

*Proposal for Chapter One of the Technical Document*

*(Project output No.1)*

# Information needs for decision makers

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## Partners



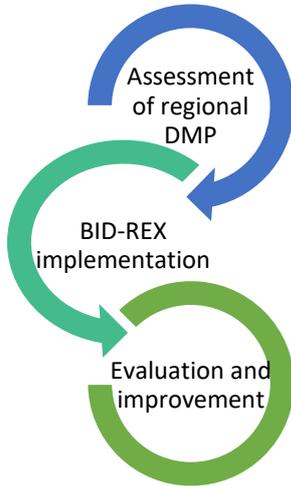
# 1 Introduction

This document summarises the discussions that took place during the first thematic workshop of the BID-REX project. This workshop, organized by the General Directorate of Agriculture, Natural Resources and Environment of the Public Service of Wallonia (SPW-DGO3) on 22 and 23 February 2017 in Eghezée (Namur, Wallonia), brought together 41 participants, including the nine project partners and stakeholders.

Focussing on defining **the information needs for decision makers**, the workshop was logically positioned at the start of the project.

## 2 Assessing regional situations

The BID-REX project aims to improve the biodiversity data management processes in the different partner regions.



Prior to implementing the project strategy, it is necessary to establish an assessment process to determine the biodiversity data management processes (DMP) currently in place in each region.

This evaluation will make it possible to identify the different regional contexts in which the BID-REX project intervenes, and to quantify the progress brought by this project to each of the partners.

The initial assessment of regional situations will allow the definition of needs as well, i.e. the policy space which is required to be filled or bridged between the existing and the objective.

### The scope of assessment

This assessment will aim to identify the regional processes about biodiversity **data** and to determine the **information** needed for decision-making at a general level, and in terms of the regional policy instruments targeted by BID-REX.

By assessing the regional processes the aim is to identify the strengths and weaknesses of the various **processes** that are in place for data management and dissemination, and to identify lessons learned about current practices. The final goal is to identify and implement measures to improve efficiency within the regional processes.

Focus must also be placed on the **stakeholders** involved in these processes, and more specifically, on the relationship between decision makers and their biodiversity information providers.

In the context of this project the decision makers are seen as the final customers and as such, their point of view plays a central role in the evaluation process, especially when these actors are not frequently directly involved in projects related to biodiversity information.

There can often be a discrepancy between the views and approaches of data providers and decision makers, with regards to the importance and the management of the data supplied. Such preconceived ideas may skew the implementation of regional action plans due to this lack of understanding of the positions and contexts of each party.

Conversely, bringing decision makers together with data providers can enable the development and introduction of good practice for the improvement of data service provision.

### **Good Practice One: Ecosystem Services Assessment in the Basque Country**

The ecosystem services assessment carried out in the Spanish Basque Country (<http://www.ehu.eus>) has developed an integrative approach between science, policy-making, and society. The methodology included mapping services at different scales, analysing social preferences, and creating indicators of multifunctionality. This study has been implemented in management strategies and legislation, demonstrating that integration of science and stakeholders can improve decision-making processes.

#### **2.1.1 Data**

Biodiversity data is comprised of collections of hundreds, thousands, or even millions of single recordings of species, habitats, or other related information that, if collated, make up a database. There are many pathways through which data can flow from the point of collection, to its uptake in decision-making.

The collected data can be submitted and recorded in a local database, used in a research project, or logged in a national, regional, or global repository. Data from schemes can then be passed to data management organisations, such as the UK National Biodiversity Network.

By itself, a single recording is not very useful, but datasets of thousands of these recordings spanning an entire region over a number of years can provide decision makers with large-scale information about distribution, condition, status, and trends in the conservation and spatial distribution of species and habitats. Increasing access—preferably online—to biodiversity data that are available in the required formats for use in the production of policy-relevant information, is therefore crucial to supporting effective decision-making at multiple scales.

#### **2.1.2 Actors**

Biodiversity data are curated by a range of data providers, from citizen scientists to nationally- or privately-funded bodies such as environment and nature agencies, universities, and a range of wildlife organisations. Effective data curators establish large networks of collaborators, experts and monitoring sites. An important part of data curation is quality assurance. Data curators ensure that all submitted data are standardised and comprehensive, with documented methods of data collection, analysis, and provision.

