

WORKSHOP ON THE REALIGNING OF THE ECOSYSTEM OBSERVATION STEERING GROUP (WKREO)

VOLUME 2 | ISSUE 14

ICES SCIENTIFIC REPORTS

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ISSN number: 2618-1371 | © 2020 International Council for the Exploration of the Sea

ICES Scientific Reports

Volume 2 | Issue 14

ICES WORKSHOP ON THE REALIGNING OF THE ECOSYSTEM OBSERVATION STEERING GROUP (WKREO)

Recommended format for purpose of citation:

ICES. 2020. ICES Workshop on the Realigning of the Ecosystem Observation Steering Group (WKREO). ICES Scientific Reports. 2:14. 24 pp. <http://doi.org/10.17895/ices.pub.5965>

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i Executive summary

The Workshop on Realigning of the Ecosystem Observation Steering Group (WKREO) reviewed the critical task and information requirements of data collectors and data users that contribute to the development of ICES fisheries and ecosystem advice. The information requirements were mapped on to the existing expert group structure to identify gaps, bottlenecks and network communication characteristics. There was a high degree of consensus across the WKREO working group participants regarding the necessary tasks, but no clear understanding of which current expert groups are responsible for a number of these tasks. Additionally, this lack of clear structure has led to gaps in collaborative analysis and communication, so the group also considered ways to formalise effective communication flow going forward. WKREO discussed a variety of options that ultimately led to consensus of group responsibilities and information flow that are outlined in a set of new standard ToRs for different groups. Our proposal should facilitate improvements in the quality of fisheries advice and improve ecosystem science compared to the current network architecture.

The WKREO proposal took a regional approach to data collection and analysis to better match the regional advisory processes compared to the existing methodological-focused data collection, resulting in a realignment of expert groups. Network indicators suggest realignment is qualitatively and quantitatively advantageous, particularly benefiting the ecosystem approach and progressing ICES science. It better supports the development of new science and regional monitoring products through effective sharing of skills and resources, while also providing an important link to regional data collection groups that hold the key to making decisions on future monitoring at the international level.

The issues impacting the flow of data into advice are near universal around the world. Although the organisation and group names may differ, the principles and challenges of what we describe are the same. Countries developing or thinking of (re-)organising workflows could learn a lot about what works and what does not from the ICES experience.

The group specifically identified the following benefits of the new structure:

- Fisheries independent data and information are reviewed on a regional level, resulting in an improved understanding of the regional processes.
- Fisheries independent data are used appropriately, and collections are understood by data users;
- Combining fisheries independent data may lead to a better understanding of ecosystem processes;
- Could more effectively incorporate fisheries independent surveys (e.g. national surveys) that currently are not used / not available to ICES;
- Improved alignment of fisheries independent data with fish stock assessment groups and integrated ecosystem assessment groups;
- Improved insight of regional changes and patterns by examination across surveys and across data types.
- Improved survey planning and improved efficiency by evaluation of the survey;
- Generation of cross-regional developments, knowledge, expertise as Fisheries Independent Regional Monitoring Groups co-develop linked by approach through IEASG activities;
- Opportunity to incorporate (expertise on) non-fisheries monitoring (e.g. phytoplankton, zooplankton, benthos, mammal, birds, etc.) to enhance survey value;
- Theme-specific workshops initiated by the survey coordination groups improve expertise across regions.

- Improved cross-network understanding of information flow and clarity of responsibility through common structure from “data to advice”.
- Appropriate division of labour with regards to skills and resources.

ii Expert group information

Expert group name	Workshop on the Realigning of the Ecosystem Observation Steering Group (WKREO)
Expert group cycle	Annual
Year cycle started	2019
Reporting year in cycle	1/1
Chair(s)	Sven Kupschus, UK
	Matthias Klopmann, Germany
	Colm Lordan, Ireland
	Olavi Kaljuste, Sweden
Meeting venue(s) and dates	29 th – 31 st November 2019, Copenhagen, Denmark (13 participants)

1 Introduction

A few years ago, ICES reorganised its advisory processes regionally to take better account of fisheries interactions and of the differences in ecosystems and resource usage in different regions. At that time fisheries independent data collections were considered more methodologically dependent, so these groups were not restructured. As surveys and budgets have developed over time, it has become clearer that more thought is needed to make data collection in general more efficient to satisfy the increasing demands for greater precision, accuracy and broader perspectives of the ecosystem approach. In addition, it has become evident that these demands are difficult to satisfy in a system where advice and data collection are organised regionally and methodologically respectively. This is at least in part because the regional advice does not necessarily match up with the way the needed information is produced by the data collection groups.

WKREO convened to examine different options of simplifying the information exchanges necessary in the ICES network to improve efficiency and effectiveness in advice provision and to evaluate such options in terms of their expected performance in specific aspects. It was not designed to deal with the increasing number of expert groups and how they are formally organised in steering groups as structural changes are the mandate of ACOM and SCICOM. Nor was the group in a position to prioritise different aspects of the advisory process, single species versus ecosystem advice. The aim was simply to provide the evidence that would allow ICES committees to make informed decisions.

Although the focus of WKREO was in relation to the ICES network, many of the principles and the necessary information flows are relevant to many other scientific organisations. The types of information, skill sets, and collaborative analyses that are needed to achieve the ecosystem approach are independent of ICES. Similarly, the need for evaluation of all data collection, QA/QC, information synthesis and the feedback to decision makers is broadly relevant and will help improve the performance of the underlying scientific networks. Finally, the description of the process followed by WKREO and the experience in ICES is of interest to other organisations going through a similar evolution from single species advice to the broader ecosystem approach.

WKREO proposal for realigning EOSG expert groups regionally:

REASONING:

Purpose:

- Move from fisheries-independent single species information towards integrated regional fisheries independent information for ecosystem-based advice including fish stock assessment;
- Convey existing information and knowledge better throughout the ICES community;
- Move towards more integrated ecosystem monitoring (cost-effective, fit for purpose);
- Make better use of resources with respect to the number of working group days.

Needs:

- Facilitate assimilation of fisheries independent information on a regional level to provide output and information on an aggregation level used by fish stock assessment groups as well as integrated ecosystem assessment (IEA) groups;

- Evaluate fisheries independent data collection on a regional level to increase efficiency (e.g., reduce redundancy, optimize sampling, improve cost-effectiveness, and improve data quality).
- Most fisheries independent surveys are cross regionally organised in a topical or methodological manner;
- Data in fish stock and ecosystem assessments are used on a regional level frequently using data from multiple survey groups for a single assessment;
- Information flow from survey groups to fish stock assessment groups is on a survey-specific basis and not regionally coordinated;
- Data is relevant to the IEA groups, but there is no clear information flow between IEA groups and survey groups;
- There is no clear linkage from the survey groups to the Regional Coordination Groups (RCGs).

Suggested improvements illustrated in Figure 1:

- To establish **Fisheries Independent Regional Monitoring Groups (FIRMOGs)** responsible for tasks and products suggested in table below.
- Change of setup for current Survey working groups and change of naming to “**Observation and Data Coordination groups (ODCs)**”. For details see the table below.
- **Methods and Innovation groups** will still act as support to the surveys and no change is suggested compared to the current situation beyond encouraging the existing ODCs and future FIRMOGs to use the available expertise more effectively through joint workshops and regular communication.
- Establishes a formal feed back mechanism to the monitoring management here indicated by the **Regional Coordination Groups**.

