

**FIFTH NATIONAL REPORT TO THE UNITED NATIONS  
CONVENTION ON BIOLOGICAL DIVERSITY OF  
BOSNIA AND HERZEGOVINA**

May, 2014

## BASIC INFORMATION

<b>Project Title</b>	Support to Bosnia and Herzegovina for the Revision of the National Biodiversity Strategy and Action Plan (NBSAP BiH) and Development of the Fifth National Report to the UN Convention on Biological Diversity (UNCBD)
<b>Project Acronym</b>	NBSAP BiH
<b>Project Duration Period</b>	January 2013 – December 2014
<b>GEF Implementation Agency</b>	United Nations Environment Programme – UNEP
<b>GEF Operational Focal Point for Bosnia and Herzegovina</b>	<b>Senad Oprašić</b> , PhD, Head of the Environmental Protection Department at the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (MoFTER BiH)
<b>UNCBD Focal Point for BiH</b>	<b>Mehmed Cero</b> , M. Sc., Assistant Minister in the Environment Sector of the FBiH Ministry of Environment and Tourism (MoET FBiH)

**Client:**

FBiH Ministry of Environment and Tourism

**Supported by:**

United Nations Environment Programme – UNEP

**External Associate Experts:**

Senka Barudanović

Stjepan Matić

Radoslav Dekić

Dragojla Golub

**Consultant:**

Centre for Energy, Environment and Resources (CENER 21)

**Translation and Proofreading:**

Gordana Lonco

Edina Dmitrović

**Graphic Design:**

Tarik Hodžić

## ACKNOWLEDGEMENTS

*We wish to thank the following institutions for the support that they provided in the development of the Fifth National Report to the United Nations Convention on Biological Diversity (UNCBD) and through their participation in workshops, provision of data, information, comments and suggestions:*

Aarhus Centre in BiH  
Administration of BiH for Plant Health Protection  
Adriatic Sea Watershed Agency  
Agency for Statistics of BiH  
Brcko District Government  
Centre for ecology and energy  
CPI „Protected Nature Areas of the Sarajevo Canton“  
Directorate for European Integration of BiH  
EKOTIM  
Environmental Protection and Energy Efficiency Fund of the RS  
Environmental Protection Fund of the Federation of BiH  
Faculty of Agriculture and Food Sciences, University of Sarajevo  
Faculty of Agriculture, University of Banja Luka  
Faculty of Forestry, University of Banja Luka  
Faculty of Forestry, University of Sarajevo  
Faculty of Natural Sciences and Mathematics, University of Banja Luka  
Faculty of Natural Sciences and Mathematics, University of Sarajevo  
Faculty of Natural Sciences and Mathematics, University of Tuzla  
Faculty of Science and Education, University of Mostar  
Federal Institute for Agropedology  
Federal Institute for Geology  
Federal Institute for Hydrometeorology  
Federal Institute for Statistics  
Federal Ministry of Agriculture, Water Management and Forestry  
Federal Ministry of Environment and Tourism  
FONDEKO  
Food Safety Agency of BiH  
Genetic Resources Institute of the RS  
Grizelj d.o.o. Sarajevo  
“Hercegbosanske šume” d.o.o. Kupres  
Herpetological Association in BiH “Atra”  
Inspectorate of the RS  
Institute for Genetic Engineering and Biotechnology  
Institute for Planning and Development of the Sarajevo Canton  
Institute for Protection of Cultural, Historical and Natural Heritage of RS  
Institute of Statistics of RS  
Ministry of Agriculture, Forestry and Water Management of the RS  
Ministry of Economic Relations and regional cooperation of the RS  
Ministry of Foreign Trade and Economic Relations of BiH

Ministry of Spatial Planning, Civil Engineering and Ecology of the RS  
P.E. National Park "Kozara"  
P.E. National Park "Sutjeska"  
P.E. National Park "Una"  
P.E. Nature Park "Blidinje"  
P.E. Nature Park "Hutovo Blato"  
P.E. Vjetrenica - Popovo polje  
Prospect C&S - „NATURA 2000“ Project  
Society for Research and Protection of Biodiversity  
The National Museum of BiH  
The Regional Environmental Centre for Central and Eastern Europe (REC)  
The Sava River Watershed Agency  
The World Bank  
THEISS d.o.o. Sarajevo  
United Nations Development Programme (UNDP) BiH  
United Nations Environment Programme (UNEP) BiH  
USAID/SIDA FARMA  
Veterinary Office of BiH

*We wish also to thank other institutions and individuals who provided their contribution to the final design of the Report.*

## FOREWORD

Bosnia and Herzegovina (BiH) is situated in South Eastern Europe, on the Balkan Peninsula, and in the central part of the northern temperate climate zone. It is characterized by a high level of biological diversity. The richness of flora, fauna and fungi, in addition to high level of endemism and relict species, ensures its significance not only on the European but on the global level as well.

Preconditions for such biological richness lie in geomorphologic structure of BiH and three climate regions (continental, Alpine and Mediterranean) stretching from northern plains along the Sava River to mountain chains of Dinarides and Adriatic Coast on the south. Biological and physical-geographical diversity of the area constitute the major natural resources that, through their mutual interaction, ensure and will continue ensuring a quality foundation for human living.

The United Nations Convention on Biological Diversity (UNCBD) is the primary international instrument regulating the comprehensive issue of biodiversity protection at the global level. As the fundamental international environment protection principle, conservation of biological diversity is considered the most important strategic assignment, common concern and responsibility of all countries in the framework of sustainable development process.

The Strategic Plan for Biodiversity 2011 – 2020, adopted in Nagoya, including twenty Aichi Targets, is elaborated in five strategic areas. Country Parties are invited to establish their respective goals within the flexible framework, taking into consideration national needs and priorities as well as achievement of global objective. The country Parties, inter alia, agreed to halve and, where possible, completely reduce the level of loss in natural habitats, including in forests, and by 2020 to achieve a goal of having 17% of protected land and water areas. Moreover, one of the goals is to halt by 2020 the disappearance of species known to be endangered, and to improve their protection status.

Bosnia and Herzegovina, as a Party to the UNCBD (as of 2002), follows the global trends in conservation and sustainable use of biological diversity and, as a result, it has brought together and joined its potentials in actions undertaken within the Aichi Targets framework.

Revision of the National Biodiversity Strategy and Action Plan (NBSAP) and the development of the Fifth National Report to the UNCBD is the first cycle of the global strategic planning process that BiH is included in from the very beginning; it is based on scientific outcomes of a large number of experts from the whole country and is part of overall activities and efforts of BiH to take adequate place in the EU integration process.

All members of the expert team who took part in the development of the document are fully aware of the responsibility, importance and significance of designing it and they succeeded in joining the interests of various sectors in BiH which have both direct and indirect influence on biological diversity. The goals that were established will strive on quite realistic bases to decrease the pressure on biological diversity.

Identification of national objectives is one of the outcomes achieved by the expert team, and a conclusion that the targets are ambitious but that, with an active commitment of all stakeholders/sectors in the process, they are also realistic and feasible.

In BiH, specific responsibility for nature conservation, for which it is necessary to ensure development of strategies, plans and adequate reports, rests with the Federal Ministry of Environment and Tourism (FMoET), as a National Focal Point to the CBD.

We are confident that the country's future is closely connected to its natural resources. The largest portion of the resources is contained in rare and authentic natural beauty spots and in the diversity of the living world the importance of which goes far beyond the local level.

NFP to the UNCBD  
Federal Ministry of Environment and Tourism

## TABLE OF CONTENTS

1	INTRODUCTORY INFORMATION.....	15
2	DATA ON THE BiH BIOLOGICAL DIVERSITY STATUS, TRENDS AND THREATS .....	17
2.1	Biological Diversity and its Significance .....	18
2.1.1	At the Global Level.....	18
2.1.2	At the Level of Bosnia and Herzegovina .....	19
2.2	Major Threats to Biological Diversity .....	24
2.3	Key Changes in Status and Trends of Biological Diversity .....	34
2.4	Impact of Biodiversity Changes on Ecosystem Services, and Socio-economic and Cultural Implications.....	42
3	STRATEGY AND ACTION PLAN, IMPLEMENTATION AND INTEGRATION OF BIOLOGICAL DIVERSITY IN BOSNIA AND HERZEGOVINA.....	47
3.1	National Biodiversity Goals .....	48
3.2	Updating the National Biodiversity Strategy and Action Plan.....	56
3.3	Implementation of the UN Convention on Biological Diversity.....	57
3.3.1	Activities under the Convention .....	60
3.3.2	Financial Mechanisms for the Implementation of the Convention .....	61
3.4	Integration of Biological Diversity into other Sectors .....	61
3.4.1	Sectoral Policies.....	62
3.4.2	Sectoral Policies and Biodiversity.....	66
3.4.3	Establishment of Cross-Sectoral Cooperation.....	70
3.4.4	Synergy in the Implementation of International Conventions.....	72
3.4.5	Possible Synergies with Other Multilateral Environmental Agreements.....	73
3.4.6	Biological Diversity within the Framework of Cross-Border Cooperation .....	75
3.5	Implementation of the National Strategy and Action Plan for Biodiversity (2008 – 2015) .	77
4	PROGRESS TOWARDS ACHIEVING THE AICHI BIODIVERSITY TARGETS (2020) AND RELEVANT MILLENNIUM DEVELOPMENT GOALS (2015) IN BOSNIA AND HERZEGOVINA .....	85
4.1	Progress towards the Strategic Plan and Aichi targets.....	86
4.2	Progress towards Relevant Millennium Development Goals .....	100
4.3	Lessons Learned in the Process of Implementing the United Nations Convention on Biological Diversity .....	102
5	REFERENCES.....	104
6	ANNEXES.....	106
6.1	Annex 1 – Information Related to Preparation of the Fifth National Report .....	106

6.2 Annex 2 – List of Projects Relevant for Biological Diversity in the Period 2008 – 2014.....108

## LIST OF TABLES

Table 1: The state and importance of ecosystem services in BiH .....	21
Table 2: Ecosystem services and their estimated values (BAM / EUR).....	22
Table 3: List of global pressures.....	26
Table 4: List of the most intensive pressures at the level of genetic and species diversity .....	26
Table 5: Pressures on different habitats, ecosystems and landscapes.....	26
Table 6: Pressures and changes caused by anthropogenic activities .....	27
Table 7: Physical volume of industrial production of BiH, 2008 – 2013 .....	31
Table 8: Officially protected areas in BiH .....	38
Table 9: Ramsar sites and IBA in BiH.....	39
Table 10: National goals for biological diversity of BiH by 2020 .....	50
Table 11: Overview of the NBSAP 2008-2015 goals and indicators, and suggested goals and indicators of the NBSAP 2015–2020 .....	52
Table 12: Institutions and their responsibilities in the field of environment protection, including the issues of biological diversity .....	58
Table 13: Public professional institutions and agencies dealing with biodiversity data collection ....	60
Table 14: Overview of strategies in BiH through levels of government with the time frame.....	63
Table 15: Integration of biodiversity in strategies through sectors and levels of government.....	68
Table 16: National Focal points in BiH for specific Conventions .....	75
Table 17: Progress towards strategic directions and objectives of NBSAP 2008 – 2015.....	79
Table 18: Overview of BiH's progress in protection of biodiversity against Aichi targets .....	87
Table 19: Surface of protected areas in BiH in the period 2000-2011.....	101

## LIST OF FIGURES

Figure 1: Geographical map of BiH .....	16
Figure 2: Administrative organization of BiH.....	16
Figure 3: Canyon of the Vrbas River .....	19
Figure 4: Livanjsko polje .....	22
Figure 5: Parasol mushroom ( <i>Macrolepiota procera</i> ).....	24
Figure 6: Goldfish ( <i>Carassius auratus auratus</i> ).....	25
Figure 7: Pumpkinseed Sunfish ( <i>Lepomis gibbosus</i> ).....	25
Figure 8: Burnt areas of Hutovo blato Nature Park .....	28
Figure 9: Dragonfly ( <i>Odonata</i> ).....	37
Figure 10: Green Lizard ( <i>Lacerta viridis</i> ).....	37
Figure 11: Mountain Čabulja.....	38
Figure 12: Protected areas in BiH.....	40
Figure 13: Donje Bare Lake.....	41
Figure 14: Mehmed Paša Sokolović Bridge on the Drina River, Višegrad .....	45
Figure 15: NP Una.....	47
Figure 16: Conceptual framework of NBSAP 2015. – 2020. ....	56
Figure 17: Livanjsko polje .....	70
Figure 18: Logo of Livanjsko polje .....	70
Figure 19: Little white egret ( <i>Egretta garzetta</i> ) .....	74
Figure 20: Mallard duck ( <i>Anas platyrhynchos</i> ).....	74

## LIST OF CHARTS

Chart 1: Surface of forests and forestland areas affected by fires in BiH and entities .....	28
Chart 2: Fire damage to wood mass (m <sup>3</sup> ) in BiH and entities .....	29
Chart 3: Number of species by individual systematic categories under the RS Red List.....	36
Chart 4: Number of species by individual systematic categories under the FBiH Red List .....	37

## ACRONYMS AND ABBREVIATIONS

ASCI - Areas of Special Conservation Interest  
BAT - Best Available Techniques  
BD - Brčko District of BiH  
BHAS- Agency for Statistics of BiH  
BiH - Bosnia and Herzegovina  
BIP - Biodiversity Indicators Partnership  
CEPRES - Centre for Ecology and Natural Resources  
CHM - Clearing House Mechanism  
CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora  
CMS - Convention on the Conservation of Migratory Species of Wild Animals  
COP - Conference of Parties  
DCF - Donor Coordination Forum  
ECNC - European Centre for Nature Conservation  
ECRAN - Environmental and Climate Regional Accession Network  
EIONET - European Environment Information and Observation Network  
EK – European Commission  
FBiH - Federation of BiH  
FMoET - Federal Ministry of Environment and Tourism  
GDP - Gross Domestic Product  
GEF - Global Environmental Facility  
IBA – Important Bird Areas  
ICPB - International Council for the Preservation of Birds  
IDA – International Development Association  
INGEB – Institute for Genetic Engineering and Biotechnology  
IPPC - Integrated Pollution Prevention and Control  
IUCN - International Union for Conservation of Nature  
KARST - Mainstreaming Karst Peatland Rehabilitation Concerns into Key Economic Sectors  
LBAP - Local Biodiversity Action Plan  
MoFTER – Ministry of Foreign Trade and Economic Relations  
NAP - National Action Programme to Combat Land Degradation and Mitigate the Effects of Drought  
NBSAP BiH - Biodiversity Strategy and Action Plan of Bosnia and Herzegovina  
NCSA - National Capacity Self - Assessment  
NFP - National Focal Point  
NM - Nature Monument  
NP - National Park  
NtP - Nature Park  
NVO – Non – governmental organization  
PBB – Pro - Biodiversity Business  
PL - Protected Landscape  
PNA - Protected Natural Areas  
POPs - Persistent Organic Pollutants  
PRTR - Pollutant Release and Transfer Register

Ramsar - Convention on Wetlands of International Importance  
REC - Regional Environmental Centre  
RENA - Regional Environmental Network for Accession  
RS - Republika Srpska  
SB – World Bank  
SEE BAP - Biodiversity and Ecosystem Services for Local Sustainable Development in the Western Balkans  
SERDA – Sarajevo Economic Region Development Agency  
SIDA – Swedish International Development Cooperation Agency  
SIS - Soil/Land Information System  
SNV - Netherlands Development Organisation  
UN - United Nations  
UNCBD - United Nations Convention on Biological Diversity  
UNCCD – United Nations Convention to Combat Desertification  
UNCSD - United Nations Conference on Sustainable Development  
UNDP – United Nations Development Programme  
UNEP – United Nations Environmental Programme  
UNFCCC – United Nations Framework Convention on Climate Change  
WWF - World Wide Fund for Nature

## 1 INTRODUCTORY INFORMATION

<b>Official Name:</b>	Bosnia and Herzegovina (BiH)
<b>Capital:</b>	Sarajevo (311.000 citizens)
<b>Other major towns:</b>	Banja Luka, Bihać, Mostar, Tuzla, Zenica
<b>Area:</b>	The surface area of BiH amounts to 51.209,2 km <sup>2</sup> . Out of that 51.197km <sup>2</sup> is the land and 12,2 km <sup>2</sup> the sea area.
<b>Geographical position:</b>	BiH is located on the Balkan Peninsula, bordering with the Republic Of Croatia (931 km) in the north, north-west and south, the Republic of Serbia (375 km) and the Republic of Montenegro (249) in the east. In the north, BiH has access to the Sava River and in the south, in Neum, to the Adriatic Sea. According to its geographical position, BiH belongs to the Adriatic and Black Sea Basin.
<b>Relief:</b>	BiH is primarily a mountainous country covered in forests. The average altitude is 500 m, with the highest peak being the Maglić Mountain (2,387 m). Out of its total land surface area, 42% consists of mountains, 24% of hills, 29% of karst areas and 5% of lowlands. BiH has a high value in water resources in the Balkan Peninsula, as there are many surface and groundwater watercourses in the country.
<b>Water resources:</b>	There are seven river basins (Una, Vrbas, Bosna, Drina, Sava, Neretva with Trebišnjica and Cetina rivers), a large number of river lakes (on Pliva and Una rivers), mountain lakes (in the area of Dinarides) and thermal and geothermal groundwater resources.
<b>Climate:</b>	Although relatively a small country, BiH has a lot of variations of the three main climates (continental, Mediterranean and southern) thanks to its diversified topography, flora and geographic location.



**Figure 1:** Geographical map of BiH

<b>Government structure:</b>	<p>BiH is an independent country with the decentralized political and administrative structure and several levels of government:</p> <ul style="list-style-type: none"> <li>▪ at the BiH level;</li> <li>▪ at the level of entities and the district: the Federation of (FBiH), the Republika Srpska (RS) and the Brčko District of BiH (BD)).</li> </ul>
<b>Administrative organization:</b>	<p>BiH is divided into two entities: FBiH and RS, and BD.</p> <p>FBiH consists of 10 cantons. The cantons are divided into municipalities and, therefore, there are 79 municipalities in total in the FBiH, whereas the RS entity consists of 62 municipalities.</p> <p>The town of Brčko is a separate administrative unit – a district.</p>



**Figure 2:** Administrative organization of BiH

<b>Population:</b>	3.791.622
<b>Religions:</b>	Muslims, Eastern Orthodox Christians, Roman Catholics, other
<b>Ethnic groups:</b>	Bosniacs, Serbs, Croats, others
<b>Languages:</b>	Bosnian, Serbian, Croatian (all official)
<b>Vulnerable groups:</b>	<p>Women</p> <p>Returnees and refugees (within BiH)</p> <p>National minorities</p> <p>Persons with disabilities</p> <p>Retired persons</p> <p>Young people aged 15–24 years</p> <p>Children</p>
<b>GDP:</b>	KM 25.734 million
<b>GDP per capita:</b>	KM 6.709, or EUR 3.430, or USD 4.406

<b>Currency:</b>	Convertible Mark (currency code: BAM – local currency symbol: KM)
<b>Exchange Rate:</b>	1 EUR = BAM 1,95 (fixed exchange rate)

## 2 DATA ON THE BIH BIOLOGICAL DIVERSITY STATUS, TRENDS AND THREATS

At the time of preparing and adopting the Strategic Plan for Biodiversity (2011-2020), Bosnia and Herzegovina was in the phase of adopting its first National Biodiversity Strategy and Action Plan – NBSAP BiH, 2008-2015. In view of the fact that it is just now that BiH fits, in terms of timing, into the global strategic planning cycles, the consultation process of preparing the new NBSAP and the Fifth National Report was not open through practical actions of updating data on the state of biological diversity. The main reasons for that are:

- the first review and assessment of the state of biological diversity of BiH was prepared just a few years before, as the basis for the first strategic document (NBSAP 2008-2015);
- the short period of time between the two NBSAPs and insufficient financial resources did not enable expeditious capacity building for monitoring the state of biological diversity.

The nature of Aichi Targets and the vision of the Strategic Plan for Biological Diversity on the one side, and the state of data on biological diversity in BiH on the other, defined the concept of the BiH NBSAP for the period until 2020, and provided a framework for identifying the national goals for biological diversity in this period.

Concerning the lack of the basic and updated data on the state of biological diversity, Bosnia and Herzegovina used the concept of ecosystem services to evaluate the state of nature and assess the human wellbeing stemming thereof.

As a country with economy in transition, and a country of the Mediterranean region already suffering from serious effects of climate changes, Bosnia and Herzegovina identified, as a first step in preparing the new Action Plan, the processes in the society and nature that are leading to loss of biological diversity.

This phase of consultation process resulted in much higher level of awareness of the connections between the state of nature and the social-economic situation in the country. For example, the damage caused by forest fires that have been getting bigger and more destructive over time in BiH, are shown in currency value, for the needs of society and the public (Chart 1). However, any media, professional, and even economic analysis indicates also the forest fire effects on the living world in the affected ecosystems, but also the unexpected reduction of ecosystem services, such as occurrence of erosion, threats to water resources, decrease in plants with medicinal and vitamin properties, reduction of hunting game population, distortion of esthetical values, etc.

General awareness of the importance of biological diversity is getting stronger in BiH but, at the same time, developmental pressures are increasing. The data released by the BiH Agency for Statistics (BHAS) show that in 2011 the industrial production growth increased by 5,6 % in relation to the year before, with considerable contribution of chemical industry, rubber and plastic

manufacturing, metal industry and production of coal and lignite (Second National Communication of Bosnia and Herzegovina under the UN Framework Convention on Climate Change, 2013).

However, simultaneous efforts are made to improve management processes in the field of biological diversity. One of the ways to achieve that is to standardize the process of issuing and possessing environmental permits. This assertion is supported by the data on new instruments, such as, for example:

- Rulebook on conditions and criteria to be met by the authorized institutions for the development of the Environmental and Social Impact Assessment on fees and other costs of the environmental impact assessment (Official Gazette of FBiH, No. 33/12 of 18-04-2012);
- Rulebook on amendments to the Rulebook on the deadlines for submitting environmental permit applications for plants and facilities for which permits were issued before the Law on Environmental Protection came into force (Official Gazette of FBiH, No. 31/12, of 11-04-2012);
- Rulebook on the manner of conducting monitoring of air quality and defining the types of pollutant species, pollutant substances, limit values, and other air quality standards (Official Gazette of FBiH, No. 1/12, of 06-01-2012);
- Decree on conditions of releasing waste waters into natural recipients and the public sewerage system (Official Gazette of FBiH, No. 4/12, of 13-01-2012).

It is necessary to point out that, with the general aim of defining the framework for the sustainability of nature and society in this area, the process of identifying and implementing the national goals for biodiversity has never been more demanding and more needed.

## 2.1 Biological Diversity and its Significance

### 2.1.1 At the Global Level

A unique feature of the planet Earth is the existence of life, and the most extraordinary feature of life is its diversity. 9 million types of plants, animals, protists and fungi inhabit the planet Earth. So, too, do seven billion people as well. Two decades ago, at the first Summit Earth, the vast majority of the world's nations declared that human actions were dismantling the Earth's ecosystems eliminating genes, species and biological features at an alarming pace. The observation led to the question of how such a loss of biological diversity will impact the functioning of the ecosystems and their ability to provide the society with the goods and services needed to prosper (Cardinale et al., 2012).

The necessity of initiating global actions with the following goals: (1) conservation of biological diversity; (2) sustainable use of natural resources, and (3) fair distribution of benefits arising from the use of genetic resources, was expressed at the end of the past century through initiating the United Nations Convention on Biological Diversity – UNCBD (Earth Summit, 1992).

Since then, 193 countries have acceded to the Convention. Through various bodies, the Parties to the Convention decide jointly on the content and legal basis of the actions that have to be undertaken at the level of each country for the purpose of achieving the three major goals of the Convention.

At the global level, the Parties to the Convention created diverse programs of work<sup>1</sup> and two protocols. The Cartagena Protocol on Biosafety (Cartagena Protocol) is an international agreement, adopted in 2000, with the view of ensuring every form of safety for the country Party to the Convention, from transporting and keeping living modified organisms resulting from modern biotechnology. Today, the Cartagena Protocol, which came into force in 2003, has 166 country Parties and BiH is one of them.

The Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (Nagoya Protocol) was adopted in 2010. The Protocol is a transparent legal framework for utilization of genetic resources within and outside the state territory.

The modern-day science makes distinction between the following levels of biological diversity: diversity of genes (genetic diversity), diversity of species (species diversity) and diversity of ecological systems (ecosystem diversity) (Convention, Article 2)

One of the dimensions of biological diversity is the number of species (or other taxonomic categories in certain space and time). According to various estimates, between 5 and 80 million plant and animal species inhabit the planet Earth, and only 1,9 million of them have been made known and described to date (Chapman, 2009). Among the known species, endangered are 21% of mammal species, 12% of bird species, 5% of reptile species, 12% of amphibian species, 5% of fish species, as high as 32 % of coniferous plant species, 3% of flowering plant species, etc. (IUCN, 2010).

### 2.1.2 At the Level of Bosnia and Herzegovina

According to the data of the First (2009) and the Fourth (2010) National Report to the UNCBD, Bosnia and Herzegovina belongs to the group of areas with quite valuable biological diversity.

Since there is no inventory of species diversity in BiH, importance of this resource is indicated by certain data. Inventory data for different groups of organisms, and for types of habitats in BiH have not yet been prepared and finalised, thus we can hardly talk about accurate data. However, based on expert evaluation (Redzic, 2007; Redzic, 2011), the ratio of the number of species and the total surface of the country indicates that BiH is among the most diverse countries in Europe. A total of 30% of the Balkan endemic flora (approximately 1.800 species) is found on the territory of BiH.

In addition to species diversity, Bosnia and Herzegovina is characterized by high degree of biological diversity at the genetic and ecosystem level as there numerous endemic centres of development and occurrence of new species. Relict-refugial species were surviving unfavourable climate conditions in shelters that were suitable to their



Figure 3: Canyon of the Vrbas River<sup>2</sup>

<sup>1</sup>[www.cbd.int](http://www.cbd.int)

<sup>2</sup> Photo by A. Trifunović

ecological valence and available in the natural diversity of BiH. Relict-refugial types of ecosystems, such as the ecosystems in the crevices of carbonate, dolomite, volcanic and silicate rocks, as well as ecosystems of screes, are predominantly represented in canyons of the Una, Vrbas, Drina and Neretva rivers. In addition to that, glacial relicts are found in ecosystems of snow patches, sub-alpine and alpine meadows as well as in ecosystems of rock crevices in the high-mountain area.

Diversity of flora, fauna, fungi and types of habitat in BiH is the result of the complete diversity of environmental conditions in this area. Taking into consideration all bio-geographical, physical-geographical and environmental specificities of the area, three types of landscapes may be found in BiH: Mediterranean, Sub-Mediterranean, Mediterranean-mountain, Pannonian, peri-Pannonian, upland, relic-refugial, wetland, and karst field landscapes.

Conservation of biological diversity encompasses actions of both conservation and recovery of endangered species, as well as actions aimed at restoring the natural resources. One of the first steps in preserving biological diversity is the inventory of species and habitats and, the second is evaluation of the threat level.

However, the latest data from BiH show the following:

- Red List of Republika Srpska (RS) contains 818 species of vascular plants; 304 bird species; 46 fish species; 57 mammal species; 20 amphibian species; 25 reptile species; 273 insect species (Official Gazette of RS, No. 124/12);
- Red List of the Federation BiH (FBiH) contains 658 plant species; 27 mammal species; 40 bird species; 6 reptile species; 4 amphibian species; 36 fish species, as well as a great number of different species of invertebrates (Official Gazette of FBiH, No. 7/14).

Conservation of the 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'.

The concept of ecosystem services implies nature as the basic source of human wellbeing and existence, and emphasises dependence of man from the state of nature.

Weakening of essential goods and benefits from forests, meadows, arable land, streams, rivers, lakes and seas, is a consequence of biological diversity loss. The loss in functions is caused by pronounced pressures on ecosystems.

Sustainability of ecosystem services depends on the use of natural resources. Human health, availability of food and water, cultural inspiration, protection against natural disasters, and many other socio-economic aspects depend on diversity and the state of ecosystem directly.

