization of length and age data (in separate WK: WKBIOPTIM4) and discuss results at the meeting.

ToR b)

- Intersessional produce and complete the templates to document sampling effort of biological data on SSF. Extend the 2018 questionnaire to the large scale fisheries (LSF) and refine the risk assessment for transversal data quality methodology developed in 2018/2019, by including LSF in the risk assesment map and compare SSF and LSF status. Assess the differences between scientific estimate and control data.
- Document sampling effort of biological data on SSF
- Continue to develop best practices guidelines on sampling and census data for SSF for transversal variables and evaluate its implementation
- Following development of RDBES database and making recommendation for the proper integration of SSF data and their specificities into
- Peer review publication on SSF
- Annual chapter in report detailing work progress, next work-plan and deliverables

ToR c)

- Continue to support RDBES developments
- Report and support on board sampling practices at national institutes, including re-desing of national databases
- Initiate review of by-catch estimations of PETS/rare species by other expert groups

ToR d)

- Intersessional liase with PGDATA and ACOM to start the process of giving WGCATCH (as a proxy for commercial catches) a more active role in the assessment and benchmark processes.

ToR e)

- This ToR will be dealt with on a yearly basis by WGCATCH.

ToR f)

- This ToR will be dealt with on a yearly basis by WGCATCH.
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**YEAR 2**

ToR a)

- Continue updating and developing the guidelines for commercial sampling.
  - Identify issues with sampling designs, focusing on sampling of sorted landings on-shore (sampling of e.g. fish for human consumption sold at auctions and other landing sites), start solving issues and develop tools for identifying issues. Start to update and develop guidelines based on the issues, solutions and tools.
  - Intersessional indentify relevant topics | contents for guidelines on estimation of catch parameters and come up with a framework for having ready-avialable and updated guidelines. Liase with the RDBES core group take the work done by former WK's into account, including WGCATCH's estimation WK's in 2021 and former
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 RDBES WK's

- Review outcomes of WKRATIO and WKPOST. Start producing best practices for estimation

## ToR b)

- Develop guidelines for SSF biological sampling
- Continue to develop best practices guidelines on sampling and census data for SSF transversal variables-and evaluate its implementation
- Following development of RDBES database and making recommendation for the proper integration of SSF data and their specificities into
- Evaluate the use of geospatial data (e.g. GPS, AIS) to improve effort estimates and produce guidelines
- Annual chapter in report detailing work progress, next work-plan and deliverables
- Identify stocks for case-studies to analyse the length frequency between SSF and LSF

## ToR c)

- Continue to support RDBES
- Report on - and support on board sampling practices at national institutes, including re-designing of national databases
- Continue review of by-catch estimations of PETS species by other expert groups
- Intersessional liaison with WGBYC and draft ToRs for a WK that addresses estimation of rare things (e.g. species, events) (WKRARE, 2022) in the following year. Taking the review of present methods into account. Approve proposed ToR's at the meeting

## ToR d)

- Intersessional liaison with PGDATA and ACOM to start a process of giving WGCATCH (as a proxy for commercial catches) a more active role in the assessment and benchmark processes

## ToR e)

- This ToR will be dealt with on a yearly basis by WGCATCH.

## ToR f)

- This ToR will be dealt with on a yearly basis by WGCATCH.

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 YEAR 3

## ToR a)

- Continue updating and developing the guidelines for commercial sampling.
- Identify issues with sampling designs, focusing on sampling of sorted landings at-sea (e.g. observerserver programmes at-sea targeting fish for human consumption), start solving issues and develop tools for identifying issues. Update and develop guidelines based on the issues, solutions and tools.
- Continue updating and developing the guidelines for estimation, taking the work from WKRARE (2022) into account

## ToR b)

- Intersessionally produce and issue an informal data call for provision of length frequency data, from the stocks identified in previous meetings
  - Analysis on length frequency data from SSF and LSF and evaluate the relevance and impact of SSF data for the stock assessment
  - Develop guidelines for SSF biological sampling
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- Evaluate the use of geospatial data (e.g. GPS, AIS) to improve effort estimates and produce guidelines
  - Continue to develop best practices guidelines on sampling and census data for SSF transversal variables-and evaluate its implementation
  - Following development of RDBES database and making recommendation for the proper integration of SSF data and their specificities into
  - Annual chapter in report detailing work progress, next work-plan and deliverables

ToR c)

- Continue to support RDBES
- Report on - and support on board sampling practices at national institutes, including re-desing of national databases
- Review outcomes of WKRARE and update guidelines | best practice (from ToR a) in accordance

ToR d)

- Intersessional liase with PGDATA and ACOM to start the process of giving WGCATCH (as a proxy for commercial catches) a more active role in the assessment and benchmark processes.

ToR e)

- This ToR will be dealt with on a yearly basis by WGCATCH.

ToR f)

- This ToR will be dealt with on a yearly basis by WGCATCH.
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## Supporting information

Priority	WGCATCH supports the development and quality assurance of regional and national catch sampling schemes and estimation procedures that can provide reliable quality input data to stock assessment and advice, while making the most efficient use of sampling resources. As catch data are the main input data for most stock assessments and mixed fisheries modelling and an essential component of analysis of ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach, these activities are considered to have a high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resources required to undertake additional activities in the framework of this group is negligible. WGCATCH builds extensively on experiences gained within PGCCDBS, WKACCU, WKPRECISE, WKMERGE, WKPICS, SGPIDS, WGRFS and previous WGCATCH work in the period 2014-2019. European countries are encouraged to provide the WG with any requested documentation of their sampling programmes and manuals, estimation methods, quality assurance procedures, for review and feedback by the WG, and to ensure that their national members of WGCATCH have sufficient resources to conduct the necessary intersessional work to address the ToRs. The attendance of 1-2 top-level experts in the area of statistically sound sampling and estimation will be secured to review the quality of final outputs of WGCATCH.
Participants	The Group is normally attended by some 30–40 participants, including members, and chair-invited 1-2 external experts.