#### **Key message**

Knowledge of the key players in the data landscape and their respective roles and competencies is important in the upstream and downstream management and use of data.

It was observed that the prerogatives of the different levels of authority or power vary from one project country to another, even if all are able to influence decision-making in the context of the environment (i.e. region>province>metropolitan area or group of municipalities> municipalities).

In most partner regions, the environment falls under the responsibility of the regional subordinate levels of authority were found to act more on a voluntary basis when it comes to nature conservation.

Effective dialogue between the various actors, as stated previously, is very important throughout the whole decision-making process. In order to develop and achieve this dialogue, the organisation of public meetings can help to make acquaintances and facilitate exchanges.

It was proposed that the BID-REX project partners could produce an "Actors" card. This could be used to set out a common methodology to describe the actors, their roles and their competencies within each of the project regions. Such a resource would aid the identification of relevant partners to team up with and facilitate exchanges between them.

### 2.1.3 Processes

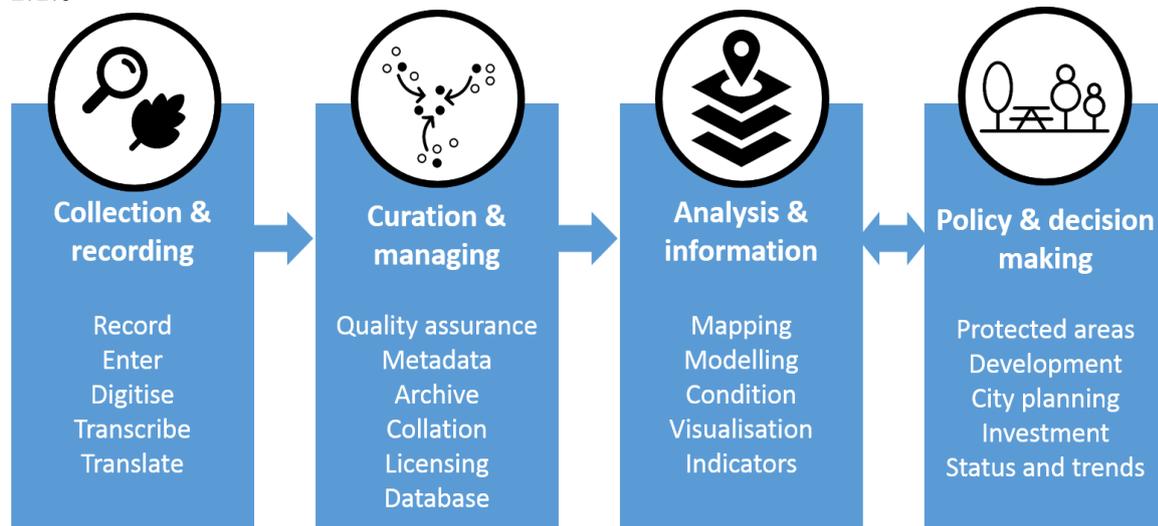


Figure 1: Data processes

### 2.1.4 Policy- and decision-making

Biodiversity data can be used to underpin good policy- and decision-making. Information products, like habitat maps, can inform decision makers about the location of critical habitat that needs protecting, or provide the expertise required to minimise impacts of development on biodiversity (e.g. fish ladders to allow them to bypass dams, or amphibian tunnels under roads). The location of habitats associated with the supply of essential ecosystem services could be used to inform city planning or investment.

The management of biodiversity data, in particular those used for analysis and producing information derived from biodiversity data, has an important role to play in the decision-making process. Effective biodiversity information products are those which have a clear policy mandate, and are often developed in collaboration, and iterative consultation, with key policy- and decision-making stakeholders, for use in indicators or other national government processes.<sup>1</sup>

<sup>1</sup> Weatherdon *et al.* 2017. Blueprints of Effective Biodiversity and Conservation Knowledge Products That Support Marine Policy. *Front. Mar. Sci.* 4:96. doi: 10.3389/fmars.2017.00096



*Figure 2. Recorded observations of the Chalk Hill Blue butterfly (Polyommatus coridon), which have been submitted to the Global Biodiversity Information Facility.*

It is important that the development of these products is ongoing, with input from both sides of the science-policy interface, so they remain up-to-date. Collating and reporting on the use metrics of biodiversity information products can ensure that they remain relevant. The Internet has allowed a revolution in biodiversity data collation, management, and accessibility. Data uploaded and shared from all over the world, and its collation by data management organisations, means that biodiversity information products are more powerful than ever.

