ICES WGISUR REPORT 2014

SCICOM STEERING GROUP ON ECOSYSTEM SURVEYS SCIENCE AND TECHNOLOGY

ICES CM 2014\SSGESST:03

REF. SCICOM & ACOM

Report of the Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR)

21–23 January 2014

Nantes, France

ICES International Council for the Exploration of the Sea

CIEM Conseil International pour l'Exploration de la Mer

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

Recommended format for purposes of citation:

ICES. 2014. Report of the Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR), 21-23 January 2014, Nantes, France. ICES CM 2014\SSGESST:03. 27 pp.

Contents

Executive summary

The Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR), chaired by Ingeborg de Boois, Netherlands, met in Nantes, France, 21–23 January 2014. Nine participants from eight countries joined the meeting.

In parallel, the Working Group on Improving use of Survey Data for Assessment and Advice (WGISDAA) met to join forces with respect to the first Term of Reference: Provide guidance on the adaptation of existing surveys to provide ecosystem data. During that activity the following issues were discussed:

1) The potential impacts of additional ecosystem data collected on survey fisheries abundance indices were discussed, as well as how to quantify these impacts and what the possible impacts may be on the stock assessments that use the survey data.

2) While the expectation may be a possible loss in precision of the fisheries abundance indices, mitigation of this kind of impact may be possible depending upon the type of survey design being used. In addition, the additional ecosystem variables being collected may actually be used improve the precision of the abundance indices by helping to explain temporal and spatial variation.

Within the second term of reference 'Provide guidance on the development of an ICES ecosystem survey approach' WGISUR created a checklist for the development of new platforms for ecosystem monitoring and research. Mindmapping lead to fruitful discussions, which resulted in a checklist that will be used by a number of WGISUR participants in 2014. Based on their experiences, the list will be revised next year.

With respect to the third term of reference 'Identify issues common to all surveys, set up workshops and manage them as appropriate', two activities for 2015 were proposed: (1) WGISUR will in the 2015 meeting work together with ICES Data Centre on how to combine data from different sources to provide information about the ecosystem monitored, and (2) WGISUR and WGFAST are going to write a theme session proposal on the use of new techniques to facilitate ecosystem monitoring.

The last term of reference 'Liaise with IEA groups, and others as appropriate (e.g. CWGMSFD), over data product needs and specification' was discussed by carrying out a force-field analysis. This analysis gave insight in the connections of WGISUR and helped to identify the needs for collaboration. Currently, there is very limited direct connection between the ICES IEA groups and WGISUR. Relationships between ICES IEA groups and WGISUR should be established or improved so that there is a framework whereby the IEA groups can provide information on data- and knowledge gaps with respect to ecosystems and WGISUR can advise how best to collect, store, handle, etc. the data.

1 Administrative details

Working Group name

Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR)

Year of Appointment

2014

Reporting year within current cycle (1, 2 or 3)

1

Chair(s)

Ingeborg de Boois, Netherlands

Meeting venue

Nantes, France

Meeting dates

21–23 January 2014

2 Terms of Reference a) – d)

2012/2/SSGESST19 The **Working Group on Integrating Surveys for the Ecosystem Approach** (WGISUR), chaired by Ingeborg de Boois*, Netherlands, will meet in Nantes, France, 21–23 January 2014 to work on ToRs and generate deliverables as listed in the Table below:

WGISUR will report on the activities of 2014 (the first year) by 1 April 2014 to SSGESST.

ToR descriptors

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
a	Provide guidance on the adaptation of existing surveys to provide ecosystem data	a) Science Requirements b) Advisory Requirements c) Requirements from other EGs	1.2, 1.4, 1.5, 1.7, 2.1, 2.4, 2.5	3 years	CRR
b	Provide guidance on the development of an ICES ecosystem survey approach	a) Science Requirements b) Advisory Requirements	1.2, 1.4, 1.5, 1.7, 2.1, 2.4, 2.5	Year 2	CRR
c	Identify issues common to all surveys, set up workshops and manage them as appropriate	a) Science Requirements c) Requirements from other EGs	1.2, 1.4, 1.5, 1.7, 2.1, 2.4, 2.5	yearly	Workshop Report

d	Liaise with IEA groups, and others as appropriate (e.g. CWGMSFD), over data product needs and specification	a) Science Requirements b) Advisory Requirements c) Requirements from other EGs	1.2, 1.4, 1.5, 1.7, 2.1, 2.4, 2.5	yearly List of data product needs

3 Summary of Work plan

WHEN	WHAT
Year 1	Workshop report, identfy next workshop
Year 2	Workshop report, Provide data product needs
Year 3	Completion of CRR

4 List of Outcomes and Achievements of the WG in 2014

1) The joint WGISUR/WGISDAA activity resulted in the following:

a) The potential impacts of additional ecosystem data collected on survey fisheries abundance indices were discussed, as well as how to quantify these impacts and what the possible impacts may be on the stock assessments that use the survey data.

b) While the expectation may be a possible loss in precision of the fisheries abundance indices, mitigation of this kind of impact may be possible depending upon the type of survey design being used. In addition, the additional ecosystem variables being collected may actually be used improve the precision of the abundance indices by helping to explain temporal and spatial variation.

A full overview of the results of this activity can be found in the WGISDAA 2014 report.

2) A checklist for new platforms suitable for ecosystem monitoring and research was developed. The first version of the checklist can be found in Annex 4a. The checklist will be used in 2014 by a number of WGISUR members involved in development of new vessels or refit processes for existing vessels. The final checklist will be presented in the deliverable of ToR b.

