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ICES
CIEM

International Council for
the Exploration of the Sea

Conseil International pour
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Executive summary

The Data and Information Group (DIG) met in Copenhagen, 23–25 May 2016. 18 people representing 17 institutes in 10 different countries, a representative from OSPAR and ca. 10 members of the ICES Data Centre joined the meeting.

During the 2016 plenary meeting, the group reviewed the progress related to the data deliverables of ICES Strategic Plan and furthermore met up with ICES Data Centre, and discussed digital data citation, progress on ICES Data Guidelines, and the ICES Data Policy.

ICES dataset collections and portals

Tools and facilities that have been developed or improved by the ICES Data Centre were presented and discussed:

New operational dataportals and datasets

- [Portal](#) for deep sea discoveries (Vulnerable Marine EcoSystems): The portal recently launched by ICES visualises all known vulnerable marine ecosystem (VME) data in the North Atlantic.
- [Impulsive noise register system](#) was requested and funded by OSPAR and HELCOM, the regional sea conventions dealing with the North East Atlantic and Baltic respectively. Underwater noise, sound that has the potential to cause negative impacts on marine life, is one of the key descriptors of marine ecosystem health under the Marine Strategy Framework Directive (MSFD).
- Litter data from Trawl Surveys: In support of the MSFD descriptor 10 “Marine Litter”, data reporting of seabed litter from bottom trawl surveys to DATRAS became operational as of November 2015. A simplified data reporting format was implemented to support data for the existing DATRAS surveys. Data format details can be found at [DATRAS documents page](#). Submitted litter data can be downloaded together with the related haul data from [DATRAS Download page](#).
- The [biodiversity portal](#), which collates data on seabirds and seals abundance and distribution, went online in May 2016. This portal assembles data supplied by contracting parties to OSPAR (North East Atlantic) as well as other data from the ICES area. This database is specifically purposed with supporting OSPAR in providing information that will feed their regional assessments of biodiversity.

Updates and improvements on existing data portals

- The new [ICES spatial facility](#) was put in production in 2015. The ICES spatial facility is the main GIS map portal which provides a viewer for common reference layers and map products alongside with their accompanying services and metadata. Furthermore it hosts a set of tools (widgets) for more specific purposes (Querying the Datras survey polygons, searching the ICES popular advice etc).

Coming up (soon)

- The [acoustic trawl data portal](#) is a result of a series of workshops, and on request of the survey groups involved in acoustic fish surveys (e.g. WGIPS 2016 report). The ICES Data Centre presented the idea behind and the component of the upcoming Acoustic Trawl data portal as well as the general structure of the Acoustic Trawl data model.
- The Quality Control (QC) Database is a repository for information about the checks that are applied to the incoming datasets. It now has about a thousand

registered checks. It is scheduled for the second part of 2016 to develop a web based interface for the QC Database in order for users to query it and produce downloadable reports for each dataset.

ICES Data Guidelines

The [ICES data type guidelines](#) as currently shared at the ICES website and [OceanDataPractices](#) (since autumn 2014) are a valuable asset for the wider oceanography community. The ICES data type guidelines were originally written in the 1990's, and reviewed in in the early 2000's. The last review took place in 2006. It is important to keep the guidelines up to date. DIG agreed on a procedure to review the guidelines and make their existence better known.

Digital Data Citation

Citation of data can give proper credit to data providers who have made data available to the scientific community. In 2014 DIG and the Publication group (PUBCOM) presented a joint document about digital citation to the ICES Science Committee (SCICOM). During 2015 and the beginning of 2016 the ICES secretariat has been implementing digital citation capabilities through [DataCite](#). As a result ICES is now capable to mint persistent identifiers as DOI's (Digital Object Identifiers) for publications and datasets. The implementation in ICES is currently in a testing phase and will be available in 2016.

The minting process connects metadata, DOI number and the URL of the publication (landing page) together. Using a DOI resolver (eg. <https://dx.doi.org/>) the DOI number can then direct a user to the publication or dataset via the URL linked to the DOI. The developed solution integrates with the current ICES SharePoint webpage on [library publications](#). The DOI metadata will be available as a link on each publication thumbnail.

The use of digital citation and DOI minting is expected to widen in scope after this initial phase where the focus has been on publications. When doing digital citations on datasets there are additional issues to deal with like how to deal with non-static datasets.

ICES Data Policy

DIG updated the ICES Data Policy as part of the regular update data Policy reviewing cycle (every four years). The scope of the Data Policy was reworded and a new paragraph referring to open access data was added, related to inclusion of more restricted data sets than the current ones. The Data Policy now distinguishes between data submitted to ICES where public access might be restricted – the underlying data- and the data products that are still fully publicly available even if derived from restricted undelaying data.

The updated Data Policy will be reviewed by Council before it will be published. The most recent version of the ICES data policy is always available via the [ICES website](#).

Next meeting(s) and chair

Due to its role, DIG meets throughout the year by phone/video when needed, and during ICES Annual Science Conference 2016 a DIG subgroup (all DIG participants attending ASC) meets in Copenhagen to discuss progress of the action items and other

relevant topics. Next plenary DIG meeting will take place in May 2017, at ICES in Copenhagen.

There is a new chair proposed (Jens Rasmussen, UK). DIG agreed on proposing Jens as the next chair and if allowed by SCICOM his term will start in May 2017. Till then Ingeborg will extend her chair period.

1 Opening of the meeting

The Data and Information Group (DIG) met in Copenhagen, 23-25 May 2016. 18 people representing 17 institutes in 10 different countries, a representative from OSPAR, and ca. 10 members of the ICES Data Centre joined the meeting.

The participant list is in Annex 1.



DIG members and ICES Data Centre meeting in 2016

The DIG mission is 'To provide ICES with advice on all aspects of data management including data policy, data strategy, data quality, technical issues, and user-oriented guidance'.

2 Adoption of the agenda

The terms of reference of the group were as follows:

- a) Review priorities on the Data Centre action list
- b) Provide guidance and feedback to the ICES Data Centre
- c) Advise on other data regulations and their impact on ICES Data Strategy, ICES Data Policy
- d) Review output from offspring groups (WKIDP, LinkedIn Data and Information Forum) if relevant
- e) Promote new technologies and data management infrastructure development

Products (e.g. updated data management guidelines, reviews of ICES Data Strategy, ICES Data Policy, etc.) from the meeting as well as a written report to SCICOM will be delivered before 15 July 2016. The group reports to SCICOM during the SCICOM mid-term meeting March 2017 as well as the SCICOM meeting at ICES ASC 2016. The group reports to ACOM by correspondence and via the ACOM representative (Christian von Dorrien).

Main topics discussed during the meeting were:

- i. Information exchange with ICES Data Centre (Chapter 3, related to ToR b)
- ii. Outline for updating and reviewing ICES Data Guidelines (Chapter 4, related to ToR d)
- iii. Digital citation, mainly focusing on data, within ICES (Chapter 5, Annex 6, related to ToR e)
- iv. Update of the ICES Data Policy (Chapter 6, related to ToR c)
- v. Progress on ICES Data Plan (Chapter 9.4, Annex 6, related to ToR a)

The agenda of the meeting is in Annex 2.

3 Updates from ICES Data Centre

3.1 New operational data portals and datasets

3.1.1 Portal for deep sea discoveries (Vulnerable Marine Ecosystems)

The portal recently launched by ICES visualises all known vulnerable marine ecosystem (VME) data in the North Atlantic. [Vulnerable marine ecosystems](#) (VMEs) are deep-sea ecosystems that can be adversely impacted by bottom contact fishing gear. VMEs include cold-water coral reefs, coral gardens and deep-sea sponge aggregations. It is quite difficult to positively identify VMEs in deep-water without using specialist underwater camera equipment. However, "VME indicators" are a start for investigation. A VME indicator is a species from a broad group of benthos that is found in trawl bycatch, for example sponges, gorgonians, or stony corals. Their presence indicates that there may be an actual VME habitat on the seabed – for example gorgonians may be a component of coral garden VMEs.

In the new ICES VME data portal (<http://vme.ices.dk>), "People can now map and explore the data from the VME database and the key thing about the portal is that it differentiates between the VME indicators (often recovered as by-catch) and the VME habitats (observed in situ on the seabed)."

3.1.2 Development of the Impulsive Noise Register System

Underwater noise, sound that has the potential to cause negative impacts on marine life, is one of the key descriptors of marine ecosystem health under the Marine Strategy Framework Directive (MSFD). ICES has established an impulsive noise register system (<http://underwaternoise.ices.dk>) that was requested and funded by OSPAR and HELCOM, the regional sea conventions dealing with the North East Atlantic and Baltic respectively. Their requirement was for a system that would comprise a web interface where impulsive noise events would be uploaded, quality controlled, displayed via a map interface and downloaded via a number of services. In addition, the portal builds in the calculation and visualization of the indicator that will form the basis of the impulsive noise indicator for the OSPAR Interim Assessment (IA) and HELCOM holistic assessment (HOLAS).

3.1.3 Litter data from Trawl Surveys

In support of the MSFD descriptor 10 "Marine Litter", data reporting of seabed litter from bottom trawl surveys to DATRAS became operational as of November 2015. A simplified data reporting format was implemented to support data for the existing DATRAS surveys. Data were collected under the OSPAR seabed litter data call, and

further data will be provided by the forthcoming HELCOM seabed litter data call. Regular data calls and data submissions are expected for this type of data.

Data format details can be found at DATRAS documents page: <http://www.ices.dk/marine-data/data-portals/Pages/DATRAS-Docs.aspx>

Submitted litter data can be downloaded together with the related haul data from DATRAS Download page:

https://datras.ices.dk/Data_products/Download/Download_Data_public.aspx

At present, DATRAS received litter data from nine surveys conducted by 13 countries. Data were reported for nearly 5000 hauls sampled within six years.

3.2 Updates and improvements on existing data portals

3.2.1 Spatial facility

The new ICES spatial facility (<http://gis.ices.dk/sf/>) was put in production in 2015. The ICES spatial facility is the main GIS map portal which provides a viewer for common reference layers and map products alongside with their accompanying services and metadata. Furthermore it hosts a set of tools (widgets) for more specific purposes (Querying the Datras survey polygons, searching the ICES popular advice etc). Finally a [tool](#) for the Operational Oceanographic Products and Services was presented. This tool is not yet in production and can for the moment be found on the development page: <http://gis.ices.dk/sfdev> (Zooplankton abundance) and <http://gis.ices.dk/devoops/> (temperature and salinity).

