IODE Steering Group for OBIS (SG-OBIS)

Second Session
IOC Project Office for IODE, Oostende, Belgium
19-21 November 2012
Oostende, 19-21 November 2012
English only

From left to right: Katsuhiko Tanaka (Japan), Ward Appeltans (Belgium), Sung Dae Kim (Korea), Kevin MacKay (New Zealand), Tony Rees (Australia), Ursula Von St Ange (South Africa), Eduardo Klein (Venezuela), Sarah Faulwetter (Greece), Bart Vanhoorne (Belgium), Patrick Halpin (USA), Mark Fornwall (USA), Katsunori Fujikura (Japan), Philip Goldstein (USA), Nicolas Bailly (Philippines), Michael Flavell (UK), Mary Kennedy (Canada), Leen Vandepitte (Belgium), Bruno Danis (Belgium), Anton Van de Putte (Belgium), Narayanane Saravanane (India), Francisco Hernandez (Belgium).

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Executive Summary

The Second Session of the IODE Steering Group for OBIS took place at the IOC Project Office for IODE, Oostende, Belgium on 19–21 November 2012. In 2012, OBIS has undergone changes in management and operation, and all activities previously carried out at Rutgers University, USA have now been transferred to the IOC Project Office for IODE in Oostende, Belgium. The meeting resulted in several decisions and recommendations that will move OBIS forward. In addition, several task teams were formed to further develop OBIS and support the execution of the 2013 Work Plan. The new data system architecture was presented and new procedures will become operational from June 2013 onwards. It is expected that this will greatly enhance the data flow and provide tools to further improve data quality.

Despite the fact that the new OBIS manager was only recruited in May 2012, considerable progress was made with establishing international partnerships, engaging OBIS in global initiatives and increasing public awareness through social media. In 2012, 92 new datasets were collected and integrated in OBIS. OBIS now integrates 1,125 datasets, serving 33 million georeferenced species observations of 120,000 marine species and is by far the largest global database of its kind. OBIS is increasingly picked-up by the scientific community; scientific papers using OBIS data appear on a weekly basis (80 publications in 2012) and 50,000 people visited the data portal in 2012 (35% are returning visitors). OBIS continues playing a crucial role in providing guidance and information for the identification of Ecologically or Biologically Significant marine Areas (a process developed within the Convention on Biological Diversity). The 22 OBIS nodes (data assembly centres) are engaged in a wide spectrum of activities, which demonstrates that the role of OBIS is not limited to raw data encoding but also to develop tools and products and offering services (including capacity building) for data-science and science-policy activities on a local, regional to global scale.

In 2013, the task teams will produce an IOC Manual and Guides for OBIS nodes that will include the definition of OBIS nodes, the terms of reference and procedure to establish OBIS nodes, standards and best practices (OBIS handbook) and a section on quality assurance, criteria and evaluation of OBIS nodes.

Funding remains an issue for the OBIS project office as well as for many OBIS nodes. The November 2011 decision of the USA to cease funding to UNESCO is threatening all programmes and activities of the IOC, including OBIS. OBIS now relies almost completely on extra budgetary funding. An OBIS business plan will be finalized early 2013 and will address OBIS’ vision and mission, objectives and key priorities, budget needs in relation to the work plan and potential funding opportunities. An OBIS data manager, bringing the staff to two professional positions, will join the OBIS project office in 2013.
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1. **OPENING OF THE MEETING**

   The Chair of the IODE Steering Group for OBIS (SG-OBIS), Dr. Mark Fornwall opened the Session on Monday 19 November 2012 at 09:01. The chair welcomed the attendees and thanked the Project manager and other IODE staff for organizing the meeting. Participants (both at the table and on webex) introduced themselves and summarized their interests. The list of participants is attached as Annex 3. The participants adopted the Agenda without change (agenda in Annex 1).

2. The work for the week was then summarized according category:

   - Day 1 – Revisit our accomplishments & technology
   - Day 2 – Data and Organization
   - Day 3 – Plan of Work & Special Hands on Data Session

3. The meeting process was also summarized; each topic would include a presentation, discussion and identification of actions. Each day was closed with a review of the discussion for the day, agreement on decisions made and any actions.

2. **OBIS PROGRESS REPORT**

   2.1 **OBIS PROJECT OFFICE ACTIVITIES AND REVIEW WORKPLAN 2012**

4. **Project Office.** The establishment of the IOC Project Office for IODE/OBIS at Rutgers University, N.J., USA (Recommendation IODE-XXI.5) was no longer considered opportune and the international OBIS project office moved to the IOC project office for IODE in Oostende, Belgium.

5. **Staffing at the OBIS Project Office.** At the suggestion of the IODE Steering Group for OBIS (SG-OBIS), IOC/IODE divided work of the OBIS manager into 2 positions: one, to be located in Oostende dealing with programme coordination, management and strategy, and a second at Rutgers University dealing with technical matters (data harvesting, data management and quality control). The OBIS manager was established at the IOC Project Office for IODE and the position filled by Mr Ward Appeltans as of 1 May 2012. Dr Edward Vanden Berghe was retained to support OBIS operations first through IOC (January and February) and then under a service contract with Rutgers University as from 1 March 2012. On 3 July 2012 Rutgers University requested the termination of the contractual arrangement and Dr Vanden Berghe left Rutgers at the end of August 2012. At that time a P-1 position for an OBIS data manager was advertised (pre-advertised August 2012) with an application deadline on 21 October 2012. The selection process was completed and the new OBIS data manager is likely to start between January and March 2013 and will be based at the office in Oostende, Belgium.

6. **SG-OBIS membership.** The SG-OBIS is composed of the managers of the OBIS nodes and the representatives of the institutes/organizations that provide in-kind support to the core tasks of OBIS. Some nodes have a deputy node manager. Deputies are not official members, but can represent the node manager or can act as observers at the SG-OBIS meetings. All receive the electronic discussions via the SG-OBIS mailing list, managed by the OBIS project office. The SG-OBIS membership (currently 32 members) is documented on the IODE website: (http://www.iode.org/index.php?option=com_oe&task=viewGroupRecord&groupID=230)
SG-OBIS Co-Chair. At the first session of the SG-OBIS (December 2011) it was
decided to elect a Co-Chair to assist the Chair (Dr Fornwall). Dr Bruno Danis was elected as Co-
Chair in June 2012 (by e-mail). At the 1st SG-OBIS meeting in December 2011, it was decided
that Chairs have terms of 4-6 years.

OBIS executive committee. The OBIS project manager and the 2 SG-OBIS Co-Chairs
held regular (monthly) web conference calls to discuss priorities, issues as they may arise and
progress of the OBIS activities. The minutes of these meetings are shared with the SG-OBIS.

SG-OBIS pages. In response to a request from 1st SG-OBIS, a web space to archive
SG-OBIS documents was created, which is available at: http://www.iobis.org/sg (only SG
members have access). It has links to the minutes of meetings, draft working documents and links
to the shared workspace (technical issue tracking, dataset tracking, surveys etc.).

OBIS Technical Task Team. At the 1st SG-OBIS meeting it was decided to create an
informal technical task team (previously called the OBIS Development Consortium), composed
of those institutions that provide in-kind (technical/infrastructure) support to OBIS. A formal
document detailing the contribution (what, how and duration) from these institutes is needed. The
technical task team had their 2nd OBIS technical workshop in June 2012, and additional smaller
meetings (through webex) took place to organize the database and knowledge transfer from
Rutgers to Oostende.

GE-OBIS. The IODE Group of Experts on OBIS (GE-OBIS), established in 2011, did
not meet due to lack of funding. In response to IOC Circular Letter 2398 (August 2012) the group
was composed with four long-term members. The GE-OBIS has an advisory role on technical
developments. However, none of the institutions that provide in-kind technical or infrastructure
support are members of the GE-OBIS. The SG-OBIS recommends GE-OBIS to invite additional
short-term members of the OBIS technical task team to the GE-OBIS. It is felt that there is a need
to have a better involvement of major stakeholders and global partners (Intergovernmental
agencies) in order to advise OBIS on strategic issues, ensure sustainability and help OBIS to keep
a strong position at the international level. A Terms of Reference for such a group will need to be
prepared and proposed to IODE.

Meetings. The OBIS project manager participated in several meetings (Table 1). The
meetings can be categorized into those related to internal business (e.g., Executive Committee
calls), the iMarine project, expert meetings (e.g., ETDMP, GE-BICH) or representing OBIS in
international meetings (e.g., CBD-COP11, GEO BON). It was made clear that 2012 was again a
busy year for OBIS and the members of the SG appreciated the active role of the OBIS manager
in representing OBIS at several meetings.

<table>
<thead>
<tr>
<th>Date</th>
<th>Meeting</th>
<th>Place</th>
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<tbody>
<tr>
<td>15 May</td>
<td>OBIS Executive Committee meeting</td>
<td>Webex</td>
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<tr>
<td>30 May</td>
<td>Meeting with the Executive Director of EOL</td>
<td>Skype</td>
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<tr>
<td>7 June</td>
<td>OBIS Executive Committee meeting</td>
<td>Webex</td>
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<tr>
<td>18-19 June</td>
<td>iMarine Technical Committee meeting</td>
<td>Rhodes, Greece</td>
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<tr>
<td>21-22 June</td>
<td>Second OBIS Technical Meeting</td>
<td>Oostende, Belgium</td>
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<td>26 June</td>
<td>Meeting with GBIF Executive Secretary</td>
<td>Skype</td>
</tr>
<tr>
<td>31 July</td>
<td>OBIS Executive Committee meeting</td>
<td>Webex</td>
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<tr>
<td>28 August</td>
<td>iMarine – VLIZ – OBIS meeting</td>
<td>Oostende, Belgium</td>
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<tr>
<td>Date</td>
<td>Meeting</td>
<td>Place</td>
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<tr>
<td>5 September</td>
<td>ICES Working Group on the History of Fish and Fisheries</td>
<td>Oostende, Belgium</td>
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<td>10-12 September</td>
<td>ODINAfrica Marine Biodiversity Workshop</td>
<td>Tunis, Tunisia</td>
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<td>21 September</td>
<td>EarthCube Meeting</td>
<td>Bremen, Germany</td>
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<td>25 September</td>
<td>Ad-hoc technical meeting (Duke, VLIZ, PO)</td>
<td>webedx</td>
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<tr>
<td>26 September</td>
<td>OBIS Executive Committee meeting</td>
<td>webedx</td>
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<tr>
<td>2-5 October</td>
<td>iMarine Technical and Board meeting</td>
<td>Rome, Italy</td>
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<td>6-13 October</td>
<td>CBD-COP11</td>
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<td>16-19 October</td>
<td>ETDMP-III: Third Session of the JCOMM/IODE Expert Team on Data Management Practices</td>
<td>Oostende, Belgium</td>
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<td>17 October</td>
<td>PICES/TCODE meeting</td>
<td>webedx</td>
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<tr>
<td>22-24 October</td>
<td>Second IODE Workshop on Quality Control of Chemical and Biological Oceanographic Data Collections</td>
<td>Oostende, Belgium</td>
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<td>5-6 November</td>
<td>Rehearsal and iMarine Review Meeting</td>
<td>Brussels, Belgium</td>
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<tr>
<td>14 November</td>
<td>Meeting with IOC HQ and UNESCO Intersectoral Platform on Biodiversity</td>
<td>Paris, France</td>
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<tr>
<td>19-21 November</td>
<td>Second session of the SG-OBIS</td>
<td>Oostende, Belgium</td>
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<td>22 November</td>
<td>IOC Ocean Science Section Annual Meeting</td>
<td>Paris, France</td>
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<td>3-6 December</td>
<td>GEO BON All Hands Meeting</td>
<td>San Francisco, USA</td>
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<td>12 December</td>
<td>WoRMS Steering Committee</td>
<td>Oostende, Belgium</td>
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<tr>
<td>13 December</td>
<td>EMODnet species attributes workshop</td>
<td>Oostende, Belgium</td>
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13 **Database infrastructure and software.** The database structure was changed slightly, to rationalize the 'storedpath' field in several of the tables in the portal schema, and on the indices on those fields. These changes also required changes in the portal software. The teams at the Marine Geospatial Ecology Laboratory (MGEL) at Duke University (is also host of OBIS-SEAMAP) and Flanders Marine Institute (VLIZ, is also host of EurOBIS) have been working together to implement these changes on the development, staging and production server. The small changes in the database structure and code of the search interface will not have any implications on the user interface. All R scripts have been placed on SVN server of Duke and staff at Duke University was familiarized with the OBIS update routines through a series of skype calls with Dr Vanden Berghe in August 2012 prior to his departure.

14 The Indian National Centre for Ocean Information Services (INCOIS) has procured new blade servers (at the cost of approx. USD 20,000) as part of India's contribution to OBIS. Further, two scientists from INCOIS are contributing to OBIS activities on a part-time basis. The OBIS Portal and database were successfully loaded at INCOIS and it was ready to go online in May 2012. However, due to proposed up-grades of the OBIS data system architecture, it remains pending. INCOIS reported that it can go online as per the new data system architecture presented by Mr Hernandez.

15 **Statistics.** 92 new datasets and several updates were added to OBIS in 2012. OBIS now integrates 1,125 datasets, serving 33.6 million distribution records of 119,337 valid marine species and 27,228 genera. Five new datasets are ready to be uploaded to OBIS, but because the
need to change the portal software the datasets are waiting on the development machine. When uploaded, the number of records will grow to 35.5 million, of over 120,000 species (Fig 1.).