3) A force-field analysis was carried out to identify which groups influence or are influenced by WGISUR, which relationships should be intensified or loosened. The result of the analysis is in Annex 5. The analysis highlighted that if groups are not linked on a personal basis, it is difficult to create an information flow. This is currently the case for IEA groups and WGISUR, which might lead to suboptimal development of integrated ecosystem assessments. Citing WGMARS 2013: "It is important to explore the properties of the social networks in ICES as these may serve to enable or to constrain its capacity to provide integrated ecosystem assessments " (ICES, 2013, chapter 2).

Furthermore, the outcome of the analysis will help WGISUR to consider its position in a rapidly changing field.

5 Progress report on ToRs and workplan

5.1 ToR a: Provide guidance on the adaptation of existing surveys to provide ecosystem data

5.1.1 Joint activity WGISDAA/WGISUR

A joint activity with WGISDAA on the possibility to modify existing fish surveys without losing information relevant to stock assessments lead to a number of potential methodologies for further investigation of the survey. The topics for this activity were:

a) Evaluate the current level of precision for the survey estimates with respect to the maximum (theoretical) precision possible.

b) Evaluate impact in terms of changes in sample size for trawl stations used for abundance indices when adding additional activities.

c) Evaluate if and which design changes need to be made to accommodate the additional activities with the objective of minimizing any loss in precision of the survey estimates used for stock assessment.

As the activities are highly interlinked, the outcome is organized thematically and not by activity.

A full overview of the results of this activity can be found in the WGISDAA 2014 report.

The combined WGISUR/WGISDAA group.

5.1.1.1 Concepts

Impact on assessment and community data on cutting stations from Irish Sea Beam Trawl survey

By Sven Kupschus and Brian Harley

In 2011 Cefas carried out analysis on the effect of removing stations from the DCF funded Beam Trawl survey in the Irish Sea. The project had two strands, a) "The bootstrap approach" and b) "The Ecological approach".

a) "The bootstrap approach"
   This approach uses R to bootstrap the abundance indices calculation to give confidence intervals, and then use a Jack-after-boot to assign station leverage values per species at each age and year. To calculate an overall station importance these leverage values are averaged across a user-defined number of the most recent years, to give a value per age for each station. A user-defined weight (multiplier) is then applied to each age and species, and the remaining leverages are summed at each station, thus producing an age-combined leverage value for each species per station. The overall importance value is then simply the maximum (over all species) 'age-combined leverage value' per station.
   This process allows a selection of scenarios to be presented by removing varying numbers of fishing stations deemed to have lesser "importance" and the effect on the abundance indices can be observed.
b) "The Ecological approach"
   This approach uses 'Hierarchical Clustering' to determine clusters of species communities within the survey area. These will be used to determine the effect of station reduction on the species communities' data collection.
   The approach results in a set of scenarios, listing both the expected efficiency savings and the consequences to the abundance indices produced from strand a). In recent times there have been periods in which commercial landings data have deteriorated, and this created a heavy reliance on survey information in stock assessments. It is therefore imperative that the abundance indices supplied to ICES are not adversely affected by any efficiency gains.
   The analysis also gave an indication as to whether the reduction in fishing station numbers in each scenario would completely exclude any species communities proposed in work strand b). The removal of a community cluster would imply the potential cessation of data collection for certain species and hence a loss of data for ecosystem monitoring.

   With respect to the Irish Sea Beam Trawl survey, the analysis concluded the following:

   i. For plaice and sole assessments it was possible to reduce the numbers of stations sampled by up to 50% (depending on scenario) and not significantly affect the stock assessment of these stocks.
      However if doing so whiting assessment suffered. Also in doing this there was loss of complete communities and thus a reduction in the use of this survey in ecosystem monitoring.

ii. By reducing the number of stations by 20% there was no significant impact on any of the stock assessments or the communities covered.

iii. When the stock assessment model/method/parameters are changed, the current analysis does not take that into account, so current leverage information will change and then the stations removed may not be consistent with the current analysis.

The effect of collecting more ecosystem information during regular fishery abundance surveys on number of tows.

By Stephen Smith

Meeting the requirement for collecting more ecosystem information during regular fishery abundance surveys could result in the reduction in the number of survey tows being used to derive abundance indices. One measure of this impact could be the associated reduction in precision of the abundance indices as measured by the survey CV. There also could be a further impact on the actual stock assessment advice based on these abundance indices. One way of evaluating this impact is to carry the survey CV through the stock assessment analysis. However, CVs are currently not available for most of the surveys used in ICES for stock assessment and even if they were available experience elsewhere on incorporating CVs into stock assessment models has been limited and controversial.

Smith and Hubley (2014) investigated using a state-space assessment model to evaluate the common expectation that an increase or decrease in precision of the survey index would carry through to increased or decreased precision in the stock assessment advice. The state-space model allows for characterizing survey indices variability as observation error and model uncertainty as process error. The study indicated that the impact of increasing or decreasing survey precision (or CV) depends upon the concurrence between the annual changes in biomass as observed by the survey and those predicted by the model. Where these changes were aligned, changes in precision in the survey did carry over into changes in precision for model predictions such as current population biomass. However, where there was a lack of concurrence, the model would not only provide less or more precise estimates but also indicate a change in the biomass. Two such examples were presented in Smith and Hubley (2014) where stock status actually changed with respect to the reference points used.

5.1.1.2 Analyses

5.1.1.2.1 Decreasing number of tows

One of the anticipated impacts of adding more ecosystem data collection to cruises collecting data for fish abundance indices is a decrease in the number of tows or transects devoted to fish abundance indices. Changes in the coefficient of variation (CV) of the abundance index have been suggested as one measure of potential impact of the reduced number of stations on the survey indices.

