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**Agenda item 5: MAP Data Management Policy**

**MAP Data Management Policy**

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## **Executive Summary**

Descriptive summary to explain at political level which is the role of this technical document in order to support the governance decision to prepare a general data policy agreement between the Barcelona Convention contribute parties.

## **Data Policy Scope**

The policy will ensure that data is handled in a transparent manner, and are properly handled, disseminated and acknowledged 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. 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 UNEP/MAP through the INFO/RAC System called InfoMAP.

The data policy document is a general description framework to initiate the data policy identification within the Mediterranean countries in order to support the Barcelona Convention data flow and is mainly based on two axis: one is the granularity of security of Authentication and roles defined in the InfoMAP system, the second is the data granularity due to the different data flows.

## **UN Environment Programme/MAP Data policy history**

### **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 protocol 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 list of good environmental status common indicators and 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, collect and share 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 global level in 2013 G8 leaders signed the G8 Open Data Charter and in 2015 open data experts from governments, multilateral organizations, civil society and

private sector, worked together to develop 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.

At European level the INSPIRE Directive 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 among Member States, to the institutions and bodies of the Community.

The Infrastructure for Spatial Information in the European Community (INSPIRE), addresses spatial data themes needed for environmental applications and 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 Infrastructure for Spatial Information in the European Community (INSPIRE), which 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, a number of 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 Mediterranean countries (i.e. OSPAR Commission's data policy) have defined rule or specific data policy in order to regulate the data sharing and publication as well documented with metadata the right to access and use these datasets and services.

In a wider international contest is also recognise that the importance of data sharing in achieving the GEOSS vision and anticipated societal benefits and has defined GEOSS Data Sharing Principles and the works of the Group on Earth Observations (GEO) is building block for grow the Global Earth Observation System of Systems (GEOSS).

*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.

## **Sharing Environmental information principle**

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

SEIS in the European Union represents the natural extension of INSPIRE Directive regulation about the Spatial Data Infrastructure to share 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, to their 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 and optimise and expand its use. Applying the SEIS principles makes that easier.

Information is often created with a specific scope, but there are many potential use, where this data can be re-use in order to have a wider application and understanding of phenomena. For example, information about landslide, while needed to mitigate potential land impacts, is also extremely valuable for insurance companies and homebuyers to assess property 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 have to identify the types of content (data) required and their potential sources we need as second step, 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

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).

repackaging of data in such a way that has provided significant added value (intellectual or commercial).

## **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 necessary 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:

- Authentication is the process of ascertaining that somebody really is who they say they are.
- Authorisation 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, indeed, who or what it declares itself to be. Authentication technology provides access control for systems by checking to see if a user's credentials match the credentials in a database of authorized users or in a data authentication server.

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

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

### **Users profile and role**

User, generically, is any entity (physical person or organization) that want to interact with the InfoMAP System. The InfoMAP System is composed by several data flow components in order to collect different data sources.

The user may or may not be authenticated in the system via a login procedure, using a provided user name and password, in order to facilitate this procedure, the InfoMAP System has unified the login procedure and a single-sign-on system has been set-up. In each user guide of component of the System there is a section dedicated to explaining how to obtain the right credential to enter. 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, in according with the role, has a set of corresponding permissions inside the system.

The profiles structure and relatively right in the InfoMAP System are:

- **Contracting Party users:** all the data collection can have a different composition of national role, in order to guarantee a correct transfers of the environmental information and three different level are 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 one there is a different role in the system due to the competence and to activity role played in the different data flow and data assessment. The subdivision is:
  - CU is the the supervisor of overall of the InfoMAP System, they have all right to view the environmental data and product, specific right shall be discussed on how manage official dataset.
  - INFO/RAC is the administrator of 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, NBB and IMAP data flows 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 hasn't the role to manage if isn't required.
  - REMPEC, PAP/RAC, PB/RAC, SCP/RAC and SPA/RAC are the Regional Centre involved in the data aggregation in order to prepare specific evaluation layer or environmental products, they can view great part of data, but haven't the role to manage if isn't required.
  - **Anonymous users:** Users who are not authenticated have the possibility to search and view metadata and data public available. If the data are available for public download it can be applied, in this category also third party can be applied.

Each authenticated user can access and manage domains of data according to the configured role of the user inside 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 the enough right.

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

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 organized mainly on a simple "tree" hierarchy consisting of the following levels:

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

For each individual's element a profile and a role has been assigned.

