Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

IODE Steering Group for OBIS (SG-OBIS)

Twelfth Session

Gunsan, Republic of Korea
25-29 March 2024

UNESCO

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Executive Summary

The 12th session of the IODE Steering Group for OBIS was held on 25-29 March 2024 in South Korea, hosted by the National Marine Biodiversity Institute of Korea and supported by the Ministry of Oceans and Fisheries, and was attended by 23 participants representing 16 OBIS nodes and the secretariat.

During this session, the SG-OBIS agreed on a new priority strategy and management structure to align with the new Rules of Procedure for IODE Programme Components, Programme Activities, or Projects. Accordingly, OBIS has decided to concentrate on two thematic areas: A) Data Mobilization and B) Data Application, and OBIS will establish a data coordination group and a product coordination group to address these priorities, respectively. For data application (Area B), OBIS is developing a data products portal comprising an online virtual laboratory and a products catalogue. Additionally, a nodes coordination group will be formed to facilitate discussion among OBIS nodes about ongoing activities, priorities, and challenges. The three Coordination groups will be formed and Chairs appointed during the intersessional period. The OBIS Nodes have been given a broader mandate than previously, going beyond data publication to include a mentoring role for data custodians in their respective regions and domains. With OBIS node endorsement and support, data custodians will be able to publish biodiversity data directly to OBIS and GBIF, though potentially will need ongoing support to adhere to marine-specific data requirements. An OBIS All Hands meeting will be convened on a biennial basis to bring together the broad OBIS Community of Practice. The new coordination and community engagement activities will be supported through the employment of a part-time OBIS staff member (consultant), made possible by the increased regular programme funding from UNESCO. The SG-OBIS has also prepared a communication plan and allocated a budget for the development and dissemination of branding materials. In addition, to align with the new IOC Data Policy and Terms of Use, the SG-OBIS revised and adopted new guidelines for data sharing and use in OBIS.

The two global biodiversity data networks, OBIS and the Global Biodiversity Information Facility (GBIF), have had an ongoing cooperation agreement since 2014. However, to achieve tangible progress, OBIS and GBIF have now endorsed a joint Marine Strategy and Action Plan with clear targets to be achieved by 2030. OBIS SG endorsement was reached at this meeting.

For the 2024-2025 biennium, the UNESCO-IOC regular programme budget for OBIS has been increased to US$200,000 and an additional US$2 million in project funding (for 5 Horizon Europe projects and 2 FUST projects) has been secured. This has enabled the Secretariat to hire 6 new staff (3 project positions and 3 consultants) including 2 eDNA experts, a modeller, a stakeholder engagement officer, a training officer and a data manager. In addition to the Programme Manager, UNESCO has also created a second fixed-term regular programme position and the recruitment process for the OBIS Technical and Scientific Coordinator has just started.

1. Opening of the session and adoption of the agenda

Mr Choi Wan-hyun, President of the National Marine Biodiversity Institute of Korea (MABIK) opened the meeting and said: “It is truly an honor to host the 12th OBIS Steering Group Meeting. Let me begin by thanking Ms. VIDES CASADO and MS. TATTERSALL, the Co-Chairs, and the OBIS secretariat. Furthermore, I am grateful to all you, our distinguished guests, for coming from such far-off places to attend this event. Welcome, everyone, to Korea.

The Ocean Biodiversity Information System was first developed as the Ocean Biogeographic Information System of the Census of Marine Life. Then in 2009, OBIS was operated by the International Oceanographic Data Exchange and now serves as a pillar in the system that distributes international marine data. OBIS has remained dedicated to the international sharing and utilization of ocean biodiversity data. The cooperation with the OBIS Secretariat and the OBIS node managers has been the greatest impetus behind these activities. MABIK joined the IODE as an ADU and began Korean node operation in September 2023 to bolster this effort. This year, I am truly delighted to host the first capacity-building workshop and meeting with experts from the OBIS node countries. MABIK is a relatively young institution, but we’ve been playing a key role in Korea’s research, exhibitions, and education specialized in marine bio-resources. We are working to raise public awareness of the oceans through various research projects on marine bio-resource preservation and sustainable uses as well as through the SeaQrium exhibitions. Furthermore, our Marine Bio-Resource Information System standardizes and collectively manages the marine bio-resource data handled separately by different departments. In this process we contribute to the goal of preserving ocean biodiversity and using marine resources sustainably. MABIK fulfils its responsibilities and roles as Korea's national focal point for marine biodiversity. To this end, I believe that it is very important for us to work closely with the OBIS Secretariat and marine biodiversity authorities from various countries, including all of you gathered here today. Therefore, I hope the capacity-building workshop and meeting that begin today will be held on a regular basis. MABIK will also do its part to make this happen. Some of you have travelled great distances to come to Korea, yet we are all well aware how we were connected by one vast ocean system.

The inception of OBIS reminds us of our interconnection. Today, we have come together once again to reaffirm our commitment to conserving our marine diversity. I am confident that what we will share here over the next 5 days will lay the groundwork for conserving marine biodiversity and ensuring sustainable uses of it. Once again, I sincerely welcome all of you who have joined this meeting. I hope you will enjoy your time in Korea and create many lasting memories. Thank you.

Mr Kang Sung-min, Deputy Director of Marine Ecology Division at the Ministry of Oceans and Fisheries of the Republic of Korea extended his deepest gratitude to us all who have taken time from your busy schedules to join us at the 12th OBIS Steering Group Meeting. He said: “Firstly, I am deeply appreciative of the OBIS Secretariat and MABIK for their efforts in preparing for this meeting and workshop. Also, I am grateful to UNESCO for their generous support in organizing

and hosting this meeting. Furthermore, my thanks go out to the government officials, node managers and all the other attendees. Welcome to Korea!
Ladies and gentlemen, as you all agree, ocean life provides immense benefits to humanity in terms of food, energy, healthcare, and various other areas. However, marine life today is in crisis, faced with ocean pollution, climate change, and indiscriminate overfishing. We are continuing our efforts to promote sustainable development through the Convention on Biological Diversity, Access and Benefit Sharing, and other initiatives to overcome these serious issues. To this end, we must systematically manage and share global ocean biodiversity information. Our efforts will substantially contribute to research on global ocean biodiversity and become the foundation for response measures aimed at biodiversity preservation. OBIS has been dedicated to the international sharing and utilization of ocean biodiversity information. Notably, the OBIS node managers who are here with us have played pivotal roles for the development of OBIS. Thanks to your dedicated efforts, OBIS is bearing the fruits of ocean biodiversity information management and sharing. I expect the OBIS Steering Group Meeting, which commenced today, will allow participants to share their experiences and knowledge, strengthen cooperation, and seek concrete measures to preserve ocean biodiversity. I know the OBIS Steering Group plays a key role in the effort to preserve ocean biodiversity. I ask for continued participation and cooperation from you OBIS node managers. Once again, let me thank all you distinguished guests. I hope you will have fruitful discussions and have a great time in Korea".

Mrs Katherine Tattersall, SG-OBIS co-chair, said: "Good morning everyone and thank you President Wan-Hyun Choi, Deputy Director Sung min Kang for your thoughtful and measured words. Gamsahabnida. It is an honour to be here at MABIK today. We deeply appreciate your generous and kind hospitality and the dedicated effort that the meeting organisers have put into preparing for this week. We look forward very much to the tour of facilities, exhibitions, and collections at MABIK in the afternoon today. Coming from marine biodiversity and research centres around the world, we will find the opportunity to learn more about MABIK very interesting. The proposed agenda for this week is, I think, going to present us with opportunities to enjoy our time here in Gunsan and the Republic of Korea and to appreciate the unique strengths and beauty of your special part of the world. I am delighted that the Marine Bio-Resource Information System at MABIK has joined the IODE OBIS alliance and will host the KOBIS Node of our community. Our strengths as a biodiversity data and information network largely rest in the skills, dedication, and cooperation of the OBIS Nodes, who have a strong history of supporting one another and our shared purpose. The workshops that we will hold over the next couple of days will showcase the combined efforts of our expert community as we work together to learn, solve problems, and strengthen our capacity to succeed in our mission. It is truly a pleasure to see you all face-to-face once again, for the first time since 2019. Like MABIK President Wan-Hyun Choi, I hope that this is the first of many regular meetings and workshops to be held in the coming years, as there are indisputable benefits that come from having face-to-face meetings. Thank you once more to our distinguished guests for joining us today, and for your very warm welcome to MABIK. We are honoured to have your company as we now officially open the 12th meeting of the Steering Group for the IODE Ocean Biodiversity Information System".

Mr Ward Appeltans, OBIS programme manager, also expressed his gratitude to Choi Wan-hyun, President of the National Marine Biodiversity Institute of Korea (MABIK), and Kang Sung-min, Deputy Director of Marine Ecology Division at the Ministry of Oceans and Fisheries of the Republic of Korea, for hosting us this week and for their unwavering support for OBIS, as well as for revitalizing the national OBIS node in Korea. He provided a bit of the history of the OBIS node in Korea. The Korean OBIS node was previously hosted by the Korean Institute of Ocean Science and Technology, KIOST, in Busan. It started serving data to OBIS in October 2006. At that time the institute was called the Korea Ocean Research & Development Institute (KORDI). Sung-dae Kim, the former KOBIS node manager, had been a regular attendee at several OBIS meetings in the past and was always very supportive. Unfortunately, the project funding KOBIS ended in 2014, leading to a halt in activities. In 2016 and 2017, informal discussions were held with staff from MABIK, and the Korean Oceanographic Data Centre hosted at the National Institute of Fisheries Science (NIFS) under the Ministry of Oceans and Fisheries (MOF) to address the situation and try to find a solution. In 2018, Sung-dae Kim officially announced that the Korean OBIS node was no longer active and should be removed from the OBIS node network. The KOBIS database, which contained 25,000 occurrence records, had to find a new home, and was adopted by OBIS Malaysia. In July 2023, a delegation from MABIK visited our headquarters in Ostend, expressing a keen interest in joining OBIS. Subsequently, they applied for IODE ADU status in August 2023, which was accepted a few weeks later. Mr Appeltans said he is delighted that after many years, the Korean OBIS node has found a new home at MABIK and enjoys the support of KIOST and MOF. It is the most natural place for it to flourish. He continued that he has known MABIK for eight years as a highly active institute with very high standards and ambitions, not only nationally but also internationally, particularly in the context of the CBD and BBNJ. International cooperation has always been challenging, especially given recent geopolitical dynamics. However, in the face of significant planetary challenges we need international cooperation. It is heartening to see so many OBIS nodes present here today, especially the Asian OBIS nodes. In a global context, robust regional cooperation is crucial. The world recognizes the intrinsic relationship between biodiversity and climate, and the need for OBIS and our global network has never been greater. While we, OBIS and its many nodes encounter challenges, there are also many new and exciting opportunities, through what I would call a new "enabling environment for the ocean" created by the UN Ocean Decade, the potential ratification of a UN Treaty for biodiversity in the high seas (BBNJ), internationally agreed biodiversity targets under the CBD, which include coastal and marine targets, and the emergence of new observing technologies which all offer both new and existing opportunities. As a network of OBIS nodes, he feels that we are transitioning from being a group of "data centers" to a global Community of Practice. OBIS and our nodes are becoming more deeply involved in ocean observations, research, and policy. Over the past two decades, OBIS has built a solid reputation and is highly valued by many. Although we are a small one, facing immense challenges, we are also a resilient community. My hope is that by the end of this week, we can, as a unified group, devise and agree on a new strategy for OBIS and establish ways to engage with the many initiatives, fostering an open and inclusive community of practice.

Mrs Katherine Tattersall asked all participants to introduce themselves briefly (the list of participants is available in annex 7). Unfortunately, we had three late cancellations: Yasin Bakis (FishOBIS), Narayanane Saravanane (IndOBIS) and Leen Vandepitte (EurOBIS). To ensure the

presence of a majority of OBIS nodes, EurOBIS has authorized Dan Lear (OBIS UK), and IndOBIS has authorized Katherine Tattersall (OBIS Australia) to act as their proxy.

The **SG-OBIS adopted** the agenda and timetable without changes.

The **SG-OBIS thanked** IOCAfrica to cover the travel and accommodation cost of our two African OBIS node representatives.

2. Hands-on sessions

2.1. Darwin Core

Ms Elizabeth Lawrence (OBIS Capacity Development officer) covered this topic. In her presentation she introduced Darwin Core as a body of standards, highlighting important terms for OBIS as well as an introduction on dataset structuring. She led the group through exercises to determine core type and extension tables for a set of example dataset descriptions, using the below flow chart:

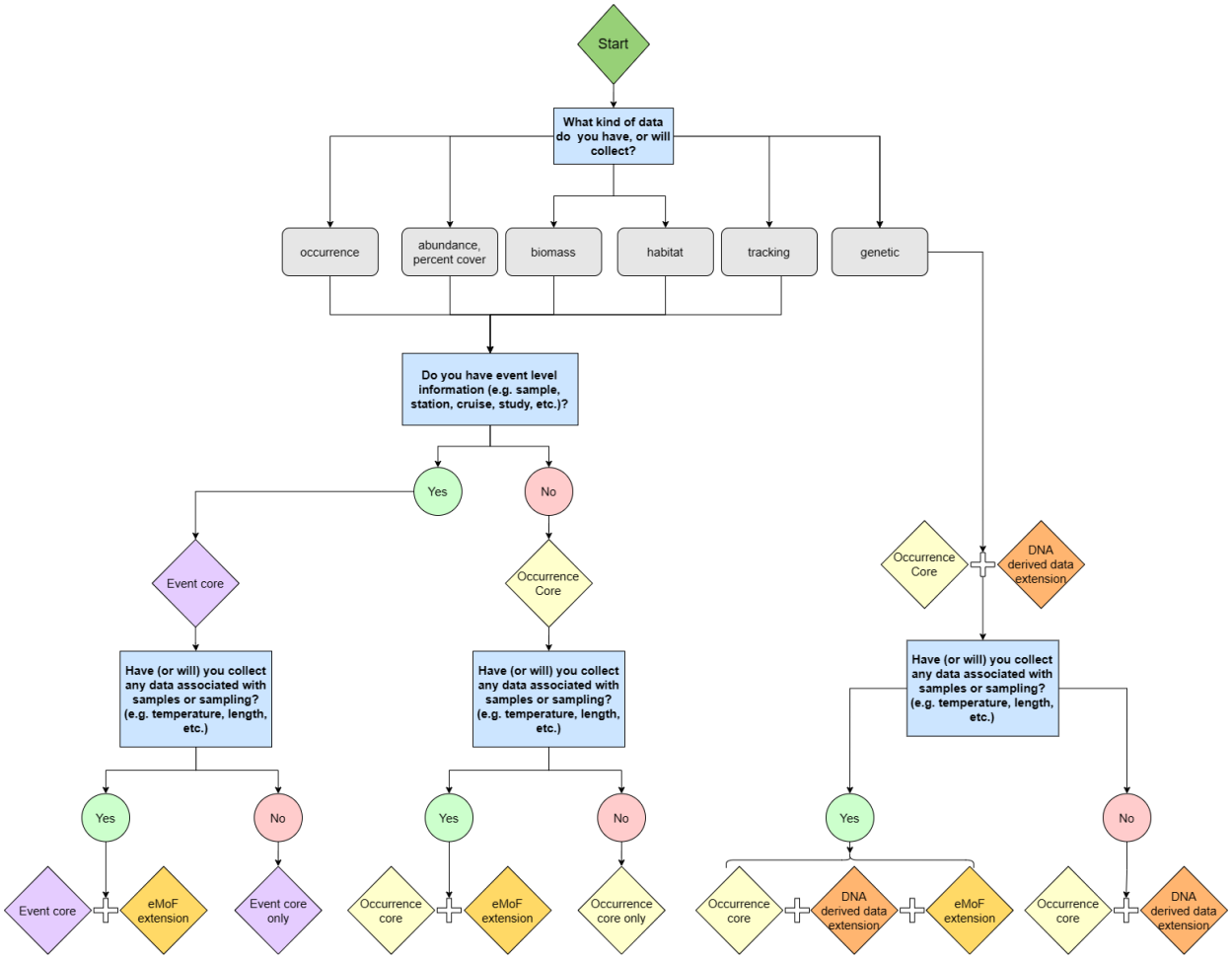


Figure 1. Flow chart to help decide which DwC core and DwC extension to use.

The slides for the presentation material can be found here: https://oceanexpert.org/document/34033.

The **SG-OBIS thanked** Elizabeth Lawrence for the very clear explanation of Darwin Core Archive.

2.2. JupyterHub and OBIS products platform

Mr Silas Principe (OBIS researcher - modelling) covered this topic. When the Intersessional Working group on OBIS data products was established, our initial proposal was to have a catalogue to showcase products derived from OBIS data. However, as discussions took place, it became clear that there was an opportunity to create a whole set of tools that would enable users to work and take the maximum advantage of OBIS data more efficiently.
Within this proposal, the virtual laboratory is the main tool we are going to provide and is a JupyterHub with Python and R kernels. Users will be able to run their analysis online, taking advantage of an environment containing tools, cloud optimised data, the main packages used for biodiversity analysis, and one dedicated package to speed up pre-processing of OBIS data for specific purposes.

During the hands-on session we provided a demonstration of the JupyterHub and used it to work on the practical activities of the hands-on training.

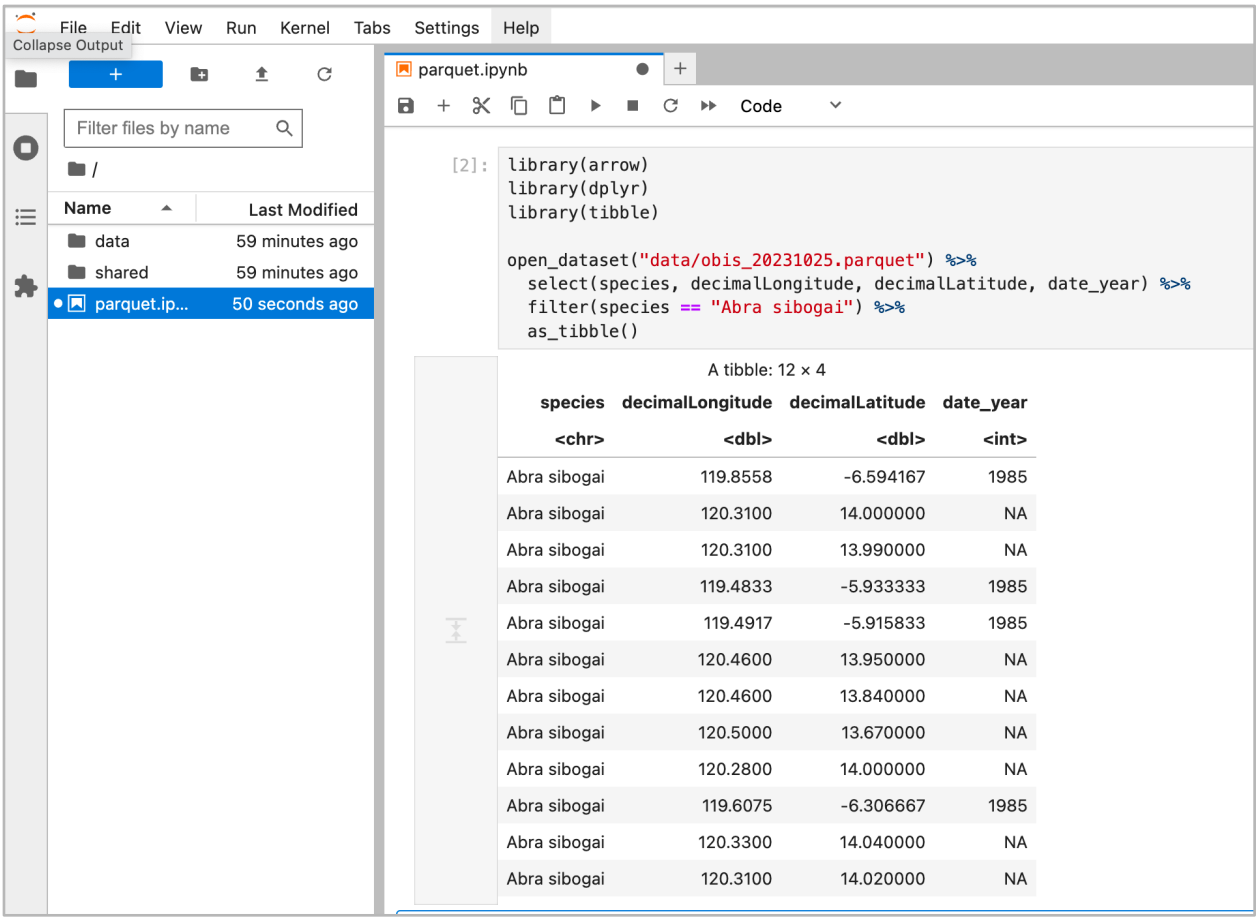


Figure 2. Example of access of OBIS full export through the JupyterHub.

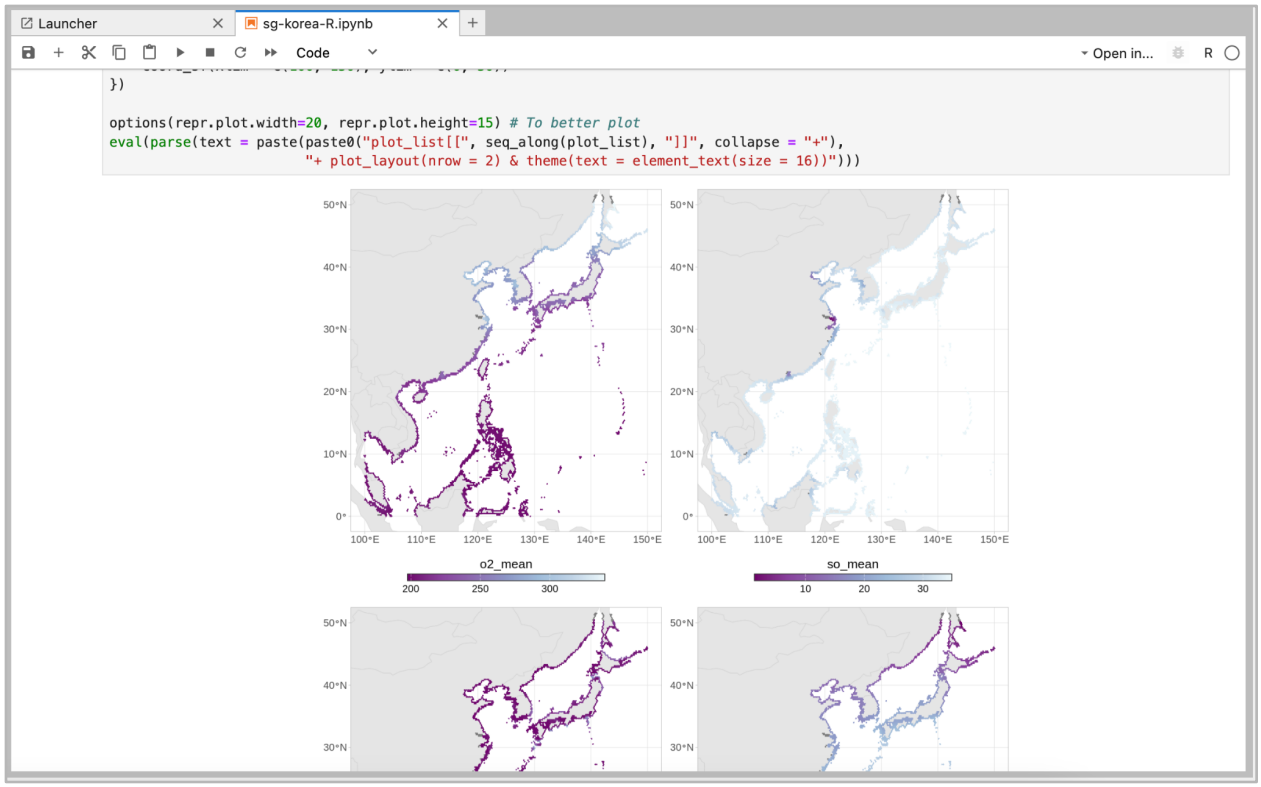


Figure3. Example of data visualization generated with the use of the JupyterHub.

The full concept note of the OBIS data products platform is available in Annex 5.

The **SG-OBIS thanked** Silas Principe for the very nice presentation and expressed excitement about this new development and provided a number of suggestions which are copied under the Data Products section of the meeting report.

2.3. Git and GitHub

Mr Pieter Provoost covered this topic. Git is a version control system designed to track changes in source code during software development. However, its applications go well beyond software development and can be used for the tracking of changes in any kind of text-based file, including documentation and notebooks. During the training, participants were introduced to git, including the most commonly used commands and workflows. In a second session, the GitHub platform was introduced. GitHub is a web-based platform that provides hosting for projects using git version control. It is widely used by OBIS for collaborative development and documentation.

Practical exercises of git and GitHub use were done using the newly implemented JupyterHub. The git and GitHub training material is available at https://iobis.github.io/sg-12-training.

The **SG-OBIS thanked** Pieter Provoost for his clear and useful presentation of Git and GitHub during the workshop.

2.4. MeasurementOrFacts extension and vocabularies

Ms Elizabeth Lawrence covered this topic. Elizabeth presented the workshop from a set of powerpoint slides, available on OceanExpert[1]. The trainees had the opportunity to see the recently developed vocabulary decision tree and were guided in the multiple ways that vocabularies can be accessed. Some examples were used to illustrate how the decision tree can help in preparing the eMoF table.

Comments and suggestions from the floor during demonstration of NERC VocPrez tool were:

- Data publishers find vocabulary choice (e.g. through BODC vocab P01 in NERC) intimidating (not data managers by profession).
- OBIS YouTube instructional videos provide this information in a clear way, which will reward those who have time to put in the effort to understand the methods.
- A slimmed down flowchart/pathway for directing choice for researchers would help a time-stretched research community and lower a perceived barrier to data publication (or much smaller choice of appropriate terms).
- OBIS Nodes/managers can provide an advisory/checking role to look at the vocabs chosen by data publishers in formatting their datasets (as data management experts).
- Nodes could build tools to assist in choices (role for consultancy?).
- Each researcher usually works with a small range of types of data and once they've established the appropriate vocab terms for their data, publishing more data will be lower effort/barrier.
- OBIS could document and publish the reasoning behind different vocabulary term choices, to help the broader research community understand how to work with these terms.

The SG-OBIS thanked Elizabeth Lawrence for her clear explanation of the vocabulary decision tree.

2.5. DNADerivedData extension, quality control and example dataset

Mr Pieter Provoost covered this topic. A walkthrough explanation on how to process DNA derived data to Darwin Core was presented for all trainees. The training material is available here: The DNADerivedData extension[2].

The **SG-OBIS thanked** Pieter Provoost for the excellent training material and demonstration of processing a DNA derived dataset by using the OBIS JupyterHub and Git.

[1] https://oceanexpert.org/document/34033
[2] https://iobis.github.io/sg-12-training/dna.html

2.6. Visit to MABIK exhibition and collections

At the end of the first day's hands-on session, the participants were invited to a tour at MABIK Exhibition and Collection. The exhibition was created with the aim to educate and explore marine biodiversity, understand the latest research and to enhance the knowledge of marine ecosystems and the importance of preserving marine biodiversity, and engage the public with educational resources provided by the institute.

The **SG-OBIS thanked** the local host for the visit and was impressed with the emphasis and interest that the staff at MABIK have placed on involving the community in learning about marine science and, in particular, the biodiversity of their seas. The dedication to building the next generation of marine biologists was inspiring and the **SG-OBIS was deeply grateful** for the opportunity to tour the facilities.

2.7. eDNA data quality control exercise

Mr Pieter Provoost covered this topic. During this hands-on session, we applied all topics covered during the previous session in a data cleaning and quality control exercise. A raw eDNA dataset was made available through GitHub and formatted to Darwin Core by the participants in JupyterHub. The training materials for this session are available at https://iobis.github.io/sg-12-training/dataset.html.

2.8. Field trip to Baekje Cultural Land

In the afternoon of the second day, the participants were invited to join a field trip to Baekje Cultural Land.

The **SG-OBIS thanked** our hosts for sharing their culture with us. We appreciated the opportunity to learn about the history of the region we are visiting, and of the country, and to explore the architecture and cultural treasures of this marvellous part of the world.

3. OBIS reports

3.1. OBIS Secretariat

3.1.1. Staffing

Mr Ward Appeltans (OBIS programme manager) reported on the OBIS Secretariat staffing. Thanks to the increase in IOC's budget and the priority setting of the Member States at the IOC

Assembly, the OBIS secretariat will get a second position covered by UNESCO's regular programme budget. This OBIS technical coordinator position has been advertised until 15 March 2024 and the selection process is ongoing.

The OBIS Secretariat is involved in five new Horizon Europe projects which allowed us to grow and keep current staff. A project appointment position for an associate project manager was advertised in December 2023 and Dr Saara Suominen was appointed and joined the office on 18 March 2024. Saara has been a consultant with us for over 3 years and did a tremendous job in coordinating the scientific work of PacMAN and eDNA expeditions and assisted in the proposal writing for several EU projects. The consultancy position of Saara is now filled by Dr Emilie Boulanger. Emilie has a PhD in marine biodiversity conservation and next generation sequencing tools with a focus on eDNA in Marine Protected Areas. Her scientific and technical skills and hands-on expertise with eDNA will be extremely valuable for OBIS. Dr Chandra Earl was part of our team for a short period (3 months) to help mobilize datasets into OBIS covering marine World Heritage Sites.

In addition to the staff at the OBIS secretariat, our Flanders funded projects also cover the cost of several staff members at the UNESCO World Heritage Centre and the University of the South Pacific in Fiji.

Table 1: OBIS secretariat staffing 2023-2024

Name	**Title**	**Contract type**	**Until date**
Ward Appeltans	Programme manager	P3 fixed term (100%)	permanent
TBD	Technical and scientific coordinator	P3 fixed term (100%)	permanent
Pieter Provoost	Data manager	P3 project appointment (100%)	Dependent on who will get the fixed term position
Saara Suominen	Associate project officer	P2 project appointment (100%)	Dependent on who will get the fixed term position
Silas Principe	Associate project offer	P2 project appointment (100%)	30/04/2026
Sofie De Baenst	Admin officer	G3 project appointment (30%)	31/12/2024
Elizabeth Lawrence	Capacity development officer	Consultant (100%)	31/01/2028

Lisa Benedetti	Stakeholder engagement officer	Consultant (75%)	31/08/2026
Emilie Boulanger	Scientific officer, DNA	Consultant (100%)	31/08/2026
TBD	Community engagement officer	Consultant (50%)	31/12/2025
Chandra Earl	Data officer	Consultant (25%)	finished Oct 2023

The **SG-OBIS commended** the OBIS Secretariat for its successful expansion of human capital, which is facilitating numerous opportunities for support and growth within the OBIS community.

3.1.2. Technical developments

Mr Pieter Provoost reported on several technical developments that happened in the intersessional period.

- Amazon cloud storage

OBIS has applied for the AWS Open Data Sponsorship Program[3] and the application has been accepted. This means that we are eligible for free data storage and data transfer on AWS. To finalize the application, we need to document how our data are structured, provide tutorials on using the data on AWS, and create an entry in the Registry of Open Data on GitHub. The documentation needs to be published on the OBIS website or on GitHub. This is ongoing.

Noah Ngisiang'e (OBIS Kenya) suggested looking into https://www.d4science.org/ as well.

- Mailman

Due to continuing issues with email bounces, we have decided to move the SG mailing list to Mailman. We will use https://www.mailmanlists.net/ for this. The new list has been created and configured, and all existing mailing list subscribers will be invited to the new list.

The **SG-OBIS suggested** using Mailman also for the new OBIS coordination groups and **suggested** that this service could also be offered to OBIS nodes.

- JupyterHub

[3] https://aws.amazon.com/opendata/open-data-sponsorship-program/

A Docker based JupyterHub instance has been set up at https://jupyter.obis.org/ and a notebook container has been created that is tailored to OBIS nodes and users, with all the necessary data processing and analysis packages for R as well as Python. This new platform will be used to share data product workflows and to organize trainings. We will also provide analysis ready datasets on the hub including a snapshot of the OBIS database. Anyone can register on the hub, but new users need to be approved by the administrators before they can start using the platform.

- Shiny server

We have also set up a new R Shiny server which is for now just being used to host the MPA Europe data products.

- Nonmatching names sync with WoRMS

Nonmatching names are now automatically submitted to the new WoRMS taxonomic annotation tool.

- eDNA related tools

Several tools have been created within our eDNA projects eDNA Expeditions and PacMAN for the processing and analysis of eDNA data. This includes a workflow for creating reference databases[4] based on publicly available sequence data, an R package for performing spatial gap analyses of reference databases[5] based on OBIS and GBIF data, an R package for summarizing distribution data[6] from OBIS/GBIF/WoRMS and the calculation of thermal envelopes, and an example application[7] of this R package to aid manual quality control of the detections from eDNA Expeditions. Most of these tools are still actively being developed and need to be consolidated and documented a bit more.

Stephen Formel (OBIS USA) suggested creating an umbrella package for all OBIS R packages, similar to tidyverse, and Jon Pye (OTN OBIS) suggested publishing the package collection on https://r-universe.dev/.

[4] https://github.com/iobis/edna-reference-databases
[5] https://github.com/iobis/ednagaps
[6] https://github.com/iobis/speedy
[7] https://github.com/iobis/edna-qc

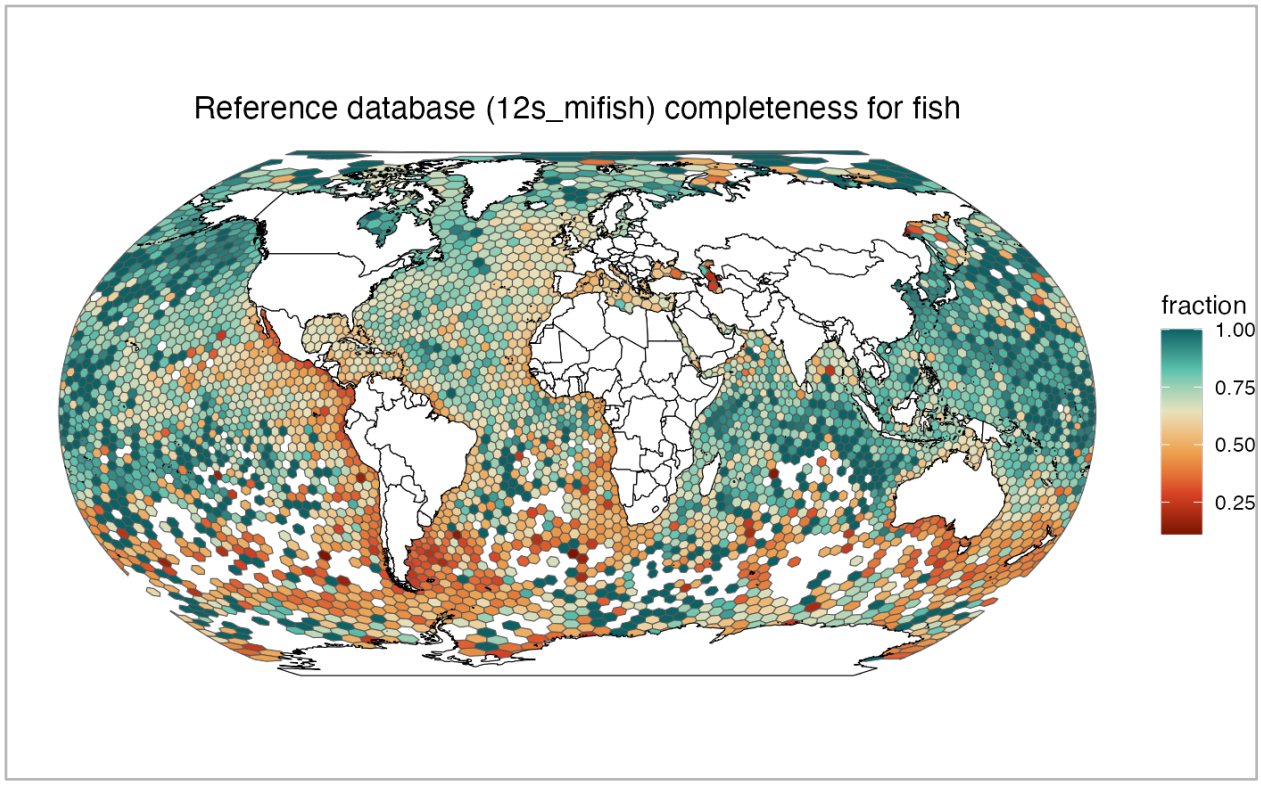


Figure 4: 12S reference database gap analysis for MiFish primers.