**Figure 1.** Number of records in OBIS, in millions. From [http://www.iobis.org/about/statistics](http://www.iobis.org/about/statistics).

## 16 New data was added to the international OBIS portal in 2012:

- On 27 July 2012, over thirty new data sets from the Balearics were made available through EurOBIS. A large data set from ICES, the Database of Trawl Surveys (DATRAS) is now available as a series of separate data sets; this allows us to better acknowledge the original data providers in the metadata. OBIS Canada provided four new data sets. The South Western Pacific OBIS Node supplied two data sets. More information on individual datasets in this data load is available at: [http://www.iobis.org/node/407](http://www.iobis.org/node/407).

- On 11 May 2012, 3 new data sets from a new data provider, the “Institut de Recherche pour le Développement” (IRD) of France - all three of them very large, were uploaded to OBIS. There is one new data set, and several data sets refreshed, from OBIS Canada. Scientists at Rutgers University contributed a small data set, from an area where OBIS cover is poor. EurOBIS has 8 new data sets, and many of them refreshed. Many data sets of OBIS SEAMAP were reloaded, resulting in fewer records however; track data is now summarized similar to other track data in OBIS. More information on individual datasets in this data load is available at: [http://www.iobis.org/node/397](http://www.iobis.org/node/397).

- On 28 March 2012, 31 new data sets from OBIS SEAMAP were added to OBIS. There was also one new data set from each of OBIS USA, the Ridge 2000 project, and FishBase. OBIS Canada has 4 new data sets (including one freshwater which will be passed on to GBIF), and 3 updates. More information on individual datasets in this data load is available at: [http://www.iobis.org/node/395](http://www.iobis.org/node/395).

- On 24 January 2012, 11 updates and 5 new datasets were added to OBIS. Notable additions include a CSIRO dataset representing a 3-year study on fishery habitat ecosystems in southeast Australia, a dataset containing the entirety of contributions from the Universidade Federal de Pernambuco’s Zooplankton Laboratory (Brazil), and an update to a fish repository from the Canadian Museum of
Nature provided by OBIS Canada. Additional updates provided by OBIS Canada include an addition of records to the electronic atlas of ichthyoplankton on the Scotian Shelf of North America as well as a high-resolution dataset covering all species found in the Haida Gwaii archipelago. OBIS has also obtained a number of new datasets from Fishbase and its associated providers. These include a large biodiversity research repository from the Academia Sinica, the fish collection of Japan’s National Museum of Nature and Science, and the French National Museum of Natural History’s Ichthyology collection. More information on individual datasets in this data load is available at: http://www.iobis.org/node/389

The project website and data portal are the main means to advertise activities on OBIS and to serve our user community. According to Google analytics, during 1 January – 31 October, the iobis.org website received 73,742 visitors of which 48,748 are unique; 169,407 page views (2.3 pages per visit). 64.15% of the visitors are new or 35.85% are returning visitors.

Outreach. Today raising (public) awareness is important for the success on any project. The project manager has created several accounts on social media to distribute information on OBIS or information relevant to marine biogeography.

On 18 November 2012, the (closed) LinkedIn group has 200 members, 21% is of junior level (others are senior, manager, director levels), and 35% has a research function. There were 14 discussion topics and a job advertisement posted. LinkedIn is a good medium to reach a professional audience and to have a discussion on issues of particular importance to OBIS with the external community.

To reach a general (mostly non-professional) audience, a FaceBook page was created (http://www.facebook.com/OceanBiogeographicInformationSystem) and currently has 116 followers. 21 articles were posted, which attracted on average between 500 to 1,000 readers (Fig 2.).

![Number of unique visitors to OBIS' FaceBook page](image)

Figure 2. Number of unique visitors to OBIS’ Facebook page from June-November 2012.

The twitter account is less successful with only 45 followers. We have not been very active on this medium.
We also started sharing some presentations on OBIS (e.g., a general introduction to OBIS) on SlideShare (http://www.slideshare.net/OBIS-IOC/presentations). These had from 100 to over 200 views each.

We also created an OBIS Public Library on Mendeley (http://www.mendeley.com/groups/2276521/obis-public-library/papers), which holds papers describing OBIS or citing OBIS (using data from OBIS). The papers can be sorted by year or by OBIS node. There are currently 25 papers published in 2012.

Through Google Scholar we also track publications that mention “Ocean Biogeographic Information System” (http://scholar.google.be/citations?user=xGK5dwQAAAAJ). Google could track 814 publications, of which 75 are published in 2012. This accounts for 6,610 citations and an H-index of 33.

A handout (flyer) describing what OBIS is and what it offers to researchers, managers and policy makers, is created, and distributed at the CBD COP11 (October 2012) and Blue Planet Symposium (November 2012).

On 13 April, OBIS was mentioned in a media release in connection with the 100-year anniversary of the Titanic. OBIS data was nicely used in a graphic by the Canadian National Post: (http://news.nationalpost.com/2012/04/13/follow-the-titanic-down-to-the-bottom-of-the-ocean-graphic).

2.2 FINANCIAL REPORT

In 2012, salary costs of the OBIS project office were around USD 175,000, which covered the salaries of the project manager in Oostende, and a data manager at Rutgers (until 31 August). USD 15,000 was provided by UNESCO’s Regular Programme, which covered the costs of the SG-OBIS meeting, and around 10,000 USD was spent on travel (covered by iMarine and IOC/IODE budgets). The operational expenses (for hosting the OBIS project office) are close to USD 10,000 annually and are currently provided by the IOC Project Office for IODE.

In 2013, the salary costs will be higher (around 250,000 USD) because of the addition of a full-time data manager to the project office. Funding for these two positions will come from two EU FP7 projects iMarine and GEOWOW, two IODE projects (ODINAfica and Caribbean Marine Atlas) and the IOC special account for OBIS. The iMarine EU project runs until 30 April 2014.

It is expected that the UNESCO Regular Programme will again contribute USD 15,000 to be allocated for the SG-OBIS meeting in 2013.

To continue the OBIS operations beyond 2013-2014, new financial resources are needed. The IOC Executive Secretary issued Circular Letter 2441 on 21 May 2012 to urge Member States to contribute to the IOC special account for OBIS. In 2010, contributions were received from Australia (USD 90,000) and Brazil (USD 10,000). In 2011 CAD 20,000 were received from Canada. USA provided USD 200,000 to Rutgers University for the OBIS project office in 2010–2011. Canada has prepared documentation to donate another CAD 20,000 for 2012–2013.
A minimum of USD 300,000 is needed annually to operate the OBIS project office. Based upon the current budgetary situation of UNESCO and its IOC, funding will need to come from additional extra-budgetary contributions from IOC Member States, and possibly also from project and other international funding sources. It is important to note that the full cost of OBIS implementation includes the voluntary contributions by OBIS nodes.

2.3 OBIS INVOLVEMENT IN PROJECTS AND GRANT PROPOSALS

Currently international project funding is helping to cover the cost of core staffing of the OBIS project office. IOC/OBIS is currently involved in two EU FP7 projects: iMarine and GEOWOW (through IOC/GOOS). iMarine covers the salary of 1 FTE until April 2014, and GEOWOW will contribute USD 20,000 to OBIS for providing OBIS related products. We have also been successful in applying for additional funding (USD 36,000) from the UNESCO Emergency Fund (set up by UNESCO Director General to compensate for the loss of USA funding). The emergency funds may not be used for salary of UNESCO staff. A contract (USD 16,000) will be set up with OBIS-SEAMAP to assist in work related to the CBD (EBSA process), and the remaining will be used to cover costs for attending three CBD-EBSA regional workshops and some other important events (e.g., GBIF Governing Board, e-Biosphere conference). A project proposal submitted to the JRS Foundation in February 2012 was not successful and due to some administrative issues OBIS cannot take part as a contractor in the EU DG MARE EMODnet tenders. OBIS (through Rutgers), however, was a partner in the pilot phase of the biological lot of EMODnet. The Census of Marine Life won the COSMOS prize (half a million USD) in 2010. Four projects were selected, of which OBIS (through Rutgers) received nearly USD 100,000 in 2012. Rutgers reported that they would deliver the results of their work performed under this contract to IOC/OBIS before the end of 2012.

2.4 OBIS INVOLVEMENT IN INTERNATIONAL ORGANISATIONS AND GLOBAL INITIATIVES

OBIS needs to demonstrate that it is well positioned to operate on the data-science and science-policy interface and can deliver well-defined inputs for global assessments (e.g., World Ocean Assessment), global initiatives (e.g., CBD to reach the Aichi biodiversity targets) or to bridge science and policy (IPBES, GEO BON). In order to be relevant, OBIS will need to build partnerships in the biodiversity information world, and have a prominent coordinating role at the global level.

The Global Biodiversity Information Facility (GBIF) and OBIS obviously share common goals (both serving biogeographical data online at a global level). Hence, GBIF is naturally one of our first partners to work with. OBIS has been an associate partner of GBIF since its inception and is by far its largest marine data provider. The best option to formalize our relationship with GBIF is a Memorandum of Cooperation (MoC), and to engage in a number of joint activities (e.g., on the infrastructure, data, science, capacity building and policy). An explicit partnership with a shared vision and objectives may ultimately also lead to shared resources. SG-OBIS drafted an MoC (through email discussion) and the GBIF Executive Secretary Mr Hobern responded during the SG-OBIS meeting that GBIF agrees with the objectives and principles and stated that we should move to sign the MoC to reinforce the message that GBIF and OBIS are 100% aligned in their goals and plan to support each other’s activities (OBIS work plan 2013 item 3).
The **Convention on Biological Diversity** (CBD). Since 2009, OBIS, and OBIS-SEAMAP in particular, have worked closely with the CBD secretariat. OBIS-SEAMAP has built the EBSA repository for the CBD secretariat and provides scientific guidance for applying the criteria for EBSAs. EBSAs are based on 7 general criteria (OBIS data is used for those underlined):

- Uniqueness or rarity
- Special importance for life-history stages of species
- Importance for threatened, endangered or declining species and/or habitats
- Vulnerability, fragility, sensitivity, or slow recovery
- Biological productivity
- Biological diversity
- Naturalness

At the tenth meeting of the Conference of the Parties (COP 10) in Nagoya (October 2010), OBIS was explicitly mentioned as one of the important data sources on marine biodiversity – decision X/29, para 35 [URL http://www.cbd.int/decision/cop/?id=12295]. At the eleventh meeting (COP11) in Hyderabad (October 2012), OBIS was also mentioned in the decision report (decision XI/22, para 16) as one of the competent organisations to work with in the EBSA process.

In 2012, OBIS-SEAMAP (and others) have also provided data from OBIS for the scientific preparation in support of a series of regional workshops, convened by the CBD Secretariat, to facilitate the description of EBSAs:

- Wider Caribbean and Western Mid-Atlantic Regional Workshop, 28 February - 2 March 2012 (Recife, Brazil)
- Southern Indian Ocean Regional Workshop, 30 July 2012 - 3 August 2012 (Flic en Flac, Mauritius)
- Eastern Tropical and Temperate Pacific Regional Workshop, 27 August 2012 - 31 August 2012 (Galápagos Islands, Ecuador)
- A Northern Pacific workshop in Russia and a Western Africa workshop are planned for early 2013.

The **Global Ocean Observing System** (GOOS) of UNESCO-IOC is a permanent global system for observations, modelling and analysis of marine and ocean variables to support operational ocean services worldwide. GOOS provides accurate descriptions of the present state of the oceans, including living resources; continuous forecasts of the future conditions of the sea for as far ahead as possible, and the basis for forecasts of climate change. GOOS has recently created a biodiversity and ecosystems panel of experts, to advise GOOS on biodiversity and how it should deal with biological parameters. Closer collaboration between OBIS and GOOS is essential, especially since both projects are now under the same parent organization. How both OBIS and GOOS can work together is currently under discussion; the project managers last met at IOC headquarters on 14 November 2012, and it was proposed to invite OBIS to participate in the GOOS biodiversity and ecosystems expert panel.

OBIS is also involved in GEO BON – the **Group on Earth Observations Biodiversity Observation Network**, and more specifically in working groups 5 (marine ecosystem change) and 8 (Data integration and inter-operability; informatics and portals). GEO BON coordinates activities relating to the Societal Benefit Area (SBA) on Biodiversity of the
Global Earth Observation System of Systems (GEOSS). Some 90 governmental, inter-governmental and non-governmental organizations are collaborating through GEO BON to organize and improve terrestrial, freshwater and marine biodiversity observations globally and make their biodiversity data, information and forecasts more readily accessible to policymakers, managers, experts and other users. The 2nd GEO BON meeting will take place in Asilomar, 3–6 December 2012. GEO BON may be the vehicle to provide the scientific knowledge for IPBES.

The Encyclopedia of Life (EOL) is a consortium of institutions led by the Smithsonian Institution. EOL, funded by the Sloan and MacArthur Foundation, entered their second phase (2 years term) in July 2012 (OBIS, through Rutgers University, provided a letter of support for their proposal in May 2012).

EOL’s vision is “global access to knowledge about life on Earth”. To achieve this vision, it has chosen a mission to increase awareness and understanding of living nature through an Encyclopedia of Life that gathers, generates and shares knowledge in an open, freely accessible and trusted digital resource.”

