Marine geospatial information management

Annex III

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ANNEX III: MARINE GEOSPATIAL INFORMATION MANAGEMENT – INTERGOVERNMENTAL ORGANIZATIONS

CONVENTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT OF THE NORTH-EAST ATLANTIC (OSPAR COMMISSION)

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The Commission for the Protection of the North-East Atlantic (OSPAR Commission ("OS" for Oslo and "PAR" for Paris)) is the mechanism by which 15 Governments and the European Union cooperate to protect the marine environment of the North-East Atlantic.

In addition to the 15 Governments[1] and the EU, OSPAR has a number of Observer Organisations which include other intergovernmental organisations working in similar fields, and international non-governmental organisations. The non-governmental observer organisations are environmental protection and nature conservation organisations, industry and trade organisations and organisations of regional and local authorities.

The geographic scope of interest of the organisation is the North-East Atlantic which OSPAR divides into the following five Regions; Region I Arctic Waters, Region II Greater North Sea, Region III Celtic Seas, Region IV Bay of Biscay and Iberian Coast and Region V Wider Atlantic. The Maritime Area means the internal waters and the territorial seas of the Contracting Parties, the sea beyond and adjacent to the territorial sea under the jurisdiction of the coastal state to the extent recognised by international law, and the high seas, including the bed of all those waters and its sub-soil, situated within the following limits:

1. those parts of the Atlantic and Arctic Oceans and their dependent seas which lie north of 36° north latitude and between 42° west longitude and 51° east longitude, but excluding:

    a. the Baltic Sea and the Belts lying to the south and east of lines drawn from Hasenore Head to Gniben Point, from Korshage to Spodsbjerg and from Gilbjerg Head to Kullen,

    b. the Mediterranean Sea and its dependent seas as far as the point of intersection of the parallel of 36° north latitude and the meridian of 5° 36' west longitude;

2. that part of the Atlantic Ocean north of 59° north latitude and between 44° west longitude and 42° west longitude.

https://www.ospar.org

https://odims.ospar.org/en/

https://oap.ospar.org/

1 Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention') was opened for signature at the Ministerial Meeting of the Oslo and Paris Commissions in Paris on 22 September 1992. It was adopted together with a Final Declaration and an Action Plan. In this decade, the Convention will be implemented through OSPAR's North-East Atlantic Environment Strategy 2030. It is according to the Strategy that allows the legislative administrative and policy framework mandating the marine geospatial information collection, coordination, standardization management and/or dissemination activities. Specifically, Part I Section 5;

> *We will ensure that data collection and assessment programmes are kept under continuous review, so they are up to date and fit for purpose as both technology and our understanding of the marine environment develop. Monitoring and assessment of the marine environment require the effective use and management of data and information to support the production of robust assessments. This will be achieved through the OSPAR Data and Information Management System (ODIMS) and the OSPAR Assessment Portal (OAP), allowing links to be made with other providers and consumers of OSPAR data and information. We are committed to ensuring that the data we use are findable, accessible, interoperable, reusable and reproduceable.*

OSPAR's Joint Assessment & Monitoring Programme (JAMP) provides the strategic direction to the preparation of assessments of the implementation of the North-East Atlantic Environment Strategy.

The OSPAR JAMP sets out that, "The monitoring data and information generated by OSPAR through its coordinated environmental monitoring activities form the basis for assessment of the state of the OSPAR Maritime Area". These include the Intermediate Assessment 2017 and the Quality Status Report. Such data and information should be "gathered in accordance with agreed OSPAR guidelines and procedures" and thus be "comparable across the breadth of the OSPAR Maritime Area".

The questions identified in the JAMP are addressed in coherent assessments that are developed by using OSPAR's Coordinated Environmental Monitoring Programme (CEMP). The aim of the CEMP is to deliver comparable data from across the OSPAR Maritime Area through providing a coordinated approach to monitoring, data collection and assessment activities. The CEMP Appendices set out details of the agreed monitoring and assessment approaches for each component of the themes including the approaches to be applied to realise coordination of monitoring and assessment.

The work of the OSPAR Commission is formally governed by the Rules of Procedure of the OSPAR Commission.

Work to implement the OSPAR Convention and its Strategy is taken forward through the adoption of Decisions, which are legally binding on the Contracting Parties, Recommendations and Agreements. Decisions and Recommendations set out

actions to be taken by the Contracting Parties. These measures are complemented by Agreements setting out:

- issues of importance;
- agreed programmes of monitoring, information collection or other work which the Contracting Parties commit to carry out;
- guidelines or guidance setting out the way that any programme or measure should be implemented;
- actions to be taken by the OSPAR Commission on behalf of the Contracting Parties.

The OSPAR Commission also issues publications comprising background documents, data reports and the results of evaluations and assessments of data reported to OSPAR by its Contracting Parties.

The OSPAR Commission is supported by the Coordination Group (CoG), Biodiversity Committee (BDC), Environmental Impacts of Human Activities Committee (EIHA), Hazardous Substances and Eutrophication Committee (HASEC), Offshore Industry Committee (OIC) and Radioactive Substances Committee (RSC). These bodies are in turn supported by Intersessional Correspondence Groups and Working Groups.

The Heads of the Delegations of the Contracting Parties meet regularly to prepare the meetings of the Commission, to advise on management and to oversee the development and implementation of the agreements made by the Commission. The Commission is also supported by meetings of the Group of Jurists and Linguists and the Committee of Chairs and Vice-Chairs.

Currently OSPAR is divided into the following work areas reflecting the different issues that OSPAR is addressing under its strategic and operational objectives under the NEAES 2030 and within each work area are Datastreams that Contracting Parties are obligated to report towards:

Biological Diversity and Ecosystems

- Abundance and Distribution of Cetaceans, Food webs, Habitats in the North-East Atlantic, Marine Birds, Marine Protected Areas Network, Non-Indigenous Species, Other Effective Area-Based Conservation Measures, Pelagic Habitats, Recovery of sensitive fish species and Vulnerable Marine Ecosystems.

Cross-cutting

- Quality Status Report, Marine Strategy Framework Directive, Joint Assessment & Monitoring Programme, Coordinated Environmental Monitoring Programme, Climate Change and Ocean Acidification, Economic and Social Analysis, Cumulative Effects Assessment, Ecosystem Approach, OSPAR Measures and Actions Programme, Science Needs Agenda, Environmental Protection of the Arctic, and Cross-sectoral Cooperation and International Engagement.

Environmental Impacts of Human Activities

- Dumping and Placement of Wastes or Other Matter at Sea, Encounters with Dumped Chemical and Conventional Munitions, Extraction of Marine Sediments, Fishing for Litter, Litter ingested by Sea Turtles, Marine Litter Beach Monitoring, Noise, Offshore Renewable Energy, Plastic Particles in the Stomachs of Seabirds and Seabed Litter.

Hazardous Substances and Eutrophication

- Eutrophication Status, Inputs of Heavy Metals, Inputs of Nutrients, Levels and Trends in Marine Contaminants and their Biological Effects and Riverine Inputs and direct Discharges (RID).

Offshore Industry

- Discharges, Spills and Emissions from Offshore Oil and Gas Installations and Inventory of Offshore Installations

Radioactive Substances

- Discharges of Radionuclides from the Non-Nuclear Sectors, Environmental Monitoring of Radioactive Substances and Liquid Discharges from Nuclear Installations.

The annual meeting of each Committee agrees to circulate data calls for Contracting Parties to report data on each Datastream before the next Committee meeting.

Contracting Parties implement the monitoring of components, according to CEMP Guidelines, through ongoing or specific national programmes coordinated within that country, national programmes coordinated on a regional or Convention-wide basis and programmes carried out by one or more supplier/contractor on behalf of the OSPAR Commission and paid for by Contracting Parties (including one-off surveys).

Contracting Parties report data either to the OSPAR Secretariat or to the relevant Data Manager, depending on the Datastream, the Data Manager could for example be an external organisation or Contracting Party. The data are reported according to reporting formats that are tailored to each Datastream (and published as OSPAR Agreements). The OSPAR Secretariat Data Team compile Contracting Parties' submissions or collaborate with the external data managers to ensure the data adheres to the relevant reporting format. This ensures the data are ready for sign off by the relevant Committee meeting then the data can be forwarded to the OSPAR Commission meeting to be agreed for publication via ODIMS.

The data agreed by the annual Commission meeting are published in ODIMS. Each submission in ODIMS usually comprises a Shapefile that is styled and presented as an interactive map in the portal. A submission could also be a spreadsheet or other data format. Supplementary INSPIRE compliant metadata is created for each submission. The OSPAR Secretariat collaborates with external data managers to ensure that data are interoperable within the OSPAR data environment as well as findable via the central data management system, utilising webservices insofar as possible (examples include the OSPAR Marine Protected Area database, and Impulsive Underwater Noise Registry). Leveraging the functionality provided by webservices, ODIMS has the

capacity to seamlessly display externally managed data directly in ODIMS allowing all content to be presented in parallel, ensuring users are receiving the most accurate data.

There is an abundance of international cooperation required through the exchange of OSPAR data. This applies throughout the data lifecycle: from the submission through to the reuse of data. The data OSPAR produces and presents via ODIMS feeds directly into other international mechanisms, for example the International Atomic Energy Agency Marine Radioactivity Information System (MaRIS), EMODnet data portals, and a multiude of other tools, systems, and reports, made possible as OSPAR data are licensed according to Creative Commons Zero.

In line with the NEAES, OSPAR Data follows the FAIR principles, ensuring that the data are findable, accessible, interoperable and reusable.

ODIMS is an online tool which provides a single point of access to all the data and information gathered through OSPAR's Joint Assessment and Monitoring Programme. The data is uploaded, amended and managed in an administrative interface by the OSPAR Secretariat.

All the code that runs ODIMS is based on Django and Python, with REST API. Geoserver and Geoportal provide the OGC mapping and metadata webservices respectively.

AWS is used to store the uploaded files in ODIMS.

OSPAR Commission website - https://www.ospar.org/

OSPAR Data and Information Management System - https://odims.ospar.org/en/

OSPAR Assessment Portal - https://oap.ospar.org

OSPAR Assessment Portal and OSPAR Data and Information Management System's role in delivery of the OSPAR Quality Status Report 2023

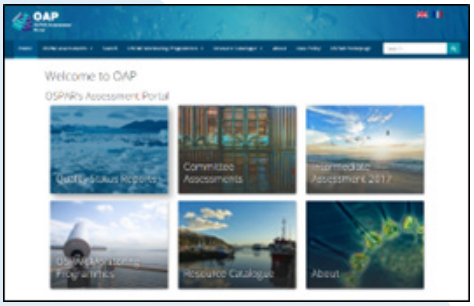
1.1.1 https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/

1.1.2 https://odims.ospar.org/

1.1.3 https://oap.ospar.org/

The OSPAR Assessment Portal (OAP) and the OSPAR Data and Information Management System (ODIMS) are two key tools in the dissemination and management of OSPAR data and information. The tools played a critical role in the delivery of the OSPAR Quality Status Report 2023 (QSR 2023).

OSPAR's Quality Status Report 2023 is a comprehensive assessment of the environmental health and status of the North-East Atlantic Ocean and of human activities interacting with it.



The report is made up of more than 120 assessments and covers various aspects, including, biodiversity, habitats, and human activities that impact the marine environment. It examines the presence of contaminants and pollutants in the water, such as chemicals and microplastics, and assesses their potential effects on marine life and ecosystems.

Additionally, the report evaluates the status of different marine species, from fish and seabirds to mammals and plants. It looks at population, distribution, and trends, identifying any changes or threats to these species. This information helps scientists and policymakers understand the overall health and resilience of the oceanic ecosystem.

