



MONITORING AND EVALUATION SUPPORT ACTIVITY (MEASURE-BiH)

# COUNTRY BIODIVERSITY ANALYSIS: BOSNIA AND HERZEGOVINA

FAA 119 Analysis

Actions Necessary for Biodiversity Protection

July 2016



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## LIST OF ABBREVIATIONS

<b>ADS</b>	Automated Directives System
<b>BAM</b>	Bosnia and Herzegovina convertible mark
<b>BAT</b>	Best Available Techniques
<b>BD</b>	Brčko District
<b>BIH</b>	Bosnia and Herzegovina
<b>EC</b>	European Commission
<b>EMIS</b>	Environmental Management Information System
<b>EU</b>	European Union
<b>FAA</b>	Foreign Assistance Act
<b>FBiH</b>	Federation of Bosnia and Herzegovina
<b>FMET</b>	Federal Ministry of Environment and Tourism of FBiH
<b>FSC</b>	Forest Stewardship Council
<b>GDP</b>	Gross domestic product
<b>GEF</b>	Global Environment Facility
<b>IBA</b>	Important Bird Area
<b>IESCE</b>	Inter-Entity Steering Committee for the Environment
<b>IPA</b>	Instrument for Pre-Accession Assistance
<b>IUCN</b>	International Union for Conservation of Nature
<b>MDGF</b>	Millennium Goals Development Fund
<b>MEA</b>	Multilateral Environmental Agreement
<b>MOFTER</b>	Ministry of Foreign Trade and Economic Relations
<b>MUPCEE</b>	Ministry of Urban Planning, Civil Engineering and Ecology of Republika Srpska
<b>NBSAP</b>	Strategy of Bosnia and Herzegovina and Action Plan for Biodiversity and Landscape's Protection
<b>NGO</b>	Non-governmental organization
<b>NM</b>	Nature Monument
<b>NP</b>	National Park
<b>OG</b>	Official Gazette
<b>PA</b>	Protected Area
<b>PL</b>	Protected Landscape
<b>PRTR</b>	Pollutant Release and Transfer Register
<b>RS</b>	Republika Srpska
<b>SC</b>	Sarajevo Canton
<b>SEP</b>	Stakeholder Engagement Plan
<b>SNR</b>	Strict Nature Reserve
<b>UNCBD</b>	United Nations Convention on Biological Diversity
<b>UNCCD</b>	United Nations Convention to combat desertification / land degradation
<b>UNDP</b>	United Nations Development Programme
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UNEP</b>	United Nations Environmental Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>USAID</b>	United States Agency for International Development
<b>USD</b>	United States Dollar
<b>WWF</b>	World Wide Fund for Nature

## I. EXECUTIVE SUMMARY

**Introduction:** The report *Biodiversity Analysis – Action Necessary for Biodiversity* is developed in line with the requirements of Section 119 (d) of the Foreign Assistance Act of 1961 (as amended) and Automated Directives System 201.3.9.2 regarding biodiversity analyses for country-level long term plans. The Report is the update of United States Agency for International Development 2011 Biodiversity Report intended to assist the USAID Bosnia and Herzegovina Mission during the upcoming strategic planning process for the period 2016-2021 by identifying the actions necessary to conserve biodiversity in the country. It is based on information obtained from desk review of background documents related to biodiversity and information obtained through: (i) interviews with key stakeholders, (ii) surveys, and (iii) focus groups with local communities. The Project Team would like to thank all who contributed to the development of this Report with information, sharing of their knowledge, experiences and opinions.

**Country Background Information:** Bosnia and Herzegovina is a country in South-eastern Europe located on the Balkan Peninsula, bordered by Croatia to the north, west, and south; Serbia to the east; Montenegro to the southeast; and the Adriatic Sea to the south, with a coastline of about 20 kilometers (12 miles) long. Sarajevo is the capital and largest city. In the central and eastern interior of the country the geography is mountainous, in the northwest it is moderately hilly, and the northeast is predominantly flatland. The inland is a geographically larger region and has a moderate continental climate, with hot summers and cold and snowy winters. The southern tip of the country has a Mediterranean climate and plain topography. Bosnia and Herzegovina has a population of 3,531,159 people. The country is home to three main ethnic groups or, officially, constituent peoples: Bosniaks, Serbs and Croats. The central government's power is highly limited, as the country is largely decentralized and comprises two autonomous entities: the Federation of Bosnia and Herzegovina and Republika Srpska, with a third region, the Brčko District, governed under local government. The Federation of Bosnia and Herzegovina is itself complex and consists of 10 federal units—cantons. The country is a potential candidate for membership to the European Union.

**Status of Biodiversity:** Bosnia and Herzegovina has a particularly rich biodiversity due to its location influenced by three distinct geological and climatic regions: (i) the Mediterranean region, (ii) the Euro Siberian-Bore American region, and (iii) the Alpine-Nordic region. As a result of unique orography, geological surface, hydrology and eco-climate, Bosnia and Herzegovina is one of the countries in Europe with the greatest diversity of species of plants and animals. Vascular flora accounts for about 5,000 confirmed taxa of species, subspecies, and variety and form levels. As much as 30% of the total endemic flora in the Balkans (1,800 species) is contained within the flora of Bosnia and Herzegovina. Some advancement has been achieved since 2011 in relation to status of biodiversity information. Republika Srpska established the register of Protected Areas. Eight documents developed after 2011 present data about status of biodiversity using 15 relevant indicators. Bosnia and Herzegovina Agency for Statistics included 3 indicators for biodiversity in their statistical report from 2013. The new areas of special importance to biodiversity and new unique aspects of biodiversity have not been identified since 2011. Unique aspects of biodiversity are hidden in protected areas that are most probably supporting life of new, so far undiscovered, species. This argument is supported by several pilot studies resulting in discovery of new species earlier unknown to Bosnia and Herzegovina scientific community. Situation concerning landscape and ecosystem diversity has not changed significantly compared to 2011, mainly due to the lack of a monitoring system regarding status and trends of landscape and ecosystem diversity in Bosnia and Herzegovina. The best situation in terms of monitoring the status of ecosystems is in the forestry sector. The Development of Forest Management Baseline Documents and establishment of pilot sites in certificated forest areas provided significant data on status of forest ecosystems. Several research



activities in Bosnia and Herzegovina regarding assessment and valorization of ecosystem services have been carried out since the 2011 Report. Since 2011 the number of birds species increased by 14 new species and amounts to total of 340 species, while number of mammals increased by 2 new species and amounts to total of 87 species. Entities have developed and adopted red lists of endangered species of flora and fauna including list of endangered fungi which (Federation of Bosnia and Herzegovina only). In total, 1,029 species have been put on the Federation of Bosnia and Herzegovina red list, and 1,545 species on the Republika Srpska red list. Bosnia and Herzegovina has not yet developed a Red Data Book of threatened species. Compared to the 2011 Report, some improvements have been observed concerning genetic diversity including: initiation of the first steps for accession to the *Nagoya Protocol* (Feasibility Study for accession to the Nagoya Protocol has been developed), integration of issues of protection of genetic diversity into entity agriculture strategies, and establishment of gene banks and botanical gardens. The research of genetic diversity of forests, ichthyofauna and agricultural variety of fruits and grains has also been carried out, but the results are not publicly available. A particular progress in terms of protection of genetic diversity is seen in Republika Srpska through development of programs for conservation and sustainable use of plant genetic resources.

**Threats to Biodiversity:** Since the 2011 Report there are no new threats to biodiversity reported. The pressures of already identified threats increased compared to 2011, especially in the industrial and energy sector.

**Society's Responses:** No international conventions of importance to biodiversity have been ratified after 2011. Seven Multilateral Environmental Agreements (MEAs) of importance to biodiversity are expected to be ratified by 2018. For most MEAs ratification is in progress. National policy framework that is relevant to biodiversity and natural resource use, has not changed since 2011. The most significant change is the adoption of new entity Laws on Nature Protection in 2013 in the Federation of Bosnia and Herzegovina and in 2014 in RS. Development of the second NBSAP for the 2015 – 2020 period was started in January 2013. The document was completed in 2014, but still not adopted by the state Council of Ministries. The Nature Protection Strategy of Republika Srpska was developed in 2011. The Environmental Protection Strategy of Brčko District (2013-2023) that also includes nature protection strategy is in the adoption procedure. Since the 2011 Report there was no change in terms of institutional capacities. All environmental issues are the responsibility of entity ministries for environment. International cooperation and harmonization of state affairs is the responsibility of state institutions. At Cantonal level (Federation of Bosnia and Herzegovina) there is one ministry per canton. 31 research institutions provide professional and expert opinions on biodiversity in Bosnia and Herzegovina. Ten new protected areas were proclaimed in Bosnia and Herzegovina since 2011 while only 1 new protected area manager (Protected Landscape Konjuh) was appointed. Among many NGOs in Bosnia and Herzegovina, 19 were identified as being active in biodiversity research and protection issues. According to the entity legislation on nature protection, the system of protection of natural areas foresees establishment of national Protected Areas (in line with International Union for Conservation of Nature categorization) and Natura 2000 sites. Important Bird Area and Ramsar sites are not integrated into the national protected area system, as they are not recognized in the legislation on nature protection in the Federation of Bosnia and Herzegovina and Republika Srpska. There are no established NATURA 2000 areas or areas of importance for the European to date. Number of Ramsar and Important Bird Area sites remains the same compared to the 2011 Report. For areas that have potential to be proclaimed as protected the situation has not changed since the 2011 Report. The most important documents for establishment of protected areas continue to be the entity spatial plans.

**Biodiversity Value Identification:** The value of biodiversity for people and sustainable local development was in general analyzed using the ecosystem services approach including protected areas and the services their ecosystems provide. Information and opinions were collected based on the statements of the focus groups and a survey. Indirect benefits (regulating and supporting ecosystem services) mainly come from forest ecosystems. Biodiversity contributes significantly (Direct benefits: provisioning and cultural ecosystem services) to the local population livelihoods in rural and underdeveloped areas of Bosnia and Herzegovina, as well as rural development of certain, mostly protected, areas. Forest and meadows ecosystems are most significant for direct benefits (provisioning ecosystem services) which are particularly noticeable in rural areas, as confirmed by the focus group participants who harvest forest fruits, medicinal plants and mushrooms. Information on the contribution of tourism and recreation (cultural ecosystem services) on rural development (especially in protected areas) was not available during the preparation of this study. There have been few research activities in Bosnia and Herzegovina regarding assessment and valorization of ecosystem services, two of them related to protected areas (Nature Park Hutovo blato and National Park Una) where economic value of all certain ecosystem services were calculated.

**Biodiversity Conservation Needs:** The biodiversity conservation needs are identified through detailed analysis of the current state, threats and responses to biodiversity needs (Chapters 4-6 of this Report). Opinions of relevant stakeholders were taken into account.

**Relevant Current and Planned Activities:** Around 50 projects were implemented in the period 2011-2015 with a total value of over USD 1.0 million. Main international donors were the World Wide Fund for Nature, Mava foundation, Ministry of Foreign affairs of Norway, Instrument for Pre-Accession Assistance fund (IPA)/European Commission and German non-governmental organization Euronatur. The entity environmental funds and relevant ministries also contributed to the sector.

**Actions Needed to Conserve Biodiversity:** 54 specific actions are identified aiming at addressing Biodiversity Conservation Needs (Chapter 8).

## 2. INTRODUCTION

### 2.1 PURPOSE AND OBJECTIVES

United States Agency for International Development (USAID)/Bosnia and Herzegovina (BiH) commissioned IMPAQ International, under MEASURE-BiH, to conduct *Country Biodiversity Analysis for Bosnia and Herzegovina*. MEASURE-BiH, with our partner Enova d.o.o. Sarajevo will produce two deliverables for this analysis: (i) Biodiversity Analysis – Action Necessary for Biodiversity protection, and (ii) Addressing the Biodiversity Needs in 2016 – 2021.

This Report (Biodiversity Analysis – Action Necessary for Biodiversity Protection) is developed in line with the requirements of Section 119 (d) of the Foreign Assistance Act (FAA) of 1961 (as amended) and Automated Directives System (ADS) 201.3.9.2 regarding biodiversity analyses for country-level long term plans. Under FAA Section 119 (d), USAID Missions are required to report on the actions necessary to conserve biodiversity in the BiH and, the extent to which actions proposed by USAID under its strategy meet those conservation needs. The assessment is intended to assist the USAID BiH Mission during the upcoming strategic planning process for the period 2016-2021 by identifying the actions necessary to conserve biodiversity in the country, and the extent to which actions proposed by the Agency meet the needs thus identified.

This Report is an update of USAID's 2011 Biodiversity Report (hereinafter referred to as the 2011 Report) and includes the following topics: (i) general overview of information available on the status of biodiversity in BiH, (ii) descriptions and status of major natural ecosystems, species and PAs, (iii) description of current and potential threats to biodiversity, (iv) description of the current policy framework, (v) description, structure, capacity, intended and perceived role of all important public institutions, (vi) description of relevant current and planned activities of other donors, (vii) identification of the value of biodiversity to local population through organization of focus groups and (viii) summary of perceived biodiversity conservation needs.

### 2.2 METHODOLOGY

This Report was prepared based on information obtained from desk review of background documents related to biodiversity and information obtained through: (i) interviews with key stakeholders, (ii) surveys, and (iii) focus groups in local communities.

This Report contains systematically collected, sorted and processed information about biodiversity in BiH, summarized and described in the following manner: (i) the status of biological diversity, (ii) threats to biodiversity (iii) society's responses, (iv) biodiversity value identification (v) biodiversity conservation needs (vi) relevant current and planned activities (donors and international non-governmental organization (NGOs)), and (vii) actions needed to conserve biodiversity (Action Plan).

The baseline for comparison and analysis was the 2011 USAID Biodiversity Analysis Report. The key background documents used for preparation of this Report were as follows:

- NBSAP BiH 2008-2015<sup>1</sup>;
- Second Environmental Performance Review Report for BiH - United Nations Economic Commission for Europe (UNECE) (2011);
- Natura 2000 BiH – publication (World Wildlife Fund, 2011);
- Decree on Red List of Protected Flora and Fauna of RS (RS) (Official Gazette (OG) of RS, no. 124/12);

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<sup>1</sup>Official name: The Strategy of BiH and Action Plan for Biodiversity and Landscape's Protection.

- State of Environment Report BiH (MOFTER BiH, 2012) supported by Millennium Goals Development Fund (MDGF) of United Nations Development Programme (UNDP);
- Selected Environmental Indicators for BiH (Agency for statistics of BiH, 2013);
- Draft list of Natura 2000 areas (MOFTER BiH, 2013);
- Sustainable Development Indicators for BiH Agency for statistics, 2014);
- BiH Fifth Report to the Convention on Biological Diversity (2014);
- Red List of Wild Species and Subspecies of Plants, Animals and Fungi of (OG of the FBiH, no. 7/14);
- Draft of NBSAP BiH 2015-2020<sup>2</sup>.


A comprehensive stakeholder engagement strategy was developed at the beginning of the project. The Stakeholder Engagement Plan (SEP) identified all relevant stakeholders including public institutions (both governmental and non-governmental), universities and scientific and research institutions, PAs managers and donors. Information was obtained through face-to-face interviews and survey based on questionnaires. A set of questionnaires was prepared for each group of stakeholders with questions relevant for their competence and level of involvement in nature protection. The non-governmental organizations (NGOs), universities and scientific and research institutions were provided with the questionnaires, while representatives of entity institutions responsible for environmental and biodiversity issues as well as PAs managers were interviewed face to face. The report also includes the views of local population in relation to the value of biodiversity as well as of implication of biodiversity to the local/rural development. Their views were sought through two focus groups in 2 pilot PAs in BiH: National Park (NP) Sutjeska in RS and Protected Landscape (PL) Bijambare in FBiH.

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<sup>2</sup>Official name: Strategy and Action Plan for Protection of Biodiversity in BiH.

### 3. COUNTRY BACKGROUND INFORMATION

**Table I: General Information about Bosnia and Herzegovina**

<b>Official name:</b>	Bosnia and Herzegovina (Bosna i Hercegovina - BiH)
<b>Capital:</b>	Sarajevo (275,524 citizens) <sup>3</sup>
<b>Other major towns:</b>	Banja Luka, Bihać, Mostar, Tuzla, Zenica
<b>Geographic location:</b>	BiH is located at the western part of Balkan peninsula.
<b>Surrounding countries:</b>	Serbia (north-east), Montenegro (south-east), Croatia (north, west and south).
<b>Administrative division:</b>	<p>BiH consists of two entities: Federation of BiH (FBiH) and Republika Srpska (RS), and a separate administrative unit under the exclusive sovereignty of the State – Brčko District (BD).</p>  <p style="text-align: center;"><b>Figure 1: Administrative Set-up</b></p>
<b>Entity structure:</b>	FBiH is divided into 10 cantons. Cantons are further divided into municipalities. FBiH has 79 municipalities. RS has 62 municipalities. BD is a separate administrative unit - District.
<b>Area:</b>	BiH has 51,209.2 km <sup>2</sup> , where 51,197 km <sup>2</sup> (99.9 %) is land and sea covers 12.2 km <sup>2</sup> (0.1 %).
<b>Climate:</b>	Mostly continental, Mediterranean at the south.
<b>Population:</b>	3,531,159 <sup>4</sup>
<b>Population structure:</b>	Bosniaks, Croats, Serbs and others.
<b>Religions:</b>	Muslims, Eastern Orthodox Christians, Roman Catholics, other
<b>Official languages:</b>	Bosnian, Croatian and Serbian with two alphabets: latin and cyrillic.
<b>Official currency:</b>	Konvertibilna marka (KM), international BAM. Pegged to Euro, 1 KM = 0,511292 Euro.
<b>GDP:</b>	27,259 million BAM / 13,943.02million EUR (2014) <sup>5</sup>
<b>GDP per capita:</b>	7,123 BAM / 4,040.19 USD / 3643.43 EUR (2014) <sup>6</sup>

<sup>3</sup>Agency for Statistics of BiH (2016).2013 Census of Population, Households and Dwellings in BiH. Sarajevo

<sup>4</sup> Ibid.

<sup>5</sup> Agency for Statistics of BiH, link: <http://www.bhas.ba/> (last accessed on July 12, 2016).

<sup>6</sup>Ibid.

## 4. STATUS OF BIODIVERSITY

### 4.1 GENERAL OVERVIEW

BiH has a particularly rich biodiversity due to its location influenced by three distinct geological and climatic regions: (i) the Mediterranean region, (ii) the Euro Siberian-Bore American region, and (iii) the Alpine-Nordic region.<sup>7</sup> As a result of unique orography, geological surface, hydrology and eco-climate, BiH is one of the countries in Europe with the greatest diversity of species of plants and animals. Vascular flora accounts for about 5,000 confirmed taxa of species, subspecies, and variety and form levels. As much as 30% of the total endemic flora in the Balkans (1,800 species) is contained within the flora of BiH.

### 4.2 STATUS OF BIODIVERSITY INFORMATION

Some progress has been achieved since 2011 in relation to status of biodiversity related information. RS established the register of PAs. Eight documents developed after 2011 present data about the status of biodiversity using 15 relevant indicators. BiH Agency for Statistics included 3 indicators for biodiversity in their statistical report from 2013.

Although all five BiH reports to the UNCBD highlight significant biodiversity in BiH in terms of genetic diversity, species diversity and ecosystem diversity, there are no exact and up-to-date general and specific data on status of biodiversity.

The problem with the unavailability of data and indicators for biodiversity monitoring is recognized though the Project "Capacity Development for Integration of Global Environmental Commitments into National Policies and Development of Decision Making in BiH", approved and funded in July 2014 by the Global Environment Facility (GEF) and implemented by the United Nations Environmental Programme (UNEP). The project is aiming at establishing a system for reporting and data flow (EMIS) in accordance with the requirements of the three Rio conventions (United Nations Framework Convention on Climate Change - UNFCCC, the United Nations Convention on Biological Diversity - UNCBD and the United Nations Convention to Combat Desertification/Land Degradation - UNCCD). One of the results of the project will be a list of indicators in the field of environment (including nature protection and biodiversity), with a methodology adopted at state level that would improve monitoring of biodiversity and facilitate reporting of BiH to the Conventions.

Systematic collection and analysis of data on biodiversity and monitoring of biodiversity status is almost non-existent. At the state level, the Agency for Statistics of BiH is responsible for providing relevant statistical data. When it comes to providing environmental data, or biodiversity related statistical data there is no competent institution at any administrative level. In 2013, Agency for Statistics of BiH reported on 3 indicators for biodiversity (listed in Table 2).

The main sources of data on biodiversity come from studies and publications prepared by various institutions or are an outcome of the assessments carried out in the framework of different projects funded by 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 (e.g. baseline study on birds and bats for development of wind farm projects in the country). Monitoring of certain

<sup>7</sup>RS Ministry for Spatial Planning, Civil Engineering and Ecology (2013).  
Second National Communication of BiH under the UNFCCC. Banja Luka

species and areas is carried out in studies and researches for scientific purposes. However that information is usually not available to the general public.

According to the current laws on nature protection in the entities and BD, entities and the district are obliged to establish information systems for nature protection. However these information systems are not in place. Only RS has introduced a register of PAs. RS also plans to adopt the bylaw on management of information system, issues of monitoring, collecting, recording and analyzing data, facts and other relevant information about the state and use of nature in 2016. Data collected on PAs are submitted to the Institute for Protection of Cultural, Historical and Natural Heritage of RS, responsible for updating the register of PAs.

Several documents included data about status of the environment including biodiversity in the past years. Documents developed since 2011 are given in Table 2.

