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Agenda item 5: Data Management Policy

MAP Data Management Policy

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Note by the Secretariat

During the **CorMon meetings** on **Biodiversity and Fisheries** (Marseille, 12-13 February 2019) and on **Pollution and Marine Litter** (Podgorica, 2-5 April 2019), first elements on the draft document "**MAP Data Management Policy**" were provided jointly with a roadmap for its implementation.

The document, approved during the **INFO/RAC NFPs Meeting** (16/17 April 2019), has been further improved in view of the submission to **MAP Focal points**.

Starting from the general framework and after the official mandate from Contracting Parties at COP21, INFO/RAC will develop a complete general data management policy for MAP in close cooperation with MAP Components and Contracting Parties. The final document will focus mainly on **BCRS** and **IMAP** data flows.

According to the proposed roadmap, bilateral meetings will be organized between INFO/RAC and CPs during 2020-2021 in order to grant the proper level of accessibility and use for the different data and data products.

In this framework, close cooperation with MAP Components will be needed to define the appropriate level of aggregation of data to visualize relevant information for the general public.

Although the process is just started and will be further developed during next biennium, an initial discussion on data policy focused on **IMAP (Pilot) Info System** has been stimulated during all the CorMon meetings of the 2019, starting from CorMon Bio and Fisheries (12-13 February, Marseille) concerning the following points:

- the principles of the **Shared Environmental Information System (SEIS);**
- Authentication, Authorization and Accounting;
- IMAP user profile: CP, MAP, INFO/RAC, Partners, General public.
- Type of data and data products: reference layers, assessment data, aggregated data, raw data;
- accessibility and use of data: open, sensitive and restricted data;

In particular, the following **USER PROFILES** for the **IMAP (Pilot) Info System** have been agreed:

CP: Contracting Parties, Focal Points, National Experts

As a rule, a single user as "**CP**" is provided for each Country. Additional users (FP, NE) can be requested.

The CP profile has followings rights:

- Download of Data Standards and Data Dictionaries;
- Upload monitoring data compliant to Data Standards;
- **Compliance check** on data uploaded in the system;
- Consistency check (**Validation**) on data uploaded in the system;
- Access and download of data **(belonging only to its own Country**) uploaded to the system;
- Access and download of informative documents, compilation guides, methods etc.;

MAP: MAP Coordinating Unit and MAP Components

The **MAP** Profile has followings rights:

- Download of Data Standards and Data Dictionaries;
- Access and download of data **(**all Countries data) uploaded to the system;
- Access, download and upload of informative documents, compilation guides, methods etc.;

INFO: INFO/RAC

The INFO/RAC profile has following rights:

- Perform any function available on the system and is responsible for managing users (create/delete users with username and password) for all profiles, including ADMINISTRATOR profile.
- Upload, modify and delete: Data Standards, Data Dictionaries, Background and reference documents, Manuals and guidelines
- View and manage all kind of data.
- Publish data according to CPs official decisions.

Partner: MAP Partners, Stakeholders and other Regional Institutions with the specific authorization of MAP CU

The Partner profile has following rights:

- Download of Data Standards and Data Dictionaries;
- Access and download to validated data uploaded to the system, according to specific authorization provided by MAP CU;
- Access and download of informative documents, compilation guides, methods etc.;
- No changes are allowed.

Public: Citizen, general public

The Public profile has following rights:

- Access to published data and information (no credentials);
- Download of Data Standards and Data Dictionaries;
- View reference layers and aggregated data displayed on geoviewer
- View and download of background and reference documents

The USERS' credentials, as in the presented scheme, will be active in the IMAP (Pilot) Info System starting from the Testing Phase (May 2019). According to the further development of the system and incoming needs of MAP network, they will be updated in the second Phase of IMAP Info System implementation.

A first proposal about the management of collected monitoring data has been provided for the period 2019-2021.

The "**minimum scenario**" to be assured (from now to the end of next biennium) is the following:

i. **First step**: Each Contracting Party has free access to only its data, and no data are available to be shown as public to a general audience.

ii. **2019 (starting from July)**: initial step could be followed by publishing reference layers at level of Mediterranean basin.

iii. **2020**: a set of validated data accessible at the regional level (all CPs can visualize data referred to the whole Mediterranean basin)

iv. **2021: a** set of aggregated data at the level of Mediterranean Sea publicly accessible

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Scope

The data policy aims to ensure that data are managed transparently, ensuring the certainty that they are properly disseminated and recognized, following similar principles and rules across countries and stakeholders.

As a general assumption data and information should be managed as close as possible to its source, collected once and shared with others for many purposes and readily available to easily fulfil the UNEP/MAP mandates. In a more concrete way data and environmental information should be accessible to enable comparisons of the environment at the appropriate geographic scale, fully available to the general public, to enable citizen participation; supported through common, free and open software standards and proprietary action based on a interoperable Infrastructure for Spatial Information in the Mediterranean area.

The policy will cover environmental data and information collected, acquired, processed and disseminated by UN Environment Programme/Mediterranean Action Plan through the INFO/RAC System called InfoMAP.

The data management policy document is a general description framework, to start identifying data policy within the Mediterranean countries in order to support the data flows of the Barcelona Convention, and is mainly based on two axis: one is the management of the Accountability and security due to the roles in the InfoMAP system, the second is the data's granularity due to the different type of data handled by the System. The final aim will be, based on the structure presented in Annex 2, to define a Data Policy for each data flow collected in the system.

Legal framework

Within the Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean adopted by Contracting Parties in 1995 and entered in force in 2004, there are seven protocols to addressing specific aspects of Mediterranean environmental. In 2015 (during the 19th Meeting of Contracting Parties - COP 19) the Contracting Parties agreed to include the Integrated Monitoring and Assessment Programme (IMAP) with a specific common indicators list of good environmental status and with targets and principles of an integrated Mediterranean Monitoring and Assessment Programme (Decision IG. 22/7).

