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

24–26 January 2012

IJmuiden, the Netherlands



**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](http://www.ices.dk)  
[info@ices.dk](mailto:info@ices.dk)

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## Executive summary

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The Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR) met in IJmuiden, the Netherlands, 24–26 January 2012. Ingeborg de Boois chaired the meeting as Dave Reid could not join the meeting due to personal circumstances. Ten participants from seven countries attended the meeting.

The WG had four new Terms of Reference to address, and continued to address four other terms of reference that were set up to be ongoing. The first four ToRs were as follows:

- a) Develop surveys to be applicable to the ecosystem approach;
- b) Identify expert groups and develop terms of reference for them;
- c) Identify issues common to all surveys, set up workshops and manage them as appropriate;
- d) Identify complementary technology to add value to surveys;

The first of these essentially describes the principle aim of the group, and was the focus of the more directed ToR presented below. Following the 2011 meeting of this WG, a table of potential data products and the feasibility of producing them was developed. This was for all survey métiers and focused on data provision for the MSFD 11 descriptors. The table was passed to a series of other ICES Expert Groups under ToR b). An essential component of this meeting was evaluating these responses, updating the table, and feeding the findings back to the EG that had responded, as a continuing delivery under this ToR. Details of this process are presented below. The updated table of potential data products from fishery surveys, and how this could be achieved was carried out in the context of ToR c). While complementary technologies (ToR d) were considered briefly in the table, this ToR continued to be developed *inter alia* with the other, more directed ToR.

The Expert Group focused its attention for this meeting on the remaining four Terms of Reference:

- e) Evaluate feedback from ICES ecosystems EGs to the CATDAT data tasks table, and the feedback from the survey EGs on the options within their surveys.
- f) On this basis define the requirements for ideal fisheries ecosystem surveys and develop a descriptions of such surveys;
- g) Provide guidance on the adaptation of existing surveys to provide an approach to the ideal fishery ecosystem survey;
- h) Report on any implications from this exercise for the planning of future surveys.

A number of other ICES EGs responded to requests to examine the CATDAT table produced at the 2011 meeting. The results from this exercise are presented in **Section 3 Data cataloguing and address ToR e).**

Detailed responses were provided by a number of survey Expert Groups; WGNAPES, WGMEGS, WGACEGG and IBTSWG. WGBIFS also provided feedback, and WGBEAM considered that the IBTSWG was representative of their position, and WGEKG took the same view with respect to WGMEGS. The responses from these groups covered most of the major survey métier carried out under ICES auspices; Trawl surveys (Otter and beam), Acoustic surveys, and Ichthyoplankton surveys. The only major métier unrepresented in the responses was TV surveys for *Nephrops*, which may be seen as probably initially too specialised for obvious adaptation to

EAFM surveys, although the methods used have significant value for such surveys. An initial evaluation was made for TV surveys and is described further below.

As a general overview of the survey group responses, it was noted that, for most of this increment in data collection, there would be a need for additional resources (People, time, equipment, skills). They also noted the following:

- Appropriate experts in a particular data type would be needed to help plan data collection.
- Additional data would need additional data/material storage.
- While collection of material at sea could be straightforward, post analysis could be much less so, e.g. stomach contents or plankton samples.
- Sampling that required vessels slowing or stopping would potentially compromise quasi-synoptic surveys.

These responses were used to refine the CATDAT table from 2011, and this will be available on the ICES website.

Responses were also provided by two ecosystem based EG, WGECO and WGOOFE and these are discussed further below.

The next step taken by the WG was to examine what was needed to design the “ideal” ecosystem and fishery survey, or as close to that as we could attain. This addressed **ToR f**), and is presented in **Section 4**.

The group started the process using mind-mapping methodology, working out all the steps and scientific support needed to correctly design the ideal survey. This in turn led to a flow diagram of the components and needed on each step of designing such a survey. The components of the process led from exploration of the problems, through design of the survey and the sampling programme, to testing, carrying out the survey in anger, and then the use of the results. The report also covers issues of time-series continuity, exact definition of the “ecosystem” that we plan to survey (pressures, states, impacts etc.), and whether such surveys could or should be national or international and how this might link to the national MSFD programmes.

An alternative approach to designing a complete new designed-for-purpose survey would be to adapt existing surveys to some extent. This is not the “ideal” but is a pragmatic approach to that.

The types of supplemental data collection were presented in the CATDAT table from the 2011 meeting, but detailed comments were provided by WGECO, and WGOOFE. A key observation was that the essential first step was to identify the real data needs and priorities within those. Both of these EGs tried to advise on this, but a more holistic view is needed from a wider base.

Particular areas emphasized by WGECO and WGOOFE were:

- Stomach sampling, including seabirds and mammals as well as fish.
- Continuous underway oceanographic sampling in the context of chemical and physical processes. This could also include appropriately designed station based data collection.
- Information on phyto- and zoo-plankton was identified as a key data gap, and continuous sampling systems (e.g. LHPR) could be used. Much more intensive use of samples from ichthyoplankton surveys would be appropriate
- Where invertebrates are taken in the surveys and thus far not recorded, this should be improved, although species identification issues were recognized.

- Megafauna sight surveys should ideally be routine supplements, although would clearly require additional personnel, but would yield important data without impact on the core the survey and.
- Where visual or acoustic recording systems were used, the potential for more seabed habitat data should be maximized.
- Any litter caught should be recorded.

