Bosnia and Herzegovina Fourth Report to the United Nations Convention on Biological Diversity
2010 Biodiversity Targets National Assessments

April 2010

Contents

1 Introduction

Bosnia and Herzegovina is situated in South Eastern Europe, in the central part of the Balkan Peninsula and has a total land area of 51,129 km^2. The total length of its borders is 1,537 km of which 762.5 km are land borders, 751.0 km river borders and 23.5 km sea borders. Bosnia and Herzegovina has common frontiers with Republic of Croatia (931 km), Serbia (375 km) and Montenegro (249 km). To the north, BiH has access to the River Sava, and to the south to the Adriatic Sea, at Neum. The land is mainly hilly to mountainous with an average altitude of 500 meters. Of the total land area, 5% are lowlands, 24% hills, 42% mountains and 29% Karst area. Most of the western part of Dinaric Alps is situated here, descending gradually in the northern direction and suddenly in the southern direction.

BiH climate is influenced by following: the Atlantic ocean in the West, the Mediterranean in the South, and vast space of continental masses of Europe in the North, and of Asia in the northeast and East. Climate of Bosnia and Herzegovina is temperate, but shows often extremes and high diversity level. The lowest temperature characterizes highest mountain peaks. An average temperature in January on Bjelašnica Mt. amounts -7,2^{O}C, while in Neum city, on Adriatic coast, it is +6,5^{O}C. Annual precipitation in Bosnia and Herzegovina is unevenly distributed, whereas it increases from the South towards Dinaric massifs, and declines again towards peri-pannonian margin. Snow occurs regularly in winter, covering mountain peaks over 6 months a year. Climate of Bosnia and Herzegovina is comfortable for human life and health, being therefore an important natural wealth of our country.

Forests and forest soils cover 2,709,769 ha (about 53% of the territory). Woods cover 2,209,732 ha (about 43%), and barren land covers 500,037 ha (about 10%). The total agricultural land covers 2.5 million hectares or 0.7 hectares per capita.

With its high average annual precipitation (1250 l/m^2 compared with the European average of 1000 l/m^2) Bosnia and Herzegovina possesses significant water resources. There are seven river basins (Una, Vrbas, Bosna, Drina, Sava, Neretva with Trebišnjica and Cetina) of which 75.7% belong to the Black Sea catchment and 24.3% to the Adriatic Sea catchment. There are also a large number of river lakes (on Pliva and Una) and mountain lakes (in the area of Dinarides), as well as thermal and geothermal groundwater resources. BiH has got large quantity of high quality fresh water. Most of mentioned watercourses emerge under the Dinaric Mountains. The underground water collection, which country has got plenty of, occurs in lose depositions, around large river beds, karst fissures, trenches and caves. Thermal and mineral springs occur around ingenious bedrocks and tectonic disruptions. The hottest thermal spring (with water temperature of +58^{0}C) is Ilidža's spa, and other well known mineral springs are: Kiseljak, Kakanj, Srednje, Busovača, Srebrenica, Žepa, Tešanj, Maglaj, Žepče, etc.

BiH has an access to the Adriatic Sea with coastline which is 22 km long. Average annual temperature of sea water at Neum city is +9.6^{0}C; salinity varies between 29 and 35 ‰; color is blue-green, with 10 m transparency.

Rocks that make a country's foundation have been deposited over geologic times at the bottom of former Tetis Sea. Metamorphous rocks, of which mountains in central part are made of, date back from Paleozoic. Paleozoic layers occur also in other parts of Bosnia in mosaic. Sedimentary rocks originating mainly from Mesozoic, were upraised during Alpine orogenesis, and folded into Dinaric Mountains by lateral stress. Northern and southern zones of the mid Dinaric Alps are built of Cenozoic layers. After dynamic geological events in Cenozoic, Tetis Sea has been withdrawn leaving land with smaller water bodies (Paratetis). At the end of Cenozoic, the Pannonian Sea, finally withdrew leaving shallow lakes and marshes behind. Rivers Sana, Una, Vrbas, Bosna and Drina followed east and north direction of the Sea

withdrawing by increasing their lengths. In the Adriatic basin, after Pleistocene, level of the Sea elevated due to ice melting, which sunk the lower valley of Neretva river. In Bosnia and Herzegovina are prevailing soil types from auto morphous and hydro morphous division.

1.1 Diversity of species

The richness of living world that exist on its territory is the result of ecological heterogeneity of Bosnia and Herzegovina, its geomorphologic and hydrological diversity, specific geological past and its eco climate diversity. Flora, Fauna and Fungi of Bosnia and Herzegovina are considered to be among the most diverse in Europe, being especially important in terms of global biodiversity due to its high level of endemism and relicts.

Living world that inhabit different places of Bosnia and Herzegovina compose numerous communities and ecosystems at present-day, which are specific for this area, the Balkan Peninsula and entire Europe. Main factors responsible for high diversity of BiH are:

- Diversity of terrestrial habitats caused by:
  - occurrence of rocks of different age,
  - diversity of bedrocks,
  - diversity of soil types,
  - unique and diverse forms of relief, and
  - diversity of climate conditions.
- Diversity of aquatic habitats reflected by:
  - rich and diverse hydrological network (mountain lakes, springs, mountain torrents, brooks, rivers, sinking streams, ponds, marshes, underground water, thermal sources, brakish water and sea)

High level of floristic diversity is based upon diversity of cyanophytes, alges and vascular plants.

By undertaken investigations, till now it is identified 1,859 species from 217 genera within group of cyanophytes and alges. The most diverse groups are Charophyta, i.e. Charophyceae and Chlorophyceae classes, and Heterokontophyta, i.e. Bacillariophyceae class.

Table1.- Diversity of cyanophytes and alges

Taxon	Genus	Species	Variety	Form
Cyanobacteria	36	303	1	4
Rodophyta	7	20	1	-
Charophyceae	33	319	31	5
Chlorophyceae	65	242	25	2
Euglenophyta	4	21	-	-
Dinophyta	5	20	-	2
Bacillarioph.	57	881	222	15
Xanthophyceae	4	21	-	-
Chrysophyceae	12	32	4	-
Total	217	1,859	284	28

Table 2 - Taxonomic diversity of higher plants

	Family	Genus	Species	Sub-species	Total
Bryo-phyta	52	187	565	0	565
Pterido-phyta	14	26	61	8	71
Spermato-phyta	161	858	3,256	1,078	4,498
Total	227	1,071	3,882	1,086	5,134

The fact that identified was 5,134 taxa, underlines the floristic richness of Bosnia and Herzegovina and places it among the richest ones in Europe.

Within Spermatophyta, families with the highest species diversity are:

- composits,
- pea family,
- grasses,
- roses,
- crucifers,
- parsley family,
- mint family,
- sedges,
- figworts,
- pinks,
- lilies and
- buttercups.

A special diversity character of this group is reflected through a great number of families with only one genus and species (approximately 30 % of total number).

The most specific characteristic of BIH's flora is a great deal of paleo and neo endemic species, tertiary and glacial relicts maintained in refugial habitats, such as cliffs, canyons and mountain cirques. Most of endemic forms are recognized within the flora of higher plants, which at current state of knowledge is estimated to have 450 endemic taxa. Newly undertaken investigations indicate that this number is much bigger, especially as far as poorly investigated genera are concerned, such as:

- *Alchemilla,*
- *Potentilla,*
- *Rosa,*
- *Rubus,*
- *Hieracium,*
- *Centaurea,*
- *Carex,*
- *Festuca.*

Flora of higher plants in BIH is also characterized by stenoendemic species, which includes, among others:

- *Acinos orontius (K.Maly) Šilić,*
- *Alyssum moellendorfianum Aschers. ex G.Beck,*
- *Asperula hercegovina Degen,*
- *Barbarea bosniaca Murb.,*
- *Campanula hercegovina Degen and Fiala,*
- *Centaurea bosniaca (Murb.) Hayek,*
- *Dianthus freynii Vandas,*
- *Edraianthus niveus G.Beck,*
- *Minuartia handelli Mattf.,*
- *Oxytropis prenja G.Beck,*
- *Symphyandra hofmanni Pantocsek etc.*

More than one half of them occur in Herzegovina, within the area of mountain complex Prenj-Čvrsnica-Velež and canyon of the Neretva River, as well as canyons of its tributaries. These data confirm the statement that it is the centre of endemism in Bosnia and Herzegovina.

Thanks to the abundance and diversity of certain animal groups, Bosnia and Herzegovina belongs to the top of European biodiversity. This is also confirmed by great deal of endemic and relict species, especially among the invertebrates. BIH's fauna is characterized by the occurrence of refugia and development centres, and by the most unique fauna of karst sources, mountain torrents and canyons.

Despite of the abundance of the distinct animal groups, in Bosnia and Herzegovina hasn't been undertaken any action to make an inventory and compile existing knowledge on those groups. Although some zoologist confirms their enormous enthusiasm by attempts to organize the knowledge in more systematic manner, the fauna of Bosnia and Herzegovina is far from being full. Thus, the attempt to compile records on fauna of Bosnia and Herzegovina has recognized unequal knowledge level by groups. For the regnum of Protozoa, there are missing data on species and phylla, while phylla of Metazoa, such as Plathelminthes, Nemertina, Nematoda, Rotatoria, Pogonophora happen to be the least, or not at all investigated in BiH. Within invertebrates, special attention of scientist is paid to different groups of Arthropoda.

Table 3 – Diversity of certain groups of invertebrates

Arthropoda: Chelicerata: Arachnida:Acarina	208
Arthropoda: Crustacea: Malacostraca: Amphipoda	31
Arthropoda: Crustacea: Malacostraca: Decapoda	5
Arthropoda: Chilopoda	9
Arthropoda: Diplopoda	55
Arthropoda: Pauropoda	23
Arthropoda: Symphila	12
Arthropoda: Insecta: Colembola	224
Arthropoda: Insecta: Ephemeroptera	58
Arthropoda: Insecta: Plecoptera	74
Arthropoda: Insecta: Trichoptera	215
Arthropoda: Insecta: Protura	18
Arthropoda: Insecta: Diplura	15
Arthropoda: Insecta: Zygentoma	2
Arthropoda: Insecta: Mantodea	4
Arthropoda: Insecta: Blattodea	17
Arthropoda: Insecta: Heteroptera	705
Arthropoda: Ins.: Col., Adephaga	701
Arthropoda: Ins.: Col., Polyphaga: *Lymexylidae*	1
Arthropoda: Ins.: Col., Polyphaga: *Buprestidae*	129
Arthropoda: Ins.: Col., Polyphaga: *Hydrophilidae*	47
Arthropoda: Ins.: Col., Polyphaga*: Sphaeridiidae*	30
Arthropoda: Ins.: Col., Polyphaga: *Sphaeritiidae*	1
Arthropoda: Ins.: Col., Polyphaga: *Dascillidae*	1
Arthropoda: Ins.: Col., Polyphaga: *Trogidae*	3
Arthropoda: Ins.: Col., Polyphaga: *Geotrupidae*	9
Arthropoda: Ins.: Col., Polyphaga: *Scarabaeidae*	159
Arthropoda: Ins.: Col., Polyphaga: *Lucanidae*	7
Arthropoda: Ins.: Col., Polyphaga: *Chrysomelidae*	322
Arthropoda: Ins.: Col., Polyphaga: *Cerambicidae*	218
Arthropoda: Ins.: Col., Polyphaga: *Scolytidae*	55
Arthropoda: Insecta: Lepidoptera	1,622
Arthropoda: Insecta: Caelifera	70
Arthropoda: Insecta: Ensifera	85
Arthropoda: Insecta: Hymenoptera	353

Due to the diversity of aquatic habitats, and the occurrence of different kind of watercourses, limnofauna of invertebrates of Bosnia and Herzegovina ought to be very diverse (50 species of annelids that belong to 19 genera; 8 species of leaches belonging to 7 genera, etc). River crustaceans encompass 31 species, of which 16 are endemic.

For freshwater ecosystems in Bosnia and Herzegovina, the most characteristic is fauna of aquatic insects, with high level of the diversity and endemism. Thus, fauna of mayflies comprises 58 species belonging to 20 genera, of which five are Dinaric,

Balkan or Dinaric-alpine endemic species. In the fauna of stoneflies, it has been described 74 species from 15 genera. Water moths ought to be numerous groups with 215 detected species from 78 genera. 50 of these species possess endemic character and 24 of them are endemic with the Dinaric distribution range. The most interesting is genus *Drusus.*

As interesting forms of life it should be mentioned species that inhabit Herzegovina's caves. Among them endemic are:

- *Eremulus simplex* Willmann, 1940,
- *Autognata willmanni* Willmann, 1941,
- *Chamobates petrinjensis* Willmann, 1940 and
- *Carabodes bosniae* Frank, 1965.

Fauna of vertebrates in Bosnia and Herzegovina is represented by following groups:

- fish (Pisces),
- amphibians (Amphibia),
- reptiles (Reptilia),
- birds (Aves) and
- mammals (Mammalia).

Table 4 – Fauna of vertebrates in Bosnia and Herzegovina

Animal group	Number of families	Total number of species	Threatened species in BIH	Endemic species
Fish	27	119	?	12
Amphibians	7	20	3	6
Reptiles	12	38	11	12
Birds	60	326	97	-
Mammals	19	85 (+2?)	24	9
Total	125	588 (2?)	135	39

Fish fauna in Bosnia and Herzegovina is relatively well investigated. There are 119 fish species in total. The highest diversity is recognized within the family *Cyprinidae* (26 genera and 51 species) and *Salmonidae* (5/8). More than one species comprise families:

- *Acipenseridae* (2/7),
- *Mugilidae* (1/6),
- *Percidae* (4/7),
- *Cobitidae* (3/6),
- *Clupeidae* (1/3),
- *Gasterosteidae* (2/2),
- *Gobiidae* (5/7) and
- *Cottidae* (1/ 2).

From 27 families, 7 live exclusively in the Black Sea and 12 in the Adriatic Sea confluence.

Diversity of amphibians in BIH is bespoken in 7 genera, 21 species and 22 subspecies. Among tail-less most abundant is genus *Rana* with 7 species and among caudate amphibians this is genus *Triturus* with 5 species.

Reptiles inhabit freshwater, ponds, marshes and almost all terrestrial ecosystems (especially extreme habitats, such as rocky grassland) belonging to 40 species (45 sub-species) from 12 families. The highest reptile diversity in BiH is evident in the Mediterranean region and supra-mediterranean belt. However, some species are spread up to the highest mountain peaks (Bosnian and Orsiny's viper live in mountain swards, then on screes and rock crevices all around BIH).

Birds diversity recorded are 326 species belonging to 60 families and 18 orders. Most of them are stationary (nesting), while migratory ones spend some time in ecosystems of Bosnia and Herzegovina only by seasons (wetlands: Buško Blato, Hutovo Blato, Bardača, lower flow of Drina river etc.).

