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Workshop Report No. 209

Workshop on Collaboration Between IOC and OBIS Towards the Long-term Management, Archival and Accessibility of Ocean Biogeographic Data

IOC Project Office for IODE, Oostende, Belgium, 24-26 November 2008

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Workshop Participants (from left to right: first row: Kristin de Lichtervelde (IOC Project Office for IODE), Gwenaelle Moncoiffé, Geoff Holland, Greg Reed, Bob Branton; back row: Edward Vanden Berghe, Vishwas Chavan, Peter Pissierssens, Ronald O'Dor, Mary Kennedy).
Serge Garcia is not in this picture.

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ANNEXES

1. OPENING OF THE MEETING

The Chair welcomed the participants (see Annex II) and asked them to introduce themselves. The Chair and Rapporteur described the reasons for the expert meeting and the objectives to be achieved.

In 2010 the funding from the Sloan Foundation for the Census of Marine Life, and therefore also for OBIS, will cease to exist and the future of OBIS beyond 2010 has to be addressed. At the first meeting of the OBIS Governing Board (Rome, 28–29 April 2008), the IOC Executive Secretary offered to explore an institutional framework for the continuation of OBIS. The OBIS Governing Board welcomed the offer, but recommended that this suggestion be further elaborated and a business model prepared. Subsequently, IOC Member States received a presentation on the subject at the IOC Executive Council **(**EC-XLI**,** June 24 - July 2, 2008). The EC considered OBIS a highly attractive future component or partner of IODE and, in particular, the value of the OBIS component as a global repository for marine biological data. The EC accepted the wish of the OBIS Governing Board to investigate different scenarios for a closer affiliation between IOC and OBIS, including the adoption of OBIS by the Commission.

The Executive Council requested the Executive Secretary and the IOC Data and Information Management Advisory Group (DIMAG) to work together with the OBIS Secretariat to develop a document for submission to the 25th Session of the IOC Assembly in 2009. The Executive Council considered that such a document should describe possible scenarios for collaboration between IOC and OBIS, concentrating on the possibility of the creation of an IOC-OBIS programme and an IOC–OBIS Programme Office. It should, for different scenarios, investigate consequences for both IOC and OBIS, and should contain estimates of budgetary implications, and involve consultations, as appropriate, with potential donors and/or host organizations. The full text as included in the summary report of the 41st Session of the IOC Executive Council is shown in Box 1, below.

The Executive Council recognized the importance and value of CoML, the particular value of the OBIS component as a global repository for marine biological data, and the potential of a second phase of OBIS to expand data in this vital repository and to improve the interface for global access and exchange of marine biological data. **The Executive Council considered** OBIS a highly attractive future component or partner of IODE, and welcomed the wish of the OBIS Governing Board to investigate different scenarios for a close affiliation between IOC and OBIS, or the adoption of OBIS by the IOC. It requested the Executive Secretary and the IOC Data and Information Management Advisory Group to work together with the OBIS Secretariat to develop a document for submission to the 25th Session of the IOC Assembly in 2009. **The Executive Council considered** that the document should describe possible scenarios for collaboration between IOC and OBIS, concentrating on the possibility of the creation of an IOC-OBIS Programme and an IOC–OBIS Programme Office. It should, for different scenarios, investigate consequences for both IOC and OBIS, and should contain estimates of budgetary implications, and involve consultations, as appropriate, with potential donors and/or host organizations.

Box 1: Discussions and decisions by the 41st Session of the IOC Executive Council on cooperation with OBIS

This meeting between OBIS and IODE experts has been called to further the decisions of the OBIS Board and the IOC Member States and will be an important step in the process. The outcome of this meeting is to consider the various options and to develop recommendations that can be brought before the next meeting of the OBIS Board and the IODE Steering Committee meeting for their amendment and approval leading to the preparation of a Resolution to be presented to the 25th. IOC Assembly. In addition the IOC Data and Information Management Advisory Group will also be consulted, as instructed by the IOC Executive Council.

2. INTRODUCTION OF IOC-IODE AND OBIS

The meeting received presentations on the two organizations involved, explaining what IOC-IODE and OBIS are, their structures and governing rules, etc.

2.1 The IOC and its IODE

Peter Pissierssens explained that the Intergovernmental Oceanographic Commission is a body with functional autonomy within UNESCO. It has its own 136 Member States and own Statutes, but it relies upon the UNESCO host for its regular programme funding and much of its administration. The IOC Headquarters are at UNESCO, Paris with field offices in Colombia, Brazil, Thailand, Kenya, Denmark, Belgium and Australia. Its governing bodies consist of an Assembly and an Executive Council (EC).

The IOC was created in 1960 "*to promote international cooperation and coordinate programmes in research, sustainable development, protection of the marine environment, capacity, capacity-building for improved management, and decision-making*". It assists developing countries in strengthening their institutions to obtain self-driven sustainability in marine sciences. On a regional level, it is coordinating the development of tsunami early warning and mitigation systems. The IOC also facilitates interagency coordination through the UN-Oceans mechanism and works with the United Nations Environment Programme (UNEP) in establishing a process for global reporting and assessment of the state of the marine environment. Through the Global Ocean Observing System (GOOS) the IOC helps improve operational oceanography, weather and climate forecasts and monitoring and support the sustained observing needs of the UN Framework Convention on Climate Change (UNFCCC).

The existing high-level objectives for the organization (2008-2013) are:

- Prevention and reduction of the impacts of natural hazards
- Mitigation of the impacts and adaptation to climate change and variability
- Safeguarding the health of ocean ecosystems, and
- Management procedures and policies leading to the sustainability of coastal and ocean environment and resources.

These objectives are carried out through the four main IOC Programmes/Sections, namely:

- ***Ocean Science*:** Oceans and Climate-related research and assessment (WCRP. IOCCP, OOPC); Coastal Research monitoring and modelling (HAB, GLOBEC); Science for integrated coastal area management (ICAM)
- ***Ocean Observations and Services*:** observation of the global ocean and coastal seas (GOOS); integrated marine observations and services (JCOMM), sea level science and observations; oceanographic data and information management (IODE)
- ***Tsunami Coordination Unit,*** and
- ***Capacity Development*** of Member States in marine science for the coastal ocean

In terms of Governance, the IOC has Primary Subsidiary Bodies (Scientific or Technical Committees; Sub Commissions; Regional Committees and Joint Subsidiary Bodies) reporting directly to the Assembly and EC. Each of the Primary Subsidiary Bodies can have Secondary Subsidiary Bodies (Task Teams and Groups of Experts) (see Figure 1). The Primary Bodies bring recommendations to the IOC governing bodies for decisions that are called resolutions.

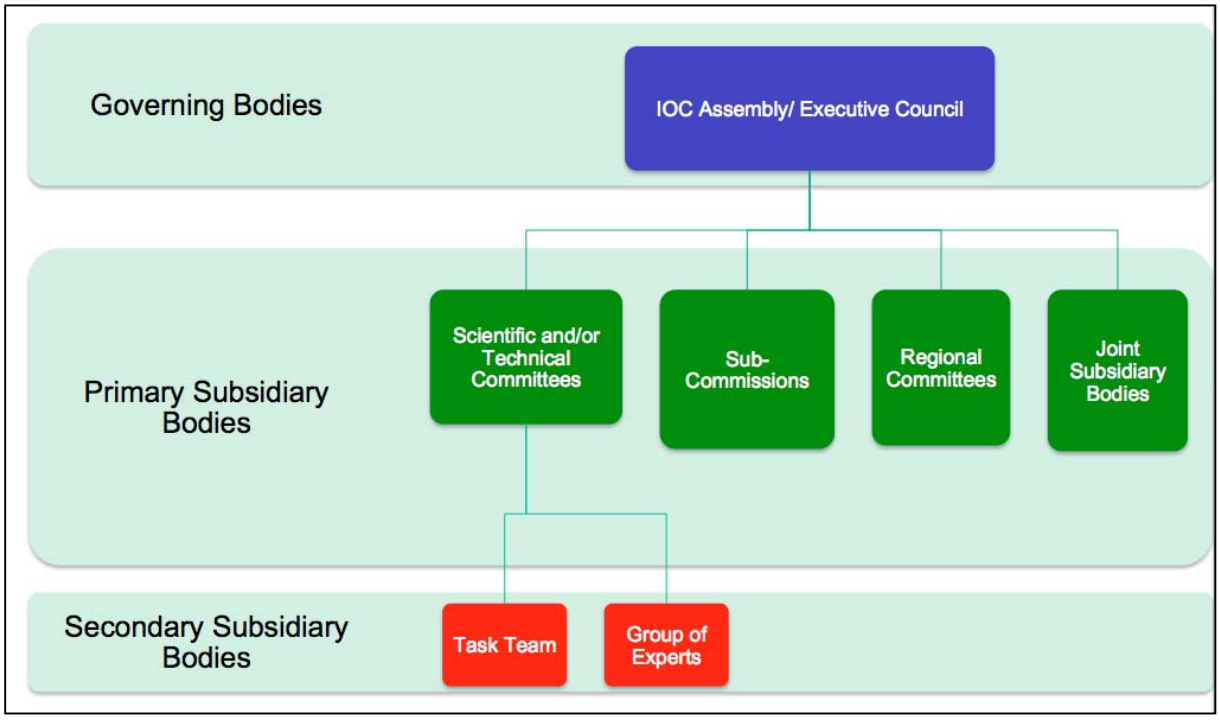

Figure 1: IOC Governance structure

UNESCO is responsible for the regular programme budget (RP) of the IOC, which makes up about a third of the available funds, the remainder coming from extra-budgetary contributions provided to the IOC Special Account or through UNESCO Funds-in-Trust.