Moreover, the Security procedure gives the warranty that the data archived in the InfoMAP system will be treated in a correct way and are protected from any case of fraud or loss of data, using an appropriate backup daily system and a network firewall multiple level of control.

## Data collection

The data flow process needs to consider the Global framework where Barcelona Convention has established as well the European Union procedure defined within the EIONET networking. All dataset acquired in the Barcelona Convention regional framework as well in European union regulation can consider part of data collection process.

Data collection is the gathering and measuring information on targeted variables in the InfoMAP system, which then enables to answer relevant questions and evaluate a Good Environmental Status outcome.

The Data collection action is managed by reporting system that have different procedure and approach if we consider the two main chain available in the framework: BCRS Protocols and IMAP Monitoring actions.

## Type Data flow protocols

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

At this stage both the reporting system (BCRS and IMAP) are designed to collect data that are coming from standard data structure and protocols, based on the procedure to generate or fill-in directly the service on the XML/GML files. At the same time reporter can also upload the spread sheets prepared by the country.

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

Basic geographic data layer could be collected as well with specific data call campaign in the InfoMapNode due to ensure that data reported are geographically located.

## Data format

The standard format to exchange and share data and information are many an example is presented here below, but this itself they not guarantee the correct interoperability if we haven't implemented in a correct way some general assumption 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 modeling 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                | Open Geospatial                             | The OGC (OpenGeospatialConsortium) standards depend on a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|              |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OGC services | Consortium Web Service for share data and information | 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 licences

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

Starting from the open sharing concept we have evaluated the state of art in the licensing trends for the public sector information and material, following the PSI EU Directive<sup>1</sup> for European countries or using in common way by geospatial communities to ensure use and re-use of data and products.

The license, taken into consideration, have been those provided by The Creative Commons Licenses (CCL – <http://creativecommons.org>) that are the most common and used licenses available for the digital material. The CC selection is driven by the flexibility it offers 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 license types (figure 1) through a point – and – click web interface moving from more open to restrictive.

<sup>1</sup> 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>

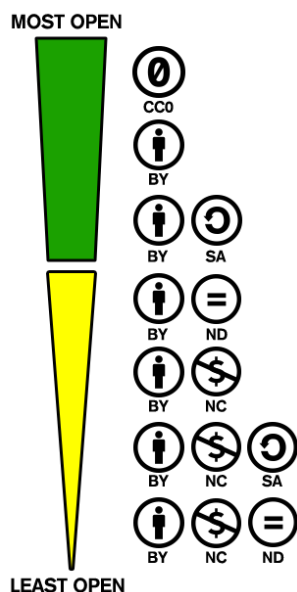


Figure 1 - Common Creative licenses open-restrictive spectrum (image takes from Common Creative web site)

Here below the six main type of licenses are described in order to have a complete overview, the selected for InfoMAP data policy are defined in the Data collection chapter.

| Type of license                                                                     | Name                                                       | Main description                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | CC BY Attribution<br>International                         | <i>This license lets others distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation.</i><br><br><i>Recommended for maximum dissemination and use of licensed data and products.</i>                                                               |
|  | CC BY-SA<br>Attribution-ShareAlike<br>International        | <i>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.</i><br><br><i>All new works based on yours will carry the same license, so any derivatives will also allow commercial use.</i> |
|  | CC BY-ND<br>Attribution-<br>NoDerivatives<br>International | <i>This license allows for redistribution, commercial and non-commercial, as long as it is passed along unchanged and in whole, with credit to you.</i>                                                                                                                                                               |

|                                                                                   |                                                            |                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | CC BY-NC<br>Attribution-<br>NonCommercial<br>International | <i>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.</i>                                                                                                                                                            |
|  | CC BY-NC-SA<br>Attribution                                 | <i>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.</i><br><br><i>All new works based on yours will carry the same license, so any derivatives but not for commercial purpose.</i> |
|  | CC BY-NC-ND<br>Attribution                                 | <i>This license allows for redistribution, non-commercial, as long as it is passed along unchanged and in whole, with credit to you.</i><br><br><i>It is the maximum restriction for data and products.</i>                                                                                                              |

## Metadata and data generation

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

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

In the same way when a new dataset is generated in the InfoMAP system a metadata and a network service to share this data must be created and make available for public use with minimum restriction possible. For each dataset an Unique Persistent Identifier should be assigned, in order to orchestrate data in the better way and to recognise easily the source of 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 level of dataset. For embargoed datasets, basic metadata are 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 embargoed dataset will have one or more access managers, usually the original data generator or data uploader. Access managers or designates people can access their embargoed data in infoMAP system, using single-sign-on system and standard tools such as InfoMapNode geoportal, Data Centre repository, and APIs. Access will be enabled via an unique persistent identifier (PIDs).

