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REPORT OF THE WORKING GROUP ON DATA AND INFORMATION MANAGEMENT (WGDIM)

12–14 JUNE 2007

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ICES International Council for the Exploration of the Sea

CIEM Conseil International pour l'Exploration de la Mer

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Contents

Executive summary

The ICES Working Group on Data and Information Management met for the first time in June 2007. WGDIM was established to provide ICES with advice on all aspects of data management including technical, data policy, data strategy and user-oriented guidance. The group reports directly to the Consultative Committee, and consists of data managers and data users. The group will try to attract more data users in the near future as currently not all aspects of ICES' work are properly represented in WGDIM.

During its first meeting, WGDIM discussed a number of different items important for the future of ICES databases. Enhanced integration of diverse fishery, oceanographic, and other marine environmental data, and tools to enable fishery and environmental assessments are needed to respond to the requirements for ecosystem-based management initiatives. The growing number of databases and data sources requires new approaches to be developed for efficient access to data – and especially to data in distributed databases. Management of data should also meet enhanced requirements and take advantage of ever-evolving technologies, for example, GIS-based systems and the internet.

WGDIM was asked to advice on the future of oceanographic databases at ICES. A recently conducted external review resulted in the recommendation to stop collecting hydrography data at ICES, as this would be elsewhere available faster and more complete. While WGDIM agreed that ICES should not try to compete with these other data centres for completeness of their inventories, it recommends to continue the collection of data provided by member states and sees a specific role for ICES databases: to hold hydrography data collected at the same time (e.g. on the same cruises) as environmental and fisheries data. This is a chance to strengthen the integration of different disciplines' data, which forms the basis for an integrated advice. Further, some nations use ICES instead of a national oceanographic data centre and ICES should continue to provide this service at least for the near future. The ICES Data Centre should seek to establish a closer cooperation with the World Data Centre for Oceanography, Silver Spring to find a long term solution for adequate archiving of oceanographic data.

WGDIM urges the ICES Data Centre to contribute actively to international projects developing distributed database systems, like the EU funded projects SeaDataNet, and continue the ambition of becoming a hub for distributed data.

Other important topics discussed during the meeting included guidelines for data management and for the collection of specifically hydrography and nutrient data; the need to supply metadata to be provided along with the data downloaded form ICES inventories in accordance with the new ICES data policy; the need to provide products like trend plots and gridded data graphs to ICES data users and data contributors; the appropriate choice of taxonomy codes for future use in ICES databases; the need of interoperability by means of using common vocabularies; standards for metadata and data structures; and issues to consider when using Geographical Information Systems.

1 Venue and participation

The first meeting of WGDIM took place at ICES Headquarters, Copenhagen, Denmark from 12 to 14 June 2007.

Members of the Working Group present were: P. Alenius (Finland), S. Almeida (Portugal), R. Ayers (United Kingdom), T. de Bruin (Netherlands), J. Egekvist (Denmark), G. Evans (United Kingdom), M. Fichaut (France), O. Folmer (Denmark), L. Fyrberg (Sweden), R. Gelfeld (USA), K. Larsen (Faeroes), G. Moiseenko (Russia), E. Mortensen (Faroe Islands), F. Nast (Germany), R. Olsonen (Finland), H. Parner (Denmark), L. Rickards (United Kingdom), H. Sagen (Norway, co-chair), S. Scory (Belgium), A. South (United Kingdom), J. Szaron (Sweden), M. Wichorowski (Poland), P. Wiebe (USA, co-chair), C. Zimmermann (Germany, co-chair).

In addition E. J. Green C. Hagebro, N. Holsworth (appointed ICES Data centre manager (Day 1 only)), A. Kellermann and M. Sørensen participated as observers from the ICES Data Centre.

Apologies for absence were received from E. van den Berghe (Belgium), M.F. Borges (Portugal), M. Danielsen (Iceland), G. Dawson (United Kingdom), R. Eisner (Canada), M-J. Garcia (Spain), D. Gregory (Canada), S. Jans (Belgium), M-D Lilover (Tallinn), C. Maillard (France), T. O'Brien (USA), Y. Sagarminaga (Spain), A. M. Santos (Portugal), D. Schaap (the Netherlands), R. Schlitzer (Germany), I. Shevchenko (Russia), G. Slesser (UK), E. Tel (Spain), H. Valdimarsson (Iceland).

A complete list of names, addresses and contact points of participants is listed in Annex 1.

2 Adoption of the agenda

The Terms of Reference (Annex 3) for the WGDIM meeting was adopted as a resolution of the 94th ICES Statutory Meeting in Maastricht, the Netherlands (C.Res. 2006/2/OCC:10). The agenda addressing the ToR (Annex 2) was adopted by the group at the beginning of the meeting (see Annex 5 for a list of acronyms). The agenda was amended to leave sufficient time to discuss the future of the working group. Three subgroups were formed during day one, focusing on 1) The mission of WGDIM, 2) The data services needed at ICES Data Centre and 3) Distributed databases. The subgroups reported back to the plenary.

H. Sagen reviewed quickly the Action Items from the 2006 meeting of the WGMDM to be fulfilled by WGDIM. There were 43 action items to fulfil. Only two actions were not started, others were either completed or in progress. The actions were discussed under the relevant Agenda Items.

3 Presentation of the WGDIM Web site created in ICES "SharePoint"

V. Piil and B. Chemnitz presented the WGDIM website at the ICES SharePoint server. The ICES Secretariat has created users for all members of the working group. The site is available at http://groupnet.ices.dk/EG/EG2007/WGDIM2007/. All members are at the moment defined as "Contributors", meaning that they can upload new documents and edit old documents. It was stressed by the Secretariat that a document be "Checked out" before editing it and then afterwards to save the document and "Check it in" again. While a document is checked out, it is locked for editing by other members.

Several members expressed their interest in using the system, especially the possibilities concerning editing of documents by several members. According to the ICES Secretariat the documents on SharePoint will only be available for a time span of two years. The members of the working group expressed concern about this short time span and agreed to request the Secretariat to give the documents a longer life time. The Secretariat stressed that this time limit was set to keep the storage capacity needed within a reasonable size.

The group suggested that a new top menu in the "Quick Launch" area be added to provide access to Data products, including CDROM products, links to online databases, and portals. It was suggested that IOC/IODE be contacted to see what web portals and online databases they have that might be listed in the menu.

Proposed new action items for 2007/2008

Action 1: Add a "Quick Launch" menu on Data products including CDROM products, links to online databases, and portals coordinated with IOC/IODE [G. Evans].

Action 2: Request the ICES Secretariat to prolong the time span for documents on SharePoint beyond the current two year limit [Chairs].

4 ICES Oceanographic Database evaluation report (CONC request)

L. Rickards presented the report that was compiled by her at the request of the ICES Secretariat. It examined the oceanographic data held by the ICES Secretariat and recommended the possible future direction to be taken. This takes into account the ICES ambition to remain a focal point for marine data in the North Atlantic and to create a portal serving as a hub for distributed data, and also the newly published data policy.

In particular, the report seeks to answer the following:

a) With background by input from the ICES Data Centre, what are the data that exist in the ICES database covering all existing oceanographic knowledge from the region, is ICES meeting its own ambition (e.g. as outlined in the data policy and data strategy)?

b) Who are the users of regional oceanographic data not confined to those who use the ICES database, but seen more broadly?

c) What other (competing) databases exist?

d) Consider whether there are among those identified under c) alternative data sources where the same information as exists in the ICES oceanographic database can be found, if yes please identify these sources. Are these data sources better covering the available knowledge than ICES?

e) What are the arguments for using ICES as the source and for using alternative sources; seen from a user perspective (can this be answered by the consultant?).

The report looks briefly at the history and background to the development of the data set, examines the content of the data set in terms of its completeness, considers other (similar) global or regional data sets that have been compiled, and assesses whether they are complimentary or in competition with the ICES held data set. These include:

- Global Ocean Data Archaeology and Rescue (GODAR) Project

- World Ocean Database (WOD) – used by IPCC
- Global Ocean Surface Underway Data (GOSUD) Pilot Project
- Global Temperature and Salinity Pilot Project (GTSPP)
- Global DACs for Argo Profiling Float Data
- CLIVAR Carbon and Hydrography Data Office (CCHDO)
- International Comprehensive Ocean-Atmosphere Data Set (ICOADS) – used by IPCC
- World Data Centre for Marine Environmental Sciences (WDC-MARE)
- Nationally held data sets (assembled for example by NODCs)

The report also considers the visibility of the ICES oceanographic data and who uses them.

The internet is fast becoming the mechanism of choice for retrieving data, thus several projects are described where distributed systems are being developed – these include examples within an organization (NERC Data Grid), a country (IOOS DMAC, USA), a region (SeaDataNet, Europe) and internationally (E2EDM, JCOMM/IODE).

Finally the report provides a series of options for the path the ICES should take to remain a focal point for oceanographic data in the North Atlantic to best meet the needs of ICES scientists, the Secretariat, and the wider marine community who utilize ICES data.

The options considered are:

1) Business as usual.
2) Business as usual, but with extra resource.
3) Abandon oceanographic data altogether and let another organization take on responsibility.
4) Gradual move to distributed system – ICES acting as an oceanographic data centre for those who want it, but develop links to other systems.
5) Act as a focal point for expertise, coordination, and product generation for the ICES region and community.