Secretariat facilities	None.
Financial	Member States may fund this through their EMFF programme. ICES may cover the attendance of reviewers.
Linkages to ACOM and group under ACOM	WGCATCH falls under the joint ACOM/SCICOM steering group on integrated ecosystem observation and monitoring (EOSG), and supports the ICES advisory process by promoting improvements in quality of fishery data underpinning stock-based and mixed fishery assessments, ecosystem indicators related to fishery affects, and in developing data quality indicators and quality reports for use by assessment EGs and benchmark assessments.
Linkages to other committees or groups	There is a very close working relationship with all catch-related EGs and end-users including WGBIOP (in relation to collection of stock-based biological variables from fishery catches), PGDATA (in relation to data requirements of stock assessment EGs and benchmark assessment groups, optimization of catch sampling programmes and communication of quality information on commercial catch data), WGBYC (in relation to the sampling design and estimation of PETS bycatch and other incidental by-catches), RCM/RCGs and the Liaison Meeting (e.g., in relation to data requirements and regional sampling designs), the SC-RDBES and the ICES Data Centre (in relation to RDBES issues), STECF EWGs dealing with EU-MAP and other legislative changes that impact catch sampling and JRC (in relation to data provision from commercial catch sampling programmes).
Linkages to other organizations	The work of this group is closely aligned with similar work in FAO, GFCM, CECAF, NAFO/NEAFC and in the Census of Marine Life Programme.

### Workshop on Operational Implementation of Stomach Sampling (WKOISS)

2020/WK/DSTSG[00] The **Workshop on operational implementation of stomach sampling** (WKOISS), chaired by Maria Cristina Follesa\*, Italy, and [new chair]\*, [country], will be established and meet in Cagliari, Italy, [00]–[00] June 2022 to:

- a) Analyse and discuss the results of the two pilot studies established during the previous WKSTCON (*Merluccius merluccius* for Mediterranean and *Psetta maxima* for Black sea); ([Science Plan codes](#): 1.7);
- b) Take into account the pilot studies results and other recent findings from stomach content studies (i.e. Atlantic and Mediterranean areas), select the best-suited methods/indices to fill in data gaps useful by example in the improvement of currently available ecosystemic models; ([Science Plan codes](#): 5.1, 5.2);
- c) Taking into account the RCG recommendations, review factors of variability in diet (ontogeny, time, space, etc.), prioritize the most relevant in terms of the effect on stock variability, and propose a sampling plan that takes it into account; ([Science Plan codes](#): 1.7; 3.2; 3.3);
- d) Taking into account WKBECOSS and RCG recommendations and WGSAM requirements, propose a standardized sampling scheme and selection method for species (or species groups) and objective of study to be included in stomach content, that could (1) take into account regional similarities and differences in species abundance and importance in community functioning and fisheries and (2) allow comparison between systems; ([Science Plan codes](#): 1.9; 3.1);
- e) Develop an appropriate stomach sampling manual (i.e. ATLAS in SmartDots) or guidelines for best practice; ([Science Plan codes](#): 1.5; 1.9);
- f) Review formats (e.g. ICES, DAPSTOM as listed in WKBECOSS) for stomach content data and their regional suitability; ([Science Plan codes](#): 3.1);



- g) Consider the development of an intercalibration approach that will allow the results obtained separately by several partners at the regional scale to be combined; ([Science Plan codes](#): 3.4; 6.3).

This workshop can be considered as a follow-up to WKSTCON held in Palma de Mallorca, Spain, in April 2018; WKBECOSS held in Santander, Spain, in September 2019; and the June 2020 RCG meetings.

WKOISS will report by [TBD] for the attention of DSTSG, ACOM, SCICOM, and WGBIOP.

### Supporting information

Priority	The EU Multi-Annual Programme (EU MAP) on Data Collection requests data on predator-prey relationships and planning for future data collection for each marine region. After the Workshop on Better Coordinated Stomach Sampling (WKBECOSS) in 2019, this meeting on the operational aspects for stomach contents is needed and is urgently to begin to organize the sampling of new biological data from 2020. Therefore, these activities are considered to have a high priority.
Scientific justification	The EU MAP provides a unique opportunity for the regular collection of diet data within fisheries research surveys. To ensure a homogeneous data set with suitable spatio-temporal coverage and make effective and efficient use of available resources, coordination of stomach sampling studies is essential. Stomach sampling is necessary to ensure that multi-species and ecosystem models remain relevant and to support MSFD descriptor 4 regarding the structure and functioning of food webs. This work could benefit the new research on the food web from the ecosystem models.
Resource requirements	None
Participants	Given its relevance to the ICES quality assurance, the workshop is expected to attract interest from the Mediterranean and Atlantic areas, ICES and GFCM. Participants will be experts from leading labs and universities working in stomach contents. The workshop will work closely with the newly formed RCG Intersessional subgroup on Stomach Sampling.
Secretariat facilities	None.
Financial	None.
Linkages to advisory and science committees	ACOM, SCICOM.
Linkages to other groups	WGBIOP, WGSAM, RCGs.
Linkages to other organizations	GFCM.

### Working Group on Governance of the Regional Database & Estimation System (WGRDBESGOV)

**2020/FT/DSTSG01** A Working Group on Governance of the Regional Database & Estimation System (WGRDBESGOV), chaired by Els Torrele\*, Belgium and Lucia Zarauz\*, Spain, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2020	1– 3 December	Online	Interim report by 1 Feb 2021 to DSTSG	
Year 2021	30 November – 2 December	Online	Interim report by 1 Feb 2022 to DSTSG	David Currie (Ireland) and Katja Ringdahl (Sweden) ends 3-yr term as chairs; Els Torreele (Belgium) and Lucia Zarauz (Spain) are new chairs for 2021-2023; This group used to be SCRDB and turned into WGRDBESGOV from 2020 onwards. However, Katja and David were chairs of SCRDB from 2018, and therefore, their 3-year terms ends before the 3-year resolution has run all three years.
Year 2022	1 June 1 September 28–30 November	Online Online ICES HQ, Copenhagen, Denmark	Final report by 1 Feb 2023 to DSTSG	

## ToR descriptors

TO R	DESCRIPTION	BACKGROUND	<a href="#">SCIENCE PLAN CODES</a>	DURATION	EXPECTED DELIVERABLES
a	Review the status of the development of the new commercial fisheries Regional Database & Estimation System (RDBES) and its project plan for implementation, including the funding of the outstanding development. Adjust the project plan as required. Oversee and advise on the interpretation and prioritisation of recommendations for the RDBES development. Identify user guidance and training required for RDBES users.	The commercial fisheries Regional Database & Estimation System (RDBES) will be extensively used by ICES member states, the EU Regional Coordination Groups, and ICES expert groups to store detailed commercial fisheries sample data. The RDBES is also intended to replace the current ICES Inter-Catch system so will also function as a database and estimation system for ICES Fisheries Advice. The RDBES is therefore a key development to support the ICES advisory process.	3.1, 3.2, 3.3	3 years	An up-to-date roadmap for the Regional Database & Estimation System (RDBES) developments describing when functionality will be available. The RDBES project plan is monitored and fulfilled. Recommendations for relevant workshops are made.
b	Provide a platform for user feedback to the Regional Database & Estimation System (RDBES). Appropriate	The Regional Database & Estimation System (RDBES) should develop to meet the requirements of a broad range of users	3.1, 3.2, 3.3	3 years / generic ToR	A public Regional Database & Estimation System (RDBES) GitHub site is maintained - this makes