Biodiversity data can aid decision makers in making informed choices for biodiversity conservation that are based on accurate information.

## Performing assessment

The methodology for carrying out an assessment of the regional biodiversity data landscape and its associated processes depends on several factors:

- Institutional context (administration, university ...)
- Availability of stakeholders
- Available time
- Technical means etc.

Regional situations can be evaluated in a participatory way in a dedicated workshop, by organising focus groups or working groups focused on specific points of the processes to be evaluated or by the use of a questionnaire. They may be subject to internal evaluation or, on the contrary, be determined with the help of an external consultant.

## 3 How to identify and express needs of information?

In a decision-making process, multiple factors, not only ones related to biodiversity, are interacting and conditioning the final decision. In this context, it is critical that the biodiversity information is adjusted to the needs and demands of the decision maker from the outset, to be able to maximise the impact and increase its specific weight in the final decision.

### **Key message**

Prior to meeting the needs, understanding the needs of end users is the first crucial step.

The expression of 'information needs' or requirements by decision makers is a vital step towards informing effective implementation and action. Poorly expressed or imprecise definition of needs may lead to misunderstanding, and the provision of data or information that is not fit for purpose.

Furthermore, the clear and effective expression of data and information needs might impact the inventory methodology or approach to data processing employed by the data manager, and as such it is important to discuss this at an early point in the process.

### **Good practice Two: Biodiversity auditing in Norfolk**

The biodiversity audit approach conducted by the University of East Anglia in the United Kingdom, has been used in the Breckland Region (Norfolk,UK) to inform management of Natura 2000 sites. The methodology incorporates stakeholder engagement and interaction from the start to the end. It begins with management questions, uses biodiversity data to define the aims (what biodiversity, how to manage), includes citizen science and expert knowledge, defines integrated 'management guilds', takes into account the evidence-base for better management, and develops a cost-effective support for priority biodiversity.

Shared points of analysis identified in this context are:

- Data demands formulated by decision makers facilitates the process by creating a climate of favourable collaboration
- Requests for data by policy makers are often motivated by the existence of external regulations (e.g. international conventions, and European directives and regulations) or by a difficulty to solve problems related to biodiversity considerations (for example, power outages following electrical shocks to raptors and other large birds on power lines)
- To share experiences provides an opportunity to appropriate good practices

### **Key message**

- Establish a dialogue between applicants and suppliers.
- Clearly define the needs, if necessary by formalising them. The context of use of the data should be systematically expressed by the applicants.
- Ensure that the context and demand are properly understood by data suppliers.
- Organise regular evaluation of the process on both sides.

## 4 How to meet the needs of decision makers

In order to improve the relationship and understanding of needs and constraints between data managers and decision makers, the parties should be brought together. These opportunities will facilitate the integration, as far as possible, the desires of the end users, and ideally will allow them to input to the methodology and processes of information gathering in order to best meet their needs.

Such a convening of the actors facilitates the identification and understanding of regional contexts and institutional arrangements that could be acting as impediments to dialogue and the establishment of good working relationships. Identifying these difficulties or problem areas through assessment processes allows for awareness raising and can be useful in terms of implementing ameliorative processes.

- The analysis of the expression of needs reveals the following central elements: An adequate response to these information requirements should be based on high quality, reliable data that has been **interpreted** according to the relevant decision-making context
- **Biodiversity information infrastructures** are tools developed especially for this purpose, allowing heterogeneous data to become standardised, shared, stored in the long-term, analysed and, ultimately, trustworthy and relevant

### Interpretation – from data to knowledge

The interpretation of data is considered an essential element to ensure its use. Biodiversity data need to be accessible. Databases are often highly complex and difficult for non-experts to understand. For these reasons, the translation (or packaging) of data into useful information is key. Through analysis and computer modelling, data can be translated into information products that are specifically tailored to decision makers' needs (e.g. maps, graphs of trends).

Information products derived from modelling and analysis can highlight trends over space and time; this can include changes in species' migration patterns, declines in the extent of saltmarsh, or increases in numbers of farmland birds. These trends can be visualised in maps, graphs, diagrams, reports and other products which decision makers require.