After Bird life's data in Bosnia and Herzegovina nest five endangered species pygmy cormorant (*Phalacrocorax pygmaeus*), ferruginous duck (*Aythya nyroca*), saker falcon (*Falco cherrug*), white-tailed eagle (*Haliaetus albicilla*), corncrake (*Crex crex*), while three globally endangered species (*Aegypius monachus*, *Pelecanus crispus* and *Aquila clanga*), are listed in Bosnia and Herzegovina as extinct nesting birds.

The fauna of mammals encompasses 85 identified species from 51 genera and 19 families. Most of the species lives in terrestrial habitats, while small number of them inhabits aquatic ecosystems on secondary basis or only occasionally. High abundance and diversity characterize the family *Vespertiolinidae* with 20 identified species from 8 genera.

Fungi inhabit both terrestrial and aquatic environment. It is being estimated that in Bosnia and Herzegovina live between 15,000 – 20,000 mushroom species. However, identified are only 552 species of higher Fungi.

There are many macromycetes in Bosnia and Herzegovina which has high economic potential and value being therefore an important income source for a local community since ever. The most important among them are:

- smrčak (*Morchella sp.*),
- vrganj (*Boletus sp.*),
- lisičarka (*Cantarelus cybarius*),
- sunčanica (*Macrolepiota sp*.),
- mliječnica (*Lactarius deliciosus*),
- pečurka (*Psaliota procera*) i ostali.

1.2 Ecosystem's and landscape's diversity

Along the horizontal profile from Adriatic Sea in South to Sava river in North of the country, the series of landscapes and belonging ecosystems are identified. Mediterranean landscape is recognised through presence of ecosystems of Maquis, Pseudo-Maquis and Garrigues, ecosystems in littoral sea belt and ecosystems of rock crevices and screes.

In supra-Mediterranean landscape, thermophilous oak species, being best bio indicator of supra-mediterranean climate, show that this territory stretches along Neretva river up to Jablaničko lake, encompassing valleys of Lištica and Tihaljina and lower karst fields, going all the way to Bileća in East and Trebinje in South. Main groups of ecosystems are:

- ecosystems of supra-mediterranean rocky grassland and xeric meadows,
- ecosystems of karst caves, holes and abysses and
- ecosystems of thermophilous woods and shrubs of supra-mediterranean landscapes

Very specific part of BIH belongs to the Mediterraneo-montane landscapes, where occurs:

- ecosystems of mediterraneo-montane sessile and turkey oak woods,
- ecosystems of mediterraneo-montane frigophilous-thermophilous turkey oak woods,
- ecosystems of mediterraneo-montane thermophilous flowering ash and turkey oak woods,
- ecosystems of thermophilous pubescent oak woods,
- ecosystems of low forests and shrubs with maple and oriental hornbeam,

- ecosystems of hazel,
- ecosystems of mediterraneo-montane roky grassland,
- ecosystems of mesophilous meadows and
- ecosystems of rock crevices and screes.

High level of ecosystem's diversity is recognized in upland belt on BIH mountains. Regarding eco climate and geomorphology, this part of BIH is recognized as a highly dynamic area. All geomorphologic structures exceed 900 (1,000) meters above sea level. Main diversity features are ecosystems of:

- mixed broadleaved-conifer forests with Illyrian beech, fir and spruce;
- acidophilous forests with beech, fir and melicgrass;
- mixed broadleaved-conifer forests with moesian beech and dinarci fir;
- forests with illyrian beech and autumn moor grass; with moeasian beech and autumn moor grass;
- sycomore and european ash;
- conifer forests with spruce and fir;
- balkan alder buckthorn and fir;
- conifer woods with spruce and Scot's pine;
- Serbian spruce;
- mountain heaths with blue berry; with common heather; with birch and european aspen; with hazel and hawthorn;
- mountain thermophilous meadows with brome;
- tall herb communities;
- mountain temperate humid meadows;
- hygrophilous meadows with illyrian purple moorgrass;
- raised and blanket bogs;
- lakes, ponds and marshes;
- mountain springs and rivulets;
- hygrophilous woods and shrubs with grey alder and
- rock crevices and screes.

From central part of BIH, toward to the North, hilly belt occurs, covering significant area. Habitats are scattered over very dynamic and pronounced relief, up to 900 meters above sea level. Especially underlined is a diversity of broadleaved deciduous woods and meadows, where main group of ecosystems is built of:

- ecosystems of hornbeam and sessile oak in several floristic and geo-pedologic variants (with sedges, dog's tooth violet, bladdernut);
- montane beech woods with alpine barrenwort;
- montane beech woods with melicgrass;
- beech and *Acer obtusatum*;
- black pea and sessile oak;
- acidophilous sessile oak woods.

The mountains of Peri-pannonia (northwestern Kozara, northern Prosara and Motajica, northeastern Trebovac and Majevica) are the product of specific oro- and geo genesis. The entire area, up to 400 (600) meters above sea level, is splashed by warm pannonian climate which is under strong influence from continental climate of steppes. Main ecosystems of this landscape are ecosystems:

- of woods with sessile oak and *Ruscus hypoglossum;*
- with sessile oak and silver linden;
- with sessile and turkey oak;
- with italian and turkey oak in northeastern region;
- of beech woods with hart's tongue fern;
- of acidophilous beech- melicgrass woods,
- of woods with hornbeam, sessile oak and butcher's broom and

- with hornbeam, sessile oak and bladdernut.

Today, beside significant area under hygro-mesophilous meadows, substantial woodland area is converted into agricultural ecosystems.

The pannonian area of Bosnia and Herzegovina takes the lowest positions (between 100 and 200 meters above sea level). The ground is more or less flattened with deep alluvial kind of soils, pseudo-gley and moulder, and high water table. The climate is continental. Warm summers, deuce relief and hydro-geological conditions enabled the emergence of very specific wildlife of the pannonian landscapes.

Plain landscapes of northern Bosnia are dominated by vast fields covered by cereals, maize, watermelons, different sorts of vegetables and fruits, but also forests of willow, poplar, common oak, ash, robinia, then settlements, artesian wells and houses of worship.

Beside mentioned landscapes on horizontal profile, after the highest level of biodiversity and endemism, one specific group of BIH landscapes and ecosystems is recognized. This specific group makes:

- highmountain landscapes,
- refugio-relict landscapes of canyons, cliffs and steep slopes,
- landscapes of karst fields and
- wetlands of Bosnia and Herzegovina.

Each of the mountains of Dinaric Alps was some kind of insulated island and passed its own development patterns and evolution of living world. The final result of those processes is high endemism and relict level. The mountain landscapes in Bosnia and Herzegovina regarding physiognomy differentiate in two major units:

- Sub-alpine belt comprising low woodland and mountain pine woods;
- Alpine belt above mountain pine woods.

Biodiversity of sub-alpine belt of BIH mountains is dominated by ecosystems:

- of sub-alpine woods with illyrian beech and sycomore;
- of acidophilous woods with moesian beech and melicgrasss;
- of sub-alpine woods with moesian beech and greek maple;
- of sub-alpine spruce woods;
- with mountain pine and blue berry;

Above upper forest line stretches the belt with landscapes that comprises following ecosystems:

- ecosystems of alpine grassland on alkaline ground with elyna and sedges;
- ecosystems of alpine grassland on acid ground with sedge and rush;
- ecosystems around snow patches on alkaline ground with silesian willow;
- ecosystems around snow patches on acid ground with white buttercup;
- ecosystems of alpine screes on carbonate bedrock;
- ecosystems of alpine screes on silicate bedrock;
- ecosystems of carbonate rock crevices;
- ecosystems of silicate rock crevices;
- ecosystems with lichens on both carbonate and silicate bedrock.

Here are the habitats of glacial relicts of Bosnia and Herzegovina, and, among them most of endemic species of flora and fauna BIH.

Refugio-relict habitats represent the most unique share in Bosnia and Herzegovina's environment, created in a stormy process of the Earth's crust formation, geo genesis, and evolution of both climate and living world. Those places have been least altered in a period between pre- and post-glaciations having preserved their natural ecologic values. In these habitats occur many tertiary plant and animal species which have endured drastic climate changes in last glaciations period. These habitats have been

a shelter for many plant and animal species during an Ice Age. They are positioned in the basins of Una, Vrbas, Bosna, Drina and Neretva rivers.

Relict pine woods are one of the landscapes and it is differentiated on:

- ecosystems of dalmatian black pine,
- ecosystems of white-bark pine and
- ecosystems of illyrian black pine in series on peridote and serpentine, on dolomites and on limestone:

Within group of relict serpentinophytes are:

- *Halacsya sendtneri* (Boiss.) Doerfl.,
- *Potentilla visianii* Panc.,
- *Fumana bonapartei* Maire et Petitm.,
- *Haplophyllum boissierianum* Vis. et Panc.,
- *Gypsophila spergulaefolia* Gris. f. *serbica* Vis. et Panc.,

while dolomitophytes are:

- *alyssum (Alyssum moelendorfianum),*
- *thyme (Thymus aureopunctatus) i*
- *acinos (Acinos orontius).*

Today, in the river canyons of Una, Vrbas, Bosna, Drina and Neretva, are still present plenty of endemic and refugial-relict ecosystems**,** which are in syntaxonomic view belonging mostly to Asplenietea rupestris (H.Meier) Br.-Bl 1934 and Thlaspeetea rotundifoliii Br.-Bl. 1947.

Karst fields are another unique phenomena that reflect specific patterns of Earth's crust development. It is a specific relief with special, mainly underground, water circulation ongoing within soluble rocks (limestone, dolomite, tuff). Karst fields of Bosnia and Herzegovina are differentiated in several groups, following the extension direction of Dinaric Alps. Many of them are endemic centers of flora and fauna of BIH. The largest of them (surface of 400 square kilometers) is Livanjsko polje, where specific conditions brought together very different types of ecosystems. Here, especially in Ždralovac area (field's northwestern part), have been ongoing post-glacial processes of alkaline bogs formation. The unique type of hydromorphous soil which occurs here, planohystosol, is vitally important for the survival of wilderness in swamps.

Among rare plant species on karst fields are:

- *Helleborus hercegovinus*,
- *Ranunculus croaticus*,
- *Corydalis leiosperma*,
- *Hesperis dinarica,*
- *Rhamnus intermedius,*
- *Bupleurum karglii,*
- *Athamantha haynaldii,*
- *Scrophularia bosniaca,*
- *Onosma visianii* and others,

while to the category of vulnerable belong:

- *Salvia bertolonii,*
- *Utricularia vulgaris,*
- *Scilla litardierei,*
- *Narcissus radiiflorus,*
- *Iris illyrica* itd.

It has to be stressed that karst fields are an integral part of migratory bird's routes. Even globally threatened bird species find their habitats here, for instance Anthya nyroca, Aquila pomarina, Falco neumanni, Crex crex and kindred species.

Wetlands, which are often with local character in Bosnia and Herzegovina, are induced by specific orographic and edaphic conditions. At present, that kind of ecosystems in Bosnia and Herzegovina occur along large watercourses (Una, Vrbas, Bosna, Drina, Neretva) with hygrophylous woods and shrubs of willow, alder, purple and marsh willow.

Going upwards on vertical profile of Bosnia and Herzegovina's Dinaric Alps, emerges special kind of wet habitats around springs and brooks. On some places occur bog ecosystems.

At lower altitude form alkaline blanket bogs, whereas in the zone of dark coniferous woods (at altitude over 1.000 m) form raised bogs with a domination of bogmosses. In the subalpine belt, in the small depressions and around springs develop special form of boreo-relict blanket bogs.

Special wetland ecosystems are developed around mountain lakes of Bosnia and Herzegovina's Dinaric Alps (Šatorsko, Kukavičko, Rastićevsko and Turjača on plateau of Kupres, Prokoško jezero on Vranica Muntain, Blatačko jezero on Bjelašnica Muntain, Idovačko jezero on Raduša Muntain, Blidinje jezero in Dugo Polje between Čvrsnica Muntain and Vran Muntain, Uloško jezero on Crvanj Muntain, Boračko jezero beneath Prenj Muntain, Veliko, Blatno, Crno and Bijelo jezero on Treskavica Muntain, Kotlaničko, Orlovačko, Crno, Bijelo, Štirinsko, Kladopoljsko, Donje Bare and Gornje Bare on Zelengora Muntain).

1.3 Genetic diversity

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Through the existence of different civilizations on the territory of BIH, domesticated were many animal breeds. Majority evolved as distinct ecotypes representing today separated forms. High diversity is achieved among the breeds of horses (Bosanski brdski), cattle (Buša i Gatačko), sheeps (Pramenka), goats (Balkanska rogata), pigs (Šiška), dogs (Bosanski tornjak) and pigeons.

Different cultures emerging in long and rich tradition of Bosnia and Herzegovina used to make many traditional products out of domain of bread making, milk-production, brewery, viniculture and especially cheese production. So far identified and recognized are 15 sorts of indigenous cheese, but for sure exist many other unknown biotechnological formulas, deeply hidden in the mountain cottages of Dinaric Alps.

1.4 Invasive species

Invasive species are considered under alien flora and fauna of Bosnia and Herzegovina. Among species which got out of human control, in BIH the most common are:

- *Asclepias siriaca,*
- *Helianthus tuberosus,*
- *Solidago gigantea,*
- *Tagetes minuta,*
- *Amorpha fruticosa,*

- *Robinia pseudacacia,*
- *Phytolaca americana,*
- *Impatiens glandulifera*.

Within most invasive are:

- *Ambrosia artemisifolia,*
- *Bidens bipinata,*
- *B. frondosus,*
- *B. subalaternus* and
- *Echinocystis lobata* (envade habitats of moist and flooded woods, then rural and urban type).

Alien animal species of aquatic ecosystems are the most frequently fish species that came into free water from fish farms or occurred spontaneously from adjacent rivers and lakes. Gudgeon Gobio gobio is one of the most invasive fish species in our country.

Taking into account the principles of an ecosystem-based approach, the invasive species should be monitored regardless of the character of their impact on the ecosystem they have come to populate.

1.5 Trends of biodiversity

For the purposes of IV Report, the state of biodiversity is estimated through analysis of trends and intensity of known existing pressures.

Results of analysis are presented in Table 5, where is shown that conversion of habitats, followed by overexploitation of resources and pollution are the most intensive pressures on biodiversity. In the group of ecosystems under intensive processes of habitat's conversion is majority of ecosystems belonging to specific landscapes of Bosnia and Herzegovina, as: ecosystems of Sub-alpine grassland on carbonate, of Sub-alpine grassland on acid ground, of meadows on karst fields, of Sub-mediterranean rocky-grasslands and karst, of marshes and wetlands, of fresh waters, of polydominant refugial communities, of endemic pine forests etc.