The impact of reducing the number of tows on the CV was evaluated for the Western Channel (Q1SWECOS formerly the Q1SWBeam) beam trawl survey which uses a stratified random survey design. Reduction in the number of tows for this kind of survey may simply be accomplished by a proportional decrease across all strata. However, the variance of the abundance indices associated with this kind of survey design is a function of both the appropriateness of the strata boundaries and the

number of tows allocated to each stratum. A preliminary examination of the age 6 sole indices from the survey indicated that the CV could have been reduced with a reallocation of tows to some of the more variable strata.

The point of this demonstration was to show that there are tools available for the stratified random design that allow for improving the variance of the mean (and CV) without an increase in sample size. These tools are equally applicable in the situation where the sample size has been reduced. That is, changes to the allocation scheme could be made to maintain or even possibly increase the precision of the estimates even though the sample size has been reduced.

5.1.2 Presentations

The following presentations were given in relation to this ToR:

1) Don Clarke: Should we change our trawl? Choosing among competing objectives when we cannot achieve both.

This presentation reviewed the reasons DFO (Maritimes) are considering changing the trawl used during their surveys. The trawl being considered as an alternative is used in an adjacent geographic area and benefits from more stable geometry in relation to depth and bottom type. The design also reduces escape over the headline and under the footgear.

Comparative trawling has been conducted using back-to-back sets. Initial comparison of the catch indicates that the new trawl may provide improved indices of abundance for many fish but will reduce the number of invertebrate species caught, which is detrimental for an ecosystem survey. It was recommended that the value of the existing invertebrate data be investigated to determine if there is any real ecosystem information lost in a trawl change. In addition, the option of using alternative sampling modalities for benthic invertebrates should be considered, since tow duration would be reduced for the new trawl, potentially freeing up time for additional sampling.

2) Anne Sell: EU Project Joint monitoring Programme in the North Sea and Celtic Sea

A short presentation on the EU project "Towards a Joint Monitoring Programme for the North Sea and the Celtic Sea (JMP NS/CS) "was given in order to inform group members about this ongoing project and its status. The project started on 1 October 1 2013 and will continue until 31 March 2015. The ultimate goal is to propose a Joint Monitoring Programme, which will provide data required to fulfil the MSFD obligations in the North Sea and the Celtic Sea. Members of WGISUR are involved, especially in the Activities C and E, having the task to develop multidisciplinary approaches as well as tools for survey planning and evaluation.

3) Sven Kupschus: It's time for Truly Integrated Monitoring for Ecosystems

Integrated surveys are coming. The lure of efficiency through combining the monitoring requirements of the DCF and MSFD, as well as the potential for improving ecosystem science means the topic is attracting a lot of attention within Europe. However the spectrum of integration advocated by various institutions is wide. In the short term, adding indicator data collection onto existing surveys will satisfy current environmental monitoring requirements. However, the longer-term requirement to understand the linkages between ecosystem components and the reasons for

observed changes means that the current monitoring paradigm will become obsolete. In consequence, advisors will be unable to deliver the information that managers need to assess national and international compliance with GES status. Developing a fully integrated monitoring program focused on discerning the underlying ecological processes will overcome these difficulties by allowing managers to relate the effect of human and environmentally induced changes to impacts in the ecosystem. Such an approach is especially beneficial in the spatial management of marine resources when trying to quantify the benefits and risks associated with certain types of activities in specific locations. I equivalent situations status based monitoring of indices can at best identify risks, but not establish cause.

The TIME project funded by Defra (UK) intends to develop a truly integrated ecosystem monitoring program based on what we need to know about the ecosystem. It casts aside national boundaries and preconceived notions based on current monitoring and replaces this with a combination of general ecosystem principles and a detailed understanding of the temporal and spatial scales of these processes in the Celtic Sea. The resulting "ideal ecosystem monitoring program" is then trimmed back to what is possible given realistic financial and practical constraints as well as maintaining as much coherence as is possible in the interpretability of old timeseries and using other data sources where ever possible and effective. It does not mean we have to change everything, but those changes we need to make should be as effective as possible in moving us towards ecosystem understanding.

4) Dave Reid: Practical implications of including additional data collection in current surveys.

This presentation detailed the links between the CATDAT table of potential data products from fisheries surveys and the implications of including such data collection in practice. The key element considered was that of time implications on the survey. Some data collection e.g. acoustic, underway hydrography, CUFES) can be carried out on passage and would not need additional time. Some additional sampling could be done in downtime for the vessel, e.g. at night on IBTS surveys. But some data collection would likely be taken at stations, increasing the station duration, or require stopping in mid transect on transect based surveys. In particular additional time was identified as being required for some physical, chemical or biological oceanography, for plankton sampling, benthic sampling and habitat description.

5.1.3 Progress final output ToR a

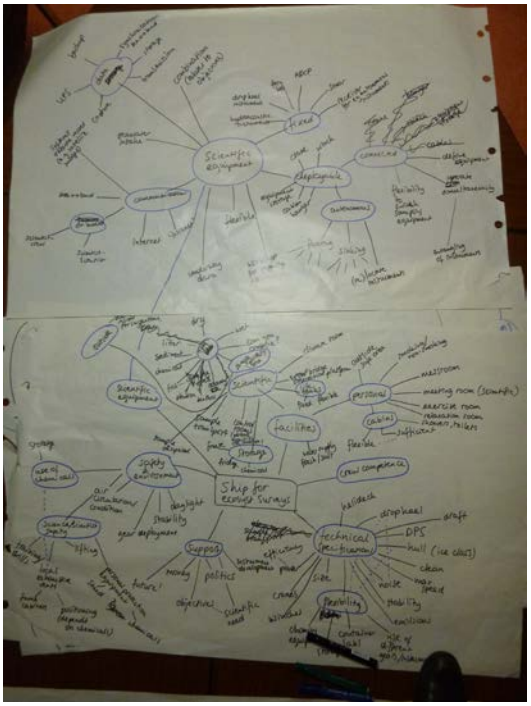
A first attempt was made to collect and collate all potential relevant information for the final output of ToR a, which is scheduled for 2016. In this way, information and knowledge gaps can be detected and filled in before the end of the multi-annual ToRs.

