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Abbreviations

ASCI - Areas of Special Conservation Interest
BD - Brcko District
BiH - Bosnia and Herzegovina
BIMR - Biodiversity Information System Management and Reporting
CBD - Convention on Biological Diversity/Biodiversity
CHM - Clearing House Mechanism
CITES - Convention on International Trade in Endangered Species
EAS - Environmental Approximation Strategy
EEA - European Environmental Agency
EIA - Environmental Impact Assessment
EIONET - European Environment Information and Observation Network
FBiH - Federation of Bosnia and Herzegovina
FMAWMF - Federal Ministry of Agriculture, Water Management and Forestry
FMET - Federal Ministry of Environment and Tourism
GEF - Global Environmental Facility
GIS - Geographical Information System
GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit
IPA - Instrument for Pre-Accession Assistance
IUCN - International Union for Conservation of Nature
MoFTER - Ministry of Foreign Trade and Economic Relations
MAFWM RS - Ministry of Agriculture, Forestry and Water Management of Republika Srpska
MCE - Main Component Element
MSPCEE RS - Ministry of Spatial Planning, Civil Engineering and Ecology of Republika Srpska
NBSAP – National Biodiversity Strategy and Action Plan
NGO - Non-Governmental Organization
NFP - National Focal Point
NRC - National Reference Centre
NP - National Park
ORF-BD - Open Regional Fund for South-East Europe - Biodiversity
PA - Protected Area
PE - Public Enterprise
PI - Public Institution
pSCI - proposed Site of Community Importance
REC - Regional Environmental Center
RS - Republika Srpska
SEA - Strategic Environmental Assessment
SEE - South-East Europe
SIDA - Swedish International Development Cooperation Agency
UNCCD - United Nations Convention to Combat Desertification

UNDP - United Nations Development Programme

UNEP - United Nations Environment Programme

UNFCCC - United Nations Framework Convention on Climate Change

WWF - World Wildlife Fund

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Preface

South-East Europe (SEE) is one of the richest parts of Europe in terms of biodiversity. In order to conserve and sustainably use these biodiversity assets and valuable natural resources under a concerted regional approach, a regional consensus on principles and key elements of a biodiversity information management and reporting (BIMR) mechanism in line with Convention on Biological Diversity (CBD) and European Union (EU) requirements is required. It will enable regional exchange of data and information for collaborative monitoring, reporting and management of (shared) biodiversity resources. Accession to the EU constitutes a common goal for economies of SEE, where an important pre-requisite is the transposition and full implementation of the environmental *acquis communautaire*, especially the Birds Directive (2009/147/EC) and Habitat Directive (92/43/EEC) and the EU Biodiversity Strategy 2020. Therefore, BIMR is a crucial component for all economies in the SEE region and improvements are needed.

In general, the SEE region has significant gaps at different levels in each economy regarding BIMR issues. For instance, key challenges in all economies relate to insufficient technical, organizational and financial capacities of the institutions involved (especially environmental ministries, environmental agencies and nature parks' institutions), as well as missing standards for data collection, verification and validation and indicators for monitoring of the implementation of national action plans and Aichi goals according to CBD recommendations.

One of the attempts to successfully contribute to the establishment or improvement of biodiversity information systems in the SEE region has commenced with this publication. It was scaled up from existing regional projects and initiatives, as well as European and global standards. This publication describes the current situation of BIMR elements at the national and regional level considering contributions from key stakeholders in the period from September 2016 to April 2017. The focus of the approach taken was on findings of high relevance adding value to related ongoing and future initiatives. Subsequent collaborative and coordinated efforts on implementing the recommendations are needed.

The German Federal Ministry for Economic Cooperation and Development (BMZ) supports this ongoing process including development of BIMR Regional Guidelines and piloting through the *Regional Network for Biodiversity Information Management and Reporting* project as part of the GIZ Open Regional Fund for South-East Europe-Biodiversity (ORF-BD) in close dialogue and coordination with relevant stakeholders and partners.



Gabriele Wagner
GIZ Sector Fund Manager – ORF-BD

Acknowledgement

This publication is the result of a joint effort of ministries, competent authorities, research institutions, NGOs and experts from Bosnia and Herzegovina (BiH) to develop a comprehensive overview of biodiversity information management and reporting in the SEE region. This endeavour, which involved pooling of expertise from BiH, was pursued with determination and in a spirit of high cooperation at all levels: political, technical and administrative. All parties and persons involved are greatly acknowledged in BiH for their contribution to this work.

1. INTRODUCTION AND BACKGROUND

Bosnia and Herzegovina (BiH) is a sovereign state with a decentralized policy implemented by administrative structures at multiple levels of government. It consists of two entities: Federation of Bosnia and Herzegovina (FBiH) and Republika Srpska (RS), with a third region, Brcko District (BD), governed under local government. FBiH is itself complex and consists of 10 federal units – cantons. Environmental matters are not explicitly entrusted to state institutions of BiH and rest within the competence of entity governments. Pursuant to Article 9 of the Law on Ministries and Other Bodies of Administration of BiH, the Ministry of Foreign Trade and Economic Relations (MoFTER) is responsible only for carrying out the obligations in defining policies and basic principles of environmental protection, sustainable development and use of natural resources by coordinating activities and harmonizing plans of the entity authorities with the international framework.

All environmental matters requiring concerted efforts of the entities (such as harmonization of environmental laws, regulations, standards and action plans suggested by administration at entity and/or cantonal level) are coordinated by a special body - Inter-Entity Coordination Body for the Environment.

In both entities, as well as in BD, regulation of environmental matters and management of natural resources are separated. For issues in FBiH not regulated at the entity level, responsibilities are delegated to the governments of 10 cantons i.e. the relevant ministries. Most of the key strategies and laws for biodiversity conservation, natural resource management and spatial data handling were adopted at the entity level and are generally harmonized. However, serious problems are present in enforcement of adopted laws and efficiency of the multi-layered, fragmented government.

Although international support and efforts of various stakeholders yielded significant results in biodiversity data collection, systematic collection and analysis of biodiversity data and biodiversity status monitoring is poorly developed. Professional tasks related to nature conservation in RS are carried out by the Republic Institute for Protection of Cultural-Historical and Natural Heritage, which maintains a Register of Protected Natural Resources and other data of importance for nature conservation, and operates its own database. A similar organisation with comparable authority does not exist in the FBiH.

International obligations for biodiversity reporting in BiH are carried out regularly but, in the absence of an organised system for collection, storage, processing and analysis of biodiversity data, data is collected only on an ad-hoc basis through mobilisation of a large number of experts from governmental and academic institutions.

We noted a significant shortage of biodiversity data providers and poor cross-sectoral coordination and cooperation on collecting and sharing biodiversity data, which presents serious difficulties in data integration and development of indicators on the regional level.

Importance of biodiversity in BiH in the regional and European context requires further improvements of protection and sustainable use of natural resources in BiH through creation of a viable system for biodiversity data management.

The idea of BIMR (“Biodiversity Information Management and Reporting”) project was to assist South-East Europe (SEE) region countries to assess the current status of biodiversity information system setup on the regional and national level, and to improve partner institutions’ capacities to comply with the reporting requirements of the Convention on Biological Diversity/Biodiversity (CBD) and other European Union (EU) requirements (e.g. Natura 2000 network). In order to gain clear insights into procedures and methodologies used for biodiversity data management in BiH, a comprehensive assessment of stakeholders, policy and information system setup on the national level was performed. This assessment was prepared based on information obtained through a desk review of different documents related to biodiversity and natural resource management (legislation, reports, assessments), interviews with key stakeholders and an online questionnaire.

The assessment was focused on all forms of biodiversity data management (field data, indicators and/or metadata on biodiversity) but, owing to its importance for biodiversity planning, conservation and monitoring, data management for natural resources such as forests, water and agricultural land was also taken into account.

2. METHODOLOGY

Assessment methodology consisted of four main steps with a set of sub-steps, as follows:

- 1) Stakeholder identification by means of local expert knowledge.
- 2) Stakeholder analysis by means of ranking stakeholders according to their relevance to BIMR, political influence and capacity.
- 3) Policy analysis by means of a desk review of all relevant sources.
- 4) Stakeholder meetings:
 - a) National briefings
 - b) Stakeholder interviews (in person and by telephone)
- 5) Collecting data on information system set-up via an online questionnaire.

1) Stakeholder identification

In order to gain detailed insights about the legal, organisational and technical background of biodiversity data management and data flow between different parties in each country, all relevant stakeholders engaged in biodiversity data inventory, storage, processing and reporting were identified. For this purpose, as well as for later stakeholder analysis, three local experts have been engaged which provided valuable knowledge and insights related to BIMR stakeholder identification in their respective countries. With their help, the initial stakeholder list was prepared and all relevant stakeholders were identified. This list was additionally expanded after the feedback from national briefings and stakeholder meetings held in October and November 2016. In addition to identification, they also provided important information about the stakeholders and ranked them according to their political influence, relevance, capacity, roles and reporting obligations.

2) Stakeholder analysis

All stakeholders were first ranked in respect to their political influence, relevance, capacity, roles and reporting obligations by means of local expert knowledge and other available information. After the initial screening, all stakeholders were grouped according to their role in the BIMR context. The first role and 'first link in the chain' are individuals who collect biodiversity data in the field (**biodiversity data collectors**) about species, habitats and/or landscape features that are important for biodiversity. The collected data may be used for individual purposes (publishing scientific papers, for instance) or may be integrated with data that comes from other data collectors.

Stakeholders that integrate biodiversity data from different sources into a single database (**biodiversity data integrators**) must take care of standardisation of structure and harmonisation of collecting methodologies used by different sources.

Stakeholders that are willing and ready to share their structured data with other individuals or organisations (by granting access to their biodiversity data or providing structured digital data) are **biodiversity data providers**.

Data providers which provide data not directly related to biodiversity but useful for better understanding of biological patterns and processes (e.g. orthophoto or satellite images, land use maps, etc.) are **supporting data providers**, and are also important for efficient biodiversity data processing and reporting.

Stakeholders that are not directly involved in biodiversity data collection and processing but are ready to provide support (logistical, in-kind or financial) are **financial supporters**.

In addition to stakeholder ranking, detailed data flows between all stakeholder groups were mapped to show specific relationships between stakeholders and to gain insights into all existing and planned information systems and databases.

3) Policy set-up analysis

By reviewing all relevant sources (legislation, studies, reports etc.) related to the biodiversity information system policy set-up, a list was compiled of all relevant legislative documents which mention the obligation of establishing biodiversity information systems in any of the stakeholder institutions.

4) Stakeholder meetings

To gain additional information about specific stakeholders, two types of meetings were organised.

First, one national briefing was organised in each country for ministries and agencies for nature protection and environment. The objective was to follow up on the BIMR Kick-off meeting held in Sarajevo, and particularly to secure engagement of national stakeholders involved in the BIMR project. Meeting participants were given a presentation of the Croatian experience on "Development of the Croatian National Nature Protection Information System".

In parallel with meetings, consultations were conducted with individual stakeholders which involved in-person (or, in some situations, telephone) meetings with relevant stakeholders (mostly academia and NGOs) related to biodiversity data collection, provision, integration and management.

5) BIMR questionnaire

To acquire specific information about the information system set-up and data management for each stakeholder organisation, an online questionnaire was developed and hosted on the Google Form platform. BIMR questionnaire was published and sent to stakeholders on 11 November 2016 and remained online until the end of December 2016.

The questionnaire was intended to be filled by each stakeholder organisation and each of the above-mentioned groups: biodiversity data collectors, biodiversity data integrators and biodiversity data providers, as the three groups most important and relevant for the BIMR assessment.

The complete questionnaire with all questions is provided in Annex 3 of this document.

6) Biodiversity data

The focus of the BIMR framework is on solutions for efficient biodiversity data management and reporting. Biodiversity data can refer to a particular area or group of living organisms; it may contain specimen-level information, species-level information, ecosystem-level information, information on nomenclature, or any combination thereof. According to the level of processing, biodiversity data collected in the field can be divided to:

Primary (raw) biodiversity data

Occurrences - an observation (in the field or vouchered (labelled) specimen in a collection) of a taxon (or biological community) at a particular place on a specified date

(eventually enriched with other attributes of the collecting/sampling event like collector name, number of specimens etc).

Checklists - lists of scientific names of organisms (or habitats) grouped into taxonomic hierarchies that are common in a particular area.

Registers of places and/or landscape features - list of (if possible spatially referenced) elements of an environment.

Processed biodiversity data

Indicators - statistical measures of biodiversity which help scientists, managers and politicians understand the state of biodiversity and the factors that affect it. Usually indicators are result of some form of processing like grouping, categorising, pulling, or mathematical transformations of primary biodiversity data.

Metadata - structured descriptions of other datasets.

Supporting biodiversity data

This is data that is not directly related to biodiversity but is useful for better understanding of biological patterns and biological processes and represents a valuable resource for monitoring of the state of nature. This data is usually collected and maintained by institutions responsible for natural resource management and is available in the form of orthophoto or satellite images, land use maps, geological maps, meteorological data as well as data used for fish, game and forest stock surveys.