To reach these targets a specific mandate has been assigned to INFO/RAC in order to contribute, to collecting and sharing information, raising public awareness and participation and enhancing decision-making processes at the regional, national and local levels. The mission of INFO/RAC is to provide adequate information and communication services and infrastructure technologies to the Contracting Parties to implement the Barcelona Convention's Article 12 on public participation and Article 26 on reporting. In this framework, the Data Policy Management document represents a mandatory reference to ensure data sharing and use.

In this context we have to consider that at a global level in 2013 G8 leaders signed the G8 Open Data Charter, after that in 2015 open data experts from governments, multilateral organizations, civil society and private sector, worked together developing an international Open Data Charter, with six principles for the release of data:

- Open by Default;
- Timely and Comprehensive;
- Accessible and Useable;
- Comparable and Interoperable;
- For Improved Governance and Citizen Engagement; and
- For Inclusive Development and Innovation.

In a broader international contest, it is also recognised the importance of data sharing in achieving the GEOSS vision and interconnected societal benefits; indeed, the GEOSS Data Sharing Principles and the works of the Group on Earth Observations (GEO) is building block for growing the Global Earth Observation System of Systems (GEOSS).

At European level, the INSPIRE Directive (INfrastructure for SPatial Information in the European) establishes harmonised conditions of access to spatial data sets and services and facilitates the sharing of spatial data sets and services between public authorities in Member States and between Member States, the institutions and bodies of the Community.

The Infrastructure for Spatial Information in the European Community addresses spatial data themes needed for environmental applications and which aims at making available relevant, harmonised and quality geographic information to support formulation, implementation, monitoring and evaluation of policies and activities which have a direct or indirect impact on the environment. The INSPIRE Directive in article 17(8) requires the development of implementing rules to regulate the provision of access to spatial data sets and services from Member States to the institutions and bodies of the Community. It lays down also, some rights and obligations regarding the sharing of spatial data sets and services between all levels of government.

Even at Regional sea level, some Conventions that involve some European countries (e.g. OSPAR Commission's data policy) have defined rules or specific data policy to regulate the data sharing and publication, as well as documented with metadata, the right to access and use these datasets and services.

Following the same approach, the Barcelona Convention will also have to define a policy of its own data considering all the data processed in the system.

Legislation notice:

Directive 1996/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases,

The UN Convention of 1998 on the access to information, public participation in decision-making and access to justice in environmental matters (the Aarhus-Convention),

Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC,

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) and related Implementing Rules,

Regulation 2014/377/EU that Establishing the Copernicus Programme and repealing Regulation 2010/911/EU.

Regulation 2016/679/EU on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

Sharing environmental information principles

Since 2008 the European Commission has started the Communication on SEIS principles, and many efforts have been made to create a SEIS and implement its pillars. The benefits of a regular SEIS-based reporting process for environmental assessment to improve and optimise existing information systems and processes have been recognised at a global level. The ENI initiative adopted by European Environmental Agency (EEA), which extends the principles of SEIS, also to the neighbouring countries, in order to understand and solve environmental issues that are transboundary for nature and could play global reach.

The SEIS in the European Union represents the natural extension of INSPIRE Directive's regulations about the Spatial Data Infrastructure to share environmental data and information in a common way.

SEIS is also about a shift in approach, from individual countries or regions reporting data to specific international organisations, creating online systems with services that make information available for multiple users — both people and machines. Such a shift happens in a stepwise way, ensuring that SEIS remains a driver for access to environmental information and its integration in the knowledge-based economy.

A key cross-cutting goal of SEIS is to provide access to environmental information, optimising and expanding its use. Applying the SEIS principles makes that easier.

Information is often created with a specific purpose, but there are many potential uses, in which this data can be re-use to have a wider application and understanding of phenomena. For example, information about the landslide, although necessary to mitigate potential land impacts, is also extremely valuable for insurance companies and homebuyers to assess the real estate risks.

The seven SEIS principles are:

1. Managed as close as possible to its source.
2. Collected once and shared with others for many purposes.
3. Readily available to easily fulfil reporting obligations.
4. Easily accessible to all users.
5. Accessible to enable comparisons at the appropriate geographical scale and the participation of citizens.
6. Fully available to the general public and at national level in the relevant national language(s).
7. Supported through common, free, open software standards.

A functional SEIS should be structured around three pillars:

- Content (data);
- Infrastructure (SDI);
- Cooperation (Policy).

After the system has identified the types of content (data) required and their potential sources, as a second step, we need an effective, web-enabled technical infrastructure that takes full advantage of ICTs, including web services. The third step is the cooperation and governance structure to manage human resources, inputs and networking and to ensure data sharing agreement.

Environmental data and product definition

Environmental data is defined as individual items or records (both digital and analogue) usually obtained by measurement, observation or modelling of the natural world and the impact of humans upon it, including all necessary calibration and quality control. This includes data generated through complex systems, such as information retrieval algorithms, data assimilation techniques and the application of numerical models. However, it does not include the models themselves.

Environmental products are created by adding a level of intellectual input that refines or adds value to data through interpretation and/or combination with other data. They result from analysis or repackaging of data in such a way that has provided significant added value (intellectual or commercial).

Data collection

The data flow process must take into consideration the Global framework in which the Barcelona Convention operates, as well as the European Union procedure defined within the EIONET network. All dataset acquired in the Barcelona Convention regional framework and in European union regulation may take into account a part of data collection process.

Data collection is the gathering and measuring information on targeted variables in the InfoMAP system, which allow, therefore, to answer relevant questions and evaluate the outcomes of a Good Environmental Status.