The report concludes with the following recommendation:

“The future direction must be in line with the ICES strategy and vision, but should avoid duplication of effort. Any changes to the current mode of operation must include an assessment of cost and type of resources needed, but also needs to take on-board the views of major contributors to the ICES Oceanographic Database.”

“The resource necessary to continue to develop the ICES Oceanographic Database and try to make it complete is well in excess of the resource available, and with other competing systems around it would seem more appropriate to take advantage of these, including initiatives for distributed systems which should provide more data in the medium term.“

“For ICES to both make a difference and have a unique role in respect of physical oceanographic data and marine data management, I would recommend that option v) above is taken, but with elements of option iv), a gradual move to a distributed system. The only disadvantage of option v) is that the current staff resource at ICES does not map well with this option and so would need to be reassessed. However, in the immediate future, the ICES Oceanographic Database should

continue to exist and be added to - evolution is more beneficial than revolution. In the medium term, say over the next five years, discussions need to be held with the major data contributors to ensure that they are satisfied that there are adequate archives available for their data in the future (e.g. World Data Centre for Oceanography, Silver Spring and the network of national oceanographic data centres). In parallel ICES should contribute actively to the development of the SeaDataNet distributed system to ensure that it meets their needs. The ICES ambition to create a portal serving as a hub for distributed data can still be met, as ICES will continue to hold fisheries and environment data, and will have close links with major oceanographic databases."

The request from CONC to WGDIM:

ConC recommends that the Working Group on Data and Information Management [WGDIM], in collaboration with the ICES Data Centre Manager, discuss the strategic plan to move ICES towards a distributed system, identify strategies to deal with issues of possible differences in data QC/QA procedures among data centres, and discuss the implications for the development and production of data products by the Data Centre for use by the ICES community.

The WGDIM discussed the conclusion L. Rickards presented:

Act as a focal point for expertise, coordination, and product generation for the ICES region and community and a gradual move to distributed systems. Option v) with elements of iv).

Some important remarks that were raised:

- It is important to avoid redundancy of data.
- Data availability gaps must be identified.
- ICES serve as a data centre for several programs, HELCOM, OSPAR and AMAP.
- ICES Data Centre can not only be a repository for data, must be more proactive.
- Identify what kind of products other WGs plan to produce.
- Important to have the human resources needed at the Data Centre.
- ICES Data Centre must provide data format translators.
- ICES Data Centre must become a more active partner in existing partnerships, like SeaDataNet.
- Identify products need by integrated assessments, grids…
- If ICES abolished the oceanographic database, where should member countries send their oceanographic data, to the world data centres? If so, does WDCs have the resources needed to manage the data? Will more data get lost?
- What about member countries that do not have a NODC?
- It is of great importance to register metadata together with the managed data.

This discussion concluded that most members of WGDIM disagree with L. Rickards on her conclusion that in fact could result in the oceanographic database being abolished at ICES within 5 years. WGDIM members would rather recommend that ICES kept on managing oceanographic data since they are needed by other datasets that ICES will continue to manage like fisheries data. While ICES should not aim at completeness of oceanographic data for the ICES area, it should increasingly focus at data collected at the same time (e.g. on the same cruises) as environmental and fisheries data. This is seen as a chance to strengthen the integration of different disciplines' data, which forms the basis for an integrated advice.

The discussion continued in the subgroup on Distributed Databases later on.

Proposed new action items for 2007/2008

Action 3: Write a recommendation to ConC to continue the management of oceanographic data at ICES, but with a changed focus (L. Rickards and H. Sagen).

5 Discussions in subgroups

The members split into three sub groups to discuss for about one hour three themes, 1) The mission of WGDIM, 2) The data services needed at ICES Data Centre and 3) Distributed databases.

5.1 Subgroup 1: The mission of WGDIM

The subgroup was chaired and reported by Taco de Bruin.

The mission statement is already in the ToRs to the group. ***WGDIM is established to provide ICES with advice on all aspects of data management including technical, data policy, data strategy and user-oriented guidance.*** The WGDIM group has 20 members from the old WGMDM group and 5 members from the former SGMID. The subgroup recognised that users are underrepresented in the present WGDIM, and that not all fields of research in ICES are properly covered. A number of possibilities to increase participation of users for the benefit of WGDIM's work were discussed. Among these, public announcements of WGDIM's work and aims e.g. in the ICES Bulletin Board and "ICES insight" appeared to be a reasonable initial action.

WGDIM reports to ConC. The subgroup raised the question of where the new WGDIM group will report its ToRs for the ICES ASC 2007 and asked the chairs to clarify this before the ASC.

The subgroup discussed several opportunities for WGDIM work

- To be an advisory board for the ICES Data Centre
- To comment on and help to develop the ICES Data Centre work plan
- To be a fast track system to advise the ICES Data Centre by having a few identified persons in a special group that work intersessionally directly with the ICES Data Centre (or coordinate such a fast-track advice after distributing the request to the group)

The subgroup discussed how the WGDIM group connects with the ICES User community?

- Wait to be asked
- Ask the ICES community to identify typical users for the group

The subgroup suggest to identify specific WGs that collect a lot of data, like IROC, NORSEPP, WGZE, Survey-working- or planning groups – e.g. ecosystem, acoustic, mackerel egg.

The subgroup discussed integration of data within ICES community.

Proposed new action items for 2007/2008

Action 4: Make the WGDIM mission statement more visible to the ICES community

5.2 Subgroup 2: The data services needed at ICES Data Centre

The subgroup was chaired and reported by Andy South.

The group discussed existing ICES web services and looked on the ICES web site:

- Oceanography works, but some data are restricted requiring permission to be sought.
- ICES fish map can create dynamic maps from fish survey data
- Integrated data web interface for selecting cruises and different data types from them, but we couldn't get to work.
- Intercatch ability to upload data, modify and download.

The subgroup suggests that single access point for ICES data would make locating data easier. Currently accessing data can be difficult because data are separated by groups within ICES.

The subgroup acknowledge that graphics (maps, contour maps, and time series plots), are very useful for quick viewing, for identifying data availability, patterns, and whether users want to download data themselves.

The subgroup suggests that plots should be produced dynamically from data, otherwise there is the danger that the plots are another duplicate of the data, and that if the data are corrected the plots will not be.

The subgroup is concerned that much data at ICES are held in flat ASCII files, that whilst good for archiving, but may make it difficult to access via web services.

The ship code list was one example of where a web service is required. Initially for research vessels, there is the potential to extend it to any vessel or survey platform (in discussion with platforms working group). The code should include country and should be able to account for vessels that are replaced, but where the name does not change. Work is already going on within SeaDataNet: http://seadatanet.maris2.nl/v_bodc_vocab/welcome.aspx and POGO: http://www.ocean-partners.org/.

The subgroup suggests that ICES could provide data archiving systems for working groups. Current ways that data dealt with at working groups:

1. Helcom model: experts have data on their own PCs.
2. Baltic model: data submitted to one expert.
3. Ospar model: data brought together at ICES.

There was a suggestion that bringing data together at ICES should be favoured in order to keep a record of the data used to produce a report. Both the report and the data would be static. If corrections were made to the original data, these would not be represented in either. In future there is the potential for creating dynamic reports directly linked to databases so that if corrections/updates made to data these could automatically be incorporated.

Suggestions summary:

a) Single access point on the web for access to ICES data.

b) Provision of graphics (maps and time series plots) as well as data.

c) Dynamic plots should be created directly from the data.

d) Provision of 'ship code list' as a web service.

e) Provision of data archiving service for working groups.

Proposed new action items for 2007/2008

Action 5: Request the ICES Data Centre to develop a single access point on the ICES web portal for access to ICES data holdings

Action 6: Request the ICES Data Centre to develop graphical products like maps and time series plots in ICES data holdings for the ICES user community.

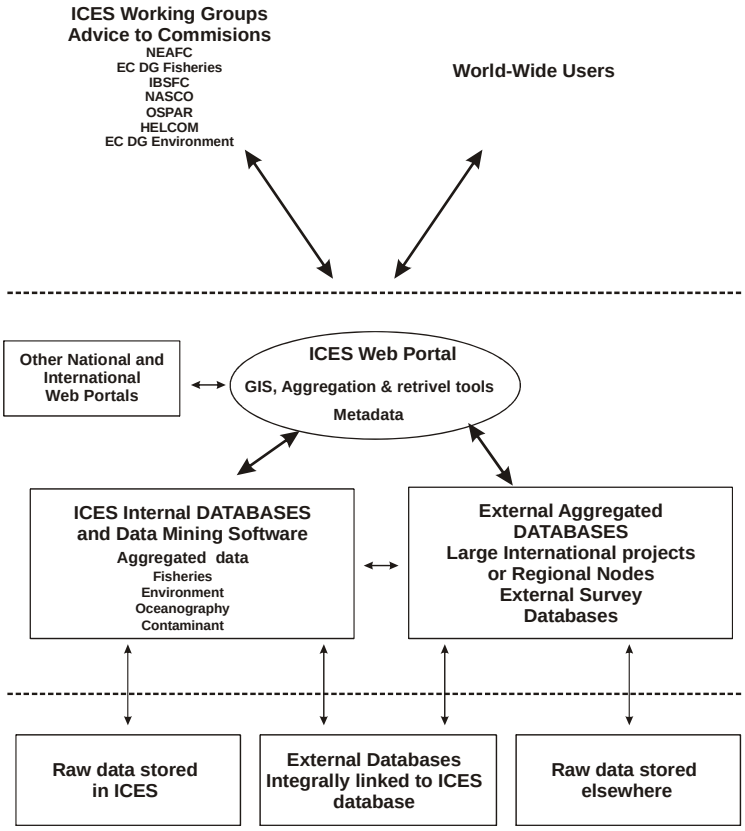
Action 7: Request the ICES Data Centre to make available a Web Service on ship codes.