Understanding the nature of biodiversity data which will be handled by the information system is essential because system design and functionality must be adapted to its specific features.

3. POLICY SET-UP ASSESSMENT

The Constitution of Bosnia and Herzegovina (BiH), based on the 1995 General Framework Agreement for Peace in BiH, defines BiH as a sovereign state with a decentralized policy implemented by administrative structures at multiple levels of political management. BiH is largely decentralized and comprises two entities: Federation of Bosnia and Herzegovina (FBiH) and Republika Srpska (RS), with a third region, Brcko District (BD), governed under local government. The FBiH is itself complex and consists of 10 federal units – cantons. The smallest administrative units in BiH are municipalities, 79 municipalities in FBiH and 64 municipalities in RS. BD does not belong to either entity and is governed as a condominium of both FBiH and RS. Although technically not a municipality, it is treated as such for statistical purposes.

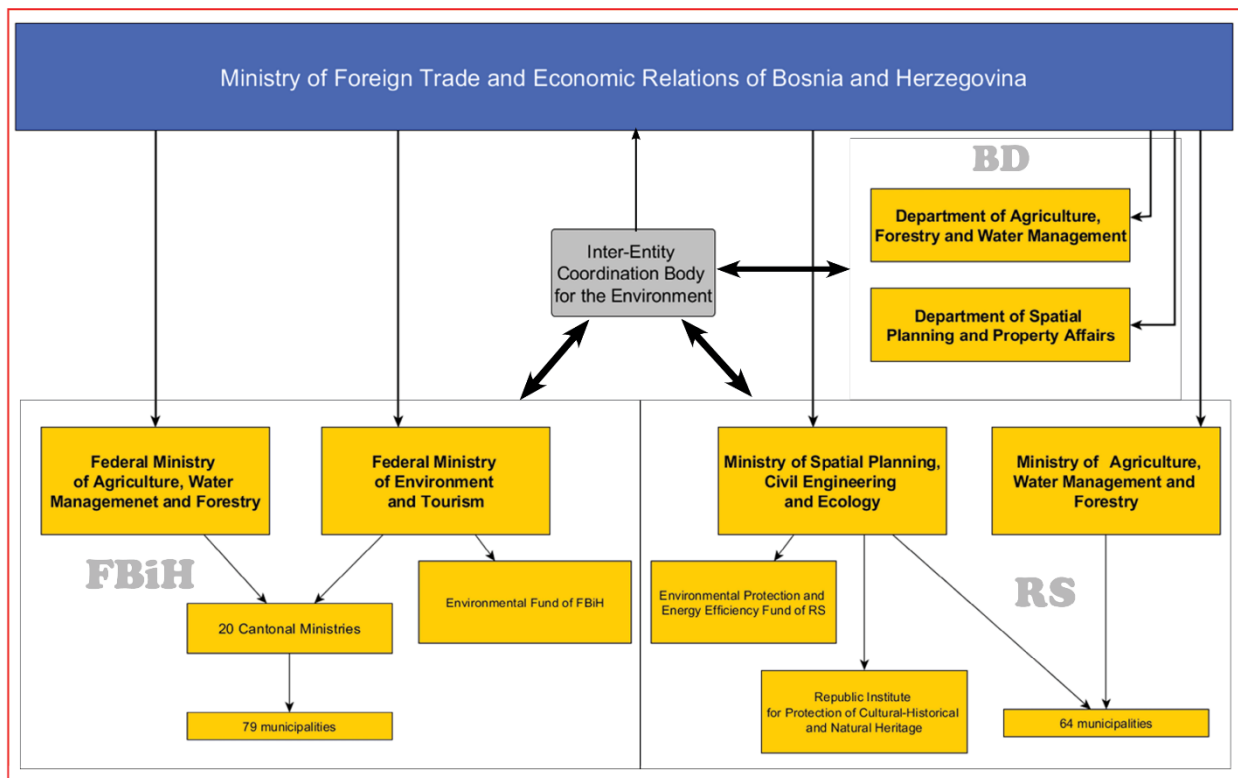


Figure 1. Administrative organisation of environmental and natural resource management in BiH

Matters under the central government's competences are highly limited. Environmental matters are not explicitly entrusted to the institutions of BiH and therefore rest within the competence of lower levels of government. The relevant authority for environmental matters at the state level, the **Ministry of Foreign Trade and Economic Relations (MoFTER)** is responsible only for carrying out the obligations in defining policies and basic principles of environmental protection, sustainable development and use of natural resources through coordination of activities and harmonisation of plans of the entity authorities with the international framework. Harmonization of environmental laws, regulations, standards and action plans proposed by lower level administrations (entities) is performed by a special body - **Inter-Entity Coordination Body for Environment**. This body was formed in 2006 and consists

of eight members, of which four are appointed by the FBiH Government and four by the RS Government. Meetings of the Inter-Entity Coordination Body for Environment always include invitations and participation of representatives from BD, MoFTER and, when necessary and relevant for the topics under discussion, representatives of other institutions. The Inter-Entity Body for Environment is responsible for coordination of all environmental matters which require concerted efforts of the entities, inclusive of drafting of laws and other regulations.

The Advisory Council for the Environment of FBiH, appointed by the FBiH Government pursuant to Article 41 of the Law on Environment Protection of FBiH, is responsible for scientific and expert support to the Federal Ministry of Environment and Tourism (FMET) and the FBiH Government in environmental matters, and its main focus is on improving coordination between federal and cantonal authorities. The Advisory Council consists of 13 members, of which 10 are nominated by the relevant cantonal ministries and the remaining three by the FMET, BiH Academy of Sciences and Arts and the Regional Environmental Center (REC) BiH. The Advisory Council is currently not operational.

In both entities, as well as in BD, regulation of environmental matters is separate from regulation of natural resource management. For issues not regulated on the entity level in FBiH, responsibilities are delegated to the governments of 10 cantons i.e. the relevant ministries. Environmental matters and natural resource management are separated in all cantons of FBiH, which makes a total of 20 cantonal ministries that are in one way or another involved in managing the environment and natural resources.

The list of relevant legislative and other documents in BiH (at state and entity level) which define the obligations, procedures, and methodologies for collecting and managing data important for biodiversity is shown in Annex 2.

3.1. Environmental protection

BiH has achieved notable progress in drafting of strategic documents and regulations related to biodiversity, based on entity laws on protection of the environment. The most important strategic document for biodiversity at the state level was the **Strategy of Bosnia and Herzegovina and Action Plan for Biodiversity and Landscape's Protection (2008-2015)**, drafted in accordance with CBD principles and the Global Strategic Plan for Biodiversity, adopted in July 2011 by the BiH Council of Ministers, however without the Action Plan. This strategy has expired and its implementation was rated as insufficient in the Fifth National Report of BiH to CBD for 2014. In 2013, BiH started developing its second **Strategy and Action Plan for Protection of Biological Diversity in BiH** for the period 2015 – 2020, harmonised with the Aichi Biodiversity Targets. The document was finalised in 2016 and adopted in May, 2017 by the BiH Council of Ministers.

In May, 2017 the Environmental Approximation Strategy (EAS BiH) was adopted by the BiH Council of Ministries as well. Nature protection forms an integral part of this strategy. This

strategy includes a calculation of costs of approximation of EU acquis and application of European nature protection standards in BiH.

In accordance with the BiH Constitution, environmental matters are managed at the entity level. Both entities have a ministry responsible for the environment, the **Federal Ministry of Environment and Tourism (FMET)** in FBiH, and the **Ministry of Spatial Planning, Civil Engineering and Ecology (MSPCEE)** in RS. In the BD the responsible state body is the **Department of Spatial Planning and Property Affairs**.

3.1.1. Nature conservation and protected areas

Entities also adopted their strategies and action plans which directly or indirectly tackle biodiversity: the **Federal Strategy for Nature Protection** (which is part of the **Environmental Protection Strategy of FBiH (2008-2018)**) and the **Nature Protection Strategy of RS (2011)**. The **Environmental Protection Strategy of Brcko District (2013-2023)** is in the adoption procedure. Both Nature protection strategies in FBiH and RS, as a mid-term priority, foresee establishment of continuous inter-entity information flow between the available databases, including establishment of an information network in the framework of the competent ministries and other state institutions responsible for nature protection.

In the framework of the **Convention on the European Wildlife and Natural Habitats (Bern)** – ratified in 2008, the project “Establishment of Emerald Network in Bosnia and Herzegovina” was realised and 11 sites in BiH that fulfilled certain criteria were proposed as Areas of Special Conservation Interest (ASCI), however the proposed network was not established in BiH.

Competences in the sector of nature conservation in BiH are conferred to the entity level and principal legal enactments in this area are defined in the **Law on Nature Protection of FBiH**, the **Law on Nature Protection of RS** and the **Law on Nature Protection of BD**. All three laws stipulate that a new subordinate act will prescribe the establishment and management of an information system for protection of nature. However, these information systems are still not in place.

Three of ten cantons in FBiH have adopted laws on nature protection, including Tuzla Canton (2004), Central Bosnia Canton (2005) and Herzegovina-Neretva Canton (2005). However, given that the federal Law on Nature Protection was adopted in 2013, these laws are outdated and not completely in line with the new federal regulations.

Laws on nature protection in both entities and BD laid the foundation for establishing a system for planning, management, information management and funding of nature protection. These laws prescribe the formation of a specialized institution for conducting activities on nature conservation in FBiH and RS. In RS this was implemented by entrusting nature conservation matters to the Republic Institute for Protection of Cultural-Historical and Natural Heritage, while in FBiH this provision was not implemented. Special by-laws were adopted in both entities to clarify and explain the jurisdictions and activities in more detail (FBiH: **Rules on the establishment and management of information system for nature protection and monitoring, Rules on content and manner of keeping the register of protected areas, Rules on content and methods of preparing management plans of protected areas and Red list of wild species and subspecies of plants, animals and fungi**; RS: **Rules on content, establishing and method of implementing measures of management of protected areas, Rules on ways of setting up and managing the information system for nature protection and system monitoring and Decree on Red List of Protected Flora and Fauna of RS**). In RS the Republic

Institute for Protection of Cultural-Historical and Natural Heritage was established and operates according to the law. In FBiH no such institution was established and all tasks defined by the law and bylaws are performed by **FMET**.

The procedure for establishment of **protected areas** (PAs) varies between entities and depends on the category of protection and distribution of PAs in the territory of each administrative unit. It may entail adoption of a special law, special acts of the relevant government/parliament or decision of the responsible ministry (entity or cantonal). In all cases it is expected that the relevant document will define management measures, body responsible for implementation of management measures, and the technologies that will be applied to the protected area. Several by-laws and subordinated legal decisions were adopted to operationalize and clarify aspects of management:

- (i) methods of management (**Rules on content and manner of keeping the register of protected areas** and the **Rules on content and methods of preparing management plans of protected areas** in the FBiH, and the **Rules on content, establishing and method of implementing measures of management of protected areas** in the RS);
- (ii) handling biodiversity data (**Rules on the establishment and management of the information system for nature protection and monitoring** - FBiH and the **Rules on ways of setting up and managing the information system for nature protection and system monitoring** - RS);
- (iii) lists of targeted species and habitats important for nature conservation have been created in both entities: **Red List of Wild Species and Subspecies of Plants, Animals and Fungi** (FBiH) and **Decree on Red List of Protected Flora and Fauna** (RS).

In RS national parks are declared on the basis of the **Law on National Parks** (the procedure is defined in the Law on Nature Protection and also applies to declaration of other types of protected areas), while in FBiH national parks and other protected areas are declared based on the Law on Nature Protection.

3.1.2. Environmental monitoring

Environmental protection laws of both entities as well as BD prescribe the obligation of monitoring and preparation of regular reports about the environment. According to the signed Memorandum of Understanding on mutual cooperation and support to the establishment and functioning of the National Environmental Monitoring System in BiH (formalized in the framework of the RANSMO project¹), the process of collection and preparation of statistics about the environment for reporting to the European Environment Agency (EEA) and European Environment Information and Observation Network (Eionet) is managed by the **BiH Agency for Statistics**. The Agency gathers data from stakeholders authorized to report certain environmental indicators (National Resource Centres - NRCs) and provides processed data to the National Focal Point. This framework was never formally adopted and is functioning on questionable legal grounds. **National Museum of BiH** is an unofficial NRC for indicators in the field of Biodiversity and Nature and by request they send data annually to the Agency for Statistics.

¹ EU CARDS "Development of a National Environmental Monitoring System for Bosnia and Herzegovina (RANSMO) implemented between 2002 to 2005. Main project results were the establishment of the legal and organisational foundation for the national system for streamlined environmental monitoring and reporting, and adoption of the proposed standard methodologies for environmental monitoring and reporting. Unfortunately, little progress has been made in operationalisation of project recommendations till now.

3.1.3. Environmental Impact Assessment / Strategic Environmental Assessment

The procedures for issuing environmental permits or **Environmental Impact Assessment (EIA)** are defined at the entity level and regulated by corresponding environmental laws. Overall responsibility for environmental permits rests with FMET in FBiH and with MSPCEE in RS.

