

# ICES WKSUREQ REPORT 2015

ACOM/SCICOM STEERING GROUP ON INTEGRATED ECOSYSTEM OBSERVATION AND MONITORING

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## Report of the Workshop on the review of the Ecosystem Survey Requirements (WKSUREQ)

By correspondence



**ICES**

International Council for  
the Exploration of the Sea

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Conseil International pour  
l'Exploration de la Mer

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## 1 Introduction

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The ICES Bureau has requested that ACOM/SCICOM provide a 10-page position paper reviewing existing surveys, and how ecosystem data can be included in future surveys. In response to this request, the Workshop on the review of the Ecosystem Survey Requirements (WKSUREQ) was established to work by correspondence.

Several ICES expert groups have made an effort to address the topic on expanded data collection to move towards an ecosystem survey approach, and the report summarizes these existing reports. Some gaps in the ICES work are identified and need to be filled towards the overall goal to support advisory processes in a wider context compared to traditional management.

The review is mindful of the current policy context including the ecosystem approach, as well as the EU specific context of the new Common Fishery Policy (CFP) and the Marine Strategy Framework Directive (MSFD).

The structure of this report, which should also be followed when implementing the resulting recommendations in the Expert Group portfolio, follows this logic:

- 1 ) The first step is to catalogue existing, known data needs. This needs to be done by the data users, and it should focus on the information content that is needed as opposed to the techniques and technologies to acquire the information;
- 2 ) Detail the possibilities of obtaining these data on existing surveys;
- 3 ) Identify information gaps for further new data needs, for continuous monitoring and one-off hypothesis testing;
- 4 ) Identify new data collection possibilities emerging from new technology.

## 2 Specific Response to ToRs

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### 2.1 Ecosystem data needs (ToR i)

*ToR i) Describe the ecosystem data needs to support ICES advice in general with specific reference to CFP, MSFD, and other EAFM/EBFM initiatives for the North Atlantic using inter alia the reports of WGISUR. Identify similar report material from the eastern Canadian and US seaboard*

North West Atlantic – Draw on data needs for SSGIEA in NWA waters – inputs from Sarah Gaichas and Robin Anderson, Chairs of Working Group on the Northwest Atlantic Regional Sea (WGNARS).

Develop a full list of data needs (NOT how to actually do it, but what they need with priority ranking) from this, but then pass to appropriate ecosystem groups for improvement. E.g. WGEKO, SSGIEA Expert Groups, WGMSFDemo etc. This full list should include details of temporal and spatial resolution requirements. There is a clear need for an improved presentation of the data needs. We recommend that the ICES Secretariat should facilitate this procedure by setting up a data overview system at the data centre. This overview should be linked with the overview of the current data collection, see Section 2.2 below on WKCATDAT.

Prioritization of information needs should be based on an initial priority developed by ecosystem groups and Stock Assessment Groups. However, this should be broadly circulated to e.g. MSFD authorities, or other agencies in Norway, USA, and Canada for agreement or amendment. MSFD 11 descriptors represent a good framework to start with, but we should recognize the needs of non-EU countries.

### 2.2 Survey needs to meet these requirements (ToR ii)

*ToR ii) Using existing work by ICES and others (STECF SGRN, WKCATDAT, WKECES and WGISUR...) describe briefly, survey needs to meet these requirements, and identify broad gaps in current provision. Include a priority listing for the most important sampling needs in the context of these gaps, and of the most important ecosystem components*

The list of ICES coordinated surveys (under SSGIEOM) is currently being mapped to information being collected. This includes the information that goes to the single species assessment models, but should also include information about data products in a wider context. However, this information is not easily accessible, and there needs to be built a place to store and present this information. This probably needs to be hosted by the secretariat and/or the data centre.

Use of Ecosystem E2E or OSSE models to identify priority data needs, and best places and times to collect these. Models can be used to identify where they find major weaknesses in data support, or where assumptions are strong. The intention here is to develop a feedback loop between models and the empirical data collection need to support them.

For the North East Atlantic, the data that can be produced from a RV survey basis have been summarized by WKCATDAT. The catalogue was constructed in terms of what are the data needs for the MSFD, but from a RV survey point of view and not in terms of the actual data needs.

LOT projects: Three contracts to look at MSFD sampling in Baltic, NS/Celtic Sea and Med. The CS study is looking at using the existing fishery survey resources to build a designed for purpose ecosystem survey and/or improving the existing surveys. Also included is evaluation of other ad hoc data collection such as litter and benthic fauna to evaluate potential use but this work needs to be extended.

A definition of an ideal ecosystem survey has been provided for WKECES, but again based on a survey practitioner's perspective. Specific current "ecosystem" surveys were evaluated against this. This definition could be expanded with wider participation.

WGISUR have also examined a small number of specific vessel and survey combinations in the context of data collection within existing surveys. So while a particular type of survey e.g. transect or station based, has a theoretical ability to collect a range of additional data this may be limited on any particular

Include potential data products from WGOOFE should be included.

