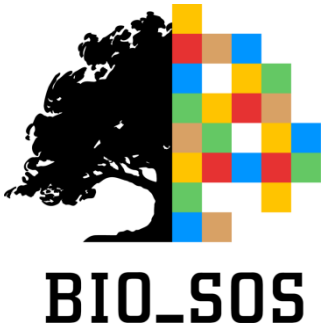

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Abstract	This report provides a synthesis of work carried out in the first six months of Task 4.1. Specifically, it provides a conceptual, legal and institutional reference framework for dataset description and quality evaluation, results from a first inventory and preliminary internal quality evaluation of pre-existing datasets across BIO_SOS sites, a methodological framework for external quality evaluation, and a first set of proposals and guidelines for data acquisition and for data quality management throughout the project.
Keywords	Data quality evaluation, Data quality management, Datasets inventory, Metadata, Pre-existing datasets

Signatures

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Table of Contents

1. Executive summary

This report summarizes work developed under Task 4.1 ("Collection and analysis of pre-existing data"), within work package n. 4 (WP4, "On-site data collection") of the BIO_SOS project. Specifically, as **deliverable D4.1** it provides a first inventory and analysis of pre-existing datasets within the consortium regarding their potential relevance and usefulness for the objectives and tasks throughout the project. As an intermediate product of Task 4.1 and of WP4, this report includes: (i) a description of the relevant concepts, references and standards to be used in such dataset evaluation; (ii) a methodological framework for the whole of Task 4.1; (iii) a first synthetic inventory of pre-existing datasets available in the consortium; (iv) a first evaluation of their internal quality; (v) a specific methodological framework and protocol for evaluation of external quality and potential usefulness according to data-user criteria; and (vi) a first set of guidelines for dataset acquisition and data quality management across the project.

Pre-existing data can be valuable in several moments (and work-packages) of BIO_SOS, namely: (i) in the description of the environmental and ecological conditions in the several sites (WP2 and WP8); (ii) in the identification and selection of key processes and drivers of ecological change in each site (WP2); (iii) in the selection of focal areas within sites for EO imagery selection and acquisition (WP4: Task 4.2); (iv) in the identification of crucial data gaps and selection of key on-going projects which may provide important datasets (WP4: Task 4.3); (v) in the support to sampling designs for new on-site campaigns (Task 4.4); (vi) in the support to EO image analyses and habitat classifications (WP5 and WP6); (vii) in the modelling of relations between EO data, habitat classifications, landscape patterns, and focal indicators adopted in BIO_SOS (WP6); and (vii) in the support to the collection of complementary field data for system validation (WP7).

The report is organized in **five sections**, including: (i) a definition of the scope of D4.1 and a justification of the importance of Task 4.1 in the project (Section 2); (ii) a theoretical synthesis on concepts, references and standards for spatial data quality evaluation and management (Section 3); (iii) a first evaluation of the internal quality of pre-existing datasets in the consortium, based on the collection of simple metadata across site partners (Section 4); (iv) a proposal of a methodological framework and protocol for the evaluation of the external quality of pre-existing datasets in the context of BIO_SOS (Section 5); and finally (v) a preliminary diagnostic summary of quality and potential usefulness of pre-existing datasets to support future work in the project, a preliminary strategy for acquisition of new datasets targeted at key data gaps, and a proposed set of guidelines for data quality management across the project (Section 6).

In **Section 3**, the fundamental concepts underlying data cataloguing and quality evaluation are described. The most relevant international initiatives, frameworks, legal and technical standards and references are listed and discussed. Moreover, approaches and methods for quality analysis and management of metadata and spatial data are described and discussed in the context of BIO_SOS. A strong emphasis is put on the fact that data quality, interoperability and (meta)data sharing should be at the core of the project at all moments. Finally, a summary workflow of Task 4.1 until its completion is presented and discussed under this conceptual framework.

In **Section 4**, a specific methodological framework and a first evaluation of internal quality of pre-existing datasets are presented and discussed. The workflow so far has included: (i) the collection of a first metadata catalogue by all site partners; (ii) the selection of quality indicators; and (iii) the application of the methodology to all metadata catalogues provided by site partners. The overall quality of global, European and site datasets was assessed and a comparative synthesis is provided. This preliminary evaluation of internal quality of pre-existing datasets was hampered by a set of important constraints, among which: (i) the diversity of background between the different partners; (ii) the diversity of data types, sources, formats, and reference systems; (iii) the heterogeneity of collected metadata; and (iv) the restricted access to the actual datasets at this stage of the project.

Section 5 describes a framework and a protocol for assessing external data quality of pre-existing (and new) datasets in BIO_SOS. The overarching rationale behind the proposed framework is based on the fact that external quality assessment is by definition user-oriented and should be based on a quantitative comparison of internal quality with user requirements and expectations (expected quality). These are

determined by intended service outputs and their quality, which in the case of BIO_SOS should mean the involvement of final Users (i.e. agencies and other stakeholders) in the remaining of Task 4.1. This external quality evaluation is on-going as part of work in Task 4.1 and final results will be reported in deliverable D4.5. In this report, the framework is illustrated with examples based on metadata for both simulated data and actual pre-existing datasets. Perspectives for implementation across partners, sites and application contexts are also discussed.

Section 6 closes the report providing a synthesis on the preliminary assessment of quality and relevance of pre-existing datasets across the consortium. A strategy for the selection of core pre-existing datasets, for the identification of key data gaps, and for the acquisition of complementary pre-existing and new datasets is described. The importance of data quality management across the project is once again highlighted, and a first set of guidelines is proposed. Finally, the implementation of quality evaluation routines is discussed in the context of the data-sharing platform to be developed under Task 4.1 (deliverable 4.5).

Until its completion (month 12), Task 4.1 will evaluate, select, organize and share relevant and potentially useful pre-existing datasets, identify important data gaps, establish priorities for new dataset acquisition, detail guidelines for data quality management across the project, and develop a collaborative platform for data sharing within the consortium. The data quality evaluation in Task 4.1 is therefore of high importance for **future work** in BIO_SOS, since, among other reasons: (i) it provides an evaluation of pre-existing datasets in their quality and relevance for the several WPs and Tasks of BIO_SOS; (ii) it signals important data gaps with potential consequences for the workflow in the project; (iii) it contributes to identify opportunities (and limitations) for studies of specific processes of change across sites; (iv) it provides a framework and a set of tools for data (and data quality) management throughout the project; and (v) it may contribute to the establishment of a methodological reference (“best practice”) for similar projects. Beyond the specific context and objectives of BIO_SOS, this evaluation of pre-existing datasets across several European and non-European countries will provide a formal assessment of the actual usefulness of a wide range of habitat, biodiversity and ancillary datasets to support or frame the monitoring of habitats, biodiversity and landscapes under international goals, targets and indicators.

2. Introduction

2.1 Scope of the report

This report is related to **deliverable D4.1** ("Report on pre-existing in situ and ancillary datasets for sites") of Task 4.1 ("Collection and analysis of pre-existing data"), within work package n. 4 (WP4, "On-site data collection") of BIO_SOS. It provides a synthesis on a first inventory and quality analysis of pre-existing datasets within the consortium regarding their potential relevance and usefulness for the objectives and tasks in the project. As an intermediate product of Task 4.1 (and of WP4), this report does not present the final results of the dataset quality evaluation process being developed under the Task. Instead, and as described below, it is intended to provide: (i) a description of the relevant concepts, references and standards to be used in such evaluation; (ii) a methodological framework for the whole of Task 4.1; (iii) a first synthetic inventory of pre-existing datasets available in the consortium; (iv) a first evaluation of the internal quality of those datasets; (v) a specific methodological framework and protocol for the evaluation of external quality and potential usefulness according to data-user criteria; and (vi) a set of guidelines for data quality evaluation and management throughout the project.

In this context, in subsequent sections of the report the following **contents** can be found: (i) a theoretical synthesis on concepts, references and standards for spatial data quality evaluation and management (Section 3); (ii) a first evaluation of the internal quality of pre-existing datasets in the consortium, based on the collection of simple metadata across site partners (Section 4); (iii) a proposal of a specific methodological framework and protocol for the evaluation of the external quality of pre-existing datasets in the context of BIO_SOS (Section 5); and finally (iv) a preliminary diagnostic summary of quality and potential usefulness of pre-existing datasets to support future work in the project, a preliminary strategy for acquisition of new datasets targeted at key data gaps, and a proposed set of guidelines for data quality management across the project (Section 6). Descriptions of future work until completion of Task 4.1 are also presented and discussed in the several sections.

The **overarching rationale** behind this organization of work throughout Task 4.1 is based on the fact that external quality assessment is, by definition, a user-oriented process and should be based on a quantitative comparison of internal quality and user requirements and expectations. As described in Section 5, these are determined by intended service outputs and their quality, which in the case of BIO_SOS should mean a close involvement of final Users (i.e. agencies and other stakeholders) in the remaining of Task 4.1, as a follow-up of the signed Service Level Agreements (see deliverable D2.3). This external quality evaluation is on-going as part of work in Task 4.1 and final results will be reported in deliverable D4.5.

The preliminary evaluation of internal quality of pre-existing datasets presented in this report was hampered by a set of important **constraints**, among which: (i) the diversity of background and experience among the different partners in terms of spatial data management and metadata collection; (ii) the diversity of data types, sources, formats, and reference systems of pre-existing datasets; (iii) the heterogeneity of collected metadata in terms of language and followed standards; and (iv) the restricted access to the actual datasets in this stage of the project.

2.2 D4.1 within the scope of Task 4.1. and of WP4

In the broader context of WP4 objectives within BIO_SOS ("collecting, harmonizing and sharing pre-existing datasets on sites relevant for habitat mapping, and supplementing existent datasets with new field data from on-site campaigns based on standard protocols"), **Task 4.1** intends to: (i) identify datasets, projects and institutional data providers; (ii) describe and collect all relevant in situ and ancillary data from the several countries; (iii) organize and harmonize all datasets on common standards; and (iv) provide a collaborative platform to catalogue, query and share databases among project partners using an internal network, particularly to feed other WPs as well as other tasks in WP4.

As described in detail later in this report (see section 3.4), Task 4.1 will include the implementation of a **methodological framework** harmonized with the general timeline defined for this task in the Description

of Work, from the collection of simple metadata on all existing datasets concerning sites, to the development and implementation of a collaborative platform for data sharing among partners within the project (Figure 2.1).

		WP4																							
	Months	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	**Pre-existing datasets**						**D41**			**MS1**	**D45**															
2	**Criteria for EO selection**			**D44**																						
3	**Ongoing projects**								**D42**																	
4	**On site data collection**						**D43**																**MS2**			

Milestone MS1 - Pre-existing data have been collected and harmonized for all test sites
Milestone MS2 - Data from new on-site field campaigns have been collected from all sites
Deliverable D41 - Report on pre-existing in situ and ancillary datasets for sites
Deliverable D42 - Report of the connection to other projects
Deliverable D43 - Report on protocols for new on-site in-field campaigns
Deliverable D44 - Report on criteria for selection of suitable EO datasets and identification of EO datasets with adequate range of spectral, spatial and temporal resolutions for each site
Deliverable D45 - Database and collaborative platform for sharing pre-existing data

Figure 2.1 *D4.1 within the general timeline of Task 4.1 and relations with milestones and other deliverables within the Task and WP4.*

In this sense, D4.1 relates with several **other deliverables** in WP4 (Figure 2.1), since: (i) it complements D4.4 (Task 4.2) in the assessment of data needs and requirements, as well as in the evaluation of relevance of pre-existing datasets; (ii) together with D4.4 and D4.5, it helps identifying data gaps and establishing priorities for new data acquisition, either through financial investment (e.g. new very-high resolution imagery), field campaigns (D4.3, Task 4.4), or connection to other projects and initiatives (D4.2, Task 4.3); and (iii) it provides the methodological framework for a complete evaluation and final selection of relevant pre-existing datasets to be managed and shared across the consortium through a dedicated platform (D4.5).

2.3 D4.1 within the broader scope of BIO_SOS (and beyond)

Pre-existing data can be valuable in several moments of BIO_SOS, namely: (i) in the description of the environmental and ecological conditions in the several training and test sites (WP2 and WP8); (ii) in the identification and selection of key processes and drivers of ecological change in each site (WP2); (iii) in the selection of focal areas within sites for EO imagery selection and acquisition (WP4: Task 4.2); in (iv) the identification of crucial data gaps and selection of key on-going projects which may provide important datasets (WP4: Task 4.3); (v) in the support to sampling designs for new on-site campaigns (Task 4.4); (vi) in the support to EO image analyses and habitat classifications (WP5 and WP6); (vii) in the modelling of relations between EO data, habitat classifications, landscape patterns, and focal indicators adopted in BIO_SOS (WP6); and (vii) in the support to the collection of complementary field data for system validation (WP7).

WP4 is divided in four major tasks that intent to support a continuous flow of information, as well as the development of standardization protocols to facilitate communication between partners and to build coherent field datasets to support the analysis and modelling tasks (WP5, WP6 and WP7). In this context, D4.1 relates with several milestones and deliverables from **other WPs in BIO_SOS**, since: (i) it builds upon previous work on indicators (D2.1), sites and pressures (D2.2), user requirements (D2.3) and service design (D3.1) in WP2 and WP3; and (ii) together with on-going deliverables from WP5 (D5.1) and WP6 (D6.2), it provides results which are important for future work in WP5, WP6 and WP7.

Until its completion, Task 4.1 will evaluate, select, organize and share relevant and potentially useful pre-existing datasets, identify important data gaps, establish priorities for new dataset acquisition, detail guidelines for data quality management across the project, and develop a collaborative platform for data sharing within the consortium. The data quality evaluation in Task 4.1 is therefore of high importance for **future work** in BIO_SOS, since, among other reasons: (i) it provides an evaluation of pre-existing datasets in their quality and relevance for the several WPs and Tasks of BIO_SOS; (ii) it signals important data gaps with potential consequences for the workflow in the project; (iii) it contributes to identify opportunities (and limitations) for studies of specific processes of change across sites; (iv) it provides a framework and a set of tools for data (and data quality) management throughout the project; and (v) it may contribute to the establishment of a methodological reference ("best practice") for similar projects. In fact, beyond the specific context and objectives of BIO_SOS, this evaluation of pre-existing datasets across several European and non-European countries will provide a formal assessment of the actual usefulness of a wide range of habitat, biodiversity and ancillary datasets to support or frame the monitoring of habitats, biodiversity and landscapes under international goals, targets and indicators.

3. Spatial data quality evaluation and management

In recent years, databases stopped being looked at as merely simple collections of information stored in a structured format. Nowadays, databases are included in information systems that use their data and of which they are part (Servigne *et al*., 2010). This represented an increase in the **spatial data** life cycle and consequently it highlighted the importance of evaluating, managing and controlling the quality of spatial databases and datasets. Existing geographic databases often contain errors due to acquisition sources (measuring instruments), data-input processes and information processing (Shi, 2009).

WebGIS development and widespread availability of geospatial technologies promoted an intensification of data sharing and integration (Devillers *et al.,* 2007). Because spatial data are transferred and shared by many users, these data must be correct and useful. To ensure that existing digital data are appropriately used, the data producer must provide, among other items, documentation about the practices of spatial data use. In addition, data developers and users have begun to document and implement **data quality** indicators. Spatial data are frequently relied upon as factual data, and so data quality indicators and metadata are crucial to assess their fitness for use in each application context. Data producers must also be aware of the implications involved with the careless development of spatial data if those datasets are intended to be used for legal or political reasons. On the other hand, the data user should also be responsible for understanding the limitations of that spatial data (Kumi-Boateng and Yakubu, 2010).

The increasing amount and mobility of data, associated with the heterogeneity of users and uses, influences the length and the complexity of the life cycle of spatial data. These facts place a central importance in the **evaluation and management of quality** in the processes of capture, organization, analysis and publication of spatial data. They should be reflected on information systems governance and on technical-scientific community management. In this section, these issues are presented and discussed in the context of the objectives and quality requirements of the BIO_SOS project.

3.1 Initiatives, framework, legal and technical standards and references

Technological and organizational developments and political options jointly contribute to a vision of “Digital Earth” as a multi-resolution, three-dimensional representation of the planet that would make possible to find, visualize, and make sense of vast amounts of georeferenced information on the physical and social environments. Such a system would allow users to access historical data as well as future predictions based for example on environmental models, and support access and use by scientists, policy-makers and the general public (Gore, 1998 cit. in Craglia *et al*., 2008).

In fact, the availability of spatial data, namely airborne and spaceborne imagery as well as from ground based sensors, emphasizes the need of evolving spatial information systems into spatial data infrastructures (SDIs) which can support human activities and environmental management and conservation towards sustainable development (Strande, 2009).The physical and functional integration of thematic and territorial spatial information systems at global, regional, national, local and institutional levels promotes spatial and temporal continuity. This facilitates the development and functioning of knowledge networks across scientific, technological and political domains to support environmental management as well as social and economic activities. In fact, Lacasta *et al.* (2007) highlight that one of the main goals of SDI is to facilitate the access to geo-spatial data in a dynamic and cooperative environment where interoperability plays a crucial role.

The knowledge networks resulting from WebGIS thematic platforms and SDIs generate potential benefits at different levels, namely (Sanderson *et al*., 2011): (i) **direct use value or benefit** -this refers to availability of data models, increased data availability, flexibility for data requests, faster data management, improved data access, compatibility and ease of use, as well as better data sharing, reduced cost of integrating data, increased data quality and reliability, availability of new services, and improved efficiency and quality of environmental assessments; (ii) **social value** -this refers to enabling better decision making, reducing barriers between organizations, increasing institutional efficiency, promoting more efficient use of (taxpayer) funds, and increasing public participation in governance and

other societal issues; (iii) **operational benefits for institutions** -this refers to promoting intra- and inter-institutional collaboration, promoting the reuse of existing datasets, and reducing the cost of information management; it also relates to increasing the possibilities to run or join up various projects involving geospatial data or commissioning research tasks;(iv) **institutional financial value** - this relates to overall cost savings for information management; (v) **strategic and political value** - this means fostering closer working relationships, supporting improved decision making and other information infrastructure, as well as e-Government or other related governance models and instruments.

These advantages and opportunities have led to the conceptualization, proposal, discussion and application of different **global standards**:

i) **ISO 19100** is a series of standards for defining, describing, and managing geographic information, *i.e.* information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth; this series of standards specifies methods, tools and services for management of information, including the definition, acquisition, analysis, access, presentation, and transfer of such data in digital/electronic formats between different users, systems and locations; these standards make it possible to define profiles in order to facilitate the development of geographic information systems and application systems that will be used for specific purposes; in this context, "*profiling*" consists of putting together "*packages*" or "*subsets*" of the total set of standards to fit individual application areas or users (ISO 19100 Series of Geographic Information Standards, 2004)

ii) the **Open Geospatial Consortium** (OGC) is a non-profit, international, voluntary consensus standards organization that is leading the development of standards for geospatial and location based services; OGC standards are technical documents that detail interoperability guidelines; software developers use these documents to build open interfaces and encodings into their products and services; these standards are the main "*products*" of OGC and have been developed by its members to address specific interoperability challenges; ideally, when OGC standards are implemented in products or online services by two different software engineers working independently, the resulting components will plug and play, that is, they will work together without further debugging (OGC, 2011).

Benefits of using (and enforcing) data standards include: (i) more efficient data management (including updates and security); (ii) increased data sharing; (iii) higher quality data; (iv) improved data consistency; (v) increased data integration; (vi) better understanding of data, and (vii) improved documentation of information resources (National Land & Water Resources Audit 2008).

The recognized advantages of WebGIS platforms and SDIs have promoted integrative or thematic initiatives from global to local level (Rajabifard, 2010). Since 2003, with the creation of the intergovernmental Group on Earth Observations (GEO) (*http://www.earthobservations.org*), and 2004, with a worldwide commitment for the implementation of the Global Earth Observation System of Systems (GEOSS) (*http://www.earthobservations.org/geoss.shtml*), governments have recognized the key role of Earth observation and the urgent need for a combined effort to identify, characterize and evaluate global change and its effects on components of human well-being. One of the main goals of GEOSS is to **link existing systems and networks** to achieve comprehensive, coordinated and sustained observations of the Earth system. In order to accomplish this, efforts must be put into implementing, standardizing and evaluating existing data flows and infrastructures to promote better communication between observation systems, in agreement with political, legal, organizational and standard references associated to Global Spatial Data Infrastructure (GSDI) development. In this sense, biodiversity should represent one of main subsets of such an Earth observation infrastructure. Also, at the **European level** several initiatives are developing, namely:

i) **Global Monitoring for Environment and Security (GMES)** - this is the European Program for the establishment of European capacity for Earth Observation services, addressing six main

thematic areas: Land Monitoring, Marine Environment Monitoring, Atmosphere Monitoring, Emergency Management, Security, and Climate Change (*http://www.gmes.info/*);

ii) **INSPIRE** - 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), aims to ensure that spatial data infrastructures of the Member-states are compatible and usable in a Community and transnational context; the Directive requires that common Implementing Rules are adopted in a number of specific areas (Metadata, Data Specifications, Network Services, Data and Service Sharing, and Monitoring and Reporting) (*http://inspire.jrc.ec.europa.eu/*);

iii) **Shared Environmental Information System (SEIS)** (Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Towards {SEC(2008) 111} {SEC(2008) 112}) - this Communication sets out an approach to modernize and simplify the collection, exchange and use of data and of information required for the design and implementation of environmental policy; the overall aim is to maintain and improve the quality and availability of information required for environmental policy, in line with better regulation, while keeping the associated administrative burdens to a minimum (*http://ec.europa.eu/environment/seis/*).

In recent years, these initiatives have tried to promote and integrate thematic SDI (e.g. Water Information for Europe - WISE), *e.g.* through technical and scientific projects which test, implement and disseminate concepts and practices, as well as experiences and instruments. Projects like EBONE - European Biodiversity Observation Network (*http://www.ebone.wur.nl/UK/*) are defining the way to communicate environmental and biodiversity information along geographic, administrative and institutional environments, and determining their role in the development of **Spatial Data Infrastructures** (SDI). The implementation of projects like the best practice network for SDI in nature conservation (NatureSDIplus) (*http://www.nature-sdi.eu/*) or the Biodiversity Information System for Europe (BISE) (*http://www.eea.europa.eu/publications/bise*) promotes the involvement of stakeholders and the sharing of data and best practices. These initiatives facilitate the implementation of spatially explicit ecological or environmental monitoring programs, which are crucial for the gathering and consolidation of knowledge related to the patterns of distribution, function, and interaction of biological assets with other spatially explicit factors (e.g., land cover, human development, and environmental disasters).

Environmental monitoring and biodiversity spatial databases and thematic SDIs like the Global Biodiversity Information Facility (GBIF) have shown the importance of implementing interoperability concepts and data sharing principles, thus decentralizing management procedures and encouraging participation. Such initiatives also improve and stimulate research, and promote the re-use of existing information on nature conservation and reporting. The relation to other projects that are being implemented across Europe and elsewhere (see Task 4.3), as well as the integration of all core information used within the several WPs of BIO_SOS, will therefore be a critical issue for the implementation of a **collaborative framework** to support the development of the project and the achievement of its goals.

Programs or projects, with a scope similar to BIO_SOS, involving the handling of high volumes of geospatial data, typically use methods for assessing, measuring, reporting and controlling spatial data quality (ESDIN, *http://www.esdin.eu/*). There is an opportunity for projects included in GMES, INSPIRE, and other SDI activities on the global geospatial environment, to create communities of specialists working in harmony to deliver data with quality patterns that meet well defined and accepted standards (Devillers *et al.*, 2010). These communities will face the challenge of promoting individual and institutional capacity building in spatial data handling, while learning and testing the implementation of spatial data quality evaluation methods and quality management procedures.

3.2 Metadata and spatial data quality analysis and management

3.2.1 Metadata and the management of spatial data

Spatial data refers to qualitative or quantitative attributes of a variable or set of variables which are georeferenced (FGDC, 2010). The nature and life cycle of spatial data call for attention to spatial data quality elements, evaluation procedures and indicators (Devillers *et al*., 2007).The contexts within which geospatial data are used have changed significantly. Users now have easier access to geospatial data but often have less knowledge in the geographical information domain, so they have limited perception of the risks related to the use of geospatial data (Devillers *et al*., 2007).Van Oort (2005) refers that, based on Aronoff (1989), Morrison (1995) and Longley *et al*. (1999), the five main reasons for current concerns about spatial data quality issues were identified as: (i) there is an increasing availability, exchange and use of spatial data; (ii) there is a growing group of users less aware of spatial data quality; (iii) GIS enable the use of spatial data in all sorts of applications, regardless of the appropriateness with regard to data quality; (iv) current GIS offer hardly any tools for handling spatial quality; (v) there is an increasing distance between those who use the spatial data (the end users) and those who are best informed about the quality of the spatial data (the producers).

To deal with these concerns, it will be necessary to formalize and standardize descriptions of spatial data quality, and to apply these descriptions in assessing the suitability (fitness for use) of spatial data, before using the data, in order to enhance the **description of spatial data quality** and to improve our understanding of the implications of spatial data quality (van Oort, 2005). In this sense, there should be a focus on quality assessment and management of spatial data as a basis to guide production techniques and spatial data use, but also to support the selection of relevant information for external users, researchers and end-users (e.g. institutions of environmental management and nature conservation participating of the Advisory Board of BIO_SOS). This requires the development of appropriate tools to allow and facilitate spatial data quality management in the context of spatial data discovery, access and sharing services (Sanderson *et al*., 2011).

The provision of **metadata** is the key management mechanism for any spatial information environment. Metadata, defined as ‘data about data’ or ‘information about information’, provides a fundamental basis for information management tools at three levels: (i) discovery, enabling users to locate and evaluate information; (ii) management, enabling custodians to better manage their spatial information; and (iii) utilization, enabling users to access and manipulate information by means of automated/distributed systems (Victorian Spatial Council, 2009). Metadata should include information on data quality as well as on the organizations responsible for providing the data and metaquality management (INSPIRE; Data quality in INSPIRE from requirements to Metadata, 2010).

Metadata are required for a range of purposes, as a structured summary that describes characteristics such as content, quality, currency, access and availability of the data or information. The provision of metadata aims to provide custodians and users with a common understanding of the data. Metadata describe the content of (spatial) datasets and specifies the links and access conditions for distributed clearinghouses. The ESDIN Metadata Guidelines refer to metadata at three levels: for **discovery,** for **evaluation,** and **specific metadata** (Williams *et al*., 2010). Metadata also enable custodians to manage their spatial information effectively by providing rules for documenting datasets and archival mechanisms for retaining data historical log (Neuschmid *et al.,* 2010).Frequently, the independence between data and the corresponding metadata results in the static nature of metadata, which are therefore not useful for dynamic operations when using a GIS (Fischer *et al*., 2010).

3.2.2 A definition of spatial data quality

Data quality is the degree of data excellence that satisfies a given objective. In other words, data quality may be considered the completeness of attributes of a given dataset in order to support a given task. Data quality is a pillar in any GIS implementation and application, as reliable data are indispensable to allow the user obtaining meaningful results (Preece *et al.,* 2006). Quality can be described from different viewpoints, as described e.g. by Garwin (1988) and Lillrank (1998) cit. in Jakobsson and Giversen,

(2008): (i) a production-centred perspective; (ii) a planning-centred perspective; (iii) a customer-centred perspective, focusing on the value of products and services to the customer; and, (iv) a system-centred perspective.

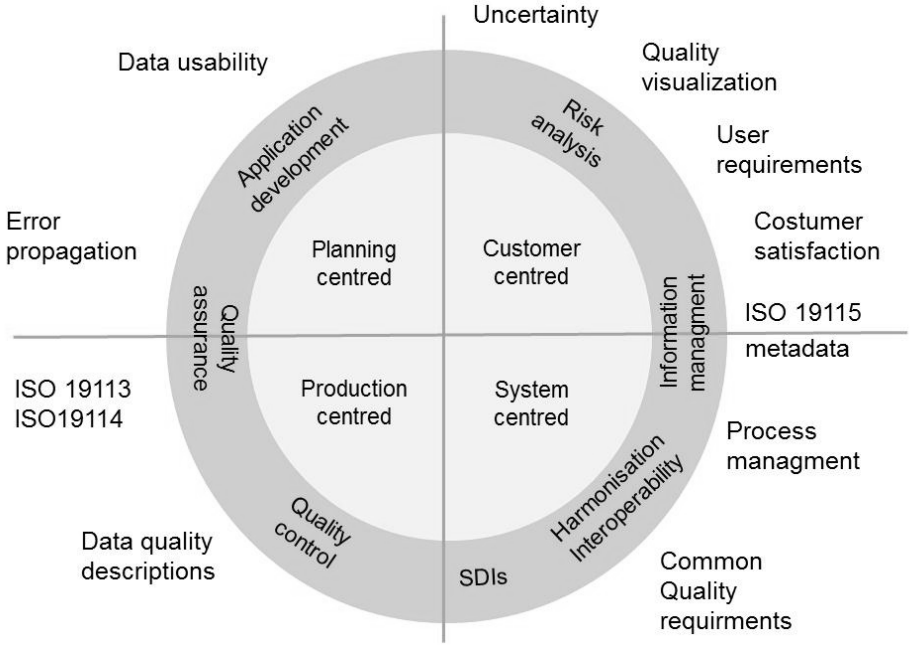


Figure 3.1 *Different approaches (viewpoints) to geographic information quality within a quality management context (Jakobsson and Tsoulos, 2007).*

At same time, data quality is a measure of the difference between universe of discourse (*i.e.* a view on the real or hypothetical world, defined by a product specification) and a dataset. A producer's view and a user's view on data quality may coincide if the requirements are identical (Fig3.2). Producers and users may use different universes of discourse, and will thus assess differently the quality of the same dataset. The role of **product specifications** (if possible, including *a priori* known user requirements) in establishing a generic, or clearly structured, universe of discourse, is therefore central and the subject of the ISO 19113 standard (see below).

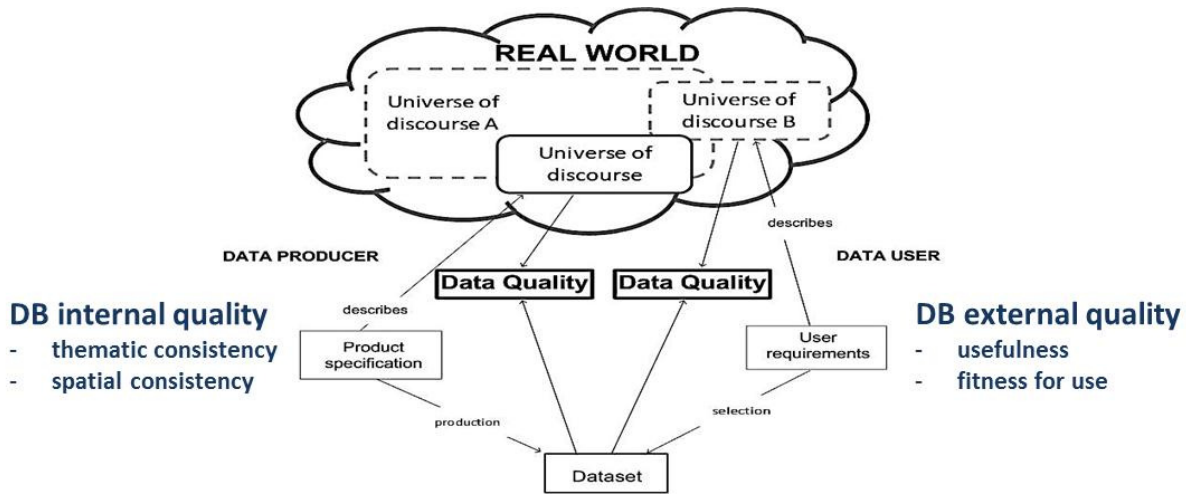


Figure 3.2 *Product specification and data user to dataset (ISO 19113 standard)*

A **quality evaluation process** consists in the application of quality evaluation procedures to specific dataset-related operations performed by the dataset producer and by the dataset user. Quality evaluation processes may be used in different phases of a product life cycle, with different objectives in each phase. The phases of the life cycle considered here are specification, production, delivery, use, and update. The process for evaluating data quality is a sequence of steps to produce and report a data quality result. Processes for evaluating data quality are applicable to static datasets and to dynamic datasets. Dynamic datasets are datasets that receive updates so frequently that for all practical purposes they are continuously changing (*e.g.* meteorological data; ISO 19114 standard: 2003).

The use of a quality evaluation process is important during and after collection or maintenance of a dataset. Quality evaluation procedures can be used in the development of product specifications. This means that a product specification should contain data quality requirements, and quality evaluation may be used to test the validity of requirements. The definition of a **quality model** is important for large reference datasets in order to report quality in metadata. Quality evaluation results will only confirm that quality requirements are met in a given moment and for a given context. After any update in the database, evaluation results are no longer valid, and therefore metadata on large reference datasets should contain conformance quality levels and information about performed tests.

Data quality may be assessed by different users, considering different evaluation techniques. The first level of assessment ("internal quality evaluation") is performed by the data producer through a data quality check based on given data specifications. In a second level ("external quality evaluation") it is generally accepted that spatial data quality descriptions allow the user to evaluate the fitness of the data for a particular application (Moellering 1987, Morrison 1995). According to Devillers and Jeansoulin (2006), internal quality connects the quality of the data to the internal characteristics of the data, i.e., represents the difference between the produced data and "perfect" data, while external quality is connected to the level of adequacy between the characteristics of the data and the user's needs for various aspects. In general terms this process of assessing **quality** should include (van Oort, 2005): (i) searching for a spatial dataset that contains the information needed for the intended application (Brassel*et al.,* 1995 called this the "assessment of model completeness"); (ii) exploring whether there are legal or financial constraints to access or particular use of the data (Aronoff 1989 called this the "*usage component*"); and,(iii) finding out if, given the quality of the data, risks are acceptable (see Agumya and Hunter 2002).

3.2.3 Standards for metadata and (spatial) data quality

Global networks are putting pressure on institutions to adopt specific metadata profiles and international standards for metadata (Williams, 2010) . **ISO 19100 standards** development reflects the direct relation between spatial data life cycle, metadata production, and (spatial) data quality**.** These standards are meant to enable geospatial datasets to interact across different data models and different applications. International 19100 ISO standards series are also relevant as they outline metadata standards, custodian standards, and product specification standards. The most important quality-related standards, for spatial data, in the ISO 19100 family are:

- ISO 19113 Geographic Information – Quality principles
- ISO 19114 Geographic Information – Quality evaluation procedures
- ISO 19138 Geographic Information – Data quality measures

- ISO 19115 Geographic Information – Metadata
- ISO 19115 Geographic Information – Metadata - Part 2 : Extensions for imagery and gridded data

- ISO 19131 Geographic Information – Data product specifications
- ISO 19139 Geographic Information – Metadata – XML schema implementation

- ISO 19138 Geographic information – Data quality measures
- ISO 19157Geographicinformation– Data quality
- ISO 19158 Geographic information – Quality assurance of data supply

From the above five specific standards are particularly relevant for the purpose of this report:

ISO 19113 introduces quality principles but does not specify in detail how to measure the differences between a dataset and the corresponding universe of discourse. It defines the taxonomy of the various kinds of differences that are usually measured, those various kinds of differences being called "*quality elements and sub-elements*". It also describes how to identify whether these elements and sub-elements apply to one given dataset, how to create additional elements and sub-elements, and how the reporting of quality assessment should be performed, in relation to the ISO 19114 standard

ISO 19114 (Quality evaluation procedures) provides a set of procedures for determining and evaluating quality of geographic datasets, and establishes a framework for evaluating and reporting data quality results, as part of metadata or as a data quality report. The procedures for evaluation of data quality according to the ISO 19114 standard should be implemented in five steps (Jakobsson, 2011): (i) Identifying the data quality scope: elements and sub elements; (ii) Identifying the data quality measure; (iii) selecting the evaluation method; (iv) determining data quality results; and (v) determining conformance (ISO 19114).

ISO 19138 (Data quality measures) is a technical specification intended to guide the data producer in choosing the right data quality measures for data quality reporting, but also the user in the evaluation of the usefulness of a dataset by standardizing the components and structures of data quality measures and by defining commonly used data quality measures. It defines a set of quality measures that can be used when reporting data quality for the sub-elements in ISO 19113. The idea is to build a register of standardized quality measures. However it does not limit users from defining their own quality measures. Each quality measure is described by a set of components (Droj *et al*., 2010). Currently the central dimensions of spatial data quality impose, address and propose new international standards.

ISO 19157 (Data quality) tries to establish the concept of quality for geographic data, components for describing data quality, components and content structure of a register for data quality measures, general procedures for evaluating the quality of geographic data, and principles for reporting data quality. It also provides guidance on how to describe, evaluate and report data quality. This International Standard is applicable to data producers providing quality information to describe and assess how well a dataset conforms to its product specification, and to data users attempting to determine whether or not specific geographic data is of sufficient quality for their particular application. ISO 19157 does not attempt to define a minimum acceptable level of quality for geographic data but introduces the concept of metaquality.

ISO 19158 (Quality assurance of data supply) (project accepted 2009 and TS expected 2011) aims to provide a framework that facilitates the production or update of a product to meet quality requirements: An organization applying the standard will have to consider: (i) quality requirements; (ii) identification of processes; (iii) how to measure quality during production or update; and (iv) introducing accreditation of its processes and personnel.

A possible workflow for evaluating and reporting data quality based on relevant ISO standards includes six steps may be recognized in a quality evaluation process (Figure 3.3):

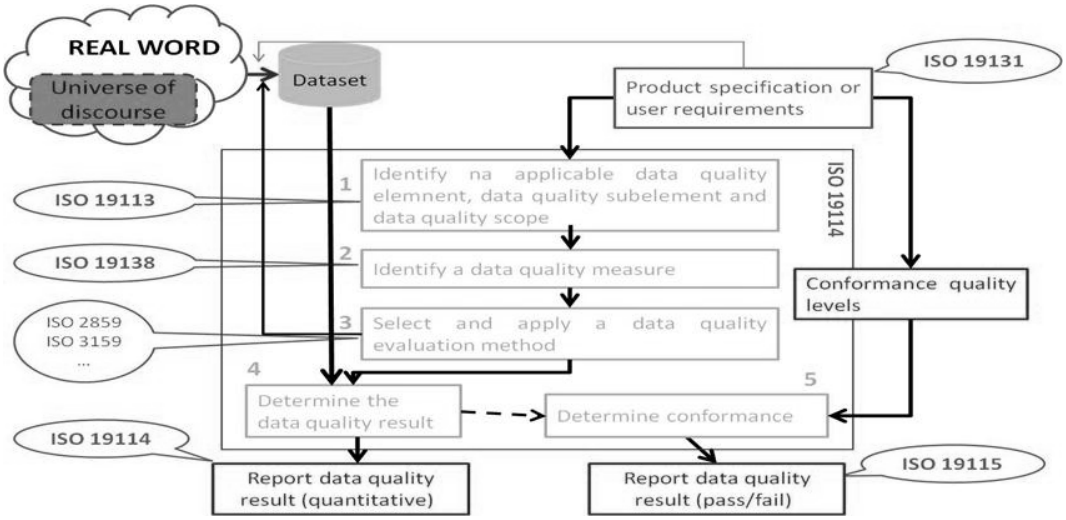


Figure 3.3 *Workflow for evaluating and reporting data quality results (adapted from ISO/DIS 19114)*

i) Identify an applicable data quality element, data quality sub-element, and data quality scope; these shall be identified in accordance with the requirements of ISO 19113; this is repeated for as many different tests as required by the product specification or user requirements;
ii) Identify a data quality measure, a data quality value type and, if applicable, a data quality value unit for each test to be performed;
iii) Select and apply a data quality evaluation method for each identified data quality measure;
iv) Determine the data quality result, *i.e.* a quantitative data quality result, a data quality value or set of data quality values, a data quality value unit and a date, as the output of applying the method;
v) Determine conformance, whenever a conformance quality level has been specified in the product specification or user requirements; a conformance data quality result (pass-fail) is the comparison of the quantitative data quality result with a conformance quality level;
vi) Report, *i.e.* the quality evaluation information shall be reported as metadata; a separate quality evaluation report is required when metadata result is only “pass/fail” or when aggregate quality results are generated.

Quality evaluation can be implemented by using metadata. It is therefore imperative that efficient and well-conceived standards exist and take into account data quality in the appropriate measure (Jakobsson and Giversen, 2008). i.e., the definition of the metadata profile must incorporate quality issues, useful both for internal and external quality evaluation.

3.2.4 Methods and indicators for spatial data evaluation

Measurable quality of a dataset should be described using data quality elements and sub-elements (Table 3.1). **Data quality overview elements** can be used to describe non-quantitative quality. Overview elements are purpose, usage and lineage.

A data quality evaluation procedure is accomplished through the application of one or more **data quality evaluation methods**. Data quality evaluation methods are divided into two main classes, direct and indirect. Indirect methods infer or estimate data quality using information on the data such as lineage (ISO 19113 and ISO 19114). Indirect evaluation methods consist in an approach that evaluates the quality of a dataset based on external knowledge. This external knowledge may include, but is not limited to, data quality overview elements and other quality reports on the dataset or data used to

produce the dataset (Jakobsson and Giversen, 2008). Direct methods determine data quality through the comparison of the data with internal and/or external reference information.

Table 3.1 *Quality elements and sub-elements in the ISO 19113 standard.*

Data quality element **Data quality sub-element**	**Description**
Completeness	Presence or absence of features, their attributes and relationships
Commission	Excess data present in a dataset
Omission	Data absent from a dataset
Logical consistency	Degree of adherence to logical rules of data structure, attribution and relationships
Conceptual consistency	Adherence to rules of the conceptual schema
Domain consistency	Adherence of values to the value domains
Format consistency	Degree to which data is stored in accordance with the physical structure of the data set
Topological consistency	Correctness of the explicitly encoded topological characteristics of a dataset
Positional accuracy	Accuracy of the position of features
Absolute or external accuracy	Closeness of reported coordinate values to values accepted as or being true
Relative or internal accuracy	Closeness of the relative positions of features in a dataset to their respective relative positions accepted as or being true
Gridded data position accuracy	Closeness of gridded data position values to values accepted as or being true
Temporal accuracy	Accuracy of the temporal attributes and temporal relationships of features
Accuracy of a time measurement	Correctness of the temporal references of an item (reporting of error in time measurement)
Temporal consistency	Correctness of ordered events or sequences, if reported
Temporal validity	Validity of data with respect to time
Thematic accuracy	Accuracy of quantitative attributes and the correctness of non-quantitative attributes and of the classifications of features and their relationships
Classification correctness	Comparison of the classes assigned to features or their attributes to a universe of discourse (e.g. ground truth or reference data set)
Non-quantitative attribute correctness	Correctness of non-quantitative attributes
Quantitative attribute accuracy	Accuracy of quantitative attributes

Direct evaluation methods are further subdivided into **internal** and **external**. All the information needed to perform an internal direct data quality evaluation method is inherent to the dataset being evaluated, while for external quality evaluation user defined requirements are needed. For both external and internal evaluation methods, there are two important choices to consider, automated vs. non-automated, and full inspection vs. sampling. A full inspection requires testing every item in the population specified by the data quality scope, whereas sampling requires testing sufficient items in the population in order to achieve a meaningful data quality result.

Indirect evaluation methods consist in an approach that evaluates the quality of a dataset based on external knowledge. This external knowledge may include, but is not limited to, data quality overview

elements and other quality reports on the dataset or data used to produce the dataset (ISO 19113).This evaluation method includes other sources and methodological considerations about the production process in order to know more about direct evaluation centred in spatial database management.

3.3 Data quality, interoperability and (meta)data sharing

Data interoperability is a challenge posed by the use of information collected at different scales, with distinct sampling and collection protocols, and different spatial extents. As an example, spatial, chorological (*i.e.* geographic records of species or habitats) and alphanumerical datasets covering Natura 2000 sites are available for multiple spatial scales and contexts, but they may be valuable to support and/or validate EO habitat maps resulting from work to be developed in BIO_SOS. Other potential datasets include *in situ* observational records and maps on habitats and biodiversity, EO data and products, as well as many types of ancillary datasets, resulting from previous local, regional or national surveys (*e.g.* Habitat/Land Cover maps) and European projects (e.g. CLC maps).

Data quality standards, among others, aim to promote **interoperability** as the ability of diverse systems and organizations to work together (inter-operate). The term is often used in a technical systems engineering sense, or alternatively in a broad sense taking into account social, political, and organizational factors that impact system performance. To achieve interoperability of geographic information it is necessary to establish a set of minimum standards and policies. These standards and policies must define rules and procedures at three levels (Longhorn, 2005): (i) the institutional level, represented by organizational rules like access rules, data protection, and copyright; (ii) the technical level, which consists in all the hardware, software and communication protocol compatibility; (iii) the semantic level, *i.e.* data standards, the set of public data and process standards.

Data standards are semantic definitions that are structured in a model. They describe the minimum requirements of objects, features or items that are (will be) collected, automated, or affected by processes. Process standards, also referred to as “service standards”, describe the procedures to follow, methodologies to apply, procedures to present information, or business rules to be followed to implement data standards. Process standards are used: (i) to establish a threshold for minimally acceptable data; (ii) to determine the best data for an application; or (iii) to promote interoperability and broad use of data (Longhorn, 2005). Current standards in geographic information may be classified as “*industry standards*”, also called “*de-facto standards*”, and “*official standards*”. *De-facto* standards are generated by industry; in the case of spatial data, this role is played by the Open GIS Consortium (OGC).Official standards can be divided into international standards (ISO), regional standards (*e.g.* INSPIRE European standards) and national standards. These standards specify methods, tools and services for data management (including definition and description), acquisition, processing, analysing, accessing, presenting and transferring such data in digital/electronic form between different users, systems and locations (Sanderson *et al.*, 2009).

Performing **data and dataset inventories**, as well as developing digital (and web based) catalogues, represents one of the most important steps to establish interoperability and sharing framework between different data providers and users. In the scope of WP4 of BIO_SOS, and specifically in Task 4.1, these issues are considered in order to establish a procedure to create, manage and maintain relevant datasets for each test site, having in mind the need to collect metadata that adequately describe the available information, its thematic and spatial extent and quality, as well as the demand for a communication/collaboration platform that allows searching and sharing information on biodiversity and habitats within (and beyond) the project. In order to do so, four procedures must be considered: (i) the collection of metadata and the creation of digital catalogues to facilitate data search and sharing; (ii) the identification of coordinate systems and reference criteria; (iii) the implementation of an harmonization process, in order to create spatial and thematic interoperability between different datasets; and (iv) the establishment of data collection standards in order to control the quality of all datasets to be gathered.

Interoperability takes effect on such concepts as *“harmonization*” (i.e. multidisciplinary interoperability) and *“integration*”, as well as on user’s management and on facilitating access and data sharing in a spatial data management context. The resulting **knowledge networks** promote systemic functioning, global scale vision across different jurisdiction areas, temporal continuity of processes and also

communication among actors. In this regard, there is the need to promote training, to facilitate innovation and diffusion due to the intensification of the cycles of generation and application of knowledge. On the other hand, the complexity of setting up knowledge systems, policies and practices of sharing operational databases highlights the increasing importance of spatial database quality management.

Before data and information is readily accessible, some issues should be addressed concerning data and databases **access** (Burley and Peine 2009), including: (i) relevant data policy and data ownership issues regarding access and use of data; (ii) the specific needs of those who will require access, and the differentiated levels of access needed; (iii) the cost of actually providing data versus the cost of providing access to data; (iv) data format(s) appropriate for end-users; (v) system design considerations, including any data (if any) that requires restricted access to a subset of users; (vi) issues of private and public domain in the context of the data being collected; (vii) liability issues that should be included in the metadata; (viii) a carefully worded disclaimer statement to be included in the metadata so as to free the provider, data collector, or anyone associated with the dataset of any legal responsibility for misuse or inaccuracies in the data; (ix) the need for single-access or multi-user access, and subsequent dataset version associated with multi-user access systems; and (x) to protect sensitive data (e.g. private property rights, endangered species) while still sharing data.

WebGIS platforms for data sharing promote potential gains associated with scale economies, resource use efficiency, increased spatial data production, and also experiences and inherent knowledge sharing. However, data interoperability, effective public data access and reuse are central questions to guarantee quality controlled processes and to ensure that large volumes of data are managed efficiently and consistently.

3.4 Data quality in BIO_SOS and the general workflow of Task 4.1

Task 4.1 intends to identify datasets, projects and institutional data providers, to catalogue all relevant in situ and ancillary data from the several countries, to promote the harmonization of datasets on common standards, and finally to provide a collaborative platform to search and share databases among project partners using an internal network.

The multiplicity of scales, natural and human contexts, and data collection methods will require a **dataset quality assessment** prior to the implementation of any organization and harmonization processes. The main problems/caveats to be considered are: i) the existence of different spatial and thematic scopes that can reflect on the existence of distinct thematic and spatial gaps for some sites; ii) the diversity of data collection methods and protocols, as well as the different timeframes of data collection and availability, which can hamper the ability to compare results across sites; and, iii) the diversity of threats and processes of change that can create biased evaluations or influence the assessment of dataset relevance and actual data needs/gaps.

In order to manage these potential limitations within the project scope and to contribute to a standard for future comparability and interoperability for biodiversity and habitat data sharing, a **general methodological framework** was proposed for Task 4.1 that includes six stages (Figure 3.4):

1. the collection of metadata, according to a simplified metadata profile, on all pre-existing datasets concerning sites, as proposed in the table included in Annex 1 (for further detail see section 4.2 of this deliverable);
2. the development and implementation, on all collected datasets, of a quality assessment methodology to support a final dataset selection and harmonization;
3. the identification of data gaps and new data acquisition needs, resulting mainly from identified thematic or spatial data gaps;
4. the establishment of selection criteria for the identification of relevant datasets for BIO_SOS, in connection to the most important pressures and threats in each site (see deliverable D2.2);
5. the collection of core metadata for all selected datasets according to the INSPIRE Standard Metadata Profile; and
6. the development and implementation of a collaborative platform for metadata and core dataset sharing among partners within the project (deliverable D4.5).

In this context, the information collected in stage one (initial metadata, according to a simplified metadata profile) acts as the basis for the methodological design of Task 4.1, and represents a first structural element in the development of this task. The option for these six progressive steps was based on a **methodological design** that considers the difficulties related to the collection of metadata of pre-existing, non-catalogued, datasets, and incorporates those difficulties in a step-by-step, progressive framework, that aims to gather and organize a broad range of information with an optimised amount of collective effort across the consortium. This general procedure will support the development of a metadata database, with core information from all partners with training and test-sites in BIO_SOS, as well as a first evaluation of the quality of the datasets identified in the first stage. This preliminary quality evaluation and the subsequent evaluation procedures, including both internal and external dataset quality, will be based on a diversified set of quantitative and qualitative indicators. It will allow to describe and assess the quality and global usability of the recognized databases and datasets collected by each BIO_SOS partner, and particularly to define harmonization needs and data gaps that represent critical factors for project goals, *i.e.* the inexistence of particular datasets that are considered core variables in specific analyses, classification procedures or modelling frameworks.

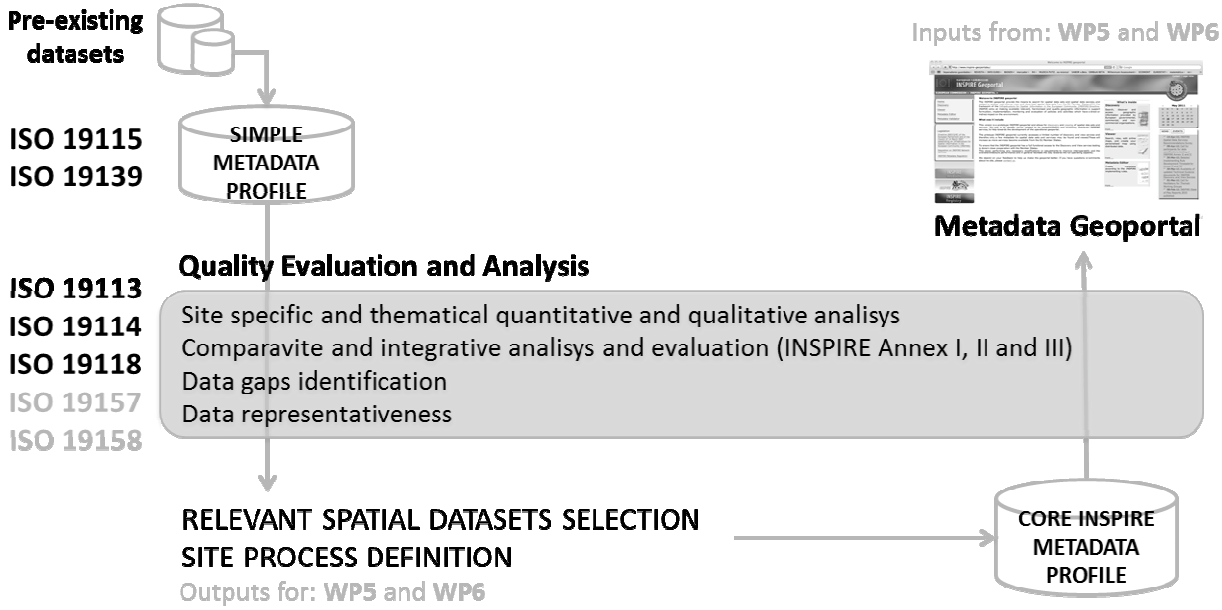


Figure 3.4 *Methodological framework for the assessment of pre-existing datasets in Task 4.1 of BIO_SOS.*

In this sense, **data description** procedures will be implemented in three different but complementary moments: (i) dataset identification/cataloguing and definition of standards for the collection of a simplified metadata catalogue; (ii) user's definition of data requirements and selection of relevant spatial datasets; and, (iii) fulfilment of the complete metadata catalogues (based on the INSPIRE Core Metadata standard profile) for selected relevant datasets. These three moments are not hermetic in time; instead they have several intermediate steps to achieve specific goals.