In RS the content of EIA is further clarified in a special legal document (**Guidance on the content of environmental impact assessments**) where it is highlighted that an assessment has to contain “... *description of flora and fauna, natural areas of special value (protected) rare and endangered plant and animal species and their habitats and vegetation ...*”. An implementing regulation was adopted in FBiH which stipulates the content of the assessment. The author of the assessment must not deviate from the prescribed content. (**Rulebook on plants and facilities that require an environmental impact assessment and on plants and facilities that can be constructed and commissioned only if an environmental permit has been issued**, adopted pursuant to the Law on Environmental Protection). The new Law on Environmental Protection is currently in the adoption procedure and prescribes mandatory adoption of by-laws to regulate EIA and its contents.

3.1.4. Financing environmental protection

Environmental funds, in many countries recognised as the most important tool for implementation of national environmental policy priorities, are established and functional in both entities. Clear legal frameworks and mandates of these Funds are regulated by special laws (**Law on Environmental Protection Fund** - in FBiH and **Law on Fund and Financing of Environmental Protection** - in RS). Currently a proposal of the new **Law on Environmental Fund and Energy Efficiency** in FBiH is under public debate.

Practical operation (conditions for application, procedures for evaluation of projects, etc.) are further clarified by a number of bylaws in both entities. Projects focusing on biodiversity inventories and nature conservation are legitimate and were supported in the previous period in both entities. Environmental Protection Fund was established in the Herzegovina-Neretva Canton in 2012 with the goal to collect and distribute funding for environmental protection and, inter alia, is used for conservation of protected areas and protection and conservation of biological and landscape diversity. Other cantons have still not established functional environmental funds.

3.2. Natural resource management

In addition to the primary Law on Environmental Protection and dedicated laws regulating nature and biodiversity, there is a whole set of environmental legislation composed of laws and by-laws relevant to management of natural resources such as forests, water and agricultural land. This legislation defines and prescribes the goals, principles, measures, responsibilities, documents, financing and supervision of activities in BiH which may directly or indirectly impact the status of biodiversity.

In both entities, biodiversity and environmental matters and natural resource management are treated separately. The responsible ministries for natural resource management are the **Federal Ministry of Agriculture, Water Management and Forestry (FMAWMF)**, in FBiH, and **Ministry of Agriculture, Forestry and Water Management (MAFWM)**, in RS. In FBiH, some cantons (Herzegovina-Neretva Canton, Una-Sana Canton, Tuzla Canton, Zenica-Doboj Canton, Posavina Canton, Central Bosnia Canton and Canton 10 (Herzeg-Bosnian Canton) have special ministries for natural resource management (agricultural land, water and forests) while other

cantons (Sarajevo Canton, Bosnia-Podrinje Canton and West Herzegovina Canton) place this area under the competence of their ministries of economy. Regulation of the use of natural resources in BD are performed by the **Department of Agriculture, Forestry and Water Management**.

Forests

The legal framework for forest management in FBiH is not clear. The **Law on Forests** was repealed after a ruling of the Constitutional Court in November 2009. As an interim solution, the FBiH Government adopted the **Decree on Forests** but another ruling of the Constitutional Court in December 2011 repealed this Decree as well. The new **Law on Forests** was drafted immediately but the Parliament of FBiH did not adopt it. In the meanwhile (during legal vacuum), nine cantons adopted their regulations in the field of forestry and this left FBiH completely disempowered in the area of forest management. Last year (2016), the Parliament of FBiH finally accepted the draft Law and tasked the proposer to prepare a proposition of the Law². Until the new law is adopted, the forest sector at the level of FBiH will remain unregulated. In addition, the draft version of the Law prescribes establishment of a **forestry information system** and obligates cantonal ministries and forest users to submit information. According to the (draft) Law, the FMAWMF manages the forestry information system and the **Federal Administration for Forestry**, operating body of the Ministry, is responsible for collecting data, maintaining databases on the state and development of forests, and providing all necessary information for planning, monitoring and reporting purposes. The process of establishing the forest management information system in FBiH was started in 2007 and continued with support from several projects but is still not fully functional.

Forest management in RS is regulated by the **Law on Forests** which prescribes establishment of a forestry information system managed by the **MAFWM**, but such a system does not currently exist.

Agricultural land

According the **Law on Federal Ministries and other Bodies of Federal Administration**, the existing Institute for Agropedology was transformed into the **Federal Institute for Agropedology**. Among other things the Institute is responsible for “...*establishing a land information system for agricultural land and keeping records on agricultural land...*”.

According to the **Law on Agricultural Land** in the RS, the **MAFWM** “...*in order to establish an information system on agricultural land i.e. land information system, the Ministry keeps records on agricultural land...*”.

Fishing

Fishing and fish stock management are regulated by special laws in both entities: **Law on Freshwater Fisheries**, in FBiH and **Law on Fisheries** in RS. Both laws prescribe the obligation to prepare and define the content of fish stock surveys of fishing waters. Among other things, a fish stock survey has to contain a chapter with data about the qualitative and quantitative composition of fish stock in the particular fishing water. The survey has to be financed by the user of the fishing water, performed by competent institution and the report has to be submitted to the relevant ministry.

² At the session held on 7 July 2017, the Government of FBiH unanimously approved the proposed Law on Forests.

Hunting

Hunting and management of game animals are regulated independently at the entity level. In FBiH, vague legislation (**Law on Hunting**) and lack of clear delineation of responsibilities for game stock management between FBiH and cantons in practice leads to poor law enforcement. Previous attempts to improve the federal law did not bring the desired results. According to this law, there is no formal obligation to establish an information system or a database.

In RS, hunting and game management are regulated by the **Law on Hunting**. According to this law, users of hunting areas are obligated to collect data and submit it to a central database in the MAFWM, i.e. Public Enterprise (PE) **Forests of RS**.

Water management

The **FMAWMF** in FBiH and the **MAFWM** in RS are the line ministries responsible for water policies in their respective entities. These ministries have legislative competence in the water sector and supervise the implementation of laws on water utilisation and protection.

Water agencies, created under 2006 **Water Acts** of both entities, grant rights and control water management in BiH. There were three water agencies, one in RS and two in FBiH (**Sava catchment** area and **Adriatic catchment** area). But in 2012 the status of the Water Agency in RS changed and it became a public institution called **Vode Srpske**.

According to water acts in both entities, water agencies responsible for water management are obliged to organize, establish and manage a **water information system** for their management areas.

3.3. Meteorology and hydrometeorology

Meteorological activities are carried out by two entity institutes that together form a National Reference Center for quality of water and air in BiH. The **Federal Hydrometeorological Institute** is an independent organization, responsible directly to the Federal Government, which performs a variety of activities on meteorological data management. They permanently monitor a number of parameters in the field of hydrology, water resources and environmental quality (air, water, soil) in the territory of FBiH. In RS hydro-meteorological activities are performed by the **Republic Hydrometeorological Institute**, an administrative unit of the MAFWM. The Institute performs similar activities on collecting and managing data on environment for the territory of RS.

Hydrometeorological data produced by these institutes is essential for biodiversity management and effective nature conservation.

3.4. System of official statistics

In BiH there are three statistical institutions. The **Agency for Statistics of BiH** is responsible for statistics at the state level, with, at the entity level, the **Federal Institute for Statistics of FBiH** and the **Institute of Statistics of RS** are responsible for keeping statistics in the FBiH and the RS, respectively. According to the **Law on Statistics**, Agency for Statistics of BiH is the body responsible for the processing, distribution and determination of statistical data for entire territory of BiH. Data collecting and handling is divided into 10 areas. For the BIMR framework the most important are the data processed in the area of Agriculture, Environment and Regional

Statistics, further divided into: (i) Environment, Energy and Regional Statistics and (ii) Agriculture. The Agency for Statistics regularly sends reports to EEA and Eionet.

3.5. Spatial data infrastructure

The **Decree on the spatial data infrastructure of the FBiH** laid the foundations for systemic management of spatial data in FBiH. The **Council for Spatial Data Infrastructure in FBiH** is appointed and the **Federal Administration for Geodetic and Property Affairs** is authorized to perform operational tasks on spatial data management in FBiH. Land surveying in FBiH is decentralised, with the central office in Sarajevo. Along with the Federal Administration for Geodetic and Property Affairs, there are 4 independent cantonal administrations and 79 municipal departments competent for land surveys, property-legal affairs related to the real estate property and land cadastre.

In RS the responsible institution for spatial data management is the **Republic Authority for Geodetic and Property Affairs**. It is an independent institution at the entity level, reporting directly to the RS Government. Its core competencies are defined in the **Law on Survey and Cadastre** of RS.

Both responsible administrations collaborate on a legal and professional basis and act as partners in various projects and programs.

Within the framework of the INSPIRATION project (*Spatial Data Infrastructure for Western Balkans*) implemented during 2012 and 2013 in countries of the Western Balkan, geoportals were launched in both entities. These geoportals provide spatial data and services for territories of corresponding entities. The INSPIRATION project was successfully finished and a follow up project was started: "Cooperation in the Western Balkans Region - Infrastructure for Spatial Information in the Region of Western Balkan - IMPULS project" focused on facilitation of cooperation between authorities within states, as well as between countries of Western Balkans. Implementation of this project was started in 2014 and is planned to last until 2018. Project activities are focusing on harmonisation of data sharing policies and regulations, data structure standardisation, data quality evaluation and methods of data dissemination.

3.6. Conclusions

- The complex governing structure of BiH leads to slowness and inefficiency in adoption and improvement of the legal framework for biodiversity data management;
- All key strategies that tackle biodiversity data management were adopted at state and entity level and, although some progress was achieved, generally the level of implementation of action plans is low or still pending;
- Most of the key laws regulating biodiversity conservation, natural resource management and spatial data handling were adopted at the entity level and are generally harmonized. However, there are serious problems in application of adopted laws and efficiency of the multi-layered and fragmented government. Some sectors (e.g. forestry in FBiH) are poorly regulated with lack of harmonisation between different government levels;
- In FBiH the responsible institution for nature and biodiversity conservation has not been established and all activities are performed by several individuals in the FMET;
- Creation and functioning of biodiversity information systems is not sufficiently emphasised in the current legislation in FBiH, while in RS its functional features are not clearly defined;

- Although the guidelines and reporting to the EEA (Environment Status Reports, inclusive of the nature component) exist, stakeholders in BiH (protected area managers, users of natural resources and/or producers of expert EIA/SEA studies in FBiH, fish stock and game animal stock surveyors) are not given sufficiently clear guidelines or instructions for biodiversity data management for intra-entity reporting purposes;
- There are no guidelines or instructions about biodiversity data management and reporting for biodiversity inventory projects supported by public funding.

4. STAKEHOLDER ASSESSMENT

4.1. Consultation process

A formal **National briefing**, such as in other countries, was not held due to objective reasons but in the “Streamlining Biodiversity Data” meeting organised by IUCN on Vlačić (January, 2017) the consultants had an opportunity to get insight into plans and discuss ideas about biodiversity data management directly from key stakeholders in FBiH and RS. The meeting was attended by representatives of key state governmental institutions from FBiH and RS: FMET, MSPCEE of RS, the Republic Institute for Protection of Cultural-Historical and Natural Heritage and Faculty of Forestry from Banja Luka. It was concluded that it is not realistic to expect a successful institutional solution for biodiversity data management at the state level in the near future, and that, due to urgency, it is necessary to establish special teams to organize data collection and data integration at the entity level as soon as possible. It was pointed out that these systems should harmonize data storage methodologies and standards in order to maximize compatibility and facilitate reporting at the state level. Institutional support for natural conservation matters in RS exists in the form of Republic Institute for Protection of Cultural-Historical and Natural Heritage, and representatives of this institution confirmed their willingness to engage a part of their technical and human resources to maintenance of a biodiversity database in RS. Situation in FBiH is far more complex. Institutions that should have been involved in the organization of a system for biodiversity data management (e.g. FMET, Faculties of Natural Sciences or the National Museum of BiH) are extremely undercapacitated in every sense, so a decision about biodiversity management in FBiH should be made at the highest level of government.

During the consultation process, a series of bilateral interviews with representatives of the governmental and academic institutions were organised in both entities. Thorough discussions were made by key representatives from MoFTER, FMET, Republic Institute for Protection of Cultural-Historical and Natural Heritage, National Museum of BiH, Faculty of Forestry and Faculty of Natural Sciences in Sarajevo, Faculty of Natural Sciences and Faculty of Forestry in Banja Luka. In these discussions it emerged that a significant amount of biodiversity data already collected by different institutions exists, but that it is necessary to continue to systematically collect data for better understanding and protection of BiH natural values. The fact that the available data is scattered and stored on individual computers, and that it is not publicly available, often results in inefficient use of (international) support by ‘recycling’ the results of previous projects or duplication of field research.