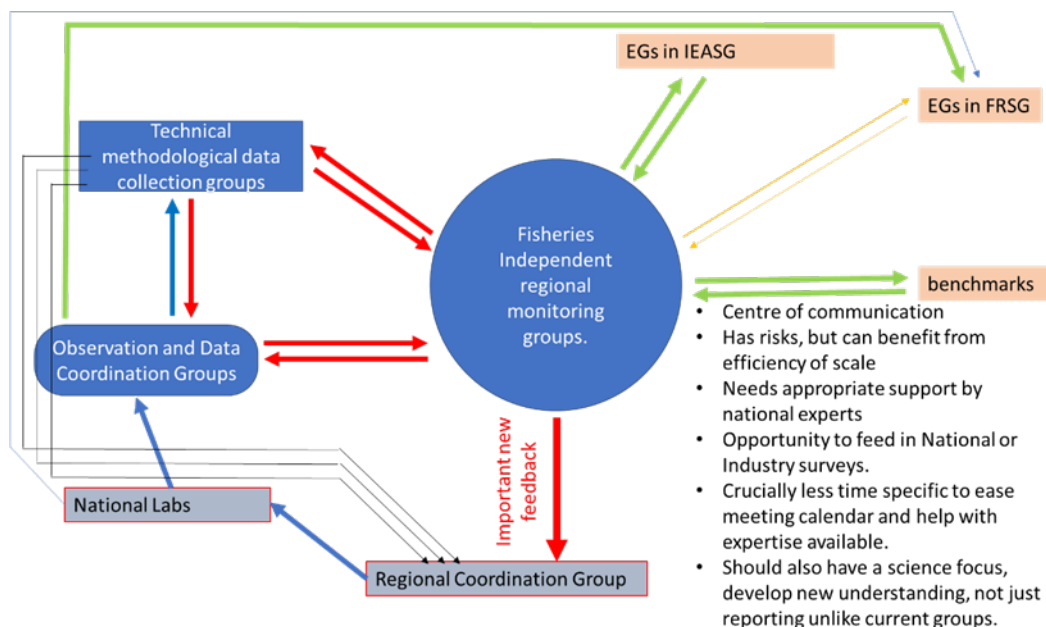


Figure 1: WKREO concept of realigned data collection groups and their communications as considered by WKREO to facilitate development of the ecosystem approach while ensuring quality and consistency of advice. Arrows indicate information transfer between groups analogous to Figure 1. A region-specific example of this generalised plots is provided in Appendix 3 for the Baltic.

- The proposed structure should provide a clearer understanding of the expert groups in the ICES network regarding the products and responsibilities of various groups.

- The current information transfer should be improved because the expectation being put on survey coordination groups with too little time and a limitation on skills will be more adequately addressed by the more data user focused groups that have the opportunity to work on the advancements and suggestions that often arise from the network.

Table 1 Generalised terms of reference and group descriptions of the different types of expert groups under a system of partial regional alignment while maintaining cross regional methodologies where appropriate. Region-specific examples have been prepared in Appendix 3.

	Fisheries Independent REGIONAL monitoring groups.	Observation and Data COORDINATION Groups	Observational METH-ODS and INNOVATION groups.
Task list	<p>Provide novel science and analyses for more effective use of regional information including the development of standardised data calls and methods necessary to perform these as standard reports.</p> <p>Provide input on fisheries independent monitoring to (data compilation) benchmark groups on a regional (stock) level.</p> <p>NOTE: An example of possible ToRs have been provided for the Baltic region (Annex 3B).</p>	<p>Coordinate survey / data collection planning, prior to and during the survey.</p> <p>Coordinate quality assured data delivery to relevant data portals and implement data calls where necessary.</p> <p>Cooperate with observational methods and innovation groups to maintain standards and improve efficiency.</p> <p>Provide input on specific surveys to data compilation workshops in the benchmark process.</p> <p>Propose workshops to develop survey specific expertise.</p> <p>An example of possible ToRs have been provided for the Baltic region (Annex 3A B).</p>	<p>As current, but in addition will receive requests from regional monitoring groups on methodological or statistical development needed for more effective monitoring.</p> <p>Specific topics requiring cross regional considerations are addressed in workshops.</p>
Products	<p>End-user driven reporting on regional fisheries resource and synthesised ecosystem assessments metrics.</p> <p>NB what is needed by “end-users” needs to be further defined by the data users in cooperation with data collectors. This could be through evolution or initiated by workshops.</p> <p>Formal evaluation of surveys in relation to specific existing survey objectives with alternate survey designs and other objectives being developed in conjunction with RCGs and data user groups.</p> <p>Scientific papers reporting key developments and</p>	<p>Tabular survey summary sheets (see WGBEAM report for template) for the past survey.</p> <p>Tabular overview of planned surveys for the next year.</p> <p>Coordinate data and ensure timely upload in the relevant database(s) (e.g. acoustic.ices.dk, egg-sandlarvae.ices.dk, datras.ices.dk, ocean.ices.dk,) that have been checked for consistency over the survey of the past two years.</p> <p>Provide (update of) survey manual (SISP; year 3 update for review; year 1 and 2 update on SharePoint).</p>	As current

	findings from observational science and integration of new observational knowledge into advice.		
Expertise needed	Ecologists, survey experts, statistical expertise, end-users (at least proper information on end-user requirements)	Survey experts from all institutes involved in the survey	As current
Resolution type	3 years	3 years	As current
Workload	Annual meeting 5 days (physical)	Annual short meeting (max. 2 days) connected to the survey, if possible by correspondence	As current
See Table 3 for existing and future groups responsibility			
Number of groups	7	10	14
Type of group	New	Existing groups revamped Based on current survey coordination groups, with reduced and limited tasks list and new names.	Existing

Opportunities and benefits over the current model:

- Fisheries independent data and information are reviewed on a regional level, resulting in more accurate information on the patterns from fisheries independent surveys. This will eventually lead to reduction in effort for the assessment groups;
- Fisheries independent data are used appropriately and understood;
- Combining fisheries independent data may lead to a better understanding of ecosystem processes;
- Possibility to incorporate (expertise or information on) fisheries independent surveys (e.g. national surveys) that currently are not used;
- Improved alignment of fisheries independent data with fish stock assessment groups and integrated ecosystem assessment groups;
- Improved insight of regional changes and patterns by combining data (time-series) from different fisheries independent sources in a region collated by experts from the field. This will ultimately lead to improved information on potential explanations for patterns in regional time-series to fish stock assessment groups as well as integrated ecosystem groups;
- Improved survey planning by evaluation of the survey;
- Generation of cross-regional developments, knowledge, expertise due to a limited number of FIRMOGS linked in approach through IEASG activities;
- Possibility to incorporate (expertise on) non-fisheries monitoring (e.g. phytoplankton, zooplankton, benthos, mammal, birds, etc.);
- Streamline sampling from different data sources (e.g. HELCOM, OSPAR, national);
- Theme-specific workshops initiated by the survey coordination groups improve expertise across regions.
- Improved cross-network understanding of information flow and clarity of responsibility through common structure from “data to advice”.
- Appropriate division of labour with regards to skills and resources.