5.3 Subgroup 3: Distributed databases

The subgroup was chaired and reported by Helge Sagen

WGDIM to request the ICES Data Centre to investigate WMS (Web Map Services) possibilities in presentation of data and as an access port to data.

WGDIM to request the ICES Data Centre to be active in the Quality Control / Quality Assurance (QC/QA) workshop in Oostende 15–19 October 2007, (L. Rickards, T de Bruin, B. Gelfeld).



Ocean databases are important and need resources to be updated and filled with more data. WDC Silver Spring can help the ICES Data Centre on the backlog of data awaiting QC/QA in order to be served to the community, if requested. The schema in the BWGDDP report for the Data Strategy should be endorsed by WGDIM. The figure below illustrates ICES position as hub between data users and data providers – both inside and outside ICES.

Proposed new action items for 2007/2008

Action 8: Investigate in cooperation with the ICES Data Centre the possibilities in using WMS techniques in presenting and accessing research data.

Action 9: Request the ICES Data Centre to participate actively in the QC/QA workshop in Oostende 15-19 October 2007.

Action 10: Request the ICES Data Centre and the WDC Silver Spring work together in overcoming the backlog of data at ICES awaiting QC/QA in order to be served to the community.

6 Data availability gaps – ToR a)

R. Gelfeld presented the status of data flow from ICES to the WDC Silver Spring and stressed that no data have been sent the last six years. The last submission of oceanographic data from ICES

was from Belgium, Finland, Poland, Portugal, the Netherlands, and Spain in 2000 and from Iceland and Norway in 2001.

When looking at the status page for accessions to ICES Data Centre at http://www.ices.dk/datacentre/accessions/oceandata.htm one can see the large backlog of uncompleted data submissions.

R. Gelfeld presented information about the EU project SeaDataNet that plans to connect 40 NODCs in Europe in a transnational data access system. The ICES Data Centre is a partner in the project, but not as a data provider, since that would probably introduce duplications.

Proposed new action items for 2007/2008

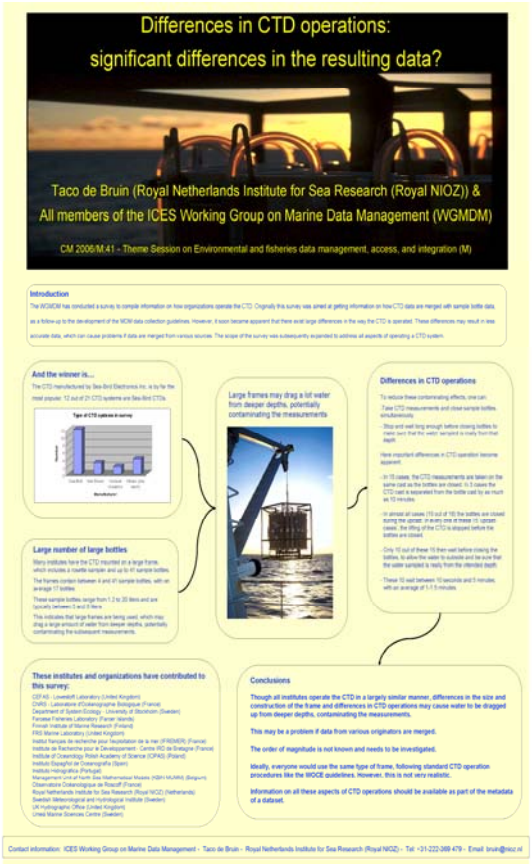
Action 11: Report the results of the discussion between WDC and ICES on how they could cooperate more effectively and improve data exchange [R. Gelfeld, N. Holdsworth].

Action 12: Request the WDC Silver Spring to help ICES Data Centre to overcome the backlog of uncompleted QC/QA on submitted datasets [Chairs, R. Gelfeld].

Action 13: Request members to send their quality controlled data to ICES Data Centre giving priority to datasets like IBTS data needed for the NORSEPP report and currents meter inventory to be included in the BODC International Current Meter Inventory. [All]

7 Data transparency, traceability and quality – ToR b)

T. de Bruin reported the activities concerning the questionnaire distributed among members to clarify routines used while sampling temperature and salinity and data from water bottles. Nothing much new has been achieved the last year being a transition year between two groups. The group discussed whether to stop this activity or continue. It was agreed that it is important to clarify such differences in operating similar equipment and the work should be extended. T. de Bruin recommended repeating the request to fill in the questionnaire among those members that are new to the group and those members that have not responded. Each member should also try to gather information about other institutions in their own country.



T. de Bruin explained the poster presented at the ASC in Maastricht (CM 2006/M:41) and the poster has been made available on the WGDIM SharePoint web site. The conclusions presented are:

Though all institutes operate the CTD in a largely similar manner, differences in the size and construction of the frame and differences in CTD operations may cause water to be dragged

up from deeper depths, contaminating the measurements.

This may be a problem if data from various originators are merged.

The order of magnitude is not known and needs to be investigated.

Ideally, everyone would use the same type of frame, following standard CTD operation procedures like the WOCE guidelines. However, this is not very realistic.

Information on all these aspects of CTD operations should be available as part of the metadata of a dataset.

ConC has requested WGDIM to identify differences in data QC/QA procedures used in member countries to clarify implications for the development and production of data products by the ICES Data Centre. WGDIM members should make available their QC/QA procedures to make this possible.

P. Wiebe and C. Zimmermann raised issues discussed during the 2006 meeting of SGMID concerning data ownership and traceability. During SGMID the issue of documenting the submitter of the data and the data owner itself were discussed. At present that kind of information is not a mandatory field in the DAD (Database on Accessions and Documentation) at ICES.

The SGMID had further discussions on which metadata to supply along with the data downloaded/extracted by web users, in accordance with the ICES Data Policy. P. Wiebe proposed that an information or metadata file to be supplied with every data extract from ICES databases as proposed earlier by SGMID. The file should include the following as a minimum:

- General ICES conditions of use/disclaimer.
- Specific conditions that apply to the particular dataset, as supplied by the submitter.
- Any acknowledgements to be used.
- Definitions of quality flags used.

Proposed new action items for 2007/2008

Action 14: Report to ConC and WGOH the outcome of the CTD questionnaire. [Chairs, T. de Bruin]

Action 15: Distribute the CTD questionnaire to new members and those members not responding the first time. [T. de Bruin, all]

Action 16: Prepare a questionnaire to be used to identify differences among member countries regarding QC/QA procedures important in relation to products. [G. Dawson, T. de Bruin, All]

Action 17: Request the ICES Data Centre extend the list of mandatory fields in the DAD database to include data submitter and data owner. [P. Wiebe]

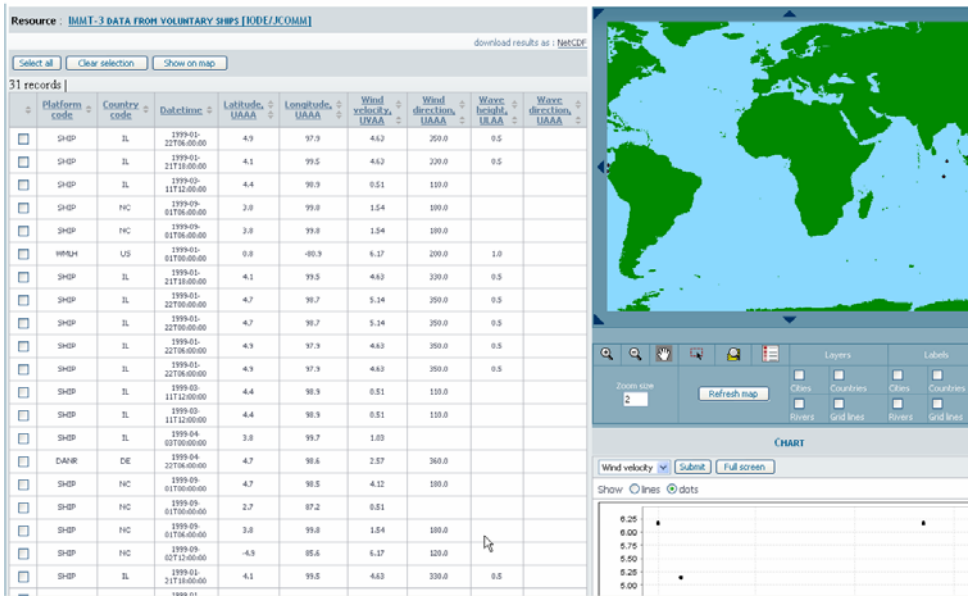
Action 18: Request the ICES Data Centre include an information or metadata file to be supplied with every data extract from ICES databases containing general and special conditions together with acknowledgments and quality flag definitions. [P. Wiebe]

8 Products – ToR c)

G. Evans reported on how to provide advice on products based on ICES data holdings. Trend plots and gridded data products are desired by ICES Annual meeting members. These would serve as an incentive to the data contributors. WGDIM should provide specific examples of the kinds of products needed and the means of this distribution.