Embargoing is not automatic; embargoes must be requested by the relevant data contributor(s).

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

- Embargoes will be automatically lifted after two years, unless data generators request an extension. Up to two two-year extensions can be requested.
- InfoMAP data policy, in which data are normally made publicly available at time of publication.

## **Data granularity**

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

## **Data Production**

Data production are all the raw data produced and insert by the Contracting Parties within specific protocols or data flow of Barcelona Convention, as well as all the data produced directly or with some

projects the MAP Components to support Good Environmental Status (GES) in accordance with Mid-Term Strategy. Particular cluster of data production can be considered the data produced by third party (various UN entities and other Inter-Governmental organizations active in the field of Mediterranean environmental protection) that are not officially part of Barcelona Convention but that are involved as MAP Partners.

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

- Base layer data
- Environmental data

The base layer data represents all the spatial data that are needed to support the environmental data and assessment, the details of these data depend to the country's sensibility 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 that are available for public use, will be made available in the InfoMAP System by way of network services. The suggested licence for these data is CC-BY.

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

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

The data produced by third part are treated in the InfoMAP system, using the interoperability Network services registered and interlinked in the InfoMapNode SDI or archived as sample dataset in the InfoMAP Infrastructure. These data are available in according with owner licence release, normally declared in the metadata associated to dataset(s) or service(s). These data are not official data to produce report and assessment evaluation 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 manage at Thematic expert group level or within the Regional Activity Centre mandate.

For each thematic domain, protocols or data flow collection can be identified different level of aggregation, this common agreement needs to be defined separately case by case within the thematic expert group or National Map Focal Point.

The aggregation layers are produced by the MAP Components and the property right should be by UN Environment Programme/MAP and MAP Component producer, for this reason datasets will be available for any purpose and in public domain, mainly with CC-BY or CC-BY-SA licences. In any case a specific Contracting Parties agreement on this aggregation level should be defined and signed.

At this stage is not able to produce an exhaustive list of all data aggregation available, but each semester by the way of InfoMAP system can be published an update list.

## **Map and document products**

Maps and documents produced within the UN Environment Programme/MAP framework are data and information for public purpose and must be available for all user and purpose. These data represent what is developed and produced directly as environmental evaluation and assessment on the

Mediterranean area. These products will be available through the InfoMapNode portal and/or Regional Activity Centre web site as open data, available with CC-BY licence.

For all the data provided by the InfoMAP System and Barcelona Convention we need to refer the UN Environment Programme /Mediterranean Action Plan source, 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 apply resulting from binding rules, including international treaties, European Union law and national legislations including the protection of personal data subjected to GDPR European Regulation, statistical confidentiality, the protection of intellectual property rights as well as the protection of national sensitive dataset, defense, or public security;
- data made available by InfoMAP System components is accompanied by a data license. Data originally made available to UN Environment Programme/MAP by a third-party may have their own data access agreements and license conditions agreed upon with UN Environment Programme/MAP, which restricts how or when InfoMAP System can make data available to others;
- the data access request exceeds INFO/RAC handling capacities.

InfoMAP will guarantee all the tools to provide access to the source data that underpins MAP Components products and services for: data held by InfoMAP that are owned by others, data held by InfoMAP which have been adapted, combined or harmonised (for instance to cover Mediterranean extent), data located, managed and public accessible in other bodies or distributed, for instance in national administrations in accordance with INSPIRE and SEIS principles, data where InfoMAP has been 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).

Data will be provided through discovery, view and, as far as possible, through download services which are compliant with established standards from ISO, OGC, INSPIRE and other relevant standardization bodies. INFO/RAC as 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 data flow collection based on two main axes: one axis is composed by the Data granularity as defined in the previous section and the second axis where the different Authentication profile of users is presented. For each cell can be defined the right and from this also which is the main licence applicable

Each country involved in Barcelona Convention process can be also defined specific restriction on environmental data provided, due to particular condition as well as apply the embargo restriction when the data are not stable.