Challenges:

- This change should not lead to an increased workload;

- Expertise needed for fisheries independent regional monitoring groups (FIRMOGs) and observation and data coordination groups (ODCs) should be clearly defined in the resolutions to make sure the tasks can be met;
- Keeping the current knowledge, expertise and network on the specific surveys (gear specifications, sampling processing, etc.) across regions (SCGs)

Practical implementation options:

1. Observation and data coordination groups (ODCs) are part of FIRMOGs, and have their meeting directly connected to FIRMOGs. Benefit: all information is available at the same moment.

Points of attention:

- a. All FIRMOGs should meet at the same place and time,
- b. SCG availability will be influenced by timing of fieldwork.

2. Survey coordination groups dissociate from regional monitoring groups

Points of attention:

- a. Actively arrange communication between the groups through ToRs and influence group constituency at the national level
- b. Formal representation of all relevant survey coordination groups in the regional monitoring groups.

Table 2. Transition matrix linking current survey coordination groups (columns) with the regional assessment groups through the proposed FIMROGs (columns). Current ecosystem data collection group interactions required to effectively cross into the current regional advisory and integrated ecosystem assessment structures. The number of crosses are indicative of the number of inter group connections between data collection and advice groups as these tend to vary between regions due to the organisation and quantity of data collection.

RCGs		Baltic Sea	Eastern Arctic/North Atlantic	North Sea	North Atlantic			
Regional Survey Coordination Groups (ICES Ecoregion)		Baltic Sea	Norwegian and Barents Sea	Faroe, Icelandic and East Greenland	Celtic Sea	Greater North Sea	Bay of Biscay and Iberian	Oceanic Atlantic (incl. widely distributed stocks)
Current Survey WGs	IBTSWG				x	x	x	
-> Fishery Independent Regional Monitoring Groups	WGACEGG				x		x	
	WGBEAM			x	x	x		
	WGBIFS	x						
	WGDEEPS							x
	WGIPS		x	x	x	x		x
	WGMEGS							x
	WGNEPS				x	x	x	
	WGRFS	x						
	WGSINS	x			x	x		
End users FRSG	AFWG							
	HAWG	x						
	NIPAG		x	x				
	NWWG			x				
	WGBAST	x						
	WGBFAS	x						
	WGBIE						x	
	WGCSE				x			
	WGDEEP		x	x				x
	WGDIAD	x	x	x	x	x	x	
	WGEEL	x	x	x	x	x	x	
	WGEF		x	x	x	x	x	
	WGHANSA				x		x	
	WGHARP		x	x				
	WGMIXFISH				x	x	x	
	WGNAS		x	x				
	WGNSSK					x		
	WGTRUTTA	x	x	x				
	WGWISE							x
End Users IEASG	WGIBAR		x					
	WGCOMEDA		x	x	x		x	x
	WGEAWESS				x			
	WGCERP	x	x	x	x	x	x	x
	WGIAB	x						
	WGICA							
	WGINOR		x					
	WGINOSE					x		
	WGIPEM	x	x	x	x	x	x	x
	WGMARS	x	x	x	x	x	x	x
	WGNARS							
	WGSOCIAL	x	x	x	x	x	x	x
	WGIEAGS			x				
	WGIAZOR (draft)							x
	WGBESEO (draft)	x	x	x	x	x	x	x
End Users HAPISG								
Human Activities, Pressures and Impacts SG								
Methods/Knowledge and Innovation					PGDATA			
					WGALES			
					WGBIOP			
					WGCATCH			
					WGDG			
					WGELECTRA			
					WGFAS			
					WGFTFB			
					WGISDAA			
					WGISUR			
					WGML			
					WGMLEARN			
					WGSMAST			
					WGTIFD			

The process, how the group developed the proposal, by ToR:

ToR a: Review the current tasks of the multi-annual data collection expert groups in the Ecosystem Observation Steering Group (EOSG) and identify essential tasks for the science and advisory processes ([Science Plan codes: 3.1, 3.2, 3.3](#));

What needs doing?

To address ToR a) from multiple perspectives WKREO participants individually identified the existing tasks and ICES network expectations for current survey data collection groups. The results were discussed and compiled into a groups of tasks that were closely related (topical objectives indicated by numbers across data users and data providers in Annex 2, images of completed exercises). To develop a group view of the ICES network's activities this information was compiled into a information flow diagram at the expert group level reflecting the current network implementation (Figure 1).

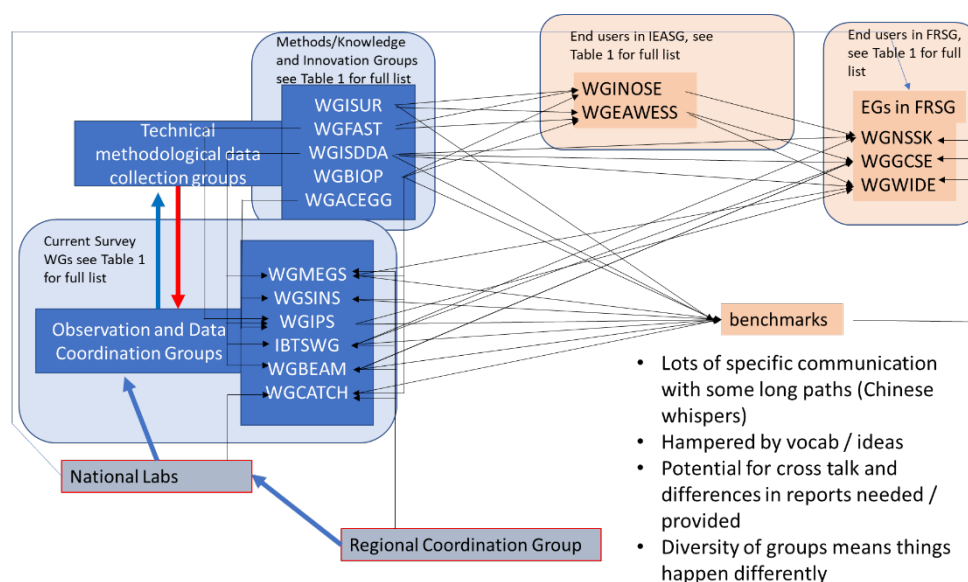


Figure 2 Graphical representation of Table 1 showing the currently required information flow given the existing expert group structures. Groups shown are examples, with a full list of WGs found in each category in Table 1 under the same heading. The large number of intersecting lines indicates a high degree of network complexity.

The list of topical objectives is long, the perception of whom has the responsibility for each objective is quite unclear for many of the tasks and overall the range of skills needed to accomplish them is wide and usually a single task requires multiple skills. Accomplishing the desired improvement in communication with the current expert groups, even with a clearer understanding of the roles and responsibilities seems highly ambitious. This suggests that the current expert groups, even with more clearly defined tasks, would struggle to fulfil the network expectation.

A purely regional split of data collection groups would reduce the magnitude of tasks of each group but would still require a broad spectrum of skills and would likely hamper the survey coordination element due to the need for national representation at the technical level. Survey coordination and data provision were the most practical topical objectives to isolate in terms of skills needed and proximity of tasks. Therefore, survey coordination groups focusing only on the technical aspects were split out.

Separation of relevant tasks by expertise was considered a more feasible approach, as regional groups dealing with cross-survey data and could better in addressing the main communication

difficulties moving from data to assessment. Routine task associated with planning and communicating with the national labs could more effectively be performed by survey specific groups with a significantly reduced effort compared to current groups.