The Millennium Ecosystem Assessment 2005 divided ecosystem services into four categories (UNCBD, 2010). Based on the following reports, provisional assertions can be made about the state of some groups of ecosystem services in BiH:

**Table 1:** The state and importance of ecosystem services in BiH

Category of services	Benefits	Trend	State	Importance	Source
<b>Provisioning services</b>	Food, timber, fuel, genetic resources, potable water, natural medicines, etc.	Favourable in the present conditions	☺	Economic potentials: agriculture, exploitation of forests, organic production, traditional medicine, aquaculture, hunting, fishing, etc.	The First (2009) and the Fourth (2010) National reports to UNCBD; State of the Environment Report of Bosnia and Herzegovina (2012)
<b>Regulating services</b>	Air-quality regulation, climate regulation, water regulation, water purification, waste dilution, disease control, control of epidemics, regulation of natural disasters.	Unfavourable, with an increase in direct pressures	☹	Potential human and economic damage: human health, damage to forestry, agriculture, water management, civilian and social protection, tourism	Second National Communication of Bosnia and Herzegovina under the UN Framework Convention on Climate Change, 2013); Risk Assessment of Bosnia and Herzegovina regarding Natural and other Disasters (2011)
<b>Cultural services</b>	Cultural, spiritual and religious values, knowledge system, educational values, inspiration, aesthetical values, social relations, development of the sensitiveness for place, cultural heritage values, recreation and eco-tourism.	Favourable with additional investments	☺	Economic potentials: tourism development, quality of education, improvement of human health, development of social values.	State of the Environment Report of Bosnia and Herzegovina (2012)
<b>Supporting services</b>	Primary production of organic matter, flow of nutrients, land forming, pollination,	Unfavourable with an increase in direct pressures	☹	Potential human and economic damage: human health, damage to forestry, agriculture, water management, civilian and social protection, tourism.	State of the Environment Report of Bosnia and Herzegovina (2012); Second National Communication of Bosnia and Herzegovina under the UN Framework Convention on Climate Change, 2013);

There have been few research activities in BiH regarding assessment and valorisation of ecosystem services. The current studies are mostly independent and isolated attempts by the academicians, higher education students, and experts, to bring the topic closer to the stakeholders and the wider public. In addition to that, few studies and assessments were conducted within the framework of various projects and most of them are linked to certain locations. When it comes to protected areas, the trend of economic valorisation has just appeared in BiH. Perception that protection of nature does not yield economic profit has been present here to date and the advantage is given to projects that have the so-called 'existential importance' while natural resources are being irreversibly destroyed in the process with short-term financial effects. However, from the strategic point of

view, the real economic valorisation of the protected areas is before us and it will deny this kind of thinking (Information on Protected Natural Areas of the Sarajevo Canton, 2007).

**Example of Ecosystem Services**

**Hutovo blato**

The *World Wide Fund for Nature* – WWF pilot project „Assessment of the Ecosystem Services of the Hutovo blato Nature Park according to the Protected Area Benefits Assessment Tool (PA-BAT)”, 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.

A study conducted in Hutovo blato in 2000 identified 163 bird species from 39 families, which accounts for 51 % of all bird species and 76,47 % of all bird families identified so far in Bosnia and Herzegovina. The area of Hutovo blato ensures purification of water feeding this karstic area with cleaner water on its way to the Republic of Croatia. It also has a key role in preventing salinisation of ground water in the lower Neretva river basin, ensuring water for the downstream area. The ecosystems of Hutovo blato (Table 2) 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 damage estimated in millions (WWF, 2014).

Table 2: Ecosystem services and their estimated values (BAM / EUR)

Ecosystem service	Estimated value (BAM)	Estimated value (EUR)
Fishing	45.936 annually	23.557 annually
Eco-tourism and recreation	129.052	66.180
Flood and courses control	2.000.000	1.025.641
Education	83.200	42.666

Source: *Hutovo blato Nature Park*

**Livanjsko polje**

In the vicinity of Livno, in the Cetina river basin, there is an extraordinary natural phenomenon and a karstic field known as Livanjsko polje (45.000 ha). As half of the field is always covered with water, Livanjsko polje is a combination of wetlands of exceptional value - an important bird species habitat - peatlands and meadows, inhabited by endemic and rare species. Its southern border is carved by abundant agricultural areas whereas the forest lands, typical



Figure 4: Livanjsko polje<sup>3</sup>

<sup>3</sup> Photo by A. Velagić

for temperate climate, are situated on the northern side of the field. Traditional agriculture in Livanjsko polje, that is, raising cattle and sheep, as well as the production of milk and famous brands of delicacy cheese, support the sustainability of diverse and unique habitats of this field. Communities of rare and endangered species continue habituating there, including Hen Harrier, White-tailed Eagle, Jack Snipe, and Great Bittern. Although Livanjsko polje is one of the best preserved fields in BiH, huge quantities of peat are being exploited there, which may have grave effects on the field's hydrology and its productive meadows. Other identified pressures include: inadequate water management processes, exploitation of coal from open mining casts, fires, and reduction of pastures – cattle raising (WWF, 2014).

### **The Neretva and Trebišnjica Rivers**

The Neretva and Trebišnjica Rivers are fundamental resources for Bosnia and Herzegovina (they account for 40% of flowing water) and play an important role for the neighbouring Croatia and Montenegro. These rivers are a showcase for outstanding biological diversity. For example, in the Neretva river basin that encompasses only one fifth of the total surface of BiH, more than one half of the total number of species and lower taxonomic units of flora in BiH is inhabited here. The Neretva river basin has approximately 170 (in a broader sense) endemic and relict species. In addition, these rivers have a key socio-economic role in energy production, drinking water supplies, and agriculture. As the Neretva and Trebišnjica rivers are channelled they have been drastically changed through land reclamation processes taking place in 1960s. At present, there are ten hydro-power plants on Neretva and Trebišnjica and construction of additional seven is being planned (WWF, 2014).

### **Provisioning Services – medicinal plants, mushrooms and forest products**



The sector of medicinal plants, mushrooms and forest fruit is expanding at an ever-faster rate. According to the data released by the Foreign Trade Chamber of BiH, 3.406.573 kg of medicinal plants and forest fruit was exported in 2010 only, the value of which amounted to BAM 26.277.602, which is an increase of no less than 68% in comparison to 2009. Collecting the 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 mainly their sole source of income. Relying on their long-time experience and intuition and with occasional instructions provided by potential buyers, these persons find and pick medicinal and aromatic plants in forests, on mountains and non-cultivate meadows and fields across BiH. It is estimated that annual collecting of plants in this way varies from 1.500 to 9.000 tons, depending on weather conditions (A Guide for Cultivation of Medicinal and Aromatic Plants, 2012).

Figure 5: Parasol mushroom (*Macrolepiota procera*)<sup>4</sup>

## 2.2 Major Threats to Biological Diversity

The Fourth National report to UNCBD, 2010) identified different intensity of pressures on biological diversity, and the most intensive are: conversion of habitats, over-exploitation of resources, pollution, climate changes, and invasive species. The levels of threat to some ecosystems vary and depend on the intensity of endangerment factors.

In the group of ecosystems undergoing intensive processes of conversion of habitats, is the majority of ecosystems belonging to specific areas in BiH, such as: meadows on karstic fields, sub-Mediterranean rocky grasslands and karstic areas, sub-Mediterranean rocky grasslands and karst areas, marshes and wetland, fresh waters, predominant refugial communities, and endemic pine forests (Fourth National report to the UNCBD, 2010).

At the same time, overexploitation of resources is prevailing in the most productive ecosystems of BiH, which are situated in easily accessible areas. Overexploitation affects the resources and ecosystem services: ecosystems of oak forests in continental areas, Pannonian oak forests, upland beech-fir tree forests, upland deciduous forests, arable land, fresh waters, etc.

Pollution of air and water is a predominant type of pressure in landscapes and ecosystems in the immediate vicinity of bigger towns and smaller residential settlements. Most affected are: hygrophilous forests with alder, mesophilous meadows in continental valleys, of hygrophilous meadows within Pannonian landscapes, of brackish waters, of sub-Mediterranean rocky grasslands and karstic areas, of littoral sea belt, of fresh waters, of ecosystems in urban and rural areas (Fourth National report to the UNCBD, 2010).

With regard to the threats to biological diversity caused by global climate changes, the most affected areas are Alpine-Nordic and Mediterranean area. The area of Dinarides, as an extremely important area in the Balkans rich in endemic species and sensitive habitats, will be particularly affected. This mountain chain has its own specific biological and geo-morphological values. Rivers on karst fields and ecosystems that evolved along the rivers also may be in great danger. However,

---

<sup>4</sup> Photo by S. Matic

most affected are ecosystems of high mountain zones in BiH that are most sensitive to climate changes (First National Communication of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change, 2009).

Invasive species (for example, Ambrosia, Swingle, False Indigo Bush, Black Locust, Sunroot, Pumpkinseed Fish, Goldfish, Brown Bullhead, etc.) invade all types of ecosystems that can be reached on the banks of fresh waters and adjacent habitats as the initial points of invasion. Based on the available data on invasive species it can be concluded that dozens of invasive species are present in BiH, but there are no detailed information on their numbers and distribution (NBSAP BiH, 2008)



Figure 6: Goldfish (*Carassius auratus auratus*)<sup>5</sup>



Figure 7: Pumpkinseed Sunfish (*Lepomis gibbosus*)<sup>6</sup>

When it comes to species used for horticultural activities, and which got out of human control later on, the following can be found in BiH: Swingle (*Ailanthus altissima* Mill.), Sunroot (*Helianthus tuberosus* L.), False Indigo Bush (*Amorpha fruticosa* L.), Black Locust (*Robinia pseudacacia* L.), American Pokeweed *Phytolacca americana* L.), Japanese Knotweed (*Reynoutria japonica* Houtt.), Himalayan Balsam (*Impatiens glandulifera* Arn.) etc.

Most invasive species are: *Ambrosia artemisiifolia* L., *Bidens bipinnata* L., *Bidens frondosus* L., *Bidens subalternans* DC. and *Echinocystis lobata* (Michx.) Torr. & A. Gray.

Among invasive aquatic species the most common are fish coming to free waters of fish farms or appear spontaneously from adjacent rivers and lakes, and some of the most invasive fish species in BiH are: Common Goldfish, *Carassius auratus auratus* (Linnaeus, 1758), Pumpkin Seed Sunfish, *Lepomis gibbosus* (Linnaeus, 1758), Eastern Mosquitofish, *Gambusia holbrooki* (Baird et Girard, 1853), Brown Bullhead (*Ameiurus Nebulosis*) (Lesueur, 1819), etc.

Threats to biological diversity primarily include different pressures and dangers at various levels. Thus, pressures may be identified on global level, various levels of biological diversity, and genetic and species diversity levels as well.

---

<sup>5</sup> Photo by D. Golub

<sup>6</sup> Photo by D. Golub

**Table 3:** List of global pressures

No.	Global pressures:
1	Population growth
2	Unsustainable use of natural resources
3	Climate changes
4	Conversion of habitats
5	Land desertification
6	Usage of genetically modified organisms
7	Spreading out of invasive species
8	Poor implementation of agreements
9	Low level of public awareness at the global level.

Source: Fourth National report to the UN CBD, 2010

**Table 4:** List of the most intensive pressures at the level of genetic and species diversity

No.	The most intensive pressures
1	Conversion of habitats
2	Unsustainable use of natural resources
3	Permanent pollution of all spheres of environment
4	Devastation and destruction of ecosystems
5	Degradation and fragmentation of ecosystems
6	Disturbances in natural reserves of intact nature
7	Logging, hunting and poaching
8	Unsustainable collecting of economically important species
9	Uncontrolled use of pesticides and fertilizers
10	Uncontrolled introduction of alien species
11	Uncontrolled introduction of and manipulation with GMOs

Source: Fourth National report to the UN CBD, 2010

Different groups' habitats are exposed to specific types of pressures. For example, due to intensified human pressures, the situation of invertebrates has been changed significantly. Those pressures specifically affect hygrophilous and hydrophilous organisms. Dominant pressures affecting aquatic invertebrates include:

**Table 5:** Pressures on different habitats, ecosystems and landscapes

No.	Type of pressures on different groups' habitats
1	Intensive process of eutrophication of watercourses by diverse organic and inorganic pollutants
2	Intensive eutrophication caused by creation of artificial lakes;
3	Changes of main physical parameters of streams, such as outflow rate, water quantities, thermo and light regime due to construction of dams and creation of very deep hydro-accumulations. In this way, destroyed are natural habitats of many benthic organisms of canyons (Neretva, Vrbas and Drina river) where used to be development centres of endemic fauna;
4	Substantial disturbance of water regime around source area due to conversion of wood habitats into logged or burned surfaces, which intensifies erosion processes and causes decrease of water supplies in the natural water cycle;
5	Direct activities affecting a bottom of the flowing watercourse (sand and gravel extraction), followed by a disposal of communal waste;
6	Disposal of different sorts of waste material, including toxic and dangerous material (pharmaceutical waste, oils, batteries, charges of cooling devices), on riverbanks and even in the very watercourses;
7	Uncontrolled introduction of alien invasive species;

No.	Type of pressures on different groups' habitats
8	Water pollution by pesticides and mineral fertilizers draining from arable land;
9	Toxification of watercourses by chemical compounds (for example, diphenols);
10	Increased conversion of coastal belt areas through construction of facilities' infrastructure, without being harmonized with the spatial plans;
11	Springs' catchments (which are the centres of endemism) and redirecting of watercourses into arable land areas or other confluences.

Source: Fourth National report to the UNCBD, 2010

**Table 6:** Pressures and changes caused by anthropogenic activities

Br.	Pressures with the greatest effect on biodiversity of ecosystems and landscapes
1	Construction of full infrastructure (construction of traffic network; construction of power facilities /hydro-accumulation, power plants, power transmission, pipelines, gas lines etc./; construction of water supply facilities /catchment areas, trenches, dam lakes, retentions, dams/);
2	Agricultural activities (melioration, exhausting of habitats by monoculture, use of pesticides and fertilizers);
3	Uncontrolled urbanization and ruralization;
4	Disharmony between strategic development goals by sectors;

Source: Fourth National report to the UNCBD, 2010

Changes in biological diversity at the state level take place every year through various economic development activities and impact of other anthropogenic actions.

## Fires

One of the negative pressures is fire, the intensity of which has assumed alarming proportions over the past several years. The effects of fires are reflected through the direct impact on local communities and biological diversity, in form of:

- Damage to agricultural land (orchards, vineyards, and the like,);
- Damage to the medicinal plants (additional source of income for returnee population);
- Threats to water-catchment areas;
- Local hunters associations record huge losses due to great migratory activities of hunting game and fauna;
- Loss of tree species and pastures important for cattle raising activities of the local community;
- Transitional vegetation, etc.

Fires cause huge material damage to different habitats, such as forests (on the mountains of Prenj and Čvrtnica, for example), marshlands (Hutovo blato, Livanjsko polje), and the large karts area in general (Dinarides). Major consequences include immense economic damage in both social and private sector, direct damage inflicted on forestry and other benefits provided by forest ecosystems, and a significant impact on endemic flora and fauna in the burnt areas.

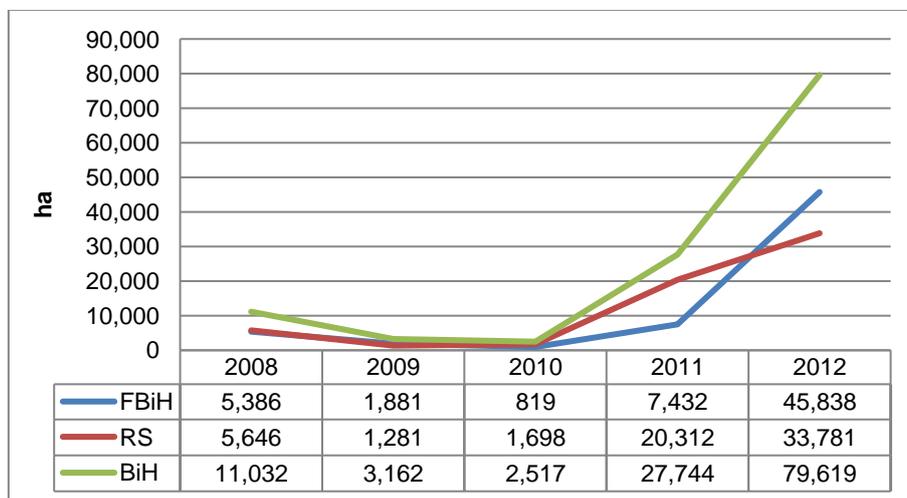
One of the examples is related to the fires that took place in the Nature Park of „Hutovo blato“, one of the three Ramsar Areas in Bosnia and Herzegovina, in October 2011. The burnt area size amounts to 1.350 ha, and the direct damage amounts to BAM 2,5 million, while indirect effects will be felt for many years during gradual revitalization of the ecosystems.



**Figure 8:** Burnt areas of Hutovo blato Nature Park

Source: Fire Record, 2012 (Hutovo blato, NtP)

**Chart 1:** Surface of forests and forestland areas affected by fires in BiH and entities



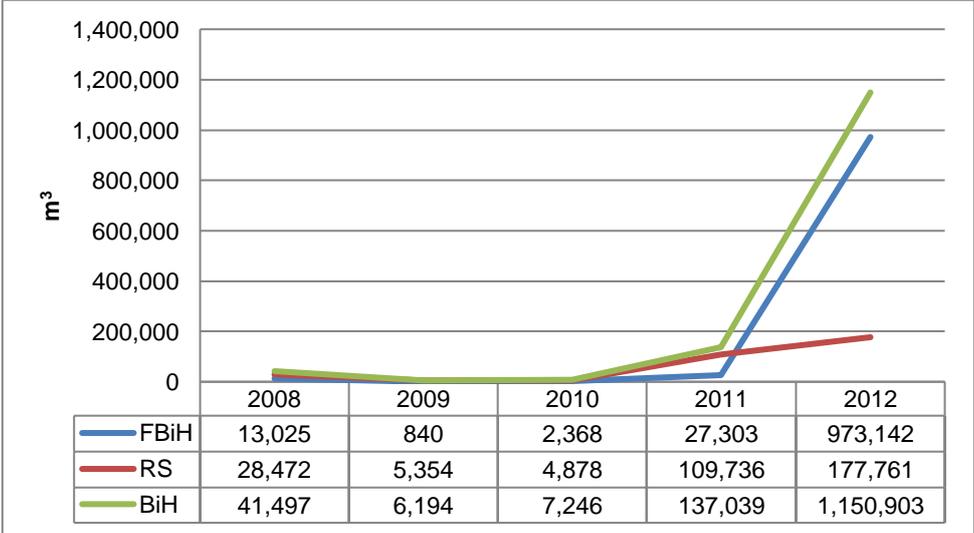
Source: Federal Institute for Statistics, Republika Srpska Institute for Statistics<sup>7</sup>

According to the Chart 1, a conclusion may be drawn that, in the period from 2008 until 2010, there was a slight decrease in the size of burnt areas, whereas in 2011 and 2012 the decrease is suddenly getting higher in terms of surfaces affected by fires. The year of 2012 saw the most intensive impact and effects of fires, due to climate characteristics prevailing over the observed period. The cause of fires is unknown at the level of BiH, and assumptions include first of all human factor, climate conditions and, in particular, unfavourable distribution of precipitation in the spring – autumn period, some characteristics of relief, and the like. Based on the data released by the RS Institute for Statistics, the cause of fires is usually negligence or inattention connected to activities such as burning of agricultural waste material and the like. However, causes behind the largest number of fires are unknown.

<sup>7</sup>Aggregate data for the entire BiH were obtained by adding up data from both entities, while the data for BD BiH are not available.

The following chart shows fire-induced damage to wood mass, expressed in cubic meters. On the basis of data and the chart itself a conclusion can be drawn that in 2011 there was three times more burnt areas and four times more damage to wood mass in the Republika Srpska. In the Federation of BiH, in 2012 there was about 12.000 ha more burnt area than in the RS, but the damage in wood mass was more than 5 times bigger. Estimated fire damage in the Federation of BiH for 2012 amounts to BAM 40.662.000, whereas the data for the Republika Srpska are not available. The reason for such a high difference in damages by entities is the fact that, in the Republika Srpska, only 614 ha was affected by high fires and 33.167 ha by low fires in 2012. In the Federation of BiH, data show that in 2012 fires affected 10.356 ha of high forests, 11.010 ha of low forests and 13.534 ha that belong to the category of other forests.

**Chart 2: Fire damage to wood mass (m<sup>3</sup>) in BiH and entities**



Source: Federal Institute for Statistics, Republika Srpska Institute for Statistics <sup>8</sup>

**Agriculture**

Some of the major challenges that have negative effects on land resources, and which may be potential threats to biological diversity in BiH as well, are: lack of systematic soil monitoring; lack of Soil/Land Information System; 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 (classification of land capability); lack of single land inventory (a separate registry and excerpt from the land registry books); low level of awareness about importance of soil and land for sustainable development and survival of mankind; low level of land use planning activities; and the lack of land (pedological) large-scale maps that could better serve the land use planning processes.

However, one of the positive sides is that the process of developing the document “BiH National Action Programme Plan to Combat Land Degradation and Mitigate the Effects of Drought (NAP)” is under way.

<sup>8</sup>Aggregate data for the entire BiH were obtained by adding up data from both entities, while the data for BD BiH are not available.

## Energy

When it comes to energy sector, electricity and thermal energy consumption is presently the only topic to report on in BiH. A huge body of data is missing in order that the sector could be followed up, and some of the most important steps in improving the reporting from energy sector of BiH include: development of energy related strategies, reduction of energy intensity, use of renewable energy sources, and application of the Best available Techniques – BAT, which will contribute to preservation and sustainable use of natural resources and, therefore, to protection of biological diversity.

According to the BHAS, total energy consumption in BiH from 2008 to 2010 increased by 7 %, while the largest share in the structure of primary energy consumption is taken by fossil fuels. For example, in 2012 in the the final consumption of coal, which is 747,023 tons, lignite accounts for 48 %, 43 % of brown coal, and coal and anthracite with 9 %. The largest share in final consumption of coal have households with 48 %. However, there is an encouraging growth of share of energy consumption from renewable sources. According to the BHAS, the share of energy consumption from renewable sources in the total energy consumption in BiH amounted to 11,9 % in 2009, and to 13,6 % in 2010. The share of hydro-energy in the total energy consumption in 2009 amounted to 8,9 %, and in 2010 to 10,8 %. Rate of energy consumption from renewable sources is growing, among other things, due to favourable hydrological conditions.

## Industry

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 including biological diversity. BiH made significant progress in the implementation of the EU Directive 2008/1/EC on Integrated Pollution Prevention and Control – IPPC, especially regarding issuance of environmental permits in industry. The Pollutant Release and Transfer Register (PRTR) has been introduced in BiH but is still in initial phase of implementation, and one of important steps towards the future is that the industrial sector start filling in the register of pollutants adequately and properly, and on a year by year basis.

The data and indicators that are missing for regular reporting and monitoring of emissions from industrial facilities in BiH are 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.

The following Table shows the physical volume of industrial production of BiH in the period from 2008 to 2013. Based on the data for the referential period, it can be seen that the industrial production level varies over years. However, a general conclusion can be made that there is an increasing trend in industrial production during the observed period.

**Table 7:** Physical volume of industrial production of BiH, 2008 – 2013

	2008	2009	2010	2011	2012	2013
<b>Industrial production in BiH – physical volume growth</b>	8,9%	-4,7%	2,5%	5,6%	-4,4%	6,2%
<b>Manufacturing industry - physical volume growth</b>	8,7%	-8,1%	5,5%	3,1%	-3,0%	8,5%

Source: Directorate for Economic Planning of BiH

## Mining

Very few studies have been conducted in relation to the environmental impacts of mining, and even fewer on the impact exerted on biological diversity. The studies were mainly related to the issues of damages caused by mining activities and the effects of mining on certain residential areas. Comprehensive protection measures and adequate monitoring of potential impacts on the environment have not been defined. Generally, the processes of land re-cultivation and reclamation of surfaces on the mined out areas have not been implemented in accordance with the legal regulations. For example, coal mines, which were mainly devastated during the war, and still being out of function, were not closed down properly and it is therefore necessary to carry out an inventory of such abandoned coal mines in order to identify critical spots, hazards, and environmental and biodiversity risks, as well as to establish priorities in terms of their reclamation. All this requires active engagement of not only the legal successors of the mines but also of representatives of authorities, local community, and all other stakeholders as well.

The available data of the BHAS show that the amount of waste from the mining sector grew from 2008 to 2009 for 10.126.033 tons. In 2009, the total amount of waste from mining represented 2 % while in 2010 participated with 3.5 %. In 2012, the share of waste from mining in relation to the total amount of waste is reduced and amounted to 1.6 %. It is important to note that the amount of hazardous waste has plenty declined in this period (for example, the generation of hazardous waste was 39.905 tons for 2008, 15.136 tons for 2009, 10.719 tons for 2010, and 142 tons for 2012). The total amount of waste from mining for 2012 amounted to 72.364 tons, which means that hazardous waste has a share of 0.2 %.

## Waste Disposal

Due to limited waste disposal capacities and low levels of public awareness of the adequate waste management processes, there is a large number of illegal waste landfills in BiH. It is estimated that there are about 1.100 illegal landfills although the number is actually much higher as many of such sites have not been registered (State of the Environment Report of BiH, 2012). This problem should be sorted out systemically and, first of all, it is necessary to work on the coverage by the organized disposal service, training and repressive measures. One of the crucial activities for the prevention of illegal disposal is training and implementation of public awareness raising campaigns regarding adequate waste management procedures, separate collecting of waste, recycling, and negative impacts of illegal landfills on human health, environment and biodiversity.

According to the BHAS, the estimated amount of municipal waste produced at the territory of BiH in 2011 amounts to 1.306.663 tons, while in 2012 amounts to 1.306.866 tons, or 340 kg per capita per

year, or 0,90 kg per day. In 2012, there were 964.121 tons of collected municipal solid waste, which is 6.2 % less than in the previous year. Around 68 % of the population in BiH is covered by organized collection and waste disposal in 2011. The amount of municipal waste generated per capita was slightly increased from 2008 to 2011, and for the next period it was expected to continue this upward trend, due to the expected increase in consumer habits. However, data from 2012 suggest that the production of waste per capita is the same as for the previous year, making it difficult to predict the next period.

Given the numerous shortcomings related to the data in the mentioned sector, a conclusion may be drawn that biodiversity threats exist, however, it is difficult to say to what extent certain sectors affect biodiversity in BiH.

#### Case Study #1: Prenj Salamander

Alpine or Black Salamander (*Salamandra atra* Laurenti, 1768), inhabits the Alpine-Dinaric area discontinuously and the first person who found and described it in BiH was Otoman Reiser (11<sup>th</sup> August 1895, Prenj Mountain). Almost no detailed analyses were conducted over the next 50 years, that is, until 1969 when Sofija Mikšić collected new samples on Prenj, on two locations at 1800 m above sea level. She decided that this could have been a new sub-species of the Alpine Salamander – the Prenj Salamander (*Salamandra atra prenjensis*) that has a very specific representation areal linked to few separate and rare localities (Prenj and Čvrsnica mountains in Herzegovina and Treskavica mountain in Bosnia). By gradual occurrence of warmer climate conditions and withdrawal of ice in earlier geological epochs, these organisms withdrew towards the peaks of Dinaric mountains as their last refuge.



Figure 1: Prenj Salamander (*Salamandra atra prenjensis*)<sup>9</sup>

The story about the Prenj Salamander (*Salamandra atra prenjensis*) was revived through the project of the Sarajevo University Institute for Genetic Engineering and Biotechnology, entitled "Application of the results of genetic analysis of Prenj Salamander (*Salamandra atra prenjensis*)"

---

<sup>9</sup> Photo by INGEB

with the aim of developing new eco-tourism contents". Following the long-term studies on Prenj salamander to date, which were based on morphological differences, this research was founded for the first time on the modern scientific methods of molecular characterisation.

Following an assessment of the observed populations' heterogeneity parameters as well as inter-population genetic differentiation, a predictive analysis of the trends in changes of the genetic structure of the Prenj Alpine Salamander population in future generations. As the trend of generational decline in genetic diversity has been observed, which will continue to be present in successive generations as well, in the very next five generations this resource will be under the risk span according to standard genetic parameters. The project results indicate that the current population of the Prenj salamander is at the verge of vulnerability and risk.