Based on this input and analysis, the WG went on to examine what scope existed for making such alterations in the context of existing surveys. It had been identified in 2011 that changes to surveys fell into three broad categories:

- “Status quo”, where appropriate ecosystem data were already collected but not necessarily made full use of
- “Light”, where such data could be collected with minimal changes and additional resources
- “Major”, where such data could be collected but at substantial additional costs and changes.

Intersessional work had indicated that this type of evaluation could only be done at the level of a particular survey métier AND vessel, as different research vessels had different capabilities. The WG then focused on a series of individual vessel and survey métier combinations and provided an analysis of what data were, or could be collected, and what resources would be needed for that collection. The surveys covered were:

- Norwegian Barents Sea ecosystem survey
- Belgian International Beam Trawl Survey
- English IBTS
- German mackerel and horse mackerel egg survey
- French Pelagic Ecosystem survey – PELGAS
- Scottish *Nephrops* TV survey

For data not already collected the analyses indicated whether collection would involve light or major additional resources, and the same for the analysis of the material/data. In broad conclusion, significant improvements could be made for data/material collection in the light category, but that most additional post-processing would involve major resources.

The WG also evaluated a number of these surveys against the “ideal”. The results of this work are presented in **Section 4.4.**, and addresses **ToRs g) and f)**. Surveys evaluated in this context were:

- Norwegian Barents Sea ecosystem survey
- French Pelagic Ecosystem survey – PELGAS
- IBTS
- Mackerel and horse mackerel egg survey

Not surprisingly, the Norwegian survey is closest to the ideal, but even this survey would entail improvements to reach the “ideal”. Changes needed in the IBTS or the mackerel egg survey would be commensurately greater. The WG recommended that the Norwegian ecosystem surveys be evaluated in detail, in terms of their current design and achievements, in terms of potential improvements, and as a model for the development of other designed-for-purpose fishery ecosystem surveys. The WG proposed that this be carried out as an ICES Workshop on Evaluation of current ecosystem surveys (WKECES) to be held in November 2012. This also addresses **ToR c)**.

In conclusion, the WG has taken the next step in detailing what is required to develop fishery ecosystem surveys both as an ideal, and as a pragmatic development of existing surveys, while maintaining time-series integrity.

## 1 Opening of the meeting

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The terms of reference were:

- a) Develop surveys to be applicable to the ecosystem approach;
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- c) Identify issues common to all surveys, set up workshops and manage them as appropriate;
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- e) Evaluate feedback from ICES ecosystems EGs to the CATDAT data tasks table, and the feedback from the survey EGs on the options within their surveys.
- f) On this basis define the requirements for ideal fisheries ecosystem surveys and develop a descriptions of such surveys;
- g) Provide guidance on the adaptation of existing surveys to provide an approach to the ideal fishery ecosystem survey;
- h) Report on any implications from this exercise for the planning of future surveys.

The report contains a short outline of the feedback on the 2010 WKCATDAT table (Section 3) as provided by survey coordination EGs as well as WGECO and WGOOFE. The updated table is available as a separate Excel file.

The main components of the ideal ecosystem survey are described in Section 4.1, and the steps leading to the survey in Section 4.2 and 4.3.

## 2 Adoption of the agenda

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The agenda was adopted without any changes. The agenda is in Annex 2.

### 3 Data cataloguing

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#### 3.1 Feedback from survey EGs

WGISUR 2010 recommended to the survey coordinating groups (ICES, 2010, Annex 4): Evaluate the prioritized catalogue of data needs for the EAFM developed by WKCATDAT/WGISUR and report to WGISUR on what is currently provided, could be provided but is not currently, and what could be provided with modification. For the latter category please provide details of what these changes would be and any implications.

WGNAPES, WGMEGS, WGBIFS and IBTSWG provided the following points of attention:

- 1) Additional tasks undertaken to address the 'ecosystem approach' are likely to impact the existing surveys, unless sufficient additional resources (staff, ship time, equipment) become available. For a number of surveys, it is unlikely that most additional tasks can be conducted without these additional resources.
- 2) Lack of expertise in the additional survey tasks makes it difficult to exactly specify additional staff, equipment and financial requirements without consulting experts in the task related research fields.
- 3) Any additional tasks that require the survey vessels to stop or slow down or divert course from the original survey plan will seriously impact the quasi-synoptic nature of WGNAPES and WGMEGS surveys.
- 4) Established systems for survey data storage could put constraints on the ability to store data for the EAFM. Post-survey database developments for new data collection is not taken into account and should be included. Each individual country will be providing views on what good environmental status (GES) might be for those descriptors, including methods that could be used to determine status.
- 5) The need for additional resources for data collection during ichthyoplankton surveys might differ for those on fish trawl surveys
- 6) The need for additional laboratory facilities after the survey to analyse samples depends on the lab: a lab might not have any room for more analysis, so this should always be checked.
- 7) It is recommended that the production and delivery of this information is authorized by ICES. For the trawl surveys the DATRAS database and the new ICES EcoSystemData could be used for this purpose for standardizing the procedures. For ichthyoplankton surveys, a database is under development which might provide information. For acoustic surveys, it is recommended that ICES Data Centre creates a database as platform for the analysis and delivery of such information.

A short outline of the other reactions by survey EG is given below.

WGBIFS did not review the table, but discussed for which descriptors of the MSFD it can deliver information, based on the surveys conducted under its coordination. This information refers to the practices used currently during the surveys, and not the practices that can be potentially implemented in future activities (see also ICES, 2011a for more information).

IBTSWG provided additions to the original table, and discussed for which descriptors of the MSFD it can deliver information, based on the surveys conducted under its coordination. This information refers to the practices used currently during the surveys, and not the practices that can be potentially implemented in future activities (see also ICES, 2011b).