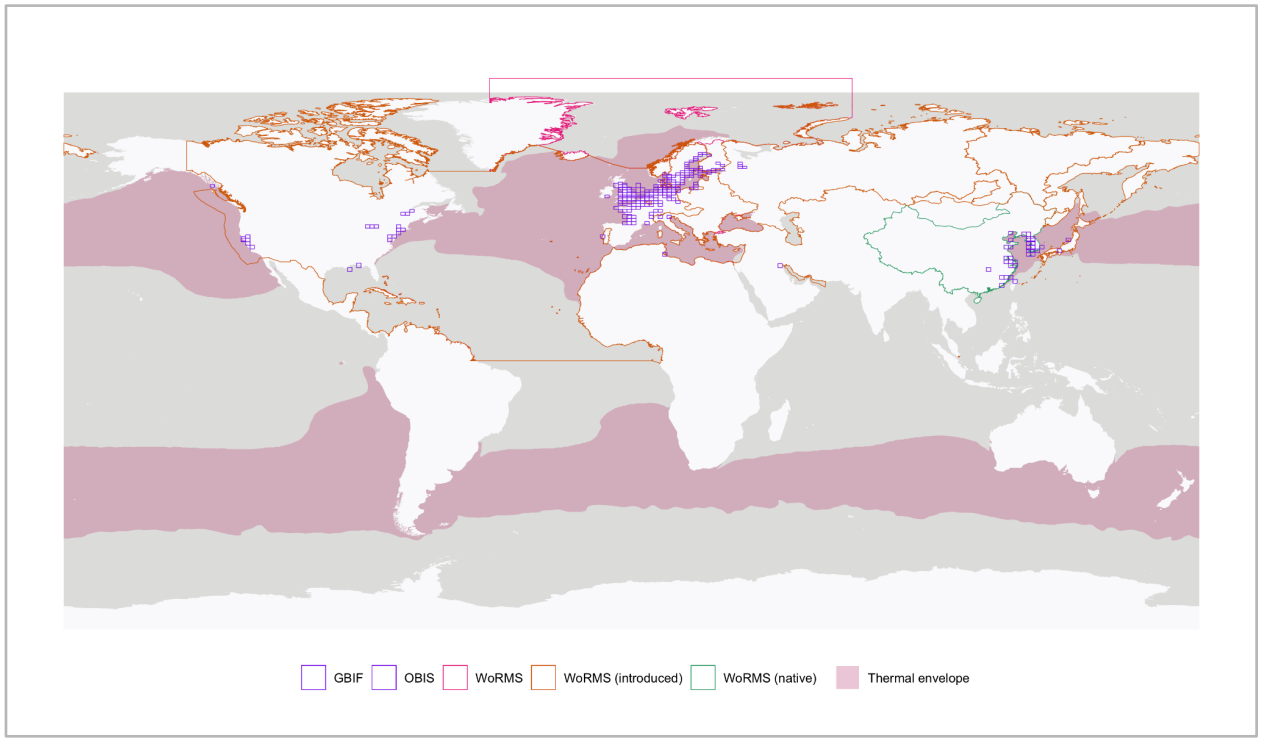


Figure 5: combined distribution data (WoRMS/OBIS/GBIF) and thermal envelope (speedy R package).

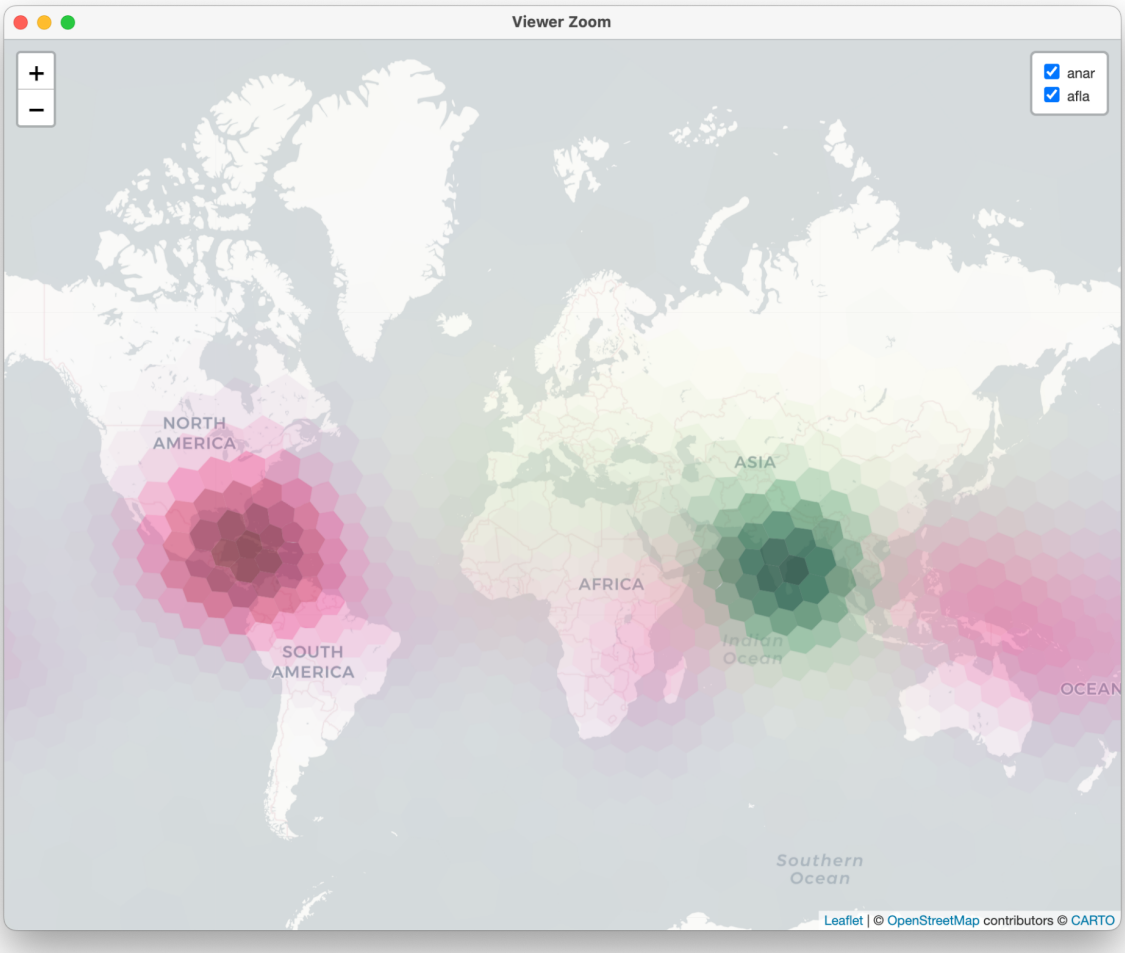


Figure 6: kernel densities for related species based on OBIS and GBIF data.

- R package updates

The obistools r package has been updated to remove dependencies on the deprecated rgeos and rgdal packages. This caused installation issues.

The **SG-OBIS expressed gratitude** to the OBIS Secretariat, with special acknowledgment to its data manager Pieter Provoost, for driving numerous crucial technical advancements.

3.1.3. Extra-budgetary projects

As mentioned before, the OBIS secretariat is involved in several Flanders and EU funded projects. These funded activities are key to allow the secretariat to further develop in-house as well as

external capacity in ocean science and data management and has enabled the secretariat to continue delivering our services (our core funding would not be sufficient).

Members of the secretariat reported on the major outcomes so far from these activities including the importance for OBIS.

3.1.3.1. PacMAN: Pacific Islands Marine Bioinvasion Alert Network (PacMAN)

Start Date:13/03/2020
End Date: 31/12/2024

The Flanders-UNESCO funded PacMAN project aims to establish a marine invasive species monitoring facility within Fiji's Suva Harbour. Leveraging both molecular techniques such as metabarcoding and qPCR, alongside visual methodologies like ARMS plates, the project is now entering its final phase. Right from its inception, the project has prioritized robust community engagement, adopting a co-design approach to optimize both fieldwork (including sampling and lab procedures) and foster a sense of local ownership endorsed by the Fijian government.

Furthermore, the comprehensive scientific training course hosted on OTGA and with on-site training has been instrumental in nurturing local capacity, while simultaneously enhancing project visibility amongst key partners across Fiji. Importantly, the project contributes to ongoing reviews pertaining to Fiji's Invasive Alien Species Policy and the country's National Invasive Species Framework of Strategic Action Plan (NISFSAP), thus making a tangible contribution to shaping Fiji's environmental policies and conservation efforts.

The self-paced online PacMAN training course hosted on the OTGA platform was successfully delivered, with 178 enrolled participants from 63 countries and 113 institutions, from which 68 (~40%) were able to complete the course and receive a certificate. According to the course feedback survey and post-course survey, participants valued the course and educational resources.

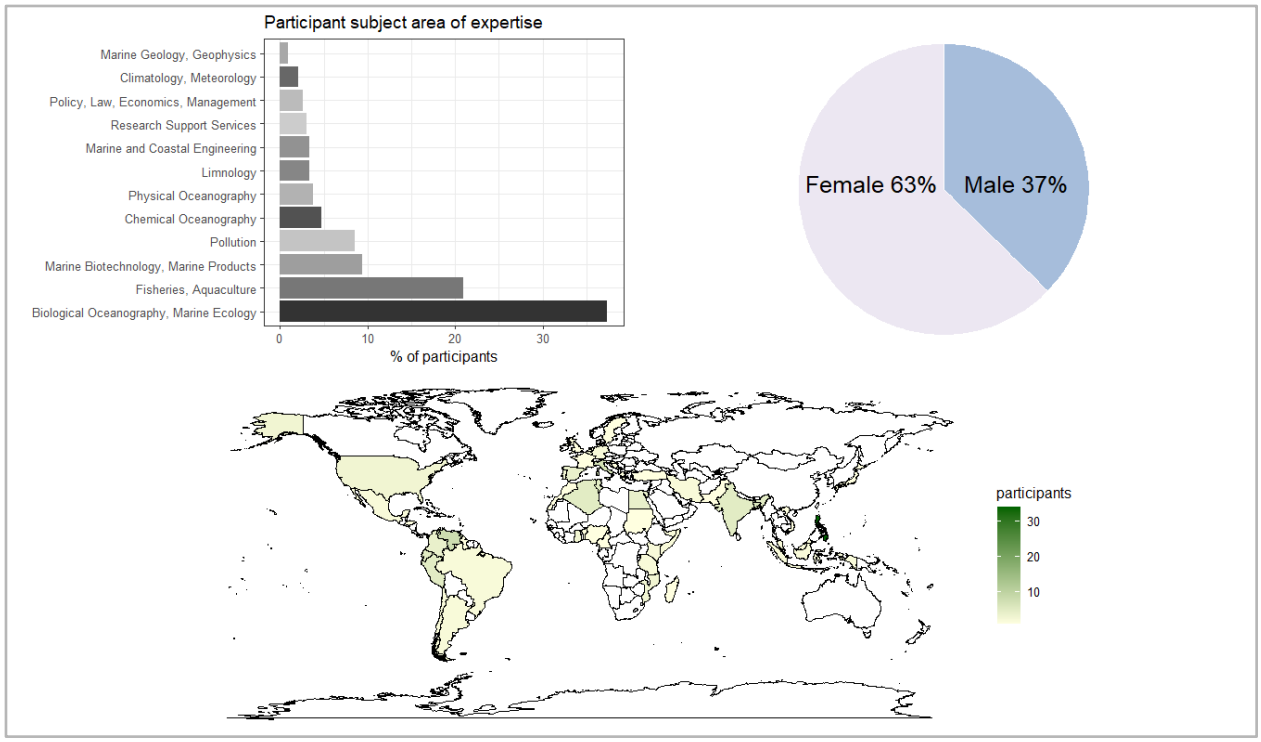


Figure 7. Summary of PacMAN OTGA course participants' subject area of expertise, gender distribution, and country of origin.

Capacity for DNA extraction and (q)PCR was developed at the University of the South Pacific. Leveraging these capabilities, metabarcoding analysis targeting commonly used markers such as COI and 18S revealed the presence of a total of 1,449 species. Among these, 124 were flagged in invasive species databases, with two species, *Didemnum perlucidum* and *Perna viridis*, being classified as invasive in the context of Fiji. Subsequent qPCR assays, developed and optimized by USP in collaboration with the Biosecurity Authority of Fiji, confirmed *Didemnum perlucidum's* presence.

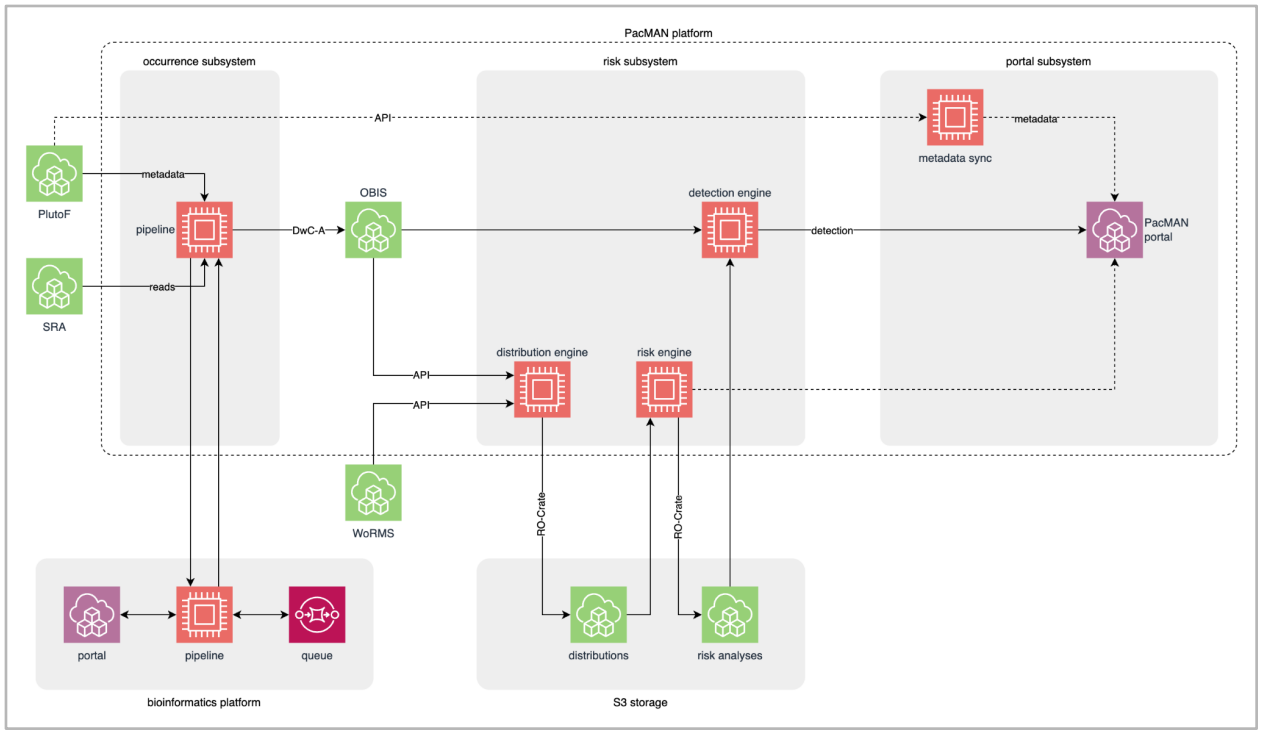


Figure 8. High level overview of the PacMAN data flow.

The PacMAN project envisions a robust data management platform designed to be user-friendly, adhering to FAIR principles—ensuring data are Findable, Accessible, Interoperable, and Reusable. Noteworthy progress has been made in various components of this platform, with particular emphasis on the bioinformatics pipeline. This pipeline, forged from a combination of publicly available metabarcoding data analysis tools, seamlessly transitions raw sequences from port surveys into formatted data tables, ready for submission to OBIS.

The PlutoF is used for managing primary data and metadata within PacMAN. Complementary software interfaces have been crafted to facilitate seamless integration between PlutoF and other components of the PacMAN data ecosystem, including the OBIS database and the evolving decision support system. Quality control protocols have been implemented, ensuring taxonomic annotations undergo scrutiny against established distributions and species thermal ranges.

The framework for the risk analysis and decision support system has been documented, drawing insights from an exhaustive review of existing frameworks, tools, and data sources. This framework underwent iterative refinement in collaboration with local communities, resulting in the development of initial versions of all decision support system subcomponents. These include the distribution engine, detections engine, risk analysis engine, and portal frontend—pioneering steps towards an integrated platform aimed to support invasive species management and conservation efforts in Fiji.

3.1.3.2. eDNA Expeditions: Environmental DNA Expeditions in UNESCO World Heritage Marine Sites

Start date: 08/12/2021
End Date: 30/06/2024

This 2-year Flanders funded project is jointly coordinated by the secretariats of OBIS and the marine programme of the World Heritage Centre. This citizen-science project aims to assess the diversity and vulnerability of marine species to climate change. During 2023, eDNA expeditions were organized in 21 sites across the world, involving over 250 students and children. The project received a lot of media attention and is considered a high-profile project within UNESCO. The UNESCO Director General joined one of the expeditions.

The OBIS secretariat is responsible for the science and data management aspects. A sample registration application has been developed to record sample metadata such as time, location, and sample size in the field. The app, available at https://app.ednaexpeditions.org, can be used in a web browser or installed as a mobile app on Android or iOS.

In total 400 samples from 20 sites (due to the war we did not receive the samples from Sudan) were successfully processed and sequenced by the eDNA laboratory at KULeuven in Belgium, resulting in approximately 2 million sequences from each sample. All sample collection and DNA extraction information is collected on the PlutoF data management system. This system allows for the comprehensive registration of sample metadata including details on DNA extraction, PCR and sequencing runs.

We developed data pipelines to process and bring together all project data and metadata (from PlutoF and the LifeWatch bioinformatics server) as well as data from external sources (site shapefiles, OBIS and GBIF occurrence data), to feed into the sample tracking portal (https://samples.ednaexpeditions.org), which provides reports, species lists, and the final analysis ready dataset to be used for the scientific analysis. The pipelines are documented at https://github.com/iobis/edna-expeditions.

The PacMAN bioinformatics pipeline has been further developed to accommodate for the use of the newest sequencing technology (NovaSeq), and to test the analysis and annotation of multiple biomarkers and target taxonomic groups, and special emphasis was put into accurate taxonomic annotation of the genetic sequences. Two separate taxonomic annotation methods were chosen. An automated quality report for all species detections is generated to help with clean-up of the species lists. This report is based on known species distributions in OBIS, GBIF, and WoRMS, as well as thermal ranges calculated from these distribution data. This quality control workflow was used for an initial check for incorrect species assignments. The species data was also provided to the sites, for an in-depth review of possible mischaracterizations to closely related species.

To support the scientific analysis, we also recruited Chandra Earl for 3 months who collected additional species occurrence data for the UNESCO marine world heritage sites. She reviewed and processed those data and ultimately published 53 new datasets to OBIS, contributing 40,340 new records of 4,949 marine species.

The OBIS secretariat, with support from a group of scientists, are now analyzing the data to assess biodiversity and the role those sites can play as refugia under climate change. The report will also include a review of the methodology to inform future monitoring. A UNESCO publication is expected to be released in June 2024.

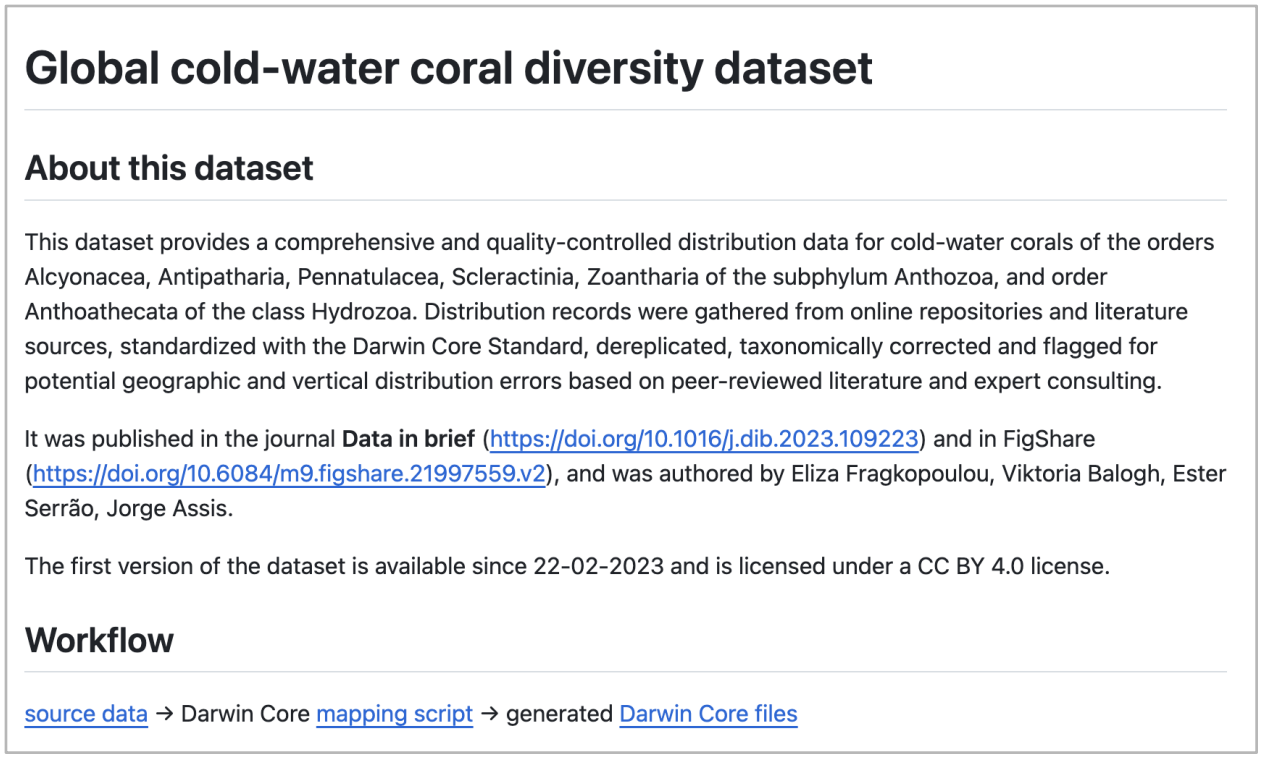
3.1.3.3. MPA Europe: Marine Protected Areas Europe

Start date: 01/01/2023
End Date: 30/04/2026

MPA Europe is an Horizon Europe project that aims to identify the locations within the European seas where Marine Protected Areas (MPAs) would protect the highest number of species, habitats and ecosystems. This information is crucial to establish a functional MPA network and will help managers to propose further areas for conservation in the future. MPA Europe will also go one step further by considering the potential blue carbon benefits of the prioritization and the potential impacts of climate change on species distribution.

The OBIS secretariat is responsible for Work Package 3, and is producing the following: (i) species distribution models (SDMs) of ~15,000 marine species; (ii) diversity metrics for European seas; and (iii) habitat maps considering habitat forming species. In all cases, models are being developed with the use of OBIS data and include predictions for future scenarios according to CMIP6 (for two time periods, 2050 and 2100), and 5 SSP scenarios.

During the first year of the project, we successfully completed three deliverables. The primary deliverable entailed identifying supplementary datasets for integration into OBIS. A portion of these datasets had already been incorporated, and we anticipate adding over 10 million records to OBIS by the project's conclusion. To streamline dataset ingestion, we created an R package (leveraging the TrIAS Project checklist recipe) which is accessible at https://github.com/iobis/obisdi.



Global cold-water coral diversity dataset

About this dataset

This dataset provides a comprehensive and quality-controlled distribution data for cold-water corals of the orders Alcyonacea, Antipatharia, Pennatulacea, Scleractinia, Zoantharia of the subphylum Anthozoa, and order Anthoathecata of the class Hydrozoa. Distribution records were gathered from online repositories and literature sources, standardized with the Darwin Core Standard, dereplicated, taxonomically corrected and flagged for potential geographic and vertical distribution errors based on peer-reviewed literature and expert consulting.

It was published in the journal **Data in brief** (https://doi.org/10.1016/j.dib.2023.109223) and in FigShare (https://doi.org/10.6084/m9.figshare.21997559.v2), and was authored by Eliza Fragkopoulou, Viktoria Balogh, Ester Serrão, Jorge Assis.

The first version of the dataset is available since 22-02-2023 and is licensed under a CC BY 4.0 license.

Workflow

source data → Darwin Core mapping script → generated Darwin Core files

Figure 9. Example of a GitHub repository generated using the `obisdi` package for the ingestion of a cold-water coral dataset, as part of the MPA Europe project.

In parallel with identifying additional datasets, we commenced the development of a robust framework for generating marine species distribution models (SDMs). Given that models will be generated for a large number of species, it is necessary that all steps are automated, including the validation of outputs. Based on the results of the first models, we are now fine-tuning our pipelines and should produce the final species and habitat models by June 2024.

All species and habitat models will be openly accessible to the OBIS community. In addition, we are currently in the process of developing a Shiny app that will allow users to explore the results and download the maps. Furthermore, the pipeline for generating the distribution maps is open, with an accompanying R package (https://github.com/iobis/mpaeu_msdm) and documentation (https://github.com/iobis/mpaeu_docs).

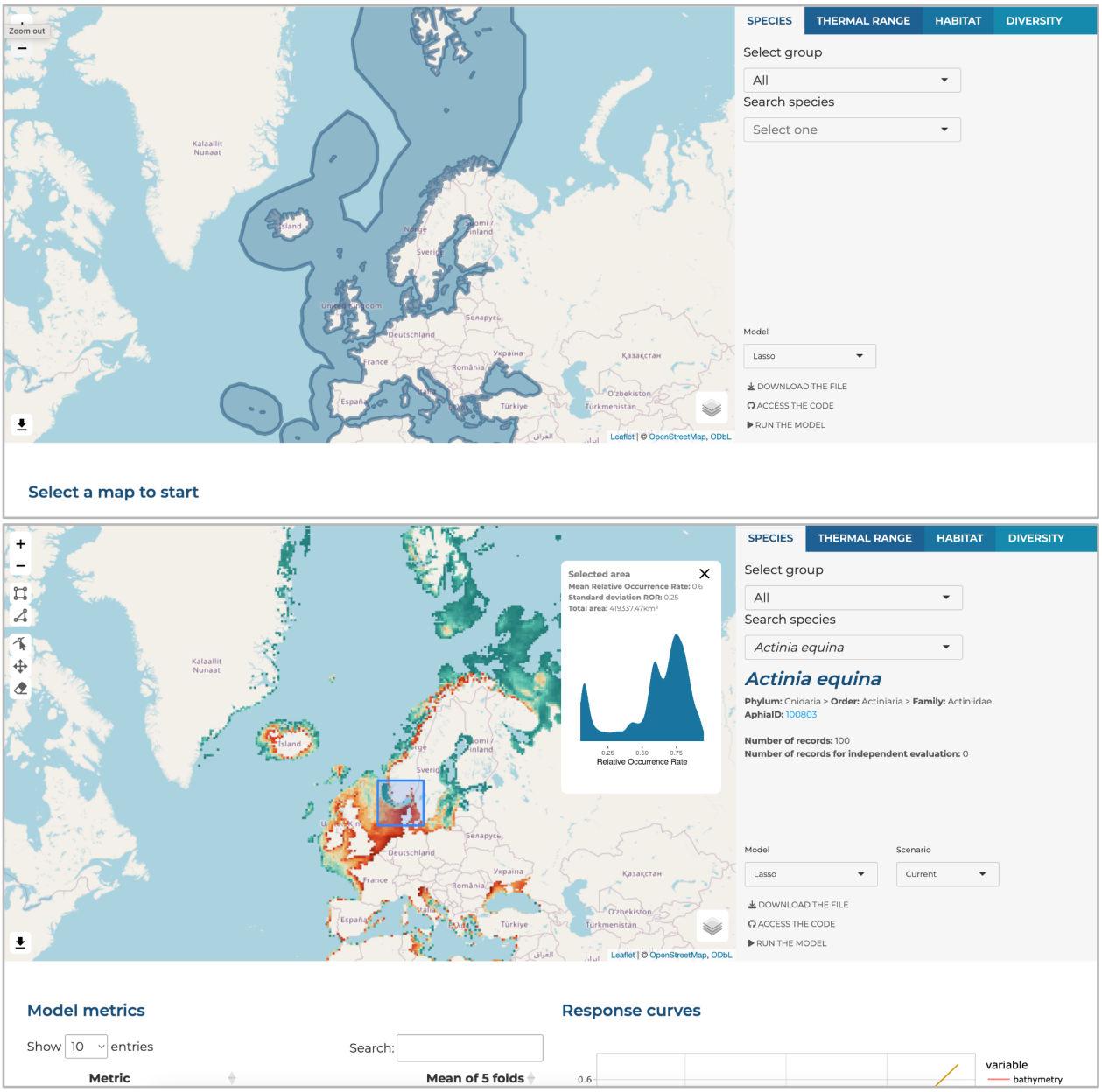


Figure 10. Screenshots from the Shiny app being developed for the MPA Europe deliverables. The tool will enable interactive exploration of distribution maps, and the development version is available on https://shiny.obis.org/distmaps.

More information can be found on the project website: https://mpa-europe.eu/.

3.1.3.4. MARCO-BOLO: MARine COastal BiOdiversity Long-term Observations

Start date: 01/12/2022
End Date: 30/11/2026

MARCO-BOLO is an Horizon Europe project that will connect and strengthen existing European coastal and marine biodiversity observation capabilities across Europe, while linking these to global efforts. The project aims to improve the acquisition, coordination and delivery of marine, coastal and freshwater biodiversity observations to relevant users, and to test new tools, technologies using eDNA, robotics, optical and acoustic techniques, and develop data integration methods for environmental modelling.

The OBIS Secretariat is involved in several project activities, including delivering Essential Ocean/Biodiversity Variables (EOVs) for marine and coastal systems, developing protocols and standard operating procedures for eDNA-based approaches, and contributing to the establishment and co-coordination of a Community of Practice for the project (the "MARCO-BOLO CoP"). Through the CoP, biodiversity data generators and users will be brought together to co-design and co-develop tools and services that are fit for purpose and suit the needs of users, including policy makers, industry, researchers, civil society, and other user groups.

For more information, see the project's website: https://marcobolo-project.eu

3.1.3.5. eDNAqua-Plan: A Plan towards an eDNA reference library and data repository for Aquatic Organisms, navigating Europe towards the next generation biodiversity monitoring

Start date: 01/09/2023
End Date: 31/08/2026

In the face of climate change and the critical need for effective biodiversity conservation, the eDNAqua-Plan project will address the challenges associated with aquatic environmental DNA (eDNA) research and will represent a significant step forward in the harmonization and advancement of eDNA application, offering a promising future for the monitoring and conservation of aquatic ecosystems worldwide. More specifically, the project aims to design a coordinated reference library and eDNA repository to enable the broad use and application of genomics tools in marine and freshwater biodiversity observation, monitoring, and research.

The project aims to achieve the following:

- Harmonized and interoperable infrastructure for aquatic eDNA data, promoting consistency and comparability across monitoring programs and research endeavours.
- An integrated open-access reference library for marine and freshwater species facilitating access to eDNA information and supporting researchers, policymakers, and stakeholders in their conservation efforts.
- Advancement of aquatic biomonitoring through harmonised eDNA data, providing a crucial basis for understanding and addressing the impact of climate change and other impacts on aquatic ecosystems.

- Global collaboration creating an international network of researchers and institutions working together to advance our understanding of aquatic biodiversity.

The OBIS secretariat is involved mainly in the work packages related to data standards and data interoperability. These work packages will develop a plan for a digital ecosystem that will make the sharing, analysis and use of eDNA data easier and more transparent. This work will help bring eDNA forward as a monitoring tool, not only in Europe, but also worldwide, by showcasing and proposing how the interconnected data resources that are needed in eDNA work can be maintained. OBIS involvement in this project highlights our role in eDNA data management. The project will greatly benefit from our network, and data sharing experience and expertise.

For more information, see the project's website: https://ednaquaplan.com

3.1.3.6. DTO-BioFlow: Integration of biodiversity monitoring data into the Digital Twin Ocean

Start date: 01/09/2023
End Date: 28/02/2027

Data on biodiversity comes from a variety of sources, including omics, optical identification, imaging, acoustics, and others. Although new technology (imaging, acoustics, DNA-based, satellite) enables biodiversity observations at previously unattainable scales and frequencies, many of these types of data require one or more processing steps to become digital, and thus remain unavailable and inaccessible, the so-called "sleeping data". DTO-BioFlow will awaken "sleeping" biodiversity data, enabling the ongoing flow of these and new data into the EU Digital Twin Ocean via primary integrators and EMODnet, generating a digital replica of marine biological processes and transforming new and current data flows into evidence-based knowledge.

The OBIS secretariat supports several activities in this project including the development of an inventory of unavailable data sources and constructing a priority list for integrating these unavailable sources. The inventory will inform the project as well as offer recommendations for enhancing or streamlining operational access and data flow.

For more information, see the project's website: https://dto-bioflow.eu

3.1.3.7. BioEcoOcean: Co-Creating Transformative Pathways to Biological and Ecosystem Ocean Observations

Start date: 01/02/2024
End Date: 31/01/2028

BioEcoOcean is a new Horizon Europe project that focuses on raising the technical readiness for important Essential Ocean Variables (EOVs) and co-creating a guiding Blueprint that seeks to

transform biological and ecosystem ocean observations. BioEcoOcean is spearheaded by Lina Mtwana Nordlund at Uppsala University. The project aims to create and test a globally applicable Blueprint for Integrated Ocean Science. This comprehensive blueprint will become a tool to guide ocean observing programs from the early planning stages, to data collection, to integrating results into policy and decision making. Importantly, the blueprint will include data management aspects to facilitate standardization of ocean observation data, and flow into global repositories like OBIS. As part of testing the Blueprint, the project is also conducting research on important EOVs to fill in knowledge gaps, particularly for plankton, marine organic carbon, fish, macroalgae, seagrasses, and other EOVs. Co-creation as a consortium and with interested parties in the relevant fields is highly emphasized to ensure the Blueprint will be useable for a diverse range of projects.

The OBIS secretariat will lead the development of the project's Data Management Plan, to ensure data generated by the project will seamlessly flow into OBIS as well as other relevant repositories like the GOOS BioEco Portal. Additionally, OBIS will lead development of the training materials that will enable widespread adoption of the Blueprint beyond Europe, extending the project's impact worldwide.

For more information, see the project's website: http://www.bioecoocean.org.

The **SG-OBIS suggested** developing and sharing a Github curated Data Management Template based on the ones created for Marco-Bolo and BioEcoOcean, for use by OBIS nodes and the wider community.

The **SG-OBIS thanked** the secretariat for providing an update on the implementation and progress of these extra-budgetary projects and **congratulated** the team on developing many new tools and applications.

The **SG-OBIS is excited** to see the secretariat play an important role in several new Horizon Europe projects together with other OBIS nodes like EurOBIS, OBIS UK, Black Sea OBIS and MedOBIS, who often have work package leading roles. The **SG-OBIS thanked** the European Commission for mentioning and promoting the collaboration with OBIS in several of these funding calls to make sure the new tools and solutions have international reach and are not only applicable within Europe.

AntOBIS asked if other OBIS nodes can also become involved and leverage the funding. The OBIS secretariat responded that there are strict rules, and the funding can only be allocated to consortium members as defined in the grant agreement with the European Commission.

AntOBIS asked if there are any new fundraising plans. The OBIS Secretariat reported that a new call for proposals under the new phase of the Flanders-UNESCO science trust fund (FUST) provides another opportunity to submit new proposals and invited the SG-OBIS to make suggestions. In UNESCO projects, we can set up implementing partnership agreements (IPAs) which we did for example with the University of the South Pacific in the PacMAN project. The

FUST call will close in June 2024 and concept notes are expected by 15 May 2024. In addition to fund raising for extra-budgetary projects, member states can also second staff to the OBIS secretariat and provide financial resources to the IOC special account to support the implementation of the OBIS work plan.

3.2. OBIS Executive Committee

Ms Katherine Tattersall reported on the OBIS Executive Committee activities and provided an update on IOC and IODE relevant decisions:

3.2.1. IOC Assembly and funding decision

At SG-OBIS-11 the OBIS steering group requested IOC Member States to advocate for more stable funding and a regular programme position for the OBIS data manager during the 32nd session of the IOC Assembly, which was held in June 2023. OBIS node managers worked with their respective IOC delegations to raise interventions on this topic and the Assembly supported the proposal, as reflected in the IOC Assembly meeting report (https://oceanexpert.org/document/32840):

"The Assembly called for an increased regular programme allocation for IODE as well as additional staff to ensure the long-term sustainability of OBIS. This additional regular programme position for the OBIS data manager will enable sustained technical support to the global network of national, regional and thematic OBIS nodes, to allow the expansion of OBIS with biological and ecosystem essential ocean variables of GOOS and to support the implementation of international agreements, such as the Kunming-Montreal global biodiversity framework under the CBD and the recent agreement on Biodiversity Beyond National Jurisdiction (BBNJ) under UNCLOS".

At the IODE Management Group meeting in February 2024, OBIS gladly welcomed the increase in IOC budget to IODE and the new status of OBIS as an IODE programme component. We see that the value of IODE work, including the work of OBIS, is recognised by both this general funding increase to the IODE programme, to be distributed amongst the Programme Components and Programme Activities and the creation of a new, ongoing technical staff position for OBIS.

OBIS welcomed the creation of a funded OBIS Technical and Scientific Coordinator position which will support the work of the programme secretariat and be responsible for technical and scientific coordination, implementation and maintenance of the OBIS data system and planning of related programme activities. The position was advertised, and the IOC are currently going through the recruitment process.