EOL is governed by a council, which is composed of members from institutions and programs around the world that have demonstrated a commitment to support and implement the EOL. OBIS has been a content provider to EOL for several years (although there is no signed Memorandum of Understanding between OBIS and EOL) and OBIS is represented at the council by the OBIS manager Mr Appeltans. In the next years, EOL will keep a strong focus on marine life. EOL expects OBIS data to be “a valuable test bed for summarizing occurrence data and its associated environmental data” and “in return, the integration of our structured information with other fields that EOL is aggregating could be useful to OBIS users and researchers”. Collaboration with EOL will involve data sharing activities.

The Global Ocean Biodiversity Initiative (GOBI) is an international partnership advancing the scientific basis for conserving biological diversity in the deep seas and open oceans. GOBI is facilitated by IUCN with core support from Bundesamt für Naturschutz (BfN) in Germany. It aims to help countries, as well as regional and global organisations, to use and develop data, tools, and methodologies to identify “Ecologically or Biologically Significant Areas (EBSAs)” in the oceans, with an initial focus on areas beyond national jurisdiction (www.gobi.org). The work under this initiative builds on the scientific criteria adopted by the Parties to the Convention on Biological Diversity (CBD). Both UNESCO-IOC and OBIS are founding partners, and Mr Appeltans represents both IOC and OBIS on the GOBI Advisory Board, and Prof. Patrick Halpin (OBIS-SEAMAP) sits on their Scientific Committee.

The UN World Ocean Assessment (WOA). In 2014, the first “Global Integrated Marine Assessment of the UN Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-economic Aspects”, will be published. UNESCO-IOC is one of the supporting technical UN Agencies. The Group of Experts, who will meet end of November in New York, will start assembling drafting teams (drawing experts from the pool that has been established), based on the outline of the report that was agreed at the UN General Assembly.

Outline of WOA:
- PART I – Summary
- PART II – The Context Of The Assessment
- PART III – Assessment Of Major Ecosystem Services From The Marine Environment (Other Than Provisioning Services)
OBIS, through IOC, can contribute data and information (maps, datasets, baseline indicators, expert assessments) to several chapters under part VI (assessment of marine biological diversity and habitats). A table has been prepared to indicate to what OBIS can contribute and who will be the contact point. Link to document: http://www.iode.org/index.php?option=com_oe&task=viewDocumentRecord&docID=9760

Figure 3. Patricia Miloslavich gives a live demonstration about OBIS at the World Ocean Assessment/Caribbean regional workshop organized by the UN, on 14 November 2012.

Other partnerships with international organisations and global initiatives to explore or further develop are:

47 The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) is co-hosted by four UN agencies: UNESCO, UNEP, UNDP and FAO — and is supported by ninety countries. The secretariat is hosted by Germany, in Bonn. IPBES, like IPCC for Climate Change, will bridge the science-policy interface for biodiversity and ecosystem services. IOC and OBIS – because of its network of scientists, data providers and aggregator nodes, infrastructure and tools – could play an important role in coordinating the data and information flow (from observation, data aggregation, validation and interpretation) to advice and serve IPBES.

48 The UNEP Regional Seas Programme (http://www.unep.org/regionalseas). The Regional Seas Conventions and Action Plans cover issues ranging from chemical wastes and coastal development to the conservation of marine animals and ecosystems.

49 The UNEP’s World Conservation Monitoring Centre (UNEP-WCMC). UNEP-WCMC is hosting databases such as the World’s Marine Protected Areas database, and the World Mangrove Atlas.
The **International Union for Conservation of Nature (IUCN)**. Biodiversity is a priority area for IUCN. Key products are e.g., the Red list of Threatened Species. The IUCN Global Marine and Polar Programme (GMPP) is active in areas such as Marine Protected Areas, and managing marine invasive species. They have a 25-strong team of marine professionals in 10 countries working at various levels. From local fishermen and decision-makers right up to the United Nations General Assembly, as well as several Commissions, including the World Commission on Protected Areas (WCPA) – Marine Division, the Species Survival Commissions (SSC) – Specialists Groups, the Marine Conservation sub-committee, and the Commission on Environmental Law (CEL) – Oceans Law and Governance Specialists Group.

Other important collaborations may include DIVERSITAS, UNESCO – Man and Biosphere, PICES, FAO etc.

### 3. OBIS NODES REPORTS

An online survey was sent to all the OBIS nodes one month before the meeting. Nodes were asked to respond to five questions in order to prepare an integrated report on their activities during the past year:

- (3) Most significant achievements in 2012
- (3) Significant challenges in 2012
- (3) Significant aims for 2013
- What should OBIS be doing in the short-term (2013-2014) to long-term (2013-2020)?
- Pertinent issues that we should discuss at the SG-OBIS meeting

12 OBIS nodes responded (of 22): AfroBIS; FishBASE; KOBIS; OBIS Australia; EurOBIS; OBIS Black Sea/Ukrainian; Southwestern Pacific OBIS; OBIS Japan; OBIS Canada; OBIS-USA; WSA OBIS; AntOBIS. The results of this survey are visible here:

- [https://docs.google.com/spreadsheet/ccc?key=0AjUWEA7pWDo9dERDUko5bUNFNU05UF1wTXBXeTh2Z3e](https://docs.google.com/spreadsheet/ccc?key=0AjUWEA7pWDo9dERDUko5bUNFNU05UF1wTXBXeTh2Z3e)

The answers to the questions can be summarized as:

- **Question 1**: main achievements (the good news)
  - Cooperation and networking
  - Data enhancements: openness, flows, rescuing, quality and quantity
  - Usefulness for policy
  - Recognition, support and promotion
  - Funding
  - New tools, scripts, portals, projects and applications

- **Question 2**: main challenges, difficulties encountered
  - Funding
  - (Political) recognition
  - (Meta)data standardization/interoperability/QC
  - Capacity building
  - Resistance to data openness
  - Species names in different languages
• Question 3: main aims, objectives
  o Funding
  o Documentation, promotion
  o (Meta)data enhancements: interoperability, openness, flows, rescuing, quality and quantity
  o New developments: webservices, portals, tools (data cleaning, Export-Transform-Load (ETL), ...), projects
  o Networking/collaborations
  o Capacity building

• Question 4: OBIS should:
  o Build a sustainable budget
  o Become (more) multilingual
  o Provide metrics and feedback to custodians
  o Develop use cases
  o Develop web services
  o Increase recognition
  o Organize data flow, and improve data quality
  o Expand networks and cooperation, build synergies
  o Contribute to Marine Spatial Planning, in particular Marine Protected Areas

• Question 5: food for discussions
  o Procedures related to Nodes (incl. Roles & Responsibilities)
  o Cooperation with taxonomic registries, and with citizen science initiatives
  o Extensions of the OBIS schema
  o GBIF-OBIS relationship
  o Sustainability beyond iMarine
  o Collections digitization (incl. underwater pictures)
  o Role of OBIS in the IODE system
  o Unique identifiers
  o Show and tell session
  o Data flows, standards, vocabularies and tools
  o Business plan
  o Use cases

After the presentation by Dr Danis, the discussion continued on (the lack of) sustainable funding. It is a common problem for small and even global data systems, although the big data aggregators are often in a better position to attract funding, and the data collectors/providers are too often neglected in the funding process. Libraries were mentioned as having a good sustainable model, although nowadays specialized libraries (e.g., at universities) are also in trouble and many are being closed. A white paper on bioinformatics published by a large (mostly EU) consortium gives an overview of the status and requirements for global data systems, but does not give direct solutions for sustainability. It was said that most of funding is in operations and applications (e.g., environmental assessments) and not in data or infrastructure per se. If we want to receive support from Member States, whatever we do, it must be relevant to society and we need to showcase the applicability of OBIS and become heavily involved, not only in raw data encoding, but also in the development of tools and products and offer services to data-science and science-policy activities.
4. OBIS NODES

Nodes were initially established under the Census of Marine Life (2000-2010). At that time membership was informal (often based on stated interest) or was part of a contract with the Sloan Foundation. This resulted in a mixture of NGOs, Individuals, Universities, and Government organizations being designated as nodes. A clear definition of an OBIS node within the IODE context is lacking and a process for adding new nodes must be developed. It will be driven by a clearly defined set of minimum node requirements and seek commitment for long-term support of the network. These administrative issues need to be addressed within the context of the current network and its history so that current nodes can be recognized as being a part of the network and new OBIS nodes can be added under the IODE umbrella.

4.1 CURRENT STATUS, AND LIST OF CANDIDATE NODES

As a first step in this process, the OBIS manager has contacted all the OBIS nodes to verify and confirm their status and node manager. As a result of this survey, a list of the ‘official’ (active and less active) OBIS nodes was prepared and a number of ‘candidate’ OBIS nodes identified (Annex 4). There are currently 22 OBIS nodes and 4 candidate OBIS nodes.

4.2 STATUS OF OBIS NODES IN IODE

The IODE network is composed of 80 National Oceanographic Data Centres (NODC). The current IODE framework is organized almost exclusively within the NODC context. This approach makes it difficult to include OBIS Nodes within the IODE framework, as the majority of nodes do not all readily fit within the current NODC context. At the same time, a proposal will be submitted to IODE-XXII (March 2013) to expand the IODE framework that would provide another option for OBIS Nodes. The next IODE Committee session (March 2013) will consider a proposal for the revision of the IODE terms of reference and for the establishment of “IODE Specialized Ocean Data Centres (IODE-SODC).”

In order for the OBIS network to fully participate within the IODE network, each OBIS Node organization will need to meet the requirements of an NODC, SODC or propose another option for consideration by the IODE Committee. Currently, 5 out of 22 OBIS nodes are NODCs (DFO Canada, VLIZ, NIWA, CSIR, IBSS).

The tasks of NODCs and SODCs and the formal procedures to join IODE are provided in Annex 5. Reference is also made to Document IOC/IODE-XXII/21.

4.3 TERMS OF REFERENCE OF OBIS NODES

The OBIS project office is responsible for the daily operations of the international OBIS node (iOBIS) within the network of OBIS nodes. The OBIS nodes operate as data assembly and quality control centres for biogeographical data from their region and/or areas of expertise, and subsequently provide this high-quality information to the iOBIS node. A review of OBIS activity identified the breadth of contributions from iOBIS and the Nodes including: technological developments, science and research, policymaking, outreach and capacity development and networking activities (Annex 6). The need to be active on several domains was already highlighted in Agenda Item 3.
The OBIS manager Mr Appeltans presented an overview of the tasks of iOBIS and OBIS nodes, as defined in the past, and matched them with tasks of an NODC. The SG-OBIS members discussed the Terms of Reference of OBIS nodes and agreed on the list of tasks in Table 2. The level of tasks and responsibilities follows the structure of a 3-tier system, proposed and accepted under Agenda Item 5. This table will be used to define the terms of reference for OBIS Nodes.

**Table 2. List of tasks for OBIS tier I, II and III nodes as identified and adopted at this meeting.** All OBIS nodes are tier III. Some nodes will take up additional responsibilities, such as performing data validation, which in the past was done by iOBIS (tier I). These extra activities are assigned to tier II. In the absence of an active tier III or no tier II is found, tier I can perform tasks under tier II and III (marked by *), or a tier III needs to fill in a tier II (**). Tier I = iOBIS; Tier II = OBIS nodes with extra responsibilities; Tier III = OBIS nodes. M = mandatory; R = recommended; O = optional.

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Tier I</th>
<th>Tier II</th>
<th>Tier III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving or harvesting marine biodiversity data (and metadata) from national, regional and international programs, and the scientific community at large</td>
<td>*</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Making data (and metadata) available to tier II nodes</td>
<td></td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Harvesting data (and metadata) from tier III nodes</td>
<td>*</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Perform data validation (using standards, tools and best practices), as described in the OBIS manual</td>
<td>*</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Reporting the results of quality control directly to tier III</td>
<td>*</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Reporting the results of quality control directly to data collectors/originator as part of the quality assurance activity</td>
<td>*</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Making data (and metadata) available to tier I node using agreed upon standards and formats which are described in the OBIS Manual</td>
<td></td>
<td>M</td>
<td>**</td>
</tr>
<tr>
<td>Automated data (and metadata) harvesting from tier II nodes</td>
<td></td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Making data (and metadata) available on the iOBIS portal</td>
<td></td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>Ensuring the long-term preservation of the data, metadata and associated information required for correct interpretation of the data (including version-control), as described in the OBIS manual</td>
<td>M</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>The OBIS node shall nominate a node manager (and deputy) who will be a member of the IODE Steering Group for OBIS (SG-OBIS), and participate in various activities associated with OBIS and IODE, such as the SG-OBIS meetings and electronic discussions</td>
<td></td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Contribute to the development of standards and best practices</td>
<td>M</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Contribute to the development of open-source tools</td>
<td>M</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Provide indicators on up-time, responsiveness and data processed by nodes and present a report to SG-OBIS</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report on activities to SG-OBIS</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Engage in stakeholder groups</td>
<td>M</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Capacity Building (i.e., providing expertise, training and</td>
<td>M</td>
<td>M</td>
<td>(to M)</td>
</tr>
</tbody>
</table>
support in data management, technologies, standards and best practices).  
Coordinate data and metadata quality assurance (OBIS node best practice manual)  
Providing marine data to external networks (e.g., GBIF)  
Maintenance of the OBIS website and global data portal and implement (mapping, download) tools  
Ensure an operational system (delivering data access services to OBIS nodes and the community)  
Providing statistics on data usage (report on data provider level)  
Providing statistics on data content and analysis on gaps  
Control data access, terms of use and sharing policies  
Coordinate internal communication among nodes (mailing list, news, website), put data providers in touch with the relevant OBIS nodes  
Customer support (data queries, analyses, feedback).  
Outreach (as defined in the Communication and Outreach Strategy)  
Build customized portals (e.g., multiple languages)  
Comply with the IOC/OBIS data policy for using and sharing OBIS data.