In view of the fact that the trend of using autochthonous plant and animal resources for the eco-tourism purposes is getting more and more present globally, the project put forward a series of guidelines with the aim of investing the return funds into the protection of these resources. One of the guidelines asks for several types of promotion activities related to this resource.

Importance of this project has been recognized by the Federal Ministry of Environment and Tourism (FMoT), which supported financially a publication with the aim to clarify to the public of BiH the needs of protecting the Prenj Salamander as an endemic and unique species that makes this mountain so specific.

Subsequent research activities, which included scientists from BiH, Slovenia, Croatia, Serbia and Montenegro, who analyzed samples from the mentioned countries by applying DNA markers, confirmed the status of Prenj Salamander as a sub-species thus increasing the importance of protection of this resource as our endemic species.

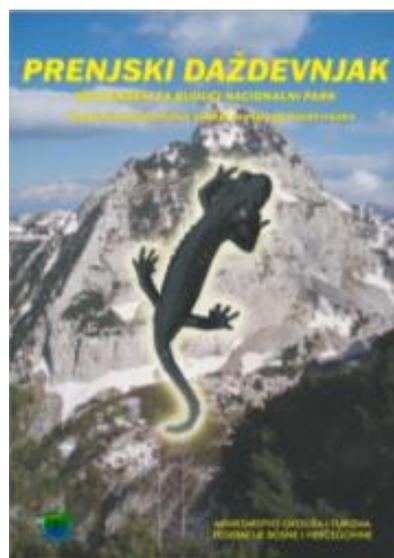


Figure 2: Publication of the Prenj Salamander<sup>10</sup>

---

<sup>10</sup> Photo by INGEB

### 2.3 Key Changes in Status and Trends of Biological Diversity

The major challenge for BiH, with respect to provision of reliable data on changes in the status of biodiversity, is the lack of adequate biodiversity monitoring system. Current reports provide some outdated information on the state of biodiversity (some data relate to as early as 2000s or even 1990s) and they cannot illustrate the dynamic aspects of the state of biological diversity in the country as, in most cases, there are no data needed for comparison. In addition to that, there is neither a system nor institutions responsible for collecting, compiling and keeping reliable information on biological diversity in the country. As a result, any analysis or reporting on biological diversity and its fields is a huge challenge.

However, it is evident that there is a large number of sources of information on various aspects of biological diversity but they are scattered among different institutions (for example, government bodies, museums, research organizations, non-governmental organizations, projects, programmes, etc.), and quite often such information are not available or confirmed. It is expected that the BHAS will soon start collecting and publishing a share of data on biodiversity.

The process of monitoring the biodiversity status and trends is implemented partially through various studies and strategies dealing with environmental and biodiversity protection, but there is no permanent monitoring that would evaluate the state of biological diversity itself. Permanent monitoring is conducted in certain segments only (for example, monitoring of water in bigger watercourses) and for the purpose of monitoring certain ecosystems.

In spite of the fact that there are no data on the majority of at-risk species, populations and habitats, scientific and professional publications refer to diverse examples of biodiversity risks, in the process of which the risk level of certain ecosystems varies and depends on the risk factor intensity.

Geographical position of BiH, characteristics of its relief, the environmental heterogeneity of the area, geo-morphological and hydro-graphical characteristics, and the diversity of eco-climate were the conditions for particular abundance of the living world in the area. Flora, fauna and fungi of BiH are among the most diverse in Europe, and the high level of endemism and relict species ensure the country's significance at the global biodiversity level. Chordates and vascular plants are best researched species while the greatest puzzles are among invertebrates, fungi and bacteria.

According to the NBSAP 2008-2015 and the Fourth National Report to the UNCBD 2010, the main strategic directions needed for efficient and sustainable biodiversity management were identified through the following three strategic objectives:

- Reduce the loss of biological diversity;
- Establish a system of conservation and sustainable use of biological diversity; and
- Reduce the pressures on biological diversity in BiH.

Programme activities and assignments needed for the implementation of strategic objectives and achievement of the desired outcomes were identified. However, many of the anticipated and recommended activities aimed at meeting the strategic objectives were not carried out. One of

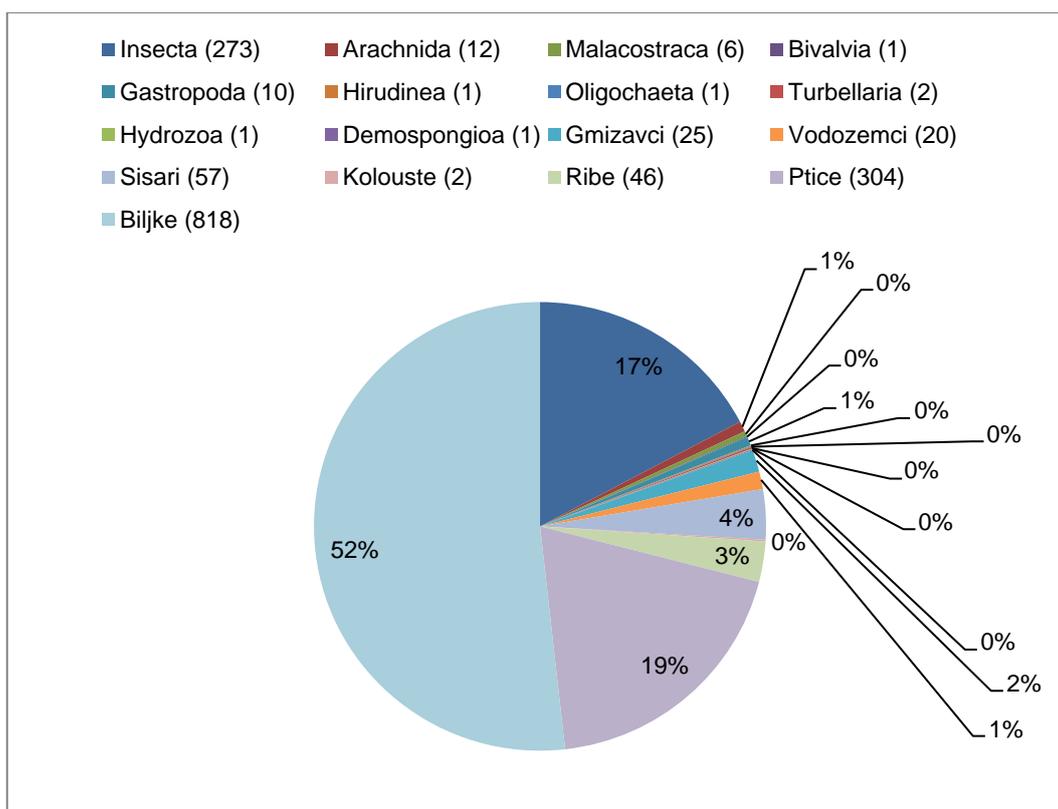
them, which is of extreme importance for conservation of biodiversity, is related to the development and endorsement of Red Lists.

With regard to the official documents of the sort, Republika Srpska adopted the Red List of Protected Flora and Fauna Species (Official Gazette of RS, No. 124/2012) that contains: the list of vascular plants, bird species, fish species, mammal species, amphibian species, reptile species, and sub-kingdoms of metazoe. Within the framework of individual lists, information is provided with respect to the scientific name, synonyms in use, family and local name. The Red List contains the list of at-risk species in RS. In accordance with the provisions of the Nature Protection Law (Official Gazette of RS, No. 50/02), Official Gazette of RS, No. 34/08) the issue is about:

- a) *Extinct or extinct in the wild* – species for which there is no credible evidence that they are extinct or it is known that they just survive or are in captivity;
- b) *Endangered species*:
  - Species at risk of extinction from their natural environment, either the entire species or its vast majority;
  - Species at risk of reduction in the number of species due to one or several cause factors;
- c) *Vulnerable species* – species that are assumed to be most likely in the category of endangered species in the near future, if the cause factors continue to be active;
- d) *Rare species* – species that have one or several populations with a small number of individuals, which are not currently endangered or vulnerable, but their survival is at risk. The species are situated within limited geographical areas or scattered in the exterior;
- e) *Endemic species* – require special attention due to specific nature of their habitats and/or potential impact of studies into their habitats, and/or potential impact of studies into the state of the species.

Number of species by categories included in the Red List is illustrated by the following Chart:

Chart 3: Number of species by individual systematic categories under the RS Red List



When it comes to the Federation of BiH, it adopted the Red List of Endangered Plants, Animals and Fungi (Official Gazette of FBiH, No. 7/2014). The List includes the following species: plants, mammals, birds, reptiles, amphibians, invertebrates, fish, and cyclostomes, as well as information on affiliation to the adequate threat category. Plant species are distributed into the following categories: Data Deficient (DD); Least Concern (LC); Near Threatened (NT); Vulnerable (VU); Endangered (EN); Critically Endangered (CE); and Extinct (EX). In addition to that, it contains an overview of the species orders of *Ephemeroptera* (Mayfly), *Odonata* (Dragonflies), *Plecoptera* (Stoneflies) and *Trichoptera* (Caddisflies), *Lepidoptera*, *Heteroptera* and *Scarabaeidae*, species from the orders of *Amphipoda* (Lawn Shrimps), *Decapoda* (Ten-footed Crustaceans), *Opiliones* (Harvestmen), and *Pseudoscorpionida* (False Scorpions). The List includes endangered fungi species as well and they too are divided by categories of threat.



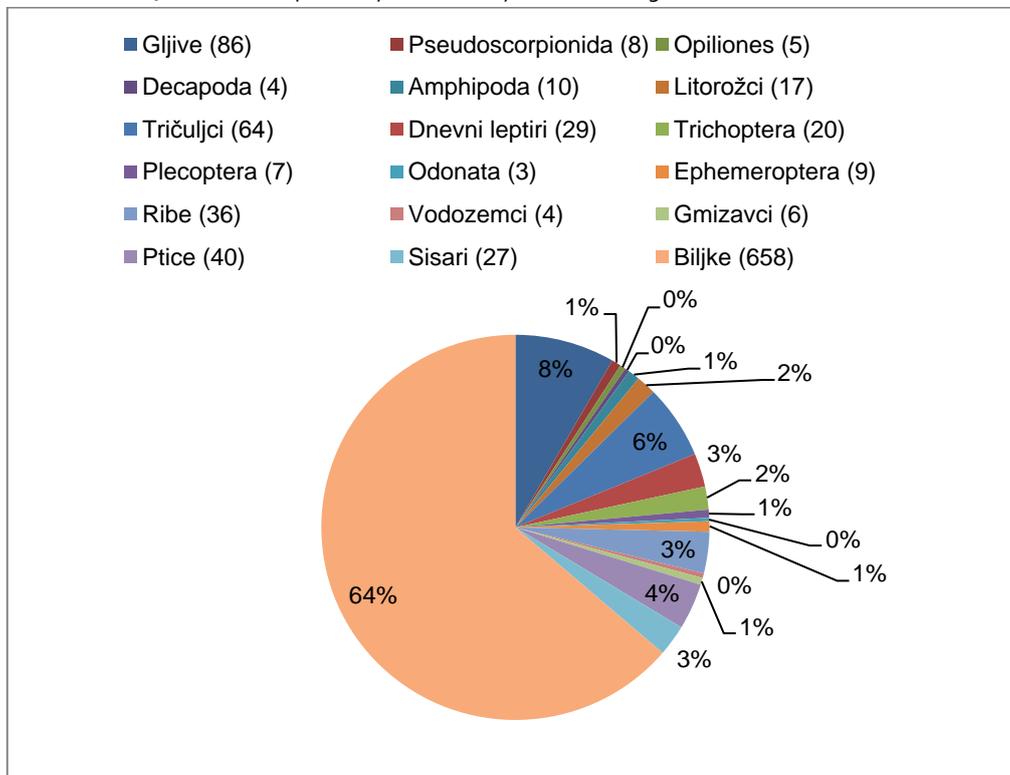
Figure 9: Dragonfly (*Odonata*)<sup>11</sup>



Figure 10: Green Lizard (*Lacerta viridis*)<sup>12</sup>

The following Chart provides the number of species by systematic categories of the Red List of BiH.

Chart 4: Number of species by individual systematic categories under the FBiH Red List



However, the above Lists have not been harmonized and there is no single List at the state level. In addition to the development and adoption of the Red Lists in the RS and the FBiH, there are also very important decisions and other acts dealing with biological diversity that have been either enacted or are in a drafting stage (Law on Nature protection (Official Gazette of RS, No. 20/14); Official Gazette of FBiH, No. 33/03; Official Gazette of BD, No. 24/04 with the amendments 1/05 and 19/07). In this regard, it is also important that specific sites have been declared protected and designated for certain regimen of protection.

<sup>11</sup> Photo by S. Matic

<sup>12</sup> Photo by S. Matic

Recently (2010, 2011, 2012, and 2013) the following sites have been proclaimed as protected sites: Strict Nature Reserve “Janj”; Strict Nature Reserve “Lom”; Special Nature Reserve “Gromiželj” (placed under the previous protection regimen), Nature Reserve „Lisina” (previous protection). In addition to that, a number of decisions was passed regarding the protection of Monuments of Nature (Caves: Ljubačevo, Žuta Bukva, Orlovača, Rastuša, Jama Dedana, Vaganska Cave, and Đatlo and Pavlova Caves) as well as decrees on the protection of the Protected Area for Resources Management “University Town” (Official Gazette of RS, No. 53/12).



Figure 11: Mountain Čabulja<sup>13</sup>

Moreover, a Feasibility Study for Protection of Čvrsnica, Čabulja, Vran and Prenj with NtP “Blidinje” was developed in FBiH in 2011 (Final Draft).

The following Table provides the list of all officially protected areas in BiH, including the map of the areas.

Table 8: Officially protected areas in BiH

Category according to the FBiH and RS Laws on Nature Protection	IUCN Category	Location	Surface (ha)	Entity	Total Locations
Protected Nature Areas (PNA)	I.a and I.b	Special Nature Reserve Lisina	560,6	RS	4
		Strict Nature Reserve Lom	297,82	RS	
		Special Nature Reserve Gromiželj	831,3	RS	
		Strict Nature Reserve of the Janj Virgin Forest	295,0	RS	
National Park (NP)	II.	NP Sutjeska	16.052,34	RS	3
		NP Kozara	3.907,54	RS	
		NP Una	19.800,0	FBiH	
Nature Park (NtP) (cantonal regulations only)		Nature Park Blidinje	35.800,0	FBiH	2
		Nature Park Hutovo blato	7.411,0	FBiH	
Nature Monument (MN)	III.	NM Pećina Ljubačevo	45,45	RS	12

<sup>13</sup> Photo by S. Gebert

Category according to the FBiH and RS Laws on Nature Protection	IUCN Category	Location	Surface (ha)	Entity	Total Locations
		NM Jama Ledena	28,26	RS	
		NM Pećina Đatlo	43,42	RS	
		NM Pavlova pećina	13,40	RS	
		NM Vaganska pećina	12,0	RS	
		NM Pećina Rastuša	11,39	RS	
		NM Pećina Orlovača	27,01	RS	
		NM Žuta Bukva	0,5	RS	
		NM Skakavac	1.430,7	FBiH	
		NM Prokoško jezero	2.225,0	FBiH	
		NM Vrelo Bosne	603,0	FBiH	
		NM Tajan	3.510,0	FBiH	
Habitat Management Area (in RS only)	IV.	-	-	-	-
Protected Landscape (PL)	V.	PL Bijambare	497,00	FBiH	3
		PL Bentbaša	147,70	FBiH	
		PL Konjuh	8.016,61	FBiH	
Protected areas for resources management (in RS only)	IV.	Protected area for resources management „University Town“	27,38	RS	1
<b>Total</b>			<b>101.594,42</b>		<b>25</b>

Source: State of the Environment in BiH, 2012 with updated data

Protected areas in BiH by the international conventions and regulations (Ramsar sites and Important Bird Areas (IBA)) are shown in the following table.

**Table 9:** Ramsar sites and IBA in BiH

Ramsar sites	Surface (ha)
Hutovo blato (FBiH)	7.411,0 ha
Livanjsko polje (FBiH)	45.800 ha
Bardača (RS)	3.500 ha
IBA	Surface (ha)
Hutovo blato (FBiH)	7.411,0 ha
Boračko jezero (FBiH)	26 ha
Bardača (RS)	3.500 ha

Source: State of the Environment in BiH, 2012



Figure 12: Protected areas in BiH

With respect to the improvement of the state of biological diversity, of great importance is the project "GISPASS – Network of Potentially Protected Nature Areas of the RS" implemented by the Association for Protection of Natural Heritage "ARBOR MAGNA" from, Banja Luka. A multimedia spatial database on protected and potentially protected areas in the RS, including basic data on those areas (e.g. municipality, status, surface, legal framework, protection related legal documents, etc.).

Proclaiming a certain area "protected", and prescribing a certain protection regimen thereof, provides important preconditions for protection of biological diversity within the given area. In such areas, conservation of biological diversity, existing ecosystems, and types of flora and fauna; protection of the original state; conservation of specific natural features; and prevention of degradation processes are implemented through the following activities: establishing of supervision services; monitoring the health status and environmental capacity of ecosystems; area monitoring; providing information and training to visitors on the importance of the protected area; and development of the feelings of responsibility for natural and other values, thus enabling mitigation of negative anthropogenic activities.

Based on the above, a conclusion may be drawn that the state and trends of changes in biodiversity should be analyzed in the forthcoming period, a permanent monitoring should be introduced, and the previously specified strategic directions that will contribute to conservation of biological diversity, should be introduced in the new NBSAP 2015-2020 document.

### Case Study #2: The Sutjeska National Park

Sutjeska National park (NP) is the oldest national park in BiH. It was established in 1962 and encompasses a wider area of Sutjeska, including the strictly protected nature reserve Perućica Virgin Forest and the mountains of Maglić, Volujak and Zelengora. Due to great beauty of its natural features and the fact that the issue is about intact natural area, since 2000 this National Park belongs to IUCN Category II. In addition to that, the Park is an affiliated member park of the EUROPARC Federation.

Specificity of and unique experience in the Sutjeska National Park (NP) are numerous glacial lakes scattered across the mountains (Maglic, Volujak and Zelengora) along the Sutjeska River, for their beauty commonly known as "mountain eyes" (Orlovacko jezero, Crno jezero, Bijelo jezero, Stirinsko jezero, Kotlanicko jezero, Gornje Bare, Donje Bare and Trnovacko jezero). The NP extends over a total area of 16,052.00 ha, of which more than 66 % is covered with forests. There are over 140 registered bird species and over 2,600 vascular plant species, of which a great number of rare and endemic species.

The Environmental Protection and Energy Efficiency Fund of the RS funded the restoration works on the Donje Bare Lake. The project preliminary proposal was to maintain the natural harmony of the lake area without disturbing the balance of the prevailing ecosystems. Joint resources of the Environmental Protection and Energy Efficiency Fund of the RS and the Sutjeska National Park were the necessary input for carrying out physical-chemical, biological and micro-biological analysis of water by the Bijeljina Water Institute.



Figure 13: Donje Bare Lake<sup>14</sup>

Donje Bare Lake is located in the north-eastern foothill of Tovarnica with Planinica peak (1,722m). On the north-eastern side of the lake there are mountain meadows in the recesses of which small ponds rich in pond flora are grouped. The lake is at around 1,500 m/altitude and gets spring water from several sides.

However, vegetation started to endanger progressively the space for fish fund and all other species living out there. Species that do not belong to the ecosystem appeared as well. There is a water source in the immediate vicinity of the Lake, which actually feeds the Lake with water, but it

<sup>14</sup> Photo by P.E.N.P. Sutjeska

started disappearing due to excessive vegetation of Mountain Germander (*Teucrium Montanum*) that has been planted on the walk trails along the lake.

It was estimated by the project that the Mountain Germander should be removed together with certain beech trees that were producing organic waste and causing “suffocation” of the Lake. Autochthonous fish of the area, trout, were not able to survive any more due to the lack of oxygen and the only solution was to carry out mechanical cleaning of the lake, which took two years, and the trees around the lake were felled as well. The outcome was a successful fish-stocking of the lake and, therefore, there is a satisfying fishing fund in the Lake waters. In addition to that, the Lake’s life span has been prolonged, and quality and sustainability of water levels was improved. There is a ban on fishing in effect but use of artificial fly is allowed.

## 2.4 Impact of Biodiversity Changes on Ecosystem Services, and Socio-economic and Cultural Implications

Changes in the biological diversity are the result of threats, the most intensive of which were described in the previous chapter. The loss of biodiversity does not imply the loss of species only but also the loss of ecosystems that the given species were taking part in (Global Biodiversity Outlook 3, 2010).

The loss of biological diversity is caused by the impact of pressures that can be divided into two major categories: direct and indirect pressures.

Millennium Ecosystem Assessment established five major types of direct pressures: conversion of habitats, invasive species, overexploitation, pollution, and climate changes (World Resources Institute, 2005).

Indirect, or the so-called hidden, pressures imply social processes that generate unsustainable use of natural resources. The ultimate outcome of indirect pressures is multiplication of the five types of direct pressures on nature.

It is necessary to point out that both categories of pressures are currently in effect in BiH. The cause of indirect pressures is reflected in the fact that BiH is passing through the process of social and economic transition along with simultaneous attempts to overcome adverse effects of war destruction and to move towards progress.

As an example of impacts of direct and indirect pressures on biological diversity, the consequence of which is reflected in changes to the quality of ecosystem services, we may note extensive (uncontrolled/illegal) construction of tourist facilities across mountain landscape areas in BiH. The main direct pressure, which has the role in this case, is a need for gaining greater economic profit. Additional indirect factors, when the issue is about construction and expansion of mountain resort facilities, include: quality of spatial planning, regulation plans, processes of issuing relevant permits, inspection surveillance, implementation of sets of environment laws, synergy between different sectors in terms of optimal use of space, etc.

Direct pressures occurring in this case include: complete conversion of natural (primary) into anthropogenic (tertiary) ecosystem, possibility of introducing invasive species, and pollution.

Primary ecosystem, which had been encompassing the given habitats before the construction took place, is the ecosystem of mountain meadows (the so-called "upland fields"). In BiH, mountain meadows are guardians of genetic biodiversity of BiH with regard to the number of endemic species and glacial relicts living in those biocenoses. A large number of plant species are medicinal and honey plants. Provisioning ecosystem services disappear primarily due to degradation of this ecosystem.

Instead of having a regulatory role in maintaining the climate, constructed facilities condition an accumulation of thermal energy in summer as well as changes in the hydro-thermal regime of soil following the melting of snow, by which the second (regulatory) group of ecosystem services is lost.

Cultural services' value has been decreased due to the lost aesthetical value of natural areas. In case of construction building, support services, which enable self-sustainability and functioning of the mountain meadow ecosystems are, are degraded completely.

There are numerous similar examples of impact of indirect and direct pressures on biological diversity in BiH which indicate the loss of ecosystem services.

For example, according to the State of Environment Report of BiH (2012), a significant change in land use area is taking place, where the loss of agricultural land is particularly evident: "In most cases, loss of agricultural land is a result of unplanned construction of residential and industrial facilities and infrastructure, uneconomic exploitation of mineral raw materials, and excessive erosion caused by deforestation and inadequate treatment of slopes" (p.123).

Agricultural production is one of the most important ecosystem services. Second National Communication of BiH under the UN Framework Convention (2013) reads that 46 % of agricultural land in BiH is suitable for agricultural production activities. In spite of that, and in spite of a large number of employed persons in this sector (19 %), the share of agriculture in Gross Domestic Product (GDP) structure in 2010 was no more than 6,2 %.

Agricultural production decrease, caused by loss of agricultural land, that is, conversion of agricultural ecosystems into artificial ones, may have immense socio-economic consequences for the population in BiH.

However, it is possible to reverse the process, that is, to improve and enhance degraded ecosystem services through reclamation and restoration of ecosystems, in terms of decisions made by Conference of Parties, COP X/33 (Nagoya, 2010) and COP XI/16 (Hyderabad, 2012).

Marshland habitats are presently under huge pressures and they belong to the most vulnerable and significantly degraded habitats globally (Global Biodiversity Outlook 3, 2010). It is a known fact that these habitats provide numerous ecosystem services among which the following are of great

importance: water purification/treatment, intensive absorption and storing of CO<sub>2</sub>, and conservation of marshland biodiversity (Secretariat of the UNCBD, 2014). There is a large number of water habitats in BiH, which were created following the completion of ground exploitation of coal. Through joint care and activity of the society such water habitats could become functional marshland ecosystems in the near future. (Barudanović et al., 2013).

It is necessary to emphasize that collecting and sale of forest fruit and mushrooms is a traditional, well developed and well preserved activity. At present, there is no single legal framework that would regulate this field. However, the current economic situation forced some categories of the BiH population to engage again in this activity. According to data released following an annual gathering of the manufactures of medicinal and aromatic plants and forest fruit, the export value amounted to BAM 16,6 million for the first nine months in 2013 (eKapija, 2013). Better organization and training on sustainable use of these ecosystem services could result in even better economic results.

Given the above, it is clear that ecosystem services play one of the most important roles in the quality of living in Bosnia and Herzegovina. That is exactly the source of significance of the Strategic Plan for Biodiversity and the Aichi and National Targets. Establishment of such goals that, at the same time, imply wellbeing for both people and nature is the only sustainable direction of development in BiH. Such development cannot challenge essential ecosystem services necessary for both present and future generations.

#### Case Study #4: Biological Diversity and Ecosystem Services for Local Sustainable Development in the West Balkan Countries

ECNC – European Centre for Nature Conservation, and REC – Regional Environmental Centre for Eastern and Central Europe and its offices implemented a three-year project (2009–2011) in 18 municipalities of South Eastern Europe countries, with the aim of integrating biological diversity and ecosystem services into the local sustainable development policies and practice. The title of the Project was “Biodiversity and Ecosystem Services for Local Sustainable Development in the Western Balkans – SEE BAP” and it was funded by the Ministry of Foreign Affairs of Finland that is committed to the goals of poverty reduction, sustainable development, and capacity building in the countries of the region. The aim of this particular project was to provide support in protection, and to contribute to sustainable use of biological diversity and ecosystem services, on order that they could be integrated into the municipalities’ planning and decision-making processes. An additional goal was to promote development of local business (green economy) for the benefit of local sustainable development in rural municipalities and their respective local communities (women and vulnerable groups in particular) in the Western Balkan countries. Various project activities were implemented including national and local training for municipalities taking part in the development of the Local Biodiversity Action Plans (LBAP). BiH was represented by four municipalities: Goražde, Srebrenica, Foča-Ustikolina and Višegrad. As for the project results, every municipality developed a higher level of awareness on and recognition of the importance of preserving biological diversity and sustainable utilization of ecosystem services. In the spirit of cooperation, and by applying a participatory approach, the project stakeholders learned from one another and found solutions for problems occurring in cross-border areas. Bosnia and Herzegovina took part in this regional project with four municipalities Goražde, Srebrenica, Foča-Ustikolina i Višegrad.

Various project activities were implemented through the Project, including national and local training for municipalities taking part in the Project activities. In addition to training that provided the participants with the methodology of developing the Local Biodiversity Action Plans (LBAP), and as an example of good practice, all municipalities' representatives as well as representatives of relevant Ministries, had an opportunity to go on a study tour to Holland. Project publications included a promotional leaflet for the entire region, an LBAP document for every municipality, the Project web site, and final publication on successful implementation examples.



Figure 14: Mehmed Paša Sokolović Bridge on the Drina River, Višegrad<sup>15</sup>

From the beginning of the Project, training sessions on the development and implementation of LBAPs were carried out in 18 partner municipalities. Local training programmes were conducted with the aim of introducing the terms related to biological diversity and ecosystem services, participatory decision-making, inclusion of local community, and understanding and use of benefits arising from biological diversity and ecosystem services. At the same time, participants learned to carry out concrete actions by applying techniques intended to ensure inclusion and participation of stakeholders.

LBAP Development Manual was designed and adjusted to all six Project beneficiary countries. It was used by the municipality staff, non-governmental organizations (NGO) staff, and local community representatives, in order to develop their own LBAPs, with participation of their wider communities. Moreover, in addition to the Manual and training sessions, international and local experts provided support to the partner municipalities in the process of developing their LBAPs. Finally, the municipalities received financial assistance by the Project, for the purpose of implementing their priority activities.