The IODE was established in 1961 **'***to enhance marine research, exploitation and development by facilitating the exchange of oceanographic data and information between participating Member States and by meeting the needs of users for data and information products***'.** The programme has built a global network of 66 National Oceanographic Data Centres (NODCs), as

well as a growing network of Marine Libraries. IOC Member States participate in IODE through IODE National Coordinators for oceanographic data management and IODE national coordinators for marine information management who are members of the IODE Committee. The IODE Committee is the main governance body of IODE and is a Technical Committee, which is a Primary Subsidiary Body.

IODE forms the ocean data and information arm of the IOC. Administratively it is part of the IOC Ocean Observation and Services Section. The IODE Committee meets every two years and reports directly to the IOC Governing Bodies. The Strategy, Objectives, deliverables and elements of the IODE are given in Annex IV. IODE can recommend the establishment of a Group of Experts (GE) through a "recommendation". This recommendation is submitted to the Assembly or Executive Council for adoption. Costs of meetings of GEs (tickets, per diem, etc.) are covered by the IOC or by participants (Member States). IODE currently has three Groups of Experts, one of which is a joint group with JCOMM. Figure 2 shows the current structure of IODE.

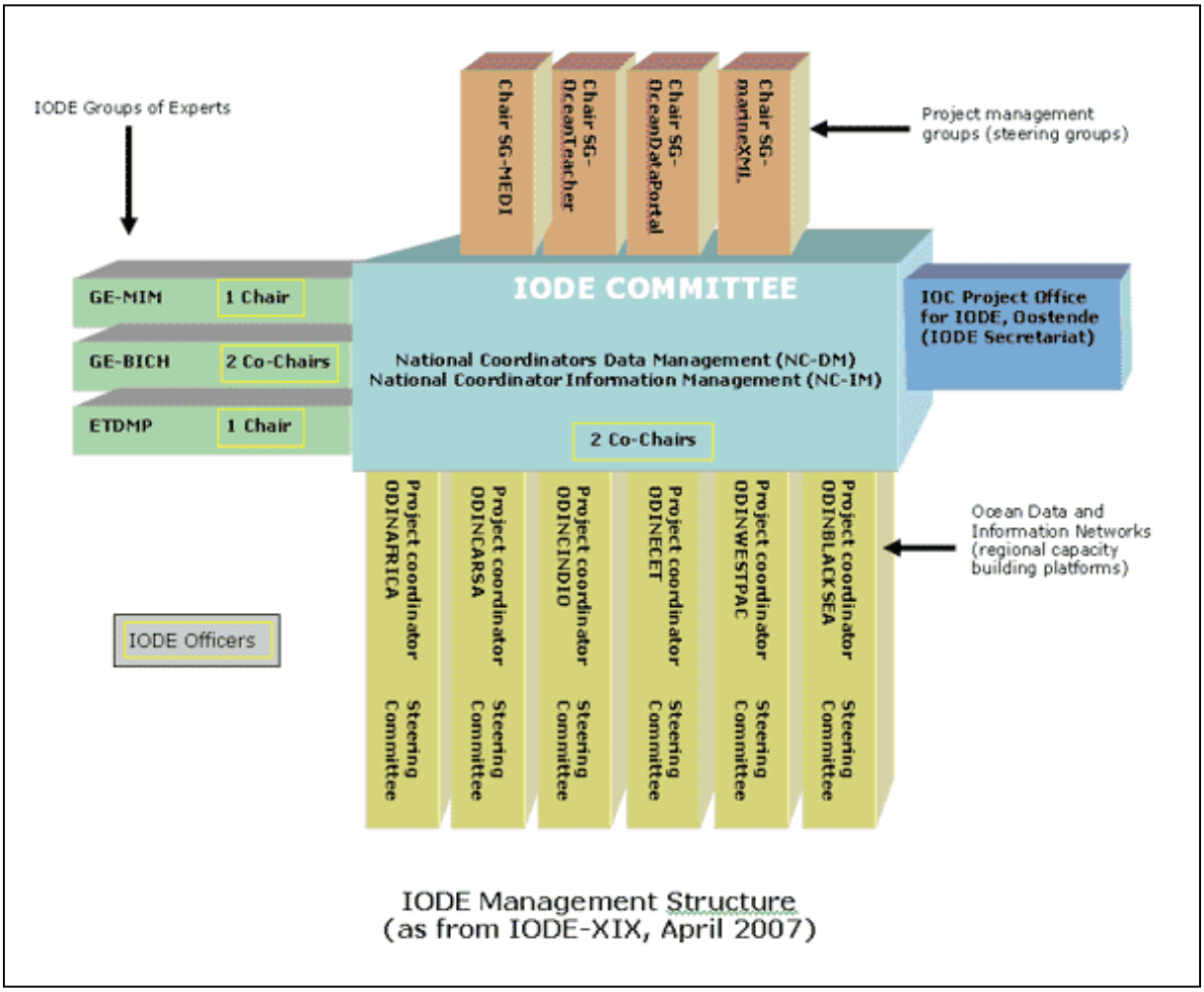

Figure 2: IODE Management Structure

Of particular interest to this meeting is the objective of the IODE to expand its mandate into biological and chemical data and its creation of a Group of Experts to assist with this. GE-BICH (IODE Group of Experts on Biological and Chemical Data Management and Exchange Practices) was established at IODE-XVI (2000) and has held three sessions, with a fourth session scheduled for January, 2009. The present Terms of Reference of the Group are:

- documenting the systems and taxonomic databases and inventories currently in use in various data centres;
- documenting the advantages and disadvantages of different methods and practices of compiling, managing and archiving biological and chemical data;
- developing standards and recommended practices for the management and exchange of biological and chemical data, including practices for operational biological data;
- encouraging data centres to compile inventories of past and present biological and chemical data holdings;
- encouraging data holders to contribute data to data centres for the creation of regional and global integrated oceanographic databases incorporating physical, chemical and biological data;
- creating and keeping updated GE-BICH web "portal" making all results from the GE's work available to a wider community of data managers and data users;
- contributing results of GE-BICH activity to Ocean Teacher making results from the GE and from other programmes available to education of data managers and data users.

Mr. Pissierssens also highlighted the adoption, by the twenty-fourth Session of the IOC Assembly (2007) of the "IOC Strategic Plan for Oceanographic Data and Information Management (2008-2011)". The Strategy will provide "*A comprehensive and integrated ocean data and information system, serving the broad and diverse needs of IOC Member States, for both routine and scientific use*."

The concept of delivering a data and information service for the "global ocean commons" (i.e. global public good) is central to this vision.

The objectives of the Strategy are to develop:

- A system that can receive data collected by all IOC programmes and projects and deliver them in a uniform and transparent way to all users;
- A system that can collect bibliographic and factual information from all IOC programmes and projects and deliver them in a uniform and transparent way to all users.

The IOC Data and Information Management System resulting from the strategy will deliver the following:

- Assembled, quality controlled and archived data on a diverse range of variables according to scientifically sound and well-documented standards and formats;
- Timely dissemination of data on a diverse range of variables (observations and model outputs) depending on the needs of user groups and their technical capabilities (automatic dissemination as well as "on demand"); and will
- Facilitate easy discovery and access to data on a diverse range of variables and derived products (including forecasts, alerts and warnings) by users who have a broad range of capabilities.

The IOC Data and Information Management System will, like that of the Global Earth Observing System of Systems (GEOSS), be a system of systems. Each of these should be an end-to-end system, handling data from the point of collection, through processing and quality control, to archival and dissemination. There is no "one size fits all", but by use of standards interoperability between the systems can be achieved. A fundamental concept is that, like GEOSS, the ocean or marine "system of systems" must be built on existing systems and initiatives with sufficient flexibility to encompass future systems. One system will not be suitable for all requirements and thus it is envisioned that a number of complementary end to end data systems will best address the vision. Increasingly standards are available, which have been designed elsewhere but which are applicable to ocean or marine data. These include those developed by the International Organization for Standardization (ISO), the World Wide Web Consortium (W3C) and the Open Geospatial Consortium (OGC).