Further elements to include or consider in the supply and presentation of fit-for-purpose data include indicators or trends, explanations of the absence of data or lack of knowledge, and verification and validation information. These properties and features will help to increase the usability and uptake by decision makers.

### The role of infrastructure

Biodiversity information infrastructures are tools especially developed for the purpose of standardising, sharing, storing, and analysing heterogeneous data; providing a trustworthy and relevant resource for decision makers and other end users.

### Good practice Three: ALERC

ALERC (Association of Local Environmental Records Centres ([www.alerc.org.uk](http://www.alerc.org.uk))) collects, collates, and manages environmental information provided from a national network of Local Environmental Records Centres in the UK. Working with a network of experts, ALERC manage information and data collected and provided by volunteers and through studies for example, to provide accessible, accurate, and robust information products and services for a range of audiences, including decision makers.

To address the issue of data infrastructures and the practical arrangements required to meet the needs of decision makers, it is important to consider the following:

- Data must be: **standardised** at the outset, sufficiently complete in terms of content, ideally with a time series, and covering the territory concerned
- The methods of data collection and analysis should be **documented** and include details of the **quality assurance** processes employed
- Effective data management should ensure its long-term preservation and accessibility; and ideally it should be scalable and **user-friendly**
- Tools developed to **publicise and disseminate** data should inform and update users. Human, technical and financial resources should be guaranteed for these processes in the long-term

### Good practice Four: Marche Ecological Network

The Marche Region has established the Marche Ecological Network (REM) with legislative backing (Law 2/2013). This network divides the regional territory into 82 patches based on the botanical, faunal and anthropological characteristics (functional ecological units). Each unit describes opportunities, threats, strengths and weaknesses, indicating possible management strategies to implement policies of conservation of biodiversity by policy makers. According to this standard, the indications provided must be incorporated into the planning tools at the local scale (provinces, municipalities, parks).

<http://www.regione.marche.it/Regione-Utile/Ambiente/Rete-Ecologica-Marche-REM>

In order to answer the question of whether infrastructures set up for the dissemination of biological data have an influence on decision-making processes, four criteria for consideration were identified:

- Networking, cost-effectiveness, and stakeholder involvement should be considered as essential in order to ensure the development of efficient data infrastructures to support decision-making processes.
- Tools and technical aspects are major factors that can influence the use of data infrastructures. Among the most important elements are the **quality and standardisation** of the data, the presence of **metadata**, and the **flow or the format** used.
- The way in which data is **interpretation** is a key factor to ensure the use of data infrastructures.
- **Access to the data** characteristics (e.g. reliability/confidence intervals, confidentiality, etc.) is essential, as is an understanding of any restrictions on use and access.

To minimise the risk of this occurring, a number of recommendations for data managers and providers operating information infrastructures for decision makers were defined; these include:

- The clear identification of information priorities based on mandates and responsibilities.
- Making the best use of financial resources and networks to mobilise biological information to inform decision-making processes.
- Making databases accessible, and providing sufficient accompanying interpretation. The "raw data" are generally useless. It is essential to present interpreted and user-friendly data to the end users. For example, thematic maps can often be popular with end users.
- Building the understanding and confidence of the end users such that they are comfortable and confident to take biodiversity data into account in decision-making processes.
- Sharing the results of data use by end-users could lead to leveraging increased financial resources and network development.

### Key message

Data managers have to **be agile** to adapt to the needs of the end user and should provide relevant, useful, and timely data. This can be achieved through numerous approaches, including some of the following, as identified by the partners:

- use participatory approaches and coordinate contact with the end users
- involve input and feedback from end users into the data collection approaches and methodology
- optimise the methodology, if necessary, by increasing the number of inventories
- integrate upstream of the parameters identified by the end users
- improve data availability
- use innovative ways of disseminating data, i.e. broad access or more customer-oriented portals
- build flexibility into tools
- strengthen or increase interpretation
- improve the "after-sales service" by producing manuals and guides for understanding and interpretation
- call upon the experience and lessons learned from similar data structures or tools and incorporate this into future updates and developments

## 5 The use of biodiversity information in decision-making processes

The effective use of biodiversity information in decision-making processes is influenced by internal and external factors that interact and modulate the final outcomes. The concept of 'internal' or 'external' is to be considered in relation to the data management process itself.