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<tr>
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<tr>
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<td>M</td>
<td>O</td>
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<tr>
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<td>M</td>
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<td>M</td>
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</tr>
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<td>Providing statistics on data content and analysis on gaps</td>
<td>M</td>
<td>O</td>
<td>O</td>
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<tr>
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<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Outreach (as defined in the Communication and Outreach Strategy)</td>
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<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Build customized portals (e.g., multiple languages)</td>
<td>*</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Comply with the IOC/OBIS data policy for using and sharing OBIS data.</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
</tbody>
</table>

4.4 PROCEDURE FOR THE ESTABLISHMENT OF NEW NODES

The OBIS Network has not grown for some time and needs additional nodes to help improve coverage both geographically and thematically. In addition there are four organizations that have expressed interest in becoming nodes. Procedures need to be developed and they should not be onerous and should allow for a timely response to the requestor. The following approach was discussed.

For institutions that wish to organize the data contribution to OBIS on a local level, there are several ways to join the global network of OBIS nodes:

- If the institute is an existing NODC:
  o Send a letter of “expression of interest” to the OBIS project office, wishing to join the OBIS network of nodes.

- If the institute is not an existing NODC, but wishes to apply for an NODC status:
  o Follow the procedure for NODCs and include your wish to join the OBIS network of nodes.

- If the institute is an existing SODC (if the SODC entity type is adopted by the 22nd session of the IODE Committee):
  o Send a letter of “expression of interest” to the OBIS project office, wishing to join the OBIS network.
• If the institute is not an existing SODC, but wishes to apply for an SODC status:
  o Follow the procedure for SODCs and include your wish to join the OBIS network of nodes.

The extra information required for OBIS to include in the application/expression of interest is the following:

• Indicate the level of commitment to function as an OBIS tier II and/or tier III node;
• Indicate the person who will act as the OBIS node manager (and deputy).

Applications will be reviewed by the IODE Steering Group for OBIS and a decision will be made within two weeks after confirmation of receipt. The results of the decision from the 22nd session of the IODE Committee will affect the final process developed by the SG-OBIS.

4.5 IODE QUALITY MANAGEMENT FRAMEWORK

Mr Reed provided an overview of the Quality Management Framework (QMF) to set the stage for the Steering Group’s deliberations. At the previous two IODE Committee sessions, IODE-XX (2009) and IODE-XXI (2011), the Committee discussed the need to establish a QMF to ensure that NODCs are established and operate according to defined principles, including adherence to agreed standards and the requirements of the IOC Oceanographic Data Exchange Policy. Accreditation of data centres is needed to ensure NODCs can provide data of known quality to meet the requirements of a broad community of users. In addition, in 2012 IODE was granted network membership of the ICSU World Data System, which requires NODCs to demonstrate their capability to meet ICSU certification requirements.

Currently, any IOC Member State can establish an NODC, but there is no instrument within IODE to review compliance with the Terms of Reference of NODCs. The Quality Management Framework should help institutes with “the strategy, advice, guidance and tools necessary for an organization (such as a National Oceanographic Data Centre or OBIS node) to attain quality, efficiency, and effectiveness in performing its mission responsibilities“.

A Quality Management System (as an integral component of QMF) is a management tool consisting of a set of rules to direct and guide an organization with regard to quality. It is not just a set of documents but a group of interrelated processes that brings resources, activities and behaviours together to improve an organization's effectiveness and efficiency – and it helps an organization keep customer focus, involve everyone from the top down and drive continual improvement.

A QMF for OBIS can form the framework to:

• Initiate and review existing Standards, Manuals and Guides with respect to the inclusion of quality management procedures and practices;
• Offer assistance in establishing organizational quality management systems;
• Promote accreditation of OBIS nodes according to agreed criteria;
• Provide regular feedback to the IODE Committee and IOC Assembly.

In addition, to contribute data to the IODE Ocean Data Portal, accreditation of the data centre by IODE will be required and data must meet agreed standards and the requirements of the IOC Oceanographic Data Exchange Policy.
The SG-OBIS needs to decide if OBIS nodes can become part of the IODE QMF and have a separate section in the document.

**Recommendation/actions required regarding “OBIS nodes”**

The SG-OBIS welcomes the IODE QMF to support the operations of NODCs, but felt it was too ambitious for OBIS at this stage. OBIS nodes very much operate on a voluntary basis (often do not function as funded national data centres) and adding more constraints and requirements at this stage may be too onerous for the voluntary members that make up the OBIS network.

The SG-OBIS recommends that OBIS nodes that are not NODCs (but SODCs) should not be included in the IODE QMF, but recognizes that those OBIS nodes that are NODCs or those that wish to become NODCs will be part of the IODE QMF.

It was agreed that OBIS needs its own IOC Manual and Guides for OBIS nodes (in analogy with M&G 5 for NODCs). Several Task Teams will be responsible for writing sections of this “OBIS manual”, and for keeping it up-to-date.

Proposed outline for an IOC Manual and Guides for OBIS nodes:

- Vision & Mission of OBIS;
- Objectives and key priorities of OBIS;
- Definition of OBIS Nodes;
- Subsidiary bodies (SG-OBIS, GE-OBIS);
- Terms of Reference of OBIS nodes;
- Procedure to establish OBIS nodes;
- Standards and Best Practices in OBIS (‘OBIS Handbook’);
- Quality Assurance, Criteria and Evaluation of OBIS nodes.

5. **OBIS DATA SYSTEM ARCHITECTURE**

Data harvesting ceased with the termination of the contract between IOC and Rutgers University, 31 August 2012. During August 2012, the OBIS-SEAMAP team worked with Dr Vanden Berghe (Rutgers University) to document the harvesting and indexing procedures. OBIS-SEAMAP and EurOBIS are currently testing these procedures to check if the last five new datasets that are in queue are integrated correctly. An updated version of the OBIS database (www.iobis.org) is expected to be online in December 2012. A geo-load balancing mirror of the OBIS database will be set up at INCOIS (India) in 2013.

The taxonomy in OBIS should be consistent with international standards. Three authority lists are currently used: the World Register of Marine Species (WoRMS), the Integrated Taxonomic Information System (ITIS), and the Catalogue of Life (CoL). The Interim Register of Marine and Nonmarine Genera (IRMNG) is used to distinguish marine from freshwater species. Today, around 30,000 scientific names in OBIS do not match any of these taxonomic registers. To solve this issue, a number of steps will be undertaken by the Taxonomy Task Team (see work plan item 6).
At the second OBIS technical meeting in June 2012, a new data system architecture was proposed. This will have several implications on the data processing and harvesting procedures. In 2013, OBIS will go through an intermediate/preparatory phase to implement the new architecture.

Currently several data streams are in place, from and between local data providers, OBIS nodes, iOBIS and GBIF (fig. 4). In the future this will be more organized – hierarchically structured – to avoid overlap and duplication (fig. 5). A more detailed figure is provided in Annex 7.

Figure 4. Current scenario of data flows in OBIS, between OBIS nodes, data providers and GBIF.

Figure 5. The future preferred scenario of data flow in OBIS. Currently thematic nodes are global and not regional or national. However, this may not always be the case in the future and in those cases they will be linked to a tier III node instead of directly talking to tier I.
The EurOBIS database will be used as the new “data assembly” database by iOBIS. Those datasets in OBIS that are “frozen or archived” (i.e., no further updates are expected) will be imported in this database. EurOBIS already serves 13 million records and it can have an additional 1.5 million records if it also harvests not only the European, but also the non-European records of datasets from other OBIS nodes, which it already harvests. EurOBIS has offered to assist the Project Office with harvesting OBIS nodes. EurOBIS has extensive experience in harvesting data providers through DiGIR and IPT.

An analysis performed by EurOBIS tells us that 80% of the OBIS records are currently “harvestable” through DiGIR or IPT (Fig. 6).

The number of metadata fields in OBIS is limited and serves mainly the purpose of data discovery and administration. The metadata schema will be further expanded in 2013, e.g., including sampling protocol to make it possible to select datasets according to its ‘fitness for use’.

The suggestion is that iOBIS uses the Integrated Marine Information System (IMIS) developed and maintained by VLIZ for managing the metadata. EurOBIS and AntOBIS also use IMIS. The metadata can be stored in IMIS, and the system can subsequently export the metadata to the OBIS portal, as EML for IPT and as a DIV format for GCMD. Unique identifiers for datasets were identified as one of the key priorities OBIS should work on. IMIS could serve as a platform for this. This will be considered as the evolution of OBIS continues in 2013.
In the past, iOBIS was involved in many data processing activities (QC, indexing), sometimes duplicating the work of other OBIS nodes. The future architecture will ‘push’ these activities as much as possible to the OBIS nodes (see proposed Terms of Reference for tier I, II and III nodes in Table 2).

This means that the OBIS nodes need access to a number of QC tools that run directly on the global OBIS database in addition to some reference databases, such as WoRMS, ITIS, GEBCO, WOD. Some of these tools are currently being worked out by VLIZ in the framework of LifeWatch.

Besides improving data quality by using new taxonomic and geographical data validation tools, OBIS will also need to provide additional services to its user community. OBIS now provides global species distribution maps, environmental species envelopes, regional species lists (EEZ, MEOW, IHO), time series, seasonal information, metadata and global maps showing diversity indices. Future OBIS data products may be maps showing species quantity information (abundance/biomass), not only presence but also species absence data, tracking/transect lines, migratory routes etc. Environmental species envelopes should be built using regional higher resolution oceanographic data. Links with a gazetteer will allow building regional species lists on the basis of locality names. Metadata will hold sampling information, and the data schema will be extended.

The OBIS OGC (Open Geospatial Consortium) web service (on Geoserver) shows gridded and point data based on the OBIS scientific name, and serves a number of diversity indices. This service needs to be further expanded (e.g., WFS – Web Feature Service), should allow using taxon IDs and should provide associated metadata.

The OBIS portal should also make better use of other webservices (e.g., WoRMS for taxonomy, species attributes; LifeWatch etc.).

6. OBIS DATA QUALITY ASSURANCE

6.1 OBIS HANDBOOK – FOR IMPROVED QUALITY MANAGEMENT, STANDARDS AND BEST PRACTICES (TAXONOMIC AND GEOGRAPHICAL QC/DATA VALIDATION PROCEDURES)

The preparation of a handbook (previously called OBIS manual) describing iOBIS/Node operations was listed as a high priority at the SG-OBIS-1 and as a result the Data Quality Task Team prepared a draft handbook. Members of this team are Leen Vandepitte, Francisco Hernandez (EurOBIS), Mary Kennedy (OBIS Canada) and Bruno Danis (AntOBIS). This draft was circulated to all node managers for comments in April 2012 and was posted online as part of the background documents for the Second OBIS Technical meeting in June 2012: http://www.iode.org/index.php?option=com_oe&task=viewDocumentRecord&docID=9174.

The aim is to make a final document, but also to keep it dynamic and promote revision on a regular basis. This ‘handbook’ should be seen as a guide for the OBIS community, created by the OBIS community. It is the intent that this document be a result of a combined effort of all node managers, to come to a clear understanding of how data in OBIS should be managed and to make sure that each node follows best practices on data processing before submitting the data to OBIS. This should help to ensure the best possible quality and consistency of the data. Suggestions for additions and changes to this document can be made at any time and feedback
from SG-OBIS on the draft version will be incorporated and a revised version released. The guide will be available on the OBIS website for nodes and other interested organizations.

212 The document is meant to be a starting point for a standardized methodology for nodes to process submitted datasets. The objective of the document is to provide an overview on the best practices used by the different node managers, to come to a common understanding on the level of data quality expected by the OBIS community. As such, it describes a set of norms that should be followed as much as possible; and perhaps is the beginning of a quality management framework for OBIS.

213 Ms Vandepitte presented an overview of the draft handbook created by the task team. Each of the five sections/parts was described (and SG-OBIS members were encouraged to ask questions at the end of each section and a list of actions for each section was compiled).

Metadata

214 Part 1 of the document deals with the metadata associated with a dataset and stresses the fact that the importance of good metadata should not be underestimated. Metadata can capture information that does not fit within the OBIS Schema, but is important to the users of the data. Metadata should include a description of the dataset with linkages to associated documentation that will facilitate proper interpretation of the data. It should also aid online users in deciding if they wish to download the dataset – by determining its ‘fitness for use’.

215 ‘Terms of use agreements’ promote proper citation of datasets, and metadata is the only means to provide this kind of information to its users. It should also be noted that it is not just the data provider that should be cited – credit should also be attributed to the various organizations that are involved in the data flow path, especially if the source dataset has been enhanced at any of the stages along the way to its final home in OBIS and beyond (e.g., GBIF).

216 The presentation holds a few statistics related to metadata content currently in OBIS and it was clear that many existing datasets currently lack any citation, contact or abstract information. A number of best practices to deal with metadata and how metadata can be completed – even if the data custodian provides very little information – are described in the document.