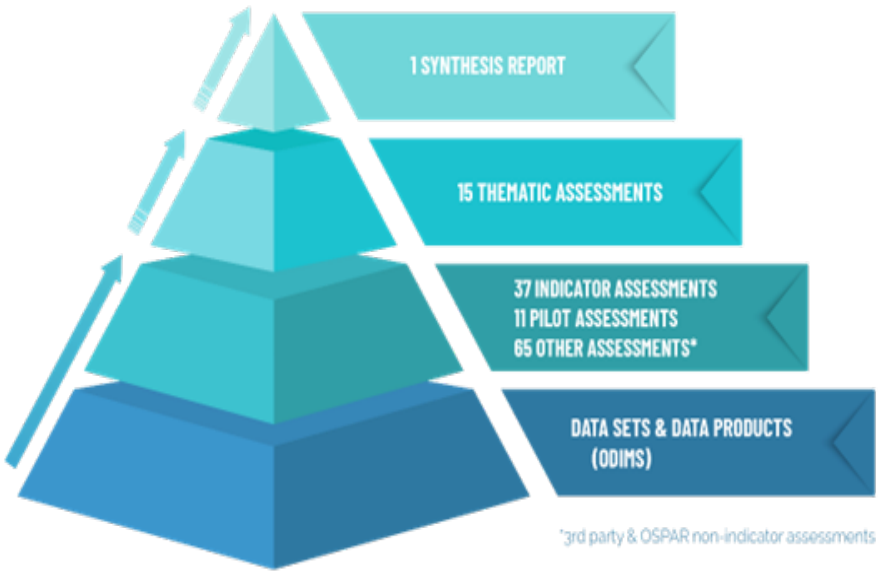
Another crucial aspect addressed in the QSR 2023 is the impact of climate change and ocean acidification on the marine environment. It examines the changes in ocean

temperature, acidity, and sea-level rise, among other factors, and assesses their effects on marine life and ecosystems.

Overall, the QSR 2023 serves as an important tool for scientists, policymakers, and the public to understand the current state of the North-East Atlantic Ocean, the challenges it faces, and the measures needed to ensure its long-term health and sustainability.

Underpinning the Quality Status Report 2023 is a huge amount of data, shown at the base of the pyramid below:

These data are the result of years of work from a huge number of people, to define, collect, administer, prepare and analyse. The data are hosted in the OSPAR Data and Information Management System (ODIMS) https://odims.ospar.org/ and made available in accordance with the OSPAR Rules of Procedure which states:



> *"OSPAR is committed to making as much information as possible publicly available, consistent with achieving other similarly important goals of public policy. The framework for this is set out in Article 9 of the OSPAR Convention."*

Following this, OSPAR data made available for download via ODIMS, are licensed according to Creative Commons Zero, https://creativecommons.org/publicdomain/zero/1.0/. Further information is available via the OSPAR Data Policy, https://odims.ospar.org/en/data_policy/

The information presented via the OSPAR Assessment Portal (OAP) is also made available in accordance with the OSPAR Rules of Procedure. Following this, information

presented in OAP are licensed according to Creative Commons BY-4.0, https://creativecommons.org/licenses/by/4.0/.

1.1.4 Background: The Role of ODIMS and OAP in OSPAR's work

The OSPAR Data and Information Management System was developed as an online tool providing a single point of access to all the data gathered through OSPAR's Joint Assessment and Monitoring Programme (JAMP) as well as being critical in delivering the Monitoring and Assessment element of the North-East Atlantic Environment Strategy 2030 (NEAES, https://www.ospar.org/convention/strategy).

The JAMP describes the strategy, themes and products that OSPAR Contracting Parties are committed to deliver, through collaborative efforts in OSPAR, across the different thematic work areas of the Convention.

With an increasing level of detail on the actions and process, underneath the JAMP is the Coordinated Environmental Monitoring Programme (CEMP). The CEMP details the overall aims and concepts of delivering comparable data from across the OSPAR Maritime Area, which can be used in assessments to address the specific products raised in the JAMP.

Each element of the CEMP should also have a CEMP Guideline providing detailed documentation of agreed monitoring and assessment methods. In order to collect data to align with the monitoring and fulfil the assessment methods, detailed reporting formats and associated guidance documentation are also drafted that are utilised by Contracting Parties in responding to OSPAR Data Calls.

At the end of this process, data sets and associated assessment products are published via ODIMS and OAP. Having the NEAES Strategy, JAMP, CEMP, CEMP Guidelines and reporting formats as underpinning information allows for the creation of a transparent, robust and reliable monitoring and assessment process. This background structure enables assessments of extended geographic areas and timescales, such as the QSR 2023, to be completed.

To date, ODIMS contains over 900 individual data submissions, from 42 data streams (https://odims.ospar.org/en/datastreams/). Data are from the full complement of OSPAR thematic areas; including, data on environmental pressures, environmental status, area-based management, and measures. Not all data are managed by the Secretariat and ODIMS allows for connection to external data managers via compliant webservices. All spatial data can be overlaid by the user to create individual custom maps.

Another benefit is the reuse of the data and information. As the collection and structure methods are detailed, the content can be widely and reliably reused. An example of this is the integration of QSR2023 assessments in Member State reporting under European Directive 2008/56/EC - Marine Strategy Framework Directive (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008L0056).

CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

ANNEX

Contribution from the Secretariat of the Convention on Biological Diversity to DOALOS publication on marine geospatial information management May 2023

Executive Summary

This note summarizes recent work under the Convention on Biological Diversity (CBD) relevant to marine geospatial information management, focusing on the process for describing ecologically or biologically significant marine areas (EBSAs).

The CBD Secretariat coordinates the global process to facilitate the description of EBSAs. Since 2011, the Secretariat has coordinated a series of regional workshops to facilitate the description of EBSAs. As a result of these 15 workshops, 338 areas meeting the EBSA criteria have thus far been entered into the EBSA repository and transmitted to the UN General Assembly and its relevant processes. The Parties to the CBD continue to consider potential modalities for the modification of the description of existing EBSAs and for the description of new EBSAs. In the meantime, the Secretariat continues to support Parties, Other Governments and competent organizations in using EBSA information and working to enhance the capacity of Parties to describe EBSAs and use them to inform planning and management.

Background on the EBSA process

The term "ecologically or biologically significant marine area" or "EBSA" first appeared in the context of the Convention on Biological Diversity (CBD) in 2006, when the Conference of the Parties (COP) to the CBD decided to convene a scientific expert workshop to:

> "refine and develop a consolidated set of scientific criteria for identifying ecologically or biologically significant marine areas in need of protection, in open ocean waters and deep sea habitats, building upon existing sets of criteria used nationally, regionally and globally" (para 44b, decision VIII/24).

The Expert Workshop on Ecological Criteria and Biogeographic Classification Systems for Marine Areas in Need of Protection was convened the following year (2007) in the Azores, Portugal. Experts considered more than 20 different sets of national and

international criteria, including those of the FAO and IMO. Distilling common elements from various existing criteria sets and experiences in biogeographical and ecological classification systems, the workshop drafted a set of proposed CBD scientific criteria for identifying EBSAs: https://www.cbd.int/doc/meetings/mar/cbwsoi-wafr-01/other/cbwsoi-wafr-01-azores-brochure-en.pdf.

The Scientific Criteria for Identifying Ecologically or Biologically Significant Marine Areas in Need of Protection in Open-Ocean Waters and Deep-Sea Habitats, which have come to be known as the "EBSA criteria", were adopted by the Conference of the Parties at its ninth meeting, in 2008 (decision IX/20). The CBD EBSA criteria are as follows:

1. Uniqueness or rarity
2. Special importance for life history of species
3. Importance for threatened, endangered or declining species and/or habitats
4. Vulnerability, fragility, sensitivity, slow recovery
5. Biological productivity
6. Biological diversity
7. Naturalness

More information on the criteria, including a definition, rationale, examples and guidance on how they should be applied, is available in the annex to decision IX/20.

At its next meeting, in decision X/29 (2010), the COP noted that the application of the EBSA criteria is a scientific and technical exercise, that areas found to meet the criteria may require enhanced conservation and management measures, and that this can be achieved through a variety of means, including marine protected areas and impact assessments. The COP also emphasized that the identification of EBSAs and the selection of conservation and management measures is a matter for States and competent intergovernmental organizations, in accordance with international law, including the United Nations Convention on the Law of the Sea.

To support Parties in their efforts to identify EBSAs, the COP, in the same decision, requested the CBD Secretariat to organize a series of regional workshops, in collaboration with Parties and other Governments as well as competent organizations and regional initiatives, such as regional seas conventions and action plans and regional fisheries management organizations.

This inclusive, science-driven process has led to the identification and description of areas of the ocean that are among the most crucial to the healthy functioning of the global marine ecosystem. As a result of the regional 15 workshops held between 2011 and 2019, 338 areas have been identified as EBSAs in regions covering nearly the entire global ocean. These EBSAs incorporate every type of marine ecosystem and cross all ocean basins, except for the Southern Ocean and Antarctic ecosystems.

The regions covered appear below chronologically, together with some selected examples of the features described for each, for illustrative purposes only (further information is available in the corresponding workshop reports, available at www.cbd.int/ebsa):

- **Western South Pacific Ocean:** Equatorial high-productivity zone, with high primary production over a large area; high aragonite saturation zone (special biological and ecological value under conditions of ocean acidification); submarine canyons, seamounts, ridges, trenches, archipelagos; important

coral reefs; seabirds; important whale migration corridors; endemic fish species; cold-water corals and deep-sea species; biodiversity hotspots;

- **Wider Caribbean & Western Mid-Atlantic Ocean**: high diversity of corals and fish of the Mesoamerican Barrier Reef; pelagic and benthic ecosystems of the Sargasso Sea; high productivity of the Amazonian – Orinoco influence zone; major oceanographic and seafloor features of the Atlantic Equatorial fracture zone;
- **Southern Indian Ocean**: high productivity and high pelagic and benthic habitat heterogeneity of the Agulhas Current ecoregion; unique oceanographic features of the Mozambique Channel, producing a highly productive, highly biodiverse ecosystem, including many threatened and endangered; "East African Coral Triangle", second in biodiversity to the Coral Triangle
- **Eastern Tropical & Temperate Pacific Ocean**: areas containing endemic species, such as the Galapagos Archipelago, offshore aggregation area of great white sharks ("White Shark Café"); nutrient-rich, highly productive upwelling systems, including the Costa Rica Thermal Dome; equatorial high productivity zone;
- **North Pacific Ocean**: high productivity of the North Pacific Transition Zone; seamounts; hydrothermal vent fields; high productivity and biodiversity of the West Kamchatka shelf; polynya system along the Chukotka coast; upwelling systems in the Sea of Okhotsk and off the Alijos and Coronado islands (California Current);
- **South-Eastern Atlantic Ocean**: three large marine ecosystems: Benguela current, Guinea current and Canary current, giving rise to such areas as Benguela Upwelling System and Guinea-Canary currents convergence area; Subtropical Convergence Zone; Mid-Atlantic Ridge; Walvis Ridge (seamounts); Namaqua Fossil Forest;
- **Arctic Ocean**: The marginal ice zone and the seasonal sea-ice habitat for endemic and vulnerable species; dynamic multiyear ice; high productivity and high benthic biomass of the Barents Sea large marine ecosystem, including key habitat for walrus; critical seabird habitats and wintering areas; polynyas;
- **North-West Atlantic Ocean:** seamount chains; hydrothermal vents; the Southeast Shoal / Flemish Cap, Flemish Pass and Orphan Knoll; Labrador Sea deep convection area; transition zone front; seabird foraging areas; deepwater canyons;
- **Mediterranean Sea:** Coastal seagrass meadows, trenches and seamounts, diverse benthic and pelagic habitats, underwater caves, spawning and nursery zone for important demersal and pelagic resources (e.g., bluefin tuna); upwellings, cold-water coral and deep-sea sponges; red coral; important habitats for megafauna and deep-sea species; abundant marine mammals due to high primary productivity; endangered migratory seabirds (e.g., Balearic shearwater), sharks and endemic fish (Maltese skate);
- **North-East Indian Ocean:** Bay of Bengal Large Marine Ecosystem, including shallow shelf, slope, deep abyssal and offshore ridge system and unique biophysical conditions, as well as a highly productive marine ecological system containing a wide range of highly valuable, species-rich and diverse ecological systems; mangrove forests, shallow and deep-sea coral, high diversity of seagrass beds; canyon systems; small- and medium-sized pelagic fishes; diverse range of marine animals, including groups of endangered species (e.g., cetaceans, including

non-migratory blue whales, seabirds, sea turtles, sea snakes, fish, dugongs, whale sharks, manta rays, gastropods, sea cucumbers, sponges, sea fans and corals);