As it was mentioned above, every municipality developed its LBAP that should assist in making the local communities aware of their natural and cultural richness, and of the possibilities provided through ecotourism, professional-biodiversity business (PBB), interest of scientists and the public in conservation of species, public parks with high levels of biological diversity, etc.

LBAP is a document that defines activities that a municipality should undertake with the aim of achieving protection, management and use of nature and living world in its environment, both presently and in the future. Every LBAP is expressed through a process of engaging a local action that helped ensuring that endangered species, habitats, and ecosystems be sustained and improved for the benefit of people and environment. The LBAPs constitute a clear benefit in terms of increased knowledge about and awareness of biological diversity and they:

---

<sup>15</sup> Photo by REC

- raise the public and local community's awareness and may help to emphasize the value and uniqueness of biological diversity;
- underline connection between biological diversity, quality of living, and wellbeing; and
- promote knowledge on less known species and habitats in the municipality area.

As a result of the SEE BAP Project, every municipality now enjoys much higher level of recognition and awareness of the importance of biodiversity conservation and sustainable use of ecosystem services. The Project stakeholders learned from one another and, in the spirit of cooperation and through applying participatory methods, found solutions to the problems created in trans-boundary areas.

Following the completion of their respective LBAPs, every municipality received grant funds in the amount of EUR 25.000 to implement activities specified thereof. Višegrad Municipality restored its Botanical Garden "Vilina vlas" and the Bikavac Park. The Bikavac Park was not only restored but all species were recorded as well, and it serves now for environment-based teaching activities. Municipality of Foča-Ustikolina implemented a project related to reconstruction of the Kolina River sewerage network that endangered hatcheries juvenile fish prevailing in the area. Srebrenica Municipality established an environmental association "EKO" where they keep natural nurseries of *Picea Omorika* (Serbian Spruce) present in one part of the Municipality, whereas the Goražde Municipality implemented the activities aimed at cleaning the banks of the Drina River, fish-stocking of the river, and training of population in sustainable use of medicinal plants.

### Case Study #3: Una Nacionalni park Una

A specific feature of the Una River is reflected in its "sedra" (limestone rock) barriers that create waterfalls, river islets, cascades, rapids and greater waterfalls. These sediment barriers exactly create a visual effect and cause the Una river's colour (emerald-green blue). Sedimentation of sedra (calcium carbonate -  $\text{CaCO}_3$ ) is accelerated by phytogenetic processes that are particularly pronounced in algae and moss, which are known as "sedra-makers". By their specific ecological conditions habitats on sedra waterfalls constitute a special biotope that is significantly different from all other fresh water habitats. Apart from higher plants and diatomea, a total of 42 plant species were found in the Una River waterfalls, out of which 25 were algae and 17 were moss species. In February 2011, an unexplained water loss occurred on the right side portion of the waterfall in the protected part of the Una National Park, where the so called "Milančev buk" is situated. As a result, the sedra stone was exposed to a great danger, that is, the so called "sedra-makers" were becoming extinct. Competent institutions decided that experts should be contracted to conduct a study for which an amount of 55.000 EUR would be designated.

The discussion of the National Park Manager and the local residents provided information on previous occurrences of similar phenomena in this area. It was established that the water coming onto the sedra rock moves to the left side and the remaining portion of water drops down through a gap in the rock. By using wooden poles and nets made of thin twigs a man living in Martin Brod devised a special method to resolve the problem and make the waterfall run again. As of June 2011, the right side of the waterfall had been without water for five months. The director was eagerly waiting for the craftsman' telephone call but the time was running so slowly. And on a Saturday morning in June he received the call and heard the man's voice: "Director, can you hear the sound?" and he replied: "Yes, I do, I do!". The man just said: "Mission accomplished, water is flowing and the waterfall is saved". And it was, indeed, and it has been in function since. In this way, in cooperation with the local community, and applying adequate decision-making procedures, it was shown that money is not always a success factor. Moreover, sustainability of the location's biodiversity was ensured in this way.



Figure 15: NP Una<sup>16</sup>

### 3 STRATEGY AND ACTION PLAN, IMPLEMENTATION AND INTEGRATION OF BIOLOGICAL DIVERSITY IN BOSNIA AND HERZEGOVINA

Focus of this chapter is placed on the processes of updating and implementing the National Biodiversity Strategy and Action Plan (NBSAP BiH) 2015-2020. In addition to that, the chapter includes description of the national goals developed in accordance with the Strategic Plan for Biodiversity 2011-2020, including Aichi targets, and having in mind specific characteristics of BiH. The NBSAP BiH is described, including the differences between the updated NBSAP BiH 2015 – 2020 and the previous one (2008 – 2015), with an analysis of the activities that will contribute to the realization of the Strategic Plan for Biological Diversity 2011–2020 and which are important for the implementation of the NBSAP. Updating of the NBSAP, by way of incorporating the new national goals, is necessary in order that biological diversity could be mainstreamed into other national plans, programmes and policies, as well as into economic and social spheres at all levels of government. For this reason, analysis of sectors and inter-sectoral connections in decision making related to use of biological and landscape diversity, is also provided in this chapter. As the national reporting is a major obligation of the Parties to the biodiversity conventions and treaties, the analysis of synergy-based approach in reporting was carried out, with the aim of improving cooperation between

---

<sup>16</sup> Photo by P.E.N.P. Una

multilateral environmental agreements. In addition to the synergy approach in national reporting, biological diversity was analysed within the cross-border cooperation projects as well.

### 3.1 National Biodiversity Goals

Setting the national biodiversity goals for BiH was carried out in accordance with the Strategic Plan for Biodiversity 2011-2020, and the Aichi Targets defined within the Plan. The Strategic Plan is a ten-year strategic framework that includes strategic objectives and ambitious, but viable, Aichi Biodiversity Targets, which should motivate all Parties/countries and stakeholders to conserve biological diversity and enhance its benefits for all people.

The Strategic Plan for Biodiversity 2011-2020 was adopted in the Conference of Parties to the UNCBD - COP 10, in Nagoya in 2010. It serves as a flexible framework for setting out national and regional goals and promotes coherent and efficient implementation of the three UNCBD goals:

1. Conservation of biological diversity;
2. Sustainable use of natural resources; and
3. Fair and equitable sharing of benefits arising from the use of genetic resources.

To this end, national goals of BiH are harmonized with both five global strategic directions and Aichi Targets, but taking into consideration specific characteristics of BiH, which required certain deflections, that is, different formulation. All national goals are clearly defined, including timelines for their implementation and achievement, as well as indicators the task of which is to monitor the state of the given goal. To this end, goals and indicators for conservation of biological diversity in BiH are provided in Table 10.

Biological diversity indicators, according to the UNCBD, are representative values of a case observed. Indicators mostly provide quantitative numeric information on the basis of interpretation of different measurements, obtained from a set of data. Indicators should be representative, important, convincible, transparent, and accurate. Multiple functions are achieved by using biodiversity indicators, some of which are:

- Better understanding of the current and the past state of biological diversity, as well as the causes of change;
- Assistance in making decisions as to what are the most adequate objectives and activities that should be undertaken in terms of conserving biological diversity; and
- Monitoring the progress of national, regional and global objectives for conservation of biological diversity.

It should be pointed out that these national goals, as well as indicators, are currently in form of proposals and that in the course of further efforts they might be modified or reformulated by the time when the new NBSAP (2015-2020) is developed. A large number of BiH experts and representatives of different and relevant sectors were included in the development of national goals for conservation of biological diversity. It is important to point out that the process of selecting and setting out national goals was approached on the basis of both the Aichi Targets and the relevant specific characteristics of BiH, some of which are: the main pressures on the biological diversity in

BiH, the existing and missing data on biodiversity, the financial and institutional capacities, and the like.

**Table 10:** National goals for biological diversity of BiH by 2020

GLOBAL STRATEGIC GOAL A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	
National Goal	Indicators
1. By 2020, the role of NGOs, media, academic, scientific and professional institutions enhanced, and the number of projects related to the implementation of the Convention increased.	<ul style="list-style-type: none"> <li>▪ Number of projects related to the implementation of the Convention</li> <li>▪ Biodiversity representation trends in media and press clipping.</li> </ul>
2. By 2020, biological diversity incorporated into national, entity, and local development strategies and strategic plans.	<ul style="list-style-type: none"> <li>▪ Trends related to inclusion of natural resources and biodiversity values into the system of state and entities' budgets.</li> </ul>
3. By 2020, incentives and subsidies harmful to biodiversity monitored and decreased and the public informed thereof, whereas those with positive effects are increased.	<ul style="list-style-type: none"> <li>▪ Number and type of positive and negative incentive mechanisms for biological diversity that have been developed and implemented.</li> </ul>
4. By 2020, governments have passed their plans for sustainable production and consumption of natural resources.	<ul style="list-style-type: none"> <li>▪ Number of adopted sectoral plans for sustainable use of natural resources.</li> </ul>
5. By 2020, functional institutional framework for protection and sustainable use of nature has been established, through forming of and cooperation between new and the current entity-levels institutions.	<ul style="list-style-type: none"> <li>▪ Number of legal acts and bylaws passed in the field of biodiversity or in other closely related areas.</li> <li>▪ Number of institutions networked into a biodiversity management monitoring system.</li> </ul>
GLOBAL STRATEGIC GOAL B: Reduce the direct pressures on biological diversity and promote sustainable use	
6. By 2020, management and sustainable development programmes for all fishing waters prepared and implemented.	<ul style="list-style-type: none"> <li>▪ Number of fishing bases.</li> <li>▪ Population density trends in autochthonous, endemic and invasive fish species.</li> </ul>
7. By 2020, strategies for the development of aquaculture and fish-stocking by economically important fish species prepared and implemented, with regard to water ecosystems that are not habitats to rare and endemic types of organisms.	<ul style="list-style-type: none"> <li>▪ Population density trend in economically important fish species in watercourses</li> <li>▪ Number of fish farms.</li> </ul>
8. By 2020, all forest areas in BiH have been certified.	<ul style="list-style-type: none"> <li>▪ Surface of certified forest areas.</li> </ul>
9. By 2020, a system of sustainable agricultural production has been developed, including organic production, conservation and cultivation of autochthonous varieties and breeds.	<ul style="list-style-type: none"> <li>▪ Surface under organic production.</li> </ul>
10. By 2020, industrial and municipality waste waters treatment system has been established as well as monitoring of use of pesticides and fertilizers.	<ul style="list-style-type: none"> <li>▪ Quantity of imported crop protection substances and chemical fertilizers</li> <li>▪ Number of waste water treatment systems that have been established.</li> </ul>
11. By 2020, strategies related to invasive species have been developed.	<ul style="list-style-type: none"> <li>▪ Number of invasive species on the List.</li> <li>▪ Number of Reports to the UNCBD Secretariat.</li> </ul>
12. By 2016, specific biological diversity of BiH (canyon, upland, high-mountain, and marshland ecosystems, kart fields and alluvial plains) mapped and protected in accordance with the spatial documents in effect.	<ul style="list-style-type: none"> <li>▪ Ratio of protected areas' surface and the surface of BiH</li> </ul>
GLOBAL STRATEGIC GOAL C: Improve the status of biological diversity by preserving ecosystems, species and genetic biological diversity	
13. By 2020, Red Lists of plants, animals and fungi prepared, and action plans for protection of the most endangered taxa adopted.	<ul style="list-style-type: none"> <li>▪ Number of measures implemented with the view of protecting the endangered taxa.</li> </ul>
14. By 2020, an inventory of i) flora, fauna and fungi; and ii) ecosystems and types of habitats,	<ul style="list-style-type: none"> <li>▪ Number of species by ecosystems in the inventory.</li> </ul>

has been completed.	
15. By 2020, a strategy of <i>in situ</i> and <i>ex situ</i> protection of local plant variations and domesticated animal breeds, and of their wild relatives, prepared and implemented, including inventory thereof, and autochthonous and endemic status parameters have been defined and a bank of genes established.	<ul style="list-style-type: none"> <li>▪ Strategy</li> <li>▪ Number of species under <i>ex situ</i> and <i>in situ</i> protection.</li> </ul>
<b>GLOBAL STRATEGIC GOAL D: Enhance the general benefits to all from biological diversity and ecosystem services</b>	
16. By 2020, benefits from forest, agricultural and water ecosystems have been mapped out and the environmental permits issued for infrastructure and catchments outside the areas of special interest and the planning area for the ecological network NATURA 2000.	<ul style="list-style-type: none"> <li>▪ Surface under essential ecosystem services has been mapped.</li> </ul>
17. By 2020, thirty (30) lakes, created in opencast mining pits, have been restored into marshland habitats; the productivity of all forest categories has been increased, the existing surfaces under the alder and willow tree flood forests have been conserved; and green surfaces in towns have been increased by 20%.	<ul style="list-style-type: none"> <li>▪ Number of lakes restored.</li> <li>▪ The size of green surfaces in towns.</li> <li>▪ Forest volume, by categories.</li> </ul>
18. By 2015, legislation has been developed and conditions established for ratification and implementation of the Nagoya Protocol.	<ul style="list-style-type: none"> <li>▪ Ratified Nagoya Protocol.</li> <li>▪ Number of legal acts harmonized with the Nagoya Protocol requirements.</li> </ul>
<b>GLOBAL STRATEGIC GOAL E: Enhance implementation through integrated planning, knowledge management and capacity building</b>	
19. Do 2015, The institution that will monitor implementation of the NBSAP through the selected indicators has been established.	<ul style="list-style-type: none"> <li>▪ Number of institutions included in the implementation of the NBSAP.</li> </ul>
20. By 2020, centres for safeguarding and implementation of traditional knowledge and practices, especially in rural areas of interest, have been established.	<ul style="list-style-type: none"> <li>▪ Number of scientific and professional references on traditional practices.</li> <li>▪ Number of inputs (scientific and professional references) in the database on traditional knowledge and practices</li> </ul>
21. By 2017, Strategy for Communication, Education, Participation and Public Awareness of Biodiversity (CEPA) has been adopted.	<ul style="list-style-type: none"> <li>▪ Adopted Strategy document.</li> </ul>
22. By 2020, a strategy for mobilization of financial resources at all relevant levels has been developed and implemented.	<ul style="list-style-type: none"> <li>▪ ODA funds aimed at conservation and sustainable use of biological diversity.</li> </ul>

The overview (Table 10) of the newly established national biodiversity goals and indicators is provided with the aim of comparing them with the ones presented in the previous BiH Strategy (NBSAP 2008-2015). The main difference between the “old” and the “new” national biodiversity goals is guidance by the global Aichi Targets in the process of formulating the national goals for the NBSAP 2015-2020. Unlike the NBSAP 2008-2015, where the strategy of conserving biological diversity was presented through strategic directions, objectives and programmes, the strategy establishment approach was made simpler in the NBSAP 2015-2020, i.e. only national goals were given and they are generally characterized by concrete and clear mission, have the timeframe and are feasible. The main step forward, in relation to the previous Strategy, is related to the national goals monitoring indicators that are

included in the NBSAP 2015-2020 and designed for every single goal specifically, and which should be a reliable and valuable instrument in the implementation of the Strategy, for monitoring the progress made in achieving the national goals.

**Table 11:** Overview of the NBSAP 2008-2015 goals and indicators, and suggested goals and indicators of the NBSAP 2015–2020

		Aichi Targets		National biodiversity goals and indicators (NBSAP 2015. – 2020.)	
Strategic goals (NBSAP 2008.-.2015.)	Indicators (NBSAP 2008.-.2015.)				
Strategic goal 3.4 Strategic programme 3.4.1 (3.4.1.1. – 3.4.1.4) Strategic programme 2.2.5	<ul style="list-style-type: none"> <li>▪ Level of implementation and completion of strategic tasks within the anticipated timeframe</li> </ul>	1. Significance and values of biological diversity	1. By 2020, the role of NGOs, media, academic, scientific and professional institutions enhanced, and the number of projects related to the implementation of the Convention increased. <ul style="list-style-type: none"> <li>▪ Number of projects related to the implementation of the Convention</li> <li>▪ Biodiversity representation trends in media and press clipping.</li> </ul>		
Strategic goal 2.3 Strategic programmes 2.3.1, 2.3.2. and 2.3.3		<ul style="list-style-type: none"> <li>▪ Surface of BiH territory under the adequate protection regimen</li> </ul>	2. Inclusion of biodiversity values into the national budget	2. By 2020, biological diversity incorporated into national, entity, and local development strategies and strategic plans. <ul style="list-style-type: none"> <li>▪ Trends related to inclusion of natural resources and biodiversity values into the system of state and entities' budgets.</li> </ul>	
Strategic programme 2.1.3.	<ul style="list-style-type: none"> <li>▪ Financial support from extra-budgetary sources</li> </ul>		3. Elimination of incentives harmful to biodiversity	3. By 2020, incentives and subsidies harmful to biodiversity have been monitored and have decreased, and the public has been kept informed thereof, whereas the incentives with positive effects have been increased. <ul style="list-style-type: none"> <li>▪ Number and type of positive and negative incentive mechanisms for biological diversity that have been developed and implemented.</li> </ul>	
Strategic goals 2,1 - 2.5 (including all programmes)		<ul style="list-style-type: none"> <li>▪ Level of harmonization of the local legislation with international documents</li> <li>▪ Development of legislation</li> <li>▪ Development of ecological network NATURA 2000</li> </ul>	4. National plans of sustainable use of biological diversity	4. By 2020, governments have passed their plans for sustainable production and consumption of natural resources. <ul style="list-style-type: none"> <li>▪ Number of adopted sectoral plans for sustainable use of natural resources.</li> </ul>	5. By 2020, functional institutional framework for protection and sustainable use of nature has been established, through forming of and cooperation between new and the current entity-levels institutions. <ul style="list-style-type: none"> <li>▪ Number of legal acts and bylaws passed in the field of biodiversity or in other closely related areas.</li> <li>▪ Number of institutions networked into a biodiversity management monitoring system.</li> </ul>
-			5. Loss of habitats halved or reduced	-	
		6. Sustainable management of sea and freshwater resources	6. By 2020, management and sustainable development programmes for all fishing waters prepared and implemented. <ul style="list-style-type: none"> <li>▪ Number of fishing bases</li> </ul>		

		Aichi Targets	National biodiversity goals and indicators (NBSAP 2015. – 2020.)
Strategic goals (NBSAP 2008.-.2015.)	Indicators (NBSAP 2008.-.2015.)		
			<ul style="list-style-type: none"> <li>▪ Population density trends in autochthonous, endemic and invasive fish species.</li> </ul>
Strategic programmes 2.3.2.1. – 2.3.3.3.		7. Sustainable agriculture, aquaculture and forestry	<p>7. By 2020, strategies for the development of aquaculture and fish-sticking by economically important fish species prepared and implemented, with regard to water ecosystems that are not habitats to rare and endemic types of organisms.</p> <ul style="list-style-type: none"> <li>▪ Population density trend in economically important fish species in watercourses.</li> <li>▪ Number of fish farms</li> </ul>
			8. By 2020, all forest areas in BiH have been certified. <ul style="list-style-type: none"> <li>▪ Surface of certified forest areas.</li> </ul>
			9. By 2020, a system of sustainable agricultural production has been developed, including organic production, conservation and cultivation of autochthonous varieties and breeds. <ul style="list-style-type: none"> <li>▪ Surface under organic production.</li> </ul>
Strategic programme 3.1.3		8. Pollution reduced	10. By 2020, industrial and municipality waste waters treatment system has been established as well as monitoring of use of pesticides and fertilizers. <ul style="list-style-type: none"> <li>▪ Quantity of imported crop protection substances and chemical fertilizers.</li> <li>▪ Number of waste water treatment systems that have been established.</li> </ul>
Strategic programmes 3.3.1., 3.3.2. and 3.3.3		9. Invasive alien species prevented and controlled	11. By 2020, strategies related to invasive species have been developed. <ul style="list-style-type: none"> <li>▪ Number of invasive species on the List.</li> <li>▪ Number of Reports to the UNCBD Secretariat.</li> </ul>
Strategic programmes 1.1.1, 1.1.2., 1.1.3., 1.1.4., 1.1.5., 1.1.6, 3.1.1		10. and 11. Pressures on sensitive ecosystems reduced; protected areas	12. By 2016, specific biological diversity of BiH (canyon, upland, high-mountain, and marshland ecosystems, kart fields and alluvial plains) mapped and protected in accordance with the spatial documents in effect. <ul style="list-style-type: none"> <li>▪ Ratio of protected areas' surface and the surface of BiH.</li> </ul>
Strategic programmes 1.1.1, 1.1.2., 1.1.3., 1.1.4., 1.1.5., 1.1.6			
Strategic programmes 1.2.1., 1.2.2., 1.2.3, 1.2.4		12. Preventing disappearance of endangered species	13. By 2020, Red Lists of plants, animals and fungi prepared, and action plans for protection of the most endangered taxa have been adopted. <ul style="list-style-type: none"> <li>▪ Number of measures implemented with the view of protecting the endangered taxa.</li> </ul>
			14. By 2020, an inventory of i) flora, fauna and fungi; and ii) ecosystems and types of habitats, has been completed.

		Aichi Targets	National biodiversity goals and indicators (NBSAP 2015. – 2020.)
Strategic goals (NBSAP 2008.-.2015.)	Indicators (NBSAP 2008.-.2015.)		
			<ul style="list-style-type: none"> <li>Number of species by ecosystems in the inventory.</li> </ul>
Strategic programmes 1.3.1., 1.3.2., 1.3.3., 1.3.4		13. Conservation of genetic diversity	<p>15. By 2020, a strategy of <i>in situ</i> and <i>ex situ</i> protection of local plant variations and domesticated animal breeds, and of their wild relatives, prepared and implemented, including inventory thereof, and autochthonous and endemic status parameters have been defined and a bank of genes established.</p> <ul style="list-style-type: none"> <li>Strategy</li> <li>Number of species under <i>ex situ</i> and <i>in situ</i> protection.</li> </ul>
Strategic programmes 3.1.1., 3.1.2, 3.1.3.		14. Ecosystems and essential services preserved	<p>16. By 2020, benefits from forest, agricultural and water ecosystems have been mapped out and the environmental permits issued for infrastructure and catchments outside the areas of special interest and the planning area for the ecological network NATURA 2000.</p> <ul style="list-style-type: none"> <li>Surface under essential ecosystem services has been mapped.</li> </ul>
		15. Ecosystems restored and resilience increased	<p>17. By 2020, thirty (30) lakes, created in opencast mining pits, have been restored into marshland habitats; the productivity of all forest categories has been increased, the existing surfaces under the alder and willow tree flood forests have been conserved; and green surfaces in towns have been increased by 20%.</p> <ul style="list-style-type: none"> <li>Number of lakes restored.</li> <li>The size of urban green areas.</li> <li>Forest volume, by categories.</li> </ul>
		16. Nagoya Protocol operational and in force	<p>18. By 2015, legislation has been developed and conditions established for ratification and implementation of the Nagoya Protocol.</p> <ul style="list-style-type: none"> <li>Ratified Nagoya Protocol.</li> <li>Number of legal acts harmonized with the Nagoya Protocol requirements.</li> </ul>
		17. NBSAP as an adopted policy instrument	<p>19. Do 2015, The institution that will monitor implementation of the NBSAP through the selected indicators has been established.</p> <ul style="list-style-type: none"> <li>Number of institutions included in the implementation of the NBSAP.</li> </ul>
Strategic programmes 2.5.1., 2.5.2		18. Traditional knowledge	<p>20. By 2020, centres for safeguarding and implementation of traditional knowledge and practices, especially in rural areas of interest, have been established.</p> <ul style="list-style-type: none"> <li>Number of scientific and professional references on traditional practices.</li> <li>Number of inputs (scientific and professional references) in the</li> </ul>

		Aichi Targets		National biodiversity goals and indicators (NBSAP 2015. – 2020.)	
Strategic goals (NBSAP 2008.-.2015.)	Indicators (NBSAP 2008.-.2015.)			database on traditional knowledge and practices.	
Strategic programmes 2.2.3, 2.4.1, 2.4.2 and  Strategic tasks 2.2.2.1, 2.2.2.2, 2.2.2.3		19. Knowledge improved, shared and applied	21. . By 2017, Strategy for Communication, Education, Participation and Public Awareness of Biodiversity (CEPA) has been adopted. ▪ Adopted Strategy document.		
Strategic programmes 2.1.1, 2.1.2., 2.1.3		20. Funding from all sources increased	22. By 2020, a strategy for mobilization of financial resources at all relevant levels has been developed and implemented. ▪ ODA funds aimed at conservation and sustainable use of biological diversity.		

### 3.2 Updating the National Biodiversity Strategy and Action Plan

Together with other relevant policies and the current legal framework, the National Biodiversity Strategy and Action Plan of BiH (2015-2020) is the major instrument for implementation of the UNCBD and, as a result, it plays an important role in achieving the Aichi biodiversity targets within the Strategic Plan 2011-2020. The NBSAP document indicates the need for enhancing the communication and coordination between the relevant institutions at the municipality, entity and state levels, as well as for the implementation of other multilateral environment protection agreements (such as, for example, the UN Framework Convention on Climate Change (UNFCCC), and the UN Convention to Combat Desertification (UNCCD). It also emphasises importance of ensuring governmental support at various levels of authority in the process of developing, updating and implementing the NBSAP, as well as the need of including all relevant sectors and stakeholders in the process.

The NBSAP 2015-2020 document contains a number of new components making it different from the NBSAP 2008-2015. The difference is reflected in the structure of the document that is based on a conceptual framework suggested by the Biodiversity Indicators Partnership – BIP, adopted by the UNCBD Secretariat. The conceptual framework includes five major components (that is, five global strategic objectives): driving forces/causes (Strategic goal A), pressures (Strategic goal B), state (Strategic goal C), benefits (Strategic goal D) and responses by the society and policies (Strategic goal E).

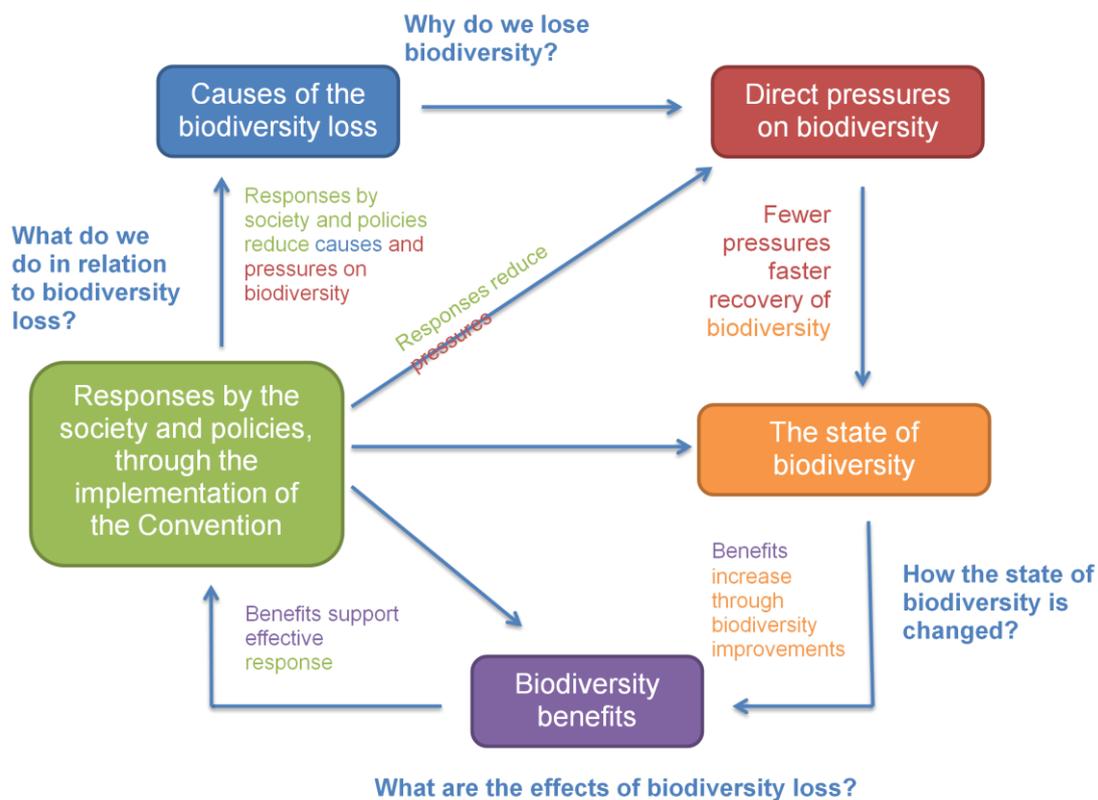


Figure 16: Conceptual framework of NBSAP 2015. – 2020.