WGMEGS specified the comments which were already put into the data catalogue and identified elements which could be incorporated into the work of WGMEGS (see also ICES, 2011c).

WGNAPES started identifying the tasks that are already done during the surveys as well as tasks that could be done during future surveys. Table 5.4 in the WGNAPES report (ICES, 2011d) identifies elements which could be incorporated into the work of WGNAPES, which might contribute to a broader 'ecosystem approach'.

The Excel file can also be found on the WGNAPES SharePoint <http://groupnet.ices.dk/wgnapes2011/default.aspx>.

WGACEGG tried to review the table following the WGNAPES report but had difficulties filling the columns, as data collection highly varies by country and ship. Representatives of the group however reviewed the table during WGISUR, and added some tasks.

WGBEAM: No review, basically following review from IBTSWG.

WGEGGS: No review, following WGMEGS.

WGIPS: No review.

WGNEACS: No report available for 2011.

SGNEPS: No report available for 2011.

### 3.2 Feedback from other EGs

EGs not dealing with survey coordination, received the following recommendation: Evaluate the table cataloguing the data needs for the EAFM produced by WKCAT-DAT (ICES, 2010). Provide index of priorities to each data task, 3 – primary, 2 – important, 1- desirable and, 0 – not needed. Also provide a brief description of why the priority has been assigned at this level, and what it would be used for. If possible address the accuracy, precision and resolution issues for these data tasks, in the form of a brief description of the degree of accuracy and precision required in the data, possibly including the positioning of samples, i.e. random locations or adopting the often fixed sample locations of trawl surveys. This should also include the optimal spatial and temporal resolution of the samples, i.e. would samples taken at IBTS trawl stations be useful, or would there need to be more stations.

WGECO (ICES, 2011e) and WGOOFE (ICES, 2011f) reviewed the table and prioritized the tasks for adaptations of surveys to match the ecosystem approach. The priorities were added to the original WKCATDAT table and discussed by WGISUR (Section 4.3).

WGEAWESS: No review.

WGINOSE: No review

WGEAWESS: No review

WGIAB: No review

## 4 Moving towards an ecosystem survey

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Essentially, there are two ways to move towards an ecosystem survey:

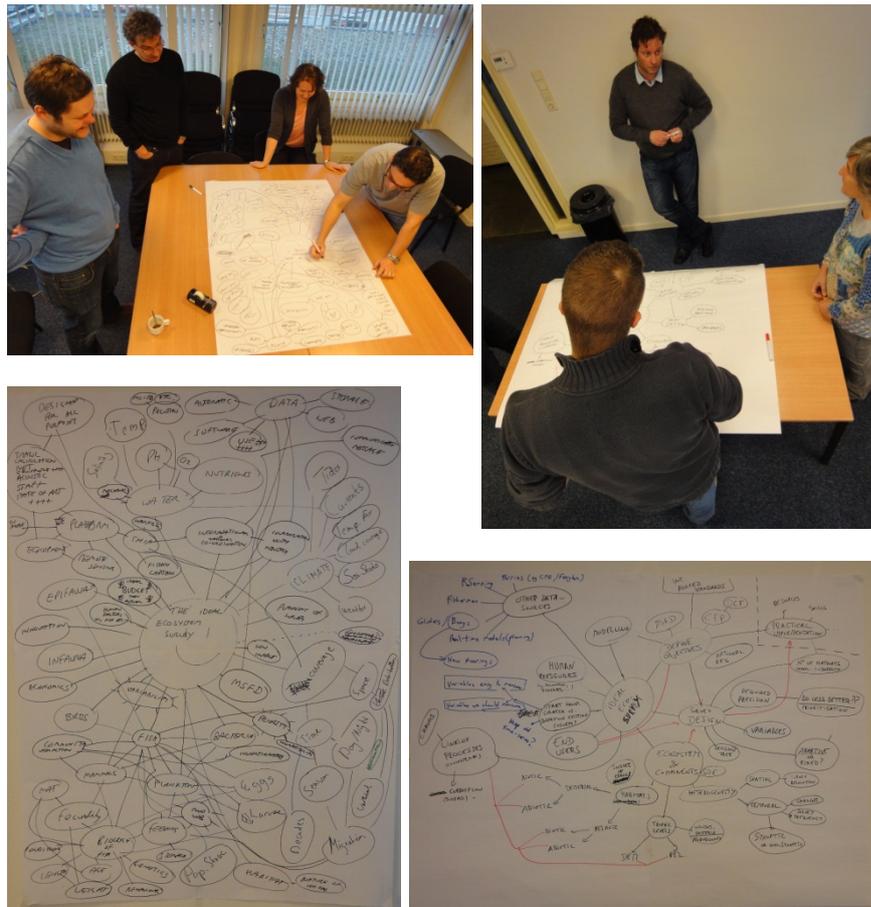
- 1 ) Change survey objectives and create new priorities (Section 4.2).
- 2 ) Add additional tasks to the current survey, keeping the original objectives as first priority (Section 4.3).

Both paths will lead to valuable information, and it depends on the current objectives including the use of the data after the survey to which extent objectives of a survey can be changed. Adding tasks to an existing survey will only occasionally lead to 'the ideal ecosystem survey' covering the full ecosystem, or matching all MSFD descriptors. However, a newly created ecosystem survey will put constraints on precision levels of some information collected, which subscribes the need for prioritization.

With respect to coordination of the surveys, adding additional tasks to existing surveys can be done within the current ICES survey expert groups. If however, new ecosystem surveys develop, a coordinating group for those surveys is highly recommended.