The following eight categories were considered to be representative of necessary communication between the data users and data providers for use in subsequent ToR b. Figure A2.1 and A2.2 in Annex 2 outline the scope of work for the two groups with topic areas common between the groups identified by the numbers below:

- 1) feed survey knowledge and experiences into benchmark process
 - 2) provide robust survey indices
 - 3) ensure data quality
 - 4) provide information on data series quality
 - 5) report on consistency across surveys within regions
 - 6) consider restrictions of survey design in relation to data users
 - 7) find appropriate methods to service data user need
 - 8) coordinate and confirm timely data submission
- In general, there was good agreement between the objectives of the survey groups in relation to their expected function as considered by WKREO.
 - However, the proportion of time spent reporting and fulfilling the various tasks seemed to be out of synch with the perceived tasks driven by the data users. Particularly the volume of the reporting seemed excessive and substantial parts of the report seemed not to address any particular user group within ICES.
 - A large proportion of the data quality control seemed to be conducted nationally (counter to the belief of most of the wider ICES network), though some survey groups bring together the different national datasets for a final control.
 - Both survey and assessment groups were interested in uncertainty and variability, but the terminology used differed between the groups. Misinterpretation of the needs / requests may have contributed to the development of extensive reporting on states and QC whereas greater clarity was desired on the variability in the processes and identification of potential causes of such changes.
 - We identified differences between the importance of certain common tasks by data users and data providers which seemed to indicate a disparity between the data provider WG effort (time spent, pages in the report) and the perceived importance of the tasks by data users. This suggests that more efficient use of EOSG groups time was possible.

What is there at the moment?

There are currently ten working groups within the Ecosystem Observation Steering Group (EOSG), which coordinate surveys in the different ICES ecoregions. Their primary objectives are to either directly generate indices or provide data for the calculation of abundance indices for the different assessment working groups, which operate under the auspice of the Fisheries Resources Steering Group (FRSG). Data provision should also be granted for integrated ecosystem assessment conducted by working groups of the Integrated Ecosystem Assessment Steering Group (IEASG).

The name of the groups, tasks, deliverables, meeting frequency, and duration and number of participants of the groups are briefly described in Table A2.1. Table 2A.2 and 2A.3 in Annex 2 provide description of the regional data user groups (identified as “data users” in Figure 1).

To illustrate the consequences of having a regional approach on the survey work the current groups were listed by region and shown in Table 2. The table also shows the relevant end user groups for a region as well as which Survey Coordination Groups are to be connected to the discussions about data needs. Lastly it identifies cross regional methodological groups that need

to work together with both FIRMOGs and ODCs at various times to maintain advisory quality and consistency where appropriate.

ToR b: Develop options for reorganizing EOSG expert groups that can effectively conduct the essential tasks most efficiently while improving communication between, and incorporation of innovation from, expert groups (EGs) and across ICES steering groups (SGs) ([Science Plan codes: 3.1, 3.2, 3.3](#));

Discussions in WKREO on options for reorganizing

Having evaluated the tasks associated with data collection and the information required by the wider ICES network (science and advice) under ToR a) 'random' subgroups were created to assess how best to structure the necessary information. These subgroups discussed ways to ensure communication with the relevant data users, including the RCGs which require assistance in evaluating the effectiveness and efficiencies of the national monitoring programs. Sub-group presentations and the subsequent discussions focused around a regional approach since advisory and RCG groups were already organised this way though it was universally acknowledged that methodological discussions across regions had to be facilitated in any new approach.

Differences in the suggestions usually reflected the makeup of the subgroups rather than major differences in general approach and with some compromises all suggestions could be effectively combined in a single approach. Rather than spending effort to further refine the subgroup options independently as originally intended, time was thought better spent to develop a single refined approach. Where differences existed in the detail (e.g. how to facilitate methodological discussions), the functions were described in general terms to be decided on after feedback from ACOM and SCICOM.

Suggested way forward

The working group took the evaluation of the current survey WG effort from ToR a) and projected it onto regionally based fisheries independent regional monitoring groups (FIRMOGs, Figure 1). According to the ecoregions, where the surveys operate, the existing survey groups can be projected into one or more FIRMOGs as illustrated in Table 2. The FIRMOGs would then also become the platform or interface facilitating communication between the principal data end users from FRSG and IEASG and the Observation and Data Coordination groups (ODCs). The potential interaction between those groups and their assignment to the different FIRMOGs can be inferred from Table 2.

ToR c: Critically evaluate different reorganisation options for EOSG to identify the potential for issues with crucial delivery and timing for annual advisory needs, risks to communication pathways, and other possible implications for ICES science delivery ([Science Plan codes: 3.2](#)).

In response to the similarity of the options developed in the subgroups and the subsequent decision to converge the options into a single approach, the critical evaluation of options was of lower priority. Nevertheless, it was still thought useful to demonstrate the reasoning behind the realignment option and to provide background information to readers of this report as to the wide range of considerations that were made (Table 3). It was decided to carry out the critical evaluation against the status-quo to highlight where the group identified communication issues and how the new alignment could structurally facilitate some of the missing information and analysis. Table 3 is largely self-explanatory and WKREO considered the potential benefits of a regional re-alignment far outweighed the potential risks, which had been minimised by the retention (though substantially shortened meeting duration of survey specific coordination groups). Criteria used to evaluate options are described and defined in terms of their risks and

benefits as well as the groups assessment of their change and impact in the comparison conducted.

REO beyond the ICES network

The analysis of the ICES network with regards to the impediment to communication flows from survey data collection to advice are specific to the ICES network in relation to the existing structures, but the information needed and the interactions necessary for this communication are more universally applicable beyond the confines of ICES. The group found:

Most organisations have tended to see data users and data providers as separate functions. The reason for this is that both are highly specialised near exclusive skill sets and in organisations of sufficient size it is more efficient for them to act autonomously. In ICES this corresponds to the steering group structure which is frequently mirrored at the national institute level. The judgement of data quality differs between the data users and data providers. Partly this is due to the difference in the tools used, but mostly because of the perspective. The data providers tended to focus on the last years while data users tend to assess data quality of the time series. The two are obviously linked, but a thorough evaluation can only be carried out in conjunction between the two groups.

ICES data collection groups are currently still strongly fisheries focused but are further divided into gear specific expert groups for very similar reasons, efficiency. Acousticians and gear technicians have a limited overlap and even less overlap exists with plankton or benthic collections which, where they exist, tend to be driven by national rather than ICES interests. Largely this corresponds to the current expert group structure within the steering group. However, splits between environmental and fisheries departments and / or policy are also common outside of ICES and Europe.

Formal evaluation of data collection and a means to implement improvements have long been discussed but there are still relatively few effective feedback loops among data providers and users that would support an optimisation of monitoring for multiple objectives, i.e., the ecosystem approach. WKREO sought the support of the regional coordination groups to establish these important links. These groups sit outside of ICES whereas in many other organisations they may be more proximal, but formal links for the purpose of evaluation are necessary irrespective of location / control.

WKREO acknowledges the need for some divisions, because they are practically useful and likely operationally necessary. This is likely one reason why analogous structures exist in most monitoring organisations. What we have focused on is how to use the existing structure to bridge across these gaps by using a primitive network analysis with some predefined indicators by which to assess different options. Such methods are helpful in identifying network bottlenecks as well developing improved network options.