3.2.2. IODE restructure

At SG-OBIS-11 (May 2023), the OBIS Co-Chairs and Secretariat announced to the SG that in March 2023 the IODE had agreed to new Rules of Procedure (https://oceanexpert.org/document/33283) for the global projects that operate for IODE. Subsequently a restructure of IODE projects into IODE Programme Components, Programmes and Projects was proposed. Subsequently, in September 2023 an ad hoc meeting of the IODE Management Group approved definitions of these elements of IODE and the designation of each former IODE project within these new classifications (https://oceanexpert.org/event/3967). In this new structure, OBIS is a Programme Component with core IODE budget allocation and staff positions and overseeing a number of Projects. Across IODE the structure in September 2023 was agreed as follows:

I. ODIS (Ocean Data and Information System)

Programme Activities:

1. GODAR/ WOD (data)
2. GOSUD (data)
3. GTSPP (data)
4. IQuOD (data)
5. ICAN (data)
6. QMF (data)
7. OBPS (information) (IODE/GOOS)
8. OceanExpert (information)
9. AquaDocs (information) (IODE/IAMSLIC)

Projects:

10. Ocean InfoHub (FUST support ending June 2024 – to be absorbed into ODIS PC)
11. Under OBPS Programme Activity: ADAPT project (NORAD funded, ending mid-2024)

II. OBIS (Ocean Biodiversity Information System)

Programme Activities:
None

Projects:

1. PacMAN (FUST support until 30 June 2024)
2. eDNA Expeditions (FUST support until 30 June 2024)
3. MPA Europe (EU support until 30 April 2026)
4. Marco-Bolo (EU support until 30 Nov 2026)
5. DTO-BioFlow (EU support until 28 Feb 2027)
6. eDNAquaPlan (EU support until 31 Aug 2026)
7. BioEcoOcean (new, EU 4-year project not yet started)

III. OTGA (OceanTeacher Global Academy)

Programme Activities:
None

Projects:
None

IODE elements were requested to restructure as needed to align with the new IODE Rules and Procedures. They were also requested to provide a work plan and budget for approval by the IODE Management Group and the OBIS work plan and budget for 2024/25 were developed by the OBIS Executive Committee in a meeting in November 2023 (https://oceanexpert.org/event/3979). Two of the Intersessional Working Groups (IWGs) established during SG-OBIS 11 are focused on key areas of alignment:

- IWG-OBIS-Data Policy: data and metadata sharing guidelines that can be added as annexes to the new IOC data policy.
- IWG-OBIS-Structure: a new management structure aligned with IODE rules and procedures.

Outcomes from the IWGs are tabled in other sections below.

3.2.3. 5th OBIS EC meeting

In November 2023, the 5th OBIS Executive Committee meeting convened in Oostende, Belgium, to evaluate the progress of the OBIS 2023 work plan and budget and to develop a work plan and budget for the upcoming years. During the meeting the committee addressed various IWG action items, including the development of a draft communication and outreach plan, and the establishment of a new OBIS data policy and guidelines aligned with and implementing the recently adopted IOC data policy. Additionally, a comprehensive review of the OBIS management structure was initiated to align it with the new IODE Rules and Procedures. A proposal outlining a revised structure and updated Terms of References has been drafted to be presented to this Steering Group meeting under section 4 of our meeting agenda.

The EC-OBIS shared the proposed restructure and 2024-2027 work plans and budget with the Steering group in online debriefing sessions in November 2023. The feedback gathered from the SG-OBIS during those scheduled online briefing and question sessions was engaged and positive, acknowledging that the work was still in progress and more information would be provided as it becomes available. In brief, the new proposed OBIS structure intends to reinvigorate our focus on marine biodiversity **Data Mobilisation** and **Data Application** and will have three standing Coordination Groups with broad membership from our Node management and technical staff. The coordination groups are:

- **OBIS Nodes Coordination Group**

- **OBIS Data Coordination Group**
- **OBIS Products Coordination Group**

The Data and Products Coordination Groups will contribute to the technical and scientific coordination of OBIS and the Nodes group will play a role in monitoring and reviewing the OBIS work plan and budget, alongside the SG-OBIS, and will be supported by a part-time consultant community engagement officer to assist in the establishment of these coordination groups and to provide administrative support.

The community engagement officer will be funded through OBIS. Further regarding the OBIS Budget, technical and scientific workshops for the coordination groups will require travel funding and the biannual OBIS all hands meeting will also require travel funding for some Nodes. The in-person SG-OBIS meetings will continue to be a significant component of our annual expenditure. OBIS is self-sustaining for IT/website/software requirements and the new OBIS Technical Coordinator position assures us much-needed stability. However, annual digital infrastructure costs will draw on our budget, and will very likely increase over time. Finally, we plan a small but important allocation of funds for development of OBIS communication and outreach materials and distribution of these materials. The table below provides an overview of the proposed workplan and budget 2024-2025 (in US dollars). An extra column (in green) provides the numbers of already mobilized funding through extra-budgetary projects.

Table 2: OBIS budget as submitted to the IODE Management Group in December 2023.

OBIS	**2024**	**2024 exb mobilzation**	**2025**	**2025 exb mobilization**
OB 1 SG-OBIS meeting	15,000		15,000	
OB 2 OBIS coordination group workshops (data & products),	20,000		20,000	
OB 3 OBIS conference			40,000	
OB 3 Part-time consultant, community engagement officer, to assist the various OBIS Coordination Groups and partnerships	30,000		30,000	
OB 4 Cloud, software and hardware	15,000		20,000	
OB 5 OBIS branding material development and distribution	5,000		5,000	
FUST PacMAN		180,000		0
FUST eDNA exp		126,000		0
EU MARCO-BOLO		185,000		173,000
EU MPA Europe		200,000		182,000
EU eDNAquaplan		70,000		73,000
EU DTO-BioFlow		135,000		135,000
EU BioEcoOcean		230,000		200,000
EMODNET		5,000		5,000
Total for OBIS	**85,000**	**1,131,000**	**130,000**	**768,000**

3.2.4. IODE Management Group

The IODE Management Group met in Oostende in February 2024. The OBIS budget proposed by the EC-OBIS (see above) was tabled and approved. Katherine Tattersall presented an update on OBIS activities, and it was warmly received by the IODE MG.

During the meeting, Henrick Enevoldsen presented an update on the Harmful Algal Information System (HAIS) and recalled support from the IODE Committee for continued development of and fundraising for the HAIS portal (https://data.hais.ioc-unesco.org/). He stated that the publication of the first Global HAB Status Report (GHSR) was possible due to the establishment of the 'Harmful Algal Information System' (HAIS) as an element of the GHSR and as a data portal integrating the data from OBIS and the Harmful Algal Event Database (HAEDAT).

On behalf of the Intergovernmental Panel on Harmful Algae Blooms (IOC-FAO IPHAB) he expressed appreciation for the collaboration provided by the IODE programme in general, and by the technical OBIS staff in particular, for the development, hosting, and technical maintenance of the HAIS and HAEDAT data systems. He highlighted the importance of collaboration between IODE and IPHAB in particular in relation to:

(i) Advise HAIS partners and define amendments required to update HAEDAT to facilitate proper data entry, extraction and quality control.

(ii) Advise and encourage regional groups and editors on data compilation, quality control and submission of HAB data to OBIS/HABMAP and HAEDAT and production of associated metadata documents,

(iii) Develop a template, for FAO approval, for a short and concise annual summary of HAEDAT with the view to submit such summaries annually to the FAO Committee on Fisheries (COFI) and the Subcommittee on Fish Trade (COFI-FT) and starting in 2024 covering the year 2023,

(iv) Identify the focus of the second Global HAB Status Report, identify priority drivers and associated relevant global datasets. Engage with working groups, groups of experts within and outside IOC and individual scientists to identify time series of phytoplankton data including information on HAB species,

(v) Work with the IOC FAO IPHAB Task Teams to develop and implement the UN Decade Action – HAB Solutions.

IODE was requested to designate an expert for the TT-HAIS and the IODE Management Group instructed the SG-OBIS to designate a representative from IODE/OBIS in the TT-HAIS who can

then take part in defining detailed technical and financial requirements with input from OBIS experts.

The IODE MG meeting covered the actions, priorities and activities of all IODE elements and collaborations between IODE and other organisations globally. Specifically relevant to OBIS, the meeting addressed collaborations between OBIS and GOOS (BioEco Portal), and Ocean Decade Actions including OBIS 2030, Marine Life 2030 and the role of OBIS in European Commission projects. The meeting report is available from https://oceanexpert.org/document/33860.

The **SG-OBIS recognised** that there are many activities that OBIS undertakes to support work under IOC programmes (e.g. GOOS BioEco portal, GOSR portal, OA portal and HAIS portal) which are currently not a recognised IODE/OBIS activity and aren't represented in the new IODE structure. **The SG-OBIS asked** the OBIS Secretariat or Co-Chairs to bring this up at the IODE Management Group and consider adding those in the list of joint IODE-(IOC programme) activities. The **SG-OBIS requested** that IODE give these activities their own designation in the IODE structure framework and be addressed more formally, with a workplan and budget.

The **SG-OBIS proposed** that the representative from IODE/OBIS in the TT-HAIS be the soon to be appointed OBIS Technical Coordinator.

3.3. OBIS Nodes

Mr Ward Appeltans reported on the status of OBIS nodes. During the intersessional period (May 2023-March 2024), OBIS nodes published 18.1 million new records from 346 new datasets, adding 2,900 previously unreported marine species. Currently, OBIS has a total of 126.8 million occurrence records for 183,579 marine species from 5,122 datasets and is growing with on average one new dataset and 50,000 records per day.

The figure below shows the number of records and datasets published in OBIS through time. There is a jump after 2020, which might indicate that more time was available for scientists and data managers to process and publish data during the Covid pandemic, which is also visible in the increase of the number of papers citing OBIS.

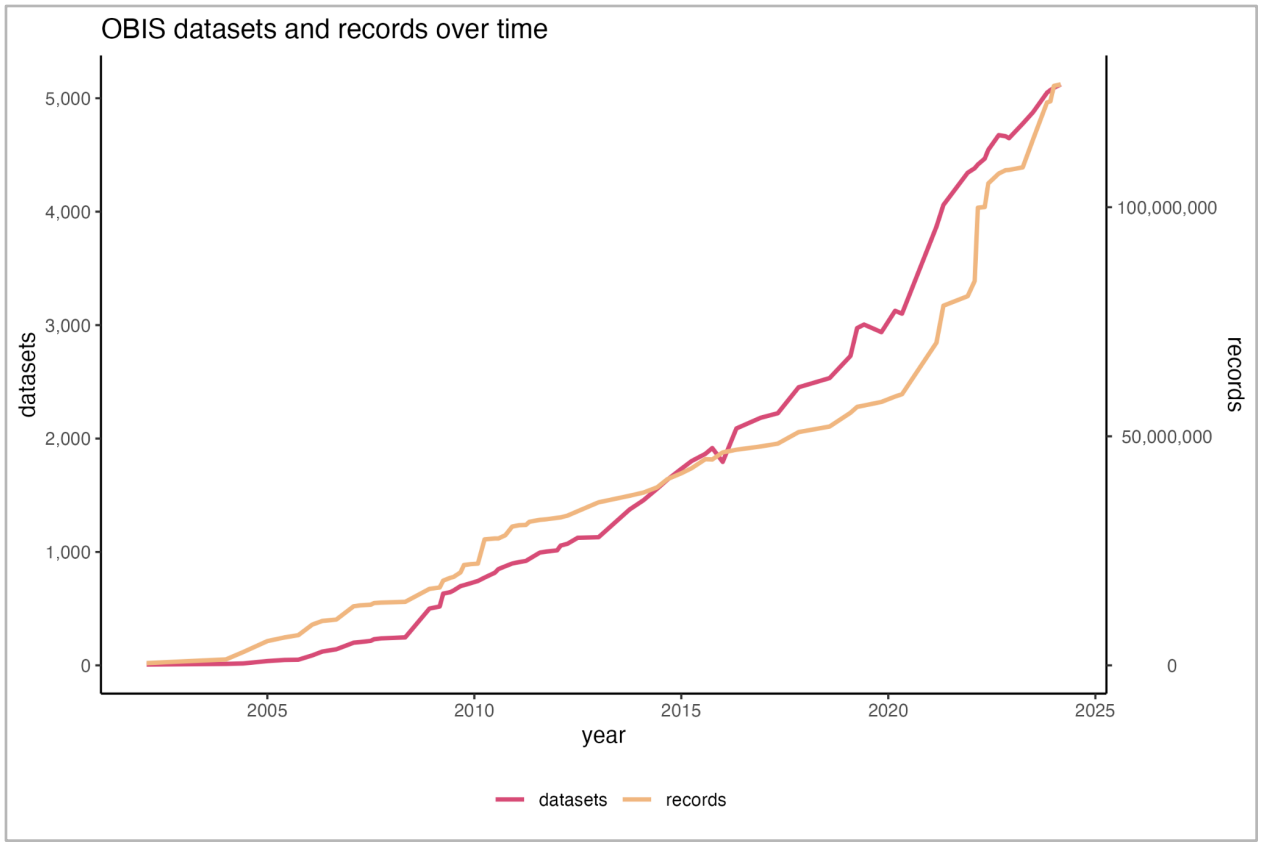


Figure 11. Number of datasets and records published in OBIS through time, starting from 2002.

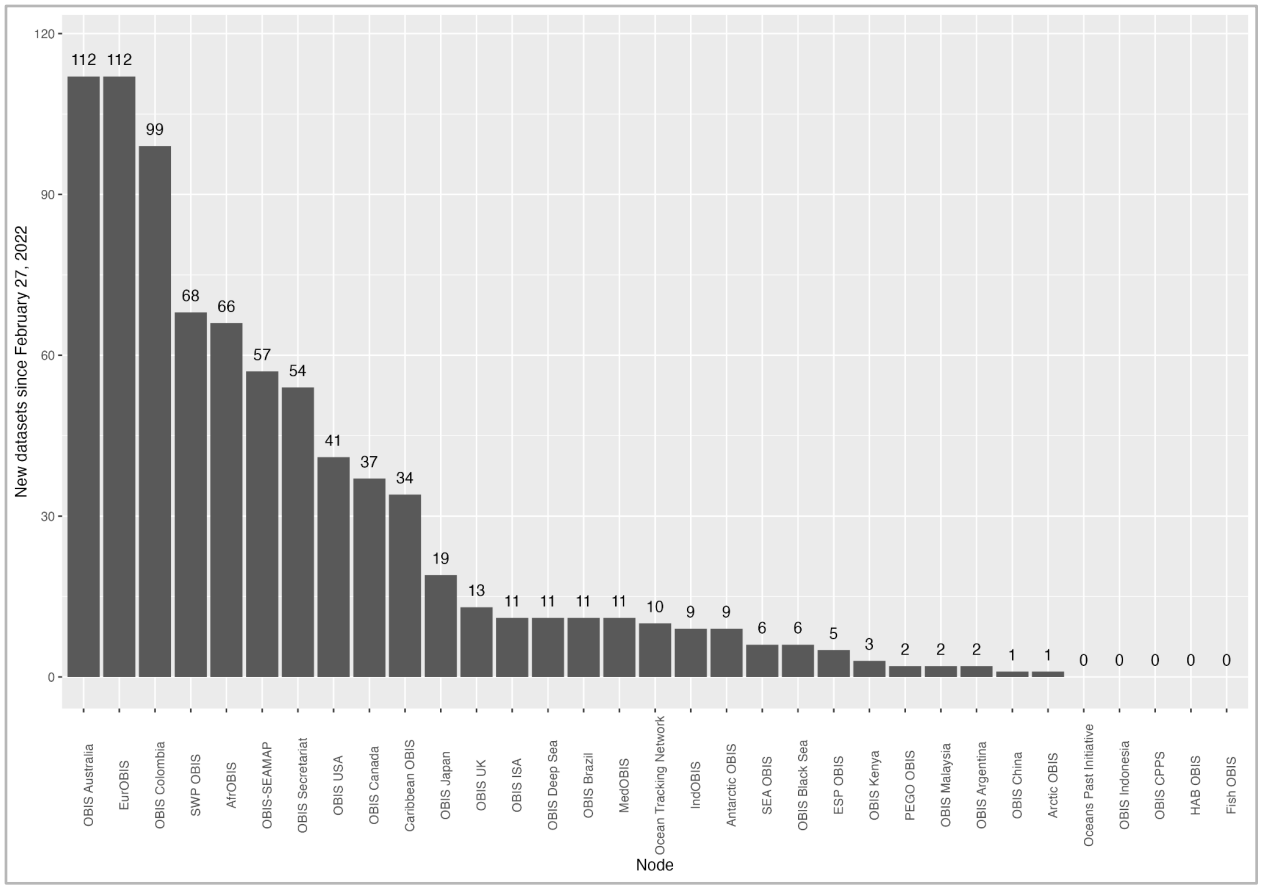


Figure 12. Number of new datasets per OBIS node published in the last two years.

Every year we assess the “health status” of OBIS nodes based on six criteria of which publishing new data to OBIS is one of them. Failing this puts the OBIS node in the ‘non-active’ basket and the SG-OBIS needs to formulate a recommendation to either re-activate the node or recommend the IODE Committee to accept the removal of the OBIS node from the network, while at the same time looking for a long-term or temporal solution and if desired still welcoming them back when they regained the capacity.

There are a few OBIS nodes that have not published new datasets (OPI, Indonesia, CPPS, HAB and FishOBIS). However, both HABOBIS and FishOBIS have published new data, but in existing datasets.

The programme manager informed the other OBIS nodes of their status and solicited feedback from them. OBIS-OPI, OBIS-CPPS, and OBIS Indonesia responded in writing.

Mr Udhi E. Hernawan (Head of Research Center for Oceanography (RCO), National Research and Innovation Agency (BRIN), Indonesia) apologised for the current idle status of the Indonesian OBIS node. BRIN is still actively exploring all possible ways to address this situation, especially how to revive the node and ensure its contribution to the OBIS community. He will keep us

updated and is hopeful for a positive resolution and thanked us for our understanding and patience.

Mr John Nicholls reported that the OPI (Oceans Past Initiative) group has been engaged in broad research and is compiling a series of datasets that will be used to inform publications that are in the process of being released. As soon as these publications are in the public domain, the datasets will be available to be submitted for inclusion in the broader OBIS big data arena. The historical datasets will range from ocean mammals to fish and will also incorporate zooplankton series. Release of the datasets is expected to be during 2024.

Mrs Mónica Machuca reported that during 2023, CPPS performed server maintenance and system updates, which caused the IPT to not be fully operational. In the meantime, the IPT is again fully functional, and 3 datasets covering 1,476 records have been published and we will continue to fulfil the responsibilities we have acquired.

Mr Ward Appeltans reported that discussions are taking place to bring the OBIS Brazil node, which was operated by the Long-Term Ecological Research Program Coastal Habitats of Espírito Santo (PELD HCES) under the GBIF Brazil node: the Brazilian Biodiversity Information System (SiBBr: www.sibbr.gov.br). In addition, GBIF Norway, which is a distributed network of institutions, is also keen in collaborating with OBIS and is exploring the option to become an OBIS node.

The **SG-OBIS acknowledged** the challenges faced by certain OBIS nodes in publishing new data. Because OBIS is in a transition period regarding its new management structure and reviewed the terms of reference for OBIS nodes, the **SG-OBIS** has opted to defer any decisions regarding inactive OBIS nodes until the next SG meeting.

The **SG-OBIS discussed** the diversity of strengths across the Nodes, recognising that some nodes are very strong in data publishing and others are strong in capacity building, training, and developing networks. There is a wide range of roles and relationships of OBIS Nodes with their domain and regional communities.

The **SG-OBIS proposed** that the history and evolution of OBIS nodes be documented to help “tell the story” of OBIS. The **SG-OBIS requested** that the Nodes Coordination Group consider this as an activity for the group.

The **SG-OBIS asked** the OBIS Nodes Coordination Group to consider developing an organisational chart of how OBIS fits into the IODE and IOC framework.

The **SG-OBIS requested** that the Nodes Coordination Group consider broadly mapping relationships for each node between OBIS, GBIF nodes, institutions, and governments to capture the diversity of landscapes that Nodes work in.

The **SG-OBIS discussed** how the role of Nodes has evolved over time and considered whether publication of data each year should remain as one of the Terms of Reference for OBIS Nodes.

Mr **Tshikana Rasehlomi (AfrOBIS)** noted that the SG-OBIS and OBIS community should be careful to maintain the role and identity of OBIS Nodes as data publishers and custodians, as the value of OBIS is to a degree considered to be in the data mobilised by OBIS.

Mr **Jon Pye (OBIS OTN)** stated that they report to funders on OBIS data publication rates as part of their mandates and KPIs and so would still find this information relevant, even if that component of the SG-OBIS report changes or disappears.

Mrs **Martha Vides (OBIS Co-Chair)** continued this agenda item. At the SG meetings, OBIS nodes are required to report on their activities over the last year. Prior to the meeting, the Co-Chairs and Secretariat provided a template to help collect the same type of information from across all Nodes which could help to clearly present our network strengths and understand the needs and strategic plans of our Nodes.

The following 21 OBIS Nodes responded, and a consolidated copy of all Node reports is available as Annex 8: Southeast Asia OBIS, OBIS Canada, Deep sea OBIS, AfrOBIS, AntOBIS, Caribbean OBIS, ESP-OBIS, IndOBIS, OBIS Japan, OBIS-UK, OBIS China, OBIS-SEAMAP, OBIS-AU, OBIS OTN, SWP-OBIS/SWPRON,OBIS-USA, OBIS Colombia, OBIS Malaysia, EurOBIS, OBIS Korea and OBIS Kenya.

Mrs Martha Vides invited the OBIS Nodes that were present to provide a summary on their activities and future plans.

The following Nodes made a presentation of the last year's results: Ocean Tracking Network, Antarctic OBIS, OBIS Malaysia, OBIS Japan, OBIS Australia, OBIS UK, OBIS USA, OBIS Canada, OBIS Kenya, AfrOBIS

The **SG-OBIS discussed** the need for Node stability, recognition and funding and acknowledged that perceived competition for limited funding resources between different individual OBIS Nodes and between OBIS Nodes and the OBIS Secretariat could be considered a threat. The **SG-OBIS suggested** that careful consideration should be given when developing new project proposals to make sure they do not compete with existing tools or activities by other OBIS nodes or secretariat and consider involving other OBIS nodes and the secretariat if possible and desired. The **SG-OBIS invited** all OBIS nodes to share information on their tools and developments through the Nodes Coordination Group, which should help avoid potential redundancy.

Productive suggestions came from the room for how node attribution might be improved. These included:

- Clarity of attribution for work done by Nodes
- OBIS Nodes might consider applying for ROR codes to help in citation of their work.

Mr **Stephen Formel (OBIS-USA)** proposed that:

- OBIS nodes join Standardising Marine Biological Data (SMBD) meetings, which can act as a model for how the OBIS Nodes coordination group could work.
- OBIS nodes consider using either the OBIS queue GitHub or the GBIF GitHub for data mobilization (https://www.gbif.org/suggest-dataset). Data providers can also work on the GBIF test IPT to create DwC-A without the need to have access to the node IPT.

The **SG-OBIS requested** the Nodes Coordination Group to consider these suggestions for OBIS nodes and discuss whether they might be adopted by some or all Nodes.

The **SG-OBIS encouraged** OBIS nodes to join the OBIS JupyterHub as the collaborative space that the OBIS secretariat is developing, which will provide a platform where we all can support and learn from each other.

3.4. OBIS Task Teams

3.4.1. OBIS Taxonomy Task Team

In the absence of Leen Vandepitte (Chair OBIS Tax TT), Pieter Provoost (OBIS data manager) reported that the OBIS annotated names tool has received some major updates: the set of annotation types has been simplified and improved, and the tool will be accessible for people outside VLIZ. In terms of numbers there are now 56,742 names from OBIS in the tool, of which 9,107 have been annotated in the past few years. For the remaining 47,635 names, we will be able to link 8,774 names (18%) to WoRMS using automated matching and add an annotation to 29,120 names (60%) using automated checks. A manual for the tool has been created and is available upon request for review by the SG members.

A component has been developed by the secretariat to submit names via the tool's API in an automated way.

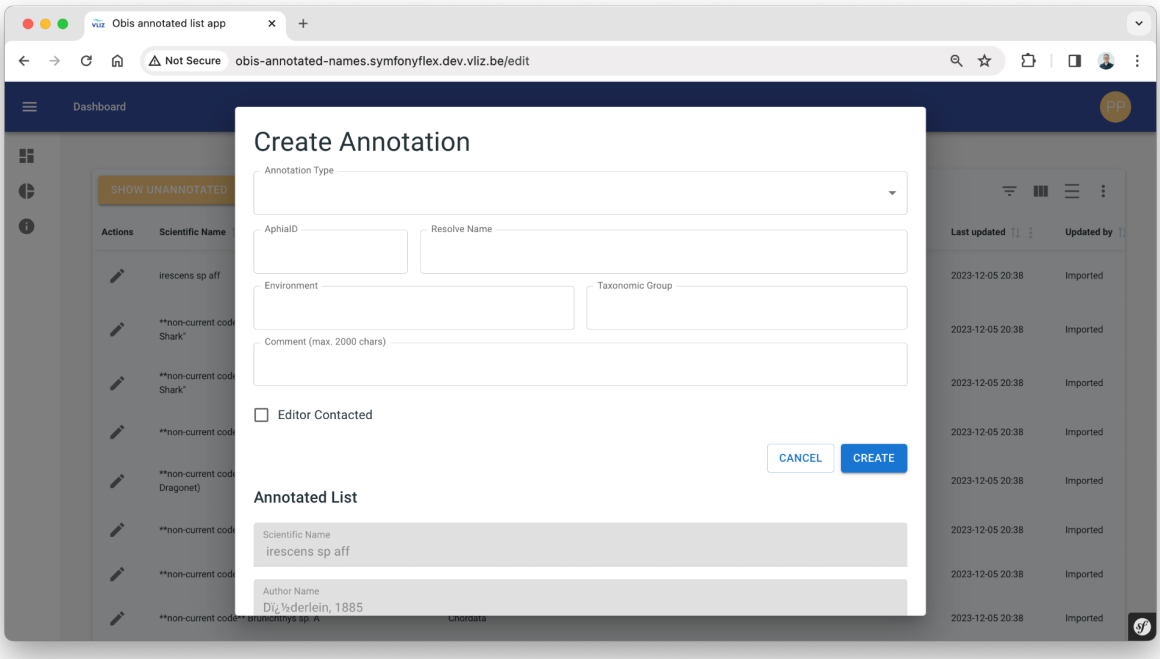


Figure 13. Screenshot of Taxonomic names annotation tool.

3.4.2. OBIS Capacity Development Task Team

Ms. Elizabeth Lawrence (OBIS CD officer) and Mrs Ana Carolina Peralta (OBIS CD TT Chair) (in writing) introduced this agenda item.

The CDTT has been actively involved in current training preparation and designing new programs with support from the OBIS Capacity Development Officer.

Carolina noted that the implementation of the new CD strategy has been initiated in accordance with the recommendations put forth by the IWG-OBIS-Structure. The strategy aims to enhance capacity building efforts within the OBIS community through a structured and regionally focused approach. The implementation plan will follow the new OBIS structure that is being discussed in the current SG meeting.

Below Elizabeth and Carolina outlined various OBIS capacity development activities.

OBIS Manual Updating

- Updating the OBIS Manual is a continuous task, where team members have been working to identify or address issues documented in OBIS Manual GitHub repository. 10 issues have been closed since the last SG meeting and ~50 commits have been submitted by Elizabeth Lawrence and Pieter Provoost. Updates included an extensive reorganization of the OBIS Manual so that now specific data formatting sections are clearly identified. Elizabeth thanked members of the OBIS Secretariat, the OBIS DQC team, the OBIS

Vocabulary Infrastructure team, the OBIS CDTT, and all others who contributed to this effort. The content of the Manual corresponds with the content on the OTGA/OBIS online course.

- Spear-headed by Elizabeth, 18 video training tutorials on data formatting were made available in English on the OBIS YouTube channel[8].
    - Collaborative efforts from four Latin American OBIS Nodes have led to two Spanish translations for the training videos becoming available, five audio translations currently in progress, and plans for the remaining 11 videos to be translated in the future. The Spanish videos can be found on this Spanish Data formatting playlist[9].

OBIS Online Self-Paced Training Course

Elizabeth Lawrence reported on the OBIS/OTGA Online course: Contributing and publishing datasets to OBIS (self-paced)[10] as she developed the course based on the updated OBIS Manual with feedback from the OBIS Secretariat and supported the course for its duration (Oct 2023 - Feb 2024).

- A total of 239 participants from 63 different countries enrolled in the English version of the course, with 41 receiving certificates of successful completion (>80% grade total across 22 assignments and quizzes). The course received feedback from 55 individuals and most of the feedback was positive, with particular emphasis on the use of training videos and valuable instructor feedback. Critical feedback included requests for synchronous meetings to encourage more engagement with/among participants, use of more videos and short exercises, support for new R users, confusion around the OTGA platform's navigation system, and a suggestion to reorder some course content (e.g. moving the module on controlled vocabulary earlier). The majority (72%) of participants noted that they spent between 20 to >40 hours on the course. Due to the intensive nature of the course, many participants were not able to complete the course and it is recommended to provide extensions and access for groups that require certification.

[8] https://www.youtube.com/channel/UCokyj9fP5DMQfIdUhtZT9tw
[9] https://www.youtube.com/playlist?list=PLIgUwSvpCFS6q2R0fstazk6HkFd2iSPs5
[10] https://classroom.oceanteacher.org/course/view.php?id=907

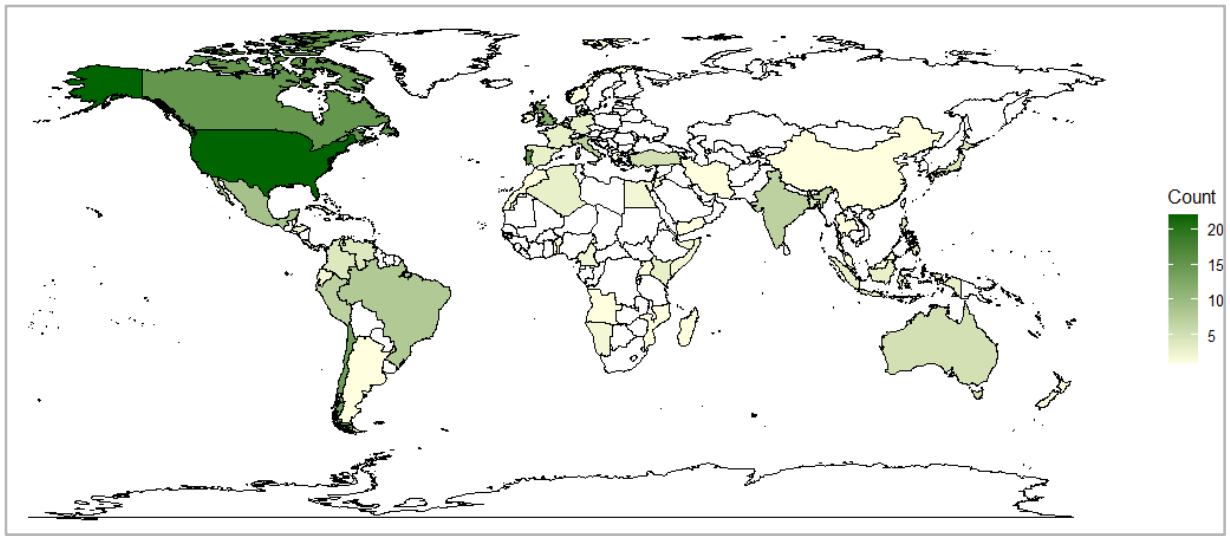


Figure 14. Map of participants' countries coloured according to the number of participants from each country (Count).

- Carolina noted in writing that a Spanish version of the course is still under development and is expected to be open in May 2024. Due to exceptional circumstances in terms of loss of staff and lack of availability for the remaining staff to meet the set preparation times, the opening of the course was delayed. The Spanish training material was prepared in collaboration with four Latin-American Nodes and was finalized and submitted to the OTGA RTC in 2023. Carolina pointed out that the development of modules for this course adheres closely to the outlined objectives of the "new OBIS Capacity Development Strategy," highlighting the potential for enhanced training outcomes through coordinated support among nodes, optimizing resources, personnel allocation, and curriculum development. Additionally, it ensures alignment with the specific needs and insights pertinent to the regions involved.

In-Person Workshop

- OBIS-ISA organized an in-person Workshop on Enhancing Biological Data Sharing to Advance Deep-Sea Taxonomy which was held in Vietnam in October 2023. Mr Ward Appeltans provided a demo of the OBIS portal and did an exercise/quiz with all participants.

Marine Biodiversity Data Mobilization Workshop

- The OBIS secretariat (Elizabeth) and Carolina Peralta (CDTT and Caribbean OBIS) are contributing training resources to the third annual Marine Biodiversity Data Mobilization workshop[11], a hands-on, interactive, virtual workshop focused on mobilizing marine biological observation datasets to OBIS by helping data providers standardize their data using Darwin Core. The workshop is jointly hosted by OBIS-USA, IOOS, Hakai, CIOOS,

[11] https://ioos.github.io/bio_mobilization_workshop/

MBON, OTN, and OBIS. This year >400 participants applied to join the workshop, so the team selected 100 participants to join for the 8 hours divided into two days. The large interest in this workshop demonstrates a great need in our community for more training opportunities for data standardization.

The **SG-OBIS expressed** gratitude to Elizabeth Lawrence for coordinating updating the manual with input from the wider OBIS community, creating and managing the OBIS online training course, and for creating the OBIS training videos and **suggested** adding tags to break down the videos into content components.

3.4.2.1. IODE internship programme

Mr Ward Appeltans introduced the NORAD funded project on IODE internships. After the successful online OBIS training course, the idea arose to offer internships at OBIS nodes to students that completed the training course. A concept note was developed by Johanna Diwa (IOC CD officer) and Carolina Mazzuco (OTGA coordinator) and the grant from NORAD funds was allocated.

The goal of this project is to build more expertise for the ocean, promoting collaborative opportunities for continuous professional development and lifelong learning. This will be done through promoting national and international exchange of professionals to acquire expertise related to the IOC mandate. Through a learning-by-doing approach, the interns will have the opportunity to learn from experts in the field and contribute to the development of new resources fit for the global or regional community. It is anticipated that an internship will be of 2-3 months duration and will be supported with a stipend.

IOC partner institutions, including OBIS nodes, will be invited to host, mentor, and supervise professionals for a short training period and specific product or service delivery, to be incorporated into the current IOC infrastructure (e.g. OBIS data system, OBIS data platform).

The internship period will be August-October 2024. The calls will be announced soon:

- April 2024: Call for Applications: Potential Host Institutions
- June 2024: Call for Internship Applications

The **SG-OBIS welcomed** the opportunity for hosting interns at OBIS nodes.

3.4.2.2. OBIS propagules program proposal

Mr Silas Principe introduced the concept of an OBIS propagules program. OBIS is an exceptional resource for marine researchers; however, a significant number of individuals are unaware of the platform's full range of capabilities. In this regard, OBIS is constantly investing in capacity building.

To add to this, we are now proposing the “Propagules program”, an initiative to increase awareness about OBIS capabilities among the next generation of marine scientists.

The OBIS “Propagules program” targets one part of the OBIS community - (under)graduate students - by inviting educators to incorporate OBIS content into their regular courses. This is achieved by providing resources, such as models for thematic classes, data kits, and virtual labs. Educators participating in the program also receive training and have the opportunity to engage in discussions and share their experiences within a community of like-minded educators. At the end, we anticipate paving the way for a newly skilled community of OBIS users.

Briefly, this program entails integrating OBIS data and tools into standard higher education courses with marine-related components, as well as into supplementary activities associated with those courses. The spectrum of implementation spans from straightforward thematic classes to the establishment of coding clubs. In addition to the resources curated by the secretariat and nodes (or guest educators), our objective is to establish a platform where every participant in the program can contribute their experiences and materials. This collaborative approach ensures that as the program progresses, a growing reservoir of resources will facilitate the emergence of novel and more innovative methods for integrating OBIS data into the curriculum. More information is provided in annex 2.

The **SG-OBIS welcomed** the OBIS propagules proposal and **requested** the OBIS secretariat to further develop the concept note into a full proposal and **submit** it to the upcoming FUST call.

The following OBIS nodes expressed interest to join the drafting group: OBIS Colombia, OBIS-UK, OBIS deep-sea, OBIS Ocean Tracking Network, OBIS Malaysia, OBIS-AU, OBIS Canada.

The SG-OBIS members contributed examples (for the areas of their node engagement) for how a Propagules program could be integrated to their domains:

Table 3. Overview of national initiatives to which an OBIS Propagules programme could link with.