### 4.1 What does a full ecosystem survey look like?

WGISUR created two mind-maps about 'the ideal ecosystem survey' (Figure 4.1.1), which were put into a final mindmap (Figure 4.1.2, also available as a separate pdf document at the WGISUR 2012 report site, and as a freemind document (download via <http://freemind.sourceforge.net/wiki/index.php/Download>)).



**Figure 4.1.1. WGISUR creating mindmaps.**

From the mindmaps and the discussion, it appeared that the ideal ecosystem survey should be considered as a very complex project, as it deals with many different sampling strategies, equipment, expertise fields, etc.



## 4.2 How to start a new ecosystem survey?

One of the major questions in the design of an ecosystem survey is which ecosystem is going to be monitored, as 'the' ecosystem does not exist. Pressures, threats and so objectives, will vary. If an ecosystem cannot be monitored on a national level as it is spread out to neighbouring countries, international collaboration is highly recommended.

When current surveys are changed into one or more ecosystem surveys, current time-series should be taken into account. Data from fish surveys are used for fish stock assessment, and so, the time-series cannot be changed without consulting the assessment working groups. This does not necessarily mean that it is not possible to design an ecosystem survey. One of the options for internationally coordinated surveys could be to leave the survey as it is for a number of countries, and to start an ecosystem survey with other countries. After some time the parallel time-series can then be compared and maybe translated into each other.

As an ecosystem survey is complex (see Section 4.1), it is very important to follow a clear procedure when designing it, on one hand to manage expectations and on the other hand to be able to respond to unexpected situations. WGISUR defined the outline of the process, including the major steps that have to be taken into account (Figure 4.2.1). The flow diagram follows the regular steps for designing a new survey, but as many parties have to and will be involved in the design and conduction of an ecosystem survey, it is very important to communicate clearly to keep all parties working together along the same line.

The teams involved in the different phases in the flowdiagram might vary as the tasks per phase require different skills. It therefore is important to create clear output at the end of each phase, and to evaluate at the end of every phase if the output is in line with the output of earlier steps.

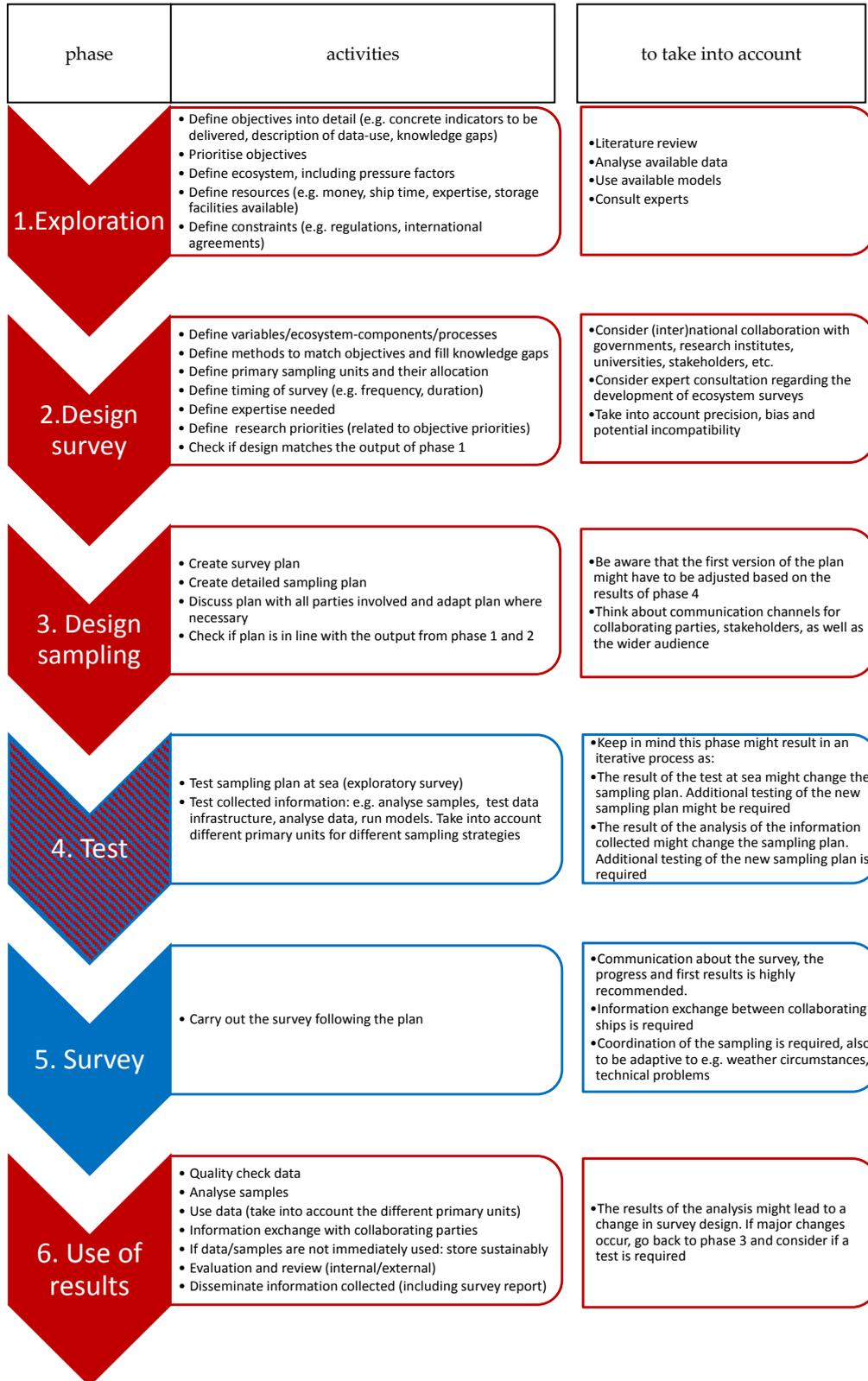


Figure 4.2.1. Flow diagram for starting an ecosystem survey (red boxes=on land, blue=at sea. Phase 4 (testing) at sea and on land).