Interviews with representatives of the civil society were fruitful and encouraging. During the consultation process the consultants had a chance to directly communicate with a number of managers and volunteers from the Herpetological Association in BiH, Ornithological Society “Our Birds”, Society for Biological Research and Protection of Nature, Society for Research and Protection of Biodiversity, Center for the Environment and Arbor Magna, which are important stakeholders for biodiversity data collection and, potentially, integration. Consultants recognised that this is a strong and committed community with significant results and

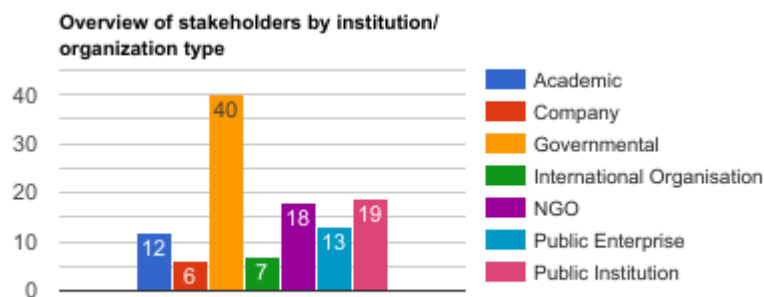
experiences in fundraising for activities focused on biodiversity inventories. They reach an enviable professional level and entity borders are not an obstacle for efficient cooperation between organisations.

Representatives of key stakeholders from most important groups (data collectors, data integrators and data providers) reacted positively to the online questionnaire. During the survey period, we received 22 completed questionnaires from 19 legal persons. Respondents provided valuable information for better understanding of availability, methods of biodiversity data collection and management in BiH, which was then used to create an overview of initiatives related to biodiversity information systems, data collection, processing, analysis and data provision.

4.2. Stakeholder analysis

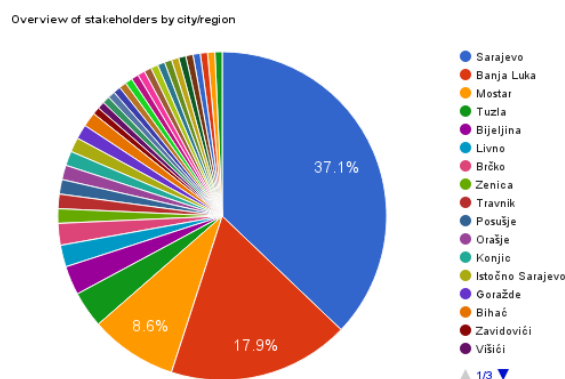
Based on a review of their legal responsibilities, recent activities and results, we created a list of stakeholders relevant to biodiversity, nature conservation or use of natural resources. General details (name, address, operational level, contacts etc...) were collected for over 200 stakeholders from 144 legal persons in BiH. After a process of selection of listed stakeholders a more detailed analysis was carried out on 116 legal persons. All selected stakeholders were classified by institution type and role in biodiversity data management and then ranked according to their relevance to the BIMR framework, political influence and capacity.

Overview of stakeholders by type of institution/organization



The analysis of stakeholders by their organizational background showed that more than a half of the analysed stakeholders in BiH are state-owned institutions - governmental, public enterprise and public institution. In this group, the most numerous are governmental institutions which operate at different levels of administration in BiH (entity, cantonal or municipal). The non-governmental organization (NGO) community is also abundant and important in the biodiversity arena in BiH. A significant and active presence of international institutions actively involved and supporting activities on evaluation and protection of biodiversity in BiH is also apparent.

Overview of stakeholders by city/region



The analysis of stakeholders with regard to location of their headquarters shows a high level of decentralization. Stakeholders are located in 41 different towns in BiH, of which as many as 15 towns are home to more than 1 stakeholder. There is some concentration of stakeholders in Sarajevo, Banja Luka and Mostar, which is understandable given that these cities are important administrative and academic centres in BiH with a significant concentration of the population.

Overview of stakeholders by political influence, relevance and capacity

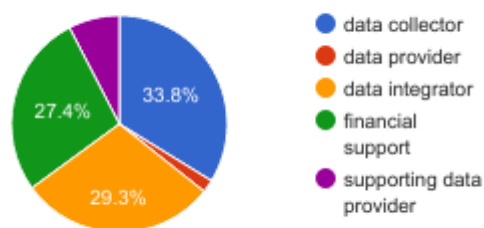
Most relevant stakeholders in BiH are from the governmental, academic and civil communities.

The relevant governmental institutions for the BIMR framework, like MSPCEE RS and FMET, have the most political influence. Some other important governmental institutions, such as Environmental Protection Funds in FBiH and RS and the Republic Institute for Protection of Cultural-Historical and Natural Heritage, also have a significant amount of political influence.

The unfortunate fact is that the relevant ministries in BiH are highly undercapacitated for all tasks that are within their responsibility, including nature conservation and biodiversity reporting. In RS the situation is somewhat better, the competent ministry authorised the Republic Institute for Protection of Cultural-Historical and Natural Heritage to carry out all operational tasks on recording and protection of natural heritage in RS. The situation in FBiH is, regardless of existing legal decisions, completely inadequate because some decisions were not implemented. In the FMET two (!) employees perform all nature conservation tasks and there are no specialised governmental or public institutions to support them. The National Museum of BiH is also highly undercapacitated and the conditions in which they operate are far below their importance on the local and regional level. Civil society organisations are always struggling with capacity problems (human, technical and/or organizational) and this assessment revealed that training in biodiversity data management and improving technical capacities should be first priorities.

Most relevant institutions from the academic (Faculties of Natural Sciences and Mathematics and Faculties of Forestry in Sarajevo and Banja Luka, National Museum of BiH) and civil community (Ornithological Society „Our Birds“, Center for the Environment, Society for Biological Research and Protection of Nature or Arbor Magna) have an almost negligible political influence. It is worth mentioning that faculties, as academic institutions, are left out of political decision-making but some of the associates from faculties were regularly consulted individually and engaged in preparation of documents (strategies, reports) that have long-lasting political consequences for BiH and its entities.

Stakeholder roles overview



The analysis of stakeholders according their role in biodiversity data management revealed that in BiH there is an almost equal number of organisations that collect data in the field and organisations that integrate or transpose information from others. On the other hand, organisations that provide biodiversity data to other stakeholders in structured form (data providers) are very few. This ratio of stakeholder groups is not optimal for efficient biodiversity data management and in the future should be changed to increase the number of data collectors and data providers. The number and the level of involvement of stakeholders that provide financial support for biodiversity-related projects is encouraging and hopefully it will remain at the same level in the future.

Overview of reporting obligations

According to the obligations defined in the three Rio conventions, BiH is submitting periodic reports that provide information on the status of biodiversity and measures to be implemented using a provisional set of indicators. A legal act that would define a core set of indicators to be used for official reporting in BiH has not been adopted to date. In the framework of the project “Capacity development for the integration of global environmental commitments into national policies and development decision making” in 2015 a set of indicators for reporting under three Rio conventions was proposed. Reporting under Rio conventions is performed by governmental bodies at the entity level and with coordination by MoFTER.

- Institution responsible for reporting under the CBD at state level is the FMET, which has successfully submitted reports and developed strategies/reports (in accordance with

Section 3.1.) with assistance from individuals and organizations from FBiH and RS. Up to now, fifth reports were provided and the last report to CBD was prepared and submitted in 2014.

- Institution responsible for reporting under the Framework Convention on Climate Change (UNFCCC) at state level is the MSPCEE from RS. Up to now two reports were submitted while the third report was adopted in May, 2017 by the BiH Council of Ministers.
- Institution responsible for reporting under the United Nations Convention to Combat Desertification is (UNCCD) is the MSPCEE from RS. The Action Programme for combating land degradation and drought mitigation in BiH (2014) was prepared and adopted in May, 2017 by the Council of Ministers. Up to now, fifth reports were prepared and the last report was submitted in 2014.

In the framework of the project “Development of the National Environmental Monitoring System” (RANSMO) in BiH, a system for reporting to EEA and Eionet was proposed which, among other things, contains suggestions for National Focal Points (NFPs) - responsible for coordination of national activities related to the EEA, National Reference Centres (NRCs) - nationally funded institutions with expertise in specific environmental areas which should collect and provide environmental data, and Main Component Elements (MCEs) - institutions which should provide environmental data to NRCs. Even the *Memorandum of Understanding on the mutual cooperation to the establishment of the national environmental monitoring system* between the BiH Council of Ministers, FBiH and RS Governments and the Commission of the European Union were signed in 2005, but, unfortunately, without proper legal adoption this framework never become fully operational.

- BiH indicator-based reporting to EioNet is not centralised. According to environmental bodies and institutions active in the EEA cooperating countries, several institutions from BiH are recognised as Resource Centers in the Eionet network and responsible for reporting different indicators: FMET, Department for Environmental Protection within MoFTER and MSPCEE RS, Republic Institute for Protection of Cultural-Historical and Natural Heritage, hydrometeorological institutes in FBiH and RS, and others. These institutions prepare reports on environmental indicators entrusted to them, using their own data and data collected from other institutions.

Stakeholder relationship mapping

The stakeholders were grouped according to similarities in institutional level, obligations and methodologies used in biodiversity data management and reporting. Red arrows used in the graph indicate regular/obligatory reporting defined by actual legislation, while black arrows indicate occasional reporting, i.e. reporting for particular projects or tasks. Keg icons scattered on the graph indicate a biodiversity database management system (DBMS) where blue colour points to biodiversity DBMS while gray colour points to DBMS that operate with data useful for the BIMR framework.

Please note that arrows used in Figures 2, 3 and 4 represent the flow of biodiversity data documents in any form (e.g. reports, tables, graphs, images, etc.), not exclusively in digital format.

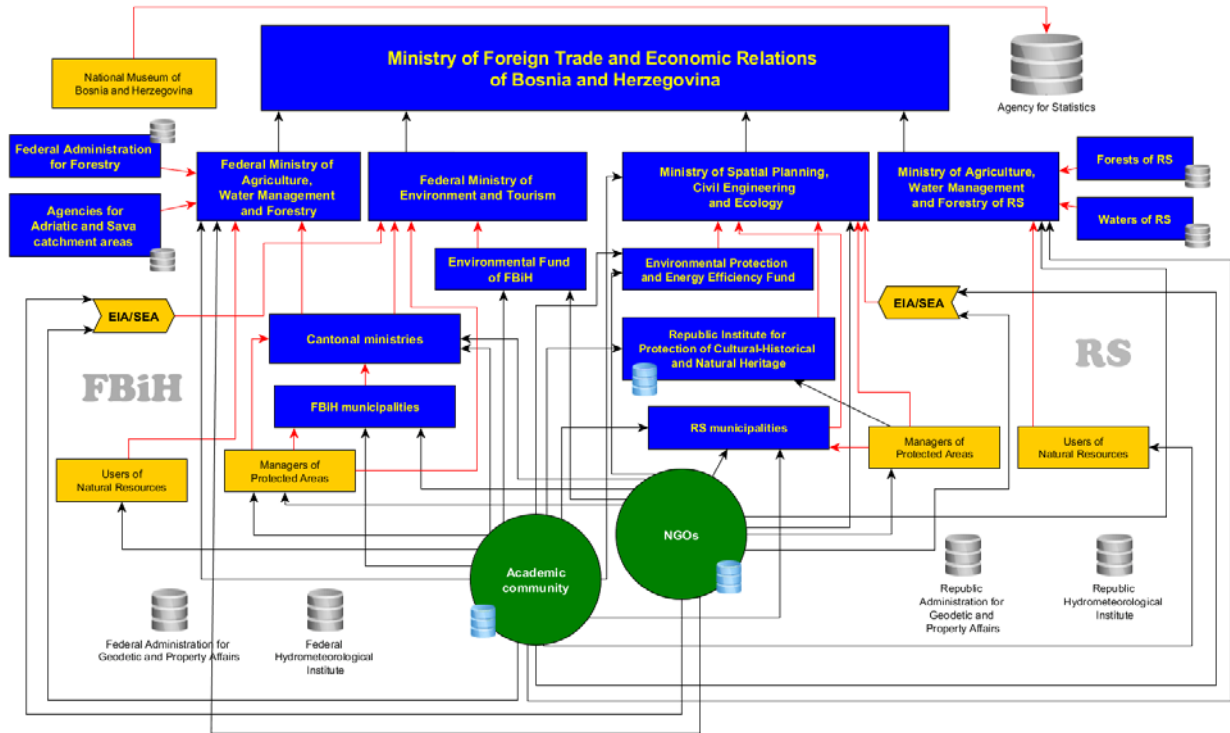


Figure 2. Conceptual chart of biodiversity data flows in BiH

Environmental matters in BiH are in the competence of lower levels of government. At the state level, MoFTER is responsible only for a limited number of issues and performs coordination of activities of entity authorities within the international framework. In the BIMR framework this includes coordination of projects supported by international donors which cover the entire (or most of the) territory of BiH, such as the Natura 2000 network and/or reporting to international conventions. The responsible ministries in FBiH (FMET and FMAWWMF) and RS (MSPEE and MAFWM) regularly inform MoFTER about their activities and plans (and vice versa), while all other data circulates within individual entities.

Academic institutions and NGOs are the main data collectors in BiH and are using every opportunity to apply for funding (environmental funds, governmental bodies, companies performing EIA/SEA, managers of PAs and users of natural resources) and they submit reports to the organization that engaged them.