	actions to be taken with assigned responsibilities and resource requirements will be listed and prioritised. Ensure that any required sub-groups (including the existing “Core group”) are created and function effectively whilst needed.	and thus needs to be responsive to user feedback.			the data model available, and provides a platform for users to raise and discuss issues. Sub-groups (such as the existing “Core group”) complete any required tasks (e.g. refining specifications and answering user queries) Recommendations from users are responded to.
c	Oversee and summarize how the existing commercial fisheries Regional Database (RDB) and the new Regional Database & Estimation System (RDBES) are used in the EU Regional Coordination Groups (RCGs), and ICES expert groups, along with any other uses. Where possible, share any outputs with other interested groups and users.	The aims of the new Regional Database & Estimation System (RDBES) include increasing the awareness of fisheries data collected by the users of the RDBES and the overall usage of these data. Therefor it is important to monitor how different users are using the data.	3.1, 3.2, 3.3	3 years / generic ToR	Summaries of the existing commercial fisheries Regional Database (RDB) and the new Regional Database & Estimation System (RDBES) data calls are published annually. Summaries of the use of RDB/RDBES data are published annually.
d	Review the data governance framework of the commercial fisheries Regional Database (RDB) and Regional Database & Estimation System (RDBES)	The Regional Database & Estimation System (RDBES) is intended to host data from multiple ICES member countries and EU member states. Different users will have different permissions (depending on their needs). Data governance of the RDBES is therefore a key topic to ensure that it can function in a secure and efficient manner.	3.1, 3.2, 3.3	3 years / generic ToR	Appropriate Regional Database (RDB) and Regional Database & Estimation System (RDBES) data governance policies are agreed and implemented

**Summary of the Work Plan**

Year 1 - 3	<p>An annual meeting will be held, as well as any inter-sessional work required, to work on the ToRs.</p> <p>ToR a)</p> <ul style="list-style-type: none"> <li>Review the Regional Database &amp; Estimation System (RDBES) project plan.</li> <li>Review feedback summaries from RDBES workshops (such as WKRDB-POP2, WKRDB-EST2, WKRDB-RAISETAF)</li> </ul>
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- Review results and feedback from the RDBES test data call.
  - Adjust the project plan as required.
- ToR b)
- Information on the public RDBES GitHub (<https://github.com/ices-tools-dev/RDBES>) site is kept up-to-date
  - Issues raised on the GitHub site are responded to in a timely manner
  - The “Core group” (and any other required sub-groups) meet as required to work effectively.
- ToR c)
- Review and summarise responses to the RDB/RDBES data calls
  - Determine which groups have used RDB/RDBES data during the year and, where possible, view any of their outputs based on RDB/RDBES data.
  - Review any feedback arising from those groups.
  - Ensure all data governance policies are being adhered to during data use.
  - Where possible, share outputs and code from the different users of RDB/RDBES data
- ToR d)
- Review the RDB/RDBES data policy and draft amendments if required
  - Review the “Conditions for detailed RDBES data use” document
  - Make any further changes required to the RDB/RDBES data governance policies and procedures
  - Ensure data governance will be suitable for using RDBES data within ICES stock assessment
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## Supporting information

Priority	The activities of this group will ensure the development of the commercial fisheries Regional Database and Estimation System, RDBES, whilst still maintaining the existing Regional Database (RDB) during the development period. The RDBES when it is implemented works as a database for the Baltic Sea, North Sea & Eastern Arctic, North Atlantic and Long Distance Fisheries Regional Coordination Groups (RCGs). The RDBES is also intended to replace the current ICES InterCatch system so it will also function as a database and estimation system for ICES Fisheries Advice. Consequently, these activities are considered to have a high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resources required to undertake additional activities in the framework of this group are negligible. Countries are encouraged to ensure that their national members have sufficient resources to conduct the necessary intersessional work to address the ToRs. For EU Member States, work within this WG can be funded under the Data Collection Framework (DCF)/European Maritime, Fisheries and Aquaculture Fund (EMFAF).
Participants	The Group is normally attended by some 20–25 members and guests.
Secretariat facilities	SharePoint and meeting room requirement.
Financial	No financial implications.
Linkages to ACOM and group under ACOM	There are no direct linkages with ACOM, but most of the stock assessment Working Groups will be impacted by the development of the RDBES.

Linkages to other committees or groups	There is a strong thematic link with groups including WGCATCH and WGBIOP. Since the RDBES will interact with the ICES Transparent Assessment Framework (TAF) there is also a close link with WGTAFGOV. It will also be relevant to other data governance groups under the new Data Science and Technology Steering Group (DSTSG).
Linkages to other organizations	The RDBES will support the work of the EU Regional Coordination Groups (RCGs).

### Working Group on the Governance of Quality Management of Data and Advice (WGQuality)

**2020/FT/DSTSG03** A Working Group on the Governance of Quality Management of Data and Advice (WGQuality), chaired by David Currie, Ireland, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2021	19-22 January	Online	Interim report by 1 <sup>st</sup> March 2021 to DSTSG	
Year 2022	18-20 January	Online	Interim report by 1 <sup>st</sup> March to DSTSG	
Year 2023	TBC	TBC	Final report by Date Month May to DSTSG	

### ToR descriptors

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
<b>a</b>	Analyse existing ICES quality management processes within advice production and evaluate their coherence with the objectives of the ICES advisory plan. In particular highlight any gaps and overlaps between different processes.	The concept of “quality” is cross-cutting and should be managed throughout a process. The ICES advisory plan highlights the first priority area for development is “Assuring Quality” - it states that quality assurance “encompasses the entire process from data collection to the publication of objective and independent advice”.	3.1, 3.2, 3.3	3 years	An evaluation of the existing quality processes and procedures within ICES.
<b>b</b>	Specify a fully operational ICES advisory quality management system that is in line with the scope	There is a recognition within ICES of the need for an end-to-end quality management system (QMS) to encompass best practice in data management, data integration, and translation into advice. A QMS is defined as	3.1, 3.2, 3.3	3 years	A draft ICES quality manual which will describe the overall approach to assuring the quality of assessment and advice within ICES. This will cover the quality assurance process from data collection to advice publication.