The major elements of the Strategy are:

- Adherence to the IOC Oceanographic Data Exchange Policy;
- Acceptance and implementation of agreed interoperability arrangements including technical standards and specifications for processing, quality control, storing and disseminating shared data and information;
- A global network of data centres and related national distributed networks, and permanent long term data archiving centre(s) for all data, which operate to agreed standards, providing seamless access to data and information;
- Capacity building through continued development of Ocean Data and Information Networks (ODINs) whilst extending the OceanTeacher capacity building tool through cooperation with WMO, JCOMM and others as appropriate;
- Governance by an Advisory Group that brings together the various programme elements of IOC as well as of bodies and organizations collaborating closely with IOC.

There are many IOC and IOC-related programmes and projects with a data management component. Presently there are also many mechanisms to coordinate the various individual ocean and marine data systems. Whilst these are essential to the continued operation of data management and exchange of the various data streams, an overarching coordination must be put into place to encourage adoption of standards, protocols, technologies, etc.

In order to provide a coherent yet open ended governance system for the IOC's data and information management system, it is proposed to establish an "IOC Data and Information Management Advisory Group". This body will bring together the various programme elements of IOC (GOOS, IODE, tsunami, HAB, Ocean Carbon, ICAM, Capacity Development, GOOS GRAs, IODE ODINs,) as well as of bodies and organizations collaborating closely with IOC (JCOMM, WMO, ICES, ICSU WDCs Oceanography,…). Its main objective and responsibility will be to oversee the implementation of this Strategy.

Figure 3 shows the proposed organogram, linking the various programmes and projects and their involvement in the Advisory Group.

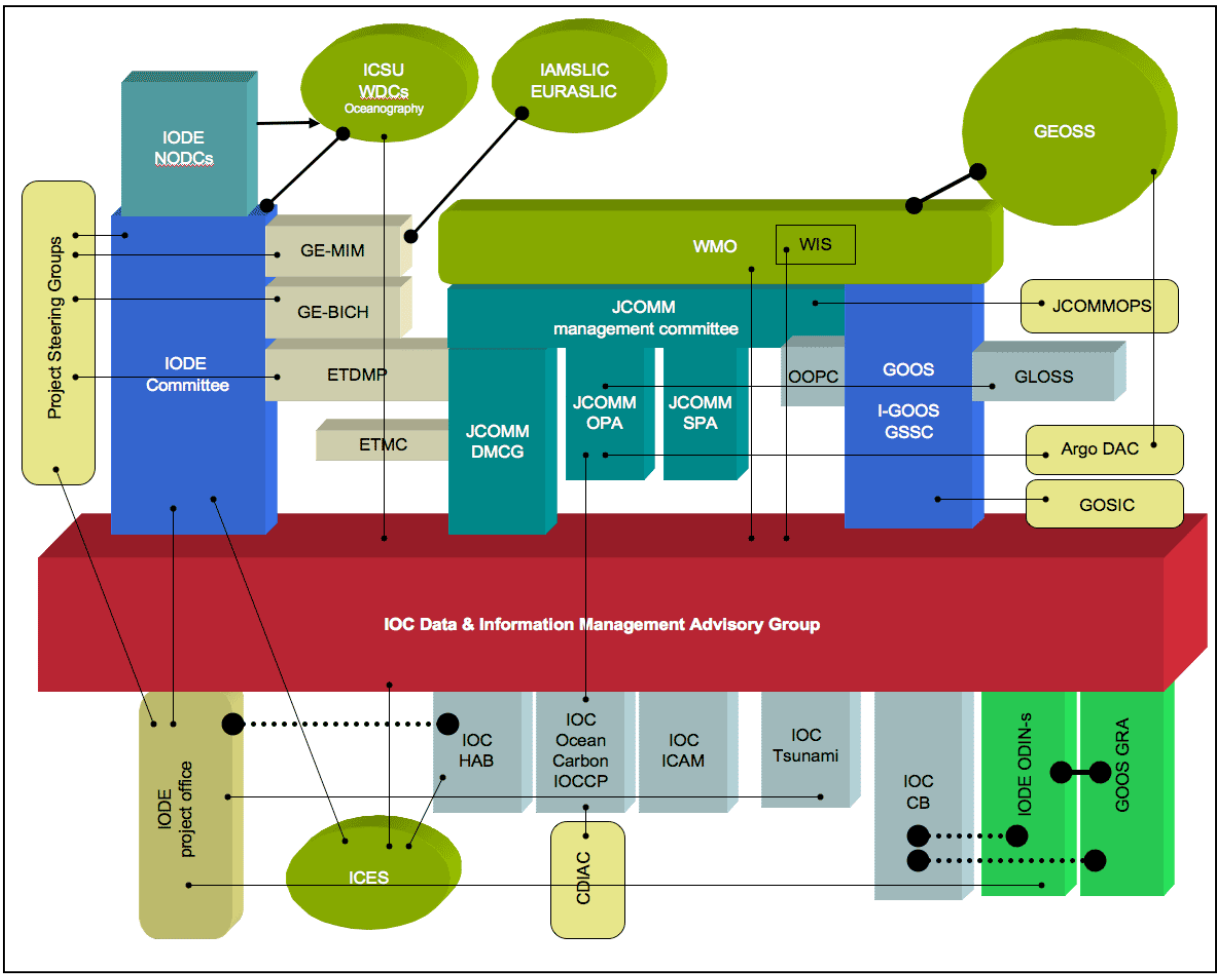

Figure 3: organogram of the IOC Data and Information Management System and its Advisory Group

Related to the Strategy is the establishment of the Ocean Data Standards Pilot Project (ODS) (http://www.oceandatastandards.org). The objective of this joint IODE/JCOMM Project is to achieve broad agreement and commitment to adopt a number of standards related to ocean data management and exchange.

Finally, attention was drawn to the extensive work by IODE on Capacity Building, data management training and education and how such efforts are necessary in order to achieve global participation in IODE. The Ocean Data and Information Network (ODIN) strategy aims to link training, equipment and operational support in a regional context. It is oriented towards products and services. The strategy focuses on inter-personal and institutional networking involving multiple stakeholders. It also focuses on both data and information management and on an end-to-end process from observation to product delivery.

In April 2005, IOC established the IODE Project Office in Ostend, Belgium, hosted by the Government of Flanders. The main objectives of the Project Office are (i) to establish a creative environment facilitating the further development and maintenance of IODE and partner data and information management projects, services and products with emphasis on improving the efficiency and effectiveness of the data and product/service stream between the stage of sampling and the user;

and; (ii) to assist in strengthening the capacity of Member States to manage oceanographic data and information and to provide ocean data and information products and services required by users.

The Project Office hosts about 15 events per year and in the last biennium welcomed 300 students from 70 countries. IODE also operates the training and education tool Ocean Teacher, (www.oceanteacher.org).

2.2 OBIS

The Executive Director stated that the mission of OBIS was to make available, online, primary data on marine species. OBIS integrates data from all data providers across taxa and marine themes. The system facilitates data discovery and research by allowing the user to search the data bank by species, higher taxa, time, location, depth and database. OBIS also provides tools for mapping, overlaying species distributions on other ocean environments and modelling activities such as potential environmental range. A primary mission element is to support the CoML synthesis in 2010.

The management of natural resources must be based on timely and accurate knowledge and information based on access to dependable data sources. For marine biological data this has not always been possible. Now OBIS makes data and information management more efficient, through the sharing of tools, formats and standards across different organizations and amongst countries. It ensures data is not lost, encourages the rescue of historic data sets and ensures repositories for new data. It promotes data discovery and links with other related organizations such as BOLD and EoL.

The institutional framework of OBIS began as the data integration component of CoML and has now been recognized as the marine component of the Global Biodiversity Information Facility. Recognizing the value of its continued existence to researchers and managers after the completion of its original mandate within CoML, it is now seeking a more permanent future within a stable organization such as the IOC. OBIS has the potential to complement the existing ocean data sources within the IOC by contributing an operational and successful component dealing with biological data.

In its operational role OBIS performs many useful functions. It caches species distribution data from many existing contributors and seeks out new standards for data exchange and management. Data are quality controlled and all data and tools are freely available and accessible online. OBIS is able to monitor web statistics and provide useful feedback on system usage and slides were shown to demonstrate these and other features of the online system. The number of records downloaded from the databases has grown from under 20,000 per day in 2006 to more than 100,000 per day at present levels; the number of hits on the web site is now well over a million per month. The available data sets to-date number 437, with 16 million distribution records, and 220,000 “taxonomic names”, corresponding with 102,00 taxa. OBIS is now one of the largest providers to GBIF.