The chapter on data collection describes the capabilities of the InfoMAP system to manage data, associated information and data licenses. The system can be represented according to 3 axes (figure 1) that describe: the formats managed or manageable by the system, the types of licenses that can be associated with the data and the associated meta information that describes the data, its formats and the methods of access and use.

The Data collection action is managed by the reporting system which has different procedures and approaches relating to the two main chains available: BCRS Protocols and IMAP Monitoring actions.

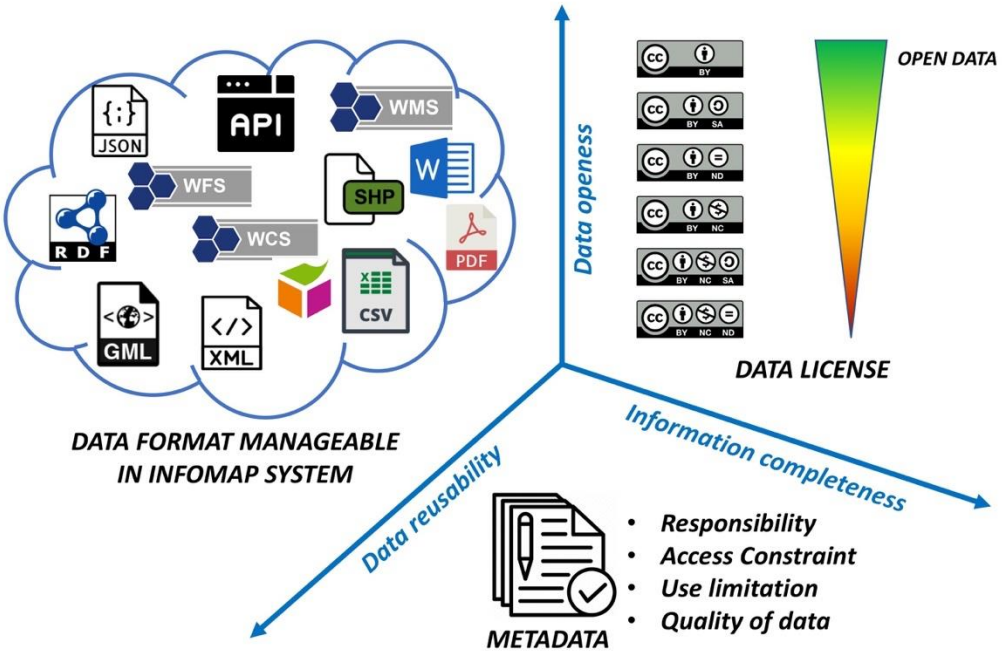

Figure 1 – InfoMAP data capabilities and management.

Type Data flow protocols

Since the Data Centre is set-up to collect the submit report from the Contracting Parties, it was designed to take in consideration not only the data transfer protocol available at the moment as more robust, but also future evolution of these.

At this stage, both reporting system (BCRS and IMAP) are designed to collect data from standard data structures and protocols, based on the procedure for generating or directly fill-in the service on the XML/GML files. At the same time, the Reporter can also upload the spreadsheets prepared by the country.

All data submitted to the InfoMAP system is subjected to validation and quality assessment checks in order to guarantee the quality of data acquired.

Basic geographic data layer could also be collected with specific data call campaign in the InfoMapNode to ensure that the reported data is geographically located.

Data format

There are many standard formats for exchanging and sharing data and information, an example is presented here below, but this itself does not guarantee correct interoperability if we haven't correctly implemented some general assumptions on data harmonisation.

CSV	Values separated by comma	Type of documents in simple open format to represent data in table format, in columns separated by commas (or semicolons, where the comma is the decimal point) and the rows are line breaks. Fields that have a comma, line break, or double quote must be enclosed in double quotes. It does not indicate a specific set of characters, nor how the bytes are located, nor the format for the line break. The extensions that are used are .csv and .txt.
DOC	Microsoft Office Word	Closed format to transfer formatted or unformatted texts. It can contain texts, images, graphics and links. The 2007 version works with a new format, docx, which is more advanced and compresses the document more.
GML-XML	Geography Markup Language	GML is the XML grammar defined by the Open Geospatial Consortium (OGC) to express geographical features. GML serves as a modelling language for geographic systems as well as an open interchange format for geographic transactions on the Internet. Key to GML's utility is its ability to integrate all forms of geographic information, including not only conventional "vector" or discrete objects, but coverages and sensor data.
JSON	Notation of JavaScript Objects	Lightweight data exchange format, easy to understand, and offers simplicity to machines in generation and interpretation. Based on a subset of the JavaScript programming language, suitable for programming by the client.
PDF	Portable Document Format	Universal portable format document that maintains the appearance of the document regardless of the operating system used (multiplatform). It includes any combination of text, multimedia and hypertext and you can also encrypt the content and sign it digitally. It is the ISO standard, from 2008, for electronic document container files for long-term preservation. It is a specification that can be created, visualized or modified with free software tools. This format was originally proprietary (up to 2008).