G. Evans has investigated what IOC/IODE does in publishing online databases and web portals, information available at http://www.iode.org/. The IODE site does work as a data and information portal due to it having:

- Simple and consistent page layout, not confusing to the eye;
- Few clicks to get where you want to be;
- High resolution dynamic maps that are speedy and user friendly;
- User-friendly data delivery.



It was noticed that MapServer is very useful open source software that is used behind many oceanographic web-page implementations like GLOBEC. Members of the WGDIM were encouraged to visit the GLOBEC web database and report if they can break it.

Proposed new action items for 2007/2008

Action 19: Set up a list of products on the WGDIM SharePoint site. [G. Evans]

9 Data management interoperability ToR d)

F. Nast gave a presentation on Cruise Summary Report (CSR) directory. The annual gain is about 1000 CSRs, of those online comes 33%, as XML 34%, through ICES 25% and via other means 8%. Another topic was metadata management in SeaDataNet. The WG recommends that ICES continues and intensifies its cooperation with SeaDataNet, POGO, and MMI by mapping its RECO system to common vocabularies.

It was pointed out that POGO website (http://www.pogo-oceancruises.org/) contains information on research vessels longer than 60 meters and on planned research cruises. The cruise schedules were noted to be very dynamic and there are problems in keeping the continuously changing information up-to-date.

It was noticed that there is some discrepancy between CSRs in ICES and SeaDataNet. It was also noted that the RECO system cannot be reached by computers and is thus insufficient. US Navy and NOAA have sponsored projects on interoperability and there exist a document summarizing problems and giving recommendations to avoid them.

Proposed new action items for 2007/2008

Action 20: Request ICES Data Centre maps its RECO system to common vocabularies such as Marine Metadata Interoperability (MMI). [G. Evans, P. Alenius]

Action 21: Request ICES Data Centre set up a mirror site for the CSR online system developed in Sea-Search and SeaDataNet. [F. Nast, N. Holdsworth]

Action 22: Request ICES Data Centre set up a Web Service for ship codes. [Chairs]

Action 23: Promote international metadata and cruise summary report systems to the PICES community. [F. Nast]

Action 24: Members should prepare to be contacted by SeaDataNet or POGO and to submit information about planned research cruises. [All]

10 Data guidelines and data integration ToR e)

Action point 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 and 25.

The WG discussed on the guidelines made by the former WGMDM. It was considered important that there are links to the guidelines in ICES WebPages as well as in every data centres Web Pages. The WG suggested that the name of the guidelines would be changed from working group guidelines to ICES guidelines.

G. Dawson has drafted a new guideline on Multi-beam data. It is completed and is available from the ICES website. It was decided that the guidelines will be revised when needed and new guidelines will be given when needed. The WG suggested intensified promotion of the guidelines at the ASC, and that a link to these guidelines is prominently placed on the ICES data inventory website.

The WG considered it useful to promote the adoption of WGMDM/ICES guidelines as the IOC/IODE's official guidelines. In this context the chairs should invite Peter Pissierssens from IODE to be an expert in the WGDIM and include him on the post list of the group.

The guidelines are made available in both Word and PDF format at the web site.

Data Integration was acknowledged to be a key element in future programmes. ICES databases should be internally integrated and also integrated with the rest of the rest of the world. This work should be supported. The WG will follow the topic of Data Integration in its future work. P. Wiebe was asked to draft an action item for this.

It was noted that in 2003 the other WGs of ICES were asked to review the guidelines. However, there was a feeling that though some of the WGs did that they got no response on their work.

Proposed new action items for 2007/2008

Action 25: Request ICES to adopt the WGMDM Guidelines as the ICES guidelines [Chairs]

Action 26: Contact IOC/IODE Secretariat to make them an official member of the WGDIM working group. [Chairs]

Action 27: Promote the guidelines at the ICES ASC 2007. [ICES data centre]

Action 28: Promote data integration within ICES community. [P. Wiebe]

Action 29: Request IODE GE-BICH to cooperate on identifying guidelines on biodiversity by writing a letter from the WGDIM to IODE. [Chairs]

Action 30: Request ICES Data Centre to supply WGDIM with exact web statistics on guidelines web pages [G. Evans, N Holdsworth]

11 Taxonomy issues – ToR f)

Action point 19, 20 and 21.

P. Wiebe presented the topics on taxonomy issues. A questionnaire has been done and 11 responses were received showing very variable use of different codes and scientific names of taxa.

There was lively discussion on ITIS. It was noted that ITIS is focusing efforts on plankton data using COPEPOD taxa lists (which contains BODC, NOAA, BSH, and FIMR plankton taxa in its holdings). Of approximately 5000 plankton taxa, 530 are not in ITIS. Still it was considered a big problem that ITIS continues to be unresponsive, which mainly is because it still is grossly understaffed, receives zero funding from NOAA during 2007 and is solely running under USGS funding. ERMS (European Registry on Marine Species) has now welcomed the development of WoRMS (World Registry of Marine Species) (http://www.marinespecies.org).

- WoRMS with ERMS roots intends to fully support the ICES community
- WoRMS is being used by OBIS for its validation of species
- WoRMS is a community effort (expert can help review taxa via online system)

It was noted that ITIS couldn't be abandoned. However, ERMS is suggested for Baltic Species as well as Guy Hällfors list. ERMS does not create temporary ITIS codes for those species that have no code in ITIS whereas COPEPOD does.

The WG recommended the use of ITIS and thus ICES are requested to follow how ERMS is evolving.

There was also lively discussion on the species codes. There are difficulties even if species codes are numbers rather than scientific names. The problem is that the system is dynamic. The classification changes during time and that cannot be solved better with numbers than by names, but it is a question of the date when the changes happened. The advantage of names is that those tell something to users and are easily checkable if they are misspelled or not, by pure number codes it is much more difficult.

The WG considered that a ToR on taxonomic codes should be on the agenda also in the future.

Proposed new action items for 2007/2008

Action 31: Request ICES Data Centre to keep updated on how ERMS and WoRMS are evolving. [Chairs]

12 Data management practices in Operational Oceanography ToR g)

Action points 22, 23, 26 and 27

J. Szaron presented the topic. He reminded the WG on the WGMDM's action item from year 2006 on an inventory of relevant web pages. Jan Szaron has produced an Excel-file including the relevant web pages sent to him by the members of WGMDM. Updating of that list was considered useful. The list is available on WGDIM SharePoint site.

The latest report from GOSUD will be put available to WGDIM members to the SharePoint by R. Gelfeld.

J. Szaron presented the recent demonstration of operational oceanography that has been done under EU/EuroGOOS SEPRISE project (http://www.eurogoos.org/sepdemo/). The site shows real time data of several parameters around Europe. It shows that some facilities already are working very well and others not so good. The WG considered that very impressive and a link to those pages should be included on the ICES Website. However, fisheries people need time-series data from longer time spans to predict the fish stocks. It was noted that individual fishermen could still benefit from the real-time data being available in Internet.

The SEPRISE system is technically based on ftp servers sitting at each data provider's site and a central site downloading data and producing products to the web. S. Scory is going to contact people operating ferry boxes in order to do something similar for chemistry data from the North Sea.

The WG discussed on the topic of ICES participation in operational oceanography. It was noted that at least part of the operational data should be put to ICES databases in delayed mode. It was noted that ICES already has operational links in its web pages (like NORSEPP). In the discussion the future of oceanography in ICES was raised. It was pointed out that operational oceanography is important if oceanography is continued in ICES at all.

The WG strongly encourages the use of established QC procedures and the use of international standards in the field of operational oceanography.

Proposed new action items for 2007/2008

Action 32: Make available the latest GOSUD report on SharePoint. [R. Gelfeld]

Action 33: Request ICES Secretariat makes a web link on the ICES web pages to the EU/EuroGOOS SEPRISE project at http://www.eurogoos.org/sepdemo/.

Action 34: Promote to the ICES community that WGDIM strongly encourages the use of established QC procedures and the use of international standards in the field of Operational Oceanography. [J. Szaron, all]

13 Data exchange protocols –XML and others – ToR h)

Action point 29, 30 and 42.

M. Sørensen and M. Wichorowski gave reports on the discussions in IOC MarineXML Steering Group. It was noted that SeaDataNet connects data centers of participating 35 countries together into a network. XML exchanges compliant to ISO19115 are used within that community in exchanging different types of metadata like CSRs. There are six catalogues on metadata linked to EDMO supported by web services for delivering dictionaries. Ifremer has produced software for producing XML files for exchange from database through adjustable mapping between local databases and SeadataNet system. Within this system a XML schema for CSR will be updated and made available in February 2008.