The OBIS network is comprised of 15 Regional OBIS Nodes (RONs) that together ensure a true global coverage for OBIS. These regional nodes provide closer access to the data providers and mobilise regional data. They provide local visibility, technical assistance and specialized information products. Of course all the regional data is available on the global network. The flow of data is multi-directional with regional nodes able to receive data from the central data banks at OBIS, or through its partners, and from other regions where necessary. The combined asset provided by the regional

network, in its facilities and human resources, is formidable and represents an investment of experience and resources that is manifold the cost of the coordinating function.

The presentation also emphasized the present limitations in marine biographical data, noting that only a small fraction of the ocean biodiversity is known. There is a bias towards temperate zones and relatively shallow waters and the majority of species covered are vertebrates and larger creatures. Nevertheless the numbers of known species is growing rapidly and the OBIS contribution is significant. It is now possible to produce diversity patterns on a global scale that are not dependent on single taxa and several of these were illustrated. The present OBIS activities continue to be the development of IT infrastructure, seeking out new and historical data, improving quality control and analysis tools.

The Executive Director explained that the Governance Structure of OBIS had recently changed and the oversight was now in the hands of a Governing Board, which replaced the former International Committee. It was composed of senior science policy managers capable of providing the necessary direction and resource advice.

The Managers Committee, composed of the RON managers was retained, providing a forum to meet and discuss technical and operational issues and developments. Although a Technical Committee was possible, it had been found to be more effective to-date to garner this advice from a technical Workshop. There had been no meeting of a science committee to the present time, but it was envisaged that such a body would give credibility to the OBIS process and provide an editorial board function in the future.

Finally the presentation covered the administrative details. OBIS staff were; the Executive Director having responsibilities for external relations and general management; the Portal Manager with responsibility for local management; an IT Developer; two data managers and secretarial support. Some of these were supplied by the host organization. Details of the governance and management structure can be found in Annex V. As already mentioned in the introduction of the meeting, the present funding arrangements will come to an end in the next two years and other means of sustaining this important and valuable activity will need to be found.

The representative of GBIF gave a brief explanation of his organization. GBIF was established in 2001 to make available scientific biodiversity data freely available online. The organization is hosted by the University of Copenhagen. It has now a membership of 50 countries, thirty of which are voting members and the rest Associate participants. It also has 40 international organizations as Associate participants, of which OBIS is seen to be an important member. It is funded through contributions from its Voting Participant countries. It has a data portal and associated web services and supplies a central registry and indexing facility.

2.3 Commentary

The management and protection of the marine environment and its living resources is dependent upon wise and learned decision-making capability. Whether those decisions relate to climate prediction, the mitigation of natural disasters, fisheries management, weather forecasting, ecological protection, pollution prevention, biodiversity or coastal area management, and the performance assessment of all of these, requires accurate and timely knowledge and information to be successful. The ocean represents a critical element of the planetary life support system; as a contributor to the air we breathe, as a supplier of resources, as a regulator of our climate and,

unfortunately, as a receptor of our wastes. Its continued health is vital to our survival and yet we understand relatively very little of its complex physical, chemical and biological interactions. Individual datasets, from individual projects or monitoring activities, are usually limited in taxonomic, geographic and temporal scale. It is by integrating many different datasets that we can achieve results on a scale commensurate with the global problems we are facing. The value of data collected and available through the OBIS network goes far beyond its interest to the research community, although the accumulation of knowledge and understanding is, in itself, an essential part of the overall system. Under the CoML umbrella, OBIS has been addressing the weakest link in our wisdom and its importance cannot be underestimated. Bringing this new system into the IOC family to contribute to the ocean network that already exists and that has been successfully dealing with data management and exchange for nearly fifty years represents a wonderful opportunity that should not be lost.

3. ESTABLISHMENT OF PRINCIPLES AND OBJECTIVES FOR THE CONTINUING PROTECTION OF AND ACCESS TO OCEAN BIOLOGICAL DATA

The meeting considered the necessary requirements of a future home for OBIS. If such principles could be readily agreed, they would serve as a set of criteria that would need to be satisfied by an option in order for it to be viable. These needs should be borne in mind when addressing the various options. After some discussions the meeting prepared the following list: -

OBIS requirements:

- Functioning system that is able to deliver timely access to data continued;
- Ensure current OBIS client audiences continue to receive services ;
- Improved visibility, appreciation and support of OBIS activities at national Decision making levels;
- Continue to be a mega science marine biodiversity informatics initiative;
- Continue to maintain its role and function for the CoML and any successor.

IOC requirements:

- Inherit/adopt megascience marine biodiversity informatics initiative;
- Improvement of IODE data type coverage;
- Strengthened interface with CBD;
- Strengthened IOC ocean sciences/living resources programme;
- Contribute to GOOS by adding biogeographic component.

JOINT Requirements:

- Assure access to marine biodiversity related data and metadata;
- Maintain linkages and enhance interdisciplinary studies;
- Ensure data availability for long-term research needs;
- Maintain and expand network affiliations for both IODE and OBIS *(e.g. HAB-WoRMS, HAB-OBIS-IODE,);*
- Standardization of formats, conventions, *(e.g. unified metadata repository, citation reporting)*
- Address data version control;

- Make archives, activities and experiences equally available to all communities;
- Continued development of informatics infrastructure to ensure free and open access to marine biodiversity data (incl. access logs) and also contribution to/integration with the Ocean Data Portal;
- Promote integration of data types and integration of data systems (interoperability) and improved integrated products (e.g. WODB);
- Ensure long-term secure archival;
- Ensure that the arrangement contributes to the strategic objectives of both IOC (IOC/UNESCO HLOs) and OBIS (e.g. OBIS - CoML and GBIF mandates) strategic objectives;
- Contribute to HOTO (Health of the Oceans);
- Contribute to GEO/GEOSS.

UNESCO requirements:

- Strengthened interface with DIVERSITAS, MAB

4. POSSIBLE SCENARIOS FOR THE FUTURE

The Rapporteur introduced this agenda item covering general considerations and information on several options that could be considered.

4.1 General Considerations

The first question to be addressed is whether the examination of the objectives, structure and governance had demonstrated any reasons why a possible future relationship between OBIS and the IOC should not take place. The two organizations are certainly very different; The IOC is an established intergovernmental organization of the United Nations with functional autonomy within UNESCO. It has its own Member States, Statutes and Rules of Procedure that need to be satisfied. OBIS is an international organization established by the Census of Marine Life for a specific purpose, to integrate all data generated by the Census, and to combine them with data from other sources. It is an evolving strategic alliance of people and organizations sharing a vision to make marine biogeographic data, from all over the world, freely available. From the OBIS side, its fundamental goals and objectives will need to be maintained and furthered.

The IOC Statutes, clearly encompass the goals and objectives of OBIS within the statement of its purpose in Article 2.1

> "*2.1 The purpose of the Commission is to promote international cooperation and to coordinate programmes in research, services and capacity-building, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development, the protection of the marine environment, and the decision-making processes of its Member States."*

With regard to an affiliation with OBIS, the Statutes also clearly encourage such collaboration within its purpose, Article 2.2

> *"2.2 The Commission will collaborate with international organizations concerned with the work of the Commission, and especially with those organizations of the United*

Nations system which are willing and prepared to contribute to the purpose and functions of the Commission and/or to seek advice and cooperation in the field of ocean and coastal area scientific research, related services and capacity-building."

and in Article 11 on Relations with other organizations.

"*11.1 The Commission may cooperate with Specialized Agencies of the United Nations and other international organizations whose interests and activities are related to its purpose, including signing memoranda of understanding with regard to cooperation.*

11.2 The Commission shall give due attention to supporting the objectives of international organizations with which it collaborates. On the other hand, the Commission shall request these organizations to take its requirements into account in planning and executing their own programmes."

Additionally, the ability of the IOC to act in the intergovernmental sphere would clearly offer the opportunity for the OBIS program to grow in stature and acceptability. For example from Statute 11:

"11.3 The Commission may act also as a joint specialized mechanism of the organizations of the United Nations system that have agreed to use the Commission for discharging certain of their responsibilities in the fields of marine sciences and ocean services, and have agreed accordingly to sustain the work of the Commission."

Another general consideration is the compatibility of data management policies between the IOC and OBIS. With any closer association between the two organizations differences in policy management must be minimal. The IOC Member States adopted an oceanographic data exchange policy at the XXII Assembly in 2003 and it is attached as Annex III. No restriction exists that is likely to cause concern. If OBIS does become a program within the IOC in some form, then data generated from that program will be freely available, in accordance with Clause 1 of the IOC data policy. The meeting should however examine the policy and any similar statement from OBIS to eliminate any concerns.