From the (meta)data collected in these three moments, **four critical results** are expected: (i) the systematization of metadata for all identified pre-existing datasets, and a quality evaluation report (this deliverable and future work in Task 4.1); (ii) the selection and characterization of relevant/critical spatial datasets for the project (this deliverable and future work in Task 4.1); (iii) the fulfilment of a more extended metadata profile for the selected relevant datasets (future work in Task 4.1), and, (iv) the development and implementation of a metadata geoportal that allows searching, sharing metadata and information on pre-existing (and new) datasets and quality control routines across the consortium (future work in Task 4.1).

The ensemble of final results of Task 4.1 will be reported in deliverable D4.5 (due by end of month 12).

4. Internal quality evaluation of pre-existing data

4.1 Methodological framework and workflow

4.1.1 Collection of metadata on pre-existing datasets

4.1.1.1 Dataset typifying and identification

Data inventory methods often use descriptive indicators to better characterise the objects being identified. The **pre-existing spatial data inventory** within BIO_SOS was centred in the identification and organization of the pre-existing databases and in the fulfilment of metadata for a description of the identified datasets. In this context, in order to identify pre-existing datasets within the project consortium, site partners were asked to characterize and typify their databases according to the organization described in the Annexes of the INSPIRE Directive (see Appendix 2). In this exercise, partners were asked to identify and describe pre-existing reference, *in situ* and ancillary datasets that could fall within the scope of the BIO_SOS project.

A **first survey** was conducted in the first six months of Task 4.1 and focused on the availability of: i) global or pan-European spatial databases (e.g. European Environmental Zones, European Soil Database, Hydrography and Hydrology [WISE/WFD], land cover and land use [CLC, GLC2000 and PELCOM]); ii) national and regional relevant databases, namely from environmental monitoring facilities (including LTER sites), statistical units associated to population, economic activities, agro-forestry censuses and inventories, regional and local master plans, and Natura 2000 management plans; and iii) *in situ* ecological datasets resulting from previous field surveys, mostly including species distribution records, spatially-explicit diversity assessments, and field validated habitat maps, possibly available at multiple scales and resolutions across sites and countries, and potentially spanning over large time frames.

Overall, this first inventory was **aimed at supporting**: i) a preliminary evaluation of the availability of data and databases to support site characterization, habitat mapping, and pressure modelling for each partner/site; ii) the definition of assertive strategies for internal data organization and sharing; and iii) the identification of possible key data gaps or other data limitations within the consortium. In this context, this first assessment was essential i) to determine the thematic and spatial availability of datasets across sites; ii) to identify the need and define a general strategy for new data acquisition; and to iii)evaluate the need and potential problems of implementing harmonization processes for datasets within and across databases provided by the several partners.

In order to implement a coherent metadata collection that allows coping with the difficulties of information gathering and with the implementation of a first dataset quality assessment, the collection of metadata was based on the fulfilment of a **simplified metadata profile** that follows the concepts, themes and framework (DT-DS, 2007) of the INSPIRE metadata regulation (CEC, 2008) with a few minor additional inputs (essentially for data quality assessment).

4.1.1.2 Metadata profile description

Metadata collection represents one of the core procedures in data organization and sharing, as it allows to conduct searching and querying of a large amount of datasets without the need to have access to the actual data, making processes less time consuming and more manageable at broader (e.g. worldwide) scales of implementation. Despite this fact, metadata fulfilment can still be a complex process and a time consuming task as a consequence of the need to gather information concerning many different, often specific, types of information.

Presently, at the **European level**, there are several metadata profiles being applied (e.g. INSPIRE Profile [EU], MIG Profile [PT], NEM Profile [SP], WMO Profile [meteorology]). In this context, there are two main global, national or thematic standards that establish the core metadata that need to be fulfilled

in order to have compliant information about each dataset: i) the International Standard ISO 19115:2003; and ii) the INSPIRE metadata profile, that extended the mandatory fields of the former towards a more consistent and descriptive core profile.

The descriptive capacity of these metadata profiles collides with the agility necessary to timely describe a great number of datasets. In the case of BIO_SOS, in order to have a timely analysis and to produce a first evaluation that not only considers a sufficient description of all identified datasets, but also provides a number of quality indicators, allowing the selection of critical datasets based on their internal quality, a **simplified metadata profile** was adopted for this first stage of Task 4.1 (Table 4.1).

Table 4.1 *Description of the simplified metadata profile used in the first stage of Task 4.1.*

Metadata	Description	Type of data	ISO19115	INSPIRE
Resource title	This is a characteristic, and often unique, name by which the resource is known. This field refers to the title of a specific dataset [e.g. a dataset of distribution information for the population of bats should be referred as “bats distribution data”]. The titles should be short (in length) and objective.	Text	Mandatory	Mandatory
Resource abstract	This is a brief narrative summary of the content of the resource with no more than 200 characters.	Text	Mandatory	Mandatory
Topic category	The topic category is a high-level classification scheme to assist in the grouping and topic-based search of available spatial data resources, according to the European Norm ISO 19115.	List	Mandatory	Mandatory
Spatial resolution	Spatial resolution refers to the level of spatial detail of the dataset. It shall be expressed as a set from zero to many resolution distances (typically for gridded data and imagery-derived products) or equivalent scales (typically for maps or map-derived products). An equivalent scale is generally expressed as an integer value expressing the scale denominator. A resolution distance shall be expressed as a numerical value associated with a unit of length.	Numeric	Optional	Mandatory
Temporal extent	The temporal extent defines the time period covered by the content of the resource.	Date	Optional	Mandatory
Date of publication	This is the date of publication of the resource when available, or the date of entry into force.	Date	Mandatory	Mandatory
Geographic bounding box	This field refers to the geographical scope of the dataset, particularly whether the dataset covers all or just a portion of the study area. The bounding box shall be expressed with westbound and eastbound longitudes, and southbound and northbound latitudes in decimal degrees, with a precision of at least two decimals.	Numeric	Conditional	Mandatory
File type	This field refers to the type of file of the dataset	Text	---	Mandatory
Author	This field refers to the institution or individual that produced the dataset.	Text	Mandatory	Mandatory
Property	This field refers to the property of the dataset being necessary to state if there are any conditions applying to its access and use.	List	---	Mandatory
Spatial Reference System	This field refers to the geographical reference system of the dataset.	List	Optional	---

The fulfilment of this simplified metadata profile was considered suitable at this stage, since it provides a brief dataset description and allows the assessment of the datasets main quality traits. It also allows the identification of major data gaps that need to be considered. The selected metadata profile complies with the methodological references defined for the project and allows the agile completion of a future, more complete, **INSPIRE metadata profile** by transformation of the metadata already collected to an XML format, compliant with the INSPIRE geoportal XML structure.

4.1.1.3 Data collection procedure

Methodologically, the general approach was to provide, to each BIO_SOS site partner, a **structured table** based on the simplified metadata profile described in Table 4.1, together with a methodological document where the profile was described and instructions for fulfilment were provided (see Appendix 1). Using these two resources, partners were asked to verify their own spatial databases and to contact their local and regional stakeholders (i.e. end-users and other potential data providers) in order to provide a more complete inventory of pre-existing datasets for each site. After this first database verification, partners were responsible for fulfilling the simplified metadata table for each dataset they had identified.

In order to implement a coherent metadata collection procedure and to allow the implementation of a first dataset quality assessment, test-site partners were responsible for **verifying** their collected metadata following a standard procedure that included: i) the confirmation of the inexistence of duplicates; ii) the confirmation of the inexistence of invalid characters or categories; iii) the confirmation of the inexistence of absent information; iv) the validation of the coordinate systems names and acronyms; and v) the validation of the classification of each dataset according to the annexes of the INSPIRE Directive.

A **global/European database** was also compiled by conducting a preliminary survey regarding available datasets that (spatially) covered Europe (and therefore the majority of the selected sites). This database was also submitted to internal quality evaluation and description (see below).

4.1.2 Internal quality evaluation

Data quality evaluation is a critical aspect of database evaluation procedures. **Internal data quality** evaluation refers to the assessment of specific indicators derived from the description of the internal attributes of each dataset. These indicators can be quantitative or qualitative, depending on the object of evaluation and on the evaluator's familiarization with the actual dataset. Therefore, internal quality evaluation can be implemented: (i) based on the actual datasets, using quality indicators derived from their geometrical and thematic characteristics; or then (ii) using internal and/or external descriptive characteristics of the datasets (i.e. based on metadata).

In the context of this exercise, internal quality evaluation was conducted based on the analysis of quality indicators extracted from the proposed simplified metadata profile. As data collection procedures were based on the fulfilment of metadata, and since partners were not asked to provide the actual datasets, quality evaluation was conducted at the database level. **Internal quality indicators** were computed in order to further describe the identified databases and to produce a quality evaluation focused on quantitative and qualitative descriptors (Figure 4.2). This procedure allowed the evaluation of the heterogeneity of conditions inside each database, but also of the variety of dataset context, dimension and diversity across partners and sites.

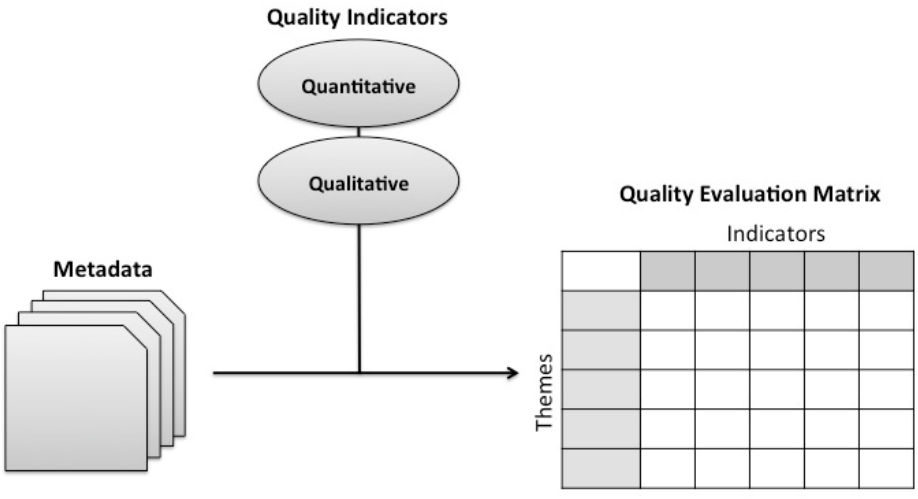


Figure 4.2 *General workflow for internal data quality evaluation.*

In terms of internal data quality, a set of **quantitative and qualitative indicators** were selected and are described in Table 4.2. In this context, all site databases were described and a preliminary quality assessment was performed for each specific database, based on the metadata information provided by site partners. Beyond this first quality evaluation, these indicators will also support the procedures for an external quality assessment of databases (see Section 5). Both internal and external quality evaluations are based on establishing comparison terms among themes for a given site (intra-database) and across sites (inter-database).

Table 4.2 *Description of the quality indicators computed from the metadata database collected by each BIO_SOS Test-site partner.*

Indicator	Description	Type of indicator	Data used	Information provided
Number of datasets	Number of datasets identified in a specific theme	Quantitative	Resource title	Dimension of the database
Spatial Quality				
Range of scales	Difference between the smaller and higher spatial scale	Quantitative	Spatial resolution	Range of scales
Range of resolutions	Difference between the smaller and higher spatial resolution	Quantitative	Spatial resolution	Range of resolutions
Number of different scales	Quantity of different spatial scales	Quantitative	Spatial resolution	Quantity of different scales
Number of different resolutions	Quantity of different spatial resolutions	Quantitative	Spatial resolution	Quantity of different resolutions
Predominant scale	Most frequent spatial scale available	Quantitative	Spatial resolution	Most frequent scale
Predominant resolution	Most frequent spatial resolution available	Quantitative	Spatial resolution	Most frequent resolution
Better scale available	Better spatial scale available	Quantitative	Spatial resolution	Better scale available
Better resolution available	Better spatial resolution available	Quantitative	Spatial resolution	Better resolution available
Temporal Quality				
Temporal extent	Difference between the most recent and ancient date	Quantitative	Temporal extent + Date of Publication	Range of dates
Predominant date (PD)	Most frequent date	Quantitative	Temporal extent + Date of Publication	Predominant date
Most recent date	Most recent date	Quantitative	Temporal extent + Date of Publication	Most recent date
Temporal actuality				
Present date – Most recent date	*Difference between present date and the most recent date*	*Quantitative*	*Temporal extent + Date of Publication*	*Actuality of the database*
Present date – Predominant date	*Difference between present date and the predominant date*	*Quantitative*	*Temporal extent + Date of Publication*	*Actuality of the database*
Format diversity	Number of different data formats available	Quantitative	File Type	Data format diversity
Image related formats	Number of datasets with image related formats	Quantitative	File Type	Quantity of image related datasets
CAD related formats	Number of datasets with CAD related formats	Quantitative	File Type	Quantity of CAD related datasets
GIS formats	Number of datasets with GIS related formats	Quantitative	File Type	Quantity of GIS related datasets
Other (not spatial) formats	Number of datasets with other, non geographical, related formats	Quantitative	File Type	Quantity of datasets related to other, non geographical, data formats
Diversity of reference systems	Number of different reference systems available	Quantitative	Spatial reference system	Quantity of different coordinate systems
Number of Global or Regional Datums	Number of datasets with Global or Regional Datums	Quantitative	Spatial reference system	Quantity of datasets with Global or Regional Datum
Number of National Datums	Number of datasets with National Datums	Quantitative	Spatial reference system	Quantity of datasets with National Datum

Table 4.2 *(Cont.).*

Indicator	Description	Type of indicator	Data used	Information provided
Property issues (PI)				
% of datasets with PI	Percentage of datasets in need of some form of licensing	Quantitative	Property	Percentage of datasets with property issues
Property				
Nr of datasets from the Administration	*Number of datasets that are property of organisms related to the Administration*	*Quantitative*	Property	*Number of datasets that are property of organisms related to the Administration*
Nr of datasets from Companies	*Number of datasets that are property of organisms related to Companies*	*Quantitative*	Property	*Number of datasets that are property of organisms related to Companies*
Nr of datasets from Universities	*Number of datasets that are property of organisms related to University*	*Quantitative*	Property	*Number of datasets that are property of organisms related to University*

These preliminary quality indicators were then used to provide a **general quality assessment** of the different databases described by site partners through metadata. This general assessment represents a comparative synthesis (see 4.2.3) and results from the combination of the evaluation and interpretation of the selected quantitative and qualitative indicators across sites and partners, and of the description of the overall (comparative) quality of the databases in terms of temporal, spatial and thematic suitability.

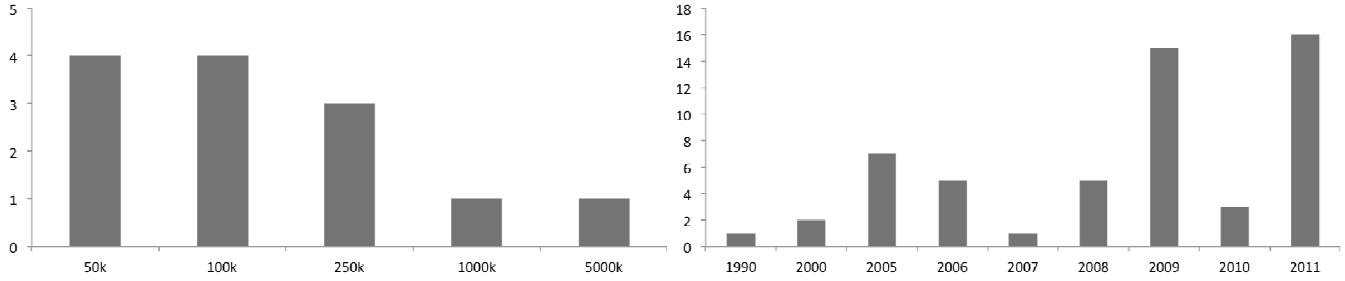
4.2 Internal quality of pre-existing datasets

4.2.1 Quality of global and regional datasets

Global and regional (European) datasets can be a source of spatial and contextual information to fill data gaps and/or to support the completion of local databases. From this preliminary survey, it was possible to identify **69 datasets**, covering 50 % of the INSPIRE Themes considered (Table 4.3). Although critical categories like Land use, Habitats and Biotopes, or Species distribution were not fulfilled, others like Hydrography, Protected areas, Land cover, Soil and Meteorological geographical features were well covered by this preliminary search, representing over 62 % of the entire database. In this context, the categories included in INSPIRE Annex I concentrate 47.8 % (30 datasets) of the datasets identified, followed by Annex III (20 datasets [29 %]) and finally Annex II (16 datasets [23.2 %]) (Table 4.3). An important factor in the scope of BIO_SOS is the availability of relevant themes like Orthoimagery or Land cover (both from Annex II), which can be of great importance for habitat classification and validation procedures and, in this sense, provide direct support for meeting project goals.

In terms of **spatial quality**, the database presents a wide range of scales (Figure 4.3a), between 1:50 000 and 1:5 000 000, and of resolutions, between 50 and 1000 meters. Despite this wide range of spatial scales, the predominant scales fall between 1:50 000 and 1:100 000 (over 61% of the identified datasets with known scale or resolution). It is also important to highlight that, in the context of project goals related to image classification and the necessary calibration procedures, Orthoimagery with 30 meters of spatial resolution are available (from Landsat sensors), as well as elevation models with the same resolution (important for calibration procedures), although the latter will require a licence in order to be used.

In terms of **temporal quality**, publication dates range between 1990 and 2011, while the temporal extent of the datasets spans between 1950 and 2011.Publication dates are more frequent for years 2009 (21.7%) and 2011 (23.2%), which denotes a high degree of up-to-dateness (Figure 4.3b). On average, datasets have a time lag between the present date (2011) and the most recent date for each INSPIRE theme of 1.9 years. This time lag is bigger when considering the same indicator for the predominant date in each INSPIRE theme (3 years).



a) b)

Figure 4.3 *Internal quality indicators for pre-existing global and European spatial data: a) number of datasets according to spatial scale; and b) number of datasets according to temporal scale (based on publishing date).*

Within this database it was possible to identify different types of **data formats** related to image and GIS related types, although other format types may also appear (in this particular case related to table and statistical data types concerning ancillary data). Over 82 % of the identified datasets are in GIS (or GIS-related) formats, and for these conversion procedures are, in principle, only limited by the diversity of spatial reference systems available. In the particular case of this global/European database, although different Datums are available, they are all related to global or regional coordinate systems, what facilitates conversion procedures and also reduces potential error propagation in modelling applications.

This first (preliminary) identification of valuable global and regional datasets that fall within the scope of BIO_SOS reveals the **availability of datasets** in specific and critical areas for the achievement of project goals, namely Land cover and Orthoimagery. Although in terms of spatial scale these datasets are not suited to act as reference data for many tasks in the project, their thematic amplitude and temporal quality, as well as their availability and reduced property issues, suggest that they can, at the least, be used to suppress specific data gaps in partner's databases at local/site level.

Table 4.3 *Summary of quality indicators (global and European datasets) extracted for each INSPIRE Directive thematic area.*

		THEMES	Nr of datasets	Range of scales	Range of resolutions	Nr of diferent scales	Nr of diferent resolutions	Predominant scale	Predominant resolution	Better scale available	Better resolution available	Temporal extent	Predominant date
			nr			nr	nr						
ANNEX I	01	Coordinate reference systems	0	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	1	-	1000m	-	1	-	1000m	-	1000m	-	-
	03	Geographical names	1	-	-	-	-	-	-	-	-	-	-
	04	Administrative units	4	100k - 5000k	-	4	-	100k 250k 1000k 5000k	-	100k	-	2010	2010
	05	Addresses	0	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	0	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	2	-	-	-	-	-	-	-	-	-	-
	08	Hydrography	13	-	-	-	-	-	-	-	-	1977 - 2011	2011
	09	Protected sites	12	-	-	-	-	-	-	-	-	2009	2009
ANNEX II	01	Elevation	4	-	30m - 1000m	-	4	-	30m 80m 60m 1000m	-	30m	1950 - 2009	2009
	02	Land cover	6	100k - 250k	1000m	2	1	100k	1000m	100k	1000m	1990 - 2009	2000
	03	Orthoimagery	4	-	30m - 1000m	-	3	-	30m 250m 1000m	-	30m	1989 - 2011	1989 2007 2009
	04	Geology	2	-	-	-	-	-	-	-	-	-	-
ANNEX III	01	Statistical units	1	-	-	-	-	-	-	-	-	-	-
	02	Buildings	1	-	-	-	-	-	-	-	-	-	-
	03	Soil	6	50k - 250k	1000m	2	1	50k 250k	1000m	50k	1000m	2006 - 2008	2006
	04	Land use	0	-	-	-	-	-	-	-	-	-	-
	05	Human health and safety	0	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	0	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	3	-	-	-	-	-	-	-	-	2011	2011
	08	Production and industrial facilities	0	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	0	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	0	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	2	-	-	-	-	-	-	-	-	2008	2008
	12	Natural risk zones	0	-	-	-	-	-	-	-	-	-	-
	13	Atmospheric conditions	0	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	6	-	200m - 1000m	-	2	-	1000m	-	200m	1950 - 2005	2005
	15	Oceanographic geographical features	0	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	0	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	1	-	-	-	-	-	-	-	-	-	-
	18	Habitats and biotopes	0	-	-	-	-	-	-	-	-	-	-
	19	Species distribution	0	-	-	-	-	-	-	-	-	-	-
	20	Energy resources	0	-	-	-	-	-	-	-	-	-	-
	21	Mineral resources	0	-	-	-	-	-	-	-	-	-	-

Table 4.3 *Summary of quality indicators (global and European datasets) extracted for each INSPIRE Directive thematic area (Cont.).*

		THEMES	Most recent date	2011-MRD	2011-PD	Format diversity	Image related formats	CAD/CAM formats	GIS formats	Other formats	Diversity of Coordinate Systems	Global or Regional Datum	National Datum	% of property issues	Administration	Companies	Universities (education)/Research teams
						nr	nr	nr	nr	nr	nr	nr	nr	%	nr	nr	nr
ANNEX I	01	Coordinate reference systems	-	-	-	-	-	-	-		-	-	-	-	-	-	-
	02	Geographical grid systems	-	-	-	1	0	0	1	0	1	1	0	0	1	0	0
	03	Geographical names	-	-	-	1	0	0	1	0	1	1	0	0	0	1	0
	04	Administrative units	2010	1	1	1	0	0	4	0	1	3	0	75	3	1	0
	05	Addresses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	-	-	-	1	0	0	2	0	1	2	0	0	0	2	0
	08	Hydrography	2011	0	0	2	0	0	1	12	1	1	0	0	12	1	0
	09	Protected sites	2009	2	2	2	0	0	1	1	1	1	0	0	1	0	0
ANNEX II	01	Elevation	2009	2	2	2	3	0	1	0	2	3	0	25	3	0	0
	02	Land cover	2009	2	11	3	2	0	4	0	3	5	0	0	3	0	2
	03	Orthoimagery	2011	0	0	3	3	0	1	0	1	4	0	0	3	1	0
	04	Geology	-	-	-	2	0	0	1	1	1	2	0	0	0	2	0
ANNEX III	01	Statistical units	-	-	-	1	0	0	1	0	1	1	0	0	-	-	-
	02	Buildings	-	-	-	1	0		1	0	1	1	0	0	0	1	0
	03	Soil	2008	3	5	3	1	0	4	0	-	-	-	0	6	0	0
	04	Land use	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	05	Human health and safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	2011	0	0	1	0	0	0	2	-	-	-	0	3	0	0
	08	Production and industrial facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	2008	3	3	1	0	0	0	2	-	-	-	0	2	0	0
	12	Natural risk zones	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13	Atmospheric conditions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	2005	6	6	2	5	0	1	0	1	6	0	0	5	0	1
	15	Oceanographic geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	-	-	-	1	0	0	1	0	1	1	0	0	1	0	0
	18	Habitats and biotopes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19	Species distribution	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20	Energy resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21	Mineral resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

4.2.2 Quality of test-site datasets

4.2.2.1 Brazil sites

Partner 12 identified a total of **46 datasets**, evenly distributed across the three Annexes of the INSPIRE Directive (Annex I: 10; Annex II: 17; Annex III: 19). From the analysis of the identified pre-existing spatial datasets (Appendix 3) it was possible to observe that, although a relatively small number of datasets was identified, 63 % of the INSPIRE Themes are covered by the described database. This is an important result, as all of the potentially critical thematic categories for the project are covered by at least one dataset (Table 4.4). Nevertheless, it is important to stress that the associated spatial scale is often very coarse (up to 1:500 000; Figure 4.4a).

Regarding the amplitude and diversity of **temporal and spatial scales**, the collected datasets present a wide range of temporal and spatial representations. In the particular case of Partner 12, datasets span over a temporal range of 10 years, between 2001 and 2011, being more frequent for years 2004 and 2011 (Figure 4.4b). Core thematic categories like Land cover, and Habitats and biotopes, present a narrower temporal timeframe (2000 and 2004, respectively), but others like Orthoimagery, Land use, and Species distribution, present a high degree of up-to-dateness (2011). As previously noted, in general the identified datasets have low spatial resolution; only Orthoimagery (best resolution: 10 meters) and Elevation (best resolution: 30 meters) seem to have resolutions compatible with project goals (Figure 4.4a). Nonetheless, even the datasets described under Orthoimagery would still not meet the expected very-high resolution of BIO_SOS classification objectives.

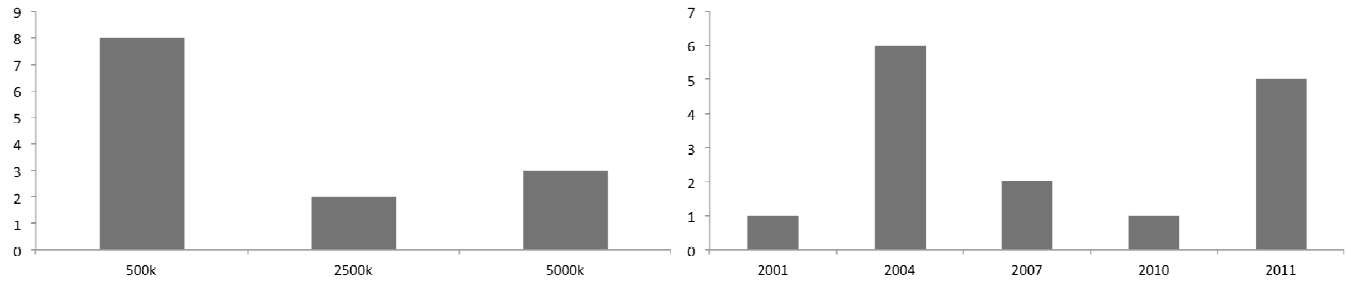


Figure 4.4 *Internal quality indicators for Partner 12 pre-existing site spatial data: a) number of datasets according to spatial scale; and b) number of datasets according to temporal scale (based on publishing date).*

Data formats are distributed by image (12 datasets) and GIS-related formats (24 datasets),as expected, although some thematic categories have image formats that can present harmonization problems as well as data gaps in terms of thematic diversity (e.g. Land Use, and Habitats and biotopes). At this level, an important issue is related to the existence of over 19 % of other formats, mainly related to PDF or other contextual, non-geographic, data. Another issue, in terms of harmonization problems, is related to the fact that only 34.1 % of the identified datasets are converted to some type of geographic reference system compatible with a European format. This detail, associated to the fact that this database is from the Southern Hemisphere, indicates that data harmonization processes related to coordinate systems transformation is one of the main issues to consider in this particular database.

In terms of **property issues**, it was interesting to observe that 100% of the datasets are available for use without the need of any type of licensing, indicating an easy access to the described datasets, which is a clear advantage, even though some of those datasets may have problems due to non-controlled lineages.

Table 4.4 *Quality indicators (Brazil sites) extracted for each INSPIRE Directive thematic area.*

		THEMES	Nr of datasets	Range of scales	Range of resolution	Nr of diferent scales	Nr of diferent resolutions	Predominant scale	Predominant resolution	Beter scale available	Beter resolution available	Temporal extent	Predominant date
			nr			nr	nr						
ANNEX I	01	Coordinate reference systems	0	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	0	-	-	-	-	-	-	-	-	-	-
	03	Geographical names	0	-	-	-	-	-	-	-	-	-	-
	04	Administrative units	2	2500k	-	1	-	2500k	-	2500k	-	2007	2007
	05	Addresses	0	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	1	500k	-	1	-	500k	-	500k	-	2004	2004
	07	Transport networks	1	-	-	-	-	-	-	-	-	-	-
	08	Hydrography	2	-	-	-	-	-	-	-	-	2011	2011
	09	Protected sites	4	-	-	-	-	-	-	-	-	2011	2011
ANNEX II	01	Elevation	4	-	30m - 90m	-	2	-	30m	-	30m	2002	2002
	02	Land cover	3	5000k	1000m	1	1	5000k	1000m	5000k	1000m	2000 - 2001	2001
	03	Orthoimagery	9	-	10m - 250m	-	6	-	30m	-	10m	1973 - 2009	2000 2001 2009
	04	Geology	1	500k		1	-	500k	-	500k	-	2004	2004
ANNEX III	01	Statistical units	0	-	-	-	-	-	-	-	-	-	-
	02	Buildings	0	-	-	-	-	-	-	-	-	-	-
	03	Soil	2	500k - 5000k	-	2	-	500k 5000k	-	500k	-	2001 - 2004	2001 2004
	04	Land use	5	500k	30m - 250m	1	2	500k	250m	500k	30m	2000 - 2008	2004
	05	Human health and safety	0	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	0	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	0	-	-	-	-	-	-	-	-	-	-
	08	Production and industrial facilities	0	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	0	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	1	-	-	-	-	-	-	-	-	2010	2010
	11	Area management/restriction/regulation zones	0	-	-	-	-	-	-	-	-	-	-
	12	Natural risk zones	2	-	500m	-	1	-	500m	-	500m	2000	2000
	13	Atmospheric conditions	0	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	3	-	0,25°	-	1	-	0,25°	-	0,25°	1964 - 1998	1964 - 1990 1998
	15	Oceanographic geographical features	0	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	0	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	2	5000k	-	1	-	5000k	-	5000k	-	2001	2001
	18	Habitats and biotopes	2	500k	-	1	-	500k	-	500k	-	2004	2004
	19	Species distribution	1	-	-	-	-	-	-	-	-	2011	2011
	20	Energy resources	1	-	-	-	-	-	-	-	-	2011	2011
	21	Mineral resources	0	-	-	-	-	-	-	-	-	-	-

Table 4.4 *Quality indicators (Brazil sites) extracted for each INSPIRE Directive thematic area (Cont.).*

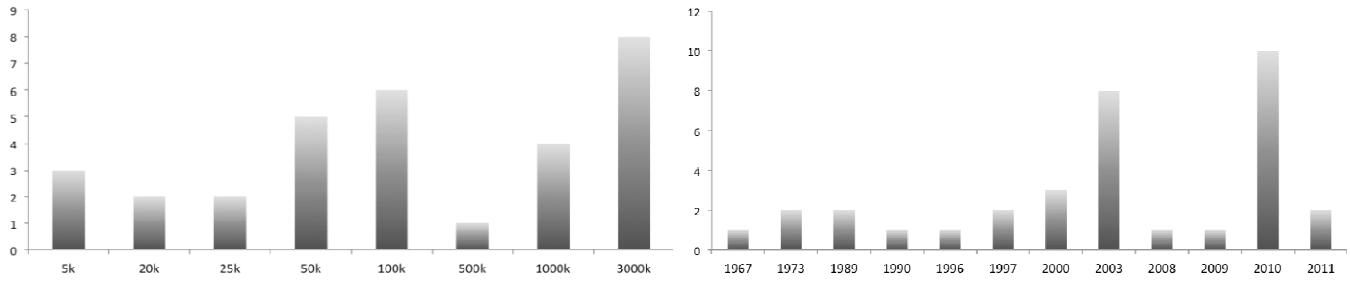
		THEMES	Most recent date	2011-MRD	2011-PD	Format diversity	Image related formats	CAD/CAM formats	GIS formats	Other formats	Diversity of Coordinate Systems	Global or Regional Datum	National Datum	% of property issues	Administration	Companies	Universities (education)/Research teams
						nr	nr	nr	nr	nr	nr	nr	nr	%	nr	nr	nr
ANNEX I	01	Coordinate reference systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	03	Geographical names	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	04	Administrative units	2007	4	4	1	0	0	2	0	1	0	2	0	?	?	?
	05	Addresses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	2004	7	7	1	0	0	0	1	1	0	1	0	?	?	?
	07	Transport networks	-	-	-	1	0	0	1	0	1	0	1	0	?	?	?
	08	Hydrography	2011	0	0	1	0	0	2	0	1	0	2	0	?	?	?
	09	Protected sites	2011	0	0	1	0	0	4	0	1	0	4	0	?	?	?
ANNEX II	01	Elevation	2002	9	9	2	2	0	1	0	2	3	1	0	?	?	?
	02	Land cover	2001	10	10	2	0	0	3	0	2	1	2	0	?	?	?
	03	Orthoimagery	2009	2	2	1	9	0	0	0	1	9	0	0	?	7	?
	04	Geology	2004	7	7	1	0	0	0	1	1	0	1	0	?	?	?
ANNEX III	01	Statistical units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	03	Soil	2004	7	7	2	0	0	1	1	1	0	2	0	?	?	?
	04	Land use	2008	3	7	3	0	0	4	1	1	0	5	0	?	?	?
	05	Human health and safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	08	Production and industrial facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	2010	1	1	1	0	0	0	1	0	-	-	0	?	?	?
	11	Area management/restriction/regulation zones	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12	Natural risk zones	2000	11	11	2	1	0	1	0	2	1	1	0	?	1	?
	13	Atmospheric conditions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	1998	13	13	3	0	0	1	2	2	1	1	0	?	1	?
	15	Oceanographic geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	2001	10	10	1	0	0	2	0	1	0	2	0	?	?	?
	18	Habitats and biotopes	2004	7	7	1	0	0	0	2	1	0	2	0	?	?	?
	19	Species distribution	2011	0	0	1	0	0	1	0	1	0	1	0	?	?	?
	20	Energy resources	2011	0	0	1	0	0	1	0	1	0	1	0	?	?	?
	21	Mineral resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

4.2.2.2 Greece sites

Partner 2 identified a total of **49 datasets** covering all three Annexes of the INSPIRE Directive (Annex I: 22; Annex II: 9; Annex III: 18). From the analysis of the identified pre-existing spatial datasets (Appendix 3), it was possible to observe that over 58% of the INSPIRE categories are covered by the database. Only Annex II is completely covered (100% of categories covered), denoting some important data gaps in the other two Annexes (66.7%coverage for Annex I; 42.9%coverage for Annex III) (Table 4.5). Nonetheless, all themes have at least one identified dataset, which potentially represents good database consistency. In this context, it is important to observe that the spatial scales associated to the datasets described in these central themes (e.g. Land Cover, Land Use and Species distribution) are very coarse when compared to project goals, being mainly coarser than 1:100 000 (Figure 4.5a).

The collected datasets present a wide range of **temporal and spatial scales,** which reflects on a diverse data quality for these two general indicators. In the particular case of Partner 2, datasets cover a range of 45 years, between 1967 and 2011, being more frequent within the interval spanning from 2003 to 2010 (Figure 4.5b). Despite this wide temporal amplitude, datasets are predominantly from recent years, with around 41% of the entire database between 2008 and 2010. Spatial quality indicators show a range of available scales varying between 1:5000 and 1:3 000 000, but more frequently between 1:1 000 000 and 1:3 000 000 (38.7 % of the available scales), and between 1:50 000 and 1:100 000 (35.5 % of the available scales) (Figure 4.5a).

Regarding the **potentially critical themes** for project goals, this particular database includes Google's Web Map Service as a pre-existing dataset for Orthoimagery. This represents an important positive indication of the way pre-existing data are seen within the scope of BIO_SOS, but still, because no other dataset was listed for this specific theme, it cannot be considered a core dataset for project goals as it cannot be used for image classification.



a) b)

Figure 4.5 *Internal quality indicators for Partner 2 pre-existing site spatial data: a) number of datasets according to spatial scale; and b) number of datasets according to temporal scale (based on publishing date).*

The described datasets present **data formats** distributed in image and GIS related formats. This, together with the fact that 60%[1] of the datasets are in national reference systems, presents potential difficulties for data harmonization within the project scope. In this particular case, it is important to stress that this specific field in the metadata profile (spatial reference) was only filled in 51% of the described databases, which affects the analysis of this indicator. As for other site databases, the use of different local Datums can result in error propagation problems and in an important reduction of spatial accuracy of the subsequent spatial analyses.

In terms of **property issues**, it is interesting to observe that only 27.5% of the database requires some type of licensing, indicating an easy access to the collected datasets. Nonetheless, it is also important to highlight that datasets related to Species distribution are entirely subject to licensing; the same applies to 50% of the Land use datasets.

Table 4.5 *Quality indicators (Greece sites) extracted for each INSPIRE Directive thematic area.*

		THEMES	Nr of datasets	Range of scales	Range of resolution	Nr of diferent scales	Nr of diferent resolutions	Predominant scale	Predominant resolution	Better scale available	Better resolution available	Temporal extent	Predominant date
			nr			nr	nr						
ANNEX I	01	Coordinate reference systems	0	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	7	-	5000m - 1000000m	-	7	-	5000m 25000m 50000m 100000m 250000m 500000m	-	5000m	-	-
	03	Geographical names	1	50k	-	1	-	50k	-	50k	-	-	-
	04	Administrative units	1	50k	-	1	-	50k	-	50k	-	-	-
	05	Addresses	0	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	0	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	1	1000k	-	1	-	1000k	-	1000k	-	-	-
	08	Hydrography	8	50k	-	1	-	50k	-	50k	-	2008 - 2010	2010
	09	Protected sites	4	100k	-	1	-	100k	-	100k	-	2000 - 2011	2000 2010 2011
ANNEX II	01	Elevation	4	5k - 50k	30m - 250m	2	3	5k 50k	30m 100m 250m	5k	30m	2009	2009
	02	Land cover	3	100k	100m - 250m	1	2	100k	100m	100k	100m	1990 - 2000	1990 2000
	03	Orthoimagery	1	-	20cm - 50cm	-	2	-	20cm 50cm	-	20cm	2010	2010
	04	Geology	1	50k	-	1	-	50k	-	50k	-	1996	1996
ANNEX III	01	Statistical units	0	-	-	-	-	-	-	-	-	-	-
	02	Buildings	0	-	-	-	-	-	-	-	-	-	-
	03	Soil	2	1000k	-	1	-	1000k	-	1000k	-	1967 - 2003	1967 2003
	04	Land use	2	20k - 3000k	-	2	-	20k - 3000k	-	20k	-	1973	1973
	05	Human health and safety	0	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	0	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	0	-	-	-	-	-	-	-	-	-	-
	08	Production and industrial facilities	0	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	1	3000k	-	1	-	3000k	-	3000k	-	2003	2003
	10	Population distribution — demography	1	3000k	-	1	-	3000k	-	3000k	-	1973	1973
	11	Area management/restriction/regulation zones and reporting units	1	-	-	-	-	-	-	-	-	-	-
	12	Natural risk zones	2	500k	-	1	-	500k	-	500k	-	1989	1989
	13	Atmospheric conditions	0	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	5	1000k - 3000k	-	2	-	3000k	-	1000k	-	2003	2003
	15	Oceanographic geographical features	0	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	0	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	0	-	-	-	-	-	-	-	-	-	-
	18	Habitats and biotopes	3	20k - 3000k	-	3	-	20k 100k 3000k	-	20k	-	2000 - 2003	2000 2003
	19	Species distribution	1	100k	-	1	-	100k	-	100k	-	2000	2000
	20	Energy resources	0	-	-	-	-	-	-	-	-	-	-
	21	Mineral resources	0	-	-	-	-	-	-	-	-	-	-

[1]This value considers only the datasets with coordinate system characterization, which only occurs in 51% of the described database.

Table 4.5 *Quality indicators (Greece sites) extracted for each INSPIRE Directive thematic area (Cont.).*

		THEMES	Most recent date	2011-MRD	2011-PD	Format diversity	Image related formats	CAD/CAM formats	GIS formats	Other formats	Diversity of Coordinate Systems	Global or Regional Datum	National Datum	% of property issues	Administration	Companies	Universities (education)/Research teams
						nr	nr	nr	nr	nr	nr	nr	nr	%	nr	nr	nr
ANNEX I	01	Coordinate reference systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	-	-	-	1	0	0	7	0	3	4	1	86	?	?	?
	03	Geographical names	-	-	-	1	1	0	0	0	-	-	-	100	?	?	?
	04	Administrative units	-	-	-	1	0	0	1	0	1	0	1	0	?	?	?
	05	Addresses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	-	-	-	1	0	0	1	0	1	0	1	100	?	?	?
	08	Hydrography	2010	1	1	1	0	0	8	0	1	0	8	0	?	?	?
	09	Protected sites	2011	0	0	1	0	0	4	0	1	2	0	0	?	?	?
ANNEX II	01	Elevation	2009	2	2	3	1	0	3	0	2	1	3	75	?	?	?
	02	Land cover	2000	11	11	2	2	0	1	0	1	3	0	0	?	?	?
	03	Orthoimagery	2010	1	1	1	0	0	1	0	1	0	1	0	?	?	?
	04	Geology	1996	15	15	1	0	0	0	1	-	-	-	100	?	?	?
ANNEX III	01	Statistical units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	03	Soil	2003	8	8	1	0	0	0	2	-	-	-	0	?	?	?
	04	Land use	1973	38	38	1	0	0	0	2	-	-	-	0	?	?	?
	05	Human health and safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	08	Production and industrial facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	2003	8	8	1	0	0	0	1	-	-	-	0	?	?	?
	10	Population distribution — demography	1973	38	38	1	0	0	0	1	-	-	-	0	?	?	?
	11	Area management/restriction/regulation zones and reporting units	-	-	-	1	-	-	-	-	-	-	-	0	?	?	?
	12	Natural risk zones	1989	22	22	-	-	-	-	-	-	-	-	0	?	?	?
	13	Atmospheric conditions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	2003	8	8	1	0	0	0	5	-	-	-	0	?	?	?
	15	Oceanographic geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Habitats and biotopes	2003	8	8	2	0	0	1	2	-	-	-	66,6	?	?	?
	19	Species distribution	2000	11	11	1	0	0	1	0	-	-	-	100	?	?	?
	20	Energy resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21	Mineral resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

4.2.2.3 Italy sites

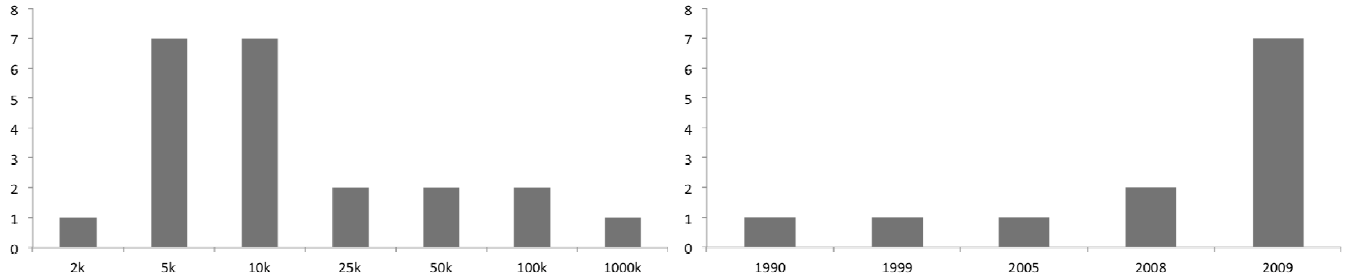
Partner 8 and Partner 1 jointly collected **34 datasets**, distributed across the three annexes of the INSPIRE Directive (Annex I: 14; Annex II: 9; Annex III: 11). Over 55% of the INSPIRE categories are not filled; there are thus potentially critical themes (e.g. Land Use) with no datasets in the database. From the analysis of the identified pre-existing spatial datasets (Appendix 3), the degree of completeness of the database is rather small at this stage, particularly for Annex III, with a fulfilment of only 23.8% of the themes (Table 4.6).

Regarding the **spatial quality indicators** for the identified datasets, it was possible to observe that the predominant scales are between 1:5000 and 1:10 000 (63.3% of the datasets identified[2]) (Figure 4.6a). This internal quality indicator is compatible with project goals, but it is important to note that finer spatial scales are often associated with datasets with earlier temporal ranges (between 2000 and 2006).

Concerning the **temporal quality indicators**, the collected datasets present wide amplitude, covering a temporal range of 20 years, between 1990 and 2009, but being more frequent for 2009[3] (Figure 4.6b). Since these results were extracted from the collected metadata, some important gaps in the filling of the publication date field in the metadata table suggest that these preliminary temporal quality results may be misleading. In the particular case of Orthoimagery, this theme presents a temporal range between 1997 and 2006 and it is based on aerial photographs. These datasets present a high spatial resolution (0.5 and 2 meters resolution), and therefore they may be important ancillary data to support project goals.

[2] 23.5% of the listed datasets in this specific database don't have spatial scale related metadata described.

[3] 44.1% of the listed datasets in this specific database don't have temporal scale related metadata described.



a) b)

Figure 4.6 *Internal quality indicators for Partner 8 and Partner 1 pre-existing site spatial data: a) number of datasets according to spatial scale; and b) number of datasets according to temporal scale (based on publishing date).*

In terms of **data formats**, only 55.9 % of the database was characterized, which denotes a limited quantity of information to assess. In this regard, 89.5 % of the datasets characterized (in relation to this specific quality indicator) are in GIS formats, potentially indicating less difficulty when trying to harmonize or combine information. The data harmonization process is also limited by the type of reference system of the datasets in the database, which is predominantly in national Datums, representing 63 % of the described datasets. This is more prominent in some specific INSPIRE Themes, namely Land use, Biogeographic regions, and Habitats and biotopes, while Orthoimagery and Elevation are predominantly in global/regional Datums. Also, it is important to note that none of the characterized datasets are subject to any type of **licensing** or other constraints, facilitating their access.

Table 4.6 *Quality indicators (Italy sites) extracted for each INSPIRE Directive thematic area.*

		THEMES	Nr of datasets	Range of scales	Range of resolution	Nr of diferent scales	Nr of diferent resolutions	Predominant scale	Predominant resolution	Beter scale available	Beter resolution available	Temporal extent	Predominant date
			nr			nr	nr						
ANNEX I	01	Coordinate reference systems	0	0	0	-	-	-	-	-	-	-	-
	02	Geographical grid systems	3	-	5000m - 100000m	-	3	-	5000m 50000m 100000m	-	5000m	-	-
	03	Geographical names	1	1000k	-	1	-	1000k	-	1000k	-	-	-
	04	Administrative units	2	50k	-	1	-	50k	-	50k	-	-	-
	05	Addresses	0	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	1	2k	-	1	-	2k	-	2k	-	-	-
	07	Transport networks	1	-	-	-	-	-	-	-	-	2008	2008
	08	Hydrography	0	-	-	-	-	-	-	-	-	-	-
	09	Protected sites	6	10k	-	1	-	10k	-	10k	-	2000 - 2007	2000 - 2007
ANNEX II	01	Elevation	2	25k	8m	1	1	25k	8m	25k	8m	2009	2009
	02	Land cover	4	5k - 100k	-	2	-	5k 100k	-	5k	-	1990 - 2009	1990 1999 2006
	03	Orthoimagery	2	-	0,5m - 2m	-	2	-	0,5m 2m	-	0,5m	1997 - 2006	1997 2006
	04	Geology	1	25k	-	1	-	25k	-	25k	-	2006 - 2009	2006 2009
ANNEX III	01	Statistical units	0	-	-	-	-	-	-	-	-	-	-
	02	Buildings	0	-	-	-	-	-	-	-	-	-	-
	03	Soil	1	-	-	-	-	-	-	-	-	-	-
	04	Land use	0	-	-	-	-	-	-	-	-	-	-
	05	Human health and safety	0	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	0	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	0	-	-	-	-	-	-	-	-	-	-
	08	Production and industrial facilities	0	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	0	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	0	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	0	-	-	-	-	-	-	-	-	-	-
	12	Natural risk zones	1	10k	-	1	-	10k	-	10k	-	2000 - 2007	2000 - 2007
	13	Atmospheric conditions	0	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	4	-	-	-	-	-	-	-	-	-	-
	15	Oceanographic geographical features	0	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	0	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	0	-	-	-	-	-	-	-	-	-	-
	18	Habitats and biotopes	3	5k	-	1	-	5k	-	5k	-	2005 - 2009	2005 2006 2009
	19	Species distribution	2	-	-	-	-	-	-	-	-	2006 - 2009	2006 2009
	20	Energy resources	0	-	-	-	-	-	-	-	-	-	-
	21	Mineral resources	0	-	-	-	-	-	-	-	-	-	-

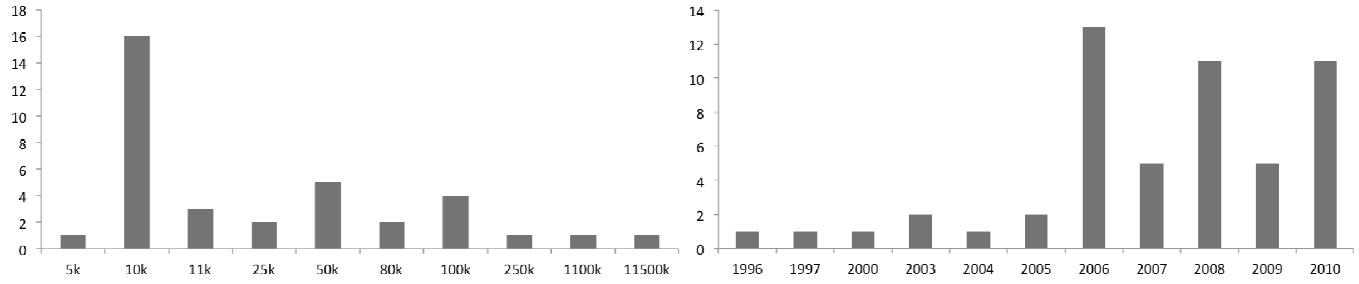
Table 4.6 *Quality indicators (Italy sites) extracted for each INSPIRE Directive thematic area (Cont.).*

		THEMES	Most recent date	2011-MRD	2011-PD	Format diversity	Image related formats	CAD/CAM formats	GIS formats	Other formats	Diversity of Coordinate Systems	Global or Regional Datum	National Datum	% of property issues	Administration	Companies	Universities (education)/Research teams
						nr	nr	nr	nr	nr	nr	nr	nr	%	nr	nr	nr
ANNEX I	01	Coordinate reference systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	-	-	-	1	0	0	3	0	1	0	3	0	?	?	?
	03	Geographical names	-	-	-	1	0	0	1	0	1	0	1	0	?	?	?
	04	Administrative units	-	-	-	1	0	0	2	0	1	0	2	0	?	?	?
	05	Addresses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	-	-	-	1	0	0	1	0	1	1	0	100	?	?	?
	07	Transport networks	2008	3	3	-	-	-	-	-	1	1	0	100	?	?	?
	08	Hydrography	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	09	Protected sites	2007	4	4	-	-	-	-	-	1	0	6	0	?	?	?
ANNEX II	01	Elevation	2009	2	2	2	1	0	1	0	2	1	1	0	?	?	?
	02	Land cover	2009	2	5	1	0	0	4	0	2	1	2	25	?	?	?
	03	Orthoimagery	2006	5	5	1	1	0	0	0	2	1	1	0	?	?	?
	04	Geology	2009	2	2	1	0	0	1	0	1	1	0	100	?	?	?
ANNEX III	01	Statistical units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	03	Soil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	04	Land use	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	05	Human health and safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	08	Production and industrial facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12	Natural risk zones	2007	4	4	1	0	0	1	0	1	0	1	0	?	?	?
	13	Atmospheric conditions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15	Oceanographic geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Habitats and biotopes	2009	2	2	1	0	0	3	0	-	-	-	66,6	?	?	?
	19	Species distribution	2009	2	2	-	-	-	-	-	-	-	-	100	?	?	?
	20	Energy resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21	Mineral resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

4.2.2.4 Netherlands sites

Partner 4 was responsible for describing **60 datasets** distributed across the three annexes of the INSPIRE Directive. From the analysis of the identified pre-existing spatial datasets (Appendix 3), it could be observed that only 41% of the INSPIRE themes are covered by the collected data. This represents an important indicator, as some of the core thematic categories for the project were, apparently, not covered by any dataset, namely Orthoimagery, and Habitats and biotopes. According to this analysis, only Annex I (reference data) is well covered by pre-existing datasets; while Annex II and especially Annex III (thematic data) are not representatively filled, corresponding to only 28.3% of the collected pre-existing spatial datasets (Table 4.7). Although some core themes are not covered by the collected datasets, there are also themes that are represented by a large number of datasets, namely Land Use (with spatial scales ranging from 1:25 000 to 1:100 000) and Elevation (with spatial resolutions ranging from 5 to 100 meters).