Table 3 Evaluation of the developed proposal for realigning ecosystem observations against the current situation against a number of drivers and network criteria developed by WKREO

Criterion	Definition	Comment	Impact of realignment compared to current methodological focus of data
Network structural indicators			
Number of contact points	The total number of inter group communications needed in the system and the maximum number of contacts required for anyone group.		overall fewer contact points, less "cross chatter" and more coherent feedback
distance between data providers and data users	Increasing numbers of communication layers in the hierarchy will decrease the efficiency and effectiveness of knowledge transfer in the regional dimension.	extra layers in the communication can reduce the detail but may improve the filtering of relevant information. May have financial implications for the national labs to find representation at the relevant groups.	a bit longer (but this may be compensated by feedback)
average number of contact points in any deliverable	level of required coordination (n groups vs n participants per meeting)	may have financial implications for the labs	decrease significantly
process consistency across ICES network	consistency of process across ICES aids in knowledge transfer in the method dimension	Currently ecosystem observation is dealt with regionally in the NW-Atlantic and the Baltic. Fisheries	increase uniformity, reduce redundancy
Network process evaluation			
Feed back facilitation	Ability to provide feedback in the advice data collection direction compared to the predominantly data to advice direction.	Feedback has been one of the major shortcoming of the current organisation, and although the changes may provide better and more formal	should substantially improve depending end users willingness
ICES calendar impacts	Improvements in the flexibility in EG scheduling associated with separation of tasks allocated to current EGs.	One of the main issues with the current system has been that knowledge transfer between expertise has been	more difficult
Cost and efficiency indicators			
Number of person meeting days (incl. travel)	With an ever increasing number of ICES groups member participation is restricted by national budgets.	Overall resources from member states are finite so the increases in number of working groups must ultimately result	neutral or increase depending on re-distribution of tasks, decreases for some members of the data
ICES secretariat resources	The number of supporting and scientific officers and their time required to process deliverable and organise EGs	The amount of secretariat effort is almost directly linked to the number of EGs, though report length and complexity reductions are not necessarily directly comparable. Currently it is difficult to effectively implement changes to data collection coherently across member states for fisheries independent surveys due to a	some extra organisation and report formatting necessary, but should improve once the system settles in
Efficiency and effectiveness of data collection	The long-term costs in terms of additional information gained per sample. (reduction in redundancy as well as bias). Initial costs may rise		should improve
Network evaluation			
Community buy in	the likelihood that changes are actively supported by providing suitable incentives and rewards to EG members.	Key individuals particularly those with long-term ICES experience may be lost from the system due to difficulties in adapting to change. However, new individuals may be attracted to new	depends on how the change is promoted
Knowledge transfer / distribution	the ability of the structure to transfer and ultimately retain knowledge and expertise due to familiarity and commonality	There may be some short-term loss of institutional knowledge where individuals unable to adapt to new ways of working are lost from the system. This has to be balanced against	improve considerably
Transparency of process	Advice and science transparency is important for robustness of products, reputation as well as institutional stability with fluctuating group members.	Better ICES wide oversight as to the expectation of different groups to communicate and the responsibilities to initiate such communication will not only help chairs and groups to work	improve (specialist knowledge is more broadly available)
Coherence of advice	Common data sources along with the necessary science and transparency will reduce the risk of conflict between different types of advice.	Coherent approaches across the system will ensure consistent considerations are made even if the advice forms may appear contradictory due to the	neutral?
Customer focus	The quality and spread of response to novel advice requests (special advice and new forms) which can be	How cost-effective is ICES in providing advice to its members and its wider customer base?	better because more modern (across disciplines)
ICES reputation	Quality and quantity of cutting edge science and advisory products	How is the quality of the science seen by other organisations and the public?	improvement due to greater coherence and more holistic analysis
Progress towards ICES top level higher quality advice and a greater application to the ecosystem approach	The degree to which the ICES structure facilitates incorporation of robust science into advice	Realigning EOSG is only one element in this process which critically relies on the enthusiasm and innovation of its expert groups supported by member states. A change in itself will not facilitate improvements, but without it is not clear to the group how the current system could make targeted	improve, improve markedly with the right buy-in.

Annex 1: List of participants

Name	Institute	Country (of institute)	Email
Sven Kupschus	Cefas, Lowestoft, also representing EOSG	UK	sven.kupschus@cefes.co.uk
Matthias Kloppmann	Thünene Institute of Sea Fisheries, Bremerhaven	Germany	matthias.kloppmann@ti.bund.de
Colm Lordan	Marine Institute, also representing ACOM	Ireland	Colm.Lordan@Marine.ie
Olavi Kaljuste	Swedish University of Agricultural Sciences	Sweden	olavi.kaljuste@slu.se
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Don Clark	DFO	Canada	Don.Clark@dfo-mpo.gc.ca
Michael Jech	NEFSC / NOAA	US	michael.jech@noaa.gov
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Marie Storr-Paulsen	DTU Aqua, Copenhagen	Denmark	msp@aqua.dtu.dk
Maria Hansson	Swedish University of Agricultural Sciences, also representing the RCG chairs.	Sweden	maria.hansson@slu.se
Julie Kellner	ICES		julie.kellner@ices.dk
Lotte Worsøe Clausen	ICES		Lotte.worsoe.clausen@ices.dk

Annex 2: Results of the group exercise relating to ToR a)

