

WORKING GROUP ON INTEGRATING SURVEYS FOR THE ECOSYSTEM APPROACH (WGISUR; outputs from 2020 meeting)

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International Council for the Exploration of the Sea Conseil International pour l'Exploration de la Mer

H.C. Andersens Boulevard 44-46
DK-1553 Copenhagen V
Denmark
Telephone (+45) 33 38 67 00
Telefax (+45) 33 93 42 15
www.ices.dk
info@ices.dk

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Editors

Donald Clark • Ralf van Hal

Authors

Donald Clark • Ralf van Hal

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i Executive summary

The Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR) explores the integration and further development of the surveys coordinated by ICES to inform the ecosystem approach as well as adding value to existing surveys. The role of WGISUR is to provide guidance on the development of ecosystem monitoring programmes and advice on expanding objectives as surveys with a narrower focus transition towards ecosystem monitoring programmes. In addition, the group provides evaluations of ecosystem monitoring surveys and an opportunity for exchange on developments in ecosystem monitoring. WGISUR leads or assists others in developing workshops to summarize options for optimizing sampling opportunities at-sea, reviewing advances in technology, and exploring options for improving integration of existing surveys.

Workshops were held to review ecosystem sampling opportunities in the North Sea and in the Western Atlantic. These workshops provided advice on how to modify sampling to improve ecosystem monitoring. The review of Western Atlantic surveys led to the initiation of WGNABO, the Working Group on Northwest Atlantic Ecosystem Observations.

While progress was made in some areas, there has been lethargy in implementing recommendations for modifications to improve integrated ecosystem monitoring in others. While workshops involving fisheries and ecosystem biologists have been able to develop proposals for ecosystem surveys, when it comes to implementing these proposals operationally, there has been less support and uptake.

WGISUR advises to include end-users in the discussions on how these surveys could collect additional ecosystem information and especially in the discussions on which additional data will be collected and get their support for the additional data collection. In addition, it is proposed that for many regions, a summary of what surveys and sampling are already in place, what monitoring data are being collected and how they could be better integrated may be needed as a precursor for developing support for modifying existing surveys.

The group should continue to summarize technological advances in ecosystem monitoring and provide summaries for survey and assessment working groups. The group should work with the Chair of EOSG to identify a Region for which there is an interest in convening a workshop to review existing sampling and data gaps. This would provide the background for identifying data gaps or lack of integration in data collection and a stronger rationale for proposing integrated ecosystem monitoring in a Region.

ii Expert group information

Expert group name	Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR)
Expert group cycle	Multiannual fixed term
Year cycle started	2018
Reporting year in cycle	3/3
Chair(s)	Ralf van Hal, Netherlands
Meeting venue(s) and dates	29 May – 2 June, 2018. St. Andrews, N.B., Canada (17 participants)
	17-20 June 2019. Bremerhaven, Germany, (5 participants)
	2 – 3 November, 2020. Webex (8 participants)

1 Background

For the 2018 - 2021 period, WGISUR set out to take part in annual workshops on survey design. The first two were for surveys in transition towards ecosystem monitoring, in the Western Atlantic and the North Sea. The third year was intended to be a review of the Norwegian Sea ecosystem survey. The Norwegian workshop was, unfortunately, cancelled due to the impacts of Covid on travel and also on the ability of many to get planned work completed.

In addition, the meetings provided an opportunity to review advances in ecosystem monitoring. In some areas, notably the United States Pacific North-West, new technologies are transforming the way that ecosystem surveys are conducted, with drones, sub-surface gliders, and autonomous saildrones providing new and efficient ways to collect data on ecosystem metrics.

The ecosystem survey as a unit

For a joint survey with a broad disciplinary base, it is essential that the survey be viewed as a cohesive project, rather than an agglomeration of smaller projects on a platform. In effect, all participants must think of themselves as members of a team, 'Econauts', focussed on achieving the broad ecosystem survey objectives. The understanding that the survey is one unit is imperative both for those taking part in the survey, the funding organisations, and institutional leadership.