Regarding the **temporal and spatial scales**, the collected datasets present a wide range of temporal and spatial representations. In the particular case of Partner 4, datasets cover a temporal range of 160 years, between 1850 and 2010, but they were published predominantly between 2006 and 2010 (Figure 4.7b). Thematic categories like Transport network, Hydrography, Protected sites, Land cover, Geology, and Land use, present a greater level of up-to-dateness in this specific database. In this context, it is important to make a particular reference to the listed Land use datasets, as they cover a range of 159 years, being the widest range listed in all INSPIRE categories from all studied site databases. While these themes present a high temporal quality, some of them, namely Land Cover, Geology, and Land Use, have low predominant spatial scales (e.g. 1:50 000 and 1:100 000), which indicate that although the datasets have a good degree of up-to-dateness, some themes may have spatial scales which are inconsistent with project objectives. In terms of spatial scale, the datasets range from an identified scale of 1:11 500 000 (e.g. “Military terrains 2003 [names]”) to 1:5000 (e.g. “Top25 names 2006”), being more frequent at spatial scales over 1:11 000 (Figure 4.7a). This wide range of scales indicates the diversity present in this particular database.



a) b)

Figure 4.7 *Internal quality indicators for Partner 4 pre-existing site spatial data: a) number of datasets according to spatial scale; and b) number of datasets according to temporal scale (based in publishing date).*

Data formats are very consistent since all datasets are already in GIS formats. Although this is true, data conversions are still needed, since it was possible to observe some diversity of spatial reference systems, 91 % of which are national systems. The fact that only 9 % of the datasets are in European spatial reference systems can contribute to error propagation in the data harmonization processes within BIO_SOS. Another important issue is the inexistence (in the provided metadata) of image related formats (e.g. Orthoimagery). Since BIO_SOS focus on image classification processes, this may represent a major data gap for this specific database.

In terms of **property issues**, it is relevant that 85 % of the database requires some type of licensing, being that only one dataset from each of the Land cover, Soils, and Land use themes are not subject of licensing.

Table 4.7 *Quality indicators (Netherlands sites) extracted for each INSPIRE Directive thematic area.*

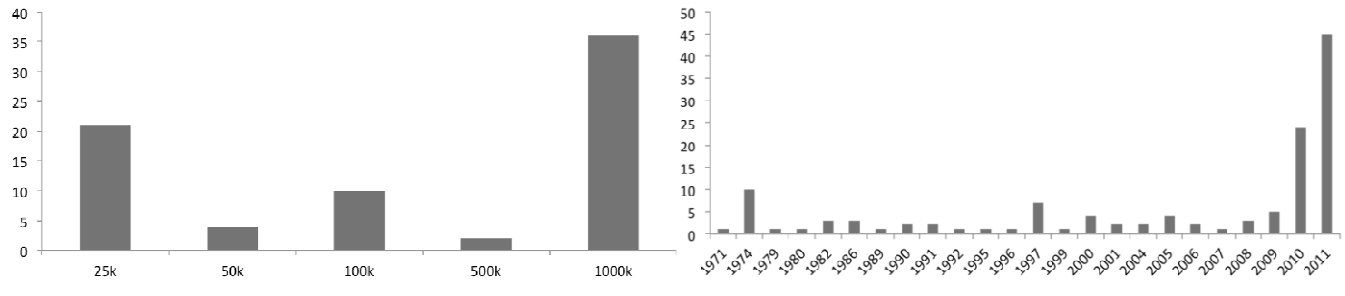
		THEMES	Nr of datasets	Range of scales	Range of resolution	Nr of diferent scales	Nr of diferent resolutions	Predominant scale	Predominant resolution	Beter scale available	Beter resolution available	Temporal extent	Predominant date
			nr			nr	nr						
ANNEX I	01	Coordinate reference systems	1	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	4	-	5000m -	-	4	-	5000m 10000m 50000m 100000m	-	5000m	2003 - 2010	2007
	03	Geographical names	2	5k - 11500k	-	2	-	5k 250k - 11500k	-	5k	-	2003 - 2006	2003 2006
	04	Administrative units	12	10k - 11k	-	2	-	11k	-	10k	-	2006 - 2010	2006
	05	Addresses	3	-	-	-	-	-	-	-	-	2006	2006
	06	Cadastral parcels	0	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	3	10k	-	1	-	10k	-	10k	-	2010	2010
	08	Hydrography	5	10k - 50k	-	2	-	10k	-	10k	-	2006 - 2010	2008
	09	Protected sites	13	10k - 1100k	-	5	-	10k	-	10k	-	1996 - 2010	2008
ANNEX II	01	Elevation	3	-	5m - 100m	-	3	-	5m 25m 100m	-	5m	-	-
	02	Land cover	1	100k	-	1	-	100k	-	100k	-	2008	2008
	03	Orthoimagery	0	-	-	-	-	-	-	-	-	-	-
	04	Geology	1	50k	-	1	-	50k	-	50k	-	2008	2008
ANNEX III	01	Statistical units	0	-	-	-	-	-	-	-	-	-	-
	02	Buildings	0	-	-	-	-	-	-	-	-	-	-
	03	Soil	2	50k	-	1	-	50k	-	50k	-	2006	2006
	04	Land use	4	25k - 100k	-	3	-	50k	-	25k	-	1850 - 2009	1859 1900 2005 2006 2007 2009
	05	Human health and safety	0	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	0	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	0	-	-	-	-	-	-	-	-	-	-
	08	Production and industrial facilities	0	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	0	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	0	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	0	-	-	-	-	-	-	-	-	-	-
	12	Natural risk zones	0	-	-	-	-	-	-	-	-	-	-
	13	Atmospheric conditions	0	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	0	-	-	-	-	-	-	-	-	-	-
	15	Oceanographic geographical features	0	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	0	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	6	10k	25m	1	1	10k	25m	10k	25m	1997 - 2009	2007
	18	Habitats and biotopes	0	-	-	-	-	-	-	-	-	-	-
	19	Species distribution	0	-	-	-	-	-	-	-	-	-	-
	20	Energy resources	0	-	-	-	-	-	-	-	-	-	-
	21	Mineral resources	0	-	-	-	-	-	-	-	-	-	-

Table 4.7 *Quality indicators (Netherlands sites) extracted for each INSPIRE Directive thematic area (Cont.).*

		THEMES	Most recent date	2011-MRD	2011-PD	Format diversity	Image related formats	CAD/CAM formats	GIS formats	Other formats	Diversity of Coordinate Systems	Global or Regional Datum	National Datum	% of property issues	Administration	Companies	Universities (education)/Research teams
						nr	nr	nr	nr	nr	nr	nr	nr	%	nr	nr	nr
ANNEX I	01	Coordinate reference systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	2010	1	4	1	0	0	4	0	2	2	1	50	?	?	?
	03	Geographical names	2006	5	5	1	0	0	2	0	1	0	2	100	?	?	?
	04	Administrative units	2010	1	5	1	0	0	11	0	1	0	12	100	?	?	?
	05	Addresses	2006	5	5	1	0	0	3	0	1	0	3	100	?	?	?
	06	Cadastral parcels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	2010	1	1	-	-	-	-	-	1	0	3	100	?	?	?
	08	Hydrography	2010	1	3	-	-	-	-	-	1	0	5	100	?	?	?
	09	Protected sites	2010	1	3	-	-	-	-	-	1	0	6	100	?	?	?
ANNEX II	01	Elevation	-	-	-	-	-	-	-	-	-	-	-	0	?	?	?
	02	Land cover	2008	3	3	-	-	-	-	-	1	0	1	0	?	?	?
	03	Orthoimagery	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	04	Geology	2008	3	3	-	-	-	-	-	1	0	1	100	?	?	?
ANNEX III	01	Statistical units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	03	Soil	2006	5	5	-	-	-	-	-	1	0	1	50	?	?	?
	04	Land use	2009	2	2	1	1	0	0	0	1	0	4	75	?	?	?
	05	Human health and safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	08	Production and industrial facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	12	Natural risk zones	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13	Atmospheric conditions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15	Oceanographic geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	2009	2	4	1	0	0	3	0	2	3	3	100	?	?	?
	18	Habitats and biotopes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	19	Species distribution	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	20	Energy resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	21	Mineral resources	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

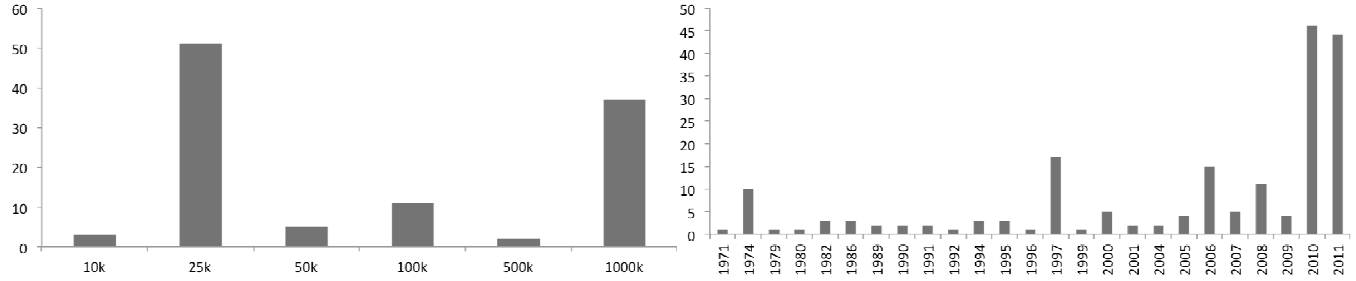
4.2.2.5 Portugal sites

Partner 9 was responsible for describing **196 and 265 datasets**, respectively for sites PT1 and PT2, distributed across the three annexes of the INSPIRE Directive (Tables 4.8 and 4.9). From the analysis of the identified pre-existing spatial datasets (Appendix 3) for PT1 ("Sabor-Maçãs"), it was possible to observe that 79.4% of the INSPIRE themes are covered by the database, fulfilling all potential critical themes. In this database, INSPIRE categories related to Annex II are fulfilled, and the other Annexes have a coverage of 67% (Annex I) and 85.7% (Annex III). In the case of the database related to PT2 ("Peneda-Gerês"), the overall coverage percentage rises to 82.4%, although with a similar level of theme fulfilment (Annex I: 67%; Annex II: 100%; Annex III: 85.7%). Within both databases, potentially critical themes (e.g. Elevation, Land cover, Orthoimagery, Habitats and biotopes, and Species distribution), present a high number of datasets listed, representing 42.9% (PT1) and 46.4% (PT2) of the respective databases. In both cases, Orthoimagery corresponds to the theme with the highest number of datasets (57 datasets).



a) b)

Figure 4.8 *Internal quality indicators for Partner 9 pre-existing site spatial data (PT1site): a) number of datasets according to spatial scale; and b) number of datasets according to temporal scale (based on publishing date).*



a) b)

Figure 4.9 *Internal quality indicators for Partner 9 pre-existing site spatial data (PT2site): a) number of datasets according to spatial scale; and b) number of datasets according to temporal scale (based on publishing date).*

For **scale quality indicators**, the PT1 and PT2 databases had similar results, although the latter presented somewhat higher quality evaluation results. In this sense, it is important to notice that spatial scales range between 1:25 000 and 1:1 000 000 in PT1 and between 1:10 000 and 1:1 000 000 in PT2. These spatial scale ranges indicate predominance for 1:25 000 and 1:1 000 000 in both databases (Figures 4.8a and 4.9a). Regarding this particular indicator, although both databases present high spatial quality, only PT2 datasets are close to project goals. The described datasets present high **temporal quality** for both databases. Temporal amplitude varies between 1971 and 2011 in both cases, but datasets were most frequently published between 2010 and 2011 (Figures 4.8b and 4.9b). Although both databases present similar results, temporal up-to-dateness indicators show a slight difference between PT1 and PT2. On average, PT2 (difference between present date and most recent date: 5.5 years) is 1.1 year more up-to-date then PT1 (difference between present date and most recent date: 6.6 years).

Datum conversions for datasets present in these two databases will be needed, since it was possible to observe some diversity of **spatial reference** systems, with 64 % and 66 % of national spatial reference systems for PT1 and PT2, respectively. In these two databases, Orthoimagery presents not only the highest number of datasets available, but also the fewest problems with conversion, since the listed datasets are already in global/regional Datums. In terms of **property issues**, the proportion of datasets requiring some type of use licence reaches 32 % for PT1 and 42 % for PT2, configuring a good result for this specific quality indicator.

Table 4.8 *Quality indicators (PT1site) extracted for each INSPIRE Directive thematic area.*

		THEMES	Nr of datasets	Range of scales	Range of resolution	Nr of diferent scales	Nr of diferent resolutions	Predominant scale	Predominant resolution	Beter scale available	Beter resolution available	Temporal extent
			nr			nr	nr					
ANNEX I	01	Coordinate reference systems	0	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	4	-	1000m - 50000m	-	4	-	1000m 10000m 25000m 50000m	-	1000m	1997 - 2000
	03	Geographical names	2	25k	-	1	-	25k	-	25k	-	1996 - 1998
	04	Administrative units	5	25k - 100k	-	2	-	25k	-	25k	-	2009 - 2010
	05	Addresses	0	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	0	-	-	-	-	-	-	-	-	-
	07	Transport networks	2	50k - 1000k	-	2	-	50k 1000k	-	50k	-	1997 - 2000
	08	Hydrography	8	25k - 1000k	-	2	-	25k	-	25k	-	1989 - 1997
	09	Protected sites	3	100k	-	1	-	100k	-	100k	-	2008 - 2009
ANNEX II	01	Elevation	6	1000k	25m - 80m	1	3	1000k	30m	1000k	25m	1982 - 2009
	02	Land cover	6	25k - 100k	-	2	-	25k 100k	-	25k	-	1990 - 2011
	03	Orthoimagery	57	-	30m - 1000m	-	3	-	30m	-	30m	1984 - 2011
	04	Geology	2	500k	-	1	-	500k	-	500k	-	2005
ANNEX III	01	Statistical units	1	25k	-	1	-	25k	-	25k	-	2001
	02	Buildings	0	-	-	-	-	-	-	-	-	-
	03	Soil	4	100k - 1000k	-	2	-	1000k	-	100k	-	1971 - 2004
	04	Land use	3	100k - 1000k	-	2	-	1000k	-	100k	-	1980 - 2004
	05	Human health and safety	0	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	11	-	-	-	-	-	-	-	-	2007 - 2010
	07	Environmental monitoring facilities	10	50k - 1000k	-	2	-	1000k	-	50k	-	1986 - 2009
	08	Production and industrial facilities	10	1000k	-	1	-	1000k	-	1000k	-	2010
	09	Agricultural and aquaculture facilities	4	25k -1000k	-	2	-	25k 1000k	-	25k	-	1989 - 1999
	10	Population distribution — demography	4	25k	-	1	-	25k	-	25k	-	1991 - 2001
	11	Area management/restriction/regulation zones and reporting units	10	25k	-	1	-	25k	-	25k	-	2011
	12	Natural risk zones	5	1000k	25m	1	1	1000k	25m	1000k	25m	1901 - 2010
	13	Atmospheric conditions	1	1000k	-	1	-	1000k	-	1000k	-	1992
	14	Meteorological geographical features	14	50k - 1000k	200m - 1000m	3	2	1000k	1000m	50k	200m	1931 - 2007
	15	Oceanographic geographical features	0	-	-	-	-	-	-	-	-	-
	16	Sea regions	0	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	5	25k - 1000k	-	2	-	1000k	-	25k	-	1984 - 1994
	18	Habitats and biotopes	3	25k - 1000k	-	2	-	25k	-	25k	-	2000 - 2010
	19	Species distribution	12	1000k	5m - 10000m 0,002778°	1	4	1000k	5m 1000m 10000m 0,002778°	1000k	5m 0,002778°	1997 - 2010
	20	Energy resources	1	1000k	-	1	-	1000k	-	1000k	-	-
	21	Mineral resources	3	1000k	-	1	-	1000k	-	1000k	-	1991

Table 4.8 *Quality indicators (PT1site) extracted for each INSPIRE Directive thematic area (Cont.).*

		THEMES	Predominant date	Most recent date	2011-MRD	2011-PD	Format diversity	Image related formats	CAD/CAM formats	GIS formats	Other formats	Diversity of Coordinate Systems	Global or Regional Datum	National Datum	% of property issues	Administration	Companies	Universities (education)/Research teams
							nr	nr	nr	nr	nr	nr	nr	nr	%	nr	nr	nr
ANNEX I	01	Coordinate reference systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	1997 2000	2000	11	11	1	0	0	4	0	2	2	2	0	-	-	-
	03	Geographical names	1996 - 1997 1996 -	1998	13	13	1	0	0	2	0	1	0	2	0	2	0	0
	04	Administrative units	2010	2010	1	1	1	0	0	5	0	2	4	1	0	5	0	0
	05	Addresses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	1997 2000	2000	11	11	1	0	0	2	0	2	0	2	50	2	0	0
	08	Hydrography	1997	1997	14	14	1	0	0	8	0	1	0	8	0	8	0	0
	09	Protected sites	2009	2009	2	2	1	0	0	3	0	1	0	3	0	3	0	0
ANNEX II	01	Elevation	1982 2009	2009	2	2	2	3	0	2	0	2	1	4	0	3	3	0
	02	Land cover	1990	2011	0	21	1	0	0	6	0	1	0	6	0	6	0	0
	03	Orthoimagery	2011	2011	0	0	2	57	0	0	0	1	57	0	0	0	57	0
	04	Geology	2005	2005	6	6	1	0	0	2	0	1	0	2	100	2	0	0
ANNEX III	01	Statistical units	2001	2001	10	10	1	0	0	1	0	1	0	1	100	1	0	0
	02	Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	03	Soil	1971 1979 1982 2004	2004	7	7	1	0	0	4	0	1	0	4	25	4	0	0
	04	Land use	1980 1999 2004	2004	7	7	1	0	0	3	0	1	0	3	33,3	3	0	0
	05	Human health and safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	2008 2009	2010	1	2	1	0	0	11	0	1	0	11	81,8	10	1	0
	07	Environmental monitoring facilities	1986	2009	2	25	1	0	0	10	0	1	0	10	50	10	0	0
	08	Production and industrial facilities	2010	2010	1	1	1	0	0	10	0	1	0	10	90	10	0	0
	09	Agricultural and aquaculture facilities	1989 - 1999 1997	1999	12	12	1	0	0	4	0	1	0	4	50	4	0	0
	10	Population distribution — demography	2001	2001	10	10	1	0	0	4	0	1	0	4	0	1	0	3
	11	Area management/restriction/regulation zones and reporting units	2011	2011	0	0	1	0	0	10	0	1	0	10	0	10	0	0
	12	Natural risk zones	1901 - 1072 1974 1996 2003 1990 - 2009 2010	2010	1	1	1	0	0	5	0	1	0	5	0	5	0	0
	13	Atmospheric conditions	1992	1992	19	19	1	0	0	1	0	1	0	1	0	1	0	0
	14	Meteorological geographical features	1974	2007	4	37	3	1	0	13	0	3	2	12	7,1	12	0	2
	15	Oceanographic geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	1984	1994	17	27	1	0	0	5	0	2	1	4	20	4	0	1
	18	Habitats and biotopes	2000 - 2005 2010	2010	1	1	1	0	0	3	0	1	0	3	66,6	3	0	0
	19	Species distribution	2010	2010	1	1	3	0	0	11	1	3	4	8	25	8	0	4
	20	Energy resources	-	-	-	-	1	0	0	1	0	1	0	1	100	1	0	0
	21	Mineral resources	1991	1991	20	20	1	0	0	3	0	1	0	3	66,6	3	0	0

Table 4.9 *Quality indicators (PT2site) extracted for each INSPIRE Directive thematic area.*

		THEMES	Nr of datasets	Range of scales	Range of resolution	Nr of diferent scales	Nr of diferent resolutions	Predominant scale	Predominant resolution	Beter scale available	Beter resolution available	Temporal extent	Predominant date
			nr			nr	nr						
ANNEX I	01	Coordinate reference systems	0	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	5	-	1000m - 50000m	-	4	-	1000m	-	1000m	1997 - 2000	1997 2000
	03	Geographical names	2	25k	-	1	-	25k	-	25k	-	1996 - 1998	1996 - 1997
	04	Administrative units	5	25k	-	1	-	25k	-	25k	-	2010	2010
	05	Addresses	0	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	0	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	4	25k - 1000k	-	3	-	25k	-	25k	-	1996 - 2000	1997
	08	Hydrography	14	25k - 1000k	100m	2	1	25k	100m	25k	100m	1996 - 2010	1997
	09	Protected sites	3	100k	-	1	-	100k	-	100k	-	2008 - 2009	2009
ANNEX II	01	Elevation	13	25k - 1000k	5m - 80m	2	3	25k	5m	25k	5m	1996 - 2010	2006
	02	Land cover	15	25k - 100k	5m - 1000m	2	2	25k	5m	25k	5m	1990 - 2011	2006
	03	Orthoimagery	57	-	30m - 1000m	-	3	-	30m	-	30m	1984 - 2011	2011
	04	Geology	5	25k - 500k	-	3	-	25k 500k	-	25k	-	1973 - 2010	2005 2008
ANNEX III	01	Statistical units	1	25k	-	1	-	25k	-	25k	-	2001	2001
	02	Buildings	4	10k - 25k	-	2	-	25k	-	10k	-	1996 - 2010	1997 2008 2010
	03	Soil	6	25k - 1000k	-	3	-	1000k	-	25k	-	1971 - 2004	1971 1979 1982
	04	Land use	4	100k - 1000k	-	2	-	100k 1000k	-	100k	-	1980 - 2004	1980 1995 1999
	05	Human health and safety	0	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	13	25k	-	1	-	25k	-	25k	-	1996 - 2010	2008 2009
	07	Environmental monitoring facilities	10	50k - 1000k	-	2	-	1000k	-	50k	-	1986 - 2009	1986
	08	Production and industrial facilities	10	1000k	-	1	-	1000k	-	1000k	-	2010	2010
	09	Agricultural and aquaculture facilities	5	25k - 1000k	-	2	-	25k 1000k	-	25k	-	1989 - 1999	1989 - 1999
	10	Population distribution — demography	7	25k	5m	1	1	25k	5m	25k	5m	1990 - 2006	2001
	11	Area management/restriction/regulation zones and reporting units	15	10k - 25k	-	2	-	10k 25k	-	10k	-	1994 - 2011	1994 2008 2011
	12	Natural risk zones	5	1000k	25m	1	1	1000k	25m	1000k	25m	1901 - 2010	1901 - 1972 1974 1996 1990
	13	Atmospheric conditions	1	1000k	-	1	-	1000k	-	1000k	-	1992	1992
	14	Meteorological geographical features	14	50k - 1000k	200m - 1000m	3	2	1000k	1000m	50k	200m	1931 - 2007	1974
	15	Oceanographic geographical features	0	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	0	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	5	25k - 1000k	-	2	-	1000k	-	25k	-	1984 - 1994	1984
	18	Habitats and biotopes	10	25k - 1000k	2m - 1000m	2	2	25k	1000m	25k	2m	1991 - 2010	2008 2010
	19	Species distribution	28	25k - 1000k	5m - 10000m	2	4	1000k	1000m 0,002778°	25k	5m 0,002778°	1853 - 2010	2010
	20	Energy resources	1	1000k	-	1	-	1000k	-	1000k	-	-	-
	21	Mineral resources	3	1000k	-	1	-	1000k	-	1000k	-	1991	1991

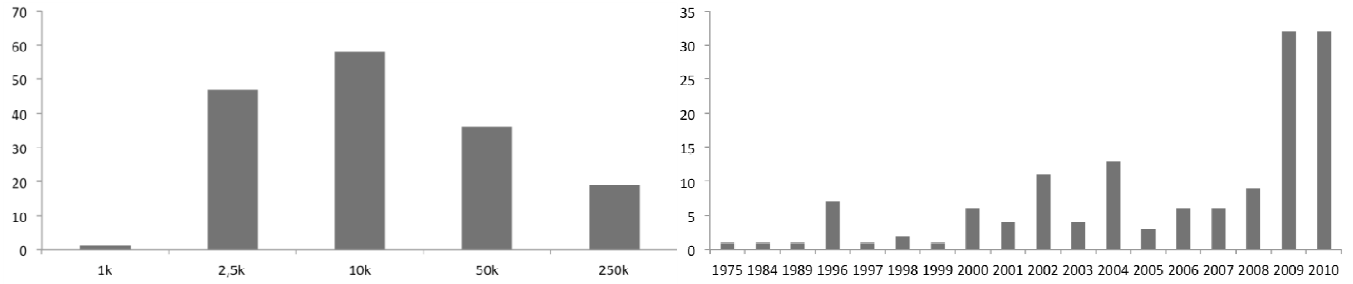
Table 4.9 *Quality indicators (PT2site) extracted for each INSPIRE Directive thematic area (Cont.).*

		THEMES	Most recent date	2011-MRD	2011-PD	Format diversity	Image related formats	CAD/CAM formats	GIS formats	Other formats	Diversity of Coordinate Systems	Global or Regional Datum	National Datum	% of property issues	Administration	Companies	Universities (education)/Research teams
						nr	nr	nr	nr	nr	nr	nr	nr	%	nr	nr	nr
ANNEX I	01	Coordinate reference systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	2000	11	11	1	0	0	5	0	3	3	2	0	2	0	0
	03	Geographical names	1998	13	13	1	0	0	2	0	1	0	2	0	2	0	0
	04	Administrative units	2010	1	1	1	0	0	5	0	2	4	1	0	5	0	0
	05	Addresses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Cadastral parcels	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Transport networks	2000	11	14	1	0	0	4	0	2	0	4	75	4	0	0
	08	Hydrography	2010	1	14	1	0	0	14	0	2	1	13	28,6	12	0	2
	09	Protected sites	2009	2	2	1	0	0	3	0	1	0	3	0	3	0	0
ANNEX II	01	Elevation	2010	1	5	3	3	0	10	0	2	1	12	23	5	3	5
	02	Land cover	2011	0	5	3	1	0	14	0	3	1	14	13,3	6	0	9
	03	Orthoimagery	2011	0	0	2	57	0	0	0	1	57	0	0	0	57	0
	04	Geology	2010	1	3	1	0	0	5	0	1	0	5	100	2	1	2
ANNEX III	01	Statistical units	2001	10	10	1	0	0	1	0	1	0	1	100	1	0	0
	02	Buildings	2010	1	1	1	0	0	4	0	2	0	4	100	2	0	2
	03	Soil	2004	7	7	1	0	0	6	0	1	0	6	50	6	0	0
	04	Land use	2004	7	7	1	0	0	4	0	1	0	4	50	4	0	0
	05	Human health and safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	2010	1	2	1	0	0	13	0	1	0	13	84,6	12	1	0
	07	Environmental monitoring facilities	2009	2	25	1	0	0	10	0	1	0	10	50	10	0	0
	08	Production and industrial facilities	2010	1	1	1	0	0	10	0	1	0	10	90	10	0	0
	09	Agricultural and aquaculture facilities	1999	12	12	1	0	0	5	0	1	0	5	60	5	0	0
	10	Population distribution — demography	2006	5	10	2	0	0	7	0	1	0	7	0	1	0	6
	11	Area management/restriction/regulation zones and reporting units	2011	0	0	1	0	0	15	0	1	0	15	20	13	0	2
	12	Natural risk zones	2010	1	1	1	0	0	5	0	1	0	5	0	5	0	0
	13	Atmospheric conditions	1992	19	19	1	0	0	1	0	1	0	1	0	1	0	0
	14	Meteorological geographical features	2007	4	37	3	1	0	13	0	3	2	12	7,1	12	0	2
	15	Oceanographic geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	17	Bio-geographical regions	1994	17	27	1	0	0	5	0	2	1	4	20	4	0	1
	18	Habitats and biotopes	2010	1	1	4	2	0	7	1	3	2	8	90	3	0	7
	19	Species distribution	2010	1	1	4	0	0	16	11	4	17	11	46,4	12	0	16
	20	Energy resources	-	-	-	1	0	0	1	0	1	0	1	100	1	0	0
	21	Mineral resources	1991	20	20	1	0	0	3	0	1	0	3	66,6	3	0	0

4.2.2.6 United Kingdom sites

Partner 11 was responsible for describing **206 datasets** distributed across the three annexes of the INSPIRE Directive. It was possible to observe that 61.8% of the INSPIRE themes are covered by the described datasets. Although this quality indicator can suggest the existence of potentially critical INSPIRE themes that are not covered by any specific dataset, this does not occur in this particular database. This is reinforced by the fact that themes like Elevation, Land cover, Orthoimagery, Habitats and biotopes, and Species distribution, present a high number of datasets, representing 45.6% of the entire database.

Datasets cover a **temporal range** of 35 years, between 1975 and 2010, and were published mostly between 2009 and 2010 (Figure 4.10b). Thematic categories like Addresses, Elevation, and Species distribution, present the best level of up-to-dateness. It is also important to observe that in terms of **spatial quality indicators**, this database presents a high quality, ranging in scale from 1:1000 to 1:250 000. Also, the datasets listed in the Orthoimagery category present quality indicators comparable with project classification goals (spatial resolutions between 2 and 100 meters). When combining space and time, this database shows good adequacy to project goals, as it presents temporal range and spatial scales compatible with local scale evaluations. An example is the theme Habitats and biotopes, which presents a temporal range of 15 years (1996-2010) and spatial scales ranging from 1:1000 to 1:10 000.



a) b)

Figure 4.10 *Internal quality indicators for Partner 11 pre-existing site spatial data: a) number of datasets according to spatial scale; and b) number of datasets according to temporal scale (based on publishing date).*

Data formats are quite consistent, since 88.3% of the datasets are in GIS formats. Nonetheless, data conversions are still needed, since around 90 % of the listed datasets present national spatial reference systems. The fact that only 10.2% of the datasets are in global/regional spatial reference systems can contribute to error propagation, like in previous databases. In terms of **property issues**, nearly 100% of the database will require some type of licensing, and only 58.3% of the datasets listed under Orthoimagery are available for use without licensing.

Table 4.10 *Quality indicators (UK sites) extracted for each INSPIRE Directive thematic area.*

		THEMES	Nr of datasets	Range of scales	Range of resolution	Nr of diferent scales	Nr of diferent resolutions	Predominant scale	Predominant resolution	Beter scale available	Beter resolution available	Temporal extent	Predominant date
			nr			nr	nr						
ANNEX I	01	Coordinate reference systems	0	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	6	-	1000m - 100000m	-	5	-	10000m	-	1000m	2002	2002
	03	Geographical names	0	-	-	-	-	-	-	-	-	-	-
	04	Administrative units	3	2,5k - 50k	-	3	-	2,5k 10k 50k	-	2,5k	-	2007 - 2010	2007 2010
	05	Addresses	4	2,5k - 10k	-	2	-	10k	-	2,5k	-	2009	2009
	06	Cadastral parcels	1	10k	-	1	-	10k	-	10k	-	2006	2006
	07	Transport networks	14	50k - 250k	-	2	-	250k	-	50k	-	2002 - 2010	2009
	08	Hydrography	30	2,5k - 250k	-	4	-	10k	-	2,5k	-	2000 - 2010	2010
	09	Protected sites	28	2,5k - 50k	-	3	-	2,5k	-	2,5k	-	1996 - 2010	2010
ANNEX II	01	Elevation	7	2,5k - 50k	-	3	-	2,5k	-	2,5k	-	2008 - 2010	2009
	02	Land cover	12	2,5k - 250k	-	3	-	10k	-	2,5k	-	-	-
	03	Orthoimagery	36	2,5k - 10k	2m - 100m	2	3	10k	30m	2,5k	2m	1975 - 2010	2009
	04	Geology	3	250k	-	1	-	250k	-	250k	-	1905	1905
ANNEX III	01	Statistical units	0	-	-	-	-	-	-	-	-	-	-
	02	Buildings	5	50k - 250k	-	2	-	250k	-	50k	-	2009 - 2010	2009
	03	Soil	5	-	-	-	-	-	-	-	-	-	-
	04	Land use	0	-	-	-	-	-	-	-	-	-	-
	05	Human health and safety	0	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	0	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	5	-	-	-	-	-	-	-	-	2008 - 2009	2008 - 2009
	08	Production and industrial facilities	0	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	0	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	0	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	5	2,5k - 10k	-	2	-	2,5k	-	2,5k	-	2001 - 2010	2010
	12	Natural risk zones	0	-	-	-	-	-	-	-	-	-	-
	13	Atmospheric conditions	0	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	0	-	-	-	-	-	-	-	-	-	-
	15	Oceanographic geographical features	0	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	1	10k	-	1	-	10k	-	10k	-	1997	1997
	17	Bio-geographical regions	0	-	-	-	-	-	-	-	-	-	-
	18	Habitats and biotopes	31	1k - 10k	-	3	-	2,5k	-	1k	-	1996 - 2010	2004
	19	Species distribution	8	2,5k - 10k	-	2	-	10k	-	2,5k	-	2007 - 2010	2010
	20	Energy resources	1	50k	-	1	-	50k	-	50k	-	2008	2008
	21	Mineral resources	1	10k	-	1	-	10k	-	10k	-	-	-

Table 4.10 *Quality indicators (UK sites) extracted for each INSPIRE Directive thematic area (Cont.).*

		THEMES	Most recent date	2011-MRD	2011-PD	Format diversity	Image related formats	CAD/CAM formats	GIS formats	Other formats	Diversity of Coordinate Systems	Global or Regional Datum	National Datum	% of property issues	Administration	Companies	Universities (education)/Research teams
						nr	nr	nr	nr	nr	nr	nr	nr	%	nr	nr	nr
ANNEX I	01	Coordinate reference systems	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	2002	9	9	1	0	0	6	0	1	0	6	100	?	?	?
	03	Geographical names	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	04	Administrative units	2010	1	4	1	0	0	3	0	1	0	3	100	?	?	?
	05	Addresses	2009	2	2	1	0	0	4	0	1	0	4	100	?	?	?
	06	Cadastral parcels	2006	5	5	1	0	0	1	0	1	0	1	100	?	?	?
	07	Transport networks	2010	1	2	1	0	0	14	0	1	0	14	100	?	?	?
	08	Hydrography	2010	1	1	1	0	0	30	0	1	0	30	100	?	?	?
	09	Protected sites	2010	1	1	1	0	0	28	0	1	0	28	100	?	?	?
ANNEX II	01	Elevation	2010	1	2	2	0	0	7	0	1	0	7	100	?	?	?
	02	Land cover	-	-	-	1	0	0	12	0	1	0	12	100	?	?	?
	03	Orthoimagery	2010	1	2	3	21	0	15	0	2	21	15	41,7	?	?	17
	04	Geology	1905	106	106	2	0	0	3	0	1	0	3	100	?	?	?
ANNEX III	01	Statistical units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	02	Buildings	2010	1	2	1	0	0	5	0	1	0	5	100	?	?	?
	03	Soil	-	-	-	1	0	0	5	0	1	0	5	100	?	?	?
	04	Land use	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	05	Human health and safety	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	06	Utility and governmental services	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	07	Environmental monitoring facilities	2009	2	2	2	0	0	2	3	1	0	5	100	?	?	?
	08	Production and industrial facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	09	Agricultural and aquaculture facilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	2010	1	1	1	0	0	5	0	1	0	5	100	?	?	?
	12	Natural risk zones	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	13	Atmospheric conditions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	14	Meteorological geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15	Oceanographic geographical features	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16	Sea regions	1997	14	14	1	0	0	1	0	1	0	1	100	?	?	?
	17	Bio-geographical regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	18	Habitats and biotopes	2010	1	7	1	0	0	31	0	1	0	31	100	?	?	?
	19	Species distribution	2010	1	1	1	0	0	8	0	1	0	8	100	?	?	?
	20	Energy resources	2008	3	3	1	0	0	1	0	1	0	1	100	?	?	?
	21	Mineral resources	-	-	-	1	0	0	1	0	1	0	1	100	?	?	?

4.2.3 Comparative synthesis

4.2.3.1 Comments on the ensemble of collected databases

The analysis of **internal database quality** represents an important step towards a better understanding of the capabilities of a specific database to fulfil the needs of a specific use and/or goal and/or to identify the main data gaps associated to it. In this context, internal data quality evaluation, here only referring to metadata evaluation, can be an agile, flexible and very descriptive process, allowing the evaluation of an entire database with an optimised amount of effort in terms of data collection. In the scope of the methodological framework implemented in Task 4.1 of BIO_SOS, this quality analysis also allows for comparative standards to be set across databases (*i.e.* sites), enabling the identification of potential problems and also the proposal of database specific, non-standardized, solutions.

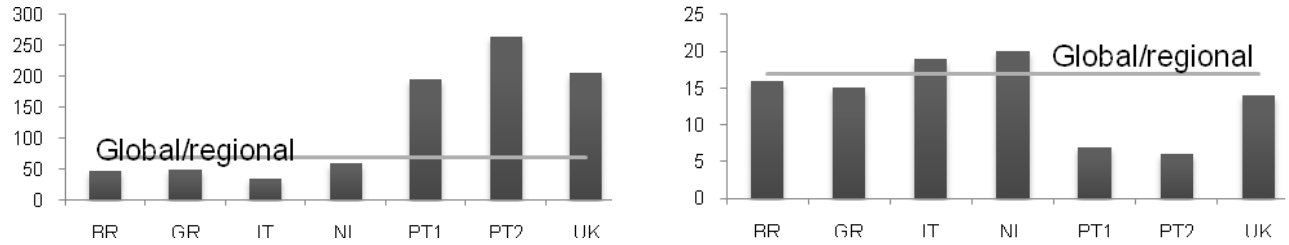
It should be noted that results from this first metadata collection revealed a broad diversity of methodological approaches and background to fulfil the proposed simplified metadata profile, even though a methodological document with guidelines and instructions was prepared and circulated in the consortium. This resulted in a **diverse metadata pool**, with some databases where all sites of a given country/partner appear aggregated, instead of being described separately, and with a low percentage of metadata completely fulfilled. These problems resulted in limitations for some analyses, specifically in terms of database comparison across partners and sites, and highlight the need for further discussion on metadata collection among site partners in subsequent stages of Task 4.1 (and beyond).

Considering all identified datasets, a first standard comparison can be established between the global/regional preliminary database and the site/partner databases, in order to evaluate the **quality of those local databases** in comparison to other, broader databases. In this context, and evaluating the number of datasets described in each database, it was possible to observe that only the Portuguese and the UK sites overcome the number of datasets available in the global/regional database. Considering this indicator, Italian sites could benefit from the inclusion of these datasets for specific application

contexts, since only 49.3 % of the number of datasets listed in the global/regional database was reported for the local database (Figure 4.11a). If we consider the number of **data gaps** (concerning the fulfilment of the INSPIRE themes) per database as a secondary indicator, the same pattern was observed (Figure 4.11b). These results suggest the necessity of sharing the knowledge of other potentially interesting datasets within the BIO_SOS consortium in order to improve the local fulfilment of potentially important data gaps.

Table 4.11 *Comparison across sites in relation to the main internal quality indicators.*

Metrics	BR	GR	IT	NL	PT1	PT2	UK
Nº of datasets	46	49	34	60	196	265	206
Data gaps (themes)	16	15	19	20	7	6	14
% of data gaps	95,6	100	100	91,7	67,9	72,1	100
Nº of image datasets	9	1	2	0	57	57	36
Predominant scale	500k	3000k	10k	10k	1000k	25k	10k
Predominant resolution	30m 0,25°	100m	0,5m 2m 8m 5000m 50000m 100000m	25m	30m 0,002778°	30m 0,002778°	30m
Range of scales	500k - 5000k	5k - 3000k	2k - 1000k	5k - 11500k	25k - 1000k	10k - 1000k	1k - 250k
Range of resolutions	10m - 1000m 0,25°	20cm - 1000000m	0,5m - 100000m	5m - 100000m	5m - 50000m 0,002778°	2m - 50000m 0,002778°	2m - 100000m
Predominant date	2004	2010	2006	2006	2011	2010	2009 2010
Range of dates	1964 - 2011	1967 - 2011	1990 - 2009	1850 - 2010	1901 - 2011	1853 - 2011	1905 - 2010
Diversity of Coord. Systems	2	5	3	2	7	8	2
Property issues (%)	0	30,6	23,5	85	20,9	26,4	89,8



a) b)

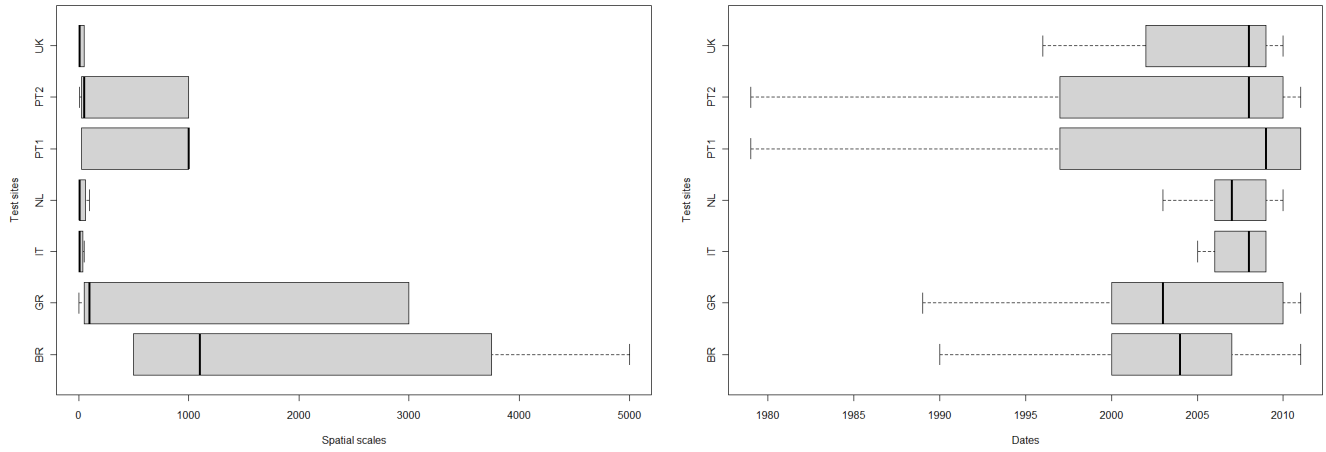
Figure 4.11 Comparison *between the global/regional database and the several site databases for: a) number of datasets inventoried and described; and b) number of datasets with data gaps considering all INSPIRE Themes.*

These **differences** between the global/regional database and the site databases suggest that partners may have not recognized most of the datasets present in the global/regional database as valid datasets to fit the purposes intended for the local databases. Although this can be the case, it was interesting to observe that, from the group of partners whose inventories fell far below the global/regional database in terms of dataset number, only few listed datasets related to Orthoimagery in their specific databases. In each local database, for most cases, many (or all) the datasets described in the global/regional database could have improved the fulfilment of these potential data gaps.

Another important issue related to the implementation of this methodology is the **completeness** associated to the fulfilment of the proposed metadata profile. The collected metadata revealed that partners found some difficulties in the fulfilment of the metadata profile, as shown by the number of datasets which were under-described (only the Portuguese datasets fall below 90 % of incomplete metadata descriptions; Table 4.11). Given this scenario, some evaluations based on these incomplete metadata may produce misleading results, particularly those based on the less fulfilled metadata and for related quality indicators (e.g. spatial quality, property, data format, reference systems).

In terms of **spatial quality**, spatial scales range between 1:1000 and 1:11 500 000, considering all databases described (Figure 4.12a). This very high range of spatial scales indicates the potential existence of difficulties to compare results across sites/partners. This poses a serious problem to the achievement of project goals. Even if considering the range of predominant scales, although narrower, it

still ranges from 1:10 000 (United Kingdom) to 1:3 000 000 (Greece), highlighting this harmonization problem across sites.



a) b)

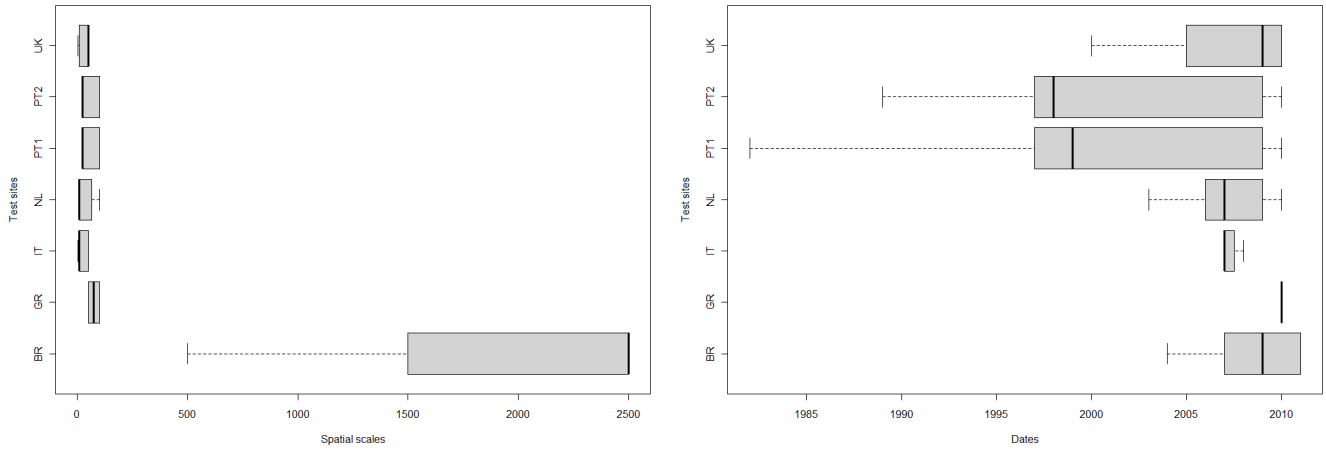
Figure 4.12 *Internal quality indicators for all pre-existing datasets: a) distribution of dataset spatial scale (x10^3) by partner; and b) distribution of dataset temporal scale by Partner (based in publishing date) [outliers were eliminated from the representation to improve the comparison across databases].*

In terms of **temporal quality**, the scenario is slightly different since the predominant dates range from 2004 to 2011 (Figure 4.12b). Additionally, temporal amplitude of all datasets ranges from 1850 to 2011 (spanning over 162 years), and it presents, with the exception of the Italian database, a predominance of datasets from years 2010 and 2011, allowing to consider that this temporal range is suitable to support future analyses and evaluations in the project. In this context, the results show that the temporal and spatial quality of the databases described should be reinforced in order to promote the harmonization of spatial and temporal suitability within those INSPIRE categories that are critical for BIO_SOS. This could act as an important factor to promote the overall achievement of project goals.

4.2.3.2 Results across Annexes of INSPIRE

When looking with more detail into the databases in terms of the distribution of the datasets within the **Annexes of the INSPIRE Directive**, it was possible to observe that the temporal range present in each dataset varies greatly across partners, but it is maintained with some stability when comparing within each of the three Annexes (Annex I: predominantly between 2007 and 2010; Annex II: predominantly between 2008 and 2011; Annex III: predominantly between 2007 and 2010). These results highlight the up-to-dateness of the databases regarding the three Annexes but they differ greatly when comparing site databases (Figures 4.13, 4.14 and 4.15).

Results show that, in relation to **Annex I** (Reference information), the PT1 site presents the best temporal amplitude (1982-2010) although it presents spatial scales over 1:25 000 (between 1:25 000 and 1:1 000 000). In this context the UK dataset presents a more consistent database concerning the number of datasets and their temporal resolution, associated with better spatial scales (varying between 1:2500 and 1:250 000). Still regarding Annex I, it is important to notice that the databases from The Netherlands and from Italy also present suitable distributions in terms of spatial scale (between 1:5000 and 1:1 100 000 and between 1:2000 and 1:250 000 respectively), although the latter database is less representative in terms of quantity. It is also important to stress that while all other sites present spatial scales closer to the target quality of BIO_SOS, the Brazilian database presents coarser scales and resolutions for the identified datasets.

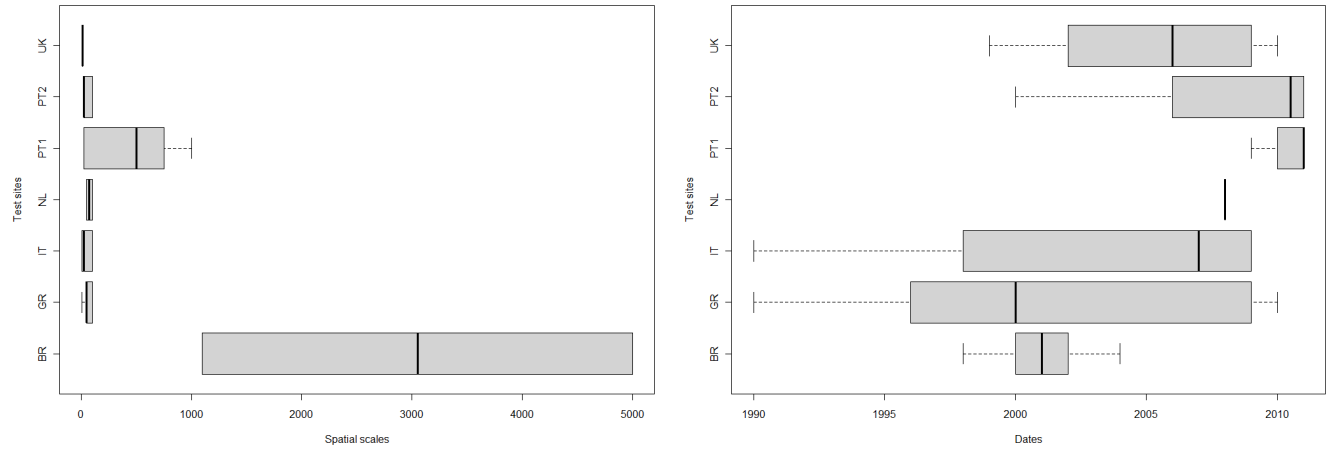


a) b)

Figure 4.13 *Internal quality indicators for all pre-existing datasets in INPIRE Annex I: a) distribution of dataset spatial scale (x10^3) by partner; and b) distribution of dataset temporal scale by partner (based on publishing date) [outliers were eliminated from the representation to improve the comparison across databases].*

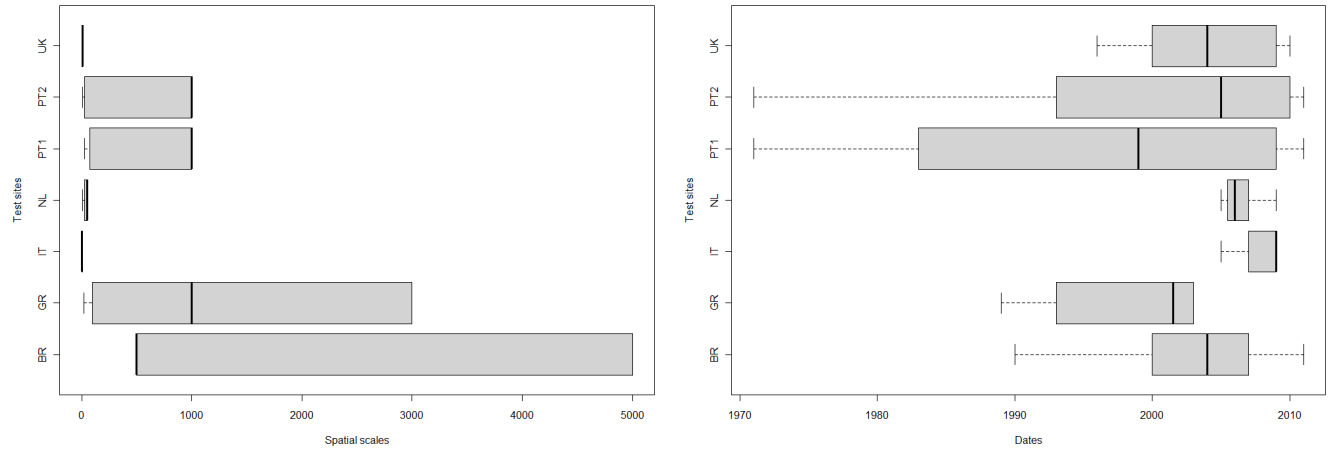
Concerning **Annex II** (Thematic information), it was interesting to observe that the databases from the UK and Brazil sites present the widest indicator amplitude from all databases. The UK database was found to be the most consistent in terms of dataset quantity and temporal range. Regarding the latter indicator, Portuguese sites databases also present a good temporal consistency. Once again, the UK site database presents datasets with the highest spatial resolutions (mainly between 1:2500 and 1:10 000). By analysing further this particular Annex, it is possible to observe that, although the temporal amplitude is narrow (datasets published predominantly between 2008 and 2011), the datasets from year 2011 are only from the Portuguese sites (together with over 90 datasets), shifting the measure of central tendency to a more up-to-date value. This contrasts with the lower representativeness of the Netherlands database (with 5 datasets). Results for these two indicators, together with the diversity of coordinate systems and the previously discussed harmonization problems, would suggest that there may be some difficulties to meet project goals, since this Annex includes not only Orthoimagery but also ancillary data for EO data calibration (e.g. elevation models) (see Deliverable 8.5: Project Management and Quality Assessment Plan). The foreseen acquisition of satellite imagery will contribute to address and overcome this limitation, provided that access to compatible critical ancillary datasets is also guaranteed.