RDF-XML	Infrastructure for Description of Resources	Model for the representation of web resources in expressions with the form subject-predicate-object. The subject is the resource that is described, the predicate is the property on which the resource is to be established and the object is the value of the property with which the relation is established. The combination of RDF with other tools allows to add meaning to the pages and is one of the essential technologies for the semantic web. To be interpretable, it is represented in XML format.
SHP	ESRI	Shapefile is a proprietary format of spatial data that is the standard for the exchange of geographic information between Geographic Information Systems (GIS). It is a vector format of digital storage where the location of geographic elements and the attributes associated with them are stored, but without the capacity to store topological information. It is generated by several files, minimum 03 and has 03 types of extensions: .shp, .shx and .dbf
SPARQL	Simple Protocol and RDF Query Language	Standardized language for the query of RDF data, normalized by the W3C. It is an official recommendation of the W3C since January of 2008 for the development of the semantic web.
Web services - API	Application programming interface	They are application programming interfaces or web APIs that are accessed through HTTP and run on a remote hosting system for the services requested. Web services are software systems designed to support the interoperable machine-to-machine interaction over a network. It has an interface described in a format processable by a machine and other systems interact with the web service in a manner prescribed by its description using SOAP messages, transmitted through HTTP with an XML serialization in conjunction with other standards related to the web.
WxS OGC services	Open Geospatial Consortium Web Service for share data and information	The OGC (OpenGeospatialConsortium) standards depend on a generalized architecture captured in a set of documents collectively called the Abstract Specification, which describes a basic data model for representing geographic features. is developed to support in-line content as well. The goal is to support use cases such as the distribution of search results, the exchange of a set of resources such as OGC Web Feature Service (WFS), Web Map Service (WMS), Web Map Tile Service (WMTS), Web Coverage Service (WCS) and others in a 'common operating picture'.
XML	Extensible Labeling Language	It is a simple but strict metalanguage, developed by W3C. It develops a fundamental role in the exchange of a great variety of data. XML is a format that allows the interpretation of data through several applications. It is a simplification and adaptation of the SGML and allows to define the grammar of specific languages. Actually, XML is a way to define languages for different needs.

Data licenses

There are many types of licenses that can be applied to the data flow of the Barcelona Convention, below are the main licenses selected to manage all types of data in the InfoMAP system.

Starting from the concept of open sharing we evaluated the state of the art in licensing trends for public sector information and material, following the EU PSI Directive[1]for European countries or what is used by geospatial communities to ensure use and re-use of data and products.

The licenses, taken into consideration, were those provided by the Creative Commons Licenses (CCL – http://creativecommons.org) which are the most common and used licenses available for digital material. The CC selection is driven by the flexibility offered by a series of 'baseline rights', with attribution (CC-BY) as a core requirement, together with three other 'license elements' that can be mixed and combined to obtain six main customized types licenses (figure 2) through a point – and – click web interface, which passes from more open to restrictive.

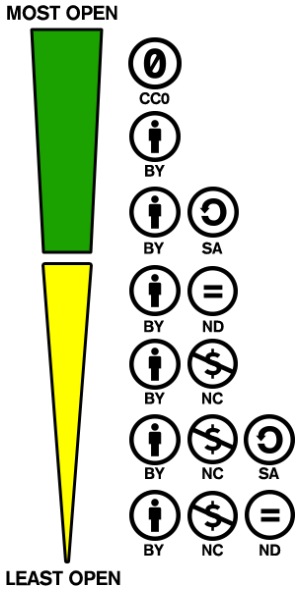

Figure 2 - Common Creative licenses open-restrictive spectrum (image takes from Common Creative web site)

Below are described the six main type of licenses in order to have a complete overview, the criteria adopted for InfoMAP will be defined in article 10 "Data license"of the data policy following the schema proposed in the chapter Data Policy model.

[1] PSI Directive (Directive 2003/98/EC - 31 December 2003) The Directive on the re-use of public sector information provides a common legal framework for a European market for government-held data (public sector information). It is built around two key pillars of the internal market: transparency and fair competition. http://ec.europa.eu/digital-agenda/en/european-legislation-reuse-public-sector-information

Type of license	Name	Main description
	CC BY Attribution International	*This license lets others distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation.* *Recommended for maximum dissemination and use of licensed data and products.*
	CC BY-SA Attribution-ShareAlike International	*This license lets others remix, tweak, and build upon your work even for commercial purposes, as long as they credit you and license their new creations under the identical terms.* *All new works based on yours will carry the same license, so any derivatives will also allow* *commercial use.*
	CC BY-ND Attribution-NoDerivatives International	*This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to you.*
	CC BY-NC Attribution-NonCommercial International	*This license lets others remix, tweak, and build upon your work but not for commercial purposes, as long as they credit you for the original creation.*
	CC BY-NC-SA Attribution	*This license lets others remix, tweak, and build upon your work but not for commercial purposes, as long as they credit you and license their new creations under the identical terms.* *All new works based on yours will carry the same license, so any derivatives but not for commercial purpose.*
	CC BY-NC-ND Attribution	*This license allows for redistribution, non-commercial, as long as it is passed along unchanged and in whole, with credit to you.* *It is the maximum restriction for data and products.*

Metadata and data generation

All the data collected, in order to facilitate the search and discovery to manage access to resources, shall have a metadata document to describe in detail the dataset and the service; the metadata is managed and archived directedly or as harvest service in the InfoMAP System metadata catalogue and they are available in the InfoMapNode geoportal.

The basic information available in the metadata is presented as template in this section, in accordance with international standard and to ensure enough interoperability between InfoMAP System and other platforms in the Mediterranean area, but also to store the access constraint and limitation of use.

In the same way, when a new dataset is generated in the InfoMAP system, metadata and network service must be created to share this data and make it available for public use with minimum possible restriction. For each dataset, a Unique Persistent Identifier should be assigned in order to orchestrate data in the best way and easily recognise the source of the dataset.

[Metadata Template]

1. General requirement
   - 1.1. File identifier
   - 1.2. Metadata language
   - 1.3. Metadata point of contact
   - 1.4. Metadata date
2. Identification info section
   - 2.1. Resource title
   - 2.2. Resource abstract
   - 2.3. Responsible party
   - 2.4. Responsible party role
   - 2.5. Temporal reference
     - 2.5.1. temporal extent of the described resource
     - 2.5.2. date of publication, date of last revision or,
     - 2.5.3. date of creation
   - 2.6. keywords
     - 2.6.1. Originating controlled vocabulary
   - 2.7. Limitations on public access
   - 2.8. Conditions applying to access and use
   - 2.9. Geographic bounding box
3. Data quality information
4. Metadata for data sets properties
   - 4.1. Resource type
5. Identification info section
   - 5.1. Unique resource identifier
   - 5.2. Keywords for Spatial Data Theme(s)
   - 5.3. Spatial resolution
   - 5.4. Resource language
   - 5.5. Topic category
6. Distribution info section
   - 6.1. Resource locator
7. Data quality info section
   - 7.1. Scope
   - 7.2. Conformity
   - 7.3. Lineage

Data Embargo periods

Embargoes are enforced at the dataset level. For embargoed datasets, the basic metadata is publicly viewable, but the datasets themselves are not. Basic metadata include geospatial coordinates, site name, dataset type, current end date of embargo, and researchers' names.