217 The OBIS database contains several tables for metadata information. These tables need to be adapted to an adopted standard for metadata. Currently a variety of systems are being used by different OBIS nodes and the introduction of GBIF’s Integrated Publishing Toolkit (IPT) will introduce yet another method.

218 A major discussion on the various systems being used in the OBIS community ensued (GCMD, FGDC, ISO and IMIS). It was pointed out that it is very important to know which system OBIS will promote in order to properly describe required content in the handbook. Recommendations regarding how to resolve metadata questions will be handled by a new task team (the Data Task Task Team).

Data

219 Part 2 of the document focuses on the data itself. Several fields of the OBIS Schema are discussed in detail: what kind of information belongs in these fields and how should the data be formatted to get to a standardized dataset before submitting it to OBIS? Different scenarios are
dealt with, all based on actual situations node managers have already encountered. For each field, a number of best practices are formulated, helping the node managers to accurately deal with the submitted data.

OBIS has three required fields, the scientific name and the geographic position (latitude and longitude). One of the QC procedures recommended in the manual is to map scientific names to a standard such as the World Register of Marine Species (WoRMS). Various tools to facilitate this process were described.

There are many issues related to datasets that include records where scientific names cannot be easily mapped to any currently accepted name. Similar issues exist for geographic positions (location names). In addition, how should we deal with the precision of a sampling location?

The SG-OBIS also discussed and concluded that there is a need to create controlled vocabularies for several OBIS schema fields such as life history stage and gender (sex). The first step will be to review existing content and then propose a set of terms and associated definitions. This vocabulary development should be in collaboration with the IODE GE-BICH (https://sites.google.com/site/gebichwiki/).

It was pointed out that the steering group requires a private online workspace to discuss issues related to data quality, standards and practices. It should list (frequently) asked questions and post suggestions to solve these. The content of this workspace can provide input to future updates of the OBIS handbook, and the OBIS node managers were encouraged to submit feedback, questions and comments on the current draft version of the OBIS handbook either directly to the data quality task team or to the OBIS project office.

Statistics

Part 3 of the document lists a number of possible statistics that can be run on the node data. These are examples from EurOBIS and AntOBIS, but could be extended to all nodes, making for example a uniform reporting to OBIS and the scientific community possible. Running these statistics on a regular basis will help in visualizing the progress of each node and can also help in identifying gaps. The SG-OBIS was asked to provide examples of types of statistics that would be useful to their communities.

OBIS Schema

Part 4 in the document lists a number of possible improvements and changes that can be made to the OBIS Schema to be able to better deal with certain data and information. These are merely suggestions – based on experiences of node managers – and should be discussed with the wider OBIS community. It is intended to regularly update this section, as node managers might come up with more issues or when issues are being tackled and solutions are formulated.

Unresolved issues

Part 5 in the document lists some problematic situations, in which it is not clear which ‘procedure’ should be followed to add the data to the OBIS Schema. Each of the items listed here should be open for discussion within the OBIS community, in order to come to a consensus on how to deal with it. As for part 4, this will be a very dynamic part: more issues will be added and – after discussion and agreement – most of these issues will fit under part 1 or 2.
The presentation ended with a request to review the draft OBIS handbook and provide feedback. The task team will address issues and recommendations and revise the handbook if necessary. The location of the online workspace will be identified and SG-OBIS members will be notified via the mailing list.

The handbook can also serve as a basis for training material at biological data management training courses (e.g., IndOBIS will be organizing one in March 2013). Feedback from this event may result in revisions of the handbook.

It is expected that the handbook will come under scrutiny of the SG-OBIS on an annual basis and the recommended plan is to regularly review, revise and update the online version after each SG-OBIS meeting.

7. OBIS DATA CONTENT

7.1 OBIS DATA AND METADATA SCHEMES

This topic addresses the desirability and recommendations for enhancing OBIS content, including both the content of occurrence records and accompanying metadata aspects of content.

Recommendations and Discussion

Below is a summary of the recommendations and discussions made during the presentation on OBIS content enhancement (data and metadata). Discussion time was limited so some topics did not get addressed at length and a data task team is established to further address these issues.

Rely on Darwin Core and integrate Darwin Core with metadata to enrich content – prioritize specific features, in relation to other OBIS goals, based on factors to be determined;

Enhancements should respond to specific requirements:

- There are sources of requirements; governments, conventions, etc. For example, requirements can be linked to official national or international directives. The data task team will analyze and prioritize requirements rather than just do things because they are possible in Darwin Core or because of a single request;
- Enhancements might not necessarily be restricted to external requirements. OBIS may internally see needs to upgrade how current content is represented in light of Ratified Darwin Core. Revise this recommendation so some internal OBIS requirements can influence content enhancement in addition to external requirements;
- Example of survey protocol: can we create a guide to what kind of description is required to adequately describe methods?
- Investigate controlled vocabularies for many parameters;
- Don’t try to enhance everything at once; focus strategically.
Engage partners for requirements and development and beyond.

Bring along community when developing enhancements; seek sponsors, partners, experts, and users, to participate in developing enhancements. Develop this group to be a community of acceptance and practice to make OBIS solutions stronger and more widely accepted.

Research and develop in-depth knowledge with collaborators from data originators through to modelers. Sponsors may request solutions at a high level, but there is much detail to work out. Engage a range of participants to represent detail areas so these details are well represented. The detail areas mentioned here are data originators and modelers. Additional areas of detail, such as policy, operations, and others, may apply future OBIS enhancements.

Identify specific connections between Darwin Core contents and metadata. Richer data in Darwin Core may require further explanation in metadata. For example, Darwin Core can contain a reference to sampling methodology in a short form such as a code or short name in a Darwin Core field. Metadata can include a longer more thorough description of the sampling method so the user of OBIS data can better understand how the sampling methodology impacts their use of the data. For each metadata protocol (e.g., FGDC or ISO) there will be a specific location in the metadata structure where that methodology description will reside. Similar connections to metadata may apply in other areas as well besides sampling methodology, such as georeference, taxonomic identification, data history and quality, attribution, and others.

Evaluate and select a metadata protocol for OBIS based on the capabilities of each metadata protocol, such as what kind of description, citation, discovery metadata each protocol supports. Choices include GCMD, ISO, FGDC, and EML. Acknowledge that many situations of various nodes may require diverse forms of metadata to be supported, but OBIS will choose one format that is required for OBIS purposes. Evaluation and selection of a metadata protocol may include developing and publishing a list of evaluation criteria so the decision of which form of metadata to use can be documented and justified according to the criteria.

Evaluate mechanical concerns of different forms of metadata, and determine if these concerns factor into choice of metadata approach for OBIS. By mechanical concerns, we mean topics like how is metadata created (editors, templates, information-gathering practices), how is metadata published and distributed (portals, crawlers, search engines) how is the authoritative copy of metadata controlled (by OBIS or by external entity).

Include in selection of metadata protocol the considerations of ability to convert between different forms, for example, to convert between GCMD and ISO. Include consideration of existing or potential tools for conversion, as well as benefits and hazards of conversion. Determine what kind of content may be lost during such conversion. Determine which metadata protocols are better for originating different kinds of capabilities. For example, is GCMD better for creating discovery capability (hypothetical example) and if so, can the discovery capability be retained even if GCMD is converted to ISO?
8. OBIS GOVERNANCE

8.1 BUSINESS PLAN – OBJECTIVES, COSTS AND BENEFITS ANALYSIS, FUNDING MODEL, SG- AND GE-OBIS, PARTNERSHIPS, DATA ACCESS AND SHARING POLICY

The goals for this discussion included: relevance and sustainability; vision and mission; strengths and weaknesses; objectives; work plan; costs; funding model; partnerships; data access and sharing policies. The conversation was organized against the draft outline for an OBIS business plan. It was hoped that this approach would address many of the objectives and also directly influence the development of the business plan. The topics addressed included the vision, mission, goals, organization, cost and funding.

SG members agreed with the overall organisation of the draft business plan and the direction. The Vision and Mission statements should continue to consider a broad vision that addresses societal concerns. Consideration should be given to include of the value of an aggregator of disparate data and the concept of OBIS as an alliance of providers that offers important services.

There was also general agreement with the goals. Key specific concerns were identified and discussed for each goal. Goal 1 (Infrastructure and Data Management) may be too all encompassing. It is difficult to include two concepts as broad as infrastructure and data management within one goal. Consideration should be given to creating two goals from this one. As with Goal 1, Goal 2 (Scientific Advancement) is quite broad, including both science and education; these would better be served as separate goals. Both biodiversity and information science should be considered within the scope of this goal. There was general agreement on goal 3 (Support to Decision-Making) but some reworking is necessary as this goal is critical in attaining both institutional support and funding. Clearer identification of impacts would improve this goal substantially. Goal 4 (Capacity Building) is very important as it ties very directly to IODE goals. It should be rewritten in the context of IODE. Last, Goal 5 (Networking/Partnerships) is acceptable but should better reference the potential for engagement with other United Nations Organizations.

The organisational structure for the OBIS operations was nominally agreed to last year and was presented as a draft for confirmation. The group affirmed the approach and agreed that the structure should be better described to clearly indicate the roles and responsibilities of the informal task teams.

The final topic discussed under this agenda item was resources. This included both the investment in the project office and the investment of individual nodes. A summary was provided for three different staffing levels – a minimal level (285,000 USD); intermediate (440,000 USD) and Optimal (670,000 USD). The proposed staffing levels and costs for the project office should be further developed, specifically in the area of justification for increased staff levels. The collective investment of OBIS participants was also discussed. It was noted that the full investment by all participants in OBIS is not known and it would be an important piece of information for IODE and OBIS. A clear understanding of the full investment in OBIS by its members would be one indicator of the value of OBIS to members and help to highlight the role of Nodes.

It was agreed that a task force would be established to complete the business plan by 31 March 2013. Each SG member agreed to provide a summary of products and services provided and an estimate of indirect and direct support to OBIS. This data will be included in the
business plan. These interim deliverables are to be provided to the OBIS project office by 31 December 2012.

9. OBIS OUTREACH AND COMMUNICATION

9.1 COMMUNICATION STRATEGY

In communicating, OBIS prioritizes scientists, but it is also important to reach out to policy makers, funding agencies and the general public. The biodiversity informatics developers should also be considered a priority group to communicate with. The following points are part of the outreach and communication strategy of OBIS. They give an overview of ongoing activities and a measure of their success and penetration level in various communities.

The project website and data portal are the main means to advertise activities on OBIS and to serve our user community. According to Google analytics, during 1 January–31 October 2012, the iobis.org website received 73,742 visitors of which 48,748 are unique; 169,407 page views (2.3 pages per visit). 64.15% of the visitors are new or 35.85% are returning visitors.

Today, raising (public) awareness is important for the success on any project. The project manager has created several accounts on social media to distribute information on OBIS or information relevant to marine biogeography (see chapter on progress report). Detailed statistics are shown in the graphs below.
Discussions during the session on Communication and Outreach touched on the following issues:

- How are the press releases handled?
  - The UNESCO press office could help in handling these tasks.
- General public communication exercises (straightforward communication)
OBIS needs a clear vision and mission to communicate, as well as a clear-cut, and coherent message across its networks.

- **Engagement with organizations doing Education & Outreach (E&O)**
  - There is currently no particular engagement with existing E&O organisations, but some nodes are within organisations that can help.

- **Highlighted parallel projects**
  - Champions should be highlighted through the relevant communication channels, together with stories on how OBIS is useful to the community, how it is engaged in providing its services, etc.

- **Tools and services developed on top of OBIS data**
  - These tools and services should be highlighted in the communications as well. They should also be documented and made discoverable by e.g., using specific metadata entry points (such as GCMD SERFs – Global Change Master Directory Service Entry Resource Format).

- **The possibility to distribute “goodies”** was also discussed, and if funding allows, certain items (T-shirts, National Geographic posters) could be produced.

The group addressed the question of the languages to be used in communications. Regarding the website, the group agreed that the front page should be multilingual. The various posts through social networks can be done in the languages used by the nodes. It was also agreed to have one curator by language/page (see list of language curators under Agenda item 11 – Work Plan).

Finally, the SG-OBIS came up with the following recommendations regarding communication and outreach:

- Produce a flow chart describing the data flow;
- Provide metrics, as an overview of data provider (# records);
- Set up an Outreach Task Team to discuss the website (what and where/how);
- Seek funding to hire a Science/Outreach officer to join the OBIS Project Office.

10. **CAPACITY DEVELOPMENT**

Unfortunately, due to time constraints this agenda item was not discussed in detail. There is a consensus that in 2013 we need to train ourselves and other candidate OBIS nodes in the new data processing and validation tools. More outward looking capacity building activities are also needed, e.g., OBIS will take part of a training workshop in summer 2013, which is organised by the Caribbean Marine Atlas project of IODE. The third meeting of SG-OBIS should include an assessment of the needs and budget requirements for Capacity Development.

11. **OBIS WORK PLAN FOR 2013**

The OBIS work plan for 2013 is established by the IODE Steering Group for OBIS (SG-OBIS) during the 2nd session and adopted at the end of the meeting. Several task teams are established and are responsible for delivering the work. The staff of the OBIS Project Office (PO) is member of all task teams, and the OBIS manager oversees the execution of the work plan and reports to SG-OBIS and all task teams on progress of the activities.