- **North-West Indian Ocean and Adjacent Gulf Areas:** diverse deep-sea and shallow-water coral beds; large population of dugongs; endemic subspecies of avifauna; hawksbill nesting sites; resident population of Indo-pacific humpback dolphin; highly biodiverse mangrove communities; seagrass and algal beds; high seabird and fish diversity; significant feeding, breeding and nursery grounds for sea turtles, waterbirds, dolphins, reef fishes, sharks, rays and skates; feeding areas for marine megafauna (e.g., baleen whales, whale shark, mobulids and sunfish); unique ecology of the Arabian Sea Oxygen Minimum Zone; highly productive areas, including an upwelling region resulting from "the Great Whirl" and associated eddies and gyres;
- **East Asian Seas:** Network of 20 sites in a flyway of 100+ migratory waterbird species; extremely high biodiversity and endemism of Sulu-Sulawesi Marine Ecoregion—in the centre of the world's highest concentrations of marine biodiversity (Coral Triangle); areas of high biological productivity and diversity (e.g., seagrass, kelp); globally high levels of fish biodiversity; major spawning area for bluefin tuna; unique set of 2400 limestone islands and islets with very high habitat and ecosystem diversity; only known spawning area of the Pacific bluefin tuna; turtle nesting areas; high coastal productivity from the warm Kuroshio Current; complex and unique convection zone where it mixes with the cold Oyashio Current, creating one of largest fishing grounds in the world; trenches, troughs and seamounts with hydrothermal vents and hydrocarbon seeps hosting endemic, very rare, vulnerable species;
- **Black and Caspian Seas**: globally unique habitats created by river deltas; habitat for endangered Black Sea cetaceans (e.g., bottlenose dolphin, harbour porpoise); Caspian seal (the only marine mammal in the Caspian Sea); regionally rare red algae (Phyllophora crispa); globally threatened seabird species; Important Bird and Biodiversity Areas; important nursery and feeding areas for sturgeon species, critically endangered globally; phyllophora fields, which support more than 110 species of invertebrates and 47 species of fish; seagrass beds;
- **Baltic Sea**: high diversity of endemic and endangered aquatic plants; complex archipelago area, with islands and skerries, and different types of waters (enclosed lagoons to large open-sea areas); deep, oxygenated trenches; habitat of endangered Baltic ringed seal (sea ice) and critically endangered harbour porpoise; highly productive waters in lagoons, inlets and bays with high numbers of macrophytes, invertebrates, waterfowl and fish; habitats important for various life-history stages of fish, invertebrates and birds (e.g., coastal lagoons, large shallow inlets and bays, estuaries, wetlands, Boreal Baltic narrow inlets, outer skerries and sea ice);
- **North-East Atlantic and Adjacent Areas**: structurally complex seabed habitats; hydrothermal vent fields, seamount complexes and large submarine canyons; Charlie-Gibbs Fracture Zone (unique geomorphological feature to the region); Mid-Atlantic Ridge; globally significant deep-water, cold-water corals; rich communities of unique and endemic fauna; fragile cold-water corals, sponge aggregations

and deep-water vulnerable fish; upwellings with high pelagic productivity; pelagic-feeding bird species; "bubbling reefs"; areas of complex hydrology; persistent presence of cetacean populations; seasonal migratory pathway for large migratory pelagic species; Mid-North-Atlantic Frontal System;

How shapefiles are created during the workshop

The COP emphasized that the application of the EBSA criteria is a scientific and technical exercise and that it should use the best available scientific and technical information, integrating the traditional, scientific, technical and technological knowledge of indigenous and local communities. In order to do so, these regional workshops have engaged a range of experts from governments, global and regional organizations, academia and civil society, catalyzing partnerships and building capacity.

The data on which the EBSA process relies is made available by:

- **A technical team**: Each regional workshop conducted to date has been supported by a technical team from either the Commonwealth Scientific and Industrial Research Organisation (Australia) or Duke University Marine Geospatial Ecology Lab (United States of America). The technical teams have used a consistent approach: prior to each regional EBSA workshop, they develop a detailed data report synthesizing regional ocean data and identifying strengths and gaps in the knowledge base. These data reports compile three general types of data:
    - **Biogeographic data** (major biogeographic classification systems)
    - **Biological data** (data and statistical indices compiled by the Ocean Biogeographic Information System)
    - **Physical data** (bathymetric and physical substrate data, oceanographic features and remotely sensed data) that can be used as surrogates; this includes seamounts, vents and seeps, geology, climatologies, remotely observed data and derived oceanographic products,

These datasets, which include 70 to 100 GIS layers, are generally sourced from internationally accessible sites. The data tend to be large-scale: global or regional in nature, providing a consistent core of base environmental conditions across the workshops.

- **CBD Parties and relevant organizations**: A call for information to support the objectives of the workshops is also sent out to all CBD Parties and relevant global and regional organizations/initiatives prior to the workshop, in the hope that they can identify critical regional data sets and analyses that can supplement the larger-scale efforts of the technical team. This can be ecological and biological data and/

or traditional knowledge on marine ecosystems, habitats and species, and/or physical/oceanographic/geological data and/or traditional knowledge. This information is often integrated into the data report compiled and made available by the technical team (see above).

- **Experts attending the workshop**: Workshop participants include experts nominated by governments, intergovernmental organizations (including regional organizations), non-governmental organizations, academia, research institutions, and indigenous peoples and local communities (IPLCs). They are selected based on their scientific knowledge of the given region and their access to relevant ecological and biological data on marine ecosystems, habitats and species, and/or physical, oceanographic and geological data. They often bring scientific data/literature to the workshops to supplement the data brought by the technical team. In many cases, the scientific and technical information they provide is at a local level, as opposed to a global/regional level, with a finer level of detail than that provided by the technical team. These experts are also asked to fill in an EBSA template to describe in detail any area they believe meets the EBSA criteria. They may send in these templates prior to the workshop or complete them during the workshop.

The process for describing areas meeting the EBSAs criteria is based on expert knowledge available at the workshop, as well as data compiled prior to the workshop. Many of the workshops have benefitted from the participation of an expert nominated by IPLCs, with a view to integrate their traditional knowledge in the EBSA description process. The approach is therefore based on available data and expert knowledge rather than a comprehensive process – this is unavoidable due to constraints related to data availability at multiple spatial scales.

At the workshop, the participants break into smaller groups and, with the support of the technical team, begin by drawing approximate boundaries of areas that may meet the EBSA criteria on a central map, noting opportunities to extend or merge these areas and to identify areas yet to be considered. Through this process, experts increase their understanding of the data available. At a plenary discussion, workshop participants review the areas proposed and consider them for inclusion on the final list of areas described.

At the end of each workshop, participants build on the process by identifying, through open plenary discussion, gaps and needs for further elaboration in describing EBSAs, including the need for the development of scientific capacity and future scientific collaboration.

How the information is shared through the EBSA repository

The proposed EBSAs from the regional workshops are submitted for consideration and review by the CBD Subsidiary Body on Science, Technology, Technological Advice

(SBSTTA), and the Conference of the Parties. Upon the decision of the COP, they are considered formal CBD EBSAs and their descriptions and shapefiles, are included in the EBSA repository (https://www.cbd.int/ebsa/ebsas) and transmitted to the United Nations General Assembly and its relevant processes.

This EBSA website (available at: www.cbd.int/ebsa) hosts the EBSA repository and also acts as an information sharing-mechanism on EBSAs, providing access to the reports of the EBSA regional workshops and other EBSA-related resource materials, such as EBSA booklets, brochures, video, training materials or other publications; weblinks to relevant global processes (e.g., FAO's work on vulnerable marine ecosystems, IMO's work on Particularly Sensitive Sea Areas); and the schedule of EBSA meetings.

Status of negotiations on EBSA modalities

The EBSA process has been extremely valuable to improving our understanding of the ecological and biological significance of various components of the ocean, and providing a solid scientific basis for States and competent intergovernmental authorities to select, as appropriate, adequate measures to plan and implement conservation and sustainable use of marine biodiversity. EBSAs provide information that is not only useful for management planning, but also provide a focus for research and monitoring of various features in the ocean. Furthermore, the EBSA regional workshop process has facilitated scientific collaboration, networking and capacity-building at various scales around the world.

Notwithstanding the success of the EBSA process, the COP has been considering ways to improve it since 2014 (COP XII), when the COP requested the Executive Secretary to develop practical options to further enhance scientific methodologies and approaches to describe areas meeting the EBSA criteria, ensuring that the best available scientific and technical information and traditional knowledge of various users of marine resources are used and that the products are scientifically sound and up-to-date.

Discussions on this issue thus far have brought forth valuable insights on means to improve the EBSA process and the use of EBSA information. However, the COP has unfortunately not yet been able to find consensus on all elements of this issue. Important elements of these discussions include: (a) Modalities to modify the description of areas described as meeting the EBSA criteria, considered by the Conference of the Parties and included into the repository; (b) Modalities to describe new areas meeting the EBSA criteria; and (c) Actors who can propose the modification of EBSAs and the description of new EBSAs.

DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA OFFICE OF LEGAL AFFAIRS UNITED NATIONS

Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations

Under the 1982 United Nations Convention on the Law of the Sea (UNCLOS), States Parties are required to deposit with the United Nations Secretary-General charts or the lists of geographical coordinates of points, specifying the geodetic datum, in relation to straight baselines and archipelagic baselines as well as the outer limits of the territorial sea, the exclusive economic zone and the continental shelf.

Following the entry into force of the on 16 November 1994, the United Nations General Assembly, in its resolutions on the law of the sea and, later, on oceans and the law[2] of the sea , requested the Secretary-General to first establish, and subsequently develop and update, the infrastructure and activities to discharge the depositary functions.

The Division for Ocean Affairs and the Law of the Sea (DOALOS) of the Office of Legal Affairs (OLA) is mandated to discharge the responsibilities entrusted to the Secretary-General under UNCLOS, including:

2 GA resolutions 49/28 of 1994, 52/26 of 1997, 59/24 of 2004, 60/30 of 2005, 67/78 of 2012, 74/19 of 2019, 75/239 of 2021; 76/72 of 2022; 77/248 of 2023 and Secretary-General's bulletin ST/SGB/2021/1 paragraphs 9.2 (b) and (e)

a) Establishing appropriate facilities, as required under UNCLOS, for the deposit by States of maps, charts and geographic coordinates concerning national maritime zones and establishing a system for their recording and publicity as part of an integrated programme on the law of the sea and ocean affairs, distinct from the usual depositary functions of the Secretary-General;
b) Developing and maintaining the appropriate facilities for the deposit by States of charts and geographical coordinates concerning maritime zones, including lines of delimitation, and giving due publicity thereto;
c) Improving the existing geographic information system for the deposit by States of charts and geographical coordinates concerning maritime zones, including lines of delimitation, submitted in compliance with the Convention, and giving due publicity thereto, in particular by implementing, in cooperation with relevant international organizations, such as the International Hydrographic Organization, the technical standards for the collection, storage and dissemination of the information deposited, in order to ensure compatibility among the geographic information system, electronic nautical charts and other systems developed by these organizations.