Every embargo dataset will have one or more access managers, usually the original data generator or data uploader. Access managers or designated persons can access their embargoed data in infoMAP system, using single-sign-on system and standard tools such as InfoMapNode geoportal, the Data Centre repository, and the APIs. Access will be enabled via a unique persistent identifier (PIDs).

The embargo process is not automatic; embargoes must be requested by the contributor(s) of the relevant data.

Embargoes are temporary and last for a defined period of time. Normally, an embargo lasts two years after a dataset has been uploaded to the system, or until publication is approved, whichever happens first.

- Embargoes will be automatically lifted after two years unless the data generators require a further extension. Up to two-year extensions can be requested.
- InfoMAP data policy, in which data is normally made available to the public at the time of publication.

Authentication, Authorization and Accounting

Authentication, authorization, and accounting (also called AAA) is the architecture behind the InfoMAP System to manage intelligently controlling access to UN Environment Programme /MAP resources, enforcing policies, and providing the information needed to use for services. These three elements are considered important for effective network management and security.

The three pillars to control security and right of actors are:

- The Authentication is the process of ascertaining that somebody really is whom they say they are.
- Authorization refers to rules/permissions that determine who is allowed to do what.
- Accounting is about keeping track of the resources used for financial or auditing purposes.

Authentication system

Authentication is the process of determining who someone is, or who or what they claim to be. Authentication technology provides access control for systems by checking if a user's credentials match the credentials in an authorized user database or in data authentication server.

Users are usually identified with a user ID, and authentication is performed when the user provides a correct credential, such as a password, which matches with the user ID in the database. Most users are most familiar with using a password, which, as a piece of information that should only be known to the user, is called a knowledge authentication factor.

In the InfoMAP System in order to support the user in not having a specific credential in each component, based on the open standard OpenLDAP, a single-sign-on authentication system was integrated. The security offered by this system is described in the security section below.

Users profile and role

The user, in general, is any entity (physical person or organization) that wants to interact with the InfoMAP System. The InfoMAP system is composed of different components for the data flows in order to allow the collection from different data sources and expose data sets, services and maps.

The user may or may not be authenticated in the system, through a login procedure, using a username and password provided. In order to facilitate this procedure, the InfoMAP System has unified the

access procedure and a single-sign-on system has been set-up. In the user guide of the System components, there is a section dedicated to explaining how to obtain the right credentials for access. There is a different composition of roles in each data flow procedure in order to guarantee the correct right assigned to all the actors involved. Each person, according to its role, has a set of corresponding permissions within the system.

The structure of the profiles and the relative right in the InfoMAP System are:

- **Contracting Party users**: all the data collection may have a different composition of a national role, in order to guarantee a correct transfer of the environmental information, three different levels have been designed to manage data flows:
  - ***National Focal Point user***
  - ***National Expert user***
  - ***Reporter user***
- **MAP Component users**: Users which are staff of one of MAP Component (CU, INFO/RAC, MEDPOL, REMPEC, PAP/RAC, PB/RAC, SCP/RAC, SPA/RAC); for each of them, there is a different role in the system due to the competence and role of the activities carried out in the different data flow and data assessment. A possible subdivision is the following:
  - ***CU*** is the supervisor of the overall of the InfoMAP System, its members have all rights to view all the environmental data and products, a specific right to manage official dataset shall be defined.
  - ***INFO/RAC*** is the administrator of the overall of the InfoMAP System, it has all right in order to protect data and system security, normally not manage the dataset if it isn't required by the owner.
  - ***MEDPOL*** is the officer for Monitoring and NBB data flows and part of IMAP indicators. Its members have the right to view all the data in these and manage part of some layers. In the other system components, it can view great part of data, but it doesn't have the role to manage if it isn't required.
  - ***REMPEC, PAP/RAC, PB/RAC, SCP/RAC*** and ***SPA/RAC*** are the Regional Centres involved in the BCRS and IMAP data collection and are also involved in data aggregation in order to prepare specific evaluation layer or environmental products. They can view a great part of data, but doesn't have the role to manage if it isn't required.
- **The MAP Partners and third-party users**: these are users who have a minimum level of access to supply data or web data services that can be used to support environmental analyzes.
- **Anonymous users:** They represent users who are not authenticated and only have the possibility to search and view metadata and data publicly available. If the data is available for public download this can be applied.

Each authenticated user can access and manage data domains, based on the user's configured role within the system. Each role has a set of corresponding permissions inside the system, in order to manage, edit and view specific data.

Security procedure

IT security services expertise helps to reduce the risk in operating and managing IT infrastructure network, Data Centre, servers and other IT assets, and the InfoMAP System Manager and Administrator shall guarantee enough rights.

Although a variety of models and techniques are available to manage, access and share geospatial data, we need to pay attention how to address security concerns, such as access control, security and privacy policies, and in particular the development of GIS applications secure and interoperable.

In order to guarantee the correct right to each authenticated user, a formal procedure to receive the credential in the single-sign-on system has been defined in the InfoMAP System; using a central Directory Access Protocol. The security system is mainly organized on a simple "tree" hierarchy

composed of the following levels:

- Countries;
- Organizations;
- Organizational units (divisions, departments, and so forth);
- Individuals (includes people, files, and shared resources)

A profile and a role have been assigned to each individual element.