### 4.3 Add tasks to existing surveys

Adding tasks to existing surveys can be a very good method to obtain more data related to the ecosystem (e.g. Dickey-Collas *et al.* (2011)). The main difference with creating an ecosystem survey is that the primary objective remains the same, and so, priorities are clear.

WGISUR worked on potential additional tasks from two directions. First of all, the evaluation of WGECO and WGOOFE (see Section 3.2) was used to prioritize additional tasks, and to discuss the level of difficulty and potential constraints for the additional data collection (Section 4.3.1). Second, the additional columns as already filled in by WGNAPES (see Section 3.1) were filled in for a number of surveys by country (Section 4.3.2).

#### 4.3.1 Potential additional data collection

Carrying out additional tasks should only be done when the objective for the data collection is clearly defined, as the preferred method might vary between objectives. It should be mentioned that in some cases the resources needed for sample processing are high. They should be taken into account before the sampling starts. If expertise on a specific field of interest is low, collaboration with other parties (institutes, universities) might solve the gap, as it is not necessary that not all samples are processed by the institute collecting the samples.

Furthermore, it is important to realize that for the same task, the burden of additional data collection can vary between countries. For example, for those using an electronic measuring board with a scale included, providing information for length-weight relationships in fish is only one extra click away, whereas for others it might take more actions. In an internationally coordinated survey, this might result in different additional data collection by ship. As long as the spatial and temporal coverage is equal, this might be an effective way to collect additional data during the survey.

Based on the WGECO and WGOOFE evaluation, it is recommended that if the resources allow, the following additional tasks are carried out (no ranking):

Fish and shellfish (survey specific)

- Stomach sampling: frequency and number per species might depend on the objective. If there is high spatial autocorrelation, than few samples at one place, and otherwise many samples at one place (e.g. diurnal pattern). Levels of data collection and analysis should be based on the objectives and be defined before sampling starts. Stomach samples can provide information for foodweb models and to monitor ecosystem functioning, but also for stock assessment purposes. For example, Norway uses cod stomach content in the capelin assessment. If any dead top predator (bird, mammal) is available, either from stranding or at open sea, it is encouraged to analyse the stomach content.
- Additional biological data.

Physical and chemical oceanography (e.g. CTD, chlorophyll, oxygen, nutrients, turbidity, etc.)

- Continuous underway oceanographic measurements (from the ship), continuous underway oceanographic measurements (autonomous devices): added values regarding this type of data are the real-time transmission of

the data from the ship to oceanographers. Underway measurements could be a cheap way to collect additional hydrographic data.

- Station oceanographic measurements, water movement, station nutrient samples: The hydrographic gear deployed depends on the objective. A physical oceanographer will need different data than a fisheries oceanographer. The added value of hydrographic data from fisheries surveys for physical oceanographers is spatial coverage, as the oceanographic samples are taken on fixed stations. The number of stations to provide a reliable map depends on the number of gradients.

#### Biological oceanography

- Continuous phytoplankton samples
- Station zooplankton samples (towed), station zooplankton samples (dipped), continuous zooplankton samples: zooplankton is considered as one of the missing links in ecosystem research. When multifrequency echosounders and analysis software, and image-analysis expertise are present, acoustic zooplankton (density, distributions, and species types) research is a relatively easy way to monitor zooplankton. As with acoustic fisheries research, acoustic zooplankton research needs to be validated by fishing, preferably stratified. Optical zooplankton samples take a lot of effort to sort and identify. Measuring the volume of zooplankton is a valuable measure which requires not too much time. The preferred method depends on the objective.

#### Invertebrates

- Infauna: sampling infauna during fisheries surveys requires dedicated time at sea and resources for sample processing.
- Epifauna (towed): if there is epifauna in the catch, record the information. It requires however expertise to identify the species. As a result, it can be considered to decide upon a standard species list, or decide not to identify species to the lowest taxonomic level, but to a higher level as the required identification level might vary between objectives.
- Epifauna (video): when a camera survey is carried out, it is easy to use it for other species than the target species (e.g. during *Nephrops* surveys). A camera could also be installed on the towed boy at the end of an open trawl (also applicable to fish).
- Pelagic: if pelagic invertebrates are in the catch, record them. Decide upon the taxonomic identification level before the survey.

#### Megafauna

- ESAS sampling (birds, sea mammals): ichthyoplankton surveys as well acoustic surveys are highly suitable for ESAS sampling. It is recommended that observers are actively approached to join the survey.

#### Habitat description

- Camera [towed/dropped], sidescan sonar, multi beam echosounder: collection does not take any time when the devices are available; however the analysis takes time and effort.

### Pollution

- Sinking litter: it is easy to collect and to register sinking litter from bottom trawls.
- Floating litter: might be taken into account by mammal/bird watchers.

### Environmental conditions

- Weather conditions (manually recorded), weather conditions (meteo station on board), sea state (manually recorded), sea state (wave recorder on board): add value if available real-time, especially when continuously recorded (see also 'Physical and chemical oceanography').