These depositary functions do not involve any determination concerning the conformity of the deposited material with the relevant provisions of UNCLOS. The receipt of and publicity given to deposited charts and/or lists do not imply the expression of any opinion whatsoever on the part of the Secretariat concerning the designations employed therein, the presentation thereof, or the legal status

of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. In addition, due publicity given by the Secretary-General to the deposited charts and/or lists in the context of these depositary functions does not imply recognition by the United Nations of the validity of the related actions and decisions of the respective coastal States.

Websites:

www.un.org/depts/los

https://oceans.un.org/ (access provided upon request through the State's Permanent Mission to the United Nations)

FOOD AND AGRICULTURE ORGANIZATION (FAO)

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Food and Agriculture Organization of the United Nations (UN-FAO) – Fisheries & Aquaculture Division

The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger. The goal is to achieve food

security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives.

The FAO Fisheries and Aquaculture Division (NFI) works with Members and partners to transform aquatic systems and promote the responsible and sustainable management of aquatic food systems, for better production, better nutrition, a better environment, and a better life. Leaving no one behind.

- Membership of the organization :

With 195 members - 194 countries and the European Union, FAO works in over 130 countries worldwide.

- Geographic scope of interest of the organization: National/Regional/Global

- URL: https://www.fao.org/fishery-aquaculture/en

Corporate FAO data standards

FAO data management and dissemination activities are generally governed under a corporate policy framework which includes a Data Protection and Policy Notice, and by FAO Statistics and Data Quality Assurance Framework. This framework is the overarching FAO framework that guides the Organization in ensuring the availability of high-quality international statistics on food and agriculture for decision-making. It consists in a series of principles to adhere to at the institutional, statistical process and statistical output level, in order to ensure the quality of FAO data and statistics. The quality of data and statistics itself is defined in the framework, through various quality dimensions, in order to guarantee common understanding of what it is to achieve. Under this general framework, specific standards were recently developed: a Standard on the acquisition and use of non-statistical data sources (including Big data) for statistical purpose; a standard on metadata dissemination for statistics; and soon will follow a standard on metadata dissemination of geospatially referenced datasets.

Best practices and FAO Geonetwork legacy

The marine geospatial information management has been set based on the legacy of FAO to build on open geospatial standards, such as with the GeoNetwork metadata catalogue (created by FAO). The promotion of geospatial standards in the field of fisheries, aquaculture and related marine information has been carried out by the Fisheries & Aquaculture division through its leading role in FAO in developing and operating marine Spatial Data Infrastructures (SDI) and related web portals through the Fisheries Global Information System (FIGIS), essentially based on tools promoted through the Open Source Geospatial foundation (OsGeo).

Promotion of marine geospatial information existing standards

In the recent years, geographic information standards have been progressively introduced through the Coordinating Working Party (CWP) on fishery statistics. The CWP provides a mechanism to coordinate the statistical programmes conducted by regional fishery bodies and other intergovernmental organizations with a remit for fishery statistics; The CWP is composed of experts nominated by intergovernmental organizations with an expertise in fishery statistics. There are currently 19 participating IGOs in the CWP. UN-FAO, by means of its Fisheries & Aquaculture division, acts as CWP Secretariat.

As of today, the CWP has recommended several geographic information standards as part of its handbook including:

- General concepts and related standards such as Spatial Reference Systems, Geographic coordinates, Geographic Systems and Main Water Areas
- GIS recommended standards, covering both geographic data and metadata, and related formats and protocols

Most of the core GIS standards recommended by the CWP are inherited from the ISO/TC211 standardization technical committee on Geographic Information/Geomatics and the Open Geospatial Consortium (OGC).

In the previous years, ad hoc task groups have been created to foster reference harmonization and standardization, particularly for fisheries geo-referenced data exchange and dissemination. This includes various activities including the dissemination of reference harmonization digital resources (fisheries and geospatial domain reference datasets) and the design of data exchange format specifications for geo-referenced fisheries datasets applicable at various scales (national, regional, global).

FAO directly puts in practice internationally recognized geospatial information standards that are recommended by the CWP and adopted as FAO corporate standards, through two main information pillars:

- the FAO fisheries & aquaculture knowledge base (FishInfo): a portal that provides access to the breadth of FAO Fisheries and Aquaculture technical knowledge and products. The databases, geospatial platforms, software, glossaries that this portal gives access to will help researchers, media, students, decision makers and Ocean enthusiasts with up-to-date information to support their work.
- the Fisheries and Resources Monitoring System (FIRMS) which primary aim is to provide access to a wide range of high-quality information on the global monitoring and management of fishery marine resources.

Geospatial aggregated information is collated by the FAO Fisheries & Aquaculture division who acts as custodian of the information. Such collation of data is done through networking, governance models and related arrangements.

The Regional Fishery Body Secretariats' Network (RSN) was established to facilitate information exchange among Secretariats of the different Regional Fishery Bodies (RFB) and Regional Fisheries Management Organizations (RFMO). FAO disseminates RFB fact sheets as well the RFB map viewer to visualize the RFB areas of competence.

The Fishery and Resources Monitoring System (FIRMS) relies on apartnership made of IGO members (Regional Fishery Bodies), collaborative institutions, and observers. Arrangements are in place to set the rights and obligations of the Partners and the rules driving the partnership, as well as for collaboration (for collaborative institutions). A governance model is in place with a Steering Committee (FIRMS SC), the Secretariat (provided by FAO) and the Technical Working Group (FIRMS TWG). Currently, the FIRMS Technical working group includes three separate working groups:

- The working on the Global Record of Stocks and Fisheries (GRSF TWG)
- The Global Tuna Atlas working group (GTA TWG) gathering the five Tuna Regional Fisheries Management Organizations, FAO and the French National Research Institute for Sustainable Development (IRD – as collaborative institution)
- The working group on terminology, that includes terms and definitions pertaining to geospatial

Through these working groups, FIRMS contributes to the development of geospatial standards, which then may be proposed to CWP for endorsement as geospatial data standards recommended for use in fisheries statistical data collection.

• **Implemented standards**

FAO implements core ISO/OGC standards as recommended by the CWP including:

- Standards for Spatial Reference Systems and Geographic coordinates
- GIS recommended standard formats and protocols for data and metadata

• **Standards under development**

Water Jurisdiction Areas geospatial standard

With the growing need to characterize spatially information domain objects (e.g. fisheries, stocks) based on reference water areas, the CWP has started to work on a coding system (and associated geographic boundaries) to better categorize and represent marine water jurisdiction areas (covering national jurisdiction areas – NJA – vs. Areas beyond national jurisdiction – ABNJ) based on the UNCLOS area type definitions, and existing research material development on marine regions (e.g. VLIZ Flanders Marine Institute Marine Regions portal). Preliminary results of this work were

presented at CWP Intersessional meeting (London – UK, June 2023) In a next phase, CWP looks forward to consolidating this work with partners beyond the CWP, such as UN DOALOS, UN Geospatial, and VLIZ.

Global Record of Stocks and Fisheries – Areas database

In the context of the FIRMS Global Record of Stocks and Fisheries, a global database of reference areas is under development to help characterizing spatially stocks and fisheries.

Geospatial information system description

These two pillars are technically supported by a common Spatial Data Infrastructure (SDI) made of ISO/OGC compliant components, including:

- software components to store and serve geospatial data and metadata: spatial database/file systems, geographic server (GeoServer), metadata catalogue (GeoNetwork),
- middleware components (geospatial processing workflows)
- fact sheet embedded maps (through GIS web-mapping widgets)
- thematic GIS portals/ map viewers to browse geospatial information

Thematic portals include:

- For the FAO FAO fisheries & aquaculture knowledge base (FishInfo)

o The GeoInfo map viewer, to browse all geospatial content from the FAO Fisheries & aquaculture knowledge, based on the FAO Fisheries & Aquaculture GeoNetwork

o Collection-specific map viewers:

- The aquatic species distribution map viewer
- The RFB map viewer
- The Vulnerable Marine Ecosystems database

- For Fishery Resources Monitoring System (FIRMS)

o The Stocks & Fisheries map viewer
o The Global Tuna Atlas (GTA)
o The Global Record of Stocks and Fisheries map viewer (GRSF) [Pilot version disseminated via the iMarine platform]
o Regional data bases (under development as pilot use cases – WECAFC DCRF and Regional Commission for Fisheries, RECOFI), with regional map viewers

At FAO organization level, the Fisheries & Aquaculture Spatial Data Infrastructure (SDI) is then harvested by a geospatial platform launched as part of the FAO Hand-In-Hand initiative. Similar harvesting mechanisms are in place for external data infrastructures (including national SDI) that need to access FAO fisheries & aquaculture geospatial data through ISO/OGC protocols for interoperability

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION OF UNESCO (IOC)

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION OF UNESCO (IOC)

Author: Peter Pissierssens, Head IOC Project Office for IODE

The Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO) promotes international cooperation in marine sciences to improve management of the ocean, coasts and marine resources. The IOC enables its 150 Member States to work together by coordinating programmes in capacity development, ocean observations and services, ocean science, tsunami warning and ocean literacy. The work of the IOC contributes to the mission of UNESCO to promote the advancement of science and its applications to develop knowledge and capacity, key to economic and social progress, the basis of peace and sustainable development. The IOC is in charge of coordinating the United Nations Decade of Ocean Science for Sustainable Development 2021-2030, the "Ocean Decade".

IOC has a membership of 150 countries.

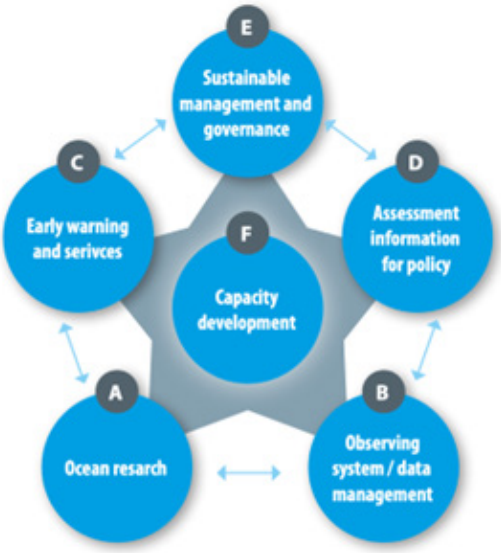
IOC's High Level Objectives

The IOC is working to achieve its Vision through the following High-Level Objectives:

- Healthy ocean and sustained ocean ecosystem services;
- Effective warning systems and preparedness for tsunamis and other ocean-related hazards;
- Resilience to climate change and contribution to its mitigation;
- Scientifically-founded services for the sustainable ocean economy;
- Foresight on emerging ocean science issues.

The value chain of IOC

IOC generates value through interaction of all its functions. In order to maximize the value, the IOC should work as an end-to-end system, in which observations and research enable various services and assessments, leading to informed decisions and guidance to policy and culminating in multiple societal and economic uses. Feedback from various functions in the system should lead to evolving and, generally, increasingly more and more demanding requirements for observations, science and



services. The capacity development will act as the catalyst of the whole system, working both at the cutting edge and leaving no one behind.

The IOC functions will be realised through the continuously developing programmes, acting globally, regionally, nationally and locally, through activities of regional subsidiary bodies, and by undertaking shorter-term project activities. In reality, all the programmes, constituencies and projects act as co-design and coordination mechanisms, while the true groundwork is done in and by Member States.

The Decade will provide an opportunity to mainstream IOC programmes and activities internationally and within Member States. The work will be directed towards achieving IOC High-Level Objectives.