The meeting agreed that neither IOC nor OBIS have technical requirements that are unacceptable to the other party and no other technical obstacles exist that may prohibit further discussion.

With no fundamental reasons why scenarios should not be developed and discussed, the prime consideration must be the satisfaction of the criteria developed to ensure the long-term security and access to the data. To avoid wasting time over options that are too extravagant or unwieldy, the question of feasibility should also be part of the initial considerations.

In comparing options, the meeting must consider the benefits and weaknesses of proposals, administration, governance and management concerns and of course funding and staffing issues. Although very important, the resource question should not be paramount until the other factors are debated, as an attractive proposal would be more likely to attract the necessary support, even though it may be considerably more expensive than a less ambitious alternative.

The following list of options should not be taken as a complete list for consideration. The purpose of the meeting is to investigate acceptable arrangements for the continuation of OBIS beyond its present mandate and all feasible proposals should be examined. This obviously includes new suggestions in addition to possible amendments or sub sets of the options listed below. The given examples of strengths and weaknesses of the options are also intended as starting texts only and amendments by the meeting are not only possible but also expected.

It was reported to the meeting that preliminary discussions between the OBIS Secretariat and its current host institution had begun, regarding the possibility of continued and /or enhanced support for the programme. It was hoped that more information and perhaps a definitive answer could be expected by the end of January 2009. This support was seen as crucial to the future of OBIS as the IOC funding possibilities within UNESCO was restricted. The meeting was also informed that the likelihood of UNESCO supplying a permanent post for OBIS within the timeframe being considered was minimal. A Programme Office for OBIS would be expected to have a UNESCO Staff Officer, which, in the circumstances, would need to be funded from extra-budgetary sources, at least initially, plus professional and staff support to be found locally. The present host of OBIS is Rutgers University in the US and negotiations are on going to continue this relationship.

The instruction given by the Executive Council was to investigate possible scenarios for an OBIS Programme and Programme Office. This could be accomplished through either the establishment of an IODE programme activity or through an independent IOC OBIS programme and that both options could be considered.

4.2 Possible Options

4.2.1 Status Quo

IODE and OBIS have shared interests and many of their respective operations and objectives for biological data are very similar. Quite naturally a great deal of cooperation already exists and many joint activities have been carried out. IODE and OBIS were co-organizers in a series of three conferences on Ocean Biodiversity Informatics (held in Brussels, 2002, Hamburg 2004 and Halifax 2007). Representatives of OBIS have attended GE-BICH meetings. Joint training workshops on biodiversity informatics have been held. Joint IODE-OBIS Data management training courses have been organized and, on a related front, OBIS collaborates with HAB on the development of HAIS.

The organizational models of OBIS and IODE mesh very well. Both are distributed networks, with OBIS' RONs equivalent to IODE's NODCs. Several RONs are actually operated by NODCs. Both OBIS and IOC are standards-based, and have been actively involved in developing internationally accepted standards.

The harmonious relationship between IODE and OBIS justifies the tabling of the *status quo*, however, as the future situation for OBIS demands change, it is not a viable option. The respective governing bodies have requested the investigation of new directions and the present valuable interaction between the IOC and OBIS can be used as a starting point for those future options.

The meeting accepted the view that no fundamental reason existed to suggest that an arrangement bringing IOC and OBIS together would not be possible and would in fact be extremely desirable.

4.2.2 OBIS becomes a UNESCO programme

This option would seem to be a possibility, but would need to be further explored. Many of the objectives of OBIS would find a reflection in the UNESCO programmes of MAB, DIVERSITAS etc. especially the scientific research and background surrounding the OBIS data set. Another advantage would be the linkage to a more substantial financial base and potential access to a wider audience of interests. A major disadvantage would be the lack of operational data management experience within the UNESCO programs, in particular the on-line archival and exchange capabilities. It is possible that this arrangement would be feasible if it were taken in connection with a partnership arrangement within UNESCO linking an internal UNESCO OBIS programme with the IOC/IODE, together with a commitment of the necessary resources. This may seem an overly complicated way of achieving the same result as Options 4.2.3 or 4.2.4.

The meeting agreed that this was not a viable option

4.2.3 A partnership agreement between OBIS and the IOC

This option is of course very flexible and could cover a wide variety of topics. For example:

- Agreement, use and maintenance of common standards and formats;
- Free exchange and access amongst IODE/OBIS centres;
- Encouragement for OBIS RONs to become part of the IODE/NODC network at any time, where such moves improve the security and stability of the data holdings;
- Joint meetings;
- *Ex officio* representation at respective management meetings.

A partnership agreement would be the least intrusive option on present arrangements. Administration and operation of the two organizations would remain separate and the agreement could formalize and strengthen the present informal collaboration.

A formal partnership arrangement would need to be agreed upon and signed by the respective governing bodies. Action by the IOC would be covered through a Resolution at the Assembly, approving a formal partnership arrangement, and the OBIS Board would do the same. There is room for flexibility within a formal partnership agreement. In addition to the present cooperation, the IOC could commit additional support at both the national and intergovernmental levels; it could also assist with training, expert meetings, symposia and improving links between OBIS and other intergovernmental and global organizations. It could be possible for such an arrangement to include a commitment for financial support.

This option does not address the fundamental reason that was foremost in the minds of the governing bodies. It would not resolve the uncertainties in the future of OBIS. The OBIS Board would need to seek other partners for the resources and support necessary to ensure the future stability of its archives, network and operation. This arrangement would not seem to promote an organizational

structure that would link OBIS to a closely related intergovernmental organization with a mature and stable record.

As part of its discussions the meeting also took into account the possibility of such a formal agreement between the two organizations being an intermediate step before a more substantial action. In such a case the agreement would need to include a schedule and milestones for the agreed organizational changes that would allow for present plans to come to fruition and future resources to be found and committed.

The possibility of leaving OBIS as a separate entity in the present host institution, providing that the necessary support could be found, and accompanying this arrangement with increased liaison with the Commission, was considered as a potential option. OBIS could be recognized as a node of the IODE data system, functioning as a centre for ocean biodiversity data. It could also be invited to participate in an IODE GE on marine biological data and participate in the IODE Committee. It would retain its present affiliations and organization and there exists a possibility for OBIS to apply to become a data centre of the ICSU new World Data System presently under discussion.

Although this option would be an improvement on the existing cooperation between the two organizations it was also seen to fall short of the expectations agreed by the respective governing bodies and would not give the intergovernmental status and sustainability that was envisaged.

The meeting rejected this option.

4.2.4 OBIS becomes part of the IODE programme

As noted in the description of the *status quo*, OBIS and IODE operate in a similar fashion and several of the regional centres are already linked organizationally. The organizational changes could take place rather smoothly. For example:

- The OBIS RONs would become IODE NODCs[1], or part of their distributed national network;
- The Heads of the RONs would become members of the IODE Committee;
- The technical/scientific committee of OBIS could become an IODE Group of Experts (GEs deal with issues assigned to it by the Committee), or Steering Group (SGs coordinate and oversee projects);
- The OBIS Executive Director would become an IOC programme specialist (level P-4 or P-5);
- The OBIS secretariat could remain in Rutgers, move to Ostend or find another suitable host location.

In this case, the Member States of the IOC would govern the oversight of the OBIS operation. Recommendations, developed with the guidance of the OBIS technical/scientific experts and/or Heads of the RONs, would be brought to the IOC Assembly and Executive Council through the action of the IODE Committee.

Difficulties for OBIS may exist in the individual transfer of RONs from their present affiliation to a national or governmental status. As stated above, in some instances this is already the

[1] IODE promotes the development of distributed national networks of data centres and the present definition of an NODC reflects this change.

case; however negotiations may be required for other centres. These difficulties should not prove insurmountable, but may require some extended schedule for OBIS to complete.

For the IOC the main issue will be a resource question. Such an important programme will necessitate the allocation of permanent personnel positions, at least for the programme head and the direct and in-kind financial resources needed to support the new Group of Experts or Steering Group. The availability of resources has been a continuing struggle at the IOC, which also has to justify its budget at the UNESCO level. However because of the close links of the OBIS objectives to the main thrusts of UNESCO itself (oceans, biodiversity, MAB etc) and in particular the relevance of OBIS to the UNESCO priority programmes (climate change, biodiversity), requests for additional resources may be successful. The IOC also has its own IOC Special Account supported by direct donations from Member States and an ability to have in-kind contributions towards programme operations. For example a commitment from the current host country to operate the existing OBIS centre for an extended period, or a similar offer from another Member State, would facilitate the acceptance of this option.