### Internal factors

A number of **internal** factors influencing the use of biodiversity information were identified:

- It is important to provide concise information, adapted to the context and to the recipients.
- Biological information should be accompanied by a risk analysis of the various options that have an impact on biodiversity and, if mitigation measures can be envisaged, they should also be proposed to decision makers.
- Biodiversity data should be supplied with an indication of the scale of relevance, i.e. is it applicable at the local, regional, or global level(s).
- Finally, the stage at which biodiversity data feeds into the decision-making process can also be important and should be considered.

However, one of the main internal factors in the decision-making process, and one of the most influential in terms of biodiversity information being taken into account in decisions, is the credibility of the data provider.

#### 5.1.1 *The credibility of the data provider*

The credibility of the data provider is considered essential in the decision-making process. Such credibility and reputation depends upon a number of factors, such as independence of political power, impartiality, objectivity, professional reputation, stakeholder consideration and transparency.

Conversely, any uncertainty in any of these areas can give rise to a lack of confidence and willingness to use the information supplied.

Information on a data providers credibility, and the associated confidence in the information they supply, might need to be included in an uncertainty assessment (including temporal and spatial scale, risk analyses, etc.), when using or supplying the information in decision-making processes.

The credibility of the data provider is significantly influenced by the quality of the data they manage and supply. For example, when considering long-term monitoring and inventory species or habitat data, the age of data, the inclusion of geographic scale and accuracy (systematic versus opportunistic, interpretation of no data), and the establishment and use of validation processes are factors that affect the perceived quality and credibility of the data and the data manager.

Finally, credibility is also a function of the quality of data interpretation. The format of the data used for communication (e.g. maps, tables, graphs, reports, etc.), the level of detail required, explanations of data uncertainty, and transparency of methods and use of recognised methods are important factors influencing credibility.

## External factors

As with those internal factors set out above, there are also **external** factors that can have impacts on decision-making processes; some examples were identified and are set out below.

Some external factors are *socio-economic*, such as personal understanding and appreciation of biodiversity; the influence of lobbying processes; the local and regional economic context; the level of public interest in, and acceptability of, the project; the creation of jobs directly linked to the project team and subcontractors; the additional cost of establishing compensation or mitigation measures for biodiversity loss; the opportunities for (co-) funding; the ecosystem services resulting from restoration projects; and the uncertainty about how projects will have economic and societal influence.

### Good practice Five: SITxell

SITxell (<http://www.sitxell.eu>) is an example of an Open Data Infrastructure based on physical data, natural value, and socio-economic aspects, which is openly accessible and available. It provides biodiversity information to the Municipalities of Deputation of Barcelona for the incorporation in local planning and policies. With a user-friendly design, the information provided considers the responsibilities of the municipalities, and provides information to facilitate its interpretation and its successful uptake. The resulting impacts allow for the identification and procurement of long-term funding.

Other external factors that were identified relate more to the **political and legal context**, namely the legal provisions that prevail, the legal status of habitat and species protection, the level of devolved decision-making authority (local or regional), and the possible drift of corruption, or the existence of national/regional/local planning documents.

## Combined factors

There were also a number of factors identified that combine both internal and external elements and have an impact on the consideration of biodiversity data in decision-making processes; these include:

- The development and use of ‘think tanks’, which can include all stakeholders, to support decision-making;
- The communication of the value of habitats and species, and ecosystem services; and
- The efficient communication and flow of information, use of common language and terms (i.e. jargon free), and the formation of a climate of trust between departments of the relevant administration.

One remarkable combined factor is the improvement of conservation priority setting, especially taking into account different socio-economic scenarios with constrained budgets.

### 5.1.2 *Priority setting for nature conservation on a limited budget*

Among the various criteria to be taken into account when setting priorities, some are linked to the biological information itself. These include: the legal and conservation status of the habitat or species of interest; the IUCN status; the presence on a regional red list of endangered, threatened or endemic species; location of habitats/species, including consideration of range, population, and area; information on data availability, quality, and relevance; assessment of the impact of the proposed actions on the conservation status of the habitat/species (and related indicators), and on the

consequences of non-action; the technical feasibility of the project including the definition of its duration, and the timing for results.