3.2.2 InterCatch

InterCatch is the database system which the fish stock assessment Expert Groups use for collecting and estimating the commercial fisheries data used for the stock assessment. InterCatch is used by a large number of Expert Groups. InterCatch operates typically on the level of catches of species per country, year, quarter, subdivision and metier/fleet. The stock coordinator sets up the estimations for unsampled data, and exports total catch, numbers and mean weight at age or length. The advantages of InterCatch are: Documentation of the data transmission, data quality checks and approved standardised estimation/raising methods and algorithms.

3.2.3 Regional DataBase (RDB)

The RDB stores detailed commercial fisheries data, data can be estimated/raised to the level used in InterCatch. At the moment primarily the Regional Coordination Meetings (RCMs), coordinating sampling for the Baltic Sea, the North Sea & Eastern Arctic and the North Atlantic are using the RDB, but the large potential of the RDB is the use for estimations of age distributions for samples at the detailed level. Several projects and groups are looking into the use of statistical sound sampling and estimations like the ICES Working Group on Commercial Catches (WGCATCH), the EU FishPi project and the ICES Workshop on developing the RDB data format for design based sampling and estimation (WKRDB). When the statistical estimations have been specified the methods and algorithms will be included in the RDB. The advantages of the RDB are: Documentation of the data transmission, data quality checks and standardised estimation/raising methods and algorithms.

3.3 Coming up (soon)

3.3.1 ICES Acoustic Trawl data portal

The [acoustic trawl data portal](#) is a result of a series of workshops, and on request of the survey groups involved in acoustic fish surveys (e.g. ICES 2016). The ICES Data Centre presented the idea behind and the component of the upcoming Acoustic Trawl data portal (Figure 3.3.1) as well as the general structure of the Acoustic Trawl data model (Figure 3.3.2).

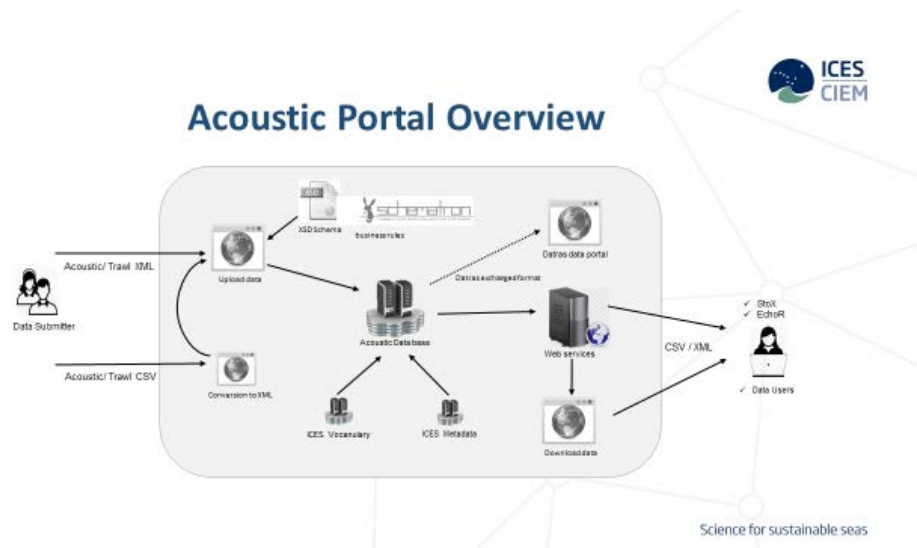


Figure 3.3.1 Acoustic portal overview.

Acoustic Trawl data model

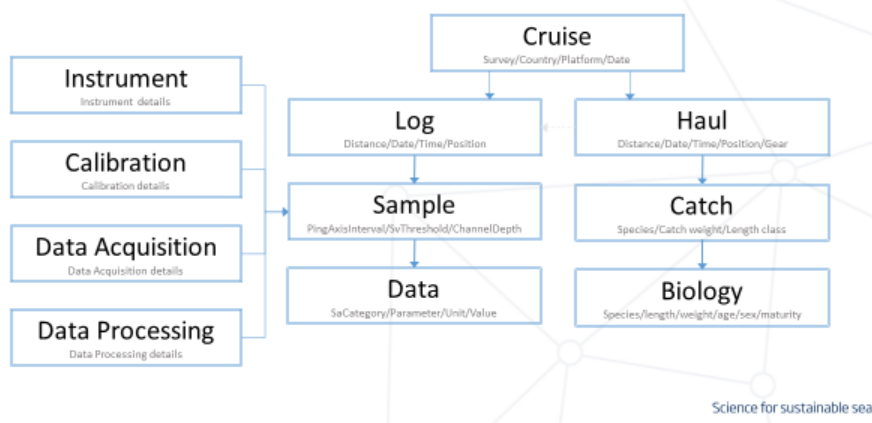


Figure 3.3.2 ICES Acoustic Trawl data model (specification).

3.3.2 Quality Control Database

The Quality Control (QC) Database is a repository for information about the checks that are applied to the incoming datasets. It now has about a thousand registered checks. A brief report of those checks was presented to the group which can also be found in the DIG SharePoint page. It is scheduled for the second part of 2016 to develop

a web based interface for the QC Database in order for users to query it and produce downloadable reports for each dataset.

3.3.3 Biodiversity data portal

The [biodiversity portal](#), which collates data on seabirds and seals abundance and distribution went online in May 2016. This portal assembles data supplied by contracting parties to OSPAR (North East Atlantic) as well as other data from the ICES area. This database is specifically purposed with supporting OSPAR in providing information that will feed their regional assessments of biodiversity. At present data calls released by OSPAR will populate the database by the end of summer.

3.4 Data harvesting and data versioning

Scientists will always need access to the highest quality, largest collection of, and most recent version of the data. Advances in technology can meet this increasing demand via technical solutions. In order to ensure these demands are met, one way forward is to grant open access, and using machine to machine interfaces.

3.4.1 Trawl survey data harvesting database through web services

Data harvesting into the DATRAS database through a [web service](#) is a pilot project between ICES Data Centre and IMARES (NL). The main goal of this approach is to minimise manual intervention during submissions, and automate the upload process. This task was already started in 2015, and modules are developed for authorisation and auto screening and checking, there are some issues which need to be resolved for accessing the service from the client side, and that will be completed with co-operation from the IMARES development team.

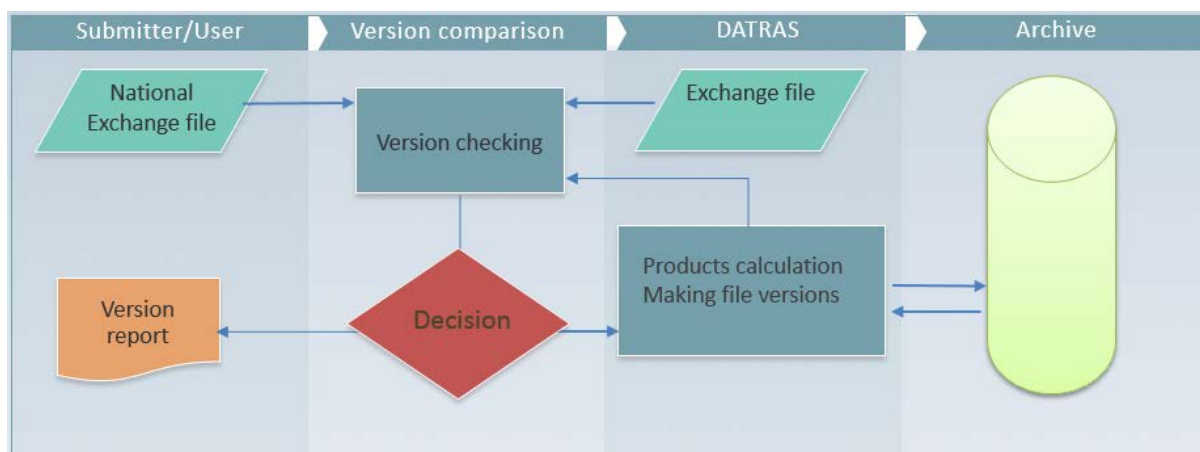
3.4.2 DATRAS data versions comparison utility

Resubmission of data are a continuous process throughout the year. For assessments, changes in the data products/time series can have a major effect on the outcome. The DATRAS database, which is used for a number of key indices for stock assessment, has a constant challenge in tracking the historical change in the data as it is continuously updated with new/missing/corrected data.

The expert group WGNSSK and IBTS working group requested the ICES Data Centre to facilitate a means of tracking and alerting to changes in DATRAS datasets and products by creating a version difference utility. This functionality is currently under development (planning first trial Q3 2016) and includes:

- Extension of submission status page (Reported species and comment information)
- Comparison of current version of dataset with previous version and show differences on the fly
- Drill down comparison on all levels CPUE, ALK data and Indices
- If there is more than 5% variation in indices an email goes to submitter, expert group members and stock coordinator

Data submitters will receive an email after each re-submission with a comparison report before the upload.



3.4.3 Data harvesting and data versioning in environmental data (SMHI)

SMHI have developed the SHARKdata.se system to handle complex marine biogeochemical and abundance types of datasets. There is an ongoing pilot study in cooperation with the ICES data centre. The aim of the pilot is to investigate the possibility for the national submissions of data to be automated. This will:

- reduce the amount of manual labour;
- ensure the most recent version in the ICES DOME (Marine Environment) database;
- allow the quality checks performed by ICES to be called by the SHARKdata.se system directly, which collectively leads to higher quality of the data.