Within IOC data management is coordinated by the International Oceanographic Data and Information Exchange Programme (IODE) (https://www.iode.org). IODE was established in 1961. Its purpose is to enhance marine research, exploitation and development, by facilitating the exchange of oceanographic data and information between participating Member States, and by meeting the needs of users for data and information products.

The main objectives of the IODE Programme are:

> (i) To facilitate and promote the discovery, exchange of, and access to, marine data and information including metadata, products and information in real-time, near real time and delayed mode, through the use of international standards, and in compliance with the IOC Oceanographic Data Exchange Policy for the ocean research and observation community and other stakeholders;
> (ii) To encourage the long term archival, preservation, documentation, management and services of all marine data, data products, and information;

(iii) To develop or use existing best practices for the discovery, management, exchange of, and access to marine data and information, including international standards, quality control and appropriate information technology;
(iv) To assist Member States to acquire the necessary capacity to manage marine research and observation data and information and become partners in the IODE network;
(v) To support international scientific and operational marine programmes, including the Framework for Ocean Observing for the benefit of a wide range of users.

Since 1961 IODE has built a network of over 100 National Oceanographic Data Centres (NODC), Associate Data Units (ADU) and Associate Information Units (AIU) in 68 Member States.

Member States oversee the work of the IOC through two Governing Bodies, the Assembly and the Executive Council.

The IOC Assembly meets once per biennium. The purpose of the Assembly is to review the work of the Commission, including the work of the Member States and the Secretariat, and formulate a common work plan for the coming two years.

The Executive Council meets every year and reviews issues and items from on-going work plans, and makes preparations for the Assemblies. The Executive Council consists of up to 40 Member States, including the six Member States represented by the Chairperson and the five Vice-Chairpersons. The Executive Council meets every year to review issues and items from on-going work plans, and make preparations for the IOC Assembly.

Representation in the IOC Executive Council Electoral Group I can consist of up to 10 seats; Group II of up to 3 seats; Group III of up to 9 seats; Group IV of up to 9 seats; and Group V of up to 9 seats.

Both the IOC Assembly and the Executive Council are prepared, supported and run by the six IOC Officers, under the leadership of the IOC Chair, in close alignment with the IOC Secretariat, under the leadership of the Executive Secretary.

IOC Data Policy and Terms of Use (https://www.iode.org/policy)

IOC adopted its IOC Data Policy and Terms of Use during the 32nd Session of the IOC Assembly (June 2023) through IOC Decision A-32/4.4 (IOC Data Policy and Terms of Use (2023)). The preamble states “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."

It has 10 sections focusing on Purpose, FAIR and CARE principles, Conditions of Use, Data Repositories and the IOC ocean data and information system (ODIS), Secure long-term data archives, Access restrictions, Data sharing policies of Member States, and Data and metadata sharing guidelines. The full policy can be found on https://www.iode.org/policy

IOC/IODE Manuals and Guides (https://oceanexpert.org/doclist/9)

IODE has published a number of Manuals and Guides related to ocean data and information management and exchange (https://oceanexpert.org/doclist/9) providing guidance to national data centres and other stakeholders on procedures to manage data and information.

IODE/GOOS Ocean Best Practices System (https://www.oceanbestpractices.org)

In addition, IODE and GOOS have jointly created the "Ocean Best Practices System". The OBPS is a global, sustained system comprising technological solutions and community approaches to enhance management of methods as well as support the development of ocean best practices. A best practice is a methodology that has repeatedly produced superior results relative to other methodologies with the same objective; to be fully elevated to a best practice, a promising method will have been adopted and employed by multiple organizations. The repository now contains over 2000 documents and is available on https://search.oceanbestpractices.org/

Ocean Biodiversity Information System (OBIS) (https://www.obis.org)

OBIS aims to be the most comprehensive gateway to the world's ocean biodiversity and biogeographic data and information required to address pressing coastal and world ocean concerns. Its mission is to build and maintain a global alliance that collaborates with scientific communities to facilitate free and open access to, and application of, biodiversity and biogeographic data and information on marine life.

More than 20 OBIS nodes around the world connect 500 institutions from 56 countries. Collectively, they have provided over 45 million observations of nearly 120 000 marine species, from Bacteria to Whales, from the surface to 10 900 meters depth, and from the Tropics to the Poles. The datasets are integrated so you can search and map them all seamlessly by species name, higher taxonomic level, geographic area, depth, time and environmental parameters. OBIS emanates from the Census of Marine Life (2000-2010)

and was adopted as a project under IOC-UNESCO's International Oceanographic Data and Information (IODE) programme in 2009.

Objectives

- Provide world's largest scientific knowledge base on the diversity, distribution and abundance of all marine organisms in an integrated and standardized format (as a contribution to Aichi biodiversity target 19)
- Facilitate the integration of biogeographic information with physical and chemical environmental data, to facilitate climate change studies
- Contribute to a concerted global approach to marine biodiversity and ecosystem monitoring, through guidelines on standards and best practices, including globally agreed Essential Ocean Variables, observing plans, and indicators in collaboration with other IOC programs
- Support the assessment of the state of marine biological diversity to better inform policy makers, and respond to the needs of regional and global processes such as the UN World Ocean Assessment (WOA) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
- Provide data, information and tools to support the identification of biologically important marine and coastal habitats for the development of marine spatial plans and other area-based management plans (e.g. for the identification of Ecologically or Biologically Significant marine Areas (EBSAs) under the Convention on Biological Diversity.
- Increase the institutional and professional capacity in marine biodiversity and ecosystem data collection, management, analysis and reporting tools, as part of IOC's Ocean Teacher Global Academy (OTGA)
- Provide information and guidance on the use of biodiversity data for education and research and provide state of the art services to society including decision makers
- Provide a global platform for international collaboration between national and regional marine biodiversity and ecosystem monitoring programmes, enhancing Member States and global contributions to inter alia, the Global Ocean Observing System (GOOS) and the Global Earth Observing System of Systems (GEOSS)

World Ocean Database (WOD) (https://www.iode.org/wod)

The World Ocean Database represents the world's largest collection of vertical profile data of ocean characteristics available internationally without restriction. The World Ocean Database was first released in 1994 and updates have been released approximately every four years, 1998, 2001, and 2005. The most recent World Ocean Database series, WOD09, was released in September 2009. The WOD09 has more than 9 million temperature profiles and 3.6 million salinity profiles.

The World Ocean Database is hosted and managed by the World Data Center Oceanography in Silver Spring, USA. It can be accessed through http://www.nodc.noaa.gov/OC5/SELECT/dbsearch/dbsearch.html

The WOD Project is closely related to the Global Archaeology and Rescue (GODAR) Project.

In addition to WOD, IODE is coordinating a number of other specialized data projects such as GTSPP (https://www.iode.org/gtspp) and IQuOD (https://www.iquod.org),

Ocean Data and Information System (ODIS)

The UNESCO/IOC Project Office for IODE has documented over 3100 online repositories of ocean data and information, which shows the highly complex online environment, and challenge of finding the right information from the right source (ODISCat 2023-10; https://catalogue.odis.org). This prompted IOC and its IODE to proceed with the Ocean Data and Information System (ODIS).

The Ocean Data and Information System (ODIS) provides an interoperability layer and supporting technology to allow existing and emerging ocean data and information systems, from any stakeholder, to interoperate with one another.

ODIS links these distributed, independent, systems through a decentralized interoperability architecture (ODIS-Architecture), to form a digital ecosystem. As with natural ecosystems, ODIS will be resilient to the gain or loss of parts, and accommodate a high diversity of products and services, while maintaining its core functions. In this way, ODIS will provide a comprehensive and global e-environment where users can discover data, data products, data services, information, information products and services provided by Member States, projects and other partners.

The Ocean Data and Information System (ODIS) Architecture currently links over 32 nodes from 25 partners. This is demonstrated through three regional portals and a global search portal that can now be searched to find Oceans related data and information from multiple sources (https://oceaninfohub.org).

The global portal currently contains over 100,000 content items in 8 content categories: (i) Experts (26,000); (ii) Institutions (15,000; (iii) Documents (42,000); (iv) Training (1,900); (v) Vessels (238); (vi) Projects (3,600); (vii) Datasets (17,000); and (viii) Spatial search (8,700).

The overarching goal of the Ocean Data and Information System (ODIS) in the long term, is to provide a sustainable and responsive digital ecosystem where users can discover data, data products, data services, information, information products and services provided by IOC Member States, independent projects, private sector partners, and other partners associated with the UN Decade of Ocean Science for Sustainable Development.

AquaDocs (https://www.aquadocs.org)

Within the value chain published knowledge and reporting is the next step after data management and an important content type/knowledge element. AquaDocs is the joint open access repository of the UNESCO/IOC International Oceanographic Data and Information Exchange (IODE)and the International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC) with support from the FAO Aquatic Sciences and Fisheries Abstracts. It is a thematic repository covering the natural marine, coastal, estuarine /brackish and fresh water environments and includes all aspects of the science, technology, management and conservation of these environments, their organisms and resources, and the economic, sociological and legal aspects.

OceanExpert (https://www.oceanexpert.org)

Closely related to published papers is information about publication authors, other experts who are members of our various communities of practice, as well as information on their instututions and organizations. The OceanExpert database currently contains information on over 25000 individual experts and over 8000 institutions.

International Coastal Atlas Network (ICAN) (https://ican.iode.org)

ICAN is a community of practice of organisations who have been meeting since 2006 to scope and implement data interoperability approaches to coastal web atlases (CWAs). In 2013 ICAN became a project of UNESCO IOC´s International Oceanographic Data and Information Exchange (IODE) Programme.

The mission/strategic aim of the IODE ICAN project is to share experiences and to find common solutions to CWA development (e.g., user and developer guides, handbooks and articles on best practices, information on standards and web services, expertise and technical support directories, education, outreach, and funding opportunities, etc.), while ensuring maximum relevance and added value for the end users.

ICAN members seek to play a leadership role in forging international collaborations of value to the participating nations, thereby optimizing regional governance in coastal zone management. A major goal is to help build a functioning digital atlas of the worldwide coast based on the principle of shared distributed information. The long-term view is for global-level operational interoperability which will evolve as the ICAN project members strive to increase awareness of the opportunities that exist for increased coastal and marine data sharing among policy makers and resource managers as strategic users of a CWA.

The long-term strategic goal of the IODE ICAN project is to encourage and help facilitate the development of digital atlases of the global coast based on the principle of distributed, high-quality data and information. These atlases can be local, regional, national and international in scale. This can be achieved by sharing knowledge and experience among atlas developers in order to find common solutions for coastal web

atlas development whilst ensuring maximum relevance and added value for the users. In some cases users may be significantly involved in atlas development itself. In order to reach this goal ICAN has the following objectives:

- Ensure that ICAN has representation from coastal web atlas development and user groups from across the world.
- Develop technical and policy guidelines to assist coastal web atlas developers in acquiring data and engaging with data providers. Accordingly, collate and publish a set of best-practise guidelines for the development of coastal web atlases.
- Highlight the benefits of interoperability and standards based systems to the coastal atlas developer communities.
- Develop collaborative projects for the sharing of know-how, implementation of technical solutions and demonstration of atlas benefits to users.
- Align the atlas efforts of the Network partners in order that interoperability can be facilitated.
- Engage with other relevant international IODE projects and developments as well as relevant activites outside of IODE.
- Involve representatives of the relevant user communities to help in tailoring coastal web atlases to their needs.
- To further these objectives ICAN has identified a range of activities in the areas of technical implementation, atlas assessment, outreach, training, and participation in scholarly communities, and strategic planning and funding.

IODE covers all ocean physical, chemical and biological data (including biodiversity) as collected by IOC Member States and managed by their national data centres and/or global databases such as those described above.