Overexploitation of resources is prevailed in the most productive ecosystems of Bosnia and Herzegovina, positioned in easy accessible landscapes. Such an assessment of the condition of forest resources in the first report under the CBD has been provided on the basis of the 2004 UNECE Report (UNECE 2004, 'Environmental Performance Review: Bosnia and Herzegovina'). Overexploited are resources and services of: ecosystems of oak forests within continental landscapes, of pannonic oak forests, of upland's beech-fir forests, of upland's deciduous forests, of arable land, of fresh waters etc.

Pollution is very present type of pressure in landscapes and ecosystems near and around human settlements. Most affected are: ecosystems of hygrophilous woods with alder, of mesophilous meadows of continental valleys, of hygrophilous meadows within pannonic landscapes, of brakish waters, of Sub-mediterranean rocky-grasslands and karst, of littoral sea belt, of fresh waters, of riparian area of fresh waters, ecosystems in urban and rural areas and ecosystems of nitrificated habitats.

Effects of global climate changes are expected all over the national scale. But the most affected, as the most sensitive ecosystems, could be these belonging to the group of specific landscapes of Bosnia and Herzegovina. Like in most transition countries, there are no direct data on the monitoring of the climate change impact on Bosnia and Herzegovina's biodiversity. Appropriate monitoring projects could be developed relatively easily with adequate funding, since there is the opportunity to use the data from a great number of surveys conducted earlier in the territory of BiH. Having in mind the potential momentum in the natural ecosystems, within the

estimates of the climate change effects it would be necessary to take immediate action without waiting for any direct evidence of these effects to materialize

Invasive species, however, attack all types of ecosystems that are reached, with fresh water and adjacent habitats as current startup points of invasions.

Table 5 – Intensity and trend of pressures

INTENSITY AND TREND OF PRESSURE	conversion of habitats	climate changes	invasive species	unsustein. use	pollution
ecosystems of rock crevices within mediterranean landscapes	→	↗	↗	↗	→
ecosystems of rock crevices within continental landscapes	↗	↗	↗	↗	→
ecosystems of rock crevices within alpine landscapes	→	↑	→	→	→
ecosystems of screes	→	↑	→	→	→
ecosystems around snow patches	→	↑	→	→	→
ecosystems of alpine grassland on carbonate	→	↑	→	→	→
ecosystems of Sub-alpine grassland on carbonate	↗	↑	↗	↗	↗
ecosystems of alpine grassland on acid ground	→	↑	→	→	→
ecosystems of Sub-alpine grassland on acid ground	↗	↑	↗	↗	↗
ecosystems of alpine shrubs	↗	↗	↗	→	→
ecosystems of raised bogs	→	↑	→	→	→
ecosystems of xerophilous grasslans within continental landscapes	↗	↗	↗	→	↗
ecosystems of mesophilous meadows of continental valleys	↑	↗	↑	↑	↑
ecosystems of mesophylous meadows of inner mountains	→	↗	→	↘	→
ecosystems of meadows on karst fields	↑	↑	↑	↑	↗
ecosystems of hygrophilous meadows within continental landscapes	↗	↗	↑	↑	↑
ecosystems of hygrophilous meadows within pannonic landsacapes	→	↗	↑	→	↗
ecosystems of mediterranean wetlands	↑	↗	↗	↑	↑

INTENSITY AND TREND OF PRESSURE	conversion of habitats	climate changes	invasive species	unsustein. use	pollution
ecosystems of brakish waters	↗	↗	↗	↑	↑
ecosystems of mediterranean rocky-grasslands and karst	↗	↗	↗	↗	↗
ecosystems of Sub-mediterranean rocky-grasslands and karst	↑	↗	↑	↑	↑
ecosystems of mediterraneo-montane rocky-grasslands and meadows	↗	↗	→	→	→
ecosystems of rocky-graslands on serpentine	↗	↗	↗	↗	↗
ecosystems of sea cliffs	↗	↗	↗	→	→
ecosystems of littoral sea belt	↗	↗	↗	↑	↑
ecosystems of blanket bogs	↗	↗	↗	→	↗
ecosystems of marshes and wetlands	↑	↗	↗	↑	↑
ecosystems of fresh waters	↑	↗	↗	↑	↑
ecosystems of riparian area of fresh waters	↑	↗	↑	↑	↑
ecosystems with flowering macrophytes	↗	↗	↗	↗	↑
ecosystems around springs and brooks (rivulets)	↗	↗	→	→	→
ecosystems of tall herb communities	→	↗	→	↗	→
ecosystems of Sub-mediterranean oak forests	↗	↗	↗	↗	↗
ecosystems of oak forests within continental landscapes	↑	↗	↗	↑	↑
ecosystems of pannonic oak forests	↗	↗	↗	↗	↗

INTENSITY AND TREND OF PRESSURE	conversion of habitats	climate changes	invasive species	unsustein. use	pollution
ecosystems of mediterraneo-montane beech forests	↗	↗	→	↗	→
ecosystems of upland's beech-fir forests	↑	↗	↗	↑	↑
ecosystems of Sub-alpine beech forests	↗	↗	→	→	↗
ecosystems of pannonic beech forests	↗	↗	↗	→	↗
ecosystems of hygrophilous woods with alder	↑	↗	↑	→	↑
ecosystems of polydominant refugial communities	↑	↑	↑	↑	↗
ecosystems of upland's decidous forests	↗	↗	↗	↗	↗
ecosystems of Sub-alpine decidous forests	↗	↗	→	→	↗
ecosystems of woodland with mountain pine	↑	↑	→	→	↗
ecosystems of endemic pine foreststst	↑	↗	↗	↑	↑
ecosystems of black pine forests on dolomite	↗	↗	↗	→	↗
ecosystems of black pine forests on serpentine	↗	↗	↗	→	↗
ecosystems of mediterranean evergreen forests	↑	↗	↗	↗	↗
ecosystems in urban and rural areas	→	↗	↑	→	↗
ecosystems of arable land	→	↗	↑	↑	↗
ecosystems of dry landfills with tails	→	↗	↗	→	↗
ecosystems of nitrificated habitats	→	↗	↑	→	↗
ecosystems of dry waste habitats	→	↗	↑	→	↗
ecosystems of damp waste habitats	→	↗	↑	→	↗

1.6 Threats on biodiversity

Main attributes of the biological and landscape's diversity in Bosnia and Herzegovina are:

- High level of genetic, species and ecosystem's diversity;
- High preservation level of landscape diversity's units important on European and global scale;
- Significant degree of changes, referring to the distribution and composition of climax ecosystems;

- Protruding loss trend regarding biological and landscape's diversity, caused by wide spectrum of anthropogenous factors;

It is possible to identify pressures on different levels of biodiversity. On the level of genetic and species diversity the most intensive pressures are:

- Habitats conversion
- Unsustainable use of resources
- Permanent pollution of all environmental spheres
- Devastation and destruction of ecosystems
- Degradation and fragmentation of ecosystems
- Disturbance in willderness
- Logging, hunt and poaching
- Unsustainable gathering of economically important species
- Uncontrolled use of pesticides and fertilisers
- Uncontrolled introduction of alien species
- Uncontrolled introduction and manipulation with GMOs.

Habitats of different groups are under specific pressures. For example, due to increasing human pressures, invertebrates picture in Bosnia and Herzegovina has undergone major changes. Those pressures specially affect hygrophilous and hydrophilous organisms, such as crabs, water insects, leaches and molluscs. Pressures onto aquatic invertebrates that prevail are:

- Intensive eutrophication process of streams by diverse both organic and inorganic pollutants;
- Intensive eutrophication due to creation of artificial lakes;
- Changes of main physical parameters of streams, such as outflow rate, water quantities, thermic and light regime due to raising 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;
- Substantial disturbance of water regime around source area due to conversion of wood habitats into logged or burned surfaces, which promotes erosion process and decrease of water supplies in the natural water cycle;
- Direct activities affecting a fluent's bottom (sand and gravel extraction), followed by a disposal of communal waste;
- Disposal of different sorts of waste material, including the toxic and dangerous ones (pharmaceutical waste, oils, accumulators, charges of cooling devices), on riverbanks and even in streams itselfs;
- Uncontrolled introduction of alien animal species;
- Water pollution by pesticides and fertilizers draining from arable land
- Toxification of watercourses by chemical compounds (for instance, diphenols);
- Increased conversion of coastal belt areas by infrastructure for the facilities, which disagree with physical plan;
- Catchement of springs (which are centres of endemism), and re-direction of watercourses into arable land or other confluences.

The highest effects on ecosystem's and landscape's diversity have the following pressures:

- Construction of full infrastructure (construction of traffic network; construction of power facilities /hydro-accumulation, power plants, power transmission, pipelines, gasslines etc./; construction of water supply facilities /catchment areas, trenches, dam lakes, retentions, dams/);
- Agricultural activities (melioration, replotting, exhausting of habitats by monoculture, use of pesticides and fertilisers);

- Uncontrolled urbanisation and ruralisation;
- Disharmony between development goals by sectors.

Beside pressures that have an effect on the local, i.e. national scale, present are also global pressures:

- Growth of human population
- Unsustainable use of resources
- Climate changes
- Conversion of habitats
- Desertification
- Usage of GMOs
- Spreading of invasive species
- Poor agreement's implementation
- Low public awareness level on global scale.

2 National Strategy and Action Plan for Protection Biological and Landscape Diversity of Bosnia and Herzegovina

2.1 Strategy of Bosnia and Herzegovina and Action Plan for Biodiversity and Landscape's Protection - NBSAP BiH 2008-2015

Document *Strategy of Bosnia and Herzegovina and Action Plan for Biodiversity and Landscape's Protection (2008-2015)* includes the identification of main strategic directions that should be followed in order to achieve an effective and sustainable management of biological and landscape's diversity, and that was elaborated on the base of study *Bosnia and Herzegovina – Land of Diversity.*

The expected outcomes are to be accomplished through an adequate implementation of the following strategic directions: Decrease of biodiversity loss (1); Set up of conservation system and sustainable use of biodiversity (2) and Decrease of pressures on biodiversity in Bosnia and Herzegovina (3).

Strategic direction 1 – Decrease of biodiversity loss

The territory of Bosnia and Herzegovina is imprinted by unique, mosaic like distribution of ecosystems: upland landscapes with underlined diversity of glacial biological/ecological forms, ecosystems of canyons and narrow passages comprising high diversity of well preserved tertiary biological/ ecological forms, ecosystems of karst fields and wetlands.

Target 1.1. – Conservation of ecosystem and landscape's diversity in BIH; has been determined with following program of activities:

1.1.1. Identification and classification of both ecosystem and habitat types;

1.1.2. Conservation of biodiversity in mountain landscapes;

1.1.3. Conservation of biodiversity in refugia of canyons and narrow passages;

1.1.4. Conservation of biodiversity in karst fields;

1.1.5. Conservation of biodiversity in wetlands.

For each program's point *Strategy* has determined specific tasks. For example, the conservation of biodiversity in mountain landscapes has to be achieved through tasks (i.e. projects):

1.1.2.1. Estimation of natural values in mountain belt of Bosnia Herzegovina's Dinaric Alps

1.1.2.2. Setting up of protected areas according to the Law on nature protection in FBIH, RS and following IUCN principles.

Target 1.2 – Conservation of species diversity in BIH; is oriented to decrease of loss of specific flora, fauna I fungia of BIH. By Strategy, target has to be achieved through following program of activities:

1.2.1. Assessment of species diversity in BIH

1.2.2. Assessment of conservation status for species diversity in BIH

1.2.3. Setting up of in situ conservation measures for species diversity in BIH

1.2.4. Setting up of *ex situ* protection measures.

Bosnia and Herzegovina is one of the newest states in the world. BiH still did not realize huge projects as it is identification of biodiversity. Consequently, one of first steps in conservation actions, has to be identification of flora, fauna and fungia of BiH, followed by the fortification of the status i.e. identification of red lists of mentioned groups. It is proposed in NBSAP as one of the first actions for implementation.

Target 1.3. – Conservation of diversity of genes in BIH. Target could be achieved through following program of activities:

1.3.1. Assessment and conservation of indigenous genetic resources in BIH under *in situ* conditions
1.3.2. Conservation of indigenous genetic resources in Bosnia and Herzegovina under *ex situ* conditions
1.3.3. Monitoring and conservation *in situ* by analysis of genetic variability

1.3.4. Protection of biological diversity against potential risk arising from GMOs introduction.

First steps in realization of the program are: identification and estimation of significance for indigenous genetic resources in BIH and creation of Action Plan for conservation of different herbal and animal genetic resources in BIH under *in situ* conditions.

Strategic direction 2 – Set up of conservation system and sustainable use of biodiversity

Setting up of biodiversity conservation system requires mechanisms for nature management to be developed. This includes, among others, economic functions and connections between adjacent sectors, and extremely important economic potentials for the development of natural management sector as a new branch of sustainable development in Bosnia and Herzegovina.

Target 2.1 – Setting up of financial current as a support to the system for conservation of biodiversity in BIH; includes following program of activities:

2.1.1. Setting up of financial base for the system of conservation and sustainable use of biodiversity in Bosnia and Herzegovina

2.1.2. Setting up of strong mechanisms for creation of economic obligations in sector of use of natural resources

2.1.3. Setting up and strengthening of economic incentive measures for nature preservation

2.1.4. Utilisation of foreign means.

Target 2.2 – Setting up of efficient institutional framework; could be achieved through following program:

2.2.1. Strengthening of legislative basis for nature protection;

2.2.2. Increased implementation of laws on nature protection in FBiH, RS and DB;

2.2.3. Strengthening of cooperation between entity institutions and laws;

2.2.4. Strengthening of cooperation between scientific institutions in the field of nature protection.

Target 2.3. - Inter-sectoral approach in nature management; requires a realization of following program of activities:

2.3.1. Harmonization of sectoral strategies with strategic targets related to biodiversity management;

2.3.2. Incorporation of biodiversity issue in sectoral policies and targets;

2.3.3. Development of integrated environmental management process.

Target 2.4 – Exchange of scientific and technological information in the field of biodiversity; is precondition of efficient system for conservation of biodiversity in BIH. Proposed is the next program of activities:

2.4.1. Strengthening of BH-CHM network for exchange of information on biodiversity

2.4.2. Promotion of practice on exchange of information

Target 2.5 – Maintenance of traditional knowledge and practice; is proposed as on of the bases for sustainable development of BIH, and especially as one connection between biodiversity management and human society. First steps in the realization of the target are:

2.5.1. Setting up of centres for maintenance of old knowledge and practice

2.5.2. Promotion of traditional knowledge and practices.

Strategic direction 3 – Decrease of pressures on biodiversity in BIH

During NBSAP project, many types of pressures attacking biodiversity in Bosnia and Herzegovina are identified. Specific pressures have an effect on each biodiversity group and level. In order to achieve strategic targets with goal of biodiversity conservation, NBSAP has identified necessity of decreasing and control of current pressures.