All technology used is open source and hence for anyone available for download and build their own system. For the scientist it is possible to use for example R or Python to set up any type of analysis using the most up to date data from the Swedish Oceanographic data center. Examples are published on the server human interface SHARKdata.se and <http://datsu.ices.dk/test>

3.5 Coordinating Working Party on Fisheries Statistics (CWP)

ICES collects fisheries statistics in cooperation with FAO/EUROSTAT as well as separately via Intercatch, RDB and Accessions. Standards and requirements used in fisheries data collections are set by the CWP. CWP has a global influence, operates since 1960, and consists of 19 regional fishery bodies and statistical offices including ICES. The main product of CWP is the Handbook of Fishery Statistical Standards: <http://www.fao.org/fishery/cwp/search/en>

4 Data guidelines

4.1 Guideline update request

There was a request from HELCOM to update the water sample guideline to reflect the recommendation to submit full CTD profiles data when submitting water bottle data in order to improve the quality check. The guidelines will be reviewed and updated where needed.

4.2 Criteria for updating ICES Data guidelines

The [ICES data type guidelines](#) as currently shared at the ICES website and [OceanDataPractices](#) (since autumn 2014) are a valuable asset for the wider oceanography community. The ICES data type guidelines were originally written in the 1990's, and reviewed in in the early 2000's. The last review took place in 2006. It is important to keep the guidelines up to date. Therefore, a generic review may be needed, and, if necessary, the ICES Data Guidelines should be updated.

There may be two reasons for reviewing the ICES data type guidelines:

- a) Feedback from guideline users that text is outdated/unclear
- b) Reviewing cycle, to check if the guidelines are still applicable. Each guideline should at least be checked every decade.

DIG agreed on the following steps to review the guidelines and make their existence better known.

To facilitate the reviewing, the following concrete short-term actions are proposed:

- a) A contact address (of the ICES Data Centre) be added to the ICES Guidelines webpage, inviting all to contribute comments and revisions to the guidelines. This address will be added as part of the first review coming up.
- b) BODC will compare the (more recently written) MEDIN Guidelines with the ICES Data Guidelines. The MEDIN guidelines were based on the ICES guidelines and have all been reviewed by experts up to three years ago.
- c) If there is no reason to make any (major) changes, the ICES guideline will be marked as having been reviewed in 2016.

Review of ICES guidelines needing a major upgrade or without a MEDIN equivalent, will be done by experts that will be identified by a DIG subgroup. The subgroup will provide guidance for the review and monitor the review process. ICES Data Centre will be involved in reviewing the sections related to the data flow to the Data Centre. The history of changes as well as the reviewers will be added to the guideline documents as a header, in a separate section before the main text.

4.3 Statistics on OceanDataPractices.com

The average number of visits/month for the [oceandatapractices.net](#) site is approx. 650/month. Google Scholar harvests the (metadata of the) repository.

Activities at visit:

- 50% of all visitors performs a search action
- 20% of all visitors performs a download action

The most popular ICES items are:

- ICES Guidelines for Biological Plankton data (24 downloads)
- ICES Guidelines for XBT data (22 downloads)

4.4 Guideline policy document

In 2015, DIG reviewed the draft [OceanDataPractices Repository Policy Document v0.5](#) by IODE. The subgroup discussed, and produced a series of questions concerning the

contents of this Policy Document, mainly about the governance structure, the possibility to refuse contributions, and the amount of required bibliographic metadata connected to the guidelines to become part of the repository.

Without intervention of the DIG 2015 subgroup however a new version of the document became available in autumn 2015, addressing and solving the concerns.

Next steps in this process are (1) to ask for update on status of policy document, (2) contribute more ICES data publications if relevant, (3) advertise existence of repository in ICES community and at institutes. A DIG subgroup will take care of this.

5 Digital data citation

In 2014 the ICES Data and Information Group (DIG) and the Publication group (PUB-COM) presented a joint document about digital citation to the ICES Science Committee (SCICOM). During 2015 and the beginning of 2016 the ICES secretariat has been implementing digital citation capabilities through DataCite (<https://www.datacite.org>). As a result ICES is now capable to mint persistent identifiers as DOI's (Digital Object Identifiers) for publications and datasets.

There are two main steps in minting DOI's:

1. creating metadata ([DataCite metadata schema](#))
2. mint DOI with a URL of the publication (landing page)

Metadata needs to be following the DataCite schema. ICES has decided on a minimum set of metadata items (see box) that publishers will have to provide.

Other metadata information could be added either in the DataCite metadata or possibly included on the landing page. This could for example be information on geographic area covered. (see [IODE Ocean Data Publication Cookbook](#)).

The minting process connects metadata, DOI number and the URL of the publication (landing page) together. Using a DOI resolver (e.g. <https://dx.doi.org/>) the DOI number can then direct a user to the publication or dataset via the URL linked to the DOI.

Minimum set of metadata for DOIs:

- Publication author
- Title
- Abstract
- Type
- Year
- Keyword(s)
- Contributor
- Version number

The implementation in ICES is currently in a testing phase and will be available in 2016. The developed solution integrates with the current ICES SharePoint webpage on library publications (see <http://ices.dk/publications/library/Pages/default.aspx>). The DOI metadata will be available as a link on each publication thumbnail (Figure 5.1, red circle).

The use of digital citation and DOI minting is expected to widen in scope after this initial phase where the focus has been on publications. When doing digital citations on datasets there are additional issues to deal with like how to deal with non-static datasets. Standard procedures on how to handle digital citation specifically for datasets in ICES still needs to be established, but will be based on the overall solution now being implemented.

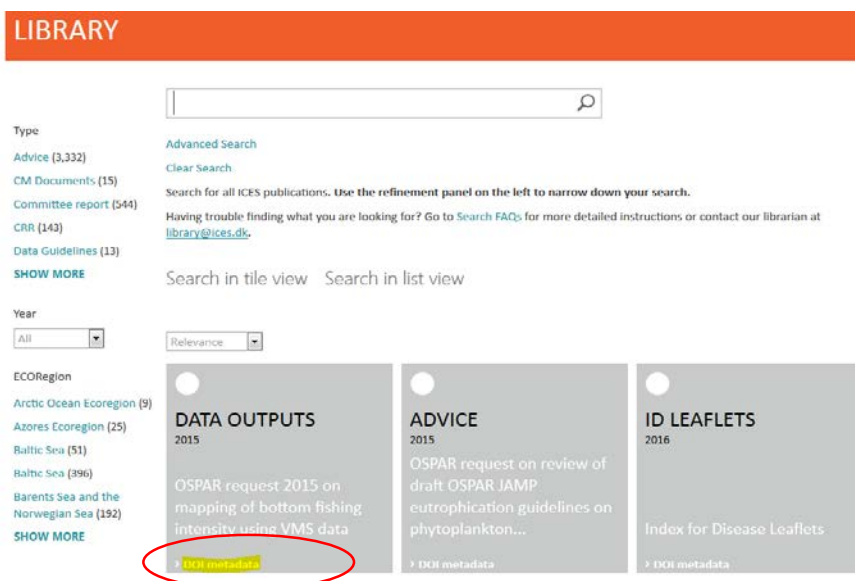


Figure 5.1 Red circle indicates location of DOI link on the ICES Publications webpage.

6 Data Policy

DIG updated the ICES Data Policy as part of the regular update data Policy reviewing cycle (every four years). Main updates relate to inclusion of more restricted data sets other than those two (RDB and InterCatch) previously mentioned in the Data Policy version from 2012, e.g. Logbook or biodiversity data. Restricted data sets are needed to formulate ICES advice and are submitted by different entities, not as part of ICES data calls.

To include the above cases, the scope of the Data Policy was reworded and a new paragraph referring to open access data was added. It now distinguishes between data submitted to ICES where public access might be restricted – the underlying data- and the data products that are still fully publicly available even if derived from restricted undelaying data.

The Definitions section was updated to include the new terms “Underlying Data” and “Data Products”.

The updated Data Policy will be reviewed by Council before it will be published. The most recent version of the ICES data policy is always available via the ICES website: <http://ices.dk/marine-data/guidelines-and-policy/Pages/ICES-data-policy.aspx>.

7 Dissemination and external collaboration

7.1 Quality assurance and external contributions using GitHub

In 2016 ICES created a GitHub page (<https://github.com/ices-dk>) where the ICES community (secretariat and experts) can version control and document their working procedure. An example of this can be seen at: https://github.com/ICES-dk/wg_HAWG, where the herring assessment working group has been documenting their assessments in a repository since 2009. Initially, all that was committed was the assessment of Western Baltic spring spawning herring, which can be viewed by navigating back to the

original commit: https://github.com/ICES-dk/wg_HAWG/tree/fe37f703a2. The benefit of this way of working is the ease by which many authors can collaborate on a single project, and that all contributions are visible and hence there is an inherent transparency and traceability to the work.

7.1.1 What is GitHub

GitHub has three units: users, organisations, and repositories (see box).

GitHub is a service that hosts repositories so that they are accessible over the internet. There are other companies that provide this service, such as Assembla, Bitbucket, CloudForge, among others, but GitHub is by far the most popular, hosting software projects like Ruby on Rails, jQuery, RStudio and pandoc. GitHub is free of charge if your repository is open source.

While GitHub is a web hosted service, the version control system it uses is called “git”. Git is responsible for keeping track of changes to content (usually source code files), and it provides mechanisms for sharing that content with others. On top of this, GitHub provides additional features for code review and collaboration, tools for workflow and versioning and the option of a community wiki page for each repository.

GitHub units:

Repository: where the code and the text resides. Normally repositories contain the source code for single pieces of software, but often repositories are used as a collaborative workspace.

Users write and commit changes to the repositories. All the work is done by users and changes are recorded as being done by the user. Each user has their own GitHub profile page, where they can host personal repositories, and where their recent activity and contributions are shown.

Organisation: a structure acting as a collection of repositories, where contributors can have granular access to repositories. The organisation has a GitHub homepage which lists all the repositories belonging to it, and a summary of which users are members.

7.1.2 GitHub for collaboration

Many companies such as Google (895 members), Microsoft (1908 members) and Twitter (96 members) have set up GitHub organisations. GitHub is also used by many fisheries scientists, e.g., collaborating on tools in the FLR library. Already in its first few months, the ICES GitHub organisation has multiple members and several repositories.