The current state of biological diversity is elaborated through the above mentioned five major components, including twenty Aichi Targets. The National goals were developed according to the Aichi Targets, with the view of improving the state of biological diversity and enhancing the biodiversity management and protection processes. They were developed on the basis of SMART Methodology according to which they are: S-specific, M-measurable, A-assignable, R-realistic, T-time-related. In addition to the national goals, indicators were developed as well and they are based on the available data and for the purpose of monitoring the progress of each national goal. Furthermore, Action Plan will be developed and it will contain a number of new components: implementation measures, timeframe, level of activity, duty bearers, other stakeholders, and a source of financing. List of projects, which were implemented from 2008 to 2014, and were financed by the international and local funds, will be provided as Annex I. Four separate plans will be developed within the NBSAP document: 1) Capacity Development Needs Plan; 2) Communication Strategy; 3) Financial Resources Mobilization Plan; Scientific Technologies Development Needs Plan.

The NBSAP document will serve as an effective mechanism in terms of promoting and supporting integration of biodiversity into other sectors (for example, forestry, water management, agriculture, soil/land). Moreover, it will delegate, through the Action Plan, the responsibilities for the implementation of measures defined by the Action Plan to relevant institutions, through the developed indicators and the Financial Resources Mobilization Plan. Therefore, the national goals will be accomplished within the given timeframe and will contribute to lessening of the major biodiversity threats (for example, pollution, conversion of habitats, invasive species, climate change, and overexploitation of resources). At the same time, the document follows in parallel the Strategic Plan for Biodiversity (2011-2020). Progress of the national goals will be monitored by the indicators that are going to be published and updated through the BiH Clearing House Mechanisms (CHM).

The NBSAP document passed through a number of public discussion sessions attended by the representatives of all relevant institutions, NGOs and media. In addition to that, it passed through a phase of professional examinations/revisions. Conservation of biological diversity was also promoted through a number of promotional materials (brochures, internet sites, press articles). Finalization of the document is expected to take place in September / October 2014, and the end of the year will be the time when the respective BiH entities' governments should approve launching of the procedures for adoption of the NBSAP at the state level.

### 3.3 Implementation of the UN Convention on Biological Diversity

In BiH, there is no single designated institution dealing with the issue of biodiversity and collecting, keeping and analysing biodiversity-related data at the entity or state level. There are no data on the majority of generally accepted indicators for monitoring the state of biological diversity in BiH. This field is regulated and monitored through various bodies and institutions that regulate biodiversity issues partially. However, cooperation and flow of information, necessary for monitoring the data and reporting on the state of biological diversity, are not at a satisfying level.

Collecting the statistical data on the environment and biodiversity is still not part of the entity/state data collection systems. That is exactly the reason why majority of data on biological diversity is found in research works and publications developed by various institutions.

Establishment and functioning of the Environmental Protection Fund of FBiH (Official Gazette of FBiH, No. 33/03) and the Environmental Protection and Energy Efficiency Fund of RS (Official Gazette of RS, No. 117/11) contributed to enhancement of the institutional framework for improvement and higher level of biodiversity protection.

In addition, it is important to point out passing of new environment protection laws in the Federation of BiH and the Republika Srpska (Nature protection Law – Official Gazette of FBiH, No. 66/13; and the Nature Protection Law of RS – Official Gazette of RS, No. 20/14) that are harmonized with the respective EU Directives on Habitats and on Birds (Directive 2009/147/EC, and the Directive 92/43/EEC), with respect to nature protection issues. In addition, Federation passed NATURA 2000 Regulation (Official Gazette of FBiH, No.41/11) that will define the status of certain areas which are currently not under protection and which are important areas from the biodiversity point of view. The NATURA 2000 Regulation was passed in the Republika Srpska as well and it will have the same purpose as the one in the Federation of BiH.

The following Table provides an overview of environment protection institutions that have certain responsibilities at the state, entity and BD level. As it was already stated, these institutions are partially dealing with issues of biological diversity as well.

**Table 12:** Institutions and their responsibilities in the field of environment protection, including the issues of biological diversity

Institution/Sector/Department	Responsibilities
	<b>BiH Level</b>
Ministry of Foreign Trade and Economic Relations of BiH (Sector for Natural resources, Energy and Environment Protection)	Defining the policies and basic principles; coordination of activity and harmonization of plans of entities' bodies, authorities and institutions at the international level, in the area of agriculture, energy, environment protection, development and use of natural resources, and tourism <sup>17</sup>
Agency for Statistics of BiH (Federal Institute for Statistics, and the Republic Institute for Statistics of RS)	Statistical research development; maintenance of statistical IT system; exchange of information with other countries and institutions organizations with respect to bilateral agreements and other international treaties.
Food Safety Agency of BiH	Providing scientific counselling; scientific and technical support to legislation and policy of BiH in the field of food products safety, safety of animal foodstuffs; data collection and analysis; Focal Point for activities carried out within the Codex Alimentarius commission and Early Warning Systems (RASFF, INFOSAN); requesting, comparing and summarising scientific and technical data in the food safety area.
Inter-entity Environment Board	Coordination and harmonization of the Environment Laws and Policies of relations between the two entities; promoting ratification of international conventions; and implementation of the EU projects.

<sup>17</sup> Article 9 of the Law on Ministries and Other Administrative Bodies of Bosnia and Herzegovina (Official Gazette of BiH, No. 5/03, 42/03, 26/04, 42/04, 45/06, 88/07, 35/09, 59/09 and 103/09).

Institution/Sector/Department	Responsibilities
<b>FBiH Level</b>	
Ministry of Environment and Tourism	Administrative and professional tasks in relation of air, water and soil protection; monitoring and environment standards; development of environment strategy and policies; development of tourism.
Ministry of Spatial Planning	Spatial planning and land use
Ministry of Agriculture, Water Management and Forestry	Administrative, professional and other duties in the field of agriculture, water management, forestry and veterinary medicine; management of water areas (Adriatic Sea Basin and the Sava River Basin)
Ministry of Health	Administrative, professional and other tasks related to the FBiH competencies in the field of health care.
Environmental Advisory Board of FBiH	Scientific and expert support to the Ministry of Environment and Tourism and the FBiH Government; revision of and providing comments on the strategic and planning documents; establishing higher quality cooperation between the Federal and cantonal levels.
Administration for Inspection Issues	Implementation of regulations; inspection in the environment protection field.
FBiH Environmental Protection Fund	Collecting and distributions of financial resources for environment protection in the territory of the Federation of BiH; providing support and financing the preparation, development and implementation of programs, projects and similar activities in the field of conservation, sustainable use, protection and improvement of the state of environment, and use of renewable sources of energy.
<b>RS Level</b>	
Ministry of Spatial Planning, Construction and Ecology	Environment protection (soil, air and water); waste management (solid and hazardous waste); legal matters and biological diversity.
Ministry of Agriculture, Forestry and Water Management	Administrative, professional and other tasks in the field of agriculture, water management, forestry and veterinary medicine; management of river basins (Sava and Trebišnjica)
Ministry of Environment and Tourism	Administrative and other tasks in the field of trade, tourism and catering service.
Ministry of Health and Social protection	Administrative and other professional tasks related to the field of health and social protection.
Republic Administration for Inspection Activities	Supervision over the implementation of administrative acts.
Environmental Protection and Energy Efficiency Fund of the RS	Collecting of resources and financing the preparation, development and implementation of programmes, projects and similar activities in the field of conservation, sustainable use, protection and improvement of environment, and in the field of energy efficiency and use of renewable sources of energy.
<b>BD Level</b>	
Department for Urban Planning and Property-legal Issues	Environment protection
Department for Agriculture, Forestry and Water Management	Issues related to water management processes (issuance of permits for usage of water, release of water, and infrastructure for protection against floods).
Department for Health and other Services	Professional, administrative and other duties in the field of health care and social protection.
Inspectorate	Implementation of regulations and inspection duties in the field of environment.

In addition to the state, entity and BD institutions referred to in the above Table, it is necessary to mention other public, professional institutions and agencies dealing with biological diversity data collection. The following Table specifies them by their respective sectors of activity.

**Table 13:** Public professional institutions and agencies dealing with biodiversity data collection

Sector	Institutions/Agencies
Air quality	<ul style="list-style-type: none"> <li>▪ Federal Hydro-meteorological Institute of BiH</li> <li>▪ Republic Hydro-meteorological Institute of RS</li> </ul>
Quality of water	<ul style="list-style-type: none"> <li>▪ The Sava River Watershed Agency (based in Sarajevo)</li> <li>▪ The Adriatic Sea Watershed Agency (based in Mostar)</li> <li>▪ Public Institution "VOĐE SRPSKE"</li> </ul>
Quality of soil	<ul style="list-style-type: none"> <li>▪ Federal Institute for Agropedology, Sarajevo</li> <li>▪ Agricultural Institute of the RS, Banja Luka</li> <li>▪ Federal Agro-Mediterranean Institute, Mostar</li> </ul>
Genetic resources	<ul style="list-style-type: none"> <li>▪ Genetic Resources Institute, Banja Luka University</li> <li>▪ Institute for Genetic Engineering and Biotechnology, Sarajevo</li> </ul>
Cultural and historical heritage	<ul style="list-style-type: none"> <li>▪ Republic Institute for Protection of Cultural-Historical and Natural Heritage</li> <li>▪ National Museum, Sarajevo</li> </ul>
Scientific-educational institutions	<ul style="list-style-type: none"> <li>▪ Faculties of Nature Sciences and Mathematics</li> <li>▪ Faculties of Agriculture</li> <li>▪ Faculties of Forestry</li> </ul>

Based on the above, a conclusion may be drawn that it is necessary to establish an institution that will be dealing with the issues of biological diversity and collecting, keeping and analyzing biodiversity-related data at the entity and state level.

### 3.3.1 Activities under the Convention

Bosnia and Herzegovina developed the NBSAP 2008-2015 and following the required procedure the BiH Council of Ministers endorsed the document in mid-2011.

The reasons behind a long period of time from the adoption of the document (NBSAP 2008-2015) until it came into effect include: slow administrative system, lack of human resources, absence of professional agencies, and the like. Programs and actions foreseen and defined by the NBSAP 2008-2015 were not implemented completely, due to the lack of financial resources and absence of professional institutions that would lead expert and scientific activities in the field of biological diversity.

National Biodiversity Reports: First, Second, Third and Fourth were developed in the course of the period 2005-2010.

In addition, one of the commitments of Bosnia and Herzegovina under the CBD is related to the establishment of the Clearing House Mechanism – CHM. Its purpose is to provide comprehensive information on biological diversity through efficient information services as well as to enable technical and scientific cooperation, knowledge exchange and flow of information. CHM portal provides information on the implementation of the UNCBD in Bosnia and Herzegovina and provides most recent information on events, conferences, and other related issues. It includes the

biodiversity-related state-level data necessary for assisting the decision-makers and stakeholders in meeting the obligations defined by the CBD, and in conservation and sustainable use of biodiversity<sup>18</sup>.

### 3.3.2 Financial Mechanisms for the Implementation of the Convention

In accordance with Articles 20 and 21 of the UNCBD, which are related to the sources of financing and the funding mechanisms for the implementation of the Convention, it is necessary to establish a financial resources mobilisation system, in order that national objectives could be accomplished and biodiversity-related activities implemented.

At present, there are entity-level environment protection funds in BiH: the Environmental Protection and Energy Efficiency Fund of the Republika Srpska, and the Environmental Protection Fund of the Federation of BiH regulated by the Law on the Fund and the Financing of Environment (Official Gazette of RS, No. 117/11), that is, the Law on the Environmental Protection Fund (Official Gazette of FBiH, No. 33/03), as well as by other bylaws. However, these legal documents are not sufficient for financing the activity of the respective Funds. Their activities include: collecting and allocation of financial resources for environment protection in the territory of the respective entities; and support and financing of the preparation, development and implementation of programmes, projects and similar activities in the field of conservation, sustainable use, protection, and improvement of the state of environment.

Activities of Bosnia and Herzegovina in the field of sustainable natural resources management have been supported to date mostly through financial resources of the above-mentioned Funds and relevant ministries, through implementation of important projects and through international donors' funds. International donors have been financing the implementation of projects in the environment protection, agriculture, and forestry sectors, which have positive effects on conservation of biological diversity. Donors active in the environment protection sector regularly take part in the Donor Coordination Forum (DCF) meetings organized by the Ministry of Finances and Treasury / Sector for Coordination of International Economic Assistance. When it comes to the forestry sector, there is no formal coordination mechanism at the level of BiH. The DFC members, active in the environment protection sector in 2011 and 2012 include: the EU/EC, UNDP, World Bank, Germany, Italy/IC, Check Republic, Norway, and the Netherlands. Active donors in the agriculture and forestry sector in the same period are: USA/USAID, World Bank, Sweden/SIDA, EU/ECOSYSTEMS, Italy/IC, Check republic, Japan/JICA, and Norway.

Although there are certain local and international financial resources set aside for sectors assisting in conservation of biological diversity, it is still necessary to establish an adequate financial mechanism for the implementation of the Biodiversity Strategy and Action Plan.

### 3.4 Integration of Biological Diversity into other Sectors

---

<sup>18</sup>[http://www.bih-chm-cbd.ba/Bos/index\\_bos.htm](http://www.bih-chm-cbd.ba/Bos/index_bos.htm)

Activities of almost all sectors affect biological diversity in a certain way and at a certain level. These effects may be long-reaching in terms of time and space. Traditionally, the environmental protection sector is dealing with the conservation of biodiversity; however, if the problems of biodiversity are not included into other sectors, even the best conservation attempts are likely to fail (UNCBD Secretariat, 2011).

In an ideal scenario, biological diversity policy should not be seen as an independent sectoral policy. Instead, sectoral policies should be seen as an instrument for the implementation of national biodiversity goals (UNCBD Secretariat, 2011).

In the framework of the Strategic Direction A of the Strategic Plan for Biodiversity 2011 – 2020, three Aichi Targets (2, 3 and 4) are closely related to the biodiversity integration issue.

The biodiversity issues should be fully integrated into the development and functioning of economic sectors, developmental models, policies and programmes. "Integration" exactly means inclusion of conservation and sustainable use of biodiversity into inter-sectoral plans, such as the plans of sustainable development, poverty reduction, climate changes, trade, and international cooperation, as well as into specific sectoral plans such as the plans of agriculture, fishery, forestry, mining, energy, tourism, transport, etc.

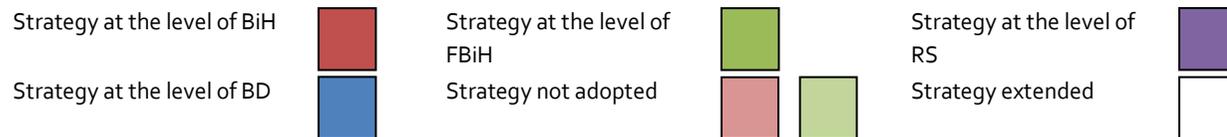
Integration of biodiversity into other sectors may provide immediate benefits through improvement of environment quality and productivity but can also serve as a long-term foundation for sustainable development.

### 3.4.1 Sectoral Policies

BiH has been passing through a continuous reform process in order to achieve political and economic stabilization and to encourage development required for the EU accession process, through harmonization of the local and the EU legislation. Although some progress was achieved in passing sectoral policies at all levels of government, there are still certain challenges related to harmonization of policies at all levels as well as the lack of inter-sectoral and inter-institutional cooperation (horizontal and vertical), coordination, implementation and monitoring the processes of those strategies.

In addition, timeframes were provided for all relevant strategies by sectors, and by levels of government. The following Table 14 provides an overview of the situation in BiH and entities with respect to passing of inter-sectoral policies.

**LEGEND**



**Table 14:** Overview of strategies in BiH through levels of government with the time frame

Adopted strategies	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	...	2030
NBSAP				Red	Red	Red	Red	Red	Red	Red												
BiH Development Strategy						Light Red																
BiH Social Inclusion Strategy						Light Red																
Strategic Plan for Harmonisation of Agriculture, Food and Rural Development				Red	Red	Red	Red															
Strategy of SME Development					Red	Red	Red															
FBiH Development Strategy						Light Green																
BiH Medium Term Development Strategy of the Agriculture Sector		Green	Green	Green	Green	Green																
FBiH Strategy of Development of Textile, Clothing, Leather and Footwear sector								Green	Green													
FBiH Strategy of Development of Military Industry								Green	Green													



## **Socio-economic development**

Given the need for a systematic approach to socio-economic development in BiH, the BiH Development Strategy (DS) and the BiH Social Inclusion Strategy (SIS) have been developed in 2010. DS and SIS are the most important development documents in BiH, which define the BiH's strategic courses of action in the field of economic and social development in the coming period. However, although the Government of FBiH and the Government of Brcko District (BD) have adopted these two strategies, their adoption by the House of Representatives of the BiH Parliamentary Assembly and by the RS Government is still pending. Regardless of the fact that these strategies have not been adopted, due to their significance, they will be further analysed in this document.

## **Industry and small and medium-sized enterprises**

Strategies of Development and Social Inclusion encompass the elements of the industrial policy. Nevertheless, it is still needed to develop the state level industrial strategy. The entities are implementing industrial policy actions based on their action plans.

The implementation of the state level SME Development Strategy 2009 – 2011 is insufficient. The Federation BiH has not adopted the Strategy of Tourism Development 2008-2018. while RS has adopted the Strategy of Tourism Development for the period 2010-2020.

## **Agriculture and rural development**

BiH has not harmonised its policies of agriculture and rural development with the EU standards as yet. A state level Strategic Plan and Operational Programme for Harmonisation for Agriculture, Food and Rural Development has been developed. Nevertheless, the implementation has yet to start.

The FBiH Operational Programme for Harmonisation of Agriculture, Food and Rural Development, as well as the RS Strategic Plan for Rural Development and the Action Plan has to be harmonised with the state level framework. The Medium Term Development Strategy of the Agriculture Sector (2006-2010) in the FBiH has been extended for two years. The Strategy expired, whereas the FBiH Rural Development Strategy is in the process of development.

## **Environment**

The BiH environmental policies are still at an early stage of development. The establishment of a harmonised legal framework for environmental protection, the establishment of the state level Environmental Agency, and a functional environmental monitoring system remain a priority.

There is neither a strategic document in BiH providing for environmental protection at the state level, nor a sustainable development strategy. Activities to achieve the sustainable development objectives in BiH represent an ongoing task that permeates all segments of society. In accordance with resources, the existing constitutional organisation of BiH, and opportunities and needs, the

government institutions, companies, organisations and all other entities of the society participate in the sustainable development process, each their own way, either through passing the laws and by-laws, development of strategies, or through implementation of the assumed local and international commitments with varying degree of success.

BiH has adopted the NBSAP 2008 - 2015.

RS has adopted its Air Protection Strategy and its Environmental Protection Strategy. They have prepared a draft Strategy for Integrated Water Management in RS (2014 - 2024).

The FBiH has adopted the Strategy of Integrated Environmental Protection, comprising: the Federal Nature Protection Strategy, the Federal Air Protection Strategy, and the Federal Waste Management Strategy with Action Plan. Subsequently, the Strategy of Water Protection, i.e. Water Management has been developed and adopted.

There is no state level strategy in the field of waste management. The Federal Waste Management Plan has been adopted in the FBiH in order to implement the FBiH Strategy of Environmental Protection 2008 - 2018. In RS – the same as in BD – there are no strategies in the field of waste management.

## **Transport**

BiH still neither has a strategy for transport infrastructure nor a legal framework for it.

## **Energy**

A state level energy strategy does not exist. It is of crucial importance to develop a comprehensive energy strategy, including the promotion of energy efficiency and renewable sources of energy.

### **3.4.2 Sectoral Policies and Biodiversity**

By analysing the sectoral and cross-sectoral strategies at all levels in BiH, it is noticeable that there are good examples of biodiversity integration, but also the examples of uncoordinated policies, i.e. non-integration. It is necessary to continue seeking for harmonisation of the existing policies at all levels, as well as better coordination, cross-sectoral collaboration, implementation and monitoring.

The biodiversity issues are more represented in different sectoral policies, but considerable efforts are needed in order to fully incorporate the biodiversity issues into all relevant sectoral policies and strategies, budgets and planning.

A positive example of biodiversity integration is the FBiH Spatial Plan (2008 – 2028) that has not been adopted yet. This document represents an overarching strategic document, serving as a basis for defining space utilisation and preparing development plans, which will define monuments and areas of natural heritage, and objectives of spatial development, protection, utilisation and land use planning.

As part of the Spatial Plan, it was necessary to state proposals for protection and improvements to the state of the environment in FBiH. Hence, within this document, a strategic environmental assessment was conducted not with legislative authority but as an advisory instrument and tool to assist the decision makers in ensuring a higher level of environmental protection and contribute to integration of environmental issues in preparation and adoption of plans and programmes. Within the strategic environmental assessment, the issues of biological diversity have been integrated through the following chapters:

- Protection of the FBiH biological and geological diversity through establishing and strengthening the institutional framework for implementation of efficient measures;
- Equal distribution of profit from natural resources (biological and geological diversity);
- Reducing pressures on biological and geological diversity;
- Establishing financial mechanisms for sustainable management of biological and geological diversity;
- Minimising/eliminating risks for human health, biological diversity, natural and architectural heritage.

The RS Spatial Plan by 2015 does not directly include the issues of biodiversity, but it is assumed that it will be included in the document of the RS Spatial Plan by 2025, which is currently prepared in compliance with the European rules and regulations.

As for the subsidies and incentives that are harmful for biological diversity, as well as those that affect conservation and sustainable use of biological diversity, it is difficult to assess what are those incentives and subsidies, and in what way and to what extent they have either positive or negative impact on biological diversity since there is no system in BiH for monitoring subsidies/incentives to so many details that are needed for this analysis. It is for these reasons that we need to establish a monitoring system for subsidies and incentives that harm biodiversity and find a way to reform them, since these are the sectors that the BiH economic development depends on – these are most frequently subsidies and incentives in the sectors of energy, mining and industry. These types of incentives and subsidies cannot be revoked because BiH has still not reached such level of industrial and economic development to enable it to redirect incentives only to conservation of biodiversity. Moreover, many types of incentives cannot be abolished because of the poverty reduction programmes that aim at the economic development of the country.

Furthermore, we have presented the integration of biodiversity in different sector-based strategies through levels of government (BiH, FBiH, RS and BD). Darker colour indicates that biodiversity is more intensely integrated in a given strategy – biological diversity is one of the priorities or objectives of the strategy, medium dark colour shows that biodiversity is one of the measures in a given strategy, and mark "X" shows that the issue of biodiversity has not been taken into consideration in a given strategy.

**Table 15:** Integration of biodiversity in strategies through sectors and levels of government

Sector	BiH	FBiH	RS	BD
Economic growth and development	<p>Biodiversity is included under:</p> <ul style="list-style-type: none"> <li>Priority 3 – Conservation of nature and rational natural resources management under Measure 2: Support to biodiversity protection measures and sustainable use of genetic resources.</li> </ul>	<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>	X	<ul style="list-style-type: none"> <li>Biodiversity recognised as a particularly important resource</li> <li>Prevention of threats to general biodiversity through conservation of environment in agriculture.</li> </ul>
Agriculture and rural development	<ul style="list-style-type: none"> <li>Biodiversity and its rational utilisation is one of the five general objectives of the strategy.</li> </ul>	<ul style="list-style-type: none"> <li>Agro-biological diversity is key to adopting documents for EU integrations</li> <li>Activities of enhancing biological potential of livestock</li> <li>Support to biological, ecological production</li> <li>Identification of biodiversity centres and indigenous species.</li> </ul>	<ul style="list-style-type: none"> <li>Rural policy deals with promotion of biodiversity</li> <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>	Strategy does not exist
Industry	Strategy does not exist	X	X	Strategy does not exist
Energy	Strategy does not exist	<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>	<ul style="list-style-type: none"> <li>Recognised 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>	Strategy does not exist

Environment	Strategy does not exist	<ul style="list-style-type: none"> <li>Biological diversity incorporated into several strategic objectives and measures: 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>19</sup></li> </ul>	<ul style="list-style-type: none"> <li>Introduction on commitments of the UN CBD Parties</li> <li>State of biological diversity, impacts of other sectors</li> <li>Overview of negative impacts on biodiversity</li> <li>Biological diversity as part of vision</li> <li>Biological diversity incorporated in operational objectives: 1.5, 1.9, 2.2<sup>20</sup></li> </ul>	Strategy does not exist
Water	Strategy does not exist	<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>	<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>	Strategy does not exist
Forestry	Strategy does not exist	Strategy does not exist	Strategy in draft version	Strategy does not exist
Tourism	Strategy does not exist	<ul style="list-style-type: none"> <li>Recognised importance of biological diversity for environmental services</li> <li>Ecological sustainability and biological diversity</li> <li>Features of biodiversity in BiH</li> </ul>	<ul style="list-style-type: none"> <li>Programme: monitoring status of the environment Measure: stimulate activities for environmental monitoring: water, air, soil, ecosystems and biodiversity.</li> </ul>	Strategy does not exist
Social	X	Strategy does not exist	Strategy does not exist	Strategy does not exist

<sup>19</sup> 4.2.1. Establishment 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>20</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.

### 3.4.3 Establishment of Cross-Sectoral Cooperation

As can be seen in the above table, one of the features of the nature management process in BiH is the "lack of cross-sectoral linkages in decision making pertaining to use of biological and landscape diversity" (NBSAP 2008 – 2015).

In order to overcome this barrier towards establishing cross-sectoral cooperation, it is necessary to integrate sectoral policies through strengthening the environmental protection policies of other sectors (for example, energy, transport, agriculture, industry, tourism, etc.) along with reinforcing cross-sectoral coordination in drafting of legislation (including those laws that have not been passed yet), which directly or indirectly affect environmental protection and preservation of biological diversity. The activities arising from the Strategy aim at optimisation of natural resources management through linkages in:

- Determination of sustainable purpose and utilization of individual areas of BiH with all the resources contained therein;
- Decision making that will ensure long-term wellbeing for the community;
- Development of programmes that are profitable for several sectors in the community;
- Identification and promotion of biological and landscape diversity in BiH as a common national asset with potentials to bring profit.

#### Case study #5: Livanjsko polje

UNDP KARST project entitled "Public Awareness Campaign on Protection of Biodiversity in Livanjsko Polje" aimed at providing information and increase participation of the public in the major processes such as: i) conservation of biological diversity and its integration in the development of a Spatial Plan at the federal, cantonal and municipality levels; ii) raising public awareness on preserving the value of peatlands and their sustainable utilization; and iii) the need for adequate cross-border water management at the territory of the Republic of Croatia and Bosnia and Herzegovina.



Figure 17: Livanjsko polje<sup>21</sup>



Figure 18: Logo of Livanjsko polje

<sup>21</sup> Photo by A. Velagić

The activities of the campaign were implemented in the municipalities of Tomislavgrad, Livno and Bosansko Grahovo. There were five major activities:

1) *Development of promotional materials:*

A catalogue entitled "*Eco-tourism in Livanjsko Polje and surroundings*" provides basic information on the importance of eco-tourism for the local community, a list of endangered, rare and endemic animal and plant species, a list of well-known artists and amateurs, local producers with their authentic home-made products (e.g. honey, medicinal herbs, cheese, wine, handicrafts, etc.), and NGOs dealing with activities such as fishing, hunting, mountaineering, paragliding, bicycling, etc. At the end of the catalogue there is a map with locations of all individuals, producers and non-governmental organisations. The catalogue contains approximately 40 pages, while the issue is 5.000 copies. 43 persons participated in development of the catalogue.

A leaflet developed separately for each municipality contains a brief introduction to the municipality, pictures and a map with chartered locations of cultural-historical-religious sights of interest. The issue is 2.500 copies per municipality.