Target 3.1 – Controlling of habitats conversion; Transformation of habitats at present, mainly from primary into secondary or tertiary ones, including all of their structure and functions, represents in our society frequently occurring, yet less noticed and monitored phenomenon. Following program of activities has been determined:

3.1.1. Identification of sensitive areas and ecosystems;

3.1.2. Co-operation with physical planning sector;

3.1.3. Strengthening of environmental license tools.

Target 3.2 – Monitoring of the effects of global climate changes; Climate changes were emphasized in the Millennium Ecosystem Assessment as one of the strongest drivers for changes in biodiversity and its loss in general. Within ecosystems live populations of such species for whom the environmental conditions, measured on human timescale, are being either rapidly or moderately fast altered. The process of adaptation cannot be accelerated, but monitoring could be way in finding a solutions. The following program is proposed:

3.2.1. Monitoring of the effects that climate changes have got on state in species diversity in BIH

3.2.2. Monitoring of the effects that climate changes have got on state in ecosystem's diversity in BIH

3.2.3. Co-operation by the implementation of Convention on biological Diversity and Framework Convention on climate changes at local level.

Target 3.3 – Controlling of invasive species in BIH; Many invasive species are allied to different herbal genetic resources, such is the case with weeds that sustain within

crops, leaving agro ecosystems hardly ever and taking ecological niches of autochthonous flora. Invasive animals have been reaching the BIH territory spontaneously, especially through aquatic ecosystems. In order to ensure control of invasive species in BIH, NBSAP has determined following program of activities:

3.3.1. Identification of invasive species on the territory of BIH

3.3.3. Restrain of dispersal of invasive species on the territory of BIH

3.3.2. Monitoring of invasive species in BiH.

Target 3.4 - Public awareness rising; The environmental awareness level in citizens of Bosnia and Herzegovina is in general low, because of: achieved level of environmental education, presence of environmental issues in media, information on citizen rights, information on duties of governmental structures in charge, legal basis for environmental protection etc. Public awareness raising on importance and values of biodiversity in BIH is proposed by NBSAP, as program for the realization of target.

Determined tasks under program are.

3.4.1. Setting up of the system for environmental education;

3.4.2. Strengthening of NGO's activities;

3.4.3. Program for persistent biodiversity presence in media;

3.4.4. Connecting of NGO's sector and the system for monitoring and reporting.

2.2 Current status of NBSAP

Preparations of BiH NBSAP document (*Strategy and Action Plan for the Protection of Biological and Landscape Diversity of Bosnia and Herzegovina (2008-2015)* has extremely great importance for Bosnia and Herzegovina. This fact is in accordance with the state of biodiversity, but also with all other related aspects, such is sustainable development, intentions for accession to European community, etc.

After its finalization (spring of 2008), the document successfully passed the phase of the public discussions, and also the phase of expert reviews (by reviewers from the wider region).

Currently, this document is in the stage of adoption. According to the assigned procedure in Bosnia and Herzegovina, it is necessary for *Strategy* to obtain an approval of Entity's governments for the running of adoption procedure on the State level.

By the moment of preparation of the IV Report, the NBSAP document has reached the consent of the Federation Government. A complex administrative organization (Section 3.1.), on the one hand, and the overall socio-economic situation in Bosnia and Herzegovina, on the other hand, are both slowing down the process of adoption of the NBSAP document at the state level. As a project implementation unit responsible for implementation of the NBSAP preparation project and the Focal Point for the Convention on Biodiversity, the Federation Ministry of Environment and Tourism is making efforts to accelerate the process of adopting this highly important strategic document at the state level.

3 Sectoral and Cross-sectoral Approaches to Integration and Inclusion of Biological Diversity

3.1 Summary of the current situation in Bosnia and Herzegovina

Environmental protection represents one of the most important and most complex activities affecting more or less all organisations of human society. Laws and regulations in the domain of environmental protection define and regulate the

protection of all natural resources and the activities having a direct or indirect impact on the environment through sectoral operation policies.

The constitutional organisation of Bosnia and Herzegovina also defines the environmental protection policy-making, but on the other hand there are several levels of responsibilities and bodies that regulate them:

- The State of Bosnia and Herzegovina (the Ministry of Foreign Trade and Economic Relations)
- The entities:
  - The Republika Srpska
    - The Ministry of Spatial Planning, Civil Engineering and Ecology
    - Municipalities
  - The Federation of Bosnia and Herzegovina
    - The Federal Ministry of Environment and Tourism
    - Cantonal ministries (10 cantons/different ministries in the cantons)
    - Municipalities
- Brcko District (public utility sector)

What is apparent from this summary is a highly complex administrative structure in Bosnia and Herzegovina with the lack of those professional institutions that are not established, but that would otherwise regulate the environmental protection matters.

During preparation of this document, it is recognized that there is no single agency at the state level competent for the issues of nature protection. However, the establishment of an environmental protection agency was a subject of discussions between the entities. Establishment of the Environmental Management Committee between the two entities did not yield any anticipated results. According UNECE Report (UNECE 2004, 'Environmental Performance Review: Bosnia and Herzegovina'), the absence of the adequate institutions (agencies) dealing with and regulating the environmental protection issues at the level of Bosnia and Herzegovina, but also the absence of those institutions at the level of the entities and at lower levels of government, pose a particular problem of incoherence and incompatibility of the sectoral and cross-sectoral cooperation and activities. Adoption of the Law on Environment at the level of Bosnia and Herzegovina and establishment and functioning of the State Agency for Environment and Water management in Bosnia and Herzegovina are both identified as the main indicators of progress within the short-term environmental priorities of the European Partnership. This fact has also been confirmed in the published priority tasks of the Council of Ministers, where the enactment of an environmental protection law at the BIH State level was highlighted as one of the priority tasks. According to the Decision of the Council of Ministers of 16 May 2002, the Ministry of Foreign Trade and Economic Relations, as the competent ministry, has the responsibility to prepare the draft law at the state level. Apart from that, the amendments to the Law on the Council of Ministers and the Law on the Ministries have now long been in the parliamentary procedure. Adoption of these amendments should establish the firm legal grounds for establishment of the following two new ministries at the state level: the Ministry of Agriculture, Food and Rural Development and the Ministry of Science, Technology and Environment. The Law should also constitute the legal ground for establishment and financing of the future environmental agency and would thus lay down the principles and mechanisms for integration of the environmental issues into other sectors and would provide the foundation for a comprehensive system of financing and economic incentives for optimisation of environmental requirements and for minimisation of pollution and losses of natural resources. Such a law could help Bosnia and Herzegovina in the process of alignment with the EU requirements and fulfillment of the obligations arising from various international conventions. It would

therefore be necessary to point out that the adoption of this Law is one of the priorities for the entire Bosnia and Herzegovina.

3.2 Institutional framework

In the institutional framework of the Federation of Bosnia and Herzegovina, competences and functions are adequately defined by its various laws. However, the inefficiency of the key activities that also involve responsibility is reflected in:

1. the horizontal and vertical incoherence of the institutional frameworks and thus the incoherence of the sectoral and cross-sectoral activities,
2. the lack of appropriate capacities in the existing institutions,
3. the insufficient number of professional institutions.

Within the institutional framework of the Republika Srpska there is a clear definition of „vertical“ responsibility of the institutions and bodies of the entity and its municipalities, but also without sufficiently available funds, capacities, educated staff, etc.

- In the Federation of Bosnia and Herzegovina, pursuant to the Law on Environmental Protection (“Official Gazette of the Federation of Bosnia and Herzegovina”, no. 33/03) since 19 July 2006 the Environmental Advisory Council was established under the Decision to Appoint the Members of the Environmental Advisory Council (“Official Gazette of the Federation of Bosnia and Herzegovina”, no. 69/06) of 19 July 2006.
- In the Republika Srpska, pursuant to the Law on Environmental Protection (“Official Gazette of the Republika Srpska” no.53/02), since 11 November 2005 the Advisory Council for Environmental Protection was established under the establishment and appointment decision (the Decision of the Government of the Republika Srpska, no. 02/1-020-1386/05).
- The Environmental Protection Fund of the Republika Srpska (“Official Gazette of the Republika Srpska BiH no.51/02) since 29 July 2002.
- The Environmental Protection Fund of the Federation of BiH (“Official Gazette of the Federation BiH”, no. 33/03) since 19 July 2006.
- The Inter-Entity Body for Protection of Human Environment of the Republika Srpska was established on 16 November 2006 (“Official Gazette of the Republika Srpska of BiH”, no. 116/06) of 30 November 2006.

3.3 Implementation of efficiency objectives

The following strategic and operational objectives should be achieved:

1. To create a decentralised and efficient environmental administration capable of responding to the EU membership requirements.

1.1. To create professional capacities in the environmental sector of the Federation of Bosnia and Herzegovina

1.2. To achieve institutional strengthening in the environmental sector in the Federation of Bosnia and Herzegovina

1.3. Establishment of cross-sectoral cooperation and cooperation of the ministries dealing with the environmental segments with the Federation governmental institutes and administrations.

There are institutional elements in the Federation of Bosnia and Herzegovina for adequate environmental administration, but at the same time there are no sufficient numbers of well-trained skilled staff capable of managing the environment in accordance with the European standards and practices.

1.1. Creation of professional capacities in the environmental sector in the Federation of Bosnia and Herzegovina

Through the strategic and operational objectives, the plan is to enable the administration to meet the requirements, respond to the challenges of EU membership, and establish professional capacities in the environmental sector in the Federation of Bosnia and Herzegovina through the educational sector from the universities down to the lower levels of education, continuing professional training of the existing employed staff (certification by some of the internationally attested schemes) and continuing education of the industrial sector.

1.2. Institutional strengthening of the environmental sector in the Federation of Bosnia and Herzegovina

It is reflected in reorganization and human resource demands in both the Federation Ministry of Environment and Tourism and the cantonal ministries. Likewise, it is reflected in the operational establishment of administrations for inspections and the networking of professional institutions for providing the support to the Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina. Establishment of new and interconnection of the existing institutions is anticipated to be carried out in two stages.

Stage One – Establishment of new and reinforcement of the existing agencies at the Federation level, and so as follows: the Agency for Energy, the Agency for Nature Protection, to strengthen the coordination between the Federation Institutes for Agricultural Pedology, Geology and Geodetic and Property Law Affairs. The Hydro-meteorological Institute of the Federation of Bosnia and Herzegovina should be reinforced and trained to maintain a cadastre or inventory of emissions, a register of pollutants and solid waste and wastewater flows. An Environmental Fund should be established operationally. Institutional integration with the responsible water management agencies and the Federation Office of Statistics (establishment of a system for collection and processing of the data received from professional institutions).

Stage Two – stands for integration with the Republika Srpska and Brcko District, where these stages depend on the proposal of a new state-level environment law, since the EU integration process requires a cross-entity coordination and integration of all segments of the environment.

This objective would be accomplished through establishment of a permanent inter-ministerial body, by establishing cooperation between the government institutes and ministries of environment and tourism and other ministries engaged in the various segments of tourism.

1.3. Establishment of cross-sectoral cooperation and cooperation between the ministries engaged in the environmental segments and the Federation governmental institutes and administrations.

One of the most important operational objectives is integration of the sectoral policy in regard to the environmental protection issue through the strengthening of the environmental protection policy in other sectors (energy, trade, agriculture, industry, tourism, etc.). Likewise, in any case the plan is to strengthen the cross-sectoral coordination during the development of legislation-regulations (and also those regulations that are not yet adopted) that have a direct or indirect impact on the environmental protection.

3.4 International obligations

Bosnia and Herzegovina has endorsed the objectives of the UN Convention on Biological Diversity (CBD – Rio de Janeiro 1992) by ratifying the Convention in 2002,

which includes the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

By ratifying the Convention, Bosnia and Herzegovina has made a commitment to use all available mechanisms necessary to reduce the loss of biological diversity by 2010 at the global, regional and national levels.

Ratification of other Conventions, but also of the conventions that are not yet endorsed by Bosnia and Herzegovina, requires an even higher efficiency of the institutions and their staff in their implementation.

The strategy of Bosnia and Herzegovina along with the Action Plan for Protection of Biological and Landscape/Seascape Diversity (2008 – 2015) contains identification of the main strategic directions, programs, tasks and objectives. It was adopted on the basis of a Study called *Bosnia and Herzegovina the Country of Diversity*. Having in mind the registration of rare and unique forms, endemic and endangered species, the geographic and geopolitical position, approximation to EU and adequate implementation of international documents aimed at improving and utilising the natural resources and reducing the local poverty, the following main strategic directions are identified:

1. Reduce the current rate of loss of Bosnia and Herzegovina's biological diversity
2. Establish a system of conservation and sustainable use of Bosnia and Herzegovina's biological diversity
3. Reduce the pressure on Bosnia and Herzegovina's biological diversity

Once these directions have been identified, an Action Plan for their implementation was developed, including the indicators of effectiveness of the strategic measures.

The implementation of the tasks relating to biological diversity is monitored by the ministries in both entities, including the cantonal ministries in the Federation, supported by the expert work of the faculties, institutes and government administrations from the environmental protection domain.

The Ministry of Sarajevo Canton and the City of Sarajevo help the work of the National Museum, which is regarded as being the most relevant institution at whose disposal there are the data, collections, literature and depots tied to Bosnia and Herzegovina's biological diversity.

Also, the involvement of the non-governmental sector in the adoption of important strategic goals in Bosnia and Herzegovina has substantially promoted the conservation, management and sustainable use of biodiversity.

The CBD seeks to make analyses of the environmental impact for all projects, programs and plans that could have adverse effects on the biological diversity, so that these effects could be either avoided or reduced. This procedure is evaluated at the level of entity ministries and cantonal ministries in the Federation of Bosnia and Herzegovina.

Public dialogue and participation are of immense importance for the successful implementation of environmental impact analyses and their aim is to raise public awareness rather than the awareness of the specialised staff only.

Through international cooperation certain important projects in Bosnia and Herzegovina have been launched and implemented in the field of protection, promotion and relevant utilisation of biological diversity and for some of them the implementation stage is still ongoing.