OTN’s Ocean School (Canada)	OBIS Canada & OTN		https://oceanschool.nfb.ca/
Canadian Ocean Literacy Coalition	OBIS Canada & OTN		https://colcoalition.ca/
European Marine Science Educators Association	OBIS UK		https://www.emseanet.eu/
Marine Biological Association Young Marine Biologists (UK)	OBIS UK		https://mymba.mba.ac.uk/membership/categories-ymb.html

Aquatrax (now defunct)	OBIS OTN	An effort to bring animal movement data to senior classrooms	http://aquatrax.ca/
WHOI MBARI Scripps LUMCON	OBIS-USA	Research institutions that are associated with universities, rather than the universities themselves	WHOI MBARI Scripps LUMCON
The Sea Grant program	OBIS-USA		The Sea Grant program
Tulane LSU UNO Nicholls State University	OBIS-USA	Local connections with various universities in New Orleans area. Also, Frank Muller-Karger at USF might have good suggestions, and Steve Diggs at University of California	
CSIRO Education Programs	OBIS-AU		https://www.csiro.au/en/education/programs
University of Tokyo	OBIS-Japan	Connections with university programs on marine science and policy making	https://www.oa.u-tokyo.ac.jp/english/education-e.html
Africa Network of Deep Water Researchers	OBIS Kenya	Amalgamation of Research Institutes and Universities in the Global South under Challenger150	https://challenger150.world/african-network-of-deep-water-researchers/
KMFRI Early Career Capacity development	OBIS Kenya	6 Months Internship engagement at KMFRI to work with	

		OBIS data and Products	

3.5. OBIS project teams

3.5.1. OBIS Data Quality Control Project Team

Ms Yi-Ming Gan reported on this topic. She pointed to the full activity report which is available here: https://oceanexpert.org/document/33975.

In summary, to accomplish the objectives of the OBIS QC project team, we implemented a collaborative framework for quality control best practices within OBIS, which consisted of:

- The creation of communication channels: a dedicated slack channel and a GitHub repository[12]
- Holding monthly online meetings, including data laundry events
- Organizing surveys: OBIS user survey and internal survey

This framework helped us to perform the assigned task, which was to align the OBIS QC pipelines with the TDWG and GBIF quality checks.

A joint online meeting between OBIS QCPT, OBIS Historical Data Project Team, OBIS Secretariat, GBIF Secretariat and TDWG Biodiversity Data Quality (BDQ) task group 2 (TG2) was held on 3 February 2023. The outcomes of this meeting were:

- The alignment of the OBIS quality checks[13] with the core tests and assertions[14] developed by the TDWG Biodiversity Data Quality Tests and Assertions task group (BDQ TG2). The mapping is summarized on a wiki[15] as part of the QCPT GitHub repository.
- The incorporation of a link to the LifeWatch & EMODnet Biology QC tool[16] in a dialog box when users add their dataset to the OBIS network on IPT, available since IPT version 2.7.3.
- A summary of the OBIS and GBIF quality control tools, data flagging approaches and procedures pre- and post- publication with the aim of standardizing the quality control procedures across networks. This summary triggered an open Github discussion on merging the GBIF and OBIS validators[17].

[12] https://github.com/iobis/quality-taskteam/issues
[13] https://github.com/iobis/obis-qc/
[14] https://github.com/tdwg/bdq/projects/2
[15] https://github.com/iobis/quality-taskteam/wiki/Mapping-of-checks-in-obis%E2%80%90qc-to-TDWG-BDQ-core-tests-and-assertions
[16] https://rshiny.lifewatch.be/BioCheck/
[17] https://github.com/gbif/portal16/issues/1837

In summary, the project team completed the alignment of all obis-qc[18] quality checks to the Core Tests and Assertions[19] developed by TDWG Biodiversity Data Quality Tests and Assertions task group (BDQ TG2)[20]. The obis-qc is a Python library developed by the OBIS Secretariat that powers the quality checks[21] behind the OBIS portal. The mapping is summarized in the project team wiki. Tasks that are deemed out of current scope were listed as GitHub issues with a tag "won't fix"[22].

Future directions and Recommendations

While the project team addressed most of the tasks set out at the beginning, they were not always fully completed by the end of the project. In order to avoid the challenges encountered during these three years and with the intention of bringing OBIS data and procedures up to best practices, the project team proposes the following recommendations:

- Better align data quality procedures. Within OBIS, the obis-qc pipelines, and the R packages "obistools" and "EMODnetBiocheck" still need to be aligned for a standardization of quality control procedures within the network. It is essential that OBIS also aligns its quality procedures with the broader biodiversity informatics communities such as GBIF and TDWG.
- Request UNESCO to establish a permanent position for a full-time data manager at the OBIS Secretariat. This position is currently lacking but is vital in order for OBIS to participate in working groups related to OBIS operations such as TDWG BDQ task group 2. This would help to implement and maintain the outcome and vision of this project team.
- Optimize the functioning of OBIS Task and Project Teams. An assessment of how OBIS Teams are designed and carried out in order to be made sustainable is essential for the correct functioning of these teams.

During her report, Yi-Ming suggested that ongoing work will be required to keep the data quality tests up to date as there are still new tests being developed within the TDWG BDQ task group which hasn't yet wrapped up. She also suggested that spatially distributed OBIS nodes attend time zone appropriate communities of practice and channel lessons learnt back to OBIS.

Stephen Formel (OBIS-USA) suggested that OBIS Nodes might like to join a GBIF workshop/presentation about GBIF quality control that will be held next week.

Jon Pye (OTN-OBIS) emphasised that being able to cross time zones in our communication might help us work together well as a group when we can't be in the same room, e.g. educational licenses for Slack, or GitHub, or other.

[18] https://github.com/iobis/obis-qc/
[19] https://github.com/tdwg/bdq/projects/2
[20] https://github.com/tdwg/bdq/tree/master/tg2
[21] https://r.obis.org/quality/
[22] https://github.com/iobis/quality-taskteam/issues?q=label%3Awontfix+is%3Aclosed

The **SG-OBIS recommended** that the work of the OBIS Data QC Project Team be picked up within one of the OBIS Coordination Groups in order to continue to assimilate further tests and assertions as they are released by the TDWG BDQ task group. In addition, the **SG-OBIS proposed** to align OBIS-controlled tools such as 'obistools' with the broader biodiversity informatics community, while **recommending** that community-built tools such as 'EMODNetBioCheck' align in turn with OBIS QC regimes. Other recommendations from the Project Team report should be reviewed and considered.

The **SG-OBIS thanked** the OBIS Data QC Project Team for their exemplary efforts and achievements, for which they are very grateful.

3.5.2. OBIS Vocabulary Infrastructure Project Team

Ms Elizabeth Lawrence reported on the progress of the OBIS VIPT. The team held monthly meetings since the last SG to further develop important training resources for use of controlled vocabulary. Considerable development of resources has been created, including:

- The migration of Q01 terms to the P01 collection with assistance from Mrs Gwen Moncoiffe and the BODC team
- Near completion of a decision tree that helps users select vocabulary to populate the measurementTypeID, measurementValueID, and measurementUnitID fields.
    - Work remaining includes creating a separate measurementTypeID branch for sampling measurements once Q01 terms have been fully migrated to the P01 collection.
- Five training videos that introduce controlled vocabulary and the use of the decision tree. The videos are hosted on the OBIS YouTube channel, playlist: Using Controlled Vocabulary[23]. Further videos to be developed include one for measurementValueID and the above-mentioned branch for sampling measurements provided to measurementTypeID.

She also noted the team did not have an official chair or co-chair, and the OBIS secretariat had to step in.

The **SG-OBIS expressed** their deep appreciation for the work of Elizabeth Lawrence and the OBIS Vocabulary Infrastructure Project Team in enhancing the vocabularies that are managed by the BODC.

The **SG-OBIS thanked** NORAD and LifeWatch ERIC for supporting OBIS to develop training material regarding required precursor vocabulary mapping.

[23] https://www.youtube.com/playlist?list=PLlgUwSvpCFS4hADB7Slf44V1KJauEU6Ul

Mr **Dan Lear (OBIS UK)** asked whether it would be possible to have an interactive version of the vocab decision tree.

The **SG-OBIS decided** to establish an IWG-OBIS-Vocab with the following tasks:

- Completing incomplete tasks (video tutorials on measurementValueID and measurementTypeID: sampling measurements).
- A slimmed down flowchart/pathway for directing choice for researchers to help a time-stretched research community and lower a perceived barrier to data publication (or much smaller choice of appropriate terms).
- Vocabulary template that data providers can provide to node managers.
- A list of commonly used measurementTypes with suggested measurementTypeIDs
- Document and publish the reasoning behind different vocabulary term choices, to help the broader research community understand how to work with these terms.
- Report back at the next SG-OBIS meeting.

The Members of the IWG-OBIS-Vocab: OBIS-UK, OBIS Secretariat, OBIS OTN

IWG-OBIS-Vocab Chair: none at this moment.

A call for members and Co-Chair will be communicated by the OBIS secretariat.

3.5.3. OBIS Grand Unified Data Model Project Team

Mr Stephen Formel (OBIS USA), in lieu of Abby Benson, reported that the OBIS Grand Unified Data Model Project Team (GUMPT) addressed most of the tasks identified at the beginning of the project. However, not all tasks are completed, in part because the new data model (previously known as the Grand Unified Model) continues to develop and change. The project team met a total of eight times from June 2022 until October 2023, and identified ten model use cases as relevant to OBIS. The most completely explored were “camera traps”, and “environmental and community measurements.” The team also identified and explored a new use case, "absences". In conclusion, the project team noted that a future team could work with those publishing models once they are completed, to make a fuller assessment. Further details of all project tasks can be found in the report distributed to the SG-OBIS via email on September 26, 2023. The report can also be found at: https://oceanexpert.org/document/33978.

The **SG-OBIS thanked** the team for the excellent work done and agreed that we need to continue working in this space and represent the marine perspective as it develops.

The **SG-OBIS suggested** that the Data Coordination Group formally delegate OBIS nodes with an interest in the data model and other extensions (e.g. Humboldt) developments to join the relevant TDWG and GBIF groups as a representative of OBIS, follow-up on OBIS-relevant developments, provide feedback and report back to the OBIS data coordination group.

4. OBIS Future

Mr Ward Appeltans introduced this agenda item. He reported that there were several events that have an impact on the future of OBIS:

(i) The IODE Committee approved the designation of IODE activities as Programme Components, Programme Activities and Projects, and decided to designate OBIS, and ODIS, and OTGA as Programme Components.

(ii) The IODE Committee approved the "Rules of Procedure for IODE Programme Components, Programme Activities or Projects (MG918[24])" and instructed all projects to adopt these in their management structure by the next meeting of the IODE Management Group (February 2024).

(iii) The return of the USA to UNESCO, and the UNESCO Executive Board decision to allocate extra financial resources to IOC as well as the IOC Assembly resolution to prioritise IODE, GOOS, CD and regional activities in the allocation of the additional budget. This means that we will have a much better base funding for our OBIS activities. The IOC Assembly also requested the IOC secretary to create a regular programme position for the OBIS data manager. The proposed new staffing allocation has been approved by the UNESCO General Conference in November 2023, and the recruitment process has started.

At SG-OBIS-11, the steering group established an IWG-OBIS management structure with the task to propose a new OBIS management structure and working methods to be in line with the new rules and procedures for IODE programme components. And to reconsider the tasks of the OBIS Strategic Advisory Task Team in this new structure.

The work of the IWG commenced at the EC-OBIS-5 meeting and started with reviewing the Strategic plan for OBIS (OBIS business plan) which was adopted in 2014 and included the OBIS' vision and mission, objectives, needs assessments, contributions to IOC functions, resource requirements and organizational structure. A survey was published where we asked OBIS nodes to provide feedback to the ToR of OBIS nodes, the ToR of SG-OBIS and the OBIS vision, mission and objectives. 21 OBIS nodes responded, and the results of this survey were published as annex 1 in the EC-OBIS-5 report[25].

The EC-OBIS listed the elements in the IODE new rules and procedures that are important for OBIS or have an impact on OBIS (see p. 18-24 of EC-OBIS-5 report).

The EC-OBIS spent a considerable amount of time in reviewing the survey results, analyzing the new IODE rules and procedures, which was followed by brainstorming sessions on a new OBIS management structure and started drafting revised Terms of References for the OBIS steering

[24] https://oceanexpert.org/document/32232
[25] https://oceanexpert.org/document/33552

group, Co-Chairs and OBIS nodes. The EC-OBIS did not manage to review the vision, mission and objectives, nor drafted the ToR of the new coordination groups.

The OBIS Co-Chair Katherine Tattersall debriefed the OBIS nodes of the proposed new structure and proposed ToRs during two online information sessions covering different time zones.

4.1. OBIS Management Structure

Ms Katherine Tattersall introduced this agenda item. The first session of the IODE Steering Group for OBIS was held in 2011 following a recommendation from IODE-XX1.2. Under the original TOR it was recommended that "the membership of the Steering Group shall include the managers of OBIS Nodes or their designated representatives, and representatives from organizations contributing to the development and maintenance of the OBIS infrastructure."

OBIS now has 33 nodes and the current list of eligible SG members[26] (Node Managers and potential designated representatives) is 72 people which exceeds the number of SG members indicated by the Rules of Procedure for IODE Programme Components[27] (recommended to be "a manageable number, e.g. 20"). The IODE TORs also state that members of the SG should be selected based on their expertise and "not be considered as representatives of their country". Under IODE TORs for SGs the responsibility of SG members to attend meetings is underlined, as decisions can only be made if a quorum (50% of membership +1) is present.

The IWG-OBIS-Structure has sought to define an equitable way to reduce the size of our SG and to define a mechanism to rotate through eligible OBIS Node Managers and community members who are interested in joining the SG (see proposed TORs section 4.1.3). However, the IWG also very much wanted to provide a forum for all OBIS Nodes representatives, managers, staff, and affiliate partners to meet, hold workshops, report on working groups, coordinate activity, share training and strengthen our community. To do this, we have designed a flexible management structure that aims to give all OBIS community members an opportunity to participate in the SG, collaborate with other nodes, contribute to OBIS working groups, and that we hope will strengthen and grow our community.

[26] https://oceanexpert.org/group/230
[27] https://oceanexpert.org/document/32232

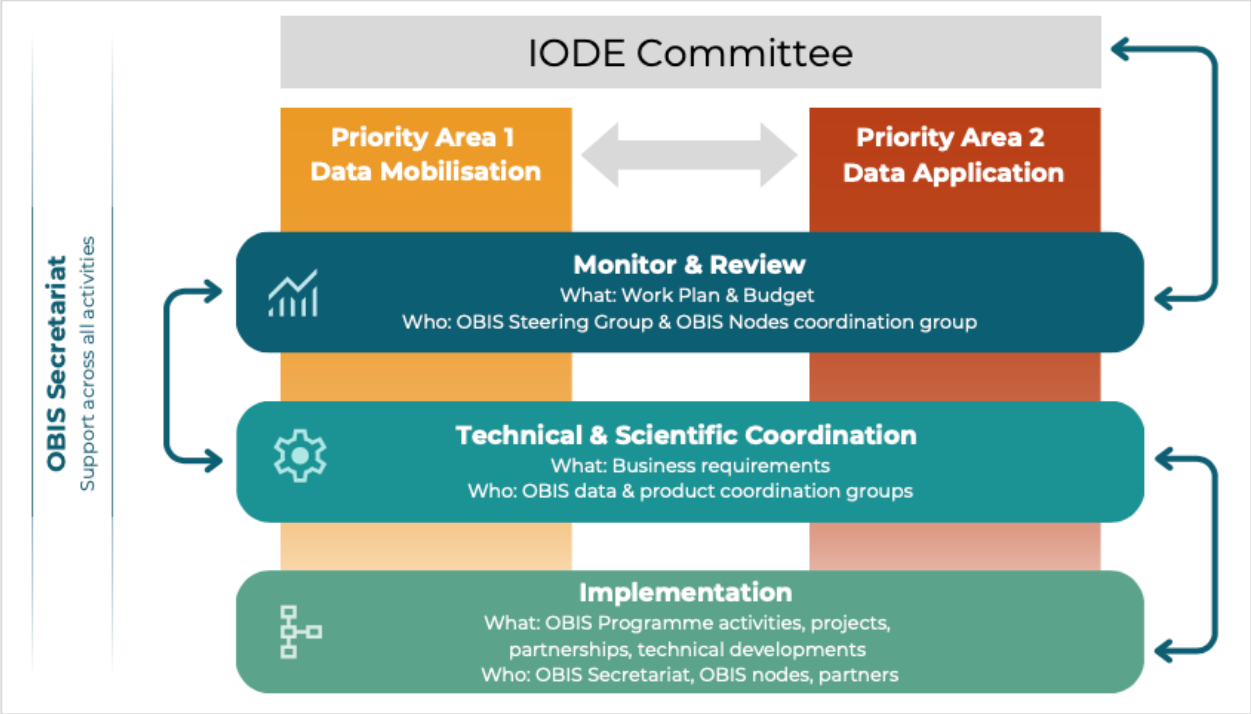


Figure 15. Overview of the new OBIS management structure.

The IWG-OBIS-Structure:

- Proposes one big **OBIS All hands** meeting every two years.
    - Attended by all OBIS community members and Node representatives.
    - Opportunity for nodes to discuss technical issues.
- Proposes **SG-OBIS meetings** annually.
    - Attended by a smaller OBIS SG
    - Focus on business and OBIS strategy.
- Proposes creation of a **Nodes Coordination Group**
    - Membership is mandatory for all OBIS Nodes
    - Co-Chairs of the Nodes Coordination Group will be, by default, members of the SG (additional to representative Node membership of the SG)
    - Will define priority objectives to guide the efforts of OBIS Nodes
    - The Nodes Coordination Group will be tasked with some responsibilities that previously were the work of the Strategic Advisory Task Team.

The IWG-OBIS-Structure anticipates that OBIS will continue to collaborate with GBIF to build and implement data infrastructure and publishing tools. OBIS will continue to focus on data mobilization (input) and data application (output), defining these as **Priority Areas** for OBIS. OBIS will collaborate with GBIF on the “middle layer”. Importantly:

- Many institutions now have an IPT and publish marine data directly to GBIF.
- OBIS nodes will have a mentoring role for local data providers in publishing to both OBIS and GBIF via either a GBIF or OBIS node or data provider publishing endpoint, with a shift

in OBIS node responsibility: not all marine data needs to be published on the OBIS node IPTs.

To guide and support **Priority Area 1: Data Mobilization** and **Priority Area 2: Data Application** across OBIS Nodes, the IWG-OBIS-Structure:

- Proposes two further Coordination Groups (to replace guiding role of task teams and project teams)
    - **Data Coordination Group (**data mobilization/input focus)
    - **Products Coordination Group** (data application/output focus)
- External (to OBIS) experts can be invited to join these groups and contribute.
- All OBIS nodes can choose to sign up to either of the two optional Coordination Groups.

Under the new IODE rules and procedures there is no scope for the Task and Project Teams that previously were fundamental to important work that the OBIS community has done at the direction of the OBIS SG. As discussed during SG-OBIS-11, we instead will have **Intersessional Working Groups (to be established by SG-OBIS)** and the three Coordination Groups.

To support our new Priority Area focus on data mobilization and data application, OBIS may enter into **partnership agreements** with long-term monitoring programmes. The IWG-OBIS-Structure:

- Proposes that regional and domain OBIS Nodes could be invited to join or lead these agreements where appropriate as partners and provide support services for mobilization of data.

To comply with the ”Rules of Procedure for IODE Programme Components, Programme Activities or Projects” the IWG-OBIS-Structure needed to make several updates to the Terms of Reference for elements of OBIS management structure. The following four items are specified by IODE as TORs for Programme Components:

- Steering Groups (4.1.3)
- Members of a Steering Group (4.1.3 - Membership)
- Steering Group Co-Chairs (4.1.4)
- Project Managers (4.1.5 - OBIS Programme Manager)

Outcomes of the mandatory revisions are described in relevant sections of this document.

At the same time and to improve alignment with the above TORs the IWG-OBIS-Structure revised TORs for:

- OBIS Nodes (4.1.2)
- Executive Committee (4.1.7)

IWG-OBIS-Structure also intends to develop TORs for the Coordination Groups (4.1.6).

Changes for OBIS Nodes arising from this proposed new OBIS management structure are:

- Nodes are members of the Nodes Coordination Group and must report to that group.
- Nodes need to express a desire to join the SG-OBIS and take on extra responsibilities.

- OBIS node staff (in addition to node managers) can join the data coordination group and products coordination group, which replace the task teams and project teams.
- Financial support may be available to sponsor attendance at a bi-annual OBIS all hands meeting, which is a different forum to the OBIS-SG meeting (all Nodes are invited to the all hands meeting).
- Nodes will be community/national focal points with an important coordination role supplementing an existing data publication role.

Table 4. Listing the major activities in the proposed new OBIS management structure.

Activity	**When**	**Participants**	**Frequency**	**Location**
SG-OBIS meeting	Mar-2024	OBIS SG (current membership)	Annual	Korea
SG-OBIS meeting	2025	OBIS SG (new membership)	Annual	TBC
EC-OBIS meetings		OBIS Executive Committee	Quarterly	Online
OBIS DCG meetings		OBIS Data Coordination Group	Monthly	Online
OBIS PCG		OBIS Products Coordination Group	Monthly	Online
OBIS NCG		OBIS Nodes Coordination Group	Bimonthly	Online
OBIS All Hands		All OBIS Nodes and community	Biannual	In person
GBIF/OBIS Partnership meeting	Feb-2024	OBIS Secretariat, OBIS Co-Chair, Past Co-Chair, PT Co-Chairs	Once off	In person
IODE MG meeting	Feb-2024	OBIS Secretariat, OBIS Co-Chair	Annual	In person
GBIF/OBIS collaboration feasibility study	Through 2024	OBIS Secretariat, OBIS Data and Product CGs	Once off	Online
OBIS Coordination Group workshops		OBIS Data and Products Coordination Groups	Ad Hoc (To be determined)	In person
OBIS technical development activities: new website, improved data QC and access (performance and filtering), data products platform	Through 2024	OBIS Secretariat	Ongoing	NA
OBIS training in collaboration with OTGA	Ending Feb 2024	OBIS Nodes, OBIS Secretariat	Ad Hoc (To be determined)	Online
Translating current OBIS course into other languages	Through 2024	OBIS Nodes	Once off	Online

OBIS branding material development and distribution	Through 2024	OBIS Secretariat	Once off	NA

4.1.1. OBIS Vision, Mission and Objectives

The IWG-OBIS-Structure has not finished reviewing the OBIS vision, mission, and objectives. Our current vision, mission and objectives are here: https://obis.org/about/.

4.1.2. TORs for OBIS Nodes

The IWG-OBIS-Structure invited the SG-OBIS to review the proposed new Terms of Reference for OBIS nodes:

Required

- OBIS nodes can be national, regional or thematic.
- Be an IODE National Oceanographic Data Centre (NODC), or IODE Associate Data Unit (ADU).
- Be responsible for ensuring the timely delivery of high-quality data (and metadata) and data flows from marine data providers to OBIS and/or other global aggregators (e.g. GBIF) following the principle of "publish once", the guidelines in the OBIS manual (with respect to obtaining permission, licenses, QC…) and the FAIR Data Principles[28].
- At least one staff member holds a current OBIS certification (completing recognized training OBIS/OTGA course "Contributing and publishing datasets to OBIS") with a 12-month grace period for acquiring said certification after a Node is established.
- Be compliant with the IOC data policy (http://iode.org/policy) and implementation guidelines from OBIS (Annex 3: Data Policy) with a 12-month grace period for achieving compliance after a Node is established.
- Be a member of the Nodes Coordination Group (Nodes CG), and other OBIS coordination groups if desirable.
- Provide an annual work plan to the Nodes CG and report on activities to the Nodes CG
- Provide user/community support (e.g., data queries, data analyses, and feedback).

Optional

- May maintain a presence on the Internet (e.g., a web page, social media, or data portal) representing their specific area of responsibility.
- May establish and/or join OBIS collaboration agreements with OBIS partners, and report on these collaborations to the Nodes CG.
- Encouraged to undertake outreach and communication activities (e.g. social media, conferences), in accordance with the OBIS Communication Plan (Annex 4).

[28] https://www.go-fair.org/fair-principles/

- Encouraged to engage in capacity development activities in collaboration with the OBIS secretariat. These activities may include offering expertise, conducting academic and professional training sessions, and providing support in various aspects of data management. Additionally, assistance in publishing data to global aggregators like OBIS and GBIF, utilizing relevant technologies, and applying our community standards and best practices.
- Encouraged to engage in adjacent and affiliated user communities and actively seek new partners (e.g. data providers, data using partners).

Notes:

- OBIS nodes are eligible to become a member of the SG and have voting rights. A formal letter expressing their commitment to contribute according to Terms of Reference of the SG must be renewed every 2 years.
- OBIS nodes can become a member of and contribute to the various OBIS coordination groups.

The **SG-OBIS adopted** the new ToR for OBIS nodes.

The **SG-OBIS requested** that (i) the OBIS Secretariat define a pathway for OBIS Nodes to complete required training within the next 12 months (existing nodes) or within 12 months of start date (if a new node) and (ii) The course assessment be streamlined as much as possible to reduce the number of assignments that need to be marked (and associated workload for Secretariat staff).

The **SG-OBIS acknowledged** that language may be a barrier in completing the required training, which is currently offered only in English, and asked the Secretariat to consider a mentorship pathway to help nodes who are doing assessment to navigate and complete the course.

The **SG-OBIS recommended** that the Data Coordination Group consider:

- Whether nodes can request for certification to be opened at any time, or there can be a schedule for training going forward (annual, quarterly opportunities, etc).
- If part of the assessment work can be distributed amongst volunteer nodes.
- Whether node-node mentoring can help new nodes to complete training, or supplement training.
- If the course can be opened more broadly and be made available to other partners.

4.1.3. TORs for OBIS Steering Group

The IWG-OBIS-Structure invited the SG-OBIS to review the proposed new Terms of Reference for the IODE Steering Group for OBIS:

Required

- Propose, and revise as necessary, the vision, mission, objectives, strategies (e.g. sustainability), management structure, work plans, budgets, and timetables for OBIS.
- Review and respond to reports from OBIS coordination groups.
- Monitor the implementation of the adopted work plan, identify any technical, scientific, or capacity challenges and suggest appropriate responses.
- Seek to support each other with resource mobilisation to advance the mission of OBIS together.
- Report to the IODE Management Group (every year) and IODE Committee (every two years).

Notes:

- Regular meetings of the Steering Group will be held at least once a year. The Co-Chairs can decide, in consultation with the members, to have additional meetings if needed.
- OBIS Steering Group decisions are made by consensus. Voting will only be organized if co-chairs identify that all means have been exhausted and no consensus can be reached with decisions accepted by two-thirds majority of members in attendance, with one vote per node in attendance.
- Co-chairs can act on behalf of their Nodes for portions of these meetings if they explicitly state the role in which they are acting.

Membership:

- Two Co-Chairs (2 seats), who are elected from the membership of the Steering Group.
- Co-Chairs of the OBIS coordination groups (6 seats). Appointments shall be for a term of 2 years, renewable for one further term.
- OBIS nodes (up to 16 seats): OBIS node managers (or one alternate) who are not already represented as co-chairs or CG co-chairs. Each OBIS node should inform the OBIS secretariat of any changes to their representative(s) as soon as possible. OBIS nodes need reconfirmation after two 2-year terms.
- OBIS secretariat (2 seats, ex-officio) OBIS Programme manager as SG-OBIS technical secretary, and OBIS technical coordinator).

The **SG-OBIS adopted** the new Terms of Reference of the IODE Steering Group for OBIS

Notes: OBIS nodes will be invited to become SG members via an official invitation letter.

The **SG-OBIS established** an IWG-SG-Membership to determine the process by which Nodes can self-nominate for the SG, ensuring representation and equity across Nodes.

The outcomes of the IWG-SG-Membership work will be reviewed for adoption by the SG-OBIS in an online intersessional ad hoc meeting, following which there will be a call to all OBIS Nodes for commitment to join the SG-OBIS.

The following nodes expressed interest in joining the IWG-SG-Membership: OBIS-UK, AntOBIS, OBIS Malaysia, OBIS Canada, OTN, OBIS-AU.

4.1.4. TORs for OBIS Co-Chairs

The IWG-OBIS-Structure invited the SG-OBIS to review the proposed new Terms of Reference for the OBIS Co-Chairs:

The role of (Co-)Chair(s) is:

- To (Co-)Chair sessions of the OBIS Steering Group and OBIS Executive Committee.
- To call for meetings of the OBIS Steering Group, in close consultation with the Programme Manager and/or IODE/OBIS Secretariat.
- To assist the Programme Manager and/or IODE/OBIS Secretariat with the preparation of OBIS Programme Component reports.
- To represent OBIS and its Steering Group, and to promote OBIS at meetings and other events.

Notes:

- Co-Chairs must act independently of other affiliations and will not represent their institution, node or country while performing co-chair duties.
- Co-Chairs may focus (in addition to the tasks outlined above) on particular elements of the OBIS work plan if they have specific expertise in those elements.
- Co-Chairs should expect to dedicate a minimum of 160 working hours per year to their duties, including monthly video conferences, one or more representations at IODE management group and Committee meetings, major international conferences or special events on behalf of OBIS, and leadership duties in preparation and execution of annual SG-OBIS meetings.
- Co-Chairs positions are not funded by IODE/OBIS, and SG-OBIS members seeking nomination to become Co-Chair are encouraged to obtain full support from their home institutions to cover time and expenses of the role as part of core duties. Travel support may be provided by the IODE OBIS Programme component when available.
- It is required that Programme Managers, IODE/OBIS Secretariat and OBIS Co-Chairs communicate frequently.
- Co-Chairs are elected based on their level of activity in the work of the Steering Group over a period of time, the respect they have gained from the membership of the Group and their professional expertise related to the subject of OBIS. Proficiency in the working language of the group is essential.
- Experience in mobilizing resources is an additional element but not a requirement.
- Elections of Co-Chairs can only be held during regular meetings of the Steering Group during which a quorum of the membership is present.
- Co-Chairs are elected for one inter-sessional period of the Steering Group (regular meeting), with the possibility of re-election for an additional term. In exceptional circumstances Co-Chairs (or one of them) can be re-elected for a third term. If more than one regular meeting is organized within a calendar year, then the term of office will be one

year. Exceptions (e.g. further extensions) are possible by a decision of the IODE Committee.

- In exceptional cases one or more Co-Chairs can be invited from outside the Steering Group if they can bring in exceptional expertise or experience or if no other candidates have come forward. In such cases the Steering Group will need to invite them as members first after which he/she/they can be elected (Co-)Chair(s). Non-voting members are ineligible to serve as Co-Chair.
- When (Co-)Chair(s) step down after one or two terms they may remain as members of the Steering Group and Executive Committee for the subsequent term. They should inform the OBIS Programme Manager at the time they inform of their decision to step down as co-chair.
- When Co-Chairs step down after one or two terms, they will become Past Co-Chairs and will be invited to provide guidance to the incoming Co-Chairs during the first term of the new Co-Chairs. This will be a voluntary service to the new Co-Chairs and the outgoing Co-Chairs may decline.
- Co-Chairs should inform the OBIS Programme Manager and IODE Secretariat of their desire to step down at least 6 months before the expiry of their term of office or next regular meeting of the Steering Group, whichever comes first. This will allow the Programme Manager and IODE Secretariat to start the election procedure for the new Co-Chairs.
- The Co-Chairs are not involved in the day-to-day implementation of OBIS which is the remit of the OBIS Programme Manager.
- Nominations for Co-Chairs shall be accepted from members of the SG-OBIS as either nomination on behalf of another or self-nominations.

The **SG-OBIS adopted** the new Terms of Reference for OBIS Co-Chairs.

4.1.5. TORs for OBIS Secretariat

The IWG-OBIS-Structure invited the SG-OBIS to review the proposed new Terms of Reference of the OBIS secretariat:

The OBIS secretariat, hosted at the UNESCO/IOC project office for IODE in Oostende (Belgium), provides training and technical assistance to its network of partners including OBIS nodes and data providers, guides and advices on the development of new data standards and technical developments, and encourages international cooperation and implement the OBIS work plan and oversees the budget, to foster the group benefits of the network.

The OBIS Secretariat currently has 2 fixed term regular programme positions: an OBIS programme manager and an OBIS technical coordinator with the following tasks and objectives:

The **OBIS programme manager** will:

- Coordinate the day-to-day planning and implementation of the OBIS work plan, including organizing meetings of the OBIS steering group, OBIS executive committee, OBIS

coordination groups (data, products, and OBIS nodes), and supervising the OBIS secretariat staff.
- Coordinate the planning and implementation of other Extra Budgetary projects.
- Support the implementation of the IODE work plan and assist with the planning and implementation of the IODE/OBIS contribution to the UN Decade of Ocean Science for Sustainable Development.
- Establish, maintain, and strengthen (international) partnerships (e.g., GBIF, MBON, GOOS, MarineLife2030, CBD, BBNJ, IPBES etc).
- Ensure a performance management culture within the secretariat team. Through regular staff team meetings: listen, seek views, monitor performance, solve problems, and meet needs of colleagues and collaborators. More specifically:
    - set clear objectives for the team and ensure effective/timely completion of all performance management related tasks.
    - provide regular performance feedback on the implementation of set task objectives, including expected behavior and development needs.
    - address all performance related issues in a timely manner and propose corrective measures for any under-performance. In cases of strong performance, commend staff and seek ways to leverage for improved overall team performance.
- Set professional and inter-personal development objectives.

The **OBIS technical coordinator** will:

- Be responsible for the technical and scientific coordination, implementation and maintenance of the OBIS data system and planning of related programme activities.
- More specifically:
    - In close collaboration with the Head of the IOC Project Office for IODE, OBIS programme component manager and OBIS team, establish technical programme goals, plan of activities, budget proposals, and performance measures - in accordance with technical guidance from the IODE Committee and OBIS coordination and steering groups.
    - Coordinate and provide technical maintenance and further development of the OBIS technology stack and infrastructure; Manage the technical implementation of the OBIS work plan; Manage and provide support to the OBIS data and products coordination groups; Provide terms of reference for, and monitor/evaluate progress of, contractors hired to provide technical work; Collaborate closely with the Ocean Data and Information System (ODIS) team to ensure interoperability between ODIS and OBIS.
    - Resource mobilization: Manage drafting technical and scientific aspects of extra-budgetary project proposals, as well as the technical and scientific implementation of approved extra-budgetary projects.
    - Networking and Outreach: Participate in meetings of technical groups as well as the OBIS steering group and other relevant events; Assist with the promotion and communication of the OBIS programme component.

- Provide assistance with technical support of IODE databases and other IT services of, or hosted by, the IOC Project Office for IODE, Oostende, Belgium.

The **SG-OBIS adopted** the new Terms of Reference for the OBIS Secretariat, Programme Manager and Technical Coordinator.

4.1.6. TORs for OBIS Coordination Groups

The IWG-OBIS-Structure has not finished drafting the Terms of Reference of the OBIS coordination groups, instead these were drafted during the session.

The roles and responsibilities of coordination groups are not regulated by IODE rules and procedures and IWG seeks input from the SG about how these coordination groups will best meet the needs of our network.

Each of the coordination groups will have one or two Co-Chair(s) who will:

1. Chair meetings according to the group's agreed-upon schedule.
2. Ensure that tasks are appropriately distributed amongst the group members.
3. Coordinate their activities with the other coordination groups.
4. Report to and represent their group at the SG-OBIS.
5. Participate/report in OBIS Executive Committee meetings.

Each group should also maintain a secretary position to promote consistent notetaking across meetings.

All coordination groups should use the same collaborative tools, proposed by the Secretariat and available in all countries, to maintain a clear record of group activities and progress accessible to the Secretariat and members of the OBIS Coordination Groups. The Coordination Group reports will be made public.

The **SG-OBIS agreed** with these principles for OBIS Coordination Groups.

4.1.6.1 OBIS Nodes Coordination group

The Nodes Coordination group (NCG) provides a forum for all OBIS nodes to discuss ongoing activities, priorities, and barriers they may be facing.

Membership to this group is mandatory for all OBIS nodes, with at least one representative from each node attending. Meetings will occur every two months. Chairs will lead the membership in pursuing methods to promote communication from all parts of the world and overcome the challenge of time-zone coordination (e.g. leveraging asynchronous communication methods).

OBIS Node Coordination Group activities will include:

- Facilitate inter-Node communication and exchange of expertise.
- Define priority objectives to guide the efforts of OBIS Nodes.
- Coordinate and distribute the work related to mobilisation of datasets.
- Provide advice to the OBIS Steering Group on the OBIS science mission, policy, and management relevance and strategic priorities.
- Identify and pursue new directions, potential pilot projects, potential resources, and areas of development for data-driven research and ocean policy and management applications, as well as investigate timely topics to help set future strategic directions.
    - This will be done in coordination with the Data Coordination Group and Products Coordination Group.
- Coordinate communication of Node successes and achievements.
- Provide annual OBIS node activity reports and mutual support for the challenges of individual nodes.
- Identify and resolve training needs within the community.
- Coordinate and implement any inter-Node related activities agreed-upon by the SG to achieve the OBIS mission.

The **SG-OBIS adopted** the Terms of Reference for the OBIS Nodes Coordination Group.

4.1.6.2 OBIS Data Coordination group

The OBIS Data Coordination Group (DCG) will focus on topics/issues related to OBIS Priority Area 1: Data mobilisation and input.

The OBIS data coordination group will consist of one or two Co-Chairs and a body of voluntary members. There will be no limit to the number of members who can join. Members can include OBIS Secretariat, OBIS node staff, as well as interested or invited experts.