7.1.3 Additional services for quality control

There are a number of services that can link with a GitHub repository designed to aid quality assurance. One such tool is Travis CI (=continuous integration). This service is invoked automatically every time a user pushes a change to the repository. The tests are defined by a file in the repository so that checks can be tailored. The results of these tests can then be communicated on the repository’s homepage. See for example <https://github.com/google/mtail>:

This repository has two automated test services running. One tests whether the software can be built according to the instructions laid out a script (in this example the package cannot be built), and the other showing how much of the code is covered by tests (here 25% of the code is untested).

7.2 Training for Data

Training was discussed as a continuation of previous years' discussions on options for providing data related training in ICES. Between meetings, additional options and possibilities were examined. The Blue Bridge project participation from ICES and the possibility of providing e-learning on the ICES website were both discounted as being potentially too ambitious without a more explicit request.

A few screencasts/video instructions were put on the ICES website during the year as well, and this could be a possible format to provide end-user support and training on targeted subjects. However it was discussed and concluded that most web cast support tend to be very specific and addresses a very specific need, and in that sense would not really be considered training – more like a “how-to” guide.

Overall, the group felt that it would perhaps be best to let such steps grow organically rather than trying to impose them. In light of new initiatives such as more community based development and code on GitHub (see section 7.1), the possibility of providing screencasts could come from the user community as well as directly from ICES.

For larger, more complex interactions of using particular software, there is already a training process for the longer, formal ICES training courses. Currently, DIG did not identify any such products that require training.

7.3 ICES Data at conferences

7.3.1 IMDIS 2016

ICES Data Centre has handed in three submissions, covering the noise register, Eutrophication assessment tool and stock assessment graphs database, for the International Conference on Marine Data and Information Systems - Gdansk (Poland) - October 11-13, 2016 ([IMDIS](#)).

7.3.2 ASC 2017 combined WGZE/DIG proposal

The Working group on Zooplankton Ecology (WGZE; Sophie Pitois and others) proposed a joint ASC Theme session with DIG. After reviewing the proposal, it was concluded that there may be a role for DIG. A subgroup will discuss with the writers of the proposal on options for modification to a session focussing more on the data integration using ICES data, the (tools for) output and combined data use (and maybe on data automatically generated), in combination with a substantive set of science questions, rather than on integrated planning.

7.3.3 Suggestions for DIG and Data Centre related activities

7.3.3.1 Poster session on data tools, developments, etc. as a demonstration.

In general, it is difficult to set up a session on data related topics as such at the ICES Annual Science Conference. First of all because the target audience is not solely data managers or database developers, and secondly because a 'Data session' in itself may lead to fragmented contributions. DIG however concluded that many data related activities take place in the ICES community and that there may be interest to share the experiences.

It is therefore proposed to investigate the possibility for a poster session during ASC (2017 or 2018, to be decided) where only interactive (=the audience should be able to play around with it) contributions will be allowed.

Potential topics for contributions:

- Data quality; what happens if you don't have good data quality, use a good metaphore.
- The effect of a changed data selection on the output
- Advice interpretation in relation to quality
- Use of ICES data portals

A proposal will be prepared intersessionally.

7.3.3.2 Hackathon

SCICOM suggested to investigate the possibility for a hackathon on ICES data. There are however already many hackathons in place (e.g. [Fishackathon](#); [EnviroHack](#)). A DIG subgroup will make an inventory of marine data hackathons based on which DIG can recommend how to best participate in existing hackathons, or organise an ICES data related hackathon.

7.3.3.3 Screening ASC sessions

Due to the timing of its meeting, DIG contributions for ASC in the running year should be handed in prior to the meeting. To stimulate collaborative action, a DIG subgroup will screen the ASC sessions from 2017 onwards on potential room for contributions from DIG and/or ICES Data Centre.

8 Feedback from workshops, working groups, related initiatives, etc.

8.1 Working Group on Spatial Fisheries Data (WGSFD)

At the meeting of WGSFD 2016, the question was raised whether the group can produce and publish data products also for the Baltic Sea, although no formal request by HELCOM was forwarded for those data, as in 2015. WGSFD was informed by the ICES secretariat that this is not possible, because data products are part of the advice process and no formal request for advice was issued for the Baltic Sea in 2016.

However, to fulfil WGSFD ToR g 'To provide input to the following ICES Workshop on Fisheries Benthic Impact (WKFBI) maps and data products for the Baltic' the products had to be produced. All participants followed the ICES Conditions for VMS data use, but the current situation was unsatisfying.

WGSFD requests ICES Data Centre and DIG to develop improved conditions for getting and working with Logbook/VMS data so that the results (aggregated data products) would become more freely accessible. This would enable WGSFD to answer the requests from other ICES expert groups for spatial fisheries effort data and to work on standardised methods to analyse and produce products that describe the fishery in space and time. At the moment this is not possible, due to the constraints set up by the Data Call and ICES conditions for VMS data use.

A way forward could be to get already prior to the Data Call the agreement by all ICES member countries that resulting maps and data products (aggregated and anonymised data), can be made available to other ICES expert groups and interested parties.

8.2 ODIMS tool

The OSPAR Data and Information Management System (ODIMS) was presented.

Sound data and information management is critical to the successful delivery of OSPAR's work. ODIMS underpins this activity acting as a repository, increasing accessibility and allowing strategic management of all OSPAR data. All data are supported by metadata, increasing usefulness of data for supporting assessment activities, a crucial part of OSPAR's work.

ODIMS is being put for final sign-off at the OSPAR Commission meeting at the end of June 2016.

8.3 MSFD DATRAS analysis

Between autumn 2015 till spring 2016 a large scale quality assessment of the data in DATRAS has been carried out by Marine Scotland (Moriarty & Greenstreet, in prep.). It aimed to produce a quality assured dataset for use in MSFD assessment by checking existing data, correcting genuine mistakes and estimating missing values in the haul chronology of the datasets under consideration for inclusion in the "MSFD Data Monitoring Product". Based on this study, it was recommended by the authors that a new working group be installed: Working group for Data Quality within DATRAS. DIG has discussed the governance of products and/or datasets in a larger context and also taken this recommendation into account (see section 10).

9 Follow-up of actions, recommendations and Data Plan

9.1 2015 recommendations from DIG

NR	YEAR	RECOMMENDATION	STATUS
230	2015	To be able to get better insight in historic data, it is recommended that the list of historic datasets is made publicly available.	Complete

ICES Data Centre joined their group meeting to get more details on the WGHIST needs. A couple more technical online meetings with Emily Klein and Ruth Thurstan where we agreed to the following steps:

1. Develop a metadata schema to implement the historical records (complete)
2. Update and refine the table (complete)
3. Develop a script to translate the table to metadata files (complete)
4. Publish the metadata on the Geonetwork (in the process)

9.2 2015 recommendations to DIG

The recommendations to DIG as well as to the ICES Data Centre have been reviewed. Only the recommendations relevant to DIG and their follow-up are mentioned in this paragraph. The full list of recommendations to DIG and ICES Data Centre including follow-up can be found in Annex 5. In 2015, no specific recommendations to DIG could be found in the ICES recommendations database.

9.3 DIG Actions

ACTION	ADDRESSED TO	ACTION BEFORE	STATUS
1. Prepare draft new version ICES Data Policy: include exceptions on data permissions, incorporation of 8 principles	Ingeborg de Boois, Christian von Dorrien, Chris Moulton, Joni Kaitaranta, Simon Claus, Neil Holdsworth	1 April 2016	Complete See section 6
2. Data guidelines: compile statistics, approach to incorporate missing guidelines in the IODE/JCOMM/ICES clearing house	Taco de Bruin, Hjalte Parner, Ruth Lagring, Sjur Ringheim Lid	1 December 2015	Complete See section 4.3
3. Data guidelines: prepare response on IODE draft Oceandatapactices Repository Policy Document v0.5	Taco de Bruin, Hjalte Parner, Ruth Lagring, Sjur Ringheim Lid	15 June 2015	N/A See section 4.4
4. Send response on IODE draft Oceandatapactices Repository Policy Document v0.5 to IODE	Ingeborg de Boois, Taco de Bruin, Neil Holdsworth	25 June 2015	N/A See section 4.4
5. QC database: develop output for end-users	Periklis Panagiotidis, Malin Werner, Simon Claus	1 April 2016	In progress See section 3.4
6. Spatial facility: further develop and evaluate tools&widgets; evaluate technical aspects	Periklis Panagiotidis, Lena Szymanek, Jens Rasmussen, Lesley Rickards	1 April 2016	21-09-2015: First phase is live gis.ices.dk/sf 05/2016: Complete
7. Training 'Making the most of ICES data': develop a survey to gauge interest in the different topics (survey aimed for ICES ASC 2015)	Jens Rasmussen, Ingeborg de Boois, Carlos Pinto, Sjur Ringheim Lid, Ruth Lagring	1 August 2015	21-09-2015: blue bridge project – Neil to communicate to Jens 05/2016: Complete. See section 7.2
8. Highlight the importance of the topic 'Data' during ICES ASC	Neil Holdsworth (Bureau), Ingeborg de Boois (ASC organisers)	1 August 2015	Done.
9. Pilot metadata: identify benchmark group to be involved together with Jörn Schmidt, Carmen Fernandez	Ingeborg de Boois	15 June 2015	21-09-2015: probably DAB benchmark 05/2016: On hold. See comment action 12

10. Pilot metadata: discuss approach with ACOM, SCICOM and SSGIEOM chairs	Ingeborg de Boois, Neil Holdsworth	15 June 2015	Complete.
11. Pilot metadata: develop online form based on Annex 8 DIG report 2015	ICES Data Centre (Periklis Panagiotidis, Neil Holdsworth)	1 August 2015	21-09-2015: rescheduled to November 2015 based on WGHIST meeting in October 05/2016: Complete. See section 9.1
12. Use online form to fill in the fields for the identified Expert Groups, and provide feedback	Ingeborg de Boois, Neil Holdsworth, Josefine Egekvist, Carlos Pinto, Christian von Dorrien, Peter Wiebe, Lena Szymanek, Jens Rasmussen	1 December 2015	On hold. SCICOM and ACOM have taken on the topic Data, and the engagement has increased. First get agreement from SCICOM and ACOM before continuation
13. DIG 2016: practical implications of DOIs for data (IODE cookbook)	Ingeborg de Boois	Put on DIG 2016 agenda	Complete See section 5

9.4 Data Plan

The progress on the Data Plan has been reviewed. The current status can be found in Annex 6.