	and direction in the advice plan.	“...a formalized system that documents processes, procedures, and responsibilities for achieving quality policies and objectives”.			
c	Create and implement an internal communication plan to explain the quality management system, ensure effective feedback mechanisms to identify needed improvements and highlight existing good practice.	There is a large amount of activity in the ICES world focussing on data needs for assessment and advice. One of the major benefits of having a large number of expert groups, organisations, and individuals participating in this process is the high level of innovation displayed. However, the downsides of this can include a lack of knowledge about what other work is being done by other people and a lack of coordination in harnessing this work.	3.1, 3.2, 3.3	3 years	Quality assurance communication plan for the ICES network.
d	Use the quality management system to evaluate current activities.	Identify gaps and create a plan to fill them. Prioritise issues, identify unnecessary duplication of activities, and propose remedies.	3.1, 3.2, 3.3	3 years	
e	Operationalise the quality tools and processes that were proposed during the previous 3-year cycle of PGDATA.	PGDATA has previously proposed a number of interesting tools and processes to improve the data informing the assessment and advice process. With the new RDBES/TAF system becoming fully operational over this next work cycle, this is an ideal time to embed these within the workflow. To this end, the next 3-year cycle should also ensure that these ideas are operationalised.	3.1, 3.2, 3.3	3 years	The finalised “Series of ICES Sampling Protocols” template proposed by PGDATA for fisheries dependent data. Documents (based on the temple) describing commercial sampling programs have been created by countries. The process to link the completed documents to data submitted to the commercial fisheries Regional Database & Estimation System (RDBES) is agreed. The procedure to make these documents available to stock assessment groups via the RDBES and Transparent Assessment Framework (TAF) has been agreed and tested. Structure and maintenance of PGCCDBS repository is agreed RDBES/TAF script and tools repository

### Summary of the Work Plan

YEAR 1	ToR a) and b) <ul style="list-style-type: none"> <li>Collate existing policies that relate to the quality of ICES advice and identify any gaps.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Agree on a format for the ICES quality manual and which ICES publication type it fits best</li> <li>• Create a first draft an ICES quality manual for the advisory process – the purpose of the manual is to document the overall approach to quality management of advice within ICES. The working group will not be looking to invent multiple new procedures but will instead concentrate on compiling and collating the existing procedures into a coherent whole.</li> <li>• Identify the types of generic processes within ICES that contribute to advice outputs.</li> </ul>
	ToR c) <ul style="list-style-type: none"> <li>• Outline a communication plan for the 3-year cycle of the working group.</li> <li>• Identify key stakeholders that should be prioritised</li> <li>• Identify the key messages that should be communicated</li> </ul>
	ToR d) <ul style="list-style-type: none"> <li>• Limited activity expected in year 1</li> </ul>
	ToR e) <ul style="list-style-type: none"> <li>• Identify if are all data collected and used for advice purposes are covered by an identified sampling protocol (e.g. the Series of ICES Sampling protocols used for surveys, and the PGDATA proposed “Series of ICES Sampling Protocols” for fisheries dependent data)</li> <li>• Finalise the “Series of ICES Sampling Protocols” template for fisheries dependent data and encourage countries to start using it.</li> <li>• Investigate the feasibility of a “species identification” app and other ideas produced by PGDATA</li> <li>• Review status of the PGCCDBS (Data Quality Assurance) repository and agree on the way forward.</li> <li>• Review draft ICES advice and RDBES data calls and give feedback</li> </ul>
<b>YEAR 2</b>	ToR a) and b) <ul style="list-style-type: none"> <li>• Revise draft ICES quality manual in line with feedback</li> <li>• Define what documentation is needed for the processes that contribute to ICES advice (such as process flows, standard operating procedures, guidelines, and manuals). Propose tools such as standard templates when required</li> <li>• Propose who will need to complete the documentation e.g. a benchmark assessment group.</li> </ul>
	ToR c) <ul style="list-style-type: none"> <li>• Review and refine communication plan</li> <li>• Identify key targets for year 2 and year 3, alongside the stakeholders identified for Year 1</li> </ul>
	ToR d) <ul style="list-style-type: none"> <li>• Use the quality management system described in the quality manual to identify gaps in processes</li> <li>• Begin identifying new or revised tools or processes that can fill the identified gaps. Tools could refer to code but might also could be “soft” items such as decision support flow-charts. The group would not intend to create all the identified tools ourselves.</li> </ul>
	ToR e) <ul style="list-style-type: none"> <li>• Start to create a collection of useful data quality, scripts, graphs and function that can be used within the RDBES/TAF. Design processes that will allow people to contribute to this work. Agree how this work fits with the PGCCDBS (Data Quality Assurance) repository and how it will be maintained.</li> <li>• Review draft ICES advice and RDBES data calls and give feedback</li> </ul>
<b>YEAR 3</b>	ToR a) and b) <ul style="list-style-type: none"> <li>• Revise draft ICES quality manual in line with feedback</li> <li>• Track and review the documentation.</li> </ul>
	ToR c) <ul style="list-style-type: none"> <li>• Refine year 3 of the communication plan and implement it</li> </ul>
	ToR d) <ul style="list-style-type: none"> <li>• Use the quality management system described in the quality manual to identify gaps in</li> </ul>

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- processes
- Continue identifying new or revised tools or processes that can fill the identified gaps
- ToR e)
- Promote the data quality and RDBES/TAF repository/ies.
  - Review draft ICES advice and RDBES data calls and give feedback
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### Supporting information

Priority	Improving quality assurance processes is a key priority for ICES and is a priority area of the ICES Advice Plan – the work of this group is thus considered as a high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resources required to undertake additional activities in the framework of this group is negligible. WGQuality builds extensively on experiences gained within PGDATA and PGCCDBS. Countries are encouraged to ensure that their national members have sufficient resources to conduct the necessary intersessional work to address the ToRs. For EU Member States, work within this WG can be funded under the Data Collection Framework (DCF)/European Maritime, Fisheries and Aquaculture Fund (EMFAF).
Participants	The Group is normally attended by some 20–25 members and guests. The participants at WGQuality should represent the entire process from data collection (fisheries dependent and independent data) to the publication of objective and independent advice.
Secretariat facilities	SharePoint and meeting room requirement.
Financial	No financial implications.
Linkages to ACOM and group under ACOM	There will be strong linkage with ACOM
Linkages to other committees or groups	The work within this group is very relevant to the groups within the FRSG and forthcoming DSTSG (particularly WGCATCH, WGBIOP and WGRDBESGOV). This work will also be relevant to groups within the IEASG, in particular since a wide variety of data sources will be contributing to the outputs of those groups.
Linkages to other organizations	There is a natural link to similar issues of quality assurance in the EU Regional Coordination Groups.