The work plan is added as annex 2 to this report.
The following task teams are established:

- **Technical Task Team (TechTT)**
  - Chair: Francisco Hernandez (VLIZ)
  - Members: OBIS-SEAMAP, EurOBIS, Caribbean OBIS, INCOIS, KOBIS, PO

- **Data Task Team (DataTT)**
  - Chair: Philip Goldstein (OBIS-USA)
  - Members: OBIS-USA, AntOBIS, OBIS-New Zealand, EurOBIS, OBIS-Canada, PO

- **Taxonomy Task Team (TaxTT)**
  - Chair: Tony Rees (CSIRO)
  - Members: OBIS-Australia, Fishbase, EurOBIS, PO

- **Governance Task Team (GovTT)**
  - Chair: Mark Fornwall (USGS)
  - Members: OBIS-USA, OBIS-Japan, AntOBIS, PO

- **Documentation/Training Task Team (TrainingTT)**
  - Chair: Leen Vandepitte (VLIZ)
  - Members: OBIS-Canada, EurOBIS, PO

- **Outreach Task Team (OutreachTT)**
  - Chair: Sarah Faulwetter (HCMR)
  - Members: MedOBIS, IndOBIS, OBIS-Canada, PO, Language Curators

- **Language curators**
  - Spanish: Eduardo Klein
  - French: Bruno Danis / OBIS Canada
  - Portuguese: Rubens Lopes
  - Japanese: Katsuhiko Tanaka and Katsunori Fujikura
  - Others are welcome to join!

12. **ADOPTION OF THE WORK PLAN REPORT**

The OBIS 2013 work plan was adopted by the SG-OBIS on 21 November 2012 at 15:05.

13. **DATE AND PLACE OF NEXT SESSION**

SG-OBIS felt that a three-day meeting, including a time slot for short demonstrations, was ideal and recommended this format also for the next meeting. There were no offers for hosting the third session of SG-OBIS, and there was a general consensus to hold it again in Oostende. In case nothing changes to the current plan, SG-OBIS-3 will take place on 18-20 November 2012 at the IOC Project office for IODE in Oostende, Belgium.

14. **ANY OTHER BUSINESS**

No other issues were raised.
15. CLOSING OF THE SESSION

260 The Chair thanked the Members of the Group for their active participation in this Session.

261 The Chair closed the meeting on 21 November 2012 at 15:17.
AGENDA

1. OPENING OF THE SESSION (Mark Fornwall)
   1.1. ADOPTION OF THE AGENDA AND TIME TABLE
   1.2. WORKING AND PRACTICAL ARRANGEMENTS

2. OBIS PROGRESS REPORT (Ward Appeltans)
   2.1 SECRETARIAT ACTIVITIES AND REVIEW WORKPLAN 2012
   2.2 FINANCIAL STATUS
   2.3 OBIS INVOLVEMENT IN PROJECTS AND GRANT PROPOSALS
   2.4 OBIS INVOLVEMENT IN INTERNATIONAL ORGANISATIONS AND GLOBAL INITIATIVES

3. OBIS NODES REPORTS (Bruno Danis)
4. OBIS NODES (Ward Appeltans)
   4.1 CURRENT STATUS, AND LIST OF CANDIDATE NODES
   4.2 TERMS OF REFERENCE
   4.3 OBIS IN IOC AND IOE
   4.4 PROCEDURE FOR THE ESTABLISHMENT OF NEW NODES
   4.5 QUALITY MANAGEMENT FRAMEWORK

5. OBIS DATA SYSTEM ARCHITECTURE (Francisco Hernandez)
   5.1 DATA FLOWS, HARVESTING PROCEDURES, INDEXING PROCEDURES
   5.2 ISSUE TRACKING SYSTEM AND SHARED WORKSPACE
   5.3 INFRASTRUCTURE AND WEBPORTAL FEATURES
   5.4 ROLE AND TASKS OF OBIS DEVELOPMENT CONSORTIUM

6. OBIS DATA QUALITY ASSURANCE (Leen Vandepitte)
   6.1 OBIS NODES MANUAL – FOR IMPROVED QUALITY MANAGEMENT, STANDARDS AND BEST PRACTICES (TAXONOMIC AND GEOGRAPHICAL QC/DATA VALIDATION PROCEDURES)

7. OBIS DATA CONTENT (Philip Goldstein)
   7.1 OBIS DATA AND METADATA SCHEMES

8. OBIS GOVERNANCE (Mark Fornwall)
   8.1 BUSINESS PLAN – OBJECTIVES, COSTS AND BENEFITS ANALYSIS, FUNDING MODEL, SG- AND GE-OBIS, PARTNERSHIPS, DATA ACCESS AND SHARING POLICY

9. OBIS OUTREACH AND COMMUNICATION (Bruno Danis)
   9.1 COMMUNICATION STRATEGY
   9.2 SOCIAL MEDIA
   9.3 PUBLICATIONS
   9.4 MEETINGS

10. CAPACITY DEVELOPMENT
    10.1 OBIS MANUAL (cookbook)
    10.2 TRAINING & SUPPORT

11. OBIS WORK PLAN FOR 2013 (Ward Appeltans)
    11.1 OBIS PROJECT
    11.2 OBIS DATA
    11.3 OBIS DATA SYSTEM INFRASTRUCTURE
    11.4 SG-OBIS
    11.5 GE-OBIS

12. ADOPTION OF THE WORK PLAN AND REPORT
13. DATE AND PLACE OF NEXT SESSION
14. ANY OTHER BUSINESS
15. CLOSING OF THE SESSION

ANNEX 1: Agenda.
### 1. Next version of the OBIS database

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Responsibilities</th>
<th>Deadline</th>
<th>Budget source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 New version OBIS database in Ostend (VLIZ)</td>
<td>TechTT</td>
<td>December 2012</td>
<td>EurOBIS</td>
</tr>
<tr>
<td>1.2 Geo-load balancing mirror operational in Hyderabad (INCOIS)</td>
<td>TechTT, INCOIS, PO</td>
<td>May 2013</td>
<td>INCOIS</td>
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</table>

### 2. Metadata to acceptable standard (min fields)

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Responsibilities</th>
<th>Deadline</th>
<th>Budget source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Contact the data providers / nodes &amp; nodes need to respond</td>
<td>PO</td>
<td>March 2013</td>
<td>IODE</td>
</tr>
</tbody>
</table>

### 3. OBIS data to GBIF

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Responsibilities</th>
<th>Deadline</th>
<th>Budget source</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Identify duplicate datasets in GBIF</td>
<td>PO, EurOBIS, GBIF</td>
<td>March 2013</td>
<td>IODE, EurOBIS</td>
</tr>
<tr>
<td>3.2 Meeting with GBIF (discuss data flow from GBIF to OBIS and sign MoC)</td>
<td>PO, EurOBIS</td>
<td>April 2013</td>
<td>IODE, EurOBIS</td>
</tr>
</tbody>
</table>

### 4. Nodes operational

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Responsibilities</th>
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<th>Budget source</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Document mapping OBIS schema to ratified DwC</td>
<td>DataTT</td>
<td>January 2013</td>
<td>OBIS-USA</td>
</tr>
<tr>
<td>4.2 Document a procedure to determine if a dataset is new or changed</td>
<td>EurOBIS</td>
<td>April 2013</td>
<td>EurOBIS</td>
</tr>
<tr>
<td>4.3 Set up DiGIR or IPT</td>
<td>All OBIS nodes</td>
<td>June 2013</td>
<td>All OBIS nodes</td>
</tr>
<tr>
<td>4.4 Set up IPT instance at PO for OBIS nodes</td>
<td>PO</td>
<td>April 2013</td>
<td>IODE</td>
</tr>
<tr>
<td>4.5 Taxon match procedures in place</td>
<td>EurOBIS</td>
<td>April 2013</td>
<td>EurOBIS</td>
</tr>
<tr>
<td>4.6 QC services prototype online</td>
<td>EurOBIS</td>
<td>April 2013</td>
<td>EurOBIS</td>
</tr>
<tr>
<td>4.7 Next Node data harvest</td>
<td>All OBIS nodes</td>
<td>June 2013, and regularly thereafter</td>
<td>All OBIS nodes, IODE</td>
</tr>
<tr>
<td>Tasks</td>
<td>Responsibilities</td>
<td>Deadline</td>
<td>Budget source</td>
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<tr>
<td>5. New data loaded to OBIS</td>
<td>Tier II, PO</td>
<td>July 2013, and regularly thereafter</td>
<td>Tier II nodes, IODE</td>
</tr>
<tr>
<td>5.1 QC, Communicate Results to Nodes</td>
<td>OBIS-SEAMAP, PO</td>
<td>July 2013, and regularly thereafter</td>
<td>OBIS-SEAMAP, IODE</td>
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</tbody>
</table>

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<th>Responsibilities</th>
<th>Deadline</th>
<th>Budget source</th>
<th>Budget (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Taxonomy to acceptable standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1 Status report on numbers of errors (per taxonomic groups and time)</td>
<td>EurOBIS</td>
<td>April 2013</td>
<td>EurOBIS</td>
<td></td>
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<tr>
<td>6.2 Preliminary Cleaning Assessment</td>
<td>TaxTT</td>
<td>June 2013</td>
<td>In-kind</td>
<td></td>
</tr>
<tr>
<td>6.3 Cleaning up residual errors – Ongoing</td>
<td>EurOBIS, all nodes</td>
<td>Continuous from July 2013 onwards</td>
<td>All nodes</td>
<td></td>
</tr>
<tr>
<td>6.4 Implement webservice (taxonomy, species attributes, common names)</td>
<td>PO, EurOBIS</td>
<td>September 2013</td>
<td>IODE, EurOBIS</td>
<td></td>
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<table>
<thead>
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<th>Deadline</th>
<th>Budget source</th>
<th>Budget (USD)</th>
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<tbody>
<tr>
<td>7. Improve the (meta)data schema (marine extension of DwC, version 1)</td>
<td></td>
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</tr>
<tr>
<td>7.1 Identify the needs/drivers</td>
<td>DataTT</td>
<td>March 2013</td>
<td>OBIS-USA</td>
<td></td>
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<tr>
<td>7.2 Set up a process for approval by OBIS - (submission, evaluation, adoption)</td>
<td>DataTT</td>
<td>April 2013</td>
<td>OBIS-USA, IODE</td>
<td></td>
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<tr>
<td>7.3 Define solutions and implementation plan for needs identified</td>
<td>DataTT</td>
<td>November 2013</td>
<td>OBIS-USA</td>
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<tr>
<td>8. Improve the data system architecture by implementing the 3-tier system</td>
<td>PO, EurOBIS</td>
<td>April 2013</td>
<td>EurOBIS, IODE</td>
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<tr>
<td>9. Website and Portal improvements</td>
<td></td>
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</table>
9.1 Search beyond International Date Line & Issues as they arise
OBIS-SEAMAP, PO
February 2013, ongoing

9.2 Fixing up and configuring the OBIS portal translation utility
Simon Bolivar Univ.
February 2013

9.3 Multilingual Interface
Language curators
July 2013, translations ongoing

9.4 Improve OGC webservices (incl metadata, WoRMS IDs)
PO, EurOBIS
July 2013

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<td>10. Capacity Development</td>
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<td>10.1 Ocean Teacher Course on-line Resource</td>
<td>TrainingTT</td>
<td>April 2013</td>
<td>EuOBIS, OBIS Canada, IODE</td>
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<td>10.2 Organize training workshops</td>
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<td>India (March 2013)</td>
<td>IndOBIS, EurOBIS</td>
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<td></td>
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<td>Barbados (July 2013)</td>
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<td>10.3 Find a budget for Capacity Building</td>
<td>SG-OBIS</td>
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<tr>
<td>11. Governance</td>
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<tr>
<td>11.1 IODE-XXII Committee</td>
<td>PO, chair SG-OBIS</td>
<td>11-15 March 2013</td>
<td>IODE, OBIS-USA</td>
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<td>11.2 IOC Assembly</td>
<td>PO, chair SG-OBIS</td>
<td>24 June-5 July 2013</td>
<td>IODE, OBIS-USA</td>
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<td>11.3 GE-OBIS Meeting 2013</td>
<td>PO, GE-OBIS, TechTT</td>
<td>Autumn 2013</td>
<td>IODE</td>
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<td>11.4 SG-OBIS Meetings 2013-2014</td>
<td>PO, SG-OBIS</td>
<td>November 2013, 2014</td>
<td>IODE from UNESCO RP</td>
<td>30,000</td>
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<td>11.5 Business/Strategic Plan, Budget specifications</td>
<td>GovTT</td>
<td>March 2013</td>
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<tr>
<td>11.6 Include OBIS in the IODE Strategic Plan</td>
<td>GovTT</td>
<td>March 2013</td>
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<tr>
<td>11.7 IOC Manual &amp; Guides for OBIS Nodes</td>
<td></td>
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</table>
- OBIS vision and mission, objectives and key priorities
- Definition of OBIS nodes (ToR and type of entity in IODE)
- Procedure to establish OBIS nodes, quality assurance, criteria and evaluation of OBIS nodes
- Governance structure (SG-OBIS, GE-OBIS)

| Standards and best practices in OBIS (handbook) | All TT, PO | April 2013 | In-kind |
| Production (layout and printing) of M&G | PO | October 2013 | IODE | 10,000 |