10 DIG positioning in ICES

In the light of the current SCICOM leadership discussion, DIG discussed its position within ICES. In general, DIG is well able to be a cohesive pillar between horizontal layers (e.g. EGs, ADGs) in ICES. From some examples, it seems that the focus lays more on the data delivery and science side than on the advisory topics. However, the group agreed that this is merely a matter of visibility. Via the Data Centre DIG is at least informed about all ICES work related to data, and the responsibility for regular updates of Data Policy and Data Strategy, DIG has a generic role for the ICES community.

It was concluded that the DIG mission still applies, and reflects the scope of the group.

The current report structure and terms of reference were largely inherited from the expert group structure, and do not always effectively reflect the more strategic approach by DIG to provide an element of Data and Information Governance for the ICES community.

10.1 Short-term changes

It was suggested that one of the terms of reference could be refined, by changing it from 'Review offspring groups' into 'Propose ad-hoc groups (governance, workshops, training, etc.) related to specific topics, and/or datasets, to facilitate improvements related to data issues to SCICOM, ACOM, SCICOM SSGs and/or EGs, and review the outcome of those ad-hoc groups'. The ad-hoc groups fall under DIG, and all have a limited life-time –till the task is fulfilled. In this way, DIG will have the possibility to organise follow-up on specific problems, and define the appropriate group composition for the specific issue.

Furthermore, to increase the visibility of DIG and let more people be aware of the role of DIG, the group should be actively represented at the annual ICES WGCHAIRS meeting.

10.2 Proposal for change of workflow on longer term

It was felt that the reporting structure and deliverables for DIG could potentially change quite dramatically instead reporting and profiling the ICES data community by topics areas that are more relevant to data and information management.

10.2.1 Basic model for future DIG work

The model preferred was to align the broad governance issues into topic areas corresponding to the functional areas of the Data Management Association's Body of Knowledge (DAMA-DMBOK) 0- although it would benefit from slight modifications to align the ICES terminology in some places. The overarching areas of data governance that DIG could evaluate would be:

Topic Area	What is included
Architecture and governance	Understanding integration and linkage between underlying data, data products and associated working groups in ICES
Data Development	Updates to structures and formats of data either as requirements arising from new use cases or legal requirements
Database Operations	Understanding the ICES responsibilities in terms of maintaining databases versus data coming from outside or other data providers.
Data Security	Ensure that you can enable appropriate access to data and prevent inappropriate access. This also touches on potential limitations on data use and/or further dissemination.
Reference and Master Data Management	Identify the authoritative copies of the master data and understand where shared references codes are used and who maintains and develops these.
Warehousing and Business Intelligence	How data are made available for sharing and integration through presentation within the ICES working community, more broadly on websites, and how different types of users need to interact with the data.

Topic Area	What is included
Document and content management	How documents, guidelines and other unstructured ¹ content relevant to the data are maintained.
Metadata management	How well data structures and information is profiles via metadata. This links to both legal compliance obligations (e.g. INSPIRE) and improvements in data sharing and citation (e.g. minting DOI for reports, datasets etc.).
Data Quality Management	Consideration of how data quality is managed for the given collection. Responsibilities may be shared between expert groups and data centre, and the key thing is to understand how decisions on quality management are made, and how they align across ICES data handling.

If this methodology is adopted, the format of the DIG annual report would change to essentially become the framework evaluation instead, structured around data governance principles. The key question that need to be addressed is if there is a desire to have an overview framework and risk management tool for data management in ICES.

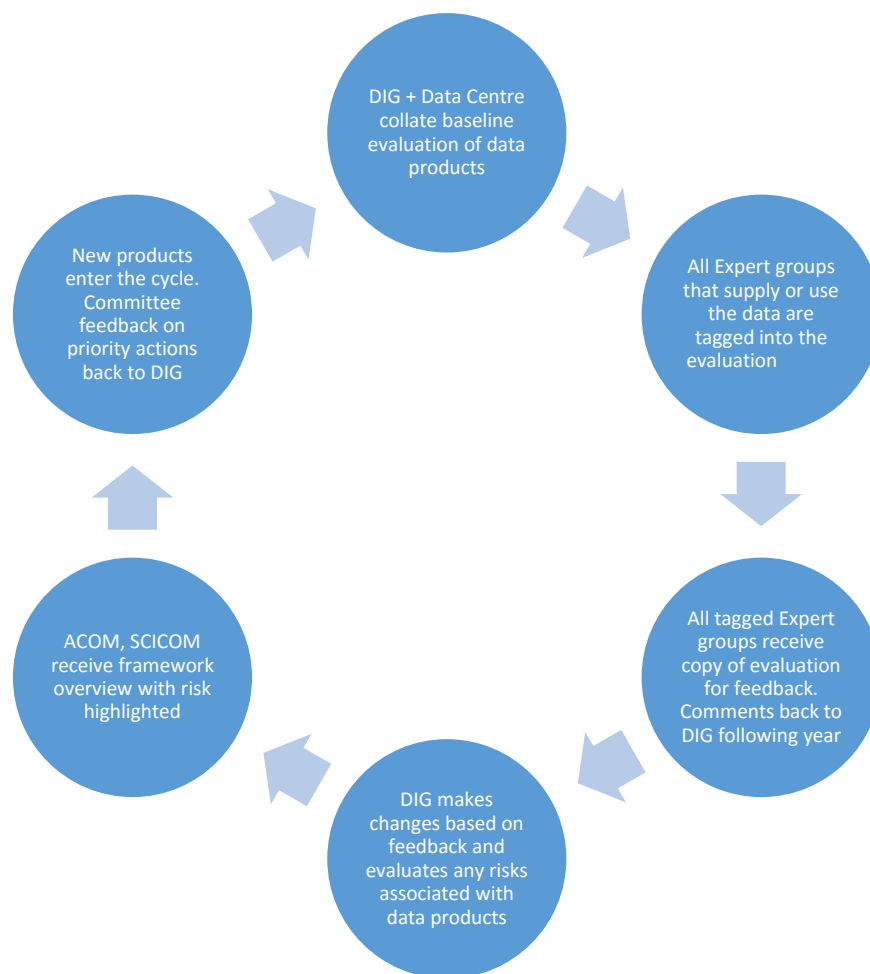
10.2.1.1 Example

One option would be for DIG to review all ICES data products with this governance framework, and essentially develop a reporting framework that enables feedback to all associated working groups and committees. The reporting tool would serve to identify strengths and weaknesses for ICES data handling and thus could help inform any risk management as well by identifying weak areas that might pose a risk to successful delivery of advice for a number of working groups.

Clearly this type of exercise would be a substantial undertaking, and would essentially become the primary recurring action for DIG, with other terms of references being placed within the framework context.

A workflow for developing this reporting tool could look like the diagram below:

¹ Unstructured in this context simply means that the content is not part of a relational database – it can still be well organised.



The cycle would provide regular updates and maintain overview of the data management principles for the ICES “estate” of data. It is not a highly detailed walkthrough every single data quality issue, for example, but rather an overall evaluation of the extent to which e.g. data quality management meets the needs of the organisation while adhering to best practises and international standards.

This approach would help SCICOM and ACOM in getting an overview of the data related interactions, and would allow DIG to more proactively engage with the wider user community rather than waiting for single issue terms of references to find their way to DIG. However, it is recognised that it is a very substantial task, and the delivery of the framework would take 2-3 years initially, but afterwards if primarily a matter of maintaining the overview and noting changes that occur along with new pressures, uses or demands on the data.

References

[ICES. 2016.](#) Report of the Workshop on the review of the ICES acoustic-trawl survey database design (WKIACTDB), 1–2 October 2015, ICES Headquarters, Copenhagen, Denmark. ICES CM 2015/SSGIEOM:35. 17 pp.

Moriarty M and SPR Greenstreet in prep. Derivation of Groundfish Survey Monitoring and Assessment Data Products for the Northeast Atlantic Area.

Annex 1: List of participants

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Annex 2: Agenda

Monday 23 May

- | | |
|-------------|--|
| 13.00-13.30 | Logistics, round the table, etc. |
| 13.30 | Safety, etc.
Vivian |
| 13.35-14.30 | Recommendations and actions 2015 if not covered in other agenda items (see Annex 1) |
| 14.30-15.00 | Data guidelines: progress [actions 2-4, and Data Plan –Annex 2]
Taco |
| 15.00-15.30 | Outline Training ‘How to make more of ICES Data?’ (action 7)
Jens |
| 15.30-16.00 | Tea |
| 16.00-16.30 | Progress Data Plan if not covered in other agenda items, focus on highlighted topics (see Annex 2) |
| 16.30-17.00 | Feedback from workshops, working groups, related initiatives, etc. and potential actions for DIG: <ul style="list-style-type: none"> • WGSFD
Lena, Christian
(also check:
recommendation WGBYC 2015-26;
WGSFD recommendation to ICES DC 2015-173;
ADGBENTH recommendation 2015-213) • ODIMS tool
Chris • MSFD DATRAS analysis
Ingeborg
(Recommendation to DIG: New working group for Data Quality within DATRAS) |
| 17.00-17.30 | Strategic developments within ICES; SCICOM leadership discussion
Ingeborg, Neil |
| 17.30 | AOB |

Tuesday 24 May

9.00-12.00 (including a coffee break)

Update from and feedback to ICES Data Centre ICES Data Centre; presentations will be ca. 15 minutes

Including:

- Litter from trawl surveys [Data Plan] - Anna
- New datasets [Data Plan]; acoustics database (Hjalte/Mehdi)
- MSFD Workflow [Data Plan]:
 - WGEXT (Neil)
 - Underwater noise (Neil/Carlos)
 - Biodiversity DB (Neil/Carlos/Jorgen)
 - Data harvesting and data versioning (DATRAS example, SMHI example) (Vaishav, Carlos)
 - Commercial catch data: RDB and InterCatch (Henrik)
 - Cooperative Working Party on Fisheries Statistics (CWP) (Anna)
 - VME portal (Carlos)
 - Platform coding expansion (Marilynn)
- Demo of Eutrophication tool for HELCOM (Hjalte)
- QC Database (Action 5)
- Spatial facility and OOPS (Action 6) Periklis
-

12.00-12.30

Plenary: summary of morning session, highlights, follow-up, etc.