The OBIS data coordination group will:

- Identify, prioritise, and propose solutions for issues around the following topics:
    - Data and metadata standards and formats
    - Data QC
    - Taxonomy
    - Vocabularies
    - Methods of bringing new data into the system

- Identify data gaps and, in collaboration with the OBIS Nodes Coordination group, prioritise and coordinate data mobilisation efforts.

- Ensure the fitness of quality metrics for assessing the current status of OBIS data (e.g. spatial and taxonomic completeness).
- Maintain the OBIS Manual; especially regarding standards or methods.
- Engage with activities of other relevant bodies (e.g. TDWG, GBIF, GOOS, SCOR) by identifying representatives who will report back to the group.

The **SG-OBIS adopted** the Terms of Reference for the OBIS Data Coordination Group.

4.1.6.3 OBIS Products Coordination group

The OBIS Products Coordination group (PCG) is a collaborative and interdisciplinary group that is driven by the importance of creating data and information products (i.e. indicators) that are scientifically sound, practical, and relevant to decision-makers in government, industry, and civil society. PCG focuses on OBIS Priority Area 2: Data application and output.

The PCG will consist of one or two co-chairs and a body of voluntary members. There will be no limit to the number of members who can join. Members can include OBIS Sec, node staff, as well as interested or invited experts.

We consider data and information products any type of analysis (description, data visualisation, etc.) that synthesises and generates new information from data hosted on OBIS and other sources.

The OBIS Products Coordination Group will:

- Identify, prioritise, and coordinate the development of data and information products that are of interest to our user community.
- Advise on how best to showcase and catalogue data and information products developed by the wider OBIS community, in line with the OBIS data policy, including proper acknowledgment of other formats of resources (e.g. software applications, workflows, papers, etc.).
- Set minimum metadata and quality requirements for data and information products.
- Propose and develop tools, pipelines, and documentation that can bolster the development of products based on OBIS data.
- Support groups/institutions working on products development (e.g. early warning systems, ecological synthesis groups, etc.) to identify potential collaborations.
- Propose a process for frequent expert validation of data and information products by consulting with local scientific experts and end-users (including local communities and indigenous people).
- Engage with activities of other relevant bodies by identifying representatives and report back to the group.

The **SG-OBIS adopted** the Terms of Reference for the OBIS Products Coordination Group.

4.1.7 TORs for OBIS Executive Committee

The IWG-OBIS-Structure invited the SG-OBIS to review the proposed new Terms of Reference of the OBIS Executive Committee

The OBIS Executive Committee will:

- Support the secretariat and assist with the management of OBIS.
- Address issues that arise intersessionally.
- Work with the secretariat to draft documents, monitor the work plan, and otherwise ensure that the work of the Steering Group and Coordination Groups progresses.
- To monitor the implementation of the adopted work plan, identify any technical, scientific and capacity challenges and suggest appropriate responses.

Notes:

- The OBIS EC meets 4 times per year, online and in-person if necessary.
- The OBIS EC can invite experts to join a meeting as required.

Members:

- SG-OBIS Co-Chairs and the most recent outgoing Co-Chair(s).
- Coordination groups Co-Chairs.
- Secretariat/ Programme Manager.

The **SG-OBIS adopted** the new Terms of Reference of the OBIS Executive Committee.

4.2 OBIS data policy

Mr Ward Appeltans reported that the IOC Assembly adopted a new IOC Data Policy and Terms of Use[29] (IOC Decision A-32/4.4, 2023) and requested that IOC programmes, projects as well as other communities of practice should develop and/or apply, where applicable, detailed metadata, data and products sharing guidelines that are consistent with this new policy.

The OBIS guidelines on the sharing and use of data in OBIS was agreed at SG-OBIS-IV (Feb 2015) and adopted at IODE-XXIII (March 2015) and was based on the principles of the previous IOC data exchange policy. The SG-OBIS-11 (May 2023) decided to set up an IWG Data Policy to fulfil this task before the next SG meeting and suggested combining this task with the IWG OBIS-Structure.

The OBIS secretariat provided a draft OBIS data policy, which is available in Annex 3.

[29] https://iode.org/policy

The **SG-OBIS adopted** the OBIS data policy as guidelines to implement the IOC data policy principles and **requested** the OBIS secretariat to submit this policy to IOC for addition as annex to the IOC data policy.

The **SG-OBIS recommended** further development of the mechanics of implementing the CARE principles in the OBIS manual.

The **SG-OBIS requested** the OBIS secretariat and Data Coordination Group to provide guidelines to nodes for long-term archival of data, via the Node Coordination Group.

4.3 OBIS communication plan

Mrs Martha Vides introduced this item. An outreach and communication strategy for OBIS is essential for effectively sharing information, engaging with stakeholders, and promoting the programme's goals and achievements. The SG-OBIS tasked an intersessional working group to develop a new OBIS Outreach and Communication Plan. During the EC-OBIS meeting in November 2023, we drafted an OBIS Communication Plan which is available in Annex 4.

The **SG-OBIS adopted** the OBIS communication plan.

The SG-OBIS recommended the OBIS secretariat to create an OBIS wide 'Risk Register' to track and manage the likelihood and impact of the range of risks faced across the programme.

4.4 OBIS products

Mr Silas Principe introduced this agenda item. OBIS developed the OBIS2030, an UN Ocean Decade endorsed project, to provide a biodiversity data hub made up of standardised, quality controlled and managed data to support the Ocean Decade objectives. This will help researchers, practitioners, and decision makers to protect and restore marine ecosystems and protect life in the ocean.

One integral part of the OBIS2030 targets is to create and publish information products, at global, regional, and national scales to feed directly into reporting and assessment processes. This should occur by providing a platform to (jointly) develop and share reliable biodiversity indicators and information products that describe changes in marine ecosystems.

To start with the implementation of those solutions, the SG-OBIS decided to establish an open-ended intersessional working group on OBIS-based marine biodiversity indicators and information products (IWG-OBIS-PRODUCTS).

The IWG-OBIS-Products is a collaborative and interdisciplinary group that is driven by the importance of creating indicators and information products that are scientifically sound, practical, and relevant to decision-makers in government, industry, and civil society. Our main objectives are to:

- Review existing OBIS information products.
- Identify product needs (at local, regional, or broader scales) in order to create a plan for future product implementation by contacting nodes and interested parties, including the diverse community of users.
- Perform a systematic analysis of the data in OBIS, identifying geographic and taxonomic gaps, which can help identify indicator species and ecosystems or strategies for species distribution modelling.
- Contact ecological synthesis centres/groups to promote an exchange of knowledge and gather suggestions/advice on possible products that could be derived from OBIS.
- Propose a process for frequent expert validation of information products by consulting with local scientific experts and end-users (including local communities and indigenous people).
- Discuss the relevance of supporting community generated OBIS products and establish a potential framework for receiving and sharing those products.

Part of those objectives were already completed and generated a concept note for an OBIS data product portal, which is available in Annex 5.

The **SG-OBIS welcomed** the draft concept note of a data products portal and **requested** the OBIS secretariat to further develop this into a project proposal for funding, potentially for a FUST/Flanders funded project, and **requested** all OBIS nodes to support and be involved in this.

The **SG-OBIS provided** the following suggestions for the data products portal:

- Request for a recommended folder structure (Steve Formel)
- Request for ability to pull from GitHub repository (Jon Pye)
- Request for some governance around using the repository for training (Hanieh)
- Clarification about installing packages for read-only users (Ming): they can be installed in a session but closing a session will mean that the packages “disappear”. For persistence they would need to be installed by admin.

5 OBIS partnerships

5.1 GBIF

Mr Stephen Formel (OBIS USA) reported on this agenda item. As a follow up and upon the request of the SG-OBIS-11, we organized an OBIS-GBIF consultation meeting that took place at the OBIS secretariat on 8-9 February 2024 in Ostend, Belgium[30]. There were 15 participants representing the secretariats of OBIS and GBIF, the OBIS co-chair, OBIS nodes (Antarctica, Australia, Europe, USA) and GBIF nodes (Antarctica, Norway, France, USA) and external advisors representing MBON.

To recap, GBIF and OBIS have signed a five-year agreement[31] (in 2020, which was the second agreement after the first one signed in 2014), to promote further cooperation across a wide range of activities and services between the two global biodiversity data networks. The Letter of Agreement targets both (i) technical collaboration, covering data standards, publishing and processing; and (ii) institutional collaboration to ensure closer ties between OBIS and GBIF nodes, shared training opportunities and aligned documentation.

During this meeting a draft joint strategy, action plan and annual work plan has been developed (see Annex 6). The SG-OBIS is invited to review this joint GBIF-OBIS marine strategy and action plan.

The **SG-OBIS endorsed and celebrated** the joint GBIF-OBIS marine strategy and action plan.

The **SG-OBIS requested** the OBIS Secretariat to engage with GBIF to develop speaking notes about the partnership with GBIF. The notes should be applicable for communication at both the Secretariat and Node level, and the messaging should also be shared with GBIF Nodes.

The **SG-OBIS requested** that after notes are distributed, there be an ad hoc SG meeting with the opportunity to ask questions of the OBIS Program Manager and the GBIF Deputy Director.

The **SG-OBIS requested** that a joint communication be developed rapidly to support an announcement of the partnership which should come from the OBIS and GBIF Secretariats and that there be a moratorium on a public announcement until the release date.

The **SG-OBIS suggested** that the announcement be tied to an existing notable calendar event e.g. Earth Day April 22nd or International Day for Biological Diversity May 22nd.

5.2 GOOS and BioEco panel

Mr Ward Appeltans reported that the collaboration with the Global Ocean Observing System (GOOS) and its BioEco panel remains a high priority for us and will be further strengthened under the EU projects Marco-Bolo and BioEcoOcean. As reported in previous sessions, the OBIS

[30] https://oceanexpert.org/event/4048
[31] https://obis.org/2020/09/07/obis-gbif/

secretariat developed the BioEco portal and supported the feeding of observing programme metadata. Further development and management stalled because of lack of funding, but discussions are now happening at GOOS Steering Committee and GOOS Observation Coordination Group (OCG) level on the potential future role of OBIS and the BioEco portal in monitoring and coordinating the biological component of GOOS as part of a fully integrated GOOS. This typically is an activity undertaken by OceanOPS in Brest for the physical/climate observing system, but not for biogeochemistry and biology.

The proposal is to have this role assumed by the OBIS secretariat in close collaboration with the GOOS BioEco project office and the OceanOPS office.

The aim is for the BioEco portal to harvest metadata from the EOV observing programmes through OBIS and the IOC Ocean Data and Information System (ODIS)/Ocean Information Hub (OIH), which then feeds the BioEco portal, and to connect the BioEco portal with OceanOPS to feed information into the annual GOOS report cards.

Through funding from Marco-Bolo, we are currently connecting the BioEco portal to ODIS.

A fundamental step now is to develop and agree on the minimal required metadata fields and interoperable linked-open data specifications/ontology so that the observing networks or programmes can start publishing the metadata and make those discoverable through ODIS technology.

Below is a schematic diagram of the BioEco portal data flow (current and planned).

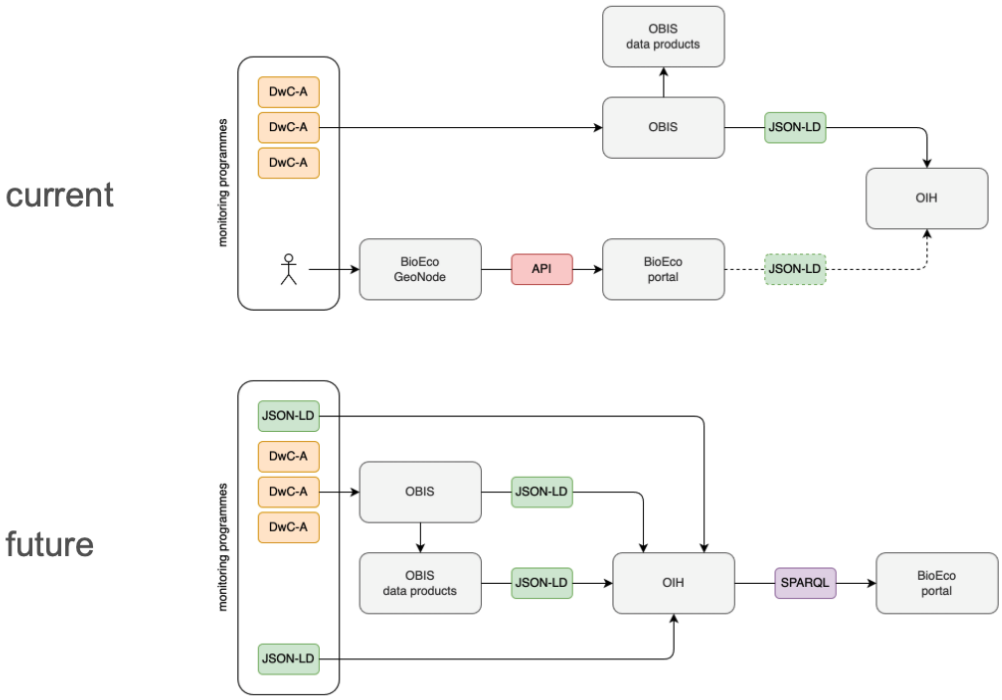


Figure 16. Top: current schema of the BioEco Metadata Portal, requiring manual input of metadata records. Bottom: planned schema of the BioEco Metadata Portal.

The **SG-OBIS welcomed** the continued collaboration with GOOS and **requested** IODE and the OBIS secretariat to work with GOOS to develop a work plan and budget and formally recognize this activity under the OBIS programme component within the new IODE framework.

6 OBIS workplan and budget

Mrs Katherine Tattersall presented the OBIS work plan and budget. OBIS had to submit its workplan and budget to IODE before the end of November 2023 and was adopted by the IODE Management Group during its meeting on 5-7 February 2024.

The budget for 2026-2027 are indicative and will depend on the budget allocation to IODE in the next biennium.

Table 5: OBIS work plan and budget 2024-2025. The figures covering 2026-2027 are indicative.

Activity		**2024**	**2025**	**2026**	**2027**
Meetings (travel & subsistence)	SG-OBIS meeting 25-29 March 2024, South Korea, in person	15000			
	SG-OBIS meeting 2025, TBD		15000		
	SG-OBIS meeting 2026, TBD			15000	
	SG-OBIS meeting 2027, TBD				15000
	OBIS All hands meeting, bi-annually, in person, back-to-back with SG and possibly another major conference (e.g., IODC-3, WCMB 2026 in Ostend)		40000	40000	
	EC-OBIS meetings, quarterly, online	0	0	0	0
	OBIS Data Coordination Group meetings, monthly, online	0	0	0	0
	OBIS Product Coordination Group meetings, monthly, online	0	0	0	0
	OBIS Nodes Coordination Group meetings, quarterly, online	0	0	0	0
	OBIS coordination group workshops (data & products), time and place TBD, in person	20000	20000	20000	20000
	IODE MG meetings (e.g. 5-7 February 2024, Ostend, Belgium, in person), in-kind co-chairs	0	0	0	0

	GBIF/OBIS meetings (e.g. 8-9 February 2024, Ostend, Belgium in person	0	0	0	0
Staffing	Part-time consultant, community engagement officer, to assist the various OBIS Coordination Groups and partnerships	30000	30000	30000	30000
	Other OBIS staff (currently 6) covered by RP and XB projects	0	0	0	0
Technical infrastructure	OBIS website and portal developments. Covered by additional RP position	0	0	0	0
	Cloud, software and hardware	15000	20000	25000	30000
Capacity Development	OBIS training courses in collaboration with OTGA. Covered by XB funding (NORAD, FUST)	0	0	0	0
Communication and Outreach	OBIS branding material development and distribution	5000	5000	5000	5000
		85000	**130000**	**135000**	**100000**

The **SG-OBIS agreed** with the OBIS work plan and budget, and **thanked** the OBIS-EC for preparing the work plan and budget and having provided an opportunity to check-in with OBIS nodes to provide feedback prior to submission to the IODE MG.

The **SG-OBIS thanked** the IODE MG for approving the work plan and budget without changes and is **grateful** for the increase in budget.

7 Election of new OBIS Co-Chair

Mr Ward Appeltans reported that Martha Vides completed her two terms as Co-Chair and therefore a new co-chair had to be appointed.

Mrs Martha Vides expressed her gratitude for the opportunity as she completed her second term as Co-Chair:

“Being Co-Chair of OBIS is not only a tremendous responsibility but also a profound source of pride. It entails leading a network of dedicated people who devote their time, effort, and wisdom to create the most comprehensive global, open-access clearinghouse of marine biodiversity data and information, not just for science, but for conservation and sustainable development. As a co-chair, one learns not only about the great challenges that each OBIS node faces in terms of its contribution, in fulfilling its tasks, the time, human and technical constraints that standardising data and information means, so that each data set is of the necessary quality to be managed to produce information at the scale required by decision-makers, not only within each country where they are national references, but thematically, regionally and globally. It is the understanding that

the OBIS network is not the sum of its nodes, but of all the people who, within their means, contribute with a grain of sand to the visibility of a new report in the ocean of data. It is an understanding of the difficulty of retaining experienced, skilled, and invaluable people in the face of financial difficulties. It is also an understanding of the essence of what it means to have a common voice in global initiatives such as IODE-IOC, to be a spokesperson for the opinion and position of the nodes in new alliances and involvement in new initiatives, and to take on new tasks and projects.

The shared responsibility of belonging to the OBIS Executive Group means thinking about the future and strengthening the network with ambitious initiatives but focused on current needs and adapted to the immediacy of information flows imposed by technological development. There is no doubt that this is a great opportunity to support, year after year, the construction of a long-term plan of action and ambitions to the satisfaction of the entire network.

I leave my position with a great desire to see OBIS continue to grow, to strengthen it now as a programme, and with a commitment, as part of my position as administrator of OBIS Colombia, to build and strengthen its foundations together with the people who make it up. Many shared experiences and many new friends, but above all a great feeling of admiration and respect.

I offer my unconditional support, guaranteeing that it will be a unique experience, with great satisfaction of service and an opportunity for personal and professional growth, to the new member who wishes to assume this position. I invite all members to apply to join Katherine in bringing the OBIS 2030 vision closer to reality for the next term as Co-Chair."

The **SG-OBIS expressed** gratitude to Martha Vides. She contributed so much to the OBIS community and led OBIS through difficult times of a pandemic, and we **welcomed** her as our first Past Co-Chair. Under her leadership, OBIS finds itself in very good shape with more resources, more staff, and a new management structure.

Mr Ward Appeltans reported that no nominations for a new Co-Chair were received.

The **SG-OBIS decided** to keep the call open for Co-Chair nominations until 30 May 2024, considering that the new ToRs of the Co-Chair were not yet approved prior to this meeting and members will need more time to consider and get approval from their home organisation. The **SG-OBIS agreed** that under this situation the election/appointment of the Co-Chair can happen during an ad-hoc online SG-OBIS meeting.

8 Adoption of the report

The **SG-OBIS adopted** the report and all the recommendations, and decisions listed.

9 Date and place of next session

The **SG-OBIS suggested** organizing the next SG-OBIS meeting back-to-back with the OBIS all-hands meeting.

The **SG-OBIS requested** offers from OBIS nodes to host the SG-OBIS and OBIS all-hands meeting based on a list of requirements to be provided by the OBIS secretariat, to be submitted to the OBIS Secretariat before mid-May 2024.

The **SG-OBIS requested** that the OBIS secretariat keep a register of offers to host the meeting.

10 Closing

The **SG-OBIS Co-Chairs thanked** the SG members and the OBIS secretariat for their commitment during this meeting, and for the camaraderie and good-will shown by all members in our discussions and resolutions.

The **SG-OBIS congratulated and thanked** the Co-Chairs and OBIS Secretariat for their hard work and dedication in guiding the SG-OBIS through a rewarding week of activity in shaping the future of OBIS.

The **SG-OBIS expressed** their deep gratitude to the hosts of the SG-OBIS-12, MABIK and the Ministry of Oceans and Fisheries, for organising and managing a truly exemplary workshop and meeting. We were very impressed by the level of organisation and the care taken to meet the needs of the SG.

Annexes

Annex 1. SG-OBIS-12 agenda and time table

Monday 25 March 2024 (MABIK)

08:30-09:00	Bus from hotel to MABIK
09:00-10:00	Opening of the session and adoption of the agenda
10:00-10:45	Hands on sessions: Darwin Core
10:45-11:00	Break
11:00-11:45	Hands-on sessions: JupyterHub and OBIS products platform
11:45-12:30	Hands-on sessions: Git and GitHub
12:30-13:30	Lunch
13:30-14:40	MeasurementOrFacts extension and vocabularies
14:40-15:00	DNADerivedData extension
15:00-15:30	Break
15:30-16:00	Hands-on sessions: quality control and example dataset (intro)
16:00-17:30	Visit to MABIK exhibition and collections
17:30-18:00	Bus from MABIK to hotel

Tuesday 26 March 2024 (MABIK)

08:00-09:00	Bus from hotel to MABIK
09:00-10:30	Hands-on sessions: quality control
10:30-11:00	Break
11:00-11:30	Hands-on sessions: quality control (continued)
11:30-12:30	OBIS annotated names tool (to be confirmed)
12:30-13:30	Lunch
13:30-14:30	Bus from MABIK to Baekje Cultural Land
14:30-17:30	Visit Baekje Cultural Land
17:30-18:30	Bus from Baekje Cultural Land to hotel

Wednesday 27 March 2024 (Ramada hotel)

09:00-09:30	OBIS reports: secretariat
09:30-10:00	OBIS reports: executive committee
10:00-10:30	OBIS reports: OBIS nodes
10:30-11:00	break
11:30-12:30	OBIS reports: OBIS nodes
12:30-13:30	Lunch
13:30-14:00	OBIS reports: OBIS Taxonomy Task Team
14:00-14:30	OBIS reports: OBIS Capacity Development Task Team

14:30-15:00 OBIS reports: OBIS Data Quality Control Project Team
15:00-15:30 Break
15:30-16:30 OBIS reports: OBIS Vocabulary Infrastructure Project Team
16:30-17:00 OBIS reports: OBIS Grand Unified Data Model Project Team
18:00-20:00 Reception and dinner offered by MABIK

Thursday 28 March 2024 (Ramada hotel)

09:00-10:30 OBIS Future: OBIS management structure: SG, CHAIRS, SEC, NODES
10:30-11:00 break
11:00-11:30 OBIS Future: OBIS management structure: coordination groups
11:30-12:30 OBIS Future: OBIS data policy
12:30-13:30 Lunch
13:30-14:30 OBIS Future: OBIS communication plan
14:30-15:00 OBIS Future: OBIS products
15:00-15:30 Break
15:30-16:30 Partnerships: GBIF
16:30-17:00 Partnerships: other partners

Friday 29 March 2024 (Ramada hotel)

09:00-11:00: OBIS workplan and budget
11:00-11:30 Break
11:30-12:30 Adoption of the report
12:30-13:00 Date and place of next session & Closing

Annex 2. Concept note/Proposal OBIS Propagules program

Training a new generation of OBIS users

1. Rationale and background

OBIS is the primary biodiversity platform dedicated to the marine environment, currently hosting over 122 million occurrence records along with a wealth of data related to abundance, environmental information, eDNA, and more. This renders OBIS an exceptional resource for marine researchers. However, a significant number of individuals are unaware of the platform's full range of capabilities.

In addition to the limitations this lack of knowledge imposes on the potential for new research questions and answers, it also hinders the sustainability of OBIS. Many researchers do not grasp the process of data submission to OBIS, including how to properly format their data. In this sense, OBIS is constantly investing in capacity development. To add to this, we are now proposing the “Propagules program”, an initiative to increase awareness about OBIS capabilities among the new generation of marine scientists.

2. Overall purpose (objectives) and relevance: needs and issues:

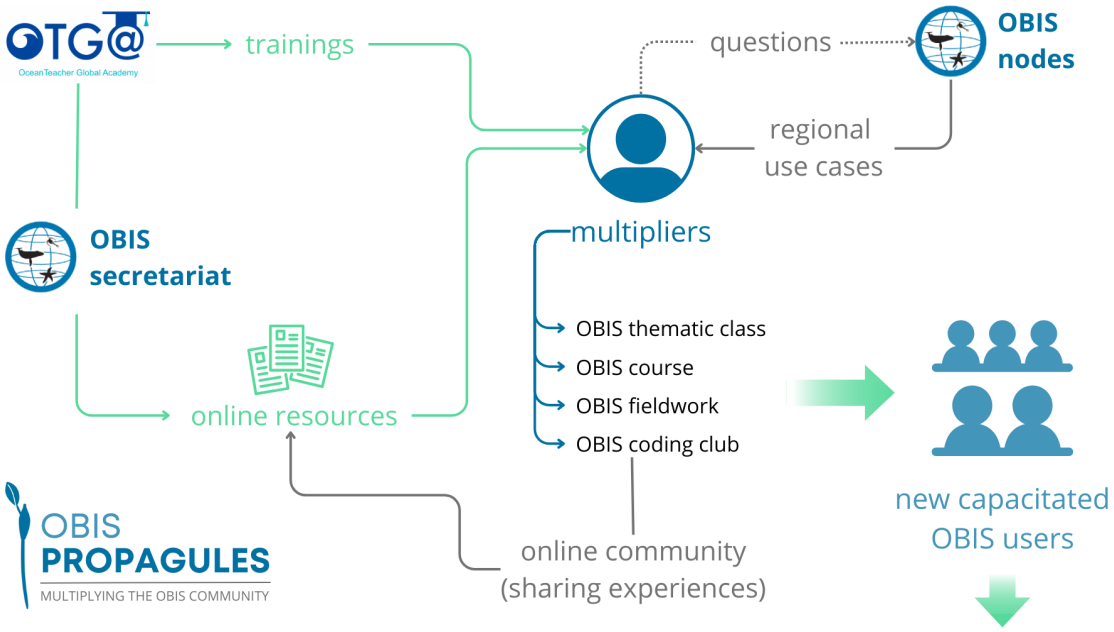
The OBIS “Propagules program” targets one part of the OBIS community - graduate students - by inviting educators to incorporate OBIS content into their regular courses. This is achieved by providing resources, such as models for thematic classes, data kits, and virtual labs. Educators participating in the program also receive training and have the opportunity to engage in discussions and share their experiences within a community of like-minded educators. At the end, we anticipate paving the way for a newly skilled community of OBIS users.

The core of the “Propagules program” are the educators, which will guide a new generation of OBIS users. Because of that, we term them “multipliers” in this proposal.

This program entails integrating OBIS data and tools into standard higher education courses with marine-related components, as well as into supplementary activities associated with those courses. The spectrum of implementation spans from straightforward thematic classes to the establishment of coding clubs. OBIS will furnish educators with resources such as models, use cases, and data kits, which they can subsequently incorporate into their curriculum. Rather than

providing a rigid structure, the 'Propagule program' is designed to offer a foundation upon which educators can customize according to their specific circumstances.

Additionally, OBIS will offer online training sessions via the OceanTeacher Global Academy (OTGA), demonstrating various methods for integrating OBIS into their curriculum. Furthermore, OBIS nodes, the local branches of OBIS, will be equipped to supply regional or local use cases that are more closely aligned with the specific context of the area.



Multipliers can have different levels of engagement, all equally acceptable:

OBIS thematic class

The most straightforward method of implementing the OBIS propagules program is by incorporating one or more thematic modules into the course curriculum. For instance, one could use OBIS data to exemplify diversity patterns within a specific region when teaching a class on diversity indices. Educators would have access to numerous online resources to facilitate the seamless integration of one or more themes into their regular curriculum, requiring minimal adjustments.

Examples of contents that will be available for OBIS thematic classes:

Lesson Plans: Comprehensive outlines encompassing various topics, designed as complete lessons integrating OBIS data or data management concepts.

Use Cases: Curated instances derived from OBIS datasets, intended for exercises, peer instruction, problem-based learning (PBL), or as illustrative examples for explanatory sessions.

Data Kits: Selected OBIS datasets or data collections tailored for practical classes. These kits encompass instructions for one or more practical activities that can be implemented.

OBIS course

OBIS courses facilitate the integration of OBIS data and tools throughout the entire curriculum. Engagement with and utilization of OBIS resources grow as the course advances, and can be incorporated into explanatory sessions, exercises, as well as other activities such as Problem-Based Learning (PBL) practices or peer-learning exercises.

To prepare OBIS courses, educators will have access to all the aforementioned content (lesson plans, use cases, data kits), structured to cover various aspects of a typical marine-focused ecology or zoology course. These resources will be organized to align with the progression of student learning, offering increasing levels of complexity as students advance in their studies.

OBIS fieldwork

Fieldwork constitutes an indispensable element of courses related to the environment, serving as a bridge between theory and practical application. OBIS can be seamlessly integrated into various aspects of fieldwork activities. For instance, let's consider a straightforward exercise involving the assessment of species richness in a rocky shore. Before heading out to the field, OBIS can be employed to identify the species known to inhabit that specific area, providing valuable context. During data processing, students can utilize the OBIS structure for proper data formatting. Finally, students may also have the opportunity to contribute their own data to OBIS, completing the cycle of information flow to the platform.

Educators that chose to apply an OBIS fieldwork would have available fieldwork guides, containing detailed instructions and ideas for including OBIS concepts within regular fieldwork activities. This would include a set of instructions to help educators to apply the life cycle concept (collection, data preparation and submission) within their course, providing the students the knowledge on how to properly prepare and curate their datasets, as well as how to submit it to a biodiversity database.

OBIS coding club

Coding clubs offer an excellent avenue for fostering the utilization of OBIS data among students, providing a deeper and more comprehensive engagement with OBIS tools and functionalities. Moreover, these clubs aid students in acquiring crucial skills in data

analysis through programming languages. Educators keen on incorporating this approach can leverage the examples provided by the secretariat to initiate their own coding groups. The dynamics of such groups may vary, ranging from weekly or monthly meetings to progressive data work or even a 'hackathon'-style format. In any case, they consistently create an engaging environment for students.

For coding clubs, the Propagules program will provide data kits alongside specific problems to be tackled through programming routines. These data-challenge kits will encompass varying degrees of complexity, considering the learning curve of the participants.

Of course, the outcomes in terms of capacity development will be higher if the educator sets higher engagement targets.

In addition to the resources curated by the secretariat (or guest educators), our objective is to establish a platform where every participant in the program can contribute their experiences and materials. This collaborative approach ensures that as the program progresses, a growing reservoir of resources will facilitate the emergence of novel and more innovative methods for integrating OBIS data into the curriculum.

3. Contribution to IOC programmes and international frameworks (e.g. SDGs, Ocean Decade):

This proposal supports the IOC Capacity Development Strategy, by developing human resources at individual and institutional levels, more specifically with the actions 1.2.1 (“Promote and assist with the organisation of training courses, workshops and “summer schools”, relevant to the IOC mandate, including training of trainers/technicians and executive career development for institutional managers/decision makers, in collaboration with other organisations”) and 1.2.5 (“Promote the development and sharing of training materials and tools”). The proposal is also aligned with output 2, by promoting the development and use of global data and information systems (action 2.2.1) and promoting the sharing of ocean data and information (action 2.2.2).

The Propagules program will also contribute to the long-term sustainability of OBIS, and its regional nodes, by fostering a new generation of data users and providers, with better capacity to adequately collect, prepare and share its data.

Finally, this proposal also contributes to the SDG 14 (*Conserve and sustainably use the oceans, seas and marine resources for sustainable development* the project outcomes should in the long-term contribute to an *Increase scientific knowledge, develop research capacity and transfer marine technology*), investing in the development of future marine professionals, and to the SDG 4 (*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*) by creating new learning opportunities, specially for developing regions.

4. Implementation strategy:

We firmly believe that the 'Propagules program' should not impose an additional significant burden on educators, who are often already engaged in various educational and administrative responsibilities. On the contrary, we envision the program as offering straightforward and engaging avenues to incorporate new activities into their courses. Adhering to the program involves minimal effort:

- Implementing one of the program's recommended activities.
- Participating annually in the 'Propagules meeting,' an online forum for educators to share their experiences with the program.
- Providing brief feedback to the secretariat once a year on how the activities were implemented and their perceptions of the outcomes. This feedback, not longer than a single page, serves primarily as a basis for us to assess the program's application and identify potential enhancements.

While we encourage educators to participate in the community fostered by the program, we understand that this is not a strict requirement.

As a counterpart, beyond the access to the “Propagules program” resources, educators will receive a badge of “OBIS multiplier” in their OceanExpert profiles, highlighting their engagement in an official UNESCO program.

OBIS nodes will also have the opportunity to voluntarily participate in the program, contributing on two fronts: (1) providing local use cases or activities with specific regional context; (2) acting as a primary point of contact for educator inquiries.

The program will be implemented in 6 phases:

- Phase 1 - design of the program and structuring of the platform
- Phase 2 - creating activities, data kits, examples. Invite guests to produce material.
- Phase 3 - pilot implementation: invite a group of educators to take part in the program (preference for developing countries). Provided there is funding, make a local training.
- Phase 4 - evaluate the pilot implementation.
- Phase 5 - open the program for all the public (announce in communication channels).
- Phase 6 - evaluate the program.

5. Stakeholders, beneficiaries, partners:

Regions and their higher education institutions would be direct beneficiaries, as its students will gain improved access to biodiversity data management concepts and to the

potential utilization of OBIS data. Partners will include OBIS nodes, which will also be benefited by the capacity development of future data providers.

6. Preliminary budget:

Activity	**cost (USD)**
Consultant contract (11-months) for the creation of educational content (e.g. lecture notes, data kits, use cases) and prepare training content to be served through OTGA	66,000
In-person meeting (50 participants) for first program training (pilot implementation).	24,000
Publishing and hosting content on online platform (e.g. OTGA) for sharing educational content and promoting discussion between educators.	10,000
Total	100,000

Annex 3. Draft OBIS data policy

Section 1. Preamble

The OBIS data policy follows the guidelines from the Intergovernmental Oceanographic Commission (IOC) data policy. In this regard, we recognize that: *the timely, open and unrestricted international sharing, in both real-time and delayed mode of ocean metadata, data and products is essential for a wide variety of purposes and benefits including scientific research, innovation and decision making, the prediction of weather and climate, the operational forecasting of the marine environment, the preservation of life, economic welfare, safety and security of society, the mitigation of human-induced changes in the marine and coastal environment, as well as for the advancement of scientific understanding that makes this possible. Innovation of specialised products can be stimulated and encouraged by timely, open and unrestricted access to metadata and data. Metadata, data, and products should be accessible, interoperable and openly shared with minimum delay and minimum restrictions.*

This document describes how the IOC data policy is implemented by OBIS. Although this document broadly covers the requirements for metadata, data, and data products, more detailed guidance for the OBIS community is also provided in the OBIS manual (https://manual.obis.org).

Section 2. Purpose

The purpose of this data policy is to outline the requirements with respect to sharing, access, preservation, and attribution to facilitate the broad use and reuse of metadata, data and data products.

Section 3. FAIR & CARE principles

To support knowledge discovery and innovation both by humans and machines and to acknowledge indigenous data governance, data should meet the FAIR Guiding Principles (Findable, Accessible, Interoperable and Reusable)[1] and In the case of indigenous data and information, data should meet the CARE principles (Collective Benefit, Authority to Control, Responsibility, Ethics)[2] to the greatest extent practicable.

The FAIR Principles related to **Findability** state that data and metadata are assigned globally unique and persistent identifiers. For OBIS this means that all event and occurrence records published to OBIS should have a globally unique identifier in the appropriate field. Care must be taken to preserve these identifiers across dataset updates. Datasets should be assigned a DOI (Digital Object Identifier) upon publishing. Findability also means that datasets are described using rich metadata. In practice, this means that OBIS dataset metadata records must contain at least the following: a title, a detailed description including information on the methodology used to collect the data, contact information, a license, a citation, geographic and taxonomic scope, and may contain other relevant metadata.

Regarding the **Accessibility** aspect of the FAIR data principles, OBIS datasets' metadata should always be accessible via the data provider IPT instance even when the data is no longer available. In addition, OBIS datasets should be retrievable by using a DOI that leads to the data.

Interoperability principles state that knowledge must be described using a shared language which has been formally specified, so that the knowledge can be interpreted not just by humans but also by machines. OBIS data are described using the Darwin Core standard, which includes a set of terms with identifiers and definitions, as well as a number of vocabularies which should be used wherever possible. In order to optimize interoperability of measurements and sampling facts data, it is recommended that OBIS datasets use terms and identifiers from the BODC NERC vocabulary server, or other vocabulary collections with machine interpretable identifiers.

OBIS data must also be **Reusable**, that is, enough information is available so that others can use that data in different settings. In this regard, all data and metadata associated with records needs to be complete and accurate, containing at least the minimum information described in the OBIS manual. Ideally, providers should go well beyond the minimum and provide as much information as possible. Both the data and metadata should comply with the standards adopted by OBIS, for example Ecological Metadata Language (EML) for metadata and Darwin Core for biodiversity data. It is also necessary that all data provided is clearly linked to a usage license, respecting the licenses currently accepted by OBIS (i.e. CC0, CC BY, CC BY-NC), ensuring that users are able to fully understand how they can reuse the data and also to give the correct acknowledgement to data providers where required.

Beyond complying with FAIR principles, OBIS data must also be in accordance with the CARE principles. That is, indigenous data and information should always be handled with sensitivity and respect. Authority of indigenous data holders must be respected, and indigenous peoples' rights and wellbeing should be considered at all stages of the data life cycle.