**Table 2: Overview of Indicators on Biodiversity Presented in Relevant Documents in BiH**

Document	Indicators	Available data
<b>Second Environmental Performance Review Report for BiH (UNECE, 2011)</b>	- The current state of information on biodiversity, - Threats to biodiversity, - Use of biodiversity, - Number and coverage of PAs.	-Rating of vertebrates biodiversity (with the number of species) -The number of traditionally used flora species -National PAs (by categories and their surfaces)
<b>Natura 2000 BiH – publication (WWF, 2011)</b>	/	-Data about all habitats and species listed in Appendix I and II of the EU Habitats Directive present in BiH, based on literature data, and partial field verification within field researches. -A digital database - BIS (Biodiversity Information System), based on the ArcGIS platform, was developed.
<b>Decree on the Red List of endangered species of flora and fauna of RS (OG of RS, no. 124/12) (2012)</b>	/	The Red List consists of a list of endangered species of flora and fauna in RS (vascular flora, metazoan, fish, amphibians, reptiles, birds and mammals). Every list contains the following data: scientific, name, used synonym, name of species and family.
<b>State of Environment Report BiH (MOFTER BiH, 2012) supported by MDGF (UNDP).</b>	CSI 007 (SEBI 003) - Species of European interest, CSI 008- Designated areas, CSI 009 (SEBI 004)- Species diversity, SEBI 013- Fragmentation of natural and semi-natural areas, SEBI 025- Financing biodiversity management, SEBI 026- Public awareness, CLIM 022- Distribution of plant species, CLIM 024- Distribution and abundance of animal specie	- Status of biological and landscape diversity , -pressures and threats to biodiversity, -endangered and protected species, -Invasive species, -PAs, -Ramsar sites, - Changes in biodiversity related to climate change.
<b>Selected environmental indicators for BiH (Agency for statistics of BiH, 2013)</b>	EECCA D17 PAs, Forest and other wooded land, Threatened and protected species <sup>8</sup>	- EECCA D17 PAs- data available for 1990 and 1995 and period 2000-2012.
	EECCA D18 forests and forest areas	- Forests and forest areas ('000 ha) for the period 2007-2012
	EECCA D19 Endangered and protected species <sup>9</sup>	-Number of endangered species according to IUCN categories for 2013
<b>Draft list of Natura 2000 areas (MOFTER BiH, 2013)</b>	/	-List of potential Natura 2000 areas with codes, areas, species and habitats - Draft of list of 122 potential Natura 2000 areas in BiH – on SDF forms, - Topographic maps (1:25.000) of the draft of potential Natura 2000 areas in BiH

<sup>8</sup> The indicator is calculated by analyzing the number and size of PAs in each category annually. Change in PAs is showed according to international and national categories through the years.

<sup>9</sup> This indicator shows the estimated number of globally threatened and/or protected species (according to IUCN standards and national legislation) present in BiH.

Document	Indicators	Available data
<b>Sustainable Development Indicators for BiH (Agency for statistics of BiH, 2014)</b>	/	-Indicator on the increase in percentage of terrestrial PAs for period 1990 – 2012
<b>Red List of Wild Species and Subspecies of plants, animals and fungi of FBiH (OG of FBiH, no. 7/14) (2014)</b>	/	-List of taxons according to endangered status. In the assessment of status of taxons the <i>IUCN Red List categories</i> version 3.1. was used

### 4.3 UNIQUE ASPECTS OF BIODIVERSITY

The new areas of special importance to biodiversity and new unique aspects of biodiversity have not been identified since 2011. Unique aspects of biodiversity are hidden in PAs that are most probably supporting life of new, so far undiscovered, species. This argument is supported by several pilot studies resulting in discovery of new species earlier unknown to BiH scientific community.

BiH has many unique aspects of biodiversity such as natural and preserved forest ecosystems (virgin forests, of special importance for genetic diversity), large areas of karst with many unexplored speleological structures, relict-refugial types of ecosystems as endemic centres of development and occurrence of new species, and numerous endemic and relict species.

Relict-refugial types of ecosystems (ecosystems in the crevices of carbonate, dolomite, volcanic and silicate rocks) and ecosystems of screes (predominantly represented in canyons of the Una, Vrbas, Drina and Neretva rivers) are of special value to the biodiversity of BiH. These ecosystems are especially important as endemic centers of development and occurrence of new species. Relict and refugial species are surviving unfavorable climate conditions in shelters suitable to their ecological niche and available in the nature of BiH. Additionally, glacial relicts are found in ecosystems of snow patches, subalpine and alpine meadows as well as in ecosystems of rock crevices in the high-mountain area.<sup>10</sup>

Species discovered after 2011 are described in Chapter 4.5 Diversity of Species.

### 4.4 LANDSCAPE AND ECOSYSTEM DIVERSITY

Given the lack of ecosystem inventories and lack of systematic monitoring of landscape and ecosystem biodiversity, progress in this area in relation to 2011 could not be assessed.<sup>11,12</sup> The best situation in terms of monitoring the status of ecosystems is in the forestry sector. Development of Forest Management Baseline Documents and establishment of pilot sites in certified forest areas provide significant data on status of forest ecosystems. Several research activities in BiH regarding assessment and valorization of “ecosystem services” have been carried out since the 2011 Report.

The first serious step in identification of ecosystem and landscape diversity in BiH was undertaken during the development of the 2008 BiH First National Report to the UNCBD entitled “*Overview and state of biological and landscapes diversity in BiH, BiH —land of diversity*”. The 2008 Report summarized most important research and findings carried out to date. Data presented in the report can be considered as the only attempt of ecosystem and landscape diversity inventory development in BiH to date. As given in the 2011 Report (based on data from 2008), nine types of landscapes may be found in BiH: (i) Mediterranean, (ii) sub-Mediterranean, (iii) Mediterranean-mountain, (iv) upland, (v)

<sup>10</sup>ibid.

<sup>11</sup>“Landscape” is a system of ecosystems in a certain area, as perceived by the human eye, its features being a result of interaction between natural and / or human factors (Law on Nature Protection of FBiH).

<sup>12</sup>“Ecosystem” is a dynamic complex of plants, animals and micro-organisms and their nonliving environment interacting as a functional unit.



hilly (vi) peri-Pannonian, (vii) Pannonian, (viii) mountain, and (ix) karst landscapes, and within them over a hundred different ecosystems.<sup>13</sup>

**Table 3: Overview of ecosystems present in major landscapes in BiH<sup>14</sup>**

Type of landscape	Present ecosystems groups	Types of ecosystems
<b>Mediterranean landscapes</b>	Ecosystems of woods, shrubs and scrubs	1. Ecosystems of maquis and evergreen woods and shrubs ( <i>Quercion ilicis</i> "adriaticum"); 2. Ecosystems of mixed evergreen woods and shrubs (Orno- <i>Quercion ilicis</i> ); 3. Ecosystems of laurel woods ( <i>Laurion nobilis</i> ); 4. Ecosystems of coastal pubescent oak woods ( <i>Quercion pubescentis</i> "adriaticum"); 5. Ecosystems of coastal small shrubs and scrubs with oriental hornbeam and butcher's broom ( <i>Rusco-Carpinion orientalis</i> ); 6. Ecosystems of coastal jerusalem thorn shrubs ( <i>Paliurion aculeati</i> ); 7. Ecosystems with aleppo pine ( <i>Pinion halepensis</i> );
	Ecosystems of garrigues (Mediterranean bushes)	8. Ecosystems of garrigues with rock-roses ( <i>Cisto-Ericion</i> ); 9. Ecosystems of prickly juniper ( <i>Juniperion oxycedri</i> ); 10. Ecosystems of spanish broom ( <i>Spartion juncei</i> ); Ecosystems with <i>Calycotome infesta</i> ;
	Ecosystems of Mediterranean rocky grassland and meadows	11. Ecosystems of rocky grassland ( <i>Cymbopogo-Brachypodium ramosi</i> ); 12. Ecosystems of meadows ( <i>Vulpio-Lotion</i> );
	Ecosystems of rock crevices and screes	13. Ecosystems of limestone rock fissures ( <i>Centaureo-Campanulion</i> ); 14. Ecosystems of Mediterranean screes ( <i>Peltarion aliaceae</i> );
	Ecosystems in littoral sea belt	15. Ecosystems of sea cliffs ( <i>Crythmo-Staticion cancelatae</i> ); 16. Ecosystems of marine sands ( <i>Amophylion maritimae</i> ); 17. Ecosystems of brakish water ( <i>Ulvion lactucae</i> ); 18. Ecosystems of littoral sea belt ( <i>Cystoseirion</i> );
	Ecosystems of urban and rural habitats	19. Ecosystems of nitrified habitats ( <i>Inulion Viscosae</i> ); 20. Ecosystems of arable land ( <i>Panico-Setarion</i> ); 21. Ecosystems of abandoned places ( <i>Psoraleion bituminosae</i> );
<b>Sub-Mediterranean landscapes</b>	Ecosystems of woods, shrubs and scrubs	1. Ecosystems of woods and shrubs with pubescent oak; 2. Ecosystems of woods and shrubs with mazedonian oak; 3. Ecosystems of woods and shrubs with italian oak; 4. Ecosystems of woods and shrubs with oriental hornbeam; 5. Ecosystems of woods and shrubs with flowering ash; 6. Ecosystems of willows, poplars and oriental plane; 7. Ecosystems of shrubs with purple willow, chaste tree and silk vine; 8. Ecosystems with grey willow; 9. Ecosystems of willows, poplars and oriental plane;
	Ecosystems of karst caves, holes and abysses	n/a
	Ecosystems of supra-mediterranean rocky grassland with savory and common sage	n/a
	Ecosystems of supra-mediterranean rocky grassland with everlasting	n/a
	Ecosystems of rock crevices with moltkea and <i>Tanacetum cinerariifolium</i>	n/a
	Ecosystems of screes with garlic cress and robert geranium	n/a
	Ecosystems of arable land	n/a
	Rural and urban ecosystems	n/a
	Ecosystems of ponds and marshes in karst fields	n/a
	Ecosystems of supra-mediterranean hygrophilous meadows	n/a
	Ecosystems of freshwater	n/a
Ecosystems of thermophilous woods and shrubs of supra-	22. Ecosystems of shrubs with oriental hornbeam; 23. Ecosystems of shrubs with maple and oriental hornbeam; 24. Ecosystems of shrubs with butcher's broom and oriental hornbeam;	

<sup>13</sup>FMET (2008).BiH – Land of Diversity, First National Report of BiH to the UNCBD. Sarajevo

<sup>14</sup> Ibid.

Type of landscape	Present ecosystems groups	Types of ecosystems
	mediterranean landscapes	25. Ecosystems of shrubs turkich hazel and oriental hornbeam; 26. Ecosystem of autumn moor grass and hornbeam; 27. Ecosystems of mazedonian oak woods; 28. Ecosystems of italian oak woods; 29. Ecosystems of pubescent oak and flowering ash woods; Ecosystems of common horsechestnut woods;
<b>Mediterranean-mountain landscapes</b>	Ecosystems of woods, shrubs and scrubs	1. Ecosystems of mediterraneo-montane sessile and turkey oak woods; 2. Ecosystems of mediterraneo-montane frigophilous-thermophilous turkey oak woods; 3. Ecosystems of mediterraneo-montane thermophilous; flowering ash and turkey oak woods; 4. Ecosystems of thermophilous pubescent oak woods; 5. Ecosystems of low forests and shrubs with maple and oriental hornbeam; 6. Ecosystems of hazel;
	Ecosystems of mediterraneo-montane roky grassland	n/a
	Ecosystems of mesophilous meadows	n/a
	Ecosystems of rock crevices and screes	n/a
<b>Upland landscapes</b>	Ecosystems of woods, shrubs and scrubs	1. Ecosystems of mixed broadleaved-conifer foersts with illyrian beech, fir and spruce; 2. Ecosystems of acidophilous forests with beech, fir and melicgrass; 3. Ecosystems of mixed broadleaved-conifer forests with moesian beech and dinarci fir; 4. Ecosystems of forests with illyrian beech and autumn moor grass; 5. Ecosystems of forests with moeasian beech and autumn moor grass; 6. Ecosystems of sycomore and european ash; 7. Ecosystems of conifer forests with spruce and fir; 8. Ecosystems of balkan alder buckthorn and fir; 9. Ecosystems of conifer woods with spruce and Scot's pine; 10. Ecosystems of Serbian spruce; 11. Ecosystems of mountain heaths with blue berry; 12. Ecosystems of mountain heaths with common heather; 13. Ecosystems of forests with birch and european aspen; 14. Ecosystems of shrubs with hazel and hawthorn;
	Ecosystems of rock crevices and scree	n/a
	Ecosystems of trampled habitats	n/a
	Ecosystems of tall herb communities	n/a
	Ecosystems of mountain temperate humid meadows;	n/a
	Ecosystems of hygrophilous meadows with illyrian purple moorgrass	n/a
	Ecosystems of raised and blanket bogs	n/a
	Ecosystems of lakes, ponds and marshes;	n/a
	Ecosystems of lakes, ponds and marshes	n/a
	Ecosystems of mountain springs and rivulets	n/a
	Ecosystems of hygrophilous woods and shrubs with grey alder	n/a
	Ecosystems of arable land	n/a
	Ecosystems of beech-fir woods	n/a
	Primeval forest reserves	n/a
	Ecosystems of dark coniferous woods	15. Ecosystems of montane spruce woods; 16. Ecosystems of spruce-fir woods in the upland belt; 17. Ecosystems of spruce woods with coltsfoot; 18. Ecosystems of spruce with clubmosses; 19. Ecosystems of spruce-scots pine woods; 20. Ecosystems of spruce woods with bogmosses;

Type of landscape	Present ecosystems groups	Types of ecosystems
		21. Ecosystems of Serbian spruce; 22. Ecosystems of fir and <i>Oreohertzogia</i> ;
	Ecosystems of tall herb communities	n/a
	Ecosystems of mesophyllous meadows in the upland belt	23. Ecosystems of upland meadows on wet, humus-rich limestone ground; 24. Ecosystems of upland meadows on brown limestone earth; 25. Ecosystems of buttercup and <i>Paniccia serbica</i> ; 26. Ecosystems of buttercup and crocus on deep acidified soils; 27. Ecosystems of upland meadows on base-rich ground; 28. Ecosystems of upland meadows with Bosnian lily; 29. Ecosystems of <i>Paniccia serbica</i> and Bosnian lily; 30. Ecosystems of upland mowed meadows;
	Ecosystems of upland brooks	n/a
<b>Hilly landscapes</b>	Ecosystems of woods, shrubs and scrubs	1. Ecosystems of hornbeam and sessile oak in several floristic and geo-pedologic variants (with sedges, dog's tooth violet, bladder-nut); 2. Ecosystems of montane beech woods with alpine barrenwort; 3. Ecosystems of montane beech woods with melicgrass; 4. Ecosystems of beech and <i>Acer obtusatum</i> ; 5. Ecosystems of black pea and sessile oak; 6. Ecosystems of acidophilous sessile oak woods 7. Ecosystems of autumn moor grass and beech; 8. Ecosystems of sessile and pubescent oak; 9. Ecosystems of flowering ash and pubescent oak; 10. Ecosystems of flowering ash and beech; 11. Ecosystems of flowering ash and oriental hornbeam;
	Ecosystems of meadows	12. Ecosystems of lowland's temperate humid meadows; 13. Ecosystems of temperate humid eutrophic meadows with oat grass; 14. Ecosystems of acidophilous meadows with bentgrass and fescue; 15. Ecosystems of thermophilous meadows with brome and hoary plantain; 16. Ecosystems of thermophilous meadows and rocky grassland; Ecosystems of rock crevices and scree;
<b>peri-Pannonian landscapes</b>	Ecosystems of woods	1. Ecosystems of woods with hornbeam and common oak; 2. Ecosystems of woods with sessile oak and <i>Ruscus hypoglossum</i> ; 3. Ecosystems with sessile oak and silver linden; 4. Ecosystems with sessile and turkey oak; 5. Ecosystems with italian and turkey oak in northeastern region; 6. Ecosystems of beech woods with hart's tongue fern; 7. Ecosystems of acidophilous beech-melicgrass woods; 8. Ecosystems of woods with hornbeam, sessile oak and butcher's broom; 9. Ecosystems of woods with hornbeam, sessile oak and bladder-nut;
	Non-forest ecosystems	10. Ecosystems of hygro-mesophilous meadows with tufted hair-grass; 11. Ecosystems of acidophilous meadows with bentgrass and fescue; 12. Ecosystems of thermophilous meadows with brome
	Agricultural ecosystems	13. Ecosystems of arable land (cereals and gardening cultures); 14. Ecosystems of fruit-gardens; 15. Ecosystems of abandoned habitats along roads and settlements; 16. Urban and rural ecosystems;
<b>Pannonian landscapes</b>	Ecosystems of woods	1. Ecosystems of woods with willow and poplar along riversides of Sava river and its tributaries; 2. Ecosystems with <i>Fraxinus angustifolius</i> and summer snowflake; 3. Ecosystems with alder and sedges, then alder buckthorn and <i>Fraxinus angustifolius</i> , and common oak; 4. Ecosystems of shrubs with purple and basket willow; 5. Ecosystems of shrubs with desert indigo and low forests with robinia; 6. Ecosystems with common oak and dyer's broom; 7. Ecosystems with common oak, hornbeam and butcher's broom; 8. Ecosystems with common oak and silver linden; 9. Ecosystems with pannonian beech and <i>Ruscus hypoglossum</i> ;
	Non-forest ecosystems	10. Ecosystems of hygrophilous and eutrophic meadows; 11. Ecosystems of hygrophilous meadows with moorgrass and tufted hairgrass; 12. Ecosystems of standing water with sedges and reed; 13. Ecosystems in coastal belt of freshwater;
	Agricultural ecosystems	14. Ecosystems of arable land; 15. Rural ecosystems; 16. Ecosystems in urban areas;
<b>Mountain landscapes</b>	Ecosystems of sub-alpine belt	1. Ecosystems of sub-alpine woods with illyrian beech and sycamore; 2. Ecosystems of acidophilous woods with illyrian beech and european mountainash; 3. Ecosystems of acidophilous woods with moesian beech and melicgrass; 4. Ecosystems of sub-alpine woods with moesian beech and greek maple; 5. Ecosystems of sub-alpine spruce woods;

Type of landscape	Present ecosystems groups	Types of ecosystems
		<p>6. Ecosystems of sub-alpine Serbian spruce woods; Ecosystems with mountain pine and blue berry;</p> <p>7. Ecosystems with mountain pine and twoflower violet;</p> <p>8. Ecosystems with mountain pine and sub-alpine spruce and european mountainash;</p> <p>9. Ecosystems with mountain pine and yellow gentian;</p> <p>10. Ecosystems of shrubs with <i>Genista radiata</i>;</p> <p>11. Ecosystems of shrubs with <i>Genista radiata</i> and alpine bearberry;</p> <p>12. Ecosystems with mountain juniper;</p> <p>13. Ecosystems with mountain pine and rhododendron;</p> <p>14. Ecosystems of shrubs with silesian willow (<i>S. silesiaca</i>);</p> <p>15. Ecosystems of shrubs with green alder on silicate bedrock of Vranica Mt.;</p> <p>16. Ecosystems of sub-alpine woods with white-bark pine.</p>
	Ecosystems above upper forest line	<p>17. Ecosystems of alpine grassland on alkaline ground with elyna and sedges;</p> <p>18. Ecosystems of alpine grassland on acid ground with sedge and rush;</p> <p>19. Ecosystems around snow patches on alkaline ground with Silesian willow;</p> <p>20. Ecosystems around snow patches on acid ground with white buttercup;</p> <p>21. Ecosystems of alpine screes on carbonate bedrock;</p> <p>22. Ecosystems of alpine screes on silicate bedrock;</p> <p>23. Ecosystems of carbonate rock crevices;</p> <p>24. Ecosystems of silicate rock crevices;</p> <p>25. Ecosystems with lichens on both carbonate and silicate bedrock.</p>
<b>Karst landscapes</b>	Karst fields in western Bosnia (Glamočko, Livanjsko, Kupreško, Duvanjsko and Šuičko)	Ecosystems of: standing water, redbeds, sedges, alkaline bogs, hygrophilous meadows of Illyrian moor grass, hygrophilous meadows of tufted hairgrass, hygrophilous meadows with squill, yellow and siberian iris, hoary birch, montane oak woods, woods with white and crack willow, shrubs of marsh willow, shrubs of purple willow, sticky alder, <i>Prunus padus</i> , temperate humid meadows, thermophilous meadows and mediterraneo-montane rocks.
	Karst fields in western Herzegovina (Posuško, Grudsko)	Ecosystems of: ponds and marshes with reed and sedges, hygrophilous meadows with moorgrass and tufted hairgrass, dinaric squill and moor grass, temperate humid meadow with oat grass and fescue, thermophilous meadows with brome and viper grass, sub-mediterranean rocky grassland with savory, shrubs of purple willow, low woods of white willow, woods of sessile and turkey oak in marginal fields area, Herzegovina's woods with Italian oak.
	Karst fields in lower western Herzegovina (Lištičko, Ljubuško and Mostarsko Blato)	Ecosystems of: marshes with reed and sedges, hygrophilous meadows pannonian knapweed and pea, hygrophilous-eutrophic meadows with plantain, shrubs of marsh willow, chaste tree, white willow and <i>Fraxinus angustifolius</i> , white willow and silvine, <i>pseudo-maquis</i> with evergreen oak and flowering ash, shrubs of oriental hornbeam, butchers broom and pomegranate.
	Lower karst fields in eastern Herzegovina (Buško Blato and Popovo Field)	Ecosystems of: standing water with pond weed, standing water with pond lilies, reed beds, sedges, rushes, coastal area with Fimbristiles, woods of white willow and silver leaved poplar, shrubs of purple willow, hygrophilous meadows with moor grass and ryelike barley, thermophilous meadow, Mediterranean and sub-mediterranean rocky grassland with winter savory, sage and everlasting pseudo-maquis, oriental hornbeam and butchers broom, macedonian oak, oak and hornbeam.
	Mid karst fields in eastern Herzegovina (Ljubinsko, Dabarsko, Fatničko and Plansko)	Ecosystems of: standing water with pondweed, hygrophilous meadows with dinaric squill and siberian iris, hygrophilous meadows with moor grass and tufted hairgrass, hygrophilous meadows with knapweed and pea, red and sedges, hygrophilous meadows with hind, mesophilous meadows with oat grass, bentgrass and fescue, hind with brome and viper grass, mediterranean-montane rocky grassland with red savory, shrubs of basket willow, purple and marsh willow, white willow and <i>Fraxinus angustifolius</i> , woods of rukej and sessile oak, twig hazel, low forests and underbrush oak with Dynarian vetch.
	Upper karst fields in eastern Herzegovina (Nevesinjsko and Gatačko).	Ecosystems of: slow meandering streams, hygrophilous and eutrophic meadows, snowflake, hygrophilous meadow with Illyrian gladiola, hygrophilous meadows with dinaric squill and narrow leaved plantain, meadows with pannonian knapweed and wild parsley, shrubs of purple and marsh willow, <i>Fraxinus angustifolius</i> , sticky alder, sub-mediterranean rocky grassland with winter savory, thermophilous woods with hornbeam and sessile oak, oak and hornbeam.