5.2 ToR b: Provide guidance on the development of an ICES ecosystem survey approach

5.2.1 Checklist for development of platforms suitable for ecosystem monitoring and research

The majority of the institutes represented, are planning to build a new vessel or conduct a refit of an existing vessel. In recognition of this, WGISUR developed a checklist to assist in the design and equipping of new platforms for ecosystem monitoring and research. The checklist is in Annex 4a, the underlying result of the brainstorm can be found in Annex 4b.

The checklist will be tested by members of WGISUR in 2014 and will be updated based on the experiences.



In general, it is recommended that the process of designing a new ship for ecosystem surveys is done in the international context. It might well be that one ship cannot meet all requirements for the ecosystem survey but that in collaboration with other countries, all capabilities can be included in an international fleet. This also means that all partners/countries involved should take responsibility for long-term engagement to programs for which collaboration is needed. In that way, building new platforms for ecosystem monitoring and research is not a standalone action, but is part of a larger activity: to build an international suite of platforms suitable for ecosystem monitoring and research.

Before the decision to build a new vessel can be made, the following questions have to be answered:

1) What are the main objectives for the activities to be carried out on the platform? It is preferred that the objectives of ecosystem monitoring and research are defined in an international context.

2) Which area will be the main operation area of the platform? E.g. inshore vs. offshore, size of the sampling area

3) What are the primary objectives for the platform?

a) Is building one platform sufficient to meet the objectives?

b) Would it be better to invest in two (or more) platforms, and if yes, should they have similar characteristics or should they be complementary?

c) What are the possibilities for collaboration with other organizations/countries to carry out activities having lower priorities?

4) When and how often will the monitoring/research take place? Does this influence the decisions following from questions 3 a-c?

The list above should be used iteratively in combination with the checklist in Annex 4a, to identify if all ecosystem monitoring and research objectives can be met on a single plat-form.

It is recommended to have a look at other vessels' design, especially when in use for particular tasks. WGISUR recommends some publicly available videos:

http://www.youtube.com/watch?v=tYRTkfk62bg (Canadian Ecosystem survey)

http://www.youtube.com/watch?v=FTDCj7ScNYo (Norwegian Transatlantic survey on board G.O. Sars)

http://www.youtube.com/watch?v=FObCYxAT0n4 (Dutch Beam Trawl Survey on board Tridens)

Mindmapping in WGISUR

5.2.2 Presentations

Presentations related to the ToR were:

1) Elena Eriksen presented results and experiences from the Barents Sea Ecosystem survey. In March 2014, the first meeting of the Working Group on Integrated Ecosystem Assessment in the Barents Sea (WGIBAR) will take place and the data of the Norwegian/Russian survey will be used. The presentation highlighted a few challenges for ecosystem surveys, of which handling of data of different sources and the processing of images and storage of the interpretation seemed to be the most urgent.

2) Jacques Massé: WGACEGG data collation and atlas

In 2013 WGACEGG met in Lisbon from 25 to 29 November 2013. Main objective was to produce material for a Cooperative Research Report on "Pelagic Surveys series for sardine and anchovy in ICES Areas VIII and IX (WGACEGG) - Towards an ecosystemic approach" which will be published at beginning of 2014.

During the last three years, WG members have worked along to integrate all parameters collected during pelagic surveys from 2003 to 2012 to produce a 10 years series of maps and data at the larger geographic scale as

possible and according to a standard way of processing. Data were issued from Pelagic surveys carried out by Ifremer, IEO, AZTI and IPMA. They were juveniles, adults, eggs and/or ecosystemic surveys. Methodologies are described in WGACEGG report (ICES, 2011 – Chapter 6). There is a strong wish for a common database gathering the integrated data to make all parameters available to WG members in order to carry out cross-analysis in the near future.

3) Geir Odd Johansen presented the recent development of the new database structure and data flow organization at IMR (Norway).

Over the last couple of years IMR has been revising the data infrastructure for survey data. To improve the data flow, a replicate data system is set up on our vessels, and data are synchronized with the data centre. Another key element is to link data collection, data storage, and tools to derive data products. This focus enables development of a fully integrated system, and bridge the gap between technical expertise, typically found at the data centres, the expertise on survey design and observation methodology, and the personnel that conducts the surveys.

The infrastructure makes it simpler to correctly perform surveys, and secures that all data from the survey are safely stored and are easy to retrieve on board as well as onshore. Parameters that characterize the surveys (strata systems, allocation to time-series, survey methods etc.) are explicitly stated in the meta data structure. Data products are facilitated by interfacing processing software to the data system, and thus ensuring that the information needed for the data product is available in the data system. There are several pitfalls to achieve the goal of a more efficient data infrastructure, and perhaps the most critical is to set up a system to prioritize the development. It is almost an endless list of feature requests and the complexity can easily become overwhelming. The focus on data products is useful for developing a good strategic plan, prioritizing the development and targets the effort.

5.2.3 Progress final output ToR b

A first attempt was made to collect and collate all potential relevant information for the final output of ToR b, which is scheduled for 2015. In this way, information and knowledge gaps can be detected and filled in before the end of the multi-annual ToRs.

5.3 ToR c: Identify issues common to all surveys, set up workshops and manage them as appropriate

From the discussions during the meeting (see also paragraph 5.1. and 5.4) it appeared that data handling, storage, collation and combining data for ecosystem assessment is an important topic. WGISUR feels responsible to give guidance on this topic. It was decided that next year a combined session with ICES Data Centre should take place during the WGISUR meeting.