The adoption of a Resolution by the IOC Assembly to approve the merger between OBIS and IODE with commitment of the necessary resources would be required. The objectives of the merger would reflect those of OBIS and be stated specifically in the Resolution as would the Terms of Reference for the Group of Experts or Steering Group. For a change to the IODE of this magnitude, the Terms of Reference of the IODE itself may also need some adjustment. Prior discussions with Member States of the IOC and with UNESCO would be necessary to eliminate some of the concerns over resource issues.

The IOC will gain a prestigious programme that will enhance its global data strategy and reflect its own objectives for the assimilation of biological ocean data. There may be some opportunities to consolidate the present IODE programmes, for example GE-BICH, with the new OBIS initiative.

For OBIS there may be a concern of diminished identity and visibility. This is a concern that needs to be addressed and respected by the IOC. Within the realm of IODE there exist many activities and projects that all have established and maintained their own identity but while highlighting their “parentage”. A similar approach could be taken by OBIS, whereby IODE will be an organizational umbrella that exists to strengthen links between national and international data management activities.

For the OBIS Board, this option would require discussion with, and approval from, their regional centres (RONs) and other main partners. The OBIS Board would seek approval from all these, and to decide whether unanimity would be required or, if necessary, whether some exceptions could be accommodated. The Board will also need to be satisfied that the new programme within the IOC/IODE would maintain the stated objectives of OBIS, that continuity be maintained and the future direction assured.

The meeting considered the strengths and weaknesses of having OBIS as part of the IODE programme. It would be seen as a welcome addition to the IODE and would address a notably weak part of its mandate. The addition of OBIS to the data management activities of IODE would add an important and enthusiastic new community to the IODE family. It would have the advantage of being already an operational programme with a global coverage through its Regional OBIS Nodes (RONs). The ocean biodiversity objectives matched the High Level Objectives (HLOs) of the IOC

and hence also those of the IODE. The addition of OBIS would expand the IODE network architecture and improve its capacity to integrate the biological data that would be complementary to its existing data sets.

Advantages would also be seen for OBIS, in that many of the data management requirements for quality control, exchange, archival, metadata, discovery, format, standards, interoperability etc, would be the same or at least complementary for both IODE and OBIS. The IODE could use its Ocean Data and Information Networks (ODINs) to assist in strengthening the RONs. The intergovernmental structure of the IODE would provide stability and national endorsement and a closer link between the institutional arrangements of the RONs with the governmental networks of NODCs. There would be some adjustments needed to resolve organizational and responsibility conflicts in some countries and/or regions, however the ability of the IODE Committee to recommend attention to any necessary changes, was seen to be an important benefit.

The OBIS Secretariat would be re-created as an IOC Project Office (under the IODE Programme). Details on requirements and contributions by the host country and IOC/UNESCO are detailed in Document IOC/INF-1193 prov. (Guidelines for the structure and responsibilities of the subsidiary bodies of the commission, and for the establishment of decentralized offices).

There would be a problem for the IODE with regard to resources and financial details and consequences of the adoption of OBIS would need to be examined before the final documents were brought forward for approval. OBIS was concerned over a potential loss of visibility and possibly autonomy if it were to be absorbed into IODE. It recognized that its present governance structure would need to be changed to accommodate the IOC structural differences and the reduced autonomy may lead to slower responses to requirements than is presently the case. There was an additional concern that folding OBIS into an already fully occupied data service would weaken the ability of OBIS to maintain its linkages with its external partners, such as GBIF, CBD and TDWG.

The meeting rejected this option.

4.2.5 OBIS as a new IOC programme

Many of the factors (pros and cons) discussed in the previous option apply to this option. In addition, the acceptance of a separate OBIS programme by the IOC would undoubtedly have additional obstacles. Although the costs and staffing of the Programme Office would be the same, there would be additional financial considerations in terms of the related subsidiary bodies. For example, such an arrangement would necessitate the formation of an OBIS intergovernmental Committee (similar to IODE), together with its technical/expert support groups. A separate OBIS Programme would need to be aware of and address the IODE objective of integrating biological data with other oceanographic data and with the long-term requirements for an eventual system of systems. In budgetary matters, an OBIS programme may find itself competing against the IODE for scarce funds and resources and there could be confusion regarding responsibilities for biological data within the Commission

The meeting considered the advantages of having OBIS adopted as a separate programme of the IOC. The recognition of OBIS as a separate programme within the Commission could enhance its stature and visibility. The other organizations outside the IOC, with links to OBIS, and the large network of biodiversity experts presently collaborating in OBIS, would certainly appreciate a more recognizable reflection of OBIS within the Commission ensuring a continuous involvement.

As primarily a data programme, it would be part of the Ocean Observation and Services Section and report to the IOC governing bodies through an intergovernmental Committee that would need to be established. The intergovernmental Committee would be able to recommend the establishment of Task Teams and Groups of Experts, subject to the availability of funds and approval of the IOC Governing Bodies. This would imply additional resources and again these details would need to be elaborated. The meeting agreed that the resources and staffing of the Programme Office would be the same as in the previous option as would the requirement to resolve the situation within the OBIS host facility. There may however, be increased opportunities for both the IOC and OBIS to use their combined efforts to attract extra-budgetary monies.

The OBIS Secretariat would be re-created as an IOC Programme Office. Details on requirements and contributions by the host country and IOC/UNESCO are detailed in Document IOC/INF-1193 prov (Guidelines for the structure and responsibilities of the subsidiary bodies of the commission, and for the establishment of decentralized offices).

Once again the IOC would benefit from the addition of an important program that fitted closely to its stated High Level Objectives and would strengthen its biological ocean mandate. In this option OBIS would have increased visibility and autonomy, but would need to pay more attention to its shared data responsibilities with IODE to avoid unnecessary duplication. OBIS would be better able to undertake science objectives associated with its users and the ocean biodiversity community. It would retain its networks and affiliations, but would need to cooperate closely with the IODE to ensure that regional and national issues that may arise between the NODCs and RONs were quickly resolved.

OBIS would again bring an enthusiastic and operational program into the Commission and benefit itself from a stable intergovernmental base. OBIS could assist in establishing links with other biologically related programmes within the IOC such as HAB, ICAM and GOOS. There would be longer-term possibilities to re-establish closer ties with FAO and living resource requirements, especially in the realm of climate changes. Some enhanced synergies may also be discovered within UNESCO with the programs of DIVERSITAS, HAB and the UNESCO emphasis on climate change.

There was a strong argument as to the advantage of having the OBIS programme established at the highest level to ensure that the impetus achieved by the marine biodiversity community through the efforts of CoML and OBIS would not be lost. This point of view supported the option to have OBIS as an IOC programme. There was a perceived additional risk in the IOC approval process due to the additional financial implications, if a separate OBIS programme were to be recommended.

The meeting considered the issue of a disconnect between IODE and OBIS and competition for the scarce ocean data related funds available, together with any additional funding implications. Concerns were also expressed regarding the separation of IODE and OBIS within the Commission and the potential for these two programmes to lose a valuable opportunity for close cooperation on data management matters. It was subsequently suggested that a Joint IODE/OBIS Group of Experts on Ocean Biodiversity Data be established to supplement the IOC programme option to ensure maximum complementarity and inter-operability between the IODE and OBIS data systems and in compliance with the IOC Data Management Strategy. Such a Group could also accommodate the interests of HAB, ICAM and GOOS and possibly be expanded at some later date to include exterior interests such as GBIF, CBD, TDWG, ICES and FAO.

5. CONCLUSIONS

The conclusion of the meeting and its recommendation was that OBIS should aim to become an IOC programme together with the establishment of a joint IODE/OBIS GE and that this recommendation should be further explored and elaborated and brought before the OBIS Governing Board and the Assembly for decision and also submitted to the "IOC Data and Information Management Advisory Group" for comments.

It was recognized that details of this option will require development. Financial and staffing matters remain to be addressed including the funding implications within the IOC and at the host institution, plus additional interim support from existing and other possible extra-budgetary sources of funding. Terms of Reference will need to be prepared for an IOC/ OBIS Committee and the Joint IODE/OBIS Group of Experts.

To assist with the process leading to a decision by the respective governing bodies, the Executive Director of OBIS was requested to prepare a work plan that would detail the expected deliverables of the program up to the end of the Census of Marine Life funding and to extend the plan at least until the end of the next IOC biennium in 2012, in order to show the potential future advantages that would arise from a permanent OBIS programme. It was noted that the present CoML funding would cease in 2010 and for the last two years, starting in November 2008, the level of funding will be reduced to two thirds of the existing levels.

The meeting recognized that the present report summarizes the initial discussion of a process that intends to provide the OBIS Governing Board and the IOC Assembly with a proposal for an arrangement between the IOC and OBIS for their consideration and approval.

With that in mind the meeting identified the following deadlines, deliverables and milestones that relate to the foreseen procedure.