Although putting in place a monitoring system on ecosystems is an obligation in accordance to the entity and BD laws on nature protection, this is not fully implemented to date. A monitoring institution in FBiH is not formed yet, while institutions in RS and BD lack human capacities. The ecosystems inventory for BiH has also not been developed yet. This implies that monitoring system is not established yet, not even for the particularly important ecosystems listed in *Chapter 0*

*Unique Aspects of Biodiversity.*

The best situation in terms of monitoring of the status of ecosystems is in the forestry sector. Results of monitoring on health status of forests ecosystems, types of ecosystems and their surfaces, as well as pressures like e.g. fires are presented in the Forest Management Baseline Documents. These documents, prepared in both entities, have five-year planning periods. However, given that methodologies (methodology for monitoring and methodology for drafting of documents) in these documents are usually not harmonized (within entity and between entities), it is difficult to come up with a common result at the national level. Monitoring of certain ecosystems is carried out at certificated forest areas (Forest Stewardship Council - FSC) and some PAs (NP Una, NP Kozara, NP Sutjeska, PL Bijambare) through testing plots and indicator species. However, these reports are not publicly available.

The EU approach to monitoring ecosystems is guided by the Mapping and Assessment of Ecosystems and their Services (MAES) report.<sup>15</sup> Recognizing the importance of assessment of ecosystems and their services, the draft BiH NBSAP for 2015-2020 identified it as a national target through target no. 15: “By 2020, map and evaluate the benefits from forest, agricultural and water ecosystems, and strengthen the environmental permit mechanism and supervisory inspection within PAs, areas of special interest and areas from the Natura 2000 ecological network plan”, further defining the following measures:

- Carry out inventory of ecosystems and types of habitats in BiH;
- Prepare Study on Economics of Ecosystems and Biodiversity (TEEB) in BiH;
- Complete the analysis of the state of ecosystem services in BiH.

There have been few research activities in BiH involving the assessment and valorization of ecosystem services<sup>16</sup>. Current studies are mostly isolated attempts were made by academicians, higher education students, and experts, to bring the topic closer to stakeholders and the wider public. Furthermore, few studies and assessments were conducted within the framework of various projects and most of them are linked to certain locations. These are:

- PA (Nature Park, Important Bird Area - IBA and Ramsar site) Hutovo blato (see Chapter 7),
- Neretva and Trebišnjica Rivers,
- Mountain Zvijezda,
- NP Una (Chapter 7).

#### 4.5 DIVERSITY OF SPECIES

BiH is a country with high diversity of species. Since 2011 number of birds species increased by 14 new species and amounts to total of 340 species, while number of mammals increased by 2 new species and amounts to total of 87 species.

The flora, fungi, and fauna in BiH are among the most diverse groups in whole Europe. The high level of endemic and relic qualities gives it significance on a global level<sup>17</sup>.

**Flora:** 5,134 taxa<sup>18</sup> of plants (*Thallophytes* and *Cormophytes*) have been identified so far putting BiH among richest in flora in Europe.<sup>19</sup>The most specific characteristic of BiH's flora is a large number of paleo, neo and steno endemic species, tertiary and glacial relicts maintained in refugial habitats, such

<sup>15</sup>As available at: <http://biodiversity.europa.eu/maes> (last accessed on July 10, 2015).

<sup>16</sup>Diversity of species is important from the aspect of ecosystem functioning. Any species (plant, animal, fungi or single-celled organism) has certain function that ensures consistent and balanced flow of matter and energy in a certain ecosystem. All products of such balance existing and functioning of species in an ecosystem are available to humans in form of diverse natural goods and benefits. The natural goods and benefits from nature are presently encompassed by the term “ecosystem services”.

<sup>17</sup>FMET (2010). Fourth National Report of BiH to the UNCBD. Sarajevo

<sup>18</sup>A taxon (plural taxa) is a group of one or more populations of an organism or organisms seen by taxonomists to form a unit. Although neither is required, a taxon is usually known by a particular name and given a particular ranking, especially if and when it is accepted or becomes established

<sup>19</sup>FMET (2010). Fourth National Report of BiH to the UNCBD. Sarajevo

as cliffs, canyons and mountain cirques. The most part of endemic taxa are recognized within the systematic group of *Cormophytes*, and it is currently estimated to 450 endemic taxa. These endemic species have been found in Herzegovina, within the mountain complex Prenj-Čvrsnica-Velež and canyons of the Neretva River, and its tributaries. These areas are recognized as endemic centres.

**Fungi:** Fungi inhabit both terrestrial and aquatic environments. It is estimated that between 15,000 – 20,000 mushroom species can be found in BiH. However, only 552 species of higher fungi have been identified. There are many species of *Macromycetes* which have high economic potential and value. They are an important source of income for local communities. The most important among them are: Morel, King Bolete, Chanterelle, *Macrolepiota sp.* and Saffron Milk Cap.

**Lichens:** Lichens, on the other hand, are an insufficiently studied group of organisms in BiH. More than 300 species of lichens have been recorded so far, and their biodiversity is estimated to around 1,000<sup>20</sup>. However, for the territory of BiH, no assessment of the degree of threat according to the IUCN criteria has been made so far.<sup>21</sup>

**Fauna:** The country's fauna is characterized by the occurrence<sup>22</sup> of refugia and development centers<sup>22</sup>, and by the most unique fauna of karst areas, mountains and canyons.<sup>23</sup> Limnofauna of invertebrates is very diverse due to the diversity of aquatic habitats. Fifty species of annelids have been identified belonging to 19 genera, and 8 species of leaches belonging to 7 genera. Freshwater crustaceans include 31 species of which 16 are endemic. Freshwater ecosystems are characterized by rich and diverse aquatic insects. The order *Ephemeroptera* (mayflies) comprises 58 species belonging to 20 genera, out of which five are Dinaric, Balkan or Dinaric-alpine endemic species. In the order of *Plecoptera* (stoneflies), 74 species from 15 genera have been described. The order of *Trichoptera* (Water moths) is plentiful with 215 detected species from 78 genera. Fifty of these species have attributes of endemism, while 24 of them are endemic within the Dinaric distribution range. The most interesting is genus *Drusus*. Very interesting life forms are endemic species of caves in Herzegovina area.

The total number of species of vertebrates in BiH is presented in Table 4.

**Table 4: Number of Species of Vertebrates in BiH**

Group of organisms	Number of species withing group
Fish <sup>24</sup>	119
Amphibians <sup>25</sup>	20
Reptiles <sup>26</sup>	38
Birds <sup>27</sup>	340
Mammals <sup>28</sup>	87

**Fish:** Within ichthyofauna (fish) the highest diversity is recognized within the family *Cyprinidae* (51 species) and *Salmonidae* (8 species).

**Amphibians:** The diversity of amphibians consists of 7 genera, 21 species and 22 subspecies. Among tail-less (Anura) most abundant is genus *Rana* with 7 species and among tail (Caudata) amphibians this is genus *Triturus* with 5 species.

<sup>20</sup>FMET (2008).Bosnia and Herzegovina – Land of Diversity, First National Report of BiH to the UNCBD. Sarajevo

<sup>21</sup>MOFTER (2015). Draft of NBSAP 2015-2020. Sarajevo

<sup>22</sup>In unfavourable geological periods, canyons and gorges had favourable conditions (combination of ecological factors) for survival of certain species (relicts), and those species became endems after long periods of time (endemogenesis).

<sup>23</sup>FMET (2010).Fourth National Reportof BiH to the UNCBD. Sarajevo

<sup>24</sup>ibid.

<sup>25</sup>ibid.

<sup>26</sup>ibid.

<sup>27</sup>Kotrošan, D. & Dročić, N. (2012). Fourth revised sistematic overview of bird species in BiH. In Fauna BiH: Biosistematic overview. Association ofr inventarisation and animal protectio. Sarajevo. 342-348.

<sup>28</sup>FMET (2010).Fourth National Reportof BiH to the UNCBD. Sarajevo

**Reptiles:** Reptiles inhabit freshwater, ponds, marshes and almost all terrestrial ecosystems (especially rocky grassland). They belong to 40 species (45 sub-species) from 12 families. The highest reptile diversity in BiH is evident in the Mediterranean region and supra-Mediterranean belt.<sup>29</sup>

**Birds:** Bird diversity comprises 340 species within 189 genera, 68 families and 22 orders<sup>30</sup>.

**Mammals:** The fauna of mammals comprises 87 identified species within 51 genera and 19 families. Most species inhabit terrestrial habitats, while a small number of species inhabit aquatic ecosystems secondarily or only occasionally. High abundance and diversity characterize the family *Vespertolinidae* (bats) with 20 identified species from 8 genera.<sup>31</sup> A new species of bat, pond bat, (*Myotis dasycneme*) has been recently discovered in the Cave of Bijambare. BiH is the most southern location where this species is found in Europe. In the same caves another new species of bat were registered for BiH, the mountain long-eared bat (*Plecotus macrobullaris*).

#### 4.6 THREATENED SPECIES

Since the 2011 Report, entities have developed and adopted red lists of endangered species of flora and fauna. FBiH also drafted the list of endangered fungi. In total, 1,029 species are found on the FBiH red list, and 1,545 species on RS red list. BiH has not yet developed a Red Data Book of threatened species.

A very important step in the protection of endangered species is the introduction of red lists and red data books. According to the Law on Nature Protection of FBiH<sup>32</sup> the "Red List - list of endangered species/subspecies," is the official document containing the list of endangered wild species/subspecies, arranged by category of threat of extinction. These categories are determined in line with the methodology of the International Union for Conservation of Nature (IUCN).

The Red Lists of Wild Species and Subspecies of Plants, Animals and Fungi of FBiH<sup>33</sup> were developed in January, 2014. They contain 659 endangered flora taxa (Table 5), 284 fauna taxa (Table 6) and 86 fungi taxa (Table 7).

**Table 5: Overview of Endangered Flora Taxons in FBiH<sup>34</sup>**

Category	Number of taxons within the category
Insufficient Data	161
Least Concern (LC)	52
Near Threatened (NT)	58
Vulnerable Species (VU)	173
Endangered Species (EN)	145
Critically Endangered (CR)	69
Extinct (EX)	1
<b>TOTAL</b>	<b>659</b>

**Table 6: Overview of Endangered Fauna Taxons in FBiH<sup>35</sup>**

Category	Number of taxons in this category
Class Mammalia	27
Class Aves	40
Class Reptilia	6

<sup>29</sup>FMET (2010). Fourth National Report of BiH to the UNCBD. Sarajevo

<sup>30</sup>Kotrošan, D. & Dročić, N. (2012). Fourth revised systematic overview of bird species in BiH. In Fauna BiH: Biosystematic overview. Association for inventarisation and animal protection. Sarajevo. 342-348.

<sup>31</sup>FMET (2010). Fourth National Report of BiH to the UNCBD. Sarajevo

<sup>32</sup>OG of FBiH, no. 66/13

<sup>33</sup>OG of FBiH, no. 07/14

<sup>34</sup>Red List of FBiH (OG of FBiH, no. 07/14)

<sup>35</sup>ibid.

Class Amphibia	4
Class Osteichtyes	36
Class Insecta	144
Class Malacostraca	14
Class Arachnida	13
<b>TOTAL</b>	<b>284</b>

**Table 7: Overview of Endangered Species of Fungi in F BiH<sup>36</sup>**

Category	Number of species category
Insufficient Data	59
Near Threatened (NT)	2
Vulnerable Species (VU)	7
Endangered Species (EN)	4
Critically Endangered (CR)	14
<b>TOTAL</b>	<b>86</b>

In RS, 7 Red lists for 7 taxonomic groups are in place. RS Government adopted the Decree on the Red List of Endangered Species of Flora and Fauna in 2012<sup>37</sup>. The Red List contains endangered species of flora and fauna in RS, and consists of several different lists according to different taxonomic groups (Table 8). The methodology used for development of red lists in RS is different than the methodology used in F BiH. Therefore, data are not comparable or suitable for compilation and presentation at national level.

**Table 8: Overview of Endangered Species in RS<sup>38</sup>**

Category	Number of species category
Vascular flora	818
Metazoa (class of insects described)	273
Fish	48
Amphibians	20
Reptiles	25
Birds	304
Mammals	57
<b>TOTAL</b>	<b>1,545</b>

#### 4.7 GENETIC DIVERSITY

Compared to the 2011 Report, some improvements have been observed in the area of genetic diversity including: initiation of the first steps for accession to the *Nagoya Protocol*<sup>39</sup> (Feasibility Study for accession to the Nagoya Protocol has been drafted), integration of issues of protection of genetic diversity into entities agriculture strategies, and establishing gene banks and botanical gardens. The research of genetic diversity of forests, ichthyofauna and agricultural variety of fruits and grains has also been carried out, but the results are not publicly available. A particular progress in terms of protection of genetic diversity is seen in RS through development of programs for conservation and sustainable use of plant genetic resources.

<sup>36</sup>Red List of F BiH (OG of F BiH, no. 07/14)

<sup>37</sup>OG of RS, no. 124/12

<sup>38</sup>Decree on the Red List of endangered species of flora and fauna of RS (OG of RS, no. 124/12)

<sup>39</sup>Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the UN CBD



BiH is one of the countries participating in the UNEP Project for early ratification and accession to the Nagoya Protocol. Currently, the ratification has been postponed until the adoption of the national legislation on genetic resources.

Progress has been achieved in terms of conservation of genetic diversity. This issue is integrated in various documents on agricultural development. The FBiH Medium-term Agricultural Sector Strategy (2006-2010) addressed issues such as genetic resources and plant growing, threats to autochthonous genotypes, the absence of state level programme and legislation, insufficient awareness on the problem of conservation of genetic resources and lack of skilled staff to work with the bank of genetic resources. The FBiH Medium-term Agricultural Sector Strategy for the period 2014-2018 is currently under preparation.

RS Strategic Plan for Rural Development 2009-2015 includes among its strategic objectives the support to measures for biodiversity conservation and sustainable use of genetic resources in agriculture (breeding of autochthonous breeds of animals and rare plants, setting up a gene bank, raising awareness of the population, etc).

Genetic diversity is also preserved through introduction of botanical gardens in the Campus of Banja Luka University and in the Campus of Biotechnical Faculty of Bihac University. The introduction of gene banks also makes an important step towards conservation of genetic diversity. Gene banks were established at the Faculty of Agriculture and Food Sciences of Sarajevo University and Genetic Resources Institute of Banja Luka University. A particular progress in terms of protection of genetic diversity is seen in RS through development of programs for conservation and sustainable use of plant genetic resources entitled *Conservation of Plant Genetic Resources Plan (2008)* and the *Program for Conservation of Forest Genetic Resources (2012)*.

## 5. SOCIETY'S RESPONSES

### 5.1 INTERNATIONAL TREATIES

No conventions of importance to biodiversity have been ratified since 2011. The ratification of seven Multilateral Environmental Agreements (MEAs) is currently in progress. The ratification is expected by the year 2018.

BiH became a Party, signed or ratified a number of MEAs to date, which demonstrates a strong state commitment to comply with these agreements. Table 9 gives a review of conventions of importance to biodiversity, that BiH became a Party by succession from Former Yugoslavia.

**Table 9: MEAs that BiH Became a Party to<sup>40</sup>**

No.	MEA	Place and year of adoption	Date of ratification (by succession)	OG no.
1.	Convention on Wetlands of International Importance especially as Waterfowl Habitat	Ramsar, 1971	2001	Notification of succession <sup>2</sup>
2.	Protocol Concerning Mediterranean Specially Protected Areas	Geneva, 1982	22 October 1994	SFRJ: 9/85 R BiH: 13/94
3.	Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean Sea	Barcelona, 1995	12 December 1999*	n/a
4.	Convention Concerning the Protection of the World Cultural and Natural Heritage	Paris, 1972	12 July 1993	R BiH: 25/93
5.	Convention on Fishing and Conservation of the Living Resources of the High Seas	Geneva, 1958	12 January 1994	n/a
6.	Convention on the Territorial Sea and the Contiguous Zone	Geneva, 1958	1 September 1993	n/a
7.	Convention on the Continental Shelf	Geneva, 1958	12 January 1994	n/a
8.	Convention on High Seas	Geneva, 1958	12 January 1994	n/a

Table 10 lists environmental conventions and agreements of importance to biodiversity ratified so far in accordance with the State Law on the Procedures for the Conclusion and Implementation of International Agreements (OG of BiH, no. 29/00).

**Table 10: MEAs that BiH Ratified by 2011<sup>41</sup>**

No.	MEA	Place and year of adoption	Date of ratification (by succession)	OG no.
1.	International Plant Protection Convention	Rome, 1951	2003	8/03
2.	UN Convention on Biological Diversity	Rio de Janeiro, 1992	2002	12/02
3.	Cartagena Protocol on Biosafety	Cartagena, 2000	2008	12/08
4.	UN Convention to Combat Desertification in Those Countries Experiencing Drought and/or Desertification, Particularly in Africa	Paris, 1994	2002	12/02
5.	Convention on Protection and Sustainable Use of the Danube River	Sofia, 1994	2005	65/05
6.	Convention for the Establishment of the European and Mediterranean Plant Protection Organisation	Paris, 1955	2005	8/08
7.	UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	Aarhus, 1998	2008	n/a
8.	Protocol on Strategic Environmental Assessment	Kiev, 2003	2003	n/a
9.	Convention on the Conservation of European Wildlife and Natural Habitats	Bern, 1979	2008	8/08
10.	Framework Agreement on the Sava River Basin	Kranjska Gora, 2002	2003	n/a
11.	Convention on the Protection and Use of Transboundary Watercourses	Helsinki, 1992	2009	8/09

<sup>40</sup> Available at: <http://www.unep.ba/multilateral-environmental-agreements.html> (accessed on 1 July, 2016).

<sup>41</sup> Available at: <http://www.unep.ba/multilateral-environmental-agreements.html> (accessed on 1 July, 2016).

No.	MEA	Place and year of adoption	Date of ratification (by succession)	OG no.
	and International Lakes			
12.	Council of Europe Framework Convention on the Value of Cultural Heritage for Society	Faro, 2005	2009	n/a
13.	Convention on Safety and Health in Agriculture	Geneva, 2001	2010	n/a
14.	Convention Concerning Work in the Fishing Sector	Geneva, 2007	2010	n/a
15.	European Landscape Convention	Florence, 2000	2010	n/a
16.	Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Rotterdam, 1998	2006	14/06
17.	Convention On International Trade in Endangered Species Of Wild Fauna and Flora (CITES)	Washington D.C., 1973	2008	11/08
18.	Amendment to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Art. XI)	Bon, 1979	2009	n/a
19.	European Outline Convention on Transfrontier Co-operation between Territorial Communities or Authorities	Madrid, 1980	2008	n/a

Table II lists all MEAs of importance to biodiversity ratified after 2011 and planned to be ratified by 2018.

**Table II: MEAs Ratified after 2011 and Planned to be Ratified by 2018**

No.	Convention	Date of adoption	Place	Proposal for ratification
1.	Protocol to Amend the Convention on Wetlands of International Importance Especially as Waterfowl Habitat	03.12.1982.	Paris	2016 in cooperation with the Ramsar Convention Focal Point
2.	Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention)	10.06.1995.	Barcelona	Ratification in progress
3.	Protocol on Integrated Coastal Zone Management in the Mediterranean (ICZM Protocol)	21.01.2008.	Madrid	Ratification in progress
4.	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	23.06.1979.	Bonn	Ratification in progress
5.	Agreement on the Conservation of Bats in Europe (UNEP/EUROBATS)	04.12.1991.	London	Ratification in progress
6.	African-Eurasian Migratory Waterbird Agreement (AEWA)	16.06.1995.	The Hague	Ratification in progress
7.	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)	24.11.1996.	Monaco	Ratification in progress

Many weaknesses of the existing legal framework for ratification and implementation of MEAs in BiH have been identified including<sup>42</sup>: (i) organizational structure and mechanism of coordination for the effective implementation of MEAs, (ii) obligations of the entity and BD level institutions arising with regard to harmonization of their legislation in accordance with ratified MEAs, (iii) coordination of the activities of BiH level, entity level and BD institutions on implementation of MEAs, (iv) reporting obligations of the entity and BD level institutions towards MoFTER on status of progress made on implementation of the activities agreed upon during coordination meetings, (v) procedure for nomination of Focal Points regulating also the rights and obligations of nominated Focal Points in performing their activities, (vi) procedure for coordination of the activities on implementation of different MEAs.

## 5.2 LEGAL FRAMEWORK

The most significant change to the policy/regulatory framework since 2011 is the adoption of new entity Laws on Nature Protection in 2013 in FBiH and in 2014 in RS.

<sup>42</sup>UNEP (2014).Legal analysis on ratification and implementation of Multilateral Environmental Agreements (MEAs) in BiH. Sarajevo

### 5.2.1 NATIONAL LEGISLATION

According to the Constitution<sup>43</sup>, environmental policies and use and management of natural resource are the responsibility of entity and BD governments, regulating environmental matters through laws, regulations and standards. Almost all relevant legislation is adopted and enforced at entity and BD level.

### 5.2.2 ENTITY LEGISLATION

Given that the competences in the sector of nature protection in BiH are conferred on the entity level (RS, FBiH and BD), the principal legal enactments related to biodiversity are defined in the Law on Nature Protection of FBiH (OG of the FBiH, no. 66/13), the Law on Nature Protection of RS (OG of RS, no. 20/14) and the Law on Nature Protection of BD (OG of BD of BiH, no. 24/04, 1/05, 19/07, and 9/09).

Along these specific laws, there is a whole set of environmental legislation composed of laws and bylaws relevant to environmental protection in general, as well as water, air and solid waste management. These define and set out goals, principles, measures, responsibilities, documents, financing and supervision of environmental protection in BiH that has direct impact on the status of biodiversity.

There have been no major changes in the policy framework related to biodiversity in BD and FBiH since 2011 except those related to adoption of Federal Law on Nature Protection. Four new laws were adopted in RS, and few more bylaws were amended.

### 5.2.3 CANTONAL LEGISLATION

Three of ten cantons in FBiH have adopted laws on nature protection including Tuzla Canton, Central Bosnia Canton and Herzegovina-Neretva Canton:

- Law on Nature Protection of the Tuzla Canton (OG of the Tuzla Canton, no. 10/04);
- Law on Nature Protection of the Central Bosnian Canton (OG of the Central Bosnian Canton, no. 4/05);
- Law on Nature Protection of the Herzegovina-Neretva Canton (OG of the Herzegovina-Neretva Canton, no. 3/05).