Another important topic is the use of newly developed instruments for ecosystem surveys (see also paragraph 5.4). A combined WGISUR/WGFAST proposal will be prepared for and ICES ASC session in 2015: 'The use (at sea) and the analysis of data derived from new gear/equipment and its integration (or replacement) with traditional methods.' (Preliminary title).

5.4 ToR d Liaise with IEA groups, and others as appropriate (e.g. CSGMSFD), over data product needs and specification.

To identify the proper groups for WGISUR to collaborate with, the group carried out a force-field analysis. The result is in Annex 5.

The main outcomes of the analysis were:

- Relationships between ICES IEA groups and WGISUR should be established or improved so that there is a framework whereby the IEA groups can provide information on data- and knowledge gaps with respect to ecosystems and WGISUR can advise how best to collect, store, handle, etc. the data.
- It is recommended that SCICOM investigates the need for Ecosystem survey expert groups (maybe by Ecoregion). WGISUR defines its role as an advisory board for ecosystem surveys, but does not see how in its current form coordination of Ecosystem surveys by region, data transmission from the surveys to the IEA groups would fit in the activities of WGISUR. The people carrying out the surveys need to have a forum to exchange experiences, coordinate ecosystem surveys within Ecoregions, exchange and collate data and data processing methodologies. There should be a close link between the IEA groups and the ecosystem survey expert groups as well as a close link between the ecosystem survey expert groups by Ecoregion and WGISUR.
- Suggestions for 'one-off' collaboration:
  - WGISUR <-> DIG/ICES Data Centre, to provide advice on data collation and handling big data with respect to ecosystem surveys. The workshop will be part of WGISUR 2015.
  - WGISUR <-> WGFAST/WFTFB, to study new developments for sampling equipment to be used at ecosystem surveys (connected to the ship or autonomous).
- Considerations:
  - stock assessment and benchmark groups are important to WGISUR as the main objective of current fish surveys is to provide information for stock assessment. Recommendations and requests by those groups should feed into WGISUR via survey EGs. When additional tasks are going to be added to the current survey which leads to a change in survey design, benchmark groups should investigate the effect on the index, in collaboration with WGISDAA. In this case, WGISDAA is the main group for WGISUR as well as the benchmark groups to communicate with.
  - The linkage between stock assessment ad benchmark groups, WGISDAA and survey EGs could be improved to ensure information flows to WGISUR. It is recommended that SCICOM and ACOM discuss optimization of this communication line.
  - WGECO is important to WGISUR, but should feed into WGISUR via IEA groups.

6 Dissemination of working group outcomes

- The results of the WGISDAA/WGISUR activity will be presented at the WGCHAIRS meeting 28-30 January 2014 in Copenhagen by Kelle Moreau.
- A number of pictures and two pieces of text have been submitted to ICES communication officer, to put a message on the ICES Facebook page and, if possible, at the ICES website.

7 Revisions to the work plan and justification

No revisions.

8 Next meetings

WGISUR will meet 27–29 January 2015 at ICES, Copenhagen. Part of the meeting will be a joint session with ICES Data Centre, to discuss, investigate and work on data integration of different sources to provide information for integrated ecosystem assessment.

If required, ad-hoc WebEx meetings might be set up to deal with specific issues, e.g. development of new ships suitable for ecosystem monitoring and research.

9 References

ICES. 2011. Report of the Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas VIII and IX (WGACEGG), 21–25 November 2011, Barcelona, Spain. ICES CM 2011/SSGESST:20. 157 pp.

ICES. 2013. Interim Report of the Working Group on Maritime Systems (WGMARS), 4–8 November 2013, Stockholm, Sweden. ICES CM 2013/SSGSUE:06. 30 pp.

Smith, S. J., and P. B. Hubley. 2014. Impact of survey design changes on stock assessment advice: sea scallops. ICES J. Mar. Sci., 71: 320–327.

Annex 1: List of participants

NAME	ADDRESS	PHONE	E-MAIL
Ingeborg de Boois **(Chair)**	IMARES PO Box 68 1970 AB IJmuiden Netherlands	+31 317 487070	Ingeborg.deboois@wur.nl
Donald Clarke	531 Brandy Cove Road St. Andrews New Brunswick, Canada E5B 2L9	+1 506-529-5908	Don.Clark@dfo-mpo.gc.ca
Elena Eriksen	IMR PO Box 1870, Nordnes 5817 Bergen Norway	+47 55 23 53 51	elena.eriksen@imr.no
Geir-Odd Johansen	IMR PO Box 1870, Nordnes 5817 Bergen Norway	+47 55 23 53 78	geirodd@imr.no
Brian Harley	Cefas Pakefield Road Lowestoft, Suffolk NR33 7AW UK	+441502524254	Brian.harley@cefas.co.uk
Jacques Massé	Ifremer Rue de l'ile d'Yeux , B.P. 21105 44311 Nantes Cedex 3 France	+33240374169	Jacques.Masse@ifremer.fr
Kelle Moreau	ILVO Ankerstraat 1 8400 Oostende, Belgium	+3259569830	Kelle.moreau@ilvo.vlaanderen.be
Anne Sell	Thünen-Institut für Seefischerei Palmaille 9 D - 22767 Hamburg Germany	+49 40 38905 246	anne.sell@ti.bund.de
Mattias Sköld	Havsfiskelaboratoriet Turistgatan 5 453 21 Lysekil Sweden	+46 104784046	mattias.skold@slu.se

The combined activity with WGISDAA was attended by the people above and the following participants from WGISDAA.