Some other considerations from the case studies are highlighted:

- Taking account of biodiversity data upstream of the process can lead to significant budgetary saving
- The costs of monitoring (improving the efficiency of measures) must be weighed against the cost of non-targeted measures, compensation, or possible incentives
- It is important to define priority habitats and the targeted favourable status of conservation of these habitats, otherwise there would be unclear conservation objectives

## 6 After the decision

### The need for feedback

Data providers confirmed the need for decision makers to provide feedback. They emphasised the importance of doing so for the establishment of indicators, and for the improvement of their data and adaptation to the decision makers' needs through an iterative process.

#### Key message

Systematic feedback procedures allow decision makers to inform data suppliers of the actual follow-up of the decisions taken and the impact of the data provided.

This information enriches the dialogue between parties and promotes long-term data provision. Tools that can be used to encourage decision makers to provide feedback include the organisation of public events or targeted satisfaction surveys.

### The real impact of the biodiversity information on conservation policies

Fortunately, some decisions are made taking biodiversity into account, using data and information provided by reputable and credible organisations. The results and the scale of consideration to which decision makers take biodiversity data into account in their decisions, and what influence this data can have on plans and projects, are particularly interesting to be aware of.

Examples and experiences of biodiversity information being taken into account and used by decision makers do exist; this is possibly an indication that it was sought out especially to identify win-win situations by preserving the natural heritage without loss of economic value to the projects.

These success stories must be used to identify the conditions that have made it possible to achieve these win-win situations. It can be useful to analyse these factors more thoroughly in order to guide future decision-making processes in this direction.

#### Good practice Six : Elia

In Belgium, Elia (a national Power Supply Group, <http://www.elia.be>) takes biological information into account in their operations. They use cartographic information about distribution of species, migration patterns and routes, feeding areas, and bird strike occurrences near overhead high voltage lines, that is provided by the ornithological associations Aves (<http://www.aves.be>) and Natuurpunt (<https://www.natuurpunt.be>). This information is used to reduce the impact of their operations on bird populations.

In order to be able to analyse these factors of success, data managers first need to be informed of the consequences of their work through feedback procedures, as discussed above. They would have, for this purpose, a strong interest to coordinate monitoring in order to identify how the information they provide to decision makers is used. The final goal will be to assess how positive feedback results in

impact and influence to better guide the relevance of information and ultimately lead to better decision-making.

Workshop participants highlighted the importance of defining strategic processes for the assessment of the impacts of decisions on biodiversity. This strategic assessment would result in an operational plan(s) for the assessment of resulting impacts on biodiversity. Aspects related to biodiversity should be integrated upstream in planning processes, and the monitoring of species and habitats should be independent from policy makers.

The establishment of independent biodiversity observatories, operating at the regional level, would make it possible to collect, validate, and disseminate data, and to consult decision makers to assess and specify their needs and to feedback into data-related processes.

## The importance of building mutual trust

Problems of trust exist in both directions, in the context of data supply and data use. Decision makers must have confidence in the information supplied, including the uncertainty assessment of that information, in order to make the best use of it in decision-making processes. On the other side, data providers must have confidence in the decision maker, that they will not misinterpret or misrepresent the meaning of the data transmitted to them. To establish trust, effective dialogue between the various actors is essential throughout the whole decision-making process.

In order to develop and achieve this dialogue, the organisation of public meetings can help to establish relationships and facilitate exchanges. A very useful practice, which must be systematically planned at an appropriate frequency, should be **the satisfaction assessment of bilateral expectations**.

### Key message

An environment of mutual trust should be established and reinforced through regular dialogue between parties.

Mutual trust between data providers and decision makers is also relevant to prolong biodiversity information provision, and its usage and uptake in decision-making processes.

Additional elements that can help to establish or reinforce mutual trust between the parties were also identified during the workshop; these include:

- Person-to-person relationships, especially when they are maintained and stable over time (e.g. within administrations)
- The sharing of a common technical or cultural vocabulary between suppliers and decision makers
- Development of international networks of experts
- Transparency, validation, and communication on the procedures used to generate the data and its recognition by the decision maker
- The use of official accreditation systems for data management and analysis, and details of their use provided to the supplier
- The status of the supplier guaranteeing its independence (e.g. the creation of an independent observatory)

### 6.1.1 *The open data policy: a way for building confidence?*

Biodiversity data are increasingly published online, available for download and use by anyone, as “open data”. This is partially facilitated by the rise in scientific journals requiring open data as a condition of publication, but also national regulations. Increasingly, data creators, curators and owners are advised to use standardised and machine-readable licenses such as “Creative Commons”, which offers several levels of accessibility (from completely unrestricted, to a non-commercial use restriction). Archives of open data can allow users to access current and historical data; access to long-term data is particularly important to conservation, a field where data can be costly to collect. Greater access to biodiversity data can support more robust analyses and the provision of information of greater relevance to decision makers.