However, given that the new federal Law on Nature Protection was adopted in 2013, the above listed regulations are outdated and not in line with the new regulations.

## 5.3 STRATEGIES AND ACTION PLANS

Development of the second NBSAP for the period 2015 – 2020 was started in January 2013. The document was completed in 2014, pending adoption by the state Council of Ministries. The Nature Protection Strategy of RS was developed in 2011. The Environmental Protection Strategy of BD BiH (2013-2023) that also includes nature protection strategy is in the adoption procedure.

### 5.3.1 NATIONAL STRATEGIES AND ACTION PLANS

The most significant strategic document for biodiversity at the state level is the National Biodiversity Strategy and Action Plan 2008-2015 (NBSAP) drafted in accordance with UNCBD principles and Global Strategic Plan for Biodiversity, adopted in July, 2011 by the Council of Ministers of BiH. The

<sup>43</sup> Available at: <http://www.ccbh.ba/osnovni-akti/ustav/?title=preambula> (accessed on 10 July, 2016)

strategy has expired and its implementation was rated as insufficient in the Fifth National Report of BiH to the UNCBD. Since the revised and updated Global Strategic Plan for Biodiversity 2011-2020 (including the Aichi Biodiversity Targets) was introduced in the meantime, in January 2013 BiH started developing its second NBSAP for the period 2015 – 2020. The document was completed in 2014, however still pending adoption by the state Council of Ministries.<sup>44</sup>

Second NBSAP (2015 – 2020) of BiH is in line with the Strategic Plan including 5 global strategic directions and 20 Aichi Biodiversity Targets<sup>45</sup>. Description of the current state of biodiversity and formulation of national targets was harmonized with 20 Aichi Biodiversity Targets, taking into consideration specific characteristics of BiH. Currently, there are 20 national targets identified. A set of indicators is proposed for each national target; total of 33. All national goals are clearly defined, including the Action Plan for their implementation and achievement. The document also contains four implementation plans for successful NBSAP implementation: a) Plan for capacity development; b) Technology needs assessment; c) Communication and outreach strategy; and d) Plan for resource mobilization.

Currently there is no officially adopted and valid strategic document related to biodiversity in force at the state level.

### 5.3.2 ENTITY STRATEGIES AND ACTION PLANS

**FBiH:** The key strategic document for biodiversity in FBiH is the *Environmental Protection Strategy of FBiH (2008-2018)*. This Strategy consists of 3 components with an Action Plan: (i) Federal Air Protection Strategy; (ii) Federal Strategy for Nature Protection, and (iii) Federal Waste Management Strategy.

**RS:** The *Nature Protection Strategy of RS (2011)*, developed after the Report in 2011, establishes a strategic framework and the state in the field of biodiversity protection. It defines activities, plans, methods and a set of measures to raise awareness for nature protection in RS, together with concrete measures to improve the situation in the field of nature protection, represents an initial and very important step in the implementation of strategic objectives, where the key objective is to promote an integrated approach to the preservation, promotion and use of landscape in RS in accordance with the available natural resources, integration of the II sustainable development concept and association and accession of BiH to the EU. In order to preserve, promote and encourage sustainable use of natural resources by establishing an integrated biodiversity planning and management system, four fundamental strategic objectives have been defined:

- The protection of biological, pedological, and geological diversity of RS through the establishment and strengthening of the institutional framework for the implementation of effective nature protection measures;
- Sustainable use of natural resources;
- Reduction of the pressure on bio- and geodiversity in RS;
- The introduction of financial mechanisms for sustainable management of biological and geological diversity.

**BD:** The *Environmental Protection Strategy of BD BiH (2013-2023)* is in the adoption procedure. The strategy states that, biological and geo-morphological diversity in BD have great potentials to generate environmentally profitable and sustainable projects for the reduction of rising poverty, for reconstruction, and improvement of the economy, the development of new biotechnologies based on the indigenous gene pools and following of the European Union (EU) integration paths. Considering the above, the sustainable protection of the environment and promotion of a balanced

<sup>44</sup> The document (in the form of a draft proposal) was sent for adoption to Council of Ministers of BiH.

<sup>45</sup> Available link at <http://www.cbd.int/sp/targets/> (accessed at 1 July, 2016)

use of natural resources through establishing an integrated system for the management of biological and geological diversity have been adopted as the general objective of this Strategy.

The BiH Fifth National Report to the UNCBD has analyzed cross-sectoral integration of biodiversity and provided a timeframe for all relevant strategies by sectors, and by levels of government in BiH. This table was updated for the need of this Report.






The following table provides an overview of the adoption status of inter-sectoral policies at the state level and entity level.<sup>46</sup>

































































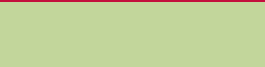










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<sup>46</sup>FMOT (2013).Fifth National Report of BiH to UNCBD. Sarajevo

**Table 12: Overview of Policies at Different Administrative Levels with Validity Period**

**LEGEND:**

Republika Srpska 	Federation of Bosnia and Herzegovina 
District of Brcko 	Strategy not adopted (FBiH and RS)  

Adopted strategies	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	...	2030
FBiH Development Strategy																			
FBiH Strategy of Development of Textile, Clothing, Leather and																			
FBiH Water Management Strategy																			
FBiH Strategy of Environmental Protection																			
FBiH Energy Sector Development Strategy																			
FBiH Strategy of Tourism Development																			

Adopted strategies	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	...	2030
RS Strategic Plan for Rural Development																			
RS Strategy for Agricultural Development																			
Energy Sector Development Strategy																			
RS Environmental Protection Strategy																			
RS Air Protection Strategy																			
RS Strategy of Tourism Development																			
RS Chemical Safety Strategy																			
RS Strategy of Integrated Water Management																			
BD Development Strategy																			



Analyzing the sectoral and cross-sectoral strategies at all administrative levels in BiH, it is noticeable that there are good examples of biodiversity integration but also the examples of uncoordinated policies. The BiH Fifth National Report to the UNCBD concluded that it is necessary to continue seeking for harmonization of the existing policies at all levels, as well as better coordination, cross-sectoral collaboration, implementation and monitoring.

A positive example of the integration of biodiversity into sectoral planning documents is demonstrated through the draft *Spatial Plan of FBiH (2008-2028)*, which is still pending adoption. Within the Spatial Plan, a guideline for strategic environmental assessments has been developed.

The *Spatial Plan of RS until 2015* has integrated some specific values of environmental protection, but it does not directly include the issue of biodiversity. The Decision on adoption of the proposed amendments to the Spatial Plan of RS until 2025 (OG of RS, No. 15/15) included a sub-section on biodiversity, where spatial planning is guided by the values of biodiversity protection, as well as environmental protection. Protection and regulation of natural and cultural heritage, landscape and environment received significant attention in this document.

Table 24 (Annex 11.3) gives an overview of biodiversity integration in different sectoral strategies in BiH.

## 5.4 INSTITUTIONAL CAPACITIES

Since the 2011 Report there was no change in institutional capacities. All environmental issues are the responsibility of entity ministries for environment. International cooperation and harmonization of state affairs is the responsibility of state institutions. At the cantonal level (FBiH) there is one ministry per canton. 31 research institutions provide professional and expert opinions on biodiversity in BiH. Ten new PAs were proclaimed in BiH since 2011 while only 1 new PA manager (PL Konjuh) was appointed. Among many NGOs in BiH, 19 were identified as being active in biodiversity research and protection issues.

### 5.4.1 STATE GOVERNMENTAL INSTITUTIONS

Environmental matters are the responsibility of the Sector on Natural Resources, Energy and Environment of the Ministry of Foreign Trade and Economic Relations (MOFTER). MOFTER is responsible for the implementation of environmental protection programs resulting from international treaties, as well as cross-sectoral coordination between other sectors of environment. There are no available data about the number of employees in the field of nature protection.

The Inter-Entity Steering Committee for Environment (IESCE) was originally established by the entities and consists of coordination and harmonization of environmental law and policy between the two entities. Each entity is represented by four members, elected for four-year terms.

### 5.4.2 ENTITY GOVERNMENTAL INSTITUTIONS

At the entity level, the ministries primarily in charge of biodiversity conservation are the FMET and RS Ministry of Urban Planning, Civil Engineering and Ecology (MUPCEE). The PAs proclaimed at federal level (IUCN categories I, II) are financed from the federal budget, while PAs proclaimed at cantonal level

(IUCN categories III - VI) are financed from cantonal budgets. Given that RS does not have cantons all PAs are financed from the entity budget.

According to the interview held with the representative of the FMET, only 2 persons (one ecologist and one biologist) are employed in the field of biodiversity protection in this Ministry, even though the classification of workplaces foresees a total of 8 employees. The MUPCEE did not respond to the request for this information.

### 5.4.3 CANTONAL GOVERNMENTAL INSTITUTIONS

At the cantonal level there is one ministry per canton (10 in total) responsible for environmental protection. The Cantonal ministries deal with environmental and nature protection issues, as well as the financing of PAs of categories III, IV, V, VI<sup>47</sup>.

Table 13 gives a list of responsible Cantonal ministries and information on their staff capacities related to nature protection obtained using questionnaires<sup>48</sup> and analysis of web pages of relevant institutions.

**Table 13:** List of Cantonal Ministries Responsible for Environmental and Nature Protection with their Capacities related to Nature Protection

No.	Canton	Responsible Ministry for Environment	Sector	Capacities	Background
1.	Una-Sana Canton	Ministry of Civil Engineering, Physical Planning and Environmental Protection	n/a	n/a	n/a
2.	Posavina Canton	Ministry of Transport, Communications, Tourism and Environmental Protection	Tourism and Environmental Protection Sector	n/a	n/a
3.	Tuzla Canton	Ministry of Urbanism, Physical Planning and Environmental Protection	Environmental Protection Sector	One employee	Technical faculty
4.	Zenica-Doboj Canton	Ministry of Physical Planning, Transport and Communications and Environmental Protection	Environmental Protection Sector	n/a	n/a
5.	Bosnian Podrinje Canton	Ministry of Urbanism, Physical Planning and Environmental Protection	/	One employee in the field of environmental protection <sup>49</sup>	University degree
6.	Central Bosnia Canton	Ministry of Physical Planning, Construction, Environmental Protection, Return and Housing	n/a	n/a	n/a
7.	Herzegovina-Neretva Canton	Ministry of Commerce, Tourism and Environmental Protection	n/a	n/a	n/a
8.	West Herzegovina	Ministry of Physical Planning, Natural	Environmental	No employees	/

<sup>47</sup>Law on Nature protection FBiH (OG FBiH no. 66/13) article 134.

<sup>48</sup> Email questionnaires were sent to all 10 Cantonal Ministries and 4 of them replied (response rate of 40%).

<sup>49</sup>The systematization of workplaces predicts 2 employees in the field of environmental protection

	Canton	Resources and Environmental Protection	Protection Sector		
9.	Sarajevo Canton	Ministry of Physical Planning and Environmental Protection	Environment Protection Sector	One employee	Bachelor of tourism and environment protection
10.	Canton 10 (West Bosnia Canton)	Ministry of Civil Engineering, Reconstruction, Physical Planning and Environmental Protection	n/a	n/a	n/a

The ministries are mainly dealing with several issues besides environmental protection including civil engineering and physical planning. The environmental protection sector, also dealing with nature protection, commonly employs one person. The professional background of the employee is usually related to environmental protection but not in the field of biology or similar that is essential for biodiversity protection. This indicates serious understaffing of Cantonal environmental ministries and lack of competences related to biodiversity protection.

#### 5.4.4 PROTECTED AREA MANAGEMENT

The majority of 10 PAs in FBiH have a managing body, except for NM Prokoško Lake. The managing bodies in Pas are: (i) Public Enterprise “NP Una”, (ii) Public Enterprise “Nature Park Blidinje”, (iii) Public Enterprise “Nature Park Hutovo Blato”, (iv) Public Institution “Protected Nature Areas of Canton Sarajevo”, (v) Public Institution “Protected Nature Areas of Canton Sarajevo”, (vi) Business Unit of Natural Monument „Tajan“, (vii) Public Institution “Protected Nature Areas of Canton Sarajevo”, (viii) Public enterprise "PL Konjuh", and (ix) Public Institution “Protected Nature Areas of Canton Sarajevo”.

In RS there are 16 PAs out of which there are two NPs that are managed by public institutions: (i) Public Enterprise “NP Sutjeska” and (ii) Public Enterprise “NP Kozara” established by the Government of RS. Other PAs still have no officially appointed managing bodies while currently NGOs and municipalities perform this function. The two virgin forests and special nature reserves Janj and Lom are managed by the Public Enterprise “Šume RS”. The Orlovača Cave is managed by Pale Cultural Centre and Rastuša Cave by the Municipality of Teslić. The remaining NMs Ljubačevo, Jama Ledana, Vaganska, Đatlo, Pavlova, Girska, Pećina pod lipom, Ledenjača Cave and NM Žuta bukva do not have an appointed manager. The PA “Univerzitetski grad” is managed by the University of Banja Luka.

#### 5.4.5 OTHER RELEVANT INSTITUTIONS

In the FBiH, there are 20 public research institutes established as a part of faculties or universities, and 10 private research institutes in the capacity of autonomous legal entities. The Register of Scientific Research Institutions in RS, maintained at the Ministry of Science and Technology, contains entries of 21 institutes meeting the requirements for scientific tasks in line with the Law on Scientific Research Activity and Technological Development<sup>50</sup>.

The list of academic institutions and laboratories relevant to biodiversity is given in Annex 11.4.

These institutions provide professional and expert opinions and carry out research in all projects related to biodiversity in BiH.

<sup>50</sup>OG of RS, no. 6/12

The academic staff was involved in development of strategic documents and reports related to biodiversity including reports to the UNCBD, as well as the National Biodiversity Action Plan 2015-2020. Additionally, the academic staff participated in drafting the Strategy for the protection of biodiversity as well as Red Lists of endangered species (both in FBiH and RS).

There are various non-governmental organizations in BiH dealing with environmental issues and specifically biodiversity protection. During the stakeholder analysis a total of 19 NGOs were identified. Some of them, e.g. Center for Environment Banja Luka or Ornithological Society “Naše ptice”, have permanent employees working on biodiversity related projects while other, e.g. Society for Biological Research and Protection of Nature - BIO.LOG Sarajevo and Association for Biodiversity Research and Protection from Banja do not have continuous financing and permanently employed staff.

The full list of NGOs dealing with biodiversity protection is given in Annex 11.4.

## 5.5 APPROACH TO BIODIVERSITY PROTECTION

According to entity legislation on nature protection, the system of protection of natural areas foresees the introduction of national PAs (in line with IUCN categorization) and Natura 2000 sites. IBA<sup>51</sup> and Ramsar sites<sup>52</sup> are not integrated into the national PA system, as they are not recognized in the legislation on nature protection in FBiH and RS.

Ten new PAs were established in BiH since 2011. There are no established NATURA 2000 areas or areas of importance for the EU in BiH to date. Number of Ramsar and IBA sites remains the same compared to the 2011 Report. Regarding potential PAs the situation has not changed since the 2011 Report. The most important documents for establishment of PAs continue to be the entity spatial plans.

### 5.5.1 NATIONAL PROTECTED AREAS

The 2013 Millennium Development Goals Progress Report for BiH states that “the amount of territories designated as PAs in BiH is extremely low in terms of percentage of protected territory compared to the total territory of BiH, far below the European standard”.

According to the data presented in the 2011 Report, the percentage of terrestrial PA in BiH was 2% covering a surface of 101,092.08 ha<sup>53</sup>. Since 2011, 10 new PAs were proclaimed at entity and cantonal level. The latest data on the percentage of terrestrial PA including all officially established PAs indicate an even lower amount of 1.96% or 1,004 km<sup>2</sup> of terrestrial land. The difference can be explained by the fact that the indicator from 2011 was based on temporary decisions that certain areas will be protected not being in accordance with the entity laws on nature protection. Coast and sea areas in BiH have not been protected so far.

Table 14 indicates the officially established PAs in BiH with where PAs established in and after 2011 are highlighted in the text.

<sup>51</sup>IBA is an area identified using an internationally agreed set of criteria as being globally important for the conservation of bird populations.

<sup>52</sup>Wetlands protected by national governments to fulfil their obligations under the Convention on Wetlands of International Importance (commonly called the Ramsar Convention).

<sup>53</sup>MOFTER (2012). State of the Environment Report of BiH. Sarajevo

**Table 14: PAs in BiH**

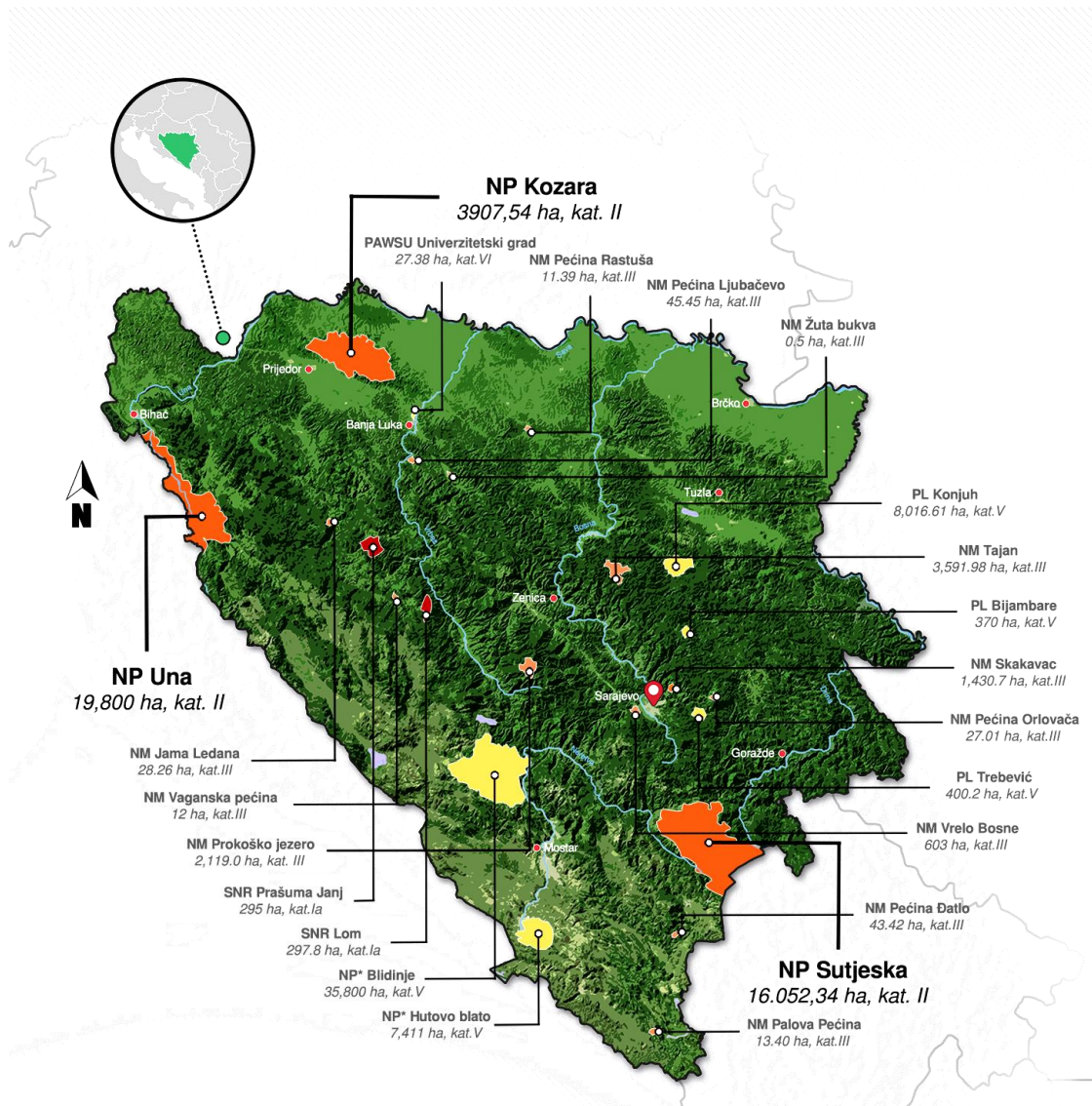
No.	Location	Entity	Year	IUCN category	Category (according to the Law on Nature Protection in RS and FBiH)
1.	Janj Primeval Forest	RS	1956	Ia	Strict Nature Reserve
2.	Sutjeska NP	RS	1962	II	NP
3.	Kozara NP	RS	1967	II	NP
4.	Blidinje	FBiH	1995	V	PL
5.	Hutovo Blato (Ramsar Site)	FBiH	1995	V	PL
6.	Skakavac waterfall NM	FBiH	2002	III	NM
7.	PL Bijambare	FBiH	2003	V	PL
8.	Prokoško Lake NM	FBiH	2005	III	NM
9.	Una NP	FBiH	2008	II	NP
10.	Ljubačevo cave NM	RS	2008	III	NM
11.	Tajan Park NM	FBiH	2009	III	NM
12.	PL Konjuh	FBiH	2009	V	PL
13.	Vrelo Bosne (Spring of Bosna River) NM	FBiH	2010	III	NM
14.	Orlovača cave NM	RS	2011	III	NM
15.	Rastuša cave NM	RS	2012	III	NM
16.	Ledana pit NM	RS	2012	III	NM
17.	Lom Primeval Forest	RS	2012	Ia	Strict Nature Reserve (SNR)
18.	Žuta Bukva NM	RS	2012	III	NM
19.	Area for resource management "University City"	RS	2012	IV	PA for resource management
20.	Vagan cave NM	RS	2013	III	NM
21.	Pavlova cave	RS	2013	III	NM
22.	Đatlo Cave	RS	2013	III	NM
23.	PL Trebević	FBiH	2014	V	PL

**FBiH:** FBiH has 10 PAs, of which only one is a NP, four are NMs and five are PLs. The majority of PAs has a managing body (see 5.4.4 Protected Area Management). Management plans are adopted for six PAs (PL Bijambare, NP Una, NM Vrelo Bosne, PL Blidinje, PL Hutovo Blato and NM Skakavac) while four PAs lack management plans (NM Prokoško Lake, NM Tajan, PL Konjuh, PL Trebević). Management plans for PL Konjuh and PL Trebević were under development at the time of preparation of this Report.