NAME	ADDRESS	PHONE	E-MAIL
Stephen Smith **(Co-Chair)**	DFO Bedford Institute of Oceanography PO Box 1006 Dartmouth, NS Canada B2Y 4A2	+1 902-426-3317	Stephen.Smith@dfo-mpo.gc.ca
Dave Reid **(Co-Chair)**	Marine Institute, Rinville, Oranmore, Co. Galway, Ireland	+353 91 387431	david.reid@marine.ie
Corina Chaves	IPMA Instituto Português do Mar e da Atmosfera Av. Brasília 1449-006 Lisboa Portugal	+351 213 027 000	corina@ipma.pt
Sven Kupschus	Cefas Pakefield Road Lowestoft NR33 0HT UK	+44 1502 524454	Sven.kupschus@cefas.co.uk
Pierre Petitgas	Ifremer Centre Atlantique Rue de l'Ile d'Yeu BP 21105 44311 Nantes Cedex 03 France	+33 (0)2 40 37 41 63	pierre.petitgas@ifremer.fr
Kai Wieland	Technical University of Denmark National Institute of Aquatic Resources Nordsøen Forskerpark Postboks 101, Willemoesvej 2 9850 Hirtshals Denmark	+45 35883276	kw@aqua.dtu.dk

Annex 2: Recommendations

Recommendation	Adressed to
1. It is recommended that SCICOM investigates the need for Ecosystem survey expert groups (maybe by Ecoregion).	SCICOM (might be responsibility of SSGESST and SSGRSP Chairs)
2. The linkage between stock assessment ad benchmark groups, WGISDAA and survey EGs could be improved to ensure information flows to WGISUR. It is recommended that SCICOM and ACOM decide how to optimize this communication line.	SCICOM and ACOM (via Chairs, maybe to be discussed in e.g. WGCHAIRS)

Annex 3: Action list

Action item	Adressed to	Complete before	Status
1. Use and evaluate the checklist for desgn of platforms suitable for ecosystem monitoring and research. Provide feedback on checklist to Ingeborg	Corina, Anne, Kelle, Mattias, Geir-Odd	1 December 2014	
2.Highlight the limited information flow between IEA groups and WGISUR, and the wish for better collaboration to both SSGESST and SSGRSP Chairs	Ingeborg	1 February 2014	Complete
3.Write combined WGISUR/WGFAST ICES ASC proposal	Elena (lead), Ingeborg	1 June 2014	
4.Present combined WGISDAA/WGISUR activity at WGCHAIRS 2014	Kelle	1 February 2014	
5. Revise checklist for development of new platforms for ecosystem monitoring and research	Ingeborg	1 January 2015	

Annex 4a: Checklist for development of platforms suitable for ecosystem monitoring and research

How to use this checklist?

1) Answer the questions in step 1 (reasons to build the platform). For flow diagram 'How to develop an ecosystem survey', see http://www.ices.dk/community/Documents/Expert%20Groups/WGISUR/flow%20diagram_ecosystem%20survey_updated.pdf

2) Answer the questions in step 2 (technical specifications)

3) Check if the answers of step 1 and step 2 are in line with each other. If not, adapt one or both lists.

4) Go through checklists Step 3a, 3b, 3c, 3d

5) Check if the answers of all steps are in line with each other. If not, adapt one or more lists.

6) Think about and write down priorities of the objectives, and the related specifications. This may be useful when budget for the platform is limited and choices have to be made.

7) If you miss any important issue in the lists below, feel free to contact the Chair of WGISUR, Ingeborg de Boois, Ingeborg.deboois@wur.nl. The list below is still under development, so all comments are welcome.

Step 1: Reasons to build the platform

Before the decision to build a new vessel can be made, the following questions have to be answered:

1. What are the main objectives for the activities to be carried out on the platform? It is preferred that the objectives of ecosystem monitoring and research are defined in an international context.
2. Which area will be the main operation area of the platform? E.g. inshore vs. offshore, size of the sampling area
3. What are the primary objectives for the platform?
    a. Is building one platform sufficient to meet the objectives?
    b. Would it be better to invest in two (or more) platforms, and if yes, should they have similar characteristics or should they be complementary?
    c. What are the possibilities for collaboration with other organisations/countries to carry out activities having lower priorities?
4. When and how often will the monitoring/research takes place? Does this influence the decisions following from questions 3 a-c?

Step 2: Technical specifications

1. Which equipment (gears, instruments) will be used?
    a. Which facilities are needed to handle the equipment?
        i. cranes
        ii. winches
        iii. dropkeel
        iv. …..
    b. What is the maximum vessel speed needed for the survey?
    c. In what depth range is the equipment going to be handled?
    d. Where can the equipment be stored if not used?
    e. Which technical constraints apply to the operation of the equipment?
        i. noise levels
        ii. power
        iii. minimum/maximum speed during operation
        iv. ship's stability
        v. staying on position
        vi. ……
    f. How much flexibility is needed:
        i. Which equipment will be used simultaneously?
        ii. How often will equipment switches occur during the survey?
2. What is the geographical survey area?
    a. minimum/maximum depth (→ draft)
    b. oceanic conditions
    c. ice conditions
3. How much room is needed for:
    a. container labs
    b. safe gear handling
    c. storage

Step 3a: Safety and environmental requirements

1. General
    a. clean ship
    b. emission levels
    c. air circulation/condition
    d. smoking areas
2. Scientist safety
    a. Safety training
        i. before going to sea
        ii. On-board drills; where will they take place?
    b. Will samples be carried around?
        i. lifting limits
        ii. lifting support
    c. Which chemicals are going to be used?
        i. How many fume cabinets are needed?
        ii. How many local exhaust vents should be installed?
        iii. Where should the local exhaust vents be installed? (i.e. depending on the nature of the chemicals)
        iv. How much storage capacity for chemicals is needed?
    d. Where will the main working areas be located?
        i. Inside the ship, think about:
            - daylight
            - stability
        ii. On deck, think about:
            - safe gear deployment location
            - visibility
        iii. Which personal protection equipment will be needed?