The WG recommends ICES to make use of the CSR XML schema to exchange CSRs with the German Data centre, DOD. The WG was reminded that a document by Roy Lowry on XML development is available from IODE WebPages. The activities of the MarineXML Steering Group should be followed.

It was concluded that no term of reference on MarineXML was needed for the time being.

Proposed new action items for 2007/2008

Action 35: Request the ICES Data Centre make use of the CSR XML Schema to exchange CSRs with the German Data Centre. [Chairs]

Action 36: Follow the discussions and activities of the IOC MarineXML Steering Group [M. Wichorowski, chairs]

14 GIS web applications – ToR i)

Action point 31, 32, 33 and 34.

S. Scory reported that his colleague S. Jans sent out a questionnaire recently regarding the use of Open Source GIS, but no responses where received before the WGDIM meeting. S. Scory was asked to continue the work through S. Jans and analyse outcome of the questionnaire for next year's meeting.

J. Szaron asked the question about who selects the software used by the ICES Secretariat. As a working group we can provide recommendations. A consideration is that software should be used by others in the community to allow data sharing. Also, any software should ideally be familiar to people who come to do work for the ICES Secretariat.

M. Wichorowski demonstrated MapServer, Geoserver, and DeeGree. All three conform to OGC. Geoserver and DeeGree are mostly used as terrestrial applications. Mapserver has increasing usage. M. Wichorowski recommended MapServer to be used by the ICES Data Centre.

P. Wiebe noted that GLOBEC uses MapServer and this software development is freely available. H. Sagen mentioned that time is something that GIS software does not handle well. 'Layers' are a way to have a temporal component, but this is fudge.

P. Alenius was unable to report on possibilities in using GIS system GRASS. M. Wichorowski suggested that this action would be maintained.

H. M. Jensen (ICES Data Centre) informed the group that there is a low level of GIS usage at ICES, and recommendations are welcomed. P. Wiebe asked that we need to assess how we can recommend to ICES use of GIS for users to access ICES data. Mapserver at GLOBEC used to deliver data as well as visualisation.

P Wiebe informed the Group about ASC 2008 and outlined the proposed theme session on marine integrated data that has been submitted to the secretariat. At the last ASC there was overwhelming support for a future data theme session. WGDIM fully supports next years proposed session.

Proposed new action items for 2007/2008

Action 37: Revise the questionnaire on the use of Open Source GIS and redistribute it in the ICES community to be able to give recommendations on the best use of GIS. [S. Jans, all]

Action 38: Request the ICES Data Centre to become familiar with the use of WMS software MapServer. [M. Wichorowski, chairs]

Action 39: Investigate possibilities of the Open Source GIS system GRASS. [M. Wichorowski, P. Alenius]

Action 40: Draft a new ToR that merges ToRs I ('GIS web applications') and C ('Provide advice on products based on ICES data holdings'). [P. Wiebe]

Action 41: Contact representatives of the EU Humboldt project to get their view on GIS systems and solutions useful to researchers and report back to WGDIM at the next meeting. [S. Jans]

Action 42: Consider presentations and inform colleagues about the possible theme session on data management at ASC 2008, 22-26 September 2008.

15 Metadata standards and quality indicators – ToR j)

Action point 24, 36, 38, 41 and 43.

L. Fyrberg led the discussion on metadata standards and quality indicators. It was noted that ICES has started to go through all codes in code lists and try to harmonize them. This is time consuming work. ICES will make RECO list as a downloadable and interoperable service.

It was noted that a new version of CSR is under development. ICES will have a mirror site of the SeaDataNet CRS site maintained by BSH.

The WG see it important to include a "Products"-page under the WGs share point that has replaced the WGMDM web pages.

The members of the WG were requested to update their information in the EDIOS database. It was noted that because the Group is for supporting the ICES Data Centre, this action item should be on the agenda every year.

ICES participation in MMI work was discussed. ICES are not participating because the Secretariat has not enough resources for that though in principle it would be useful. The WG saw that the most efficient solution would be to use people who are near to the WG and are already involved in MMI to exchange information.

Proposed new action items for 2007/2008

Action 43: The WGDIM members are requested to update their information in the EDIOS database maintained in the SeaDataNet project. [All]

Action 44: Report to the ICES Data Centre activities in the MMI project that are relevant. [G. Evans, all]

16 Other agenda items

16.1 Data policy

Access restrictions to data held at ICES but delivered before May 1st, 2006

The new ICES data policy was unanimously adopted by the ICES council and entered into force at May 1st, 2006. Since then, all data submitted to ICES or collected under ICES coordination are considered to be in the public domain. The new data policy, however, was not applicable to data

delivered prior to the implementation date. To open these inventories, ICES has contacted data sources and delegates in August 2006 asking for their permission to apply the same rules as for new data also to these "historical" data. Alternatively, the ICES data centre encouraged starting a discussion with the source if the latter wishes to impose access restrictions for data submitted prior to May 2006.

Until October 2006, which was set as deadline, only one data source indicated that it would not agree to apply the rules of the new data policy to data submitted earlier. The Dutch IMARES (ex RIVO) proposed a complex system of access restrictions to survey data, distinguishing between different species and aggregation levels, and different contexts in which the data requester plans to use data. While even under those restrictions aggregated and raw data will be freely available for work flagged as "ICES work", the implementation of such access restrictions for "outside ICES work" would require setting up a complex system for data requests and access permissions. This was exactly what the new data policy tried to avoid. The ICES Secretariat is therefore strongly encouraged to seek a constructive discussion with IMARES aiming at convincing the institute that the new data policy already covers their concerns, and that no additional restrictions would be needed. Also, a number of unresolved issues in the proposed IMARES access system should be clarified.

P. Wiebe informed the Group on an item discussed in SGMID about data originator/ownership. It was strongly recommended that ICES add a mandatory field in the DOME database giving details of the data originator. This was agreed.

16.2 Environmental data

The Environment Group at the ICES Secretariat was in the same position as the Oceanography Group is now after Janet Pawlak left. They are now in a much-improved position. A network of supporting working groups was set up during their transitional phase, which proved to be very useful. This network provided intersessional advice to the Environment Group.

P. Wiebe advised M. Sørensen that ERMS should include Baltic Sea species The ERMS system has a salinity restriction of 0.5 PSU to keep freshwater species out of the list. It has been identified as a problem to accept species from the Baltic Sea. M Sørensen requested help from WGDIM if they have further problems with ERMS.

M Sørensen asked if there should be a link up between the DOME Steering Group and WGDIM. P. Wiebe suggested that a member of the DOME Steering Group should be on the WGDIM. M. Sørensen supported the action for a ToR that ICES provides an update on the development of DOME to WGDIM as suggested by P. Wiebe.

16.3 Election of chairs

Voting took place. H Sagen will remain as co-chair for two years as already nominated by ICES and R Ayers was nominated and elected as co-chair for three years. A decision was made to have co-chairs representing both data management and data user expertise.

16.4 Next meeting

Next meeting in 2008 will be in Copenhagen at ICES headquarters. The discussion and decision not to go to a member state was based upon the group's refocusing on aiding the ICES Data Centre during this transition phase in the ICES Data Centre. The preferred time period is

1) 10–12 June 2008

2) 17– 19 June 2008

The time of the meeting will have to be coordinated with the ICES Secretariat to be able to meet in a large meeting room at ICES headquarters. It was agreed that WGDIM needs three full days to meet.

Proposed new action items for 2007/2008

Action 45: Seek contact with IMARES to clarify issues with data contribution under the new ICES Data Policy [Data Centre manager, C. Zimmermann]

Action 46: Recommend to ICES the addition of a mandatory data originator field in the Dome database and request the data model of the DOME database to be distributed among WGDIM members. [Chairs]

Action 47: Provide inter-sessional advice on request to the ICES Data Centre from a subgroup within WGDIM. [Coordination H. Sagen, R Ayers and G. Evans]

Action 48: Lend support to M. Sørensen at ICES Secretariat in her plight to get ERMS to recognise Baltic Sea species. [Chairs]

Action 49: Invite a member of DOME steering group to join WGDIM. [Chairs]

Action 50: Request the ICES Data Centre to provide WGDIM with updates on DOME development. [P. Wiebe, chairs]

17 Presentations

17.1 Presentation of IPY data management status

T. de Bruin gave a report on IPY. With its 170 endorsed coordination projects and 50000 participants from 60 nations, IPY 2007-2008 is the largest international scientific programme that the planet ever has seen. Data and data management have been considered important from the very beginning of IPY. Data are considered to be the most important single outcome of the project. However, there will not be a single central IPY database. Thus participants will receive IPY data and involvement is needed to ensure the IPY data legacy. The IPY Data Committee asks data centres to identify IPY data. After discussion the WG recommends that ICES be recognized as a regional data centre for IPY.

17.2 Presentation of World Ocean Database – news, future and dataflow

The WGDIM group discussed how to improve dataflow from member countries.

R. Gelfeld gave a presentation on US NODC and WDC-A. US NODC has already 46 years of service since 1961. At present the WDC is serving the community by data archaeology projects and with metadata. Archiving new types of data like undersea videos is ongoing.

The most recent WDC – Oceanography products are World Ocean Database 2005 and World Ocean Atlas 2005. The amount of data has expanded rapidly. The WOA contains now about 8 million profiles. The download system is used a lot and it is developed by listening to the user needs.