**RS:** At present, RS has 13 PAs, of which two are NPs: NP “Kozara” and NP “Sutjeska”, eight are NMs, two are SNRs, and one is a PA for resource management. Proclamation and management of these NPs is in accordance with 2<sup>nd</sup> category of IUCN. Here is to be noted that NPs “Sutjeska” and “Kozara” were proclaimed in former Yugoslavia. Law on NP “Kozara” and the Law on NP “Sutjeska”, were adopted at the National Assembly of RS in 2012 are in line with the IUCN categorization. These two NPs are managed by the public institution, established by RS Government. Management plans for both NPs were adopted in 2013. Management plans were developed for strict nature reserves Lom and Janj too. Other PAs still have no appointed manager (or currently NGOs and municipalities perform this function) and adopted management plans.

**BD:** There are no PAs in BD.

**Figure 2: Map of PAs in BiH**



**Procedure for establishing PAs in BiH (Entities and District of Brcko)**

The jurisdiction over the proclamation of areas as protected in FBiH is regulated between the Cantons and the Federation. The first two categories of protection (Ia - Strict Nature Reserve; Ib - Wilderness Area; II - NP), pursuant to the categorization of the IUCN, are under the jurisdiction in terms of proclamation by the Parliament of FBiH, while other categories i.e. from three to six (III - Nature Park, IV - Areas of Habitats/Species, V - PLs, and VI - PAs with Sustainable Use of Natural Resources) are under the jurisdiction of the cantons. If PAs are located in two or more cantons, these areas are proclaimed by the FBiH Parliament.

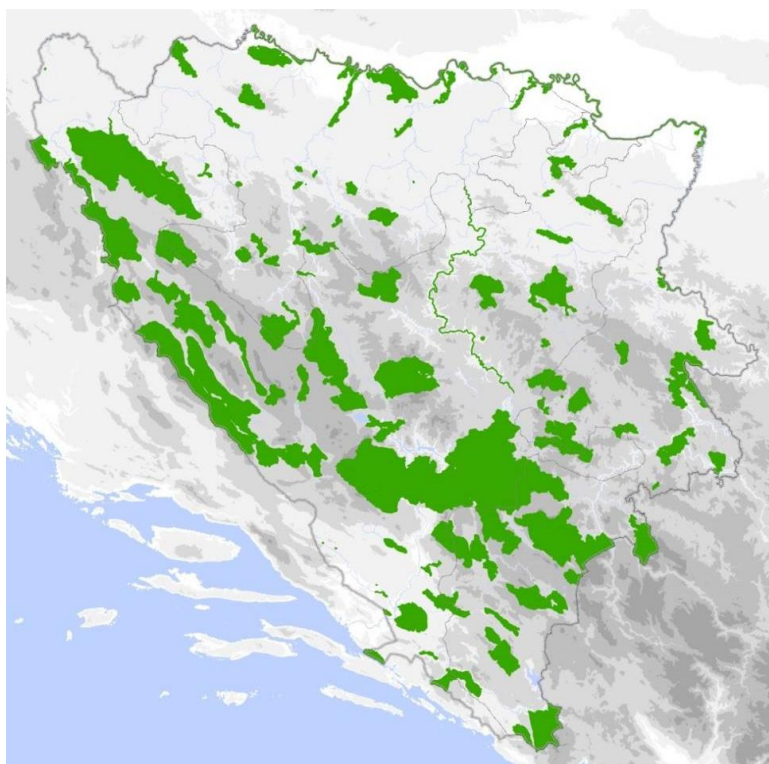
In RS, technical tasks related to protection of nature and natural resources in RS are performed by the Republic Institute for Protection of Cultural, Historical and Natural Heritage. The Institute establishes the basis (the Study for Protection of the PA), based on which an act proclaiming the PA is passed. Depending on the category, NPs are proclaimed by the RS National Assembly, while Strict Nature Reserves and Special Nature Reserves, Protected Habitats and PLs are designated by the Government of

RS, upon the proposal of MPPCEE RS. The assembly of a local self-government unit, under the consent of the ministry, proclaims the following protected zones: NMs and PAs with Sustainable Use of Natural Resources. If PAs are located in the area of both entities, the proposal for protection is provided by the FMET and MPPCEE RS in accordance with the Inter-Entity Environmental Protection Program. In BD, PAs are declared at the level of the Assembly of BD.

### 5.5.2 NATURA 2000 AREAS

Although entities laws on nature protection leave the possibility to proclaim Natura 2000 areas, currently no areas have been identified and officially proclaimed.<sup>54</sup> 122 areas (about 19% of the territory of BiH), including 200 species and 60 habitats, are proposed for future protection and formation of ecological network in BiH.<sup>55</sup> Figure 3 shows preliminary Natura 2000 sites in BiH.<sup>56</sup>

**Figure 3:** Map of Preliminary Natura 2000 Sites in BiH<sup>56</sup>



<sup>54</sup> **Law on Nature Protection of FBiH** (OG of the FBiH, No. 66/13) recognizes Natura 2000 sites and states that certain areas may be designated for the European program Natura 2000 to be engaged in the international ecological network, conservation of natural habitats and habitats of species by a regulation of the Government of FBiH. The Federation government will draw up a list of types of habitats widespread in the territory of FBiH by a decree, on the basis of submitted relevant scientific information. The list can be amended. Measures for the conservation of habitat types in favorable conservation status will be prescribed by the Federal Minister of Environment and Tourism after receiving approval from the Federal Ministry of Agriculture, Water and Forestry. Measures for the conservation of habitat types in a favorable state shall be integrated in spatial planning documents and management plans of protected natural areas.

According to the **Law on Nature Protection of RS** (OG of the RS, No. 20/14), the Government of RS adopts a regulation that establishes the ecological network and the method of its management and financing, as well as identifying ecologically important areas for the EU, which will become part of the European ecological network Natura 2000.

<sup>55</sup> As available at: <http://www.fmoit.gov.ba/userfiles/file/Natura%202000%20-%20Interpretation%20Manual%20LL.pdf> (last accessed on August 29, 2016)

<sup>56</sup> Project "Support to the Implementation of the Birds and Habitats Directive in BiH" (2014).

### 5.5.3 RAMSAR AND IBA SITES

The number of Ramsar and IBA sites remains the same compared to the 2011 Report. There are 3 Ramsar and 4 IBA sites in BiH, as shown in Table 15. No management planning has taken place (management plans are not developed) and very little or no conservation action has been undertaken for these sites.<sup>57</sup>

**Table 15: RAMSAR and IBA Sites in BiH<sup>58</sup>**

Ramsar sites	Year	Surface (ha)
Hutovo blato (FBiH)	2002	7,411
Bardača (RS)	2007	3,500
Livanjsko polje (FBiH)	2008	45,800
IBA <sup>59</sup>	Year	Surface (ha)
Boračko jezero (FBiH)	2000	26
Bardača (RS)	2000	3,500
Hutovo blato (FBiH)	2011	7,411
Livno karst field and Buško lake	2011	45,868

### 5.5.4 POTENTIAL PROTECTED AREAS

The FBiH Environmental Protection Strategy aims to establish a network of existing and new PAs (Strategic goal 4.1.4). On the other hand, the draft of the Spatial Plan for FBiH (2008-2028) includes a separate chapter on the development of PAs, with a target to protect 12 new areas (4,443 km<sup>2</sup> or 17% of the FBiH territory) by 2028. New PAs include 4 NPs, 5 nature monuments (NMs) and 6 PLs.

Based on the RS Spatial Plan, 15% of the entity's territory is to be protected. New areas will include 9 NPs, 14 regional parks (nature parks), 102 recreational, cultural, scientific, landscape and other PLs, 10 nature reserves and 13 memorial parks and monuments. It should be noted that the above mentioned Spatial Plan was prepared before the adoption of the new Law on Nature Protection in RS, so the categories of these PAs were defined in accordance with the previous legislation.

Planned PAs in BiH are shown in Figure 4.

<sup>57</sup> Available at: <http://www.birdlife.org/datazone/sitesearchresults.php?cty=27&fam=0&gen=0> (last accessed on 29<sup>th</sup> of June, 2016).

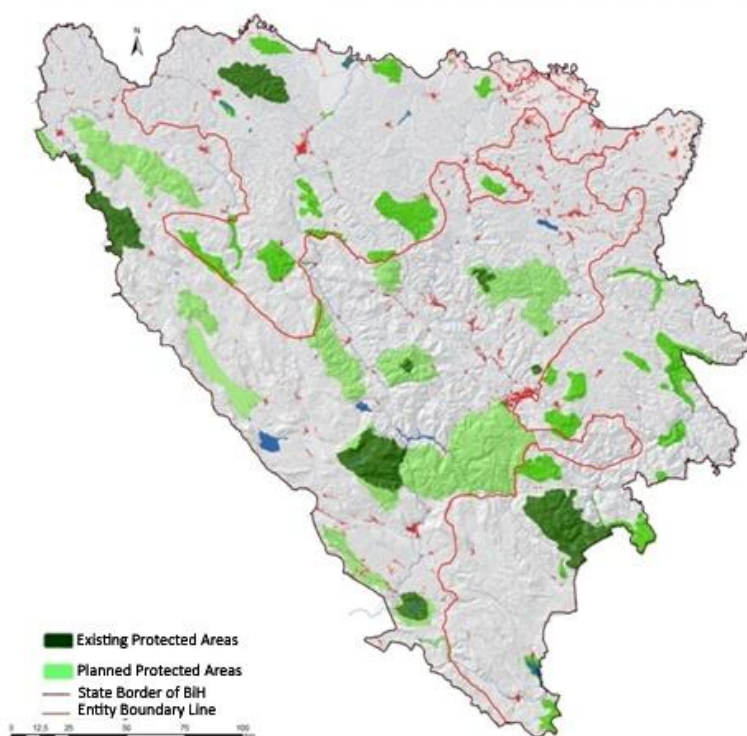
<sup>58</sup> MoFTER (2012). State of the Environment Report of BiH. Sarajevo

Available at: <http://nasljedje.org/prirodno-nasljedje/266> (last accessed on 29<sup>th</sup> of June, 2016).

<sup>59</sup> Available at: <http://www.birdlife.org/datazone/sitesearchresults.php?cty=27&fam=0&gen=0> (last accessed on 29<sup>th</sup> of June, 2016).



**Figure 4: Existing and Planned PAs in BiH<sup>60</sup>**



There are no developed guidelines for valorization of areas for protection in BiH (entities) or selection criteria used for identifying those areas. Usually, the Study for Protection of the PA (elaborate) or Expert Baseline Document for the area proposed for protection is the first step in the process of protection. The methodology is usually different among authors (developers) and among entities.

*Law on Nature Protection of FBiH* (OG of the FBiH, No. 66/13) defines the content of Expert Baseline Document as follows: a detailed description of the characteristics and values to be protected, assessment of natural values to be protected, the consequences from adoption of annunciation act, the decision of the competent authority on the allocation of the area under protection, and evaluation of funds needed and sources of funds for the protection of natural values. It is not defined who can develop these documents.

*Law on Nature Protection of RS* (OG of RS, No. 20/14), defines that the Expert Baseline Document – the Study for Protection of the PA has to determine the value of the area proposed for protection and management principles for that area. This study needs to be prepared by the competent authority: Republic Institute for Protection of Cultural and Natural Heritage of RS.

**FBiH:** Given that there is no expert institution in FBiH responsible for technical and scientific matters in the field of nature protection including the valorization of nature values, protection of nature is a slow process in this entity. Therefore, there was no significant progress since 2011. Canton Sarajevo, which established an expert institution (Institute for Protection of Cultural and Natural Heritage of Canton Sarajevo), plans to protect three areas close to the city: Bentbaša, Dariva and Stojčevac, for which

<sup>60</sup> IPSA Institute Sarajevo, Institute for Urbanism of BiH, Eco-Plan Mostar (2012).

studies on protection (the Expert Baseline Document) are in the drafting process. The FBiH Environmental Protection Fund financed in 2013 the drafting of the Feasibility Study for the protection of Zvijezda Mountain in Municipality of Vareš. The Feasibility Study underlined the need for protection of this area. There is no other information on activities concerning nature protection in FBiH.

Table 16 shows the areas to be proclaimed in line with the draft FBiH Spatial Plan 2008-2028.

**Table 16: Planned Nature PAs in FBiH**

No.	Name of the area	Categories	Area (ha)
1.	<b>Bjelašnica-Visočica-Treskavica</b>	NP	95,032.4
2.	<b>Zvijezda-Konjuh-Tajan</b>	NP	62,678.5
3.	<b>Prenj-Čabulja-Čvrsnica</b>	NP	61,334.1
4.	<b>Vranica</b>	NP	27,870.2
5.	<b>Mountain Grmeč</b>	Monument of Nature and Natural Features	66,343.6
6.	<b>Raduša-Stožer-Crnivrh</b>	Monument of Nature and Natural Features	38,215.7
7.	<b>Mountain Šator</b>	Monument of Nature and Natural Features	16,471.8
8.	<b>Hutovo blato</b>	Monument of Nature and Natural Features	7,188.4
9.	<b>Mountain Plješevica</b>	Monument of Nature and Natural Features	5,448.2
10.	<b>Livanjsko field</b>	PL	29,310.6
11.	<b>Trebižat</b>	PL	17,562.1
12.	<b>Mountain Vlašić</b>	PL	12,319.0
13.	<b>Popovo field- Vjetrenica</b>	PL	2,952.6
14.	<b>Canyon of Neretva</b>	PL	969.9
15.	<b>Pliva lakes</b>	PL	633.9
<b>TOTAL</b>			<b>444,331.2</b>

**RS:** The Decision on Adoption of the Proposed Amendments to the Spatial Plan of RS until 2025 was adopted in 2015 (OG of RS, no. 15/15). The amendments address the following issues:

- An increase of at least 5% in the total area under protection, through the proclamation of new PAs, until 2018;
- The adoption of bylaws (regulations) in the field of nature protection;
- The establishment of national ecological network and identification of areas for the European ecological network Natura 2000;
- Development of spatial plans for the special purpose areas for the larger PAs, and the development of urban development plans for the sites in PAs where it is registered or planned construction of a large scale;
- Rehabilitation of degraded areas (quarries, burnt areas, illegal landfills, gravel pits, etc.) with a significant adverse impact on the natural values and the environment;
- Updating and maintenance of existing GIS database of PAs and ecological areas;
- The identification of significant and valuable natural areas to be listed at the international lists of PAs (Ramsar, UNESCO World Heritage List, MAB - Man and the Biosphere, IBA).

The Amendments to the Spatial Plan of RS until 2025 provide a list of areas and facilities in ongoing proceedings for protection or in the process of drafting of the Study for the area proposed for protection - Expert Baseline Document (Table 17). There are 14 areas in this list with a total area of 29,117.2 ha.

**Table 17: List of Areas to be Protected in RS by 2018**

No.	Name	IUCN category	Municipality	Area (ha)	Coordinates
1.	Special Nature Reserve Tišina	Ib	Šamac	32	45.044075, 18.479347
2.	NP Drina	II	Srebrenica	6,000	44.001163, 19.303707
3.	Monument of Nature Cave Kuk	III	Kalinovik	27.4	43.501203, 18.455722
4.	Monument of Nature Cave Mišarica	III	Banja Luka	3	44.736561, 17.274682
5.	Monument of Nature Girska Cave	III	Sokolac	25.4	43.999866, 18.623003
6.	Monument of Nature Cave Ledenjača	III	Foča	19.2	43.517084, 18.651352
7.	Monument of Nature Pećina pod lipom (Cave under linden)	III	Sokolac	6.1	44.001761, 18.736881
8.	Monument of Nature Cave Banja Stijena	III	Rogatica	51.2	43.714899, 19.066394
9.	Monument of Nature Velika pećina - Big Cave	III	Bileća	820.9	43.004002, 18.304381
10.	Area of habitat management Popovo Polje (karst field)	IV	Trebinje	8,700	42.827948, 18.077831
11.	Area of habitat management Vrelo Vruljak (spring)	IV	Trebinje	2	42.699716, 18.371952
12.	PL Javorina	V	Pale, Trnovo	11,547	43.748135, 18.507039
13.	Nature Park Krupa at River Vrbas	V	Banja Luka	1,872	44.616874, 17.143843
14.	Area of landscaping Park Mladen Stojanović	VI	Banja Luka	11	44.7776403, 17.1969898
<b>Total:</b>			<b>29,117.2 ha</b>		

**BD:** There are no suitable nature areas planned for protection in the BD. The total area of DB is only 402 km<sup>2</sup>.

## 6. THREATS TO BIODIVERSITY

### 6.1 DIRECT THREATS

Since the 2011 Report no new threats to biodiversity have been reported in official national reports and strategies. The pressures of threats identified in 2011 increased, especially in the industrial and energy sectors.

Threats to biodiversity primarily include different pressures and dangers at various levels: at global level and various levels of biodiversity (genetic, species and ecosystem) as well. The most intensive pressures on biodiversity, as identified in national reports to UNCBD<sup>61,62</sup>, are:

- conversion of habitats,
- over-exploitation of resources,
- pollution,
- climate changes,
- invasive species, and
- anthropogenic actions and economic development activities.

#### 6.1.1 CONVERSION OF HABITATS

The ecosystems that suffer mostly from intensive processes of conversion of habitats are, as follows: (i) meadows on karstic fields, (ii) sub-Mediterranean rocky grasslands and karstic areas, (iii) sub-Mediterranean rocky grasslands and karst areas, (iv) marshes and wetland, (v) fresh waters, (vi) predominant refugial communities, and (vii) endemic pine forests.<sup>63</sup>

Some examples of habitats' conversion are found in meadows on karst fields which are predominantly represented by the orders of *Molinietalia*, *Deshampsietalia* and *Arrhenatheretalia*. Melioration activities reduce quantity of water needed to sustain this ecosystem resulting in conversion to dryer habitats represented by *Brometalia*. This consequently triggers change in representative plant species and other types of organisms such as birds and mammals (upper in the food chain).

Another example are wetlands which are drained and converted to agricultural land in order to increase agricultural production. This conversion is visible in the whole area of River Neretva Delta causing complete loss of representative species.

Population of some aquatic invertebrates species are significantly lowered as a consequence of habitats' conversions caused by anthropogenic activities<sup>64</sup>:

- Intensive eutrophication caused by organic and inorganic pollutants' discharge;
- Intensive eutrophication caused by formation of artificial lakes (hydropower plants accumulations and abandoned mines accumulations);
- Changes of streams' main physical parameters such as flow rate, water quantities, thermic and light regime caused by construction of dams and formation of very deep hydro-accumulations. In

<sup>61</sup> FMET (2010). The Fourth National Report of BiH to the UNCBD. Sarajevo

<sup>62</sup> FMET (2015). The Fifth National Report to UNCBD. Sarajevo

<sup>63</sup> Ibid.

<sup>64</sup> FMET (2010). The Fourth National Report of BiH to the UNCBD. Sarajevo

this way, natural habitats of many benthic organisms of canyons (Neretva, Vrbas and Drina rivers), that used to be development centers of endemic fauna, are destroyed;

- Substantial disturbance of water regime around water source areas due to conversion of wood habitats into bare or burned surfaces, which promotes erosion process and decrease water inflow into the natural water cycle;
- Sand and gravel extraction that damages the natural aspects of river banks,
- Disposal of waste in and nearby water bodies;
- Increased conversion of coastal belt natural areas into urbanized lands due to the construction of infrastructure facilities, contrary to the provisions of physical plans;
- Capture of water springs, which are centres of endemism, and water use for other purposes (irrigation, water supply, etc).<sup>65</sup>

Ecosystems that are under threat of habitat conversion, as well as trends of their conversion, are represented in Table 18.

**Table 18: Intensity and Trend of Conversion of Habitats within Main Groups of Ecosystems<sup>66</sup>**

Evaluated as: significantly increasing (↑), slightly increasing (↗) or no change in trend (→)

Type of ecosystem	Intensity and trend of pressure: conversion of habitats
Ecosystems of rock crevices within Mediterranean landscapes	→
Ecosystems of rock crevices within continental landscapes	↗
Ecosystems of rock crevices within alpine landscapes	→
Ecosystems of screes	→
Ecosystems around snow patches	→
Ecosystems of alpine grassland on carbonate	→
Ecosystems of Sub - alpine grassland on carbonate	↗
Ecosystems of alpine grassland on acid ground	→
Ecosystems of alpine shrubs	↗
Ecosystems of raised bogs	↗
Ecosystems of xerophilous grasslands within continental landscapes	→
Ecosystems of mesophilous meadows of continental valleys	↗
Ecosystems of mesophilous meadows of continental valleys	↑
Ecosystems of mesophilous meadows of inner mountains	→
Ecosystems of meadows on karst fields	↑
Ecosystems of hygrophilous meadows within continental landscapes	↗
Ecosystems of hygrophilous meadows within pannonic landscape	→
Ecosystems of Mediterranean wetlands	↑
Ecosystems of brakish waters	↗
Ecosystems of Mediterranean rocky-grasslands and karst	↗

<sup>65</sup> FMET (2015). The Fifth National Report to UNCBD. Sarajevo

<sup>66</sup> Ibid.

Ecosystems of sub-Mediterranean rocky-grasslands and karst	↑
Ecosystems of mediterraneo-montane rocky-grasslands and meadows	↗
Ecosystems of rocky-grasslands and serpentine	↗
Ecosystems of sea cliffs	↗
Ecosystems of littoral sea belt	↗
Ecosystems of blanket bogs	↗
Ecosystems of marshes and wetlands	↑
Ecosystems of fresh waters	↑
Ecosystems of riparian areas of fresh waters	↑
Ecosystems with flowering macrophytes	↗
Ecosystems around springs and brooks (rivulets)	↗
Ecosystems of tall herb communities	→
Ecosystems of Sub-Mediterranean oak forests	↗
Ecosystems of oak forests with continental landscapes	↑
Ecosystems of pannonic oak forests	↗

### 6.1.2 OVER-EXPLOITATION OF RESOURCES

Overexploitation of natural resources as a result of unsustainable harvesting of wood, medicinal herbs, non-wood forest products, etc. prevails in the most productive ecosystems situated in easily accessible areas.<sup>67</sup> It affects both resources and ecosystem services in ecosystems of oak forests in continental areas, Pannonian oak forests, upland beech-fir tree forests, upland deciduous forests, arable land, fresh waters, etc. Unsustainable harvesting is a problem present in many PAs and other natural areas such as mountain tips and forests. According to information obtained through interviews, the exploitation of medicinal herbs, forest fruits and mushrooms is not controlled systematically. This caused, for example, the population of great yellow gentian in NP Sutjeska to drastically decline in the last 10 years due to unsustainable harvesting.