Should there be storage capacity for personal protection equipment?

Step 3b: Scientific equipment

1. Which equipment is going to be used simultaneously?
2. How often will equipment switches appear during the survey?
3. How much space is needed to store the equipment?
4. Who is responsible for maintenance of the equipment?
5. Where will the maintenance/reparation of the equipment take place? (e.g. workshop)
6. Is registration of underway registration required?
7. Fixed equipment
    i. CUFES
    ii. Sonar
    iii. Receiver for autonomous devices
    iv. Ferry box
    v. Hydroacoustic instruments attached to the ship/dropkeel
    vi. ADCP
8. Deployable equipment
    a. Which deployable instruments will be used?
    b. What do you need to deploy the equipment?
        i. Cranes
        ii. Winches
        iii. …..
    c. Equipment connected to the ship
    d. Autonomous equipment:
        i. Which equipment will be used?
        ii. How will the equipment be located?
9. Communication facilities
    a. On-board
        i. Scientist-scientist
        ii. Scientist-crew
    b. Platform to outside
        i. Land (institute)
        ii. Information sources outside the vessel (e.g. satellite images, other platforms)
    c. Internet
    d. Intranet
10. Data
    a. Storage
    b. Backup
    c. UPS (uninterruptible power supply)
    d. Capture
    e. Transmission

Synchronization sea <-> land

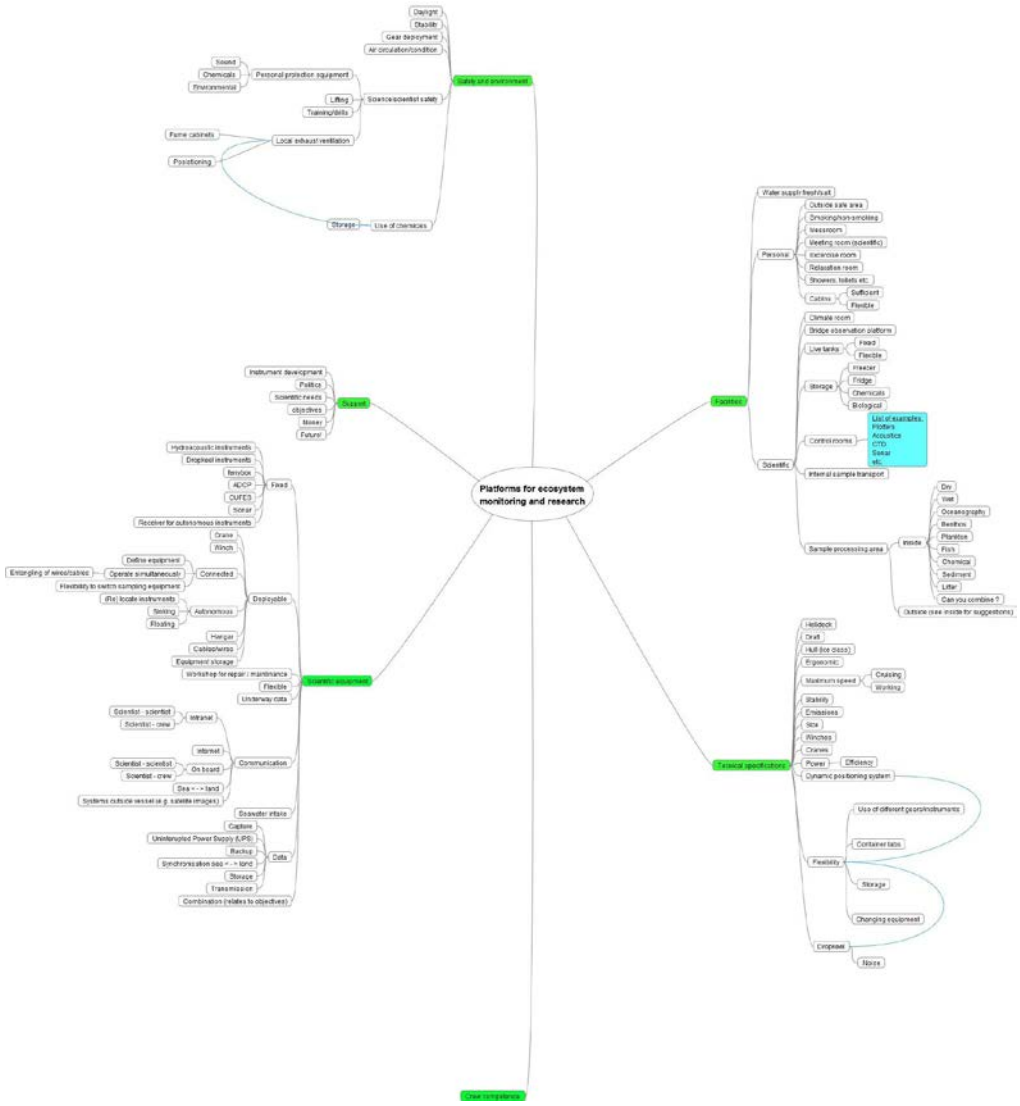
Step 3c: Scientific facilities

1. How will samples reach the location for analysis? Is transporting after collection problematic?
2. Which processing will take place simultaneously?
3. Which processing cannot be combined? (e.g. because of use of chemicals)
4. Where is (fresh/sea) water supply needed?
5. Live tanks:
    a. Size
    b. Design
    c. Flexible or fixed
6. Control rooms:
    a. Where should they be allocated?
    b. How many control rooms?
7. Outside sample processing facilities
    a. Dry processing facilities
        i. Fish
        ii. Benthos
        iii. Sediment
        iv. Plankton
        v. Oceanographic
        vi. Chemical
        vii. Litter
        viii. …..
    b. Wet processing facilities
        i. Fish
        ii. Benthos
        iii. Sediment
        iv. Plankton
        v. Oceanographic
        vi. Chemical
        vii. Litter
        viii. …..
8. Inside sample processing facilities
    a. Dry processing facilities
        i. Fish
        ii. Benthos
        iii. Sediment
        iv. Plankton
        v. Oceanographic
        vi. Chemical
        vii. Litter
        viii. …..
    b. Wet processing facilities
        i. Fish
        ii. Benthos
        iii. Sediment
        iv. Plankton
        v. Oceanographic
        vi. Chemical
        vii. Litter
        viii. …..