R. Gelfeld encourage data centres to continue sending data to ICES, but also to WDC, because in recent years WDC has had difficulties in exchanging data with ICES.

The WG asked about the delay between publications of the World Ocean Database. The present publishing cycle of four years was considered to be too long, and the WG suggested the publications occur as soon as possible.

It was noted that the WDC has insufficient personnel resources to deal with biological data. Woods Hole/GLOBEC has done an incredible job in putting data available fast and sending the data to WDC as well.

It was noted also that there is a problem in the WDC system in that only one profile per day per station is allowed, if there is more they are given the same id-number and thus the data are mixed.

17.3 Presentation of GIS usage- WMS seabed client and GBIF data node

H. Sagen presented the GIS system at IMR. The ESRI/ArcGIS system is extremely expensive and they have about 10 stand alone licences and 6 network licenses. H. Sagen demonstrated the Mareano GIS project and the Global Biodiversity Information Facility (GBIF); IMR will be a data node of GBIF.

17.4 Presentation of Spatial fisheries data in GIS

A. South presented spatial fisheries data in the GIS system used at CEFAS. ICES host the Datras database and CEFAS hold a mirror copy of Datras at CEFAS. The CEFAS copy gets updated every 6 months. Datras is partly funded by EU. Future funding not secured as yet for this database maintenance.

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Annex 2: Agenda

Meeting Agenda for WGDIM 2007 in Copenhagen (Denmark) 12-14 June.

Tuesday 12th June – Rapporteur Ebba Mortensen

0900-0930	**Opening greetings by H. Sagen, C. Zimmermann, P. Wiebe**	*[Co-Chairs]*
	Welcome by ICES representative	
	Local arrangements by ICES, Vivian Piil	*[V. Piil]*
0930-1030	**Review meeting schedule and items for discussion**	*[H. Sagen]*
	Review action items from last year's WGMDM meeting	*[H. Sagen]*
	Future of the group, develop new ToRs, DC advisors	
1030-1100	*Coffee break*	
1100-1115	**Presentation of ICES website facilities for WGs (Sharepoint)**	*[Secretariat]*
1115-1130	Discussion on website	*[G. Evans]*
1130-1215	**ICES Data Centre Evaluation report (CONC request)**	*[L. Rickards]*
	Discussion and feedback to CONC on important issues raised in the report.	
1215-1300	**ICES Data Centre towards a distributed system (CONC request)**	*[H. Sagen, ++]*
	WGDIM will in collaboration with the ICES Data Centre Manager, discuss the strategic plan to move ICES toward a distributed system and identify strategies to deal with issues of possible differences in data QC/QA procedures among data centres and the implications for the development and production of data products by the Data Centre for use by the ICES community	
1300-1430	*Lunch*	
1430-1600	**Split into three subgroups**	
	Mission	*[T. de Bruin]*
	Distributed databases	*[H. Sagen]*
	Data services/interoperability	*[A. South]*
1600-1630	Reporting from the subgroups	
1630-1645	**TOR A) Data availability gaps**	*[R. Gelfeld]*
	Action point 35, 37, 39	
1645-1715	**TOR B) Data transparency, traceability and quality**	*[T. de Bruin]*
	Action point 6, 7, 8	
1745-1800	**Summary of Day 1**	*[Co-chairs]*

Wednesday 13th June – Rapporteur Pekka Alenius

0900-0930	**Presentation of IPY data management status**	*[T. de Bruin]*
	Discussion on national activities in IPY Data Management	
0930-1000	**TOR D) Data management interoperability**	*[F. Nast]*
	Action points 3, 4, 5, 28	
1000-1030	**TOR C) Products**	*[G. Evans]*
	Action points 1, 2, 40	
1030-1100	*Coffee break*	

1100-1120	**TOR J) Metadata standards and quality indicators** Action point 24, 36, 38, 41, 43	*[L. Fyrberg***]**
1120-1215	**TOR E) Data guidelines and data integration** Action point 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 25	*[H. Sagen/ L. Rickards]*
1215-1300	**TOR F) Taxonomy issues** Action points 19, 20, 21	*[P. Wiebe]*
1300-1430	*Lunch*	
1430-1515	**TOR G) Data management practices in Operational Oceanography** Action points 22, 23, 26, 27	*[J. Szaron]*
1515-1600	**TOR H) Data exchange protocols – XML and others** Action points 29, 30, 42	*[M. Fichaut]*
1600-1630	*Coffee break*	
1630-1730	**Presentation of World Ocean Database, news, future and dataflow** Discussion on how to improve dataflow from member countries	*[R. Gelfeld]*
1730-1800	**Summary of Day 2**	*[Co-chairs]*
2000-	*Dinner*	

Thursday 14th June – Rapporteur Gaynor Evans

0900-0930	**Presentation of GIS usage - WMS seabed client and GBIF data node** Discussion on GIS activities at national level	*[H. Sagen]*
0930-1000	**Presentation Displaying spatial fisheries data in GIS** Discussion and questions	*[A. South]*
1000-1045	**TOR I) GIS web applications** Action points 31, 32, 33, 34	*[H. Sagen]*
1045-1115	*Coffee break*	
1115-1200	Theme session Data Management 2008 at ASC in Halifax, Canada 22-26 September 2008	*[P. Wiebe]*
	Data Policy feedback from member countries Data ownership	
1200-1300	**Election of co-chairs** H. Sagen accepted 3 years, C. Zimmermann and P. Wiebe 1 year	*[All]*
1230-1400	*Lunch*	
1400-1500	**Environmental issues** InterCatch database status	*[M. Sørensen]*
1500-1530	**Summary of Day 3** Recommendations for 2007/2008 ToRs	*[Co-chairs]*

1530-1600 **Next meeting and closure** *[Co- chairs]*

Annex 3: WGDIM terms of reference for the next meeting

The **Working Group on Data and Information Management** [WGDIM] (proposed Chairs: H. Sagen, Norway and R. Ayers, UK) will meet at ICES headquarters Copenhagen, Denmark from 10–12 June 2008 to:

a) Availability and accessibility - identify major gaps in data availability or data accessibility in the ICES data management system or needed data not currently held at ICES;

b) Quality and transparency - identify and resolve issues related to transparency, traceability and quality of data in relation to their use at ICES to formulate advice;

c) Metadata and dictionaries - identify and promote relevant standards for metadata, data structures, dictionaries, and the use of data quality indicators in the ICES data management system;

d) Products, integration and guidelines - provide advice on products based on ICES data holdings, data integration, and data management guidelines;

e) Interoperability - develop recommendations for ICES data management interoperability with relevant international data management bodies and programmes like PICES, IOC/IODE, GOOS, SeaDataNet, IPY (International Polar Year) to ensure rational and optimal endeavours;

f) Taxonomy - report on the progress of ITIS and ERMS/WoRMS systems in supporting and updating ICES taxonomy needs of the European community;

g) GIS - investigate Geographical Information Systems, GIS (Open source and commercial), with emphasis on web applications that can be used with ICES data management systems;

h) Complete the planning of the ASC 2008 theme session "Environmental and Fisheries Data Management, Access, and Integration" (including the formation of a subgroup for the selection of presentations to meet later in the year).

WGDIM will report by DATE to the attention of the Consultative Committee and all Science and Advisory Committees.

Supporting Information

PRIORITY:	The group provides ICES with solicited and unsolicited advise on all aspects of data management including technical, data policy and data strategy and user oriented guidance.This 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 AND RELATION TO ACTION PLAN:	a) Action Plan 6.1, 6.4; b) Action Plan; c) Action Plan 1.10, 6.1, 6.2 d) Action Plan 6.4; e)Action Plan 6.4; f) Action Plan 1.7, 4.12, 5.10, 6.4 g) Action Plan 5.13.4, 6.1, h) Action Plan 6.1, 10. a) There are major gaps in the ecosystem assessments apparently caused by lack of data. However, more data are likely available for use than currently perceived either inside the ICES system or externally. Thus, groups developing the advice may not be aware of the existence of relevant data sets either because of a lack of communication or the fact that data are not being delivered on a timely basis. In addition, those environmental assessments that are now being produced by some ICES working groups are not being effectively utilized by other groups making assessments where environmental data should be considered (NORSEPP, WGRED) Conclusions: i) Communication between ICES expert groups needs to be