Cooperation and official biodiversity data sharing between ministries responsible for biodiversity protection and management of natural resources is unregulated and generally poor in both entities.

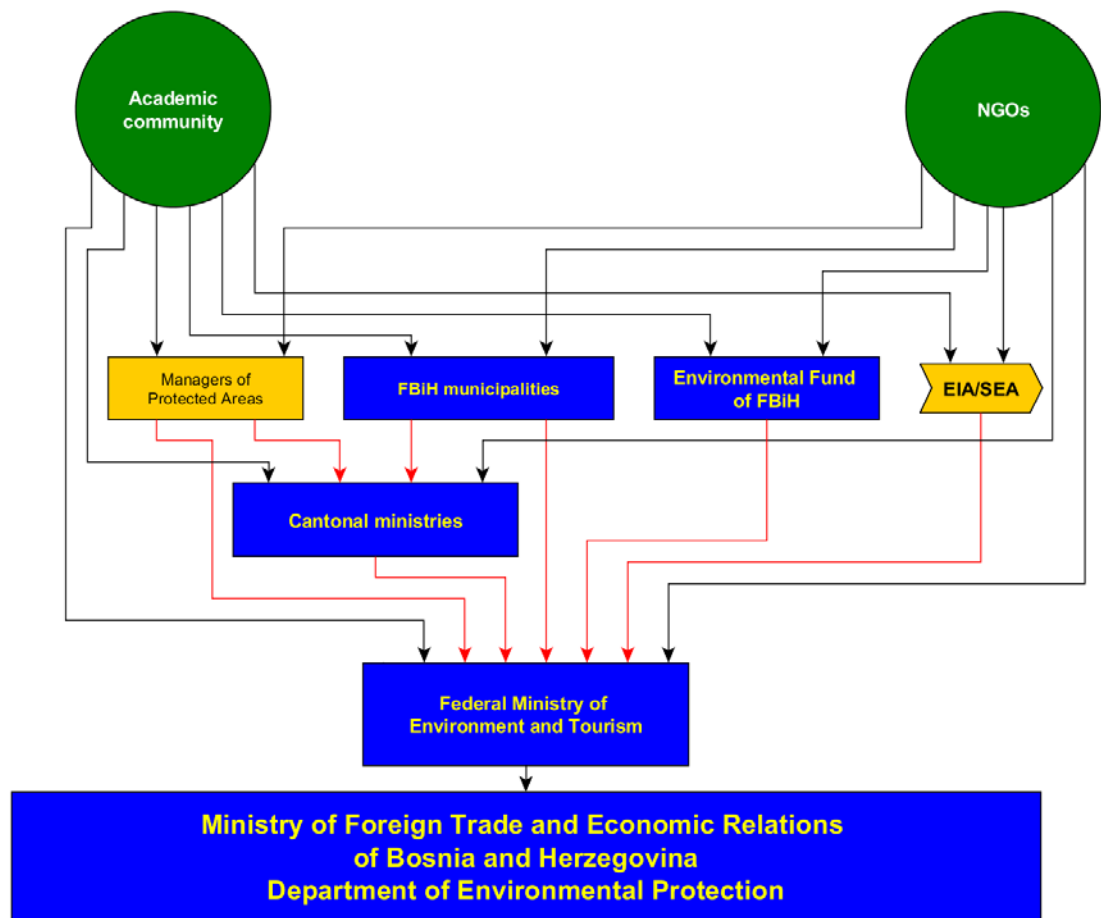


Figure 3. Detail of biodiversity data flow in FBiH, organised within FMET

Data collectors (academic institutions, individual researchers and NGOs from BiH) are sending their reports and data to the institutions/organisations that contracted them, such as municipalities, cantonal ministries, environmental funds, managers of PAs and companies that prepare EIA/SEA studies. These institutions/organisations integrate the received data and use it for preparation of their reports which they submit to the FMET, which is the central institution in FBiH where all biodiversity and PA data comes together.

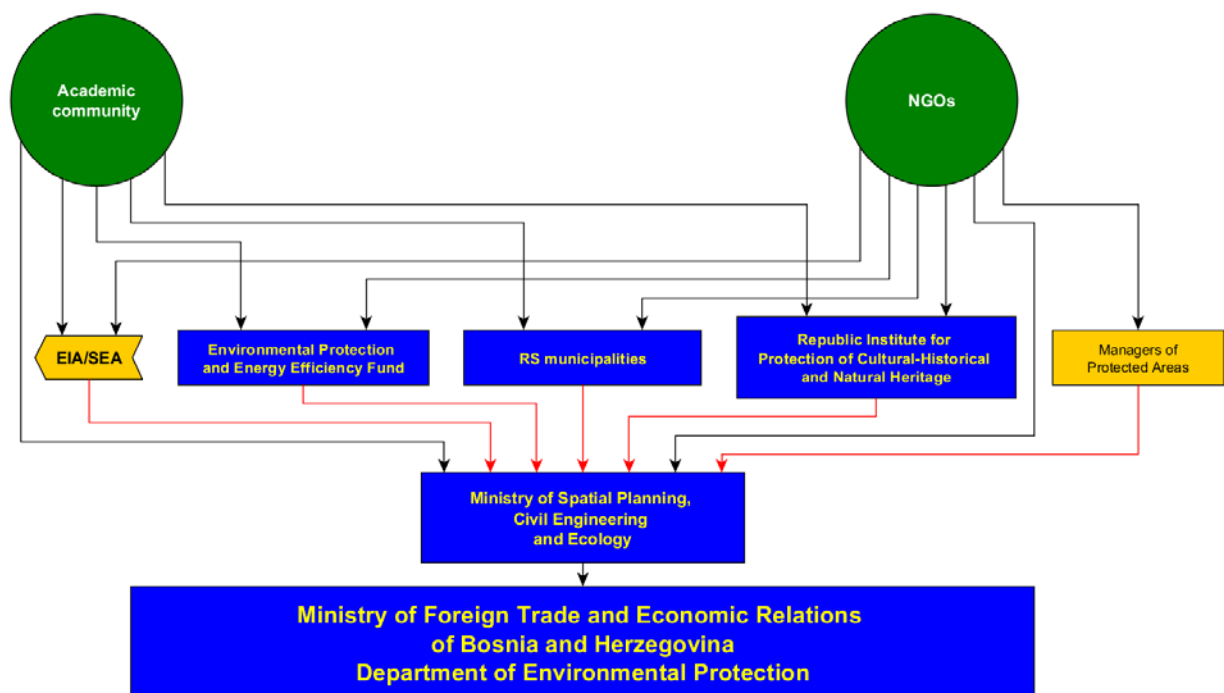


Figure 4. Detail on biodiversity data flow in RS, organised within MSPCEE

Data collectors (academic institutions, individual researchers and NGOs from BiH) are sending their reports and data to the institutions/organisations that contracted them, such as municipalities, Republic Institute for Protection of Cultural-Historical and Natural Heritage, Environmental Protection and Energy Efficiency Fund, managers of PAs and companies that prepare EIA/SEA studies. These institutions/organisations integrate the received data and use it for preparation of their reports which they submit to the MSPCEE, which is the central institution in RS where all biodiversity and PA data comes together.

4.3. Conclusions

- More than half of the analysed stakeholders in BiH are state owned institutions - governmental, public enterprises and public institutions.
- The NGO community is numerous, active and organisations cooperate with each other regardless of their entity affiliation.
- Both entities in BiH provide legal and institutional support to environmental protection, which includes evaluation of natural values.
- International institutions are actively involved through projects and financially support activities related to evaluation and protection of biodiversity in BiH.
- Institutional organisation of stakeholders in BiH is characterised by a high level of decentralization, which is generally good, but without clearly defined responsibilities and procedures and with insufficient capacities (e.g. human, technical) this could lead to communication problems and obstacles to implementation.

- Relevant governmental institutions (especially in F BiH) are highly undercapacitated for all tasks assigned to them.
- Key biodiversity collectors and integrators from the academic and NGO community have an almost negligible political influence.
- This ratio of stakeholder groups is not optimal for efficient biodiversity data management; biodiversity data integrators are unusually numerous and biodiversity data providers are extremely scarce.
- The complex governing structure of BiH leads to slowness and inefficiency in adopting legal frameworks for almost all aspects of institutional functioning, which eventually negatively impacts the quality of international reporting.

5. INFORMATION SYSTEM SET-UP ASSESSMENT

5.1. Ongoing initiatives related to biodiversity information system

In 2013, a new service was launched to provide access to information on biological diversity in BiH – the **Clearing House Mechanism** – CHM (www.bih-chm-cbd.ba). This is an effective biodiversity information service in BiH intended for relevant stakeholders and the general public, and was recognised and officially praised as such. The data provided by the CHM is only in the form of metadata for the resources managed by different stakeholders and not the actual biodiversity data.

As part of the project titled “**Strengthening of Environmental Institutions in BiH and Preparations for Pre-Accession Funds (EnvIS)**”, implemented from 2011 to 2014, the fourth project component (Environmental Monitoring and Reporting) drafted the *Data Management Strategy for EEA Environmental Monitoring and Reporting*. This draft document covered the area of nature conservation.

As part of the project “**Support to Implementation of the Birds and Habitats Directives in Bosnia and Herzegovina**”, implemented from 2012 to 2015, a digital database was developed that was used for a list of pSCIs and nomination of sites in BiH to Natura 2000 network, based on the ArcGIS platform. In accordance with project recommendations, beneficiary institutions were supposed to create, collect and update important datasets according to agreed specifications and standards. Specifications could not be modified without prior consultation with other entity, BD and state level beneficiary institutions. Beneficiary institutions were supposed to submit harmonised Natura 2000 data, which would be virtually centralised in the Natura 2000 geoportal and stored in the unified database managed by the MoFTER BiH. The unified database would be used for information exchange between entities, state-level analysis and reporting to the European Commission. Due to absence of agreement between governmental bodies at the state and entity level, at the time of preparation of this assessment this data is stored on a digital medium but not integrated into a single, publicly available and functional system.³ Natura 2000 data for the territory of RS is included in the Amendments to the RS Spatial Plan to 2025 and forms an integral part of this overarching document.

The scope of the UNEP/GEF project “**Capacity development for the integration of global environmental commitments into national policies and development decision making in Bosnia and Herzegovina**” (started in November 2014, lasted for 3 years and implemented in partnership with the MoFTER, FMET, and the MSPCEE, and two entity Environmental Protection Funds) included a system for enhancement of collection of environmental data and environmental information management. The **Indicator Reporting Information System (IRIS)**, an online tool for data collection and indicator creation for national focal points reporting

³ Note: On the ESRI's cloud-based mapping platform, the interactive web based map of Natura 2000 in BiH was published by one of the volunteers of the NGO Society for Research and Conservation of Biodiversity from Banja Luka. The map is accessible at the following address:<http://www.arcgis.com/apps/Viewer/index.html?appid=aa4ceb4a4d734623a06b37ac304191dc>.

under Rio conventions, was presented in 2016. The system was developed by UNEP and can be connected to UNEP Live so that the economy can share relevant data and indicators with UNEP audiences. Currently, the documents presenting an overview of the current state of the environment in BiH, the availability of data and the competencies of the institutions, as well as gap analysis in the legislative, technical and institutional aspects in the field of environment are being developed. A List of Selected Environmental Indicators in BiH was also prepared and is awaiting adoption by the competent authorities, so that an Environment Management Information System (EMIS) can be established to support environmental reporting and be linked to UNEP Live at address uneplive.unep.org.

GISPASS is a multimedia, spatially enabled database about protected and potentially protected areas of RS managed by the NGO Arbor Magna and publicly accessible at arbormagna.webfactional.com.

Flora of Republika Srpska at address www.florasrpske.webfactional.com is a comprehensive web application for browsing and visualisation of spatial occurrences data of vascular plants in RS, published in Günther Beck-Mannagetta, Karlo Maly and Željka Bjelčić monograph from 1983, *Flora Bosnae et Hercegovina*. It is managed by the associates of the Faculty of Forestry in Banja Luka.

The operational body of the FMAWMF, the **Federal Administration for Forestry** is responsible for collecting data and maintaining databases on the state and development of forests, ensuring all necessary information for planning, monitoring and reporting. The process of establishing the integrated **Forests Information System** of FBIH was started in 2007 and continued with support of several projects, however it is still not functional. Digitised data gathered to date is scattered across different institutions (Cantonal PE for forest management, relevant cantonal ministries, academic institutions), even individual experts databases. It is expected that the new Law on Forests (currently under public debate) will bring some order to this area in FBIH.

In RS, operational activities on development and maintenance of the information system on publicly owned forests is performed by Research, Development and Design Centre of the PE Forests of Republika Srpska. The data is not publicly available but in practice they allow access to the database to governmental institutions of RS.

Land Information System and maps at Federal Institute for Agropedology are managed by the staff in the Sector for Monitoring and Land Information System and are available for institutional use only.