ODIS (Ocean Data and Information System)

ODIS works with many types of spatial geometries in order to be as inclusive as possible. The ODIS-architecture documentation covers guidelines for Spatial Geometry:

https://book.oceaninfohub.org/thematics/spatial/index.html

Guidance is also given for describing Maps as a subtype of Document in schema.org:

https://book.oceaninfohub.org/thematics/docs/maps.html

OBIS (Ocean Biodiversity Information System)

From the very beginning, OBIS has championed the use of international standards for biogeographic data. Without agreement on the application of standards and protocols, OBIS would not have been able to build a large central database. OBIS uses the following standards:

- Darwin Core: https://manual.obis.org/darwin_core.html

- Ecological Metadata Language: https://manual.obis.org/eml.html
- Darwin Core Archive and dataset structure: https://manual.obis.org/data_format.html

More information is available on https://manual.obis.org

AquaDocs

The AquaDocs repository uses extended Dublin Core metadata standard.

INTERNATIONAL HYDROGRAPHIC ORGANIZATION

International Hydrographic Organization

The International Hydrographic Organization (IHO) is an intergovernmental organization that works to ensure all the world's seas, oceans and navigable waters are surveyed and charted. Established in 1921, it coordinates the activities of national hydrographic offices and promotes uniformity in nautical charts and documents. It issues survey best practices, provides guidelines to maximize the use of hydrographic survey data and develops hydrographic capabilities in Member States.

IHO Member States are represented within the IHO by the respective national authority responsible for the provision of hydrographic and nautical charting services in each Member State.

The IHO's scope of interest is global. Hydrography is the basis for all activities involving the sea: Safety of navigation, Tourism, Protection and management of the marine environment, Use of marine resources: minerals, oil & gas, renewable energy, Maritime trade, Coastal zone management, Maritime boundaries and policing, Marine science, Tsunami flood and inundation modelling, and Marine spatial data infrastructure.

The Convention on the International Hydrographic Organization defines the Organization's mandate to be the authoritative worldwide hydrographic body which actively engages all coastal and interested States to advance maritime safety and efficiency and which supports the protection and sustainable use of the marine environment. The Convention presents the IHO's mission to create a global environment in which States provide adequate and timely hydrographic data, products and services and ensure their widest possible use.

As an Intergovernmental Organization, the IHO is comprised of 99 Member States as of November 2023 which governs the Organization through triennial Assembly and subsidiary organizational entities.

The Secretary-General and Directors, together with international experts in hydrography and nautical cartography as well as locally-recruited administrative support staff make up the IHO Secretariat in Monaco. The Secretariat coordinates and promotes the IHO's work programmes and provides advice and assistance to Member States and relevant third parties.

The organization shall comprise the Assembly, Council, Finance Committee, Secretariat, and two subsidiary organs, which are Hydrographic Service and Standard Committee (HSSC) developing and maintaining global hydrographic standards and Inter-Regional Coordination Committee (IRCC) to coordinate and promotes cooperation with other international and regional organizations.

IHO Marine Geospatial Information is categorized into geographic data that delineates the spatial characteristics of the ocean. This spatial information is collaboratively developed with IHO member states, as well as relevant international organizations and communities. The key global marine spatial information services provided by IHO as outlined below:

- Global coverage of International Charts and Electronic Navigational Charts
- Global quality and coverage of survey data
- Global Automatic Identification System (AIS) indicated ships traffic
- Gazetteer of Under Sea Feature Names
- Layout of Marine Safety Information for NAVAREA
- Global Bathymetry data

There components represent the comprehensive range of marine geospatial information offered by the IHO, reflecting collaborative efforts with IHO Member States and International entities.

The IHO Services and Standards Programme focuses on the implementation and strategic direction of developing, improving, promulgating and promoting clear, uniform, global hydrographic standards to enhance safety of navigation at sea, protection of the marine environment, maritime security and economic development".

The main elements are:

- Programme Coordination
- Foundational Nautical Cartography Framework
- Universal Hydrographic Data Model (S-100 Framework) - Nautical Charting (S-57 / S-52 Framework)
- Supporting the implementation of e-navigation and Marine Spatial Data Infrastructures (MSDI)
- Hydrographic Surveying
- Hydrographic aspects of UNCLOS
- Other technical standards, specifications, guidelines and tools

The noted data repositories are hosted by the IHO and are accessible via the links listed below:

IHO Main website: https://iho.int/

IHO Geospatial Information Registry: https://registry.iho.int

IHO Web Catalogue for International Charts and ENCs: https//chart.iho.int

IHO Data Centre for Digital Bathymetry: https://ngdc.noaa.gov/iho/

IHO-IOC General Bathymetry Chart of the Oceans: https://www.gebco.net/

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)

The United Nations Development Programme (UNDP) is a United Nations agency tasked with helping countries eliminate poverty and achieve sustainable economic growth and human development. The UNDP emphasizes developing local capacity towards long-term self-sufficiency and prosperity. UNDP works in more than 170 developing countries and territories spanning multiple continents and regions.

www.undp.org

UNDP has been actively involved in supporting communities located in coastal and marine environments but does not have a specific mandate on marine geospatial information collection, standardization, or dissemination activities.

UNDP has started a series of initiatives on geospatial data collection and marine geospatial data is among the main data themes. In general, the UNDP geos data repository contains geospatial marine layers in three forms: 1) acquired and curated from open sources, 2) acquired and curated by remote sensing technologies, and 3) as links to public big raw geospatial data archives hosted by the major cloud vendors. The data are hosted in a cloud environment and disseminated through universal world-wide web technologies and open geospatial dissemination standards.

UNDP is currently developing GeoHub a cloud based geospatial platform designed to: 1) organize and host data in one central location, 2) support advanced geo visualization, and 3) support advanced geospatial analytics. The main goal of the platform is to support UNDP policy makers making informed decisions by leveraging geospatial data and analytics in the context of SDGs.

https://geohub.data.undp.org/

INTERNATIONAL SEABED AUTHORITY

International Seabed Authority (ISA)

Authors (contributors):

Sheldon Carter, Noemie Wouters, Ulrich Schwarz Schampera, Kioshi Mishiro

1. KEY INFORMATION ABOUT THE ORGANIZATION

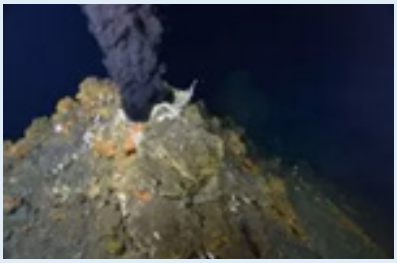
In accordance with the UN Convention on the Law of the Sea ("the Convention") and 1994 Agreement relating to the implementation of Part XI of the convention ("1994 Agreement), the International Seabed Authority (ISA) is the organization through which the States Parties to the Convention organize and control mineral exploration and exploitation activities in the Area beyond the national jurisdiction (the Area), particularly with a view to administer the mineral resources of the Area, for the benefit of mankind as a whole. At the core of this mandate is the responsibility for ISA to take the necessary measures to ensure the effective protection of the marine environment from potential harmful effects caused by seabed activities. UNCLOS also requires ISA to promote and encourage the conduct of marine scientific research in the Area and coordinate and disseminate the results of such research.

The Convention defines "the Area" as "the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction". The establishment of the exact geographic limits of the Area depends on the establishment by States of the outer limits of the continental shelf, including the delineation of the outer limits of the continental shelf, where it extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, in accordance with the Convention. Pursuant to Article 84, paragraph 2 of the Convention, coastal States are obliged to give due publicity to charts or lists of geographical coordinates of points and, in the case of those indicating the outer limit lines of the continental shelf, to deposit a copy of such charts or lists with the Secretary-General of the Authority.

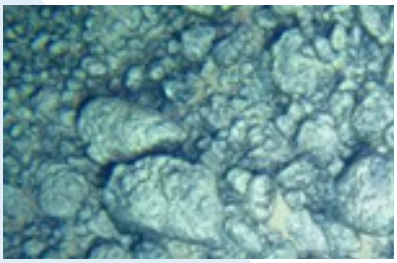
2. LEGISLATIVE ADMINISTRATIVE AND POLICY FRAMEWORK MANDATING THE MARINE GEOSPATIAL INFORMATION COLLECTION, COORDINATION, STANDARDIZATION MANAGEMENT AND/OR DISSEMINATION ACTIVITIES

With the entry into force of UNCLOS in 1982 and the establishment of ISA in 1994, exploration activities for mineral resources in the Area began to be regulated under exploration contracts. Originally, exploration activities were predominantly undertaken by mining consortia in the 1960s and 1970s to identify potential deposits and invest in research and development of technology for mining and processing nodules. These studies were carried out by four multinational consortia composed of companies from the United States, Canada, the United Kingdom, West Germany, Belgium, the Netherlands, Italy, Japan, and two groups of private companies and agencies from France and Japan. There were also three publicly sponsored entities from the Soviet Union, India and China. National agencies followed up with the decrease in commodity prices and enhanced resource supplies until 2010, when private companies restarted activities to invest in what may develop into a polymetallic-nodule-mining industry.

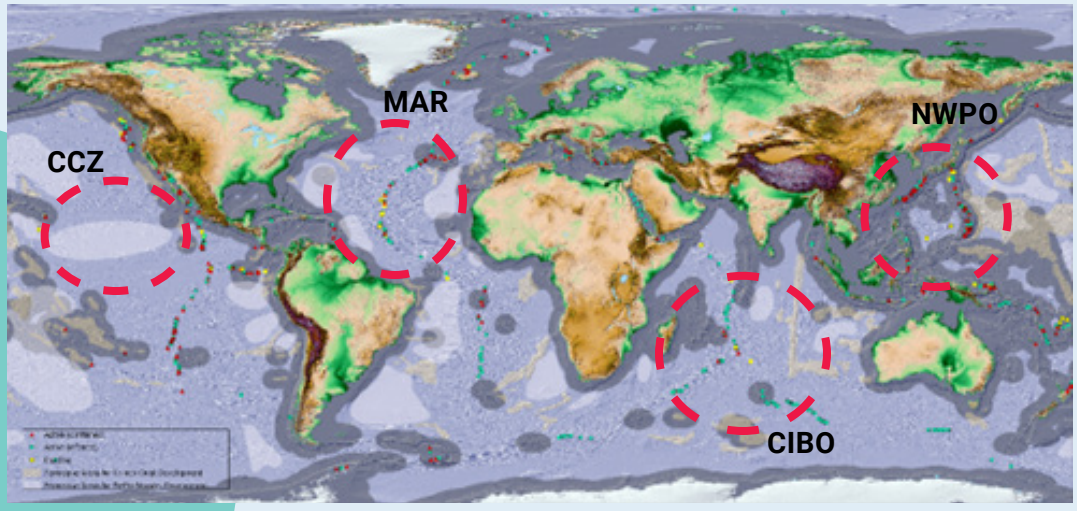
Polymetallic Nodules



Polymetallic Sulphides



Cobalt-rich Ferromanganese Crusts



2.1 Active Contract Areas[3]

As of 11 July 2024, the ISA has entered into 30 contracts with 21 contractors for the exploration of polymetallic nodules, polymetallic sulphides and cobalt-rich ferromanganese crusts in the Clarion Clipperton Fracture Zone (CCZ), the Northwest Pacific Ocean (NPO), the Central Indian Ocean Basin (CIOB), and the Mid-Atlantic Ridge (MAR).

Polymetallic Nodules:

The entitled exploration area allocated to each contractor does not exceed 75,000 sq. km after the completion of 50 per cent relinquishment of the original area allocated (not exceeding 150,000 sq. km) by the end of eight years from the date of the contract.

Polymetallic Sulphides:

The total area allocated to the contractor under the contract is limited to 2,500 sq. km after the completion of 75 per cent relinquishment of the original exploration contract area (not exceeding 10,000 sq. km) by the end of the eighth year from the date of the contract.