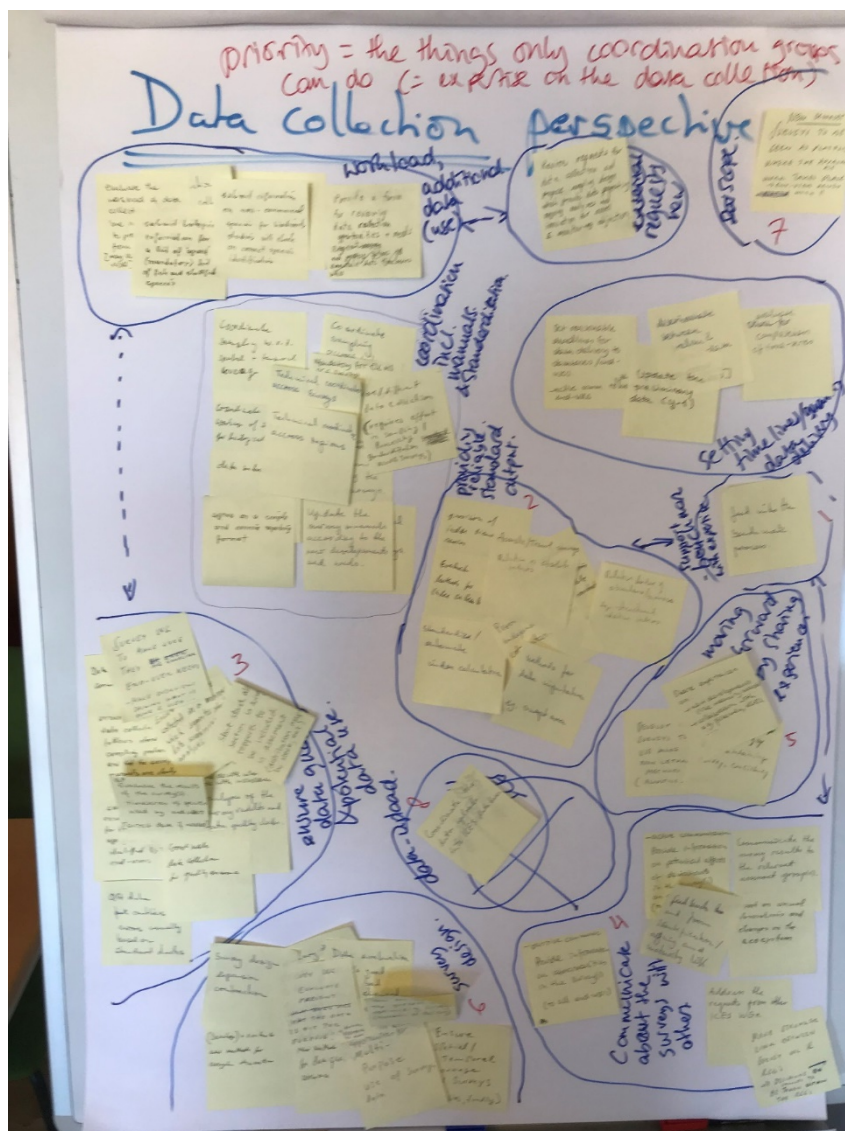


Figure A2.1 Identifying key information needs developed by fisheries independent data collection groups aggregated by higher level objectives (numbered) linking to the data user needs as considered by WKREO in Figure A2.2

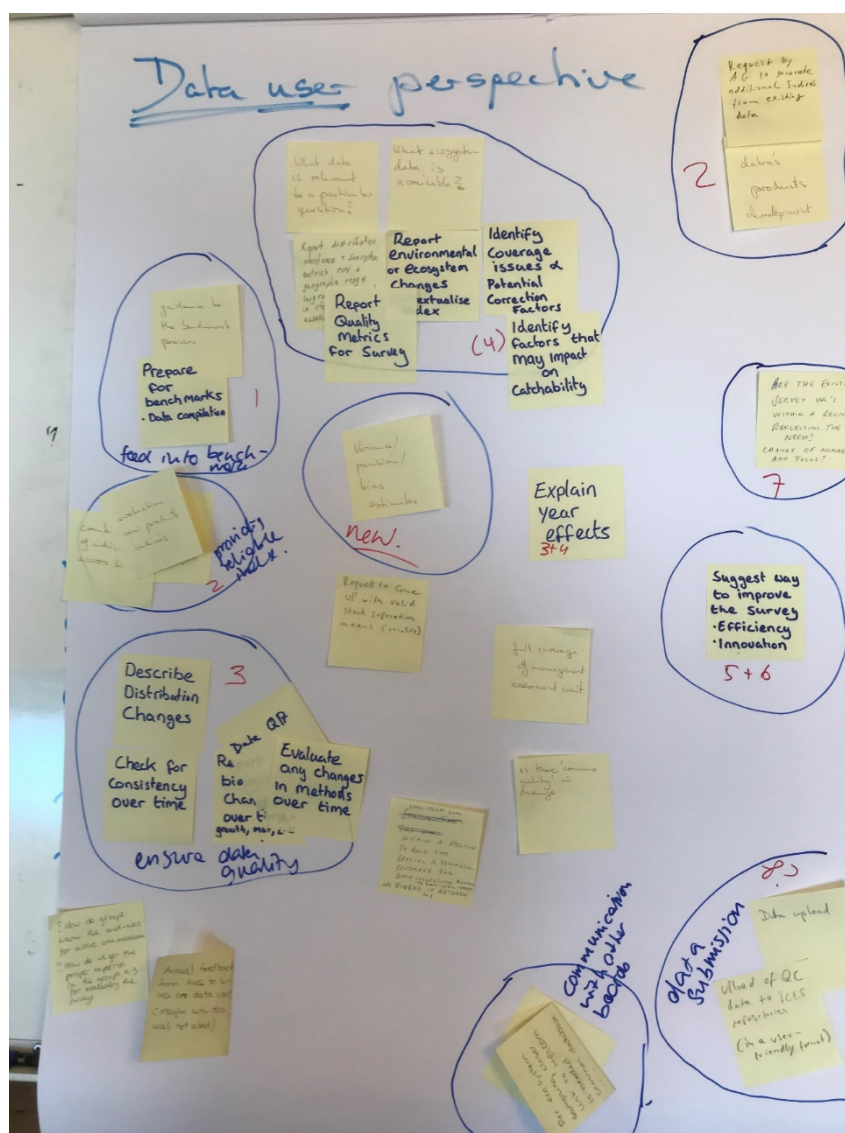


Figure A2.2 Key information requirements by data users using fisheries independent information identified by WKREO and grouped by number to link to data collection work objectives identified in Figure A2.1

Table A2.1 Description of the current survey coordination groups listing the advisory groups to whom they provide products or data, the number of participants and the meeting days.

Ecosystem Observation Steering Group (Current Survey Groups)					
Acronym	Group name	Surveys covered	Products to	Number of participants	Meeting Days
IBTSWG	International Bottom Trawl Working Group	several demersal otter board trawl surveys in the Greater North Sea, the Celtic Sea, the Bay of Biscay and Iberian Waters ecoregions.	WGNSSK, WGBIE, WGCSE, HAWG, WGWIDE, WGEF	20-25	4
WGACEG	Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES areas 7, 8 and 9	acoustic and egg surveys in the Celtic Sea and Bay of Biscay and Iberian Waters ecoregions	WGHANSA	~30	4-5
WGBEAM	Working Group on Beam Trawl Surveys	beam trawl surveys in the Greater North Sea, the Celtic Sea and the Faroe, Icelandic and East Greenland Ecoregions	WGNSSK, WBCSE, NWWG and WGEF	10-15	3-4
WGBIFS	Baltic International Fish Survey Working Group	acoustic and demersal otter board trawl surveys in the Baltic Sea ecoregion	WGBFAS, WGBAST	20-25	5
WGIDEPS	Working Group on International Deep Pelagic Ecosystem Surveys	acoustic and pelagic trawl surveys in the Faroes, Icelandic and East Greenland, and in the Norwegian and Barents Sea ecoregions (tri-annually).	WGDEEP	~5	3
WGIPS	Working Group on International Pelagic Surveys	acoustic and pelagic trawl surveys in the Greater North Sea, the Celtic Sea, the Faroe, Icelandic and East Greenland, and in the Norwegian and Barents Sea Ecoregion.	HAWG, WGWIDE	20	4-5
WGMEGS	Working Group on Mackerel and Horse Mackerel Egg Surveys	the mackerel and horse mackerel egg survey in the Northeast Atlantic and in the North Sea. The survey is carried out triennially, one year in the Northeast Atlantic and the following year in the North Sea.	WGWID	15-20 (~10)	4-5 (2)
WGNEPS	Working Group on Nephrops Surveys	Under Water TV (UWTV) and demersal trawl surveys in the Greater North Sea, the Celtic Sea, and the Bay of Biscay and Iberian Waters ecoregions.	WGCSE, WGBIE, WGNSSK	~20	3
WGRFS	Working Group on Recreational Fisheries Surveys	recreational fisheries in the Baltic Sea, the Greater North Sea, the Norwegian and Barents Sea, the Faroe, Icelandic and East Greenland waters, the Celtic Sea and the Bay of Biscay and Iberian Waters Ecoregions.	WGBFAS, WGEEL, WGBAST, WGCSE, WGNSSK, WGBIE	>40	4-5
WGSINS	Working Group on Survey on Ichthyoplankton in the North Sea and adjacent seas	ichthyoplankton surveys in the Greater North Sea, Celtic Sea and Baltic Sea ecoregions.	HAWG, WGCSE, WGNSSK	~10	3-4