The **Center for Ecology and Natural Resources** (CEPRES), an initiative of several experts at the Faculty of Natural Sciences and Mathematics - University of Sarajevo, has participated in the implementation of several important projects in the field of biodiversity inventory, evaluation and conservation. Biodiversity data gathered during realisation of these projects (*Protected areas of BiH, Emerald network of BiH and Integrated Management of the Sava River Basin*) are integrated into a GIS database. The database is only for institutional use.

Cadastre of speleological objects in BiH is an electronic database managed by the Center for Karst and Speleology and data from database is available upon email request.

In the framework of the IPA project “*Capacity Building in Water Sector*”, implemented by Eptisa regional office for SEE of in the period 2014-2016, a web portal (**Water information system of BiH**) was launched. It can be accessed at isv.voda.ba and most of the portal is closed for anonymous visitors but the interactive map of stagnant and running freshwater of BiH is publicly available.

The INSPIRATION project (*Spatial Data Infrastructure for Western Balkans*) launched **entity geoportals** for FBiH and RS. Both portals provide spatial data and services for territories of corresponding entities:

www.katastar.ba/geoportal/preglednik - geoportal for FBiH

www.geoportal.rgurs.org/geoportal - geoportal for RS

The project launched by UNEP in 2016 titled “***Achieving Biodiversity Conservation through Creation, Effective Management and Spatial Designation of Protected Areas and Capacity Building***”, financially supported by GEF, included three main components: 1) establishment and effective management of protected areas and biodiversity; 2) management effectiveness of the National PA system and 3) **biodiversity monitoring**. A detailed working plan of realisation was suggested and at the time of preparation of this assessment the project is scheduled to start in April 2017. (Additional details are available at: www.unep.ba/Biodiversity-project2.html)

Problems faced by SEE economies related to management and use of biodiversity information were highlighted and targeted by the project “***Towards strengthened conservation planning in South-Eastern Europe***”, started in 2014 and implemented by IUCN. The project addresses nature conservation priorities in the region and targets nature conservation authorities responsible for designing national conservation systems. It also provides assistance by the implementing institution for issues prioritised by the national authority. At the meeting held in January 2017 with participation of representatives of relevant governmental bodies from FBiH and RS, it was noted that biodiversity data management will be organised at the entity level (technically and organisationally harmonised between entities) and that initially it is necessary to strengthen technical capacities in both entities by providing some kind of technical support (equipment).

5.2. Data collection

Systematic collection and analysis of biodiversity data and monitoring of biodiversity status is almost non-existent. Main sources of biodiversity data are studies and publications prepared by various academic institutions and NGOs or resulting from assessments carried out in the framework of different projects funded by internal and external donors. Biodiversity monitoring is carried out on ad hoc basis, mainly to provide data for specific activities of individuals, organizations and business sectors in BiH. The most important sources of biodiversity data are (not in order of importance):

- Biodiversity data used in Studies of protected areas in both entities;
- Biodiversity data used for EIA/SEA in both entities;
- Biodiversity data used for Studies of fish stock surveys in both entities;
- Biodiversity data used for Studies of game animal stock surveys in both entities;
- Data collected by scientists engaged on biodiversity projects at universities in Sarajevo, Banja Luka, Tuzla and Mostar and used for their academic promotion;
- Data collected during implementation of projects supported by local sources of financing: Environmental Funds from FBiH and RS, federal ministries, cantonal ministries, ministries of RS, Republic Institute for Protection of Cultural-Historical and Natural Heritage and municipalities in both entities;
- Data collected during implementation of projects supported by international sources of financing (e.g. Rufford Small Projects Grants Scheme and UNEP, UNDP, World Bank, SIDA, WWF, IUCN);
- Data used for nomination of sites for the Emerald network;
- Data collected in the framework of the IPA project “*Support to Implementation of the Birds and Habitats Directives in Bosnia and Herzegovina*” is used for documenting natural values and proposing pSCIs for the Natura 2000 network in BiH;
- Collections in the National Museum of BiH and other relevant collections in scientific institutions and/or privately owned.

Generally, the biodiversity data collectors’ community does not directly oppose data sharing but in this moment there are no focused initiatives (in FBiH or in RS) aimed at integration of data from different sources. Primary biodiversity data is scattered across a number of privately and publicly owned databases and stored on local computers, differently structured and stored in various formats.

Although the lists of species (and habitats) important for nature protection and conservation in BiH are published, there is an evident need for scientifically evaluated lists of species for most of groups of organisms that live in BiH, especially for those species (and habitats) that are distributed only in BiH and adjacent areas (Balkan endemics).

5.3. Data processing and analysis

As indicated in the interviews with stakeholders and in responses to questionnaires, biodiversity data collected in the field is stored in different formats, most frequently in Excel tables. There are isolated cases of structured data and use of Database Management Systems (DBMS) but without applications of widely accepted standards for structuring biodiversity data. That variety of approaches in processing biodiversity data will create significant difficulties for future integration of (semi)structured and unstructured biodiversity data from different sources into a unique database.

There are no system solutions for validation/verification of biodiversity data used for different reporting (this is entrusted to experts engaged on a particular report) and for most raw

biodiversity data there is no possibility to personalize the source of expert decisions about identification and/or verification of data recorded during field surveys.

Unfortunately, a significant amount of biodiversity data is in form that is not suitable for automatic processing: published in literature, stored as filed paper forms or notes in private field diaries. Digitalisation of this data will be a great challenge in the future.

5.4. Data provision and data use

The stakeholder assessment revealed a significant shortage of stakeholders that provide biodiversity data ie. only several stakeholders process biodiversity data (collected by them or obtained from other stakeholders) and store it in structured form. The reason for this (most probably) is a serious lack of appropriate expertise in standards and techniques for structuring biodiversity data, as well as poor knowledge of principles of database management and available tools for storing biodiversity data.

Poor cross-sectoral coordination and cooperation on collecting and sharing biodiversity data results in the fact that even structured data is scattered and makes it impossible to perform verifiable analysis and produce indicators on the regional level.

The fact is that data on biodiversity and nature are not represented in spatial data infrastructure databases of FBiH and RS, although both these systems have the necessary functionality to embed already properly processed biodiversity data (such as borders of protected areas) with other geospatial data. This is another consequence of generally poor cross-sectoral cooperation in BiH.

5.5. Information system financial and staff capacities

Official biodiversity data repositories are not established in BiH so there is no system for financing of activities on maintaining information systems and/or databases. Insufficient human capacities, expert associates for nature protection (in all entity and cantonal ministries, professional institutions, managers of protected areas, users of natural resources and NGOs) are a chronic problem. Therefore, it is important to strengthen the human resources of this sector by training already engaged staff and to review the option to employ IT and database management experts.

5.6. Conclusions

- A large volume of biodiversity data was collected through different projects but this data is scattered across many privately and publicly owned databases/collections.
- A significant amount of collected biodiversity data is in formats that are not suitable for automatic processing.
- There are no widely accepted procedures or standards for collection, structuring and integration of raw biodiversity data.

- Available row biodiversity data is of doubtful quality due to absence of a systemic solution for validation/verification of provided field data.
- Biodiversity and nature data is not represented in spatial data infrastructure databases of FBiH and RS.
- Official biodiversity data repositories are not established in BiH or in its entities.
- There are no developed systems for financing of activities on maintaining information systems and/or databases.

6. CONCLUSIONS AND RECOMMENDATIONS

Recently, several important steps were made in the organization of nature protection and sustainable management of natural resources in BiH and its entities. The legal framework is more or less shaped and harmonised with international standards and significant international and public funding is oriented to studying and monitoring of biodiversity. Still, this analysis showed some serious gaps and/or mistakes in procedures and practices that influence efficient biodiversity monitoring and reporting. The most important conclusions are:

- Strategic documents and current legislation do not sufficiently and accurately highlight the details of forming and functioning of biodiversity information systems and the mandates of relevant institutions for biodiversity data management are defined in a manner highly inconsistent with their capacities.
- Human capacities, in terms of expert associates for nature protection in all ministries (entity and cantonal), municipalities, professional institutions, managers of protected areas and users of natural resources, are insufficient.
- A large volume amount of biodiversity data is already collected but this data is scattered across many privately and publicly owned databases/collections in formats that are not suitable for automatic processing. Absence of widely accepted procedures or systems for standardised collection, structuring and integration of raw biodiversity data leads to inefficient use of data for reporting and management purposes.
- Available raw biodiversity data is of doubtful quality due to absence of a systemic solution for validation/verification of provided field data.
- Complexity of the institutional framework, with multi-layered horizontal and vertical responsibilities of various authorities of BiH and its entities, in practice frequently leads to barriers and obstacles to communication, duplication of work or absence of coordination in implementation of activities that can influence nature protection.
- Cross-sectoral coordination and cooperation on collecting and sharing biodiversity data (between stakeholders responsible for nature conservation on the one side, and stakeholders responsible for management of natural resources on the other side) is not regulated and is faced with serious shortcomings.

Based on the conducted analyses of stakeholders, legal framework in BiH and its entities related to the BIMR process and the current status of Information systems for biodiversity data management, the following recommendations can be suggested:

Improvement of legislation

- **Improve** the procedures for provision of biodiversity data from entities for creation of unified biodiversity reports for BiH required by international obligations;
- **Create** a legal framework for delegation of responsibilities to institution(s) that will perform tasks related to biodiversity data management for public needs in FBiH;
- **Adopt** bylaw(s) associated with the Law of Nature Conservation in both entities, to regulate organizational, technical and procedural mechanisms for collection, storage, validation and provision of biodiversity data;
- **Adopt** a legal solution for privileged use of available geospatial data included in spatial data infrastructure(s) of the FBiH and RS by state/authorised institutions in charge of biodiversity management.

Strengthening biodiversity data sharing between and within sectors

- **Harmonize** methodologies for data collection and **adopt** procedures for sharing data necessary for biodiversity assessments collected and managed by other sectoral institutions (such as land use maps, forestry inventories, fish stock surveys etc.);
- **Implement** international experiences concerning authorship of biodiversity data;
- **Include** representatives of the governmental institutions from FBiH and RS responsible for nature conservation in the Councils for Spatial Data Infrastructure in FBiH and RS;
- In partnership with referent institutions for management of geospatial data in BiH (Federal Administration for Geodetic and Property Affairs, and Republic Authority for Geodetic and Property Affairs), **ensure** technical assistance for inclusion of biodiversity data into operational geoportals of FBiH and RS.

Standardisation and harmonisation of biodiversity data collection and processing

- **Organise** expert groups to reach consensus about the lists of species and habitats common in BiH;
- **Advance** regional cooperation between experts in terms of coordination of research and monitoring of species (and habitats) distributed exclusively in the territories of SEE economies (Balkan endemics);
- **Define** lists of minimum and optimal set of attributes of field species-occurrence data (harmonized with international standards) that will be requested from implementers of inventory projects supported by public funding.

Supporting primary biodiversity data collection and structuring

- **Prepare** guidelines and **provide** training to all potential data collectors from the academic and NGO community about primary biodiversity data structuring methodologies;
- **Create a list** of key natural collections in BiH and **provide** technical and financial support for preparation of digital inventories of specimens;
- **Provide** funding for structuring/digitalisation of biodiversity data from literature and expert collections, structured according to accepted standards;
- **Support** biodiversity inventory projects.

Capacity building

- **Implement** international experiences concerning authorship and models of biodiversity data sharing;
- **Promote** full-featured software solutions for biodiversity database management (open source and proprietary);
- **Establish** a specialised institution (or legally authorize an existing one) in FBiH to perform the tasks related to nature conservation and biodiversity data management;
- **Initiate** Biodiversity information centres in FBiH and RS;
- **Support** setting-up of database management systems at key stakeholders in the academic and NGO community;
- **Provide** trainings on biodiversity data management for representatives of governmental and academic institutions, NGOs, managers of protected areas and users of natural resources;
- **Hire** new staff specialised for biodiversity data management at all levels of government in BiH.

7. ANNEXES

Annex 1. List of consulted documentation

List of relevant legislation, reports and assessments in BiH that defines obligations, procedures, and methodologies for collection and managing data important for biodiversity data management.