### Working Group on Estimation with the RDBES data model (WGRDBES-EST)

**2020/FT/DSTSG07** A Working Group on Estimation with the RDBES data model (WGRDBES-EST), chaired by Kirsten Birch Håkansson, Denmark, and Nuno Prista, Sweden, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2021	20-24 September	Online	Interim report by 18 December to DSTSG	Kirsten Birch Håkansson, Denmark
	25 November	Online		Nuno Prista, Sweden
	15 December	Online		
Year 2022	To be determined	To be determined	Interim report by tbd to DSTSG	



Year 2023	To be determined	To be determined	Final report by tbd to DSTSG
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## ToR descriptors

TOR	DESCRIPTION	BACKGROUND	<a href="#">SCIENCE PLAN CODES</a>	DURATION	EXPECTED DELIVERABLES
a	Develop and document R scripts and functions for statistical estimation using the RDBES data format	The Regional Database & Estimation System (RDBES) will be extensively used by ICES member states, the EU Regional Coordination Groups, and ICES expert groups to store detailed commercial fisheries sample data. The RDBES will also replace the current ICES Inter-Catch system and function both as a database and an estimation system for ICES Fisheries Advice. Estimation within the RDBES will be done by means of R-scripts and functions that secure the transparency and reproducibility of assessment inputs. The estimation code will ultimately integrate TAF and make national and regional estimates more transparent. WKRDB-EST (1&2) have started developing those scripts and functions in what regards the simpler forms of design-based estimation. WGRDBES-EST will continue and finalize that work, extending it to more complex statistical estimation methods.	3.1, 3.2, 3.3	Regular activity every year with intersessional work	Documented R-scripts and functions to be added to icesRDBES package
b	Identify and document any problems with RDBES data model relating to statistical estimation	In coming years the RDBES data model will keep being improved and updated as feedback is received from RCGs, EGs (e.g., WGCATCH, WGBYC) and national users. The implications of those improvements and updates for estimation	3.1, 3.2, 3.3	Regular activity every year	List of recommendations to ICES data center, Core Group of RDBES development and WGRDBESGOV on aspects needing development in the RDBES data model

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		within the RDBES will need continuous evaluation. In addition new aspects will likely be found requiring incorporation in the data model so that specific estimation methods can be implemented or specific results produced. WGRDBES-EST will contribute to the identification and evaluation of these new features and data-model related aspects.		
c	Coordinate the peer-review and inclusion of ToR a) outputs in the icesRDBES package	Worldwide availability and systematic code and methodological peer review of RDBES estimation functions and scripts may be achieved by incorporation of main estimation functions in the icesRDBES package and publication on CRAN ( <a href="https://cran.r-project.org/">https://cran.r-project.org/</a> ).	3.1, 3.2, 3.3	Regular activity every year with intersessional work
d	Establish a road forward to the improvement of estimates of commercial catches used in ICES assessments	As the work of WGRDBES-EST progresses there is a need to update and inform WGRDBESGOV on the best path forward to keep improving commercial catch estimates used in ICES.	3.1, 3.2, 3.3	Regular activity every year
e	Collaborate with WGRDBESGOV and WGTAFGOV to secure the integration of outputs from WGRDBES-EST in TAF	Transparency on the use of outputs from WGRDBES-EST can be achieved by integrating the estimation scripts and/or its outputs in TAF.	3.1, 3.2, 3.3	Regular activity every year

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### Summary of the Work Plan

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Year 1	<p>ToR a) Discuss the feedback from WGRDBESGOV and RDBES core group on WKRDB-EST2 progress alongside results achieved intersessionally, and identify the R-code that needs development, refinement and/or testing. Develop that code and functions.</p> <p>ToR b) Evaluate updates of the RDBES data model from an estimation perspective. Document any problems with RDBES data model relating to statistical estimation and suggest solutions.</p> <p>ToR c) Continue the work started during WKRDB-EST2 in icesRDBES package, incorporating existing developments; prepare a standalone icesPackage; test and implement compatibility of the</p>
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	<p>icesRDBES package with CRAN requirements; suggest a work-flow and roadmap for peer-review of icesRDBES functions and scripts.</p> <p>ToR d) evaluate progress obtained in estimation of commercial catches and suggest a way forward to WGRDBESGOV.</p> <p>ToR e) Initiate the collaboration with WGRDBESGOV (and relevant groups thereunder) and WGTAFGOV to identify requirements for an integration of WGRDBES-EST outputs into TAF</p>
Year 2	<p>ToR a) Discuss the feedback from WGRDBESGOV and RDBES core group on last years progress alongside developments achieved in intersessional work, related Wks and WGs and individual contributions related to commercial catch estimation. Identify the R-code that needs development, refinement and/or testing. Develop that code and functions.</p> <p>ToR b) Evaluate intersessional updates of the RDBES data model from an estimation perspective.. Document any problems with RDBES data model relating to statistical estimation and suggest solutions.</p> <p>ToR c) Continue the work on the icesRDBES package; test and implement compatibility of the icesRDBES package with CRAN requirements; test work-flow and advise on roadmap for longer term icesRDBES maintainence to WGRDBESGOV.</p> <p>ToR d) evaluate progress obtained in estimation of commercial catches and suggest a way forward to WGRDBESGOV.</p> <p>ToR e) In collaboration with WGRDBESGOV (and relevant groups thereunder) and WGTAFGOV conclude on requirements for a integration of WGRDBES-EST outputs into TAF and adapt output to the requirements</p>
Year 3	<p>ToR a) Discuss the feedback from WGRDBESGOV and RDBES core group on last years' progress alongside developments achieved in intersessional work, related Wks and WGs and individual contributions related to commercial catch estimation. Identify the R-code that needs development, refinement and/or testing. Develop that code and functions.</p> <p>ToR b) Evaluate intersessional updates of the RDBES data model from an estimation perspective. Document any problems with RDBES data model relating to statistical estimation and suggest solutions.</p> <p>ToR c) Continue the work of previous year in icesRDBES package, incorporating new developments; Publish the icesRDBES package on CRAN.</p> <p>ToR d) evaluate progress obtained in estimation of commercial catches and suggest a way forward to WGRDBESGOV.</p> <p>ToR e) Continue the work of previous year and in collaboration with WGRDBESGOV (and relevant groups thereunder) and WGTAFGOV keep updated on potential changes in the requirements for integration.</p>

## Supporting information

Priority	This working group is considered of very high priority. The activities of this WG will promote the development of a Regional Database and Estimation System (RDBES) by developing the algorithms and code required for the estimation of commercial catches within the RDBES. The RDBES will be integrated in TAF and work as a database for both ICES and the Baltic Sea, North Sea & Eastern Arctic, and North Atlantic Regional Coordination Groups (RCGs), producing the high-quality, transparent, estimates required by ICES Fisheries Advice.
Resource requirements	The members of the core group of RDBES development are requested to participate and coordinate algorithm and code development ahead of the meetings. Participation of the ICES data centre is needed with regards to expertise in package development and maintainace.
Participants	The Group is normally attended by about 20 members. Participants should be proficient in writing own scripts and functions in R language and/or have good knowledge of survey sampling and estimation.
Secretariat facilities	None.

Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no direct linkages with ACOM, but most of the Stock Assessment Working Groups will be impacted by the development of the RDBES.
Linkages to other committees or groups	There is a direct link to WGRDBESGOV, the RDBES core group and close links to activities of WGTAFGOV, WGQUALITY, WGCATCH and WGBYC. There is an indirect link with WGRFS and WGBIOP.
Linkages to other organizations	The RDBES estimates are connected to regional data collection defined by the RCGs under the European Commission. The RDBES will also support the ICES countries in providing data for both national and international assessments and optimizing their sampling programmes. In the case of EU MS, the RDBES is expected to facilitate and improve the quality of provision of commercial catch data requested under different data calls.

### Working Group on Biological Parameters (WGBIOP)

**2020/FT/DSTSG10** The **Working Group on Biological Parameters (WGBIOP)**, chaired by Annelie Hilvarsson, Sweden, Maria Cristina Follesa, Italy, and Sally Songer, United Kingdom, will work on the ToRs and generate deliverables as listed in the tables below.

	Meeting dates	Venue	Reporting details	Comments (change in chair, etc.)
Year 2021	5–7 October	Online meeting	Interim report by 15 November to DSTSG	
Year 2022	To be determined	To be determined	Interim report by TBD to DSTSG	
Year 2023	To be determined	To be determined	Final report by TBD to DSTSG	

### ToR descriptors

ToR	Description	Background	<a href="#">Science plan codes</a>	Duration	Expected deliverables
a	Plan and prioritise validation studies, workshops, and exchange schemes on stock-related biological variables, and review the results.	Reviewing and prioritisation of the many incoming suggestions for workshops and exchanges from EGs, WGs, and other ICES related groups (e.g. planned benchmarks). It is essential to streamline this work with the ICES benchmark schedule.	3.1 and 3.2	Generic	Annual prioritised overview of planned studies, workshops, and exchanges. Update and restructure the Data Quality Assurance Repository (with ICES and WGQUALITY). Work with SID (Stock Information Database) developers to include workshop and validation study information in SID, to make this information available to the wider ICES community.
b	Improve training and quality assurance of age reading and maturity staging, and other biological parameters.	Guidelines for international calibrations are available, but methods, routines, and protocols for monitoring the quality of	3.1 and 3.2	Generic	Review the current national procedures for quality assurance.

ToR	Description	Background	<a href="#">Science plan codes</a>	Duration	Expected deliverables
		age and maturity on national levels needs to be standardized. International agreed to advice on targets (by stock) for accuracy of delivered biological data as input for assessments. If target is not met, validation should be prioritised.			<p>Outline best practice guidelines in cooperation with the RCGs.</p> <p>Preparing guidelines for method standardization and implementation in cooperation with WGSMAART.</p> <p>Continuous monitoring of the implemented standardized guidelines.</p> <p>Stock-specific targets for validation and accuracy of biological parameters achieved from exchanges and workshops.</p> <p>Liaise with WGALES on requirements for egg and larvae quality assurance.</p>
c	Evaluate the quality of biological parameters: Issues and review of quality of biological parameters used in assessments.	It is essential that the time series of biological parameters used in stock assessments are of the highest quality. Guidelines for quality assurance of biological parameters have been developed in WGBIOP's previous terms. WGBIOP will collate information on quality assurance and accuracy estimates of biological parameters used, to evaluate if improvements can be achieved.	3.1, 3.2, and 5.1	3 years	<p>Evaluation of issues put forward by the assessment WGs for benchmark species in 2021–2023.</p> <p>Review use of SID in delivering issue lists for upcoming benchmarks and provision of WGBIOP information to the assessment groups.</p> <p>Interactive quality indicator form for biological parameters used in assessments. Evaluate quality and accuracy estimates of biological parameters currently used in assessments.</p>
d	Investigate and develop data availability, documentation, and methods to improve identified biological parameter estimates as input to assessment models.	Life-history parameters are required by expert groups on assessment, multi-species modelling, ecosystem modelling, and data-limited stocks. Therefore, recent data from quality assured sources is essential. WGBIOP provides guidelines for collecting high-quality data and provides links between data providers and end-users. There is a need to assess the availability and use of	3.1, 5.2, and 6.6	3 years	<p>Document current sources of life-history parameter estimates identified by ICES/GFCM expert groups as critical components relevant to the improvement of assessment for ICES/GFCM stocks.</p> <p>Identify where biological information can be updated, provide input for improving reference points.</p>

ToR	Description	Background	<a href="#">Science plan codes</a>	Duration	Expected deliverables
		biological parameters, and to support incorporating age error matrices and other biological parameter quality information into assessments.			Overview of quality assurance for stomach sampling. Facilitate closer links between data providers and end-users. Liaise with WGQUALITY, benchmark groups, and developers on providing and implementing age error information in assessments.
e	Across database developments combining biological parameter data collection and quality assurance of this data. Address requests for technical and statistical recommendations/advice related to biological parameters and indicators.	<p>WGBIOP regularly receives requests related to (quality of) biological parameters from EGs and other related groups. Filled templates for requests sent to WGBIOP before a specified deadline will be the basis for this ToR.</p> <p>Requests often deal with provision of information or data on the quality of biological parameters which are not easily accessible. To improve the accessibility of the data and the efficiency of the quality assurance processes, cross-database developments are essential. This will allow for combining data from different sources, facilitating the work of WGBIOP and also supporting the ICES quality management system</p>	3.1, 3.2, and 3.3	Generic	<p>Each received request for technical and statistical recommendations related to biological parameters and indicators will be addressed and included in the WGBIOP work plan where appropriate.</p> <p>Provide input for current and developing data storage and tools.</p> <p>Provide a flow diagram, combining outputs from SmartDots and RDBES/TAF/DATRAS to WGQUALITY, DIG and DSTSG. This will give an overview of countries/institutes collecting biological parameter data as input for quality assurance of biological parameters.</p>
f	Provide feedback and guidance on updating and developing tools for exchanges and workshops on biological parameters.	Based on feedback from users of these tools and end-users of results of workshops and exchanges, improvements and alterations will be suggested and evaluated.	3.1 and 4.1	Generic	<p>Annual updates and developments of tools will be evaluated based on end-user needs.</p> <p>Annual overview of suggested improvements based on the needs of users will be provided to governance groups (e.g. WGSMA<span style="font-variant: small-caps;">RT</span>).</p>