- Some of the important international projects of relevance for the conservation and sustainable use of Bosnia and Herzegovina's biological diversity, are listed in Chapter 3 called Sectoral and Cross-Sectoral Approaches to Integration and Inclusion of Biological Diversity.
    - National Strategy and Action plan for Protection of Biological and Landscape Diversity of BiH (UNEP-GEF-CBD)
    - Development of a new management policy for the Hutovo Blato wetlands, Bosnia-Herzegovina (Life Third Countries)
    - Protection of the biodiversity of forests and mountains (GEF –WB)
    - Lower Neretva valley transboundary wetland
    - Living Neretva (WWF)
    - Establishment of Emerald Network in Bosnia and Herzegovina (EC)
    - Biodiversity of endemic development centers at the area of Herzegovina, as support to Targets 2010 (WB)
    - Evaluation of the biodiversity's state in ecosystems of karst fields on the territory of Federation BIH, as a contribution to topic programmes of the Convention on Biodiversity according to Targets 2010 (WB)
    - Evaluation of natural values of the environment in Brcko District (NGO Counterpart, USA)
    - Strengthening the Implementation Capacities for Nutrient Reduction and Transboundary Cooperation in the Danube River Basin (UNDP/BR)
    - Living Heart of Europe (WWF)
    - Dinaric Arc Initiative (WWF, UNESCO-BRESCE, UNDP, IUCN)
    - Protection of Biodiversity of The Sava River Basin Floodplains
    - Mainstreaming Karst Peatlands Conservation Concerns into Key Economic Sectors (UNDP-GEF)
    - Local Environmental Action Planning for Sustainability in South Eastern Europe (Sida- REC)
    - Support for Building National Capacity for Sustainable Environmental Management (UNDP)
    - Enabling Activities for the Preparation of Bosnia and Herzegovina's Initial National Communication (INC) to the UN Framework Convention on Climate Change (UNDP-GEF)
    - Study on possibility for establishment of protected area «Klekovaca-Lom» (Forest Development and Conservation Project (FDCP) TF052697)
    - The project of developing a National Monitoring System (RASMO) (EU)
- Projects implemented by national funds:
    - Project of Establishment of National Park "Prenj, Cvrsnica, Cabulja, Vran" (Federal Ministry of Environment and Tourism)
    - Project of Establishment of National Park "Bjelasnica, Igman, Treskavica, Visocica" (Federal Ministry of Environment and Tourism)
    - Strategy for Environment protection of Federation of BIH (Federal Ministry of Environment and Tourism)

- Preparation of background document for the purposes of compilation of the Study for proclamation of the regional park Sipovo and Mrkonjic Grad (Republic Institute for protection of Cultural, Historical and Natural heritage of the Republic of Srpska
- Study for the purposes of proclamation of the nature park Jahorina (Republic Institute for protection of Cultural, Historical and Natural heritage of the Republic of Srpska
- Establishing of protected cultural region “Bardaca-Donja dolina” (Republic institute for protection of cultural-historical and natural heritage of Republic of Srpska)
- Evaluation of the possible enlargement of the area of National Park “Sutjeska”, The Republic Institute for protection of Cultural, Historical and Natural heritage of the Republic of Srpska, Ministry of Culture and Education of Republic of Srpska -Forestry faculty in Banja Luka.)
- Project of Establishment of National Park “Una” (Federal Ministry of Environment and Tourism)
- Heritage List (National Commission for UNESCO of Bosnia and Herzegovina)
- Proposal for Network of Protected Areas of Republic of Srpska (Ministry of agriculture, water management and forestry of Republic of Srpska)
- Valorisation of natural values of biodiversity and ecodiversity on Mt. Igman and Mt. Bjelasnica (Institute for protection of natural, cultural and historical heritage of Canton Sarajevo)
- Valorisation of natural values in "Bijambare" area (Institute for protection of natural, cultural and historical heritage of Canton Sarajevo)
- Valorisation of natural values in "Skakavac" area (Institute for protection of natural, cultural and historical heritage of Canton Sarajevo)

Through the international cooperation and implementation of projects in the CBD context there is a particular objective which should be accomplished, which is to enable a comprehensive review for the purpose of planning, conservation, management and sustainable use of the natural habitats and natural resources.

At the same time, due to the lack of an umbrella Agency that would be responsible to deal with the protection issues, it is also of great importance to make sure that the various departments/sectors of the ministries, scientific and professional institutions, NGOs and other agencies implementing certain projects in Bosnia and Herzegovina, make available to the public their accomplishments and results that are achieved through the projects. Such ways of information exchange are very important for the purpose of a high quality and synchronised sectoral and cross-sectoral coordination in Bosnia and Herzegovina[1].

[1] *For more information see: www.fmoit.gov.ba, www.fbihvlada.gov.ba, www.sllist.ba, www.vlada.rs.net,*

4 Progress towards Achieving the 2010 Targets and Implementation of the Strategic Plan

4.1 Progress Towards Achieving the 2010 Targets

4.1.1 Key area: Protection of biological diversity components

Even though Bosnia and Herzegovina has not yet adopted the National Strategy and the Action Plan for the Protection of Biological and Landscape Diversity, there are still a number of scientific and professional activities going on in the country to support global targets in the protection of biological diversity. For the most part these activities are a result of a decade long guidance and orientation in the higher education, which is developing some broad taxonomic knowledge about all groups important for Bosnia and Herzegovina's biological diversity.

Nowadays, in the conditions of loss of biological diversity, both the scientists and the staff dealing with the nature management seek to establish and implement a simple but scientifically based methodology for the assessment of the status in regard of biological diversity of species, habitats and ecosystems.

Goal 1. Promote the conservation of the biological diversity at the level of ecosystems, habitats and biomes

Indicator: Trends in the areas of selected biomes, ecosystems and habitats

Within the Centre for Ecology and Applied Resources of the Faculty of Natural Sciences and Mathematics of the University of Sarajevo, a methodology was developed for valorisation of natural values, which was so far applied with success during the establishment of several new protected areas. The assessment of the area is done on the basis of a range of assessments for all present ecosystems.

The methodology is based on quantification of parameters that show the status of ecosystems and their eligibility for conservation. Each parameter is assessed on the basis of the ecosystem structure. By its composition the biocenosys indicates either a well-preserved primary status or changes of higher or lower magnitude, which are graded on the scale from 1 to 5. The first of the parameters of the status is the overall ecological status of the ecosystem (Table 6).

Table 6 Overall ecological status of the ecosystem

Impact on ecosystems	***Overall ecological status of ecosystem (geobiocenosys)***
Level 1	Ecosystem under a minor impact of anthropogenic factors, in a well-preserved condition with the unchanged structure compared with the primary status. There are indicators that suggest some initial changes emerging in the structure.
Level 2	Ecosystem under an impact of anthropogenic factors (logging, erosion, solid waste dumping, aerial pollution and the like). There are some changes in the structure and dynamics, including some elements of the abiotic component, and particularly soil and microclimate conditions.
Level 3	Ecosystem under a considerable impact of anthropogenic factors. Structure and qualitative and quantitative features of the abiotic component of the ecosystem are clearly undermined and altered (insolation, humidity, temperature conditions, hydrothermal regime of soil). There are indicators of degradation of the ecosystem.
	Ecosystem under an very considerable impact of anthropogenic factors. Structure and dynamics, including some elements of the

Level 4	abiotic component have changed by more than 60% compared with the primary status.
Level 5	Ecosystem under an extremely high impact of anthropogenic factors. Structure, dynamics and elements of the abiotic competent are more or less in irreversible condition compared with the primary natural status. It cannot be restored to the previous condition even by using all available technical measures. It has a clear tendency of turning (succession) into an entirely new ecosystem qualitatively and quantitatively.

Other status-related parameters are as follows:

Ecosystem carrying capacity	1: Ecosystem highly sensitive to influences, it rapidly changes its structure and dynamics and it is exposed to risks of disappearing completely or turning into another type of ecosystem. Capacity to sustain anthropogenic pressures is inconsiderable.
	5: Ecosystem with the possibility of maximum sustainability of anthropogenic pressures, which does not change its structure even when exposed.
Level of ecosystem degradation	P ecosystem of primary structure, S – ecosystem of secondary structure, T – ecosystem of tertiary structure (borderline types PS, SP, ST, TS and TP)

The following parameters are singled out as parameters of conservation priorities:

Species richness in the community (R)	From 1:Phytocenoses very rich in species (> than 100 taxa)
	Do 5: Phytocenoses poor in species (< than 10 taxa)
Rarity of communities (RA)	From 1: Very scarce flora and fauna, spread across a narrow area with capability of adapting to a narrow range of environmental factors (stenotopic)
	To 5: Community spread across a wider area with capability of adapting to a wide range of environmental factors (euritopic)
Ecosystem uniqueness (U)	1:Community highly contributing to uniqueness of space
	5: Community not contributing to uniqueness of space
Representativeness (RE)	1:Community highly representative for conservation designing
	5:Community insufficiently representative for conservation designing
Functionality of communities (F)	1:Community with highly emphasized function in the survival of the ecosystems (landscapes)
	5:Community with no apparent functions in the

	survival of the ecosystems (landscapes)
Threat level/endangerment (T/E)	1:Highly endangered community with a threat of complete disappearance from the given area
	5:Relatively stable community with consistent structure and dynamics

The given methodology uses the indicator values of species for the assessment of the ecosystem status, whereas a range of ecosystem assessments serves as the basis of spatial valorisation.

Goal 2. Promote the conservation of species diversity

Indicator: Trends in density and distribution of selected species

No red lists of flora, fauna or fungi species were ever established so far in Bosnia and Herzegovina where such species would be monitored on a regular basis.

However, since there are scientific data about the distribution of certain species that were subject to a series of scientific research, it would be possible to launch certain projects aimed at establishing any potential changes in their density and distribution.

Having in mind the fact that Bosnia and Herzegovina has clearly reaffirmed its commitment to the accession to the European Union, the process of approximation to European legislation and standards has already been initiated in the country. Since the process of identifying the scope of ecological network Natura 2000 requires an assessment of density and identification of distribution of species incorporated in the annexes to the Habitat Directive, it can be reasonably considered that the concerned indicator of biological diversity will be established relatively quickly in Bosnia and Herzegovina.

Indicator: Space under the protected areas

National protected areas

The size of the protected areas in Bosnia and Herzegovina is generally small. Apart from the great number of areas with high natural values on the one hand, but with severe developmental effects on the other hand, the status of protected areas in Bosnia and Herzegovina is awarded for an extremely small part of the territory (by 2005 it amounted to 0.67%). Such a low percent of protected territories takes Bosnia and Herzegovina to the very bottom of the European scale.

According to the Law on Nature Protection of the Federation of Bosnia and Herzegovina, there are four types of defined protected areas:

- Protected Nature Areas (IUCN categories Ia, Ib and IV);
- National Park (IUCN category II);
- Natural Monument or Feature (IUCN category III);
- Protected Landscape/Seascape (IUCN category V).

According to the Law on Nature Protection of the Republika Srpska following tipes of protected areas are defined:

- Protected Nature Areas;
- National Park;
- Natural Monument or Feature;
- Areas of habitats management;
- Protected Landscape/Seascape;
- Protected areas for resources management.

The National Environmental Action Plan, the Spatial Plan of Bosnia and Herzegovina and the Medium-Term Development Strategy all recommend the enlargement of the territories of protected areas.

Currently there are the following three (3) national parks in Bosnia and Herzegovina: the National Park „Kozara“ and the National Park „Sutjeska“ in the territory of the Republika Srpska, and the National Park „Una“ in the territory of the Federation of Bosnia and Herzegovina.

According to the level of biological diversity of species and ecosystem within their boundaries, the existing national parks constitute unique spaces at the national and international levels. The main purpose of the existing national parks is, under the national legislation, harmonised with the IUCN categorisation. The surface covered by the existing national parks is 40,525 ha. It should be emphasized that there is an enlargement plan designed for the National Park “Sutjeska”, but also, like in the National Park “Una”, there is a tendency of integration with the existing neighboring national parks in Serbia and the Republic of Croatia (Durmitor and Plitvice).

The most recently designated national park is the National Park „Una“, which was established back in 2008. At this point of time, the National Park “Una” is at the stage of establishing a public institution and implementing a spatial plan.

The national parks have defined their internal zones and in these zones certain types of activities are allowed. Thus in the heartland of the National Park “Sutjeska” there is one of the most renowned virgin forests in the Balkan Peninsula – the virgin forest of Perućica.

Way back in 1952, because of its breathtaking beauty and richness of its wildlife, Perućica Virgin Forest was formally designated as a woodland nature reserve. One of the most prominent landscape values of this virgin forest is Skakavac waterfall, which is 75 m high and makes a part of Perućica water stream. Perućica Virgin Forest, which covers the area of 1,291 ha, for the most part comprises climatogenic forest stands of beech and fir woods, and these stands host the most affluent riches of flora and fauna. Some of the beech trees are even several centuries old. They are also more than 50 m high and around 150 cm in diameter. The beech and fir forests occupy the area between the mountainous and sub-alpine beech forest stands, which, by their structure and distinct seasonal dynamics, represent the most complex ecosystems in the wider region. The animal world is rich and comprises a great number of species of mammals, birds, reptiles, amphibians, fish, and numerous representative species from the group of invertebrates. Here most common are: the bear, the chamois buck, the roe-buck, the wild boar, the mink and the beech marten, the wild cat, the fox and others; whereas among the birds there are: the golden eagle, the imperial eagle, the capercaillie, the peregrine, the red-tailed blackbird, the rock partridge, the hazel grouse and other species.

The National Parks in Bosnia and Herzegovina are managed by public institutions established by competent entity ministries. The internal bodies of organisation, protection, operations and other activities in the protected areas are all regulated by applicable legal acts of the public institutions, adopted by the competent authorities.

The national parks are institutions established by law and they have their own budgets. There are different ways of planning the funds for the personal budgets in Bosnia and Herzegovina. Some national parks are financed entirely or in part from the state budget, whereas some are funded from the revenues generated as part of their own sources and through various development projects. The national parks are managed by their management bodies (supervisory board or governing board) according to the management plan, if „any“, or according to the annual plan of activities, which is proposed to the management by the National Park director. The National Park management is supervised by a competent entity-level ministry.

There are currently 4 areas in Bosnia and Herzegovina protected as the Natural Monument category and all four are situated in the territory of the Federation of Bosnia and Herzegovina (the Natural Monument/Feature „Skakavac“, the Natural Monument/Feature „Prokoško jezero“, the Natural Monument/Feature „Vrelo Bosne“,the Natural Monument/Feature “Tajan“). The total size of this protected category amounts to 7,744.05 ha.

A natural monument represents an area with one or multiple specific, unique natural and cultural set of values. These protected areas are established for the purpose of protecting and preserving the permanent values, possibility of scientific research, education, suppression of uncontrolled use and support to the local community in accordance with the management targets/goals. In the Federation of Bosnia and Herzegovina, a natural monument is the responsibility of the cantonal authorities in the territory of which the monument is situated. The proposal to designate an area as a natural monument is provided by a competent cantonal ministry. In the Federation of Bosnia and Herzegovina, the cantonal legislatures are the authorities enacting the designation laws, whereas in the Republika Srpska the Government is the authority issuing a separate act to designate a certain area as a category of protected natural monument at the proposal of the Ministry in charge of environmental protection.