Table A2.2: Advice supporting groups under the Fisheries Resource Steering Group

Acronym	Group name
AFWG	Arctic Fisheries Working Group
HAWG	Herring Assessment Working Group
NIPAG	NAFO/ICES Pandalus Assessment Working Group
NWWG	North Western Working Group
WGBAST	Assessment Working Group on Baltic Salmon and Trout
WGBFAS	Baltic Fisheries Assessment Working Group
WGBIE	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion
WGCSE	Working Group for the Celtic Sea Ecoregion

WGDEEP	Working Group on the Biology and Assessment of Deep-sea Fisheries Resources
WGDIAD	Working Group on Science to Support Conservation, Restoration and Management of Diadromous Species
WGEEL	Joint EIFAAC/ICES/GFCM Working Group on Eels
WGEF	Working Group on Elasmobranch Fisheries
WGHANSA	Working Group on Southern Horse Mackerel, Anchovy and Sardine
WGHARP	ICES/NAFO/NAMMCO Working Group on Harp and Hooded Seals
WGMIXFISH	Working Group on Mixed Fisheries Advice
WGNAS	Working Group on North Atlantic Salmon
WGNSSK	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak
WGTRUTTA	Working Group with the Aim to Develop Assessment Models and Establish Biological Reference Points for Sea Trout (<i>Anadromous Salmo trutta</i>) Populations
WGWIDE	Working Group on Widely Distributed Stocks

Table A2.3: Advice supporting groups under the Integrated Ecosystem Assessment Steering Group

Acronym	Group Name
WGIBAR	Working Group on the Integrated Assessments of the Barents Sea
WGEAWESS	Working Group on Ecosystem Assessment of Western European Shelf Seas
WGCERP	Working Group on Common Ecosystem Reference Points
WGIAB	ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea
WGICA	ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment (IEA) for the Central Arctic Ocean
WGINOR	Working Group on the Integrated Assessments of the Norwegian Sea
WGINOSE	Working Group on Integrated Assessments of the North Sea
WGIPEM	Working Group on Integrative, Physical-biological and Ecosystem Modelling
WGNARS	Working Group on the Northwest Atlantic Regional Sea
WGIEAGS	Working Group on Integrated Ecosystem Assessment of the Greenland Sea
WGIAZOR (draft)	Working Group on Integrated Assessment of the Azores Ecoregion* ¹

Annex 3: Baltic example flow chart and terms of reference for the FIRMOGs and ODCs expert groups.

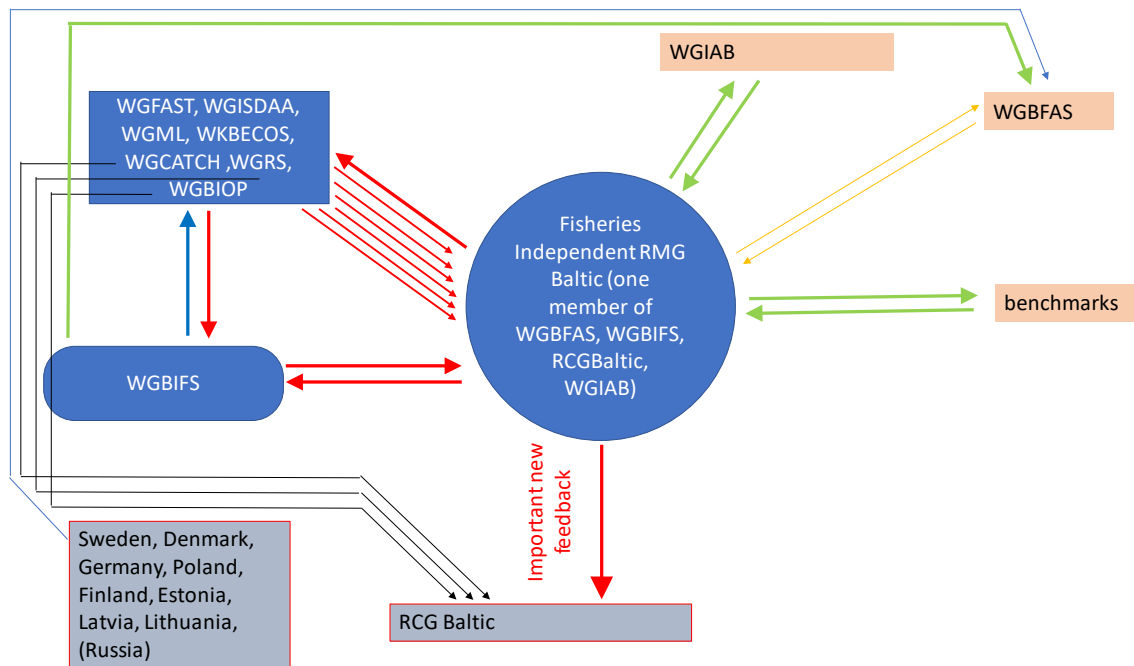


Figure A3.1 Baltic example of post re-alignment WG communications identifying the EOSG (blue) and other expert groups (orange) and external institutions (grey) involved. The Baltic surveys are already coordinated regionally, as is the plan for the new group WGNABO.

Annex 3A: Example Observation and Data Coordination group resolution: Working group meeting draft resolution for fixed-term working groups (Category 2)

A Working Group on Baltic International Fish Survey (WGBIFS), chaired by Name, 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 20XX	2 days at the end of March	NA	The first interim report by 15 April 20XX to, SCICOM and ACOM	Video meeting
Year 20XX	2 days at the end of March	NA	The second interim report by 15 April 20XX to, SCICOM and ACOM	Video meeting
Year 20XX	3 days at the end of March	Town, Country	Final report by 15 April 20XX to, SCICOM and ACOM	

ToR descriptors¹

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	Combine the results of spring and autumn acoustic surveys and update the BIAS and BASS hydroacoustic databases	The aim of BIAS and BASS databases is to store the aggregated data. WG will coordinate the data delivery of all countries, that have participated in the acoustic surveys.	3.1	annually	Updated and quality controlled acoustic data bases with the tuning indices are available in the WG SharePoint.