## Summary of the work plan

Year 1	Investigation of data availability and quality of life-history parameters and providing links between data providers and end-users. Evaluating the quality of biological parameters used in assessments. Improving quality assurance of biological parameters provided for assessments and management processes. Providing feedback and guidance on the development of tools for calibration workshops of biological parameters. Scheduling of exchanges, workshops, and validation studies aligned with the benchmark cycle.
Year 2	Investigation of data availability and quality of life-history parameters and providing links between data providers and end-users. Evaluating the quality of biological parameters used in assessments. Improving quality assurance of biological parameters provided for assessments and management processes. Providing feedback and guidance on the development of tools for calibration workshops of biological parameters. Scheduling of exchanges, workshops, and validation studies aligned with the benchmark cycle.
Year 3	Reviewing the status of issues, achievements, and developments concerning biological parameters and quality assurance of life-history parameters provided for assessment and management processes. Reviewing tools and database developments for providing and accessing biological parameters information. Identify future needs in line with ICES objectives, the ICES Science Plan, and the wider marine environmental monitoring and management within Europe, and propose a future/alternative work plan improving quality assurance of biological parameters.

### Supporting information

Priority	The main objective of WGBIOP is to support the development and quality assurance of regional and national provision of biological parameters as reliable input data to integrated ecosystem stock assessment and advice, while making the most efficient use of expert resources. As biological parameters are among the main input data for most stock assessments and mixed fishery modelling, these activities are considered to have very high priority.
Resource requirements	None.
Participants	All National Age Reader/Maturity Stager Coordinators (ICES and GFCM) will be invited. Experts relevant to the current benchmarks of the year of WGBIOP will be invited as well as relevant external experts such as statisticians or specific EG members.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory and science committees	WGBIOP supports ACOM and SCICOM by promoting improvements in the quality of biological parameters from fishery and survey data underpinning the integrated ecosystem assessment approach.
Linkages to other groups	WGBIOP links with the SCICOM/ACOM Steering Groups: Data Science and Technology Steering Group (DSTSG) and Ecosystem Observation Steering Group (EOSG), and the Working Group on the Governance of Quality Management of Data and Advice (WGQuality). It links to stock assessment EGs and benchmark assessment groups by providing input on the data quality. WGBIOP also has links to the Regional Database Steering Group (SCRDB). WGBIOP also has links with WGSMART for the development of SmartDots and WGALES for quality assurance of ichthyoplankton parameters.
Linkages to other organizations	Regional Coordination Groups (RCGs).

## Resolutions approved in 2018

### Working group on machine learning in marine science (WGMLEARN)

**2018/MA2/EOSG06** A Working group on machine learning in marine science (WGMLEARN), chaired by Ketil Malde, Norway, and Jean-Olivier Irisson, France. The group will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019	22-24 May	Ostend, Belgium	Interim report by 1 July, 2019	
Year 2020	1-2 December	Online meeting	Interim report by 14 January, 2021	
Year 2021	25-26 and 28-29 October	Online meeting	Final report by 10 December, 2021	

### ToR descriptors

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
<b>a</b>	Review 1) new method developments in machine learning, 2) current applications of machine learning methods in marine science, and 3) their implementations and deployments in advisory and scientific processes.	Machine learning holds great potential, but it is necessary for practitioners to keep up with new developments and to gain an understanding of the opportunities and challenges with new methods.	4.1, 4.5, 3.2	1, 2, 3	On-line (live) report
<b>b</b>	Invite presentations (externally and internally) and review data or analysis challenges in order to discuss possible methods, approaches and technologies.	ML experts need to meet with stakeholders and data collection efforts for mutual understanding of data analysis challenges.	4.2, 4.3	1, 2, 3	On-line list of challenges
<b>c</b>	Communicate with DIG and the ICES Data Centre on data organization and requirements related to machine learning analysis.	For effective deployment, ML has to be integrated with data collection and data management efforts.	4.2	1, 2, 3	
<b>d</b>	Summarize current and future needs in marine science and identify how machine learning methods can provide solutions. Work actively to	Future developments in the marine sciences, including project proposals, need to have an informed and up to date view of the state of the art, in order to make	4.2, 4.3	3	



promote adoption of relevant technologies.	optimal use of the technology.
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### Summary of the Work Plan

<b>Year 1</b>	Produce the annual overview of recent developments.
<b>Year 2</b>	Produce the annual overview of recent developments.
<b>Year 3</b>	Produce the annual overview of recent developments.

### Supporting information

<b>Priority</b>	Machine learning is a prioritized topic by DIG, and was explored in the WKMLEARN workshop in April 2018, on an initiative by ACOM. The workshop highlighted a need for a centrally organized venue to share methods and best practices between researchers, to attract outside expertise, and to support publication and dissemination of results. Long term engagement is especially needed to support deployment and integration of the new methods.
<b>Resource requirements</b>	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
<b>Participants</b>	Machine learning is a topic of considerable and broad interest, and is likely to attract participants from outside the traditional ICES organization. We expect some 30 members, similar to the attendance of the WKMLEARN workshop.
<b>Secretariat facilities</b>	None.
<b>Financial</b>	No financial implications.
<b>Linkages to ACOM and groups under ACOM</b>	DIG (Julie could you check does DIG sit under ACOM?, certainly they go to the SCICOM meetings), ICES Data Centre (also I think this sits under the secretariat rather than ACOM), could just be moved to the section below if we are not sure
<b>Linkages to other committees or groups</b>	Close working relationships with other groups that target data collection or analysis. Relevant examples are: WGFTFB (targets non-destructive fisheries sampling) WGNEPS (video surveys to monitor nephrops populations) WGFAST (analysis of acoustics data) WGBIOP and WGSMAART A planned WG for electronic monitoring of vessels
<b>Linkages to other organizations</b>	Machine learning is a prioritized topic by DIG, and was explored in the WKMLEARN workshop in April 2018, on an initiative by ACOM. The workshop highlighted a need for a centrally organized venue to share methods and best practices between researchers, to attract outside expertise, and to support publication and dissemination of results. Long term engagement is especially needed to support deployment and integration of the new methods.