Currently, there are 2 areas in Bosnia and Herzegovina that are protected as the Protected Landscape/Seascape category and both of them are situated in the territory of the Federation of Bosnia and Herzegovina (Bijambare and Bentbaša).

These areas are managed on the basis of zoning and the Management Plan with separate regulations enacted by the internal acts of the institution managing the particular area. Recreational use of these spaces is allowed on the condition that it is not detrimental for natural values of the protected area.

This category protects 515.06 ha out of the total territory of Bosnia and Herzegovina.

In the Federation there are also 2 protected areas in the category Nature Reserve Parks (Blidinje and Hutovo Blato). These protected areas were designated on the basis of the Cantonal Law on Nature Protection (“Official Gazette of Herzegovina-Neretva Canton”, no. 04/05). Since the category Nature Reserve Park does not exist in the Federation Law, it would be necessary to adapt the current categories and the law.

Blidinje and Hutovo Blato both have their own budgets. They are funded from the cantonal budget, but in part by generating their own revenues.

Currently, the Nature Reserve Park „Hutovo Blato“ covers 7,411 ha, but the plan to expand its boundaries to 11,300 ha is about to be prepared. The Nature Reserve Park „Blidinje“ covers the area of 358 km^2.

<u>Internationally protected areas</u>

The first internationally protected area in Bosnia and Herzegovina is Hutovo Blato, which is situated in the southern part of the country, near the delta of the Neretva River. Due to its importance for migrations and habitats of a great number of swamp birds, Hutovo Blato is included into the list of specially protected Mediterranean areas according to the 1964 Barcelona Convention. The International Council for the Protection of Birds (ICPB) included Hutovo Blato into the list of internationally recognized areas of importance for birds (1998). Since 2002 Hutovo Blato has been on the list of swamps of international importance, which was created through the work of the Ramsar Convention.

Bardača, the second Ramsar area in Bosnia and Herzegovina, which was designated as such in 2007, is situated on the north of the country, on the alluvial plane of the Sava River. The third internationally recognized area of importance for birds is the Livanjsko Field, designated as such in 2008. Ramsar habitats also

represent highly important IBA areas of international significance. Currently, some more areas of Bosnia and Herzegovina are in the designation procedure.

Loss of the formerly protected areas

Recent developments in the history of Bosnia and Herzegovina have also had an extremely strong impact on the area of natural resource management. In the period before 1992, the 1965 Law on Nature Protection provided protection to 144 areas of different sizes and levels of protection in the territory of Bosnia and Herzegovina. This Law established 16 strict nature reserves, 9 administered (managed) nature reserves, 2 national parks, 6 special reserves, 10 reserves of natural landscapes and even 110 nature monuments, among which there were numerous Bosnia and Herzegovina's waterfalls, streams, springs, wells, mountain lakes, grottoes and caves.

The practical measures for protection of biological diversity have no longer been implemented in most of these areas even since 1992. In the post-war period, Bosnia and Herzegovina failed to take any appropriate actions towards re-establishing the status on the formerly protected areas and restarting the implementation of the appropriate protective measures.

Until the new Laws on Nature Protection (2002-2003) were put in place at the entity level, the protected areas had been completely neglected in its capacity as the area of special interest. Regrettably, even the adoption of the new laws has not changed the situation significantly for the existing protected areas, since the law did not foresee their revision and transformation into new categories introduced thereunder. Thus, many of the areas have remained outside the legislative framework. Even the data and relevant documentation about the formerly protected areas can hardly be made available today.

Inconsistent implementation of the applicable spatial plan has enabled the use and planning of the protected areas for some other purposes, such as the planned construction of hydro accumulations, construction of small hydroelectric power plants, opening of queries, construction of traffic infrastructure, forest logging, and other activities contributing to the conversion of the primary types of habitats, which as a result leads to the loss of biological diversity and particularly the loss of its specific forms indigenous to our country.

In the post-war period a certain number of new protected areas were established. However, even this process was beset with problems being, above all, a result of the complex administrative structure of Bosnia and Herzegovina, but also with all other aspects of the society, which prevent the efficient management of nature in our country.

The lack of conformity of the legislation at the cantonal levels with the Federation legislation constitutes one of the problems that follow the protection of nature in the territory of the Federation. Such legislation in some of the cantons is practically fully independent from the Federation legislation, which is reflected first and foremost in the non-conformity of the protection categories, which in consequence leads to incapability of functioning for the Federation laws in their full capacity.

Nature protection in the territory of the Republika Srpska is beset with similar problems in terms of defining and declaring the categories of protection, which is evident in the example of establishment of the protected forest areas Janj and Lom, beyond the categories prescribed by the Law on Nature Protection of the Republika Srpska.

The next level of problem seems to be about non-conformity and lack of cooperation in the entity level laws, which in consequence led to incapability of establishing operational databases about the protected areas at the national level in Bosnia and

Herzegovina. This situation resulted in incapability of adequate reporting to the European Environment Agency (EEA), but more importantly, incapability of planning any uniform protection of biological diversity at the level of the State.

Economic mechanisms that are supposed to ensure sustainability of the protected areas are either underdeveloped or absent. The largest protected area in Bosnia and Herzegovina, the National Park "Sutjeska", as a public company, is forced to provide a greater part of its profit through forestry-related activities, which also runs counter to the very definition of the given protection category.

The gravity of the current problems encountered in the establishment of protected areas, or protection of biological diversity at the state level, constitutes an extremely unfavourable ground for opening of the 2000 Natura process, which, from the point of view of European Integration, has an immense importance for Bosnia and Herzegovina.

Goal 3. Promote the conservation of genetic diversity

Bosnia and Herzegovina has a high degree of diversity in terms of indigenous animal and plant genetic resources. This is reflected in the high number of animal breeds Bosnian mountain horse, bovine cattle (buša and gatačko), sheep (pramenka), goat (Balkan rogata), swine (siska), dog (Bosnian tornjak) and pigeons. A great abundance of plant material is contained in fruits of the sorts such as cherries, apples, apricots, peaches, almonds, blackberries, blueberries and strawberries.

Different cultures in Bosnia and Herzegovina fostered the traditional practices of manufacture of special products made of cereals, grains, milk (particularly cheese production), viticulture and authentic products made of grape.

The goal could be achieved through the programs of activities of assessment and conservation of indigenous genetic resources in Bosnia and Herzegovina in the conditions of *in situ* and *ex – situ* methods.

The *ex-situ* form of conservation of natural gene pool was used in the nature management systems since the very dawn of human civilisation. Today it is intensively used when the natural gene pool is at risk of being obliterated from the world of wilderness, and in the areas of educational and recreational tourism and organised scientific research. A typical example of this type of conservation is the establishment of botanical gardens, greenhouses, gene banks, arboretums, etc. In Bosnia and Herzegovina this form of conservation is poorly represented and therefore it is necessary to take the following actions:

1. Make an inventory of gene resources of the Federation of Bosnia and Herzegovina and the Republika Srpska contained in domesticated plants and animals including the species most closely related to them dwelling in the wilderness,

2. Establish a gene bank of plant and animal gene resources contained in the indigenous gene pool,

3. Establish botanical and zoological gardens in the ecologically and climatically different areas

4. Define sources of funding and their strengthening.

4.1.2 Key area: Promotion of sustainable use

Goal 4. Promote sustainable use and consumption

Indicator: Forest areas, agricultural and aquacultural ecosystems are managed in a sustainable way

Bosnia and Herzegovina is characterised by substantial natural resources comprising a biological diversity, and other segments of nature (waters, mineral resources, land)

whose exploitation is in the direct relation with the situation in terms of biological diversity.

Use of the forest resources. The use of natural resources had and still has a decisive role in the development of human society in the territory of Bosnia and Herzegovina. In that process the forest ecosystems play the leading role, both in the direct generation of profit and through the use of other ecosystem services. However, today's sector of forestry in Bosnia and Herzegovina is defined by war events and post-war transition processes. Namely, in the past war, the forestry sector was the most expeditious source of revenues for the major part of population. While other branches of economy were mostly destructed in that period, the logging of forests was an activity capable of being organised and carried out in a relatively easy way. The post-war period in Bosnia and Herzegovina is characterised by the creation of a considerable number of private sawmills. Both public and private companies were involved in an intensive cutting of trees, whereas unprocessed wood was being exported outside the country. As a result of better organisation of the forestry sector and under the growing public pressure, today the logging has been reduced in part, whereas the process of forest certification has also started with success. Still, the consequences of the intensive logging are observable through the reduced total size of the areas covered by woods.

The cultural diversity in the territory of Bosnia and Herzegovina was one of the factors that contributed to the versatility of traditional knowledge about the use of the so-called non-timber forest products. However, the war-triggered population displacement and the resulting migration towards urban parts of the country have both led to an abrupt and rapid deterioration of the rural environment and the loss of the most part of the knowledge and practices used.

The diversity of the wild fauna has always been the solid ground for a traditional well-developed hunting, whereas the great abundance of ichthyofauna was the ground for angling and fishing on fresh and sea waters. Both activities require the development and establishment of monitoring.

Today, there is a great number of small companies in the territory of Bosnia and Herzegovina whose core activities include fish-farming and production of fish products. However, due to the aggravated transitional processes in the society, this activity, as one of the highly important potentials, is still not economically exploited to a sufficient extent.

In the pre-war period, different forms of agriculture of Bosnia and Herzegovina were labor-extensive, with utilisation of an extremely great deal of traditional knowledge and practices. In the lowland parts of the country there were fertile grain producing lands; in the highland parts of the country there was a developed fruit growing, while in the mountainous parts of the country there was a developed cattle breeding. Due to the already mentioned circumstances, today's situation is quite different. Namely, large parts of these areas are nowadays still infested with mines.

Even though there is an underdeveloped agricultural activity in Bosnia and Herzegovina, there have still been notable pressures identified as emerging primarily from an uncontrolled and excessive use of pesticides and fertilizers.

Out of approximately 5,000 forms of higher plants and fungi, around 600 species were traditionally used. Apart from the species used in agriculture, many species with medicinal, nutritional, vitamin and aromatic properties were also used. Due to unsustainable harvesting and collection, today's utilisation of these resources has a frequent impact on the structure and condition of the natural ecosystems. Production of safe food may provide the broadest opportunities for development in Bosnia and Herzegovina. However, fragmented estates, poor incentives and an underdeveloped market all have a considerable effect on organisation of this industry and thus it has

to be highlighted that the potential of sustainable development, which our country has in this direction, has not yet been put to sufficient use. This fact has great effects, since there are a great number of unemployed people and the population is in a difficult material and financial condition.

On the other hand, some traditional knowledge and skills have successfully been imparted to small companies that were mostly created through the dissolution of large-scale agricultural farms from the pre-war period. Dairy industry is particularly important in this segment in Bosnia and Herzegovina, since it makes use of some traditional knowledge and skills in the production, and so primarily in the production of a great number of cheese brands, by which Bosnia and Herzegovina is renowned across the region.

4.1.3 Key area: Address the threats against biological diversity

Goal 5. Pressures from habitat loss, land purpose change and degradation, including those from unsustainable use of water, reduced

The BiH National Biodiversity Strategy and Action Plan (NBSAP) is a document conceived by setting 3 main strategic directions that seek to achieve the Convention objectives. The strategic directions should be accomplished through the targeted national goals and/or projects.

Strategic direction 3 is titled *Reduction of Pressures on Biological Diversity of Bosnia and Herzegovina*. One of the objectives to be attained through this direction is to assume control over the conversion of habitats.

The habitats of primary ecosystems, which today in our country are those most affected by human activities, include: forest habitats, habitats of vegetation growing in rock cracks, predominantly represented in relict-refugial ecosystems of canyons and cliffs, and habitats of marsh/swamp types of vegetation, affiliated with high mountain bogs, alluviums and river estuaries but often with karst fields of Herzegovina.

Habitat conversion control in Bosnia and Herzegovina includes the completion of the following tasks:

- Preparation of the map of BiH sensitive areas
- Preparation of the map of BiH habitats and ecosystems
- Revision of the conservation status of areas protected by the SRBiH laws
- Identification of BiH sensitive habitats through the spatial planning documents of the Federation BiH, the Republika Srpska and Brcko District
- Increasing the capacity of spatial planning documents by enhancing the operations of inspection services
- Increasing the capacity of spatial planning documents by enhancing the operations of court services
- Strengthening of the mechanisms of expert assessment of the status of biological and landscape diversity in the process of acquiring the environmental permit
- Valorisation of the expert assessment of the status of biological and landscape diversity in the process of acquiring the environmental permit
- Monitoring of the biological diversity protection measures specified under the environmental permit

Goal 6. Control threats from invasive alien species

Indicator: Number of invasive species and costs incurred due to them

In the first report prepared under the Convention on Biological Diversity in 2008, it was the first time that known plant and animal invasive species were identified in the territory of Bosnia and Herzegovina.

Widespread among the invasive plant species in Bosnia and Herzegovina are: Amaranthus blitoides S. Watson, Asclepias syriaca L., Ambrosia artemisiifolia L., Artemisia verlotiorum Lamotte, Artemisia vulgare L., Bidens bipinnata L., B. frondosus L., B. subalaternus D.C., Coniza canadensis (L.) , Erigeron annuus (L.) Pers., Galinsoga ciliata (Rafin.) S. F., Galinsoga parviflora Cav., Helianthus tuberosum L., Iva xanthifolia Nutt., Picris eschioides L., Solidago gigantea Ait., Tagetes minuta L., Xanthium strumarium L. subsp. Strumarium et subsp. italicum (Moretti) D. Love, Bunias erucago L., Euclidium siriacum (L.) R.Br. in Aiton, Lepidium vrginicum L., Sisymbrium altissimum L., Coronilla valentina L., Sedum sarmentosum Bunge, Echinocistis lobata (michx) Torrey & A. Graz, Juniperus communis L., Euphorbia spinosa L., E. maculata L., E. nutans Lagasca, Amorpha fruticosa L., Lathyrus tuberosum L., Robinia pseudacacia L., Iris germanica L., Oxalis stricta L., Phytolacca americana L., Eleusine indica (L.) Geartn., Paspalum dilatatum Poir. in Lam., Paspalum paspaloides (Michx) Scribn., Sorghum halepense (L.) Pers., Polygonum communis L., Reynoutria japonica Houtt., Ailanthus altissima (Mill.) Swingle, Urtica dioica L., Echynocistis lobata (Michx) Torrey & A. Gray and Elodea canadensis Michx.

Among the most aggressive invasive species are: Ambrosia artemisifolia and Amorpha friticosa.

Most commonly widespread among the invasive animal species are: gudgeon (Lat. Gobio gobio), and crucian carp (Lat. Carassius auratus gibelio), which is very frequently found in warmer hydro accumulations.

Although the information about the presence of these species is generally known for Bosnia and Herzegovina, it would be necessary to point out that the system of monitoring of these species has not been put in place thus far. The amount of costs incurred as a result of expansion of the invasive alien species is not calculated yet through any indicator.