¹ Avoid generic terms such as “Discuss” or “Consider”. Aim at drafting specific and clear ToR, the delivery of which can be assessed

b	Coordinate the data delivery into the ICES database for acoustic-trawl surveys	The aim of ICES database is to ensure that the standardized and quality-controlled scrutinized data from the acoustic-trawl surveys will be stored centrally in a safe way and enables easy access to the data, which will facilitate usage for many different analyses by a wider range of users.	3.1	annually	Updated ICES database for acoustic-trawl surveys.
c	Coordinate and plan acoustic surveys including any experiments to be conducted	Acoustic surveys provide important fishery-independent stock estimates for Baltic herring and sprat stocks.	3.1	annually	Finalized planning for the acoustic surveys in the Baltic Sea.
d	Coordinate the quality controlled data delivery into the ICES DATRAS database	WG will coordinate the data delivery of all countries, that have participated in the BITS surveys.	3.1	annually	Updated ICES DATRAS database.
e	Evaluate the characteristics of TVL and TVS standard gears used in BITS	WGBIFS has implemented a complete and smaller scale measurement of the technical parameters of the exploited demersal trawls as a standard procedure. The complete measurement procedure has to be performed at least once a year by each country involved in the BITS surveys realization.	3.1	annually	Standard protocols with the results of these measurements from all countries are available in the WG SharePoint.
f	Coordinate and plan demersal trawl surveys and experiments to be conducted, and update and correct the Tow Database	Demersal trawl surveys provide important fishery-independent stock estimates for Baltic cod and flatfish stocks. Tow-Database contains information about the suitable trawling positions in the Baltic and is used for the allocation of the control-hauls for BITS between the participating countries.	3.1	annually	Finalized planning for the trawl surveys in the Baltic Sea, updated and corrected Tow-Database available in the WG SharePoint.

g	Combine the short summary sheets of the performed acoustic and trawl surveys	The aim of survey summary sheets is to give a short overview about the survey setup and highlight the main results/encountered problems.	3.1	annually	Combined survey summary sheets are available in the WG SharePoint.
h	Review and update the manual for International Baltic Acoustic Surveys (IBAS)	Review and update the survey manual and address methodological question raised at the last review of the SISP.	3.1, 3.2	Year 3	Updated IBAS manual (SISP 8)
i	Review and update the manual for Baltic International Trawl Survey (BITS)	Review and update the survey manual and address methodological question raised at the last review of the SISP.	3.1, 3.2	Year 3	Updated BITS manual (SISP 7)

Summary of the Work Plan

Year 1	Compilation of the recent acoustic survey results and updating the acoustic data bases with the tuning indices. Coordinating the data delivery into the ICES databases. Update the Tow Database. Coordination and planning the schedule for acoustic and trawl surveys for current and for the next year. Compilation of the summary sheets of the performed surveys. Recording of the BITS gear technical check results in the standard protocols.
Year 2	Compilation of the recent acoustic survey results and updating the acoustic data bases with the tuning indices. Coordinating the data delivery into the ICES databases. Update the Tow Database. Coordination and planning the schedule for acoustic and trawl surveys for current and for the next year. Compilation of the summary sheets of the performed surveys. Recording of the BITS gear technical check results in the standard protocols.
Year 3	Compilation of the recent acoustic survey results and updating the acoustic data bases with the tuning indices. Coordinating the data delivery into the ICES databases. Update the Tow Database. Coordination and planning the schedule for acoustic and trawl surveys for current and for the next year. Compilation of the summary sheets of the performed surveys. Recording of the BITS gear technical check results in the standard protocols. Reviewing and updating the BITS and IBAS survey manuals according to SISP standards.

Supporting information

Priority	The scientific surveys coordinated by this Group provide major fishery-independent tuning information for the assessment of several fish stocks in the Baltic Sea. Consequently, these activities are considered to have a very 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 resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by about 20 members that were performing the surveys (usually 2 representatives per country – 1 for acoustic and 1 for trawl surveys).
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	The survey data are prime inputs to the assessments of Baltic herring, sprat, cod and flatfish stocks carried out by WGBFAS. Linked to ACOM through the quality of stock assessments and management advice.

Linkages to other committees or groups	Outcomes of the WGBIFS are relevant to the WGSAM, WGIAB, HAPSISG and WGML.
Linkages to other organizations	No direct linkage to other organizations.

Annex 3B: Example FIRMOG resolution: Working group meeting draft resolution for fixed-term working groups (Category 2)

Fisheries independent Regional Monitoring Group Baltic (FIRMOG Baltic), chaired by Name, 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 20XX	Date Month	Town, Country	Interim report by Date Month May to SSGXXX	annual
Year 20XX			Interim report by Date Month May to SSGXXX	
Year 20XX			Final report by Date Month May to SSGXXX	

ToR descriptors²

TOR	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	Provide quality assured survey data and/or indices for FRSG working groups on a regional level	a) Science requirements: - b) Advisory requirements: c) Requirements from other EGs: <ul style="list-style-type: none"> From FRSGG groups: information on the species used for assessment From surveys coordination group: survey expertise in the region 			Quality assured survey data and/or indices for FRSG working groups on a regional level. Quality assured means that the fisheries-independent data have been checked for e.g. consistency over the different surveys (strong yearclasses, species identification,...) in the region

² Avoid generic terms such as “Discuss” or “Consider”. Aim at drafting specific and clear ToR, the delivery of which can be assessed

b	Synthesize and compare survey information on a regional level for integrated ecosystem assessment	a) Science requirements: - b) Advisory requirements: - c) Requirements from other EGs: <ul style="list-style-type: none"> from IEA Baltic: clearly defined end-user products required from fisheries independent surveys knowledge on the ecosystem and biological processes in the region 	Quality assured survey data and/or indices for IEA working groups on a regional level. Quality assured means that the fisheries-independent data have been checked for e.g. consistency over the different surveys (e.g. patterns in time-series of different ecosystem components) in the region
c	Respond to data and index requests from IEA and FRSG working groups, and advise on options	a) Science requirements: - b) Advisory requirements: - c) Requirements from other EGs: clearly formulated end-user needs from the IEA Baltic and/or FRSG groups	End-user required deliverables
d	Evaluate and advise on fishery independent monitoring efficiency options and assess/develop monitoring evolution	a) Science requirements: - b) Advisory requirements: - c) Requirements from other EGs: <ul style="list-style-type: none"> clearly formulated end-user needs from the IEA and/or FRSG groups, preferably on a parameter level WGISUR and WGISDAA expertise for guidance on evaluation of surveys in a qualitative and quantitative manner. 	(1) Surveys in a region are fit for purpose, meaning that the information needed by the end-users is collected during the most appropriate survey/surveys. (2) Advice on further development and changes if current monitoring is not fit for purpose.
e	Communicate with RCG Baltic and other relevant regional bodies on monitoring design	a) Science requirements: - b) Advisory requirements: - c) Requirements from other EGs: <ul style="list-style-type: none"> Survey coordination group: expertise on the (im)possibilities for data collection on current surveys WGISUR and WGISDAA expertise for guidance on monitoring design in a qualitative and quantitative manner. 	Expert assistance to RCG Baltic in evaluating survey data in order to ensure / maximise efficiency and effectiveness, while data collection groups need to adopt changes in surveys.

f	Request information on developing and implementing improved/new survey methods and designs from monitoring technology expert groups	a) Science requirements: - b) Advisory requirements: - c) Requirements from other EGs: <ul style="list-style-type: none"> • Survey coordination groups: practical support on implementing new methodologies/designs • WGFAST: current state of the art acoustic monitoring techniques • WGALES: current state of the art on ichthyoplankton monitoring techniques • WGISUR and WGISDAA expertise for guidance on monitoring design in a qualitative and quantitative manner. 	Surveys in the region use optimal methodologies and are having the appropriate number of stations, appropriate spatial and temporal coverage.
g	(Request information from survey coordination groups on feasibility and costs of implementing a monitoring evolution)		

Summary of the Work Plan

Year 1
Year 2
Year 3

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very 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 resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 20–25 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	There is a very close working relationship with all the groups XXXSG. It is also very relevant to the Working Group on XXX.
Linkages to other organizations	