### 6.1.3 POLLUTION

Pollution of air and water is a predominant type of pressure on ecosystems in the immediate vicinity of settlements. The most affected ecosystems are: (i) hygrophilous forests with alder, (ii) mesophilous meadows in continental valleys, (iii) hygrophilous meadows within Pannonian landscapes, (iv) brackish waters, (v) sub-Mediterranean rocky grasslands and karstic areas, (vi) littoral sea belt, (vii) fresh waters, (viii) ecosystems in urban and rural areas<sup>68</sup>.

Air pollutants in BiH come from various sectors, primarily: energy, industrial processes and agriculture<sup>69,70</sup>. Air quality monitoring network is established by two hydro meteorological institute: the Federal Hydro meteorological Institute and the Republic Hydro meteorological Institute of the RS in the following cities: Sarajevo, Tuzla, Zenica, Banja Luka, Bijeljina, Gradiška, Gacko, Goražde and Ugljevik. The recorded data indicate poor quality of air around industrial cities such as Sarajevo, Tuzla, Zenica,

<sup>67</sup> FMET (2015). Fifth National Report to UNCBD. Sarajevo

<sup>68</sup> *Ibid.*

<sup>69</sup> *Ibid.*

<sup>70</sup> MOFTER (2015). Draft of NBSAP 2015-2020. Sarajevo

especially during the winter months<sup>71</sup>. There is no data available on the impacts of air pollution on ecosystems i.e. biodiversity within them in BiH.

According to the *BiH State of the Environment Report (2012)*<sup>72</sup>, BiH ranks among the better watered and spring fed countries, with a dense river network in the Sava River Basin, and with a less developed network of surface waters in the Adriatic Basin, but with significant karstic ground watercourses. The biggest burden in terms of water pollution comes from wastewaters (especially sewage water). The reported total quantity of wastewaters discharged amounts to 93,712,000 m<sup>3</sup>. Only ten municipalities in the FBiH (Gradačac, Žepče, Odžak, Trnovo and Srebrenik in the Sava River Basin; Ljubuški, Čitluk, Grude, Živinice and Neum in the Adriatic Sea Basin), and two in the RS (Trebinje and Bileća in the Adriatic Sea Basin) have wastewater treatment plants. This means that wastewater of about 4 % of the total population is treated with primary (mechanical) and secondary treatment.<sup>73</sup> Monitoring of surface water quality is not carried out systematically for all surface watercourses, so there are no available data to be presented at state or entity level. Systematic monitoring of groundwater quality is also not performed.

*Water Management Strategy of FBiH 2010-2022*<sup>74</sup> and *Strategy of Integrated Water Management of the RS 2015 -2024*<sup>75</sup> provide general conclusions on quality of main surface water bodies in the BiH:

- Overall effluent pressure on the watercourses in BiH is about 10.2 million of the population equivalents (p.e.), with the tendency of rapid increase,
- Waters that belong to the Bosna River Basin are significantly more polluted than sub-basins of Una, Drina, and Vrbas in FBiH, and there is concentrated about 68.8 % of all polluters;
- The largest pollution sources in the Bosna River Basin are municipal wastewater in large urban centres - Sarajevo, Visoko and Zenica, and industrial plants of Tuzla region;
- It has been noticed that urban centres Sarajevo and Tuzla produce the highest pollution load in waters of Bosna River Basin;
- In the Vrbas sub-basin organic pollution amounts to  $2.6 \times 10^6$  p.e., in Una and Sana sub-basins about  $1.7 \times 10^6$  p.e., and in Sava River basin about  $1 \times 10^6$  p.e.

#### 6.1.4 CLIMATE CHANGE

Like in most transition countries, there are no primary data or monitoring of the climate change impact on BiH's biodiversity<sup>76</sup>. According to the *Climate change adaptation and low-emission development strategy for BiH (2013)*, climate change models predict that there will be significant changes in precipitation levels caused by the rise in temperatures. This will have a strong effect on the distribution of plant species.

Alpine-Nordic and Mediterranean areas are the most affected areas with regard to the climate changes in BiH. Alpine-Nordic mountain chain has its own specific biological and geo-morphological values. The Dinarides, extremely important area in the Balkans rich in endemic species and sensitive habitats, is particularly affected<sup>77</sup>. Climate change is expected to have a significant impact on flora in mountainous

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<sup>71</sup> *Ibid.*

<sup>72</sup> MOFTER (2012). BiH State of the Environment Report. Sarajevo

<sup>73</sup> MOFTER (2015). Draft of NBSAP 2015-2020. Sarajevo

<sup>74</sup> Institute for Water Management Jsc. Sarajevo, Institute for Water Management Ltd. Mostar (2012). Water Management Strategy of FBiH 2010-2022. Sarajevo

<sup>75</sup> The Government of the RS (2016). Strategy of Integrated Water Management of the RS 2015 -2024. Banja Luka

<sup>76</sup> FMET (2010) The Fourth National Report of BiH to the UN CBD. Sarajevo

<sup>77</sup> UNDP (2009) First National Communication of BiH under the UNFCCC. Banja Luka

areas, with migration of woody species along the Dinarides, and local reduction in species. Herbaceous species are likely to be lost in the high mountains. Consequences of climate change are already visible on Vlašić Mountain, where the area reforested after the big forest fire in the 1950's with allochthonous tree species, which are more sensitive to climate change, started to dry out during the last 5 years.<sup>78</sup>

Additionally, the swamp areas in the Nature Park Hutovo Blato, with their bird and turtle populations, and the karst regions in general, are likely to be particularly affected with the anticipated loss of flora and fauna. The extinction of a number of endemic species is expected to occur.<sup>79</sup>

#### 6.1.5 INVASIVE SPECIES

A list of invasive species in BiH does not exist nor is there a systematic approach to combat invasive species, including strategies or action plans at state and/or at the entity level. Invasive species invade all types of ecosystems. Based on the available data<sup>80</sup> it can be concluded that many invasive species are present in BiH, but information on their number and distribution is not available.

Most of the invasive alien plants have been introduced for decorative purposes and during horticultural activities (e.g. the potato beetle was introduced accidentally with the potato plant) that spread quickly out of human control.

Invasive species usually have a great reproductive potential, strong competitive ability and adaptability, which allows them to make more progress in the new environment as compared to the native taxa<sup>81</sup>.

Among the invasive animal species the most common are fish species coming to free waters from fish farms or appearing spontaneously from adjacent rivers and lakes. The introduced aquatic organisms also include some species of crustaceans, mollusks and shells.

BiH is rich in different types of water bodies (rivers, streams, lakes, reservoirs, etc.) where even introduced fish species easily settle and find optimal living conditions<sup>82</sup>. For example, the Prussian carp (an allochthonous species), probably fled from fish farms, easily spread out in the waters of the Black Sea and the Adriatic Sea Water Basins in BiH due to its large reproductive adaptive capabilities and high tolerance to changes in habitat conditions (good tolerance for low concentrations of oxygen in water, high temperatures of water, and organic pollution of waters).

However, some of the introduced fish species exert invasive character and they threaten the survival of the native species. It is also expected that some of the invasive species registered in the neighboring countries could appear in the BiH waters too (e.g. Chinese sleeper which was registered in the bordering Republic of Croatia<sup>83</sup>).

Table 9 lists most common invasive species in BiH.

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<sup>78</sup>FMET (2015) The Fifth National Report to the UNCBD. Sarajevo

<sup>79</sup> UNDP(2013) Climate change adaptation and low-emission development strategy for BiH. Sarajevo

<sup>80</sup>FMET (2008) Bosnia and Herzegovina – Land of Diversity, First National Report of BiH to the UNCBD. Sarajevo

<sup>81</sup>MOFTER (2015) Draft of NBSAP 2015-2020. Sarajevo

<sup>82</sup>FMET (2008) Bosnia and Herzegovina – Land of Diversity, First National Report of BiH to the UNCBD. Sarajevo

<sup>83</sup>MOFTER (2015) Draft of NBSAP 2015-2020. Sarajevo



**Table 19: Invasive Species in BiH** <sup>84</sup>

Plant species	Fish species	Insect species
Swingle ( <i>Ailanthus altissima</i> )	Common Goldfish ( <i>Carassius auratus</i> )	Potato Beetle ( <i>Leptinotarsa decemlineata</i> )
Sunroot ( <i>Helianthus tuberosum</i> )	Pumpkin Seed Sunfish ( <i>Lepomis gibbosus</i> )	Corn Rootworm ( <i>Diabrotica virgifera</i> )
False Indigo Bush ( <i>Amorpha fruticosa</i> )	Eastern Mosquitofish ( <i>Gambusia holbrooki</i> )	Sycamore Lace Bug ( <i>Corytuca ciliate</i> )
Black Locust ( <i>Robinia pseudacacia</i> )	Brown Bullhead ( <i>Ameiurus nebulosus</i> )	Buffalo Treehopper ( <i>Stictocephala bisonia</i> )
Japanese Knotweed ( <i>Reynoutria japonica</i> )		Asian Ladybird ( <i>Harmonia axyridis</i> )
Common Ragweed ( <i>Ambrosia artemisiifolia</i> )		Black Locust Gall Midge ( <i>Obolodiplosis robiniae</i> )

### 6.1.6 ANTHROPOGENIC ACTIONS AND ECONOMIC DEVELOPMENT ACTIVITIES

In addition to previously mentioned pressures on biodiversity, various economic development activities and anthropogenic actions have huge impacts on biodiversity such as:

- Agriculture,
- Energy,
- Industry,
- Mining,
- Waste Disposal, and
- Natural and man-made fires.

Threats to biodiversity from the **agriculture** sector are as follows:

- Abandonment of former agricultural practices that were favorable to biodiversity (e.g. nesting of Corncrake),
- Pollution of soil and water with inadequate disposal of manure,
- Pollution of soil and water with pesticides,
- Introduction of invasive species that come together with horticultural plants (e.g. potato beetle with plant potato),
- Planting huge areas of the same species of crops (monoculture).<sup>85</sup>

Unsustainable construction of **small hydropower plants**, especially in PAs, can have significant impacts on biodiversity and lead to degradation of existing ecosystems that might be habitats of endemic species. Despite these negative influences, RS Government adopted, in 2012, the Decision on Approval for the Construction of Small Hydropower Plants (up to 5 MW) (no. 04/1-012-2-204-12) in the NP Sutjeska, and awarded the concessions for the construction of hydropower plants of “Sutjeska 2A”, “Sutjeska 2B”, “Hrčavka 1”, “Hrčavka 2”, “Hrčavka 3”, and “Jabušnica”. This might lead to conversion of existing

<sup>84</sup>\*FMET (2015) Fifth National Report to the UN CBD. Sarajevo;

\*\*FMET (2008) Bosnia and Herzegovina – Land of Diversity, First National Report of BiH to the UN CBD. Sarajevo;

\*\*\*Mihajlović, Lj., Stanivuković, Z. (2009). Alochthonous insect species and forest decorative plants in RS. Forest Faculty of University in Banja Luka.

<sup>85</sup> MOFTER (2015) Draft of NBSAP 2015-2020. Sarajevo

natural habitats and threaten endemic species living in the NP<sup>86</sup>. On the other hand, wind farms can harm birds and bats in three possible ways – disturbance, habitat loss and collision<sup>87</sup>.

One of the greatest challenges in the BiH **industry** sector is related to obsolete technologies that cause air-pollution and other forms of environmental contamination that among others impact biodiversity.<sup>88</sup>

Just a few studies have been conducted in relation to the environmental impacts of **mining**, and even fewer on the impact exerted on biodiversity. The studies were mainly related to the social issues and the effects of mining on certain residential areas<sup>89</sup>.

It is estimated that there are around 1,100 registered **illegal dumpsites** in BiH. Reasons to this high number are limited waste disposal capacities, low waste service coverage, and low levels of public awareness on adequate waste management processes. Given the numerous shortcomings related to the data in this sector, a conclusion may be drawn that threats for biodiversity exist, however, it is difficult to state to what extent illegal dumping affects biodiversity in BiH.<sup>90</sup>

The intensity and occurrence of **natural and man-made fires** has assumed alarming proportions over the past several years. The effects of fires are reflected through the direct impact on local communities and biodiversity. Significant pressure was exerted on agricultural land, medicinal plants, and water-catchment areas. Local hunters' associations record huge losses of game in their hunting areas as a consequence of habitats destroyed by fire and animals migrating to other suitable habitats. Loss of tree species and pastures as well as appearance of transitional vegetation occurred. Fires caused material damage to different habitats, such as forests (Prenj and Čvrsnica mountains), marshlands (Hutovo blato), and karst areas (Livanjsko polje).<sup>91</sup>

For example, the 2011 fire in the Nature Park „Hutovo blato“, one of the three Ramsar and IBA sites in BiH, destroyed 1,350 ha of land with direct damage estimated at BAM 2.5 million. The fire exerted great damage to ecosystem and plant and animal species that will be felt for years to come. The effects of fire on biodiversity of Hutovo Blato are:

- Loss of nesting sites for bird species,
- Damaged habitats of medicinal plants (which is an additional source of income for returnee population as socially vulnerable population),
- Loss of hiding places for animals,
- Loss of breeding sites for animals (especially hunting game),
- Loss of tree species and pastures important for cattle breeding activities (threat for genetic biodiversity)<sup>92</sup>.

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<sup>86</sup>FMET (2015) Fifth National Report to the UNCBD. Sarajevo

<sup>87</sup>Available at: [https://www.l.eere.energy.gov/wind/pdfs/birds\\_and\\_bats\\_fact\\_sheet.pdf](https://www.l.eere.energy.gov/wind/pdfs/birds_and_bats_fact_sheet.pdf)

<sup>88</sup> BiH made significant progress in the transposition and implementation of Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control) especially related to environmental permitting for the industry. The Pollutant Release and Transfer Register (PRTR) has been introduced in BiH but its use is still not widespread.

<sup>89</sup> FMET (2015) The Fifth National Report to the UNCBD. Sarajevo

<sup>90</sup> FMET (2015) The Fifth National Report to the UNCBD. Sarajevo

<sup>91</sup>FMET (2015) The Fifth National Report to the UNCBD. Sarajevo

<sup>92</sup>FMET (2015) The Fifth National Report to the UNCBD. Sarajevo

## 6.2 UNDERLYING CAUSES

Underlying causes of recognized threats, identified through desk review analysis and interviews with relevant stakeholders, are grouped into 3 groups of issues: (i) legal, institutional and financial issues, (ii) technical issues, and (iii) social issues.

### **The legal, institutional and financial issues:**

- Absence of secondary legislation linked to laws on nature protection in the entities and BD;
- Non-compliance of the law on Nature Protection of BD with the new laws of the entities (horizontal harmonization);
- Non-compliance of the cantonal laws with the law in FBiH (vertical harmonization) ;
- Absence of the Law on Forests in FBiH;
- Lack of organizational structure and mechanism of coordination for the effective implementation of the MEAs;
- Poor harmonization of entities and BD legislation with ratified MEAs;
- Slow process of adopting specific strategic documents especially at state level (e.g. old and new NBSAP) as well as at the lower administrative levels (Environmental Protection Strategy of BD and Spatial Plan of FBiH);
- Poor integration of biodiversity issues into sectoral and cross-sectoral policies and absence of cross-sectoral coordination and cooperation;
- Insufficient funding for implementation of strategic documents in the field of environment and nature protection and their action plans;
- Institute for Nature Conservation of FBiH has not been established although it is prescribed by Law on Nature Protection of FBiH;
- Absence of public institutions for the management of PAs;
- Insufficient human capacities, expert associates for nature protection, in all ministries (entity and cantonal);
- Insufficient cooperation between entities in practical issues (Inter-Entity Steering Committee);
- Insufficient human capacities in PAs management bodies;
- Insufficient human capacities in established institutes for nature conservation (in RS and 3 cantons);
- Absence of management plans for some of the proclaimed PAs;
- Lack of funding for implementation of adopted PA management plans;
- Ramsar and IBA sites are not recognized in entities legislation;
- Insufficient funding, level of management planning and conservation actions for RAMSAR and IBA sites;
- Enforcement of environmental regulations is weak;
- Lack of funding of nature protection activities and research activities;
- Inefficient collaboration of all competent institutions.

### **Technical issues:**

- Lack of information on species of flora, fauna and fungi, habitat types and ecosystem in the entire area of BiH -inventory has not been carried out;
- Lack of research on biodiversity at general, at any level;
- Information systems for nature protection in entities and BD have not been established, as well as PAs register in FBiH an BD;

- Continuous monitoring of biodiversity (or at least of threatened species) has not been established in any area of BiH, including protected areas, although it is prescribed by entities laws on nature protection;
- Systematic collection, analysis and reporting of data on biodiversity at any level have not been established (except for the attempts of Agency for Statistics of BiH which is insufficient and not continuous);
- List of invasive species is not defined (at any level) and monitoring and control of invasive species is not carried out;
- Low percentage of area coverage by protected areas;
- Lack of spatial plans for PAs;
- Lack of systematic soil monitoring;
- Lack of detailed information on soil/land contamination, for the purpose of ensuring production of safe food products;
- Lack of an adequate land assessment system and single land inventory;
- Lack of information on the numbers and distributions of invasive species;
- Inadequate response in unplanned situations (forest fires, landslides, drying of forests, natural diseases etc);
- Low level of land use planning activities and the lack of pedological large-scale maps for the land use planning processes;
- EIA capacity, implementation and monitoring are weak;
- Ad hoc initiatives that are incompatible with strategic documents and plans for biodiversity protection;
- Insufficient number of projects related to biodiversity protection.

**Social issues:**

- Low level of public awareness on biodiversity value;
- Unsustainable use of biodiversity due to poor socio-economic situation in the country;
- Low level of awareness about importance and value of soil for sustainable development.

## 7. BIODIVERSITY VALUE IDENTIFICATION

The values of biodiversity can be observed and valued through: ecosystem services, PAs, ecosystems, plant, fungi and animal species, etc. The value of biodiversity for people and sustainable local development was in general analyzed using the ecosystem services approach including protected areas and the services their ecosystems provide. Information and opinions were collected through based on the statements of the focus groups and a survey.

The concept of ecosystem services implies nature as the basic source of human wellbeing and existence, and emphasizes dependence of man on the state of nature. Weakening of essential goods and benefits from forests, meadows, arable land, streams, rivers, lakes and seas, is a consequence of biodiversity loss. The loss in functions (services) is caused by pronounced pressures on ecosystems.

**Perception of biodiversity and its values:** In this respect, local population perception of the biodiversity has been investigated. Focus group participants stated that biodiversity represents the extraordinary wealth of their area, natural resource without which they could not survive, their basic source for life. Some of the participants even stated that the biodiversity of the area where they are located represents a quality standard and brand for their products, meaning that their products are perceived as healthy, organic and of good quality. In this regard, local people perception on biodiversity value mostly refers to provisioning and supporting services of ecosystems. When focus groups participants were asked to vocalize synonymous to the term “biodiversity” they used the following words: colorful, art, trees, smell of flowers in the meadows, life, magic, wildlife, cleanliness, drinking spring water, health, protection, survival and beauty. These synonyms are mostly correlated with regulating and cultural ecosystem services.

**Contribution of biodiversity to local/ rural development:** Indirect benefits (regulating and supporting ecosystem services) mainly come from forest ecosystems. Besides timber production, forest ecosystems provide various ecosystem services and benefits, many of which are of essential importance for the population in BiH. These include reducing the risk of flooding, the absorption of CO<sub>2</sub>, climate regulation, air purification, regulation of soil erosion, etc. However, these ecosystem services and benefits have been reduced in the last 5-10 years period due to the increased pressures on forest ecosystems, as reported in the BiH Fifth National Report to the UNCBD.

Direct benefits (provisioning and cultural ecosystem services): Biodiversity contributes significantly to the local population livelihoods in rural and underdeveloped areas of BiH, as well as rural development of certain, mostly protected, areas. Focus group participants stated that provisioning ecosystem services, including agricultural products, medicinal plants, mushrooms and forest fruit, represent the only sources of income for many families in their areas. All survey respondents think that biodiversity significantly contributes to the local rural development, and majority of respondents (80%) stated that biodiversity absolutely contributes to the local rural development.

The ecosystem services derived from agri-biodiversity are essential for socio-economic situation of the society. In those terms, food production is the most important service, but it is conditioned by other services or processes that take place in the ecosystem (e.g. pollination, water circulation, nutrient cycling, etc.). Local residents in the area of PL Bijambare and surrounding settlements mostly produce raspberries and strawberries, but also harvest herbs and mushrooms for sale. Focus group participants

highlighted the importance of supporting ecosystem services, especial pollination for agriculture and fruit production in their area. According to the survey respondents, one of the biggest contributions to the local/rural development in their local communities represents fruit and cheese production.

Forest and meadows ecosystems are most significant for direct benefits (provisioning ecosystem services) which are particularly noticeable in rural areas, as confirmed by the focal group participants who harvest forest fruits, medicinal plants and mushrooms. The latest available data from the literature also confirms that the sector of medicinal plants, mushrooms and forest fruits is expanding at an ever-faster rate. According to data released by the Foreign Trade Chamber of BiH, 3,406,573 kg of medicinal plants and forest fruits was exported in 2010 only, the value of which amounted to BAM 26,277,602 (14,940,944.88 USD). This represents an increase of 68% in comparison to 2009. Collecting medicinal and aromatic plants is mainly carried out by local middle age population or elderly persons, mostly from rural areas, whose revenues from medicinal herbs sale is dominantly their sole source of income (confirmed by focal group participants and survey respondents). Relying on their long-time experience and intuition and with occasional instructions provided by potential buyers, pickers find and pick medicinal and aromatic plants in forests, on mountains and non-cultivated meadows and fields across BiH. It is estimated that the annual amount of plants collected varies from 1,500 to 9,000 tons, depending on the weather conditions.<sup>93</sup> Local residents in the area of Tjentište (NP Sutjeska) and surrounding settlements mostly harvest blueberries, herbs and mushrooms mainly for sale for commercial use (boletus, lactarius, milkcap, sunstroke, oyster mushroom etc.).

Tourism and recreation (cultural ecosystem services) contribute to the rural development, especially in PAs, but there is still no available information on the extent.