A manual entitled "*Key information on peatlands and Guidelines concerning their preservation in development of spatial plans at federal and cantonal level in BiH*" contains information on: a) what is peat and what are peatlands?; b) what are the functions of peatlands?; c) in what ways can peatlands be threatened?; d) is there legislation relevant for preservation of peatlands in FBiH?; e) what are the priority guidelines for preservation of peatlands?; f) what principles need to be incorporated into legal framework of the Spatial Plan at federal and cantonal level? and e) conclusions. The issue is 200 copies for all municipalities.

- 2) *Four information sessions for wider audience* ("Active participation in spatial planning and raising public awareness for biodiversity protection in Livanjsko Polje"; "Biodiversity of Livanjsko Polje and climate change"; "Waters of Livanjsko Polje"; "Development of eco-tourism and improving living conditions in Livanjsko Polje");
- 3) *Training for media representatives* "*Active role of media in raising public awareness on the need to protect biodiversity of Livanjsko Polje*";
- 4) *Study tour with media representatives* who were introduced to the values and potentials of Livanjsko Polje, i.e., rich flora and fauna, gastronomy and tourism offer, abundant cultural and historical monuments in this region;
- 5) *Training for representatives of municipalities* with the goal to indicate to the important segments of Livanjsko Polje such as: water management and possible cross-border impacts in the Republic of Croatia; development of Spatial plan at federal and cantonal level including protection of peatlands and biodiversity; analysis and use of different maps developed in the

GIS software through the KARST Project, protected areas and potentials for development of eco-tourism in Livanjsko Polje and surroundings.

The main results of the campaign are reflected in: 1) three types of promotional materials (a catalogue, a leaflet, and a manual) and their circulation (12.700 copies in total) and extensive distribution in the FBiH (for example, in tourist bureaus, hotels, museums, and the like); 2) the number of participants in information sharing sessions (around 20 per session); and 3) the number of reports (20) published or broadcasted in different media (for example, web sites such as: [www.fotografija.ba](http://www.fotografija.ba) and [www.buka.ba](http://www.buka.ba); scientific journals such as: Banks in BiH, Fondoko, and Business Magazine; Oslobođenje Daily; TV Channels BHT1 and TV Hayat, and the radio station BH Radio 1).

#### 3.4.4 Synergy in the Implementation of International Conventions

National reporting is the key obligation of the countries Parties to the Conventions and agreements concerning biodiversity, such as UNCBD, the Convention on International Trade in Endangered Species of Wild Fauna and Flora - CITES, the Convention on the Conservation of Migratory Species of Wild Animals - CMS, the Convention on Wetlands of International Importance - Ramsar and the Convention on Protection of the World Cultural and Natural Heritage, with well-established systems of national reporting. NBSAP is a primary mechanism for implementation of UNCBD at national level. Revision of NBSAP presents an important opportunity for better cooperation between the multilateral environmental agreements concerning biodiversity since their common goal is its preservation.

More efficient and coherent implementation of the aforementioned conventions could be achieved through synergy-based approach. Synergy includes all activities the aim of which is to improve cooperation between multilateral environmental agreements, through joining the processes in a way in which the effects of the entirety of joint activities would be somewhat greater than the sum of effects obtained from individual activities. In addition to the above, a synergy-based approach in reporting contributes to avoiding the duplication of reports and overlapping of some issues, including the cost and human resources efficiency.

In the period from 2000 to 2002, BiH has ratified the Rio Conventions: UNFCCC (ratified in 2000), UNCBD (ratified in 2002), and UNCCD (ratified in 2002). These Conventions affect biodiversity, land degradation/desertification and climate change, and therefore the implementation of these Conventions cannot be pursued in isolation from each other<sup>22</sup>.

In addition to these three main Conventions, BiH has also ratified other conventions such as the Convention on the Conservation of European Wildlife and Natural Habitats and the CITES, as well as

---

<sup>22</sup> The need for having a synergy-based approach is emphasized in numerous documents of the Conference of Parties to the mentioned Conventions and the relevant Working groups (FCCC/SBSTA/2004/INF.19, ICCD/COP(7)/5/Add.1 and CBD/WG-RI/1/7/Add.1, Harmonization of the reporting formats included as an item in the Joint Work Programme between the Secretariats of the UNCBD and the UNCCD (UNEP/COP/7/INF/28); Decision UNEP/CBD/COP/IX/16(B) and the UNCCD Decision 8/COP.9).

the Cartagena and the Kyoto Protocol, the Stockholm Convention on Persistent Organic Pollutants – (POPs), the Beijing Amendment to the Montreal Protocol of the Vienna Convention for the Protection of the Ozone Layer. By the Act of Succession, a series of international commitments were introduced into the legal system of BiH, including the Ramsar Convention and the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution. It is expected that several international conventions, protocols and agreements will be ratified in the upcoming period, including the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

The need to strengthen the capacities has been recognised in BiH, as well as in many other countries, particularly in terms of the state of the environment and implementation of the Conventions. Hence, a fifteen-month National Capacity Self-Assessment – NCSA process was initiated in December 2010, in order to ensure adequate identification of obstacles to the implementation of multilateral environmental agreements (BiH in the process RIO +20, BiH Report for the UN Conference on Sustainable Development (UNCSD), 2012).

The NCSA included a cross-analysis of the thematic area capacities of the Conventions – UNCBD, UNCCD, the Stockholm Convention (POPs) and the Vienna Convention for the Protection of the Ozone Layer.

This analysis, as well as the identification of priorities, was conducted to foster a higher level of synergy between the bodies that implement activities necessary for meeting the environmental protection requirements.

NCSA's objective was also to develop the Action Plan for capacity building in order to meet the obligations in compliance with international commitments related to environmental management, assumed by accession to the respective Conventions (NCSA, 2012).

In addition to these activities, it is important to mention that there is no significant synergy-based approach in reporting towards other conventions related to biodiversity in BiH.

### 3.4.5 Possible Synergies with Other Multilateral Environmental Agreements

Synergies are also possible with other Conventions aiming at conservation of biodiversity. One of them is the Ramsar Convention. Implementation of this Convention belongs under water policy and policy of protected areas and, at national level, contributes to achieving many of the Aichi targets, *in primis* the Aichi Targets 11 and 14.

In January 1996, the Secretariats of the Ramsar Convention and the UNCBD have signed the first Memorandum of Cooperation. According to this initial partnership, a Joint Work Plan 1998 – 1999 was developed and implemented. The Fifth Joint Work Plan is currently effective, which covers the period of NBSAP 2011-2020 and acts in the context of the Ramsar Convention as the lead partner for wetlands in implementing the UNCBD.

It is important to note that there are three Ramsar sites identified in BiH: Hutovo blato, Bardača and Livanjsko polje. Hutovo blato, declared a Nature Park in 1995, was enlisted into The Specially Protected Areas of Mediterranean interest in compliance with the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution, due to its importance for migration of a large number of wetland birds. The International Council for the Preservation of Birds (ICPB) included Hutovo Blato in the List of internationally recognised areas of importance for birds (1998) (State of the Environment Report of BiH, 2012). Reporting on wetland habitats in BiH could be implemented through synergy, following the instructions from the aforementioned Memorandum of Understanding and the Fifth Joint Work Plan.



Figure 19: Little white egret (*Egretta garzetta*)<sup>23</sup>



Figure 20: Mallard duck (*Anas platyrhynchos*)<sup>24</sup>

Project "Mainstreaming Karst Peatlands Conservation into Key Economic Sectors – KARST implemented in the period from 2009 to 2013 (project operationally completed on 31 May 2013) is of importance for the implementation of the Ramsar Convention. 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.

Goals of the CITES Convention directly contribute to the Aichi Target 12, as well as the Targets 2, 4, 6, 11 and 19. Goal 3 of the CITES Convention's Strategic Vision 2008 – 2020, adopted at 16th meeting of the Conference of the Parties, reads that it is necessary to contribute to significantly reducing the rate of biodiversity loss and to achieving relevant globally agreed goals. This goal emphasises the synergy between CITES and other multilateral environmental agreements and related conventions, agreements and associations.

Another Convention which is closely related to UNCBD is, as mentioned before, the CMS, since migratory species are the component of biodiversity. Aichi Targets relevant for this Convention are targets 1, 4, 5, 11, 12, 17, 19 and 20. Since CMS does not prescribe mechanisms for its implementation

---

<sup>23</sup> Photo by S. Matic

<sup>24</sup> Photo by S. Matic

at national level and the issue of migratory species cannot and must not be separated from the broader issue of conservation and sustainable use of biodiversity, there are good reasons for mainstreaming national strategy and action plans for implementation of CMS into UNCBD's implementing mechanisms, i.e. NBSAPs<sup>25</sup>.

As can be seen, there are great opportunities for synergy-based reporting among specific multilateral environmental agreements, but achieving this synergy requires both cooperation and coordination at institutional level as well as among national focal points.

**Tablea 16:** National Focal points in BiH for specific Conventions

Convention	National Focal Point
<b>UNCBD</b>	Federal Ministry of Environment and Tourism
<b>UNCCD</b>	Agricultural Institute of RS
<b>UNFCCC</b>	Ministry of Spatial planning, Civil Engineering and Ecology of RS
<b>Ramsar Convention</b>	Ministry of Trade, Tourism and Environmental Protection of the Herzegovina-Neretva Canton
<b>Aarhus Convention</b>	Federal Ministry of Environment and Tourism
<b>Stockholm Convention</b>	Ministry of Foreign Trade and Economic Relations BiH
<b>Vienna Convention</b>	Ministry of Foreign Trade and Economic relations BiH

### 3.4.6 Biological Diversity within the Framework of Cross-Border Cooperation

When talking about trans-boundary cooperation, it is important to mention the programme of setting up the European Ecological Network, which would comprise specially protected areas, in order to preserve natural habitats and species in them of special interest for the EU. Setting up the NATURA 2000 was prescribed by the Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC). The Decree on NATURA 2000 in FBiH was adopted on 29 June 2011, whereas the introduction of NATURA 2000 for the purpose of site protections has yet to be initiated (State of the Environment Report BiH, 2012).

In addition to NATURA 2000, one of the most significant is the *Emerald Network (Environmental Management Exchange and Resource Alliance for Local Development)* which is composed of the *areas of Special Conservation Interest (ASCI)* and the Contracting Parties to the Bern Convention are obliged to set up the network. The Emerald Network is based on the same principles as NATURA 2000 and represents its extension to non-EU countries, while at the same time it also represents preparation for and contribution to the implementation of the programme NATURA 2000 for the candidate countries for EU accession. The Emerald Network project in BiH was initiated in December 2004, by signing a contract between the representatives of the Council of Europe and the director of the Centre for Ecology and Natural Resources (CEPRES), which was engaged by the Federal Ministry of Environment

<sup>25</sup> Guidelines for integrating migratory species into national biodiversity strategies and action plans (NBSAPs) were presented at the 10<sup>th</sup> session of the Conference of Parties to the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

and Tourism (FMoET). This was a pilot project aiming at capacity building for training and methodologies at the state level. Based on the report of this project (January 2006), it resulted in identification of 29 ASCI areas covering 4.9 % of BiH (Odgovori na listu pitanja EU – Poglavlje 27 Okoliš, 2012).

In 2006, WWF Mediterranean Programme launched the "Europe's Living Heart" project to support the implementation of the European Ecological Network NATURA 2000 in BiH, which ended in 2011. This programme supported BiH in the implementation of the EU *acquis* pertaining to environmental protection (Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, the Birds Directive and the Water Framework Directive), as well as in capacity development, demonstration of solutions and setting up partnerships for preservation of nature.

Agreement of Cooperation between the Tara National Park from Serbia and the Republika Srpska Institute for Protection of Cultural, Historical and Natural Heritage from Banja Luka was signed on 16<sup>th</sup> November 2011 within the framework of the project "Environment for People in the Dinaric Arc", which was implemented by the *International Union for Conservation of Nature (IUCN)*, WWF Mediterranean Programme and the *Netherlands Development Organisation (SNV)*, and funded by the Ministry of Foreign Affairs of Finland. The goal of the aforementioned agreement was to establish the first trans-boundary biosphere reserve "Drina", which would spread at the territory that includes three protected areas in the municipalities of Bajina Bašta and Užice in Serbia – namely NP Tara, Nature Park Zaovine and Mokra Gora, as well as Višegrad, Srebrenica and Rogatica in BiH. The Spatial plan of RS foresees setting up of the NP Drina, which would enable establishment of the biosphere reserve "Drina". On 1<sup>st</sup> March 2013, Memorandum of Understanding was signed between the line ministries of RS and the Republic of Serbia, after which the work started on the Study to proclaim the NP "Drina", which is a requirement for trans-boundary cooperation and establishment of the biosphere reserve (WWF, 2011).

Project *Regional Environmental Network for Accession - RENA*, which lasted from March 2010 to March 2013, aimed at enhancing environmental cooperation in the Western Balkans and Turkey for the EU accession. Due to the cross border character of many environmental issues, the involvement of EU countries that border with the regional countries have also been included. It is stated in the final report of the Project that the participating countries were ready to continue working through a new regional programme *Environmental and Climate Regional Accession Network - ECRAN*. RENA was based on four main components of activities:

1. Strategic planning and investments (including progress monitoring and compliance check);
2. Climate change;
3. Cross-border cooperation;
4. Multilateral environmental agreements (with emphasis on nature protection, water protection, environmental impact assessment and strategic impact assessment).

In addition to these, there are other trans-boundary cooperation projects important for conservation of biodiversity (Annex 2). However, it is necessary to work on increasing the number of this type of projects and to include as many institutions as possible, while at the same time working on

coordination and monitoring of the projects in order to efficiently track their results and effects on conservation and improvement of biodiversity.

### 3.5 Implementation of the National Strategy and Action Plan for Biodiversity (2008 – 2015)

According to the structure developed by the Ministry of Foreign Trade and Economic Relations (MoFTER) and adopted by the Council of Ministers BiH, Federal Ministry of Environment and Tourism (FMoET) has a role of NFP for cooperation within the UNCBD mechanisms. After ratification of the Convention, preparations were completed to apply to the UNEP for the GEF funds for development of the Strategy and Action Plan for the protection of Biological and Landscape Diversity of BiH.

BiH entered the process of the NBSAP development in 2008 within the Project "Preparation of the Strategy and Action Plan for the Protection of Biological and Landscape Diversity, National Reports toward the UNCBD and the BiH Clearing House Mechanism (CHM) portal". The most of relevant experts throughout BiH were mobilised for development of this significant strategic document. BiH completed this document in 2008 and submitted to the MoFTER BiH for further procedure of adoption by the Council of Ministers BiH, which finally adopted the document only in mid-2011.

A long adoption process (3 years), i.e. coming into force (June 2011) of the document NBSAP 2008 – 2015, can be characterised by a slow administrative apparatus, the lack of human resources and professional agencies, etc.

The foreseen programmes and actions defined in the NBSAP 2008 – 2015 have not been fully implemented mainly due to:

1. Vaguely defined competencies for implementation and monitoring of the NBSAP implementation;
2. Lack of financial resources;
3. Lack of professional institutions for leading professional and scientific activities of biodiversity protection.

The main problems are primarily in inefficient functioning of the institutional framework, which is closely linked to legislation in domain of nature protection and complementary fields.

A large number of different bodies and institutions is involved in regulation of biodiversity issues on the one hand while, on the other hand, there are no professional institutions to lead professional and scientific activities related to biodiversity protection.

Key responsibilities for the biodiversity issues were delegated to the entity level ministries: FMoET and the Ministry of Spatial Planning, Civil Engineering and Ecology of RS.

Given the large number of involved bodies, including weak capacities and significant lack of personnel, conservation of biodiversity suffers because of the absence of inter-departmental cooperation and coordination. Integration and information sharing among numerous agencies does not exist. Responsibilities among the agencies are also not clearly defined and separated. Efficient work in the field of biodiversity requires strong coordination among agencies within the entities, as well as cooperation between the entities.

To sum up all what was written, a period of somewhat less than three years passed from the adoption of the NBSAP 2008-2015 to the Fifth National Report. There is no official monitoring as for the implementation of this document. For the purpose of development of the Fifth National Report and evaluation of implementation of the NBSAP 2008-2015 in BiH, we have prepared and sent questionnaires for obtaining information on projects, i.e. activities related to biodiversity to all relevant institutions and stakeholders. Based on the answers, we have prepared a table (Table 16) with the overview of undertaken activities foreseen by the Action Plan. Within the table, the last column represents progress assessment with three different colours meaning: red – no progress; orange – small progress, and green – significant progress. Given that most of the measures foreseen in this Strategy have not been implemented, progress was assessed based on available data on the undertaken activities that contributed to achieving specific objectives and programmes of NBSAP 2008-2015.

**Table 17:** Progress towards strategic directions and objectives of NBSAP 2008 – 2015.

Strategic direction	Objective	Main activities	Progress assessment
<p><b>BIODIVERSITY LOSS DECREASE IN BiH</b></p>	<p><b>Conservation of species diversity in BiH</b></p> <hr/> <p><b>Conservation of ecosystem and landscape diversity in BiH</b></p>	<p><b>Development of Red lists</b> in both entities:                      Red List of Endangered Wild Species and Subspecies of Plants, Animals and Fungi (Official Gazette of FBiH, No. 7/14)</p> <ul style="list-style-type: none"> <li>▪ Red List of Flora FBiH</li> <li>▪ Red List of Fauna FBiH</li> <li>▪ Red List of Fungi FBiH</li> </ul> <p>Red List of Protected Species of Flora and Fauna of RS (Official Gazette of RS, No. 124/12)</p> <hr/> <p><b>Strengthening legal framework</b> in the field of nature protection (providing for renewal, protection, conservation and sustainable development of landscapes, natural sites, plants, animals and their habitats, soil, minerals, fossils, etc.) and <b>further harmonisation with the EU Directives:</b></p> <ul style="list-style-type: none"> <li>▪ Law on Environmental Protection FBiH (Official Gazette of FBiH, No. 33/03, 66/13)</li> <li>▪ Law on Nature Protection RS (Official Gazette of RS, No. 50/02, 34/08)</li> <li>▪ Law on National parks RS (Official Gazette of RS, No. 75/10)</li> <li>▪ Law on Nature Protection of BD BiH (Official Gazette of BD BiH, No. 24/04, 19/07, 1/05 i 9/09)</li> </ul> <hr/> <p><b>Setting up monitoring of the state of endangered species</b> BiH in protected areas in the Sarajevo Canton</p> <hr/> <p><b>Scientific publications</b> on fishes of BiH, higher fungi, toxicology of fungi, etc.</p> <hr/> <p><b>NATURA 2000 in BiH</b> (WWF project "Europe's Living Heart") publications, mapping, digital database, interactive map</p> <hr/> <p>Setting up the <b>Emerald Network in BiH</b>, establishment and nomination of the Emerald sites</p> <hr/> <p>KARST project – Mainstreaming Karst Peatlands Conservation into Key Economic Sectors – Identification and assessment of status of species and ecosystems in Livanjsko Polje</p> <hr/> <p><b>Strengthening legal framework</b> in the field of nature protection (providing for renewal, protection, conservation and sustainable development of landscapes, natural sites, plants, animals and their habitats, soil, minerals,</p>	

Strategic direction	Objective	Main activities	Progress assessment
		<p>fossils, etc.) and <b>further harmonisation with the EU Directives:</b></p> <ul style="list-style-type: none"> <li>▪ Law on Environmental Protection FBiH (Official Gazette of FBiH, No. 33/03, 66/13)</li> <li>▪ Law on Nature Protection RS (Official Gazette of RS, No. 50/02, 34/08)</li> <li>▪ Law on National parks RS (Official Gazette of RS, No. 75/10)</li> <li>▪ Law on Nature Protection of BD BiH (Official Gazette of BD BiH, No. 24/04, 19/07, 1/05 i 9/09)</li> </ul> <hr/> <p><b>Forest inventories</b> were completed in both entities and official data are under way</p> <p><b>Preparation of the forestry programme</b></p> <p><b>Certification of forests</b> is ongoing</p>	
	<p><b>Conservation of genetic resources in BiH</b></p>	<p><b>Setting up gene banks</b> in both entities in u 2009: gene bank in FBiH stores around 500 seed accessions, whereas the gene bank in RS stores around 600 seed accessions of cereals, vegetables, fodder crops and industrial plants, and medicinal and aromatic plants on long-term ex situ conservation.</p>	
<p><b>SETTING UP A SYSTEM OF CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY IN BIH</b></p>	<p><b>Setting up financial flows to support the system for conservation of biodiversity in BIH</b></p>	<p><b>There are no budgetary funds at the level of BiH</b> allocated for implementation of any of the activities in the field of environmental protection, so individual activities are financed through funds of international institutions (e.g. EU, GEF, bilaterally, or in other ways). Entities and BDBiH have their own budgets that help them realise the defined environmental action plans.</p> <p><b>Entities and BD BiH do not have continuous budgetary funds</b> in the field of environmental protection and thus for conservation of biodiversity neither.</p> <hr/> <p><b>FBiH:</b> Through the budget of FBiH, the FBiH Environmental Protection Fund, and other sources of funding at the level of FBiH, the amount invested in biodiversity projects is around BAM 2,052,739.02 / EUR 1,047,496.40</p>	

Strategic direction	Objective	Main activities	Progress assessment
	<p><b>Setting up efficient institutional framework</b></p>	<p><b>RS:</b> Through the budget of RS, Environmental Protection and Energy Efficiency Fund of RS, and other sources of funding at the level of RS, the amount invested in biodiversity projects is around BAM 19,540,780.08 / EUR 9,971,504.66</p> <hr/> <p>Project of setting up the <b>Regional Environmental Network for Accession - RENA</b> – IPA Multi-beneficiary 2009 – financed and implemented by the EU Directorate General for the Environment</p> <hr/> <p><b>Establishing/strengthening professional bodies for environmental protection:</b></p> <ul style="list-style-type: none"> <li>▪ Institute for protection of cultural, historical and natural heritage of RS</li> <li>▪ Foreseen establishing of the Institute for protection of nature FBiH (Official Gazette FBiH, No. 33/03, 66/13)</li> </ul> <hr/> <p>IPA project "<b>Strengthening of BiH's environmental institutions and preparation for pre-accession funds</b>"</p> <hr/> <p><b>National Capacity Self-Assessment - NCSA</b> of BiH with focus on strengthening of capacities in BiH for adequate management of priority environmental issues</p> <hr/> <p><b>Professional strengthening and expanding human capacities</b> for environmental protection through many projects</p>	
	<p><b>Cross-sectoral approach to nature management</b></p>	<p>Development and strengthening of biological and landscape diversity conservation activities through the Forestry sector, plans and programmes in forestry authorities;</p> <p>Development and strengthening of biological and landscape diversity conservation activities through the Sector of agriculture, the entity level rural development strategies;</p> <p>Development and strengthening of biological and landscape diversity conservation activities through the Sector of water management, implemented through strategies, plans and programmes of the Agencies for water districts;</p>	

Strategic direction	Objective	Main activities	Progress assessment
		Development and strengthening of biological and landscape diversity conservation activities through the Sector of spatial planning, enacted through the adopted RS Spatial Plan, and the adoption in FBiH is in progress.	
	<b>Exchange of scientific and technological information on biodiversity</b>	<b>Establishment of CHM</b> – Portal BiH with the Clearing House Mechanism - CHM	
	<b>Maintaining traditional knowledge and practices</b>		
<b>DECREASE OF PRESSURES ON BIODIVERSITY IN BIH</b>	<b>Control of habitats conversion</b>	<p>The established monitoring of habitats conversion does not exist</p> <p>Forest inventory in both entities is in final stage as well as planned development of <b>Forestry programmes</b></p>	

Strategic direction	Objective	Main activities	Progress assessment
	<p><b>Monitoring the effects of global climate change</b></p>	<p><b>Second national Communication of BiH</b> under the United Nations Framework Convention on Climate Change</p> <hr/> <p><b>Services for monitoring and control of emissions in RS established</b> – partly and still insufficiently for a high quality system of monitoring the emissions and development of register of pollutants</p> <hr/> <p>There are currently two strategic documents in the process of development in BiH:</p> <p><b>1. Low Carbon Development Strategy of BiH and</b>  <b>2. Climate Change Adaptation Strategy in BiH.</b></p> <hr/> <p>There has been a significant progress in monitoring and reporting on air quality such as the installation of <i>online</i> monitoring stations and regular reporting to European Environment Information and Observation Network (EIONET). However, in order to have a more complete general state of air quality in BiH it is necessary to collect and analyse more data from different stations throughout the country.</p>	
	<p><b>Control of invasive species in BiH</b></p>	<p>Action plan for informing the public about ambrosia, its elimination and combating the spread of ambrosia at the territory of the Federation BiH, 2009</p> <hr/> <p>Information on public awareness, eradication and combating the spread of ambrosia and ailanthus altissima at the territory of FBiH, 2011</p>	

Strategic direction	Objective	Main activities	Progress assessment
	<p><b>Raising public awareness</b></p>	<p>Innovation of curricula with the introduction of environmental education in all levels of education, implemented on faculties; ecological clubs in primary and secondary schools;</p> <p>Development of activities for promotion of the importance and value of biological and landscape diversity through the public sector, NGOs, media, and other agencies.</p>	

Moreover, in the course of development of the Fifth National Report, we prepared and sent out another questionnaire for obtaining information on the projects related to biodiversity for the period 2008-2014, in order to review and analyse the actions undertaken for assessment, conservation and improvement of the state of biodiversity in BiH. Based on the answers, as well as review of database of the major international funds and organisations, we have prepared a table with projects related to biodiversity for the reference period (2008-2014) in BiH.

It is important to note that the table shows projects whose objective or result was to conserve or improve the state of biodiversity, but the shown projects were not strictly related only to biodiversity but also other issues of natural resources and environmental protection.

The table gives an overview of projects with the following details: project title, duration of the project, source of funding, and the budget (value) of the project (EUR and BAM).

On the basis of the table of projects related to biodiversity (Annex 2), it is calculated that, in the reference period (2008-2014), the total amount of approximately **BAM 179,269,881.13 or EUR 91,479,994.51** was invested in the field of natural resources and environmental protection within the framework of 100 projects. The highest share was financed by the World Bank (BAM 58,964,286.34 / EUR 30,089,006.35), than by GEF with co-financers (BAM 32,345,627.79/ EUR 16,505,716.60), through funds of the European Union, i.e. European Commission and IPA funds (BAM 30,890,806.88 / EUR 15,763,333.06), United Nations Programmes, i.e. UNEP and UNDP (BAM 396,796.95 / EUR 202,482.33). In the reference period, the amount of approximately BAM 2,052,739.02 / EUR 1,047,496.40 was invested in implementation of projects from the FBiH budget, whereas the amount of BAM 19,540,780.08 / EUR 9,971,504.66 was invested from the RS budget.

#### **4 PROGRESS TOWARDS ACHIEVING THE AICHI BIODIVERSITY TARGETS (2020) AND RELEVANT MILLENNIUM DEVELOPMENT GOALS (2015) IN BOSNIA AND HERZEGOVINA**

The issue of development of the implementation process and progress achieved to date in principles related to UNCBD is of particular importance. Given the Strategic Plan for Biodiversity 2011-2020 with clearly defined Aichi Targets, as well as broader envisaged Millennium Development Goals, by analysing the implemented and planned activities at the national level in BiH, primarily with regard to NBSAP BiH (2015-2020), we have tried to identify whether any progress and to what extent was achieved in terms of advancing towards and implementation of the aforementioned strategic documents. Thereby, we found some progress as to advancing towards the given targets, but we cannot say it is on satisfactory level and there is still a lot of work ahead of BiH. Also, based on the efforts to date and engagement with regards to implementation of specific UNCBD activities, we established that special efforts should be focused on the models of setting up and developing

cooperation in this field between the entities, more efficient methods of adoption of documents in this field, as well as developing the network for monitoring the state of biodiversity in BiH.

#### 4.1 Progress towards the Strategic Plan and Aichi targets

Strategic Plan for Biodiversity 2011 – 2020 is a ten-year strategic framework which includes a joint vision, mission, strategic goals and ambitious, but achievable, sub-goals/Aichi targets. Strategic Plan is a fundamental document for mainstreaming the international and national activities in order to preserve biodiversity. Essentially, this is a flexible framework for establishing national targets and it promotes the coherent and effective implementation of the three UNCBD goals.