The survey unit should be organised as a team under a single coordinator, with members having complementary responsibility for the different tasks during planning, execution, and reporting of the survey. This team must include members with the requisite expertise for the tasks envisaged. They must function as a single working group with cooperation at all levels. Finally, as an internationally coordinated survey, international coordination in planning, execution and reporting is also important

WGISUR advises including the end-users in the discussions on how surveys could collect additional ecosystem information and especially in the discussions on which additional data will be collected. Identifying end-users, along with the planned objective for additional data, provides a clearer rationale for expanding survey objectives. This means involving managers and persons involved in ecosystem advice. It also means involving a multi-disciplinary science team. When a multidisciplinary team state together that the data that will be collected will be useful for their research and will be useful for the ecosystem approach, it will create broader support than the same message from a narrower group (Shepherd et al. 2016).

2 Summary of deliverables and meetings during 2018-2020

CRR

A CRR, (de Boois, I. J. (Ed). 2019. Moving towards integrated ecosystem monitoring. ICES Cooperative Research Report No. 347. 44 pp. <http://doi.org/10.17895/ices.pub.4703>), summarizes much of the earlier deliberations of WGISUR. This report provides guidance on the development of ecosystem monitoring, defined here as “the monitoring of one or more components of the ecosystem”.

This report is focused around platform-based approaches, usually research vessels. It is influenced by the framework for ICES coordinated surveys, which use national efforts to collect information on fish abundance, diversity, and distribution. However, it is set up in such a manner that the general concepts can be useful for integrating other marine monitoring.

The report describes how moving towards ecosystem monitoring can take place through three different approaches: a) starting ecosystem monitoring from the very beginning; b) redesigning existing monitoring by combining new objectives with existing objectives; or c) adding data collection to existing monitoring without changing the basic survey design. The approaches are not mutually exclusive but should be considered as the starting point for the change towards ecosystem monitoring.

The approach to employ depends on multiple factors such as end-user requirements, available resources and available data acquisition techniques. The guidance aims to help decision-making on the choice of approach when moving towards ecosystem monitoring, and is designed to be adaptable and flexible. This guidance directed the discussions at workshops held in this 3-yr cycle and can be used for reviewing individual survey sampling or integration of a suite of surveys in an ecoregion.

2018

WGISUR participated in the workshop for developing a coordinated international survey in the Western Atlantic, from Cape Hatteras to Cape Breton.

The meeting was held to develop a proposal for a coordinated ecosystem survey in the Atlantic stretching from Cape Hatteras to Cape Breton. This would combine the existing spring Canadian and American surveys that cover this area, with overlapping spatial coverage from off SW Nova Scotia to south of Cape Cod.

This was the first formal step in combining these surveys as a coordinated ecosystem survey. The ongoing spatial overlap for the two vessels will be restricted to the 5Zjm area, with the US survey continuing farther west (5YZ6) and the Canadian survey farther east (4VWX). Canada will switch to the same bottom trawl which is used for the US survey and will also use the same tow evaluation procedures to ensure consistency in protocols for designating sample validity. Detailed sampling protocols are under review and minimum sampling levels for all aspects of the catch will be agreed. Identification guides will be coalesced to ensure consistency in species identification.

Bottom trawl sampling intensity (stations/stratum) will remain unchanged initially, with review after three years. The frequency of other sampling will be reviewed to ensure appropriate levels and distribution of sampling.

Oceanographic and plankton sampling will be coordinated and will attempt to fill gaps identified in an inventory of existing sampling in the Region.

The WGISUR meeting contributed to moving this initiative forward in two main ways. Participation by WGISUR assisted in developing a formal structure for overseeing a joint survey and also in crystalizing the governance process that will provide a framework for decision making.

The existing surveys both follow a stratified random sampling design and include bottom trawling, plankton sampling and Oceanographic sampling. The existing Canadian and US bottom trawl databases are very similar. In the past, each country has had access to the others bottom trawl survey database but firewalls are currently blocking access. Each country is working on application proxies which will allow secure access to data tables by the end of 2020. Oceanographic sampling also has a degree of international coordination in place, which includes some coordination in data collection and sharing of data among organizations.

Discussions of enhanced coordination had been ongoing separately amongst colleagues working in similar fields, but without any overarching focus. The ICES meeting helped in identifying the importance of this enhanced coordination and in providing the mechanism.

The WGISUR review recommended that, for a joint survey with a broad disciplinary base, it is essential that the survey be viewed as a cohesive monitoring project, rather than an agglomeration of smaller projects on a platform. In effect, all participants must think of themselves as members of a team, focused on achieving the broad ecosystem monitoring objectives. The understanding that the survey is one unit is imperative both for those taking part in the survey, the funding organizations, and institutional leadership.