Step 3d: Personal facilities

1. Sleeping
    a. How many scientists will be on board?
    b. Individual cabins vs. shared cabins? Think about:
        i. trip duration
        ii. shift work
        iii. flexibility with respect to number of beds
        iv. male/female scientists
2. Personal hygiene
    i. Showers: personal showers vs. shared
    ii. Toilets
    iii. Lavatories
    iv. Laundry
3. Meeting rooms: think about sharing with crew vs. scientists only
    a. Relaxation: inside and outside
    b. Exercise room
    c. Scientific meeting room
    d. Messroom

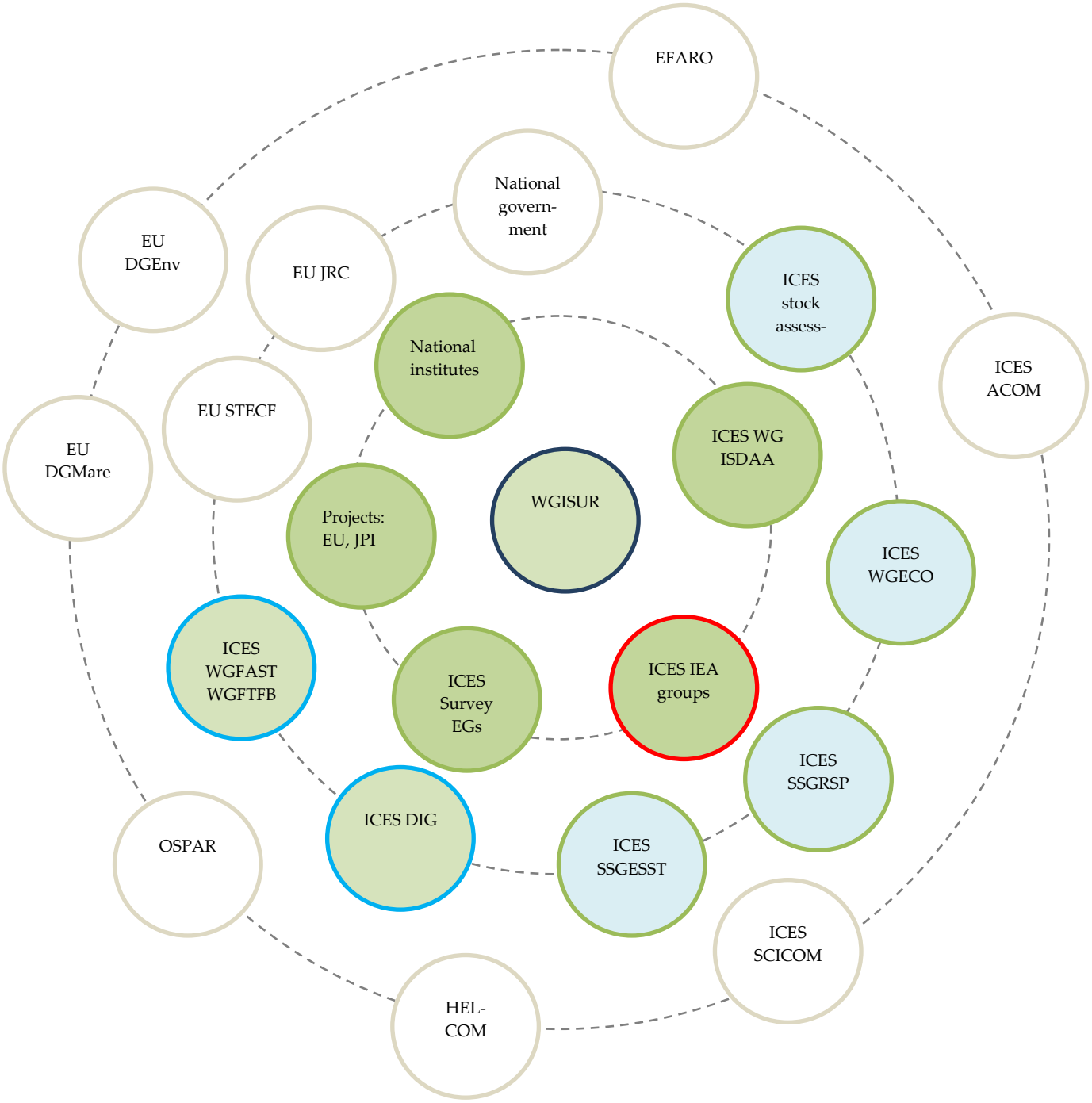
Annex 4b: Result of brainstorm about development of platforms suitable for ecosystem monitoring and research



Annex 5: Force-field analysis

Symbols used in the figure (next page)

Symbol	Influence	Communication	Frequency of contact
	Direct	Should be improved	Continuous
	Direct	OK, although risk of person-based linkage and communication	Continuous
	Direct	OK, but only needed in case of 'one-off' activities	Interesting for 'one-off' activities
	Indirect	Via other groups	
	Indirect	Via other groups	



Other distant influencers: FAO, UN, data repositories, Arctic Council, Diadromous fish committee.