### Working Group on Atlantic Larval and Egg Surveys (WGALES)

2018/2/EOSG16 The Working Group on Atlantic Larval and Egg Surveys (WGALES) chaired by Patrick Polte, Germany, ~~Richard D.M. Nash, Norway (to be replaced in 2020), and Cristina Nunes\*, Portugal (from 2020)~~ will work on ToRs and generate deliverables as listed in the Table below

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2019		By correspondence		
Year 2020	19–21 October 2020	Online meeting	E-evaluation	Richard D.M. Nash replaced by Cristina Nunes
Year 2021	27-28 October	Online meeting	E-evaluation	
Year 2022	17-21 October	Ifremer, Boulogne-sur-Mer, France	Final report by 15 December	

### ToR descriptors

ToR	Description	Background	<a href="#">Science Plan codes</a>	Duration	Expected Deliverables
a	Review the current ichthyoplankton surveys in light of their original purposes, with respect to design, estimation methods and challenges and identify their potential for other purposes such as ecosystem surveys.	Ichthyoplankton surveys collect abundance data on early life history stages useful for estimating fish standing stock biomass (SSB) and recruitment of several fish stocks.	1.4, 2.2, 3.2	year 2, 4	
b	Survey scientist work together to evaluate and recommend methodologies and research needs for sampling, processing and data analyses for ichthyoplankton surveys, concerning the Early life history stages and the contributions from the adult components. WGALES also offers the possibility for data users to gain insights into the rationale, methodology and potential applications of fish early life stage ecology (and adult fish maturity) research.	Ichthyoplankton surveys need to keep pace with developing data needs and technological developments. The provision of a workshop/conference environment provides a forum for improvement, development of new ideas and innovative insights for these surveys.	1.4, 3.2, 4.4	year 2, 4	
c	Present and report on reproductive dynamics	Successful surveys are dependent on understanding the life-history	1.7, 2.2, 3.2	year 2, 4	

	and fish early life strategies relevant for ichthyoplankton surveys	dynamics of the target organisms and understanding how this may change with ecosystem variability and change.			
d	To work together with ichthyoplankton data providers and experts to evaluate and improve surveys. This will include collaboration across members in several ICES groups including IBTSWG, WGACEGG, WGMEGS, WGSINS (WGEGBS2).	Specialist working groups need a forum with experts from other types of ichthyoplankton surveys and personnel working in different areas to seek guidance and advice.	2.3, 3.2, 3.4	year 1, 2, 3, 4	
e	Provide a standardized framework for ichthyoplankton data bases and facilitate implementation of new survey data into the ICES egg and larvae data base in collaboration with the ICES Data Center.	Ichthyoplankton data needs to be of high quality and centrally available for the assessment working groups and the science groups more generally to do their work and demonstrate transparent ways of working.	3.2, 4.2	year 1, 2, 3, 4	Updated dataset on the ICES egg and larval database

**Summary of the Work Plan**

<b>Year 1</b>	WGALES will communicate by correspondence to act upon urgent ToR's from ichthyoplankton survey groups (ToR d)
<b>Year 2</b>	WGALES will meet to address ToRs a, b, c, d, e, f
<b>Year 3</b>	WGALES will communicate by correspondence to act upon urgent ToR's from ichthyoplankton survey groups (ToR d)
<b>Year 4</b>	WGALES will meet to address ToRs a, b, c, d, f
<p>This Working Group meets every two years with a meeting format that covers general matters concerning ichthyoplankton surveys (ranging from new innovations in survey equipment and design through considering current ichthyoplankton surveys and their protocols) and also includes a specialised theme session or two on current and innovative relevant topics. The new topics are chosen at the end of each meeting to allow participants to work on them in the period between meetings. As such, new meeting ToRs can arise every two years to provide a focus for part of the biannual meeting.</p>	

## Supporting information

<b>Priority</b>	The activities of WGALES are vital for the delivery of state-of-the-art ichthyoplankton surveys, ensuring high standards and incorporating new techniques and developments for the future. WGALES will lead to the cross fertilization of ideas, methodologies, developments and standardization of ichthyoplankton surveys in the ICES area. Hence providing a platform from which to improve the assessments based on the ichthyoplankton surveys.
<b>Resource requirements</b>	The research programmes which provide the main input to this group are already underway, and resources are already committed.
<b>Participants</b>	The Group will be attended by members of ICES groups, WGMEGS, WGEGBS2/WGSINS, IBTSWG, WGACEGG and guests carrying out ichthyoplankton surveys in the non-ICES areas. The Group is normally attended by some 25–30 members and guests.
<b>Secretariat facilities</b>	None.
<b>Financial</b>	No financial implications.
<b>Linkages to ACOM and groups under ACOM</b>	There are linkages with ACOM through the individual ichthyoplankton surveys groups that are associated with WGALES and their assessment groups that use plankton data.
<b>Linkages to other committees or groups</b>	There is a close working relationship with the all the ICES expert groups of ichthyoplankton surveys, WGMEGS, WGEGBS2/WGSINS, IBTSWG, WGACEGG and their assessment groups, WGWISE, HAWG, WGHANSA.
<b>Linkages to other organizations</b>	No formal linkages.

## EGs dissolved in 2021

Res. Code	EG name	Chairs
2019/2/EOSG16	WKABM – Workshop on Acoustic Backscatter Models	Sven Gastauer, Germany
2019/2/EOSG13	WKBIOPTIM4 - The Fourth Workshop on Optimization of Biological Sampling	Gwladys Lambert (UK), Isabella Bitetto (Italy) and Patricia Gonçalves (Portugal)
2020/WK/DSTSG04	WKRATIO - The Workshop on Estimation of Commercial Catches I – Ratio estimators	Liz Clarke (UK-Scotland) and Laurent Dubroca (France)
2020/WK/DSTSG05	WKRDB-POP3 - The Third Workshop on Populating the RDBES data model	David Currie, Ireland and Edvin Fuglebakk, Norway
2020/WK/DSTSG06	WKAMEMSA - The Workshop on use of Ageing and Maturity Staging Error Matrices in Stock Assessment	Alfonso Pérez-Rodríguez (IMR-Norway) and Karen Bekaert (ILVO-Belgium)
2020/WK/DSTSG08	WKARBLUE3 - Workshop 3 on age reading of blue whiting ( <i>Micromesistius poutassou</i> )	Jane Aanestad Godiksen, Norway, and Patricia Gonçalves, Portugal
2020/WK/DSTSG09	WKARDL2 - Workshop 2 age reading of Sea bass ( <i>Dicentrarchus labrax</i> )	Valerio Visconti, United Kingdom, and Mary Brown, United Kingdom
2020/WK/DSTSG11	WKARP2 - Workshop 2 on age reading of North Sea plaice ( <i>Pleuronectes platessa</i> )	Ulrika Beier, Netherlands, and Julie Coad Davies, Denmark
2020/WK/DSTSG02	WKARA3 – Workshop 3 on age reading of European anchovy ( <i>Engraulis encrasicolus</i> )	Gualtiero Basilone, Italy