As an internationally coordinated survey, international coordination in planning, execution data storage and reporting is essential. The monitoring program should be organized as a team under a single coordinator, with members having complementary responsibility for the different tasks during planning, execution, and reporting of the survey. This team must include members with the requisite expertise for the tasks envisaged. They must function as a single working group with cooperation at all levels. Finally,

This crystallized the value of having a single organizational structure which could make decisions on priorities and sampling objectives. The advice from this meeting with WGISUR led to the inception of the ICES Working Group on Northwest Atlantic Ecosystem Observations (WGNAEO) which is intended to provide the international coordination and review of ecosystem monitoring objectives. WGNAEO includes representatives from a diversity of fields, including survey coordinators, Physical and Biological Oceanography, single species stock assessment, ecosystem assessment and data management. It should function as a Fisheries Independent Regional Monitoring Group (FIRMOG) for the North West Atlantic area.

WGNAEO met first in January, 2020 and is scheduled to meet again in May of 2021, with the immediate goal of undertaking a first joint survey in March – May of 2022.

2019

WGISUR participated in the workshop for Impacts on Planned changes in the North Sea IBTS, (ICES 2019: Workshop on Impacts of planned changes in the North Sea IBTS (WKNSIMP). ICES Scientific Reports. 1:67. 25 pp. <http://doi.org/10.17895/ices.pub.5609>).

The workshop on planned changes in the North Sea IBTS focussed on vessel usage and the introduction of a new survey gear. Additionally, a change in survey design was part of the ideas under consideration. Especially, the last aspect was where WGISUR's expertise on including ecosystem considerations was useful in the discussions. One of the main points from earlier work done in WKPIMP (ICES 2016: Report of the Workshop to plan an integrated monitoring Programme in the North Sea in Q3 (WKPIMP), 22–26 February 2016, ICES HQ, Copenhagen, Denmark. ICES Document CM 2016/SSGIEOM: 11. 50 pp.) on the wish to collect data on biological processes (benthic-pelagic, food web-interactions) was considered in redesigning the survey. Related to the discussion on the selection of a new survey trawl, the question was raised if this gear could be altered such that it would catch a wider spectrum of species/length classes more equally in order to give a better impression of the species and size structure of the North Sea ecosystem.

The input of WGISUR was well received in the workshop resulting in concrete discussions on the implementation of the monitoring of certain ecosystem components. It also raised the awareness, that changing the survey should include a wider consideration on the ecosystem to improve understanding changes in the field than a narrow focus on the target species alone.

However, the main issue remains who makes the decisions on potential implementation of specific monitoring activities. This point was raised in earlier reports of WGISUR, and again here in the North Sea workshop. Many individuals are capable of putting their wish list for additional or improved monitoring on paper, as was part of the WKNSIMP, however this multitude of options might result in conflicts with the continuation of existing time series of national institutes. This may prevent a coordinated data collection in the absence of a higher coordinating mandate at the international level unless further progress is made in developing a strategic approach involving the ICES survey groups and Regional Co-ordination Groups (RCGs). Such a change has been suggested with the implementation of a Fishery Independent Regional Monitoring Group (FIRMOG; ICES 2019: ICES Workshop on the Realignment of the Ecosystem Observation Steering Group (WKREO) ICES Scientific Reports. 2:14. 24 pp. <http://doi.org/10.17895/ices.pub.5965>) for the wider North Sea.

2020

NWFSC is exploring a number of advanced and remote sensing technologies to improve surveys methods and support stock assessment. These include unmanned vehicles such as Saildrone for a variety of missions: fisheries acoustic surveys, oceanographic data, and climate/weather data. In the future we hope to add more projects to these Saildrone missions: hydrographic surveys for habitat work, HABs sampling, eDNA, ESP, passive acoustics for marine mammals to name a few. Partnering with other divisions at NWFSC, other Science Centers and Line offices, such as NOS and PMEL, will ensure that NOAA gets the most out of these investments. Untrawlable habitat and habitat of particular concern can be monitored and documented by AUV such as SeaBed used to look at corals and photo ID fish in untrawlable areas. Buoyancy gliders and Lagrangian floats are being considered for addition observation. Camera systems, still, stereo and video, are being used to look at catch in a trawl to monitor sites and to conduct new survey in areas where traditional methods are not viable. New acoustic systems such as the EK80 broadband and EdgeTech low frequency systems hold promise of improving acoustic surveys by

direct species ID and multispecies surveys for EBFM where advanced acoustic methods will allow us to separate and identify mixed aggregations of fish and prey species, such as Krill. In order to fully complete our mission of environmental stewardship, lab-based methods in genetics, toxins and chemistry must also be considered to monitor and remediate the environment after harmful algal bloom events and oil spills for example.