There are five global strategic goals identified within the Strategic Plan (A, B, C, D and E), and the Aichi targets (20 in total) were stated within them, that the countries/parties to the Convention want and need to achieve by 2020. National objectives are harmonised with strategic goals and Aichi targets. According to the mission of the Plan, it is necessary to take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human wellbeing and poverty eradication.

BiH has entered the process of revision of the old NBSAP (2008 – 2015) and development of the new NBSAP (2015 – 2020) in line with Strategic Plan in 2013. Through the development of the new NBSAP, a detailed analysis was conducted of the situation in BiH towards the Aichi targets for the purpose of setting national targets for BiH. Based on this analysis and all collected data we assessed progress of BiH in the implementation of the Strategic Plan. A table is prepared for this purpose (Table 18) showing the most important information and conclusions from the analysis of situation in BiH towards the Aichi targets as well as qualitative progress assessment by the experts.

According to this table, progress (last column) was marked with three different colours with the following meaning: red – no progress; orange – small progress; green – significant progress.

**Table 18:** Overview of BiH's progress in protection of biodiversity against Aichi targets

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
A		<p>By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.</p>	<p>Progress towards achieving this target reflects in active contribution to raising awareness on the importance of biodiversity. Various magazines and periodicals actively dealing with the issues of the environment and biodiversity significantly contribute to this (Fondeko svijet, Turizam BiH, Geografski list, etc.) as well as daily newspapers that periodically publish specific texts and inserts on these issues (Glas Srpske, Nezavisne novine, Oslobođenje, Dnevni avaz, etc.). Electronic media (RTRS, ATV, FTV, BHT, etc.) in their thematic programmes also speak about protection and conservation of biodiversity and the environment and different positive and negative impacts. There is also a certain number of internet websites (Turizam plus, Zeleni Neretva, Ekotim, Eko akcija, Bistro BiH, CHM – BiH portal with the Clearing House Mechanism, etc.) which exclusively deal with themes of promotion of biodiversity and the environment, as well as a significant number of NGOs (Centar za životnu sredinu, Cepres, Ekologika, Zeleni Neretva, Mladica, etc.). According to the updated REC data from 2006, there are over 120 NGOs in BiH, with over 85,000 members, having in their work and activity programmes the values of biodiversity, with emphasis on raising awareness and education on biodiversity. At the same time, the implementation of projects related to biodiversity significantly enhances the realisation of this target. In addition, websites of the relevant ministries and funds also publish texts on the values of biodiversity (FMoET, FBiH Environmental Protection Fund, RS Ministry of Trade and Tourism, RS Ministry of Agriculture, Forestry and Water Management, RS Ministry of Spatial Planning, Civil Engineering and Ecology, Federal Ministry of Agriculture, Forestry and Water Management, RS Environmental protection and Energy Efficiency Fund, etc.).</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
		<p>By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes, and are being incorporated into national accounting, as appropriate, and reporting systems.</p>	<p>In addition to legislation providing for the field of biodiversity (Law on Nature Protection, Official Gazette RS, No. 50/02; Law on Amendments to the Law on Nature Protection, Official Gazette RS, No. 34/08; Law on Environmental Protection, Official Gazette FBiH, No. 66/13; Law on Nature Protection, Official Gazette FBiH, No. 33/03; etc.), various strategies and action plans pertaining to individual areas have also been adopted. In RS, the new Law on Nature Protection has been adopted (Official Gazette RS, No. 20/14).</p> <p>BiH has adopted National Strategy and Action Plan for the Protection of Biological and Landscape Diversity (2008 - 2015). RS has adopted the Air Protection Strategy, Strategy of Nature Protection, whereas FBiH adopted the Strategy of Integrated Environmental Protection that comprises: Strategy of Nature Protection, Waste Management Strategy, Air Protection Strategy and Water Protection Strategy. In addition to the above, RS has a draft version of the Forestry Development Strategy RS 2011 - 2021. There are other adopted strategies that also encompass biodiversity protection to some extent.</p> <p>Integration of biodiversity is also present in Spatial Plans of FBiH and RS, as well as spatial plans of local communities. Overall, BiH has made significant progress towards this target.</p>	
		<p>By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimise or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.</p>	<p>The analysis against the third target indicates to the existence of significant incentives and subsidies that are planned and implemented through the entity budgets, for different economic activities (launching industrial production, use of renewable energy sources, incentives to exports, agricultural production, conservation of native seeds, seedlings and offspring, certification of organic farming, etc.) while there is neither a system in place for establishing the effects of the incentives nor their positive or negative impacts on biodiversity. Hence, from this aspect, it is difficult to talk about or express progress of BiH towards this target.</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
		<p>By 2020, at the latest, government, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.</p>	<p>Sustainable production and consumption in BiH, as well as keeping the resources within safe ecological limits, is the subject of various legal acts, strategies and plans. Over-exploitation of resources is one of the threats to biodiversity. In order to improve this process and achieve visible progress, it is necessary for all most important sectors related to production and consumption (agriculture, water management, forestry, energy, industry, etc.) to bring their plans for sustainable production and consumption.</p>	
B		<p>By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.</p>	<p>Progress of BiH towards this target primarily reflects in implementation of projects that aimed at identification and mapping of various types of habitats. Emerald Network is the project that aimed at identification of habitats in BiH, identification of species and types of habitats, creating a database in the Emerald software.</p> <p>Corine project aimed at updating the CORINE 2000 database, and at identifying changes that occurred in the period between the first inventory (Emerald Network) and 2006.</p> <p>Development of NATURA 2000 is ongoing and encompasses identification of the most important areas for each individual species and type of habitat listed in relevant supplements to the Directives. Percentage of the territory that the countries need to include in the network has not been prescribed – it follows at the end of the process of professional evaluation as a result of territorial overlapping of all areas identified for each individual species and type of habitat. In addition to present habitat conversion for different purposes, progress towards this target reflects in improvement of legal acts and obtaining the required permits and consents (environmental permits, environmental impact studies, consents, etc.).</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
		<p>By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse effects on threatened species and vulnerable ecosystems, and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.</p>	<p>Overall, partial progress of BiH with this regard reflects in legal acts adopted at the level of RS, FBiH and BD (Law on Fisheries, Official Gazette RS, No. 72/12; Law on Freshwater Fisheries, Official Gazette FBiH, No. 64/04; Law on Freshwater Fisheries, Official Gazette BD BiH, No. 35/05; Law on Amendments to the Law on Freshwater Fisheries, Official Gazette BD BiH, No. 19/07) providing for this field and prescribing creation and improvement of plans for management of fishing waters through programmes of fish stocks enhancement (fishery base) that contain and set out the activities in a specific period. It is also necessary to point out that there is a well developed network of Sport Fishing Associations, which comprise fish guard services.</p>	
		<p>By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.</p>	<p>Given the general status of the ecosystem, BiH has great potentials for development of organic farming and production of healthy food. According to data from 2009, organic farming land increased by 17%, but we need to emphasise that organic sector still covers a very small percentage (0.02%) of arable land, and that the size of organic farms is small. Organic farming in the period 2003-2007 recorded a sudden growth (State of the Environment Report of BiH, 2012).</p> <p>As for the sector of aquaculture, total production of fish for consumption in 2011 was 8.3% lower than in 2010. Production of carp was 32% lower, whereas the total production of trout exceeded the production in 2010 by 5%. Of total quantity of fish produced for consumption, carp accounted for 21.9%, trout 72.2%, while the other fish species accounted for 5.9%. The other fish species include: amur, grass carp, catfish, pike-perch, tench, sea-bass, gleadhead sea bream (State of the Environment Report of BiH, 2012).</p> <p>Data on forests and growing stocks in BiH vary depending on the source we use or we get data from. Forests and forestlands in FBiH spread at the surface of around 1,452,630.8 ha or 55.71 % of the total area of FBiH, of which 1,293,590.7 ha or 89.05% are state owned, whereas around 159,040.1 ha or 10.95% of the total surface of all forests and forestlands in FBiH are privately owned</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
			<p>or owned by other legal entities. Growing stock in FBiH is 165,714.380 m<sup>3</sup> or 197.37 m<sup>3</sup>/ha. The total annual growth is 4,396,944 m<sup>3</sup>/year, i.e., 5.7 m<sup>3</sup>/ha/year. According to data of the Cadastre of forests and forestlands in RS (status on 21 December 2011) the total growing stocks in RS amounted to 228,171,218 m<sup>3</sup>, i.e., 230 m<sup>3</sup>/ha. Annual growth amounted to 5,179,187 m<sup>3</sup>/yr of publically-owned forests, and 1,272,507 m<sup>3</sup>/yr of private forests (i.e., 7.17 m<sup>3</sup>/ha/yr of state forests and 4.71 m<sup>3</sup>/ha/yr of private forests) (State of the Environment Report of BiH, 2012).</p> <p>In addition to the aforementioned, progress in achieving this target can be observed through the existence of strategies of forestry development and forestry programmes, which treat conservation of biodiversity too, as well as strategies of agriculture development, and their implementation.</p>	
		<p>By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.</p>	<p>Environmental pollution is primarily observed in terms of water, air and soil pollution.</p> <p>As for the water protection, there has been some progress. According to the authorities of the Agency (the Sava River Watershed Agency (FBiH), the Adriatic Sea Basin Agency (FBiH), the Agency for the Sava River Basin District (RS) and the Agency for Waters of the Trebišnjica River District (RS)), carry out continuous monitoring of larger watercourses and accumulations in order to improve quality of water.</p> <p>Generally it can be said that water monitoring in BiH has made significant progress in the course of the past ten years and that it continues to develop and harmonise.</p> <p>Moreover, the Water Management Strategy 2010-2022 was adopted in FBiH as well as the Decree on Conditions for Discharging Wastewater into Natural Recipients and Public Sewer Systems (Official Gazette FBiH, No. 4, 2012). In RS, the adoption of the Strategy of Integrated water Management 2014-2024 is under way. The adoption of these strategies and enforcement of the Directives on waters in fact represent the initial steps towards conservation and sustainable use of water resources. Generally speaking, water quality of rivers covered by</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
			<p>monitoring is good against most of the monitoring parameters, with certain deviations. Some progress was achieved in number of connections to public sewage system and in ratio between treated and the total quantity of wastewater. There is no systematic monitoring of ground water unless it is used for water supply. Based on the results of analysis of ground water used for water supply, we can state that this water is of good quality.</p> <p>There has been some progress as for air quality too. RS has adopted the new Air Protection Law (Official Gazette RS, No. 124/11). In FBiH several Rulebooks were adopted on the methods of air quality monitoring, definition of types of pollutants, air quality standards, etc. Air quality monitoring covers only larger centres in BiH, hence it has to be extended. Progress in air quality monitoring also reflects in online monitoring stations installation and regular reporting to EIONET networks within the European Environment Agency. Laws on Environmental Protection in FBiH, RS and BD, Rulebook on method of air quality monitoring and definition of types of pollutants, limit values and other standards of air quality (Official gazette FBiH, No. 1/12) and Decrees on conditions for monitoring and values of air quality (Official Gazette RS, No. 124/12) have defined the methodology and procedures for performing air quality monitoring in compliance with the EU Directives.</p> <p>Soil in BiH is very heterogeneous. From the total surface, automorphic soils account for 86% and hydromorphic for 14%. According to bonity classification, there are four bonity classes in BiH that include 7 classes in total. Bonity class A comprises I, II and III class of high quality soils suitable for agricultural production (15.6 %). Class B comprises moderate quality soils that can be used for other purposes (22.03 %), whereas class C comprises soils for use in extensive agricultural production and outside sectors of agriculture and forestry. Class D comprises low quality soils that can be used for different purposes with strict limitations. There are many pressures on soil, starting with land use change, through erosions, landslides, exploitation of</p>	

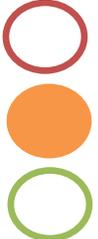
Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
			resources, construction of buildings, to landmines, etc. As for soil monitoring, there is no continuous analysis, so it is difficult to talk about progress.	
		<p>By 2020, invasive alien species and pathways are identified and prioritised, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.</p>	<p>The issue of invasive species has been provided for under different legal and by-legal acts (at the entity level – Law On Nature protection, Official Gazette RS, No. 50/02; Law on Amendments to the Law on Nature Protection, Official Gazette RS, No. 34/08; Law on Environmental Protection, Official Gazette FBiH, No. 66/13; Law on Nature Protection, Official Gazette FBiH, No. 33/03; etc.). List of existing invasive species and data on distribution and population size of these species are fragmented and produced as results of various studies. Invasive species can be met in almost all biological categories, but most data refer to invasive species of plants and animals.</p> <p>Progress of BiH towards this target is partial since the lists of present invasive species have not been set up, but there are relevant decisions and action plans providing for monitoring, control and reduction of negative effects of some of these species, primarily those that exert harmful effects on human health (e.g. Decision on measures to combat the spreading and elimination of the weed plant species <i>Ambrosia artemisifolia</i> L-ambrosia - ragweed (Official Gazette FBiH, No. 89/11), Decision on measures to combat and eradicate the weed plant species ambrosia (Official Gazette RS, No. 81/07). Progress is reflecting in various programmes and actions at the local level that focus on prevention of ambrosia spreading.</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
		<p>By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintain their integrity and functioning.</p>	<p>According to the First BiH Report to the UNCBD (2009) the ecosystems which are highly sensitive to climate change have been identified: high mountainous landscapes (with dominant ecosystems of juniper pinewood, ecosystems of sub-mountain Bosnian pine; ecosystems of mountain grassland on alkaline and acid soils, ecosystems around snow patches on alkaline and acid soils; ecosystems of mountain screes, and ecosystems of carbonate and silicate rock crevices); mountainous landscapes (with dominant ecosystems of mixed broadleaved-conifer forests with beech, fir and spruce; ecosystems of fir and spruce; ecosystems of Pancic Serbian spruce; ecosystems of temperate humid meadows; ecosystems of high and low screes; ecosystems of mountain springs and streams), refugio-relict landscapes (with dominant ecosystems in canyons and cliffs of Bosnian and Herzegovinian rivers. These are very diverse and endemic ecosystems in crevices of limestone, dolomite and silicate and ultrabasic rocks as well as different types of geological surface: ecosystems of screes, ecosystems of sub-Mediterranean and continental rocky grassland, ecosystems of xerophilous meadows, ecosystems of light conifer forests, ecosystems of Bosnian pine, ecosystems of Illyrian black pine, ecosystems of thermophilous broadleaved – conifer forests and bushes, ecosystems of mesophilous and hygrophilous polydominant forest communities, ecosystems of beech forests in canyons and cliffs, ecosystems of alder forests, ecosystem of relict Dinaric forests of fir, ecosystems of thermal springs around semi-shady habitats, and many other).</p> <p>In addition to climate change, these ecosystems are, at the same time, exposed to various pressures (construction of infrastructure facilities) arising from the activities of the sectors dealing with natural resources (energy, agriculture, water management, etc.), which cause changes in the ecosystems.</p> <p>In order to achieve this target, we need to set up adequate mechanisms for protection of the identified vulnerable ecosystems and adjust our activities accordingly. As for this</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
			target, we cannot talk about any progress in BiH.	
C		By 2020, at least 17% of terrestrial and inland water and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	Although the percentage of the territory under some regime of protection is considerably smaller compared to the European and regional level, we need to point out that there is some progress towards this target, which in addition to the existing protected areas also reflects in designation of new ones and placing them under some protection regime (Strict Nature Reserve "Janj", Strict Nature Reserve "Lom" and Special Nature Reserve "Gromiželj" (under previous protection regime), Nature Reserve "Lisina" (previous protection), Monuments of Nature (Pećina Ljubačevo, Žuta Bukva, Pećina Orlovača, Pećina Rastuša, Jama Dedana, Vaganska pećina, Pećina Đatlo and Pavlova pećina) and the decision on protection of the Area for Resources Management "University City" (Official Gazette RS, No. 53/12).	
		By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	Progress of BiH toward this strategic target primarily reflects in adoption of Red Lists. Red List of protected species of flora and fauna of RS (Official Gazette RS, No. 124/2012) contains: list of vascular flora, list of birds, list of fish species, list of mammals, list of amphibians and list of subkingdom of metazoa. As to the FBiH, there are adopted Red Lists of threatened plants, animal and fungi in FBiH. These lists comprise plant species, mammals, birds, reptiles, amphibians, fish and cyclostomes with overview of their belonging to relevant categories. Red List also contain overview of species of the order <i>Ephemeroptera</i> , <i>Odonata</i> , <i>Plecoptera</i> and <i>Trichoptera</i> , overview of diurnal butterflies - <i>Lepidoptera</i> , <i>Carabidae</i> , and <i>Trogidae</i> of FBiH from the orders <i>Amphipoda</i> , <i>Decapoda</i> , <i>Opiliones</i> , <i>Pseudoscorpionida</i> . The List also comprises the threatened species of fungi in FBiH through categories.	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
		<p>By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.</p>	<p>Some progress achieved in terms of conservation of genetic diversity primarily reflects in introduction of these issues in various documents on agriculture development. Thus the Medium-Term Agricultural Sector Strategy for the Federation of BiH (2006-2010) states genetic resources and plant growing as well as threats to disappearance of the autochthonous genotypes, the absence of the state level programme and legislation providing for this issue, insufficient awareness on the problem of conservation of genetic resources and lack of staff for work with the bank of genetic resources. Draft of the Medium-Term Agricultural Sector Strategy for the period 2014-2018 is currently being prepared.</p> <p>In RS, there is Strategic Plan for Rural Development 2009-2015, which includes among strategic objectives 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.). It is stated in this Strategic Plan that the RS Government has allocated funds for the purpose of conservation of plant genetic resources as of 2005, that the Working Group has been established for development of programme for conservation of plant genetic resources, and that the programme draft has been prepared. Progress towards this Aichi target also reflects in forming of botanical gardens. A botanical garden was established in the Campus of the University of Banja Luka, whereas a botanical garden was also opened in the Campus of the Biotechnical Faculty of the University of Bihać. The establishment of the gene banks also makes an important step towards conservation of genetic diversity. Gene bank was established at the Faculty of Agriculture and Food Sciences of the University of Sarajevo.</p> <p>Progress in this field can also be seen in establishment of the Genetic Resources Institute as well as Programme for Conservation of Plant Genetic Resources of RS (Report on Implementation of the Programme for Conservation of Plant</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
			Genetic Resources of Republika Srpska in the period 2009 - 2011, 2012).	
D		By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and wellbeing, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	<p>In accordance with the available data, the supply services (food, fuel, genetic resources, drinking water, natural medicines, etc.) show a positive trend in the current state, whereas at the same time the other types of services show stagnation or negative trends. It is necessary to emphasise that, as opposed to many countries in this region of the world, the highest proportion of the forest ecosystems in BiH still has a primary, natural structure, while a high percentage (around 52%) of soils is suitable for agricultural production.</p> <p>In order to achieve strategic target D, it is necessary to identify the ecosystems whose functioning is of essential importance for the BiH population.</p>	
		By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	<p>Degraded ecosystems in BiH are mostly found in industrial and urban zones. High level of degradation occurred during the previous century in mining zones of BiH, namely through surface and pit exploitation of coal. By arrival of plant and animal species and realisation of biological interactions, this is where the typical wetland ecosystems are slowly being set up. Process of progradation is going on spontaneously, hence on the older lakes there are already some evolved stages present. The examples of coal pit lakes are characteristic for the areas around Ljubija, Tuzla, Kakanj, Vareš and other towns where the mining industry used to be or still is developed. Some of the lakes are over 50 years old, whereas the latest ones occurred in the course of the past decade.</p> <p>The occurrence of these anthropogenic wetland habitats presents the opposite process to the trend of disappearing marshes and wetlands in the world (Barudanović &amp; Kamberović, 2013). However, the natural process of the wetland ecosystems establishment on the coal pit lakes is going on very slowly.</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
		<p>By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilisation is in force and operational, consistent with national legislation.</p>	<p>It is necessary to emphasise that currently there is no sufficient control of the use and exports of various products resulting from the utilisation of domestic genetic resources in BiH. There is also neither sufficient control of the use and exports of medicinal herbs, vitis and aromatic species, nor other ecosystem goods that BiH takes the sovereign rights to. The process of ratification of the Nagoya Protocol in BiH is under way.</p>	
E		<p>By 2015, each party has developed, adopted a policy document, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.</p>	<p>The updated NBSAP provides quite a detailed overview of the state of biodiversity, which is of great regional and global importance. NBSAP is a useful document and it presents a dynamic process of planning and decision making, provides instructions for easier acquiring and adopting knowledge in the education system, and strengthens and raises public awareness on the importance of biodiversity. In addition to being conceived so as to integrate all sectors at the local level through the given actions that can meet own developmental, economic and political interests, is also achieves functional links with the international bodies, which is of particular interest for BiH. The BiH NBSAP updating is in progress.</p>	
		<p>By 2020, traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.</p>	<p>Sustainable use of biodiversity components in BiH is very well grounded in traditional knowledge and practices. This knowledge is characterised by diversity in use of natural goods on the one hand and their moderate consumption on the other hand, which serves as a basis for production of healthy food and sustainable use of biological resources with simultaneous conservation of the autochthonous gene pool. One of the good old practices in BiH is fruit growing and methods of fruit processing and preservation. Trees of apples, plums, pears, sweet and sour cherries, quinces and other fruits are part of almost every garden in rural and sub-urban areas of BiH. Moreover, a lot of fragmented agricultural holdings outside rural settlements are under fruit plantations. Apart from fruit growing, there are also other agricultural branches rooted in traditional knowledge with the accent on</p>	

Strategic Goal	Aichi target	Aichi target	Situation analysis	Progress assessment
			healthy food production, which represent some progress towards this target.	
		By 2020, knowledge, the science base and technologies related to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	<p>In the course of the past several years BiH has implemented several projects related to education on the values of ecology and environmental protection, but this number is not sufficient to create positive changes. Projects do not include educational programmes on biodiversity values.</p> <p>There has been progress in BiH as for the environmental education by the inclusion of themes related to this field in preschool and school curricula pursuant to several laws.</p> <p>Raising awareness of the importance of protection and preservation of the environment are the aspects contained in curricula of preschool institutions, as well as inclusion of children in the activities of biodiversity protection. There are also many faculties in BiH that offer study programmes of ecology and environmental protection or courses with similar titles, which enable significant expansion and application of knowledge on biodiversity and the environment. Some of these faculties also organise postgraduate studies in these very fields.</p>	
		By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	<p>In order to achieve the Aichi target 20, it is necessary to implement activities and set up a system of monitoring financial flows aiming at biodiversity conservation in BiH, funded by the state institutions, private entrepreneurship, foreign investments and international donors, as well as financial resources from different global funds dealing with these issues.</p> <p>Some resources received from international and domestic funds assisted in biodiversity conservation.</p>	

## 4.2 Progress towards Relevant Millennium Development Goals

The Millennium Declaration was adopted by 189 United Nations Member States in September 2000 as an important moment in terms of global cooperation in the 21<sup>st</sup> century. The Millennium Declaration puts a strict focus on the international agenda for the new millennium – both in terms of human development and in terms of human rights. The commitment to the promotion of human development and protection of human rights resulted in agreement of the UN member states on eight measurable and time-bound goals – the Millennium Development Goals (2015):

1. Eradicate extreme poverty and hunger;
2. Achieve universal primary education;
3. Promote gender equality and empower women;
4. Reduce child mortality;
5. Improve maternal health;
6. Combat HIV/AIDS and tuberculosis;
7. Ensure environmental sustainability;
8. Develop a global partnership for development.

As particularly significant and the most relevant with respect to conservation of biodiversity is the goal 7, i.e. "Ensure environmental sustainability". The environmental issues covered by the Millennium Development Goals are very heterogeneous and complex – legislative and institutional framework in the field of the environment, forest land cover, climate change, biodiversity and protected areas, waste management, environmental quality monitoring, access to and use of drinking water, demining, etc.

However, with the goal to determine progress of BiH in terms of UNCBD implementation – exclusively against the relevant Millennium Goals, we hereby provide progress analysis only in terms of valorisation and conservation of biodiversity in BiH.

As a particular problem in valorisation and protection of biodiversity values in BiH stated in the "Progress towards the Realisation of Millennium Development Goals, 2013", we highlight the following:

- Lack of comprehensive data on the state of biodiversity in BiH;
- Insufficient surface of protected areas;
- Inadequate management of protected areas;
- Absence of the network of scientifically based monitoring of protected areas;
- Lack of financial resources.

Within the defined tasks and objectives of this Report, we highlight, for instance, the percentage of land areas protected for the purpose of biodiversity conservation. Starting from the baseline (data for 2000/2001) when protected areas accounted for 0.5% of the BiH territory, in 2007 this percentage amounted to 0.8%, data from 2009 present that protected areas in BiH accounted for less than 2%, whereas data from 2012 state that percentage of protected areas in 2010 was 0.6%, and in 2011 2% (Table 19) (Progress towards the Realisation of Millennium Development Goals in BiH, 2013). These

data indicate that BiH is far below the European standards (around 25% in the EU countries) in terms of protected areas and that progress achieved in this regard in the period of some 15 years is insufficient.

**Table 19:** Surface of protected areas in BiH in the period 2000-2011

Year	Surface of protected areas (in %)
2000/2001	0.5
2007	0.8
2009	> 2
2010	0.6
2011	2

Source: *Progress towards the Realisation of Millennium Development Goals in BiH, 2013*

Analysing national targets formulated in line with the Aichi targets and presented in the BiH Strategic Plan for Biodiversity 2011 -2020, we have established that their realisation will undoubtedly contribute to achieving relevant Millennium Goals as well.

Thereby, the issues highlighted in the Aichi target 11 (By 2020, at least 17 % of terrestrial and inland water and 10 % of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes) should be implemented at national level through the national target 12 (*By 2018, specific biodiversity of BiH, primarily the canyon, mountainous, high-mountainous and wetlands ecosystems, karst fields and other areas of importance for biodiversity, including the alluvial plains previously planned for protection, are mapped and urgently protected in compliance with the effective spatial regulation documents*).

Undertaking activities in order to implement this target would protect the most vulnerable and in terms of biodiversity most valuable natural ecosystems in BiH.

Bearing in mind broader framework of this national target, it is noticeable that in recent years the activities related to proclamation of the new protected areas have intensified; thereby their surface has increased as well. Moreover, they categorisation has been partially harmonised with the IUCN categories and classification of protected areas. The principles of these categories have been either transposed into national legislation or in the adoption phase. On the other hand, the very process that results in proclaiming a specific area protected, as being under the authority of a large number of institutions and bodies both in FBiH and RS, is very complicated and slow (Law on Nature Protection of FBiH (Official Gazette FBiH, No. 33/03); Law on Nature Protection of RS (Official Gazette RS, No. 113/08) and the Law on Nature Protection of BD BiH (Official Gazette of BD BiH, No. 24/04, 1/05, 19/07 and 9/09)). One should point out that mere proclamation of some area as protected is not enough by itself. There has not been recorded any significant progress in BiH as to the models of management, monitoring and financing of the protected areas, so that even the existing protected areas do not fully implement the protection programme.

Furthermore, conservation of ecosystem services and traditional knowledge and practices will play its role in poverty and hunger reduction (new jobs, source and production of healthy food) as foreseen through the implementation of the national target 20 (*By 2020, centres for safeguarding and implementation of traditional knowledge and practices, especially in the rural areas of interest, established*), whereas involvement of the general public, particularly local communities and population, through education on importance of biodiversity protection, will undoubtedly contribute to improvements in education and gender equality. This segment should be achieved through the national target 1 (*By 2020, role of NGOs, media, academic, scientific and professional institutions enhanced, and number of projects for implementation of the Convention increased*) and the national target 21 (*By 2017, Strategy for Communication, Education, Participation and Public Awareness on Biodiversity (CEPA) in BiH adopted*).

UNCBD progress in BiH in terms of reinforcing global cooperation for development reflects in implementation of international documents, project activities, use of foreign financial and other capacities with the view of protecting the biological diversity, etc., that the progress in the national target 18 will particularly contribute to (*By 2015, legislation developed and conditions for ratification and implementation of the Nagoya Protocol established*) as well as the national target 22 (*By 2020, the Strategy for Mobilisation of Financial Resources prepared and implemented at all relevant levels*).