#### 4.3.2 Evaluation of the current state of existing surveys

WGISUR completed the extra columns on the additional task WKCATDAT 2012 table, using a survey that they were experienced with, to give insight in the current sampling and the potential added value of the surveys. As for all contributors it was going to be difficult to fill the original five columns in, were transformed in to seven columns and used by the group to describe whether data are being used and if it is not, what additional resources would be required. As a result, the table now also is a useful decision-making tool. Every survey identified its primary aims and then filled the columns out keeping these in mind and any decisions on whether tasks can be carried out and the resources that would be needed, ensured that the primary aims were still completed.

It needs to be noted that when looking at each of the individual tasks it maybe that the overall additional resource needed is not great but when combining them all together it might be that the final additional resource is massive.

Codes were used to fill out the columns, reflecting the potential, frequency or resource type (EQ = Equipment, EX = Expertise, P = People, T = Time, F = Facilities, Y = Yes, N = No, NA = Not applicable, Occ = Occasionally, L = Light, M = Major, NP = Not Possible, Par = Partially).

#### 4.4 Comparing current surveys with the ideal survey

As an exercise, WGISUR investigated which steps would be required for a selection of surveys to move from their current state to the ideal ecosystem survey (see Section 4.1), either keeping the original objectives or changing the objectives. The examples are given in the boxes below (Figure 4.4.1). It is not surprising that for a survey designed as an ecosystem survey (example 1) is easier to reach the ideal survey state than for surveys not designed for that purpose. During the exercise it became clear that a definition of 'the' ecosystem is a first need, as one of the surveys (example 2) covers the pelagic ecosystem to a large extent, but as a result does not spend any effort with respect to the demersal ecosystem. Furthermore, the exercise showed that a survey targeting one or two fish species using very specific methods, cannot be transformed into an ecosystem survey without changing the objectives and leaving the old time-series (example 3), whereas a survey designed for a wider range of species (example 4) might be turned into an ecosystem survey without losing its original objective.

As time was limited during this meeting, it is recommended that a survey expert group fully carries out the exercise and provide feedback to WGISUR on the result as

well as on the flow diagram (Section 4.2) and the content of the mind-map (Section 4.1). WGBEAM offered to take that task.

As the Joint Barents Sea ecosystem survey runs for five years now, and the example showed that improvements can be made, a workshop to evaluate this survey is suggested. Annex 5 contains the full proposal for this workshop.

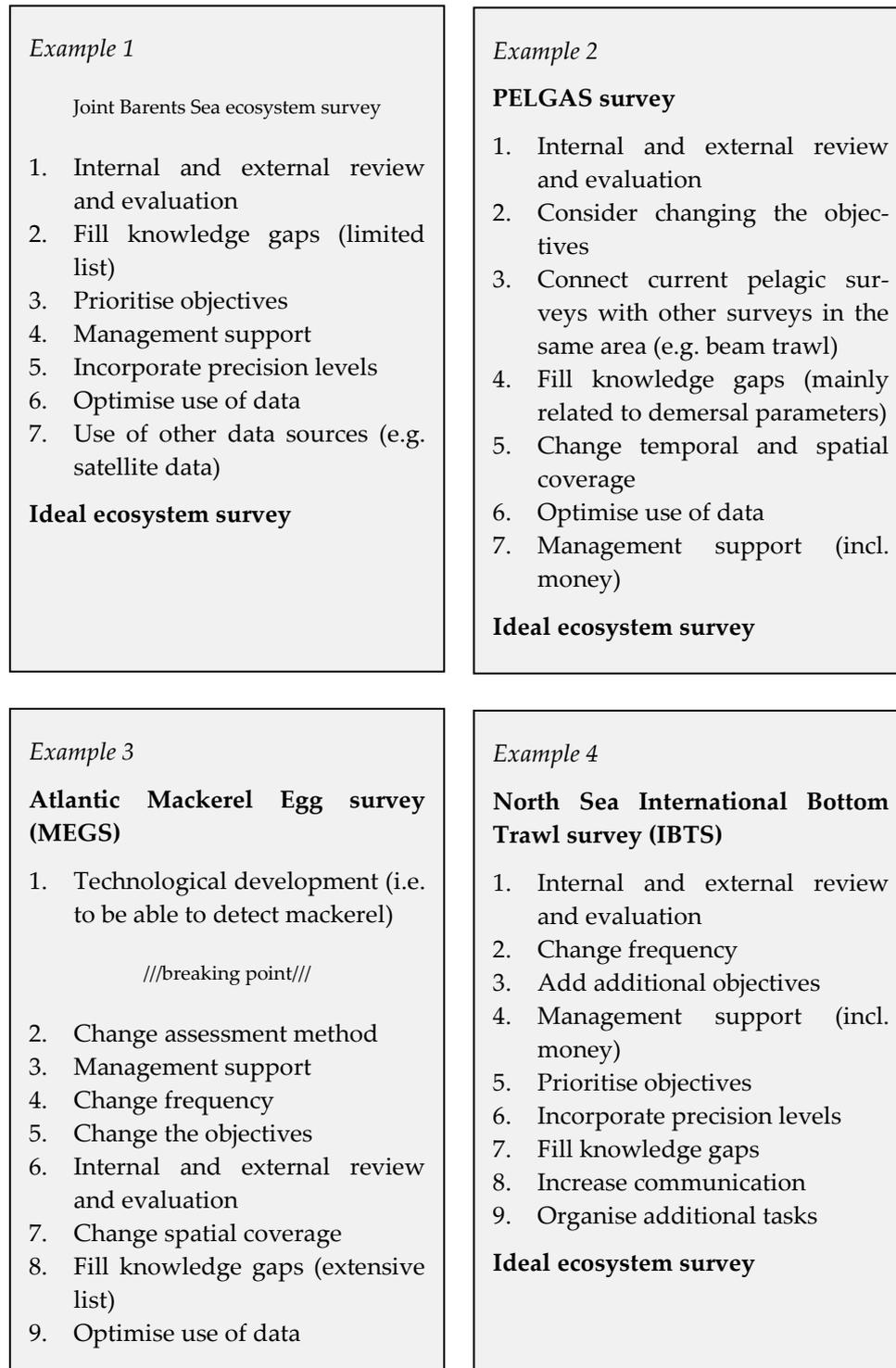


Figure 4.4.1 Examples of steps needed to move from current surveys towards the ideal ecosystem survey.