Cobalt-rich Ferromanganese Crusts:

The total area allocated to the contractor under the contract is not exceeding 1,000 sq. km after the completion of the relinquishment of 2,000 sq. km of the original exploration area (not exceeding 3,000 sq. km) by the end of the tenth year from the date of the contract.

2.2 Deepsea Data Collection

It is required that the contractors undertake profound mineral exploration work, and also gather environmental data and conduct environmental baseline studies, taking into account any recommendations issued by the agreed contract and the Legal and Technical Commission (LTC). Environmental baseline studies assess the likely effects on the marine environment of any activities under the plan of work for exploration, thus to monitor and report.

The LTC recommendations provide guidance to contractors in relation to the content, format and structure of the annual reports, that include general requirements and specific guidance for reporting on the exploration activities under contract for mineral resources (i.e. polymetallic nodules, polymetallic sulphides, cobalt-rich ferromanganese crusts). (ISBA/21/LTC/15)[4]

3 https://www.isa.org.jm/exploration-contracts/maps/

4 ISBA/21/LTC/15: Recommendations for the guidance of contractors on the content, format and structure of annual reports

In the requirements of the submissions of the data, ISA provides standard templates (i.e. reporting and metadata templates) to be used by contractors for reporting geological, and environmental data and associated digital files. (ISBA/21/LTC/15)

2.3 Confidentiality and Non-Confidentiality

The data and information related to the protection and preservation of the marine environment contained in the reports, in particular the data from environmental monitoring programmes, shall not be considered confidential. (ISBA/19/C/17: Regulation 36 and 37)

The resource-related data and information, including high-resolution bathymetric data, is confidential. No such data and information shall be released until the contractor has been accorded a reasonable opportunity to exhaust the judicial remedies available. (ISBA/19/C/17: Regulation 36 and 37)

3. INSTITUTIONAL ARRANGEMENT – GOVERNANCE MODEL – LEADERSHIP INSTITUTIONAL STRUCTURE – INSTITUTIONAL STRUCTURE

In accordance with the UNCLOS, all State Parties to UNCLOS are members of ISA. The ISA has 169 Members, including 168 Member States and the European Union. The institutional structure of the ISA is similar to most international organizations, and consisting of Legal and Technical Commission (41 members) as an advisory body, and the Finance Committee (15 members); the Assembly; the Council (36 members); the Secretariat (i.e. Executive Office of the Secretary-General, Office of Legal Affairs, Office of Environmental Management and Mineral Resources, Office of Administrative Services)

Legal and Technical Commission: Technical, scientific and legal reviews for exploration or mining activities, development of environmental management plans, assessment of the environmental implications of activities in the Area, and recommendations to the Council.

Finance Committee: Central role in the administration of ISA's financial and budgetary arrangements.

Council: Central, executive organ of the ISA, that supports the work of the plenary body. The council can exercise policy-making, and supervisory competencies, including the power to specific policies within the competencies of the ISA.

Assembly: the plenary body of the ISA, that has the power to establish, in collaboration with the Council, general policies on all matters within the competence of the ISA.

4. MARINE GEOSPATIAL DATA – DATA THEMES

The contractors are required to submit the metadata and results of their sample analysis from exploration and baseline surveys in contract areas, using the digital reporting templates recommended by the Legal and Technical Commission. (ISBA/21/LTC/15/CORR.1[5])

Building on ISA's long-term efforts to develop a central repository of data being submitted by contractors from their exploration activities, the ISA launched, in July 2019, its new comprehensive database called "ISA Deep Seabed and Ocean Database" (DeepData) (http://data.isa.org.jm). DeepData is an integrated database system designed to serve as a geospatial data management system.

The environmental data in DeepData, including the data themes; biological, oceanographic and geochemical parameters of the marine ecosystems, are accessible to the public. The geological data relating to mineral resource assessment are formally identified as confidential by the regulations on prospecting and exploration of mineral resources, and are made accessible only to authorized users of ISA organs and contractors. (ISBA/19/A/9, ISBA/19/C/17, ISBA/16/A/12/ Rev.1, and ISBA/18/A/11).

The contractors are required to produce Geographic Information System regional maps with high resolution bathymetry showing major geological and geomorphological features to reflect the heterogeneity of the environment, at a scale appropriate to the resource and habitat variability (ISBA/25/LTC/6/Rev.1). The collected and processed bathymetric data are being submitted as digital 'xyz' files in the American standard code for information interchange (ASCII) format or a common geographic information system (GIS) format. The processing sequence must be fully described (ISBA/21/LTC/15/CORR.1).

5. MARINE GEOSPATIAL INFORMATION MANAGEMENT TECHNOLOGY AND STANDARDS IMPLEMENTED

In 2015, the Legal and Technical Commission (the Commission) requested ISA to evaluate the current methods of managing seabed exploration data and make recommendations for a strategy to address identified gaps and inadequacies, and recommended that ISA proceed with the implementation of its Data Management Strategy in June 2016 (ISBA/22/LTC/15). The strategy establishment and development provide effective ways to reviewing, monitoring and evaluation of contractors' activities (environmental, geological and technological integration) by ISA.

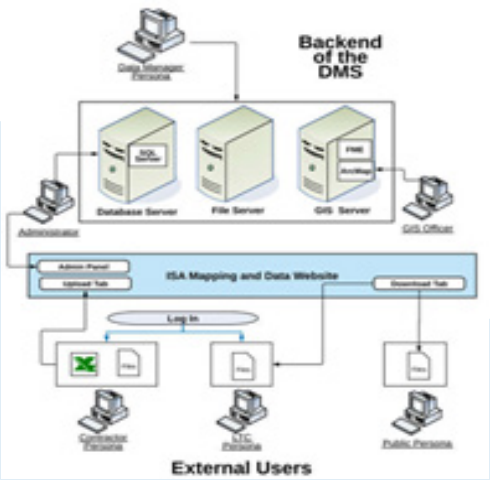
The ISA Secretariat launched the DeepData website (https://data.isa.org.jm/isa/map/) in July 2019 and fulfilled the initial objectives set out in ISBA/22/LTC/1.

DeepData has been designed to serve as a spatial, internet-based data management system; the main function is to host all data related to deep-seabed activities and sharing environmental data.

5 ISBA/21/LTC/15/CORR.1: Reporting Template: https://www.isa.org.jm/reporting-templates

After the launch of DeepData, the Secretariat focused on developing a revised version of the reporting templates that could support the extraction, transformation and loading (ETL) procedures associated with incorporating new data with the master data inventory (Figure)

Figure. *Generalized workflow diagram showing interaction between personas and ISA DeepData database.*



In 2022, the revised reporting templates underwent the implementation of several quality assurance and control mechanisms to improve the overall quality of data collected by the Authority. The revised reporting templates were accompanied by a newly developed metadata template that has aided in the cataloguing and storage of associated data (https://www.isa.org.jm/exploration-contracts/reporting-templates/).

The ISA data management aims to provide different functions, i.e., promoting and encouraging Marine Scientific Research (MSR) in the Area and coordinating and disseminating the results of such research as the core of ISA's mission. ISA further developed an Action Plan on the MSR (ISBA/26/A/17) in support of the United Nations Decade of Ocean Science for Sustainable Development. ISA DeepData database serves as the global repository of all deep-seabed-related data that are submitted by ISA's contractors. This contains, among mineral exploration data, physical and geochemical oceanographic and biological, parameters of the marine ecosystems from the seafloor to the ocean surface as well as maps, photographs, videos from contractors. The Secretariat also established several partnerships and collaborations with other UN (e.g. OBIS, WoRMS) and national agencies (e.g. ADSR project[6]) and members of the scientific community to expand the outreach and ensure interoperability with other international databases based on the F.A.I.R principles.

Three best practice examples described below illustrate how marine geospatial management informs effective science policy and regulatory frameworks:

6 Africa Deep Seabed Resources (ADSR) project funded through Norwegian Agency for Development Cooperation (NORAD)

5.1 Regional Environmental Management Plans (REMPs)

REMPs are an essential tool for ISA to ensure the protection of the marine environment, that aims to:

- provide the relevant organs of ISA, as well as contractors and their sponsoring States, with proactive area-based and other management tools to support informed decision-making processes that balance resource development with conservation;
- provide ISA with a clear and consistent mechanism to identify particular areas thought to be representative of the full range of habitats, biodiversity and ecosystem structures and functions within the relevant management area;
- provide those areas with appropriate levels of protection; and
- help ISA meet globally agreed goals and targets, such as those set out by the 2030 Agenda and in particular Sustainable Development Goal 14 (Life below water).

5.2 Area 2030

Area 2030 is a collective contribution of high-resolution mapping of the international seabed area by contractors in support of the effective implementation of UNCLOS, the 2030 Agenda and the UN Decade of Ocean Science for Sustainable Development. The high-resolution bathymetric data provided by contractors is confidential information as it concerns resource-related data; however, ISA facilitated the submission by ten contractors of the bathymetric data through the International Hydrographic Organization (IHO) as part of the ISA Area 2030 initiative (as of September 13). It will contribute to improve the geological model, identify deep-sea habitats, including inferring possible mineral occurrences based on artificial intelligence techniques, and increase the scientific knowledge of the global oceans and support global oceans' governance by mapping.

5.3 Sustainable Seabed Knowledge Initiative (SSKI)

SSKI, funded by the European Commission, aims to transform our understanding of the planet's largest ecosystem in the deep-sea. Launched at the 2022 UN Ocean Conference, SSKI aims at the description of over one thousand new species from the regions of the Area that are currently being explored for mineral resources and may be targeted for future exploitation. As such SSKI will strengthen the scientific foundation for effective identification, characterization, protection and management of the deep-sea in the Area, in collaboration with other UN entities. This includes sharing of taxonomic data with the Ocean Biodiversity Information System (OBIS), to increase the dissemination and

visibility of such data to the public. The Authority also entered partnerships with the World Register of Marine Species (WoRMS) as an additional quality control mechanism to improve taxonomic data quality. This initiative and the new knowledge it will generate will enable scientists to create maps of life on the seafloor and help to understand and manage the potential effects of anthropogenic activities on deep-sea ecosystems.

PACIFIC COMMUNITY

Response to the request for information Annex 1 Marine Geospatial Information-Intergovernmental

The Pacific Community presents its compliments to the Division for Oceans and Law of the Sea and has the honour to refer to the letter of 20 June 2023, in which the Division invited contributions from Intergovernmental organisations to describe their missions in the collection and dissemination of marine geospatial data and Information.

The Pacific Community (SPC) is the principal scientific and technical organisation supporting development in the Pacific region since 1947. SPC is proud to be applying collective capabilities in science, knowledge and innovation to serve the people of the Pacific in reaching their sustainable development goals and aspirations. By placing Pacific people at the centre of our approaches, and with our deep understanding of Blue Pacific contexts and worldviews, SPC embark on the journey to implement the Strategic Plan 2022 – 2031 that encompasses the insights and foresight of our 27 member countries and territories, staff and key stakeholders. It builds on learning from our previous plans and aligns with the 2050 Strategy for the Blue Pacific Continent.

SPC has a strong comparative advantage in being able to bring a multi-disciplinary approach to addressing some of the region's most complex development challenges, resilience and climate action, natural resources and biodiversity, food systems, equity, education and social development, sustainable economies and livelihoods, planetary health and transforming institutional effectiveness.

SPC holds itself accountable to the Pacific values enshrined in the Strategic Plan and to serving our Blue Pacific region in progressing our four development goals:

- Goal 1: All Pacific people benefit from sustainable development
- Goal 2: All Pacific communities and cultures are empowered and resilient
- Goal 3: All Pacific people reach their full potential and live long and healthy lives
- Goal 4: One SPC delivers integrated programmes through streamlined services

As a member-owned organisation, SPC commits to transforming and adapting as an institution to respond to our members' unique and evolving priorities.. In doing so, we draw on the strength of our diversity, including the vast interdisciplinary expertise and multi-cultural backgrounds of our 700+ staff located across the region.