As for **Annex III** (Thematic information: support data), results revealed a wide diversity and heterogeneity of results across databases. From a smaller quantity of datasets (e.g. Italian database) to a more expressive database covering a wider temporal range (e.g. PT2 site), it was possible to find a wide diversity in the collected databases. These results follow the analysis of thematic gaps within the databases where it was possible to observe that these data gaps are more prominent in Annex III for all databases (Table 4.11). Once again the UK database presents the best spatial scale and resolution, reflected in terms of temporal database consistency (number of data versus temporal range).



a) b)

Figure 4.14 *Internal quality indicators for all pre-existing datasets present in INPIRE Annex II: a) distribution of dataset spatial scale (x10^{-3}) by partner; and b) distribution of dataset temporal scale by partner (based on publishing date) [outliers were eliminated from the representation to improve the comparison across databases].*



b) b)

c) **Figure 4.15** *Internal quality indicators for all pre-existing datasets present in INSPIRE Annex III: a) distribution of dataset spatial scale (x10^{-3}) by partner; and b) distribution of dataset temporal scale by partner (based on publishing date) [outliers were eliminated from the representation to improve the comparison across databases].*

4.2.3.3 Final overarching remarks

Following these database analyses, a key issue regarding this internal quality evaluation is represented by the differences in the results from the spatial scale oriented analyses in comparison with the results from the temporal scale oriented analyses. This may result from the difficulties, already mentioned above, concerning the fulfilment of the metadata profile by site partners. In this context, results show that the datasets considered for the temporally oriented analyses are only based on 69.6 % of the number of datasets used in the scale oriented analyses, due to the fact that many temporal scale metadata are missing from the database descriptions. This also suggests that results for some indicators may have at this stage an **important bias** in relation to the reality of each database, and so they must be interpreted with caution.

Considering indicators related to spatial and temporal quality, the inventoried datasets present some difficulties in terms of integration and harmonization of pre-existing data, but also when considering the **quality of future datasets** resulting from BIO_SOS (WP4, WP5 or WP6), as these will be conditioned by the quality of pre-existing datasets in case these are used in any of the several application contexts (see section 5 of this deliverable). In this context, it is also important to verify that the number of different coordinate systems is very diverse, and that in some cases, e.g. Portugal and Greece sites, national systems are predominant. This is an important and critical indicator for data harmonization and error propagation within the project, and so much care should be taken in the early stage of data sharing and modelling.

Finally, in terms of **property issues** of the databases, it is interesting to notice that only the Brazilian database has no licensing constraints, contrasting with the UK and Netherlands databases which have 90 % and 85 % of licensing needs, respectively. Although this can be seen as a minor problem, as part of the described datasets may be used with existing and/or future protocols, it can also bring specific problems if the datasets in question are critical for any particular use within the project.

5. A framework for external quality evaluation

5.1 Context and concepts

This section will focus on the concept of **external quality**, which corresponds to the level of similarity between the characteristics of a product and the user's needs or expectations, in a given application context. The concept of "external quality" is generally recognized as the definition of quality in the largest sense: "totality of characteristics of a product that bear on its ability to satisfy stated and implied needs" (ISO 8402: 1994); thus, external quality is often defined as "fitness for use" or "fitness for purpose". Within this perspective, external quality is not absolute and the same product can have different quality to different users and/or in distinct application contexts (Figure 5.1).

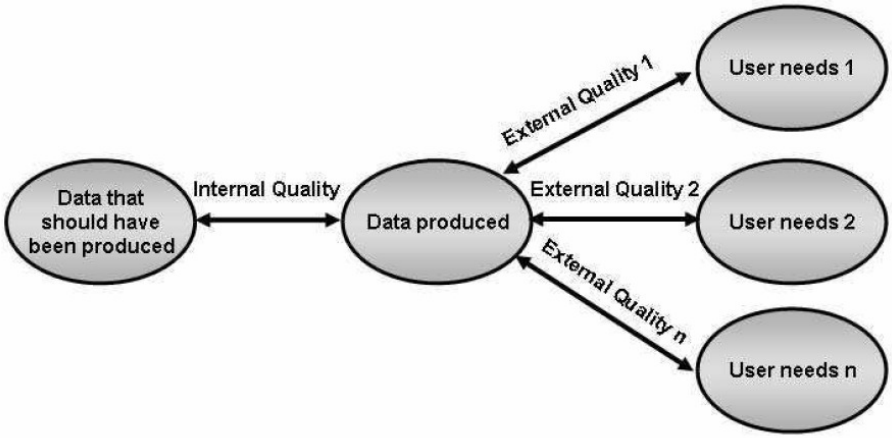


Figure 5.1.*Concepts of internal and external data quality (Devillers and Jeansoulin, 2006).*

However, the evaluation of external quality as a process is not totally isolated from internal quality evaluation rather it actually requires information describing internal quality (Figure 5.1). As an example, the evaluation whether a specific dataset fits the user's needs depends on the adequacy of attributes like spatial and temporal extent (which describe internal quality), i.e. if the data represent the focal territory and the temporal coverage required in the user's context of application.

The evaluation of the external quality is a crucial issue for the determination of uncertainty, to avoid using data for which the potential impact on end-user's decisions is deemed unacceptable. This issue is even more sensitive and complex nowadays, considering the increasing number of geospatial data users (often with limited knowledge/training on geographical information systems) associated to the easier access to geographical data and GIS applications, which makes possible to combine data from different sources and with different quality characteristics for analysis and decision-making (Boin, 2008; Devillers *et al*., 2005, 2007; Devillers and Jeansoulin, 2006). Therefore it is important to help the user to evaluate the "fitness for use" of a dataset for a specific problem. Basically, the external quality evaluation task can be looked as a process for establishing the user's (and ultimately the end-user's or stakeholder's) confidence that the inputs (datasets), processes and outcomes derived to solve a specific problem fulfil the expectations (or at least the minimum requirements).

Although the concept of **fitness for use** is becoming a common standard, little research has been done on this subject, and the information necessary for the assessment of fitness for use is yet not included in metadata standards, which are mostly oriented in a data producer's perspective (Devillers *et al*., 2005). In addition, the unavailability of commercial software packages and of well-established methodological procedures to perform the evaluation of external quality is quite limiting for data users, and so the comparison between data characteristics and user's expectations, which define the external quality, is

most often done intuitively (Grum and Vasseur, 2004). Nevertheless, in the last decade a few efforts have been done for the implementation and establishment of methods and models for external quality evaluation (e.g. Devillers *et al*., 2005, 2007; Gervais *et al*., 2009; Vasseur *et al*., 2003), but more work has to be done before a consensual methodological framework is established.

Quality characteristics and indicators for internal evaluation are well documented (e.g., ISO international standard, ISO 19113:2002 and ISO 19114:2003) in the literature, whereas for external quality evaluation only a few suggestions can be found. Wang and Strong (1996) identified four dimensions for external quality indicators, based on a survey conducted with approximately 350 users of non-geospatial data: i) Intrinsic data quality (e.g. believability, accuracy, objectivity, reputation); ii) Contextual data quality (e.g. value-added, relevancy, timeliness, completeness, appropriate amount of data); iii) Representational data quality (e.g. interpretability, ease of understanding, representational consistency, concise representation); and iv) Accessibility data quality (e.g. accessibility, access security).

For spatial data, Bédard and Vallière (1995) proposed six characteristics to define "quality":

- Definition: to evaluate the nature of data and the object it describes;
- Coverage: to evaluate whether data information about space and time meet user needs;
- Lineage: to find out data origin, their acquisition objectives and methods, to evaluate if the data meet user needs;
- Precision: to evaluate if data has value (utility value) and is acceptable (in terms of spatial, temporal, thematic,…quality) for an expressed need;
- Legitimacy: to evaluate the official recognition and the legal scope/extent of data; and
- Accessibility: to evaluate the ease with which the user can obtain the data (e.g. cost, time frame, format, confidentiality).

The proposed methodological framework for external quality evaluation of pre-existing datasets in BIO_SOS, described in the following section, will be based on the data quality characteristics presented by Bédard and Vallière (1995). Ideally, external quality evaluation should be done based on both data and metadata. However, the proposed methodological framework is solely based on metadata catalogues provided by project partners, considering the limitations imposed by the existence of many different datasets owners and related data access constraints.

5.2 A proposed framework for external quality evaluation of pre-existing datasets

5.2.1 General features of the framework

The methodological framework will be based on the definition of external data quality "… as the degree of similarity between the user's needs and the data, expressed in the same reference frame" (Deviller and Jeansoulin, 2006). This definition implies that user context is central and that his requirements determine the whole evaluation process. In this sense we argue that, in order to assess external quality, all partners (and end-users) in BIO_SOS must be involved in this process.

In general, two main categories for the evaluation of geospatial data fitness for use are documented in the literature. One of the approaches is based on standards ("standard-based"), comparing the intrinsic uncertainty of the data with acceptable levels of uncertainty; the other approach is based on the study of risk ("risk-based"), thus evaluating the potential impact of uncertain data on the decisions that the user wants to take (Agumya and Hunter, 1999; Devillers and Jeansoulin, 2006). Although we can argue that the latter approach is potentially more informative than the former, because it can give an estimation of the consequences of uncertainty, it is also recognized that risk is a complex concept and is not yet easily measurable in many contexts, which often makes risk estimates subjective (e.g. Agumya and Hunter, 1999; Vasseur *et al*., 2006).

The ontological approach for quality evaluation proposed by Vasseur *et al*. (2006) is contained in the standard-based category of approaches. Ontology can be described as a framework to carry out a clear and concise description of terms and concepts that are employed so they can be exchangeable and interpreted by others (Hunter, 2002 cit. Devillers and Jeansoulin, 2006). Therefore, ontology can help the evaluation of similarities between user's needs or expectations, defined as the ontology of the problem, and the characteristics of the data (ontology of the product; Vasseur *et al*., 2006). These two ontologies provide two comparable models that can be represented in quality matrices. The comparison of those two matrices (representing the producer's vs. the user's perspective) provides a quantitative way to measure external quality, defined by Frank *et al* (2004) as "utility value". In this context, the existence of a common framework reference and of a common language is crucial, thus assuring a geo-semantic reference that makes interoperability possible. Sboui et al. (2009) highlight the importance of (geo)semantic interoperability to facilitate the correct interpretation and use of data/metadata.

Nonetheless, it should be clear that the concept of external quality, as the ability to satisfy the user's needs, is a dynamic, fuzzy and complex process, which is context specific and sensitive to user and use. Therefore, the evaluation of external quality is by definition a continuous process, which can even be understood as an iterative process (of continual improvement) that converges towards the satisfaction of user requirements (Vasseur *et al*., 2006).

5.2.2 Protocol for assessing external quality of datasets in BIO_SOS

As already mentioned above in this section, external quality evaluation in this proposed methodological framework places the user's context at the core of the process, as his requirements will determine the evaluation process. Therefore, each partner/user/reference user (See D2.3) must be involved in the process by defining relevant criteria for evaluation within the framework.

To evaluate datasets from an end-user, objective-oriented and data-centric perspective, we propose measuring the overall and row-wise matching between an "internal quality" matrix (detailing the characteristics of the data from the producer's point-of-view, usually detailed as metadata) and an "expected quality" matrix (describing the required characteristics of the data for the user context) (Figure 5.2). Quality matrices are central to the evaluation framework proposed in this section, and they are formed by i={1,2,…,m} rows, with m being the number of relevant application contexts where a given dataset may be used, and j={1,2,…,n} columns, with n representing the number of quality indicators (see Figure 5.2). Application contexts, which correspond to the possible uses of data, and the quality indicators used to evaluate data quality in BIO_SOS, are described later in this section. For the internal quality matrix the filling of all rows will be the same because internal quality is independent of the application context.

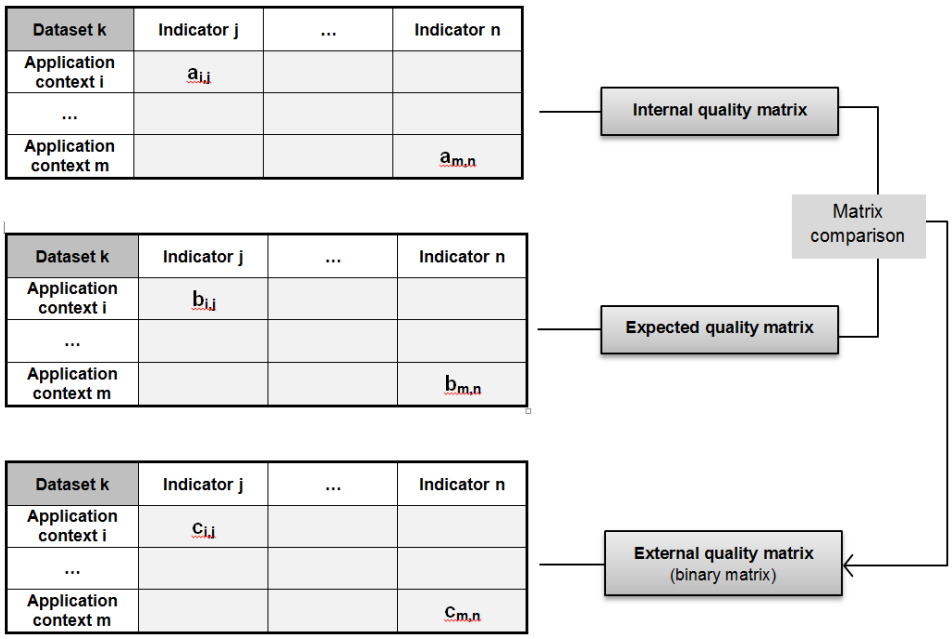


Figure 5.2 *Quality matrices and workflow of the proposed framework for external quality evaluation of datasets in BIO_SOS.*

The matrices of internal ($A = [a_{i,j}]_{m \times n}$) and expected ($B = [b_{i,j}]_{m \times n}$) data quality must be established within the same geo-semantic reference frame, thus allowing a comparison between A and B. This comparison is performed element-by-element for each listed application context (row-wise) and is supported by a rule-based system that uses metadata on the indicators (e.g.: variable type, domain, optimization sign, etc.). The comparison between A and B generates a final external quality binary matrix ($C = [c_{i,j}]_{m \times n}$) where each element is within the Boolean domain $c_{i,j} = \{0,1\}$; values equal to 1 correspond to conformities, and 0's to non-conformities, between internal and external quality. In general, a higher degree of overlap between these matrices is indicative that the spatial data element better fulfils or covers the end-user's requirements specified for a given objective or application context. This approach has an analogy with the perspective of gradual influence of the dataset quality on the user's decision about the suitability of data for a specific application context, as described by Frank *et al.* (2004): "the higher the quality, the better the decision".

From the external quality matrix, it is possible to calculate, for a given dataset k, its external quality (fitness for use) for a given application context i (*i.e.* $Q_{k,i}$; see Eq. 1) , as well as its overall external quality for the specified set of application contexts (*i.e.* Q_k; see Eq. 2).

$$Q_{k,i} = \left(\frac{1}{n}\sum_{j=1}^{n} c_{i,j}\right) \times 100 \qquad \text{(Eq. 1)}$$

$$Q_k = \left(\frac{1}{m \cdot n}\sum_{i=1}^{m}\sum_{j=1}^{n} c_{i,j}\right) \times 100 = \left(\frac{1}{m}\sum_{i=1}^{m} Q_{k,i}\right) \times 100 \qquad \text{(Eq. 2)}$$

The general workflow is defined as a six-stage process follows (adapted from Vasseur *et al.*, 2006):

i) Stage 1 ("conceptualization") includes stating the questions and the working hypotheses expressed as an ontology of the problem; this comprises the definition of quantitative indicators or measures that better characterize the data required for the specified application context, which

may use internal quality measures such as lineage, spatial and temporal extent, etc. – this stage corresponds to a geo-semantic convergence between the producer and user contexts;

ii) Stage 2 must specify indicators that represent critical factors (CF) *i.e.* an indicator that, if not fulfilled, may result in considering the dataset automatically unfit within a given application context;
iii) Stage 3 should clarify what is necessary at the beginning, including the quality requirements for each application context, i.e. building the expected quality matrix;
iv) In Stage 4, the inspection of metadata catalogues should be used to detail data quality characteristics and to build the internal data quality matrix;
v) In Stage 5, the comparison of the internal and expected quality matrices is used to generate the final external quality matrix;
vi) Finally, in Stage 6, based on the external quality binary matrix, the indices defined in Eq. 1 and 2 are calculated and their values entered in a decision framework as described below.

In the context of BIO_SOS, the ontology of the problem within the conceptualization stage can be expressed as three main application contexts (or "types of uses") for pre-existing datasets (Figure 5.3):

i) Direct support for production of habitat maps for training and test sites (WP5, WP6 and WP7)
   a. Pre-existing data will be used as input for EODHaM 2nd and 3rd stages, under implementation within WP5 and WP6 (Task 6.6) for training sites, and then for test sites in WP7, as described in the Service of Chain of deliverable D3.1.

ii) Support for sampling design, namely for:
   a. Collection of new on-site data (e.g. flora, vegetation, fauna, soil) (WP4, Task 4.4) for both training and test sites;
   b. Validation data from test sites to be used in WP7 (e.g. on-site collection of data on land cover/land use, GHC and Annex I habitat types) (WP4);
   c. Recording and mapping of pressures/threats (e.g. local collection of census data to identify areas submitted to agricultural abandonment) (WP4).

iii) Support for modelling, as predictor or response input variables, for individual species, habitats, landscape, ecosystems state, diversity indicators, pressures (WP6), *e.g.* in:
   a. Task 6.3, to provide data for ecosystem state and functions assessment, as required to assess soil/vegetation interactions, soil physical degradation, stoniness;
   b. Task 6.5 and Task 6.7, to supplement existing datasets with data on fine spatiotemporal threats (e.g. soil degradation, land use and land abandonment), as required to demonstrate the adequacy of the BIO_SOS approach across a range of pressures in and around Natura 2000 areas;
   c. Task 6.2, Task 6.4 and Task 6.7, to create a dataset on landscape pattern at multiple scales (*e.g.*, local, landscape) in order to explore their potential for predicting both local biodiversity attributes (*e.g.*, species richness, abundance, diversity) according to ecological theory, and ongoing pressures and threats, as required for indicator estimation.

The quality indicators to use in the comparison of the two matrices are integrated within the main data characteristics proposed by Bédard and Vallière (1995), as presented in Figure 5.4 and described in Table 5.1.

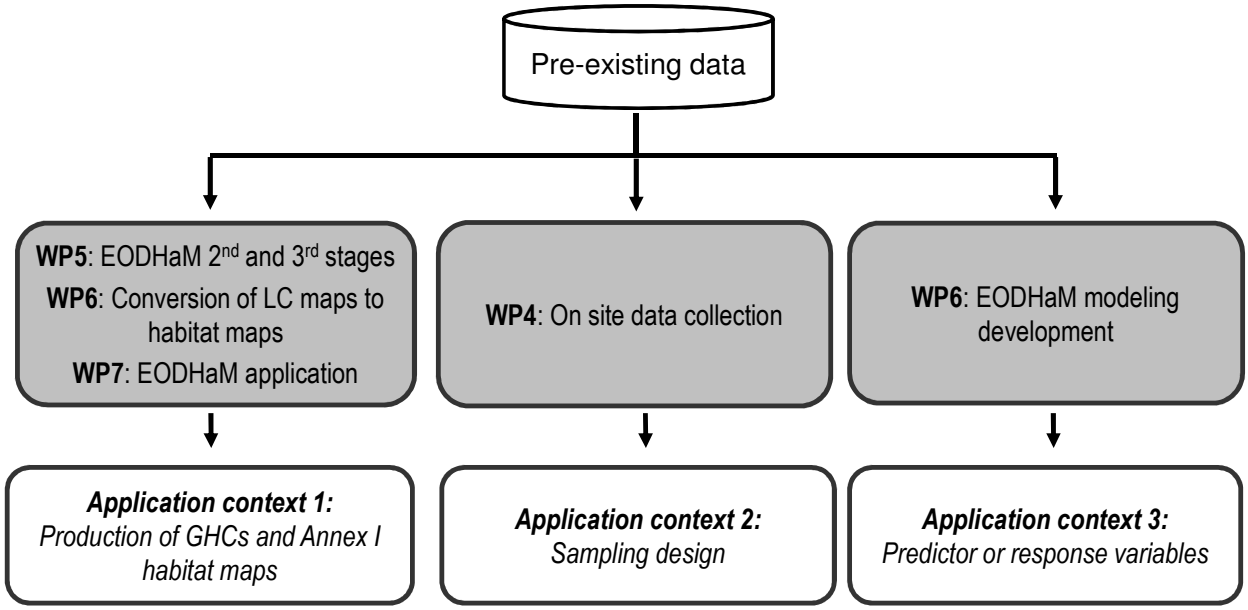


Figure 5.3 *Main application contexts of pre-existing data in BIO_SOS.*

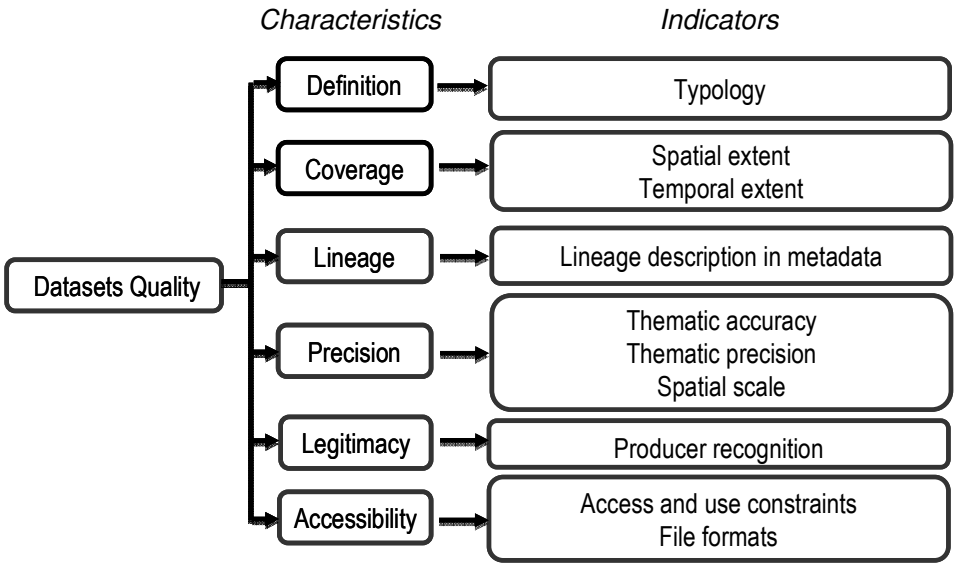


Figure 5.4 *Data characteristics and quality indicators hierarchy.*

The external quality of a dataset for any given application context can be classified under a scheme in which gaps, non-conformities and criticalness are considered (Figure 5.5). Once this assessment is carried out, users can have a better picture about which datasets are, and are not, fit for use for each of the application contexts. Conversely, it is also possible to make a summary by application context, identifying which contexts/types of use have all data quality requirements fulfilled, which ones can be improved, and which ones have important (critical) gaps. This iterative evaluation process is expected to promote a data quality improvement cycle to gradually approximate data characteristics to the user's needs.

Table 5.1 *Quality indicators description in the context of external quality evaluation.*

Quality indicator	Internal/Expected Indicator description	External Quality Indicator Evaluation
Typology	Category of the INSPIRE metadata profile	Adequacy of the data typology for user requirements
Spatial extent	Bounding box of dataset spatial extent (x max; x min; y max; y min)	Degree of intersection between the spatial extent of data and the spatial extent required by user
Temporal extent	Date or temporal interval of dataset	Degree of intersection between the temporal extent of data and the temporal extent required by user
Lineage description in metadata	Data production methods are described in metadata? [No, Yes]	Existence or inexistence of information in metadata about data production methods (in case of demand by user)
Thematic accuracy	Thematic accuracy of dataset (%)	Degree of intersection between the degree of accuracy of available data and user's needs for data accuracy
Thematic precision	Confidence interval of thematic accuracy (%)	Degree of intersection between the confidence interval of thematic accuracy of available data and user's needs for thematic precision
Spatial scale	Spatial scale of dataset	Degree of intersection between the spatial scale of dataset and user requirements for spatial scale
Producer recognition	Type of recognition of dataset producer	Degree of intersection between producer recognition and user's demand for producer recognition
Access and use constraints	Type of conditions for access to datasets as described by Article 5(2)(b) and Article 11(2)(f) of Directive 2007/2/EC.	Existence or inexistence of conditions for data access and use
File formats	Type of file formats	Adequacy of file formats for user requirements

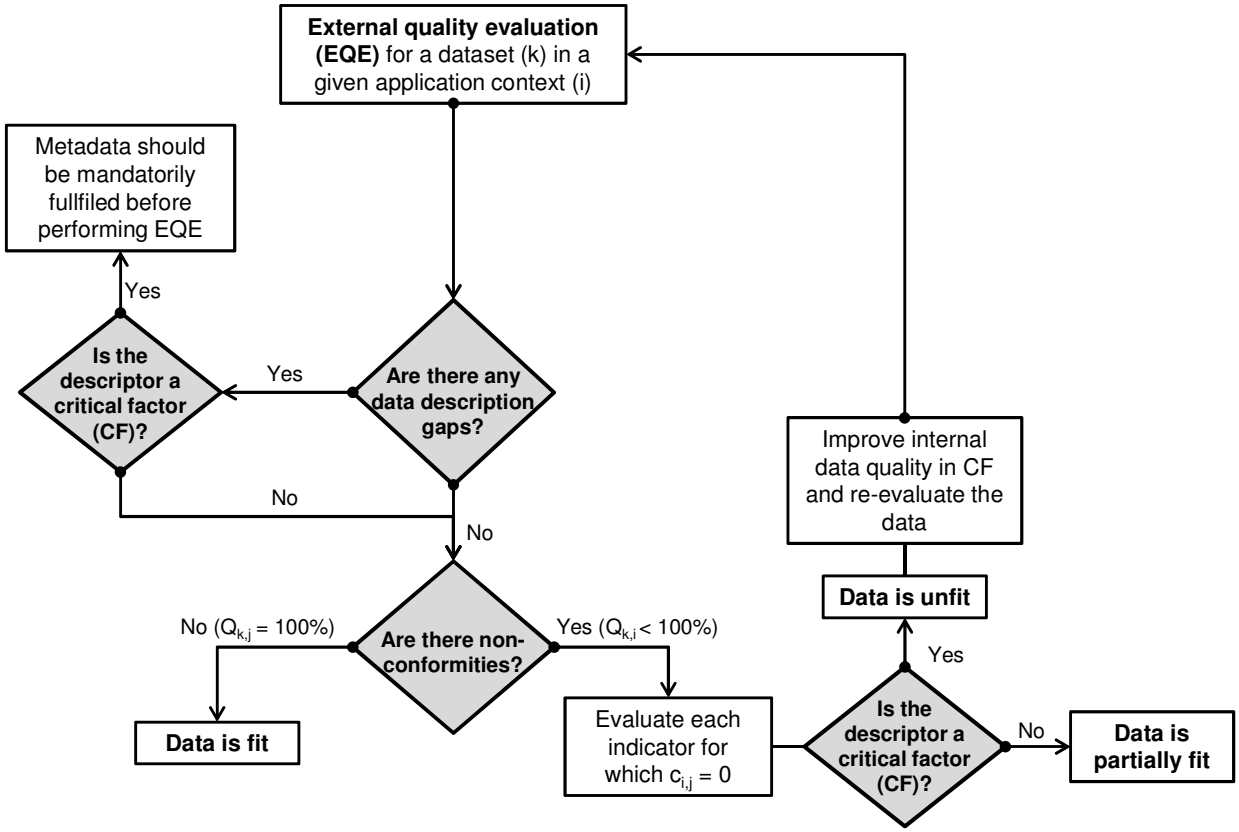


Figure 5.5 *Decision tree to assess fitness for use of datasets in BIO_SOS.*

5.2.3 Application examples

In this section we provide two examples of implementation of the proposed methodology for external quality evaluation of pre-existing datasets in BIO_SOS. For simplicity, the first example is based on a simulated dataset (a hypothetical product from the project), and then an illustration with actual BIO_SOS pre-existing datasets is provided based on metadata from the Portuguese test site PT2.

(a) With expected project products

Consider a given simulated dataset in shapefile format corresponding to an Annex I habitat map (spatial scale 1:5000). The dataset was produced within BIO_SOS project (with no restrictions to access and use) for year 2011 and with a thematic accuracy of 90 % and associated precision of 5 %. The spatial extent of the dataset is defined by a bounding box with x-max 1000m, x-min 10000m, y-max 5000m and y-min 25000m. This example of implementation of the methodology evaluates the external quality of the described Annex I habitat map dataset for three application contexts within BIO_SOS (mostly related with WP6) and related to biodiversity indicators targeted by the project (see deliverable D2.1): (i) estimation of abundance of selected species, (ii) analysis of landscape fragmentation, (iii) estimation of habitat extent (Figure 5.6).

The “fitness for use” results show that the simulated Annex I habitat map would only be totally fit for the application context “extent of select habitats” (Figure 5.6). For the application context “abundance of selected species”, the dataset would only partially fit because the typology and file formats are not in conformity with user requirements. However, these two quality indicators are not considered as critical factors by the user (Figure 5.6). The specified dataset would not fit for use in the application context “landscape fragmentation” because it would fail in meeting two critical factors as defined by users, i.e., thematic accuracy and spatial scale (Figure 5.6).

Annex I habitat map

Application contexts	Quality indicators									
	Typology	Spatial extent	Temporal extent	Lineage description	Thematic accuracy	Thematic precision	Spatial scale	Producer recognition	Acess and use restrictions	File formats
Internal quality matrix										
Abundance of selected species	Habitats	1000 10000 5000 25000	2011	Yes	90%	5%	5000	Official	No restrictions	Shapefile
Landscape fragmentation	Habitats	1000 10000 5000 25000	2011	Yes	90%	5%	5000	Official	No restrictions	Shapefile
Extent of select habitats	Habitats	1000 10000 5000 25000	2011	Yes	90%	5%	5000	Official	No restrictions	Shapefile
Expected quality matrix										
Abundance of selected species	Land cover	1000 10000 5000 25000	2010 - 2011	Yes	≥ 90%	≤ 10%	≤ 10000	Official	No restrictions	DXF
Landscape fragmentation	Land cover OR Habitats	1000 15000 5000 50000	2011	Yes	≥ 95%	≤ 5%	≤ 2000	Official	No restrictions	Shapefile
Extent of select habitats	Habitats	1000 10000 5000 25000	2011	Yes	≥ 80%	≤ 10%	≤ 10000	Official	No restrictions	Shapefile
External quality matrix										
Abundance of selected species	0	**1**	**1**	1	1	1	1	1	1	0
Landscape fragmentation	1	0	1	1	**0**	1	**0**	1	1	1
Extent of select habitats	1	**1**	**1**	1	**1**	**1**	**1**	1	1	1

Critical factors are represented in blue with bold lettering

	Fitness for use by application context	Fitness for use class
Abundance of selected species	80,00%	**Partially fit**
Landscape fragmentation	70,00%	**Unfit**
Extent of select habitats	100,00%	**Fit**
Overall finess for use	**83,33%**	

Figure 5.6 *Internal, expected and external quality matrices of a simulated Annex I habitat map resulting from BIO_SOS, and derived "fitness for use" for three specific application contexts: abundance of selected species, landscape fragmentation, and extent of selected habitats.*

(b) With pre-existing spatial data

Considering the flexibility of the proposed methodological framework, one can either evaluate a dataset for different application contexts ("dataset-oriented" evaluation) or, as in the following example, if there are pre-existing data in conformity with user requirements for a specific application context ("context-oriented" evaluation).

Consider the sampling design for collecting species data as an application context, and the results of internal quality according to INSPIRE categories for pre-existing datasets from the PT2 test site (Table 4.9 section 4). For the above application context, seven dataset categories (displayed as table rows in Figure 5.7), usually used as input variables in model-based sampling designs, were selected for external quality evaluation.

Sampling design for collecting species data / PT2 / PNPG

Datasets (INSPIRE categories)	Quality indicators									
	Typology	Spatial extent	Temporal extent	Lineage description	Thematic accuracy	Thematic precision	Spatial scale	Producer recognition	Acess and use restrictions	File formats
Internal quality matrix										
Elevation	Elevation	508891 4503827 742483 4677069	1996 - 2010	-	-	-	25k - 1000k / 5m - 80m	Official	Non-commercial / available to use without licensing	GIS formats
Geology	Geology	508891 4503827 742483 4677069	1973 - 2010	-	-	-	25k - 500k	Official	Need to request licensing	GIS formats
Hydrography	Hydrography	508891 4503827 742483 4677069	1996 - 2008	-	-	-	25k - 1000k / 100m	Official	Conditions unknown/Non-commercial/ need to request licensing / available to use without licensing	GIS formats
Land cover	Land cover	508891 4503827 742483 4677069	1990 - 2009	-	-	-	25k - 1000k / 5m - 1000m	Official	Non-commercial / available to use without licensing	GIS formats
Meteorological geographical features	Meteorological geographical features	508891 4503827 742483 4677069	1931 - 2007	-	-	-	50k - 1000k / 200m - 1000m	Official	Non-commercial / available to use without licensing	GIS formats
Soil	Soil	508891 4503827 742483 4677069	1990 - 2000	-	-	-	25k - 1000k	Official	Need to request licensing	GIS formats
Species distribution	Species distribution	523541 4527099 681661 4642479	1853 - 2010	-	-	-	25k - 1000k / 5m - 10000m	Official	Non-commercial / available to use without licensing	GIS formats
Expected quality matrix										
Elevation	Elevation	547572 4611544 603371 4659434	≥ 1990	Yes	75%	10%	100k/ ≤80m	Official	Non-commercial / available to use without licensing	GIS formats
Geology	Geology	547572 4611544 603371 4659434	≥ 1990	Yes	75%	10%	100k	Official	Non-commercial / available to use without licensing	GIS formats
Hydrography	Hydrography	547572 4611544 603371 4659434	≥ 2001	Yes	75%	10%	100k/ ≤80m	Official	Non-commercial / available to use without licensing	GIS formats
Land cover	Land cover	547572 4611544 603371 4659434	≥ 2000	Yes	75%	10%	100k/ ≤80m	Official	Non-commercial / available to use without licensing	GIS formats
Meteorological geographical features	Meteorological geographical features	547572 4611544 603371 4659434	≥ 1970	Yes	75%	10%	100k/ ≤80m	Official	Non-commercial / available to use without licensing	GIS formats
Soil	Soil	547572 4611544 603371 4659434	≥ 1970	Yes	75%	10%	100k	Official	Non-commercial / available to use without licensing	GIS formats
Species distribution	Species distribution	547572 4611544 603371 4659434	≥ 2001	Yes	75%	10%	100k/ ≤80m	Official	Non-commercial / available to use without licensing	GIS formats
External quality matrix										
Elevation	1	**1**	**1**	0	0	0	**1**	1	**1**	1
Geology	1	**1**	**1**	0	0	0	**1**	1	**0**	1
Hydrography	1	**1**	**1**	0	0	0	**1**	1	**0**	1
Land cover	1	**1**	**1**	0	0	0	**1**	1	**1**	1
Meteorological geographical features	1	**1**	**1**	0	0	0	**1**	1	**1**	1
Soil	1	**1**	**1**	0	0	0	**1**	1	**0**	1
Species distribution	1	**1**	**1**	0	0	0	**1**	1	**1**	1

Critical factors are represented in blue with bold lettering

	Fitness for use by application context	Fitness for use class
Elevation	70,00%	**Partially fit**
Geology	60,00%	**Unfit**
Hydrography	60,00%	**Unfit**
Land cover	70,00%	**Partially fit**
Meteorological geographical features	70,00%	**Partially fit**
Soil	60,00%	**Unfit**
Species distribution	70,00%	**Partially fit**
Overall finess for use	**65,71%**	

Figure 5.7 *Internal, expected and external quality matrices of seven dataset categories and derived fitness for use to support a model-based sampling design for collecting species data in BIO_SOS.*

The external quality evaluation results show that none of the considered dataset categories would be fully fit for use in the selected application context, due to the inexistence of information for three quality indicators. Since none of these indicators was marked as a critical factor for the application context in analysis, four of the dataset categories were considered partially fit (Figure 5.7). The remaining three dataset categories were evaluated as unfit since they failed in critical factors.

These results highlight the importance of collecting a more complete metadata profile to describe pre-existing (and new) data throughout the project, as will follow in the next stages of Task 4.1. Complete

metadata should at least be provided for “core” datasets, including information about thematic accuracy and error tolerance, as well as information on data production methods (“lineage”). This additional information will be very important, not only for the implementation of the proposed methodological framework for external quality evaluation, but also as a tool for monitoring the quality of project outputs.

5.3 Perspectives for implementation

Examining quality features of geospatial data is a crucial aspect for assessing its fitness for use in the context of scientific research, decision making or other application environments. This topic has now become a key issue for both users and producers of geographic information (Hunter and De Bruin, 2005). The methodological framework for external quality evaluation proposed and illustrated in the previous sections was based on concepts which are becoming common in recent literature, on integration requirements with the WebGIS platform to be developed in Task 4.1 (related with D4.5), and on the project need to perform continuous quality evaluation and control on spatial data. We argue that there is a need to perform a pilot study to evaluate the proposed framework adequacy, flexibility, and feasibility, and only then an assessment of core datasets external quality based on the proposed framework should be performed across partners, sites and application contexts. Results from the pilot study (to be performed on pre-existing datasets for one selected site), and later the feedback from each BIO_SOS partner during and after the assessment across sites, would allow a continuous and cyclic improvement of critical aspects of the framework, namely those related to core concepts, metadata profiles, comparison rules, system parameterization, and workflow.

Readily available metadata are a valuable resource in the context of spatial data quality evaluation (both in the internal and external components), and care should be put on its fulfilment, validation, description (“*metadata on metadata*”), management and sharing. The definition of the metadata profile must incorporate internal quality issues that are also useful for external quality evaluation for several types of users, ranging from scientists to the main public, and should be based on a comprehensive screening of current literature on the subject. This topic will be further developed in the continuation of Task 4.1 through a rigorous selection and definition of the required standards and indicators required for this assessment. This should include specificities related, for example, with biological data, ecological data, species distribution data, and remote sensing imagery.

The integration of both internal and external quality evaluation routines in the future WebGIS platform is central to ensure a rigorous quality control not only on pre-existing data but also on expected products generated by the EODHaM system and other contexts (i.e. WPs) in BIO_SOS. In terms of implementation, the WebGIS platform will allow an explicit inclusion of external quality evaluation concepts through the use of metadata catalogues. In addition to allowing a higher control over the EODHaM structure, this verification should increase the final quality of geospatial data products, by promoting an iterative improvement cycle and thus decreasing the risk related to the use of new data. External quality evaluation should, for example, allow the control over the accomplishment of pre-defined quality targets required for image classification products like GHC maps or Annex I habitat maps. Querying and knowledge discovery routines to be implemented in the platform should allow multiple users (from different segments) to search metadata collections and perform what we would define as an “*on-demand external data quality evaluation*”. This kind of query, which starts with the user defining the expected quality matrix, uses the metadata catalogue to assess and rank which datasets are fitter for use in selected application contexts.

6. Synthesis, proposals and guidelines

6.1 Quality of pre-existing datasets: a first diagnosis

6.1.1 Considerations on the methodology

The theoretical and methodological framework, the preliminary evaluation of pre-existing data, and the analysis of their importance/relevance (or possible need of acquisition) in the context of BIO_SOS should result in proposals and guidelines for quality management: (i) at the level of data life cycle management; and (ii) at the higher level of project management and information system development. When considering the political and institutional context, the technical standards, as well as the different stakeholders' actions and expectations, **spatial data quality management** assumes a central and transversal dimension to processes and agents in the context of any information or organizational system, of which the BIO_SOS project is an example (Figure 6.1).

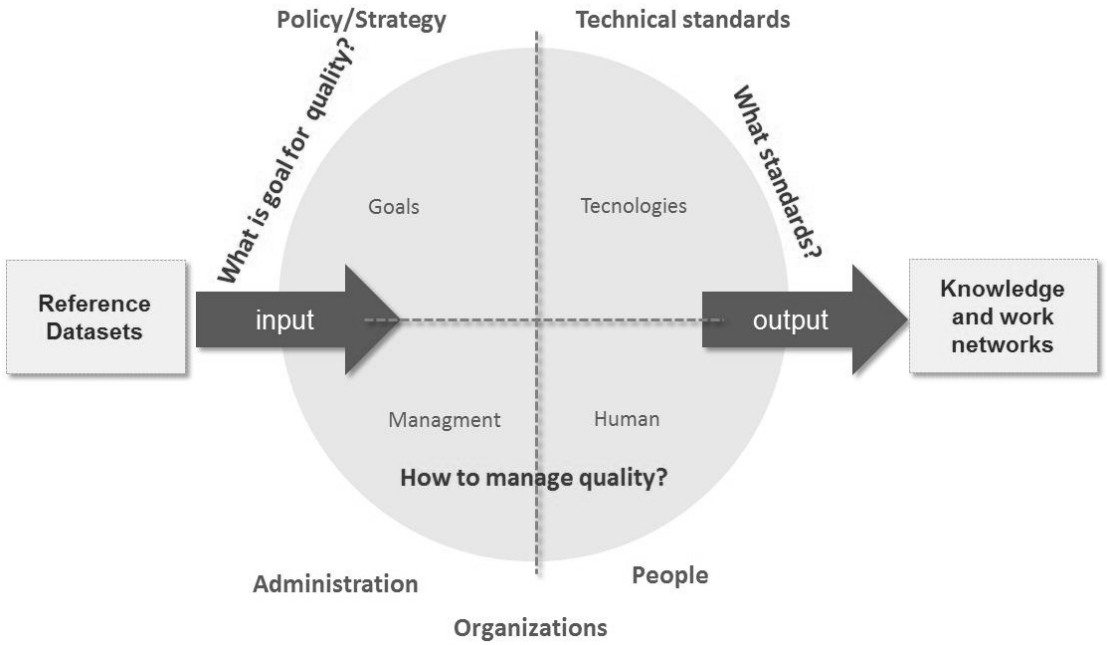


Figure 6.1 *System components and spatial data quality evaluation (adapted from Jakobsson, 2006).*

The metadata collection procedure highlighted a large heterogeneity in the completion of the proposed simplified metadata profile, which may sometimes have resulted in the reduced identification and characterization of datasets (see Section 4).This result seems to suggest, in some cases, a **lack of practical experience** in this type of exercises, which are not common in traditional ecological research. Simultaneously, the collection of metadata may have been hampered by questions of concept and procedures related to the implementation of international technical references and standards, as well as those related to the implicit multidisciplinary and complex nature of most spatial data themes and to the number of potential data providers. Further experience and knowledge in the use of international quality standards, related to individual and institutional involvement in European initiatives (e.g. spatial data model specification proposals, drafting teams or discussion groups, projects within GMES, SEIS, INSPIRE, BISE and other initiatives, which promote capacity building on spatial data management under international best practices or standards),will facilitate these internal activities in future work within WP4 and across the project.

Moreover, the proposed simplified metadata profile, defined to facilitate the inventory at this first stage, will be manifestly insufficient for a complete external quality evaluation of pre-existing datasets as well as for the implementation of dataset search and discovery services that incorporate end-user quality requirements. This highlights the importance of identifying possible difficulties in fulfilling **more complete metadata profiles** across the consortium, as a first key moment of future work in Task 4.1, before implementing evaluation procedures of direct full/sampling quality on the pre-existing datasets. Furthermore, in order to satisfy end-users' requirements and ensure the quality of final products in BIO_SOS, metadata collection (as well as quality issues) should span across: (i) sampling and field surveys (WP4); (ii) image processing and classification exercises (WP5); and (iii) spatial analysis and modelling for selected pressures in each site (WP6).

In short, results from the pre-existing data inventory and the preliminary spatial data quality evaluation **highlighted**: (i) the importance of partners being able to provide detailed metadata and to clarify access to available datasets; (ii) the interest of incorporating in the methodology a simplified inventory of datasets described through simplified metadata; (iii) the importance of developing a metadata collection model and supporting applications; and (iv) the crucial importance of disseminating quality evaluation concepts, methodologies and international standards related to internal and external data quality evaluation (end users' requirements, product specification, and conformance levels).

6.1.2 Quality and relevance of pre-existing datasets

In general, results from this first dataset inventory and description in the BIO_SOS consortium **revealed**: (i) the existence of important constraints in spatial quality of pre-existing datasets, namely for local scale spatial analyses and modelling (WP5 and WP6); (ii) the importance of implementing and maintaining spatial database management practices to support activities throughout the project; (iii) the great level of dependency of the consortium from existing and relevant datasets that may not be available at this stage of the project; and (iv) the importance of considering data property legal frameworks, institutional agreements, clarifying licensing issues, and other instruments that promote or constrain access to datasets or metadata to partners (see deliverable D8.5).

Results from the analyses across sites and partners also identified **data gaps** or unsuitable data for some critical Themes, in particular those related to georeferenced ecological data (Habitats and Biotopes, Flora/fauna inventories, and Species distribution). This fact could be associated with insufficient (or inexistent) georeferencing routines in previous ecological surveys, spatial database management or publishing and sharing practices for ecological spatial databases. Additionally, such limitations may also result from: (i) the difficulty of site partners to inventory all the available datasets at this stage of the project; and (ii) the difficulty of access to most datasets and consequently the impossibility of performing a direct data quality evaluation or even metadata collection.

In terms of **dataset quality**, the inventory of pre-existing data revealed: (i) a strong heterogeneity of the spatial and thematic quality of the datasets across INSPIRE Themes, but mainly across sites; and (ii) a diversity of data types, sources, formats and complex issues of property, data security, licensing and institutional protocol of data sharing needs. This suggests that considerable technical requirements, human effort and economic costs may have to be invested in the transformation of the different pre-existing data formats according to project objectives. In fact, format transformation potentially introduces error and affects spatial dataset quality, which calls for careful quality assurance and risk management procedures.

The heterogeneity of dataset quality across Themes and sites stresses the importance of process and data model **specifications** from each end-user, considering local site conditions and expected products. This task must involve multidisciplinary teams including specialists in geospatial technologies and spatial analysis, ecologists and end-users (Advisory Board members, potential data providers and data users in BIO_SOS), e.g. for the definition of minimum quality requirements for final products. The different partners should therefore actively participate in the development of data models and products, namely

those related to thematic specification of INSPIRE Annexes (Land Cover, Land Use, Habitats and Biotopes, and Species Distribution) and other initiatives from the scientific and technical communities.

Some of the foreseen **project products** may contribute to overcome some of the identified data gaps and user's needs. EO products can potentially provide a homogeneous base to promote appropriate products, harmonized across project sites, and therefore overcome some of the identified data gaps. However, the difficulty of obtaining homogeneous ancillary datasets to support harmonized procedures for image processing and classification highlights the importance of collaborative work with the main pre-existing data providers, including the relevant previous and on-going projects (Task 4.3), in order to create knowledge networks, to facilitate access to potentially relevant datasets, and to promote specification, quality, conformance and utility of final products.

6.2 Quality-related guidelines for new dataset acquisition in BIO_SOS

6.2.1 Guidelines for a general strategy

Based on results of the preliminary internal quality evaluation (namely the identification of data gaps), to be complemented by results from the external quality evaluation later in the development of Task 4.1, a coherent and assertive **spatial data acquisition strategy** for BIO_SOS should consider:

i) a clear establishment of **key data gaps and priorities** according to project, site-specific and partner's requirements, namely those related with local scales and higher spatial resolutions to support image classification and indicator extraction;

ii) a **wider search for pre-existing data** at all spatial scales and contexts (from global to site, from Task 4.1 to all partners and end-users of BIO_SOS), i.e. to extend the search, collection and quality evaluation of relevant datasets within and outside the consortium (supported in partner's experience from other projects), as well as exploring national, local and institutional information systems related to WebGIS platforms and Spatial Data Infrastructure (SDI) partnership initiatives that could become data providers for specific sites, pressures and indicators;

iii) a close **connection to on-going projects** (Task 4.3), not only to technological projects that explore data capture, image processing and classification, database management and spatial data sharing, but also to projects in the context of environmental modelling and management, namely those related to habitat mapping and monitoring, biodiversity indicators, and land change or other potential pressures on sites; and

iv) the **acquisition of new datasets**, from satellite imagery that fulfil the scale requirements of BIO_SOS (Task 4.2, deliverable D4.4) to field data and other on site datasets (Task 4.4, deliverable D4.3).

6.2.2 Quality evaluation across the data life cycle

The **data life cycle** can include data collection, data transformation, data handling, data manipulation, data documentation, data storage and archiving, data presentation and data publishing (Devillers *et al*., 2010). Adopting spatial data quality evaluation across the data life cycle should include (Figure 6.2): (i) data specification and modelling, processing, and database maintenance and security; and (ii) data audit, to monitor the use and continued effectiveness of data, archiving, to ensure that data is maintained effectively, including the relevant periodic records(Victorian Spatial Council, 2009).A loss of data quality at any one of these stages will reduce their applicability and potential uses (Chapman 2005). Spatial data quality management should therefore occur at different moments: (i) before spatial data collection or capture; (ii) during spatial data collection or capture and metadata development; and (iii) after data collection or capture in the context of spatial database management.

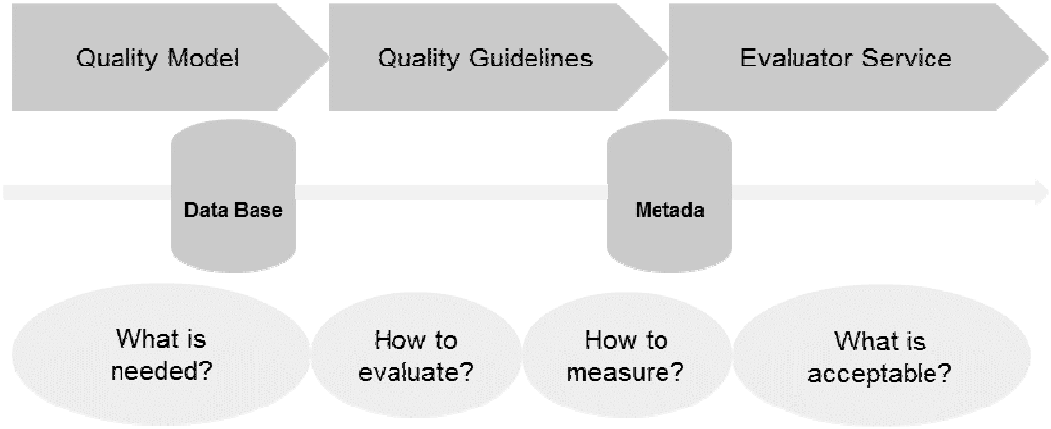


Figure 6.2 *Quality model, quality guidelines and quality evaluation process throughout the data life cycle (adapted from Jakobsson, 2009).*

6.2.2.1 Before spatial data collection or capture

This phase includes users' requirements (particularly those related to quality), data models, instrument specification, and development of data capture procedure guidelines. **Before spatial data collection or capture,** it is important: (i) to assure that quality based on "fitness for purpose" involves end-users of BIO_SOS as well as other potential users of project products; (ii) to develop common methodological guidelines for data collection, capture and management; (iii) to coordinate project teams with different end-users, who will define and specify the minimum quality specifications for products as part of the initial external quality evaluation; and (iv) to define quality guidelines for sampling and field work (Task 4.4, deliverable D4.3), but also for products from EO data (Task 4.2, deliverable D4.4, and WP5), as well as for spatial analysis and modelling for each site (WP6).