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## Annex 1: List of participants

<b>Name</b>	<b>Address</b>	<b>Phone/Fax</b>	<b>E-mail</b>
Ingeborg de Boois (Interim Chair)	IMARES PO Box 68 1970 AB IJmuiden Netherlands	p. +31 317 487070	Ingeborg.deboois@wur.nl
Kelle Moreau	ILVO Ankerstraat 1 8400 Oostende Belgium	p. + 32 59 569830	kelle.moreau@ilvo.vlaanderen.be
Geir Odd Johansen	IMR PO Box 1870, Nordnes 5817 Bergen Norway	p. +47 55 23 53 78	geirodd@imr.no
Elena Eriksen	IMR PO Box 1870, Nordnes 5817 Bergen Norway	p. +47 55 23 53 51	elena.eriksen@imr.no
Wolfgang Nikolaus Probst	Johann Heinrich von Thünen-Institute of Sea Fisheries Palmaille 9 22767 Hamburg Germany	p. +494038905202	nikolaus.probst@vti.bund.de
Jens Ulleweit	Johann Heinrich von Thünen-Institute of Sea Fisheries Palmaille 9 22767 Hamburg Germany	p. +494038905217	jens.ulleweit@vti.bund.de
Maria Manuel Angélico	IPIMAR Av. Brasilia, Lisboa Portugal	p.+ 351213027068	angelico@ipimar.pt
Bill Turrell	Marine Scotland Science Marine Laboratory 375 Victoria Road Aberdeen UK	p. +44 1224 876544	Bill.turrell@scotland.gsi.gov.uk
Jacques Massé	Ifremer Rue de l'île d'Yeux B.P. 21105 44311 Nantes Cedex 3 France	+33240374169	Jacques.Masse@ifremer.fr
Brian Harley	Cefas Pakefield Road Lowestoft Suffolk NR33 0HT UK	+441502524254	brian.harley@cefass.co.uk

## Annex 2: Agenda

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### Start: 10:00 24th January

- Feedback from Expert groups – We gave a ToR to all the survey groups and a selection of ecosystem EG to evaluate and comment on. Some of you will have chaired or attended WG that have done this, and I would like you to report back on this for WGISUR as appropriate. I will cover WGE-COs response. For those who are not in this category, I would like to ask you (at the meeting) to take responsibility for any EG that may have responded, and that do not have a member at the meeting. We will start with a list of the EGs, and allocate as appropriate.
- Discussion of the broad conclusions from these reports, and identification of what is feasible within the existing range of surveys
- Identify any additional contributions under ToRs a)-d) that can be usefully addressed by the membership present

### 25th January

- The “Ideal fishery Ecosystem Survey” Here we will make our first attempt to determine what should be included in this ideal survey, and then how that might be achieved.
- For a selected number of surveys we will then evaluate against the ideal, both in terms of current practice and in future potential. This will be based on who is there and what their skills are.

### 26th January

- Wrap up:
  - Allocate writing tasks
  - identify any response to other EGs on the basis of the 2010 response
  - Set additional ToR for the next step
  - AoB
- Concluded 15:00

### Annex 3: WGISUR terms of reference for the next meeting

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The **Working Group on Integrating Surveys for the Ecosystem Approach** (WGISUR), chaired by Dave Reid, Ireland, will meet in Lisbon, Portugal, 15–17 January 2013 to:

- a) Develop surveys to be applicable to the ecosystem approach;
- b) Identify expert groups and develop terms of reference for them;
- c) Identify issues common to all surveys, set up workshops and manage them as appropriate;
- d) Identify complementary technology to add value to surveys;
- e) Provide guidance on the adaptation of existing surveys to provide an approach to an ideal ecosystem survey;
- f) Report on any implications from ToR e) and the evaluation of the Joint Barents Sea ecosystem survey for the planning of future ecosystem surveys.

WGISUR will report by 22 February 2013 (via SSGESST) for the attention of SCICOM and ACOM.

#### Supporting Information

Priority	High. Integration of surveys is needed in support to the ecosystem approach. The working group will meet that objective by steering all survey groups and providing a home in which integration can be planned.
Scientific justification	<p>Surveys are coordinated on a regional basis but there are issues common to all, requiring the steering of all groups. Also the integration of surveys is needed in support to the ecosystem approach.</p> <p>International survey programs involve many vessels and teams. Calibration of methods, protocols and exchange in expertise requires global steering. Methodological issues include topics on: species identification, echogram interpretation, Phase I analysis of data such as combination of indices of different nature (acoustic and trawl) or of multiple surveys (different gears), precision of estimates.</p> <p>International survey programs deliver data and products. Regional databases are being developed for all surveys (not only for BTS but also for acoustic, egg and larvae surveys). Standard data format and portals to access data require global steering of all survey groups. Also, steering the format of survey products (e.g. atlas) for all surveys would contribute to constructing the overall picture needed for the ecosystem approach.</p> <p>International survey programs are evolving towards ecosystem monitoring platforms. Such evolution should be steered for all surveys. In particular, can ecosystem monitoring be performed by fisheries surveys as they are currently just adding new data collection protocols? Adaptation of surveys for the ecosystem approach include topics on:</p> <p>Planning of surveys to fit for a purpose and evaluation of the compliance of surveys to fit for the purpose;</p> <p>Spatio-temporal scales and designs to sample different components of the ecosystem;</p> <p>Coordination and combination of surveys of different nature and scales (sampling processes and surveying patterns, annual and intra-season surveys).</p>
Resource requirements	No specific requirements beyond the need for members to prepare for and participate in the meeting. There will be need for a meeting room at ASC