3 References

de Boois, I. J. (Ed). 2019. Moving towards integrated ecosystem monitoring. ICES Cooperative Research Report No. 347. 44 pp. <http://doi.org/10.17895/ices.pub.4703>

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Workshop on Impacts of planned changes in the North Sea IBTS (WKNSIMP). ICES Scientific Reports. 1:67. 25 pp. <http://doi.org/10.17895/ices.pub.5609>

Annex 1: List of participants

Name	Institute	Country (of institute)	Email
Irene Andruschenko	St Andrews Biological Station, DFO	Canada	Irene.Andruschenko@dfo-mpo.gc.ca
Melanie Barrett	St Andrews Biological Station, DFO	Canada	Melanie.Barrett@dfo-mpo.gc.ca
Kirsten Clark	St Andrews Biological Station, DFO	Canada	Kirsten.Clark@dfo-mpo.gc.ca
Adam Cook	Bedford Institute, DFO	Canada	Adam.Cook@dfo-mpo.gc.ca
Allan Debertin	St Andrews Biological Station, DFO	Canada	Allan.Debertin@dfo-mpo.gc.ca
Jamie Emberley	St Andrews Biological Station, DFO	Canada	Jamie.Emberley@dfo-mpo.gc.ca
Monica Finley	St Andrews Biological Station, DFO	Canada	Monica.Finley@dfo-mpo.gc.ca
Catherine Johnson	Bedford Institute, DFO	Canada	Catherine.Johnson@dfo-mpo.gc.ca
Ryan Martin	St Andrews Biological Station, DFO	Canada	Ryan.Martin@dfo-mpo.gc.ca
Quinn McCurdy	St Andrews Biological Station, DFO	Canada	Quinn.McCurdy@dfo-mpo.gc.ca
Philip Politis	NEFSC, NOAA	USA	philip.politis@noaa.gov
Gregor Reid	St Andrews Biological Station, DFO	Canada	Gregor.Reid@dfo-mpo.gc.ca
Catriona Regnier-McKellar	St Andrews Biological Station, DFO	Canada	Catriona.Regnier-McKellar@dfo-mpo.gc.ca
Ralf van Hal	Wageningen Marine Research	Netherlands	Ralf.vanhal@wur.nl
Kai Ulrich Wieland	DTU Aqua - National Institute of Aquatic Resource / The North Sea	Denmark	kw@aqua.dtu.dk
Donald Clark	Fisheries and Oceans Canada St. Andrews	Canada	clarkd@dfo-mpo.gc.ca
Lawrence Hufnagle	NOAA	USA	lawrence.c.hufnagle@noaa.gov
Sven Kupschus	CEFAS	United Kingdom	Sven@kupschus.net
Maria Hansson	SLU	Sweden	maria.hansson@slu.se
Russel Brown	NOAA	USA	russell.brown@noaa.gov
Per Arneberg	Institute of Marine Research	Norway	per.arneberg@hi.no

Annex 2: Resolutions

2016/MA2/SSGIEOM1 The Working Group on Integrating Surveys into ecosystem monitoring programmes (WGISUR), chaired by Ralf van Hal, The Netherlands, will work on ToRs mentioned below and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2018	29 May-1 June	Saint Andrews, New Brunswick	Interim report by 13 July to ACOM/SCICOM	2 days meeting of core group only, 2 days meeting to evaluate Canada/USA ecosystem survey plans
Year 2019	17-20 June	Bremerhaven, Germany	Interim report by 1 August 2019 to ACOM/SCICOM	2 days meeting of core group only, 2 days working on how to organise integrated monitoring in the North Sea
Year 2020	2-3 November	By Correspondence/Webex	Final report by 17 December 2020 to ACOM/SCICOM	2 days meeting of core group only, 2 days working on evaluation of Norwegian Sea ecosystem monitoring in relation to IEA and survey results.