Furthermore, the Security procedure gives the warranty that the data stored in the InfoMAP system will be treated correctly and protected from any case of fraud or data loss, using an adequate daily backup system and multi-level network firewall.

Data granularity

This part of the document describes the type of data managed and collected within the Mediterranean Action Plan in the Barcelona Convention framework. The granularity is represented by the different details of data and by the different source that provides the data itself. For each of them, a license recommendation will be suggested, but it may change case by case with the different data flow collection procedures.

Data Production

The Data production is all the raw data produced and inserted by the Contracting Parties within specific protocols or data flow of Barcelona Convention, as well as all the data produced directly by the MAP Components or with some projects, to support Good Environmental Status (GES) in accordance with Mid-Term Strategy. A particular cluster of production data can be considered that of data produced by third-party (various UN entities and other Inter-Governmental organizations active in the field of environmental protection in the Mediterranean) which are not officially part of Barcelona Convention, but which are involved as a MAP Partners.

The main and authoritative data to produce all the environmental assessment on the Mediterranean area are those represented by the data officially submitted by the Countries in the Barcelona Convention Reporting System (BCRS) or in the Integrated Monitoring and Assessment Programme (IMAP). The data are subdivided in two types of data:

- Base layer data
- Environmental data

The data of base layer data represent all the spatial data needed to support the environmental data and assessment, the details of these data depend on the sensibility of the country and some of this information could be for security reason not available for public use. A specific list of reserved data or data subjected to embargo will be edited. All the base layer data available for public use will be made available in the InfoMAP System by the way of network services. The suggested license for this data is CC-BY.

Environmental data are all the environmental parameters, observations and measurements collected within a specific Marine monitoring programme and provided by the Contracting parties through the InfoMAP System data flow on BCRS or IMAP data calls.

The data produced by the MAP Regional components are data collected in their own thematic domain in order to support environmental programmes and protocols, as well as the GES and SoED (Sustainability of Environmental Development), reports. This data is property of UN Environment Programme/ MAP and is available for public use and work with a CC-BY license.

The data produced by third part are processed in the InfoMAP system, using the interoperability Network services registered and interlinked on the InfoMapNode SDI or archived as sample dataset in

the InfoMAP Infrastructure. These data are available in accordance with the release of the owner's license, normally declared in the metadata associated with the dataset(s) or service(s). These data are not official data to produce report and an assessment but can be used to enrich the environmental analysis.

Data aggregation

The data aggregation represents the minimum common layer of official data production provided by the countries and managed at the level of the Thematic Focal Point experts or within the mandate of Regional Activity Centre.

For each thematic domain, the protocols or collection of the data flows can be identified with a different level of aggregation, this common agreement must be defined separately on a case by case basis within the group of thematic expert or National Map Focal Point.

The aggregation layers are produced by the MAP Components and the property right should be of UN Environment Programme/MAP and MAP Component that produces it. For this reason, datasets will be available for any purpose and in the public domain, mainly with CC-BY or CC-BY-SA licenses. In any case, It's necessary to define and sign a specific agreement of the Contracting Parties on this aggregation level.

At this stage it is not possible to produce an exhaustive list of all available data aggregations, but an updated list can be published every semester by the way of InfoMAP system.

Map and document products

Maps and documents produced within the UN Environment Programme/MAP framework are data and information made for public purposes and must be available to all user sand purposes. These data represent what is developed and produced directly as an environmental evaluation or assessment in the Mediterranean area. These products will be available through the InfoMapNode portal and/or Regional Activity Centre website as open data, available with CC-BY license.

For all the data provided by the InfoMAP System and the Barcelona Convention, it’s necessary to refer to the source of the UN Environment Programme /Mediterranean Action Plan, citing as well as:

“*Data source UN Environment Programme/MAP provided by InfoMAP System, all right reserved @year*”.

Data Access and Distribution

All data held by InfoMAP System shall be available at no cost, except where:

- Restrictions arising from binding rules apply, including international treaties, European Union law and national legislation, including the protection of personal data subjected to European GDPR Regulation, statistical confidentiality, protection of intellectual property rights and protection of national sensible dataset, defence, or public security;
- The data made available by InfoMAP System components are accompanied by a data license. The data originally made available to the UN Environment Programme/MAP by a third-party may have its own data access agreements and license conditions agreed with the UN Environment Programme/MAP, which restricts the way the InfoMAP System can make the data available to others;
- The request for access to data exceeds INFO/RAC handling capacities.

InfoMAP will guarantee all the tools to provide access to the source data that underpins the products and services of MAP Components for data held by InfoMAP owned by others, data held by InfoMAP that have been adapted, combined or harmonised (for instance to cover Mediterranean extent), data located, managed and accessible to the public in other bodies or distributed, for instance in national

administrations according to the INSPIRE and SEIS principles, data in which InfoMAP was requested to arrange access, for instance, to act as a data provider for third parties (e.g. European Commission, Barcelona Convention, Copernicus services, R&D projects, other public authorities).

The data will be provided through discovery, view and, as far as possible, through download services which are compliant with standards established by ISO, OGC, INSPIRE and other relevant standardization bodies. INFO/RAC as a system administrator will hold the data, where it sees fit, and INFO/RAC will aim to provide meta-information for all data.

Data policy model

The Data policy model is defined for each collection of data flows, based on two main axes: an axis is composed of the granularity of the data as defined in the previous section and the second axis is the one in which the Authentication profile is presented diversified by user. For each cell of the matrix the right can be defined and from this also which is the applicable main license.

Each country involved in the Barcelona Convection process can also be set specific restrictions on environmental data provided, due to particular conditions and apply the restriction of the embargo, when the data is not stable.