This product specification and quality need assessment must prioritize the identification of all relevant data. This implies a **strong cooperation with all potential users**, as well as disseminating the BIO_SOS project with potential data providers, to facilitate data access and sharing, including the pre-existing/ancillary data identified for each site. These proposals and guidelines are applicable, not only to the pre-existing data, but also to new data resulting from e.g. spatial and format transformation, dataset version update, dataset standardization, field data collection, or image processing and classification products.

6.2.2.2 During spatial data collection or capture and metadata development

Procedures in this phase aim at meeting the spatial data specification and at reporting dataset quality in the associated metadata. The processes of spatial data production and quality management specification must be fit into a **quality control and assurance development plan** (Figure 6.3). Quality control is an assessment based on internal standards, processes, and procedures are aimed to established to control and monitor quality, whereas quality assurance procedures maintain quality throughout all stages of data development (National Park Service, 2008; Martín and Ballard, 2010).

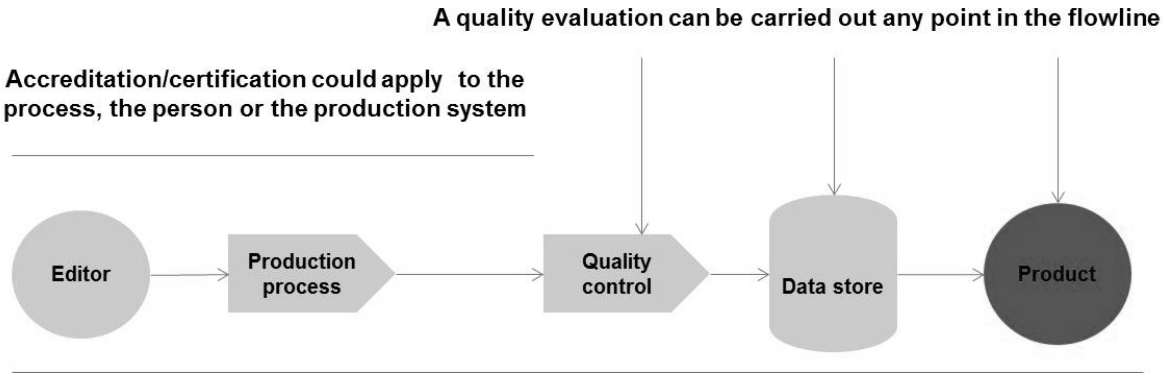


Figure 6.3 *Process data production and quality control and assurance specification (Jackobsson, 2010).*

There are many procedures for improving **data capture quality**, including: (i) choosing relevant data from relevant sources; (ii) recording data precision at the origin; (iii) testing data quality at each phase of data capture; and (iv) using automated software tools for validation of spatial and non-spatial data error introduction. Data capture or transformation requires documented methods/guidelines and qualified technicians as well as technologies (software and hardware) that reduce error introduction and facilitate data error management. This data capture process implies quality control with the reports of results for indicators and with explicit description of processes, options and difficulties. Moreover, experimenting methods in small test areas can test methodological proposals and support revisions of initial guidelines.

These processes must be accompanied by **metadata** collecting and fulfilling according to metadata profiles adjusted to the scope of the BIO_SOS project (see Sections 3 and 4, and Appendix 4).

6.2.2.3 After data collection or capture and spatial database management

This includes spatial data handling, database management, spatial analysis and modelling. **Data management** embraces all activities involved in handling data, including: (i) collection and capture; (ii) data quality, data documentation and organization through metadata and data standards; (iii) data life-cycle control; (iv) data specification and modelling (database design); (v) database maintenance and data audit; (vi) data storage and archiving, longevity and use; (vii) data security and data access; (viii) data sharing and dissemination; and finally (ix) data publishing (Martín and Ballard, 2010).

Spatial database management is influenced by: (i) spatial data models, the logical and physical architecture of the BIO_SOS information system, the thematic applications and the WebGIS platform; and (ii) the responsibility and authority to administer, manage or edit the spatial database, and associated metadata catalogue.

During project development, several issues must be considered: (i) the initial characteristics of the data and the requirements for final product, in order to establish data quality for sampling networks and products from field work (deliverable D4.3); (ii) guidelines concerning EO product quality indicators (see deliverable D4.4), which define quality concepts and principles for image processing and classification (WP5), but also related to quality validation of land cover/ use and habitat maps and related biodiversity indicators (see deliverable D2.1); (iii)assuming standards and defining methodologies to evaluate the quality requirements of inputs and outputs of spatial modelling exercises associated to the processes being studied in each site (WP6); and finally (iv) evaluating and documenting uncertainty and error propagation across modelling exercises, with particular attention to data lineage.

6.3 Guidelines for data quality management in BIO_SOS

Information system quality management involves establishing processes to improve and maintain the quality of the products by helping the user to: (i) be consistent in the way tasks are performed; (ii) reduce the chance of expensive mistakes; (iii) use time and resources more efficiently; (iv) monitor and improve user satisfaction; (v) identify new service/business opportunities; and (vi) improve public perception of the resulting products (van Oort, 2005). In this context, information systems within BIO_SOS governance should consider **direct and continuous quality evaluation of spatial data**, due to the diversity of specific processes, components, sites and partners.

The implementation of spatial data quality evaluation and system quality control and assurance protocols in BIO_SOS should be coordinated with existing (and proposed) systems and processes within the project. There are significant advantages in incorporating all quality assurance project activities within **a single quality assurance framework** (Victorian Spatial Council, 2009): (i) having an integrated assessment of all quality indicators; (ii) improving data interoperability by defining comparison terms consistently throughout the project; and (iii) creating routines for data quality evaluation across objectives, tasks and work-packages, considering all datasets, users and possible uses. The core objectives of such a framework should be to implement procedures that support quality standard definition within the project, but also that foster communication within and outside the project and its institutional partnership, not only within the project time frame, but also providing experiences and technological solutions for future users and uses.

In this context, spatial data quality management should integrate the future BIO_SOS information system and the **project management and quality assessment plan** (Task 8, see deliverable D8.5), in order to allow a more effective implementation of the data quality evaluation and management beyond the project scope and time frame. The implementation of a project information system that considers, not only functions related to data repository and organization, but also the standardized fulfilling of metadata and the implementation of data quality procedures (internal and external quality), will provide the necessary structure to evolve to (and eventually benefit from) an **Information Security Management System** (ISO 27001:2005). At same time, the project could contribute to user (researchers and end-users) capacity-building, by promoting qualification interests and opportunities, and, if intended, external professional certification (e.g. according to ISO 19122:2004 *"Qualification and certification of personnel"*).

The definition of **data quality policies and guidelines** should be translated in published documents but also be included in proposals and guidelines about property and custodianship of the pre-existing data (e.g. awareness, access, pricing, licensing, privacy, and confidentiality). More specifically, this should consider: (i) typifying user's access to the identified datasets and other technologies (Task 8, deliverable 8.5), as well as continuing to explore joint acquisitions and licensing for each partner and site(Task 2, deliverable D2.3); (ii) defining field data collection processes and protocols (deliverable D4.3), image processing methods and standards (WP5), and modelling frameworks (WP6); (iii) establishing property and exploration guidelines for new products delivered within BIO_SOS (considering the project public funding and the collective nature of tasks and products); and (iv) defining policies and practices of spatial data publication and sharing among partners and users, as well as with information systems external to the project.

Considering these orientations, BIO_SOS **data quality monitoring and reporting** should imply: (i) the definition and specification of spatial data models (INSPIRE Thematic Working Groups, 2011) and formats, as well as the development of internal data communication procedures; and (ii) the establishment of quality evaluation procedures across the project (deliverable D8.5), in order to collect and report on data quality indicators.

As an end-product of Task 4.1 (deliverable D4.5, due at the end of month 12), the **BIOSOS WebGIS Collaborative Platform** will be a metadata portal developed on open-source technologies, which will integrate spatial data, internal and external user's profile authentication, and metadata catalogue services, which will allow data discovery and sharing web services, as well as data quality and data user web services. The metadata portal will consider the **"**Metadata accessibility policy" defined in the Project Management and Quality Assessment Plan (see deliverable D8.5), which says that "all partners have access to metadata of all other partners (…) in order to promote information sharing among all

participants"). This WebGIS platform will support project governance and quality insurance, since it will allow:(i) to validate the quality of the uploaded spatial data, and to manage users under the system administrator's authority; (ii) to monitor data availability according to themes and datasets *a priori* defined for each site; (iii) to manage users' profiles and access in order to know individual and institutional patterns of WebGIS functions, besides contributing to the integrity and security of the system and consequently to data quality management; (iv) to publish and access on-line internal and external data as well as reports on (quality) indicators; (v) to discover and share services that include complex queries and oriented towards data quality requirements by specific users; and (vi) to foresee web service implementation with other Web applications and with internal (EODHaM) and external information systems.

7. Appendices

Appendix I

Metadata collection for pre-existing datasets

WP4 – On-site data collection

Task 4.1 – Collection and analysis of pre-existing data

Metadata collection for pre-existing datasets

Proposal of a standard methodology

(version 1.0)

Joaquim Alonso

João Pradinho Honrado

(ICETA-UP / Partner 9)

1. INTRODUCTION

1.1. Objectives of WP4 and Task 4.1

WP4 is intended at **collecting, harmonizing and sharing pre-existing datasets** on test sites relevant for habitat mapping, and at supplementing existent datasets with **new field data from on-site campaigns** based on standard protocols. WP4 is divided in four major tasks that intent to support a continuous flow of information as well as standardization protocols to facilitate communication between partners and build coherent field datasets to support the analysis and modelling tasks (WP5, WP6 and WP7):

Task 4.1 Collection and analysis of pre-existing data

Task 4.2 Criteria for EO selection

Task 4.3 Connection to ongoing projects

Task 4.4 Field campaigns for system validation

In this sense WP4 will focus on the fulfilment of the following **objectives** within BIO_SOS:

i. collecting metadata of pre-existing on-site in situ and ancillary data for each site;
ii. planning of in-field campaigns for system calibration and validation;
iii. establishing criteria for EO data selection;
iv. establishing co-operation protocols with ongoing projects; and
v. performing analyses on pre-existing and newly collected data.

Specifically, **Task 4.1** intends to identify datasets, projects and institutional data providers, describe and collect all relevant in situ and ancillary data from the several countries, organize and harmonize all datasets on common standards, and provide a collaborative platform to catalogue, query and share databases among project partners using an internal network, particularly to feed other WPs as well as other tasks in WP4 (namely Task 4.4).

Pre-existing data will be valuable in **several stages** of the project, namely:

i. description of the environmental and ecological conditions in the test sites (WP2 and WP8);
ii. identification and selection of key processes and drivers of ecological change in each test site (WP2);
iii. selection of focal areas within sites for EO imagery selection and acquisition (Task 4.2);
iv. identification of crucial data gaps and selection of key projects which may provide important datasets;
v. support to sampling design for new on-site campaigns (Task 4.4);
vi. support to imagery analyses (WP5) and habitat classifications (WP6);
vii. modelling of the relations between EO data, habitat classifications, and focal SEBI indicators adopted in BIO_SOS (WP6); and
viii. support to the collection of complementary field data for system validation (WP7).

As described later in this document, **Task 4.1** will include the implementation of a methodological framework including six stages, from the collection of simple metadata on all existing datasets concerning test sites, to the development and implementation of a collaborative platform for data sharing among partners within the project. The description of spatial databases by metadata profiles (ISO 19115 and ISO 19139) will then support a spatial, thematic, temporal, completeness and logical consistency quality analysis (ISO 19113, ISO 19114 and ISO 19138) to enable geographic data to be shared and widely available across application domains.

1.2. Metadata, spatial data quality assessment, sharing and interoperability

Performing data and dataset inventories, as well as developing digital (and web based) catalogues, represents one of the most important steps to establish interoperability and sharing framework between different data providers and users. In the scope of WP4, and specifically Task 4.1, these issues were considered in order to determine a procedure to create, manage and maintain relevant datasets for each test site, having in mind the need to collect **metadata** that adequately describe the available information, its thematic and spatial extent and quality, and the demand for a communication/collaboration platform that allows searching and sharing information on biodiversity and habitats.

In order to do so, four **procedures** must be considered: i) the collection of metadata and the creation of digital catalogues to facilitate data search and sharing; ii) the identification of coordinate systems and reference criteria; iii) the implementation of an harmonization process, in order to create spatial and thematic interoperability between different datasets; and iv) the establishment of data collection standards in order to control the quality of all datasets to be gathered.

Data **interoperability** poses a problem when considering the use of information collected at different scales, with distinct sampling and collection protocols and different spatial extents. As an example, spatial, chorological (i.e. geographic records of species or habitats) and alphanumerical datasets covering Natura 2000 sites are available at multiple spatial scales and contexts, but they may be valuable to support and/or validate EO habitat maps resulting from other WPs in the project. Other potential datasets include in situ observational records and maps on habitats and biodiversity, EO data and products, as well as many types of ancillary datasets, resulting from previous local, regional or national surveys (e.g. Habitat/Land Cover maps) and European projects (e.g. CLC maps).

1.3. Collaborative framework – contextual initiatives

Since 2003, with the creation of the intergovernmental Group on Earth Observations (GEO) [*http://www.earthobservations.org/*], and 2004, with a worldwide commitment for the implementation of the Global Earth Observation System of Systems (GEOSS) [*http://www.earthobservations.org/geoss.shtml*], governments have recognized the need for Earth observation and the urgent need for a combined effort to identify, characterize and evaluate global change and its effects on components of human well-being. One of the main goals of GEOSS is to **link existing systems and networks** to achieve comprehensive, coordinated and sustained observations of the Earth system. In order to accomplish this, it is necessary to implement, standardize and evaluate existing data flows and infrastructures to promote better communication between observation systems. In this sense, biodiversity represents one of many subsets of an Earth observation infrastructure and has to be addressed taking into account the specific features of its implementation.

At the European level, initiatives like the Global Monitoring for Environment and Security (GMES) [*http://www.gmes.info/*] or projects like EBONE - European Biodiversity Observation Network

[*http://www.ebone.wur.nl/UK/*] are defining the way to communicate environmental and biodiversity information along geographic, administrative and institutional environments, and determining their role in the development of **Spatial Data Infrastructures** (SDI). In this context, a major development has been the adoption in 2007 of the INSPIRE Directive, a legal framework to establish a distributed Infrastructure for Spatial Information in Europe, built on the SDIs of the Member States of the European Union.

The implementation of spatially explicit ecological or environmental monitoring programs is crucial for the gathering and consolidation of knowledge related to the patterns of distribution, function, and interaction of biological assets with other spatially explicit factors (e.g., land cover, human development, and environmental disasters). The implementation of projects like the best practice network for SDI in nature conservation (NatureSDIplus) [*http://www.nature-sdi.eu/*] or the Biodiversity Information System for Europe (BISE) [*http://www.eea.europa.eu/publications/bise*] promotes the involvement of stakeholders and the sharing of data and best practices. Such initiatives also improve and stimulate research, and promote the re-use of existing information on nature conservation and reporting. The relation to other projects that are being implemented across Europe as well as the integration of all core information used within the WPs of BIO_SOS will therefore be a critical issue for the implementation of a **collaborative framework** to support the development of the project and the achievement of its goals.

2. Methodology

2.1 A general methodological framework

Task 4.1 intends to identify datasets, projects and institutional data providers, to catalogue all relevant in situ and ancillary data from the several countries, to promote the harmonization of datasets on common standards, and finally to provide a collaborative platform to search and share databases among project partners using an internal network (see WP3).

The multiplicity of scales, natural and human contexts, and field collection methods will require a dataset quality assessment prior to the implementation of organization and harmonization processes. The main potential problems/caveats will be: i) the **existence of different spatial and thematic scopes** that can reflect on the existence of distinct thematic and spatial gaps for some test sites; ii) the **diversity of data collection methods and protocols** as well as **different timeframes of data collection and availability** that can hamper the ability to compare and analyze the results; and iii) the **diversity of threats and processes of change** that can create biased evaluations or influence the assessment of relevance and actual data needs.

In order to manage these potential limitations within the project scope and to contribute to a standard for **future comparability and interoperability** for biodiversity and habitat data sharing, the general methodological framework that was developed includes six stages:

i) the **collection of metadata, according to simple profiles** on all existing datasets concerning test sites as proposed in the table present in Appendix 1 of this methodological document (to be done by all BIOSOS test site partners until **May 4**);

ii) the **establishment of selection criteria** for a first identification of **relevant datasets** for BIOSOS by establishing a baseline quality assessment of all identified databases in connection to the most important pressures and threats regarding each site (see D2.2) (to be performed by Partner 9 until **May 14** and then discussed at the WP4 session in Wales);

iii) the collection of **core metadata** for all selected datasets according to the INSPIRE Standard Metadata Profile (to be done by all partners until **June 3**);

iv) the development (Partner 9) and implementation (all test site partners) of a **quality assessment methodology** on all selected datasets towards a final dataset selection and harmonization (to be done until **June 30**);

v) the identification of **additional data needs** (for possible acquisition within the project) resulting mainly from identified thematic or spatial data gaps (to be done until **July 14** and reported in D4.1 by **July 31**);

vi) and the development (Partner 9) and implementation of a **collaborative platform** for metadata and core dataset sharing among partners within the project (to be done until **October 31** and reported in D4.5 by **November 30**).

This first version of the methodological proposal is mostly devoted to the **collection of simple metadata**, i.e. to stage i) of the above methodology. The specific steps of this first stage will be described in detail in the next section. Finally, in section 2.3 a brief description of the next steps is outlined; this section will be further detailed in future versions of the document.

2.2 Collection of simple metadata profiles on all pre-existing datasets

As part of stage i) of the general methodology for Task 4.1, we propose that test site partners will collect a **simple metadata profile**, as a first step for the later quality assessment of pre-existing in situ and ancillary datasets, in order to allow the evaluation of the availability and general quality of existing datasets within the BIOSOS consortium. Available spatial datasets may include:

i) **global or pan-European spatial databases** (e.g. European Environmental Zones, European Soil Database, Hydrography and Hydrology – WISE/WFD; land cover and land use [CLC, GLC2000 and PELCOM]); Partner 9 will make a first collection of these datasets, but all partners are encouraged to suggest additional datasets that may be of relevance to the project;

ii) **national and regional relevant databases**, namely from environmental monitoring facilities (including LTER sites), statistical units associated to population, economic activities, agro-forestry censuses and inventories, regional and local master plans, and Natura 2000 management plans; and

iii) **In situ ecological datasets** resulting from previous field surveys will mostly include species distribution records, spatially-explicit diversity assessments, and field validated habitat maps, both possibly available at multiple scales and resolutions across partner countries, and potentially spanning over large time frames.

Therefore, this first survey will focus on the availability of **global and European datasets**, **national and local reference and thematic maps**, and **field and other site-level relevant datasets** (Table 1). This first step is essential to determine the thematic and spatial availability of datasets across test sites, to establish the need for new data acquisition, and to evaluate the need to implement harmonization processes for datasets within and among databases provided by the several partners.

Overall, this first inventory is **aimed at supporting: i) a preliminary evaluation of the availability of data and databases** to support the characterization and process modelling for each partner/site; **ii) the definition of assertive strategies** for the implementation of instruments of internal data sharing and data services; and **iii)the implementation of data production mechanisms** that aim at reducing the possible insufficiencies of data and at facilitating the access to datasets currently outside the consortium (see task 4.3).

Table 1 | Data types and examples of relevant information thematic scope.

Data Type	Thematic scope (examples)
Global and European datasets	Digital terrain model (e.g. SRTM)
	Climate (e.g. Worldclim)
	Land cover (e.g. GLC, CLC)
	European/Global geological and soil maps
National and local reference and thematic maps	Altimetry / elevation models
	National land cover datasets
	Geological and soil maps
	Climate
	Pressure dynamics
	Natural risks
	Demographic data
Field and other site-level relevant datasets	Vegetation relevés Biodiversity surveys / species distribution data

	Habitat maps
	Local infrastructures
	Management strategies

In order to implement a coherent metadata collection methodology and to allow the implementation of a first dataset quality assessment, the **simple metadata profile** will follow the concepts, Themes and framework (DT-DS, 2007) of the INSPIRE metadata regulation (CEC, 2008) with a few minor additional inputs (essentially for data quality assessment).

The resulting table (see example in Appendix 1) will be completed by each test-site partner, following a harmonized completion procedure that includes:

i) the confirmation of the inexistence of duplicates;

ii) the confirmation of the inexistence of invalid characters or categories;

iii) the confirmation of the inexistence of absent information;

iv) the validation of the coordinate systems names and acronyms; and

v) the validation of the classification of each dataset according to the INSPIRE Directive.

In the following paragraphs, a simple **definition of concepts** is provided to support the collection of this simple metadata profile.

Resource title

This is a characteristic, and often unique, name by which the resource is known. This field refers to the title of a specific dataset [e.g. a dataset of distribution information for the population of bats, should be referred as "***bats distribution data***"]. The titles should be **short** (in length) and **objective**. Some examples:

- a dataset with the distribution of 2 species of flora: "distribution data for *Species name* and *Species name*";
- a dataset with frequency, distribution and characteristics of 2 species of flora: "distribution data for *Species name* and *Species name*";
- a dataset with frequency, distribution and characteristics of a group of species of flora: "flora distribution data";
- altimetry data (scale 1:10 000) for the study area: "altimetry";
- altimetry data (scale 1:50 000) for the study area: "altimetry";
- altimetry data (scale 1:50 000) for 20% of the study area: "altimetry";
- SPOT 5 image [Panchromatic] spatial resolution 2.5 meters: "SPOT 5 image (Panchromatic) scene: 23-266"
- SPOT 5 image [SWIR] spatial resolution 10 meters: "SPOT 5 image (SWIR) scene: 23-266"

Resource abstract (description)

This is a ***brief narrative summary*** of the content of the resource [e.g. Resource title: *"altimetry"*; Resource abstract: "*altimetry data (scale 1:50.000) for a portion of the study area"*], with no more than 200 characters.

Topic category

The topic category is a high-level classification scheme to assist in the grouping and topic-based search of available spatial data resources. The following categories will be considered, according to the European Norm ISO 19115:

- Farming
- Biota
- Boundaries
- Climatology / Meteorology / Atmosphere
- Economy
- Elevation
- Environment
- Geoscientific information
- Health
- Imagery / Base Maps / Earth Cover
- Intelligence / Military
- Inland Waters
- Location
- Oceans
- Planning / Cadastre
- Society
- Structure
- Transportation
- Utilities / Communication

Spatial resolution

Spatial resolution refers to the level of spatial detail of the data set. It shall be expressed as a set from zero to many resolution distances (typically for gridded data and imagery-derived products) or equivalent scales (typically for maps or map-derived products). An equivalent scale is generally expressed as an integer value expressing the scale denominator. A resolution distance shall be expressed as a numerical value associated with a unit of length. Examples:

- in the case of vectorial datasets, reference scale: e.g. "***1:5000***", "***1:25 000***";
- in the case of image datasets, spatial (pixel) resolution: e.g. "***0.35 m***", "**30 m**";
- in the case of distribution datasets, spatial resolution: e.g. "***point locations***", "***10km grid***", "***1km grid***";

Temporal extent

The temporal extent defines the time period covered by the content of the resource. This time period may be expressed as any of the following:

- an individual date;
- an interval of dates expressed through the starting date and end date of the interval;

Special cases:

- in the case of unpublished datasets, this field refers to the date of creation of the dataset [e.g. "**23-08-1998**" or "***1998***"];
- in the case of biological datasets (e.g. flora), this field refers to the date of collection [e.g. "**23-08-1998**" or "***1998***"];
- in the case of images, this field refers to the date of capture [e.g. "**23-08-1998**"];
- in the case of a dataset with information from several sequential dates, this field refers to the timeframe [e.g. "**23-08-1998 - 23-08-1999**" or "***1998-2002***"];

Date of publication

This is the ***date of publication*** of the resource when available, or the date of entry into force [e.g. "**23-08-1998**"].

Geographic bounding box

This field refers to the geographical scope of the dataset, particularly whether the dataset covers all or just a portion of the study area. The bounding box shall be expressed with westbound and eastbound longitudes, and southbound and northbound latitudes in decimal degrees, with a precision of at least two decimals. This field is to be fulfilled as: "***westbound longitude; southbound latitude; eastbound longitude; northbound latitude***".

Example: ***-9.5325; 40.5658; -6.0608; 43.1036***

File type

This field refers to the type of file of the dataset [e.g. *ESRI shapefile*, *tiff*, *GRID*, *IMAGE*].

Author

This field refers to the institution or individual that produced the dataset and is to be filled with the ***name*** of the **institution OR individual** that **produced** or **collected** the dataset.

Property (conditions applying to access and use)

This field refers to the property of the dataset being necessary to state if there are any conditions applying to its access and use, and is to be filled as:

- *"**available to use without licensing**"*: meaning that the dataset belongs to the partner or doesn't need licensing [e.g. free available data on the web]; **OR**
- *"**need to request licensing**"*: meaning that the dataset belongs to another institution or individual and it is necessary to establish a protocol or request licensing;

Spatial Reference System

This field refers to the geographical reference system of the dataset and should be presented as: "***Datum (name of the reference system)***" [e.g. ***LisboaHayford Gauss (Lisboa IGEOE)***];

2.3 Next steps

Selection of relevant datasets for BIOSOS

A set of selection criteria will be proposed and discussed among all partners to be used in the later selection of the relevant datasets for BIO_SOS. This selection of the relevant databases will be implemented in accordance with the availability, the access and the quality of the available databases and the respective relevance for the processes in analysis for each site. It will include the fulfilling of the Core Metadata INSPIRE Profile of the selected databases as form to implement search and sharing mechanisms in a geoportal to be constructed for the project BIO_SOS (Task 4.1 and Deliverable D4.5).

In order to determine the relevant datasets for future compilation and systematization, a first analysis of the existent **processes and drivers of biodiversity change** is essential. From the analysis included in Deliverable 2.2, it is already possible to identify and describe the pressures and threats associated to each site, allowing the evaluation of the relevance of datasets to address such processes. The characterization of each site pressures and threats becomes essential to define the processes and core necessary datasets to implement modelling procedures and

analysis. Also, this evaluation will identify core processes that are important across all sites and that require standardised information and databases for comparison and integration of results.

Database quality evaluation

The proposed evaluation refers to aspects of quantity (the total number and diversity of subjects for each site), quality, and conditions of production and access to the databases for each site as well as a comparative analysis of those databases. Metadata collected according to ISO 19115, ISO 19139 and the INSPIRE Metadata Profile will then support a spatial, thematic, temporal, completeness and logical consistency quality analysis (ISO 19113, ISO 19114 and ISO 19138). The metadata to be collected will allow the evaluation of the diversity, similarity, insufficiency and utility of data regarding their expected uses. This evaluation includes analyses of different Themes included (number and INSPIRE Annexes covered), spatial resolution (scale, image description or pixel dimension) and spatial reference system (local, national or global reference system), spatial and temporal extension, date of publication as well as file types and conditions applying to access and use.

References

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Guerra, C., Castro, P., Honrado, J., Bunce, B., Jongman, R., Alonso, J., 2010. Collaborative Information Systems and Biodiversity: the path for a strategic biodiversity information system, Earthzine.org.

Appendix II

INSPIRE Annex Themes

		Resource title	Resource abstract
ANNEX I	01	Coordinate reference systems	Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.
	02	Geographical grid systems	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.
	03	Geographical names	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.
	04	Administrative units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.
	05	Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code.
	06	Cadastral parcels	Areas defined by cadastral registers or equivalent.
	07	Transport networks	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network (1) and future revisions of that Decision.
	08	Hydrography	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2) and in the form of networks.
	09	Protected sites	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.
ANNEX II	01	Elevation	Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.
	02	Land cover	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.
	03	Orthoimagery	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.
	04	Geology	Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.
ANNEX III	01	Statistical units	Units for dissemination or use of statistical information.
	02	Buildings	Geographical location of buildings.
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).
	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.
	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.
	11	Area management/restriction/regulation zones and reporting units	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.
	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.
	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.
	17	Bio-geographical regions	Areas of relatively homogeneous ecological conditions with common characteristics.
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.

Appendix III

Described Metadata for each Test-site

Global/Regional

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I	01	Coordinate reference systems	Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.										
	02	Geographical grid systems	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.										
		UTM grid zones	1 km geographical UTM grid system	-	1000m	-	-	-	-	ESRI shapefile	EEA	available to use without licensing	ETRS89 LAEA 5210
	03	Geographical names	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.										
		Toponomy	Places toponomy for the Europe, North America, South America, Africa, Central America, Australia Oceania and Asia. Information from the Open Street Map (OSM).	Location	-	-	-	-	-	ESRI shapefile	OSM (Open Street Map)	available to use without licensing	WGS84
	04	Administrative units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.										
		Administrative areas (GADM)	Country outlines and administrative subdivisions for all countries. The level of subdivision varies between countries	Boundaries	-	5000k	-	-	-	ESRI geodatabase	VDS Technologies	available to use without licensing	-
		EuroBoundaryMap - Administrative and statistical regions dataset covering 40 countries	EuroBoundaryMap v5.0 is a seamless geo database. It contains geometry, names and codes of administrative and statistical units continuously updated by our members, the National Mapping and Cadastral Agencies (NMCAs) of Europe. It offers a linkage to the updated statistical LAU- and NUTS-codes for all local administrative units of EU27.	Boundaries	-	100k	-	2010	-	ESRI geodatabase	Eurogeographics	need to request licensing	ETRS89
		EuroRegionalMap is a multi-functional topographic reference dataset	EuroRegionalMap is seamless and harmonised data that is produced in cooperation by the National Mapping and Cadastral Agencies (NMCAs), using the official national databases. EuroRegionalMap is designed for business use and enables to process comprehensive spatial analysis, e.g. – transport and water networks have full connectivity, administrative boundaries are topologically consistent. The product well fits for the following applications: marketing planning, service provision and retail site location, environmental analysis, vehicle routing, map backdrop against which to display specific information.	Boundaries	-	250k	-	2010	-	ESRI geodatabase	Eurogeographics	need to request licensing	ETRS89
		EuroGlobalMap is a topographic dataset	EuroGlobalMap is seamless and harmonised data and is produced in cooperation by the National Mapping and Cadastral Agencies of Europe, using official National Databases. The database contains the following six themes. Each theme contains one or more feature classes: Administrative boundaries, Hydrography, Transport, Settlements, Elevation and Geographical names Product Formats.	Boundaries	-	1000k	-	-	-	ESRI geodatabase	Eurogeographics	need to request licensing	ETRS89
	05	Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code.										
	06	Cadastral parcels	Areas defined by cadastral registers or equivalent.										
	07	Transport networks	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network (1) and future revisions of that Decision.										
		Railways - Street Map	Railways for the Europe, North America, South America, Africa, Central America, Australia Oceania and Asia. Information from the Open Street Map (OSM).	Transportation	-	-	-	-	-	ESRI shapefile	OSM (Open Street Map) - GEOFABRIK	available to use without licensing	WGS84
		Roads - Street Map	Roads for the Europe, North America, South America, Africa, Central America, Australia Oceania and Asia. Information from the Open Street Map (OSM).	Transportation	-	-	-	-	-	ESRI shapefile	OSM (Open Street Map) - GEOFABRIK	available to use without licensing	WGS84
	08	Hydrography	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2) and in the form of networks.										
		WFD: Surface water	Ecological status or potential of water bodies (ecological status or potential by country; All waterbodies by count).	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		WFD: Groundwater	Chemical status of groundwater bodies by count.	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		WFD: River Basin District Info	River Basin District info	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		International River Basin Districts	-	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Mon EU National River Basin	-	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Mon EU International River Basin	-	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		National River Basin Districts	-	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Water emissions	Dataset contains data selected from reporting of member and collaborating countries on emissions of nutrients and hazardous substances to water, aggregated within River Basin Districts. Reported data have been assessed and processed by the ETC-Water and the EEA. Results of quality assessment have been incorporated into the individual data tables.	Inland Waters	-	-	1977-1998 2000-2009	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Rivers and Lakes	-	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I		Groundwater	Dataset contains data selected from reporting of member and collaborating countries on chemical quality of groundwater, characteristics of groundwater bodies and sampling sites. Reported data have been assessed and processed by the ETC-Water and the EEA. Disaggregated records were annually aggregated by groundwater body, substance and year, and statistic value calculated. Results of quality assessment have been incorporated into the individual data tables.	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Marine and Coastal Environment	-	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Water Quality and Use	-	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Waterways	Waterways for the Europe, North America, South America, Africa, Central America, Australia Oceania and Asia. Information from the Open Street Map (OSM).	Inland Waters	-	-	-	-	-	ESRI shapefile	OSM (Open Street Map)	available to use without licensing	WGS84
	09	Protected sites	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.										
		RN2000	Limits of the Natura 2000 Network Sites for the Europe, public end 2009. Information from the European Environment Agency	Environment	-	-	-	2009	-	ESRI shapefile	EEA	available to use without licensing	ETRS89 LAEA
		RN2000 - Table bioRegion	-	Environment	-	-	-	2009	-	Geodatabase/Data tables	EEA	available to use without licensing	-
		RN2000 - Table describesSites	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table designationStatus	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table directivesSpecies	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table generalHabitatClass	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table habitats	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table impact	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table metaData	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table natura2000Sites	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table otherSpecies	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
		RN2000 - Table species	-	Environment	-	-	-	2009	-	-	EEA	available to use without licensing	-
ANNEX II	01	Elevation	Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.										
		ASTER Global Digital Elevation Model (GDEM)	The resource contains GDEM elevation data with approximately 30m of resolution (GDEM30m_WGS84GCS_PTN_v1) and derived products namely: solar orientation / aspect (AspectGDEM_WGS84GCS_PT1_v1), slope in percentage (SlopeGDEM_WGS84GCS_PTN_v1) and landform classes (Weiss, 2001)	Elevation	30m	-	2009	2009	-9.000139 -5.999861 39.999861 43.000139	GeoTIFF (TIF)	NASA and Japan ASTER Program	available to use without licensing	WGS84
		SRTM v4	-	Elevation	80m	-	-	2008	-	GeoTIFF (TIF)	USGS/NASA; Consortium for Spatial Information - Consultative Group for International Agriculture Research (CGIAR-CSI) - version 4	available to use without licensing	-
		EuroDEM mosaic	EuroDEM is a digital representation of the ground surface topography of Europe. It describes the distribution of terrain or 'bare earth' heights. This does not include 'first surface' elevations such as vegetation and manmade structures. The 27 countries of the European Union, the four EFTA countries (Iceland, Leichtenstein, Norway and Switzerland) as well as Croatia, Kosovo, Bosnia & Herzegovina, Serbia, Montenegro, Macedonia, Moldova and the Kaliningrad area are covered.	Elevation	60m	-	-	-	-	GeoTIFF (TIF)	-	need to request licensing	ERTS89
		Elevation - WorldClim	Elevation from the WorldClim (Global Climate Data) dataset.	Climatology / Meteorology / Atmosphere	1000m	-	1950-2000	2005	-	ESRI Grid	Royal Meteorological Society	available to use without licensing	WGS84
	02	Land cover	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.										
		CLC 1990	Corine Land Cover (1990). Information of Europe from the European Environment Agency (EEA) .	Planning Cadastre	-	100k	-	1990	-	ESRI Shapefile	EEA	available to use without licensing	ERTS89
		CLC 2000	Corine Land Cover (2000). Information of Europe from the European Environment Agency (EEA).	Planning Cadastre	-	100k	-	2000	-	ESRI Shapefile	EEA	available to use without licensing	ERTS89
		CLC 2006	Corine Land Cover (2006). Information of Europe from the European Environment Agency (EEA).	Planning Cadastre	-	100k	-	2006	-	ESRI Shapefile	EEA	available to use without licensing	ERTS89
		GLC 2000	GLC 2000 Global Class (according to LCCS terminology, aggregated from regional classes using LCCS)	Planning Cadastre	-	250k	-	2000	-	GeoTIFF (TIF)	-	available to use without licensing	-
		PELCOM	Pan-European Land Use and Land Cover Monitoring. NOAA-AVHRR satellite	Planning Cadastre	1000m	-	-	-	-	ESRI Grid	CGI, Wageningen University	available to use without licensing	WGS72_AlbersConicalEqualArea
		GlobCover 2009	GlobCover 2009 Land Cover Map produced for the year 2009.	Planning Cadastre	-	-	-	2009	-	GeoTIFF (TIF)	ESA, UCLouvain	available to use without licensing	WGS84
	03	Orthoimagery	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.										
		MODIS NDVI scene: h17v04	MODIS Vegetation Indice (NDVI) 16-Day composite L3 Global. MODIS Sinusoidal	Imagery / Base Maps / Earth Cover	250m	-	-	2010	-	HDF-EOS	USGS/NASA	available to use without licensing	WGS84
		MODIS Gross Primary Productivity scene: h17v04	MODIS Gross Primary Productivity 8-Day composite L4 Global. MODIS Sinusoidal	Imagery / Base Maps / Earth Cover	1000m	-	-	2007	-	HDF-EOS	USGS/NASA	available to use without licensing	WGS84
		EO data from Landsat4 TM sensor	Satellite imagery from Landsat4 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1989	2011	-7.848 -5.012 40.834 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS84

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX II		ESRI Imagery World 2D	ESRI Imagery World 2D, World Imagery, GeoEye IKONOS. This map presents low-resolution imagery for the world and high-resolution imagery for the United States and other metropolitan areas around the world. The map includes NASA Blue Marble: Next Generation 500m resolution imagery at small scales (above 1:1,000,000), i-cubed 15m eSAT imagery at medium-to-large scales (down to 1:70,000) for the world, and USGS 15m Landsat imagery for Antarctica. It also includes 1m i-cubed Nationwide Select imagery for the continental United States, and GeoEye IKONOS 1m resolution imagery for Hawaii, parts of Alaska, and several hundred metropolitan areas around the world. For more information on this map, visit us online at http://goto.arcgisonline.com/maps/ESRI_Imagery_World_2D	Imagery / Base Maps / Earth Cover	-	-	-	2009	-	ArcGIS Map Service	ESRI, USGS/NASA	available to use without licensing	WGS84
	04	Geology	Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.										
		Geology	Geology for the Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom. Information from the European Environment Agency (EEA).	Geoscientific Information	-	-	-	-	-	ESRI Shapefile	Institute for Geological and Mining Research, Cameroon (OneGeology)	available to use without licensing	WGS 84 (DD)
		Geology .XML	Geology for the Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom. Information from the European Environment Agency (EEA).	Geoscientific Information	-	-	-	-	-	GeoSciML - .XML	Institute for Geological and Mining Research, Cameroon (OneGeology)	available to use without licensing	WGS 84 (DD)
ANNEX III	01	Statistical units	Units for dissemination or use of statistical information.										
		Territorial Units for Statistics	Territorial Units for Statistics (NUTS1, NUTS2 or NUTS3) in which the geographical entity is located.	Boundaries	-	-	-	-	-	ESRI shapefile	-	available to use without licensing	WGS84
	02	Buildings	Geographical location of buildings.										
		Buildings	Buildings for the Europe, North America, South America, Africa, Central America, Australia Oceania and Asia. Information from the Open Street Map (OSM).	Strutcture	-	-	-	-	-	ESRI shapefile	OSM (Open Street Map)	available to use without licensing	WGS 84
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.										
		Average Soil Erosivity for Europe	A map which shows the 30 year average soil erosivity according to climatic conditions (e.g. wind velocity) and the erodibility of the soil (e.g. texture). Information from the Joint Research Centre (JRC) of the Institute for Environment and Sustainability - European Commission. For more information on this map, visit us online at http://eusoils.jrc.ec.europa.eu/library/themes/erosion/winderosion/data.html	Geoscientific Information	-	-	-	2008	-	Geodatabase/ GeoTIFF (TIF) / WebService	Joint Research Centre of the EC	available to use without licensing	-
		European Soil Data Centre - Saline and Sodic Soils Map for Europe	The Saline and Sodic Soils Map shows the area distribution of saline, sodic and potentially salt affected areas within the European Union. The accuracy of input input data only allows the designation of salt affected areas with a limited level of reliability (e.g. <50 or >50% of the area); therefore the results represented in the map should only be used for orientating purposes.	Geoscientific Information	-	-	-	2008	-	Geodatabase/ GeoTIFF (TIF) / WebService	Joint Research Centre of the EC	available to use without licensing	-
		European Soil Data Centre - Albania: Georeferenced database of soils for Albania	Georeferenced database of soils for Albania (at scale 1:250,000 for the whole of the country and at scale 1:50,000 for the coastal areas) according the the "Manual of procedures v1.1". The database was obtained through a contract (N° 17097 - 2000 - 11 - F1SC ISP IT) between JRC and CIHEAM - Istituto Agronomico Mediterraneo di Bari, consisting of two lots : LOT II (Development of a Georeferenced Database of the soils in Albania at scale 1:250,000) has been done according to the "Manual of Procedures - v1.1" - (doc. EUR 18092 EN) and resulted in a databas that fits with the European Soil Information System (EUSIS); LOT III (Development of a Georeferenced Database of the soils for the coastal areas of Albania at has also been done following the "Manual of Procedures - v1.1" - (doc. EUR 18092 EN).	Geoscientific Information	-	50k	-	2006	-	Geodatabase/ GeoTIFF (TIF) / WebService	Joint Research Centre of the EC	available to use without licensing	-
		European Soil Data Centre - BioSoil Demonstration project	Systematic inventories are usually the pre-condition for the establishment of a soil monitoring system. This is the case for the European forest soil inventory with regular observations on a 16x16 km grid, but also for many National inventories. The demonstration project BioSoil is the largest single soil monitoring exercise (app. 5000 plots) implemented so far at EU scale and can be considered as a test for the development of operational soil monitoring at Community level.	Geoscientific Information	-	-	-	2006	-	GeoTIFF (TIF)	Joint Research Centre of the EC	available to use without licensing	-
		European Soil Data Centre — DANUBE_SIS: Soil Information System for the Danube basin	The Soil Information System of the Danube River Basin (Danube_SIS) is an integral part of the JRC Flood Risk Assessment Project, which is executed among the institutional JRC tasks. It is also an integral part of the Georeferenced Soil Database for Europe at the scale 1:250,000, one of the main elements of the European Soil Information System (EUSIS). Construction of the database is based on several materials: The Georeferenced Soil Database for Europe, Manual of Procedures, Version 1.1. (ESB, 2003); LISFLOOD, a distributed water-balance, flood simulation and flood inundation model, Version 1.0. (Ad De Roo, Jutta Thielen, Ben Gouweleew. EC/JRC, 2002) and the procedures and experiences developed in the pilot project creating the soil digital database for the Odra basin at the scale 1:250,000 (final report, Warsaw, 2001).	Geoscientific Information	-	250k	-	2006	-	-	Joint Research Centre of the EC	available to use without licensing	-
		European Soil Data Centre — ESDB v2.0	In the beginning of 2006, the Scientific Committee of the European Soil Bureau Network decided that JRC could publish the European Soil Database (v2.0) soil geometry as a 1km x 1km raster version. This dataset is the implementation of that decision.	Geoscientific Information	1000m	-	-	2006	-	ESRI Grid	Joint Research Centre of the EC	available to use without licensing	-
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).										

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.										
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.										
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.										
		Reference and inter calibration surface water monitoring by country	Reference and inter calibration surface water monitoring by country (WFD Article 8)	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Surveillance and operational surface water monitoring by country	Surveillance and operational surface water monitoring by country (WFD Article 8)	Inland Waters	-	-	-	2011	-	Geodatabase/Data tables	WISE, EEA	available to use without licensing	-
		Eye on Earth - Citizen observatory on air and bathing water quality	Eye on Earth - Citizen observatory on air and bathing water quality. Bringing together environmental data with feedback and observations of millions of ordinary people. Eye on Earth is a two-way communication platform on the environment which brings together environmental data and scientific information with feedback and observations of millions of ordinary people. You'll be able to view air and bathing water quality for the majority of Europe.	Environment	-	-	-	2011	-	-	EEA	available to use without licensing	-
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.										
	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).										
		http://www.fao.org/geonetwork/srv/en/main.home	Information from the FAO-GeoNetwork.	-	-	-	-	-	-	-	-	-	-
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.										
		http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home	Information from the Eurostat (Your key to European statistics) for the European Commission.	-	-	-	-	-	-	-	-	-	-
	11	Area management/restriction/regulation zones and reporting units	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.										
		Urban Waste Water Treatment Directive (UWWTD) Sensitive Areas	Urban Waste Water Treatment Directive (UWWTD) - Sensitive Areas, application of Article 5(8) / Sensitive area for the years 2004 and 2008. Information from the European Environment Agency (EEA).	Planning Cadastre	-	-	-	2008	-	Geodatabase/Data tables	EEA	available to use without licensing	-
		Nitrate Vulnerable Zones and UWWTD Sensitive Areas	Nitrate Vulnerable Zone WTA as designated under the Nitrates Directive (2006/118/CE). Official data publication of the Nitrate Vulnerable Zone WTA in 2000, 2003, 2007 and 2008. Information from the European Environment Agency (EEA).	Planning Cadastre	-	-	-	2008	-	Geodatabase/Data tables	EEA	available to use without licensing	-
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.										
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.										
	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.										
		Annual Precipitation (mm)	Annual precipitation from the WorldClim (Global Climate Data) dataset.	Climatology / Meteorology / Atmosphere	1000m	-	1950-2000	2005	-	GeoTIFF (TIF)	Royal Meteorological Society	available to use without licensing	WGS84
		Annual Mean Temperature (ºC)	Mean annual temperature from the WorldClim (Global Climate Data) dataset.	Climatology / Meteorology / Atmosphere	1000m	-	1950-2000	2005	-	GeoTIFF (TIF)	Royal Meteorological Society	available to use without licensing	WGS84
		Maximum Temperature (ºC)	Mean annual temperature from the WorldClim (Global Climate Data) dataset.	Climatology / Meteorology / Atmosphere	1000m	-	1950-2000	2005	-	GeoTIFF (TIF)	Royal Meteorological Society	available to use without licensing	WGS84
		Minimum Temperature (ºC)	Mean annual temperature from the WorldClim (Global Climate Data) dataset.	Climatology / Meteorology / Atmosphere	1000m	-	1950-2000	2005	-	GeoTIFF (TIF)	Royal Meteorological Society	available to use without licensing	WGS84
		Bioclimatic variables	Bioclimatic variables from the WorldClim (Global Climate Data) dataset.	Climatology / Meteorology / Atmosphere	1000m	-	1950-2000	2005	-	GeoTIFF (TIF)	Royal Meteorological Society	available to use without licensing	WGS84
		Digital Climatic Atlas of Peninsula Iberica	Digital Climatic Atlas of Peninsula Iberica	Climatology / Meteorology / Atmosphere	200m	-	-	2005	-	Idrisi Raster (RST)	Miguel Ninyerola; Xavier Pons; Joan M. Roure	available to use without licensing	WGS84

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).										
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.										
	17	Bio-geographical regions	Areas of relatively homogeneous ecological conditions with common characteristics.										
		EU27 Biogeographical regions		Biota	-	-	-	-	-	ESRI shapefile	EEA	available to use without licensing	ETRS89 LAEA
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.										
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.										
		http://www.gbif.org/informatics/discoverymetadata/a-metadata-infrastructure/	Information from the GBIF's Data Portal (Global Biodiversity Information Facility)	-	-	-	-	-	-	-	-	-	-
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.										
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.										

Brazil

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference systems
ANNEX III	01	Statistical units	Units for dissemination or use of statistical information.										
	02	Buildings	Geographical location of buildings.										
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.										
		BR_soil	Brazilian soils	Geoscientific Information	-	5000k	-	2001	***Brazil***	ESRI shapefile	MMA	available to use without licensing	SAD69
		TNF_soil	Soils of the Tapajaos National Forest	Geoscientific Information	-	500k	-	2004	***TNF***	PDF	ICMBio	available to use without licensing	SAD69
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).										
		TNF_planned_land_use	Planned land use in the TNF	Planning Cadastre	-	500k	-	2004	***TNF***	PDF	ICMBio	available to use without licensing	SAD69
		AMZ_PRODES	Annual deforestation map in Amazonia based on Landsat	Environment	-	-	2000	-	***Amazonia***	ESRI shapefile	INPE	available to use without licensing	SAD69
		AMZ_DETER	Near-real-time deforestation maps based on MODIS	Environment	250m	-	2004	-	***Amazonia***	ESRI shapefile	INPE	available to use without licensing	SAD69
		AMZ_DEGRAD	Partially cleared forest based on CBERS and LANDSAT	Environment	***MMA = 6,25ha***	-	2007	-	***Amazonia***	ESRI shapefile	INPE	available to use without licensing	SAD69
		AMZ_TERRACLASS	Land use on deforested areas (secondary vegetation)	Environment	30m	-	2008	-	***Amazonia***	ESRI shapefile/GEOTIFF	INPE	available to use without licensing	SAD69
	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.										
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.										
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.										
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.										
	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).										
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.										
		BR_pop/admin_area	Population per administrative area in Brazil	Society	-	-	2010	2010	***Brazil***	CSV	IBGE	available to use without licensing	-
	11	Area management/restriction/regulation zones and reporting units	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.										
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.										
		MODIS Fire product	MODIS Active Fire and Burned area products	Environment	500m	-	2000	-	***World***	GEOTIFF	NASA	available to use without licensing	WGS84
		BDQUEIMADA	Fires in Brazil measured by various sensors	Environment	-	-	-	-	***Brazil***	Website	INPE	available to use without licensing	SAD69
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.										
	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.										
		3B42	Daily precipitation measured by remote sensing	Climatology / Meteorology / Atmosphere	0,25°	-	1998	-	***Tropics***	NetCDF	NASA	available to use without licensing	WGS84
		ANA-hidroweb	Precipitation measured by stations	Climatology / Meteorology / Atmosphere	***Point***	-	-	-	***Brazil***	TXT	ANA	available to use without licensing	-
		BR_precipitation	Mean annual precipitation (1964-1990)	Climatology / Meteorology / Atmosphere	-	-	1964-1990	-	***Brazil***	ESRI shapefile	MMA	available to use without licensing	SAD69
	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).										
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.										
	17	Bio-geographical regions + EBONE environmental zones	Areas of relatively homogeneous ecological conditions with common characteristics.										
		BR_vegetation	Vegetation map of Brazil	Biota	-	5000k	2001	-	***Brazil***	ESRI shapefile	MMA	available to use without licensing	SAD69

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference systems
ANNEX III		AM_vegetation	Vegetation map of Amazonia from PROBIO	Biota	-	-	-	-	***Amazonia***	ESRI shapefile	MMA	available to use without licensing	SAD69
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.										
		TNF_phytoeco	phytoecological map of the TNF	Biota	-	500k	-	2004	***TNF***	PDF	ICMBio	available to use without licensing	SAD69
		TNF_vegetation	Vegetation map of the TNF	Biota	-	500k	-	2004	***TNF***	PDF	ICMBio	available to use without licensing	SAD69
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.										
		BR_extinction_species	List of species endangered of extinction in Brazil	Biota	-	-	2011	2011	***Brazil***	website (http://www.icmbio.gov.br/biodiversidade/fauna-brasileira/lista-especies)	ICMBio	available to use without licensing	SAD69
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.										
		BR_hydroelectric	Hydroelectric plants in Brazil	Economy	-	-	2011	2011	***Brazil***	ESRI shapefile	MMA	available to use without licensing	SAD69
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.										