November 24-26, 2008:

- Initial IOC/OBIS Workshop

December 10:

- Draft Summary Report of Workshop prepared by the Rapporteur

December 21:

- Executive Summary of Workshop prepared by the Rapporteur

January, 2009

- Draft Business Plan prepared by the Rapporteur
- OBIS Work Plan prepared by the Executive Director of OBIS
- Draft terms of Reference for IOC/OBIS Subsidiary Bodies prepared by IODE and OBIS
- Meeting at Rutgers University to discuss future initiated by OBIS Officers
- Information agenda item presented at IOC Officers Meeting

- Information agenda item presented at GE-BICH-IV meeting (IOC Project Office for IODE, 27-30 January 2009)

February, 2009

- Consultation of the IOC Data and Information Management Advisory Group (by e-mail)
- Information agenda item for CoML Science Committee (Long Beach, CA, 5 February 2009)

April, 2009

- Information agenda item for GBIF Science Committee (Copenhagen, April 2009)
- "Working Document" finalized for submission to IOC Assembly/OBIS Governing Board (including IOC Draft Resolution and annexed Terms of Reference) - Rapporteur
- Submission of "Working Document" to OBIS Board Meeting for approval (New Brunswick, NJ, 24-25 April 2009)

May, 2009

- Submission of "Working Document" to IODE-XX Meeting for approval

June, 2009

- Submission of "Working Document" to 25th Session of IOC Assembly and Draft Resolution for adoption
- Preparation of detailed implementation plan

6. CLOSURE OF THE MEETING

The Chairman thanked the IODE Office for hosting the meeting and for the excellent arrangements. He thanked the participants for their excellent work and successful conclusion to the deliberations and declared the meeting closed at 12h00.

ANNEX I

AGENDA OF THE MEETING

1. OPENING OF THE MEETING
2. INTRODUCTION OF IOC-IODE AND OBIS
3. ESTABLISHMENT OF PRINCIPLES AND OBJECTIVES FOR THE CONTINUING PROTECTION OF, AND ACCESS TO OCEAN BIOLOGICAL DATA
4. POSSIBLE SCENARIOS FOR THE FUTURE
5. DETAILED DISCUSSION OF POSSIBLE ARRANGEMENTS BETWEEN THE IOC AND OBIS FOR THE SCHOSEN SCENARIOS
6. CLOSURE OF THE MEETING

ANNEX II

LIST OF PARTICIPANTS

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ANNEX III

IOC OCEANOGRAPHIC DATA EXCHANGE POLICY (IOC-XXII/3, 2003)

Preamble

The timely, free and unrestricted international exchange of oceanographic data is essential for the efficient acquisition, integration and use of ocean observations gathered by the countries of the world for a wide variety of purposes including the prediction of weather and climate, the operational forecasting of the marine environment, the preservation of life, the mitigation of human-induced changes in the marine and coastal environment, as well as for the advancement of scientific understanding that makes this possible.

Recognising the vital importance of these purposes to all humankind and the role of IOC and its programmes in this regard, the Member States of the Intergovernmental Oceanographic Commission agree that the following clauses shall frame the IOC policy for the international exchange of oceanographic data and its associated metadata.

Clause 1
Member States shall provide timely, free and unrestricted access to all data, associate metadata and products generated under the auspices of IOC programmes.

Clause 2
Member States are encouraged to provide timely, free and unrestricted access to relevant data and associated metadata from non-IOC programmes that are essential for application to the preservation of life, beneficial public use and protection of the ocean environment, the forecasting of weather, the operational forecasting of the marine environment, the monitoring and modelling of climate and sustainable development in the marine environment.

Clause 3
Member States are encouraged to provide timely, free and unrestricted access to oceanographic data and associated metadata, as referred to in Clauses 1 and 2 above, for non-commercial use by the research and education communities, provided that any products or results of such use shall be published in the open literature without delay or restriction.

Clause 4
With the objective of encouraging the participation of governmental and non-governmental marine data-gathering bodies in international oceanographic data exchange and maximising the contribution of oceanographic data from all sources, this Policy acknowledges the right of Member States and data originators to determine the terms of such exchange, in a manner consistent with international conventions, where applicable.

Clause 5
Member States shall, to the best practicable degree, use data centres linked to IODE's NODC and WDC network as long-term repositories for oceanographic data and associated metadata. IOC

programmes will co-operate with data contributors to ensure that data can be accepted into the appropriate systems and can meet quality requirements.

Clause 6
Member States shall enhance the capacity in developing countries to obtain and manage oceanographic data and information and assist them to benefit fully from the exchange of oceanographic data, associated metadata and products. This shall be achieved through the non-discriminatory transfer of technology and knowledge using appropriate means, including IOC's Training Education and Mutual Assistance (TEMA) programme and through other relevant IOC programmes.

Definitions

"Free and unrestricted" means non-discriminatory and without charge. "Without charge", in the context of this resolution means at no more than the cost of reproduction and delivery, without charge for the data and products themselves.
"Data" consists of oceanographic observation data, derived data and gridded fields.
"Metadata" is "data about data" describing the content, quality, condition, and other characteristics of data.
"Non-commercial" means not conducted for profit, cost-recovery or re-sale.
"Timely" in this context means the distribution of data and/or products sufficiently rapidly to be of value for a given application.
"Product" means a value-added enhancement of data applied to a particular application**.**

ANNEX IV

IODE OBJECTIVES

IODE Objectives are:

- to facilitate and promote the exchange of all marine data and information including metadata, products and information in real-time, near real time and delayed mode;
- to ensure the long term archival, management and services of all marine data and information;
- to promote the use of international standards, and develop or help in the development of standards and methods for the global exchange of marine data and information, using the most appropriate information management and information technology;
- to assist Member States to acquire the necessary capacity to manage marine data and information and become partners in the IODE network; and to support international scientific and operational marine programmes of IOC and WMO and their sponsor organisations with advice and data management services.

The IODE Strategy (2007) is stated as *"A comprehensive and integrated ocean data and information system, serving the broad and diverse needs of IOC Member States, for both routine and scientific use."*

It has the following deliverables:

- Assembled, quality controlled and archived data on a diverse range of variables according to scientifically sound and well-documented standards and formats;
- Timely dissemination of data on a diverse range of variables (observations and model outputs) depending on the needs of user groups and their technical capabilities (automatic dissemination as well as "on demand"); and will
- Facilitate easy discovery and access to data on a diverse range of variables and derived products (including forecasts, alerts and warnings) by users who have a broad range of capabilities.

And elements:

- Adherence to the IOC Oceanographic Data Exchange Policy;
- Acceptance and implementation of agreed interoperability arrangements including technical standards and specifications for processing, quality control, storing and disseminating shared data and information;
- A global network of data centres and related national distributed networks, and permanent long term data archiving centre(s) for all data, which operate to agreed standards, providing seamless access to data and information;
- Capacity building through continued development of Ocean Data and Information Networks (ODINs) whilst extending the Ocean Teacher capacity building tool through cooperation with WMO, JCOMM and others as appropriate;
- Governance by an Advisory Group that brings together the various programme elements of IOC as well as of bodies and organizations collaborating closely with IOC.

The structure of IODE Groups of Experts was amended in 2007 to restrict membership to a maximum of eight, of which not more than four will be long-term members and not more than four short-term members. The former will serve not more than four intercessional periods and the latter not more than two intersessional periods. Moreover, although all experts will be chosen for their relevant expertise the short-term members are expected to bring their particular experience and skills to deal with current priorities and needs.

ANNEX V

OBIS GOVERNANCE AND MANAGEMENT STRUCTURE

Descriptions of tasks of OBIS secretariat personnel

Executive director

- Communicate with OBIS participants, including Data Providers, Regional OBIS Nodes, etc. as required and in response to enquiries.
- Keep OBIS Board and committee members well-informed of progress, and facilitate their involvement in OBIS activities.
- Participate in hiring and supervising of OBIS staff, including allocating work and priorities, tracking leave taken and hours worked, and assessing performance.
- Organise OBIS meetings, conference calls, etc.; including drafting of agenda with meeting Chair, preparation of short-style minutes (typically drafted within 1-3 weeks of the meeting and mentioning items discussed, decisions made, and action points).
- Maintain OBIS files and records, including contact details of all OBIS Board and committee members, minutes and agenda of meetings, significant correspondence, copies of proposals and reports submitted, OBIS related publications, meetings where OBIS was represented, Agreements between OBIS and other organisations, personnel records, etc.
- Oversee the work of the OBIS Secretariat staff
- Represent OBIS, including presenting talks and handouts at meetings, and preparing articles and promotional brochures and posters.
- Prepare funding proposals with members of OBIS community, including assisting in external proposals that may benefit OBIS (e.g. letters of support).
- Be aware of potential opportunities for OBIS through taking notes at meetings, advice from members of OBIS community, and initiatives outside of OBIS (e.g. new mapping tools available on the internet).
- Record and report on OBIS statistics, such as measures of data published (e.g. number location records, species and higher taxa coverage, gaps), website use, publications, and user feedback, with assistance of the Portal Manager.