Section 4. Conditions of use

Data should be licensed (respecting Section 8) under a minimally restrictive and voluntary common-use licence[3] that grants permission, ensures proper attribution (for example, citable using a persistent identifier) and allows others to copy, distribute and make use of the data. Section 5. Data Repositories and the IOC ocean data and information system (ODIS) Data should be quality controlled (using community adopted and documented best practices or standards), accompanied by complete metadata and stored in an openly discoverable and accessible long-term data repository and made available through standards-based data services. Member States shall encourage convergence and interoperability and, where possible, use IODE data centres (National Oceanographic Data Centres or Associate Data Units) or other IOC programme related data centres that share metadata and data using the IOC Ocean Data and Information System (ODIS). ODIS is an interoperability layer and supporting technology, to allow existing and emerging ocean data and information systems to interoperate with one another.

Data provided to OBIS must be licensed with one of the accepted licenses described in the OBIS manual. Data users should be encouraged to appropriately attribute data publishers, for example

by providing a license, clear citation instructions, and a DOI. OBIS, through the work of its nodes, is also concerned in providing high-quality marine biodiversity data for users. Thus, all data submitted to OBIS needs to undergo rigorous quality assurance and validation processes before submission. Minimally, data providers must check data for locality issues, taxonomic mismatches, and proper formatting. They must also ensure that all necessary information fields are available. Guidance on how to perform data quality control is provided by the OBIS community, through its OBIS manual. An inseparable part of high quality data is that it must have complete and comprehensive metadata, as described in the Section 3.

All data and products published through OBIS are freely accessible to any user, following the principles of equitable access and benefit sharing. In this regard, when licenses allow, users can build products based on OBIS data without any cost. Whenever possible, users should consider sponsoring or partnering with OBIS and its OBIS nodes in grant proposal writing. Creating a global database like OBIS cannot happen without the, often voluntary, contribution of many scientists and data managers all over the world. Several activities, such as coordination, data integration, quality control, database and website maintenance require resources including manpower at national and international level.

Any use of OBIS data and/or derived products, including (but not limited to) software applications, workflows and papers, should be properly cited. The following formats are recommended:

General OBIS citation:

```
OBIS (YEAR) Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO. obis.org.
```

Use the following format to cite data retrieved from OBIS (dataset citations are available in the zip downloads as html file):

```
[Dataset citation available from metadata] [Data provider details] [Dataset] (Available: Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO. obis.org. Accessed: YYYY-MM-DD.
```

For example:

```
Sousa Pinto, I., Viera, R. (Year: if not provided use year from dataset publication date) Monitoring of the intertidal biodiversity of rocky beaches with schools in Portugal 2005-2010. CIIMAR - Interdisciplinary Centre of Marine and Environmental Research, Porto. [Dataset] (Available: Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO. obis.org. Accessed: 2015-01-01)
```

When data represents a subset of many datasets taken from the integrated OBIS database, you can, in addition to cite the individual datasets (and taking into account the restrictions set at each dataset level), also cite the OBIS database as follows:

```
OBIS (YEAR) [Data e.g. Distribution records of Eledone cirrhosa (Lamarck, 1798)] [Dataset] (Available: Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO. www.obis.org. Accessed: YYYY-MM-DD)
```

The derived information products from OBIS are published under the CC-0 license and can be cited as follows:

```
OBIS (YEAR) [Information product e.g. Global map showing the Hulbert index in a gridded view of hexagonal cells] [Map] (Available: Ocean Biodiversity Information System. Intergovernmental Oceanographic Commission of UNESCO. www.obis.org. Accessed: YYYY-MM-DD)
```

While those citation formats cover a broad range of applications, users should always consult the OBIS manual for more detailed guidelines on how to properly attribute the data and information products provided by OBIS and its broader community.

Section 5. Data Repositories and the IOC ocean data and information system (ODIS)

Data should be quality controlled (using community adopted and documented best practices or standards), accompanied by complete metadata and stored in an openly discoverable and accessible long-term data repository and made available through standards-based data services. Member States shall encourage convergence and interoperability and, where possible, use IODE data centres (National Oceanographic Data Centres or Associate Data Units) or other IOC programme related data centres that share metadata and data using the IOC Ocean Data and Information System (ODIS). ODIS is an interoperability layer and supporting technology, to allow existing and emerging ocean data and information systems to interoperate with one another.

As explained in section 3, data providers are responsible for performing quality control on all data prior to its submission to OBIS. Details on quality control procedures are provided in the OBIS manual, which is regularly updated by the OBIS secretariat and OBIS nodes. OBIS is connected to ODIS and is an integral part of the IODE data structure.

Section 6: Secure long-term data archives

To support long-term and secure archival, data and associated metadata should be submitted, to the best practicable degree, to IODE's World Ocean Database (WOD), the Ocean Biodiversity Information System (OBIS), Global Sea Level Observing System (GLOSS), other IOC related global data archives, and data centres linked to the World Data System (WDS), their successors or other global data archives.

OBIS and its nodes should ensure long-term data archival and adhere to best practices for data preservation. OBIS secretariat will archive the curated database, but nodes are responsible for archiving individual datasets. Data and data products provided by OBIS and its nodes must also be available through standards-based data services that allow users to access, query, and retrieve data in various formats. OBIS currently provides several ways through which users can

access its data and follows the best practices for data sharing, and in this sense, any newly developed product must ensure maximum accessibility and interoperability.

Section 7. Access restrictions

Data and associated metadata should be made available with minimal restrictions on use unless there are valid reasons to restrict access. Legitimate reasons to restrict access to, and reuse of, data include, inter alia, privacy and confidentiality, protection of species, populations, or habitats of concern, and national security.

OBIS datasets should be published using any of the three accepted CC licenses, with a preference for the most permissive CC0. In case access to information must be restricted for any of the above reasons, data providers should censor or generalize the data before publishing to OBIS, and ensure that these changes are reflected in the dataset metadata.

When data is made available to OBIS, OBIS is granted permission to:

- Distribute the data via its data and information portal
- Build an integrated database, use the data for data quality control purposes, complement the data with other data such as climate variables and build value-added information products and services for science and decision-making
- Serve the data to other similar open-access networks in compliance with the terms and conditions for use set by the data providers.

In pursuance of copyright compliance, OBIS endeavors to secure permission from rights holders to ingest their datasets. In the event that the inclusion of a dataset in OBIS is challenged on the basis of copyright infringement, OBIS will follow a take-down policy until there is resolution.

Section 8. Data sharing policies of Member States

This Policy acknowledges the right of Member States and data owners to determine the terms of metadata, data and products sharing in a manner consistent with national jurisdictions, international conventions, and treaties, where applicable.

Whenever possible, data should be made available in its fullness. However, in any case access to data must be restricted to respect Member States jurisdictions, conventions or treaties, it is the responsibility of data providers to censor or generalize the data before publishing to OBIS, as explained in Section 7.

Section 9. Data and metadata sharing guidelines

IOC programmes, projects as well as other communities of practice should develop and/or apply, where applicable, detailed metadata, data and products sharing guidelines that are consistent with this IOC Data Policy and Terms of Use.

OBIS and its nodes provide detailed guidelines on how to publish and use OBIS data. This information is made available in the OBIS manual (https://manual.obis.org/) and is regularly revised and improved to adhere to best practices.

Section 10. Definitions

'Data' is a set of values, symbols or signs (recorded on any type of medium) that represent one or more properties of an entity[4]. 'Metadata' is 'data about data' describing the content, quality, condition, and other characteristics of data that allows their inventory, discovery, evaluation or use. 'Timely' in this context means the distribution of data and/or products, sufficiently rapidly to be of value for a given application. 'Openly' means data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share alike. 'Product' means a value-added enhancement of data applied to a particular use.

OBIS uses the same definitions as IOC.

Disclaimer

Appropriate caution is necessary in the interpretation of results derived from OBIS. Users must recognize that the analysis and interpretation of data require background knowledge and expertise about marine biodiversity (including ecosystems and taxonomy). Users should be aware of possible errors, including in the use of species names, geo-referencing, data handling, and mapping. They should cross check their results for possible errors and qualify their interpretation of any results accordingly.

Unless data are collected through activities funded by IOC/IODE, neither UNESCO, IOC, IODE, the OBIS Secretariat, nor its employees or contractors, own the data in OBIS and they take no responsibility for the quality of data or products based on OBIS, or its use or misuse.

Annex 4. Draft OBIS Communication Plan

The (draft) OBIS communication plan has the following components, designated with high, medium, or low priorities. Priorities may change over time as tasks are developed and completed.

Clear Objectives and Goals (high): Define the specific objectives and goals of OBIS's outreach and communication efforts. What do we want to achieve, and how will we measure success?

Target Audience Identification (medium): Identify our target audiences, including scientists, policymakers, students, the general public, or specific demographics. Tailor our messages and methods to each group.

- Marine scientists, academics and researchers
- Policymakers, inter-governmental and government agencies
- Educators (e.g. universities and schools) and students
- NGOs and conservation organisations
- General public interested in marine science
- Donors
- Private sector
- OBIS Community (internal)

Key Messages (high): Develop clear and concise key messages that highlight the importance and impact of OBIS. These messages should be easy to understand and resonate with our target audiences.

- OBIS is a vital resource for accessing marine biodiversity data.
- Join a global community and publish your marine biodiversity data with OBIS.
- OBIS Marine biodiversity information contributes to better understanding and conservation of the ocean.
- OBIS is the world leader in marine biodiversity information sharing.
- OBIS is a close-knit community of practice composed of supportive marine experts. For example:
    - Scientists (biologists, geographers, geneticists, chemists, physicists, etc.)
    - Data experts
    - Oceanographers
    - Taxonomists
    - Maritime Historians
- UNESCO-OBIS informs and supports marine policy making.
    - For example: marine spatial planning, environmental impact assessment
- OBIS offers so much more than just occurrence data
    - DNA, measurements, event records, historical and archaeological records

Communication Channels (medium): Determine the most effective communication channels for reaching our target audiences.

- Website: Maintain a user-friendly website as a central hub for OBIS information, data access, and updates from OBIS Secretariat and OBIS nodes and partners.
- Social Media: Active presence on platforms like X (previously Twitter), Facebook, YouTube, and LinkedIn to share news, data, and engage with the community.
- Newsletters: Regularly distribute newsletters to subscribers with updates and featured datasets.
- Media Releases: press releases, media coverage, etc.
- Scientific Journals: Publish articles and papers highlighting OBIS contributions.
- Conferences: Host and participate in relevant events to showcase OBIS's work.
- Workshops: Host and participate in relevant workshops
- Online Webinars: Organise webinars for scientists and educators.
- Public Outreach via personal interactions: Participate in science festivals and public events to engage with a broader audience
- Outreach with digital resources: produce, use, and distribute OBIS digital resources
- Educational Institutions: produce materials to showcase OBIS to be used by educators

Content Creation (medium): Create a content plan that includes articles, videos, infographics, and other materials to effectively convey program's findings, research, and achievements.

- Develop a shared workspace for co-creating templated communication material such as articles, videos, infographics, and data highlights.
- Showcase real-world applications and use cases of OBIS data.
- Collaborate with the user community to create compelling case studies.
- Produce educational resources for students and educators.
- Develop branding guidelines.

Website and Online Presence (high): Maintain an informative and user-friendly website that serves as a hub for all program-related information. Ensure the website is regularly updated and optimised for search engines.

- Keep the OBIS website structure and content up to date.
- Ensure easy access to data, news, and educational resources, etc.
- Ensure messages are easily understood by target audiences
- Optimise website for search engine visibility.
- Maintain statistics updates, e.g., number of records, species, datasets, nodes, etc.
- Regularly monitor analytic information, i.e., website traffic.
- Ensure outreach and branding materials are easily accessible and up to date

Social Media Engagement (medium): Establish and maintain a presence on social media platforms. Use social media to share updates, engage with your community, and foster discussions about your program.

- Share regular updates, datasets, and marine science facts.
- Use visuals, videos, and infographics to make content engaging.
- Respond to comments and engage in conversations.
- Encourage the use of keywords where useful: obis, ocean biodiversity, ocean decade, training, etc.
- Use the following hashtag: #OBIS and tag OBIS in posts (@OBISnetwork)
- Leverage international ocean related events for social media outreach: World Ocean Day (WOD), World Environment Day (WED), World Mangrove Day, etc
    - Ensure all acronyms used are clearly defined.

Media Relations (low): Develop relationships with science journalists and media outlets to help disseminate programme news and research findings from the OBIS community. Prepare press releases and media kits for major announcements.

- Maintain contacts with journalists and media outlets with a marine focus.
- Prepare press releases for relevant OBIS data releases or OBIS research findings.
- Create templates that can be used by OBIS community members engaging with the media/press.

Events and Workshops (medium): Host or participate in events, workshops, and webinars to share knowledge, and foster collaborations.

- Organise in-person and online workshops for researchers on data submission and usage.
- Participate in international marine science conferences and expos.
- Host webinars and online workshops.

Partnerships and Collaborations (low): Collaborate with other organisations, institutions, or science programs that share similar goals.

- Collaborate with marine research organisations and institutions.
- Collaborate with communications officers of community institutions
- Partner with government agencies, NGOs and research institutes for data sharing and conservation initiatives.

Internal Communication (high):

- Develop a plan to keep OBIS nodes and partners regularly connected and in communication with each other

- Develop a way for OBIS nodes and partners to report on and promote activities and make those visible via OBIS.
- Facilitate joint meetings that encourage knowledge sharing and development of joint, regional events (e.g. data and product coordination meetings, hackathons, training events)

Evaluation and Feedback (medium): Establish metrics and key performance indicators to assess the effectiveness of outreach and communication efforts.

- Regularly assess website analytics and social media metrics.
- Collect and collate feedback from the user community to improve data access and user experience.

Risk Mitigation Plan (high): Develop a risk register and plan for addressing potential crises, such as controversial findings, breaches of security, or negative public perceptions.

- Develop a plan for addressing any data-related, public facing, or sensitive material controversies or issues transparently and professionally.

Budget and Resource Allocation (high):

- Allocate available resources, including budget, staff, and time, for effective outreach and communication.

Training and Capacity Building (low): Ensure that the team and network members are well-equipped with the necessary skills and knowledge for effective communication and outreach activities.

- Train OBIS staff and node managers in effective science communication and outreach techniques by established Communication Officers within the OBIS community.

Regular Updates and Maintenance (low):

- Keep communication strategy dynamic and adaptable. Regularly review and update approach based on feedback and changing circumstances.

Ethics and Responsible Communication (high):

- Ensure public communication from OBIS is scientifically accurate and ethical
- Avoid sensationalism and communicate scientific uncertainty when necessary.
- Maintain ethical and transparent communication guidelines, especially in data handling and sharing.
- Ensure data disclaimers are visible where applicable

Annex 5. Concept note for an OBIS data product platform

Outcome of the IWG on OBIS data products

Contributors (in alphabetical order)

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March 2024

Background

OBIS developed the **OBIS2030**, an UN Ocean Decade endorsed project, to provide a biodiversity data hub made up of standardised, quality controlled and managed data to support the Ocean Decade objectives. This will help researchers, practitioners, and decision makers to protect and restore marine ecosystems and protect life in the ocean.

One integral part of the OBIS2030 targets is to **create and publish information products, at global, regional and national scale to feed directly into reporting and assessment processes.** This should occur by providing a platform to (jointly) develop and share reliable biodiversity indicators and information products that describe changes in marine ecosystems.

To start with the implementation of those solutions, the SG-OBIS decided to establish an open-ended intersessional working group on OBIS-based marine biodiversity indicators and information products (IWG-OBIS-PRODUCTS).

The IWG-OBIS-Products is a collaborative and interdisciplinary group that is driven by the importance of creating indicators and information products that are **scientifically sound**, practical, and relevant to decision-makers in government, industry, and civil society. Our main objectives are to:

- Review existing OBIS information products.
- Identify product needs (at local, regional or broader scales) in order to create a plan for future products implementation by contacting nodes and interested parties, including the community of users.
- Perform a systematic analysis of the data in OBIS, identifying geographic and taxonomic gaps, which can help identify indicator species and ecosystems or strategies for species distribution modelling.
- Contact ecological synthesis centres/groups to promote an exchange of knowledge and gather suggestions/advice on possible products that could be derived from OBIS.

- Propose a process for frequent expert validation of information products by consulting with local scientific experts and end-users (including local communities and indigenous people).
- Discuss the relevance of supporting community generated OBIS products and establish a potential framework for receiving and portraying those products.

Part of those objectives were already completed and generated this concept note.

Proposal

Expanding the toolbox of OBIS users

When the IWG was established, our initial proposal was to have a catalogue to showcase products derived from OBIS data. However, as discussions took place, it became clear that there was an opportunity to create a whole set of tools that would enable users to work and take the maximum advantage of OBIS data more efficiently. The group then proposed to create a new structure based on **infrastructure** and **data** components. This infrastructure will enable the production and publishing of **data products based or partially based on OBIS**.

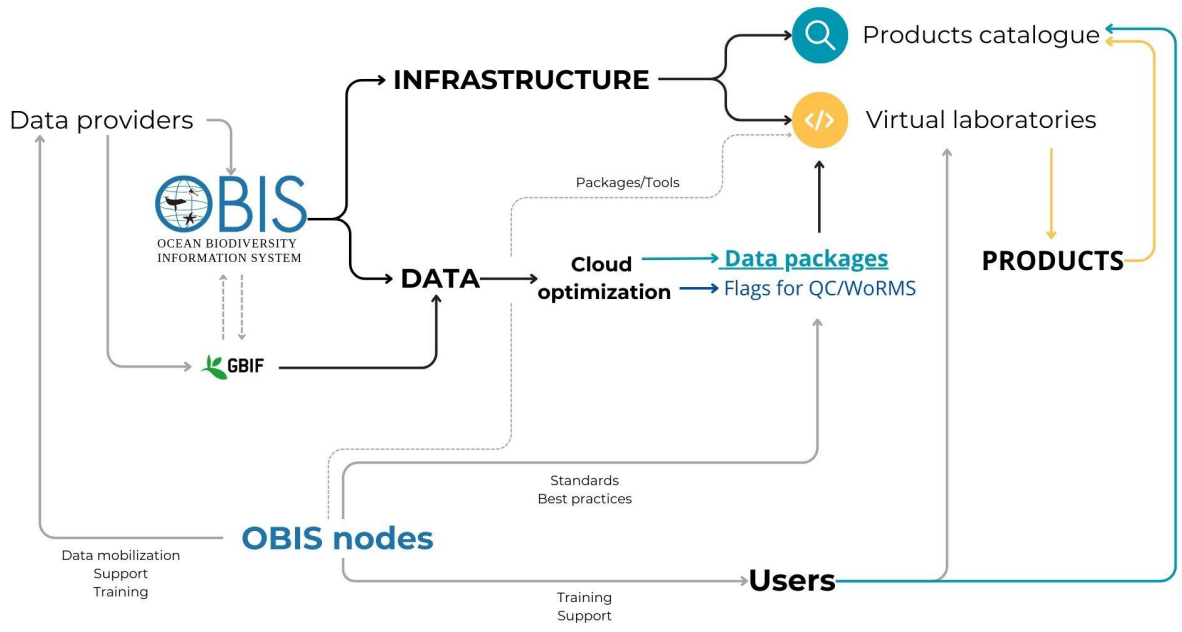

Diagram of the proposed infrastructure for OBIS data products.

Infrastructure

The infrastructure will include (1) a virtual laboratory (phase 1) and (2) a products catalogue (phase 2). The virtual laboratory is the main tool we are going to provide and is a **JupyterHub** with Python and R kernels, including an RStudio interface (like an RStudio server). This will provide users the opportunity to run their analysis online, taking advantage of an environment containing tools and cloud optimised data (for example, the full export of OBIS and data packages,

see on “Data” section). Users would have available an environment containing the main packages used for biodiversity analysis and one dedicated package to speed up pre-processing of OBIS data for specific purposes. Also, model scripts would be available, with the nodes contributing to both cases.

Since data and analytical tools reside on the same machine (the server), analyses are faster, and the user does not need to download any additional data or tools. This type of infrastructure is mature and is being successfully used by other organisations (e.g. Copernicus/WeKEO: https://www.wekeo.eu/; Digital Earth Australia: https://www.dea.ga.gov.au/developers/sandbox). This is also aligned with the Digital Twins of the Ocean idea, which aims to speed up the production of data products from ocean observation.

We consider data products being any type of analysis (description, data visualisation, etc.) that synthesises and generates new information from data hosted on OBIS and other sources. Some examples are the contribution of OBIS to the State of the Ocean Report (see pages 26 and 27 of the report); species distribution maps such as AquaMaps (https://www.aquamaps.org); and the Marine Biodiversity Observation Network (MBON) early alert dashboards (https://marinebon.org/data-products). Those are just illustrative examples, as the potential uses are multiple. One particular type of product that the IWG perceives as a priority would be data visualisation, such as maps, as those are constantly requested by the community and can be used by multiple user groups.

In a second moment we would also implement a products catalogue, to showcase those products being produced through the virtual environment, but also elsewhere. This was a particular demand received from some users, as they want to contribute with OBIS products, but do not have their own systems/websites. Also, this would enable users with less familiarity with programming languages and JupyterHub to access and use the products. Our first suggested solution was **CKAN**, but we will also test the **GeoNetwork** platform. All products on the catalogue will be accompanied by extensive metadata, in a way that it could be easily integrated with ODIS.

JupyterHub → JupyterHub is a multi-user server environment designed to facilitate collaborative and interactive computing in an academic or research setting. It serves as a platform for deploying Jupyter Notebooks, which are open-source, interactive web applications that allow users to create and share documents combining live code, equations, visualisations, and narrative text. JupyterHub, as a centralised system, enables multiple users to access and utilise a shared computational infrastructure concurrently. This centralised approach enhances efficiency, scalability, and resource management in academic environments where collaborative data analysis, scientific computation, and research are paramount.

CKAN → The Comprehensive Knowledge Archive Network (CKAN) is a robust and extensible open-source data management system widely employed in academic and research contexts. Functioning as a data portal platform, CKAN facilitates the storage, management, and dissemination of diverse datasets. Its

architecture is designed to support the systematic organisation of data resources, ensuring metadata quality, version control, and accessibility. CKAN serves as a centralised repository, empowering institutions, researchers, and policymakers to efficiently share, discover, and access datasets. Its modular and customizable nature, coupled with a rich ecosystem of extensions, renders CKAN a versatile solution for institutions seeking a standardised, transparent, and collaborative approach to data management and dissemination within the scholarly domain.

Data

On the data side, the proposal is to provide users of the virtual environments with **cloud optimised data**, providing a seamless and faster analysis. Also, we would provide users with data packages - pre-filtered data targeting specific uses. Example, a package of data including only long-term monitoring, or all eDNA data. Of course, for some studies the data package will still need some treatment, but hopefully it would maximise the effort of researchers by skipping some steps.

As a starting point, we would leverage recent developments created for projects and partnerships that OBIS is involved in, such as the State of the Ocean Report (StOR, in partnership with ProtectedSeas; https://github.com/iobis/protectedseas-statistics), the eDNA expeditions (https://www.unesco.org/en/edna-expeditions) and the MPA Europe (https://mpa-europe.eu/). The StOR, for example, already applied one of the suggestions of the IWG team - to have the full export of OBIS indexed by the H3 system (a geospatial indexing system developed by Uber Technologies; https://h3geo.org).

It is well known that OBIS data presents good quality data, thanks to the efforts of OBIS nodes, and is already quality controlled in multiple ways. It was suggested that, when creating those data packages, we have the possibility to add additional QC steps focused on the purpose (for example, on a long-term monitoring tag a year with a very different number of samples). Another suggestion is to make available scripts to perform this type of QC in standardised ways, saving scripting time for users, while sharing experiences among researchers.

OBIS nodes are key for the data component in two aspects: they are the point of contact with the local community, understanding data needs, and they provide best practices guidelines for QC of data. The idea is that OBIS nodes would be able to implement routines (through scripts) to generate specific data packages, and those could be run on the OBIS server.

One of the concerns, as outlined in the 'critical points', is that for this data to be truly useful for the user, it must be consistently updated. This necessitates the creation of pipelines for automatic data updates in a timely manner. Naturally, all data should be accompanied by a versioning system to keep users informed of changes, and the generation codes should be openly available, providing users with the option to generate the data package independently.

Cloud optimised data → Cloud optimised data refers to a paradigm in data storage and organisation tailored for efficient and scalable utilisation within cloud computing environments. This approach involves structuring and formatting datasets in a manner that aligns with the distributed and parallel processing capabilities inherent to cloud platforms. Characterised by columnar storage, partitioning, and utilising formats conducive to parallel data processing, such as Apache Parquet, Zarr and COGeo, cloud-optimised data aims to enhance query performance, reduce data transfer costs, and facilitate seamless integration with cloud-based analytical tools.

Examples of products needs

The proposed infrastructure would enable the OBIS community, including the secretariat, to generate products that are constantly required by the user community. We identified some of those needs (with contributions of the community):

- Spread and distribution of non-native species over time.
- Distribution of records by depth and bottom depth.
- Animation of OBIS records through time and depth.
- eDNA data dashboard.
- Diversity indicators (with possible corrections).
- Harvesting marine datasets from GBIF.

The IWG group agreed that a user needs assessment would be important as a next step, to identify the priority products, and data and tool needs.

Critical points

The IWG also recognizes some challenges in the implementation of the proposed plan. Those are by no means impeditive but will require a thorough consideration by the team.

- Frequency of update of data - to be meaningful, the data packages (or any full data export) need to have a reasonable update frequency. Of course, the frequency may vary depending on the data purpose. This will need automated pipelines.
- Infrastructure costs - while we plan to start/test the infrastructure with our available computational resources, in the mid/long-term it is expected that new resources will be needed. In this sense, there will be costs involved. Possible ways of tackling this problem are approaching partners to share infrastructure (e.g. LifeWatch) or finding specific funds for this project.
- Training needs - it is anticipated that many users may not be familiar with JupyterHub. Also, some of the OBIS users do not have knowledge of programming languages like Python and R. In that sense, it will be essential to provide training to ensure the progressive adoption of JupyterHub as a tool by the OBIS community.

Implementation plan

Step 1 - Test of infrastructure

- Implementation of a JupyterHub instance [done].
- Implementation of a CKAN or GeoNetwork instance.
- Test of data packages.
- Test of “recipe scripts”.

Step 2 - Prepare tools and data packages (with OBIS nodes)

- Prepare an R package with main tools (specifically tailored for our infrastructure).
- Collect sample scripts that may be of interest.
- Prepare a first set of data packages.

Step 3 - Open to test with community

- Collect users perceptions.
- Evaluate platform functioning and make adjustments.

Step 4 - Open to use and publish the CKAN for showcasing products.

Annex 6. GBIF and OBIS joint strategy and action plan for marine biodiversity data

Preamble

GBIF and OBIS—the Ocean Biodiversity Information System—have signed a five-year agreement to promote further cooperation across a wide range of activities and services between the two global biodiversity data networks.

The Letter of Agreement targets both technical collaboration covering data standards, publishing and processing; and institutional collaboration to ensure closer ties between OBIS and GBIF nodes, shared training opportunities and aligned documentation.

OBIS, originally called the Ocean Biogeographic Information System, was founded in May 2000 under the Census of Marine Life, and is now a programme component of the International Oceanographic Data and Information Exchange (IODE) programme of the Intergovernmental Oceanographic Commission (IOC) of UNESCO. It aims to be the most comprehensive data and information gateway on the diversity, distribution and abundance of marine life to support its Member States in achieving a healthy and resilient ocean ecosystem.

GBIF—the Global Biodiversity Information Facility—was formally established in September 2001 as a voluntary collaboration between governments, with the aim of providing anyone, anywhere with free and open access to data about all types of life on Earth. The mission of GBIF, as agreed by its Governing Board within the 2023-2027 Strategic Framework, is 'to mobilize the data, skills and technologies needed to make comprehensive biodiversity information freely available for science and decisions addressing biodiversity loss and sustainable development'.

This strategy and plan build on the letter of agreement to set out a set of shared organizational objectives and actions to ensure that marine biodiversity data is freely and openly available through both GBIF and OBIS for the benefit of science and decision making.

OBJECTIVES

GBIF and OBIS will collaborate and seek efficiencies where possible, respecting the vision, mission, and values of each, supporting the mandates and nurturing the strengths and expertise of their respective networks and communities of practice. This collaboration aims to achieve the following objectives by 2030:

- The best available marine biodiversity data, respecting FAIR and CARE principles, is available to meet the needs of all relevant users, supporting the goals and targets of the UN Ocean Decade, including the OBIS 2030 UN decade project, the Kunming-Montreal Global Biodiversity Framework, the 2030 Agenda for

Sustainable Development, the future UN High Seas Treaty, global assessments (e.g., IPBES, UN WOA) and other international policy objectives.
- Marine biodiversity data is securely archived, and our respective networks persist and can operate sustainably into the future.

Areas of Collaboration

GBIF and OBIS agree to collaborate in two focus areas:

Technical Cooperation - GBIF and OBIS will explore opportunities for technical cooperation, including the development of interoperability standards, data exchange protocols, and tools to facilitate the exchange and integration of biodiversity data.

Community and Capacity - GBIF and OBIS will collaborate on capacity-building activities and resources to enhance the skills and expertise of data providers and users for data integration, biodiversity informatics and marine biodiversity research.

Action Plan

To reach the objectives, OBIS and GBIF will develop:

- Clear pathways to support holders of marine biodiversity data to publish their datasets using interoperable data standards and flexible data structures, ensuring that full data provenance, lineage and attribution is retained
- Mechanisms to enable efficient, regular and effective collaboration and communication among the secretariats, nodes and relevant partners at global, regional, national and thematic levels, based on clear guidance and support from the OBIS and GBIF governing bodies.
- Joint training resources to support information exchange and capacity development across the GBIF and OBIS communities of practice
- Joint communication resources, in which the respective roles of GBIF and OBIS, as well as the collaboration between them, are effectively communicated through consistent messaging, and are well understood by all relevant communities and audiences

The following actions and suggested specific tasks are proposed. Those in bold are considered priorities by the partnership. Detailed timelines and budgeting for each task will be scheduled into the respective work programme cycles for GBIF and OBIS, taking account of the financial and human resources available and balancing other priorities. A regular review of progress on these items will determine whether implementation is on track, or if more resources are needed to accelerate progress.

Implementation/work plan to be revised annually

Technical Cooperation

Action	Suggested tasks and responsibilities
Further develop biodiversity data standards	**Engagement with TDWG in the development of standards for both organizations** *Task responsibility: GBIF secretariat, OBIS secretariat, OBIS DCG, individual nodes*
	Vocabulary of traits with TDWG to increase interoperability between WoRMS and Catalogue of Life Task responsibility: GBIF secretariat, OBIS secretariat, OBIS DCG, individual nodes
Further develop the new GBIF data model to accommodate OBIS practices	**Develop the tools for publishing and accessing marine data in an expressive way i.e. event core, eMoF, basic view and extended view** *Task responsibility: OBIS DCG and PCG, OBIS and GBIF informatics teams*
	Data publishing tools (e.g IPT) to support data packages and frictionless data under new data model Task responsibility: GBIF Informatics
Support the development of Essential Ocean Variables, Essential Biodiversity Variables, Essential Climate Variables	Provide input into the data/metadata specifications documentation for the development of essential variables Task responsibility: OBIS DCG, individual nodes
Implement traits-based filtering	Aligning species Traits from WoRMS with CoL Task responsibility: GBIF Informatics
	Extend occurrence data services by enabling discovery based on selected checklists (e.g WoRMS)
Improve representation of marine data in the GBIF portal	**Enhance the delivery of the extended Measurement or Fact extension in GBIF** *Task responsibility: OBIS data coordination group, OBIS and GBIF informatics team*s
	Improve event-based data representation in GBIF Task responsibility: OBIS data coordination group, OBIS and GBIF informatics teams
	Implement environment flags and filtering abilities within GBIF *Task responsibility: OBIS data coordination group, OBIS and GBIF informatics team*s
	Extend search and download services by filtering marine records by WoRMS-AphiaID Task responsibility: GBIF informatics teams

	Show the AphiaID for species records from WoRMS on GBIF.org Task responsibility: GBIF informatics teams
	Enable marine data discovery within GBIF using the standard list of Marine Regions https://www.marineregions.org/ Task responsibility: GBIF informatics teams
	Improve interpretation of what is considered *is_marine* at records level *Task responsibility: OBIS data coordination group,WoRMS, OBIS and GBIF informatics teams*
Support download DOI services and citation tracking for OBIS	**Support download DOI services and citation tracking for OBIS** **Task responsibility: OBIS PCG, OBIS and GBIF informatics teams**
Review of development options and specifications for shared infrastructure components	**Review of development options and specifications for a shared infrastructure** *Task responsibility: GBIF and OBIS secretariat, OBIS DCG, interested OBIS and GBIF nodes*

Community and Capacity

Action	Work programme items
Joint data mobilization and data calls	Campaigns and incentives for data mobilization through grants to support data paper publications *Task responsibility: GBIF secretariat, OBIS secretariat, individual nodes*
	Integrating marine data publication within data mobilization programmes and projects e.g. Biodiversity Information for Development (BID) *Task responsibility: GBIF secretariat, OBIS secretariat, individual OBIS and GBIF nodes*
	Explore a special issue journal publication on marine data
Enable coordination mechanisms between networks and communities of practice	**Regular, at least 6 monthly meetings between GBIF and OBIS communities** *Task responsibility: GBIF secretariat, OBIS secretariat, interested individual nodes or relevant (OBIS) coordination group members (=implementation committee)*
	Joint conference between OBIS and GBIF
	Develop mechanism to allow for knowledge exchange and capacity building at a regional level between GBIF and OBIS nodes including regional meetings and regional helpdesk services and inclusive of thematic nodes *Task responsibility: GBIF secretariat, OBIS secretariat, OBIS NCG, individual nodes*

	Develop guidance on engaging with the marine community for GBIF nodes *Task responsibility: GBIF secretariat, OBIS secretariat, OBIS NCG, individual nodes*
Develop clear messaging around the partnership	**Develop a partnership communication strategy** Task responsibility: GBIF secretariat, OBIS secretariat
	Review of the OBIS membership options within GBIF network *Task responsibility: GBIF and OBIS Secretariats*
Develop joint training resources	**Develop a shared training curriculum** *Responsible: GBIF secretariat, OBIS secretariat, interested individual nodes*
	Incorporate training materials within the Ocean Teacher Global Academy
Hosted portals for nodes (or any partner)	**Hosted portals for nodes (or any partner)** *Task responsibility: GBIF secretariat, OBIS secretariat, individual nodes*
Develop joint fundraising proposals	**Engage with funders such as GEF, ARDC, EU amongst others to promote the work of this plan** *Task responsibility: GBIF and OBIS Executive Committees, in consultation with OBIS NCG*
	Explore shared funding for community engagement officer Task responsibility: GBIF secretariat, OBIS secretariat.

Governance

OBIS and GBIF are to extend invitations to each other´s Steering Group and Governing Board meetings where they will be asked to report on progress on the actions outlined within this strategy and action plan. Implementation of the action plan will be monitored by an implementation committee composed of representatives of OBIS and GBIF Secretariats and nodes that reflect activities across technical cooperation and community and capacity. Both the GBIF Nodes Steering Group and OBIS Nodes Coordination Group should be regularly updated on progress towards the objectives of this strategy and action plan by the respective Secretariat focal point:

GBIF - Andrew Rodrigues - Data Partnerships Officer - arodrigues@gbif.org
OBIS - Ward Appeltans - Programme Manager - w.appeltans@unesco.org

Duration

The current letter of agreement between GBIF and OBIS remains in effect until 31 August 2025 and this strategic plan is aligned with its ambitions. Upon the Letter of Agreement´s expiration, this strategy and action plan will form the basis of a new Letter of Agreement to remain in force until 2030.

Annex 7. List of Participants

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Annex 8. OBIS node reporting to SG-OBIS-12

1. OBIS-USA
2. Southwestern Pacific Regional OBIS Node (SWPRON)
3. Ocean Tracking Network
4. OBIS Australia (OBIS-AU)
5. OBIS-SEAMAP
6. OBIS China
7. OBIS-UK
8. OBIS Japan
9. IndOBIS
10. ESP-OBIS
11. Caribbean OBIS
12. AfrOBIS
13. Deep-sea OBIS
14. OBIS Canada
15. AntOBIS
16. Southeast Asia OBIS
17. OBIS-Colombia
18. OBIS Malaysia
19. EurOBIS
20. OBIS Korea
21. OBIS Kenya

No OBIS node reports received from: Arctic OBIS, Fish OBIS, HAB OBIS, MedOBIS, OBIS Argentina, OBIS Black Sea, OBIS Brazil, OBIS CPPS, OBIS Indonesia, OBIS ISA, OPI OBIS, PEGO-OBIS

OBIS-USA

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

4 staff (one full-time, two part-time, one on detail and not active). Yes.

What are the most important achievements of your OBIS node since SG-OBIS-11?