Goal 7. Address challenges to biological diversity from climate change and pollution

Among highly important projects targeted through the BiH NBSAP paper, particularly important are:

- Establishment of protected areas in accordance with the Laws on Nature Protection of the Federation BiH, the Republika Srpska, Brcko District and the IUCN standards, which will include those ecosystems and landscapes of Bosnia and Herzegovina that contain a substantial ground for maintenance of ecosystem functions at the current level.
- Establishment of a uniform process of nature management through decisions of responsible ministries
- Identification of objectives optimal for the process of sustainable development
- Preparation of guidelines for identification and conservation of biologically/ecologically specific forest-, agro- and hydro-ecosystems
- Development of capacities for implementation of the ecosystem approach to nature management
- Establishment of a system and development of human and technical capacities required for monitoring of climate change

4.1.4 Key area: Maintain goods and services of biological diversity as a basis for human well-being

Goal 8. Maintain capacity of ecosystems to deliver goods and services to support livelihoods

The recommended indicators were not yet analysed and put in place in Bosnia and Herzegovina. However, the maintenance of ecosystem services and goods, by keeping them at least at their current level, represents the main and general purpose

of the NBSAP paper. Achievement of this goal is set on its path through identification of a number of tasks that are supposed to be completed through individual projects. It is necessary to stress that the above group of projects, which are all of relevance for climate change, play the central role in the achievement of the maintained capacity of ecosystems to deliver services and goods.

4.1.5 Key area: Protect traditional knowledge, innovations and practices

Goal 9: Maintain socio-cultural diversity of indigenous population and local communities

Special consideration within the NBSAP process was given to the status of traditional knowledge and practices in the territory of Bosnia and Herzegovina. The loss of the said knowledge was particularly evident in the post-war period, when the process of progressive desertion of rural areas and abandonment of traditional ways of agriculture became highly distinctive. In the pre-war period, traditional knowledge was especially well-preserved in the local communities of central, highland areas of Bosnia and Herzegovina. Extremely turbulent developments in the war and post-war periods have completely depleted the said parts of Bosnia and Herzegovina demographically and in all other respects. Judging from the post-war social developments to date, no large-scale return of the displaced population to the local territories can be expected in a foreseeable future.

Therefore, the NBSAP paper recommends the following two objectives for preservation of the traditional knowledge and practices:

- Establishment of centres for preservation of ancient knowledge and practices and
- Promotion of traditional knowledge and practices.

The former objective could be achieved through the following projects:

- Preservation of ancient practices and knowledge through ecotourism activities of the protected areas and
- Administration of traditional knowledge and practices including the preparation of the corresponding databases and publications.

The latter objective can be achieved by being represented also as a particularly important source of revenues for Bosnia and Herzegovina's population. Namely, Bosnia and Herzegovina has enormous potentials for the production of healthy and safe food, free from being treated with pesticides and based upon the use of traditional technologies. Particularly important in that regard are the indigenous genetic resources identified through the First National Report under the Convention on Biological Diversity. These resources also include, for example, numerous domestic plant sorts and animal breeds, which, as a result of specificity of Bosnia and Herzegovina's circumstances, departed through history from the species of plants and animals closely related to them. So, for example, within the vegetable-growing resources, the following sorts of vegetables stand out in particular, by a variety of forms and special ecotypes: crumpets and pumpkins within the genus Cucurbita, beans (Lat. Phaseolus vulgaris: with *čućo, bubnjo, trešnjo, kućićar, mesni* as the locally known varieties), cabbages within the genus Brassica, pepper (Lat. Capsicum annuum), far-famed okras (Lat. Hibiscus esculentum), Semberian watermelons (Cytrullus colocynthus), muskmelons (Cucumis melo), and a range of potato sorts (Solanum tuberosum: with *romanijski, kupreški, fojnički, glamočki* as the locally known varieties, etc.).

The public media have a special role in preserving the traditional knowledge, practices and experiences of the local communities today. Although even today there are well-watched TV shows, by way of which a part of the traditional practices will

remain recorded forever, such activities may well need to be intensified and designated for the purpose of permanent preservation and maintenance of such practices.

4.1.6 Key area: Ensure a fair and equitable sharing of the benefits arising out of the utilisation of genetic resources

Goal 10: Ensure a fair and equitable sharing of the benefits arising out of the utilisation of genetic resources

Ensuring of a fair and equitable sharing of the benefits arising out of the utilisation of genetic resources was not considered in isolation from other required activities in the NBSAP process.

What the NBSAP paper recommends at the local level is the establishment of the financial flows which will provide for the distribution of funds generated from the utilisation of natural resources of Bosnia and Herzegovina across the particular sectors (especially the forestry sector) and their reimbursement as the funds which should serve to finance the nature management process.

4.1.7 Key area: Provide a commission fee from the relevant resources

Goal 11: The contracting parties have improved their financial, scientific, technical and technological capacities to implement the Convention

The above group of goals that are defined in the NBSAP paper should ensure some local financial resources for implementation of the Convention objectives. Among the proposed projects the following are particularly important for attainment of this particular goal at the local level:

- Establishment of the financial basis for the system of biological diversity conservation
- Establishment of strong mechanisms of economic commitments in the sectors using the natural resources
- Establishment and reinforcement of economic incentive measures as part of nature conservation activities,

Implementation of the above NBSAP goals should be achieved through realisation of 6 targeted projects, which include the establishment of a nature management sector and the involvement of public and private interests in this process.

On the other hand, the scientific, technical and technological capacities of Bosnia and Herzegovina required for the implementation of the Convention are not sufficiently developed. Accordingly, the NBSAP paper is setting the goals that have to do with the improvement of an institutional framework and building of human capacities. In this connection, in the coming period special attention should be paid to an intensive development of scientific and professional capacities, and in particular the capacities required for the process of identification and application for international funds for biological diversity protection.

Some of the important projects related to the conservation and sustainable use of Bosnia and Herzegovina's biological diversity are listed in Chapter 3 Sectoral and Cross-Sectoral Approaches to Integration or Inclusion of Biological Diversity.

4.2 Progress towards the objectives of the Strategic Plan of the Convention on Biological Diversity

Objective 1. The Convention fulfils the leading role in the international issues of biological diversity

The Convention fulfils its leading role. From the point of view of the national implementation of the CBD Strategic Plan, considering an extremely complicated

system of administrative governance on the one hand, but also an insufficiently developed institutional framework on the other hand, Bosnia and Herzegovina highlights the difficulties and problems at the local level.

1.1 The Convention sets up the plan of global biological diversity

Bosnia and Herzegovina takes part in the implementation of projects aimed at conservation of the global biological diversity, funded by international organisations.

1.2 The Convention promotes cooperation between all relevant international instruments and processes for advancement of cooperation

All projects implemented in Bosnia and Herzegovina in the field of biological diversity protection have the strong backing in the Convention objectives.

1.3 Other international processes are actively supporting the implementation of the Convention in a way consistent with their operating frameworks.

Harmonisation of the local nature protection legislation with European standards is also based on the Convention objectives.

1.4 The Cartagena Protocol for Biosafety is implemented worldwide

Harmonisation of the local food safety legislation is carried out in accordance with EU standards, and particularly with the Cartagena Protocol.

1.5 Concerns about biological diversity are integrated in the relevant and other sectoral plans, programs and policies at the regional and global levels

The BiH NBSAP paper strongly recommends a strict inclusion of concerns about biological diversity in all relevant sectors of the society (forestry sector, agricultural sector, energy sector, tourism sector, etc.). It also recommends the establishment of the nature management sector, as it is a missing area of the great importance for Bosnia and Herzegovina.

1.6 All parties cooperate at the regional and subregional levels in the implementation of the Convention

Bosnia and Herzegovina participates in the regional projects aimed at implementing the Convention on Biological Diversity. Within the state of Bosnia and Herzegovina, which is made of administratively, territorially and regionally different subdivisions/units, the integration and joint implementation of the Convention objectives are extremely important. In this sense, the NBSAP paper recommends the development and realisation of common activities, but particularly those of relevance for the establishment of the European ecological network Natura 2000, about the assessments of the status of biological diversity of species, habitats and ecosystems and the situation monitoring.

Objective 2. The parties have improved the financial, human, scientific, technical and technological capacities for implementation of the Convention

In Bosnia and Herzegovina, it is necessary to establish an effective sector of nature management whose task would be to implement the Convention objectives and protect Bosnia and Herzegovina's biological diversity, establish the sustainable use of Bosnia and Herzegovina's biological diversity and the equitable sharing of benefits arising out of the utilisation of Bosnia and Herzegovina's genetic resources.

The current capacities for the implementation of the Convention are quite clearly insufficient. In order to provide for the sustainability of the planned sector and the implementation of biological diversity conservation tasks recommended by the NBSAP, the recommendation is also to undertake the projects enabling the establishment of financial flows from the local level required for the implementation of the Convention.

2.1. All parties have adequate capacities for the implementation of natural activities in the National Biodiversity Strategy and Action Plans.

No.

2.2. Developing countries, the Contracting Parties to the Convention, particularly small island States and transitional countries have sufficient funds at their disposal required for the implementation of three Convention objectives.

For the time being, Bosnia and Herzegovina does not have the sources for independent implementation of the CBD objectives.

2.3. Developing countries, the Contracting Parties, particularly small island States and transitional countries have at their disposal the increased resources and transfer of technology required for the implementation of the Cartagena Protocol on Biosafety

For the time being, Bosnia and Herzegovina does not have the sources for independent implementation of the Cartagena Protocol.

2.4. All parties have adequate capacities for the implementation of the Cartagena Protocol on Biosafety

For the time being, Bosnia and Herzegovina does not have the sources for independent implementation of the Cartagena Protocol.

2.5. Technical and scientific cooperation makes a significant contribution to capacity building

The proposed NBSAP paper recommends the development of scientific and professional capacities for the implementation of the CBD and international documents supporting it.

Objective 3. The National Biodiversity Strategy and Action Plans aimed at integrating the biological diversity into the relevant sectors, which serves as an efficient operating framework for the implementation of the Convention objectives.

Like the entire NBSAP process in Bosnia and Herzegovina, the proposed document also seeks to identify feasible and effective objectives, processes and projects leading to implementation of the Convention. Special attention was paid to integration of biological diversity into different sectoral policies. For the time being, the most efficient way is the preparation of guidelines for the particular sectors, with the prior gap analysis of objectives of the particular sectoral strategies not converging with the implementation of the Convention.

3.1. Each party has its own efficient national strategic plans and programs in order to ensure the national operating framework for the implementation of three Convention objectives and for the setting of the national priorities.

The NBSAP paper prescribes three strategic directions for conservation of Bosnia and Herzegovina's biological, ecological and landscape diversities (see Chapter called NBSAP Paper). Each direction is further developed through the priority objectives, and they can be achieved through the implementation of projects whose contents are also identified through the NBSAP.

Since the State of Bosnia and Herzegovina became recognized as a separate state at the time when the Convention on Biological Diversity was initiated, and since in the pre-war period it did not have any regulated documentation concerning the forms of biological diversity in its territory, the priority tasks should be focused on the inventory of biological diversity at the level of genes, species, ecosystems and landscapes. Following the inventory, it would be necessary to make a step towards identifying the endangered forms of biological diversities, and then make an effort to conserve different categories of endangered forms at the different levels of biological diversity. Through the NBSAP process, the conservation is conceived as a sustainable

process that will lay down the foundations for a long-lasting protection of Bosnia and Herzegovina's functional biological diversity.

3.2. Pursuant to the Cartagena Protocol each party has a regulatory operating framework established and functional.

For the time being, the Cartagena Protocol has laid down only partial foundations in the national institutional framework in Bosnia and Herzegovina.

3.3. The biological diversity concerns are integrated into the relevant national sectoral and other cross-sectoral plans and policies

For the time being, the integration of biological diversity into the sectoral policies and strategies exists as one of the priorities of the NBSAP paper, which is still not acknowledged as a document by the relevant national authorities.

3.4. Priorities in the national biological diversity strategy and action plans are actively implemented in order to accomplish the national implementation of the Convention as a substantial contribution to the global collection of biological diversity.

Objective 4. There is a better understanding of importance of the biological diversity and the Convention and this has led to a more extensive engagement in the society for implementation.

Bosnia and Herzegovina joined the Convention on Biological Diversity in 2002. Since the Third National Report (which launched the process of reporting under the CBD) was prepared to date, much broader, detailed and comprehensive knowledge about the international process of biological diversity protection has been developed as headed by the Convention. Through the preparation of the reports, in particular through the First National Report, which was being prepared by a great number of scientists from all over Bosnia and Herzegovina and in which a great number of stakeholders participated, a far greater understanding was developed about how important were the Convention and implementation of its objectives. On the other hand, information about the importance of the CBD found its place also in the educational programs, as part of the global policy and the need for protection of biological diversity in the conditions of global climate change and other drivers of loss of biological diversity, identified by the Millennium Ecosystem Assessment.

4.1. All parties pursue the communication, education and public awareness strategies and the promotion of public participation in the support to the Convention.

In addition to the educational system, increasingly more often the information about the Convention finds its place in the different promotional materials published by various non-governmental organisations. In the future, such an approach should result in a high level of overall awareness of the global actions taken to protect the biological diversity, recognition of its one's own problems and needs and of the possibility of participating in some more extensive activities and projects.

4.2. Each party to the Cartagena Protocol promotes and facilitates the public awareness, education and participation for the support to the Protocol

For the time being, the Cartagena Protocol has laid only partial foundations in the national institutional framework in Bosnia and Herzegovina.

4.3. Local communities are considerably involved in the implementation and processes of the Convention at the national, regional and international levels.

The NBSAP paper recommends, wherever possible, the involvement of the local community in the process of decision-making in regard to the decisions relevant in the ecosystem approach. Since the first principle of the ecosystem approach defines the societal choice as the decisive factor in the utilisation of ecosystem resources, it is thus of primary necessity to put the EIA in place in such a way to enable the local community to participate in the process actively as a stakeholder.

4.4. Key actors and donors including the private sector are engaged in the partnership for implementation of the Convention and integration of everything in relation to biological diversity into its relevant sectoral plans, programs and policies.

The NBSAP paper recommends the involvement of the private sector in the biological diversity protection policy. The most efficient method for this involvement would be to open the protected areas for interests of the private sector. Therefore within the objective 2.1.3. Establish and reinforce the economic incentive measures in the nature conservation activities, recommends the project 2.1.3.2. Development of a program for introduction of the private sector into the management of protected areas.