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<td>12.1 Develop OBIS Handout, intro presentation (multiple Languages)</td>
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<td>12.2 Clarify interaction with Data Providers on Website</td>
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<tr>
<td>12.3 Plan for user perspective review of Website</td>
<td>Outreach TT</td>
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<td>12.4 Project news and social media</td>
<td>PO</td>
<td>Ongoing</td>
<td>IODE</td>
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<td>12.5 Scientific meetings</td>
<td>SG-OBIS</td>
<td>e-Biosphere – September 2013</td>
<td>UNESCO Emergency Fund</td>
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<td>3rd WCMB - September 2014</td>
<td>IODE</td>
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<td>12.6 Other meetings</td>
<td>PO</td>
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<td>IODE</td>
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<td>IPBES</td>
<td>PO</td>
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<td>- co-organizing workshop on ocean biodiversity observation systems</td>
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<td>iMarine</td>
<td>PO</td>
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<td>CBD - EBSA regional workshops</td>
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<td>UN-WOA - Provide input to chapter 6</td>
<td>PO, OBIS-SEAMAP</td>
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<td>GOBI - GOBI advisory council</td>
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<td>EOL - EOL council - Delivering species envelope data</td>
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<td>GBIF - Governing board</td>
<td>PO</td>
<td>UNESCO Emergency Fund</td>
<td>4,000</td>
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<td>GEO BON - Global maps, gap analysis</td>
<td>PO</td>
<td>End 2014</td>
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<td>Other (UNEP-regional seas, IUCN, UNEP-WCMC, DIVERSITAS, UNESCO-MAB)</td>
<td>PO</td>
<td>Ongoing</td>
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<td><strong>14. Plan for expanding Content</strong></td>
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<td>Data schema, tables</td>
<td>DataTT, all nodes</td>
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<td><strong>15. Expanding the OBIS network</strong></td>
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<tr>
<td>15.1 Recruit other Nodes and Determine Engagement</td>
<td>PO</td>
<td>Ongoing</td>
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</table>
ANNEX 3: Participants list

**SG-OBIS members**

Dr. Nicolas BAILLY  
FIN Scientific Director / FishBase Project Manager  
WorldFish Center  
c/o IRRI, Khush Hall, College  
4031 Los Baños  
Laguna  
Philippines  
Tel: [63](0)495362701ext2852  
Fax: [63](0)49536-0168  
Email: n.bailly@cgiar.org

Dr. Patrick HALPIN  
Professor  
Duke University, Nicholas School of the Environment  
A324 LSRC Building  
United States  
Tel: 1.919.613.8062  
Email: phalpin@duke.edu

Dr Bruno DANIS  
Associate Professor  
Université Libre de Bruxelles  
Campus du Solbosch, room UC5.157  
CP 160/15  
Av. F. D. Roosevelt, 50  
1050 Bruxelles  
Belgium  
Tel: +32 26502815  
Fax: +32 2 65 02796  
Email: bdanis@ulb.ac.be

Francisco HERNANDEZ  
Manager Datacentre  
(VLIZ) Flanders Marine Institute Vlaams Instituut voor de Zee  
Wandelaarkaai 7  
8400 Ostende  
Belgium  
Tel: +32 (0)59 34 21 30  
Fax: +32 (0)59 34 21 31  
Email: francher@vliz.be

Ms. Sarah FAULWETTER  
Hellenic Centre for Marine Research, Crete  
P.O. Box 2214, 71003 Heraklion  
Greece  
Tel: +302810337753  
Email: sarifa@hcmr.gr

Mary KENNEDY  
Aquatic science biologist  
Bedford Institute of Oceanography  
1 Challenger Drive  
Dartmouth B2Y 4A2  
NS  
Canada  
Tel: +1-902-426-3263  
Email: KennedyM@mar.dfo-mpo.gc.ca

Dr. Mark FORNWALL  
U.S. Geological Survey  
USGS - Core Science Systems  
Denver Federal Center, MS-306  
Denver CO 80225  
United States  
Tel: 1 303 202 4180  
Fax: 1 303 202 4710  
Email: mark_fornwall@usgs.gov

Dr. Sung Dae KIM  
Director, Ocean Data and Information Center  
Korea Institute of Ocean Science and Technology  
787 Haeanlo  
Ansan 426-744  
Korea Rep  
Tel: 82 31 500 4510  
Fax: 82 31 500 4518

Dr. Katsunori FUJIKURA  
Senior Scientist  
Japan Agency for Marine-Earth Science and Technology, Yokosuka  
2-15 Natsushima, Yokosuka, Kanagawa
Email: sdkim@kiost.ac

Mr Eduardo KLEIN
Professor
Universidad Simon Bolivar
Venezuela
Tel: [58] (212) 9063416
Fax: [58] (212) 9063416
Email: eklein@usb.ve

Mr Kevin MACKAY
Marine Data Manager
National Institute for Water & Atmospheric Research
Private Bag 14901,
Kilbirnie
Wellington 6241
New Zealand
Tel: +64 4 3860300
Email: k.mackay@niwa.co.nz

Tony REES
CSIRO Marine and Atmospheric Research, Tasmania
Marine Laboratories
Castray Esplanade
GPO Box 1538
Hobart Tasmania 7001
Australia
Email: Tony.Rees@csiro.au

Narayanane SARAVANANE
Centre for Marine Living Resources & Ecology, Ministry of Earth Sciences, Kochi
6th Floor, C-Block, Kendriya Bhavan
P.B. No. 5415, CSEZ P.O
Kochi 682 037
Kerala
India
Email: n_saravanane@yahoo.com

Dr. Katsuhiko TANAKA
Research Scientist
Japan Agency for Marine-Earth Science and Technology, Yokosuka
224-3 Toyohara, Nago 905-2172
Japan
Tel: +81 980 50 0114
Fax: +81 980 50 0123
Email: katsuhikot@jamstec.go.jp

Dr. Anton VAN DE PUTTE
Science Officer
Royal Belgian Institute of Natural Sciences - HQ
rue Vautier 29
1000 Brussels
Belgium
Email: avandeputte@naturalsciences.be

Ms Leen VANDEPITTE
scientific assistant
Flanders Marine Institute - Vlaams Instituut voor de Zee
Wandelaarkaai 7
8400 Oostende
Belgium
Email: leen.vandepitte@vliz.be

Ms Ursula VON ST ANGE
Database Specialist
Council for Scientific and Industrial Research, Stellenbosch
South Africa
Tel: [+27] (21) 8882400
Fax: [+27] (86) 6178686
Email: uvstange@csir.co.za

SG-OBIS members by webex

Dr. Russell HOPCROFT
Professor
University of Alaska Fairbanks - School of Fisheries and Oceans
245 O’Neill Bldg
Fairbanks Alaska 99775-7220
United States
Tel: 907-474-7842
Fax: 907-474-7402
Email: rrhopcroft@alaska.edu

Mr. Pattabhi RAMA RAO
Scientist ‘E’ & Head
Ocean Valley,
Pragathi Nagar (BO), Nizampet (SO)
HYDERABAD 500090
Andhra Pradesh
India
Tel: +91-40-23895008
Fax: +91-40-23892001
Email: pattabhi@incois.gov.in
Ms Oleksandra SERGEYEVA
Engineer
53, 23/2 pr.Okt.Rev, 99057, Sevastopol
Sevastopol
Outside the US or Canada
Ukraine
Tel: +380 50 398 21 50
Email: o sergeyeva@ibss.org.ua

Mr. Paul TILDESLEY
Information Manager
CSIRO Marine and Atmospheric Research,
Tasmania
Marine Laboratories
Castray Esplanade
GPO Box 1538
Hobart Tasmania 7001
Australia
Tel: +61 3 6232 5251
Email: Paul.Tildesley@csiro.au

Invited experts

Mr Mike FLAVELL
Sir Alister Hardy Foundation for Ocean Science
The Laboratory,
Citadel Hill
Plymouth
Devon
PL1 2PB
United Kingdom
Tel: +44 1752 633208
Fax: +44 1752 300015
Email: mikfla@sahfos.ac.uk

Mr. Philip GOLDSTEIN
Informatics Engineer
University of Colorado Museum of Natural History
United States
Tel: 1-303-887-6043
Email: philip.goldstein@colorado.edu

Mr Bart VANHOORNE
(VLIZ) Flanders Marine Institute Vlaams Instituut voor de Zee
Wandelaarkaai 7
8400 Oostende
Belgium
Tel: +32-(0)59-34 01 59

Fax: +32-(0)59-34 21 31
Email: bart.vanhoorne@vliz.be

Invited experts by webex

Mr Greg REED
Executive Officer
Australian Ocean Data Centre Joint Facility
Fleet Headquarters
Wylde Street Building 89
Garden Island Potts Point NSW 2011
Australia
Tel: +61 2 9359 3141
Fax: +61 2 9359 3120
Email: greg@metoc.gov.au

IODE/OBIS Project Office

Mr Ward APPELTANS
Programme Specialist
UNESCO/IOC Project Office for IODE
Wandelaarkaai 7 - Pakhuis 61
B-8400 Oostende
Belgium
Tel: +32 59 34 01 76
Fax: +32 59 34 01 52
Email: w.appeltans@unesco.org

Mr. Aditya NAIK KAKODKAR
IT Specialist
Intergovernmental Oceanographic Commission of UNESCO
Wandelaarkaai 7/61
8400 Oostende
West Vlaanderen
Belgium
Tel: +32 59 34 01 75
Fax: +32 59 34 01 52
Email: a.naik-kakodkar@unesco.org

Mr Peter PISSIERSSENS
Head, IOC Project Office for IODE, Oostende, Belgium
UNESCO/IOC Project Office for IODE
Wandelaarkaai 7 - Pakhuis 61
B-8400 Oostende
Belgium
Tel: +32-59-340158
Fax: +32-59-79 5220
Email: p.pissierssens@unesco.org
ANNEX 4. List of current Regional/National, Thematic and Candidate OBIS nodes (grey).
* = Status uncertain, mainly through lack of funding; ** = Showed interest in the past, but no contact since. Bold = NODC status.

<table>
<thead>
<tr>
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<th>Area/theme:</th>
<th>Manager:</th>
<th>Deputy:</th>
<th>Institute:</th>
<th>Website:</th>
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<tr>
<td>1</td>
<td>AntOBIS</td>
<td>Antarctica</td>
<td>Bruno Danis</td>
<td>Anton Van De Putte</td>
<td>Royal Belgian Institute of Natural Sciences</td>
<td><a href="http://www.scarmarbin.be/">http://www.scarmarbin.be/</a></td>
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<td>2</td>
<td>ArOBIS</td>
<td>Argentina</td>
<td>Mirtha Lewis</td>
<td></td>
<td>Centro Nacional Patagónico (CENPAT) CONICET Argentina</td>
<td><a href="http://aroobis.conicet.gov.ar/obisearch">http://aroobis.conicet.gov.ar/obisearch</a></td>
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<tr>
<td>4</td>
<td>WSA-OBIS</td>
<td>Brazil</td>
<td>Rubens M. Lopes</td>
<td>Fábio L. da Silveira</td>
<td>University of São Paulo, Instituto Oceanográfico</td>
<td><a href="http://obisbr.cria.org.br/">http://obisbr.cria.org.br/</a></td>
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<tr>
<td>5</td>
<td>OBIS Canada</td>
<td>Canada</td>
<td>Mary Kennedy</td>
<td>Tana Worcester</td>
<td>Bedford Institute of Oceanography, Fisheries and Oceans, Nova Scotia</td>
<td><a href="http://obiscanada.marinebiodiversity.ca/">http://obiscanada.marinebiodiversity.ca/</a></td>
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<tr>
<td>6</td>
<td>ESPOBIS</td>
<td>Chile-Peru-Ecuador</td>
<td>Ruben Escribano</td>
<td></td>
<td>Universidad de Concepción, Department of Oceanography</td>
<td><a href="http://ron.udec.cl/">http://ron.udec.cl/</a></td>
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<td>7</td>
<td>OBIS China</td>
<td>China</td>
<td>Xiaoxia Sun</td>
<td></td>
<td>Institute of Oceanology Chinese Academy of Sciences, Qingdao</td>
<td><a href="http://159.226.158.36/index_e.htm">http://159.226.158.36/index_e.htm</a></td>
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<td>EurOBIS</td>
<td>Europe</td>
<td>Leen Vandepitte</td>
<td>Francisco (Tjess) Hernandez</td>
<td>Flanders Marine Institute (VLIZ) Belgium</td>
<td><a href="http://www.eurobis.org">http://www.eurobis.org</a></td>
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<tr>
<td>OBIS Japan</td>
<td>India</td>
<td>Narayanane Saravanane</td>
<td>Baban Ingole</td>
<td>Centre for Marine Living Resources &amp; Ecology, Ministry of Earth Sciences, Kochi</td>
<td><a href="http://www.indobis.org/">http://www.indobis.org/</a></td>
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<tr>
<td>KOBIS</td>
<td>Korea</td>
<td>Sung-Dae Kim</td>
<td>Youn-Ho Lee</td>
<td>Korea Ocean Research &amp; Development Institute</td>
<td><a href="http://kobis-en.kordi.re.kr/">http://kobis-en.kordi.re.kr/</a></td>
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<tr>
<td>AfrOBIS</td>
<td>Sub-Saharan (S-Africa)</td>
<td>Ursula Von St Ange</td>
<td>Marten Grundlingh</td>
<td>Council for Scientific and Industrial Research, Stellenbosch, South Africa</td>
<td><a href="http://afrobis.csir.co.za/">http://afrobis.csir.co.za/</a></td>
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<tr>
<td>ArCOD</td>
<td>Arctic</td>
<td>Russ Hopcroft</td>
<td></td>
<td>University of Alaska Fairbanks - School of Fisheries and Oceans</td>
<td><a href="http://www.arcodiv.org/">http://www.arcodiv.org/</a></td>
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<td>SeamountsOnline*</td>
<td>Seamounts, open ocean</td>
<td>Karen Stocks</td>
<td></td>
<td>University of California San Diego</td>
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<td>Syndeep/INDEEP*</td>
<td>Deepsea</td>
<td>Maria Baker</td>
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<td>Deputy:</td>
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<td>Website:</td>
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<th>GoA OBIS**</th>
<th>Area/theme:</th>
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<td>Deputy:</td>
<td>Sarah Faulwetter</td>
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<td>Institute:</td>
<td>Hellenic Centre for Marine Research (HCMR)</td>
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<tr>
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<td>Eduardo Klein</td>
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ANNEX 5: Overview of roles and responsibilities, and rules of establishing IODE-NODCs and proposed IODE-SODCs

IODE National Oceanographic Data Centre (NODC) tasks:

- Receiving data from national, regional and international programmes collecting oceanographic data;
- Verifying the quality of the data (using agreed upon standards);
- Ensuring the long term preservation of the data and associated information required for correct interpretation of the data;
- Making data available, nationally and internationally.