Greece

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I	01	Coordinate reference systems	Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.										
	02	Geographical grid systems	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.										
		1:25000	25km geographical grid system	-	25000m	-	-	-	-	ESRI shapefile	GYS	need to request licensing	***Lisboa Hayford Gauss (Lisboa IGEOE)***
		1:50000	50km geographical grid system	-	50000m	-	-	-	-	ESRI shapefile	GYS	need to request licensing	***Lisboa Hayford Gauss (Lisboa IGEOE)***
		1:100000	100km geographical grid system	-	100000m	-	-	-	-	ESRI shapefile	GYS	need to request licensing	***ED50 (UTM zone 29N)***
		1:250000	250km geographical grid system	-	250000m	-	-	-	-	ESRI shapefile	GYS	need to request licensing	***ED50 (UTM zone 29N)***
		1:500000	500km geographical grid system	-	500000m	-	-	-	-	ESRI shapefile	GYS	need to request licensing	WGS84
		1:1000000	1000km geographical grid system	-	1000000m	-	-	-	-	ESRI shapefile	GYS	need to request licensing	WGS84
		1:1000000	5km geographical grid system	-	5000m	-	-	-	-	ESRI shapefile	OKXE	available to use without licensing	EGSA87
	03	Geographical names	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.										
		Local Toponomy	Toponomy based on 1:50000	Location	-	50k	-	-	-	ASCII Grid	GYS	need to request licensing	-
	04	Administrative units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.										
		Administrative boundaries of Greece	Official Administrative Boundaries of Greece	Boundaries	-	50k	-	-	-	ESRI shapefile	ELSTAT	available to use without licensing	EGSA87
	05	Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code.										
	06	Cadastral parcels	Areas defined by cadastral registers or equivalent.										
	07	Transport networks	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network (1) and future revisions of that Decision.										
		Main road network	Main road map of Greece	Transportation	-	1000k	-	-	-	ESRI Grid	GYS	need to request licensing	Greek grid
	08	Hydrography	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2) and in the form of networks.										
		Water Basins	45 Water basins defined on the 16th July 2010	Inland Waters	-	50k	-	2010	-	ESRI shapefile	YPEKA	available to use without licensing	Greek grid
		Lakes	Lakes of Greece	Inland Waters	-	-	-	2008	-	ESRI shapefile	YPEKA	available to use without licensing	Greek grid
		Hydrography	Rivers and streams	Inland Waters	-	-	-	2010	-	ESRI shapefile	YPEKA	available to use without licensing	Greek grid
		Mountain Water Basins	Mountain Water Basins First Order	Inland Waters	-	-	-	2010	-	ESRI shapefile	YPEKA	available to use without licensing	Greek grid
		Mountain Water Basins	Mountain Water Basins Second Order	Inland Waters	-	-	-	2010	-	ESRI shapefile	YPEKA	available to use without licensing	Greek grid
		Mountain Water Basins	Mountain Water Basins Third Order	Inland Waters	-	-	-	2010	-	ESRI shapefile	YPEKA	available to use without licensing	Greek grid
		Mountain Water Basins	Mountain Water Basins Fourth Order	Inland Waters	-	-	-	2010	-	ESRI shapefile	YPEKA	available to use without licensing	Greek grid
		Hydrography	Hydrographic network of Greece	Inland Waters	-	-	-	2010	-	ESRI shapefile	YPEKA	available to use without licensing	Greek grid
	09	Protected sites	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.										
		Natura 2000 network SPA	The Natura 2000 network of protected areas is a European Network of protected areas. Natura 2000 is the key instrument to protect biodiversity in the European Union. It is an ecological network of protected areas, set up to ensure the survival of Europe's most valuable species and habitats. The sites designated under the 1979 Birds Directive are called SPAs (Spatial Protected Areas). The spatial data refer to the borders of these sites.	Environment	-	100k	2000	2011	-	ESRI Shapefile	European Environment Agency / Greek Ministry of the Environment	available to use without licensing	EPSG:3035
		Natura 2000 network SCI	The Natura 2000 network of protected areas is a European Network of protected areas. It is an ecological network of protected areas, set up to ensure the survival of Europe's most valuable species and habitats. The sites designated under the 1992 Habitats Directive are Sites of Community Interest and Special areas of conservation. The spatial data refer to the borders of these sites	Environment	-	100k	2000	2011	-	ESRI Shapefile	European Environment Agency / Greek Ministry of the Environment	available to use without licensing	EPSG:3035
		Forests of outstanding beauty	According to forest law, forests of outstanding beauty are protected. These category includes natural landscapes of high aesthetic and ecological value. There are 19 such forests in Greece.	Environment	-	-	-	2010	-	ESRI Shapefile	Greek Ministry of the Environment	available to use without licensing	-
		Protected areas by international treaties	It includes the borders of various protected areas that are designated by a variety of international treaties (e.g. BARCELONA, BIOGEN, BIOSPHERE, DIPLOMA, MPK).	Environment	-	-	-	2010	-	ESRI Shapefile	Greek Ministry of the Environment	available to use without licensing	-

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX II	01	Elevation	Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.										
		Altimetry	Contour lines of Greece from military maps (isoline of 20m)	Elevation	-	50k	-	-	-	ESRI Shapefile	GYS	need to request licensing	Greek grid
		Altimetry	Contour lines of Greece from military maps (isoline of 20m)	Elevation	-	5k	-	-	-	ESRI Shapefile	GYS	need to request licensing	Greek grid
		ASTER Global Digital Elevation Model	ASTER Global Digital Elevation Model (GDEM)	Elevation	***1 arcsec***	-	-	2009	-	GeoTIFF (TIF)	NASA and Japan ASTER Program	available to use without licensing	WGS84
		Digital Elevation Model	Elevation in raster format (30m, 100m, 250m resolution)	Elevation	30m, 100m, 250m	-	-	-	-	ESRI Grid	GYS	need to request licensing	Greek grid
	02	Land cover	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.										
		CLC 1990	Corine Land Cover (1990) of Greece	Planning Cadastre	100m, 250m	-	-	1990	-	GeoTIFF (TIF)	-	available to use without licensing	ETRS89 LAEA
		CLC 2000	Corine Land Cover (2000) of Greece	Planning Cadastre	-	100k	-	2000	-	ESRI Shapefile	-	available to use without licensing	ETRS89 LAEA
		Land use change 90-00 (categories)	Land use changes between 1990 and 2000 corine land cover categories	Planning Cadastre	100m	100k	1990-2000	-	-	GeoTIFF (TIF)	-	available to use without licensing	ETRS89 LAEA
	03	Orthoimagery	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.										
		Orthoimagery GRD 50cm	RGB color orthoimagery of 50 cm (20cm for urban areas) resolution of Greece	Imagery / Base Maps / Earth Cover	***50cm, 20cm***	-	-	2010	-	Web Map Service	KTIMATOLOGIO S.A.	available to use without licensing	Greek grid
	04	Geology	Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.										
		Geology	Geological map of Greece	Geoscientific Information	-	50k	-	1996	-	Analogic data	IGME	need to request licensing	***Lisboa Hayford Gauss (Lisboa IGEOE)***
ANNEX III	01	Statistical units	Units for dissemination or use of statistical information.										
	02	Buildings	Geographical location of buildings.										
		Buildings	***Buildings for the PNPG area. Information from the oficial National M888 Series of Military Map of Portugal.***	***Strutcture***	***-***	***25k***	***1996 - 1997***	***1997***	***-***	***ESRI Shapefile***	***IGEOE***	***need to request licensing***	***Lisboa Hayford Gauss (Lisboa IGEOE)***
		Other buildings	***Other buildings for the PNPG area. Information from the oficial National M888 Series of Military Map of Portugal (churches, chapels, mills, ruins, etc.).***	***Strutcture***	***-***	***25k***	***1996 - 1997***	***1997***	***-***	***ESRI Shapefile***	***IGEOE***	***need to request licensing***	***Lisboa Hayford Gauss (Lisboa IGEOE)***
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.										
		Soil	The soil map of Greece scale 1:1.000.000 gives spatial information about the soil constitution.	Geoscientific Information	-	1000k	-	1967	-	Analogic data	IGME	available to use without licensing	-
		Hydrolithology	Hydrolithological map of Greece	Geoscientific Information	-	1000k	-	2003	-	Analogic data	Ministry of Development, NTUA, Institute of Geological and Mining Research, and Centre for Research and Planning	available to use without licensing	-
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).										
		Land utilisation	Land utilisation map	Planning Cadastre	-	3000k	-	1973	-	Analogic data	-	available to use without licensing	-
		Land use maps	Land use maps of different areas of Greece	Planning Cadastre	-	20k	-	-	-	Analogic data	Ministry of Environment, Energy and Climate change	-	-
	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.										
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.										
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.										
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.										
	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).										
		Agricultural and aquaculture facilities	Water demand for agriculture	Farming	-	3000k	-	2003	-	Analogic data	Ministry of Development, NTUA, Institute of Geological and Mining Research, and Centre for Research and Planning	available to use without licensing	-
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.										
		Population density	Population denstiy	Society	-	3000k	-	1973	-	Analogic data	-	available to use without licensing	-

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III	11	\	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.										
		Natura 2000 protected and/or managed sites	Natura 2000 viewer maps of protected and/or managed areas at international, European, national, regional and local levels	Planning Cadastre	-	-	-	-	-	***Digital data***	European Organization of Environment	available to use without licensing	-
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.										
		Seismicity	Maps of seismicity (historical maps and real time maps)	Geoscientific Information	-	-	-	-	-	-	Instituta of Geodynamics, National Observatory of Athens	available to use without licensing	-
		Seismicity	Seismotectonic map	Geoscientific Information	-	500k	-	1989	-	-	Institute of Geology and Mineral exploration	available to use without licensing	-
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.										
	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.										
		Precipitation	Rainfall map of Greece	Climatology / Meteorology / Atmosphere	-	3000k	-	2003	-	Analogic data	Ministry of Development, NTUA, Institute of Geological and Mining Research, and Centre for Research and Planning	available to use without licensing	-
		Precipitation	mean annual precipitation per meteorological station	Climatology / Meteorology / Atmosphere	-	3000k	-	2003	-	Analogic data	Ministry of Development, NTUA, Institute of Geological and Mining Research, and Centre for Research and Planning	available to use without licensing	-
		Temperature	Mean annual temperature at the meteorological stations	Climatology / Meteorology / Atmosphere	-	3000k	-	2003	-	Analogic data	Ministry of Development, NTUA, Institute of Geological and Mining Research, and Centre for Research and Planning	available to use without licensing	-
		Water resources -water demands	Maps for water district	Climatology / Meteorology / Atmosphere	-	3000k	-	2003	-	Analogic data	Ministry of Development, NTUA, Institute of Geological and Mining Research, and Centre for Research and Planning	available to use without licensing	-
		Water resources quality	Water quality maps	Climatology / Meteorology / Atmosphere	-	1000k	-	2003	-	Analogic data	Ministry of Development, NTUA, Institute of Geological and Mining Research, and Centre for Research and Planning	available to use without licensing	-
	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).										
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.										
	17	Bio-geographical regions	Areas of relatively homogeneous ecological conditions with common characteristics.										
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.										
		Natura 2000 greek site maps of different habitat types	Natura 2000 sites maps of habitat types based on Annex I of the 93/42/CE Directive	Biota	-	100k	-	2000	-	ESRI Shapefile	Ministry of Environment, Energy and Climate change	need to request licensing	-
		Geomorphology	Geomorphological mapping for Greece	Biota	-	3000k	-	2003	-	Analogic data	Ministry of Development, NTUA, Institute of Geological and Mining Research, and Centre for Research and Planning	available to use without licensing	-
		Forest vegetation maps	Forest vegetation maps of different areas of Greece	Biota	-	20k	-	-	-	Analogic data	Ministry of Environment, Energy and Climate change	need to request licensing	-
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.										
		Species of Annex II of Directive 92/43/CE distribution maps	Map of species distributions based on the composite of known breeding areas of Annex II and IV of the 93/42/CE Directive and of Annex I of the 79/409/CE Directive	Biota	-	100k	-	2000	-	ESRI Shapefile	Ministry of Environment, Energy and Climate change	need to request licensing	-
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.										
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.										

Italy

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference systems
ANNEX I	01	Coordinate reference systems	Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.										
	02	Geographical grid systems	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.										
		1:100000 grid	Official topografic map of Italy 1:100000	-	100000m	-	-	-	-	ESRI shapefile	IGMI	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		1:50000 grid	Official topografic map of Italy 1:50000	-	50000m	-	-	-	-	ESRI shapefile	IGMI	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		1:5000 grid	Official topografic map of Italy 1:50000	-	5000m	-	-	-	-	ESRI shapefile	IGMI	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
	03	Geographical names	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.										
		-	Toponomy for Puglia	Location	-	1000k	-	-	-	ESRI shapefile	IGMI	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
	04	Administrative units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.										
		-	Administrative Boundaries of Puglia (Regional limits)	Boundaries	-	50k	-	-	-	ESRI shapefile	RP	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		-	Administrative Boundaries of Puglia (Municipal limits)	Boundaries	-	50k	-	-	-	ESRI shapefile	RP	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
	05	Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code.										
	06	Cadastral parcels	Areas defined by cadastral registers or equivalent										
		-	Cadastral parcels of IT3 and IT4	Planning / Cadastre	-	2k	-	-	-	ESRI shapefile	AGEA	need to request licensing	Cassini-Soldner
	07	Transport networks	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network (1) and future revisions of that Decision.										
		-	Road network (state roads, provincial roads and motorways)	Transportation	-	-	-	2008	-	-	RP	need to request licensing	WGS 84 / UTM Zone 33N
	08	Hydrography	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2) and in the form of networks.										
	09	Protected sites	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.										
		National Parks	National Parks in Puglia	Environment	-	10k	-	-	-	-	RP	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		National nature reserves	National nature reserves in Puglia	Environment	-	10k	-	-	-	-	RP	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		Regional nature reserves	Regional nature reserves in Puglia	Environment	-	10k	-	-	-	-	RP	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		N2K network SPA	N2K network SPA in Puglia	Environment	-	10k	2000 - 2007	-	-	-	RP	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		N2K network SCI	N2K network SCI in Puglia	Environment	-	10k	2000 - 2007	-	-	-	RP	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		Important bird areas	Important bird areas in Puglia	Environment	-	10k	-	-	-	-	RP	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
ANNEX II	01	Elevation	Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.										
		Altimetry	Contour lines for Puglia	Elevation	-	25k	-	-	-	ESRI Shapefile	IGMI	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		Digital Elevation Model	Digital Elevation Model for Puglia with a resolution of 8 meters	Elevation	8m	-	-	2009	-	ASCII RASTER	RTI Rilter/SIT/Telespazio	available to use without licensing	WGS 84 / UTM Zone 33N
	02	Land cover	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.										

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference systems
ANNEX II		CLC 1990	Corine Land Cover (1990) for Puglia	Planning / Cadastre	-	100k	1990	1990	-	ESRI Shapefile	-	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		CLC 2000	Corine Land Cover (1990) for Puglia	Planning / Cadastre	-	100k	1999	1999	-	ESRI Shapefile	-	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		Land Use	Land use map of Puglia	Planning / Cadastre	-	5k	2006	2008	-	ESRI Shapefile	-	available to use without licensing	WGS 84 / UTM Zone 33N
		Natural areas	Map of natural and semi-natural areas in Puglia	Planning / Cadastre	-	5k	2006	2009	-	ESRI Shapefile	-	need to request licensing	-
	03	Orthoimagery	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.										
		-	Aerial Photographs of the Bari Province Puglia	Imagery / Base Maps / Earth Cover	2m	-	1997	-	-	GeoTIFF (TIF)	AIMA	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
		-	Aerial Photographs of Puglia	Imagery / Base Maps / Earth Cover	0,5m	-	2006	-	-	-	-	available to use without licensing	WGS 84 / UTM Zone 33N
	04	Geology	Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.										
		Hydrogeomorphology	Hydrogeomorphology map for Puglia.	Geoscientific Information	-	25k	2006	2009		ESRI Shapefile	ABP	need to request licensing	WGS 84 / UTM Zone 33N
ANNEX III	01	Statistical units	Units for dissemination or use of statistical information.										
	02	Buildings	Geographical location of buildings.										
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.										
		Soil	USDA and WRB 1:100.000 soil classif. (field survey: end of 1990ies) -soil family level	Geoscientific Information	-	-	-	-	-	-	-	-	-
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).										
	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.										
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.										
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.										
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.										
	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).										
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.										
	11	Area management/restriction/regulation zones and reporting units	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.										
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.										
		Burned areas	Burned areas in Puglia from 2000 to 2007. National burned areas cartography from the National Forest Authority (CFS) (by year).	Geoscientific Information	-	10k	2000 - 2007	-	-	ESRI Shapefile	CFS	available to use without licensing	Gauss-Boaga , ROMA 40, Internazionale 1924 (Hayford 1909), UTM, EST 33, meters
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.										
	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.										
		Precipitation	mean annual precipitation (close to 60 years time series included in the period 1921-92)	Climatology / Meteorology / Atmosphere	-	-	-	-	-	-	-	-	-
		Temperature	Mean annual temperature (as above but often on different years)	Climatology / Meteorology / Atmosphere	-	-	-	-	-	-	-	-	-
		Insolation	n.a.	Climatology / Meteorology / Atmosphere	-	-	-	-	-	-	-	-	-

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference systems
		Evapotranspiration	reference Evapotranspiration (Hargreaves & Samani 1985) – mainly on data between 1950-1990	Climatology / Meteorology / Atmosphere	-	-	-	-	-	-	-	-	-
	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).										
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.										
	17	Bio-geographical regions + EBONE environmental zones	Areas of relatively homogeneous ecological conditions with common characteristics.										
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.										
ANNEX III		N2K habitat in Puglia	Map of N2K habitat in Puglia	Biota	-	5k	2006	2009	-	ESRI Shapefile	RP	need to request licensing	-
		IT3 vegetation and N2K habitat	Map of N2K habitat in site IT3 Murgia Alta	Biota	-	5k	2006	2009	-	ESRI Shapefile	PNAM	need to request licensing	-
		IT4 vegetation and N2K habitat	Map of N2K habitat in site IT3 Cesine	Biota	-	5k	2005	2005	-	ESRI Shapefile	INTERREG III-A Greece-Italy Info-NAT	available to use without licensing	-
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.										
		Species richness	Map of the species richness in Puglia based on the composite of known breeding areas of Annex II and IV of The 93/42/CE Directive and of Annex I of the 79/409/CE Directive	Biota	-	-	2006	2009	-	-	RP	need to request licensing	-
		Ecological group	Map of the distribution of ecological groups in Puglia based on the composite of both known breeding areas of Annex II and IV of The 93/42/CE Directive and of Annex I of the 79/409/CE Directive and niche their niche requirements	Biota	-	-	2006	2009	-	-	RP	need to request licensing	-
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.										
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.										

Netherlands

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I	01	Coordinate reference systems	Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.										
		RijksDriehoekstelsel New (28992)	Dutch national grid, based on triangulation with as origin the spire of the tower of Our Lady in the city of Amersfoort	-	-	-	-	-	-	-	-	-	-
	02	Geographical grid systems	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.										
		5 km grid	"Hour squares" grid for representing the distribution of flora and fauna	Environment	5000m	-	2007	2007	LL(3.047, 50.670), UR (7.351, 53,612)	GeoDatabase Feature Class	IMARES	available to use without licensing	-
		10 km grid	10 km grid for data on the distribution of flora and fauna	Environment	10000m	-	2007	2010	LL (2.116, 50.654), UR (7.543, 55.902)	GeoDatabase Feature Class	IMARES	available to use without licensing	RD_New (28992)
		50 km grid	Common European Chorological Grid Reference System	Environment	50000m	-	2003	2004	LL (-42.000, 0.000), UR (85.189, 84.197)	GeoDatabase Feature Class	EEA	need to request licensing	GCS_WGS_1984 (4326)
		100 km grid	Military Grid Reference System - Square Identification Diagram	Environment	100000m	-	-	2005	LL (-179.995, -80), UR (179.995, 84)	GeoDatabase Feature Class	-	need to request licensing	GCS_WGS_1984 (4326)
	03	Geographical names	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.										
		Military terrains 2003 - names	The map is constituted of locations and names relating to the terrains of the Ministry of Defense excluding the built-up areas, i.e. only training grounds, shooting ranges, airfields and navy ports. Some areas of the military training grounds are considered part of the National Ecological Network (EHS).	Location	-	250k - 11500k	2003	2003	LL (4.268, 50.864), UR (6.910, 53.264)	GeoDatabase Feature Class	Ministry of Defense	need to request licensing	RD_New (28992)
		TOP25 names 2006	TOP25 names file from topographical service - now part of Dutch Land Registry - converted to an annotation feature class in the form of a geodatabase	Location	-	5k	2006	2006	LL (3.243, 50.730), UR (7.249, 53.611)	GeoDatabase Feature Class	Dutch Land Registry	need to request licensing	RD_New (28992)
	04	Administrative units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.										
		Municipal boundaries 2006 - topographical service	The boundaries from the topographical service - part of the Dutch Land Registry. The names and numbers of the municipalities have been adopted as attributes. Land-water boundaries have not been included, so that the coast of Zeeland, South-Holland, the Wadden islands etc. cannot be recognised.	Boundaries	-	10k	2006	2006	-	GeoDatabase Feature Class	Dutch Land Registry	need to request licensing	RD_New (28992)
		Municipal boundaries 2009 - topographical service	The boundaries from the topographical service - part of the Dutch Land Registry. The names and numbers of the municipalities have been adopted as attributes. Land-water boundaries have not been included, so that the coast of Zeeland, South-Holland, the Wadden islands etc. cannot be recognised.	Boundaries	-	-	2009	2009	LL (3.205, 50.734), UR (7.245, 53.584)	GeoDatabase Feature Class	Dutch Land Registry	need to request licensing	RD_New (28992)
		Municipal boundaries 2006 - Bridgis	Municipal boundaries file for the Netherlands - reference date is 01-01-2006	Boundaries	-	11k	2006	2006	-	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		Municipal boundaries 2009 - Bridgis	Municipal boundaries file for the Netherlands - reference date is 01-01-2009	Boundaries	-	-	2009	2008	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		Municipal boundaries 2010 - Bridgis	Municipal boundaries file for the Netherlands - reference date is 01-01-2010	Boundaries	-	-	2010	2010	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		Boundaries of water board command areas 2006	The file indicates the boundary of the command area, the name and the seat of each water board	Boundaries	-	10k	2006	2006	-	-	Union of water boards, The Hague	need to request licensing	RD_New (28992)
		Provincial boundaries 2006 - Bridgis	Provincial boundaries file for the Netherlands - reference date is 01-01-2006	Boundaries	-	11k	2006	2006	-	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		Provincial boundaries 2009 - Bridgis	Provincial boundaries file for the Netherlands - reference date is 01-01-2009	Boundaries	-	-	2009	2009	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		Provincial boundaries 2010 - Bridgis	Provincial boundaries file for the Netherlands - reference date is 01-01-2010	Boundaries	-	-	2010	2010	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		National boundaries 2006 - Bridgis	National boundaries file for the Netherlands - reference date is 01-01-2006	Boundaries	-	11k	2006	2006	-	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		National boundaries 2009 - Bridgis	National boundaries file for the Netherlands - reference date is 01-01-2009	Boundaries	-	-	2009	2009	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		National boundaries 2010 - Bridgis	National boundaries file for the Netherlands - reference date is 01-01-2010	Boundaries	-	-	2010	2010	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
	05	Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code.										
		Boundaries of areas with postal codes of length 6 for 2006 - Bridgis	Boundaries of areas with postal codes of length 6 for 2006 - Bridgis.	Boundaries	-	-	2006	2006	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		Boundaries of areas with postal codes of length 5 for 2006 - Bridgis	Boundaries of areas with postal codes of length 5 for 2006 - Bridgis.	Boundaries	-	-	2006	2006	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
		Boundaries of areas with postal codes of length 4 for 2006 - Bridgis	Boundaries of areas with postal codes of length 4 for 2006 - Bridgis	Boundaries	-	-	2006	2006	LL (3.256, 50.735), UR (7.242, 53.517)	GeoDatabase Feature Class	Bridgis	need to request licensing	RD_New (28992)
	06	Cadastral parcels	Areas defined by cadastral registers or equivalent.										
	07	Transport networks	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network (1) and future revisions of that Decision.										
		National Road Directory NWB - State Highways 2010	The NWB State Highways is a digitally geographic directory with virtually all state highways. Adopted are all roads which are being managed by road authorities such as Rijkswaterstaat (PWD).	Transportation	-	10k	-	2010	-	-	Rijkswaterstaat Data ICT Dienst	need to request licensing	RD_New (28992)
		National Road Directory NWB - Roads 2010	The NWB Roads is a digitally geographic directory with virtually all roads. Adopted are all roads which are being managed by road authorities such as Rijkswaterstaat (PWD), provinces, municipalities and water boards, provided they have been given a street name or number. Therefore even separate bicycle paths and footpaths with street names have been adopted in the NWB roads.	Transportation	-	10k	-	2010	-	-	Rijkswaterstaat Data ICT Dienst	need to request licensing	RD_New (28992)
		National Road Directory NWB - Railways 2010	The NWB railways is a digitally geographic directory of the Dutch railway network. Adopted have been railway connections managed by NS-Infra which are in use for transportation of people and goods.	Transportation	-	10k	-	2010	-	-	Rijkswaterstaat Data ICT Dienst	need to request licensing	RD_New (28992)
	08	Hydrography	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2) and in the form of networks.										
		National Road Directory NWB - Fairways for ships 2010	National Road Directory NWB - Fairways for ships 2010 is a digitally geographic directory of the navigable waterways for professional and recreational shipping. Adopted are all fairways with a minimal navigable depth of 1.10 meter and a headroom of at least 2.45 meter.	Transportation	-	10k	-	2010	-	-	Rijkswaterstaat Data ICT Dienst	need to request licensing	RD_New (28992)

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I		Drainage units March 2008	Drainage units March 2008. This map of drainage units has been updated on the basis of water quality authorities; the starting point was the map of drainage units 1990.	Inland Waters	-	50k	2006	2008	LL (2.267, 50.613), UR (7.728, 55.782)	-	Alterra	need to request licensing	RD_New (28992)
		Flowing waters in water network TOP10 vector	Flowing waters in water network TOP10 vector, version 2008. All HAP objects have been a dopted from the TOP10 vector 2006 into this resource which pertain to flowing waters with an HRW indication or which have been designated as NDT stream.	Inland Waters	-	10k	2006	2008	LL (4.167, 50.747), UR (7.171, 53.371)	-	Alterra	need to request licensing	RD_New (28992)
		National dataset of large water bodies - June 2008 (draft)	National dataset of large water bodies - June 2008 (draft). This is an update of the Owm_NL_lijnvlak of KRW.	Inland Waters	-	10k	-	2008	LL (2.963, 50.736), UR (7.235, 53.760)	-	PBL	need to request licensing	RD_New (28992)
		Water type map of surface waters Netherlands 2008	This water type map is a map indicating the location of surface waters in the Netherlands. The geometry of this map is based on the polygons and lines of the TOP10 vector database. The water map contains the following information: (1) the location of surface waters in the Netherlands (2) The type of water in conformity with the European Water Framework Directive (3) the water bodies of the Water Framework Directive (4) indication as to whether the water body is natural, artificial or seriously changed	Inland Waters	-	10k	-	2008	LL (2.267, 50.714), UR (7.350, 55.782)	-	PBL	need to request licensing	RD_New (28992)
	09	Protected sites	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.										
		Net boundaries of National Ecological Network (EHS) - 2008	This map indicates the boundaries of the National Ecological Network (EHS). The map is an aggregation of provincial EHS maps.	Environment	-	25k	-	2008	LL (3.253, 50.736), UR (7.242, 53.584)	-	Alterra	need to request licensing	RD_New (28992)
		MJPO Ecoducts 2008	MJPO is the Dutch abbreviation used for indicating a cooperation programme between the central government and local governments that has the aim to tackle the defragmentation of habitats of flora and fauna. One of the measures that is used involves the building of bridges across across highways and other barriers - so-called ecoducts.	Environment	-	-	2008	2009	LL (4.539, 50.902), UR (7.104, 53.163)	-	Rijkswaterstaat, Dienst Verkeer en Scheepvaart	need to request licensing	RD_New (28992)
		Connection zones for National Ecological Network 1990	Map from the nineties with connection zones between the various nature development areas and core nature areas as they were envisaged in the map for the National Ecological Network (EHS)	Environment	-	-	1996	1996	-	-	Alterra	need to request licensing	-
		National parks Netherlands 2008	This map indicates the boundaries of the National Parks as have been provided by the secretaries of the parks in the period August - November 2005. An update was done in January 2007 and in August 2007. The boundaries of the Drents-Friese Wold still needs to be corrected. The dataset comprises 21 National Parks: 18 designated by the Minister of LNV (incl. 1 being founded), 2 private parks and 1 cross-border park which has been designated by the committee of ministers of the Benelux. Besides there are areas included of which the status as park still has to be "worked out".	Environment	-	100k	-	2008	LL (3.606, 51.132), UR (6.766, 53.518)	-	Ministry of EL&I , GIS Competence Center	need to request licensing	RD_New (28992)
		Natuurmonumenten 2008 departments	Natuurmonumenten is the Dutch society for preservation of nature monuments in the Netherlands. This map the various departments in the country as well as the nature target classes.	Environment	-	10k	2008	2007	LL (3.285, 50.737), UR (7.223, 53.518)	-	Natuurmonumenten	need to request licensing	RD_New (28992)
		Properties of Natuurmonumenten and areas managed by the society - January 2010	Properties of Natuurmonumenten and areas managed by the society as of 01-01-2010	Environment	-	10k	-	2010	LL (3.285, 50.737), UR (7.223, 53.518)	-	Natuurmonumenten	need to request licensing	RD_New (28992)
		Terrains of Provincial Landscape Societies 2010	In the Netherlands private societies have been founded on provincial scale. These socieiteis have acquired properties and unreclaimed areas which are now managed as nature areas. This map shows all the properties of these societies as well as the terrains managed by them.	Environment	-	10k	-	2010	-	-	Alterra	need to request licensing	RD_New (28992)
		Natura 2000 areas as of January 2006	Combination of areas which can be designated on the basis of the habitat guidelines or the bird guidelines	Environment	-	10k	2006	2006	-	-	Alterra	need to request licensing	-
		RAMSAR areas 2000	The coverage RAMSAR contains the 17 wetlands which have been registered as well as 26 areas which have been designated for adoption in the list of wetlands with international significance. All registered and designated areas are also protected as Special Protection Zones under the Bird Protection Guideline (except for the Rottige Meente, which is only a wetland).	Environment	-	80k - 1100k	-	2000	-	-	Alterra	need to request licensing	-
		Mammal habitats in the Netherlands	IMA is the coverage of important habitats of a number of mammal species. It pertains to a total of 24 threatened and vulnerable species. Their names in Dutch are: Waterspitsmuis, Veldspitsmuis, Grote hoefijzerneus, Brandt's vleermuis, Ingekorven vleermuis, Franjestaart, Vale vleermuis, Meervleermuis, Bosvleermuis, Grijze grootoor, Boommarter, Das, Gewone zeehond, Grijze zeehond, Bruinvis, Wild zwijn, Damhert, Edelhert, Bever, Hamster, Grote bosmuis, Hazelmuis and Eikelmuis.	Environment	-	80k	-	1997	-	-	Alterra	need to request licensing	-
		Properties of the State Forest Service and areas managed by the service - January 2010	Properties of the State Forest Service and areas managed by the service as of 01-01-2010	Environment	-	10k	-	2010	LL (3.285, 50.737), UR (7.223, 53.518)	-	Staatsbosbeheer	need to request licensing	-
		Nature targets of the State Forest Department 2008	Overview of all terrains of the State Forest Department and the nature target classes which have been planned as of January 2008.	Environment	-	-	-	2008	LL (3.272, 50.738), UR (7.222, 53.567)	-	Staatsbosbeheer	need to request licensing	-
		National Nature Targets Map 2003	This dataset gives a provisional indication of the nature targets pursued by the state for the year 2018, inside and outside of the National Ecological Network. Final establishment of the targets is envisaged for the year 2015. When the dataset was compiled, the aim was to take as much as possible the aggregation of the provincial nature targets maps to a higher level, viz. to a map with national nature targets. Only for a few specific areas, there have been deviations from the provincial maps in consultation with those provinces. An extra exercise was necessary to make the content of the dataset more uniform, in order to arrive at a national map. Besides some corrections to the nature target classification has been necessary for those nature areas which are being managed by state institutions. As far as subject matter is involved, the dataset consists of two components: the nature targets of the state and the nature targets of the provinces as derived from the source documents. Only the first component is part of the state policy; the second component has only been adopted for the information of the user.	Environment	-	10k - 100k	2003	2003	LL (3.253, 50.736), UR (7.242, 53.584)	-	Ministry of EL&I , GIS Competence Center	need to request licensing	-
ANNEX II	01	Elevation	Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.										
		AHN 2000 - 5m grid	5 x 5 meter Digital Elevation Model	Elevation	5m	-	-	-	-	-	Rijkswaterstaat	available to use without licensing	-
		AHN 2000 - 25m grid	25 x 25 meter Digital Elevation Model	Elevation	25m	-	-	-	-	-	Rijkswaterstaat	available to use without licensing	-
		AHN 2000 - 100m grid	100 x 100 meter Digital Elevation Model	Elevation	100m	-	-	-	-	-	Rijkswaterstaat	available to use without licensing	-
	02	Land cover	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.										

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX II		CORINE Land Cover 2006 database of the Netherlands	CORINE Land Cover 2006 database of the Netherlands. An increasing need for factual and quantitative information on the state of the environment of DG Environment, DG Agriculture and other users initiated a proposal of the EEA to collaborate with the European Space Agency (ESA) and the European Commission (EC) on the implementation of a fast track service on land monitoring. The project focused on timely, quality assured data, in particular in land cover and land use related issues for 2006-2008. The CLC2006 project is part of the GMES Fast Track Service Precursor (FTSP) Land Monitoring. In CLC2006 38 countries with total area of 5.8 Mkm2 are participating (32 EEA member states and 6 collaborating countries).	Planning Cadastre	-	100k	-	2008	LL (3.166, 50.725), UR (7.255, 53.606)	-	EEA	available to use without licensing	RD_New (28992)
	03	Orthoimagery	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.										
	04	Geology	Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.										
		Geomorphological map of the Netherlands, version 2008	The geomorphological map of the Netherlands is a polygon file in which information per polygon has been adopted about relief, genesis and age in the form of a describing code which consists of a letter and a figure.	Geoscientific Information	-	50k	2008	2008	LL (3.251, 50.735), UR (7.247, 53.612)	-	Alterra	need to request licensing	RD_New (28992)
ANNEX III	01	Statistical units	Units for dissemination or use of statistical information.										
	02	Buildings	Geographical location of buildings.										
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.										
		Grid 50 x 50 soil map of the Netherlands, scale 1:50000 with peat mapping, version 2006	The soil map of the Neterlands scale 1:50000 gives spatial information about the soil constitution for approximately 1 meter depth. With groundwater steps - so-called GT's - information is given about the groundwater regime, i.e. about the Average Highest Level (GHG) and the Average Lowest Level (GLG). Version 2006 is distinct from the earlier version because information about the actual situation has been added to the map areas with peat solis in the surroundings of the peat soils in the east of the country. This information about these peat areas has become available as a result of the peat mapping, which was carried out on approx. 100000 hectares. It was checked whether those soils currently still qualify as peat soils.	Geoscientific Information	-	50k	2006	2006	LL (3.254, 50.735), UR (7.244, 53.559)	-	Alterra	need to request licensing	RD_New (28992)
		Lithology	-	-	-	-	-	-	-	-	-	-	-
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).										
		Topographical Military Map 1850 - neat drawings	The field minutes for the Topographical Military Map (TMK) have been made between 1836 and 1856 by officers from the office of Military Reconnaissance with the aim to create a first topographical map of the whole of the Netherlands. The result of the reconnaissance has been worked out in color in a series of "neat drawings". These neat drawings are the intermediary form between the terrain work and the field minutes on the one hand and the map sheets of the TMK - engraved in stone - on the other hand. The map sheets have been published in black and white. The neat drawings are the only colored version which are available for the whole country. The neat drawings have been scanned by the Centre for Geo-Information of Alterra and have been given georeferences in the RD system. The end result is an image file of the neat drawings in the GeoTIFF format.	Planning Cadastre	-	100k	1850	2007	LL (3.045, 50.711), UR (7.298, 53.610)	GeoTIFF (TIF)	Alterra	need to request licensing	RD_New (28992)
		Georeferenced Bonne map sheets	Chromotopographic map of the Dutch state in digital form, with georeference. This map shows historical land use in the Netherlands.	Planning Cadastre	-	25k	1900	2006	LL (3.196, 50.691), UR (7.296, 53.574)	-	Alterra	available to use without licensing	RD_New (28992)
		National Land Use Netherlands - LGN5	The LGN5 dataset is a nationwide raster with a resoultion of 25 meter in which 39 different forms of land use are distinguished. In the dataset, the most important agricultural crops, a number of nature classes as well as urban classes are distinguished. The dataset has been built with the help of satellite images of 2004 and 2005 and on the basis of other relevant spatial information.	Planning Cadastre	-	50k	-	2005	LL (3.047, 50.670), UR (7.304, 53.612)	-	Alterra	need to request licensing	RD_New (28992)
		National Land Use Netherlands - LGN6	The LGN6 dataset is a nationwide raster with a resolution of 25 meter in which 39 different forms of land use are distinguished. In the dataset, the most important agricultural crops, a number of nature classes as well as urban classes are distinguished. The LGN6 dataset has undergone important changes relative to LGN5. The geometry and main themes is now fully based on TOP10 vector (version 2006). Agricultural parcels, greenhouses, orchards, fruit farms, tree nurseries, sand, heathlands, forests, water bodies and infrastructure have been adopted from TOP10 vector. The urban area has been defined with the help of the datasets "Boundaries built-up area" (BG2003) and the dataset "Bodemgebruik" (BBG). For the other main classes, satellite images from 2007 and 2008 have been used among other things, as welll as aerial photographs, Basemap Nature 2007 (BKN2007) and LGN5. The definitions of the land use classes have been formulated more strictly.	Planning Cadastre	-	50k	-	2009	LL (3.047, 50.670), UR (7.267, 53.612)	-	Alterra	need to request licensing	RD_New (28992)
	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.										
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.										
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.										
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.										

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extent	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).										
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.										
	11	Area management/restriction/regulation zones and reporting units	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.										
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.										
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.										
	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.										
	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).										
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.										
	17	Bio-geographical regions	Areas of relatively homogeneous ecological conditions with common characteristics.										
		Hotspot Floristic Biodiversity supplement to FGR	Map of physical-geographical regions supplemented with floristic hotspot biodiversity data. All units were adopted from the physical-geographical region map; the dunes were divided into 2 groups: one rich in calcium, one poor. This was done using the boundaries of the ecodistrictmap.	Biota	25m	-	-	2007	LL(3.824, 51.793), UR (6.613, 53,560)	-	Alterra	need to request licensing	RD_New (28992)
		Map of the oldest forests in the Neherlands	The dataset contains the location of old forests which developed before the year 1900 and of forest soils which were covered by forest before the year 1900. Aim of the mapping was to indicate forest sites which potentially have a high biodiversity.	Biota	-	10k	-	2006	LL (3.423, 50.741), UR (7.162, 53.399)	-	Alterra	need to request licensing	RD_New (28992)
		Basic mapping of Nature 2004	The dataset BN2004, basic mapping of nature 2004 is a raster dataset based on the basis of TOP10 vector in combination with: two datasets with land management information, a dataset with a classification of the Netherlands into Physical Geographical Regions as well the dataset on land use from the National Statistical Service CBS. The datasets on land management were used to distinguish between natural grasslands and other grasslands. The used land management datasets were: the dataset on the subdidy arrangements Agricultural Nature Management and Nature Management (SAN/SN) and the dataset from the State Forest Service 2005 (SBB2005). Besides the datasets on land management, also the dataset Land Use 2000 (BBG2000) and the dataset Physical Geographical Regions (FGR_plus) were used to distinguish nature from other land uses and to subclassify the class sand into coastal sands (dunes, beaches and sand bars) and inland sands (sand drifts and inland dunes). The resolution of the dataset BN2004 is 25 x 25 meter and it distinguishes the following classes: grassland, natural grassland, arable land, heathland, forest, built-up area and infrastructure,	Biota	25m	-	-	2007	LL (3.047, 50.760), UR (7.276, 53.612)	-	Alterra	need to request licensing	RD_New (28992)
		Vegetation mapping of Edese and Ginkelse Heathland plus Wekeromse Sand 1997	Vegetation mapping of Edese and Ginkelse Heathland and Wekeromse Sand 1997	Biota	-	-	1997	-	Just the area NW of Ede	ESRI Shapefile	Alterra	need to request licensing	GCS_WGS_1984 (4326)
		Structure mapping of Edese and Ginkelse Heathland 2003	Structure mapping of Edese and Ginkelse Heathland and Wekeromse Sand 2003	Biota	-	-	2003	-	Just the area NW of Ede	ESRI Shapefile	Alterra	need to request licensing	GCS_WGS_1984 (4326)
		Vegetation mapping of Edese and Ginkelse Heathland and Wekeromse Sand 2009	Vegetation mapping of Edese and Ginkelse Heathland and Wekeromse Sand 2009	Biota	-	-	2009	-	Just the area NW of Ede	ESRI Shapefile	Alterra	need to request licensing	GCS_WGS_1984 (4326)
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.										
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.										
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.										
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.										

Portugal (PT1)

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I	01	Coordinate reference systems	Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.										
	02	Geographical grid systems	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.										
		50 km grid	50 km geographical grid system with MGRS codes	-	50000m	-	-	1997	-	ESRI shapefile	-	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		25 km grid	25 km geographical grid system with MGRS codes	-	25000m	-	-	2000	-	ESRI shapefile	-	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		10 km grid	10 km geographical grid system with MGRS codes	-	10000m	-	-	-	-	ESRI shapefile	-	available to use without licensing	ED50 (UTM zone 29N)
		1 km grid	1 km geographical grid system with MGRS codes	-	1000m	-	-	-	-	ESRI shapefile	-	available to use without licensing	ED50 (UTM zone 29N)
	03	Geographical names	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.										
		Local Toponomy	Local toponomy for the SABOR-MAÇÃS work area. Information from the official National M888 Series of Military Map of Portugal	Location	-	25k	1996 - 1997	1997	-	ESRI shapefile	IGEOE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Mountain toponomy	Mountain toponomy for the SABOR-MAÇÃS work area. Information from the official National M888 Series of Military Map	Location	-	25k	1996 - 1998	-	-	ESRI shapefile	IGEOE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	04	Administrative units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.										
		SABOR-MAÇÃS work area limits	Official Natura2000 SABOR-MAÇÃS limits	Boundaries	-	100k	-	2009	-	ESRI shapefile	ICNB	available to use without licensing	Datum 73 Hayford Gauss IPCC
		Civil parish administrative limits	Local SABOR-MAÇÃS Official Administrative Boundaries of Portugal (Civil Parish limits)	Boundaries	-	25k	-	2010	-	ESRI shapefile	IGP	available to use without licensing	ETRS89 TM06 (ETRS89 TM06)
		Civil Parish administrative limits	Official Administrative Boundaries of Portugal (Civil Parish limits)	Boundaries	-	25k	-	2010	-	ESRI shapefile	IGP	available to use without licensing	ETRS89 TM06 (ETRS89 TM06)
		Municipal administrative limits	Official Administrative Boundaries of Portugal (Municipal limits)	Boundaries	-	25k	-	2010	-	ESRI shapefile	IGP	available to use without licensing	ETRS89 TM06 (ETRS89 TM06)
		District administrative limits	Official Administrative Boundaries of Portugal (District limits)	Boundaries	-	25k	-	2010	-	ESRI shapefile	IGP	available to use without licensing	ETRS89 TM06 (ETRS89 TM06)
	05	Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code.										
	06	Cadastral parcels	Areas defined by cadastral registers or equivalent.										
	07	Transport networks	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network (1) and future revisions of that Decision.										
		National Road Plan 2000	National Road Plan 2000 for the north region of Portugal. Information from the Portugal Roads Companay (EP) and Portuguese National Geographic Institute (IGP)	Transportation	-	50k	-	2000	-	ESRI shapefile	EP/IGP	need to request licensing	Datum 73 Hayford Gauss IPCC
		National Rail Network	National Rail Network for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Transportation	-	1000k	-	1997	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	08	Hydrography	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2) and in the form of networks.										
		Main rivers	Main rivers for the north region of Portugal. Information from the INTERSIG-INAG agencies.	Inland Waters	-	25k	-	-	-	ESRI shapefile	INTERSIG-INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Dams and Reservoirs	Dams and Reservoirs for the north region of Portugal. Information from the INTERSIG-INAG agencies.	Inland Waters	-	25k	-	-	-	ESRI shapefile	INTERSIG-INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Main Rivers Basins	Main Rivers Basins for the SABOR-MAÇÃS work area. Information from the INTERSIG-INAG agencies.	Inland Waters	-	25k	-	-	-	ESRI shapefile	INTERSIG-INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Basins WISE	Water basins for the north region of Portugal. Information from the Water Information System for the Environment (WISE).	Inland Waters	-	25k		-		ESRI Shapefile	WISE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Dams and Reservoir < 50ha	Dams and reservoir under 50ha for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Inland Waters	-	1000k	-	1997	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Dams and Reservoir > 50ha	Dams and reservoir with more than 50ha for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Inland Waters	-	1000k	-	1997	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Main Rivers	Main rivers for the SABOR-MAÇÃS work area. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Inland Waters	-	-	-	-	-	ESRI shapefile	WISE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Main Basins	Main Basins for the north region of Portugal. Information from the Nacional Hidrographic Map.	Inland Waters	-	1000k	-	1989	-	ESRI shapefile	Atlas do Ambiente/DGRN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	09	Protected sites	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.										
		SABOR-MAÇÃS Work Area	Limits of the SABOR-MAÇÃS work area. Information from the Portuguese Institute for Nature Conservation and Biodiversity (ICNB).	Environment	-	100k	-	2009	-	ESRI Shapefile	ICNB	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		RN2000	Limits of the Natura 2000 Network Sites for the north region of Portugal. Information from the ICNB.	Environment	-	100k	-	2008	-	ESRI Shapefile	ICNB	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		National Protected Areas	National Protected Areas in the north region of Portugal. Information from the ICNB.	Environment	-	100k	-	2009	-	ESRI Shapefile	ICNB	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
ANNEX II	01	Elevation	Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.										
		Contour_100m	Contour for the SABOR-MAÇÃS work area. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Elevation	-	1000k	-	1982	-	ESRI Shapefile	CNA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hypsometry	Hypsometry map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Elevation	-	1000k	-	1982	-	ESRI Shapefile	CNA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Digital Elevation Model for Portugal	Digital Elevation Model for Portugal with a resolution of 30 meters. Information from the Shuttle Radar Topography Mission (SRTM).	Elevation	30m	-	-	2000	-	GeoTIFF (TIF)	SRTM	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Digital Terrain Model for Portugal	Digital Elevation Model for Portugal with a resolution of 25 meters. Information from the IGEOE-INAG agencies.	Elevation	25m	-	-		-	-	IGEOE-INAG	available to use without licensing	-

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX II		ASTER Global Digital Elevation Model (GDEM)	The resource contains GDEM elevation data with approximately 30m of resolution (GDEM30m_WGS84GCS_PTN_v1) and derived products namely: solar orientation / aspect (AspectGDEM_WGS84GCS_PT1_v1), slope in percentage (SlopeGDEM_WGS84GCS_PTN_v1) and landform classes (Weiss, 2001)	Elevation	30m	-	2009	2009	-9.000139 -5.999861 39.999861 43.000139	GeoTIFF (TIF)	NASA and Japan ASTER Program	available to use without licensing	WGS84
		SRTM v4	Digital Elevation Model from the Shuttle Radar Topographic Mission (SRTM)	Elevation	80m	-	-	2008	-	GeoTIFF (TIF)	USGS/NASA; Consortium for Spatial Information - Consultative Group for International Agriculture Research (CGIAR-CSI) - version 4	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	02	Land cover	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.										
		CLC 1990	Corine Land Cover revised (1990) for the north region of Portugal. Information from the Portuguese Geographical Institute (IGP), Portuguese Environment Agency (APA) and Environmental European Agencie (EEA) .	Planning / Cadastre	-	100k	-	1990	-	ESRI Shapefile	IGP/APA/EEA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		CLC 2000	Corine Land Cover (2000) for the north region of Portugal. Information from the Portuguese Geographical Institute (IGP), Portuguese Environment Agency (APA) and Environmental European Agencie (EEA) .	Planning / Cadastre	-	100k	-	2000	-	ESRI Shapefile	IGP/APA/EEA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		CLC 2006	Corine Land Cover (2006) for the north region of Portugal. Information from the Portuguese Geographical Institute (IGP), Portuguese Environment Agency (APA) and Environmental European Agencie (EEA) .	Planning / Cadastre	-	100k	-	2006	-	ESRI Shapefile	IGP/APA/EEA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		COS 1990	Portuguese Land Cover Map (1990) by categories and classes of use, for the north region of Portugal. Information from the Portuguese Geographical Institute (IGP)	Planning / Cadastre	-	25k	-	1990	-	ESRI Shapefile	IGP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		COS 2007	Portuguese Land Cover Map (2007) by categories of use, for the SABOR-MAÇÃS local civil parishes . Information from the Portuguese Geographical Institute (IGP)	Planning / Cadastre	-	25k	-	2011	-	ESRI Shapefile	IGP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Forest Stands IFN	Portuguese National Forest Survey – Forest stands	Planning / Cadastre	-	25k	-	-	-	ESRI Shapefile	DIEF/DSPE/DGF	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	03	Orthoimagery	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.										
		MODIS NDVI scene: h17v04	MODIS Vegetation Indice (NDVI) 16-Day composite L3 Global. MODIS Sinusoidal	Imagery / Base Maps / Earth Cover	250m	-	-	2010	-	HDF-EOS	USGS/NASA	available to use without licensing	WGS 84 / UTM zone 29N
		MODIS Gross Primary Productivity scene: h17v04	MODIS Gross Primary Productivity 8-Day composite L4 Global. MODIS Sinusoidal	Imagery / Base Maps / Earth Cover	1000m	-	-	2007	-	HDF-EOS	USGS/NASA	available to use without licensing	WGS 84 / UTM zone 29N
		Vegetation Indices 16-Day L3 Global 250m from Terra MODIS sensor (MOD13Q1)	Vegetation Indices, with input reflectance bands and quality control flags, from Terra MODIS sensor; Global data provided every 16 days at 250-meter spatial resolution as a gridded level-3; Collection 5; Horizontal tile number 17; Vertical tile number 04	Imagery / Base Maps / Earth Cover	250m	-	2000 - 2011	2006	-15.557 0.022 39.815 50.006	HDF-EOS	Land Processes Distributed Active Archive Center || U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat4 TM sensor	Satellite imagery from Landsat4 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1989	2011	-7.848 -5.012 40.834 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat4 TM sensor	Satellite imagery from Landsat4 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1990	2011	-9.482 -6.606 40.812 42.727	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat4 TM sensor	Satellite imagery from Landsat4 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1991	2011	-7.939 -5.110 40.854 42.745	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1984	2011	-7.807 -4.968 40.831 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1987	2011	-9.379 -6.508 40.796 42.720	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1987	2011	-9.306 -6.435 40.782 42.706	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1987	2011	-7.756 -4.921 40.820 42.722	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1990	2011	-7.858 -5.015 40.834 42.739	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2010	-7.917 -4.948 40.848 42.764	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2011	-9.508 -6.606 40.809 42.738	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2010	-7.826 -4.851 40.812 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-9.405 -6.497 40.793 42.725	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-7.841 -4.965 40.812 42.717	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-9.401 -6.497 40.793 42.722	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-9.416 -6.519 40.790 42.722	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2010	-7.826 -4.855 40.812 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2010	-7.983 -5.011 40.833 42.751	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2010	-7.833 -4.865 40.823 42.741	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-9.427 -6.530 40.790 42.719	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-7.833 -4.957 40.826 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-9.416 -6.490 40.793 42.719	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-7.833 -4.935 40.823 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-9.427 -6.497 40.785 42.714	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-9.438 -6.511 40.796 42.725	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2010	-7.826 -4.837 40.807 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-9.423 -6.500 40.790 42.725	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-7.840 -4.942 40.826 42.733	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-7.844 -4.946 40.823 42.731	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-7.848 -4.851 40.807 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-9.434 -6.511 40.798 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX II		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2010	-9.456 -6.427 40.785 42.730	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2011	-7.866 -4.979 40.829 42.734	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2011	-7.862 -4.968 40.826 42.731	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2011	-7.870 -4.968 40.821 42.728	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2011	-9.453 -6.518 40.798 42.730	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2011	2011	-7.851 4.957 40.831 42.733	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1999	2010	-7.833 -4.994 40.754 42.736	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1999	2010	-7.833 -4.873 40.818 42.736	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1999	2011	-9.431 -6.533 40.801 42.736	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-9.456 -6.562 40.801 42.733	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-7.899 -5.033 40.826 42.739	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-7.862 -5.004 40.829 42.742	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-9.478 -6.581 40.795 42.733	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-7.880 -5.022 40.824 42.739	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2010	-7.858 -4.894 40.810 42.739	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2011	-9.478 -6.588 40.801 42.741	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2011	-7.873 -5.015 40.829 42.744	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2011	-7.888 -5.022 40.821 42.739	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2011	-9.478 -6.581 40.790 42.730	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2010	-9.468 -6.466 40.793 42.752	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2011	-7.873 -5.007 40.832 42.750	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2011	-9.493 -6.595 40.784 42.730	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-9.420 -6.518 40.798 42.744	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-7.858 -4.996 40.826 42.750	GTiff -TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
	04	Geology	Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.										
		Geology	Geological map for the north region of Portugal. Information from the National Institute of Engineering, Technology and Innovation, I.P. (INETI).	Geoscientific Information	-	500k	-	2005	-	ESRI Shapefile	SGP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Geology fractures	Geology fractures map for the north region of Portugal. Information from the National Institute of Engineering, Technology and Innovation, I.P. (INETI).	Geoscientific Information	-	500k	-	2005	-	ESRI Shapefile	SGP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
ANNEX III	01	Statistical units	Units for dissemination or use of statistical information.										
		BGRI 2001	Portuguese Basis for Geographic Information Referencing for the north region of Portugal. Information from de Portuguese National Statistical Institute (INE).	Boundaries	-	25k	-	2001	-	ESRI Shapefile	INE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	02	Buildings	Geographical location of buildings.										
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.										
		Soil map	Soils map for the SABOR-MAÇÃS local civil parishes. Information from the regional Directorate for Agriculture of Entre Douro e Minho (DRAEDM), University of Trás-os-Montes e Alto Douro (UTAD) and ex: National Center for Geographic Information; discribing factors like: pedology, main soils, litology, geomorphology, erosion, slopes, soils/agriculture/forest suitability, soils water conditions, soils fertility, relief, terraced places, soils drainage, etc....	Geoscientific Information	-	100k	-	2004	-	ESRI Shapefile	DRAEDM/UTAD/CNIG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Soil map	Soil map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Geoscientific Information	-	1000k	-	1971	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Acidity and alkalinity of soil	Acidity and alkalinity of soil for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the acidity and alkalinity of the soil - Classes of pH (in water).	Geoscientific Information	-	1000k	-	1979	-	ESRI Shapefile	EAN/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Lithology	Lithology map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Geoscientific Information	-	1000k	-	1982	-	ESRI Shapefile	EAN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).										
		Land use	Land Use map for the SAVOR-MAÇÃS local civil parishes. Information from the regional Directorate for Agriculture of Entre Douro e Minho (DRAEDM), University of Trás-os-Montes e Alto Douro (UTAD) and ex: National Center for Geographic Information.	Planning / Cadastre	-	100k	-	2004	-	ESRI Shapefile	DRAEDM/UTAD/CNIG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Capacity of land use	Capacity of land use for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the national capacity of land use.	Planning / Cadastre	-	1000k	-	1980	-	ESRI Shapefile	SROA/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Touristy recourses	Touristy recourses for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency)	Planning / Cadastre	-	1000k	-	1999	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.										