State level documents

- Decision "Regulation of institutional and organizational infrastructure for environmental management and GEF programs in BiH". Council of Ministers of Bosnia and Herzegovina, 2002
- Law on Statistics (Official Gazette of BiH, 26/04)
- Memorandum of Understanding on the mutual cooperation and support to the establishment and functioning of the National Environmental Monitoring System, 2005
- Law on Ministries and other administrative bodies of BiH (Official Gazette of BiH, 5/03, 42/03, 26/04, 42/04, 45/06, 88/07 and 35/09)
- Strategy and Action Plan for Protection of Biological Diversity in Bosnia and Herzegovina (2015-2020)

Federation of BiH

- Environmental Strategy for Federation of Bosnia and Herzegovina 2008-2018. Federal Ministry of Environment and Tourism, 2008
- Water Management Strategy of the Federation of Bosnia and Herzegovina 2010-2022, Federal Ministry of Agriculture, Water Management and Forestry, 2012
- State of the Environment in the Federation of Bosnia and Herzegovina. Federal Ministry of Environment and Tourism, 2010
- Law on Federal Ministries and other bodies of Federal Administration (Official Gazette of FBiH, 58/02, 19/03, 38/05, 2/06 and 8/06)
- Law on Environmental Protection (Official Gazette of FBiH, 33/03 and 38/09)
- Law on Nature Conservation (Official Gazette of FBiH, 66/13)
 - Rules on the establishment and management of information system for nature protection and monitoring (Official Gazette of the FBiH, 46/05)
 - Rules on content and manner of keeping the register of protected areas (Official Gazette of FBiH, 69/06)
 - Rules on content and methods of preparing management plans of protected areas (Official Gazette of FBiH, 65/06)
 - Red list of wild species and subspecies of plants, animals and fungi (Official Gazette of FBiH, 7/14)
- Law on Environmental Protection Fund (Official Gazette of FBiH, 33/03)
- (Draft) Law on Environment Protection and Energetic Efficiency (Government of FBiH, 2016)
- Water Act (Official Gazette of FBiH, 70/06)
 - Rules on the establishment and management of the information system of waters (Official Gazette of FBiH, 77/09)
- Law and Decree on Forests (suspended) (Official Gazette of FBiH, 83/09, 26/10 and 38/10)

- (Draft) Law on Forests, Ministry of Agriculture, Water Management and Forestry, 2016
- Law on Hunting (Official Gazette of FBiH, 4/06 and 8/10)
- Law on Freshwater Fisheries (Official Gazette of FBiH, 64/04)
 - Rules on the form, content and management of the fishing cadastre (Official Gazette of FBiH, 63/05)
- Law on Statistics of Federation of Bosnia and Herzegovina (Official Gazette of FBiH, 63/03)
- Law on Spatial Planning and Land Use at the Federation of Bosnia and Herzegovina (Official Gazette of FBiH, 2/06, 72/07, 32/08, 4/10, 13/10 and 45/10)
 - Decree on unique methodology for preparation of spatial planning documents (Official Gazette of FBiH, 63/04 and 50/07)
 - Decree on the spatial data infrastructure of the Federation of Bosnia and Herzegovina (Official Gazette of FBiH, 85/14)

Republika Srpska

- Nature Protection Strategy of Republika Srpska. Ministry of Physical Planning, Civil Engineering and Ecology, 2011
- Law on Environmental Protection (Official Gazette of RS, 71/12)
 - Guidance on the content of the environmental impact assessments (Official Gazette of RS, 118/05)
- Law on Nature Conservation (Official Gazette of RS, 20/14)
 - Rules on content, establishing and method of implementing measures of management of protected areas (Official Gazette of RS, 56/09)
 - Rules on ways of setting up and managing the information system for nature protection and system monitoring (Official Gazette of RS, 85/05)
 - Decree on Red List of Protected Flora and Fauna of RS (Official Gazette of RS, 124/12)
- Law on National Parks (Official Gazette of RS, 74/05)
- Law on Agricultural Land (Official Gazette of RS, 93/06, 86/07, 14/10 and 5/12)
- Law on Fisheries (Official Gazette of RS, 72/12)
- Water Act (Official Gazette of RS, 50/06, 92/09 and 121/12)
- Law on Forests (Official Gazette of RS, 75/08 and 60/13)
- Law on Hunting (Official Gazette of RS, 60/09)
- Law on Fund and Financing of Environmental Protection (Official Gazette of RS, 117/11)
- Law on survey and cadastre of the Republika Srpska (Official Gazette of RS, 6/12)

Brcko District

- Environmental Protection Strategy of Brcko District (2013-2023)
- Law on Environmental Protection (Official Gazette of BD, 24/04, 01/05, 19/07, 09/09)
- Law on Nature Conservation (Official Gazette of BD, 25/04, 1/05, 19/07, 9/09)

Assessments and Reports

- Guidance on Environmental Monitoring in Bosnia and Herzegovina. Handbook. Developed by the EU CARDS Project “Development of the National Environmental Monitoring System” in Bosnia and Herzegovina, 2005
- Bosnia and Herzegovina Fourth Report to the United Nations Convention on Biological Diversity. 2010
- Environmental performance reviews: Bosnia and Herzegovina, Second review. United Nations Economic Commission for Europe (UNECE), 2011
- National Capacity Self-Assessment of Bosnia and Herzegovina in the Implementation of Multilateral Environmental Agreements. Global Environmental Fund, 2012
- Review of the legal and institutional framework for environmental protection in Bosnia and Herzegovina (Final Draft). Supported by Millennium Goals Development Fund (MDGF), 2011
- Final report of the project “Integrated information system in forestry of Federation of Bosnia and Herzegovina”. Croatian forests, 2012
- Bosnia and Herzegovina - Final Evaluation. Programme: Mainstreaming Environmental Governance: Linking local and national action. Thematic window: Environment and Climate Change. supported by Millennium Goals Development Fund, 2013
- State of Environment in Bosnia and Herzegovina (MoFTER BiH) supported by Millennium Goals Development Fund and UNEP, 2013
- Fifth National Report to the UN Convention on Biological Diversity of Bosnia and Herzegovina. Federal Ministry of Environment and Tourism, 2014
- Project: “*Support to implementation of the Birds and Habitat directives in Bosnia and Herzegovina*”. Final report, 2015
- The proposed set of indicators for reporting Bosnia and Herzegovina under the three Rio Conventions. UNEP/GEF Project “Capacity development for the integration of global environmental commitments into national policies and development decision making”, 2016
- Analysis of the Forest Sector in Bosnia and Herzegovina. Report in a framework of the project “Preparation of IPARD Forest and Fisheries Sector Reviews in Bosnia and Herzegovina”, FAO Regional Office for Europe and Central Asia, 2015
- Country Biodiversity Analysis: Bosnia and Herzegovina. USAID/BiH, July 2016

Annex 2. Stakeholders list

Governmental institutions

State level

Administration of Bosnia and Herzegovina for Plant Health Protection, Sarajevo
Council of Ministers of Bosnia and Herzegovina
Directorate for European Integration of Bosnia and Herzegovina
Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (MoFTER), Department of Environmental Protection, Sarajevo

Brcko District

Department of Agriculture, Forestry and Water Management of Brcko District
Department of Urban Planning and Real Estate Affairs of Brcko District

Federation of BiH

Agency for the Water Basin of the Adriatic Sea, Sarajevo
Agency for the Water Basin of the Sava River, Sarajevo
Environmental Fund of FBiH, Sarajevo
Federal Administration for Geodetic and Property Affairs, Sarajevo
Federal Agro-Mediterranean Institute, Mostar
Federal Administration for Forestry, Sarajevo
Federal Institute for Agropedology, Sarajevo
Federal Ministry of Agriculture, Water Management and Forestry, Sarajevo
Federal Ministry of Environment and Tourism, Sarajevo
Federal Ministry of Physical Planning, Sarajevo

Cantons

Institute for Protection of Cultural-Historical and Natural Heritage of Canton Sarajevo
Institute for Spatial Planning and Environmental Protection, Mostar
Ministry of Physical Planning and Environmental Protection, Tuzla Canton
Ministry of Agriculture, Forestry and Water Management, Tuzla Canton
Ministry of Physical Planning, Transport and Communications and Environmental Protection, Zenica-Doboj Canton, Zenica
Ministry of Agriculture, Forestry and Water Management, Zenica-Doboj Canton, Zenica
Ministry of Construction, Reconstruction, Spatial Planning and Environment, Canton 10 (Herzeg-Bosnian County), Livno
Ministry of Agriculture, Water Management and Forestry, Canton 10 (Herzeg-Bosnian County), Livno
Ministry of Physical Planning, Construction, Environmental Protection, Return and Housing Affairs, Central Bosnia Canton, Travnik
Ministry of Agriculture, Water Management and Forestry, Central Bosnia Canton, Travnik

Ministry of Transport, Connections, Tourism and Environmental Protection, Posavina Canton, Orašje
Ministry of Agriculture, Water Management and Forestry, Posavina Canton, Orašje
Ministry of Construction, Urban Planning and Environmental Protection, Una-Sana Canton, Bihać
Ministry of Agriculture, Water Management and Forestry, Una-Sana Canton, Bihać
Ministry of Physical Planning, Construction and Environmental Protection, Sarajevo Canton
Ministry of Economics and Infrastructure, Sarajevo Canton
Ministry of Trade, Tourism and Environmental Protection, Herzegovina-Neretva Canton, Mostar
Ministry of Agriculture, Forestry and Water Management, Herzegovina-Neretva Canton, Mostar
Ministry of Economics of West-Herzegovina Canton, Široki Brijeg
Ministry of Urban Development, Construction and Environment, West Herzegovina Canton, Široki Brijeg
Ministry for Urban Planning and Environment, Bosnia-Podrinje Canton, Goražde
Ministry of Economics of Bosnia-Podrinje Canton, Goražde
Municipality of Fojnica
Municipality of Konjic

Republika Srpska

Environmental Protection and Energy Efficiency Fund of RS, Banja Luka
Ministry of Agriculture, Forestry and Water Management of RS, Banja Luka
Ministry of Spatial Planning, Civil Engineering and Ecology RS, Banja Luka
Ministry of Trade and Tourism of RS, Banja Luka
Municipality of Bileća
Municipality of Ribnik
Municipality of Teslić
Republic Administration for Geodetic and Property Affairs of RS, Banja Luka

Public enterprises

Federation of BiH

Nature Park Hutovo blato, Višići
PE Forests of Bosnia-Podrinje Canton, Goražde
PE Forests of Central Bosnia Canton, Travnik
PE Forests of Sarajevo Canton
PE Forests of Tuzla Canton
PE Forests of Herzegovina-Neretva Canton, Mostar
PE Forests of Una-Sana Canton, Bihać
PE Forests of Western Herzegovina Canton, Široki Brijeg
PE Forests of Zenica-Doboj Canton, Zenica
PE Vjetrenica – Popovo polje, Ravno

Republika Srpska

PE Forests of Republika Srpska, Banja Luka

Public institutions

State level

Agency for Statistics of Bosnia and Herzegovina, Sarajevo

Federation of BiH

Federal Hydro meteorological Institute, Sarajevo

Federal Institute for Agriculture, Sarajevo

Federal Institute for Agropedology, Sarajevo

Federal Institute for Geology, Sarajevo

Federal Institute for Statistics, Sarajevo

National Park Una, Bihać

Nature Park Blidinje, Jablanica, Posušje and Tomislavgrad

PI for Protected Areas of the Sarajevo Canton

PI Protected Monument "Konjuh", Banovići

Republika Srpska

Culture center Pale

Eco ethno village "Žuta Bukva", Kotor Varoš

Ethno village - museum "Ljubačke doline", Ljubačevo

National Park Kozara, Prijedor

National Park Sutjeska, Tjentište

PI "Vode Srpske" (Waters of Srpska), Banja Luka

Republic Hydrometeorological Institute, Banja Luka

Republic Institute for Protection of Cultural-Historical and Natural Heritage, Banja Luka

Institute of Statistics of the Republika Srpska, Banja Luka

Tourism Organization of Sokolac

Tourism Organisation of Šipovo

Tourism Organisation of Trebinje

Tourism Organization of Foča

Academic institutions

Federation of BiH

Agro-mediterranean Faculty, Mostar

Centre for Ecology and Natural Resources "Sulejman Redžić" (CEPRES), Faculty of Natural Sciences, Sarajevo

Center for Ihtiofauna and Fishery (CIR), Faculty of Natural Sciences, Sarajevo
Faculty of Agriculture and Food Sciences, Sarajevo
Faculty of Agriculture, Banja Luka
Faculty of Forestry, Sarajevo
Faculty of Natural Sciences, Sarajevo
Faculty of Sciences, Tuzla
Faculty of Sciences and Education, Mostar
Institute for Fishery, Zoology and Water Protection, Faculty of Agronomy, Mostar
Institute for Genetic Engineering and Biotechnology of Canton Sarajevo
National Museum of Bosnia and Herzegovina, Sarajevo

Republika Srpska

Agricultural Institute of RS, Banja Luka
Faculty of Forestry, Banja Luka
Faculty of Sciences, Banja Luka
Genetic Resources Institute of the Republika Srpska, Banja Luka

Organisations of civil society

Aarhus Center, Sarajevo
Amateur Mycological Association, Sarajevo
Arbor Magna, Banja Luka
Association for Plant Protection in BiH
Association for the protection of flora and fauna "Gromiželj", Bijeljina
Association of Hunting Associations in BiH, Sarajevo
Association Terra Dinarica
Center for Karst and Speleology, Sarajevo
Center for the Environment, Banja Luka
Eco Action, Sarajevo
Ecological Association "Lijepa naša", Čapljina
Environmental Protection Association - Green Neretva,
Fondeko, Sarajevo
Bosnian-Herzegovinian Herpetology Association - ATRA, Sarajevo
Hunters Association of Republika Srpska, Banja Luka
Ornithological Society „Our Birds“, Sarajevo
Society for Biological Research and Protection of Nature - BIO.LOG, Sarajevo
Ekotim, Sarajevo
Society for Research and Protection of Biodiversity, Banja Luka
Sport Fishing Association of Bosnia and Herzegovina
Sport Fishing Association of the Federation of BiH, Sarajevo
Sport Fishing Association of the Republika Srpska, Banja Luka
Željezničar Mountaineering Club, Sarajevo

International organisations

Delegation of the European Union to Bosnia and Herzegovina

Food and Agriculture Organization of the United Nations
Foreign Agricultural Service (FAS) - part of the U.S. Department of Agriculture (USDA)
Regional Cooperation Council (RCC)
Regional Environmental Center for Central and Eastern Europe - Bosnia and Herzegovina
Swedish International Development Cooperation Agency (SIDA)
U.S. Agency for International Development (USAID) Bosnia-Herzegovina
United Nations Educational, Scientific and Cultural Organization (UNESCO) BiH
United Nations Development Programme (UNDP) in Bosnia and Herzegovina
World Bank in Bosnia and Herzegovina
World Wide Fund for Nature World (WWF) Mediterranean Programme Office in Bosnia and Herzegovina

Companies

CETEOR Ltd., Sarajevo
Civil Engineering Institute "IG", Banja Luka
Dvokut pro Ltd., Sarajevo
Ecoplan, Mostar
ENOVA Ltd., Sarajevo
IPSA Institute, Sarajevo
Hydro-Engineering Institute - HEIS, Sarajevo

Annex 3. BIMR questionnaire

Regional Network for Biodiversity Information Management and Reporting (BIMR) Assessment

This questionnaire is prepared in scope of Open Regional Fund (ORF) for South East Europe - Biodiversity Sub-project: Regional Network for Biodiversity Information Management and Reporting (BIMR).