12.30-13.30 Lunch

13.30-14.00 Quality assurance and external contributions, e.g. in: [github](https://github.com/ICES-dk)

14.00-14.30 practical implications of DOIs for data (IODE cookbook) –discussion and suggestions

14.30-16.00 Subgroups on:

- Data Policy
- Data submission, covering:
 - Recommendation for a New working group for Data Quality within DATRAS
 - Capturing the changes in resubmissions compared to the earlier version
 - Make data submitters fill in information on changes

16.00-16.30

Feedback on subgroup output

16.30-17.30 Subgroups on:

- ASC2017 session proposals: WGSFD/DIG; WGZE/DIG; hackathon; crowd sourcing (both SCICOM initiatives)
- Training; do we have an overview of questions from data users? Need to know the questions, and the best solution for the course.
- Data guidelines:
 - HELCOM request to update water sample guidelines
 - Criteria for submitting existing and new guidelines

17.30-18.00 Plenary: Wrap-up from and feedback to subgroups

Wednesday 25 May

09.00-10.30 DIG positioning in ICES

10.30-12.00 Subgroups –depending on Tue progress

- Data Guidelines
- Data Policy
- ASC initiatives

12.00-13.00 Lunch

13.00 Planning DIG meeting at ASC 2016 (who will be there?) and setting dates for DIG 2017, new chair proposal for SCICOM

13.15-14.30 Subgroup results

14.30-16.00 Preparing presentations of DIG work:

14.30 Plenary: agree on topics for outreach

15.00 Fine-tune in subgroups:

1. Social media: LinkedIn, facebook, twitter and ICES website
2. ICES newsletter (e.g. <http://www.ices.dk/news-and-events/news-archive/newsletters/Pages/Newsletter-March-2014.aspx>)
3. Report DIG to SCICOM at ASC 2016

16.00 Plenary: review subgroup texts and decide on final versions for social media and ICES Inside out

16.30-17.30 Finalise report

17.30 End

Annex 3: DIG terms of reference for the next meeting

2016/2/SCICOM01 The **Data and Information Group (DIG)**, chaired by Ingeborg de Boois, Netherlands, (until May 2017) and Jens Rasmussen*, UK, (from May 2017) will meet in Copenhagen, Denmark, Monday 23 May (13:00)–Wednesday 25 May (18:00) 2016. The terms of reference for the meeting will support the DIG mission: **To provide ICES with advice on all aspects of data management including data policy, data strategy, data quality, technical issues, and user-oriented guidance.**

- a) Review priorities on the Data Centre action list
- b) Provide guidance and feedback to the ICES Data Centre
- c) Advise on other data regulations and their impact on ICES Data Strategy, ICES Data Policy
- d) Propose ad-hoc groups (governance, workshops, training, etc.) related to specific topics, and/or datasets, to facilitate improvements related to data issues to SCICOM, ACOM, SCICOM SSGs and/or EGs, and review the outcome of those ad-hoc groups
- e) Promote new technologies and data management infrastructure development (e.g. IODE/JCOMM/ICES Clearing house, data citation, training)

Products (e.g. updated data management guidelines, reviews of ICES Data Strategy, ICES Data Policy, etc.) from the meeting as well as a written report to SCICOM will be delivered before 1 July 2017. The group reports to SCICOM during the SCICOM mid-term meeting March 2017 as well as the SCICOM meeting at ICES ASC 2017. The group reports to ACOM by correspondence and via the ACOM representative.

Supporting Information

Priority	The Data and Information Group provides ICES with solicited and unsolicited advice on all aspects of data management including technical, data policy and data strategy and user oriented guidance. This operational group flies the flag for ICES in setting standards for global databases. It also provides an important interface for oceanographic, environmental, and fisheries data management in ICES, and promotes good data management practice.
Scientific justification	a), b), c), d), e) are direct results of DIG's main priority: The Group provides ICES with solicited and unsolicited advice on all aspects of data management including technical, data policy and data strategy and user oriented guidance.
Resource requirements	The resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is expected to be attended by some 20–30 members, with good international and topical coverage.
Secretariat facilities	Meeting facilities, organization and facilitation of WebEx meetings (frequency and participants depending on topics to be discussed). Participation of ICES Data Centre.
Financial	No financial implications.
Linkages to advisory committees	ACOM
Linkages to other committees or groups	As Data is an important topic for most groups under SCICOM and ACOM, this group links to a large number of groups, although often indirect.

Linkages to other organizations	There are linkages with relevant international bodies and programmes like PICES, IOC/IODE, GOOS, SeaDatanet, IPY, etc., with emphasis on IOC and its Working Committee on International Oceanographic Data and Information Exchange (IODE), OSPAR, HELCOM and VLIZ.
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Annex 4: Recommendations and actions

Recommendations

No recommendations have been formulated during the DIG 2016 meeting

Actions (in *Italics*: focal point)

NR	ACTION	ADDRESSED TO	ACTION BEFORE	STATUS
1	Review and update water sample data guideline according to HELCOM suggestions	<i>Else Juul Green</i>	1 September 2016	
2	Compare the (more recently written) MEDIN Guidelines with the ICES Data Guidelines	<i>Lesly Rickards</i>	1 September 2016	
3	ICES Data Type guidelines with minor or no changes: add contact address, add date stamp, and publish	<i>Taco de Bruin, Lesly Rickards, Hjalte Parner, Else Juul Green</i>	1 November 2016	
4	ICES Data Type Guidelines needing review/serious update: select reviewers and facilitate reviewing process	<i>Taco de Bruin, Lesly Rickards, Hjalte Parner, Else Juul Green</i>	1 February 2017	
5	Follow-up on Guideline policy document	<i>Taco de Bruin, Lesly Rickards</i>	1 January 2017	
6	Collaborate with WGZE on ASC 2017 session proposal	<i>Ingeborg de Boois, Lena Szymanek, Carlos Pinto, Peter H. Wiebe</i>	1 August 2016	
7	Screen ASC sessions on options for DIG/Data Centre contributions	2017 ASC: <i>David Currie, Ingeborg de Boois, Carlos</i>	1 February 2017	
8	Further develop idea for an interactive poster session at ASC (2017 or 2018). Discuss: 'interactivity', potential topics, possibility for a sole poster session, check potential problems with internet connections needed.	<i>Ingeborg de Boois, Malin Werner, Jens Rasmussen, Neil Holdsworth</i>	1 August 2016 (2017 ASC), 1 April 2017 (ASC 2018)	
9	Create an inventory of hackathons in the marine scientific field	<i>David Curry, Wim Allegaert</i>	1 September 2016	
10	Arrange DIG presence at ICES WGCHAIRS	<i>Ingeborg de Boois</i>	1 September 2016	
11	Address the framework proposal as the standard for DIG work in future to SCICOM (SCICOM@ASC)	<i>Ingeborg de Boois, Neil Holdsworth, Jens Rasmussen</i>	15 August 2016	
12	Propose new DIG ToR for 2017 to SCICOM	<i>Ingeborg de Boois</i>	15 August 2016	

Annex 5: Follow-up of recommendations and action lists

Recommendations from other groups to DIG/ICES Data Centre:

ID	Year	EG	Recommendation	DIG/Data Centre Comments	Status 05/2016
1	2015	WGDEC	WGDEC recommends that a formal VME data call is undertaken in summer 2015. The Data Call will invite ICES Member Countries to submit new data on occurrences of VME indicators or VME habitat types. The Data Call will be managed by the ICES DataCentre.	see section 3.1.1	Complete
2	2015	WGDEC	WGDEC recommends that the ICES Data Centre continue to assist in development of the ICES online VME Database Portal and in the preparation of VMS data provided for the NEAFC Regulatory Area in order to allow the WG to carry out its Terms of Reference.	see section 3.1.1	Complete
3	2015	WGDEC	WGDEC recommends that 2015 VMS data for the NEAFC Regulatory Area are provided to ICES in advance of the 2016 WGDEC meeting. This VMS data should include information on fishing gear type (e.g. bottom trawl), and should be resolved to the finest possible temporal and spatial scales (not aggregated).	see section 3.1.1	Complete
8	2015	WGIPS	1. WGIPS recommends that in advance of WKEVAL that the ICES data centre and the Faroes (host nation and developers of WGNAPES DB) determine the outstanding meta-data requirements to fulfil the ICES meta-data standards and that this be communicated to the group as soon as possible to facilitate population of the new database. ssg	Dealt with in the process of the development of acoustic database (WGFAST)	Communicated
10	2015	WGIPS	11. It is recommended that the Northern Ireland egg and larval time-series be submitted for inclusion into the ICES egg and larval database.	No data received yet	Communicated

26	2015	WGBYC	<p>WGBYC is requesting all commercial effort data (i.e. all fleets and areas) from vessel logbooks during years 2009-2014 in addition to meta-data to support proper interpretation (e.g. data gaps in reporting, field definitions and collection procedures). WGBYC intends to summarize logbook effort over broad temporal and spatial scales (i.e. calendar year and assessment units) to support PETS bycatch mortality analyses.</p>	see section 8.1	Complete
56	2015	AFWG	<p>That ICES improves reporting of catches by area (in particular the reporting to higher resolution than I/IIa/IIb), as this reporting was found to contain errors and be inadequate for proper answering this year's request from NEAFC. ICES should further request NEAFC to improve future catch reporting by separating the three international areas in the northeast Atlantic, e.g., XBS for ICES Ia, XNS for ICES IIa1/IIb1, and XRR for the international waters in the Irminger Sea.</p>		In progress
60	2015	WGNSSK	<p>This year extra information on discard quality was provided in EXCEL spreadsheets that had to be sent to ICES Accessions. However, to ask for information on discard quality inside the Intercatch framework would make analyses and the creation of overviews much more efficient. It also ensures that the information on data quality is available at the same time as the data themselves (what was not the case this year). It avoids the many e-mails from ICES Accessions.</p>	<p>Communicated to PGDATA Covered by the new catch regulation</p>	None