**Sustainable use of biodiversity:** Focus group participants stated that biodiversity is used unsustainably. For example, many people harvest mushrooms with soil and mycelium to keep them fresh for selling. Although both entities have bylaws concerning non-wood forest products use, these issues are not well defined. Equally, the daily limits of non-wood forest products amounts that can be harvested are not respected. Collection centres, instead of warning people and refusing to buy improperly harvested mushrooms, do not react to these situations. Focus group participants stated that there is a noticeable increase of local population awareness on sustainable use of biodiversity, and there are positive examples too. For example, the practice of using specially crafted rakes for picking blueberries (which strip down all blueberries and leaves in the bush) has stopped. Focus group participants emphasized the importance of educational programs for the local population in terms of sustainable use of biodiversity.

They also believe that PAs managers (NP Sutjeska and PL Bijambare) sustainably manage biodiversity. According to the survey analysis, a greater part of respondents (60 %) is of the opinion that PAs are not an effective tool for biodiversity protection. Some of the reasons they gave are: (i) insufficient public awareness, (ii) most of the pollution comes from outside of these areas, (iii) there are no management plans for these areas or unsatisfactory implementation of management plans.

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<sup>93</sup>FMET (2015). Fifth National Report to UNCBD. Sarajevo

**PAs and the services their ecosystems provide:** There have been few research activities in BiH regarding assessment and valorization of ecosystem services, two of them related to PAs (Nature Park Hutovo blato and NP Una) where economic value of all overall services were calculated.

#### **Case study: NP Una**

The estimated Total Economic Value of yearly benefits generated by all ecosystem services within NP Una is **45,481,736.98 BAM (25.860.050.90 USD) per year**. Taking into account regulating and supporting ecosystem services, the most valuable ecosystems within NP Una are generally woodland and forest ecosystems with an average value per hectare of 4,020.67 BAM. Following the woodland and forest ecosystems, the most valuable ecosystems within the NP Una are the river ecosystem, wetland ecosystem, grassland ecosystem and cropland ecosystem respectively. The highest value of all ecosystem services is in the management zone Štrbački buk-Lohovo, amounting to 22,503,300.55 BAM/yr (1,2794, 948.84 USD/yr). Following the woodland and forest ecosystems, the most valuable ecosystems within NP Una are the river ecosystem, wetland ecosystem, grassland ecosystem and cropland ecosystem respectively. The highest value of all ecosystem services is in the zone Štrbački buk-Lohovo, amounting to 22,503,300.55 BAM/yr (1,2794,948.84 USD/yr).

#### **Case study: Nature Park Hutovo blato**

The World Wide Fund for Nature – WWF pilot project „Assessment of the Ecosystem Services of the Nature Park Hutovo Blato according to the PA Benefits Assessment Tool (PABAT)”, which was conducted in BiH for the first time in the area of ecosystem services, showed that Hutovo blato is one of the most productive ecosystems in BiH and that its conservation is not only important for all living organisms that depend on it, but also for the economy of the entire region. The ecosystems of Hutovo blato provide a whole range of economically significant services of great importance for human wellbeing and economy, including tourism, agriculture and fishing, water purification, and mitigating natural hazards such as floods, which only in 2000 caused damages estimated in millions. Ecosystem services and their estimated values (BAM/ USD) were as follows: (i) fishing (45,936 BAM yearly/25,994.40 USD), (ii) eco-tourism and recreation (129,052 BAM/73,028.32 USD), (iii) flood and courses control (2,000,000 BAM/ 1,131,765.86 USD), and (iv) education (83,200 BAM/ 47,081.46 USD)

**Figure 5:** Focus Group Discussion in Protected Landscape “Bijambare”





## 8. BIODIVERSITY CONSERVATION NEEDS

The biodiversity conservation needs can be grouped into several groups (conservation approaches), as follows:

- **Policy and Reform:** (i) State-level reforms to assume greater responsibility for coordination and implementation of environmental legislation as well as transposition of international treaties into local legislation; (ii) Ratification and enforcement of all relevant treaties; (iii) Development of required legislation to meet the EU accession and other international treaty obligations; (iv) Improvement of institutional capacity (refers to the employment of relevant staff) regarding biodiversity protection issues.
- **PA management:** (i) Increase the number and coverage of protected areas; (ii) Strengthen the institutional capacities for establishment of Natura 2000 areas as well as for management of IBA and Ramsar sites (training and education, expert materials and guidelines); (iii) Increase government commitment on all levels to provide steady financing of PA protection; (iv) Carry out targeted PA support programs.
- **Economic incentives for conservation:** (i) Increase government commitments on all levels to provide steady financing of projects related to biodiversity research and protection.
- **Cross-sectoral linkages to biodiversity conservation:** (i) Promote organic agriculture in order to reduce pollution from agriculture (pollution of soil and water) i.e. pressures on biodiversity; (ii) Prevention of illegal waste disposal through implementation of public awareness raising campaigns for adequate waste management procedures, separate collection of waste, recycling, and negative impacts of illegal landfills on human health, environment and biodiversity; (iii) Introduce an organizational setup and system for the monitoring of environment, especially for the biodiversity; (iv) Improving the process of correct and regular reporting on emissions to the PRTR register on a yearly basis (especially data and indicators of emissions from industrial facilities related to: atmospheric emissions, energy consumption, overall needs, number of industrial companies in the environment management system, eco-efficiency, progress in contaminated sites management and reclamation).
- **Sustainable use of natural resources:** (i) Enforcement of environmental legislation, especially in the area of nature protection, legislation, (ii) increase human resources (number of rangers) in protected areas, (iii) increase supervision in forests.
- **Environmental Communication:** (i) Improvement of communication between all relevant institutions and stakeholders; (ii) improvement of communication on biodiversity value and biodiversity protection issues to population.

Table 20 provides an overview of identified biodiversity conservation needs recognized by institutions, PA managers, NGO and scientific and research community as well as local population (focus groups) grouped according to the four categories of issues identified above.

**Table 20: Identified Biodiversity Conservation Needs**

Needs	Identified by			
	Institutions (state, entity and cantonal ministries)	PA Managers	NGO and Scientific Research Community	Local Population
<b>Needs associated with legal, institutional and financial problems</b>				
Solving the issues of national resources in the border areas	+	+	+	n/a
Effective enforcement of legal provisions	+	+	+	+

Improvement of capacity of inspection services	+	+	+	+
Revision of existing agreements with neighboring countries	+	n/a	+	n/a
Implementation of international directives - developing a model for harmonization of laws at the entity and cantonal level (vertical and horizontal harmonization)	+	n/a	+	n/a
Increase in penalties and their enforcement against all legal entities and individuals violating environmental protection measures	+	+	+	n/a
Addressing non-regulated inter-state relations regarding the use of national resources	+	n/a	+	n/a
<b>Needs associated with technical problems</b>				
Increasing the proportion of coverage by PAs	+	+	+	n/a
Improvement of sustainable management of existing PAs	+	+	+	+
Sustainable development of existing natural areas in terms of construction of ecotourism infrastructure	+	+	+	+
Development of eco-tourism related activities based on natural resources	n/a	+	n/a	+
Introduction of a integrated waste management system	+	n/a	+	n/a
Mapping all NGOs actively involved in the protection of nature	n/a	+	+	n/a
<b>Needs associated with environmental problems</b>				
Mitigating pressures caused by climate change	+	+	+	+
Reducing chemical pollution from industry	+	n/a	+	+
Reducing the scale of pressures related to hydro power plants constructions	+	+	+	+
Mitigating excessive logging and deforestation	n/a	+	+	+
Reducing large spatial interventions in sensitive areas	+	+	n/a	n/a
Mitigating conversion of habitats	n/a	+	+	n/a
Controlling the use of invasive species and development of programs for their suppression	+	+	+	n/a
Prescribing measures for the protection of water, including measures for emergency and accidental water pollution	+	n/a	+	n/a
Building water treatment plants	n/a	n/a	+	+
<b>Needs associated with social needs</b>				
Educational programs for sustainable use of natural resources with focus on biodiversity	n/a	+	+	+
Development and implementation of environmental education programs	+	+	+	+

## 9. RELEVANT CURRENT AND PLANNED ACTIVITIES (DONORS AND INTERNATIONAL NGOS)

Information on relevant current and planned activities was collected through face-to-face interviews and survey based on questionnaires (sent by mail and fax). In total 10 representatives were interviewed, among which there were representatives of 5 PAs, 1 NGO, 4 cantonal ministries and 1 entity ministry.

In total 50 projects were analyzed. Information on the total financial value of 12 projects was not available. The total value of remaining 38 projects was 1,348,128 USD. The projects are financed by international and national funds. The main international donors are WWF, Mava foundation, Ministry of Foreign affairs of Norway, IPA fund (EC) and Euronatur<sup>94</sup>. National funds include transfers from entity ministries relevant to nature protection as well as Environmental Funds. Some projects implemented in the PAs are financed from their own resources.

One of the most significant project in terms of biodiversity protection and implementation of the Natura 2000 in BiH in last 5 years, was the Project **“Support to the Implementation of the Birds and Habitats Directive in BiH”** (October, 2012-2014). The Project supported BiH institutions in approximation of the EU Birds and Habitats Directives. The focus was on transposition and implementation of requirements through the entities' nature protection laws and by the development of appropriate implementation strategies and management plans. The experts on the project carried out field research and identified more than **200 species** and **60 habitats** of the Natura 2000 network - in a total of **122 areas** (about 19% of the territory of BiH). These results will be used for creation of an ecological network which will become part of the Natura 2000 network following the accession of BiH to the EU. The Project achieved the following results:

- Draft list of the Natura 2000 sites in BiH;
- Developed management plans for three Natura 2000 pilot areas (Tišina, Vranica, and Orjen-Bijela gora);
- Draft regulations and decrees aiming at supporting the establishment of the Natura 2000 network in BiH;
- Establishment of the Natura 2000 information system;
- Raised knowledge and public awareness about the nature in BiH and the importance of Natura 2000.

Project "Mainstreaming Karst Peatlands Conservation into Key Economic Sectors – KARST implemented in the period from 2009 to 2013 (project operationally completed on 31<sup>st</sup> of May, 2013) is significant for the implementation of the Ramsar Convention. The KARST project was implemented by UNDP, and its main objective was to strengthen the policy and regulatory framework for mainstreaming the requirements for conservation of karst and peatland biodiversity into productive sectors (mining, water use) and spatial planning at cantonal level.

Table 21 shows relevant current and planned activities concerning biodiversity in BiH.

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<sup>94</sup>For more information <http://www.euronatur.org/landingpage/landingpage/>

**Table 21: Relevant Current and Planned Activities in BiH**

Project	Status	Implementation body	Financier (donors) and level of funding	Level of funding (USD)
Educational Trail	Finished	NP Kozara	Own resources	n/a
Arboretum	Finished	NP Kozara	Own resources	n/a
Dinaric Arc Parks Forest and Mountain PAs in BiH <sup>95</sup>	Finished	NP Kozara NP Sutjeska	WWF with financial help of Ministry of Foreign affairs of Norway and Mava foundation	72,332 <sup>96</sup>
Cleaning of Starenica Stream - Walking Trail	Finished	NP Kozara	Own resources	n/a
Cleaning of Bijele vode Stream - Walking Trail	Finished	NP Kozara	Own resources	n/a
Wildlife And Large Carnivores in NP Una	Finished	NP Una	Environmental Fund of FBiH	39,801
Protection of Meadow Ecosystems I and II	Finished	NP Una	n/a	n/a
Partial Examination Populations of Butterflies	Finished	NP Una	n/a	n/a
Analysis of the Status Plane Trees in Velika Aleja	Finished	PA of SC	Ministry of Physical Planning and Environmental Protection (SC)	28,429
Analysis of the Status Horse-Chestnut Trees in Velika Aleja	Finished	PA of SC	Own resources	16,489
Monitoring of Forest Phytocenoses the Area of NM "Vrelo Bosne" and Biodiversity Monitoring of Forest Ecosystems in the Area of NM "Skakavac"	Finished	PA of SC	Own resources FMET – co- financing	n/a
Monitoring of Important Game Populations in PA of SC	Finished	PA of SC	Own resources	n/a
Monitoring of Bats PL "Bijambare"	Finished	PA of SC	Own resources	n/a
ETNAR project (phase I and II)	Finished	NGO Center for Environment	IPA fund	33,384
Research of Sutjeska and Hrvacka Canyon in NP Sutjeska	Finished	NGO Center for Environment	Pro Natura (Switzerland) ETNAR project WWF <sup>97</sup>	46,126
Management of Packaging Waste in NP Sutjeska and its Impact on Animals in the Park.	Finished	NGO Center for Environment	ETNAR project Environmental Protection and Energy Efficiency Fund of RS	(7,107) 1,421 from ETNAR 5,686
Research of Zelengora's lakes in NP Sutjeska	Finished	NGO Center for Environment	WWF	8,680
Research of Bats in NP Kozara	Finished	NGO Center for Environment	Rufford Small Grant Foundation <sup>98</sup>	6,647
Protection of Flooded Meadows of Sava River and Proposal of New Retentions	Finished	NGO Center for Environment	Euronatur <sup>99</sup>	20,865
Protection of Brown Bear in BiH	Finished	NGO Center for Environment	Euronatur	2,671
Financing of PL Konjuh	In progress <sup>100</sup>	PL Konjuh	Ministry of Urbanism, Physical Planning and Environmental Protection (Tuzla Canton)	113,716
"Management Plan of NM "Skakavac"	Finished	NGO "Greenway"	Ministry of Physical Planning and Environmental Protection	n/a

<sup>95</sup>For more information <http://www.parksdinarides.org/>

<sup>96</sup>Total project value for Slovenia, Croatia, BiH, Serbia, Kosovo, Macedonia, Montenegro, and Albania

<sup>97</sup>For more information <http://www.worldwildlife.org/>

<sup>98</sup>for more information <http://www.rufford.org/>

<sup>99</sup>for more information <http://www.euronatur.org/landingpage/landing-page/>

<sup>100</sup>The Ministry finances the work of PL Konjuh with 200,000 KM on annual basis

Project	Status	Implementation body	Financier (donors) and level of funding	Level of funding (USD)
			(SC)	
Expert Explanation for the Proclamation of the PL "Trebević"	Finished	Institute for Protection of Cultural-historical and Natural Heritage(SC)	Ministry of Physical Planning and Environmental Protection (SC)	n/a
Expert Explanation for the Proclamation of the PL ""Bentbaša"	Finished	Institute for Protection of Cultural-historical and Natural Heritage(SC)	Ministry of Physical Planning and Environmental Protection (SC)	n/a
Situation Analysis and Protection Measures Proposal for all Monuments of Natural Heritage with the Analysis of the Situation and Review of the Category of PA of Canton Sarajevo	Finished	Institute for Protection of Cultural-historical and Natural Heritage(SC)	Ministry of Physical Planning and Environmental Protection (SC)	48,329
Horse Carriage Station at "Vrelo Bosne" and "Velika Aleja"	Finished	PA of SC	Own resources Ministry of Physical Planning and Environmental Protection (SC) – co-financing	56,858
Improving the Protection of Hydrological Values of PL "Bijambare"	Finished	PA of SC	Environmental Fund of FBiH Ministry of Physical Planning and Environmental Protection (SC)	40,028
Education of High School and Primary School Children to Raise Awareness About the Natural Heritage of SC	Finished	Geographical Society in BiH	Ministry of Physical Planning and Environmental Protection (SC)	22,561
Raising Environmental Awareness on Nature Protection and Conservation of Natural Resources	Finished	Mountaineering Association "Planinar" Vogošća	Ministry of Physical Planning and Environmental Protection (SC)	10,314
Molecular - genetic Indicators of Vulnerability of <i>Silenesendtneri</i> in Canton Sarajevo	Finished	Institute for Genetic Engineering and Biotechnology	Ministry of Physical Planning and Environmental Protection (SC)	5,635
I Live my Environment	Finished	Association "Genofond"	Ministry of Physical Planning and Environmental Protection (SC)	1,427
Green Management of PAs in Cross-border Region of Serbia and BiH	Finished	Local Democracy Foundation	IPA fund Ministry of Physical Planning and Environmental Protection (SC)	103,902
Development of Sustainable Practices for the Protection, Promotion and Management of Natural Resources	Finished	NGO Center for Sustainable Environmental Development (COOR)	European Commission - EC Ministry of Physical Planning and Environmental Protection (SC)	100,152
Capacity Building for Sound Management of Areas of Outstanding Natural Value	Finished	NGP Center for Sustainable Environmental Development (COOR)	IPA fund (cross-border cooperation Montenegro, Slovenia and BiH) Ministry of Physical Planning and Environmental Protection (SC)	212,675 (for BiH and Montenegro)
The Protection of Green Treasures in FBiH	Finished	Association "Bonaventura"	FMET <sup>101</sup>	n/a
Raising Awareness on the Protection of Waterfowl and their Habitats through	Finished	NGO "Lijepanaša"	FMET	n/a

<sup>101</sup>The projects financed by FMET in the period 2011-2014, according to data provided by this Ministry, have the overall value of 199,003 USD

Project	Status	Implementation body	Financier (donors) and level of funding	Level of funding (USD)
Development of Bird Watching				
Promotion of Biodiversity and Ecosystem Services FBIH	Finished	Centre for Ecology and Natural Resources SulejmanRedžić	FMET	n/a
Protection of Ledenica Cave and Šatorsko Lake	Finished	Regional Development Service	FMET	n/a
Improvement of Watermills and Afforestation	Finished	Association Ecology and Tourism	FMET	n/a
Protection of Indigenous Medicinal Plants	Finished	Association for Protection, Production and Processing of Medicinal and AromaticHerbs	FMET	n/a
Raising Awareness of the Need to Protect Indigenous Plant Areas along the Rivers Buna and Bunica	Finished	Sports-tourist club BlagajCity	FMET	n/a
I am also a Part of Nature	Finished	Association „Ekoturist“	FMET	n/a
Eco Quiz	Finished	„RTV“ d.o.o.	FMET	n/a
Mobilization of Scientific Knowledge on Biodiversity In FBIH in Raising Public Awareness	Finished	Faculty of mathematics and Science, Sarajevo	FMET	n/a
Easier to Breathe without Ragweed	Finished	Elementary School“AvdoSmailović”, Sarajevo	FMET	n/a
Raising Awareness about the Importance of Protecting Bats in Caves in FBIH	Finished	„Biospeld“	FMET	n/a
Research of Flora and Fauna of the river Trebižat - Raising Awareness of Biodiversity and Conservation of Natural River Landscapes	Finished	Association „Tajnaprirode“	FMET	n/a
Education of Population on the Ecological and Integral Cultivation of Medicinal and Aromatic Plants	Finished	Ecological Association “Flora”	FMET	n/a
Education of the Public about the Actions, Ways of Spreading and Removal of Invasive Species in Nature	Finished	Association for Protection, Production and Processing of Medicinal and Aromatic Herbs	FMET	n/a
Kupres, how Beautiful you Can Be	Finished	Sports Cultural and Ecologic Association „Milač“	FMET	n/a
Achieving Biodiversity Conservation through Creation, Effective Management and Spatial Designation of Protected Areas and Capacity Building”	Planned	UNEP	GEF	n/a
Mainstreaming Karst Peatlands Conservation into Key Economic Sectors – KARST	2009-2013	UNDP	GEF	2.52 million

## 10. ACTIONS NEEDED TO CONSERVE BIODIVERSITY

Table 22 contains specific actions to conserve biodiversity in BiH, grouped into four groups of actions, with the information of geographic area and main stakeholders related to action. The actions proposed aim to address identified Biodiversity Conservation Needs (Chapter 8).