Participants	15–20 Chairs of identified Expert Groups and additional experts invited by the Steering Group chair as appropriate
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	SCICOM and ACOM
Linkages to other committees or groups	Survey based WGs under SCICOM, WGEKO and other ecology based WGs.
Linkages to other organizations	There are no direct linkages to other organizations

## Annex 4: Recommendations

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Recommendation	Adressed to
1. It is recommended that the WKCATDAT 2012 table is filled in by country and survey, as an exercise, to identify the current state regarding data collection towards an ecosystem survey and MSFD (don't do it for WGISUR).	IBTSWG, WGACEGG, WGBEAM, WGBIFS, WGIPS, WGMEGS, WGNEACS, SGNEPS
2. It is recommended that WGISUR is embedded in the workstream of the ACOM/SCICOM strategic initiative on MSFD	ACOM/SCICOM stretegic initiative
3. It is recommended that a survey expert group fully carries out the exercise to take the current survey through to an ecosystem survey without losing the current objectives, as an example for other groups. The expert group is requested to provide feedback to WGISUR on the result as well as on the flow diagram (Section 4.2) and the content of the mind-map (Section 4.1).	WGBEAM
4. It is recommended that bird and mammal observers are actively approached to join the ichthyoplankton and/or acoustic surveys.	WGMEGS, WGNAPES, WGIPS, WGACEGG, WGNEACS

## Annex 5: WKECES terms of reference for the next meeting

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The **Workshop on Evaluation of current ecosystem surveys (WKECES)**, chaired by Sven Kupschus\*, UK, will meet in Bergen, Norway, 20–22 November 2012 to:

- a) Evaluate a range of current fishery and ecosystem surveys in relation to the flow diagram as prepared by WGISUR 2012;
- b) Provide a SWOT analysis (Strengths, Weaknesses/Limitations, Opportunities, and Threats) for each survey;
- c) Provide recommendations for improvement of the survey;
- d) Provide advice on prioritization procedures for the different objectives implicit in an integrated ecosystem survey.

WKECES will report by 15 December 2012 for the attention of WGISUR, and by 15 January 2013 (via SSGESST) for the attention of SCICOM and ACOM.

### Supporting Information

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Priority	High. The move to the collection of ecosystem data in the context of fishery surveys is developing in importance, especially in the context of the MSFD. Guidance on survey design, practice and collection priorities is an important part of this. The aim is to use knowledge gained on existing integrated surveys to inform the process for other less developed surveys.
Scientific justification	<p>The need for data collection for the ecosystem approach and in particular for the Marine Strategy Framework Directive is growing in importance. It is recognised that fishery surveys could represent very useful platforms for collecting and integrating this sort of data. ICES WGISUR has developed criteria for the approach to developing integrated fishery and ecosystem surveys in this context. Within the ICES community, a number of surveys are already conducted that approach these criteria. These include:</p> <ul style="list-style-type: none"> <li>• The Joint Barents Sea ecosystem survey;</li> <li>• The French Pelagic Ecosystem survey – PELGAS,</li> <li>• The German Small-scale Bottom Trawl Survey,</li> <li>• The UK Western Channel Beam Trawl Survey,</li> </ul> <p>While these surveys are often very different, they all represent attempts to develop an integrated fishery and ecosystem sampling programme, and include components that could be used as a model for other surveys to make the same adaptations.</p> <p>This Workshop is proposed to evaluate these surveys (and any other candidates proposed) against the procedures and work flows identified by WGISUR for the "ideal" ecosystem survey. The workshop will identify any improvements that could be made to these surveys. A particular issue on multidisciplinary surveys is the prioritization of data collection tasks. In many cases, no prioritization is available, so the choice is left to the cruise leader. The workshop will also aim to develop guidelines on how to prioritise particular tasks in the context of the prime drivers for the surveys.</p> <p>The surveys chosen include pelagic and demersal surveys, using a variety of different gears and methodologies, including trawls (otter and beam trawls) and acoustic methods along with plankton and hydrographic data collection, and are widely recognized as important exemplars of the ecosystem approach in a survey context.</p> <p>The end product of the workshop should be guidance on how to improve these surveys further, and identification of lessons learned from these surveys that could be used to develop other more targeted fishery surveys.</p>

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Resource requirements	No specific requirements beyond the need for members to prepare for and participate in the meeting. There will be need for a meeting room at ASC.
Participants	15-20. Survey Working Group chairs and cruise leaders on the appropriate surveys, and experienced cruise leaders on similar less adapted surveys. Ecosystem modellers and MSFD data collection scientists would be very useful
Secretariat facilities	None.
Financial	No financial implications.
Linkages to advisory committees	SCICOM and ACOM
Linkages to other committees or groups	WGISUR, WGECO and all survey and ecosystem based EG
Linkages to other organizations	There are no direct linkages to other organizations