#### 4.3 Lessons Learned in the Process of Implementing the United Nations Convention on Biological Diversity

As was presented in the Final Report for the NBSAP BiH project 2008 – 2015, the following was observed at the end of the consultation process:

- Based on the active role of the Biodiversity Expert Team in the development of NBSAP 2008-2015 and on the increase in the number of scientific conferences, symposia and colloquia on conservation and sustainable utilization of biological diversity of BiH over the past period, it may be stated that there are good scientific capacities and potentials in BiH for the implementation of UNCBD objectives;
- On the other hand, technical and institutional capacities for sustainable and integrated management of biodiversity are not adequately developed. In BiH, spans of responsibility in biodiversity management have not been adequately developed yet, and this is affected to a large extent by the country's administrative complexity.

The main problems that have arisen as a result of inadequate position of the issue of biodiversity in decision making at different levels and in different sectors are:

- Extremely lengthy procedure of adoption of the NBSAP. After preparation of the NBSAP BiH 2008-2015, the adoption procedure and issuance of political decision lasted for as long as by mid-2011. However, it is also necessary to emphasise that only compliance with the adoption procedure can ensure credibility of the NBSAP at the state level;

- Implementation of NBSAP after a political decision on the adoption of the document. Given the entity level responsibility for the environmental issues in BiH, as defined by the Dayton Constitution, after the adoption of the NBSAP BiH 2008-2015, the joint action plan has not been implemented. Nevertheless, we need to point out that certain actions, such as preparation of Red Lists and projects of setting up new protected areas, have been implemented at the entity levels.

Lessons learned and recommendations that follow from the above:

1. Given the pressures arising from the economy in transition, it is necessary to explore models of prioritizing the conservation and sustainable use of nature in the decision making process. The process should encompass finding a model of shortened procedure for adoption of documents in this field at the level of the state and the entity levels;
2. It is necessary to explore models of establishing and developing cooperation in this field between the entities, as well as among lower administrative units within the BiH entities;
3. Given the need to provide a single respond to international commitments on the one hand, and the state of data on biodiversity in BiH on the other, the concept of the new NBSAP should primarily fulfil the basic needs for monitoring the state of nature, starting with the inventories of flora, fauna, fungi and habitat types in BiH.

## 5 REFERENCES

- Barudanović, S., Mašić, E., Kamberović, J. (2013). Kopovska jezera - čuvari močvarnog biodiverziteta. *Fondeko svijet*, 37.
- Cardinale, B.J., Duffy, Gonzales, J.E., Hooper, A., Perrings, D.U., Venall, C., Narwani, P., Mace, A.G.M., Tilman, D., Wardle, D.A., Kinzig, A.P., Daily, G.C., Grace, J.B., Larigauderie, A., Srivastava, D.S., Naeem, Sh. (2012). Biodiversity loss and its impact on humanity. *Nature*, 486, 59–67.
- Chapman, A. D. (2009). Numbers of Living Species in Australia and the World, Report for the Australian Biological Resources Study (2<sup>nd</sup> edition). Canberra, Australia.
- eKapija. (2013). Sektor ljekovitog bilja i šumskih plodova BiH očekuje rast izvoza do 70 %. (Retrieved from the website: <http://ekapija.ba/bs/Vijest/vijesti/sektor-ljekovitog-bilja-i-sumskih-plodova-bih-ocekuje-rast-izvoza-do-70/32704>).
- Federal Ministry of Environment and Tourism. (2008). National Biodiversity Strategy and Action Plan – NBSAP BiH, 2008-2015. Sarajevo, BiH.
- Federal Ministry of Environment and Tourism. (2009). First National Report to the UNCBD Bosnia and Herzegovina. Sarajevo, BiH: Buybook.
- Federal Ministry of Environment and Tourism. (2010). Fourth National Report to the UNCBD Bosnia and Herzegovina. Sarajevo, BiH.
- International Union for Conservation of Nature. (2010). IUCN Red List of Threatened Species. Summary Statistics for Globally Threatened Species.
- Institute for Genetic Resources University of Banja Luka. (2012). Report on Implementation of the Programme for Conservation of Plant Genetic Resources of Republika Srpska in the period 2009 - 2011. Banja Luka, BiH.
- World Wide Fund for Nature. (2014). Hutovo Blato jedan od najproduktivnijih ekosustava u Bosni i Hercegovini. (Retrieved from the website: <http://wwf.panda.org/?208893/Hutovo-blato-jedan-od-najproduktivnijih-ekosistema-u-Bosni-i-Hercegovini>).
- World Wide Fund for Nature. (2014). Livanjsko polje. (Retrieved from the website: [http://wwf.panda.org/bs/slatkovodni/livanjsko\\_polje/](http://wwf.panda.org/bs/slatkovodni/livanjsko_polje/)).
- World Wide Fund for Nature. (2014). Neretva & Trebišnjica. (Retrieved from the website: [http://wwf.panda.org/bs/slatkovodni/neretva\\_trebnjica/](http://wwf.panda.org/bs/slatkovodni/neretva_trebnjica/)).
- World Wide Fund for Nature. (2014). Partnerstvo za UNESCO prekogranični rezervat biosfere Drina. (Retrieved from the website: <http://wwf.panda.org/sr/vesti/?202842/Partnerstvo-za-UNESCO-prekograncni-rezervat-biosfere-Drina>).
- Ministry of Foreign Trade and Economic Relations, United Nations Environment Programme. (2012). BiH in the process RIO +20, BiH Report for the UN Conference on Sustainable Development (UNCSD). Sarajevo, BiH.
- Ministry of Finance and Treasury, Team of UN in BiH. (2013). Progress towards the Realisation of Millennium Development Goals in BiH. Sarajevo, BiH.
- Ministry of Physical Planning and Environmental Protection FBiH. (2007). Information on Protected Natural Areas of the Sarajevo Canton. Sarajevo, BiH.

- Ministry of Spatial Planning, Civil Engineering and Ecology of RS. (2009). First National Communication of Bosnia and Herzegovina under the United Nations Framework Convention on Climate Change. Banja Luka, BiH.
- Ministry of Foreign Trade and Economic Relations of BiH. (2012). State of the Environment Report of Bosnia and Herzegovina. Sarajevo, BiH.
- United Nations Environment Programme. (2012). National Capacity Self – Assessment in the Implementation of Multilateral Environmental Agreements - NCSA BIH, Report and Action Plan. Sarajevo, BiH.
- United Nations Development Programme. (2013). Second National Communication of Bosnia and Herzegovina under the UN Framework Convention on Climate Change. Sarajevo, BiH.
- Redzic, S. (2007). Syntaxonomic diversity as an indicator of ecological diversity – case study Vranica Mt in the Central Bosnia. *Biologia*, 62 (2); 173 – 184.
- Redzic, S. (2011). Phytogeographic and syntaxonomic diversity of high mountain vegetation in Dinaric Alps (Western Balkan, SE Europe). *Journal of Mountain Science*, 8 (6); 767 – 786.
- Secretariat of the Convention on Biological Diversity. (2010). Global Biodiversity Outlook 3. Montréal; 94 pages. ISBN-92-9225-220-8.
- Secretariat of the Convention on Biological Diversity. (2011). NBSAP training modules version 2.1 – Module 3. Mainstreaming biodiversity into national sectoral and cross-sectoral strategies, policies, plans and programs. Montreal, Canada.
- Secretariat of the Convention on Biological Diversity. (2014). Message of the Executive Secretary of UNCBD on the occasion of World Wetlands Day.
- Udruženje "GEA" – Centar za istraživanja i studije. (2012). A Guide for Cultivation of Medicinal and Aromatic Plants. Banja Luka, BiH.
- United Nations Convention on Biological Diversity. (2010). A Good Practice Guide: Ecosystem Goods and Services in Development Planning. ISBN: 92-9225-282-8.
- Council of Ministries BiH. (2011). Risk Assessment of Bosnia and Herzegovina regarding Natural and other Disasters. Sarajevo, BiH.
- Council of Ministries BiH. (2012). Odgovori na listu pitanja EU – Poglavlje 27 Okoliš. Sarajevo, BiH.
- World Resources Institute. (2005). Millennium Ecosystem Assessment. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC.

## 6 ANNEXES

### 6.1 Annex 1 – Information Related to Preparation of the Fifth National Report

Contracting Party	Bosnia and Herzegovina (BiH)
<b>NATIONAL FOCAL POINT</b>	
Full name of the institution	Federal Ministry of Environment and Tourism (FMoET)
Name and position of contact person	Mehmed Cero, MSc., Assistant Minister in the Environment Sector
Address	Marka Marulića 2, 71000 Sarajevo
Telephone	+387 33 726 700
Fax	+387 33 726 747
E-mail	<a href="mailto:mehmedc@fmoit.gov.ba">mehmedc@fmoit.gov.ba</a>
<b>CONTACT OF THE ORGANISATION FOR THE FIFTH NATIONAL REPORT (IF DIFFERENT FROM ABOVE)</b>	
Full name of the organisation	CENER 21 – Association for Energy, Environment and Resources
Address	Nova 24
Telephone	+387 33 279 113
Fax	+387 33 279 108
E - mail	<a href="mailto:info@cener21.ba">info@cener21.ba</a>
<b>DATE OF SUBMISSION</b>	<b>May, 2014</b>

The Fifth National report was prepared within the Project "Support to Bosnia and Herzegovina for Revision of the National Biodiversity Strategy and Action Plan (NBSAP) and Development of the Fifth National Report to the Convention on Biological Diversity (UNCBD)" funded by the Global Environmental Facility (GEF), and implemented by the United Nations Environment Programme (UNEP). The main project partners are the Ministry of Spatial Planning, Civil Engineering and Ecology of RS and the Federal Ministry of Environment and Tourism.

The project has been implemented over the period from January 2013 to December 2014. The Report has been prepared in compliance with Article 26 of the Convention and Decision X/10 of the Conference of the Parties, based on the guidelines provided by the Secretariat of the Convention.

The purpose of the Report that the Parties are required to submit to the Convention, is to review the level of progress achieved from the Fourth National Report.

The Fifth National Report has a clearly set structure with the following parts established by the Secretariat of the Convention:

Part 1 – Introductory information

Part 2 – An update on biodiversity status, trends, and threats and implications for human wellbeing in Bosnia and Herzegovina

Part 3 – The National Strategy and Action Plan, its implementation and the mainstreaming of biodiversity in Bosnia and Herzegovina

Part 4 - Progress towards the Aichi Biodiversity targets (2020) and relevant Millennium Development Goals (2015) in Bosnia and Herzegovina

Annex I - Information related to preparation of the Fifth National Report

Annex II - Projects relevant for biological diversity implemented in the period 2008-2014

Report was prepared by the project Team comprising, *inter alia*, the external experts: Senka Barudanović, Stjepan Matić, Radoslav Dekić and Dragojla Golub.

As a basis for the Fifth National Report to UNCBD, we used various publications, reports and strategic documents, as well as scientific references and information obtained from different institutions and organisations relevant for the environment in BiH.

## 6.2 Annex 2 – List of Projects Relevant for Biological Diversity in the Period 2008 – 2014

No.	Project title	Project duration	Source of financing	Project value (EUR)	Project value (BAM)
1.	Monitoring of transposition and implementation of the EU environmental <i>acquis</i> - Phase 3 (continuation of project RENA), than the project ECRAN	2014 – n/a	IPA Fund / European Commission (EC)	5,003,009.89	9,784,881.46
2.	Project Sustainable forests and landscape management in BiH	2014 - n/a	World bank (WB)	4,027,490.85	7,876,962.36
3.	Project Sustainable forest and landscape management for Republika Srpska	2014 - 2018	GEF / WB	3,037,893.65	5,941,509.20
4.	IPA 2012 - Further strengthening of capacities of phytosanitary sector in the fields of plant protection products, plant health and seeds and seedlings, including phytosanitary laboratories and phytosanitary inspections	2014 - 2016	IPA Fund / EC	1,500,351.83	2,934,386.52
5.	Strengthening environmental institutions in BiH and preparation for pre-accession funds	2013 - 2014	EC	959,073.23	1,875,754.41
6.	Towards strengthened conservation planning in South-Eastern Europe	2013 - 2016	MAVA Foundation	500,000 – 1,000,000	978,542.94 - 1,957,085.89
7.	IPA 2009 - Twinning light project Support to laboratory networks of phytosanitary services	2013 – 2014 (6 months)	IPA Fund / EC	250,058.64	489,064.42
8.	Support to Bosnia and Herzegovina for Revision of the National Biodiversity Strategy and Action Plan (NBSAP) and Development of the Fifth National Report to the Convention on Biological Diversity (UNCBD)	2013 – 2014 (24 months)	GEF / UNEP	158,335.29	309,672
9.	Support to Bosnia and Herzegovina for Development of National Action Programmes aligned to the UNCCD 10-Year Strategy and Reporting Process under UNCCD	2013 - 2014	GEF / UNEP	102,715.78	200,891.41
10.	Support to implementation of the Birds and Habitats Directives in BiH	2012 - 2014	Government of the Kingdom of Sweden EU Delegation in BiH	1,500,023.82	2,933,745.00
11.	National capacity Self-Assessment (NCSA) of BiH	2012 - 2013 (6 months)	UNEP	185,564.06	362,926.00
12.	Development of baseline ecological assessments of NP Una and Nature Park Blidinje	2012 - 2013 (10 months)	GEF / WB	68,161.40	133,310.00

No.	Project title	Project duration	Source of financing	Project value (EUR)	Project value (BAM)
13.	Revitalisation of dendroflora of the University campus of Mostar	2012 - 2013	Environmental Protection Fund FBiH	51,130.00	100,000.00
14.	Protection of water by planting ambient plant species in the North-Eastern part of Mostar municipality	2012 (10 months)	Environmental Protection Fund FBiH	35,791.00	70,000.00
15.	Wilderness and the life of wild animals in the NP Una	2012 - 2013	Environmental Protection Fund FBiH	35,791.00	70,000.00
16.	Sustainable use and protection of medicinal herbs and fungi resources	2012 (3 months)	Environmental Protection Fund FBiH	25,565.00	50,000.00
17.	Strengthening research capacities and protection of collections of natural science department	2012 - 2013	Environmental Protection Fund FBiH	25,565.00	50,000.00
18.	Reforestation of barren land in the section 36b and 37c GJ Prača and the section 81b G2.2 - 47	2012 - 2013	Environmental Protection Fund FBiH	25,565.00	50,000.00
19.	Development of draft measures for remediation of burnt areas of forests 2.2 - 39	2012 - 2013 (8 months)	Environmental Protection Fund FBiH	20,452.00	40,000.00
20.	Revitalisation of autochthonous plant population on the slopes of the old town of Blagaj	2012 - 2013 (6 months)	Environmental Protection Fund FBiH	17,895.50	35,000.00
21.	Revitalisation of autochthonous plant population on the slopes of the old town of Blagaj	2012 (4 months)	Environmental Protection Fund FBiH	17,895.50	35,000.00
22.	Revitalisation of Bosnian pine in the area of Ruište	2012 - 2013	Environmental Protection Fund FBiH	12,782.50	25,000.00
23.	Initial assessment of genetic diversity of salmonid fish in order to protect autochthonous ichtiofauna in the river Neretva and its tributaries	2012 (6 months)	Environmental Protection Fund FBiH	10,226.00	20,000.00
24.	Planting new and revitalising the existing dendroflora on public green surfaces in Široki Brijeg	2012-2013 (6 months)	Environmental Protection Fund FBiH	10,226.00	20,000.00
25.	Monitoring of forest phytocoenosis of the nature park Skakavac and monitoring of non-forest phytocoenosis of the nature park Vrelo Bosne	2012 - 2013	Sarajevo Canton	10,226.00	20,000.00

No.	Project title	Project duration	Source of financing	Project value (EUR)	Project value (BAM)
26.	Training on practical implementation of the Aarhus Convention	2012 – 2013	UNDP	9,944.79	19,450.00
27.	Detection, characterisation and conservation of the new forms of biodiversity in BiH: Case study of the genus SORBUS	2012 - 2013	Environmental Protection Fund FBiH	9,203.40	18,000.00
28.	Organisation of meetings to raise awareness on biodiversity and land degradation	2012 (1 month)	UNEP	7,373.43	14,420.95
29.	Maintaining the parent stock of the most threatened autochthonous breeds of domesticated animals in BiH	2012 (5 months)	Environmental Protection Fund FBiH	5,113.00	10,000.00
30.	Vulnerability assessment of the BiH endemic species <i>Moltkia petraea</i> by application of molecular-genetic markers	2012- 2013 (7 months)	Environmental Protection Fund FBiH	5,113.00	10,000.00
31.	Everything you throw in the river today, you will drink from the tap tomorrow	2012 (6 months)	Environmental Protection Fund FBiH	5,113.00	10,000.00
32.	Protection of autochthonous species and varieties of fruits from disappearance	2012 - 2013	Environmental Protection Fund FBiH	5,113.00	10,000.00
33.	Preservation and studying agro-biodiversity in vine and some mediterranean fruit species	2012 - 2013	Environmental Protection Fund FBiH	5,113.00	10,000.00
34.	Current state and needs for protection of the cave type sites of endemic stygobiont species in BiH	2012- 2013	Environmental Protection Fund FBiH	5,113.00	10,000.00
35.	Growth limits of the city of Sarajevo and the region by 2025 – ecological aspects	2012 - 2013	Environmental Protection Fund FBiH	5,113.00	10,000.00
36.	Control of the contents of heavy metals in water and fish species in the river Una 2-173	2012 - 2013	Environmental Protection Fund FBiH	5,113.00	10,000.00
37.	Proposal for protection of the monument of nature "Pavlova pećina (cave)" as a natural asset of great importance	2012 – 2013	Budget of Republika Srpska	5,113.00	10,000.00
38.	Identification of sites of importance for protection of threatened species of <i>Odonata</i> (dragonfly)	2012 - 2013	Environmental Protection Fund FBiH	4,090.40	8,000.00
39.	Development of inventory methods for assessment of species, structural and spatial diversity	2012 - 2013	Environmental Protection Fund FBiH	4,090.40	8,000.00
40.	"Video and photo-documenting the state of the Neum aquatorium"	2012 (2 months)	Environmental Protection Fund FBiH	3,067.80	6,000.00

No.	Project title	Project duration	Source of financing	Project value (EUR)	Project value (BAM)
41.	Second International biological camp Boračko jezero	2012 - 2013 (6 months)	Environmental Protection Fund FBiH	2,556.50	5,000.00
42.	Yews and Bosnian pine in BiH	2012 (4 months)	Environmental Protection Fund FBiH	2,556.50	5,000.00
43.	Printing "Newsletter of Bird watcher's network in BiH"	2012- 2013 (7 months)	Environmental Protection Fund FBiH	2,556.50	5,000.00
44.	Raising ecological awareness of members through working activities	2012 (6 months)	Environmental Protection Fund FBiH	2,556.50	5,000.00
45.	Research and inventorisation of fungi of Igman, Visočica and Bjelašnica in order to create preliminary list of species of this area	2012 - 2013	Environmental Protection Fund FBiH	2,556.50	5,000.00
46.	Impact of hydrological regime on mineralisation and possibilities of remediation	2012 - 2013	Environmental Protection Fund FBiH	2,556.50	5,000.00
47.	Strengthening environmental institutions in BiH and preparation for pre-accession funds	2011 - 2013	EC	1,920,430.49	3,755,975.93
48.	IPA 2008 - Strengthening Administration in BiH for plant health protection	2011 - 2013	IPA Fund / EC	800,187.64	1,565,006.15
49.	Feasibility of geo-information model of hydrographic network	2011 - 2012	Environmental Protection Fund FBiH	51,130.00	100,000.00
50.	Protection of land from water erosion by planting ambient plant species in the South-Eastern part of the municipality of Mostar	2011 - 2012	Environmental Protection Fund FBiH	35,791.00	70,000.00
51.	Restauration of exhibition "World of wetland and marsh habitats"	2011 - 2012	Environmental Protection Fund FBiH	5,113.00	10,000.00
52.	Evaluation of IBA areas in FBiH	2011 - 2012	Environmental Protection Fund FBiH	5,113.00	10,000.00
53.	Land protection and conservation in the area of the Mostar hill Hum	2011- 2012	Environmental Protection Fund FBiH	5,113.00	10,000.00
54.	Area of resources management in the complex "University City" in Banja Luka	2011 – 2012	Budget of Republika Srpska	5,113.00	10,000.00
55.	Proposal for protection of the monument of nature "Jama Ledana" as natural asset of great importance	2011 – 2012	Budget of Republika Srpska	5,113.00	10,000.00

No.	Project title	Project duration	Source of financing	Project value (EUR)	Project value (BAM)
56.	Proposal for protection of the monument of nature "Pećina Đatlo" as natural asset of great importance	2011 – 2012	Budget of Republika Srpska	5,113.00	10,000.00
57.	Development of training programme and materials for training on international environmental obligations of BiH	2011	CRI BiH	5,113.00	10,000.00
58.	Development of small scale commercial agriculture	2010 - 2014	International Development Association (IDA) and Government of RS	10,643,133.88	20,815,830.00
59.	The Neretva and Trebišnjica management project	2010 - 2014	GEF Municipalities of Ljubuški and Konjic Environmental Protection Fund FBiH IPA fund	4,528,686.36	8,857,200.00
60.	MDG – F programme preserving the environment and climate change titled "The standardisation of environmental management: linking local and national activities in BiH"	2010 - 2013	The Millennium Development Goals Fund	4,151,295.83	8,119,100.00
61.	Enabling activities for the preparation of the BiH's Second National Communication (SNC) under the UN Convention on Climate Change	2010 - 2013	GEF / UNDP	378,367.75	740,011.25
62.	Study for identification of activities, programmes and resources for improving the water quality in the rivers: Miljacka, Željeznica, Zujevina, Kasindolski potok and part of the river Bosna	2010 - 2012	SERDA	230,015.97	449,865.00
63.	Project of forest and mountain protected areas: preparation of the management plans for the NP Una and feasibility studies for protected area Prenj – Čvrstica – Čabulja - Vran	2010 - 2011 (9 months)	GEF / WB	177,819.91	347,780.00
64.	Botanical garden of the University of Banja Luka	2010 (6 months)	Environmental Protection and Energy Efficiency Fund of RS Ministry of Agriculture, Forestry and Water Management of RS	23,436.36	45,836.80
65.	Reintroduction of griffon vulture ( <i>Gyps Fulvus</i> ) in Popovo polje	2010 (6 months)	Environmental Protection and Energy Efficiency Fund of RS Ministry of Agriculture, Forestry and Water Management of RS	14,761.09	28,869.73
66.	Reintroduction of production of traditional plant species in order to conserve biodiversity of Manjača area	2010 (6 months)	Environmental Protection and Energy Efficiency Fund of RS	11,298.55	22,097.70

No.	Project title	Project duration	Source of financing	Project value (EUR)	Project value (BAM)
			Ministry of Agriculture, Forestry and Water Management of RS		
67.	Valorisation of natural values of virgin forest area of Gornja Trstionica Bukovica – Municipality of Kakanj	2010 - 2013	Municipality of Kakanj	10,226.00	20,000.00
68.	Proposal for protection of the monument of nature "Vaganska pećina" as natural asset of great importance	2010 – 2011	Budget of Republika Srpska	5,113.00	10,000.00
69.	Preparation of publications and relevant materials for combating the invasive species in BiH: <i>Amorpha fruticosa</i> , invasive species in BiH	2010	Federal Ministry of Environment and Tourism	3,579.10	7,000.00
70.	Mapping the nests of the white stork in Gradiška and their protection	2010 (6 months)	Environmental Protection and Energy Efficiency Fund of RS Ministry of Agriculture, Forestry and Water Management of RS	3,074.98	6,014.04
71.	Proposal for protection of the monument of nature "Žuta Bukva", Kotor Varoš	2010 – 2011	Budget of Republika Srpska	3,067.80	6,000.00
72.	Protected resources management area "Bukovica"	2010 – 2011	Budget of Republika Srpska	2,556.50	5,000.00
73.	Professional grounds for proclamation: Strict nature reserve "Virgin forest of Janj"	2010 – 2012	Budget of Republika Srpska	2,556.50	5,000.00
74.	Professional grounds for proclamation: Strict nature reserve "Virgin forest of Lom"	2010 – 2012	Budget of Republika Srpska	2,556.50	5,000.00
75.	Project of protected forest and mountain areas	2009 - 2013	GEF / SB	6,135,066.71	11,998,957.00
76.	Regional Environmental Network for Accession (RENA)	2009 - 2013	IPA fund / EC	5,212,227.47	10,194,068.98
77.	The Spreča river basin Initiative – Clear minds for clear water	2009 - 2011	EC	98,729.57	193,095.18
78.	Monument of nature "Pećina Orlovača"	2009 – 2011	Budget of Republika Srpska	5,113.00	10,000.00
79.	Proposal for proclamation of natural fish breeding in the fishing area of the municipality of Kalinovik	2009 – 2010	Budget of Republika Srpska	1,533.90	3,000.00

No.	Project title	Project duration	Source of financing	Project value (EUR)	Project value (BAM)
80.	Special purpose funds for forests	2008 - 2012	Budget of Republika Srpska	8,331,102.67	16,293,961.81
81.	Mainstreaming karst peatlands conservation into key economic sectors – KARST	2008 - 2013	GEF / UNDP	1,721,661.63	3,367,224.00
82.	Forestry programme of FBiH	2008 - 2014	WB Budget of FBiH	348,130.89	680,874.02
83.	Spatial nature reserve "Gromiželj"	2008 – 2011	Budget of Republika Srpska	12,782.50	25,000.00
84.	Special nature reserve "Lisina"	2008 – 2011	Budget of Republika Srpska	10,226.00	20,000.00
85.	Project for agricultural and rural development	2007 - 2015	WB	26,120,948.75	51,087,323.98
86.	Project for forest development and protection (additional financing)	2007 - 2011	WB / IDA Government of RS	1,452,092.00	2,840,000.00
87.	Protection of biodiversity of the Sava river basin floodplains	2007 - 2009	IUCN IPA Fund / EC SIDA (Swiss Agency for Development and Cooperation) Netherlands BBI - Matra programme	865,300.93	1,692,354.65
88.	INTERREG IIIB CADSES – Developing initiatives exploiting the potentials of natural heritage for regional spatial development - Parks and Economy (P&E) - proposal from BiH: Popovo polje	2007 - 2009	EC	50,400.80	98,573.83
89.	Valorisation of cultural-historical and natural heritage of the municipality of Mrkonjić Grad	2007 – 2009	Budget of Republika Srpska	7,669.50	15,000.00
90.	Valorisation of cultural-historical and natural heritage of the municipality of Trebinje	2007 – 2009	Budget of Republika Srpska	7,669.50	15,000.00
91.	Monument of nature - cave "Ljubačevo"	2007 – 2008	Budget of Republika Srpska	5,113.00	10,000.00
92.	Proposal for protection of the monument of nature "Girska pećina" as natural asset of great importance	2007 – 2008	Budget of Republika Srpska	5,113.00	10,000.00
93.	Proposal for protection of the monument of nature "Pećina Ledenjača" as natural asset of great importance	2007 – 2008	Budget of Republika Srpska	5,113.00	10,000.00

No.	Project title	Project duration	Source of financing	Project value (EUR)	Project value (BAM)
94.	Proposal for protection of the monument of nature "Pećina pod lipom" as natural asset of great importance	2007 – 2008	Budget of Republika Srpska	5,113.00	10,000.00
95.	Strategy of BiH and action plan for biodiversity and landscape protection (NBSAP 2008-2015)	2006 - 2011	GEF / UNEP National budget	229,610.99	449,072.93
96.	Valorisation of cultural-historical and natural heritage of the municipality of Derвента	2006 - 2008	Budget of Republika Srpska	7,669.50	15,000.00
97.	Proposal for protection of the monument of nature "Banja Stijena" as natural asset of great importance	2006 – 2007	Budget of Republika Srpska	5,113.00	10,000.00
98.	Monument of nature "Pećina Rastuša"	2006 – 2008	Budget of Republika Srpska	5,113.00	10,000.00
99.	Protected landscape "Javorina"	2004 – 2009	Budget of Republika Srpska	20,452.00	40,000.00
100.	NP „Drina“	Ongoing	Budget of Republika Srpska	15,339.00	30,000.00
<b>TOTAL</b>				<b>91.479.994,51</b>	<b>179.269.881,13</b>