**Table 22: Actions Needed to Conserve Biodiversity in BiH**

Underlying Causes	Actions	Geographic area of the action	Relevant stakeholders to be involved
<b>Legal Institutional and financial actions</b>			
Absence of the Law on Forests in the FBiH	Adopt the draft Law on Forests in the FBiH.	FBiH	Federal Ministry of Agriculture, Water and Forestry, Assembly of the FBiH
Slow progress in adopting specific strategic documents especially at the state level, as well as at the lower administrative levels	Adopt the draft NBSAP of BiH 2015-2020	BiH	Council of Ministries
	Adopt the draft Spatial Plan of FBiH2008-2028	FBiH	Parliament of the FBiH
	Adopt the draft Environmental Protection Strategy of BD 2013-2023	BD	Assembly of BD
Institute for Nature Conservation of FBiH has not been established although it is prescribed by Law on Nature Protection of FBiH	Adopt the Law on establishment of Institute for Nature Conservation of FBiH.	FBiH	Parliament of the FBiH
Poor harmonization of entities and BD legislation with ratified MEAs	Develop guidelines for the integration of the key issues of the MEAs in legislation on nature protection of entities and district (as well as recognition and integration of IBA and RAMSAR sites in legislation at all level)	BiH	International and national legal experts
Poor integration of biodiversity issues into sectoral and cross-sectoral policies and absence of cross-sectoral coordination and cooperation	Form a working group for coordination of all sectors (e.g. environmental protection, water management, agriculture, forestry, spatial planning, energy, mining and industry) at entity and district level.	BiH	MOFTER, competent ministries and entity and district sectors/departments for protection of environment
	Develop an integrated communication plan for integration of biodiversity issues into sectoral and cross-sectoral policies	BiH	MOFTER, NGOs
	Prepare instructions (publication) for integration of biodiversity values into other sectors, i.e. strategies and plans, as well as instructions for monitoring of their implementation, including organization of regular meetings.	BiH	International and national nature protection experts
Non-compliance of the law on Nature Protection of BD with the new laws of the entities (horizontal harmonization)	Improve horizontal harmonization of laws through organization of discussions and roundtables of expert associates from the relevant ministries at entity and district level.	BiH	FMOIT and relevant cantonal ministries and MUPCEE and Department of Spatial Planning and Property Relations of BD
	Adopt new law on nature protection of BD.	BD	Assembly of BD
Absence of secondary legislation linked to laws on nature protection in the entities and BD	Harmonize secondary legislation on the establishment of information system on nature protection and PAs registers in entities and BD, in terms of methodology on data collection and analysis for facilitating the reporting on the state level.	BiH	FMOIT, MUPCEE, Department of Spatial Planning and Property Relations of BD

Underlying Causes	Actions	Geographic area of the action	Relevant stakeholders to be involved
	Adopt secondary legislation of entities laws of nature protection (bylaws) as foreseen in these laws. Bylaws in FBiH and in RS on: (i) establishment of ecological network, (ii) establishment of cadastre of speleological objects, (iii) conservation of aquatic habitats, mapping and assessment of the vulnerability of habitat types with conservation measures, (iv) technical requirements for construction of poles, wind power plants and technical components above ground power lines; (v) risk assessment studies on introduction of alien species on nature, (vi) measures to preserve and monitor the internationally protected plants, fungi and animal species, (vii) protection measures for strictly protected species and sub-species and their habitats, (viii) rules of cultivation and preservation of a clean and healthy genetic basis of autochthonous domesticated species / subspecies, (ix) requirements and manner of taking genetic material from nature, etc.	FBiH, RS	FMOIT and MUPCEE
Lack of organizational structure and mechanism of coordination for the effective implementation of the MEAs	Adopt bylaw(s) of the Law on Conclusion and Execution of International Treaties of BiH, which will regulate organizational structure and mechanism of coordination of ratified MEAs , as well as Focal Points nominations.	BiH	MOFTER, Council of Ministries
Non-compliance of the cantonal laws with the law in FBiH(vertical harmonization)	Adopt the new cantonal laws on the nature protection harmonized with Law on Nature Protection of FBiH from 2013.	FBiH, cantons	FMOIT and relevant cantonal ministries, cantonal assemblies
Absence of management plans for some of the proclaimed PAs	Adopt management plans for PAs which do not have management plans	BiH	Institutes for nature protection of FBiH and RS, Department of Spatial Planning and Property Relations of BD
Absence of spatial plans at all administrative levels	Develop and adopt cantonal or municipal level spatial plans which incorporate natural resource use and biodiversity values	BiH	Cantonal ministries for spatial planning and municipalities
Insufficient funding, level of management planning and conservation actions for RAMSAR and IBA sites	Implement project of development of management plans for IBA and RAMSAR with 5 years action plan of conservation actions	BiH	International donors and implementers, national implementers
Insufficient funding for implementation of strategic documents in the field of environment and nature protection and their action plans as well as managements plans of PAs	Influence the decision-making process and budget planning of government representatives and decision makers at all levels through the organization of educational / informational visit protected areas.	BiH	Institutes for nature protection of FBiH and RS, Department of Spatial Planning and Property Relations of BD
	Influence the decision-making process and budget planning of government representatives and decision makers at all levels through informative newsletters to communicate the value of nature and in particular those of ecosystem services.	BiH	Institutes for nature protection of FBiH and RS, Department of Spatial Planning and Property Relations of BD
Revision of existing agreements with neighboring countries	Conduct analysis of all existing and outdated agreements related to nature resources use and protection with neighboring countries with an action plan for their revision and solving problem of exploitation of national resources in the border areas	BiH	International and national legal and nature protection experts
Insufficient human capacities, expert associates for nature protection, in all ministries (entity and cantonal), professional institutions and PA management institutions	Employ professional associates for the nature protection (in line with systematization of workplaces) and increase the budget for these institution	BiH	Governments of entities and cantons, Relevant institutions



Underlying Causes	Actions	Geographic area of the action	Relevant stakeholders to be involved
Improvement of capacity of inspection service	Employ a larger number of inspectors in the field of environmental protection, forestry at all levels	BiH	Federal Urban and Ecological Inspectorate Federal Forest Inspectorate Urban-construction and Ecological Inspectorate of RS Forest Inspectorate of RS Environmental Protection Inspectorate of BD Inspectorates Related to Urban, Construction, Ecological and Utility Issues(cantonal level ), governments of FBiH, cantons, RS and BD
<b>Actions to improve technical capacities</b>			
Improvement of sustainable management and sustainable development of existing PAs	Improve or develop new models for financing PA	FBiH and RS	FMOIT and MUPCEE
	Construct ecotourism infrastructure and outdoor furniture in PAs	BiH	International donors and implementers, national implementers
	Develop eco-tourism related activities based on natural resources	BiH	International donors and implementers, national implementers
List of invasive species is not defined (at any level) and monitoring and control of invasive species is not carried out	Make a list of invasive alien species for BiH and publish it in official gazette(s)	BiH	MOFTER, FMOIT and MUPCEE
	Undertake the assessment of risks of invasive alien species in BiH	BiH	International and national nature protection experts
	Develop programs and action plans for combating the high risk invasive alien species	Entities	FMOIT and MUPCEE

Underlying Causes	Actions	Geographic area of the action	Relevant stakeholders to be involved
Lack of information on species of flora, fauna and fungi, habitat types and ecosystem, lack of research on biodiversity at general, at any level, and lack of continuous monitoring of biodiversity (or at least of threatened species) in any area of BiH	Establish informative information system on nature protection and PAs registers in entities and BD	BiH	Institutes for nature protection of FBiH and RS, Department of Spatial Planning and Property Relations of BD
	Implement a project of inventory of species in PAs in BiH	BiH	International donors and implementers, national implementers , PAs managers
	Implement a project of ten-year monitoring of endemic and in particular important species in PAs in BiH	BiH	International donors and implementers, national implementers , PAs managers
	Implement a project of ten-year monitoring of indicator species in PAs in BiH	BiH	International donors and implementers, national implementers , PAs managers
	Implement a project of mapping of autochthonous domesticated animals and plant and traditional practices of food production in PAs	BiH	International donors and implementers, national implementers , PAs managers
	Train and equip institutional staff for monitoring	BiH	Institutions (ministries, expert institutions etc.)
	Capacitate and include NGOs in the monitoring	BiH	NGOs
Weakening of some ecosystem services (in particular regulating ecosystem services), especially for forests ecosystems	Complete the analysis of state of ecosystem services in BiH	BiH	International and national nature protection experts
Increase in effects of climate changes	Undertake the assessment study on effects of climate changes on primary ecosystems in BiH.	BiH	International and national nature protection experts
Conversion of habitats	Fund rural development activities for the re-establishment of traditional practices of grazing and mowing in order to reduce the succession of pastures into forest ecosystems.	FBiH and RS	FMOIT and MUPCEE
	Develop an action plans for mitigation of conversion of habitats in sub – urban areas.	FBiH, RS and BD	FMOIT and MUPCEE and Department of Spatial Planning and Property Relations of BD
	Develop an action plans for restoration of degraded habitats.	FBiH, RS and BD	FMOIT and MUPCEE and Department of Spatial Planning and Property Relations of BD
Waste management	Establish a sustainable integrated waste management system in all PAs in line with developed strategic documents of waste management at all levels.	FBiH, RS and BD	FMOIT and relevant cantonal ministries,

Underlying Causes	Actions	Geographic area of the action	Relevant stakeholders to be involved
			MUPCEE, Department of Spatial Planning and Property Relations of BD
Reduce chemical pollution from industry	Reduce chemical pollution from industry through strengthen the environmental permit mechanism and supervisory inspections.	FBiH, RS and BD	Federal Ministry of Energy, Mining and Industry of FBiH Ministry of Industry, Energetics and Mining of RS FMOIT and MUPCEE
Water management	Develop plans on emergency and accidental water pollution for all PAs.	FBiH, RS and BD	International donors , FMOIT and MUPCEE and competent operator
	Build municipal water treatment plants in municipalities bordering PAs.	FBiH, RS and BD	International donors , FMOIT and MUPCEE and competent operator
<b>Actions associated with social needs</b>			
Insufficiently developed NGO sector related to nature protection	Mapp all NGOs actively involved in the protection of nature.	BiH	Project – international donors FMOIT and MUPCEE
	Strengthen the capacity of NGOs in terms of writing projects and applications for international donors.	BiH	Project – international donors and experts
Low level of public awareness on biodiversity value due to poor socio-economic situation in the country and consequently unsustainable use of biodiversity especially in PAs	Implement educational programs for sustainable use of natural resources with focus on biodiversity for local population of Pas and surrounding areas.	FBiH, RS	FMOIT and MUPCEE NGO sector
	Implement educational programs for workers in redemption stations and making of specific guidelines (publications) for the exploitation of commercial species of plants and fungi.	FBiH, RS	NGO sector
	Make leaflets with basic information and “know-how” s on the sustainable exploitation of commercial species of plants and fungi.	FBiH, RS	NGO sector
Low level of public awareness on environment and nature protection especially in the young population	Develop and implement environmental education programs integrated in school educational system.	FBiH, RS, BD	FMOIT and MUPCEE Federal Ministry of Education and Science of FBiH and relevant cantonal ministries Ministry of Education and Culture of FBiH Ministry of Education and Culture of RS Department of Education
	Develop sustained, country-wide environmental campaigns for the general public and targeted user groups	FBiH, RS, BD	FMOIT and MUPCEE, NGO and Media

**II. ANNEXES**

## 11.1. INTERVIEW LOG

**Table 23: Interview Log**

Institutions/Organization	Name and contact of interviewee	Date
<b>Federal Ministry of Environment and Tourism (FMET)</b>	Mehmed Cero and Zineta Mujaković <a href="mailto:mehmed.cero@fmoit.gov.ba">mehmed.cero@fmoit.gov.ba</a> , <a href="mailto:zineta.mujakovic@fmoit.gov.ba">zineta.mujakovic@fmoit.gov.ba</a> +387 33 726 744	June 29, 2016
<b>Federal Ministry of Energy, Mining and Industry</b>	Zlatan Bilanović <a href="mailto:zlatan.bilanovic@fmeri.gov.ba">zlatan.bilanovic@fmeri.gov.ba</a> , +387 33 444 715	July 4, 2016
<b>Ministry of Industry, Energy and Mining of RS</b>	Milan Baštinac <a href="mailto:mier@mier.vladars.net">mier@mier.vladars.net</a> , +387 51 339 414	June 27, 2016
<b>Cantonal Public Institution for PAs of Sarajevo Canton - SC (Skakavac, Vrelo Bosne, Bijambare, Trebevic)</b>	Osman Delić <a href="mailto:osman.delic@zppks.ba">osman.delic@zppks.ba</a> , +387 33 201 112	June 29, 2016
<b>Public Institution NP Sutjeska</b>	Dejan Pavlović <a href="mailto:pavlovicradiology@yahoo.com">pavlovicradiology@yahoo.com</a> , +387 58 233-102	July 4, 2016
<b>Public Institution NP Kozara</b>	Dragan Romčević <a href="mailto:info@npkozara.com">info@npkozara.com</a> , + 387 52 211 169	June 28, 2016
<b>Institute for protection of Cultural, Historical and Natural Heritage of RS</b>	Dejan Radošević <a href="mailto:d.radosevic@kipn.vladars.net">d.radosevic@kipn.vladars.net</a> , +387 51 247 419	June 28, 2016
<b>Center for Environment</b>	Nataša Crnković, <a href="mailto:natasa.crnkovic@czzs.org">natasa.crnkovic@czzs.org</a> , + 387 51 433 142	June 27, 2016

## 11.2. RELEVANT LEGISLATION

Legislation at state level indirectly related to biodiversity and natural resource use, is the following:

- Law on Concessions (OG of BiH, no. 32/02, 56/04),
- Law on Veterinary Medicine (OG of BiH, no. 34/02),
- Law on Plant Protection (OG of BiH, no. 23/03),
- Law on Genetically Modified Organisms (OG of BiH, no. 23/09),
- Law on Animal Protection (OG of BiH, no. 25/09),
- Law on Agriculture, Food and Rural Development (OG of BiH, no. 50/08).

Legislation in FBiH, related to biodiversity (new laws and amendments are highlighted):

- **Law on Nature Protection (OG of the FBiH, no. 66/13);**
- Law on Environmental Protection (OG of the FBiH, no. 33/03; 38/09);
- Law on Freshwater Fisheries (OG of the FBiH, no. 64/04);
- Law on Una NP (OG of the FBiH, no. 44/08);
- Law on Forestry (OG of the FBiH, no. 20/02, 32/03, 37/04);
- Law on Waters (OG of the FBiH, no. 70/06);
- Law on Veterinary Medicine (OG of the FBiH, no. 46/00);
- Law on Concessions (OG of the FBiH, no. 40/02, 61/06);
- Law on the Fund for Environmental Protection (OG of the FBiH, no. 33/03);
- Law on Freshwater Fisheries (OG of the FBiH, no. 64/04);
- Law on Inspections (OG of the FBiH, no. 69/05);
- Law on Spatial Planning and Land Use (OG of the FBiH, no. 2/06, 72/07, 32/08, 4/10, 13/10);
- Law on Hunting (OG of the FBiH, no. 4/06, 8/10);
- Law on Agriculture (OG of the FBiH, no. 88/07, 4/10);
- Law on Agricultural Land (OG of the FBiH, no. 52/09).

Legislation in RS related to biodiversity (new laws and amendments are highlighted):

- **Law on Nature Protection (OG of RS, no. 20/14) ;**
- **Law on the Environmental Protection (OG of RS, no. 71/12);**
- **Law on NP “Sutjeska“ (OG of RS, no. 121/12);**
- **Law on NP “Kozara“ (OG of RS , no. 121/12);**
- Law on Forests (OG of RS , no. 75/08);
- **Law on Forest Reproductive Material (OG of RS , no. 75/08, 60/13);**
- Law on Water (OG of RS , no. 50/06);
- Law on Air Protection (OG of RS , no. 53/02);
- **Law on the Environmental Protection Fund (OG of RS , no. 117/11, 63/14) ;**
- Law on Waste management (OG of RS , no. 53/02, 65/08);
- Law on Animal Protection and Welfare (OG of RS , no. 111/08);
- Law on Hunting (OG of RS , no. 60/09);
- **Law on Fishing (OG of RS, no. 72/12).**

Legislation in BD related to biodiversity:

- Law on Nature Protection of BD (OG of BD of BiH, no. 24/04, 1/05, 19/07, and 9/09);
- Law on Air Protection of BD (OG of BD, no. 25/04, 19/07, 1/05 and 9/09);
- Law on Environment Protection of BD (OG of BD, no. 24/04, 19/07, 1/05 and 9/09);
- Law on Waste management of BD (OG of BD, no. 24/04, 19/07, 1/05 and 9/09);
- Law on Water Protection of BD (OG of BD, no. 25/04 and 19/07);
- Law on Spatial Planning and Construction of BD (OG of BD, no. 29/08);
- Law on Utility Activities of BD (OG of BD, no. 30/04 and 24/07);
- Law on Forests of BD (OG of BD, no. 14/10);
- Law on Tourist Activities of BD (OG of BD, no. 30/06 and 19/07);
- Law on Agricultural Land of BD (OG of BD, no. 32/04, 20/06, 19/07 and 10/07).

Legislation at cantonal level, related to biodiversity (new laws and amendments are highlighted):

- Law on the Environmental Protection (OG of the Zenica-Doboj Canton, no. 1/00);
- Law on Protection Environmental Protection (OG of the Central Bosnian Canton, no. 4/05 and **5/14**);
- Law on the Environmental Protection (OG of the Bosnian Podrinje Canton, no. 5/05 and 11/10);
- **Law on the Environmental Protection (OG of the Herzegovina-Neretva Canton, no. 6/12)**;
- Law on the Environmental Protection (OG of the Posavina Canton, no. 4/00);
- **Law on the Environmental Protection (OG of the West Herzegovina Canton, no. 8/13)**.

### 11.3. LIST OF STRATEGIES AND ACTION PLANS

**Table 24: Integration of Biodiversity in Sectoral Strategies**  
 (“+” good level of integration; “-” low level of integration)

Strategy	Level of integration	Additional information
FBiH Development Strategy	+	<ul style="list-style-type: none"> <li>Priority 3 - Conservation of nature and rational natural resources management</li> <li>Support to measures of biodiversity protection and sustainable use of the environmental indicators system</li> <li>Measures for maintaining and improving biodiversity in components of forestry, protection of nature and soil.</li> </ul>
FBiH Strategy of Development of Textile, Clothing, Leather and Footwear sector	-	<ul style="list-style-type: none"> <li>n/a</li> </ul>
FBiH Strategy of Development of Military Industry	-	<ul style="list-style-type: none"> <li>n/a</li> </ul>
FBiH Water Management Strategy	+	<ul style="list-style-type: none"> <li>In Millennium Development Goals (Chapter 4.1.3.3.) – ensure environmental sustainability</li> <li>Achieving and maintaining good status of surface and ground water in order to protect the aquatic flora and fauna.</li> </ul>
FBiH Strategy of Environmental Protection	+	<ul style="list-style-type: none"> <li>Biodiversity incorporated into several strategic objectives and measures.</li> <li>Strategic objective 4.1: protection of biological and geological diversity of FBiH through establishment and strengthening of institutional framework for implementation of efficient measures with 12 operational objectives as well as with strategic goals 4.2.1. 4.2.2., 5.2.1<sup>102</sup></li> </ul>
FBiH Energy Sector Development Strategy	+	<ul style="list-style-type: none"> <li>Overhaul of the existing HE facilities that should be turned into environmentally sustainable condition, "rehabilitation" of their water reservoirs from the aspect of biodiversity.</li> </ul>
FBiH Strategy of Tourism Development	+	<ul style="list-style-type: none"> <li>Recognized importance of biodiversity for environmental services</li> <li>Ecological sustainability and biodiversity</li> <li>Features of biodiversity in BiH</li> </ul>
RS Strategic Plan for Rural Development	+	<ul style="list-style-type: none"> <li>Rural policy deals with promotion of biodiversity.</li> </ul>
RS Strategy for Agricultural Development	+	<ul style="list-style-type: none"> <li>Objective 2- Conservation of nature and rational natural resources management: Measure 2.1.2. Support to measures of biodiversity protection and sustainable use of genetic resources in agriculture.</li> </ul>
RS Industry Sector Development Strategy	-	<ul style="list-style-type: none"> <li>n/a</li> </ul>
Energy Sector Development Strategy	+	<ul style="list-style-type: none"> <li>Recognized environmental impact of the energy sector</li> <li>Effects on biodiversity are of local character and should be tackled at the level of individual projects and by implementation of relevant legislation.</li> </ul>
RS Environmental Protection Strategy	+	<ul style="list-style-type: none"> <li>Introduction on commitments of the UNCBD Parties</li> <li>State of biodiversity, impacts of other sectors</li> <li>Overview of negative impacts on biodiversity</li> <li>Biodiversity as part of vision</li> <li>Biodiversity incorporated in operational objectives: 1.5, 1.9, 2.2<sup>103</sup></li> </ul>
RS Air Protection Strategy	+	<ul style="list-style-type: none"> <li>Positive effects on biodiversity through reduced disposal of acid.</li> </ul>
RS Strategy of Tourism Development	+	<ul style="list-style-type: none"> <li>Programme: monitoring status of the environment</li> <li>Measure: stimulate activities for environmental monitoring: water, air, soil, ecosystems and biodiversity.</li> </ul>

<sup>102</sup> 4.2.1. Introduction of cross-sectoral approach to management of biological and geological diversity in FBiH, 4.2.2. Preservation of traditional knowledge and experiences in the process of management of biological and geological diversity, 5.2.1 Identification and monitoring of risks for health, biological diversity, natural and architectural heritage.

<sup>103</sup> 1.5. Monitoring and control of invasive species, 1.9. Strengthening the IT service providers, 2.2. Establishment of cross-sectoral approach to management of biological diversity, pedological and geological diversity in RS.



Strategy	Level of integration	Additional information
RS Strategy of Integrated Water Management	+	<ul style="list-style-type: none"> <li>▪ One of special objectives of the strategy: protection and remediation of endangered ecosystems by improving the quality of water and improving the regime of small water bodies in ecologically critical periods; use of water systems for improving biodiversity</li> </ul>
BD Development Strategy	+	<ul style="list-style-type: none"> <li>▪ Biodiversity recognized as a particularly important resource</li> <li>▪ Prevention of threats to general biodiversity through conservation of environment in agriculture.</li> </ul>

#### 11.4. ACADEMIC INSTITUTIONS, LABORATORIES AND NGOS

**Table 25:** List of Academic Institutions and Laboratories Relevant to Biodiversity Issues in BiH<sup>104</sup>

Name	Location
Faculty of Sciences, University of Banja Luka	Banja Luka
Faculty of Agriculture, University of Banja Luka	Banja Luka
Genetic Resources Institute, University of Banja Luka	Banja Luka
Agricultural Institute of RS	Banja Luka
Veterinary Institute of RS „Dr. Vaso Butozan“	Banja Luka
Technological Faculty, University of Banja Luka	Banja Luka
Biotechnical Faculty, University of Bihać	Bihać
Veterinary Institute	Bihać
Agricultural Institute of Una – Sana Canton	Bihać
Veterinary Institute “Teolab”	Bijeljina
Institute for Waters	Bijeljina
Euro-Inspekt d.o.o.	Doboj (and Sarajevo)
Regional Laboratory of the Institute for Plant Protection of RS	Foča
Agronomy Institute - University of Mostar	Mostar
Agri-Mediterranean Faculty - „Džemal Bijedić“ University	Mostar
Agricultural and Food Faculty - University of Mostar	Mostar
Veterinary Institute of Herzegovina-Neretva Canton	Mostar
Herkon d.o.o.	Mostar
Federal Agri-Mediterranean Institute	Mostar
Agrokontrola d.o.o.	Orašje
Sistem Qualita, S d.o.o.	Pale
Inspekt RGH Sarajevo	Sarajevo
Federal Agricultural Institute	Sarajevo
Faculty of Agriculture and Food Sciences, University of Sarajevo	Sarajevo
Veterinary Station of Canton Sarajevo	Sarajevo
Veterinary Faculty, University of Sarajevo	Sarajevo
Institute for Genetic Engineering and Biotechnology	Sarajevo
Technological Faculty, University of Tuzla	Tuzla
Veterinary Institute of Tuzla Canton	Tuzla
Faculty of Sciences (Biology Department) - University of Tuzla	Tuzla
Veterinary Institute of Zenica-Doboj Canton	Zenica

**Table 26:** List of NGOs Involved in Biodiversity Research and Protection<sup>105</sup>

Name	Location
Center for Karst	Sarajevo

<sup>104</sup>MOFTER (2015). Draft of NBSAP 2015-2020. Sarajevo

<sup>105</sup>Identified during the course of the Project.

Name	Location
Atra	Sarajevo
Ecological Coalition of the Una River Basin	Prijedor
Triton	Fojnica
Center for Civil Cooperation	Livno
Society for Biological Research and Protection of Nature - BIO.LOG	Sarajevo
Fondeko association for promotion of balanced development and quality of life	Sarajevo
Ornithological Society - "Naše Ptice"	Sarajevo
Initiative for forests and environment	Sarajevo
Association of protection of flora and fauna	Lukavac
Association for environmental protection "Green Neretva"	Konjic
Center for Ecology and Energy	Tuzla
Youth Centre Livno	Livno
Center for Environment	Banja Luka
Association for biodiversity research and protection	Banja Luka
Arbor Magna	Banja Luka
Center for sustainable development	Brčko
Ze-do eco Zenica	Zenica
My Adventure Jajce	Jajce