The Open Regional Fund for South-East Europe Biodiversity (ORF BD) project promotes regional cooperation of biodiversity-related organisations – in particular the ministries in charge of environment and environmental protection agencies, institutes for nature conservation as well as the ministries that deal with or impact on biodiversity and environment, including forestry, agriculture, tourism, water and energy, the municipal administrations, academic institutions and research institutes as well as non-governmental environmental organisations. Activities of the ORF are bundled and channelled through so-called sub-projects (SP).

Importance of improving regional biodiversity information management and reporting was raised by stakeholders in the target economies of South-East Europe (SEE) region in the project identification mission in 2014 and therefore addressed as one of the three priority intervention areas of ORF BD. The continued project consultations up to now, including those held at the ORF BD kick-off meeting in Belgrade, in February 2016 reconfirmed the need for intervention and resulted in the development of a SP Biodiversity Information Management and Reporting (BIMR).

The objective of SP BIMR is that capacities of partner institutions needed to meet Convention on Biological Diversity (CBD) and EU reporting requirements have been improved in SEE.

This questionnaire is intended for collecting data regarding biodiversity information system set-up assessment in each country and are intended for: Biodiversity data collectors (data collector is an institution/organization/expert that collects biodiversity data through field inventory); Biodiversity data integrators (data integrator is an institution/organization that finances biodiversity data field research or an institution/organization that collects biodiversity data from external experts/institutions on the basis of legal obligation); Biodiversity data providers (data provider is an institution/organization that serves biodiversity data to other stakeholders in structured form - database, web service etc.).

BIMR questionnaire in PDF format is available at the following link:

<https://drive.google.com/file/d/0B35G6cPOz8QjUTBNUTZlb0dkTXM/view>

* Required

Skip to question 1.

Stakeholder general information

Institution/organisation contact information

Please enter the info regarding your institution/organisation

1. Name *

2. Address *

3. Postal code *

4. City *

Stakeholder person contact information

Please enter the info regarding the person filling the questionnaire

5. Name and surname of the person filling the questionnaire *

6. Position of the person filling the questionnaire *

7. E-mail of the person filling the questionnaire *

8. How would you describe your role in regards to the biodiversity data? *

Check all that apply.

Biodiversity data collector (data collector is an institution/organization/expert that collects biodiversity data through field inventory)

Biodiversity data integrator (data integrator is an institution/organization that finances biodiversity data field research or an institution/organization that collects biodiversity data from external experts/institutions on the basis of legal obligation)

Biodiversity data provider (data provider is an institution/organization that serves biodiversity data to other stakeholders in structured form - database, web service etc.)

Important notice

Questions in this questionnaire are divided in sections and are organized in three groups - Group 1. Biodiversity data collectors, Group 2. Biodiversity data integrators and Group 3. Biodiversity data providers.

Please answer ONLY question group(s) based on your selected role (data collector, data integrator or data provider).

Please SKIP question group(s) that are not intended for your role by choosing Next option (button) on the bottom of each question group page.

Stakoholder that belongs in two or more categories has to complete each corresponding parts of the questionnaire

A. Data collectors specific questions

This question group is intended specifically for Biodiversity data collectors.

Leave answers empty if you (or your organization) does not fit into the stakeholder category.

9. A1. What group(s) of organism do you collect data about?

Check all that apply.

- Plants
- Invertebrates (marine and terrestrial)
- Vertebrates
- Fungi
- Microorganisms

10. A2. What specific area of your country do you cover with biodiversity data?

Check all that apply.

- Entire county territory
- Specific region(s)

11. A2.1. If you collect data for specific region(s), please indicate which region(s) you cover with biodiversity data:

12. A3. What is the category of biodiversity data you are collecting?

Check all that apply.

- Species
- Ecosystems
- Biological communities
- Landscape features
- Land use
- Other: _____

13. **A4. What specific biodiversity data do you collect/store? (i.e. specific groups of species, animals, populations etc.)**

14. **A5. In what form do you collect biodiversity data/information?**

Check all that apply.

- Photographs, audio records etc.
- Processed/collected specimens or their parts
- Field observations
- Remote sensing (telemetry, photo-traps, satelit imagery etc.)
- Collecting biodiversity features from maps and GIS data Other:
- _____

15. **A6. Do you keep biodiversity specimens (collections)?**

Mark only one oval.

- Yes
- No

16. **A6.1. If you selected "Yes" in the previous question, please describe the type of specimens you keep in your collection:**

17. **A6.2. If you selected "Yes" in the previous question, please indicate approximate number of specimens you keep in your collection:**

18. **A7. Do you use any predefined standardized forms for data collecting?**

Mark only one oval.

- Yes
 No

19. **A8. Do you use any software solutions for data collection (used on PDAs, mobile devices, laptops)?**

Mark only one oval.

- Yes
 No

20. **A8.1. If you selected "Yes" in the previous question, please describe which software solutions you use for biodiversity data collecting.**

21. **A9. Do you use any software solutions for data storage (database systems, digital table formats or any other solution for storage of structured data)?**

Mark only one oval.

- Yes
 No

22. **A9.1. If you selected "Yes" in the previous question, please describe which software solutions you use for data storage.**

23. **A10. In which format do you keep your biodiversity data?**

Check all that apply.

- Text documents
 Tables (e.g. Excel, CSV)
 Databases (e.g. Access, SQL Server) Geo tagged
 photographs
 Geospatial data (e.g. Shapefile, GPX, KML)
 Other: _____

24. A11. Please specify where your biodiversity data is stored.

Check all that apply.

- Personal computer
- Local network
- Remote server
- Cloud service

25. A12. What type of biodiversity data are you ready to share?

Check all that apply.

- Information on taxonomy and nomenclature
- Information on species occurrences
- Ecosystem information
- Genetic information
- Geographical information
- Information on natural resources
- Other: _____

26. A13. Who are you ready to provide biodiversity information to?

Check all that apply.

- Individual researchers
- Training/educational institutions
- Research institutions
- Decision makers on governmental, regional and local level
- NGOs
- Media
- Companies dealing with EIA-SEA
- Other: _____

27. A14. In your opinion which are major obstacles to sharing biodiversity data?

Check all that apply.

- Although the dataset has been used in at least one published paper, I need to do more analyses
- I am afraid of colleagues with conflict interests using my data
- I cannot obtain expected benefits from sharing biodiversity data
- I do not know any properly public database to archive my data
- I am not authorized to share data by my organisation or supervisor
- Databases have no easy tool to submit my data
- Other: _____

28. A15. What benefits do you wish to obtain from sharing data?

Check all that apply.

- Material benefits
- Reputation
- Higher citation rates
- Involvement in future assessments and field research
- Other: _____

29. A16. Are there sufficient capacities and skills for adequate data collecting?

Mark only one oval.

- Yes
- No

30. A16.1. If answer to previous question is “No”, please specify what capacities and skills are you missing?

31. A17. Are there sufficient capacities and skills for adequate data processing and analysis?

Mark only one oval.

- Yes
- No

32. A17.1. If answer to previous question is “No”, please specify what capacities and skills are you missing?

B. Data integrators specific questions

This question group is intended specifically for Biodiversity data integrators.

Leave answers empty if you (or your organization) does not fit into the stakeholder category.

33. **B1. What is the source of biodiversity data that you integrate - is data collection conducted in-house (with your own experts) or/and obtained from external expert institutions or individuals (faculties, museums, institutes, NGOs, individual experts)?**

Check all that apply.

- In-house data collection
- External sources

34. **B2. What are the external sources that you obtain biodiversity data from?**

Check all that apply.

- Faculties/academia
- Museums
- Institutes
- NGOs
- Individual experts
- General public

35. **B3. Do you have formal cooperation agreements or contracts with external sources of biodiversity data?**

Mark only one oval.

- Yes
- No

36. **B4. Do cooperation agreements or contracts with researchers/external sources cover data ownership and data usage aspects?**

Mark only one oval.

- Yes
- No

37. **B5. Are there any specific biodiversity data that you integrate/maintain? (i.e. only marine data, forest ecosystems, fresh water ecosystems etc.)**

38. **B6. Do you use any software solutions for data storage (database systems, digital table formats or any other solution for storage of structured data)?**

Mark only one oval.

- Yes
- No

39. **B6.1. If you selected "Yes" in the previous question, please describe which software solutions you use for data storage.**

40. **B7. Do you maintain biodiversity bibliography database?**

Mark only one oval.

Yes

No

41. **B7.1. If you selected "Yes" in the previous question, please indicate approximate number of bibliography data you have in your database.**

42. **B8. What type of biodiversity data are you ready to share?**

Check all that apply.

Information on taxonomy and nomenclature

Information on species occurrences

Ecosystem information

Genetic information

Geographical information

Information on natural resources

Other: _____

43. **B9. In your opinion which are major obstacles to sharing biodiversity data?**

Check all that apply.

Although the dataset has been used in at least one published paper, I need to do more analyses

I am afraid of colleagues with conflict interests using my data

I cannot obtain expected benefits from sharing biodiversity data

I do not know any properly public database to archive my data

I am not authorized to share data by my organisation or supervisor

Databases have no easy tool to submit my data

Other: _____

44. **B10. Are there sufficient capacities and skills for adequate data processing and analysis?**

Mark only one oval.

Yes

No

45. **B10.1. If answer to previous question is “no” can you please specify what capacities and skills are you missing?**

46. **B11. Is there any data quality control or data validation performed?**

Mark only one oval.

Yes

No

47. **B11.1. If answer to previous question is “Yes” please describe in more details how you perform data quality control or data validation on your data?**

48. **B12. Do you have practice of regular data backup?**

Mark only one oval.

Yes

No

49. **B13. Do you use any of the national or international species/habitats catalogues for resolving taxonomic status of your biodiversity data (such as national checklists, EU Nomen PESI, Catalogue of Life, Fish Base or similar)?**

Mark only one oval.

Yes

No

50. **B14. Are you responsible for maintaining and updating of check-lists for any group of flora and fauna?**

Mark only one oval.

- Yes
 No

51. **B14.1. If answer to previous question is “Yes” please could you explain in more details how you are performing activities related to maintaining and updating the relevant checklists.**

52. **B15. Are you aware of EU INSPIRE Directive?**

Mark only one oval.

- Yes, but I have only heard about this Directive and I am not fully familiar with the scope and objective of the Directive
 Yes, I am familiar with INSPIRE Directive scope, regulations and technical guidelines
 No

C. Data providers specific questions

This question group is intended specifically for Biodiversity data providers.

Leave answers empty if you (or your organization) does not fit into the stakeholder category.

53. **C1. Do you provide your data to external users?***Mark*

only one oval.

- Yes
 No

54. **C2. Is the provided data available in structured format (database, web service)?***Mark*

only one oval.

- Yes
 No

55. **C2.1. If the answer to previous question is “Yes”, please specify in which structured format is data available.**

56. **C3. Do you charge for data (i.e. do users need to pay for data)?**

Mark only one oval.

- Yes
- No
- Other: _____

57. **C4. If you charge for data access do you make exceptions - are there specific institutions/ organizations that you provide your data for free (such as ministries, agencies or public institutions)?**

Mark only one oval.

- Yes
- No

58. **C4.1. If the answer to previous question is “Yes”, please specify to which institutions/organizations do you provide or you are ready to provide your data for free.**

59. **C5. Are you aware of EU INSPIRE Directive?**

Mark only one oval.

- Yes, but I have only heard about this Directive and I am not fully familiar with the scope and objective of the Directive
- Yes, I am familiar with INSPIRE Directive scope, regulations and technical guidelines
- No