#### **Good practice Seven: Nature Information System**

In the Spanish Basque Country, a nature information system has been developed at the request of the Government (<http://www.euskadi.eus/natura>) to provide open biodiversity data to all users. A network of knowledge is feeding this common technological infrastructure, which interacts with other open data information systems, such as GBIF for example, and publish the data needed for decision-making, reporting, education, and dissemination and communication.

One of the undeniable advantages of Open Data practice is the transparency, both of the data and of the processes used by the presence of the metadata.

However, publication by the supplier of the biological datasets does not equate to an interpreted data or information product, or a source of information that is adapted to the needs of the decision-maker. In addition, the question of the management and financing of Open Data, data management infrastructures remains open.

A certain balance must be ensured between the risk and the profit generated by the diffusion of the data. This is particularly true for so-called “sensitive” data, such as location data for rare and protected species (e.g. orchids, wolves etc.).

The Open Data policy should be integrated into the broader framework of Open Science, as developed by the Center for Open Science, a non-profit organisation whose aim is to promote openness, integrity and replicability of scientific research.

## 7 SUMMARY AND CONCLUSIONS

To summarise the main points of importance raised during the workshop they are subdivided below into headline themes:

### Assessment

- Establish an assessment process to determine the basis of each regional situation related to biodiversity data management processes (data, actors, and processes)
- Periodically evaluate regional data management processes
- Regional situations can be evaluated in a participatory way in a dedicated workshop, by organising focus groups or working groups focused on specific points of the processes to be evaluated or by the use of surveys or questionnaires

### Identification and expression of needs

- Use participatory approaches to define needs and to monitor data processes
- Involve decision makers and end-users of data in the development process and discussion phase of the data collection approach
- Systematically explain the context of the need and the use of the desired information
- Consider the needs, position, and context of the end user/data supplier

### Meeting the needs

- An adequate response to the information requirements should be based on quality and reliable data that is properly interpreted according to the decision context
- Develop and use biodiversity information infrastructures especially suited for this purpose, allowing heterogeneous data to become standardised, shared, stored in the long-term, and analysed
- Data should be trustworthy and relevant
- Make data accessible and user-friendly by focussing on, and investing in, data dissemination and communication through efficient interfaces and media
- Invest in updating data
- Accompany data with an interpretation report and metadata
- Implement quality assurance systems or protocols
- Consider the context of data requests

### The real impact of information on decision-making

- The effective use of biodiversity information in decision-making processes is influenced by internal and external factors
- Internal factors encompass the credibility of the data provider and the confidence of the information supplied, including the uncertainty assessment of that information (temporal and spatial scale, risk analyses, etc.), but also how (or when) the information is used to feed into decision-making processes
- External factors may encompass stimuli from political and legal backgrounds (e.g. conservation vs. development laws), local and regional economic contexts (e.g. economic feasibility of projects), and the influence of lobbies
- Setting priorities in conservation policies has often to be done in a context of budgetary limitations, and prioritisation may therefore, derive from the analysis of several socio-economic scenarios, or may be linked to the biological information itself

- The way to take these criteria into account and the possibility to assess what would happen if they were not considered could be useful in that context

### After the decision

- Systematic feedback procedures should allow the opportunity for decision makers to report back to the data suppliers how data was incorporated into decision-making processes (ideally with actual examples), and the impact achieved by doing so
- Organise monitoring processes to track how information provided to decision makers is used
- Identified win-win situations where biodiversity and natural heritage has been preserved without loss of economic value to the projects, and learn how to foster these situations in future contexts
- Build an environment of mutual trust between data suppliers and data users and reinforce it through regular dialogue between the parties
- Systematically assess user-satisfaction, and organise at an appropriate frequency the satisfaction assessment of bilateral (data providers as well) expectations



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