National responsibilities:
1. Receiving data from researchers, performing quality control, and archiving
2. Receiving data from buoys, ships and satellites on a daily basis, processing the data in a timely way, and providing outputs to various research and engineering users, forecasters, experiment managers, or to other centres participating in the data management plan for the data in question
3. Reporting the results of quality control directly to data collectors as part of the quality assurance module for the system
4. Participating in the development of international standards and methods for data management through the IODE and JCOMM
5. Disseminating data on the Internet and through other means (and on CD-ROM, DVD, etc)
6. Publishing statistical studies and atlases of oceanographic variables
7. Providing indicators for the different types of data being exchanged in order to track the progress

International responsibilities:
1. Participating in the development of data management plans and establishing systems to support major experiments, monitoring systems, fisheries advisory systems
2. Participating in international oceanographic data and information exchange through the IODE and JCOMM, the Joint Commission for Oceanography and Marine Meteorology
3. Assisting with data management aspects of global or regional programmes or pilot projects through IODE and JCOMM and in the framework of, inter alia, the IOC’s Strategic Plan for Oceanographic Data and Information Management
4. Operating as a data assembly and quality control centre for part of an international science experiment
5. Operating regional, specialized or World Data Centre (WDC) on behalf of the international science community

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- Data Indicators. The NODC should provide indicators on the data flow within the centre which are comparable across other data centres.

IODE is a network member of ICSU-World Data System (WDS) and IODE is currently setting up a Quality Management Framework including minimum operating criteria for NODCs.

Formal procedure to join the IODE network of NODCs
The procedure to establish an NODC is very formal, includes a government commitment, and decisions at national level.

1. At the national level:
   a. a data centre should be designated as the IODE National Oceanographic Data Centre (IODE NODC). This centre should respond to the minimum requirements as defined in section tasks.
   b. an IODE National Coordinator for Oceanographic Data Management should be nominated. This person should work at the IODE NODC.
2. National IOC representative sends letter to IOC Executive Secretary (indicating name institution, coordinator and compliance to minimum requirements).
3. A response will be sent by IOC, confirming the acceptance of the submission, or reasons why the submission could not be accepted.

**IODE Specialized Ocean Data Centre (SODC) (Proposal to IODE XXII)**

The main weakness of IODE today is the lack of involvement of the ocean research and observation community and its too closely knit and somewhat exclusive structure (limited to NODCs). The proposal is therefore to establish a new type of data centre: a “IODE Specialized Ocean Data Centres (IODE-SODC)”.

The purpose of the IODE Specialized Ocean Data Centres (IODE-SODC) will be to:
- expand the stakeholder community of IODE to include the ocean research and observation community;
- better respond to data and information management needs of the ocean research and observation community;
- improve coverage and access to oceanographic data and information;
- increase interaction and alignment of relevant services with national and international observation and research programs.

The SODCs will operate independently of IODE but will be associated with IODE. This means the following:
- they will be part of, and managed by a national/regional project, programme or institution;
- they will have access to IODE documentation and expertise in the area of oceanographic data management and marine information management;
- they will be part of the IODE information dissemination network related to oceanographic data management and marine information management;
- they will be able to obtain IODE (OceanTeacher) technical training related to oceanographic data management and marine information management;
- they will be invited to make their data and information available through relevant IODE mechanisms (e.g., OceanDataPortal, OceanDocs, OceanExpert, OBIS,…)
- they will be invited to participate in IODE projects;
- they will be invited to designate experts to participate in IODE project steering groups or IODE groups of experts (short-term members).

**Application to establish an IODE Specialized Ocean Data Centre (IODE-SODC)**

Any national, regional or international project, programme, institution or organization can apply to become an IODE Specialized Ocean Data Centre (IODE-SODC). Minimum information to include in the application is as follows:
1. a comprehensive description of the candidate project/programme/institution and its expected data output,
2. data management plan (if existing), including identified formats, quality control procedures, …
3. staff (e.g., principal investigator, person(s) responsible for data/information management);
4. stakeholders (e.g., number of scientists involved)
5. required expertise, training that IODE could contribute;
6. data policy (if identified) that describes if/how data will be made available (e.g., freely, licensed, creative commons license, following national policy,…);
7. existing relationship with a NODC.

The application should be submitted by email to the IODE Secretariat requesting the establishment of the IODE-SODC and indicating the identity of the SODC.
## ANNEX 6: Overview of the contributions of the OBIS nodes to the OBIS key priority areas.

<table>
<thead>
<tr>
<th>Node</th>
<th>Data</th>
<th>Technical</th>
<th>Science</th>
<th>Policy</th>
<th>Outreach</th>
<th>Capacity Development</th>
<th>Networks/Partnerships</th>
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</thead>
<tbody>
<tr>
<td>iOBIS</td>
<td>Occurrence (global, from nodes and data providers from regions without nodes)</td>
<td>Portal, OGC webservices, IPT, data publishing</td>
<td>Research, Soon: Essential Ocean Variables (EOV), Essential Biological Variables (EBV)</td>
<td>UN-Regular Process, EBSA, VME, Marine Spatial Planning, Biosphere Reserves, CBD</td>
<td>Website, social media, brochures, OBIS papers</td>
<td>Bio. data mgmt. (OTA), tech support to nodes</td>
<td>GBIF, GEOBON, GOOS, UNESCO-MAB, EOL, PICES, GOBI, CBD, FAO, UNEP-WCMC, IUCN, iMarine, GEOWOW, ODNIS, GeoWOW, ODIN, GE-BICH, ETDMAP, ODP</td>
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<tr>
<td>OBIS-SEAMAP</td>
<td>Global occurrence including summarized telemetry (mammals/birds/turtles)</td>
<td>Portal, online search interface, database development/maintenance</td>
<td>Habitat/density modeling, biodiversity / Conservation researches, OBIS paper</td>
<td>EBSA, VME, Marine Spatial Planning</td>
<td>NGS wall maps, CoML layer in Google Earth, presentations at conferences / meetings</td>
<td>Technical support to iOBIS and OBIS-USA, data transfer to OBIS-USA, Marine Geospatial Ecology Tools (MGET)</td>
<td>GOBI, CBD, FAO, UNEP-WCMC, IUCN, WWF, Navy, BOEM, NOAA, NASA, IOOS, GBIF, SWOT, seaturtle.org, universities / research labs / non-profit organizations worldwide, OpenGeo</td>
</tr>
<tr>
<td>FishBase</td>
<td>Occurrence (fish)</td>
<td>Portal, online search interface, database development/maintenance</td>
<td>Distribution (niche) modeling incl. climate change impact (AquaMaps), biodiversity, fishery biology</td>
<td>Fishery management</td>
<td>Website, FaceBook, Forum, Blog, scientific paper, posters, fish rulers, Future Ocean Atlas</td>
<td>Training about BIS usage, fish identification, online ichthyology course</td>
<td>CoL, WoRMS, FADA, PESI, CoF, GBIF, BoLD, GenBank, iMarine, BioFresh, IUCN, GISIN, K2Nature</td>
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<tr>
<td>Hexacoralla</td>
<td>Occurrence (hexacorals)</td>
<td>Portal, online searching</td>
<td>Habitat modeling, research</td>
<td>Web Site, scientific publications</td>
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<td>OBIS, GBIF, WoRMS</td>
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<tr>
<td>EurOBIS</td>
<td>Occurrence (Europe, GBIF), Taxonomy (WoRMS, ERMS), Marine boundaries</td>
<td>QC tools (taxon match)</td>
<td>EU MSFD</td>
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<td>LifeWatch, EMODnet, GE-BICH, SeaDataNet</td>
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<td>OBIS Ukraine</td>
<td>Occurrence: historical data – World Ocean, recent - mostly Black Sea, Taxonomy (Black Sea)</td>
<td>Some QC tools, regional species lists</td>
<td>Conservation, regional taxonomy</td>
<td>National</td>
<td>Presentations at conferences / meetings; regional languages publications</td>
<td>Technical support of local data providers,</td>
<td>SeaDataNet, EMODnet, GE-BICH</td>
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<tr>
<td>OBIS-USA</td>
<td>Occurrence (USA), presence-absence-abundance, tracking, integration with physical data, role of</td>
<td>Semantic web, Web services, Data mobilization, Agency data life cycle</td>
<td>Quantification methods (population density, biomass)</td>
<td>Federal data architecture; regulatory needs (Endangered Species Act, National Environmenta 1 Policy Act,</td>
<td>National priorities (Coastal Marine Spatial Planning, Ocean Acidification); business case for national</td>
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<td>US IOOS, Navy, BOEM, NOAA (fisheries, IOOS and NODC), DOE, Interagency Working</td>
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<tr>
<td>Node</td>
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<td>Science</td>
<td>Policy</td>
<td>Outreach</td>
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<td>OBIS-Canada</td>
<td>Occurrence (Canada), Taxonomy (CaRMS)</td>
<td>webservices, IPT, data publishing, elastic search, HIT</td>
<td>Research, SDM, Biogeography</td>
<td>CCAMLR, MPA planning</td>
<td>Websites, social media, brochures, participation to conferences</td>
<td>IPT training</td>
<td>GBIF, SOOS, SCADM, GCMD (NASA), SCAR</td>
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<td>AfrOBIS</td>
<td>Occurrence (Africa), Taxonomy (AReMaS)</td>
<td>Web presence, database</td>
<td>Synthesis of biodiversity</td>
<td>Define hot spots and areas that need protection</td>
<td>Scientific paper, popular communications and presentation in Conservation of Biodiversity Latin-American Congress</td>
<td>Partnership with SABIF in progress, IABIN, ODP, SNDM and SNBD (Argentina) and non-profit organizations</td>
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<td>ArOBIS</td>
<td>Occurrence (Argentina)</td>
<td>Interoperable platform with Ocean Data Portal</td>
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<td>OBIS-China</td>
<td>Occurrence (China)</td>
<td>Website, data publishing</td>
<td>Biodiversity and ecosystem research</td>
<td>Website, social media, papers</td>
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<td>Research labs, non-profit organizations</td>
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<td>OBIS-Japan</td>
<td>Occurrence (BISMAL)</td>
<td>Portal, online search interface, database development/maintenance, Mapping tools (J-Mapper)</td>
<td>Biodiversity, Taxonomy, Conservation</td>
<td>EBSA, Environmenta l Assessment,</td>
<td>Presentations at conferences/meetings, OBIS Japan (J-RON website</td>
<td>QC supports to Japanese community, development/maintenance of data system (BISMaL), development of small data-check tools &amp; Oceanographi c Data Center, National Science Museum, Fisheries Research Agency, Biodiversity Center,</td>
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<tr>
<td>Node</td>
<td>Data</td>
<td>Technical</td>
<td>Science</td>
<td>Policy</td>
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<td>Web service using Google API, Mobile apps for smartphone</td>
<td>Research</td>
<td>Data Management Policy of KIOST</td>
<td>Real-time data collection using smart-pad</td>
<td>Oceano. Data and inform. center of KIOST supports to node</td>
<td>KOMBIS (Korea Marine Biodiversity Information System)</td>
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<td>OBIS-New Zealand</td>
<td>Occurrence (New Zealand, south western Pacific Ocean, Ross Sea)</td>
<td>Portal, data publishing</td>
<td>Habitat/biodiversity/conservation research</td>
<td>VME, Marine spatial planning</td>
<td>Website, meetings, ad-hoc contacts, NZOR</td>
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<td>National Institute of Water and Atmospheric Research (NIWA), Ministry of Primary Industries (MPI), Department of Conversation (DoC), National Museum of New Zealand (Te Papa), WoRMS, New Zealand Organisms Register</td>
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<td>WSA-OBIS</td>
<td>Occurrence (South West Atlantic)</td>
<td>Training on OBIS datasets with local helpers</td>
<td>Discussions on Habitat and biodiversity modeling with USP and CRIA investigators</td>
<td>Assistance in fostering contacts between iOBIS and the CBD secretariat</td>
<td>Local OBIS website</td>
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<td>universities / research labs / non-profit organizations (CRIA)</td>
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ANNEX 7: Overview of the future 3-tier data system architecture.