1. MISSION

"To progress all Pacific peoples' rights and well-being through science and knowledge, guided by our deep understanding of Blue Pacific contexts and cultures."

2. MEMBERSHIP OF THE ORGANISATION

The Pacific Community consists of the Following States and Territories

American Samoa, Australia, Cook Islands, Federated States of Micronesia, Fiji, France, French Polynesia, Guam, Kiribati , Marshal islands, Nauru, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn Islands, Samoa, Solomons Islands, Tokelau, Tonga, Tuvalu, United Kingdom, United States of America, Vanuatu, Wallis and Futuna

3. URL

www.spc.int and https://gem.spc.int/

4. LEGISLATIVE AND POLICY FRAMEWORK

Details of the institutional arrangements for SPC are found The Pacific Community Governance Compendium

Our work in the oceans is guided by the needs of the people of the Blue Pacific Continent and the decisions of our leaders as expressed in the 2010 Framework for a Pacific Oceanscapes, the 2021 Pacific Islands Forum Leaders Ocean Statement, the 2050 Strategy for a Blue Pacific Continent and the Pacific Island Forum Leaders Declaration on Preserving Maritime Zones in the Face of Climate Change-related Sea-Level Rise

5. INSTITUTIONAL ARRANGEMENTS

SPC delivers its programs through 9 work areas

- Climate Change and Environmental Sustainability
- Educational Quality and Assessment
- Fisheries Aquaculture and marine Ecosystems
- Geoscience Energy and maritime
- Human Rights and Social Development
- Land Resources
- Public Health
- Statistics for Development
- Integrated programs

6. MARINE GEOSPATIAL DATA

SPC manages data relating to fisheries, the marine environment, oceanography, marine geology, maritime transport, and earth and ocean observation data. The relevant programmes and initiatives are summarised below.

6.1 Pacific Community Center for Ocean Science (PCCOS)

The Pacific Community (SPC), as the region's hub for science, technology and innovation for sustainable development, is also home to the Pacific Community Centre for Ocean Science, or the PCCOS.

PCCOS aims to help Pacific Island governments and communities easily access the ocean science and expertise they need to make informed decisions and to protect and sustainably manage ocean resources.

Whilst accurate ocean science, data, and information are critical tools, SPC recognises that actors on the ground in our member countries need advice and services tailored to their needs. PCCOS delivers integrated scientific services supporting Ocean management, Ocean governance, Ocean observations; and facilitating, and coordinating and transforming Ocean science into services for SPC members.

The Pacific Community Centre for Ocean Science website is https://pccos.spc.int/

6.2 SPC – Climate and Oceans Support Program in the Pacific (COSPPac)

Pacific Island countries are some of the most vulnerable to climate change in the world. The aim of the programme is to measure and deliver useful and usable climate change and Ocean information services in partnership with priority stakeholders, including affected communities and marginalised groups, such that Pacific Island stakeholders are using climate and Ocean information to enable all Pacific peoples to remain resilient to the impacts of climate change and disasters so that they are able to lead safe, secure and prosperous lives. The primary stakeholders in COSPPac are the Pacific Island National Hydrological Meteorological Services (NHMSs) and the Lands and Survey Departments (LSDs).

In relation to the marine geospatial information, SPC works with Pacific Island counterparts to build tools to forecast and report on climate, tides, sea level and ocean conditions, including the modernisation of geodetic reference frames. At the same time, we work with them to determine how best to communicate this information to communities, businesses and governments to improve preparedness and decision-making.

SPC – COSPPac - https://gem.spc.int/projects/cosppac

6.3 SPC - Digital Earth Pacific

Globally, the effects of climate change are already being observed through increases in drought, forest fires, sea level rise, and flooding. Given the vulnerability of Pacific Island countries and territories (PICTs) in this respect, the Pacific region faces unique challenges in managing natural resources and biodiversity, securing economies and livelihoods and ensuring sustainable food systems. Digital Earth Pacific (DEP) delivers an operational earth and marine observation system that takes decades of satellite data and makes it easier to access and use, empowering decision-makers across the Pacific. This includes changes to landcover and land use to better target humanitarian assistance after disasters, mapping of changing coastlines caused by climate change or storm events, and understanding how mangrove growth has changed without having to map this manually.

DEP will allow Pacific Community (SPC) SPC member states to make more informed decisions based on timely information. It is a free and open digital public infrastructure helps the region understand the changes in our environment quickly and at a fraction of the cost of previous data systems, at scale.

Digital Earth Pacific helps the Pacific to achieve our 2050 Leaders vision for our Blue Pacific Continent and underpins the progress being made towards the Paris Agreement and our Sustainable Development Goals.

SPC – Digital Earth Pacific website - https://digitalearthpacific.org/

6.4 SPC – Pacific Maritime Boundaries Interactive Dashboard

For Pacific Island countries and territories (PICTs), as with all coastal States, maritime boundaries function as national borders. They are critical for governance, security, law enforcement, and natural resource management within a coastal State. A State's maritime boundary can lie adjacent to the high seas or be shared with another country. The UN Convention on the Law of the Sea (UNCLOS) is the international agreement that codifies all coastal State's rights to a marine jurisdiction. Where countries' entitlements to maritime zones overlap, they need to negotiate a shared boundary.

The Pacific Regional Maritime Boundaries project with the Pacific Community (SPC) works with Pacific countries to deliver certainty and publcity on the limits of their maritime zones. The project is supported by a consortium of partners, and overall coordination has been led by the Pacific Community (SPC) since 2001.

This project has developed the Pacific Maritime Boundaries Dashboard, which is hosted on the Pacific Data Hub (PDH, pacificdata.org). The dashboard is an interactive visual presentation of the progress by Pacific countries on Maritime Boundaries tasks. The landing page has an interactive map, depicting the status of boundaries for each country,

and linking to pages that summarise regional progress and provide associated publicly available datasets in formats that can be easily consumed by end users.

SPC - Maritime boundaries dashboard website - https://pacificdata.org/dashboard/maritime-boundaries

6.5 Pacific Geospatial and Surveying Council (PGSC)

Established by the Pacific Region, for the Pacific Region

Geospatial information underpins the majority of economic and sustainable development activities in the world today. The services provided by Pacific Island geospatial scientists and surveyors contribute to the security and well-being of Pacific people, supporting numerous industries and sectors. These include natural resource management, civil engineering, climate change adaptation, disaster risk reduction, transport, land ownership, health, and agriculture to name a few.

In November 2014, a group of Pacific regional surveying and geospatial experts met in the margins of the annual Pacific Geospatial Information Systems and Remote Sensing (GIS/RS) User Conference in Suva, Fiji. It was at this meeting that the Pacific Geospatial and Surveying Council (PGSC) was first envisaged and a charter governing its mission and objectives was developed.

Today PGSC is an independent regional advisory body with a strategic plan and a partnership desk at the SPC providing Secretariat support, providing a forum for Pacific Island geospatial information and survey authorities to discuss and address regional challenges. The vision is "sustainable development in the Pacific enabled by world-class geospatial information and surveying services." Core members of PGSC are national geospatial, hydrographic, and surveying authorities of Pacific Island countries and territories.

PGSC website - http://pgsc.gem.spc.int/

6.6 Pacific Regional Navigational Initiative (PRNI)

Observing international standards is vital to raising regional maritime safety and security. SPC works in the region through projects that are interconnected to achieve similar outcomes. Funded by the New Zealand Foreign Affairs & Trade Aid Programme, the Pacific Regional Navigational Initiative, or PRNI is one project that is taking steps to meet this demand, and to strengthen the efficiency and value of the Pacific region's maritime industry.

Safe and reliable passage through Pacific waters is essential to protect fragile ocean environments and allow Pacific island countries' economies to develop. Up-to-date navigation charts based on modern, accurate surveys are critical transport infrastructure the ocean equivalent of well-constructed roads. Hydrography is highly specialised. Few Pacific countries have the technical capability or systems needed to undertake hydrographic surveys or update their own navigational charts. This new regional programme aims to ensure Pacific navigation charts meet international standards and support maritime safety and economic growth. The initiative contributes to sustainable development in selected Pacific SIDS through supporting:- improved transport and infrastructure management

services as a key enabler of growth. For every $1 spent on hydrography, there is an estimated $91 return in ongoing economic activity.- safe, reliable and affordable transport services that connect people to markets and services.

Pacific regional navigational initiative website - https://sdgs.un.org/partnerships/pacific-regional-navigation-initiative

7. RELEVANT LINKS

- Tuvalu coastal adaptation dashboard - https://opm.gem.spc.int/tcap/home
- Republic of Marshal Islands strengthening early warning preparedness dashboard -https://opm.gem.spc.int/prep/home
- Pacific Ocean portal - https://oceanportal.spc.int/portal/ocean.html
- Pacific Regional Navigation Initiative (PRNI) - https://gem.spc.int/videos/pacific-regional-navigational-initiative-prni
- Why maritime zones matter: https://youtu.be/y3p5DUvRhzY
- Exchange of maritime boundaries data to boost fisheries monitoring, control and surveillance in region: https://peump.dev/news/exchange-maritime-boundaries-data-boost-fisheries-monitoring-control-and-surveillance-region
- The Tuna Fisheries Data Management system: Tufman 2 - is a cloud-hosted, web database developed for Pacific Island Countries to manage their tuna fishery data https://fame1.spc.int/resources/tools/tufman2
- Ikasavea: is a smartphone and tablet application that allows fisheries surveyors to collect market, landing and socio-economic survey data offline https://fame1.spc.int/resources/tools/ikasavea
- Tails: is a smartphone and tablet application that allows coastal fisheries staff to easily collect tuna and reef fish catch information from small-scale fishers in remote locations https://fame1.spc.int/resources/tools/tails
- OLLO: is an Android app developed by SPC for observers monitoring longline vessels operating in the southern albacore fisheries https://fame1.spc.int/data-management-tools/ollo
- OnBoard application: app is one of the SPC-developed E-Reporting tools suite https://fame1.spc.int/data-management-tools/onboard-application
- OnShore application: is one of the tablet applications of the SPC-developed suite of E-reporting tools https://fame1.spc.int/data-management-tools/onshore-application
- MULTIFAN-CL: is a computer program that implements a statistical, length-based, age-structured model for use in fisheries stock assessment https://fame1.spc.int/resources/tools/multifan-cl
- PacFishID: is an application for the general public to learn to recognise fishes of commercial interest of the Pacific region https://fame1.spc.int/resources/tools/pacfishid
- REEFLEX: This tool is designed to allow users access to and compare laws and policies on coastal fisheries and aquaculture management in 23 Pacific Island countries and territories (22 SPC member countries and Timor Leste) https://fame1.spc.int/resources/tools/reeflex

- SEAPODYM Data Query System: SEAPODYM is a numerical model initially developed for investigating physical-biological interaction between tuna populations and the pelagic ecosystem of the Pacific Ocean https://fame1.spc.int/resources/tools/seapodym
- Pacific Marine Specimen Bank: Collecting samples of Pacific pelagic species to understand their biology and ecology https://fame1.spc.int/resources/tools/pacificmarinespecimenbank
- Web Tagging Data System: The Web Tagging Data System is a portal that gives access to tagging data collected by SPC and its partners since 2005 https://fame1.spc.int/resources/tools/web-tagging
- Bycatch Management Information System (BMIS): The Bycatch Management Information System (BMIS) focuses on bycatch mitigation and management in oceanic tuna and billfish fisheries https://fame1.spc.int/resources/tools/bycatch-mitigation