### 2.3 Minor diversion possibilities (ToR iii)

*ToR iii) Based on existing reviews (WKCATDAT) indicate which parts of currently unfulfilled need can be met by minor (<20%) diversion of existing survey resources.*

The Working Group on Improving use of Survey Data for Assessment and Advice (WGISDAA) has planned activities looking at statistical analyses to evaluate some of the consequence for reducing sampling within a survey. This was principally in a statistical sense of increasing variance. Issues like risk to the survey and some spatial aspects were also not considered.

Addressed by WGISUR and WGISDAA.

### 2.4 Other potential methods (ToR iv)

*ToR iv) Identify and summarize where other potential methods of data collection would be potentially more cost-effective*

The ever-increasing demands on quality data from the ecosystems puts a tremendous stress on the RV infrastructure, data infra structure and human resources. Additional RV time to increase data collection on current surveys may be possible, but it is unrealistic to expect that the data requirements from will be met simply by adding more data collection on existing (or new; ICES) coordinated research surveys. There is a need to look into how new technology can provide this information in a more cost-efficient way, and it may be fair to say that ICES has not been proactive enough in this regard.

Although technology improvement have opened a lot of opportunities over the last decades, many research vessel surveys are still being carried out as if this change was absent. The obvious explanation is that time-series consistency is of prime importance, and that has led to conservatism in implementing new more cost efficient technology. It is thus important to realize that the apparent conservatism is rooted in the science demands, and not in reluctance to try new technology.

The question is how we can break this circle. To allow transition into more cost-efficient platforms, one solution may be to use sensors and platforms that augment and partially replace existing RV surveys. An illustration of this approach is the use of relatively cheap acoustic platforms to replace RV transects in acoustic surveys or the use of

AUV's in underwater video surveys (close to the cost). The advantage of this approach is that the data stream will be almost exactly the same as for the RV vessel, which makes the implementation much simpler, and that RV ship time can be freed to support new data collection requirements outlined above.

In addition to the transitioning approach outlined above, a more fundamental evaluation of data collection schemes should be addressed. This cannot be achieved by the traditional approach by starting to collect data, collect for a while, and then see what you get. The common approach in physical oceanography is to do an observing system sampling experiment (OSSE), where a model of the system is used to test out different sampling schemes before implementation. This can be done before the sensors are fully developed to ensure that the sensor development is targeted relative to the need, rather than a "what we can do with the existing technology approach".

There have been substantial method development within ICES, and the working group on acoustics and technology has been working on alternative sampling platforms for the last years, efficiently highlighting the possibilities for new data collection. However, the link to model developments (in a wide sense) and parameter estimation relevant to the advisory processes are less well developed. ICES are in a position to take the lead on this, but the link between technology development and data users, e.g. model developers, needs to be strengthened.

## 2.5 Spatial and temporal sampling needs (ToR v)

*ToR v) Identify major spatial or temporal needs that can only be met by additional survey resources.*

- The full list (from ToR I bullet 3) should include details of temporal and spatial resolution requirements.
- We should be identifying both where there are additional survey needs e.g. surveys in different season. In addition, where resources can be diverted because data are already collected at unnecessarily high spatio-temporal resolution. For example, a fishery survey every 2 years instead of one.
- In many cases the spatial sampling currently used on a survey e.g. station or transect spacing will be inappropriate to the additional sampling requirement. For example, oceanographic sections are difficult to occupy within most traditional fishery surveys. This could possibly be resolved with additional vessel days on the survey.
- This may also be true for the temporal resolution of sampling for additional data collection, but will heavily depend on the detailed requirement for each new data vector.

## 2.6 Information and data handling requirements (ToR vi)

*ToR vi) Identify and summarize any substantive processing and information handling requirements.*

- Any new data collection/sensor providing new data in the context an ecosystem survey needs an efficient data infrastructure planned in advance
- This should include inter alia:



- Format
- Structure
- Guidelines and policy
- Vocabularies
- Methodologies
- Ownership
- Context (collection, use etc.)
- Input from ICES Data Centre and DIG
- It should be recognized that different data streams would have substantially different requirements. At one end would be electronically collected data (e.g. temperature sensors) which can be databased relatively easily. At the other end would be data streams where actual biological material needs to be collected, processed, analysed and then archived. All this before a data stream analogous to, say, temperature, can be created. Ground-truthing and calibration data, plus data on any analytical steps will also be required, and will need to be archived and cross-referenced to the primary data.
- No single answer to this question exists. Each data stream is likely to have its own data handling issues, and these will range from relatively straightforward to highly complex.

### 3 Recommendations

Recommendation	Adressed to
1. An overview of the data already collected and the data needs are not easily available. The secretariat should establish a method to easily present: <b>a)</b> data needs from the assessment groups including the MSFD and <b>b)</b> an overview of all data that is collected from the ICES coordinated surveys. With support from the secretariat, SSGIEA and ACOM should be tasked to update <b>a)</b> and SSGIEOM should be responsible to update <b>b)</b> .	SSGIEOM, SSGIEA
2. The possibilities to implement new and more cost efficient technology needs to be addressed, and a joint ToR linking WGEKO, as the central ecosystem effects EG, with WGFASST/WGFSTFB allowing explicit linkage between technology groups and user groups must be established through SSGIEOM and SCICOM/ACOM, as WGEKO is an advisory EG.	SSGIEOM and SSGIEA