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.										
		Hydraulic infrastructure_2008	Hydraulic infrastructure (2008) for the north region of Portugal. Information from the Portuguese National Water Authority (INAG).	Utilities / Communication	-	-	2008	2009	-	ESRI Shapefile	INnterSIG/EDP/INAG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Monitoring stations_2008	Monitoring stations (2008) for the north region of Portugal. Information from the Portuguese National Water Authority (INAG).	Utilities / Communication	-	-	2008	2009	-	ESRI Shapefile	INnterSIG/EDP/INAG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Mini_Hydro_requests	Mini Hydro Requests for the SABOR-MAÇÃS local civil parishes. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Large_dams	Large dams for the SABOR-MAÇÃS local civil parishes. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hydroelectric_power_plants_in_operation	Hydroelectric power plants in operation for the SABOR-MAÇÃS local civil parishes. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Infrastructure of urban waste_Landfill and screening stations	Infrastructure of urban waste-Landfill and screening stations for the north region of Portugal. Information from the Portuguese National Regulator of Water Services and Waste (ERSAR 2008), discribing the type of establishments.	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	ERSAR	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Wind turbines park	Wind turbines parks for the north region of Portugal. Information from the Portuguese General Directorate for Energy and Geology (DGEG).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Gas stations	Gas stations for the north region of Portugal. Information from the Portuguese General Directorate for Energy and Geology (DGEG).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		IA - INSAAR (2007)	IA - INSAAR (2007)National Inventory of Water Supply Systems and Wastewater (INSAAR- 2008) for the north region of Portugal. Information from the Portuguese National Water Authority (INAG), with the information about: Water withdrawals, Elevation stations for water supply, Wastewater elevation stations, Effluent treatment station, Wastewater treatment station, Discharge points, Water Reservoirs_DistributionAdjustmentReserve for fire, Adductors, Water distribution network and Drainage wastewater network.	Utilities / Communication	-	-	2007	2009	-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		IA - INSAAR (2008)	IA - INSAAR (2008)National Inventory of Water Supply Systems and Wastewater (INSAAR- 2008) for the north region of Portugal. Information from the Portuguese National Water Authority (INAG), with the information about: Water withdrawals, Elevation stations for water supply, Wastewater elevation stations, Effluent treatment station, Wastewater treatment station, Discharge points, Water Reservoirs_DistributionAdjustmentReserve for fire, Adductors, Water distribution network and Drainage wastewater network.	Utilities / Communication	-	-	2008	2010	-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		National Electric Network - High voltage	National Electric Network (High voltage) for the north region of Portugal. Information from the Nacional Electric Network (REN), supplemented with the Lines KV, Substations, Supports and Wind turbines park.	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	REN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.										
ANNEX III		Meteorological network	Meteorological network for the north region of Portugal. Portuguese National Water Authority (INAG).	Strutcture	-	50k	-		-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Water quality_dry residues	Water quality for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), discribing the levels (mg) of dry residues.	Environment	-	1000k	-	1986	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Chemical status of water quality_sulfates	Chemical status of water quality for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), discribing the levels (mg) of sulfates.	Environment	-	1000k	-	1986	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Chemical status of water quality_chlorides	Chemical status of water quality for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), discribing the levels (mg) of chlorides.	Environment	-	1000k	-	1986	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Rejected waters	Rejected waters features for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN), discribing parameters like organic matter, nitrogen, chemical oxygen demand, phosphorus, ...	Environment	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Monitoring network surface waters	Monitoring network of surfacewaters for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Monitoring network groundwaters	Monitoring network of groundwaters for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Strutcture	-	-	-		-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Chemical status of water quality_2008	Chemical status of groundwater quality (2008) for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Environment	-	-	2008	2008	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Chemical status of water quality_2009	Chemical status of groundwater quality (2009) for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Environment	-	-	2009	2009	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Water monitoring network	Water monitoring network map for the north region of Portugal. Information from the Water National Authority (INAG), discribing features like tipology, altitude, dimension, hidrographic regime, temperature, precipitation, ph, ...	Strutcture	-	50k	-	-	-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.										
		Fito pharmaceutical	Fito pharmaceutical establishments for the north region of Portugal. Information from the ION inventory.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Gas station	Gas station establisments for the north region of Portugal. Information from the ION Inventory.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		SEVESO_Upper level	SEVESO Upper level establishments for the north region of Portugal. Information from the ION Inventory, discribing the level of danger for the stablishments.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		SEVESO_Lower level	SEVESO Lower level stablishments for the north region of Portugal. Information from the ION Inventory, discribing the level of danger for the stablishments.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		SEVESO establishments	SEVESO establishments for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Strutcture	-	1000k	-	2010	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III		PCIP_N (1,2,3,4,5,6)	Industries subject to Integrated Pollution Prevention and Control (PCIP) for the north region of Portugal. Information from the ION Inventory, discribing the level of danger for the stablishments.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		UGR_P	Dangerous Waste Management Units (UGR-P) for the north region of Portugal. Information from de ION Inventory.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		UGR_NP	Less Dangerous Waste Management Units (UGR-NP) for the north region of Portugal. Information from de ION Inventory.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Agro industries	Agro industries features for the north region of Portugal. Information from the Directorate of regional Agriculture and Fisheries (DRAP)	Strutcture	-	-	-	-	-	ESRI Shapefile	DRAP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Oil press industries	Oil press industries features for the north region of Portugal. Information from the Directorate of regional Agriculture and Fisheries (DRAP)	Strutcture	-	-	-	-	-	ESRI Shapefile	DRAP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).										
		Variation in number of farms (89-99)	Variation in number of farms for the period 1989-1999 for the SABOR-MAÇÃS local civil parish. Information from the Portuguese General Census of Agriculture (RGA/INE).	Farming	-	25k	1989 - 1999	-	-	ESRI Shapefile	INE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Tradicional irrigation	Tradicional irrigation areas for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Farming	-	1000k	-	1997	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Irrigation projects in operation	Irrigation projects in operation for the north region of Portugal. Information from the General Directorate for Agriculture and Rural Development (DGADR).	Farming	-	-	-	-	-	ESRI Shapefile	DGADR	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Irrigation projects in potencial operation	Irrigation projects in potencial operation for the north region of Portugal. Information from the General Directorate for Agriculture and Rural Development (DGADR).	Farming	-	-	-	-	-	ESRI Shapefile	DGADR	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.										
		Rate of population change_91_01	Rate of population change map (1991-2001) for the north region of Portugal civil parish. Information from the National Statistical Institute (INE).	Society	-	25k	1991 - 2001	-	-	ESRI Shapefile	INE/ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		SABOR_Population_variation(91_01)	Population variation map (1991-2001) for the SABOR-MAÇÃS local civil parish. Information from the National Statistical Institute (INE).	Society	-	-	1991 - 2001	-	-	ESRI Shapefile	INE/ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		SABOR_Population_density_2001	Rate of population density map for the SABOR-MAÇÃS local civil parish. Information from the National Statistical Institute (INE).	Society	-	-	2001	-	-	ESRI Shapefile	INE/ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		BGRI 2001	Portuguese Basis for Geographic Information Referencing for the north region of Portugal. Information from the National Statistical Institute (INE)	Society	-	25k	-	2001	-	ESRI Shapefile	INE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	11	Area management/restriction/regulation zones and reporting units	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.										
		ZIF_2011	Portuguese Forest Area of Intervention (ZIF) for the north region of Portugal, for the year 2011. Information from the National Forest Authority (AFN).	Planning / Cadastre	-	25k	2011	2011	-	ESRI Shapefile	AFN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_POPNPG								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_POPNPG_Prot_Rec_Sist_Nat								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_POPN_Douro_Internacional								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_PO_PNPG	Development Plan for Protected Areas (POAP) for the north region of Portugal. Information from the Ministry of Agriculture to Rural Develpment and Fisheries (MADRP), discribing the resources protection zones.							ESRI Shapefile	MADRP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_PO_Montesinho								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_PO_Litoral_Norte								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_PO_Alvao								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		PROF_Nordeste Transmontano	regional Plans for Forest Management (PROF) for the Nordeste Transmontano. Information from the Ministry of Agriculture to Rural Develpment and Fisheries (MADRP).	Planning / Cadastre	-	-	-	-	-	ESRI Shapefile	MADRP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		PROF_Douro	regional Plan for Forest Management (PROF) for the Douro. Information from the Ministry of Agriculture to Rural Develpment and Fisheries (MADRP).	Planning / Cadastre	-	-	-	-	-	ESRI Shapefile	MADRP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.										
		Fire risk_2003	Fire risk map for the north region of Portugal, for the year 2003. Information from the Forest National Authority (ANF) discribing the risk of fire.	Geoscientific Information	-	-	2003	-	-	ESRI Shapefile	AFN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Burned areas_90_09	Burned areas for the north region of Portugal for the period 2000-2009. National burned areas cartography from the National Forest Authority (AFN) (by year).	Geoscientific Information	-	-	1990 - 2009	-	-	ESRI Shapefile	AFN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		CRIF2010	Forest Fire Risk map (2010) for the north region of Portugal. Information from the Information Network for Emergency Response (RISE).	Geoscientific Information	25m	-	-	2010	-	ESRI Shapefile	CRISE/ANPC/DGRF/IGEOE/INE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Seismic intensity (International)	Seismic intensity for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the zones of maximum intensity (international scale) (1901-1972).	Geoscientific Information	-	1000k	1901 - 1972	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Historical seismicity (Mercalli)	Historical seismicity for thr north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the isoseismal lines of intensities by the Modified Mercalli scale - 1956.	Geoscientific Information	-	1000k	-	1996	-	ESRI Shapefile	IM	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.										
		Bioclimatic confort	Bioclimatic confort map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the mean values (January, April, July e October) for the period 1961–1990.	Climatology / Meteorology / Atmosphere	-	1000k	-	1992	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.										
		Precipitation	Precipitation map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the Mean Anual Values (days) for the period 1931-1960.	Climatology / Meteorology / Atmosphere	-	100k	-	1995	-	ESRI Shapefile	Agroconsultores e Geometral	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Precipitation_total	Precipitation map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the annual mean values (mm) for the period 1931-1960.	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Precipitation erosivity	Precipitation erosivity map for the north Regin of Portugal.	Climatology / Meteorology / Atmosphere	-	50k				ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Temperature	Temperature map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the average daily air (degrees centigrade) (1931-1960).	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Solar Radiation	Solar Radiation map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the mean anual values (kcal/cm2) for the period 1938-1970.	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Insolation	Insolation map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), describing the average annual values (hours) (1931-1960).	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Evapotranspiration	Evapotranspiration map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), describing the amount of water returned to the atmosphere (mm).	Climatology / Meteorology / Atmosphere	-	1000k	-	1974	-	ESRI Shapefile	IST/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Relative humidity	Relative humidity map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), describing the relative humidity at 9 T.M.G. - Annual Average Values (%) Period 1931-1960.	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Frost	Frost area map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the number of days in year (1941-1960).	Climatology / Meteorology / Atmosphere	-	1000k	1941 - 1960	1974	-	ESRI Shapefile	SMN/DGRF	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Frost Farm	Frost Farm area map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the dAnnual Mean Values (months) in the agricultural year (October to September), Years 1941-1960.	Climatology / Meteorology / Atmosphere	-	1000k	1941 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Climatic Data	Climatic data for the portuguese metheorological network including a time series of temperature and precipitation from 1988 to 2007	Climatology / Meteorology / Atmosphere	1000m	-	1988 - 2007		-	ESRI Shapefile	IM	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Climatic and bioclimatic variables from WorldClim for the NUTS II north (PT11) /SIMBioN region	Climatic, bioclimatic and principal components of WorldClim variables resampled and reprojected (ED50/UTM29N) from the WorldClim dataset	Climatology / Meteorology / Atmosphere	1000m	-	1950 - 2000	2005	512000 733000 4665000 4513000	AAIGrid - Arc/Info ASCII Grid	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	ED50 / UTM zone 29N
		Digital Climatic Atlas of Peninsula Iberica	Digital Climatic Atlas of Peninsula Iberica	Climatology / Meteorology / Atmosphere	200m	-	-	2005	-	Idrisi Raster (RST)	Miguel Ninyerola; Xavier Pons; Joan M. Roure	available to use without licensing	WGS84
		Water flows	Water flows for the north region of Portugal. Information from the Portuguese Atlas of the Environment (APA), describing the amount of water in the river system (mm).	Climatology / Meteorology / Atmosphere	-	1000k	-	1974	-	ESRI shapefile	IST/DGRF	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).										
ANNEX III													
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.										
	17	Bio-geographical regions	Areas of relatively homogeneous ecological conditions with common characteristics.										
		Landscape units	Landscape units for thr north region of Portugal. Information from the University of Évora.	Biota	-	25k	-	-	-	ESRI shapefile	University of Évora	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Phytogeographic Zones	Phytogeographic Zones for the north region of Portugal. Information from the Portuguese Atlas of the Environment (APA).	Biota	-	1000k	1994	-	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Landscape units	Landscape units for the north region of Portugal. Information from the Portuguese Atlas of the Environment (APA).	Biota	-	1000k	1984	-	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Natural regions	Natural regions for the north region of Portugal. Information from the Portuguese Atlas of the Environment (APA).	Biota	-	1000k	1984	-	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		EU27 Biogeographical regions	-	Biota	-	-	-	-	-	ESRI shapefile	EEA	available to use without licensing	ETRS89 LAEA
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.										
		Biotopes CORINE	Biotopes CORINE for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the Protected areas, ZPE and Biotopes.	Biota	-	1000k	-	1991	-	ESRI Shapefile	AA/DGRN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Natura 2000 habitats from ICNB datasets for mainland Portugal	Habitats from Natura 2000 ICNB datasets represented in polygon or line geometry for mainland Portugal	Biota	-	25k	2000 - 2005	2010	105730 343453 3516 556949	ESRI Shapefile	ICNB	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Natura 2000 habitats from ICNB datasets for Sabor classified area	Habitats from Natura 2000 ICNB datasets represented in polygon or line geometry for the Sabor classified area. Features include patchy habitats and mosaics, dominant tree species and linear habitats.	Biota	-	25k	2000 - 2005	2010	286685 322854 469999 499963	ESRI Shapefile	ICNB	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.										
		Notable trees	Notable trees for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Biota	-	1000k	-	1997	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Bats-other shelters								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Bats-important shelters								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Raptors-sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Raptors-high sensitive	Species distribution for the north region of Portugal. Information from de ICNB	Biota	-	1000k	-	-	-	ESRI Shapefile	ICNB	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Esteparias-high sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Other species-sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Other species-high sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Bat species richness	Modelled (maxent) bat species richness for the SIMBioN/NUTS II north region of mainland Portugal.	Biota	0,002778 degree	-	2010	2010	-8.881944 -6.187500 40.740278 42.156945	ESRI Grid	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	unknown limitations	WGS 84 / UTM zone 29N

		Resource title	Resource abstract	Topic category	Resolution	Spatial Scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III		Bird species distribution for the NUTS II north (PT11) /SIMBioN region	Bird spatial distribution data for the NUTS II north / SIMBioN region. Recording conditions are mentioned as metadata.	Biota	10000m	-	2010	2010	512000 733000 4665000 4513000	MS Excel 2007 (xls) / ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	unknown limitations	ED50 / UTM zone 29N
		Geomalacus maculosus species distribution data	Geomalacus maculosus species distribution data for the NUTS II north / SIMBion region of mainland Portugal	Biota	5m	-	2010	2010	523541 681661 4527099 4642479	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	WGS 84 / UTM zone 29N
		Rupiculous bird species for the NUTS II north (PT11) /SIMBioN region	Rupiculous birds distribution data for the NUTS II north / SIMBioN region.	Biota	1000m	-	2010	2010	592753 702345 4562659 4648153	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	unknown limitations	WGS 84 / UTM zone 29N
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.										
		Thermal recourses	Thermal recourses for the north region of Portugal. Information from the General Directorate for Energy and Geology (DGEG).	Economy	-	1000k	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.										
		Water resources	Water resources map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Economy	-	1000k	-	1991	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Mineral Concessions	Water concessions for the north region of Portugal. Information from the General Directorate for Energy and Geology (DGEG).	Economy	-	-	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Water Concessions	Water concessions for the north region of Portugal. Information from the General Directorate for Energy and Geology (DGEG).	Economy	-	-	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)

Portugal (PT2)

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I	01	Coordinate reference systems	Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.										
	02	Geographical grid systems	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.										
		50 km grid	50 km geographical grid system with MGRS codes	-	50000m	-	-	1997	-	ESRI shapefile	IGEOE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		25 km grid	25 km geographical grid system with MGRS codes	-	25000m	-	-	2000	-	ESRI shapefile	IGEOE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		10 km grid	10 km geographical grid system with MGRS codes	-	10000m	-	-	-	-	ESRI shapefile	-	available to use without licensing	ED50 (UTM zone 29N)
		1 km grid	1 km geographical grid system with MGRS codes	-	1000m	-	-	-	-	ESRI shapefile	-	available to use without licensing	ED50 (UTM zone 29N)
		UTM grid zones	1 km geographical UTM grid system	-	1000m	-	-	-	-	ESRI shapefile	-	available to use without licensing	WGS84
	03	Geographical names	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.										
		Local Toponomy	Local toponomy for the PNPG work area. Information from the official National M888 Series of Military Map of Portugal	Location	-	25k	1996 - 1997	1997	-	ESRI shapefile	IGEOE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Mountain toponomy	Mountain toponomy for the PNPG work area. Information from the official National M888 Series of Military Map	Location	-	25k	1996 - 1998	-	-	ESRI shapefile	IGEOE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	04	Administrative units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.										
		PNPG geographical limits	Official Administrative Boundaries of Portugal for the PNPG area	Boundaries	-	25k	-	2010	-	ESRI shapefile	ICNB	available to use without licensing	Datum 73 Hayford Gauss IPCC
		Civil Parish administrative limits	Local PNPG Official Administrative Boundaries of Portugal (Civil Parish limits)	Boundaries	-	25k	-	2010	-	ESRI shapefile	IGP	available to use without licensing	ETRS89 TM06 (ETRS89 TM06)
		Civil Parish administrative limits	Official Administrative Boundaries of Portugal (Civil Parish limits)	Boundaries	-	25k	-	2010	-	ESRI shapefile	IGP	available to use without licensing	ETRS89 TM06 (ETRS89 TM06)
		Municipal administrative limits	Official Administrative Boundaries of Portugal (Municipal limits)	Boundaries	-	25k	-	2010	-	ESRI shapefile	IGP	available to use without licensing	ETRS89 TM06 (ETRS89 TM06)
		District administrative limits	Official Administrative Boundaries of Portugal (District limits)	Boundaries	-	25k	-	2010	-	ESRI shapefile	IGP	available to use without licensing	ETRS89 TM06 (ETRS89 TM06)
	05	Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code.										
	06	Cadastral parcels	Areas defined by cadastral registers or equivalent.										
	07	Transport networks	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network (1) and future revisions of that Decision.										
		Main road network	Main road network map for the PNPG local civil parishes. Information from the official National M888 Series of Military Map of Portugal	Transportation	-	25k	1996 - 1997	1997	-	ESRI shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Main paths network	Main paths network map for the PNPG local civil parishes. Information from the official National M888 Series of Military Map of Portugal	Transportation	-	25k	1996 - 1997	1997	-	ESRI shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		National Road Plan 2000	National Road Plan 2000 for the north region of Portugal. Information from the Portugal Roads Company (EP) and Portuguese National Geographic Institute (IGP)	Transportation	-	50k	-	2000	-	ESRI shapefile	EP/IGP	need to request licensing	Datum 73 Hayford Gauss IPCC
		National Rail Network	National Rail Network for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Transportation	-	1000k	-	1997	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	08	Hydrography	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2) and in the form of networks.										
		Main rivers	Main rivers for the north region of Portugal. Information from the INTERSIG-INAG agencies.	Inland Waters	-	25k	-	-	-	ESRI shapefile	INTERSIG-INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Dams and Reservoirs	Dams and Reservoirs for the north region of Portugal. Information from the INTERSIG-INAG agencies.	Inland Waters	-	25k	-	-	-	ESRI shapefile	INTERSIG-INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Transitional waters	Dams and Reservoirs for the north region of Portugal. Information from the INTERSIG-INAG agencies.	Inland Waters	-	25k	-	-	-	ESRI shapefile	INTERSIG-INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Main Rivers Basins	Main Rivers Basins for the north region of Portugal. Information from the INTERSIG-INAG agencies.	Inland Waters	-	25k	-	-	-	ESRI shapefile	INTERSIG-INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		PNPG Hydrographic network	Main water lines for the PNPG work area. Information from the oficial National M888 Series of Military Map of Portugal.	Inland Waters	-	25k	1996 - 1997	1997	-	ESRI shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Main rivers	Major rivers for the PNPG work area. Information from the oficial National M888 Series of Military Map of Portugal.	Inland Waters	-	25k	1996 - 1997	1997	-	ESRI shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hydrography	Hydrography for the PNPG work area. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), describing the main rivers, tributarys, subtributarys and basin boundary.	Inland Waters	-	1000k	-	1989	-	ESRI shapefile	IGEOE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Water bodies	Water bodies for the PNPG local civil parishes. Information from the oficial National M888 Series of Military Map of Portugal.	Inland Waters	-	25k	1996 - 1997	1997	-	ESRI shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Dams and Reservoir <50ha	Dams and reservoir under 50ha for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Inland Waters	-	1000k	-	1997	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Dams and Reservoir >50ha	Dams and reservoir with more than 50ha for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Inland Waters	-	1000k	-	1997	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Basins WISE	Water basins for the north region of Portugal. Information from the Water Information System for the Environment (WISE).	Inland Waters	-	25k	-	-	-	ESRI Shapefile	WISE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Main Basins	Main Basins for the north region of Portugal. Information from the Nacional Hidrographic Map.	Inland Waters	-	1000k	-	1989	-	ESRI shapefile	Atlas do Ambiente/DGRN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hydrographic network derived from the SRTM elevation data	Hydrographic network derived from the SRTM v4 elevation data for the NUTS II north / SIMBioN region of mainland Portugal. Strahler order of each segment is mentioned in field GRID_CODE.	Inland Waters	100m	-	2000	2010	-8.892500 -6.130000 40.685000 42.210833	ESRI shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	WGS 84
		Hydrological value maps for the Peneda-Gerês national park (PNPG)	Hydrological value maps for the Peneda-Gerês national park (PNPG)	Inland Waters	-	25k	2008	2008	177990 221590 522545 568231	ESRI shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I	09	Protected sites	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.										
		PNPG Work Area	Limits of the PNPG work area. Information from the Portuguese Institute for Nature Conservation and Biodiversity (ICNB).	Environment	-	100k	-	2009	-	ESRI Shapefile	ICNB	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		RN2000	Limits of the Natura 2000 Network Sites for the north region of Portugal. Information from the ICNB.	Environment	-	100k	-	2008	-	ESRI Shapefile	ICNB	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		National Protected Areas	National Protected Areas in the north region of Portugal. Information from the ICNB.	Environment	-	100k	-	2009	-	ESRI Shapefile	ICNB	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
ANNEX II	01	Elevation	Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.										
		Contour_10m	Contour (10 m) for the PNPG local civil parishes. Information from the oficial National M888 Series of Military Map of Portugal.	Elevation	-	25k	1996 - 1997	1997	-	ESRI Shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Contour_100m	Contour (100 m) for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Elevation	-	1000k	-	1982	-	ESRI Shapefile	CNA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Elevation points	Elevation points for the PNPG local civil parishes. Information from the oficial National M888 Series of Military Map of Portugal.	Elevation	-	25k	1996 - 1997	1997	-	ESRI Shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Geodesic vertex	Geodesic vertex for the PNPG local civil parishes. Information from the oficial National M888 Series of Military Map of Portugal.	Elevation	-	25k	1996 - 1997	1997	-	ESRI Shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hypsometry	Hypsometry map for the PNPG limit.	Elevation	5m	-	-	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hypsometry	Hypsometry map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Elevation	-	1000k	-	1982	-	ESRI Shapefile	CNA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Digital Elevation Model for Portugal	Digital Elevation Model for Portugal with a resolution of 30 meters. Information from the Shuttle Radar Topography Mission (SRTM).	Elevation	30m	-	-	2000	-	GeoTIFF (TIF)	SRTM	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		ASTER Global Digital Elevation Model (GDEM)	The resource contains GDEM elevation data with approximately 30m of resolution (GDEM30m_WGS84GCS_PTN_v1) and derived products namely: solar orientation / aspect (AspectGDEM_WGS84GCS_PT1_v1), slope in percentage (SlopeGDEM_WGS84GCS_PTN_v1) and landform classes (Weiss, 2001)	Elevation	30m	-	2009	2009	-9.000139 -5.999861 39.999861 43.000139	GeoTIFF (TIF)	NASA and Japan ASTER Program	available to use without licensing	WGS84
		SRTM v4	Digital Elevation Model from the Shuttle Radar Topographic Mission (SRTM)	Elevation	80m	-	-	2008	-	GeoTIFF (TIF)	USGS/NASA; Consortium for Spatial Information - Consultative Group for International Agriculture Research (CGIAR-CSI) - version 4	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Slopes	Slope map for the PNPG limit.	Elevation	5m	-	-	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hillshade	Hillshade map for the PNPG limit.	Elevation	5m	-	-	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Aspect	Aspect map for the PNPG limit.	Elevation	5m	-	-	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hypsometry for the Melgaço municipality	Hypsometry / elevation for the municipality of Melgaço.	Elevation	-	25k	2010	2010	182692 204171 550481 576089	ESRI Shapefile	ESA-IPVC	-	Lisboa Hayford Gauss (Lisboa IGEOE)
	02	Land cover	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.										
		CLC 1990	Corine Land Cover revised (1990) for the north region of Portugal. Information from the Portuguese Geographical Institute (IGP), Portuguese Environment Agency (APA) and Environmental European Agencie (EEA).	Planning / Cadastre	-	100k	-	1990	-	ESRI Shapefile	IGP/APA/EEA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		CLC 2000	Corine Land Cover (2000) for the north region of Portugal. Information from the Portuguese Geographical Institute (IGP), Portuguese Environment Agency (APA) and Environmental European Agencie (EEA).	Planning / Cadastre	-	100k	-	2000	-	ESRI Shapefile	IGP/APA/EEA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		CLC 2006	Corine Land Cover (2006) for the north region of Portugal. Information from the Portuguese Geographical Institute (IGP), Portuguese Environment Agency (APA) and Environmental European Agencie (EEA).	Planning / Cadastre	-	100k	-	2006	-	ESRI Shapefile	IGP/APA/EEA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		COS 1990	Land Cover Map (1990) by categories and classes of use for the north region.	Planning / Cadastre	-	25k	-	1990	-	ESRI Shapefile	IGP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		COS 2000	Land Cover Map (2000) by categories and classes of use for the PNPG limit.	Planning / Cadastre	-	25k	-	2000	-	ESRI Shapefile	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		COS 2006	Land Cover Map (2006) by categories of use for the PNPG limit.	Planning / Cadastre	-	25k	-	2006	-	ESRI Shapefile	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		COS 2007	Portuguese Land Cover Map (2007) by categories of use, for the PNPG local civil parishes . Information from the Portuguese Geographical Institute (IGP)	Planning / Cadastre	-	25k	-	2011	-	ESRI Shapefile	IGP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Land use change 90-00 (categories)	Land usechange between 1990 and 2000 by categories of use for the PNPG.	Planning / Cadastre	5m	-	1990 - 2000	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Land use change 90-00 (classes)	Land use change between 1990 and 2000 by classes of use for the PNPG.	Planning / Cadastre	5m	-	1990 - 2000	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Forest change areas 90-00	Forest change areas map between 1990 and 2000 for the PNPG (classes change).	Planning / Cadastre	5m	-	1990 - 2000	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Agriculture change areas 90-00	Agriculture change areas map between 1990 and 2000 for the PNPG (classes change).	Planning / Cadastre	5m	-	1990 - 2000	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Semi-natural change areas 90-00	Semi-natural change areas map between 1990 and 2000 for the PNPG (classes change).	Planning / Cadastre	5m	-	1990 - 2000	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Forest Stands IFN	Portuguese National Forest Survey -- Forest stands	Planning / Cadastre	-	25k	-	-	-	ESRI Shapefile	DIEF/DSPE/DGF	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Proportion of CLC 2006 classes	Proportion of CLC 2006 classes in ED50 / UTM 1km grid cells.	Imagery / Base Maps / Earth Cover	1000m	-	2006	2010	512000 733000 4665000 4513000	AAIGrid - Arc/Info ASCII Grid	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	ED50 / UTM zone 29N
		Land use/land cover map for the Melgaço municipality (COS2009)	Land use/land cover data for the Melgaço municipality with the portuguese COS90 (Carta de Ocupação do Solo de 1990) classification system (level 2 disaggregation). The data corresponds to an 2009 update.	Imagery / Base Maps / Earth Cover	-	25k	2009	2010	-17310.490000 4171.070200 250476.930200 276089.430100	ESRI Shapefile	ESA-IPVC	-	Datum 73 Hayford Gauss IPCC
	03	Orthoimagery	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.										
		MODIS NDVI scene: h17v04	MODIS Vegetation Indice (NDVI) 16-Day composite L3 Global. MODIS Sinusoidal	Imagery / Base Maps / Earth Cover	250m	-	-	2010	-	HDF-EOS	USGS/NASA	available to use without licensing	WGS 84 / UTM zone 29N
		MODIS Gross Primary Productivity scene: h17v04	MODIS Gross Primary Productivity 8-Day composite L4 Global. MODIS Sinusoidal	Imagery / Base Maps / Earth Cover	1000m	-	-	2007	-	HDF-EOS	USGS/NASA	available to use without licensing	WGS 84 / UTM zone 29N
		Vegetation Indices 16-Day L3 Global 250m from Terra MODIS sensor (MOD13Q1)	Vegetation Indices, with input reflectance bands and quality control flags, from Terra MODIS sensor; Global data provided every 16 days at 250-meter spatial resolution as a gridded level-3; Collection 5; Horizontal tile number 17; Vertical tile number 04	Imagery / Base Maps / Earth Cover	250m	-	2000 - 2011	2006	-15.557 0.022 39.815 50.006	HDF-EOS	Land Processes Distributed Active Archive Center | | U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat4 TM sensor	Satellite imagery from Landsat4 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1989	2011	-7.848 -5.012 40.834 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat4 TM sensor	Satellite imagery from Landsat4 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1990	2011	-9.482 -6.606 40.812 42.727	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat4 TM sensor	Satellite imagery from Landsat4 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1991	2011	-7.939 -5.110 40.854 42.745	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX II		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1984	2011	-7.807 -4.968 40.831 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1987	2011	-9.379 -6.508 40.796 42.720	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1987	2011	-9.306 -6.435 40.782 42.706	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1987	2011	-7.756 -4.921 40.820 42.722	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1990	2011	-7.858 -5.015 40.834 42.739	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2010	-7.917 -4.948 40.848 42.764	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2011	-9.508 -6.606 40.809 42.738	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2010	-7.826 -4.851 40.812 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-9.405 -6.497 40.793 42.725	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-7.841 -4.965 40.812 42.717	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-9.401 -6.497 40.793 42.722	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-9.416 -6.519 40.790 42.722	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2010	-7.826 -4.855 40.812 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2010	-7.983 -5.011 40.833 42.751	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2010	-7.833 -4.865 40.823 42.741	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-9.427 -6.530 40.790 42.719	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-7.833 -4.957 40.826 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-9.416 -6.490 40.793 42.719	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-7.833 -4.935 40.823 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-9.427 -6.497 40.785 42.714	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2007	2011	-9.438 -6.511 40.796 42.725	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2010	-7.826 -4.837 40.807 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-9.423 -6.500 40.790 42.725	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-7.840 -4.942 40.826 42.733	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-7.844 -4.946 40.823 42.731	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2010	-7.848 -4.851 40.807 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2009	2011	-9.434 -6.511 40.798 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2010	-9.456 -6.427 40.785 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2011	-7.866 -4.979 40.829 42.734	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2011	-7.862 -4.968 40.826 42.731	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2011	-7.870 -4.968 40.821 42.728	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2010	2011	-9.453 -6.518 40.798 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat5 TM sensor	Satellite imagery from Landsat5 TM sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2011	2011	-7.851 4.957 40.831 42.733	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1999	2010	-7.833 -4.994 40.754 42.736	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1999	2010	-7.833 -4.873 40.818 42.736	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	1999	2011	-9.431 -6.533 40.801 42.736	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-9.456 -6.562 40.801 42.733	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-7.899 -5.033 40.826 42.739	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-7.862 -5.004 40.829 42.742	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-9.478 -6.581 40.795 42.733	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2000	2011	-7.880 -5.022 40.824 42.739	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2010	-7.858 -4.894 40.810 42.739	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2011	-9.478 -6.588 40.801 42.741	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2011	-7.873 -5.015 40.829 42.744	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2011	-7.888 -5.022 40.821 42.739	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2001	2011	-9.478 -6.581 40.790 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2010	-9.468 -6.466 40.793 42.752	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2011	-7.873 -5.007 40.832 42.750	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX II		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2002	2011	-9.493 -6.595 40.784 42.730	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path204;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-9.420 -6.518 40.798 42.744	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
		EO data from Landsat7 ETM+ sensor	Satellite imagery from Landsat7 ETM+ sensor. Path203;Row031; Product type L1T (Precision and Terrain correction)	Imagery / Base Maps / Earth Cover	30m	-	2003	2011	-7.858 -4.996 40.826 42.750	GTiff - TIFF / BigTIFF / GeoTIFF (.tif)	U.S. Geological Survey	available to use without licensing	WGS 84 / UTM zone 29N
	04	Geology	Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.										
		Geology	Geology map for the PNPG local civil parishes. Information from the National Institute of Engineering, Technology and Innovation, I.P. (INETI).	Geoscientific Information	-	50k	1973 - 1978	-	-	ESRI Shapefile	INETI	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Geology	Geological map for the north region of Portugal. Information from the National Institute of Engineering, Technology and Innovation, I.P. (INETI).	Geoscientific Information	-	500k	-	2005	-	ESRI Shapefile	SGP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Geology fractures	Geology fractures map for the north region of Portugal. Information from the National Institute of Engineering, Technology and Innovation, I.P. (INETI).	Geoscientific Information	-	500k	-	2005	-	ESRI Shapefile	SGP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Geomorphological data for the Melgaço municipality	Geomorphology, soil type/characteristics/apptitude/use for the municipality of Melgaço.	Geoscientific Information	-	25k	2010	-	182689.510000 204171.069972 550476.930224 576089.430067	ESRI Shapefile	ESA-IPVC	-	Lisboa Hayford Gauss (Lisboa IGEOE)
		Geological value maps for the Peneda-Gerês national park (PNPG)	Geological value maps for the Peneda-Gerês national park (PNPG)	Geoscientific Information	-	25k	2008	2008	177990 221590 522545 568231	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
ANNEX III	01	Statistical units	Units for dissemination or use of statistical information.										
		BGRI 2001	Portuguese Basis for Geographic Information Referencing for the north region of Portugal. Information from de Portuguese National Statistical Institute (INE).	Boundaries	-	25k	2001	2001	-	ESRI Shapefile	INE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	02	Buildings	Geographical location of buildings.										
		Buildings	Buildings for the PNPG work area. Information from the oficial National M888 Series of Military Map of Portugal.	Strutcture	-	25k	1996 - 1997	1997	-	ESRI Shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Other buildings	Other buildings for the PNPG work area. Information from the oficial National M888 Series of Military Map of Portugal (churches, chapels, mills, ruins, etc.).	Strutcture	-	25k	1996 - 1997	1997	-	ESRI Shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Buildings and interest points for the Melgaço municipality	Contains information regarding buildings and interest points, namely: lodging sites, hotels, touristic infrastrctures, culture and local heritage, commerce, religious sites, leisure and other infrastructures.	Strutcture	-	10k	2010	2010	-16963.428100 1439.266400 275843.140900 253562.140800	ESRI Shapefile	ESA-IPVC	-	Lisboa Hayford Gauss (Lisboa IPCC)
		Heritage value maps for the Peneda-Gerês National Park (PNPG)	Heritage value maps for the Peneda-Gerês National Park (PNPG)	Strutcture	-	25k	2008	2008	177990 221590 522545 568231	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.										
		Soil map of the northern part of mainland Portugal	Soils map for the PNPG limit. Information from the regional Directorate for Agriculture of Entre Douro e Minho (DRAEDM), discribing factores like: pedology, main soils, litology, geomorphology, erosion, slopes, soils/agriculture/forest suitability, soils water conditions, soils fertility, relief, terraced places, soils drainage, etc....	Geoscientific Information	-	100k	-	1995	-	ESRI Shapefile	Agroconsultores e Geometral	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Soil map of the northern part of Trás-o-Montes region	Soils map for the PNPG limit included in the Norte Trás-os-Montes region. Information from the University of Trás-os-Montes e Alto-Douro (UTAD).	Geoscientific Information	-	100k	-	2004	-	ESRI Shapefile	UTAD/ex-CNIG/IGP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Soils	Soils map for the PNPG limit. Information from the PNPG.	Geoscientific Information	-	25k	-	1994	-	ESRI Shapefile	PNPG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Soil map	Soil map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Geoscientific Information	-	1000k	-	1971	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Acidity and alkalinity of soil	Acidity and alkalinity of soil for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the acidity and alkalinity of the soil - Classes of pH (in water).	Geoscientific Information	-	1000k	-	1979	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Lithology	Lithology map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Geoscientific Information	-	1000k	-	1982	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).										
		Land use of the northern part of Trás-o-Montes region	Land Use map for the PNPG work area included in the Norte Trás-os-Montes region. Information from the University of Trás-os-Montes e Alto-Douro (UTAD).	Planning / Cadastre	-	100k	-	2004	-	ESRI Shapefile	UTAD/ex-CNIG/IGP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Land use of the northern part of mainland Portugal	Land use map for the PNPG limit. Information from the regional Directorate for Agriculture of Entre Douro e Minho (DRAEDM).	Planning / Cadastre	-	100k	-	1995	-	ESRI Shapefile	Agroconsultores e Geometral	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Capacity of land use	Capacity of land use for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the national capacity of land use.	Planning / Cadastre	-	1000k	-	1980	-	ESRI Shapefile	SROA/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Touristy recourses	Touristy recourses for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency)	Planning / Cadastre	-	1000k	-	1999	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.										
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.										
		Electrical network	Electrical network for the PNPG local civil parishes. Information from the oficial National M888 Series of Military Map of Portugal.	Utilities / Communication	-	25k	1996 - 1997	1997	-	ESRI Shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Electrical network terminals	Electrical network terminals for the PNPG local civil parishes. Information from the oficial National M888 Series of Military Map of Portugal.	Utilities / Communication	-	25k	1996 - 1997	1997	-	ESRI Shapefile	IGEOE	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Hydraulic infrastructure_2008	Hydraulic infrastructure (2008) for the north region of Portugal. Information from the Portuguese National Water Authority (INAG).	Utilities / Communication	-	-	2008	2009	-	ESRI Shapefile	INnterSIG/EDP/INAG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Monitoring stations_2008	Monitoring stations (2008) for the north region of Portugal. Information from the Portuguese National Water Authority (INAG).	Utilities / Communication	-	-	2008	2009	-	ESRI Shapefile	INnterSIG/EDP/INAG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Mini_Hydro_requests	Mini Hydro Requests for the PNPG local civil parishes. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Large_dams	Large dams for the PNPG local civil parishes. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III		Hydroelectric_power_plants_in_operation	Hydroelectric power plants in operation for the PNPG local civil parishes. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Infrastructure of urban waste_Landfill and screening stations	Infrastructure of urban waste-Landfill and screening stations for the north region of Portugal. Information from the Portuguese National Regulator of Water Services and Waste (ERSAR 2008), discribing the type of establishments.	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	ERSAR	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Wind turbines park	Wind turbines parks for the north region of Portugal. Information from the Portuguese General Directorate for Energy and Geology (DGEG).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Gas stations	Gas stations for the north region of Portugal. Information from the Portuguese General Directorate for Energy and Geology (DGEG).	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		IA - INSAAR (2007)	IA - INSAAR (2007)National Inventory of Water Supply Systems and Wastewater (INSAAR- 2008) for the north region of Portugal. Information from the Portuguese National Water Authority (INAG), with the information about: Water withdrawals, Elevation stations for water supply, Wastewater elevation stations, Effluent treatment station, Wastewater treatment station, Discharge points, Water Reservoirs_DistributionAdjustmentReserve for fire, Adductors, Water distribution network and Drainage wastewater network.	Utilities / Communication	-	-	2007	2009	-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		IA - INSAAR (2008)	IA - INSAAR (2008)National Inventory of Water Supply Systems and Wastewater (INSAAR- 2008) for the north region of Portugal. Information from the Portuguese National Water Authority (INAG), with the information about: Water withdrawals, Elevation stations for water supply, Wastewater elevation stations, Effluent treatment station, Wastewater treatment station, Discharge points, Water Reservoirs_DistributionAdjustmentReserve for fire, Adductors, Water distribution network and Drainage wastewater network.	Utilities / Communication	-	-	2008	2010	-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		National Electric Network - High voltage	National Electric Network (High voltage) for the north region of Portugal. Information from the Nacional Electric Network (REN), supplemented with the Lines KV, Substations, Supports and Wind turbines park.	Utilities / Communication	-	-	-	-	-	ESRI Shapefile	REN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.										
		Meteorological network	Meteorological network for the north region of Portugal. Portuguese National Water Authority (INAG).	Strutcture	-	50k	-	-	-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Water quality_dry residues	Water quality for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), discribing the levels (mg) of dry residues.	Environment	-	1000k	-	1986	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Chemical status of water quality_sulfatos	Chemical status of water quality for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), discribing the levels (mg) of sulfates.	Environment	-	1000k	-	1986	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Chemical status of water quality_cloretos	Chemical status of water quality for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), discribing the levels (mg) of chlorides.	Environment	-	1000k	-	1986	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Rejected waters	Rejected waters features for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN), discribing parameters like organic matter, nitrogen, chemical oxygen demand, phosphorus, ...	Environment	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Monitoring network surface waters	Monitoring network of surfacewaters for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Monitoring network groundwaters	Monitoring network of groundwaters for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Chemical status of water quality_2008	Chemical status of groundwater quality (2008) for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Environment	-	-	2008	2008	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Chemical status of water quality_2009	Chemical status of groundwater quality (2009) for the north region of Portugal. Information from the Administrative north Hidrographic region, I.P. (ARHN).	Environment	-	-	2009	2009	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Water monitoring network	Water monitoring network map for the north region of Portugal. Information from the Water National Authority (INAG), discribing features like tipology, altitude, dimension, hidrographic regime, temperature, precipitation, ph, ...	Strutcture	-	50k	-	-	-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.										
		Fito pharmaceutical	Fito pharmaceutical establishments for the north region of Portugal. Information from the ION Inventory.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Gas station	Gas station establisments for the north region of Portugal. Information from the ION Inventory.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		SEVESO_Upper level	SEVESO Upper level establishments for the north region of Portugal. Information from the ION Inventory, discribing the level of danger for the stablishments.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		SEVESO_Lower level	SEVESO Lower level stablishments for the north region of Portugal. Information from the ION Inventory, discribing the level of danger for the stablishments.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		SEVESO establishments	SEVESO establishments for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Strutcture	-	1000k	-	2010	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		PCIP_N (1,2,3,4,5,6)	Industries subject to Integrated Pollution Prevention and Control (PCIP) for the north region of Portugal. Information from the ION Inventory, discribing the level of danger for the stablishments.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		UGR_P	Dangerous Waste Management Units (UGR-P) for the north region of Portugal. Information from de ION Inventory.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		UGR_NP	Less Dangerous Waste Management Units (UGR-NP) for the north region of Portugal. Information from de ION Inventory.	Strutcture	-	-	-	-	-	ESRI Shapefile	ARHN	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Agro industries	Agro industries features for the north region of Portugal. Information from the Directorate of regional Agriculture and Fisheries (DRAP)	Strutcture	-	-	-	-	-	ESRI Shapefile	DRAP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Oil press industries	Oil press industries features for the north region of Portugal. Information from the Directorate of regional Agriculture and Fisheries (DRAP)	Strutcture	-	-	-	-	-	ESRI Shapefile	DRAP	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).										

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III		Variation in number of farms (89-99)	Variation in number of farms for the period 1989-1999 for the PNPG local civil parish. Information from the Portuguese General Census of Agriculture (RGA/INE).	Farming	-	25k	1989 - 1999	-	-	ESRI Shapefile	INE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Tradicional irrigation	Tradicional irrigation areas for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Farming	-	1000k	-	1997	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Irrigation projects in operation	Irrigation projects in operation for the north region of Portugal. Information from the General Directorate for Agriculture and Rural Development (DGADR).	Farming	-	-	-	-	-	ESRI Shapefile	DGADR	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Irrigation projects in potencial operation	Irrigation projects in potencial operation for the north region of Portugal. Information from the General Directorate for Agriculture and Rural Development (DGADR).	Farming	-	-	-	-	-	ESRI Shapefile	DGADR	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Traditional irrigation	Traditional irrigation for the Entre-Douro e Minho region of Portugal. Information from the General Directorate for Agriculture and Rural Development (DGADR).	Farming	-	-	-	-	-	ESRI Shapefile	DGADR	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.										
		Human pressure/impact 1990	Human pressure/impact map for the year 1990 in the PNPG (classes).	Society	5m	-	-	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Human pressure/impact 2000	Human pressure/impact map for the year 2000 in the PNPG (classes).	Society	5m	-	-	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Human pressure/impact change	Human pressure/impact map change between 1990 and 2000 for the PNPG (classes).	Society	5m	-	1990 - 2000	2006	-	ESRI Grid	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Rate of population change_91_01	Rate of population change map (1991-2001) for the north region of Portugal civil parish. Information from the National Statistical Institute (INE).	Society	-	25k	1991 - 2001	-	-	ESRI Shapefile	INE/ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		PNPG_Population_variation(91_01)	Population variation map (1991-2001) for the PNPG local civil parish. Information from the National Statistical Institute (INE).	Society	-	-	1991 - 2001	-	-	ESRI Shapefile	INE/ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		PNPG_Population_density_2001	Rate of population density map for the PNPG local civil parish. Information from the National Statistical Institute (INE).	Society	-	-	2001	-	-	ESRI Shapefile	INE/ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		BGRI 2001	Portuguese Basis for Geographic Information Referencing for the north region of Portugal. Information from the National Statistical Institute (INE)	Society	-	25k	-	2001	-	ESRI Shapefile	INE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	11	Area management/restriction/regulation zones and reporting units	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.										
		Municipal ecological reserve	Municipal ecological reserve, refering to the ecological reserve areas from Ponte da Barca, Arcos de Valdevez and Melgaço municipalities.	Planning / Cadastre	-	10k	-	1994	-	ESRI Shapefile	Municipalities	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Municipal agricultural reserve	Municipal agricultural reserve, refering to the agriculture reserve areas from Ponte da Barca, Arcos de Valdevez and Melgaço municipalities.	Planning / Cadastre	-	10k	-	1994	-	ESRI Shapefile	Municipalities	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Wilderness map and valuation for the Peneda-Gerês National Park (PNPG)	Wilderness map and valuation for the Peneda-Gerês National Park (PNPG)	Planning / Cadastre	-	25k	2008	2008	177990 221590 522545 568231	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		ZIF_2011	Portuguese Forest Area of Intervention (ZIF) for the north region of Portugal, for the year 2011. Information from the National Forest Authority (AFN).	Planning / Cadastre	-	25k	2011	2011	-	ESRI Shapefile	AFN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_POPNPG	Development Plan for Protected Areas (POAP) for the north region of Portugal. Information from the Ministry of Agriculture to Rural Develpment and Fisheries (MADRP), discribing the resources protection zones.	Planning / Cadastre	-	-	-	-	-	ESRI Shapefile	MADRP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Zoning Plan_POPNPG_Prot_Rec_Sist_Nat											
		Zoning Plan_POPN_Douro_Internacional											
		Zoning Plan_PO_PNPG											
		Zoning Plan_PO_Montesinho											
		Zoning Plan_PO_Litoral_Norte											
		Zoning Plan_PO_Alvao											
		PROF_Alto Minho	regional Plans for Forest Management (PROF) for the Alto Minho. Information from the Ministry of Agriculture to Rural Develpment and Fisheries (MADRP).	Planning / Cadastre	-	-	-	-	-	ESRI Shapefile	MADRP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		PROF_Baixo Minho	regional Plan for Forest Management (PROF) for the Baixo Minho. Information from the Ministry of Agriculture to Rural Develpment and Fisheries (MADRP).	Planning / Cadastre	-	-	-	-	-	ESRI Shapefile	MADRP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		PROF_Barroso Padrela	regional Plan for Forest Management (PROF) for the Barroso Padrela. Information from the Ministry of Agriculture to Rural Develpment and Fisheries (MADRP).	Planning / Cadastre	-	-	-	-	-	ESRI Shapefile	MADRP	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Valimar Forest Perimeter	Valimar forest perimeter map for the Lima river valley. Information fron the Municipal Association and ESA-IPVC.	Planning / Cadastre	-	-	-	-	-	ESRI Shapefile	ESA-IPVC	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.										
		Fire risk_2003	Fire risk map for the north region of Portugal, for the year 2003. Information from the Forest National Authority (ANF) discribing the risk of fire.	Geoscientific Information	-	-	2003	-	-	ESRI Shapefile	AFN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Burned areas_90_09	Burned areas for the north region of Portugal for the period 2000-2009. National burned areas cartography from the National Forest Authority (AFN) (by year).	Geoscientific Information	-	-	1990 - 2009	-	-	ESRI Shapefile	AFN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		CRIF2010	Forest Fire Risk map (2010) for the north region of Portugal. Information from the Information Network for Emergency Response (RISE).	Geoscientific Information	25m	-	-	2010	-	ESRI Shapefile	CRISE/ANPC/DGRF/IGEOE/INE	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Seismic intensity (International)	Seismic intensity for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the zones of maximum intensity (international scale) (1901-1972).	Geoscientific Information	-	1000k	1901 - 1972	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Historical seismicity (Mercalli)	Historical seismicity for thr north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the isoseismal lines of intensities by the Modified Mercalli scale - 1956.	Geoscientific Information	-	1000k	-	1996	-	ESRI Shapefile	IM	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.										