User profile and data granularity matrix

Below in figure 3 the standard matrix used for survey of each data flows (*BCRS, IMAP and Basic layer*) is represented, the right to access the data, in order to have a complete picture (country by country) to correctly manage the data collected in the InfoMAP System. An example is presented in Annex 2 on how each country must fill the matrix within the INFO/RAC.

		Data Production				Data Aggregation		Map and document products
		Contracting Parties Data		MAP Components data	Third Party data	Minimum Common layer	Aggregation layer	
		Base Layer data	Environmental data					
Contracting Party users	National Focal Point user							
	National Expert user							
	Reporter user							
MAP Component users	CU							
	INFO/RAC							
	MEDPOL							
	REMPEC							
	PB/RAC							
	PAP/RAC							
	SCP/RAC							
	SPA/RAC							
MAP Partners								
Anonymous users								

Figure 3 *data management policy matrix template needed to acquire right and rule from the data actors.*

The possible data right is presented schematically in the legend below (figure 4)

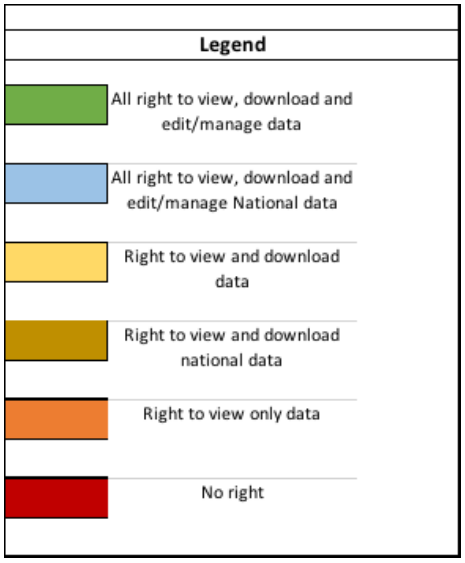

Figure 4 *data rights possible combination.*

Gaps to fill

At the moment, a clear picture country by country on what is available for public use or restricted constrains is not defined, moreover there is also the need to compile a list of possible sensible data or restricted data for security reasons.

The document introduces the importance of identifying for each type of data produced, what is the access and use constraint, in order to exploit the potential use in environmental analysis and assessment.

A specific data interview with each country will be set-up to have a list of basic layer data, as well as restricted or public environmental data. For each dataset we need to have metadata available at national level via country or organisational catalogue, or alternatively at the Mediterranean level by directly using the InfoMap Metadata catalogue. The collection of metadata information, using the standard template information provided in the previous section, is needed to evaluate the license associated with a dataset, if this information is not available the metadata document must be updated accordingly.

In parallel, we need to identify which is the common minimum layer to aggregate data information in each data flow, mainly about IMAP and monitoring data, but also in the other process of the Barcelona Convention are needed to clearly identify.

Contracting Parties role and impact for a data policy

The definition of the data policy is a long process that requires cooperation between the Policy maker, Data manager and Data producer; in this contest the Policy maker is represented by the UN Environment Programme/MAP Unit, the Data Manager is INFO/RAC as Administrator of InfoMAP System and the main Data Producer are the Public Authorities involved by the Contracting Parties.

This requires that, since the begging, all the actors are aware of the process for the creation of a common agreement on the data license procedure and data sharing, the main role for the Contracting Parties will be to ensure enough communication to be safe to have all the Authorities involved in the data production process in the same round table.

Each Country must identify which dataset is the sensitive, restricted or limited in the use and which are the official basic layer data (i.e. Administrative units, Coastline, hydrography, etc.) that are available for all uses and purposes.

Operational roadmap for Data policy

To ensure that the Data Policy is defined for each data treated in the InfoMAP System, it's necessary to bridge the gap or lack of information from the countryside. In the next biennium a preliminary evaluation will be carried out, mainly to enrich two targets:

- Define data limitation and constraint of the basic layer and environmental data in each Contracting Parties;
- Define the Minimum Common aggregation layer for each thematic topic.

To guarantee these targets the following operational roadmap has been designed, represented graphically by figure 5:

1. In the first semester, the first round of Country bilateral meeting will be carried out with INFO/RAC, CU legal unit and Competent Authority of Contracting Parties.
2. In parallel, during the first year, the Regional Activity Centres will start a discussion with National Focal Point(s) and the Thematic Focal Point(s) to identify the Minimum Common aggregation layer for each parameter or indicator.
3. The result of first bilateral round of interview will be shared with Regional Activity Centres, in order to transfer this information with their National Focal Point(s) and with working group

of Thematic Focal Point/experts.

4. A preliminary report on data policy will be prepared and shared at the end of first year.
5. In the third semester, a new bilateral round will be organised with the Contracting Parties in order to define the general agreement on data sharing and license for each type of data and on the right of access and use for each user.
6. In the last semester, the agreement on the Data policy will be discussed with other Regional Activity Centres in order to receive and integrate all the comments and therefore to produce for next 22nd COP the official document on MAP Data Policy.