1. Successfully transitioning to a new node manager.
2. Supporting the development of the Joint Statement by UNESCO, NOAA, USGS and the National Park Service to map and understand the diversity of marine life.
3. Formalizing our relationship with NOAA by adding Matt Biddle as OBIS-USA staff.
4. Supporting the development of the Summit on Ocean Biodiversity in Washington D.C. in January 2024.
5. Publishing three eDNA datasets, our first passive acoustics monitoring dataset, and a MarineGEO Seagrass dataset.

a. https://obis.org/dataset/54bc0e9c-e857-4216-a6ce-46cd6ae58cd7
b. https://obis.org/dataset/fe2ed263-2b21-47d7-a79f-f9b911132398
c. https://obis.org/dataset/210efc7c-4762-47ee-b4b5-22a0f436ef44
d. https://obis.org/dataset/7a4427f6-67ee-4cc1-b95f-3045523420a1
e. https://obis.org/dataset/beab1dcb-8235-4072-85cd-d8c3373e4ae0

6. Successful collaboration on the second and third annual Marine Biological Data Mobilization Workshop.
7. Successful collaboration and completion of the OBIS Grand Unified Model Project Team Report (GUMPT).
8. Significant contributions to the C-GRASS working group EOV specification and associated data schema template, paper forthcoming.

What are the most important risks or challenges you face with your OBIS node?

1. Our staff has undergone significant turnover in the last 5 years. Consequently, it has been difficult to offer consistent service due to the varying depth of institutional knowledge and cumulative level of effort (LOE) available from year to year.
2. Due to the circumstances described in #1, we are continuing to examine the scope of the Node and its role in our agency's program.
3. Low awareness of the potential of our work within our parent and partnering agency.

What are the current and future data management priorities for your OBIS node?

1. Continue to identify and explore mechanisms to increase available LOE from our workforce in support of coordinating and implementing community contributions and collaborations.
2. Develop training materials, for example videos, blog posts, and training modules, for US federal scientists.
3. Strengthen regional community of OBIS nodes through active engagement. For example, coordinating a virtual meeting for the regional nodes.
4. Engage with the passive acoustics monitoring community to develop a Darwin Core data management community of practice.
5. Publish a paper, scientific report, or other publication, using data published in OBIS

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

1. Support eDNA publishing for NOAA science by providing expertise on available tools and best practices for data publication.
2. Synthesize OBIS data for US biodiversity initiatives.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

1. Not currently.

Do you have any advice for other OBIS nodes?

1. We have had some success engaging with data generators by helping to build and maintain communities of practice (SMBD, eDNA CoP) that advise on data publishing

Please list conferences and meetings where your Node has presented or discussed OBIS work

1. Ocean Sciences Meeting 2024
2. The Biodiversity Information Standards Annual Meeting (TDWG 2023)
3. The US Cross-Marine Biodiversity Observation Network Meeting (X-MBON 2024)
4. National Ocean Partnership Program (NOPP) Ocean Life Forum 2023

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

1. Marine Biological Data Mobilization Workshop 2023
2. Marine Biological Data Mobilization Workshop 2024
3. Standardizing Marine Biological Data Working Group: lead monthly meetings and engage with data generators to discuss data blockers and community news.
4. NOAA Omics Working Group: Regular meetings to discuss eDNA publishing strategies and advise data mobilization.
5. USGS eDNA Community of Practice: Regular meetings to discuss eDNA publishing strategies and advise data mobilization.
6. US Marine Biodiversity Observation Network: Regular meetings and engagement to advise mobilization of US MBON data to OBIS.
7. USGS WARC Demopoulos Lab: Mentoring and training intern to develop workflows and documentation for mobilization of backlogged deep-sea data.
8. METS-RCN Town Hall: Participation as panelist in OSM town hall on biological observations in ocean time series data. This has resulted in invitation to join the METS-RCN project as a consultant on biological data.
9. North Pacific Pelagic Seabird Database Mobilization: In concluding stage of an eight year effort to mobilize > 1 million seabird occurrences to OBIS.
10. Engagement with NOAA NMFS, GOOS, and FishGlob to maximize the mobilization of data relevant to Fish EOVs.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

1. None to report this year.

Southwestern Pacific Regional OBIS Node (SWPRON)

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

One staff engaged. As listed on the contact page.

What are the most important achievements of your OBIS node since SG-OBIS-11?

New datasets are published. Regular updated datasets are still being provided by many existing contributors.

What are the most important risks or challenges you face with your OBIS node?

Funding. While costs have increased, the funding has remained static and at risk of decreasing.

What are the current and future data management priorities for your OBIS node?

Current priority is the automation of existing data streams to capitalise on efficiencies in a tightening financial situation. Advocacy for OBIS, DwC, and open data policies to the regional marine community remains an ongoing action.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

No

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

No

Do you have any advice for other OBIS nodes?

No

Please list conferences and meetings where your Node has presented or discussed OBIS work

New Zealand Marine Science Society Conference 2023
New Zealand UNESCO Ocean Decade seminar series 2023
New Zealand Marine Geospatial Infrastructure Working Group meetings 2023

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

SWPRON runs regular DwC and Data Carpentry workshops to NIWA staff nationally.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

None this year we're aware of.

Ocean Tracking Network

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

As many as 6 OTN data staff are responsible for the pipeline that brings animal telemetry data into OTN and onward to OBIS. Of these, Naomi Tress, Yinghuan Niu, and Shannon Landovskis are not yet listed on the website. OTN's data team also includes software developers who are not directly tasked with OBIS publication work but help administer workshops and produce analysis tools, these are Brian Jones, Patrick Martin, Ryan Gosse and Bruce Delo. All contact details are available at https://oceantrackingnetwork.org/staff

What are the most important achievements of your OBIS node since SG-OBIS-11?

A standardized pipeline for publishing telemetry data, agreed to between OTN data systems and independent ones like the European Tracking Network, that will make tracking data well understood as part of the OBIS data system.

What are the most important risks or challenges you face with your OBIS node?

Data privacy concerns of researchers both in terms of their study animals but also their listening equipment.

Attribution for all affiliated researchers for a project, especially when their only contribution is the sharing of incidental detections

Quality control of the detection data itself, as techniques to filter false detections evolve, improving the pipeline to match the latest methods.

What are the current and future data management priorities for your OBIS node?

Currently – expansion to regions not currently served by an OTN database, better (serialized) data formats for processing and visualization. Mapping of environmental data from in-situ and model results to the data we collect. Inclusion of animal movement data in stock assessments, Species at Risk Assessments, and Digital Twins of the Ocean.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

Help researchers fulfil their publication obligations under their various funding vehicles. Operate as a capable steward for the publication and archival of tracking data.

OTN is involved in becoming a national data assembly centre for the GOOS programme known as AniBOS, for Animal Borne Ocean Sensors (https://anibos.com). We will be assimilating oceanographic information collected via satellite and acoustic telemetry to serve ocean forecasting models.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

No. Our commitment to OBIS was independent of its status within IODE but we look forward to the increased resources and greater profile of this important network!

Do you have any advice for other OBIS nodes?

Train more people than you think you will need, engage community members who are enthusiastic to help carry your message, and engage in turn with the community of marine data professionals who are gathering at informal meetings like the Standardizing Marine Bio Data working group, and in the OBIS project teams, if you are interested in that content.

Please list conferences and meetings where your Node has presented or discussed OBIS work

Since SG-OBIS-11:

- OTN IDMC meeting – August 2023 – discussion of OBIS publication rates as a performance metric for OTN, and how it will be affected by a proposed new publish-by-default data policy for OTN-affiliated projects
- X-MBON BioTrack working group meeting November 2023 – OTN Data Pipelines to OBIS
- US IOOS DMAC 2023 – OTN and Data Pipelines to OBIS
- OTN/ETN collaboration meeting – Jan 2024 @ VLIZ
- Florida – FACT Network meeting Jan 2024 (w/ Stephen Formel of OBIS-USA) - https://secoora.org/wp-content/uploads/2024/01/Simplified-Winter-2024-FACT-Meeting-Agenda.pdf
- Great Lakes Acoustic Telemetry annual coordination meeting Feb 2024 – Partnerships in Aquatic Telemetry
- Various OTN Study Halls and researcher consultation meetings where we informally brief researchers on our role as OBIS publishers for telemetry datasets.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

Assisted OBIS USA, US-IOOS, MBON, Hakai Institute, and Canada's Integrated Ocean Observing System with a data publication pipeline for satellite tracking data
Co-authored a workshop to help mobilize all manner of marine biological data towards OBIS. This workshop series – now in its third year - had 400 researchers apply to participate in the 2024 edition (we have accepted a functional maximum of 100). https://ioos.github.io/bio_mobilization_workshop/

Held workshops in Canada and the USA on mobilizing telemetry data and OTN's pipeline towards OBIS publication.

Integration meetings with representatives from the European Tracking Network and EurOBIS to ensure coordination of publication effort towards OBIS

Participation in the Standardizing Marine Biological Data data mobilization meetings, hosted by OBIS-USA.

Co-authored pyobistools (https://github.com/cioos-siooc/pyobistools) with staff from https://ogsl.ca/ (Simon Beauvillier) and participated in multiple sprints within CIOOS and US-IOOS to extend the functionality of this Python port of the obistools R package.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

Thiago Couto – MBON A-BioTrack used OTN data as well as OBIS to determine species home ranges vs. tracking data. No publication is available as far as I know but it is my understanding that MBON seeks to continue to use OBIS data as a backstop for evaluating the contribution of tracking data to the understanding of movement in the US and across the Americas.

Use of OBIS as a home-range builder for quality control of tracking data in the remora R package(https://github.com/ocean-tracking-network/remora), which is in turn used by the DaViT data visualization tool currently used in the FACT Network:

OBIS Australia (OBIS-AU)

which is hosted by the CSIRO NCMI IDC. As a regional node, OBIS-AU includes marine datasets published on the AADC IPT.

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

- 4 staff members listed on the OBIS node contact page, each contributing to the project with a small allocation of time. Due to staff movement, this will soon be 3 people.

What are the most important achievements of your OBIS node since SG-OBIS-11?

- To date, 36 million records from 481 datasets published to OBIS in total. Of these, 21 million were eDNA records from 25 datasets with associated sequences and DNA specific metadata.
- Since SG-OBIS-11 meeting 25 new datasets have been published with 1.36 million records.
- Active participation and completion of the final report for OBIS Grand Unified Data Model Project Team (GUMPT). During the project, a Baited Remote Underwater Video Station (BRUVS) dataset was transformed to Camera Trap Data Package (Camtrap DP) and later mapped to new conceptual model.
- OBIS-AU collaborated with ALA (Atlas of Living Australia) and GBIF (Global Biodiversity Information Facility) on a regional publishing pathway, avoiding data duplication across data aggregators.
- Participation in work to test the prototype of GBIF eDNA data convertor tool for transforming eDNA data into Darwin Core.
- OBIS-AU continues to crosscheck GBIF marine datasets identified by the OBIS Secretariat Data Manager that could be added to OBIS. We are now hosting some OBIS Secretariat “no node” datasets that were delivered to OBIS via DiGIR by the

AADC, a long time ago. There are no outstanding datasets with Australian content, and no Australian region data with “no node” designation.

What are the most important risks or challenges you face with your OBIS node?

- None

What are the current and future data management priorities for your OBIS node?

- Current: Preserving contextual information for an occurance record in the OBIS data portal. For example, in our database we have preemptively marked records using an in-house term ‘occurrenceType’ (roughly matched to the GBIF dataset_subtype) to reflect differences between ‘catch_composition’, ‘specimen’ or ‘measurement’ record type which can all be from the same trawl.
- Current: Prevention of duplication of data over various networks: OBIS, ALA and GBIF. We have a workflow in place to manage this risk, based on shared understanding between regional data groups. However, checks for potential data duplication during ingestion into aggregators would be helpful.
- Future: Publishing the outcomes of TDWG tests and assertions. We are unsure where to record these test outcomes in DwC. They possibly can be stored in EmoF but then may not be explicitly exposed to data portals.
- Future: Pipelines for node managed QC, database ingestion and data transformation of large, ongoing biodiversity data collections that we republish regularly. There are challenges in building pipelines to cope with unique one-time-only datasets.
- Future: Extend the publishing capacity of the Australian Node by developing a platform to enable Australian marine biodiversity community to publish data to OBIS and GBIF, closer to the source of the data.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

- Bioplatforms/eDNA publishing
- Animal Tagging datasets
- Discussion about recommending OBIS as the biodiversity publishing platform for NESP (National Environmental Science Program) and possibly the Australian Marine Data Commons

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

- No OBIS node structure changes required

Do you have any advice for other OBIS nodes?

- None

Please list conferences and meetings where your Node has presented or discussed OBIS work

- Au/NZ DNA biodiversity day, Canberra, Australia 16 October 2023

- TDWG 2023, Hobart, Australia 9-13 October 2023
- Australian IOC stakeholder catchups between IOC delegate, NODC and GOOS representatives
- Biodiversity.aq / SOOS EG-ABI Essential Variables Workshop, Hobart, Australia 10-11 August 2023
- Meeting with Miwa Takahashi (CSIRO) and Thomas Stjernegaard Jeppesen (GBIF) to discuss a FAIR eDNA data checklist especially for non-molecular related fields and compatibility of those with GBIF and OBIS data submissions.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

- 2 staff members completed course on "Contributing and publishing datasets to OBIS (self-paced)" from OTGA
- Australian Marine Data Commons scoping meeting (part of an Australian National Environmental Science Program (NESP) marine biodiversity data assessment project)
- GOOS BioEcoPanel data publishing options meeting with Tony Koslow

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

- The OBIS-AU Node identifies datasets from data publications, liaises with the data custodians and publishes the datasets to OBIS, however, we have not produced any research publications ourselves.
- OBIS-AU have published two conference abstracts since SG-11:
    - Tattersall K, Newman P, Rajbhandari S, Watts D, Sadeghi M (2023) An Australian Model of Cooperative Data Publishing to OBIS and GBIF. Biodiversity Information Science and Standards 7: e112228. https://doi.org/10.3897/biss.7.112228
    - Watts D, Tattersall K, Rajbhandari S (2023) Publishing Australian Marine Data to OBIS: Twenty Years of Lessons Learnt. Biodiversity Information Science and Standards 7: e111565. https://doi.org/10.3897/biss.7.111565
- We are not aware of any papers that have used OBIS data directly to create a publication. The following publications served as sources for datasets that were made available and transformed into IPT resources by the OBIS-AU Node:
    - Zarco-Perello S, Langlois TJ,Holmes T, Vanderklift MA, Wernberg T. 2019 Overwintering tropical herbivores accelerate detritus production on temperate reefs. Proc. R. Soc. B286: 20192046.http://dx.doi.org/10.1098/rspb.2019.2046
    - Bradley Paine, Linda Armbrecht, Christopher Bolch, Andrew McMinn & Gustaaf M. Hallegraeff (2023) Dinoflagellate cyst distribution over the past 9 kyrs BP from offshore east Tasmania, southeast Australia, Palynology, DOI: 10.1080/01916122.2023.2273267
    - Wild-Allen, K., Andrewartha, J., Baird, M., Beardsley, J., Brewer, E., Bodrossy, L., Eriksen, R., Gregor, R., Griffin, D., Herzfeld, M., Hughes, D., Jansen, P., Langlais, C., Margvelashvili, N., Martini, A., McMahon, M., Revill, A., Rizwi, F., Skerratt, J., Schwanger, C., Sherrin, K., Frydman, S., Wild, D. 2022 Storm Bay Biogeochemical Modelling and Information System: supporting sustainable aquaculture in Tasmania (FRDC 2017-215) Final Report Appendices. CSIRO Oceans & Atmosphere, Hobart, March 2023 https://www.frdc.com.au/project/2017-215

- Tim J. Langlois, Stephen J. Newman, Mike Cappo, Euan S. Harvey, Ben M. Rome, Craig L. Skepper, Corey B. Wakefield, (2015) Length selectivity of commercial fish traps assessed from in situ comparisons with stereo-video: Is there evidence of sampling bias?, Fisheries Research, Volume 161, pages 145-155, ISSN 0165-7836, https://doi.org/10.1016/j.fishres.2014.06.008.
- Victorero, Lissette,Samadi, Sarah,O'Hara, Timothy D.,Mouchet, Maud,Delavenne, Juliette,Leprieur, Fabien,Leroy, Boris (2023) Global benthic biogeographical regions and macroecological drivers for ophiuroids. Ecography pp-. https://doi.org/10.1111/ecog.06627 https://doi.org/10.1111/ecog.06627
- Woodings Laura N., Murphy Nicholas P., Jeffs Andrew, Suthers Iain M., Liggins Geoffrey W., Strugnell Jan M. (2019) Distribution of Palinuridae and Scyllaridae phyllosoma larvae within the East Australian Current: a climate change hot spot. Marine and Freshwater Research 70, 1020-1033. https://doi.org/10.1071/MF18331
- Williams A, Osterhage D, Althaus F, Ryan T, Green M, Pogonoski J. (2021) A Very Large Spawning Aggregation of a Deep-Sea Eel: Magnitude and Status. Journal of Marine Science and Engineering. 2021; 9(7):723. https://doi.org/10.3390/jmse9070723
- Armbrecht, L., Focardi, A., Lawler, K.-A., OíBrien, P., Leventer, A., Noble, T. L., et al. (2023). From the surface ocean to the seafloor: Linking modern and paleo-genetics at the Sabrina Coast, East Antarctica (IN2017_V01). Journal of Geophysical Research: Biogeosciences, 128, e2022JG007252. https://doi.org/10.1029/2022JG007252
- Maguire, K., O'Neill, H., Althaus, F., White, W., & Williams, A. (2023). Seamount coral reefs are egg case nurseries for deep-sea skates. Journal of Fish Biology, 1ñ15. https://doi.org/10.1111/jfb.15376
- Daudt, Nicholas W.,Woehler, Eric J.,Schofield, Matthew R.,Smith, Robert O.,Bugoni, Leandro,Rayment, William J. (2024) Seabird assemblages are linked to the major western boundary current off eastern Australia. Progress in Oceanography 223 pp103215-. https://doi.org/10.1016/j.pocean.2024.103215

OBIS-SEAMAP

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?
3 (Ei Fuioka, Pat Halpin listed on the page. Plus, Ben Donnelly, a system administrator)

What are the most important achievements of your OBIS node since SG-OBIS-11?
Continued uploading new and updated datasets to OBIS and GBIF and being one of the largest contributors to OBIS.

What are the most important risks or challenges you face with your OBIS node?
While OBIS-SEAMAP is very active and well received, our maintenance work is not funded.

What are the current and future data management priorities for your OBIS node?

- Collaboration with other data repositories.
- Improvements of database structure to collect various data types (e.g. animal tracking, passive acoustic monitoring, high-resolution digital aerial surveys).
- Explore feasibility of adopting Darwin Core extensions to OBIS-SEAMAP database so that more attributes can be shared.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?
U.S. agencies like NOAA and BOEM see OBIS-SEAMAP as a useful platform for data archives. They send us their survey data regularly. Federal funds require proposals to include a data management & data sharing section. OBIS-SEAMAP has been and will be a good place for data sharing.

Also, more and more journals require the authors to clarify the data availability. Researchers ask us if they can get a URL of the data before their articles are published. OBIS-SEAMAP can do that.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?
None

Do you have any advice for other OBIS nodes?
Since OBIS-SEAMAP is a thematic node, we would appreciate it if other OBIS nodes encourage contributors of marine megavertebrates' data to share them with OBIS-SEAMAP as well.

Please list conferences and meetings where your Node has presented or discussed OBIS work
None comes to my mind.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities
Happywhale.com and Satellite Tracking and Analysis Tool (STAT) by seaturtle.org have been great partners with us. Their data are harvested each month and uploaded to OBIS.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS
Kot, C. Y. at al. 2023. Synthesizing connectivity information from migratory marine species for area-based management. Biological Conservation. 283, 110-142.

OBIS China

Website: http://www.iobis.org.cn/

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

There are two people engaging in the work. Both are listed on the OBIS node contact page.

What are the most important achievements of your OBIS node since SG-OBIS-11?

We published two datasets: Distribution of macrobenthos in the Yellow Sea in July 2011; Composition of macrobenthos in the Yellow Sea in July 2011.

What are the most important risks or challenges you face with your OBIS node?

Collect data and push local scientists to share data in OBIS.

What are the current and future data management priorities for your OBIS node?

We will publish the Hong Kong Marine Biodiversity Database about the macrobenthos and algae in the Hong Kong's rocky shores by the Swire Institute of Marine Science and School of Biological Sciences, the University of Hong Kong.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

No.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

No

Do you have any advice for other OBIS nodes?

No.

Please list conferences and meetings where your Node has presented or discussed OBIS work

1) Attended the online meeting “the Asia Pacific Marine Biodiversity Observation Network (AP MBON) workshop” on 31 October-4 November October 2022. Develop collaboration with .Prof. Dr. Zhao Qianshuo, the Ocean University of China, in collecting marine biodiversity data.
2) Discussed how to share and published data in OBIS during the meeting ‘The Third Symposium on Benthology, which was organized by the Benthology Branch of Chinese Society for Oceanology and Limnology in Qingdao on 20-22 October 2023.
3)

Please list your Node’s engagement in data publishing training courses, partnerships and data mobilisation activities

Dr. Kuidong XU, manager of OBIS-China, engaged in data publishing training courses during SG meetings. We have partnerships with Prof. Gray Williams, Hongkong University, Prof. Chunsheng Wang, Second Institute of Oceanography of China.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

Not yet published. We are preparing a paper of marine diversity pattern by using OBIS data.

OBIS-UK

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

4 staff. I need to edit the current list on the Node Contact Page.

What are the most important achievements of your OBIS node since SG-OBIS-11?

Addition of eDNA Occurrence Data – https://www.dassh.ac.uk/ipt/resource?r=l4-edna & https://www.dassh.ac.uk/ipt/resource?r=pml_l4_edna_16s
Addition of capability to hold associated habitat data
Attainment of CoreTrustSeal Accreditation

What are the most important risks or challenges you face with your OBIS node?

Ensuring representation/recognition at the national scale within the UK (especially links to the UK NODC)
Long-term funding

What are the current and future data management priorities for your OBIS node?

Imagery data pipelines
Providing feedback to users/data providers
Supporting Citizen Science data activities

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

Provision of data to EMODnet Biology/EurOBIS
Flow of biodiversity data from UK NODC (BODC) via OBIS-UK
Access to data collected from industry/licensed activities
Increased support for Citizen Science activities as UK iNaturalist node

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

No

Do you have any advice for other OBIS nodes?

Each node faces varying challenges Main advice would be to communicate with other nodes, share experiences and solutions.

Please list conferences and meetings where your Node has presented or discussed OBIS work

MARCO-BOLO Kick Off Meeting – March 2023
EMODnet Biology Partners Meeting - June 2023
MARCO-BOLO/GOOS BioEco Panel Joint Meeting – Sept 2023
G7 FOSI Plankton Observing Network Workshop – Sept 2023
DTOBioFlow Kick Off Meeting – Sept 2023
UK Benthic Natural Capital Hackathon – Nov 2023
EMODnet Open Conference – Nov 2023
MARCO-BOLO General Assembly - Feb 2024

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

Data exchange with UK GBIF node
Proof of concept of improved data flow for access to industry data
UK Node of iNaturalist (with additional QA/verification processes)
Run UK MEDIN network training in data management
Data cataloguing discussions with UK Ascension Islands

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

N/A

OBIS Japan

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

Five people (two people listed in the OBIS contact page)

What are the most important achievements of your OBIS node since SG-OBIS-11?

Attempted to expand data providers from pure scientist to governmental partners. We have established a stable connection with a local government which conducts long-term coastal survey. In 2023, we have formatted their data and published one dataset from their series of datasets.

What are the most important risks or challenges you face with your OBIS node?

Shortage of human resource with technical knowledge for data QC

What are the current and future data management priorities for your OBIS node?

Data publishing from coastal research data archived in local governments around Japan.
Submit IODE-QMF application for data management

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

Not specific expectation, but we have a question that "Are there any plan to commit BBNJ CH as an OBIS node or OBIS?".

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

Inviting government organizations, academic institutions, and researchers to participate in the operation of OBIS Japan Node, to promote the use of OBIS data and information for policy making and scientific research.

Do you have any advice for other OBIS nodes?

NA

Please list conferences and meetings where your Node has presented or discussed OBIS work

Fujikura, K. (2023) ISA E-Learning PlatformにてOBISの重要性を紹介 (in Japanese)

藤倉克則（2023）早稲田大学エクステンションセンターの講演にてOBISの重要性を紹介 (in Japanese)

藤倉克則（2023）東海大学海洋学部夏季集中講義にてOBISの重要性を紹介 (in Japanese)

藤倉克則（2023）海ロマン21定例卓話会にてOBISの重要性を紹介 (in Japanese)

Hosono, T., K. Fujita, K. A. Kakumura, S. Azuma, A. Kishimoto, S. Matsuda, A. Fusho, A. Sonoda and K. Fujikura (2023) Use of a standard format (DarwinCore) on an information system (BISMaL) to integrate recent foraminifera data and to estimate recent past habitat condition. International Symposium on Foraminifera FORAMS 2023, Perugia, Italy, June 26 –June 30, 2023, 145-146pp.

Hosono T, S. Matsuda, A. Fuho, S. Azuma, A. Kishimoto (2023) On BISMaL, a biodiversity database as a place of integration of information science and taxonomy. 8th Okinawa Marine Science Network Workshop, Ryukyus University, Okinawa, 2023-11-17. (in Japanese)

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

Providing R code with data providers (two local governments) to combine and analyze OBIS data and their own data

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

Hosono, T., T. Kitayama, H. Saito and K. Fujikura (in press) Development of marine biodiversity database (BISMaL) to enable estimations past habitat conditions for marine life in the northwestern Pacific. Database.

IndOBIS

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

02; Yes

What are the most important achievements of your OBIS node since SG-OBIS-11?

1. Launched dedicated web portal of IndOBIS node.
2. Developed mobile application namely OceanEyes to document marine species observations within Indian EEZ with citizen science approach.

What are the most important risks or challenges you face with your OBIS node?

The primary challenge that we face at our node is in encouraging data providers to share their data openly and consistently to the OBIS. Some institutions or researchers will show hesitant to share data due to concerns about data ownership and competition.

What are the current and future data management priorities for your OBIS node?

1. We aim to enhance data quality by implementing standardized protocols throughout the process of data collection, cleaning, and validation. By doing so, we ensure that the data curated by our node is accurate, complete, and reliable, thus maintaining high standards of quality and integrity.
2. We would like to strengthen capabilities of data providers by providing training and promoting best practices in managing marine biodiversity data.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

1. Stakeholders are expressing desire to our OBIS node to organize capacity building workshops, training sessions on marine biodiversity data management to enhance the skills and knowledge of data providers, researchers, and other stakeholders in the region.

2. They are also expecting our OBIS node to engage in proactive outreach and communication activities to raise awareness about the importance of marine biodiversity data, promote the use of OBIS resources, and encourage participation and collaboration in sharing data within the region.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

IndOBIS is treated nationally a recognized activity under IODE NODC

Do you have any advice for other OBIS nodes?

OBIS nodes in the Indian Ocean including the new one if any have to coordinate amongst them particularly on data from ANBJ region and capacity building.

Please list conferences and meetings where your Node has presented or discussed OBIS work

1. World Ocean Science Congress (WOSC2024) organized by NIOT, Chennai from Feb 27-29, 2024.
2. "Enhancing Biological Data Sharing to Advance Deep-Sea Taxonomy", was convened by the International Seabed Authority (ISA), in collaboration with the Ministry of Oceans and Fisheries of the Republic of Korea (MOF), the National Marine Biodiversity Institute of Korea (MABIK) and the Institute of Tropical Biology of the Vietnam Academy of Science and Technology (VAST), from 3-6 October 2023.
3. "Machine Learning based Species Distribution Modelling" hosted by the International Training Centre for Operational Oceanography (ITCOocean), ESSO-INCOIS, Hyderabad, India from Sep 11-22, 2023.
4. "MARINE BIODIVERSITY MONITORING AND BIOGEOGRAPHY: Emerging Trends in the Era of Data Science (MBMB-2023)" organized by University of Kerala on 8th and 9th July 2023.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

Recently we conducted in-house training session on digital biodiversity data collection and brining awareness among the researchers on biological data management and publication. We are also trying to attract new data providers by showcasing our node activities at various conferences and workshops.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

1. Wilson et al. Marine living resources – a blue future SPECIAL SECTION: BLUE ECONOMY CURRENT SCIENCE, VOL. 126, NO. 2, 25 JANUARY 2024
2. OBIS data has been used as training datasets in the training course "Machine Learning based Species Distribution Modelling" organized by the International Training Centre for Operational Oceanography (ITCOocean), ESSO-INCOIS, Hyderabad.

ESP-OBIS

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

Currently, our node have 11 members engaged, which 4 of them are listed on the node contact page

What are the most important achievements of your OBIS node since SG-OBIS-11?

- **SHOA/CONA meeting (IOC Chile delegation).** We met up via online with our corresponding IOC delegation, they expressed support in terms of collaboration to the data publication, however, there is no fund from them to support the node.

- **Meeting with the GBIF Chile Node.** We had a meeting with them to discuss the collaboration between both institutions in terms of the data publication. We could notice that they have some confusion regarding the collaboration to publish data since they were concerned about the data protection laws. Unfortunately, we were unable to get their support to collaborate.

- **University of Concepcion board meeting.** We had a meeting with VRID, which is an institutional project of our university. As a result of this meeting, they will support our node with some funds since this year and the funding that we have from our faculty will be now to support national travels.

- **Associated organizations.** Integration of the Zoology Museum of the University of Concepcion as an associated institution to the IPT of the ESP-OBIS Node. As a result of this, a total of 3 datasets were published.

What are the most important risks or challenges you face with your OBIS node?

Node visibility, both national and regional in the Southern Pacific
A low number of data providers
To have fund to cover a fix position for a data manager
To have fund to visit national and regional institutions for ESP-OBIS presentation
To promote the collaboration between ESP-OBIS and public and governmental institutions

What are the current and future data management priorities for your OBIS node?
Find data providers
Increase the number of dataset publications
To keep a good quality of data

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

Maintain internal data preparation workshops to expand database coverage.

Generate greater contact and dissemination of ESP-OBIS in the region, which requires funds for travel/per diem/tickets.

We hope to address a historical and spatial dataset for the South Pacific region, in order to contribute substantially to the OBIS global database. OBIS participation in human capital formation, undergraduate and graduate theses and publications. To this end, we require support incentives such as scholarships for students and support for scientific meetings and congresses to disseminate research associated with OBIS.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

We do not see major changes in the structure, however, we need the functioning between OBIS and GBIF to be clearly defined by the relevant authorities.

Do you have any advice for other OBIS nodes?

- To have in mind that the data quality control is an important process for the dataset publications
- Participate in conferences with a poster/talk representing their node and OBIS

Please list conferences and meetings where your Node has presented or discussed OBIS work

XLII Congress of Marine Sciences, Puerto Montt, Chile. Poster titled Ocean Biodiversity Information System (OBIS): A tool for the scientific community.

Annual meeting of the Millennium Institute in Oceanography (IMO).

Undergraduate and Graduate course at University of Concepción, University of Antofagasta and University of Valparaiso.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

- Undergraduate course at the University of Concepcion which has a module for OBIS. The module aims to teach students the user and data provider role.

- Preparation of the OBIS Spanish version course at OTGA in collaboration with the Caribbean and Colombia OBIS Node .

- Participation of the node members in the OBIS English version Course at OTGA.

- Internal preparation of the ESP-OBIS-Node (weekly workshops).

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

- Modeling present and future distribution of plankton populations in a coastal upwelling zone: the copepod Calanus chilensis as a study case; R Rivera, R Escribano, CE González, M Pérez-Aragón, Scientific Reports, 2023, 13 (1), 3158.
- Revealing zooplankton diversity in the midnight zone; CE Gonzalez, L Blanco-Bercial, R Escribano, I Fernández-Urruzola, R Rivera, O Ulloa, Frontiers in Marine Science, 2023.
- Variación espacial de la diversidad de copépodos en las costas de Chile. P Aros-Mardones, R Rivera, S Yañez, P Hidalgo. http://repositorio.udec.cl/handle/11594/11088

Caribbean OBIS

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

We are a group of 4 people. Yes, we all are on the OBIS contact page.

What are the most important achievements of your OBIS node since SG-OBIS-11?

1. New data sets on our IPT
2. A new member for our Node.

What are the most important risks or challenges you face with your OBIS node?

Limited time to focus on datasets curation (resolve dropped records or No WoRMS match issues). Our tasks within the Node are voluntary and unfortunately most of our time must be spent on other projects that are income-generating.

What are the current and future data management priorities for your OBIS node?

Current:

- Assist data holders that want to publish their data into OBIS, by performing QC to the data sets, help them fix any issues and ultimately put the data on the IPT.

Future:

- Finish curating all our datasets.
- Increase the flow of data into OBIS by working closer to data holders from our region.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

More guidance, training and a faster response from us when sending datasets to be reviewed by us and published on the IPT.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

Not yet. At the moment I can see that we will be working on the same tasks. Maybe we will have better opportunities to submit proposals for funding to help us integrate our responsibilities with OBIS data management and products.

Do you have any advice for other OBIS nodes?

Please list conferences and meetings where your Node has presented or discussed OBIS work

Gulf and Caribbean Fisheries Institute Annual Conference, Nassau, 2023: oral presentation.

Best Practices for measuring marine biodiversity for wise management of local and regional fisheries.

Short summary: OBIS and MBON are committed to promoting best practices in marine biodiversity data collection. These initiatives establish and disseminate the use of standardized methods for the collection and publication of marine biodiversity data by utilizing common data formats (Darwin Core), standards (EML and ISO for metadata), and vocabularies (WoRMS and NERC Vocabulary Server), permitting researchers to share, integrate, and compare datasets easily.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

1. OBIS/OTGA OBIS course in Spanish: preparation of the course content and structure in collaboration with other 3 OBIS Nodes form Latina America. Translation of training material from English to Spanish.
2. Contribution to the 2024 Marine Biodiversity Data Mobilization Workshop, serving as helpers for the Spanish speakers break out rooms.
3. Participation in the MBON data mobilization workshop face-to-face (US MBON annual meeting, March 2024).

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

AfrOBIS

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

12, Yes.

What are the most important achievements of your OBIS node since SG-OBIS-11?

AfrOBIS received many interests for data submission from regional partners.

What are the most important risks or challenges you face with your OBIS node?

- Lack of appropriate resources in the region to conduct data management activities and perform subsequent data submissions onto the AfrOBIS IPT.
- Capacity development in terms of data management practices in the region.

What are the current and future data management priorities for your OBIS node?

- Working closely with system developers and data curators to implement a biological schema onto the national MIMS – which is an IODE ADU that hosts AfrOBIS. This will facilitate more biodiversity dataset submissions via the AfrOBIS IPT.
- Working closely with regional biologists and or researchers to annotate and process underwater imagery dataset in effort to submit them via the AfrOBIS IPT.
- To conduct a regional workshop (s) with African data producers/providers.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

- We expect to reach out to other African data producers/providers beyond the sub-Saharan region to bolster data submissions and hopefully, provide a complete picture of the global south biodiversity.
- To start developing marine biodiversity products/services from the biodiversity data submitted to the AfrOBIS. This is an added value we are looking towards developing for the user community.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

Yes

Do you have any advice for other OBIS nodes?

All OBIS nodes should participate in various Task Teams to benefit from a wide array of teams of expertise in terms of biodiversity data management.

Please list conferences and meetings where your Node has presented or discussed OBIS work:

- 2nd AfrOBIS/MIMS User Engagement Workshop, Cape Town, 11 March 2024
- Marine Biodiversity Data Management Workshop, Cape Town, 18 October 2023
- 1st AfrOBIS/MIMS User Engagement Workshop, Cape Town, 25 September 2023
- Oceanography for Marine Ecosystem Mapping Workshop, Cape Town, 12 September 2023
- National Fisheries Data Summit, Cape Town, 6-7 July 2023
- Biodiversity and Coastal Research Workshop, Cape Town, 21 June 2023
- Oceans and Coastal Information Management System Stakeholder Workshop, Cape Town, 22-24 May 2023

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

AfrOBIS provided data publishing training to the following regional partners:

- Student (s) from Biological Invasion Research Unit, University of Abomey-Calavi, Benin

- Biodiversity researchers at the National Department of Forestry, Fisheries and the Environment (DFFE), Cape Town, South Africa.