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
		Bioclimatic confort	Bioclimatic confort map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the mean values (January, April, July e October) for the period 1961–1990.	Climatology / Meteorology / Atmosphere	-	1000k	-	1992	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
ANNEX III	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.										
		Precipitation	Precipitation map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the Mean Anual Values (days) for the period 1931-1960.	Climatology / Meteorology / Atmosphere	-	100k	-	1995	-	ESRI Shapefile	Agroconsultores e Geometral	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Precipitation_total	Precipitation map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the annual mean values (mm) for the period 1931-1960.	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Precipitation erosivity	Precipitation erosivity map for the north Regin of Portugal.	Climatology / Meteorology / Atmosphere	-	50k	-	-	-	ESRI Shapefile	INAG	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Temperature	Temperature map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the average daily air (degrees centigrade) (1931-1960).	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Solar Radiation	Solar Radiation map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the mean anual values (kcal/cm2) for the period 1938-1970.	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Insolation	Insolation map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), describing the average annual values (hours) (1931-1960).	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Evapotranspiration	Evapotranspiration map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), describing the amount of water returned to the atmosphere (mm).	Climatology / Meteorology / Atmosphere	-	1000k	-	1974	-	ESRI Shapefile	IST/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Relative humidity	Relative humidity map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency), describing the relative humidity at 9 T.M.G. - Annual Average Values (%) Period 1931-1960.	Climatology / Meteorology / Atmosphere	-	1000k	1931 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Frost	Frost area map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the number of days in year (1941-1960).	Climatology / Meteorology / Atmosphere	-	1000k	1941 - 1960	1974	-	ESRI Shapefile	SMN/DGRF	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Frost Farm	Frost Farm area map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the dAnnual Mean Values (months) in the agricultural year (October to September), Years 1941-1960.	Climatology / Meteorology / Atmosphere	-	1000k	1941 - 1960	1974	-	ESRI Shapefile	SMN/DGRF/IH	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Climatic Data	Climatic data for the portuguese metheorological network including a time series of temperature and precipitation from 1988 to 2007	Climatology / Meteorology / Atmosphere	1000m	-	1988 - 2007	-	-	ESRI Shapefile	IM	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Climatic and bioclimatic variables from WorldClim for the NUTS II north (PT11) /SIMBioN region	Climatic, bioclimatic and principal components of WorldClim variables resampled and reprojected (ED50/UTM29N) from the WorldClim dataset	Climatology / Meteorology / Atmosphere	1000m	-	1950 - 2000	2005	512000 733000 4665000 4513000	AAIGrid - Arc/Info ASCII Grid	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	ED50 / UTM zone 29N
		Digital Climatic Atlas of Peninsula Iberica	Digital Climatic Atlas of Peninsula Iberica	Climatology / Meteorology / Atmosphere	200m	-	-	2005	-	Idrisi Raster (RST)	Miguel Ninyerola; Xavier Pons; Joan M. Roure	available to use without licensing	WGS84
		Water flows	Water flows for the north region of Portugal. Information from the Portuguese Atlas of the Environment (APA), describing the amount of water in the river system (mm).	Climatology / Meteorology / Atmosphere	-	1000k	-	1974	-	ESRI shapefile	IST/DGRF	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).										
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.										
	17	Bio-geographical regions	Areas of relatively homogeneous ecological conditions with common characteristics.										
		Landscape units	Landscape units for thr north region of Portugal. Information from the University of Évora.	Biota	-	25k	-	-	-	ESRI shapefile	University of Évora	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Phytogeographic Zones	Phytogeographic Zones for the north region of Portugal. Information from the Portuguese Atlas of the Environment (APA).	Biota	-	1000k	1994	-	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Landscape units	Landscape units for the north region of Portugal. Information from the Portuguese Atlas of the Environment (APA).	Biota	-	1000k	1984	-	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Natural regions	Natural regions for the north region of Portugal. Information from the Portuguese Atlas of the Environment (APA).	Biota	-	1000k	1984	-	-	ESRI shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		EU27 Biogeographical regions	-	Biota	-	-	-	-	-	ESRI shapefile	EEA	available to use without licensing	ETRS89 LAEA
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.										
		Biotopes CORINE	Biotopes CORINE for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency) describing the Protected areas, ZPE and Biotopes.	Biota	-	1000k	-	1991	-	ESRI Shapefile	AA/DGRN	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Habitat types and mosaics for the Peneda-Gerês national park (PNPG)	Habitat types and mosaics for the Peneda-Gerês National Park (PNPG)	Biota	2m	-	2008	2008	177990 221590 522545 568231	GeoTIFF (TIF)	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Habitat types for the Minho valley	Contains hatitat types for classified areas within the Minho valley region	Biota	-	25k	2007	2007	-13255.184461 4168.922827 250477.093078 268144.814555 | | - 54121.551024 -5293.808243 249791.266893 276089.579481	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	Datum 73 Hayford Gauss (Lisboa IPCC)
		Natura 2000 habitats from ICNB datasets for mainland Portugal	Habitats from Natura 2000 ICNB datasets represented in polygon or line geometry for mainland Portugal	Biota	-	25k	2000 - 2005	2010	105730 343453 3516 556949	ESRI Shapefile	ICNB	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Natura 2000 habitats from ICNB datasets for Peneda-Gerês National Park (PNPG)	Natura 2000 habitats from ICNB datasets for Peneda-Gerês National Park (PNPG) including patchy, peatlands and riparian habitats	Biota	-	25k	2000 - 2005	2010	178577 229224 521034 567907	ESRI Shapefile	ICNB	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Peatlands for the Peneda-Gerês National Park (PNPG)	Peatlands for the Peneda-Gerês National Park (PNPG)	Biota	-	25k	2008	2008	177990 221590 522545 568231	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Botanical value maps for the Peneda-Gerês National Park (PNPG)	Botanical value maps for the Peneda-Gerês National Park (PNPG)	Biota	-	25k	2008	2008	177990 221590 522545 568231	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Fauna valuation maps for the Peneda-Gerês National Park (PNPG)	Fauna value maps for the Peneda-Gerês National Park (PNPG)	Biota	-	25k	2008	2008	177990 221590 522545 568232	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III		Habitat 91E0* maxent distribution model	Maxent spatial distribution model for the Natura 2000 91E0* proritary habitat (ash-alder riparian forests) for the SIMBioN / NUTS II north region of mainland Portugal.	Biota	1000m	-	2010	2010	512000 733000 4665000 4513000	AAIGrid - Arc/Info ASCII Grid	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	ED50 / UTM zone 29N
		Habitats from Natura 2000 ICN datasets reported to UTM 1/10 km grids	Habitats from Natura 2000 ICN datasets reported to UTM 1/10 km grids	Biota	1000m	-	2010	2010	-	MS Excel 2007 (xls)	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	ED50 / UTM zone 29N
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.										
		Phytosociological associations / vegetation types distribution	Phytosociological associations from João Honrado's PhD thesis. Data covers mainland Portugal specially the Peneda-Gerês national park. Environmental conditions regarding geology, soils, slope, solar orientation and other informations were also collected at each site. Geographical references use the ED50/UTM29N 1km grid with MGRS codes.	Biota	1000m	-	1998 - 2006	2010	480000 673000 4097000 4666000	MS Excel 2010 (xlsx) - ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	ED50 / UTM zone 29N
		Bat species records / distribution data	Bats species chorological records / distribution data	Biota	1000m	-	1873 - 2009	2010	-	MS Excel 2007 (xls)	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	WGS 84
		Bat species richness	Modelled (maxent) bat species richness for the SIMBioN/NUTS II north region of mainland Portugal.	Biota	0,002778°	-	2010	2010	-8.881944 -6.187500 40.740278 42.156945	ESRI Grid	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	WGS 84
		Bird species distribution for the NUTS II north (PT11) /SIMBioN region	Bird spatial distribution data for the NUTS II north / SIMBioN region. Recording conditions are mentioned as metadata.	Biota	10000m	-	2010	2010	512000 733000 4665000 4513000	MS Excel 2007 (xls) - ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	ED50 / UTM zone 29N
		Bryophyte species distribution data	Bryophyte species distribution data reported at 1/10 km ED50/UTM grids.	Biota	1000m	-	2000 - 2010	2010	-	MS Excel 2007 (xls)	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	need to request licensing	ED50 / UTM zone 29N
		Fauna distribution data - Minho	Fauna distribution data for the Minho valley. The dataset contains several prioritary species concerning the habitats and birds directive.	Biota	-	25k	2007	2007	-17306.891259 4174.812028 250475.292850 276087.857048	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	Datum 73 Hayford Gauss (IPCC)
		Fish species distribution data	Fish species/ ichtyofauna distribution data from the Article 17 Habitats directive dataset reported at 1/10 km ED50/UTM grids.	Biota	1000m	-	2000 - 2010	2010	-	MS Excel 2007 (xls)	ICNB	need to request licensing	ED50 / UTM zone 29N
		Flora distribution data - Minho	Flora distribution data for the Minho valley. The dataset contains several prioritary species concerning the habitats and birds directive.	Biota	-	25k	2007	2007	-17306.891259 4174.812028 250475.292850 276087.857048	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	Datum 73 Hayford Gauss (IPCC)
		Geomalacus maculosus species distribution data	Geomalacus maculosus species distribution data for the NUTS II north / SIMBion region of mainland Portugal	Biota	5m	-	2010	2010	523541 681661 4527099 4642479	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	WGS 84 / UTM zone 29N
		Invertebrate species distribution data	Invertebrate species distribution data from the Article 17 Habitats directive dataset reported at 1/10 km ED50/UTM grids.	Biota	1000m	-	2000 - 2010	2010	-	MS Excel 2007 (xls)	ICNB	need to request licensing	ED50 / UTM zone 29N
		Invertebrate species distribution data I	Invertebrate species distribution data from UTAD - SIMBioN data collection task	Biota	5m	-	2010	2010	504547 662402 4376788 4592240	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	WGS 84 / UTM zone 29N
		Mammalian species distribution data	Mammalian species distribution data from the Article 17 Habitats directive dataset reported at 1/10 km ED50/UTM grids.	Biota	1000m	-	2000 - 2010	2010	-	MS Excel 2007 (xls)	ICNB	need to request licensing	ED50 / UTM zone 29N
		Micromammals distribution data - 2010 SIMBioN campaign	Micromammals distribution data recorded in the 2010 SIMBioN campaign coordinated by UTAD	Biota	5m	-	2010	2010	590125 705592 4560125 4634018	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	WGS 84 / UTM zone 29N
		Odonata species distribution data - 2010 SIMBioN campaign	Odonata species distribution data recorded/collected in the 2010 SIMBioN campaign coordinated by UTAD. Records are reported at 10km ED50/UTM grid.	Biota	5m	-	2010	2010	127737 367788 417378 578815	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGeoE)
		Plant species records / distribution data for mainland Portugal	Plant species chorological records / distribution data. A large array of plant families, rarity and conservation status are included in this dataset. Distribution data focuses is on the northern region of mainland Portugal. Data compilation was initiated under the SIMBioN project.	Biota	1000m	-	2000 - 2010	2010	-	MS Excel 2007 (xls)	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	WGS 84
		Plant species records / distribution data for mainland Portugal from phytosociological inventories	Plant species records / distribution data for mainland Portugal from phytosociological inventories gathered from João Honrado's PhD thesis. Data covers mainland Portugal specially the Peneda-Gerês national park. Each species is given abundance/dominance code for the inventory to which refers to. Geographical references use the ED50/UTM29N 1km grid with MGRS codes.	Biota	1000m	-	1998 - 2006	2010	480000 673000 4097000 4666000	MS Excel 2010 (xlsx) - ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	available to use without licensing	ED50 / UTM zone 29N
		Reptile and amphibian atlas for mainland Portugal	Reptile species distribution data from the "Atlas de répteis e anfíbios" reported at 1/10 km grid	Biota	1000m	-	2000 - 2010	2010	-	MS Excel 2010 (xlsx)	ICNB	need to request licensing	ED50 / UTM zone 29N
		Rupiculous bird species for the NUTS II north (PT11) /SIMBioN region	Rupiculous birds distribution data for the NUTS II north / SIMBioN region.	Biota	1000m	-	2010	2010	592753 702345 4562659 4648153	ESRI Shapefile	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	WGS 84 / UTM zone 29N
		Trees and shrubs distribution data	This dataset contains trees and shrubs distribution data compiled from the Porto Herbarium	Biota	10000m	-	1853 - 2004	2007	-31.27 -6.19 30.14 42.15	MS Excel 2007 (xls)	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	ED50 / UTM zone 29N
		Veronica micrantha maxent distribution model	Maxent spatial distribution model for the rare plant species Veronica micrantha for the SIMBioN / NUTS II north region of mainland Portugal.	Biota	1000m	-	2010	2010	512000 733000 4665000 4513000	-	Centro de Investigação em Biodiversidade e Recursos Genéticos - CIBIO	-	ED50 / UTM zone 29N
		Notable trees	Notable trees for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Biota	-	1000k	-	1997	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Bats-other shelters	Species distribution for the north region of Portugal. Information from de ICNB	Biota	-	1000k	-	-	-	ESRI Shapefile	ICNB	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Bats-important shelters								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Raptors-sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Raptors-high sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Esteparias-high sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Other species-sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
		Other species-high sensitive								ESRI Shapefile			Lisboa Hayford Gauss (Lisboa IGEOE)
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.										
		Thermal recourses	Thermal recourses for the north region of Portugal. Information from the General Directorate for Energy and Geology (DGEG).	Economy	-	1000k	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.										
		Water resources	Water resources map for the north region of Portugal. Information from the Portuguese Atlas of the Environment (Portuguese Environment Agency).	Economy	-	1000k	-	1991	-	ESRI Shapefile	Atlas do Ambiente/APA	available to use without licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Mineral Concessions	Water concessions for the north region of Portugal. Information from the General Directorate for Energy and Geology (DGEG).	Economy	-	-	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)
		Water Concessions	Water concessions for the north region of Portugal. Information from the General Directorate for Energy and Geology (DGEG).	Economy	-	-	-	-	-	ESRI Shapefile	DGEG	need to request licensing	Lisboa Hayford Gauss (Lisboa IGEOE)

United Kingdom

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I	01	Coordinate reference systems	Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.										
	02	Geographical grid systems	Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.										
		100km grid	100 km grid squares.	-	100000m	-	-	2002	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		10km grid	10km grid squares.	-	10000m	-	-	2002	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		10km grid - GB	10 km grid for the whole of Great Britain	-	10000m	-	-	2005	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		1km grid	1 km grid squares.	-	1000m	-	-	2002	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		20km grid	20km grid squares.	-	20000m	-	-	2002	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		5km Grid	5Km Grid squares.	-	5000m	-	-	2002	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
	03	Geographical names	Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.										
	04	Administrative units	Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.										
		Forestry Commission Land	Forestry Commission Estates and Land Holdings	Boundaries	-	2,5k	-	2007	-6, 53.5 -2.5,51.0	MapInfo .TAB	FC Wales	need to request licensing	OSGB
		OS VM Admin Boundary	OS Vector Map District -Administrattive Boundaries	Boundaries	-	50k	-	2010	-	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS Unitary Authorities	Ordnance Survey Local authorities to low water.	Boundaries	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
	05	Addresses	Location of properties based on address identifiers, usually by road name, house number, postal code.										
		Post code full	Full post codes.	Boundaries	-	10k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Landmark	need to request licensing	OSGB
		OS Community Councils	Community boundaries to low water.	Boundaries	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS Counties	Old County Boundaries for Wales	Boundaries	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OSMM MultiOccupancy Address	Ordnance Survey MasterMap Multi Occupnacty Address Data	Boundaries	-	2,5k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
	06	Cadastral parcels	Areas defined by cadastral registers or equivalent.										
		National Trust Properties	Digital Boundaries of the National Trust Properties in Wales	Boundaries	-	10k	-	2006	-6, 53.5 -2.5,51.0	MapInfo .TAB	National Trust	need to request licensing	OSGB
	07	Transport networks	Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network (1) and future revisions of that Decision.										
		National Trails	National Trails	Transportation	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS VM Railway Point Features	OS Vector Map District - Railway Point Features e.g. Stations	Transportation	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS VM Railway Lines	OS Vector Map District - Railways Linear Features	Transportation	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS VM Roads	OS Vector Map District - Roads	Transportation	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS VM Roads - Point Features	OS Vector Map District - Roads - Interchange etc.	Transportation	-	50k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi A Roads	OS 1:250,000 Strategi vector maping	Transportation	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi B Roads	OS 1:250,000 Strategi vector maping	Transportation	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi C Roads	OS 1:250,000 Strategi vector maping	Transportation	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi Motorway	OS 1:250,000 Strategi vector maping	Transportation	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi Prime roads	OS 1:250,000 Strategi vector maping	Transportation	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi Railways	OS 1:250,000 Strategi vector maping	Transportation	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS 1:250,000 Legend	Legend for OS 1:250,000 RoadMap maps	Transportation	-	250k	-	2002	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS 1:250,000 Raster COLOUR	OS 1:250,000 RoadMap Raster map	Transportation	-	250k	-	2008	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS 1:250,000 Raster GREY	OS 1:250,000 RoadMap Raster map	Transportation	-	250k	-	2008	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
	08	Hydrography	Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (2) and in the form of networks.										
		EA - Welsh Reservoirs	Environment Agency Reservoirs	Inland Waters	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA Bathing Water Quality	Bathing Water Quality (Point data)	Inland Waters	-	50k	-	2001	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA Flood Defences	Flood defences	Inland Waters	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA Main Rivers	Rivers for which EA regulate flooding	Inland Waters	-	10k	-	2001	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA River Habitat Survey	River habitats (point surveys)	Inland Waters	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I		EA River quality biology	River quality biology	Inland Waters	-	250k	-	2004	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA River quality chemistry	River quality chemistry.	Inland Waters	-	250k	-	2004	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA Source protection zones	Areas for which Groundwater Protection zones are in force	Inland Waters	-	50k	-	2000	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA WFD - GES Coastal Water Bodies	Good Ecological Status for Coastal Water Bodies	Inland Waters	-	10k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA WFD - GES Groundwater	Good Ecological Status for Groundwater Water Bodies	Inland Waters	-	10k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA WFD - GES Lakes	Good Ecological Status for Lake Water Bodies	Inland Waters	-	10k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA WFD - GES Rivers	Good Ecological Status for River Water Bodies	Inland Waters	-	10k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA WFD - GES Surface Water Transfer	Good Ecological Status for Surface Water Transfer Water Bodies	Inland Waters	-	10k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		EA WFD - GES Transitional Water Bod	Good Ecological Status for Transitional Water Bodies	Inland Waters	-	10k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	EA	need to request licensing	OSGB
		Lakes (OS 1:50000)	Lakes and large ponds in Wales	Inland Waters	-	50k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		Mean High Water Mark	Mean High Water Mark.	Oceans	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		Mean Low Water Mark	Mean Low Water Mark.	Oceans	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS VM Tidal Water Marks	OS Vector Map District - Tidal Water Marks	Oceans	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		Lowest Astronomical Tide	Lowest Astronomical Tide: created using the Phase 1 Intertidal biotope survey	Oceans	-	2,5k	-	2006	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		OS. Strategi Coast. line	OS 1:250,000 Strategi vector maping	Oceans	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS Foreshore	OS Foreshore	Oceans	-	10k	-		-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi Lakes	OS 1:250,000 Strategi vector maping	Inland Waters	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi Rivers	OS 1:250,000 Strategi vector maping	Inland Waters	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		Dyfi daily flow data	Dyfi Bridge max daily flow data (1/1/79 - 13/3/05)	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
		Dyfi sub-catchment	Dyfi sub-catchments	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
		Dyfi catchment boundary	Dyfi catchment area	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
		Dyfi channel and ERS maps	River channel and ERS change maps for the Dyfi	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
		Hydrochemistry monitoring coordinates	Hydrochemistry	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		CF Historic habitats	Habitat type	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
		CF Historic rivers	River names	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
	09	Protected sites	Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.										
		BAP Areas	Created from OS UA boundaries and National Parks	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		RSPB Important Bird Areas	UK and Isle of Man Important Bird Areas (IBAs)	Environment	-	50k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	RSPB	need to request licensing	OSGB
		RSPB reserves	Land holdings (leased and owned) of the RSPB.	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	RSPB	need to request licensing	OSGB
		Sites (AONB)	Areas of Outstanding Natural Beauty	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (Biogenetic)	Biogenetic Reserve	Environment	-	2,5k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (Biosphere)	Biosphere Reserve	Environment	-	50k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (Country Parks)	Country Park boundaries. Data from Local authority.	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (Heritage Coast)	Heritage Coast	Environment	-	2,5k	-	1996	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (LNR)	Local Nature Reserves	Environment	-	2,5k	-	2007	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (MNR)	Marine Nature Reserves	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (National Parks)	National Parks	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	National Park Authorities	need to request licensing	OSGB
		Sites (NNR declar)	NNRs showing their different declarations.	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	GIU	need to request licensing	OSGB
		Sites (NNR Final Bounds)	Final Boundaries of National Nature Reserves.	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (Ramsar)	Ramsar boundaries	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (SAC)	pSAC and Csac Boundaries	Environment	-	2,5k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (Spa)	Special Protected Area Boundaries	Environment	-	2,5k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (SSSI)	SSSI notified under the 1981 WAC Act.	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Sites (Unitisation)	Unitisation Boundaries for CCW Protected Sites	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		South West Wales WT	South and West Wales Wildlife Trust Reserves	Environment	-	2,5k	-	2007	-6, 53.5 -2.5,51.0	MapInfo .TAB	SWW WT	need to request licensing	OSGB
		SSSI Qualifying features	SSSI Qualifying features as identified during the recent (2008-2010) ISIS Features Database populating exercise.	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Woodland Trust sites	All Woodland Trust acquisition boundaries as shown on the Land Registry Certificates	Environment	-	2,5k	-	2000	-6, 53.5 -2.5,51.0	MapInfo .TAB	Woodland Trust	need to request licensing	OSGB

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX I		Aber Dyfi SPA	SPA area	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
		Dyfi &Cors Fochno Ramsar Site	Ramsar Site area	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Dyfi Biosphere Reserve	Core, intermediate and transition Biosphere areas	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Dyfi NNR	NNR areas	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Dyfi pSAC	pSAC area	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Dyfi SSSI	SSSI area	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Priority areas	priority areas A, B and C	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
ANNEX II	01	Elevation	Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.										
		Contours 5m SN	5 meter contours for 100km square SN	Elevation	-	10k	-	2008	-6, 53.5 -2.5,51.0	MapInfo .TAB	Nextmap	need to request licensing	OSGB
		OS VM Spot Heights	OS Vector Map District - Spot Heights and Height Features	Elevation	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OSMM Topographic Area	OS Mastermap Topographic Area	Elevation	-	2,5k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OSMM Topographic Line	Ordnance Survey Mastermap Black & White Topographic Line	Elevation	-	2,5k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OSMM Topographic Symbols	Ordnance Survey MasterMapTopographic Points f	Elevation	-	2,5k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		Spot heights	Heights placed at the top of hills, in depressions and at cols and on saddles.	Elevation	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Nextmap	need to request licensing	OSGB
		Dyfi valley floor LiDAR	Valley floor LiDAR for the Dyfi	Imagery / Base Maps / Earth Cover	-	-	-	-	-4.0,52.8 -3.505,52.431	ESRI Grid	Aberystwyth University	need to request licensing	OSGB
	02	Land cover	Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.										
		Ancient Woodland (points)	Point data taken from woodland inventory 1999	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Ancinent woodland (polys)	Ancient Woodland Polygons, digitised to 1:10,000 scale.	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW/FC	need to request licensing	OSGB
		Land Cover 2000	Land use data for Wales in vector format derived from 25m remotely sensed data (Release 1 , Level 3).	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CEH	need to request licensing	OSGB
		Lowland Heathland Inventory	Final Lowland Heathland Inventory	Environment	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	CCW	need to request licensing	OSGB
		Public Forests	Public forests	Environment	-	2,5k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	ARCG	need to request licensing	OSGB
		LPIS field boundaries	Digitised field boundaries for Single Payment Sceheme	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
		LPIS Declared Crop Type	Crop Types as declared by claiming farmers - links to LPIS field boundaries via UID.	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
		NSRI NATMAP Vector	Soils data and associations	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
		Provisional Agricultural Land Classification	ALC grade land	Environment	-	250k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
		Welsh Ag Stats Small areas statistics	Land use/farm information (info on fram type and general land cover descriptions)	Environment	***Not great spatial resolution***	***Not great spatial resolution***	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
		Tir Gofal Land Management Layer	Ground truthed habitat type from Tir Gofal Agri Environment Scheme	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
		Environmentally Sensitive Areas Land cover layer	Ground truthed habitat type from ESA Agri Environment Scheme	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
	03	Orthoimagery	Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.										
		Air photo coverage 2003	Extents of updates to digital rectified aerial images for Wales flown by Getmapping plc in 2003.	Imagery / Base Maps / Earth Cover	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Getmapping plc	need to request licensing	OSGB
		Air photo coverage 2005	Extents of updates to digital rectified aerial images for Wales flown by Getmapping plc in 2005.	Imagery / Base Maps / Earth Cover	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Getmapping	need to request licensing	OSGB
		Air photo coverage 2007 to 09	Extents of updates to digital rectified aerial images for Wales supplied by Infoterra in 2007 to 2009.	Imagery / Base Maps / Earth Cover	-	10k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Infoterra	need to request licensing	OSGB
		Air photo index 2001 GM	Flight diagram showing the center points of all the digital rectified aerial images for the whole of Wales, flown by Getmapping plc in 2000 and 2001.	Imagery / Base Maps / Earth Cover	-	10k	-	2002	-6, 53.5 -2.5,51.0	MapInfo .TAB	Getmapping plc	need to request licensing	OSGB
		Air photo index 2003 GM	Flight diagram showing the center points of all the digital rectified aerial images, flown by Getmapping plc for the 2003 update.	Imagery / Base Maps / Earth Cover	-	10k	-	2003	-6, 53.5 -2.5,51.0	MapInfo .TAB	Getmapping plc	need to request licensing	OSGB
		Air photo index 2006 COWI	Metadata for the COWI-Vexcel 2006 aerial imagery	Imagery / Base Maps / Earth Cover	-	2,5k	-	2007	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
		Air photo index 2009	Flight diagram showing the center points of all the digital rectified aerial images, flown by Infoterra 2009.	Imagery / Base Maps / Earth Cover	-	10k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Infoterra	need to request licensing	OSGB
		Air photo index paper 1991-2002	Center point of each paper air photo, taken from 1991 to 2002.	Imagery / Base Maps / Earth Cover	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	-	need to request licensing	OSGB
		Air photos 2000 SN	Digital rectified aerial images for 100km grid square SN flown by Getmapping plc in 2000 and 2001.	Imagery / Base Maps / Earth Cover	-	10k	-	2001	-6, 53.5 -2.5,51.0	MapInfo .TAB	Getmapping	need to request licensing	OSGB
		Air photos 2003	Updates only to digital rectified aerial images for Wales flown by Getmapping plc in 2003.	Imagery / Base Maps / Earth Cover	-	10k	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Getmapping	need to request licensing	OSGB
		Air photos 2005	Updates only to digital rectified aerial images for Wales flown by Getmapping plc in 2005.	Imagery / Base Maps / Earth Cover	-	10k	-	2005	-6, 53.5 -2.5,51.0	MapInfo .TAB	Getmapping	need to request licensing	OSGB
		Air photos 2006 Cowi-Vexcel	COWI - Vexcel Aerial Imagery flown in 2006 at 40cm resolution - supplied by WAG	Imagery / Base Maps / Earth Cover	-	2,5k	-	2007	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB
		Air photos 2007 -9	Updates only to digital rectified aerial images for Wales supplied by Infoterra for 2007 to 2009	Imagery / Base Maps / Earth Cover	-	10k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Infoterra	need to request licensing	OSGB
		Air photos 2009 SN	Digital rectified aerial images for Wales supplied by Infoterra for 2009. For 100 kmsq SN.	Imagery / Base Maps / Earth Cover	-	10k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Infoterra	need to request licensing	OSGB
		Air Photos 2010 SN SO SS ST (update	Digital rectified aerial images for Wales supplied by Infoterra for 2009. For 100 kmsq SN, SO, SS, ST update.	Imagery / Base Maps / Earth Cover	-	10k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Infoterra	need to request licensing	OSGB
		LM22200231975159AAA05	Landsat MSS 2 image of Borth area	Imagery / Base Maps / Earth Cover	100m	-	-	-	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LT52040231984204AAA08	Landsat TM 5 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	1975	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LT52040231989041XXX06	Landsat TM 5 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	1984	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX II		LE72040231999253EDC00	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	1989	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232002085SGS00	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	1999	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232002245EDC00	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2002	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232003296EDC01	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2002	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LT52040232003256MTI01	Landsat TM 5 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2003	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232004059ASN01	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2003	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232004251EDC02	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2004	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232005317EDC00	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2005	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LT52040232006168KIS00	Landsat TM 5 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2006	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232006160EDC00	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2006	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LT52040232006200KIS00	Landsat TM 5 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2006	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232009152ASN00	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2009	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232010107ASN00	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2010	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LE72040232010171ASN00	Landsat ETM 7 image of Borth area	Imagery / Base Maps / Earth Cover	30m	-	-	2010	-	GLOVIS	Aberystwyth University	Available for use without licensing	UTM Zone 30 N
		LiDAR data, Cors Fochno	LiDAR data, Cors Fochno	Imagery / Base Maps / Earth Cover	*<2m*	-	-	2009	-4.05,52.54 -3.975,52.48	GeoTIFF (TIF)	NERC	Available for use without licensing	UTM Zone 30 N
		Hyperspectral (EAGLE HAWK) Cors Fochno	Hyperspectral (EAGLE HAWK) Cors Fochno	Imagery / Base Maps / Earth Cover	*<2m*	-	-	2009	-4.05,52.54 -3.975,52.48	GeoTIFF (TIF)	NERC	Available for use without licensing	UTM Zone 30 N
		Hyperspectral (CASI) Cors Fochno	Hyperspectral (CASI) Cors Fochno	Imagery / Base Maps / Earth Cover	*<2m*	-	-	2002	-4.05,52.54 -3.975,52.48	GeoTIFF (TIF)	NERC	Available for use without licensing	UTM Zone 30 N
		Airborne Thematic Mapper (ATM) Cors Fochno	Airborne Thematic Mapper (ATM) Cors Fochno	Imagery / Base Maps / Earth Cover	*<2m*	-	-	2002	-4.05,52.54 -3.975,52.48	GeoTIFF (TIF)	NERC	Available for use without licensing	UTM Zone 30 N
	04	Geology	Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.										
		BGS Geology	British Geological Survey Geology data - DiGMapGB250	Environment	-	250k	-	25-06-1905	-6, 53.5 -2.5,51.0	MapInfo .TAB	British Geological Survey	need to request licensing	OSGB
		Bryophytes	Rare Bryophytess	Environment	-	*1*	-	-	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Dyfi aerial photo	2006 aerial photography of the Dyfi area	Imagery / Base Maps / Earth Cover	-	-	-	-	-4.0,52.8 -3.505,52.431	ESRI Grid	Aberystwyth University	need to request licensing	OSGB
ANNEX III	**01**	Statistical units	Units for dissemination or use of statistical information.										
	02	Buildings	Geographical location of buildings.										
		OS VM Settlement - Linear Features	OS Vector Map District - Settlements - Linear Features	Planning / Cadastre	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS VM Settlement Areas	OS Vector Map Districts - Settlements	Planning / Cadastre	-	50k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi Town & villa	OS 1:250,000 Strategc vector maping	Planning / Cadastre	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi U Auth line	OS 1:250,000 Strategi vector maping	Planning / Cadastre	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
		OS. Strategi Urban areas	OS 1:250,000 Strategi vector maping	Planning / Cadastre	-	250k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
	03	Soil	Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.										
		Soil sample coordinates	Soil sample id and description	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Soil transect coordinates	Soil transect no. and drawings	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Soil transect lines	Photo label and photo paths	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Organic soil Dyfi	Soil type for whole area	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
		Partial soil map	Soil type part of area	Environment	-	-	-	-	-4.0,52.8 -3.505,52.431	MapInfo .TAB	CCW	need to request licensing	OSGB
	04	Land use	Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).										
	05	Human health and safety	Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.										
	06	Utility and governmental services	Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.										
	07	Environmental monitoring facilities	Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.										
		Welsh Agri Environment Monitoring Stream and Pond Monitoring Data	Points where WAES monitoring has taken place. Links to site specific information relating to the sample	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG	need to request licensing	OSGB

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
		Cors Fochno map of permanent plots	Map of plots of fixed quadrats for Cors Fochno	Environment	-	-	-	2008 - 2009	-4.05,52.54 -3.975,52.48	MapInfo .TAB	CCW	need to request licensing	OSGB
		Cors Fochno Active Bog plot data	Active bog condition with species coverage scores	Environment	-	-	-	2008 - 2009	-4.05,52.54 -3.975,52.48	Excel	CCW	need to request licensing	OSGB
		Cors Fochno Degraded Bog Plot data	Degraded bog - species coverage scores	Environment	-	-	-	2008 - 2009	-4.05,52.54 -3.975,52.48	Excel	CCW	need to request licensing	OSGB
		Cors Fochno Rhynchosporion monitoring data	Rhynchosporion area bog condition scores with species	Environment	-	-	-	2008 - 2009	-4.05,52.54 -3.975,52.48	Excel	CCW	need to request licensing	OSGB
	08	Production and industrial facilities	Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.										
	09	Agricultural and aquaculture facilities	Farming equipment and production facilities (including irrigation systems, greenhouses and stables).										
	10	Population distribution — demography	Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.										
	11	Area management/restriction/regulation zones and reporting units	Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.										
		CADW - World Heritage Sites	World Heritage Sites in Wales	Environment	-	10k	-	2009	-6, 53.5 -2.5,51.0	MapInfo .TAB	CADW	need to request licensing	OSGB
		Common Land (CROW Act)	Open access mapping	Environment	-	2,5k	-	2001	-6, 53.5 -2.5,51.0	MapInfo .TAB	Commons Registration Authorities	need to request licensing	OSGB
		LPIS Farm Boundary	Whole Farm Boundary	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG - DEPC	need to request licensing	OSGB
		LPIS Field Information	LPIS Fields with Agricultural / Crop Information	Environment	-	2,5k	-	2010	-6, 53.5 -2.5,51.0	MapInfo .TAB	WAG - DEPC	need to request licensing	OSGB
		Common land	Commonland names	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
	12	Natural risk zones	Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.										
	13	Atmospheric conditions	Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.										
ANNEX III	14	Meteorological geographical features	Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.										
	15	Oceanographic geographical features	Physical conditions of oceans (currents, salinity, wave heights, etc.).										
	16	Sea regions	Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.										
		OS Historic 1:10,000 Raster	Old Black and white 1:10,000 raster data.	Environment	-	10k	-	1997	-6, 53.5 -2.5,51.0	MapInfo .TAB	Ordnance Survey	need to request licensing	OSGB
	17	Bio-geographical regions	Areas of relatively homogeneous ecological conditions with common characteristics.										
	18	Habitats and biotopes	Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.										
		Grazing Marsh (sites)	Grazing Marsh and Floodplain Grasslands for Wales -	Environment	-	10k	-	1998	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Grassland boundary	Phase 2 survey site boundaries. Recorded during the Phase II Lowland Grassland Survey of Wales (1987-2004).	Environment	-	2,5k	-	2004	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Grassland mospolys	Recorded during the Phase II Lowland Grassland Survey of Wales (1987-2004).	Environment	-	2,5k	-	2004	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Grassland photo	Photo locations recorded during the Phase II Lowland Grassland Survey of Wales (1987-2004).	Environment	-	2,5k	-	2004	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Grassland quadrat	Quadrat locations recorded during the Phase II Lowland Grassland Survey of Wales (1987-2004).	Environment	-	2,5k	-	2004	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Grassland target	Target notes recorded during the Phase II Lowland Grassland Survey of Wales (1987-2004).	Environment	-	2,5k	-	2004	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Grassland vegetation	Vegetation types recorded during the Phase II Lowland Grassland Survey of Wales (1987-2004).	Environment	-	2,5k	-	2004	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Lowland Heathland	Lowland Heathland Dataset	Environment	-	10k	-	2010	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Lowland Peat Boundary	Lowland peat boundary	Environment	-	2,5k	-	-	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Lowland Peat Mosaic Polys	Lowland peat mosaic (polygon)	Environment	-	2,5k	-	-	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Lowland Peat Photos	Lowland peat photographs	Environment	-	2,5k	-	-	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Lowland Peat Quadrats	Lowland peat (quadrats)	Environment	-	2,5k	-	-	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Lowland Peat Target Notes	Lowland peat (target notes)	Environment	-	2,5k	-	-	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Lowland Peat Vegetation	Lowland peat vegetation	Environment	-	2,5k	-	-	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 2 Saltmarsh Photo points	GIS layer containing point vector data representing photo point locations of Phase 2 (NVC) Saltmarsh Survey data.	Environment	-	2,5k	-	1996	-	MapInfo .TAB	CCW/ MHWESG	need to request licensing	OSGB

		Resource title	Resource abstract	Topic category	Resolution	Spatial scale	Temporal extend	Date of publication	Geographic bounding box	File type	Author	Property	Spatial Reference System
ANNEX III		Phase 2 Saltmarsh Quadrats	GIS layer containing point vector data representing quadrat locations of Phase 2 (NVC) Saltmarsh Survey data.	Environment	-	2,5k	-	1996	-	MapInfo .TAB	CCW/ MHWESG	need to request licensing	OSGB
		Phase 2 Saltmarsh Sites	GIS layer containing vector polygon data representing survey site boundaries of Phase 2 (NVC) Saltmarsh Survey data.	Environment	-	2,5k	-	1996	-	MapInfo .TAB	CCW/ MHWESG	need to request licensing	OSGB
		Phase 2 Saltmarsh Surveys	GIS layer containing vector polygon data representing survey boundaries of Phase 2 (NVC) Saltmarsh Survey data.	Environment	-	2,5k	-	1996	-	MapInfo .TAB	CCW/ MHWESG	need to request licensing	OSGB
		Phase 2 Saltmarsh Target Notes	GIS layer containing point vector data representing target note locations of Phase 2 (NVC) Saltmarsh Survey data.	Environment	-	2,5k	-	1996	-	MapInfo .TAB	CCW/ MHWESG	need to request licensing	OSGB
		Phase 2 Saltmarsh Vegetation	GIS layer containing vector polygon data representing vegetation stands of Phase 2 (NVC) Saltmarsh Survey data.	Environment	-	2,5k	-	1996	-	MapInfo .TAB	CCW/ MHWESG	need to request licensing	OSGB
		Phase 2 Woodland Quadrats	GIS layer containing point vector records for quadrats from digitally captured subset of CCW commissioned Phase 2 Woodland Survey data. NVC habitat code recorded at each quadrat is attributed.	Environment	-	10k	-	2000	-	MapInfo .TAB	TSG	need to request licensing	OSGB
		Phase 2 Woodland Sites	GIS layer containing vector polygon data representing survey site boundaries from digitally captured subset of CCW commissioned Phase 2 Woodland Survey data.	Environment	-	1k	-	2000	-	MapInfo .TAB	TSG	need to request licensing	OSGB
		Phase 2 Woodland Surveys	GIS layer containing vector polygon data representing survey boundaries from digitally captured subset of CCW commissioned Phase 2 Woodland Survey data.	Environment	-	10k	-	2000	-	MapInfo .TAB	TSG	need to request licensing	OSGB
		Phase 2 Woodland Vegetation	GIS layer containing vector polygon data representing NVC code of vegetation stands from digitally captured subset of CCW commissioned Phase 2 Woodland Survey data. NVC habitat code recorded at each quadrat is attributed.	Environment	-	10k	-	2000	-	MapInfo .TAB	TSG	need to request licensing	OSGB
		Phase 1 Grazing Marsh	Grazing Marsh and Floodplain Grasslands for Wales - taken from the Inventory and Review of grazing Marsh and floodplain Grasslands	Environment	-	10k	-	1998	-	MapInfo .TAB	CCW survey	need to request licensing	OSGB
		Phase 1 Terrestrial All Wales habitats	Location of different habitats in mixed upland vegetation survey polygons.	Environment	-	10k	-	2003	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 1 Terrestrial All Wales scattered patchy vegetation	Location of patchy scattered vegetation that is not uniformly distributed across polygons.	Environment	-	10k	-	2004	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Phase 1 Terrestrial Phase 1 Target Note Locations	Location of Phase 1 Target Notes.	Environment	-	10k	-	2004	-	MapInfo .TAB	M Jones	need to request licensing	OSGB
		Phase 1 Terr. AllWales.veg	Phase 1 map Version 2 with upland and lowland split.	Environment	-	10k	-	2004	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		National Vegetation Classification (NVC)	Dyfi NVC map	Environment	-	-	-	-	-6, 53.5 -2.5,51.0	MapInfo .TAB	Aberystwyth University	need to request licensing	OSGB
		Cors Fochno NVC	Cors Fochno NVC survey data with habitat classification	Environment	-	-	-	-	-4.05,52.54 -3.975,52.48	MapInfo .TAB	CCW	need to request licensing	OSGB
	19	Species distribution	Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.										
		BAP Invertebrate Species	Point data of key BAP invertebrate species	Environment	-	10k	-	-	-	MapInfo .TAB	Recorder	need to request licensing	OSGB
		BAP marsh fritilary	Point data for marsh fritillary butterflies with latest year recorded and maximum abundance (1990-2002) for adult and larval stages.	Environment	-	10k	-	-	-	MapInfo .TAB	Recorder	need to request licensing	OSGB
		Distribution data for Great Crested Newts	Great Crested Newts	Environment	-	2,5k	-	2007	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		HEP Sensitive Bryophytes & Lichens	Bryophytes and Lichens sensitive to HEP schemes	Environment	-	10k	-	2010	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Distribution data for Lichens	Rare Lichens	Environment	-	*1*	-	2010	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		LRC - Priority and Protected Species	Priority and Protected Species	Environment	-	2,5k	-	2010	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Distribution data for Stoneworts	Rare Stoneworts	Environment	-	10k	-	-	-	MapInfo .TAB	CCW	need to request licensing	OSGB
		Priority and Protected Species	Priority and Protected Species supplied from the LRCs.	Environment	-	10k	-	2010	-	MapInfo .TAB	LRC	need to request licensing	OSGB
	20	Energy resources	Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.										
		Windfarms - All Wales Locations	Locations of all Wind Farms within Wales	Economy	-	50k	-	2008	-	MapInfo .TAB	Sandra Wells	need to request licensing	OSGB
	21	Mineral resources	Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.										
		Mining Sites	Point data of mine sites (metaliferous & non-metaliferous) in Wales.	Economy	-	10k	-	-	-	MapInfo .TAB	-	need to request licensing	OSGB

Appendix IV

INSPIRE Metadata Implementing Rules

INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119

According to Article 5(4) of Directive 2007/2/EC, the INSPIRE Implementing Rules shall take account of relevant, existing international standards and user requirements. In the context of metadata for spatial data and spatial data services, the standards EN ISO 19115, EN ISO 19119, and ISO 15836 (Dublin Core) have been identified as important standards
Commission Regulation (EC) No. 1205/2008 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata was adopted on of 3rd December 2008, and published on the Official Journal of the European Union on 4th December (OJ L 326, 4.12.2008, p. 12–30). Any reference in this document to "Implementing
Rules for Metadata" refers to the above mentioned Regulation.
The aim of this document is to define how the Regulation can be implemented using EN ISO 19115 and EN ISO 19119. The following subsections describe for each element of the Regulation its relation with the mentioned European standards.

INSPIRE profile of ISO 19115 and ISO 19119

ISO Core Metadata Elements

i) Spatial dataset and spatial dataset series

The table below compares the core requirements of ISO 19115 (see Table 3 in 6.5 of ISO 19115:2003) to the requirements of INSPIRE for spatial dataset and spatial dataset series as defined in the Implementing Rules for metadata.

ISO 19115 Core	INSPIRE	Comments
Dataset title (M)	Part B 1.1 Resource Title	-
Dataset reference date (M)	Part B 5 Temporal Reference	ISO 19115 is more demanding. The metadata shall contain a date of publication, revision or creation of the resource, while in INSPIRE the Temporal Reference can also be expressed through Temporal Extent.
Dataset responsible party (O)	Part B 9 Responsible organisation	INSPIRE is more demanding by mandating both the name of the organisation, and a contact e-mail address
Geographic location of the dataset (C)	Part B 4.1 Geographic Bounding Box	INSPIRE is more restrictive. A Geographic bounding box is mandated
Dataset language (M)	Part B 1.7 Resource Language	ISO 19115 is more demanding. It mandates the dataset language, even if the resource does not include any textual information. The ISO 19115 Dataset language is defaulted to the Metadata language.
Dataset character set (C)	-	ISO 19115 is more demanding. The dataset character set has to be documented in ISO 19115 when ISO 10646-1 is not used.
Dataset topic category (M)	Part B 2.1 Topic Category	-
Spatial resolution of the dataset (O)	Part B 6.2 Spatial Resolution	-
Abstract describing the dataset (M)	Part B 1.2 Resource abstract	-
Distribution format (O)	-	-
Additional extent information for the dataset (vertical and temporal) (O)	Part B 5.1 Temporal extent	INSPIRE is more demanding. A temporal reference is mandated, and can be expressed as a temporal extent.
Spatial representation type (O)	-	-
Reference system (O)	-	-
Lineage (O)	Part B 6.1 Lineage	INSPIRE is more demanding. A general lineage statement is mandated.
On-line resource (O)	Part B 1.4 Resource Locator	-
Metadata file identifier (O)	-	-
Metadata standard name (O)	-	-
Metadata standard version (O)	-	-
Metadata language (C)	Part B 10.3 Metadata Language	INSPIRE is more demanding. The metadata language is mandated even if it is defined by the encoding.
Metadata character set (C)	-	ISO 19115 is more demanding. The metadata character set has to be documented in ISO 19115 when ISO 10646-1 is not used.
Metadata point of contact (M)	Part B 10.1 Metadata point of contact	INSPIRE is more demanding by mandating both the name of the organisation, and a contact e-mail address.
Metadata date stamp (M)	Part B 10.2 Metadata Date	ISO is more restrictive because this element shall contain the "date that the metadata was created" and INSPIRE may contain the "date when the metadata record was created or updated
	Part B 1.3 Resource Type	INSPIRE is more demanding
	Part B 1.5 Unique Resource Identifier	INSPIRE is more demanding
	Part B 3 Keyword	INSPIRE is more demanding
	Part B 7 Conformity	INSPIRE is more demanding
	Part B 8.1 Conditions for access and use	INSPIRE is more demanding
	Part B 8.2 Limitations on public access	INSPIRE is more demanding

ii) Services

The table below compares the core requirements of ISO 19115 (see Table 3 in 6.5 of ISO 19115:2003) to the requirements of INSPIRE for services as defined in the Implementing Rules for metadata. The greyed lines correspond to core metadata elements not applicable to services.

ISO 19115 Core	INSPIRE	Comments
Dataset title (M)	Part B 1.1 Resource Title	-
Dataset reference date (M)	Part B 5 Temporal Reference	ISO 19115 is more demanding. Despite its name, this ISO 19115 Core metadata element applies to services. A reference date of the service (date of publication, revision or creation …) is mandated.
Dataset responsible party (O)	Part B 9 Responsible organisation	-
Geographic location of the dataset (C)	-	See INSPIRE Geographic Bounding Box
-	Part B 4.1 Geographic Bounding Box	The Geographic Bounding Box is handled in ISO 19119 with a different metadata element from the one corresponding to “Geographic location of the dataset”
Dataset language (M)	-	Not applicable to services
Dataset character set (C)	-	Not applicable to services
Dataset topic category (M)	-	Not applicable to services
Spatial resolution of the dataset (O)	Part B 6.2 Spatial Resolution	In the current version of ISO 19119, it is not possible to express the restriction of a service concerning the spatial resolution
Abstract describing the dataset (M)	Part B 1.2 Resource abstract	-
Distribution format (O)	-	-
Additional extent information for the dataset (O)	-	-
Spatial representation type (O)	-	-
Reference system (O)	-	-
Lineage (O)	-	-
On-line resource (O)	Part B 1.4 Resource Locator	-
Metadata file identifier (O)		
Metadata standard name (O)		
Metadata standard version (O)		
Metadata language (C)	Part B 10.3 Metadata Language	INSPIRE is more demanding. The metadata language is mandated.
Metadata character set (C)	-	ISO 19115 is more demanding. The metadata character set has to be documented in ISO 19115 when ISO 10646-1 is not used.
Metadata point of contact (M)	Part B 10.1 Metadata point of contact	-
Metadata date stamp (M)	Part B 10.2 Metadata Date	ISO is more restrictive because this element shall contain the “date that the metadata was created” and INSPIRE may contain the “date when the metadata record was created or updated
-	Part B 1.3 Resource Type	INSPIRE is more demanding
-	Part B 1.6 Coupled Resource	Optional in INSPIRE
-	Part B 2.2 Spatial Data Service Type	INSPIRE is more demanding
-	Part B 3 Keyword	INSPIRE is more demanding
-	Part B 7 Conformity	INSPIRE is more demanding
-	Part B 8.1 Conditions for access and use	INSPIRE is more demanding
-	Part B 8.2 Limitations on public access	INSPIRE is more demanding

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9. Abbreviations and acronyms

BIO_SOS	BIOdiversity multi-SOurce monitoring System: from Space TO Species
BISE	Biodiversity Information System for Europe
BR	Brazil sites
CAD	Computer-Aided Design
CEC	Commission of the European Communities
CF	Critical Factors
CIBIO/ICETA	Centro de Investigação em Biodiversidade e Recursos Genéticos/Instituto de Ciências e Tecnologias Agrárias e Agro-Alimentares
CLC	Corine Land Cover
DT-DS	Data Specifications Drafting Team
EBONE	European Biodiversity Observation Network
EC	European Commission
EO	Earth Observation
EODHaM	Earth Observation Data for Habitat Monitoring
ESDIN	European Spatial Data Infrastructure with a Best Practice Network
ESRI	Environmental Systems Research Institute, Inc.n
EU	European Union
FP7-SPA	Seventh Framework Programme - Space
GBIF	Global Biodiversity Information Facility
GEO	Group on Earth Observation
GEOSS	Group on Earth Observation System of Systems
GHC	General Habitat Categories
GIS	Geographic Information System
GLC	Global Land Cover
GMES	Global Monitoring for Environment and Security
GR	Greece sites
GSDI	Global Spatial Data Infrastructure
IGEOE	Instituto Geográfico do Exército
INSPIRE	Infrastructure for Spatial Information in the European Community
ISO	International Organization for Standardization
IT	Italy sites
LTER	Long Term Ecological Research
MIG	Metadados de informação Geográfica (Portuguese Geographic Information System Metadata Profile)
NatureSDIplus	Nature Spatial Data Infrastructure
NEM	Núcleo Español de Metadatos (Spanish Core Metadata Profile)
NL	Netherlands site

OGC	Open Geospatial Consortium
OJ	Official Journal
PDF	Portable Document Format
PELCOM	Pan-European Land Use and Land Cover Monitoring
PI	Property Issues
PT	Portugal
PT1	Portuguese Sabor-Maçãs site
PT2	Portuguese Peneda-Gerês site
SEBI	Streamlining European Biodiversity Indicators
SEC	Staff from the European Commision
SDI	Spatial Data Infrastructure
SEIS	Shared Environment Information System
SRTM	Shuttle Radar Topography Mission
SWIR	Short-wave Infrared
UK	United Kingdom sites
UP	Universidade do Porto
WebGIS	World Wide Web Geographic Information System
WISE/WDF	Water Information System for Europe/Water Framework Directive
XML	Extensible Markup Language
WMO	World Meteorological Organization
WP	Work Package
XML	Extensible Markup Language