	improved. ii) Data contributors need to be encouraged to submit data when they are useful, not when they are completely quality controlled. b) Much of the data that are being used to make the environmental assessments do not reside within the ICES and little effort is being expended to track the data used to make the assessments. If the external data are being used to formulate advice, it is often difficult to later re-establish the data sets and thus the basis for the advice. Thus the group should provide advice as to how improve this reporting c) To maximize interoperability data quality must be known. It is important to evaluate the appropriateness of use of data for specific applications on the basis on data quality. Coordinate work with relevant working groups or projects like EDMED, European Directory of Marine Environmental Datasets d) Trend plots and gridded data products are desired by ICES Annual meeting attendees. These would serve as an incentive to the data contributors. The group should provide specific examples of the kinds of products needed and the means of this distribution. Establishing data integration is a step in developing the scientific basis for an ecosystem based approach to management. This is of high priority to ICES. Good data management practice is required to ensure the underpinning databases are as complete and ultimately as high quality as possible. Identify areas of concern and give guidance to the ICES Data Centre for scientific approaches and technical solutions. The data centre needs to develop strategies that enable it to be a focal point for data storage and distribution to the ICES community. The strategy should be user driven. Ultimately want to develop means for user feedback about the ICES data centre and its effectiveness for example by conducting user surveies. This will encourage standardization of approach in management and quality control across a broad spectrum of data types and to promote best practice in data management. It will include promoting and developing the WGMDM guidelines and also development of recommended practices for merging CTD and water bottle data. e) It is vital to avoid duplicate work on data management. It is important to seek contact and collaboration with international bodies and programmes specially when the 4 th International Polar Year is close and is seeking help and guidance on data management. f) The International Taxonomy Information System (ITIS) can play a major role in standardization and improving the ease of data exchange. It is an evolving partnership that requires input from (new) collaborators whilst maintaining community standards. In particular, this will seek to improve coverage of non-North American marine species, encourage the development of remote data entry and implementation of a mirror site. The ITIS should be actively promoted with the communities and groups encouraged to feed in their information. g) The use of GIS is becoming increasingly important for the marine community. The potential benefits (and problems) of this technology will be examined and recommendations made on best practice and use of GIS. Open Source solutions will have to be investigated, but with emphasis on web applications. h) Complete the planning of a proposed themesession for the ASC 2008 on "Environmental and Fisheries Data Management, Access, and Integration"
Resource requirements:	None
Participants:	The Group is expected to be attended by some 30–35 members and guests with half of the members from each of the two categories , data managers and data users
Secretariat facilities:	Meeting facilities.

Financial:	The Data Centre Manager should attend these meetings and if possible also other employees at the data centre.
Linkages to advisory committees:	Report is seen by ConC and all science and advisory committes
Linkages to other committees or groups:	Oceanography and Advisory Committees.
LINKAGES TO OTHER ORGANIZATIONS:	There are linkages with relevant international bodies and programmes like PICES, IOC/IODE, GOOS, SeaDatanet, IPY with empahasis on IOC and its Working Committee on International Oceanographic Data and Information Exchange (IODE).

Annex 4: Recommendations

Recommendations from WGDIM.

RECOMMENDATION	ACTION
1. One need of data interoperability as a prerequisite for a later distributed system is common vocabularies. As to Cruise Summary Reports, ship codes are inter alia important. Work on ship codes is undertaken by a SeaDataNet-platform group, lead by BODC, and joined by BSH/DOD, ICES and WDC-A. The WG recommends that ICES continue and intensify co-operation with SeaDataNet, POGO, and MMI.	ICES Data Centre continue and intensify co-operation with SeaDataNet, POGO, and MMI.
2. The WG recommends that ICES provide the Ship codes as a Web service in the agreed form as per recommendation 1.	ICES Data Centre provide the Ship codes as a Web service.
3. CSRs are exchanged on a bi-weekly frequence between BSH/DOD and ICES. The WG recommends that ICES reactivate this exchange and discuss further options.	ICES Data Centre come up with a plan, meanwhile continue exchange CSRs with BSH/DOD.
4. The WG would like to have a country separated list of submissions to the CSR online system for next years meeting.	F. Nast to present survey of submitted CSRs for the last 2 years.
5. Recommendation on data policy implementation - WGDIM recommends to the ICES Data Centre to discuss with the Dutch institute IMARES their wish for the implementation of a complex system to access research data. If IMARES can't be convinced to agree to all elements in the new policy for historic data, it will have to give a number of additional definitions.	ICES Data Centre discuss with the Dutch institute IMARES data policy restrictions.
6. Recommendation on data policy implementation - WGDIM recommends that the ICES Data Centre implement technical amendments needed to fully implement the new Data Policy. These are related to the acknowledgement of data sources.	ICES Data Centre
7. ICES should work with WDC Silver Spring to reduce the data backlog on uncompleted QC/QA work on submitted datasets	ICES Data Centre
8. Data ownership should become a mandatory field in the metadata for the ICES DOME database	ICES Data Centre
9. ICES should work to be recognized to be a regional data centre in the IPY	ICES Data Centre
10. The ICES Data Centre should attend the workshop organized by IODE/JCOMM, Forum on Oceanographic Data Management and Exchange Standards in Oostende 15-19 October 2007.	ICES Data Centre

Annex 5: List of acronyms and terms

Acronym or Term	Description
ACE	Advisory Committee on Ecosystems
ADCP	Acoustic Doppler Current Profiler
AMAP	Arctic Monitoring and Assessment Programme
ARGO	The Array for Real-time Geostrophic Oceanography (profiling floats)
ASC	Annual Science Conference organised by ICES
AZMP	Atlantic Zone Monitoring Program (Canada)
BMDC	Belgian Marine Data Centre
BODC	British Oceanographic Data Centre
BOOS	Baltic Operational Oceanographic System
BIO	Bedford Institute of Oceanography
BIOCHEM	BIOlogy-CHEMistry system (Canada)
BSH	Bundesamt für Seeschifffahrt und Hydrography (Germany)
BWGDDP	Bureau Working Group for Data Development Project
CD-ROM	Compact Disk – Read Only Memory
CEFAS	Centre for Environment Fisheries and Aquaculture Science
COPEPOD	Coastal and Oceanic Plankton Ecology Production and Observation Database
COOP	Coastal Ocean Observations Panel (GOOS)
CSR	Cruise Summary Report (formerly known as ROSCOP)
CTD	Conductivity-Temperature-Depth
DAC	Data Assembly Centre
DBCP	Drifting Buoy Co-operation Panel
DMAC	Data Management and Communication
DOD	Deutsches Ozeanographisches Dataenzentrum
DOME	Database on Oceanography and Marine Ecosystems (Integrated ICES database)
DONAR	Data Omgang Natte Rijkswaterstaat - Database Dutch Ministry of Transport
DONBML	DONAR Basic Markup Language
DPC	Data Products Committee
EDIOS	European Directory of the Initial Ocean-observing System
EDMED	European Directory of Marine Environmental Data
EDMO	European Directory of Marine Organisations
ETDMP	JCOMM-IODE Expert Team on Data Management Practices
ERMS	European Register of Marine Species
ESRI	Environmental Systems Research Institute
EU	European Union
EUROGOOS	European Global Ocean Observing System
FIMR	Finnish Institute of Marine Research
FRS	Fisheries Research Services
GBIF	Global Biodiversity Information Facility
GE-BICH	IOC's Group of Experts on Biological and Chemical Data Management and Exchange

	Practices
GETADE	IOC's Group of Experts on the Technical Aspects of Data Exchange
GIS	Geographic Information System
GCMD	Global Change Master Directory (from NASA)
GLOBEC	GLOBal ocean ECosystems dynamics
GLOSS	Global Sea Level Observing System
GODAR	Global Oceanographic Data Archaeology and Rescue
GOOS	Global Ocean Observing System
GOSUD	Global Ocean Surface Underway Data
GRASS	Geographic Resources Analysis Support System (open source GIS)
GTSPP	Global Temperature-Salinity Profile Program
HELCOM	Helsinki Commission
IBTS	International Bottom Trawl Survey
ICES	International Council for the Exploration of the Sea
IEO	Instituto Español de Oceanografía
IFREMER	Institut français de recherche pour l'exploitation de la mer
IMARES	Institute for Marine Resources and Ecosystem Studies
IMR	Institute of Marine Research (Norway)
IML	Institut Maurice Lamontagne – Canada
IOC	Intergovernmental Oceanographic Commission
IODE	International Oceanographic Data and Information Exchange
IOOS	Integrated Ocean Observing System
IOPAS	Institute of Oceanology Polish Academy of Sciences
IROC	ICES Report on Ocean Climate
ISO	International Standards Organisation
ITIS	Integrated Taxonomic Information System
JCOMM	IOC-WMO Joint Technical Commission on Oceanography and Marine Meteorology
JGOFS	Joint Global Ocean Flux Study
MASDEA	MArine Species Database of Eastern Africa
MEDAR	Mediterranean Data Archaeology Rescue Project
MEDS	Marine Environmental Data Services – Canada
MDIP	Marine Data and Information Partnership (UK)
MMI	Marine Metadata Interoperability
MODIS	MODerate resolution Imaging Spectroradiometer
MUMM	Management Unit of Mathematical Modelling for the North Sea
NAFC	Northwest Atlantic Fisheries Center – Canada
NAFO	Northwest Atlantic Fisheries Organization
NARMS	North Atlantic Register of Marine Species
NCIS	National Contaminants Information System – Canada
NERC	Natural Environment Research Council
NOAA	National Oceanic and Atmospheric Administration - U.S.A.
NODC	U.S. National Oceanographic Data Center
NORSEPP	ICES/EuroGOOS North Sea Pilot Project