61	2015	WGNSSK	<p>WGNSSK recommends that checking routines include a comparison with data held in the DATRAS system before the re-submission (e.g., number of stations, number of species, sum over individuals per species). DATRAS may provide standardized outputs on changes made to the data sets.</p> <p>DATRAS provided an example of a log file to WGNSSK. This file included a list of resubmissions made during the year and comments from data submitters. This file was regarded to be useful by the group. However, the comments could be more specific highlighting the species and DATRAS products impacted by the change. A standardized set of information that is mandatory during data re-submissions might be useful.</p>	<p>Message sent to IBTSWG chair 23.09.2015; see section 3.4.2</p>	In progress
62	2015	WGNSSK	<p>WGNSSK recommends that (...) uncertainty of survey indices could be provided as standard DATRAS output next to the survey indices (ICES Data Centre). To improve the situation further the regional database for the North Sea needs to be made operational as soon as possible (ICES Data Centre). (...)</p>	<p>WGMG on hold, not communicated.</p> <p>Communicated to PGDATA.</p>	None
68	2015	WKIELD	<p>3. WKIELD recommends creating the option to show all stations sampled on the overview maps and available as a table for download.</p>	In progress	In progress
69	2015	WKIELD	<p>4. WKIELD recommends creating a data quality control routine which is a combination of format and vocabulary checks with the data outlier checks during the upload. This should include the possibility for re-uploading and logging of data changes in the database.</p>	<p>Recommendation should also be sent to DTU Aqua</p>	None

159	2015	WGEXT	Create an ICES aggregate database (linked to the ICES Data Center) comprising all aggregate related data, including scientific research and EIA licensing and monitoring data. Overall lead from WGEXT: Johan Nyberg (WGEXT ToR b)	Bilaterally with WGEXT	None
166	2015	WGOH	The ICES Data centre and WGOH have agreed a future work programme to allow development of the IROC product online. The current support from the Data Centre is excellent and continued assistance from the ICES Data Centre is vital to ensure the IROC remains a sustainable product. The WGOH recommends that time continues to be assigned to this task.	-	No further action needed
173	2015	WGSFD	Standardized and robust methods on processing VMS/logbook data developed by WGSFD should be implemented by the ICES Data centre.	-	Complete
190	2015	WKPGMEQ	The long-term management of the Eel Quality Database needs a structural basis and is currently hampered by insufficient resources. WGEEL (ICES, 2009a) already suggested that the eel quality database should be managed at an international level (e.g. by ICES (ICES Data Centre) or a European agency, with long-term funding options and database management expertise.	Bilaterally with eel experts	None
206	2015	ADGBENTH	The ADG-BENTH recommends that in next year's data call a field is included for submitter to note whether or not VMS data exists for vessel logbooks.	Data centre, ICES secretariat, WGSFD Chair to take into consideration for 2015 VMS / logbook data call	Complete

210	2015	ADGVME	The ADG noted that ICES receives data from both VMS data calls (for OSPAR/HELCOM) and from NEAFC. Only the latter was used by WGDEC. ICES data centre should be asked to check if any further data covering the NEAFC Regulatory Area are available from the OSPAR data call.	WGDEC Chair to consider this in preparation for their next meeting. Communicated to WGDEC. see section 3.1.1	Complete
216	2015	WGIDEEPS	To transfer survey data from 1999 to 2015 to ICES DATRAS	Communicated to WGIDEEPS (29/03/16)	None
222	2015	MCWG	OSPAR uses two parameters for the determination of chlorophyll a, i.e. "chlorophyll a" and "total chlorophyll a". These parameters reflect different analytical methods which seem to produce systematically different results. MCWG recommends to the ICES Data Centre to check if this differentiation is followed through in the database.	-	ICES DC responded, but no feedback from MCWG yet
234	2015	WKEVAL	Confirmation of the biological data reporting structure (DATRAS- pelagic)	see section 3.3.1	In progress
235	2015	WKEVAL	Confirmation of the additional metadata requirements for all reporting components within WGIPS.	see section 3.3.1	In progress
236	2015	WKEVAL	Communication between WGNAPES DB hosts (Faroe Islands) that data structure is cross compatible for reporting requirements e.g. IBWSS survey program within WGIPS	see section 3.3.1	In progress
237	2015	WKEVAL	Clarification on the accessibility of data within the ICES Acoustic database	see section 3.3.1	In progress
240	2015	WGBIOP	3. Currently, WebGR is freely provided at http://webgr.azti.es but without any warranties in case of problems, with a high risk of data loss. It would be very beneficial both for ICES and the users, if ICES hosts the server. This would guarantee a wider dissemination of this useful tool and ensure a better site management and support.	Done, WebGR updated, still at AZTI	Complete

305	2015	WGBEAM	WGBEAM recommends that the DATRAS checking procedures be made available in an R-script so national data can be screened prior to the DATRAS screening, making the process more efficient.		(Recommendation only available since Feb 2015)
319	2015	WGNEPS	WGNEPS proposes that an UWTV Database to should be developed to make the data available.	More specification needed; Data Centre to respond-ICES shouldn't be acting as the host of original data, but adding the products on top. National Marine Fisheries surveys do have a data mgmt problem to store data from scallop surveys	None

From 'MSFD Quality Assured Groundfish Survey Monitoring and Assessment Data Products' (recommendations 2016):

ICES Data Centre:

1. Added transparency to changes made to DATRAS data; *In progress; relates to WGNSSK and IBTSWG recommendations 2015, see section 3.4*
2. Table of changes made to the DATRAS as a result of the aforementioned screening process should be published on the DATRAS portal; *In progress; relates to WGNSSK and IBTSWG recommendations 2015, see section 3.4*
3. Added L-max checks to DATRAS screening; to be done
4. Separate the English Channel beam trawl survey data into a new file (part in BTS and part in BTS VIIa); to be done

Annex 6: Data Plan follow-up

Goal 4: Promote the advancement of data and information services for science and advice needs

- **Promoting the advancement of data and information services for science and advice needs on both regional and subregional levels, such as providing operational products for marine spatial planning, the Data Collection Framework and for the Marine Strategy Framework Directive;**

Provision of regional workflows for the coordination of data collection, collation and data product/indicator production on an agreed basis with assured delivery for i.e. MSFD reporting timelines. A collaboration between ICES Data Centre, Regional Sea Conventions and national data originators. Supporting the establishment of integrated ecosystem observation and monitoring systems that enable coordinated data collection in support of scientific and advisory needs, and which have strong links with ICES data centre and national data centres.

New processes/products from existing data to serve both MSFD and DCF needs for Advisory and Science services. Primarily, this may entail calculations for indicators in collaboration with the relevant working groups, but also the automatization of data acquisition i.e. data calls that provide information directly into the regional data assembly mechanisms with minimal use of human effort.

ICES is entering a critical phase in ensuring that the production of its advice and science is managed within a robust IT business model. This means the roll-out of the Report and Advisory Content Management System (RA-CMS) will be a major feature of the implementation plan through to 2018.

See Regional Facilitation in Annex 1.

- **Gearing up for new/expanding areas of dataset collections, such as new datasets from b integrated ecosystem monitoring, including marine litter, and anthropogenic noise in the marine environment;**

New datasets and products are being/will be requested under the MSFD. To ensure that the advisory and science services are able to respond to this, DIS will be looking at data inventories, new data assemblies and working arrangements to ensure the provision of regional data products in areas such as underwater noise, micro plastics and acoustics (fish).

In addition to reviewing and revising the ICES Data policy, Data and Information Services will also be collaborating with the Publications Committee to ensure ICES has a common strategy towards using and providing digital citation resources.

See Regional Facilitation, Data stewardship and data management in Annex 1.

Goal 5: Catalyse best practices in marine data management, and promote the ICES data nodes as a global resource

- **Ensuring the use of International standards/interoperability to enable the use and application of ICES datasets, products, and services to an expanded international user base, and to provide tools and knowledge to facilitate this use.**

All ICES datasets and data services, including datasets and data products that exist only within an expert group, are adequately described and the 'discovery' information are available through the ICES online portals. This will also allow ICES member countries to draw on these services for their own reporting needs i.e. under MSFD.

Initiate plans for training and reference guides for scientists and data managers.

This will help raise the profile of both ICES data and data services, but also of the importance to the ICES community of the value of good data management.

See International Standards, Knowledge transfer in Annex 1.

Regional Facilitation				Status DIG 2016	Status DIG 2015	Status DIG 2014
Headline action	Detail	Performance measure	Timing			
Regional operational products for Marine Strategy Framework Directive (MSFD) and Data Collection Framework (DCF)/Multi-annual programme (DC-MAP)	(a) MSFD workflow: Collaboration between ICES Data Centre and Regional Sea Conventions/other organisations with respect to MSFD (WISE-Marine production process). This assumes a good flow of data/data harvesting into the data centre, and this can imply more resources in certain data types where data are not readily provided. (b) Leading to a joint MSFD data flow vision paper. Also depends on WISE-Marine. Link to secretariat plan.	(a) Workflow(s) operational and ready for uptake into WISE-Marine (b) Joint paper strategy accepted by stakeholders at EU level	- (a) OSPAR Hazardous substances: milestone 2014 - (a) HELCOM Eutrophication: milestone 2014 - (a) OSPAR Eutrophication (2015) - (b) MSFD Data vision paper: 2014.	05/2016: a. OSPAR Hazardous substances operation for a number of years, working on database checks. HELCOM: Baltic boost funded –ICES DC to build up data flow and indicators (cf EUTRO-OPER) for contaminants – CHASE. In progress HELCOM eutrophication: Operational: EUTRO-OPER link: http://ocean.ices.dk/eutro-oper/ OSPAR eutrophication: MS issue using national protocols, and so no common assessment	05/2015: a. Progress on all workflows i.e. EUTRO-OPER, (see also chapter 4 of this report). b. complete 09/2015: a. EUTRO-OPER link: http://ocean.ices.dk/eutro-oper/ Baltic boost funded –ICES DC to build up data flow and indicators (cf EUTRO-OPER) for contaminants Impulsive underwater noise project funded under OSPAR, building up noise register	05/2014: a. Progress on all workflows i.e. EUTRO-OPER, (see also chapter 4 of this report). Online tools are developed. Documentation on methodology is still not there. b. Started, drafted template and vision paper under development. Vision paper accepted by WGDIKE.