## **User profile and data granularity matrix**

Here below is represented the standard matrix used to survey for each data flow the data access right in order to have a complete picture to manage in the correct way data collected in the InfoMAP System.

|                         |                           | 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                   |                          |                    |                     |                  |                      |                   |                           |
| Anonymous users         |                           |                          |                    |                     |                  |                      |                   |                           |

**Figure 2** 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.

| Legend                                                                              |                                                           |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------|
|  | All right to view, download and edit/manage data          |
|  | All right to view, download and edit/manage National data |
|  | Right to view and download data                           |
|  | Right to view and download national data                  |
|  | Right to view only data                                   |
|  | No right                                                  |

## **Which are the 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 we need to compile a list on possible sensible data or restricted data for security reason.

In the document is introduced the importance to identify for each type of data production which is the access constrain and use in order to exploit the potential use in environmental analysis and assessment.

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

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

## **Operational roadmap for Data policy**

To ensure that Data Policy is defined for each Data treated in the InfoMAP System we need to fill the gap or lack of information from the country side. In the next biennium a preliminary evaluation will be done, mainly to enrich two targets:

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

To guarantee these target the following operational roadmap has been designed:

1. In the first semester the first round of Country bilateral meeting with INFO/RAC, CU legal unit and Contracting Parties Authority will be executed.
2. In parallel in the first year the Regional Activity Centre will start with National Focal Point and with Thematic Expert working group a discussion 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 Centre, in order to transfer that information with their National Focal Point and with Thematic Expert working group.
4. At the end of first year a preliminary report on data policy picture will be prepared and shared.
5. In the third semester a new bilateral round will be performed with Contracting Parties in order to define the general agreement on data sharing and licencing for each kind of data granularity and on the right for each user.
6. In the last semester the Data policy agreement will be discussed with other Regional Activity Centre in order to receive all the comments and integration, in order to produce for next COP the official Data Policy document.

## **Contracting Parties role and impact for a data policy**

The Data policy definition 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 beginning all the actors will be aware about the process to produce a common agreement on Data licence and data sharing procedure, the main role for the contracting Parties will be ensure enough communication to be sure to have in the same round table all the Authorities involved in the data production process.

Each Country needs to identify which are the sensitive dataset that are restricted or limited in the use and which are the official basic layer data that are available for all use and purpose.

### **Capacity building to support data policy**

The main scope of this technical document, which describes the basic concept of Data Management policy that need to apply to Barcelona Convention data within the UN Environment Programme /MAP control, is to have the structure to elaborate three different type of Data Policy:

One document is needed in the next biennium is the Annex IMAP Data policy, defining the rules to access, use and re-use data treated by the InfoMAP IMAP component.

The second document takes in account the whole data flow involved in the BCRS System in order to supply the seven protocols required; also, in this case the annex BCRS Data policy will be created in accordance with Contracting Parties and MAP Components.

The last one is related to define a specific annex where all the data produced by Environment Programme /MAP network and components are regulated by access and use regulation.

The INFO/RAC in collaboration with the Coordination Unit of Environment Programme /MAP will set-up for each country one or two bilateral meeting as much as close to data producer and data manager, to identify data sensibility and accessibility.

In order to guarantee the transparent as much as possible secure interconnection system the InfoMAP set-up the rules to increase the dataset and layer interoperability that is the principle to not replicate data in all the repository, but just deploy and harvest the native service.

The Contracting Parties from them side have to set-up and tune their Infrastructure and platform to be aligned with international standard to ensure as much as possible the interoperability and a correct and dynamic sharing of data and information.

## **Annex I: data policy Structure examples**

In general way the Data policy document is designed after we have identify the different level of knowledge of data and the possible role that different user or producer can have in the system. The basic document needs to include the following articles and as annex all the licences identify as applicable to the Data policy.

The general structure is the following:

*Article 1: Subject Matter*

*Article 2: Objectives*

*Article 3: Data Provision*

*Article 4: Access To and Redistribution*

*Article 5: Embargo data case (optional)*

*Article 6: Recognition of Data Sources*

*Article 7: Warranty*

*Article 8: Quality*

*Article 9: Update frequency (optional)*

*Article 10: License applied*

## Annex II: Best practices

|                         |                           | 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                   |                          |                    |                     |                  |                      |                   |                           |
| Anonymous users         |                           |                          |                    |                     |                  |                      |                   |                           |