Data mobilisation activities were done in the following workshops/meetings:

- 2nd AfrOBIS/MIMS User Engagement Workshop, Cape Town, 11 March 2024
- Marine Biodiversity Data Management Workshop, Cape Town, 18 October 2023
- 1st AfrOBIS/MIMS User Engagement Workshop, Cape Town, 25 September 2023
- National Fisheries Data Summit, Cape Town, 6-7 July 2023
- Biodiversity and Coastal Research Workshop, Cape Town, 21 June 2023

AfrOBIS participated in the following data publishing training course(s):

- Ocean Data Management, Ocean Teacher Global Academy, October 2023

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

- Krug, Marjolaine and Naidoo, Ashley Desmond and Williams, Lauren Lyn, South Africa's Oceans and Coastal and Information Management System Towards Improved Marine Protection and Governance. Available at SSRN: https://ssrn.com/abstract=4633351 or http://dx.doi.org/10.2139/ssrn.4633351
- Krug, Marjolaine and Naidoo, Ashley Desmond and Williams, Lauren Lyn (2024) South Africa's oceans and coastal and information management system towards improved ocean access, protection, and governance, Journal of Environmental Management

  Volume 354, March 2024, 120255
- Shyamolina Ghosh, Blake Matthews, Sarah Supp, et al. Synchrony and tail-dependent synchrony have different effects on the stability of terrestrial and freshwater communities. ESS Open Archive . August 24, 2023. DOI: 10.22541/au.169287307.74379399/v1
- Chetty, P. & Ndlovu, J. (2022). Impact of Environmental Education on Waste Disposal Behavior of Beachgoers on the Durban Central Beachfront. African Journal of Hospitality, Tourism and Leisure,11(6):1899-1912. DOI: https://doi.org/10.46222/ajhtl.19770720.331
- Lennox, E (2022) - Assessing the utility of open-source data in exploring benthic biodiversity in mining concessions off the South African coast (Minor Thesis: https://open.uct.ac.za/)
- Michael L. ZETTLER* & Leon HOFFMAN** (2022). Nucula (Nuculidae, Bivalvia) from upper bathyal depths off Namibia© Sociedad Española de Malacología Iberus, 40 (2): 291-299, 2022
- O. E. Nwankwo, S. A. Odewo, B. A. Ajani, L. T. Soyewo, M. S. Nwefuru (2022). Could the three be edible and natural sources of Levodopa? Morphological characterization of three taxa of Mucuna (Fabaceae) in Ebonyi State, Southeastern Nigeria. Agricultural Science Digest, August 2022, Vol. 42, No. 4, 468-471
- Ágreda-Arango, J. ., Ballesteros, C., Bessudo, S., Bent-Hooker, H. ., Bolaños, N., Caldas, J. P., … Navia, A. F. . (2022). Richness distribution patterns of marine elasmobranchs in Colombia: Patrones de distribución de la riqueza de elasmobranquios marinos en Colombia. Revista De Biología Marina Y Oceanografía, 57(Especial), 8–19. https://doi.org/10.22370/rbmo.2022.57.Especial.3177
- D Yemane, SP Kirkman & T Samaai (2020) Use of openly available occurrence data to generate biodiversity maps within the South African EEZ, African Journal of Marine Science, 42:1, 109-121, DOI: 10.2989/1814232X.2020.1737573

Deep-sea OBIS

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?
1.5 staff, yes

What are the most important achievements of your OBIS node since SG-OBIS-11?
We have published three sampling events in 2023 to the deep-sea node and trained deep-sea scientists in the Challenger 150 UN Ocean Decade program to prepare their data to be published to OBIS deep-sea, finalizing the marine data flow from Senckenberg Research Institute and Natural History Museum to OBIS, most of the taxa are taxon matched and will be mobilised to OBIS, through BICIKL project (https://bicikl-project.eu/automating-interlinkage-between-gbif-data-worms-taxonomy)

What are the most important risks or challenges you face with your OBIS node?
Lack of personnel to be more active

What are the current and future data management priorities for your OBIS node?
Mapping the data quality control of the data based on the final report published by the quality control task team

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?
I have a thematic node

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?
No

Do you have any advice for other OBIS nodes?
No

Please list conferences and meetings where your Node has presented or discussed OBIS work

1- BICIKL project (https://bicikl-project.eu/automating-interlinkage-between-gbif-data-worms-taxonomy) Cambridge February 2024
2- NFDIBio (https://www.nfdi4biodiversity.org/en/) 2022-2024
3- IPBES Invasive Species Assessment 2023
4- Senckenberg retreat 2023

Please list your Node's engagement in data publishing training courses, partnerships, and data mobilisation activities

- Challenger 150 training the scientists to format their deep-sea data and publish to OBIS
- Goethe University Frankfurt, teaching biology BSc students how to extract, clean, and publish data to OBIS
- Partnership with MBON Europe
- Partnership with CETAF (https://cetaf.org/)
- Partnership with NFDIBio

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

Selected publication in 2023

Sharifian, S., Kamrani, E., Nillson, MA., **Saeedi, H.** (2023). Molecular barcoding of the Persian Gulf mangrove associated brachyuran crabs. Arthropod Systematics & Phylogeny 81, 2023, 889–896. https://doi.org/10.3897/asp.81.e96839

Chaudhary, C., Alfaro-Lucas, J.M., Simões, M.V.P., Brandt, A., **Saeedi, H.** (2023). Potential geographic shifts in the coral reef ecosystem under climate change. Prog. Oceanogr. 213, 103001. https://doi.org/10.1016/j.pocean.2023.103001

Alfaro-Lucas, J.M., Chaudhary, C., Brandt, A., **Saeedi, H.** (2023). Species composition comparisons and relationships of Arctic marine ecoregions. Deep Sea Res. Part Oceanogr. Res. Pap. 198, 104077. https://doi.org/10.1016/j.dsr.2023.104077

Bridges. A.E.H., Howell, K.L., Amaro, T., Atkinson, L., Barnes, D.K.A., Bax, N., Bell, J.B., Bernardino, A.F., Beuck, L., Braga-Henriques, A., Brandt, A., Bravo, M.E., Brix, S., Butt, S., Carranza, A., Doti, B.L., Elegbede, I.O., Esquete, P., Freiwald, A., Gaudron, S.M., Guilhon, M., Hebbeln, D., Horton, T., Kainge, P., Kaiser, S., Lauretta, D., Limongi, P., Mcquaid, K.A., Milligan, R.J., Miloslavich, P., Narayanaswamy, B.E., Orejas, C., Paulus, S., Pearman, T.R.R., Perez, J.A., Ross, R.E., **Saeedi, H.**, Shimabukuro, M., Sink, K., Stevenson, A., Taylor, M., Titschack, J., Vieira, R.P., Vinha, B. & Wienberg, C. (2023). Review of the Central and South Atlantic Shelf and Deep-Sea Benthos: Science, Policy and Management. Oceanography and Marine Biology: An Annual Review, 4. DOI: 10.1201/9781032426969-4.

Kaiser, S., Brandt, A., Brix, S., Brenke, N., Kürzel, K., Arbizu, P.M., Pinkerton, M.H., **Saeedi, H.** (2023). Community structure of abyssal macrobenthos of the South and equatorial Atlantic Ocean - Identifying patterns and environmental controls. Deep Sea Res. Part Oceanogr. Res. Pap. 197, 104066. https://doi.org/10.1016/j.dsr.2023.104066

Kohlenbach, K., Knauber, H., Brandt, A., **Saeedi, H.** (2023). Distribution and Species Richness of Benthic Polychaeta and Sipuncula in the Northwestern Pacific. Diversity 15. https://doi.org/10.3390/d15040557

Knauber, H., Kohlenbach, K., Böhm, P., Lüter, C., Ziegler, A., Brandt, A., **Saeedi, H.** (2023). Deep-sea benthic crustacean and annelid data from the Bering Sea. Data Brief 48, 109186. https://doi.org/10.1016/j.dib.2023.109186

Knauber, H., Kohlenbach, K., Brandt, A., **Saeedi, H. (**2023). Crustaceans of the Northwest Pacific Ocean: Species richness and distribution patterns. Journal of Sea Research, 191, 102332. https://doi.org/10.1016/j.seares.2022.102332

OBIS Canada

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

The OBIS Canada regional node is managed by Fisheries and Oceans Canada (DFO) on behalf of the Government of Canada. There is one person specifically engaged in the work of OBIS Canada, although many people contribute. The listing on the OBIS node contact page is accurate.

What are the most important achievements of your OBIS node since SG-OBIS-11?

OBIS Canada created and published 22 new datasets in 2023, and republished an additional 20 datasets. There are now 221 datasets published on OBIS Canada, representing 12,942,613 occurrences, an increase of 358, 224 occurrences since SG-OBIS-11. We recently added one new associated organization: Ocean Networks Canada Society, bringing the number of associated organizations to five.

What are the most important risks or challenges you face with your OBIS node?

The greatest challenge we face is the scarcity of resources dedicated to supporting the OBIS Canada node. As described above, in the Canadian model, the regional node is managed by Fisheries and Oceans Canada (DFO) on behalf of the Government of Canada. As such, the node manager is a DFO employee with knowledge/expertise in marine data stewardship who volunteers to perform the tasks of managing the node in addition to their regular job duties. The OBIS Canada IPT is set up so that individual contributors can publish their own data, rather than submitting datasets to the node manager for publication, so data quality control and troubleshooting is the responsibility of individual contributors, although the node manager's assistance can be requested.

What are the current and future data management priorities for your OBIS node?

A priority for the OBIS Canada is to continue to support publishing to the node within DFO and to make the node accessible to other organizations within Canada. In addition, OBIS Canada hopes to be able to collaborate with the Ocean Tracking Networks thematic node whenever possible to support data contributors within Canada.

An ongoing goal is to refresh and register some of our older datasets and establish some quality control oversight for publishing via the node.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

n/a

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

It is possible that OBIS Canada may change how we manage the node. We have not had any staff certified in some years, so this addition to the TOR for nodes will be a welcome change. The possibility of publishing marine data to GBIF instead of OBIS is interesting and will require some thought; however, some colleagues in Canada are already doing this. Careful consideration of the time commitments and responsibilities of the new steering group structure will influence if/when we apply to be a member of the new SG.

Do you have any advice for other OBIS nodes?

I do suggest where possible that nodes consider the need for dedicated staff time to manage the node as well as dedicated funding to attend in-person meetings – i.e. a strictly voluntary role presents limitations when balancing the potential workload of managing the node, and may limit node management to the "required" portions of the TOR for OBIS nodes.

Please list conferences and meetings where your Node has presented or discussed OBIS work

In September 2023, Dr. Kathryn Tseng of the Graduate Institute of Marine Affairs in National Sun Yat-sen University requested a meeting with OBIS Canada to discuss Canada's approach to and experience with OBIS. Dr. Tseng was particularly interested in how Canada approaches data sovereignty and who takes the lead with oceanic bio data collection and management. The OBIS Canada node manager invited Mr. Chris Hemingway (Fisheries and Oceans Canada, Director of Marine Spatial Data Services and Licensing) and Mr. Andrew McMaster (Fisheries and Oceans Canada, Director of International Oceans Policy) to attend, as Dr. Tseng's questions mainly related to national policy rather than OBIS technical details.

OBIS Canada routinely promotes the use of OBIS alongside other Government of Canada open data initiatives. Within Fisheries and Oceans Canada, OBIS is a standing item on the National Science Data Management Sub Committee and on the Fisheries Data Integration and Access Working Group. A recurring theme when asked for advice about data sharing platforms is for OBIS Canada to encourage the use of existing systems such as OBIS and GBIF.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

n/a

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

unknown

AntOBIS

SCAR Antarctic Biodiversity Portal

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

3 but not Full time working as an OBIS node
Anton Van de Putte (SO-BOMP-FED-tWIN)
Yi Ming Gan (ADVANCE)
Charlie Plasman (ADVANCE) is not listed in OBIS node contact page

What are the most important achievements of your OBIS node since SG-OBIS-11?

New project funding
WOBEC April 2024-April 2027
ADVANCE April 2023-December 2026

Contribution to MEASO - summary for policy makers

A. J. Constable, J. Melbourne-Thomas, M. M. C. Muelbert, S. McCormack, M. Brasier, J. A. Caccavo, R. D. Cavanagh, S. M. Grant, H. J. Griffiths, J. Gutt, S. F. Henley, J. Höfer, A. B. Hollowed, N. M. Johnston, S. A. Morley, E. J. Murphy, M. H. Pinkerton, I. R. Schloss, K. M. Swadling, A. P. Van De Putte, 2023. Marine Ecosystem Assessment for the Southern Ocean: Summary for Policymakers. Zenodo.https://doi.org/10.5281/ZENODO.8359584

What are the most important risks or challenges you face with your OBIS node?

Funding on short term contract, lack of long-term financial ability.
Risk that services offered under current projects (e.g. ADVANCE) are considered to be delivered by other entities (including OBIS secretariat), reducing chances of continued funding.
Inconsistent funding at National Level.
Risk of competition for funding with OBIS secretariat and other OBIS nodes at the European level.

What are the current and future data management priorities for your OBIS node?

Publication of Antarctic and Southern Ocean Biodiversity (biological and ecological) data in accordance with the data standards including new Darwin Core elements such as Material Sample and Humboldt Extension. It is also important to provide feedback to the new data model that is relevant to our data. We are also conducting a general requirements survey to the Antarctic and Southern Ocean community to identify the priorities (closes on 22nd March 2024). The results of the survey can be shared upon request.

Organisation of 20 SCAR Antarctic Biodiversity Portal Symposium in 2025

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

Expectation from the community for AntOBIS

Standardised long-term data of key groups (phytoplankton, keystone species, top predators) Translation of training documents developed by SCAR Antarctic Biodiversity Portal (English=> French, Spanish, Russian)
Development of data analysis workflows
Informative data products
Continued support publication of Data papers (collaboration with Pensoft)
We are reviewing our governance structure as a Region al biodiversity noose

Expectation from AntOBIS for OBIS (excom)

Translation of training documents developed by OBIS
Provide training to new personnel
Provide support to OBIS node to engage international partners
Provide framework for collaboration with other OBIS nodes

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

The new ToR and definition of the role of OBIS nodes, especially regional nodes will be relevant on how we engage with data publishers in SCAR and CCAMLR member countries.
How OBIS will deal with regional publisher that have been publishing to GBIF but now would also want to publish to OBIS would be relevant.

Do you have any advice for other OBIS nodes?
Lots, not sure all of it is wanted or useful.

Please list conferences and meetings where your Node has presented or discussed OBIS work

Gan, Y.-M., Perez Perez, R., Provoost, P., Benson, A., Peralta Brichtova, A.C., Lawrence, E., Nicholls, J., Konjarla, J., Sarafidou, G., Saeedi, H., Lear, D., Penzlin, A., Wambiji, N., Appeltans, W., 2023. Promoting High-Quality Data in OBIS: Insights from the OBIS Data Quality Assessment and Enhancement Project Team. BISS 7, e112018. https://doi.org/10.3897/biss.7.112018

Meyer, R., Appeltans, W., Duncan, W., Dimitrova, M., **Gan, Y.-M**., Stjernegaard Jeppesen, T., Mungall, C., Paul, D., Provoost, P., Robertson, T., Schriml, L., Suominen, S., Walls, R., **Sweetlove, M.**, Ung, V., **Van De Putte, A.**, Wallis, E., Wieczorek, J., Buttigieg, P., 2023. Aligning Standards Communities for Omics Biodiversity Data: Sustainable Darwin Core-MIxS Interoperability. BDJ 11, e112420.https://doi.org/10.3897/BDJ.11.e112420

Sica, Y., Hochachka, W., **Gan, Y.-M.**, Ingenloff, K., Schigel, D., Stevenson, R., Baskauf, S., Brenton, P., Kazem, A., Wieczorek, J., 2023. Want to Describe and Share Biodiversity Inventory and Monitoring Data? The Humboldt Extension for Ecological Inventories Can Help! BISS 7, e112229. https://doi.org/10.3897/biss.7.112229

Van De Putte, A.P., Gan, Y.-M., Hancock, A., Raymond, B., 2023. Towards a Distributed System for Essential Variables for the Southern Ocean. BISS 7, e112289. https://doi.org/10.3897/biss.7.112289

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

Van De Putte, A.P., Gan, Y.-M. attended as instructors for Marine data publishing workshop together with Nansen Legacy (AeN). https://www.gbif.no/events/2023/nansen-legacy-oslo.html

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

Using OBIS data

Bonnet-Lebrun, A.-S., Sweetlove, M., Griffiths, H.J., Sumner, M., Provoost, P., Raymond, B., Ropert-Coudert, Y., Van De Putte, A.P., 2023. Opportunities and limitations of large open biodiversity occurrence databases in the context of a Marine Ecosystem Assessment of the Southern Ocean. Front. Mar. Sci. 10, 1150603. https://doi.org/10.3389/fmars.2023.1150603

Woods, B.L., Van de Putte, A.P., Hindell, M.A., Raymond, B., Saunders, R.A., Walters, A., Trebilco, R., 2023. Species distribution models describe spatial variability in mesopelagic fish abundance in the Southern Ocean. Front. Mar. Sci. 9, 981434.https://doi.org/10.3389/fmars.2022.981434

Jossart, Q., Bauman, D., Moreau, C.V. et al. A pioneer morphological and genetic study of the intertidal fauna of the Gerlache Strait (Antarctic Peninsula). Environ Monit Assess **195**, 514 (2023). https://doi.org/10.1007/s10661-023-11066-3

Data Papers

Steger J, Linse K, Gan Y-M, Griffiths HJ (2023) Mollusca collected by Agassiz trawl from the 2016 SO-AntEco (JR15005) expedition to the South Orkney Islands, Antarctica - data. Biodiversity Data Journal 11: e105888. https://doi.org/10.3897/BDJ.11.e105888

Schmider-Martínez A, Maturana CS, Poveda Y, Rosenfeld S, López-Farrán Z, Saucède T, Poulin E, González-Wevar C (2023) Laevilacunaria (Mollusca, Gastropoda) in the Southern Ocean: A comprehensive occurrence dataset. Biodiversity Data Journal 11: e111982. https://doi.org/10.3897/BDJ.11.e111982

Che-Castaldo C, Humphries G, Lynch H (2023) Antarctic Penguin Biogeography Project: Database of abundance and distribution for the Adélie, chinstrap, gentoo, emperor, macaroni and king penguin south of 60 S. Biodiversity Data Journal 11: e101476.https://doi.org/10.3897/BDJ.11.e101476

Rosenfeld S, Maturana CS, Gañan M, Rendoll Cárcamo J, Díaz A, Contador T, Aldea C, Gonzalez-Wevar C, Orlando J, Poulin E (2023) Revealing the hidden biodiversity of Antarctic and the Magellanic Sub-

Antarctic Ecoregion: A comprehensive study of aquatic invertebrates from the BASE Project. Biodiversity Data Journal 11: e108566. https://doi.org/10.3897/BDJ.11.e108566

Eder EB, Zárate M, Lewis MN (2023) Light and temperature records of the seawater associated with southern elephant seal dives during foraging trips in South Atlantic and Pacific Oceans. Biodiversity Data Journal 11: e101284.https://doi.org/10.3897/BDJ.11.e101284

Grillo M, Bonello G, Cecchetto M, Guzzi A, Noli N, Cometti V, Schiaparelli S (2024) Planktonic, benthic and sympagic copepods collected from the desalination unit of Mario Zucchelli Research Station in Terra Nova Bay (Ross Sea, Antarctica). Biodiversity Data Journal 12: e119633. https://doi.org/10.3897/BDJ.12.e119633

Mentioning
Gonzalez, A., Vihervaara, P., Balvanera, P., Bates, A.E., Bayraktarov, E., Bellingham, P.J., Bruder, A., Campbell, J., Catchen, M.D., Cavender-Bares, J., Chase, J., Coops, N., Costello, M.J., Czúcz, B., Delavaud, A., Dornelas, M., Dubois, G., Duffy, E.J., Eggermont, H., Fernandez, M., Fernandez, N., Ferrier, S., Geller, G.N., Gill, M., Gravel, D., Guerra, C.A., Guralnick, R., Harfoot, M., Hirsch, T., Hoban, S., Hughes, A.C., Hugo, W., Hunter, M.E., Isbell, F., Jetz, W., Juergens, N., Kissling, W.D., Krug, C.B., Kullberg, P., Le Bras, Y., Leung, B., Londoño-Murcia, M.C., Lord, J.-M., Loreau, M., Luers, A., Ma, K., MacDonald, A.J., Maes, J., McGeoch, M., Mihoub, J.B., Millette, K.L., Molnar, Z., Montes, E., Mori, A.S., Muller-Karger, F.E., Muraoka, H., Nakaoka, M., Navarro, L., Newbold, T., Niamir, A., Obura, D., O'Connor, M., Paganini, M., Pelletier, D., Pereira, H., Poisot, T., Pollock, L.J., Purvis, A., Radulovici, A., Rocchini, D., Roeoesli, C., Schaepman, M., Schaepman-Strub, G., Schmeller, D.S., Schmiedel, U., Schneider, F.D., Shakya, M.M., Skidmore, A., Skowno, A.L., Takeuchi, Y., Tuanmu, M.-N., Turak, E., Turner, W., Urban, M.C., Urbina-Cardona, N., Valbuena, R., **Van De Putte, A.**, Van Havre, B., Wingate, V.R., Wright, E., Torrelio, C.Z., 2023. A global biodiversity observing system to unite monitoring and guide action. Nat Ecol Evol. https://doi.org/10.1038/s41559-023-02171-0

Southeast Asia OBIS

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?
Yes, 4 staff

What are the most important achievements of your OBIS node since SG-OBIS-11?
Continued updating the marine datasets from Museums, Universities and Institutions. Promoting and mainstreaming OBIS in ASEAN Member States, ASEAN Governing Board, ASEAN Working Group on Nature Conservation and Biodiversity (AWGNCB) and Partners.

What are the most important risks or challenges you face with your OBIS node?
The continuity of marine data and technical capacity building in the ASEAN Region

What are the current and future data management priorities for your OBIS node?
Specific priorities may vary depending on the node needs, as well as evolving technological advancements and research needs. Priorities should have a stable I.T. infrastructure, Biodiversity data mobilization across the region.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)? Possible marine datasets for analysis in one of our projects

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE? Not at this moment

Do you have any advice for other OBIS nodes?
Always keep in touch, participate, and reach out. OBIS secretariat is always available to provide technical support in data management.

Please list conferences and meetings where your Node has presented or discussed OBIS work. Asia Pacific Observation Network APBON, ASEAN Working Group, Organized workshops, discussions, Universities and museums.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities. ASEAN data mobilization workshop

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS. Mostly from APBON need to check online

1. https://www.researchgate.net/publication/349631442_The_Asia-Pacific_Biodiversity_Observation_Network_10-year_achievements_and_new_strategies_to_2030
2. https://esj-journals.onlinelibrary.wiley.com/doi/10.1111/1440-1703.12212

OBIS-Colombia

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

2 Researchers - Information is OK

What are the most important achievements of your OBIS node since SG-OBIS-11?

- Publication of 1,838,504 marine records with 2,015,288 MoF records corresponding to 21 years of fishery monitoring in the most extensive estuarine lagoon complex in Colombia.

- 30,316 new records of marine specimens from six (6) national biological collections were mobilized to OBIS and GBIF. This meant the closing of Caribbean BID Project suported by GBIF between july 2021 and june 2023.
- Advance in the adaptation of mechanisms for the publication of eDNA data. To this end, we participated in the testing of the prototype of the new tool and model for publication of data derived from environmental DNA that GBIF is developing (eDNA Tool). The exercise used data from an ongoing Invemar project. Additionally, currently we are participating together with the GBIF Colombia Node in the translation into Spanish of the Guide for publication of DNA-derived data that was launched in June 2023 with updates mainly oriented to marine data and supported by OBIS (https://docs.gbif.org/publishing-dna-derived-data/en/).
- More than 120 people impacted through different training activities in documentation, use, visualization, and mobilization of data; as well as cooperation meetings.

What are the most important risks or challenges you face with your OBIS node?

1. To have the necessary financial resources to maintain a team dedicated to the node's data management. OBIS Colombia's data management is carried out as a part-time job by the Data manager and requires at least the support of a computer specialist. This support, although not exclusive, used to be provided in part by personnel from Invemar's information systems laboratory; however, in the last 2 years the people who had the capacity to provide this support have retired or leaved from the institution and so far, these profiles have not been covered. In addition, support personnel are needed to carry out data curation tasks more efficiently, since it is a very active node with its contribution of data in the region, which demands a lot of time and dedication.

2. Regarding the publication of data, it will continue to be a challenge to find funding opportunities for documentation and digitization. In the country there is a lot of marine information in the entities that has not yet been published in OBIS, and there is generally interest in doing so, but individuals and/or entities usually require of additional personnel to compile, organize and structure the data. The hiring of students and interns has been a helpful strategy, it funding in the last 3 years was obtaining specially of the National Program to promote internships or internships for young people in the process of graduation “Estado Joven”, but unfortunately, the program is currently suspended. Small contributions have been getting from other projects (p.i. Minciencias, Institutional Research Projects, BID-GBIF).

What are the current and future data management priorities for your OBIS node?

1. Data curation.
2. More support staff for data management tasks.
3. More training in data management.

4. eDNA data management for publication through the Node.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

- As far as Latin America is concerned, there is an evident need to obtain more training for the Nodes' Data Managers (through either a general course or specific training in the use of tools that facilitate the tasks). This especially important for those Nodes that do not have IT specialists on their staff, or even for entities that want to get started in data management and do not have a clear idea of what it entails to do so. Having this type of training could encourage other initiatives or countries to join our network as Nodes. In the case of Colombia, we have been learning in a self-taught way, which in a certain way has influenced in that many tasks are not as efficient as they could be, just because of lack of knowledge. We believe that taking advantage of the knowledge of more experienced and established OBIS nodes could reduce the gap in capabilities, in addition to optimizing time and efforts.

- We would like the SG to generate on the OBIS web page a tool for consulting global statistics of the network (such as those that can be seen when a Node or a dataset is consulted on the page). This would allow showing the annual behavior of publication (in a collective way) through friendly and understandable data graphs. For example, comparative graphs with global contributions for all nodes (per regional nodes, or for thematic nodes), comparative publication by years (# of species, # of records, # of datasets, # of eMoF, # of new species, etc.), number of citations in publications, number of users consulting the tools or the OBIS portal per year. The graphs could be downloaded in the form of a report. This type of input could be available and accessible at any time from the web page (e.g., from the Resources site), providing updated information useful in management efforts to demonstrate the potential and benefits of OBIS, especially in meetings, conferences, presentation of funding proposals and in the generation of reports. In addition, it would also help the Nodes to complement their annual report.

- Continue working with the other Latin Nodes to support the generation of OBIS material in Spanish (such as courses, videos, outreach, among) to facilitate the knowledge and use of the network in the Spanish-speaking community.

- Something important for Latin American nodes is to encourage the publication of Data papers, but almost all Journals for this type of information are from Europe or USA, and require payment. The exchange prices of most currencies in the region are excessively high, becoming a major obstacle to afford this type of publications. Perhaps a way in which OBIS could help, would be to mediate with a publishing house, the possibility of applying discounts that favor this type of publications for OBIS.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

- No change has been evidenced yet. The "Node structure" functions with the same two people, Martha Vides in charge of representation and management activities with the SG OBIS, and Erika Montoya-Cadavid as the Data Manager.

Do you have any advice for other OBIS nodes?
No.

Please list conferences and meetings where your Node has presented or discussed OBIS work

- Mentoring meetings for the exchange of experiences and strengthening of biological collections / Reunión de mentores para el intercambio de experiencias y fortalecimiento de colecciones biológicas marinas. Santa Marta: 2023-06-26. Organizing by: Invemar. Number of participants: 14
- Workshops of the National Technical Committee of the Colombian Biodiversity Information System (June and November 2023).
- Workshop to consolidate national strategies for Environmental DNA data management. Santa Marta: 2023-05-25/26. Organizing by: Invemar.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

- Course Data visualisation: application to the use of biological collections / Curso Visualización de datos: aplicación al uso de las colecciones biológicas. Virtual. 2023-03-13/29. Organizing by: Invemar. Number of participants: 60.
- Workshop on Biodiversity Data Management and Publication / Taller de Gestión y publicación de datos sobre biodiversidad. Presencial. Quibdó, Chocó (Col): 2023-06-06/08. Organizing by: Invemar, SiB Colombia, Universidad Tecnológica del Chocó. Number of participants: 30.
- Capacity building workshops for BID-GBIF project staff / Talleres para el fortalecimiento de capacidades del personal del proyecto BID-GBIF. Virtual: 2023-05-01/06-28. Organizing by: Invemar. Number of participants: 10.
- Review and contributions to the reference list of marine annelids from MHNMC / Revisión y contribuciones al listado de referencia de anélidos marinos desde el

MHNMC. Santa Marta: 2023-05-24/27. Organizing by: Marine Natural History Museum of Colombia-Invemar. Number of participants: 10.

- Expert workshop for the construction of a national reference list of marine annelids / Taller de expertos para la construcción de un listado de referencia nacional de anélidos marinos. Santa Marta: 2023-05-29/31. Organizing by: Marine Natural History Museum of Colombia-Invemar. Number of participants: 24.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

We have a shortcoming in terms of monitoring the use of OBIS data in publications generated by node associates, and currently we do not have a list. Scientific articles have certainly been generated and we are certain of their use in many of the scientific reports generated within the institution administering the Node, the latter usually do not have a DOI. Something that we have noticed is that many times researchers, after using the data, tend to cite OBIS in a general way and not the specific sets, which makes follow-up difficult. Some confirmed reports are:

- Increasing the accessibility of marine information from Colombian's Natural History Collections by mobilizing data, strengthening infrastructure, and training. Invemar for GBIF, Final Narrative Report Project BID-CA2020-055-NAC. 14 p.

- Barrios E., M. Garrido, M. Vides y D. Alonso (Eds.). 2024 Información de línea base ambiental de comunidades bentónicas para el desarrollo de potenciales establecimientos de parques eólicos costa afuera en La Guajira. Contrato TDSE-SCTO-60-828-10-2023. Agencia Nacional de Hidrocarburos ANH, Fundación Colombiana para el Desarrollo – FUCOLDE e Instituto de Investigaciones Marinas y Costeras José Benito Vives de Andréis INVEMAR. Santa Marta. 34 p. + Anexos.

OBIS Malaysia

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

3 and all of them are on the OBIS Node contact page.

What are the most important achievements of your OBIS node since SG-OBIS-11?

Appointment a science officer (Mr Ahmad Fakhruzrazi) who part of job is as data officer for the node. The inclusion of OBIS data entry as part of annual staff performance evaluation of OBIS Node Malaysia team.

What are the most important risks or challenges you face with your OBIS node?

Insufficient staff (before arrival of Mr. Ahmad Fakhrurrazi) and other commitments as academics, administrators and science officer.

What are the current and future data management priorities for your OBIS node?

To complete the datasets from the marine repository (RRC) and to expand the dataset to include published data of Malaysian marine biodiversity.

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

Data sharing especially species occurrence recorded near the maritime borders.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

Not at the moment.

Do you have any advice for other OBIS nodes?

No

Please list conferences and meetings where your Node has presented or discussed OBIS work

1. 14th International Polychaete Conference – mentioned OBIS in the presentation
2. Discussion on the Malaysian involvement in BBNJ treaty with the National Security Council, Attorney General Chambers and Ministry of Foreign Affairs of Malaysia – mentioned OBIS in the presentation.
3. Discussion on the establishment of Malaysia Biodiversity Centre under Ministry of Natural Resources and Sustainability – explanation on the OBIS
4. Training and briefing on Malaysia Biodiversity Information System (MyBIS) – Introducing OBIS, framework and workflow to MyBIS technical team.

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

None

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

None

EurOBIS

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

Currently, several people are involved in EurOBIS. The main ones (3: Leen, Joana & Ruben) are listed on the contact page. Depending on the number of actively running projects that rely on the EurOBIS infrastructure and EMODnet Biology connection, other VLIZ data centre staff is temporarily reinforcing the core team to ensure quality control and data formatting, as well as a continuous flow of data to EurOBIS. At least 2 IT-people are also involved – maintenance and improvements to the general infrastructure - , but not listed on the contact page. None of the involved people have a full-time dedication towards EurOBIS.

What are the most important achievements of your OBIS node since SG-OBIS-11?

- Maintaining continuous data flows to EurOBIS from several institutes within Europe, and ensuring a high level of quality of the delivered data
- Allowing habitat-linked data to flow into EurOBIS
- Successful collaboration and completion of the OBIS Grand Unified Model Project Team Report (GUMPT)
- Successful collaboration and completion of the OBIS Data Quality Project Team Report (QCPT)

What are the most important risks or challenges you face with your OBIS node?

- Ensuring representation/recognition at the national and European scale
- Long-term funding
- Making sure the infrastructure remains fit-for-purpose to deal with the different types of data and generally increasing data flows

What are the current and future data management priorities for your OBIS node?

- Keeping up with the current data flows
- Ensuring that the infrastructure and quality control tools are able to deal with the newer data types, including e.g. imagery data & eDNA data
- Ensuring continuous and in-depth contact with data providers, keeping them motivated to comply with the standards & QC required for OBIS & EurOBIS (cfr. EMODnet Biology)
- Providing feedback to users and data providers, coming to us directly through EurOBIS and through several EU projects that connect with EMODnet Biology (e.g. Marbefes, BiOcean5D, DTO-BioFlow, …)

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

- Allow eDNA data flow
- Assist in establishing and maintaining data flows from institutes/projects to EurOBIS
- Adhere to the publish one, harvest many times motto of OBIS
- This is a non-exhaustive list. New expectations/request may rise through new project proposals in the next year(s).

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

Not at this point in time

Do you have any advice for other OBIS nodes?

Keep an open mind and open communication towards both the OBIS Secretariat as well as other nodes. Each node faces its own challenges and duties, and we can always learn from each other.

Please list conferences and meetings where your Node has presented or discussed OBIS work

Wherever someone from the EurOBIS and/or WoRMS data management team is present, we automatically also represent OBIS. The whole list of these events can be found through:

1. The WoRMS data management team annual report, available at https://www.marinespecies.org/documents/DMT%20reports/2023_WoRMS_DMT_activities_report.pdf (section 'outreach, communication & publication)

2. The EMODnet Biology quarterly reports, available at https://emodnet.ec.europa.eu/en/reports?field_emodnet_lot_value[]=biology.

Some highlights – mostly in link with EMODnet Biology - are listed below:

- MARCO-BOLO Kick Off Meeting – March 2023
- EMODnet Biology Partners Meeting - June 2023
- World Conference on Marine Biodiversity – July 2023
- MARCO-BOLO/GOOS BioEco Panel Joint Meeting – Sept 2023
- G7 FOSI Plankton Observing Network Workshop – Sept 2023
- DTOBioFlow Kick Off Meeting – Sept 2023
- TDWG annual conference – Oct 2023
- EMODnet Biology Autumn data school – Nov 2023
- EMODnet Open Conference – Nov 2023

- MBON data mobilization online workshop – Dec 2023
- EMBRC FAIR data course – Jan 2024
- MARCO-BOLO General Assembly - Feb 2024
- MBON data mobilization in person workshop – Feb 2024

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

- Monthly online Q&A sessions with EMODnet Biology data partners, improving their understanding of DwC & QC and thus leading to better quality data that flow to EurOBIS & OBIS
- 2023 update of the EMODnet Biology training course, available through the OTGA platform: https://classroom.oceanteacher.org/course/view.php?id=958
- Engaging with the OBIS team on proof-testing the OBIS OTGA training course (Contributing and publishing datasets to OBIS (self-paced)
- Planned DTO-BioFlow training (April 2024), for selected data holders, to ensure a continuous and (semi)automated data flow to EurOBIS, EMODnet Biology and thus also OBIS.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

No papers, reports other publications that use data published in OBIS. However, several reports and publications that have been written include clear references to OBIS, its network and its importance.

OBIS Korea

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

One of three engaged staff is listed in the OBIS contact page.

What are the most important achievements of your OBIS node since SG-OBIS-11?

Joining the OBIS Network and installing IPT to link with OBIS.

What are the most important risks or challenges you face with your OBIS node?

Lack of experience and tools for Data QC

What are the current and future data management priorities for your OBIS node?

Building our Website and translation Data in Korean to English

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

No.

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

No.

Do you have any advice for other OBIS nodes?

No.

Please list conferences and meetings where your Node has presented or discussed OBIS work

None

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

None.

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

None.

OBIS Kenya

How many staff are engaged in the work of your OBIS node? Are the node staff members accurately listed on the OBIS node contact page: https://obis.org/contact/?

- There are currently two staff actively engaged

What are the most important achievements of your OBIS node since SG-OBIS-11?

- Capacity development of OBIS product users and potential data contributors through OTGA OBIS training
- Submission of records that have undergone quality control to OBIS IPT

What are the most important risks or challenges you face with your OBIS node?

- Lack of experience and tools for Data QC

- Limited data access from potential contributors
- Risk of processing of non-validated datasets

What are the current and future data management priorities for your OBIS node?

- Linking OBIS node to mine data from our local data servers
- Crowdsource data campaigns to boost data submissions to OBIS Kenya

Are there any specific expectations/requests of your OBIS node from your region in the next year(s)?

- Extraction of OBIS data products
- Storage of eDNA data from local contributors
- OBIS data access through Africa network of Deep water researchers (ANDR)

Do you see any changes in the management structure of your OBIS node now that OBIS has become a Programme Component within IODE?

- No.

Do you have any advice for other OBIS nodes?

- Use other avenues available to publicize OBIS Nodes

Please list conferences and meetings where your Node has presented or discussed OBIS work

- Kenya Marine and Fisheries Social Economic Development Project Data workshops.
- Wio Symphony Tool development workshops

Please list your Node's engagement in data publishing training courses, partnerships and data mobilisation activities

- OBIS training through the OTGA platform (self-paced learning)
- Internal Seminars on OBIS products and how to access the products

Please list papers, scientific reports or other publications that your Node or affiliated network have written using data published in OBIS

- Report on shark coalition avoidance with fishermen using OBIS data
- Abstract submission to ARBEC 2024 conference on Bycatch coalition avoidance