Regional Facilitation				Status DIG 2016	Status DIG 2015	Status DIG 2014
Headline action	Detail	Performance measure	Timing			
					before spring 2016	
	New processes/products from existing data Advisory and Science with respect to MSFD: calculations for indicators. Needed: data selections, algorithms, calculation examples. Challenge: who is going to decide on the final calculations and data selections? Workshop on MSFD related DC-MAP indicators. Refer to table (MSFD table of ICES data/WG's and their operational product linkage)	a) Uptake of ICES dataset products in EG's responsible for MSFD indicators b) Operational provision of datasets, including discovery and download services	Fish and litter Timeframe: 2014-2015 for development, and from 2016 onwards fine-tuning	05/2016: LFI: In progress, see section 8.3 Litter from trawl surveys: complete, see section 3.1.3	05/2015: (offshore) litter: see section 4.6 of this report 09/2015: OSPAR data call on litter from trawl surveys	05/2014: (Offshore) litter: In progress. Drafted extension to trawl survey format for marine litter, needs further iteration. ICES will try to establish a WG on Marine litter as a complement to existing groups/RSC processes
	New datasets and products Advisory and Science: MSFD - master data holdings; data storage, calculations for indicators. Noise, microplastics, acoustic fish data (WGFAST). Needed: data collection guidelines, data, responsible WGs for data, algorithms, calculation.	Products and/or regional data management established (where mandate is given)	2015 for setup, implementation from 2016 onwards.	05/2016: see section 3.1 of DIG 2016 report	05/2015: Microplastics & acoustic data: see section 4.6 of this report. Indicator calculation: see see section 4.2 of this report 09/2015: WKEVAL (acoustics, Aug 2015) created formats and draft data flow	

Regional Facilitation				Status DIG 2016	Status DIG 2015	Status DIG 2014
Headline action	Detail	Performance measure	Timing			
					WKIACDDB (acoustics, Oct 2015) final plan for acoustics database, trawl data and oceanographic data	
	- Data requirements with regard to multi-species assessments (input for assessments). Currently, multi-species assessments are applied in e.g. Baltic, but insufficient spatial data products are available. Baltic, other areas. (action plan to be created). Needed: clear data request (unless no data are available)	(a) Successful data call(s) (b) Provision of spatial data products	Baltic: 2014-2015	05/2016: In progress (WGINOSE request completed)	05/2015: no action 09/2015: WGINOSE requests for data to feed the model (2014, 2015). No other requests received.	05/2014: no action
	- Data requirements for e.g. one species from all fish surveys (WGEF, WGNEW) ; search facility over all data, not only for raw data but also for products. (joint WGEF, WGNEW, DIG proposal -action DIG chair)		workshop in 2014 to list product requirements	05/2016: Complete. no further action needed-workshop took place in October 2014	05/2015: Complete. WKIDP took place and was successful. Report available via ICES website 09/2015: Ingeborg check with Vaishav on WKIDP action status	05/2014: workshop is planned in October and will be chaired by Clara Ulrich
End-to-end workflow for scientific advice production	- RA-CMS linking to data outputs from Expert groups (connecting the scientific reports to advice production).	Successful implementation of interfaces to a) scientific output from EG reports b) scientific output from assessment models	starting 2014 (depends on timing RA-CMS development).	05/2016: Standard graphs further developed; stock definitions database created; will	05/2015: Standard graphs: see section 4.6 of this report 09/2015:	05/2014: Process delayed. Currently concentrating on stock input and expanding standard graphs to other

Regional Facilitation				Status DIG 2016	Status DIG 2015	Status DIG 2014
Headline action	Detail	Performance measure	Timing			
				now lead to preparation work for historical advice and fisheries overviews	SLD (stock list database) –containing definition of the stock (reference database). Advice is starting to use it.	stocks. System re-named CARA.
	- RA-CMS linking to data outputs from RDB-Fishframe	See (b) above	2015	05/2016: see comment 09/2015	05/2015: no action 09/2015: no action as RDB Fishframe is related to RCMs. This is next phase.	
Mobilising aquaculture specific data	- Aquaculture databases: exact description to be decided. Related to WGAQUA.	Products and/or regional data management established (where mandate is given)	starting from 2014.	05/2016: No action needed	05/2015: no action needed (agreed upon by WGAQUA as the group does not see the need for an aquaculture database)	05/2014: no action
Mobilising Arctic specific data	- In cooperation with AMAP, getting data from small arctic research institutes. Implementing data formatting tool.	Milestone: implementing the tool, first half 2014. Performance measure: receiving data	starting 2014	05/2016: In progress. ICES DC developed conversion programme for the data, the group had to make changes for their output programme. Meanwhile, ICES DC has produced some outputs.	05/2015: Slow progress, some testfiles exchanged. The structure of the data committees is not clear. Meeting in October relate to the polar data forum; Helge Sagen and	05/2014: In progress. Some testing and need further documentation of SIMON system Helge Sagen (DIG) nominated to Committee on Information and Data

Regional Facilitation				Status DIG 2016	Status DIG 2015	Status DIG 2014
Headline action	Detail	Performance measure	Timing			
					Taco de Bruin will attend 09/2015: Helge to report on it in May 2016	Service (CDIS) of SAON

International Standards and interoperability				Status DIG 2016	Status DIG 2015	Status DIG 2014
Headline action	Detail	Status DIG 2015	Timing			
Ensuring INSPIRE readiness for ICES managed datasets/data services	- describe and make available all ICES/ICES expert group managed datasets, data products or services through ISO/INSPIRE standards to allow their discovery and reuse by other expert groups, processes and member country activities	- All ICES datasets, including those that exist only within an expert group , are adequately described and the 'discovery' information are available through the ICES online portals	- Request to EG's to be filled 2015	05/2016: see section 9.3 of DIG 2016 report, action 12	05/2015: Technical complete; Jens Rasmussen helped validating the Data Centre's work. Not published yet. Content: no information from EGs 09/2015: see above	05/2014: ICES Data Services have an online system (INSPIRE compatible).
Encouraging the broader use of ICES datasets by implementing IODE quality flagging schema	building on the quality control database that is in the process of being populated and then exposing this to online users in a digestible way to make the linkage between type of data, type(s) of QC performed and the QC flags applied to the data	- QC database online - QC flags included in data downloads	2014-2018	05/2016: see section 3.3.2 DIG 2016 report	05/2015: is in work plan –work planned after DIG 2015 meeting. 09/2015: see DIG 2015 action list for follow up	05/2014: no progress

Knowledge transfer and professional development				Status DIG 2015	Status DIG 2015	Status DIG 2014
Headline action	Detail	Performance measure	Timing			
Input to key data symposia and science meetings	- Data theme sessions (ASC, IMDIS etc): annual theme session proposal ASC by DIG	(a) presentation and promotion of ICES work at key events (b) requests for new services/projects resulting from those activities	-IMDIS runs in 2015, 2017 - ASC annual cycle	05/2016: 3 papers for IMDIS by ICES Data Centre	05/2015: Proposal 2015 ASC was not accepted by SCICOM. There is a need for 'Data' as a topic at ASC, but may be in a different format than a theme session.	05/2014: IMDIS will not take place in 2015 so a proposal for ICES ASC 2015 was prepared by DIG 2014
Training and reference guides for scientists and data managers	- ICES training courses: 'Making the most of ICES Data', modular, webinars? - Online materials and guidance: WKIDG in 2014	(a) metrics on usage of reference materials (b) requests for new services/projects resulting from reference materials/training (c) Increased awareness of data management/ICES services in new sectors	- Training: end 2017 - Workshop to produce reference guide in 2014 (WKIDG, proposed)	05/2016: see Section 7.2 of DIG 2016 report	05/2015: DIG worked on a proposal for training development 09/2015: see action list for follow-up	05/2014: In progress.

Data stewardship and data management				Status DIG 2016	Status DIG 2015	Status DIG 2014
Headline action	Detail	Performance measure	Timing			
Data archaeology; identifying and making available datasets that are relevant to the marine community	<ul style="list-style-type: none"> - (a) benthic historic data recovery. Plan ready, no timeframe. Connected to BEWG, DGMARE (DC-MAP related), perhaps EMODnet biology? - (b) Legacy data: data that are in other systems, but not available to the wider world. Linking to other data archives i.e. through metadata - (c) other historic data 	<ul style="list-style-type: none"> (a) inclusion of pilot project in EMODnet biology (b) Providing discovery services for archived information (through EG's) (c) Where resource, to run data recovery projects 	<ul style="list-style-type: none"> (a) Start 2014. (b) follow-on from 'INSPIRE readiness' activity under heading 3 	05/2016: WGHIST, benthos archaeology	05/2015: a. see section 4.5 of DIG 2015 report b. see section b. see section 4.5 and 7.2.3 of DIG 2015 report c. no action 09/2015: b. WGHIST & metadata from EGs c. WGHIST metadata	05/2014: a. benthic historic data recovery proposal was ready. After discussion not put there due to wrong focus. Work package is on hold. b. See chapter 5 DIG report 2014
Ensuring ICES data are citeable in the digital age, and therefore making the datasets easier to discover	Digital data citation and publication: ensuring ICES data are citeable in the digital age, and ensuring contributing data sources are duly credited, as well as guiding the ICES member countries on how to approach digital citation	Creating a strategy for digital citation of data resources, in agreement with PubCom	2014-2015	05/2016: see Section 5 of DIG 2016 report	05/2015: See section 5 of this report 09/2015: Minting DOIs possible in autumn 2015 DIG 2016: practical implications of DOIs (IODE cookbook)	05/2014: in progress. See chapter 5 DIG report 2014
Maintaining the user rights, security and integrity of the data sources to ICES managed datasets	<ul style="list-style-type: none"> - Data policy, facilitation of rights issues - Data security, and implications if data portfolio changes in nature (i.e. VMS, VME etc.) 		Annual basis, 2014-2018	05/2016: see Section 6 of DIG 2016 report	05/2015: No action needed, data policy update scheduled for 2016. See also section 5.2.2 of DIG 2015 report 2016: relate to new DCF!	05/2014: RDB-Fish-Frame data policy drafted but not agreed by all participating countries yet