ToR descriptors

TOR	DESCRIPTION	BACKGROUND	SCIENCE PLAN CODES	DURATION	EXPECTED DELIVERABLES
a	Provide guidance on the development of ecosystem monitoring surveys and/or programmes	The work of the group directly relates to goals 1, 2, and 3 of the ICES Strategic Plan (pages 14–15). Specifically, WGISUR work is strongly linked to the last bullet point under goals 1 and 2 (page 14).	3.1, 3.2, 3.3, 3.4	3 (focus in year 1)	after Year 3 a CRR on evaluation, use and improvement of ecosystem monitoring plans, surveys and/or programmes following up on the 2017 CRR
b	Provide guidance and advice on the shift from surveys to ecosystem monitoring programmes	The work of the group directly relates to goals 1, 2, and 3 of the ICES Strategic Plan (pages 14–15). Specifically, WGISUR work is strongly linked to the last bullet point under goals 1 and 2 (page 14), and stronger links to IEA groups.	3.1, 3.2, 3.3, 3.4	3 (focus in year 2)	after year 3 a CRR on evaluation, use and improvement of ecosystem monitoring plans, surveys and/or programmes following up on the 2017 CRR

c	Evaluation of ecosystem monitoring surveys and/or programmes	The work of the group directly relates to goals 1, 2, and 3 of the ICES Strategic Plan (pages 14–15). Specifically, WGISUR work is strongly linked to the last bullet point under goals 1 and 2 (page 14).	3.1, 3.2, 3.3, 3.4	3 (focus in year 3)	after year 3 a CRR on evaluation, use and improvement of ecosystem monitoring plans, surveys and/or programmes following up on the 2017 CRR
d	Provide an opportunity for exchange of experiences on development and evaluation of ecosystem monitoring		3.1, 3.2, 3.3, 3.4	3 (ongoing)	CRR

Summary of the Work Plan

Year 1	Review and provide guidance on the plans for the integrated USA/Canada ecosystem survey
Year 2	How to organize integrated monitoring in the North Sea (e.g. how to make use of the different surveys in the area and how to organize regional collaboration)
Year 3	Evaluation of Norwegian Sea ecosystem monitoring; prepare final output in CRR format

Supporting information

Priority	High. Integrated ecosystem monitoring will lead to better ecosystem understanding. The topics covered by WGISUR are mentioned in the ICES Strategic Plan. The working group will provide guidance to those collecting data as well as to data users on integrated ecosystem monitoring. There is a clear momentum for guidance on evaluation of plans for and results of ecosystem monitoring as there are initiatives to set up ecosystem surveys, and results from existing ecosystem monitoring becomes more and more available. In order to optimise guidance, WGISUR will use regional monitoring from different regions in the next term. From this, a generalised overview will be created.
Resource requirements	The focus for the next period will be on providing guidance on evaluating ecosystem monitoring, and application of the current guidance by evaluating plans for new ecosystem monitoring based on plans under development and by evaluating survey results of current monitoring. Furthermore, for the North Sea it will be investigated how to move from ecosystem surveys towards monitoring.

Participants	The group is normally attended by 10–15 members and guests ('core' group). Participation from all ecoregions is important. The group likes to explicitly state that there is a strong wish to keep the current participation from Norway, Canada, and USA next to EU countries, as this prevents that the group narrows down 'ecosystem monitoring' to 'MSFD monitoring'. The following expertise should be added to the 'core' group: analytical expertise, expertise on (monitoring of) other ecosystem components than fish (e.g. zooplankton, birds, physical/chemical), integrated ecosystem assessments. On top of that, dedicated additional expertise is needed in each year during a part of the meeting, on top of the 'core' members: year 1 (2018): Additional attendance needed from WGNARS USA/Canadian experts on the survey plans. year 2 (2019): Additional attendance needed from all North Sea survey planning groups, WGINOSE and chairs of IEASG, EOSG; and preferred attendance from WGNSSK, HAWG, OSPAR. year 3 (2020): Additional attendance of WGINOR and Norwegian Sea survey experts needed.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	In general, good linkage with groups under ACOM including the BSG is necessary as the move towards ecosystem monitoring may have implications on the survey stratification and as a result, on survey time-series used in stock assessment. Good linkage and communication is needed for survey groups moving towards ecosystem monitoring to understand the assessment needs, and for the assessment groups to understand the added value of the improved way of data collection, and to accept changes in time-series. Specific linkage in year 2 to assessment groups in the North Sea.
Linkages to other committees or groups	SCICOM, Survey planning WGs under EOSG, IEA WGs under IEASG, WGECO and other ecology based WGs, DIG.
Linkages to other organizations	Involvement of OSPAR and HELCOM is welcomed in the work of this group.