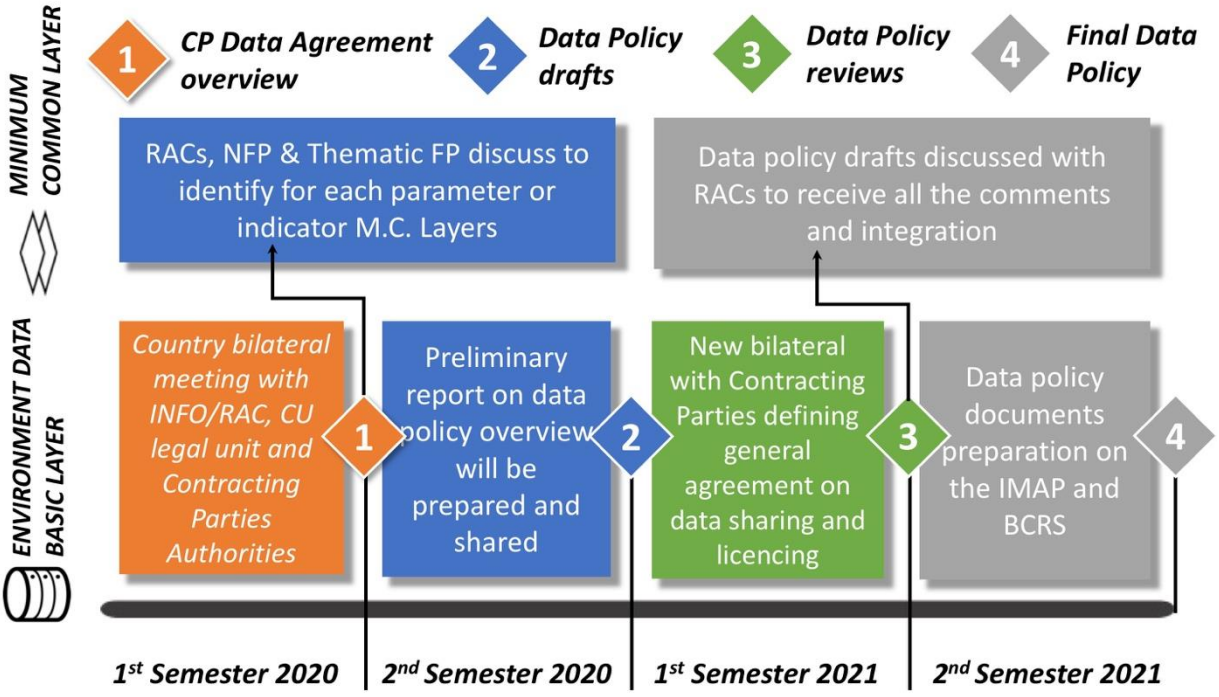

Figure 5 *data policies roadmap – through this road map, after the two years of consultation, a common data policy will be defined for each data stream of the Barcelona Convention.*

Capacity building to support data policy

The main scope of this technical document, which describes the basic concept of the Data Management policy to be applied to data of the Barcelona Convention within the UN Environment Programme /MAP, is to prepare three different agreements on Data Policy:

- The IMAP Data policy is the first document needed in the next biennium, which defines the rules for accessing, using and re-using data managed and collected by the InfoMAP IMAP Platform.
- The BCRS Data policy is the second required document; it takes into account the whole data flow involved in the BCRS System to supply the seven required protocols collected by the InfoMAP Data Centre components.
- The third document on data policy is related to data flows not included in the first two documents and to the definition of a specific agreement on all the data produced by UN Environment Programme /MAP as well as the identification of access and use regulation in the MAP Network.

To archive the goals and produce the three documents relating to the Data Policy, the INFO/RAC in collaboration with the Coordination Unit of Environment Programme /MAP will set-up several tools for each country to support them and to have enough capabilities to manage the data of quality in the right way.

Indeed, at international level, both in the activities of the UN-GGIM and in the UN Data Forum it has

been recognized that facilitating the application of new technologies and new data sources in the main activities necessary for sustainable environmental development, as well as to allow the exchange of quality data, there is the need for the Administrations to develop their capacities over the next five years.

This capacity building must involve above all local administrations at different levels (National, Regional and Local) and focus on coordination, technological updating and quality controls and validation.

To improve this, we have been recognized as the main areas for strengthening Administrations: coordination, data management and improvement of personnel's technical skills. The tools implemented by INFO/RAC in collaboration with the Coordination Unit of Environment Programme /MAP to support Capacity building in these areas are:

- For coordination: To set-up bilateral meetings for each country to improve co-operation with data providers and improve coordination with all the data stakeholders, also to reduce the gap in data sharing, sensitivity and accessibility.
- For data management: To support the Contracting Parties with the InfoMAP System platform. INFO/RAC must be set-up to ensure transparent, as possible and secure interconnection, the rules for increasing the dataset and layer interoperability which is the principle for not replicating data in all the repository, but just deploy and harvest the native service. Contracting Parties, from their side, must establish and tune their Infrastructure and platform to be aligned with international standards to ensure, as far as possible, interoperability and a correct and dynamic sharing of data and information. Specific guidelines have already developed by INFO/RAC and could be improved in the next biennium.
- For technical skills: In the training platform developed by INFO/RAC, various training packages will be available, each with modules or courses available in free form for all. These training modules can be exploited at different administrative levels by the countries, moreover, if necessary, the RACs technicians will be able to organize training events both at their headquarters and in the countries that request them.

Annex I: Data policy Structure examples

In general way, the Data policy document is designed after identifying the different level of knowledge of the data and the possible role that a different user or producer may have in the system. The basic document needs to include the following articles and as attached annex, all the licenses identified as applicable to the Data policy.

The general structure is the following:

Article 1: Subject Matter
It describes what data is the subject of the policy
Article 2: Objectives
It describes the purpose of Data policy.
Article 3: Data Provision
It describes all data included in the policy.
Article 4: Access To and Redistribution
It defines the rules to access, use and re-use the data and how to refer the data source citation.
Article 5: Embargo data case (optional)
It describes the data may be subject to the embargo, the timeframe of embargo rules and the frequency.
Article 6: Recognition of Data Sources
It defines how to cite data sources and where to find references.
Article 7: Warranty
It indicates the warranty on the data source and the right for the third party data.
Article 8: Quality
It indicates the quality of the data and the scale of the correct use of data.
Article 9: Update frequency (optional)
It defines the update rate of document.
Article 10: License applied
It indicated which type data licenses are applied in the data policy framework described in article 1 and 2.

Annex II: Best practices