NWARMS	North West Atlantic Register of Marine Species
OBIS	Ocean Biogeographic Information System
OCL	Ocean Climate Laboratory/U.S. NODC
OO	Operational Oceanography
OOPC	Ocean Observations Panel for Climate (GOOS)
OSPAR	Oslo-Paris Commission
PICES	Pacific ICES
POGO	Partnerships for Observation of the Global Oceans
QC	Quality Control
ROSCOP	Report of Observations/Samples Collected by Oceanographic Programmes (now CSR)
RECO	ICES Reference Code utility http://www.ices.dk/datacentre/reco/
RIKZ	Rijksinstituut voor Kust en Zee - The Netherlands
SABS	Saint Andrew's Biological Station – Canada
SEPRISE	Sustained, Efficient Production of Required Information Services
SGMEDI	Study Group on the Marine Environmental Data Inventory
SGMID	ICES Study Group on the Management of Integrated Data
SGXML	ICES/IOC Study Group on the Development of Marine Data Exchange Systems using XML
SISMER	French National Oceanographic Data Centre
SMHI	Swedish Meteorological and Hydrological Institute
SOOP	Ship of Opportunity Programme
SQL	Structured Query Language
SST	Sea Surface Temperature
ToR	Term of Reference
TSN	Taxonomic Serial Number
UKHO	UK Hydrographic Office
UNESCO	United Nations Educational, Scientific and Cultural Organisation
URL	Uniform Resource Locator
URMO	UNESCO Register of Marine Organisms
USGS	US Geological Survey
VEINS	Variability of Exchanges in the Northern Seas
VLIZ	Flanders Marine Institute
WCRP	World Climate Research Program
WDC	World Data Centre
WGDIM	Working Group on Data and Information Management
WGMDM	Working Group on Marine Data Management
WGOH	Working Group on Oceanic Hydrography
WGZE	Working Group on Zooplankton Ecology
WMO	World Meteorological Organisation
WMS	Web Map Service
WOA	World Ocean Atlas
WOD	World Ocean Database

WOAF	World Ocean Atlas Figures
WOCE	World Ocean Circulation Experiment
WoRMS	World Registry of Marine Species
WWW	World Wide Web
XBT	Expendable Bathythermograph
XML	Extensible Markup Language

Annex 6: WGDIM action list 2007/2008

No.	Action item	Who
1	Add a "Quick Launch" menu on Data products including CDROM products, links to online databases and portals coordinated with IOC/IODE	G. Evans
2	Request the ICES Secretariat to prolong the time span for documents on SharePoint beyond the current two year limit	Chairs
3	Write a recommendation to ConC to continue the management of oceanographic data at ICES, but with a changed focus	L. Rickards, H. Sagen
4	Make the WGDIM mission statement more visible to the ICES community	All
5	Request the ICES Data Centre to develop a single access point on the ICES web portal for access to ICES data holdings	Chairs
6	Request the ICES Data Centre to develop graphical products like maps and time series plots in ICES data holdings for the ICES user community	Chairs
7	Request the ICES Data Centre to make available a Web Service on ship codes	Chairs
8	Investigate in cooperation with the ICES Data Centre the possibilities in using WMS techniques in presenting and accessing research data.	All
9	Request the ICES Data Centre to participate actively in the QC/QA workshop in Oostende 15-19 October 2007	Chairs
10	Request the ICES Data Centre and the WDC Silver Spring to work together in overcoming the backlog of data at ICES awaiting QC/QA in order to be served to the community	Chairs
11	Report the results of the discussion between WDC Silver Spring and ICES on how they could cooperate more effectively and improve data exchange	R. Gelfeld, N. Holdsworth
12	Request the WDC Silver Spring to help ICES Data Centre to overcome the backlog of uncompleted QC/QA on submitted datasets	Chairs, R. Gelfeld
13	Request members to send their quality controlled data to ICES Data Centre giving priority to datasets like IBTS data needed for the NORSEPP report and currents meter inventory to be included in the BODC International Currents Meter Inventory	All
14	Report to ConC and WGOH the outcome of the CTD questionnaire	Chairs, T. de Bruin
15	Distribute the CTD questionnaire to new members and those members not responding the first time	T. de Bruin, all
16	Prepare a questionnaire to be used to identify differences among member countries regarding QC/QA procedures important in relation to products	G. Dawson, T. de Bruin, All
17	Request the ICES Data Centre extend the list of mandatory fields in the DAD database to include data submitter and data owner	P. Wiebe
18	Request the ICES Data Centre include an information or metadata file to be supplied with every data extract from ICES databases containing general and special conditions together with acknowledgments and quality flag definitions	P. Wiebe
19	Set up a list of products on the WGDIM SharePoint site	G. Evans
20	Request ICES Data Centre maps its RECO system to common vocabularies such as Marine Metadata Interoperability (MMI)	G. Evans, P. Alenius

No.	Action item	Who
21	Request ICES Data Centre set up a mirror site for the CSRonline system developed in Sea-Search and SeaDataNet	F. Nast, N. Holdsworth
22	Request ICES Data Centre to set up a Web Service for ship codes	Chairs
23	Promote international metadata and cruise summary report systems to the PICES community	F. Nast
24	Members should prepare to be contacted by SeaDataNet or POGO to submit information about planned research cruises	All
25	Request ICES to adopt the WGMDM Guidelines as the ICES guidelines	Chairs
26	Contact IOC/IODE Secretariat to make them an official member of the WGDIM working group	Chairs
27	Promote the guidelines at the ICES ASC 2007	ICES Data Centre
28	Promote data integration within ICES community	P. Wiebe
29	Request IODE GE-BICH to cooperate on identifying guidelines on biodiversity by writing a letter from the WGDIM to IODE	Chairs
30	Request ICES Data Centre to supply WGDIM with exact web statistics on guidelines web pages	G. Evans, N Holdsworth
31	Request ICES Data Centre to keep updated on how ERMS and WoRMS are evolving	Chairs
32	Make available the latest GOSUD report on SharePoint	R. Gelfeld
33	Request ICES Secretariat to make a web link on the ICES web pages to the EU/EuroGOOS SEPRISE project at http://www.eurogoos.org/sepdemo/.	Chairs
34	Promote to the ICES community that WGDIM strongly encourages the use of established QC procedures and the use of international standards in the field of Operational Oceanography	J. Szaron, all
35	Request the ICES Data Centre to make use of the CSR XML Schema to exchange CSRs with the German Data Centre	Chairs
36	Follow the discussions and activities of the IOC MarineXML Steering GroupReport	M. Wichorowski, chairs
37	Revise the questionnaire on the use of Open Source GIS and redistribute it in the ICES community to be able to give recommendations on the best use of GIS	S. Jans, all
38	Request the ICES Data Centre to become familiar with the use of WMS software MapServer	M. Wichorowski, chairs
39	Investigate possibilities of the Open Source GIS system GRASS	M. Wichorowski, P. Alenius
40	Draft a new ToR which merge ToRs I ('GIS web applications') and C ('Provide advice on products based on ICES data holdings'	P. Wiebe
41	Contact representatives of the EU Humboldt project to get their view on GIS systems and solutions useful to researchers and report back to WGDIM at the next meeting	S. Jans
42	Consider presentations and inform colleagues about the possible theme session on data management at ASC 2008, 22-26 September 2008	All
43	The WGDIM members are requested to update their information in the EDIOS database maintained in the SeaDataNet project	All
44	Report to the ICES Data Centre activities in the MMI project that are relevant	G. Evans, all
45	Seek contact with IMARES to clarify issues with data contribution under the	Data Centre

No.	Action item	Who
	new ICES Data Policy	Manager C. Zimmermann
46	Recommend to ICES the addition of a mandatory data originator field in the Dome database and request the data model of the DOME database to be distributed among WGDIM members	Chairs
47	Provide inter-sessional advice on request to the ICES Data Centre from a subgroup within WGDIM	Coordination H. Sagen, R Ayers and G. Evans
48	Lend support to M. Sørensen at ICES Secretariat in her plight to get ERMS to recognise Baltic Sea species	Chairs
49	Invite a member of DOME steering group to join WGDIM	Chairs
50	Request the ICES Data Centre to provide WGDIM with updates on DOME development	P. Wiebe, chairs

Annex 7: List of presentations available at SharePoint

Presentations given at the meeting are available in PowerPoint format at the WGDIM SharePoint site at ICES. The URL for WGDIM is http://groupnet.ices.dk/EG/EG2007/WGDIM2007/.

To be able to view the files at the site it is necessary to login as a registered user. The typical configuration for a user is: User id ices\"family name" with initials given as a two character password. In some cases extra characters are added to the username to make them unique. All characters should be given as lower case.

List of presentations given as a introduction to ToR discussions

- Data availability gaps ToR a) — Robert Gelfeld
- Products ToR c) — Gaynor Evans
- Data Management interoperability ToR d) — Friedrich Nast
- Data guidelines and data integration ToR e) — Garry Dawson (Helge Sagen)
- Taxonomy Tor f) — Todd O'Brien (Peter Wiebe)
- Operational Oceanography TorR g) — Jan Szaron
- Data exchange protocols ToR h) — Michele Fichaut
- GIS Web applications ToR i) — Marcin Wichorowski

List of presentations given as a special invited presentation

- Future of the ICES oceanographic database — Lesley Rickards
- International Polar Year data management — Taco de Bruin
- World Ocean Database - news, future and dataflow — Robert Gelfeld
- Displaying fisheries data in GIS — Andy South
- GIS WMS seabed client and GBIF data node — Helge Sagen