Portal Manager

- Plan, design, and manage the implementation of new Portal functions
- Work with OBIS innovation officers and technical advisory board to evaluate development plans for OBIS
- Acquire, install, and maintain hardware and software for OBIS
- Work with Rutgers Computing to facilitate the update and normal operation of production portal
- Direct performance tuning and optimization
- Establish and manage mirror sites

Data Manager

- Create and update OBIS databases
- Write scripts to analyze OBIS data
- Maintain, backup, archive, and migrate OBIS database systems
- Work with Rutgers Computing to update the production OBIS databases
- Help OBIS data providers establish DiGIR provider server
- Crawling and indexing data as provided from OBIS providers
- Obtain and install metadata from obis data providers

- Data quality checking/quality control

Web programmer

- Develop code in Java/JSP/JDBC and other languages to support the OBIS Portal function modules
- Develop code for OBIS interoperation such as crawlers, adapters, schema extension etc.
- Develop testing module for system development and maintenance
- Develop documentation and training material for the OBIS Portal

Web Master

- Implement and maintain OBIS website style design.
- Update OBIS static website content
- Acquire, maintain and analyze web usage statistics

OBIS Management structure

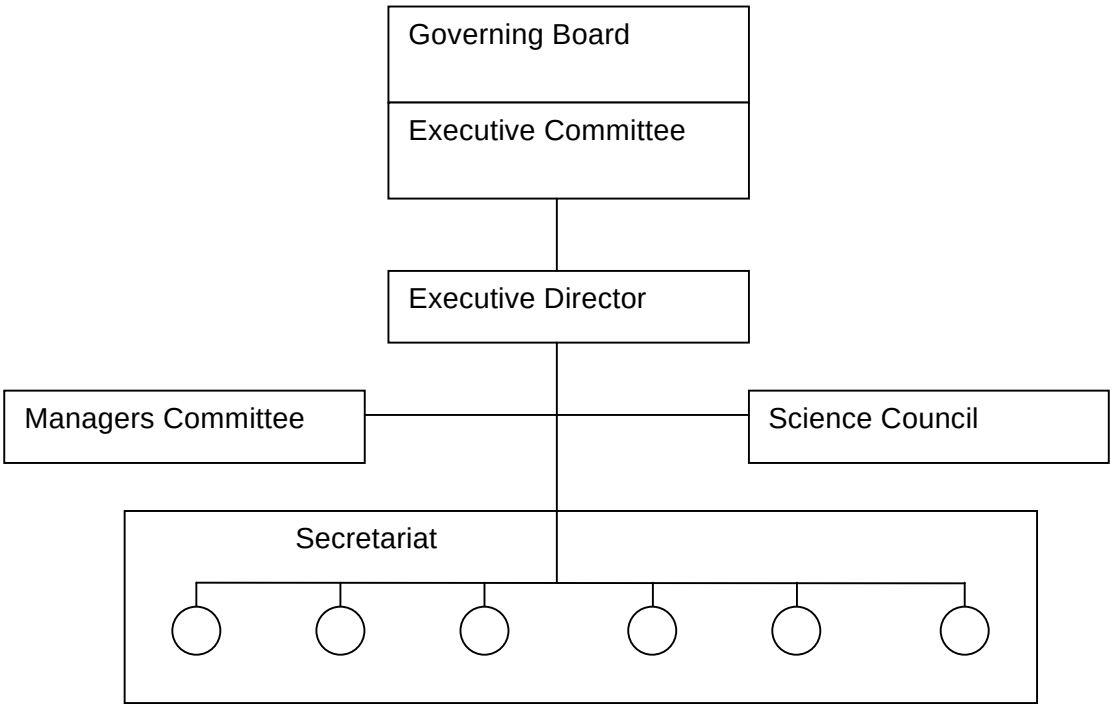
The Governing Board is the highest authority in the OBIS governance structure. It meets two times a year in person, and has two extra teleconference meetings a year. Members of the Governing Board are a representative of the hosting institute of the OBIS Secretariat; representatives of international end-users (e.g. IOC, UNEP, FAO, IUCN, GBIF, GEO); Chair of the OBIS MC; Chair of the science Council; past Chair of the Governing Board; members invited on the basis of their relevant experience; OBIS Executive Director is ex-officio, non-voting member.

The Executive Committee is part of the Board, and chaired by the Chair of the Governing Board. The Executive Director is the ex-officio, non-voting, secretary to the Executive Committee.

The OBIS Science Council is analogous to the Editorial or Advisory Board of a science journal in that members play an important role as advisors, such as in ensuring quality in the data publication process. This is achieved through members recommending good quality datasets for publication, acting as ambassadors within their specialist community for data publication through OBIS, and providing feedback and suggestions for improvements to OBIS. Where Board members were the scientists responsible for datasets published through OBIS, they maintain a role in correcting any errors apparent in the data and providing additional information to data users when requested. Where Board members have special expertise in taxonomy, oceanography, ecology, or information technologies, they advise OBIS on how to improve its quality and functionality. Members also add authority to OBIS by virtue of their scientific reputations.

Regional OBIS Nodes (RONs) are organizations that have committed to a continued support of OBIS within a geographic and/or national region using resources they have obtained. This will include serving data online and developing a data provider and end-user community. Some RONs will provide tools, different language versions of the OBIS website, and/or provide mirror sites for the OBIS portal.

Managers of the RONs meet in the Managers Committee (MC), to discuss such issues as overlapping geographical interest; common species lists and gazetteers; technology and tool development. Meetings have been organised once or twice a year. The Chair of the MC is member of the Governing Board and represents the RON mangers in this meeting.



Present members of the Governing Board

- Dr Jim Baker
- Dr Patricio Bernal, Executive Secretary, IOC
- Dr M.J. Costello, Auckland University New Zealand; ex-chair of International Committee
- Dr Serge Garcia
- Prof. J.F. Grassle, Rutgers University; Prinicple Investigator on Sloan Foundation grant
- Dr Dan Laffoley, IUCN
- Dr Fabio Lang da Silveira, University of Sao Paolo, Brazil, chair of the Managers Committee
- Dr Edward Vanden Berghe, Executive Director OBIS (ex officio)

ANNEX VI

LIST OF ACRONYMS

BOLD	Barcode of Life Data Systems
CBD	Convention on Biological Diversity
CoML	Census of Marine Life
DIMAG	(IOC) Data and Information Management Advisory Group DIMAG
EC	IOC Executive Council
EoL	Encyclopedia of Life
FAO	Food and Agriculture Organisation of the United Nations
GBIF	Global Biodiversity Information Facility
GE	Group of Experts (IOC)
GE-BICH	IODE Group of Experts on Biological and Chemical Data Management and Exchange Practises
GCOS	Global Climate Observing System (WMO/IOC/UNEP/ICSU)
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems (GEO)
GLOBEC	Global Ocean Ecosystem Dynamics (SCOR/IOC)
GOOS	Global Ocean Observing System (IOC)
GRA	GOOS Regional Alliance
HAB	Harmful Algal Bloom Programme (IOC)
HAIS	Harmful Algae Information System (HAB)
HLO	High Level Objective
HOTO	Health of the Oceans
ICAM	Integrated Coastal Area Management
ICES	International Council for the Exploration of the Sea
ICSU	International Council for Science
IOC	Intergovernmental Oceanographic Commission (UNESCO)
IODE	International Oceanographic Data and Information Exchange (IOC)
IOCCP	International Ocean Carbon Coordination Project (IOC/SCOR)
ISO	International Organization for Standardization
IUCN	International Union for Conservation of Nature
JCOMM	Joint WMO/IOC Technical Commission on Oceanography and Marine Meteorology (WMO/IOC)
MAB	Man and the Biosphere (UNESCO)
MC	Managers Committee (of OBIS RONs)
NODC	National Oceanographic Data Centre (IODE)
OBI	Ocean Biodiversity Informatics
OBIS	Ocean Biogeographic Information System
ODIN	Ocean Data and Information Network (IODE)
ODS	Ocean Data Standards (Pilot Project) (IODE/JCOMM)
OGC	Open Geospatial Consortium
OOPC	Ocean Observations Panel for Climate (GCOS/GOOS/WCRP/JCOMM)
RON	Regional OBIS Node (OBIS)
RP	Regular Programme (UNESCO)
TDWG	Taxonomic Database Working Group

UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Science and Cultural Organization
WCRP	World Climate Research Program (WMO/IOC/ICSU)
WMO	World Meteorological Organization
WODB	World Ocean Data Base
WoRMS	World Register of Marine Species

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