APPENDIX 1 Information concerning reporting party and preparation of national report

Contracting Party	***Bosnia and Herzegovina***
NATIONAL FOCAL POINT	
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CONTACT OFFICER FOR NATIONAL REPORT	
Full name of the institution	***Nature Park "Hutovo Blato"***
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SUBMITTING	
Signature of officer responsible for submitting national report	
Date of submission	

Preparation of the fourt national report

The Fourth National Report of Bosnia and Herzegovina on Biological Diversity was created within the project financially assisted by the Global Environmental Facility (GEF) and implemented by the United Nations Development Programme (UNDP). The Project was implemented during the period of September 2008 to March 2010. Coordination of the preparation was undertaken by the Ministry of the Environment and Tourism of the Federation of Bosnia and Herzegovina (as NFP – National Focal Point for the Convention on Biodiversity) and the UNDP Country Office in Bosnia and Herzegovina which initiated preparation of this Report. The Report was prepared in accordance with Article 28 of the Convention and the Decision VIII/4 of the Conference of the Parties, on the basis of the guidelines provided by the Convention Secretary.

The purpose of this Report, which the Convention on Biological Diversity requires from the Contracting Parties, is to examine the degree of achievement of 2010 Goals at the national level of the Convention implementation. To that end, each country was required to examine and analyze the mechanisms it established for implementation of these goals. The mechanisms for implementation of the 2010 goals include, in the first place the enactment of various laws, rulebooks and other acts, and thereafter the implementation of projects, initiatives, etc. Bosnia and Herzegovina joined the Convention on Biological Diversity as late as in 2002, and it was only in the period after the 2010 Goals were established that it actually started with implementation of the project of preparing the First National Report, the Second National Report and the Strategy for the Protection of Biological and Landscape Diversity (the National Biodiversity and Strategy Action Plan - NBSAP). Accordingly, only those results of the said project which were thus far implemented could be used as the basis for implementation of the 2010 Goals in Bosnia and Herzegovina. Therefore, the publication titled as „Bosnia and Herzegovina – the Land of Diversity “ was used as the basis of the Fourth Report to the CBD and this publication was prepared for the purpose of reviewing the biodiversity of Bosnia and Herzegovina as the First National Report to CBD, but also the Strategy Paper with the Action Plan for Protection of Biological and Landscape Diversity of Bosnia and Herzegovina was prepared for the purpose (www.fmoit.gov.ba).

The Fourth National Report of Bosnia and Herzegovina to the UN CBD has a clearly established structure which shows: a very concise review of biodiversity of Bosnia and Herzegovina, a review of the strategic goals and tasks established under the NBSAP, the proposed mechanisms for implementation of the individual 2010 Goals, the proposed mechanisms for implementation of the Global Plant Protection Strategy and the degree of implementation of the Work Program about Protected Areas of the Convention on Biological Diversity in Bosnia and Herzegovina. Accordingly, the structure established by the Convention Secretariat has necessitated the development of the following chapters:

Chapter One -	Review of the Status of Biodiversity, Trends and Threats
Chapter Two -	Status of the document *Strategy of Bosnia and Herzegovina and Action Plan for Biodiversity and Landscape's Protection* (NBSAP BiH 2008-2015)
Chapter Three -	Sectoral and Cros-sectoral Approaches to Integration and Inclusion of Biological Diversity
Chapter Four -	Progress towards Achieving the 2010 Targets and Implementation of the Strategic Plan

Appendix I - Information Concerning the Reporting Party and the Preparation of the National Report

Appendix II - Progress Towards the Targets of the Global Strategy for Plant Conservation and the Programme of Work on the Protected Areas

The Report was prepared by the Project Team composed of national experts Ms. Senka Barudanović, who was in charge of chapters 1 and 4 and one section of Appendix 2 (Progress towards Targets of the Global Strategy for Plant Conservation), and Mr. Stjepan Matić, who was in charge of chapters 2 and 3 and one section of Appendix 2 (Programme of Work on the Protected Areas).

As it is already indicated, the basis used for the Fourth National Report to the UN Convention on Biological Diversity was the publication „Bosnia and Herzegovina – the Land of Diversity ", but also the information and data were used that were received from the relevant ministries of environment in Bosnia and Herzegovina, as well as various publications, reports and other strategic documents received from different organizations.

The Final Draft of the Report was available on the web pages of the Ministry of the Environment and Tourism from November 2009 to January 2010, for the purpose of collecting comments, suggestions and opinions of the interested public. On January 20th 2010, a public presentation of the Final Draft of the Report was held. Experts have examined the incoming observations and reached a consensus on the text of the individual chapters.

APPENDIX 2 Progress towards targets of the global strategy for plant conservation and programme of work on protected areas

II.a Progress towards Targets of the Global Strategy for Plant Conservation

A. Understanding and documenting plant diversity

Target 1 – A widely accessible working list of known plant species, as a step towards a complete world flora

Ecological heterogeneity of Bosnia and Herzegovina's space, geomorphologic and hydrological diversity, specific geological past, and diversity of its ecoclimate have also caused an especially rich flora in the territory of our country. A high species diversity of its flora is based on the diversity of the groups of cyanobacteria, algae and vascular plants (bryophytes, pteridophytes and spermatophytes).

Bearing in mind the heterogeneity of water and dump habitats, and the existence of development centres, it can be considered that at least one-third or organisms from the groups of cyanobacteria and algae of Bosnia and Herzegovina is unknown to the scientific community. This in particular refers to the world of algae in the area of mountain low and high peatland bogs, numerous mountain and highland springs, springs in the upper parts of karst sinking streams, and water courses in the tertiary flora refugiums. The special value in the cyanobacteria and algae diversities is attributed to the forms characteristic of the thermal and mineral springs, and specifically the algae growing on calcareous sinter islands, algae growing on caves and half-caves, etc.

Spermatophytes are most numerous and most diverse among the vascular flora of Bosnia and Herzegovina. These are the plants of terrestrial habitats and only a few of them are adapted to the water environment conditions. This group of organisms makes the backbone of the living world of Bosnia and Herzegovina and function as the main factor in shaping the landscape diversity. The most distinctive specificity of BiH flora are numerous paleo- and neoendemic species, but also tertiary and glacial relicts which remained in the various types of refugiums such as cliffs, canyons and mountain cirques.

The strategy of Bosnia and Herzegovina for protection of biological and landscape diversity has set the clear directions in respect to Bosnia and Herzegovina's diversity. The first direction (A: Reduce the loss of Bosnia and Herzegovina's biodiversity) is differentiated between several objectives that should be reached through the specific tasks and projects. The first objective is to Assess the Level of Species Diversity of Bosnia and Herzegovina, whereas the first task towards achieving this objective is to prepare Bosnia and Herzegovina's flora. To date Bosnia and Herzegovina has not achieved this very important project, although there is a mass of collected scientific floristic data.

Target 2 – A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels

The overall assessment of the conservation status of Bosnia and Herzegovina's flora has not been made. However, based on the current pressures, it is possible to speak about the level of endangerment of the species from all plant groups.

When referring to algae, this has a particular bearing upon the species found in the area of mountain low and high peatland bogs, mountain and highland springs, springs and upper parts of the karst sinking streams, a type of the water courses in the tertiary flora refugiums, the forms characteristic of the thermal and mineral

springs, and specifically the algae growing on calcareous sinter islands, algae growing on caves and half-caves, etc.

Particularly endangered species of moss are those inhabiting marsh habitats of karst fields (Table 7)

Table 7 - Some endangered species of moss in Bosnia and Herzegovina

Taxon	**Habitat**	**Locality**
Drepanocladus sendtneri (Schimp.) Wstf. f. *gracilis* Sanis	Bog meadows and moist places	Kupresko field
D. *aduncus* (Hedw.) Moenkm. var. *capillifrons* (Wstf.) Mkm.	Swamp meadows, bogs	Livanjsko field
D. r*evolvens* (S. W.) Wstf. var. *intermedius* (Lindb.) Grout	Marshes	Livanjsko field
Racomitrium microcarpum (Hedw.) Brid.	Epilithe on moist rocks	Livanjsko field, Zdralovac
Polytrichum strictum Smith.	Bogs, swamp forest meadows	Livanjsko field – Sajkovici
Hygrohypnum eugyrium (B. S. G.) Broth. var. *mackayi* (Hedw.) B. S. G.	Moist habitats in lower mountain belt	Livanjsko field - Busko blato, Glamocko field
Hygroamblystegium fluviatile (Hedw.) Loeske f*. spinifolium* Mkm.	Hydrophyte, on stones and wood construction	Livanjsko field
Dialytrichia mucronata (Brid.) Broth..	Epilithe, hygrophyte	Source of Pliva River

Due to differing pressures on Pteridophyte habitats (logging, quarries, water pollution, global climate change followed by acid rain) today there is an evident endangerment of particular species and even whole genera. This group includes *Notholaena maranthe, Asplenium cuneifolium* and *Selaginella helvetica* on aged volcanic rocks, *Ceterach javorke, Asplenium lepidum* in the cracks of carbonate rocks, *Asplenium fissum* in the cracks of rocks of the mountainous zone, all species of the genus *Lycopodium, Salvinia natans, Marsillea quadrifolia*, and black spleenwort fern *Asplenium adianthum nigrum*.

As it is already indicated, spermatophytes are the most numerous and best studied group of plants. It is estimated that there are around 450 endemic taxa in the flora of Bosnia and Herzegovina. Since no assessment of the conservation status has been made so far according to the international criteria, it is impossible to tell how many species are endangered in the territory of our country. Even though there are a great number of scientific research papers dealing with this matter, their results have not been taken to further processing for the purpose of documenting the conservation status.

The next objective specified by the NBSAP BiH, as part of the direction called *Reduction of the loss of biodiversity*, relates precisely to the Assessment of the Conservation Status of Species Diversity of Bosnia and Herzegovina. One of the projects to achieve this objective should prepare the Red List and Book of the Plant Species of Bosnia and Herzegovina.

Target 3 – Development of models with protocols for plant conservation and sustainable use, based on research and practical experience

Within the new conservation actions taken in Bosnia and Herzegovina, a new model of valuation of natural values is also being developed (see page 28). Over the past years the said model has become part of the protocol applicable in the establishment

of a few smaller protected areas. However, the model is conceived so as to estimate the value of an ecosystem as a potential conservation object. Special models for the conservation and sustainable use of plant species have never been developed so far, even though under the pre-war legislation 7 plant species were protected by law in the territory of Bosnia and Herzegovina.

B. Conserving plant diversity

Target 4 – At least 10 % of each of the world's ecological regions effectively conserved

Table 8 – Assessment of the level of conservation across ecosystems

Type oft he ecosystem	% under protection
ecosystems of rock crevices within mediterranean landscapes	**0**
ecosystems of rock crevices within continental landscapes	**0**
ecosystems of rock crevices within alpine landscapes	**4**
ecosystems of screes	**4**
ecosystems around snow patches	**4**
ecosystems of alpine grassland on carbonate	**5**
ecosystems of Sub-alpine grassland on carbonate	**5**
ecosystems of alpine grassland on acid ground	**3**
ecosystems of Sub-alpine grassland on acid ground	**6**
ecosystems of alpine shrubs	**3**
ecosystems of raised bogs	**3**
ecosystems of xerophilous grasslands within continental landscapes	**2**
ecosystems of mesophilous meadows of continental valleys	**0**
ecosystems of mesophylous meadows of inner mountains	**1**
ecosystems of meadows on karst fields	**0**
ecosystems of hygrophilous meadows within continental landscapes	**1**
ecosystems of hygrophilous meadows within pannonic landsacapes	**1**
ecosystems of mediterranean wetlands	**10**
ecosystems of brakish waters	**3**
ecosystems of mediterranean rocky-grasslands and karst	**0**
ecosystems of Sub-mediterranean rocky-grasslands and karst	**0**
ecosystems of mediterraneo-montane rocky-grasslands and meadows	**0**
ecosystems of rocky-graslands on serpentine	**0**
ecosystems of sea cliffs	**0**
ecosystems of littoral sea belt	**0**
ecosystems of blanket bogs	**0**
ecosystems of marshes and wetlands	**2**
ecosystems of fresh waters	**1.5**
ecosystems of riparian area of fresh waters	**0**
ecosystems with flowering macrophytes	**2**
ecosystems around springs and brooks (rivulets)	**1**
ecosystems of tall herb communities	**0**
ecosystems of Sub-mediterranean oak forests	**0**
ecosystems of oak forests within continental landscapes	**1**
ecosystems of pannonic oak forests	**0**
ecosystems of mediterraneo-montane beech forests	**0**
ecosystems of upland's beech-fir forests	**2**
ecosystems of Sub-alpine beech forests	**1**
ecosystems of pannonic beech forests	**0**
ecosystems of hygrophilous woods with alder	**0**

ecosystems of polydominant refugial communities	**0**
ecosystems of upland's decidous forests	**1**
ecosystems of Sub-alpine decidous forests	**1**
ecosystems of woodland with mountain pine	**2**
ecosystems of endemic pine foreststst	**2**
ecosystems of black pine forests on dolomite	**0**
ecosystems of black pine forests on serpentine	**0**
ecosystems of mediterranean evergreen forests	**0**

Table 2 shows the largest groups of ecosystems by types of habitats in Bosnia and Herzegovina. Even by an assessment of this kind we can come to realise that there is an extremely high diversity of habitat and ecosystem types in Bosnia and Herzegovina. However, the current percentage of protection is not in tune with their diversity and also with the demand for protection of country-specific biological diversity at all levels.

Target 5 – Protection ensured for 50% of areas that are of the highest importance for plant diversity

The Strategy paper for Protection of Bosnia and Herzegovina's Biological and Landscape Diversity has identified the areas of the highest importance for Bosnia and Herzegovina's biological diversity. Plant diversity is indeed the basis that should be used to distinguish or set aside these areas from the entire territory of Bosnia and Herzegovina.

Table 9 – Specific landscapes and focal points

SPECIFIC LANDSCAPES	**FOCAL POINTS**
Mountain Landscapes	Plješevica, Klekovača, Osječenica, Šator, Dinara, Cincar, Vitorog, Vran, Čvrsnica, Čabulja, Prenj, Velež, Vranica, Vlašić, Bjelašnica, Jahorina, Crvanj, Zelengora, Volujak, Maglić, Gat. Bjelašnica, Orjen, Veliki Stolac
Canyons and Cliffs	Gornja Neretva, GornjaUna, central Vrbas, central Bosna and upper Drina, upper Sana
Karst Fields	Ždralovac with Livanjsko field, Glamočko, Kupreško, Duvanjsko, Mostarsko Blato, Posuško,Ljubuško, Popovo Field, Dabarsko, Fatničko, Nevesinjsko and Gatačko karst field
Marsh Areas	Mountain lakes, Plivsko lake, Hutovo blato with the delta of Neretva river, marsh parts of karst fields, highland bogs on mounts Romanija, Ozren, Zvijezda, lowland highly floodable bogs, Posavina (Tišina, Bardača, Brčko, Rača) Spreča valley
Forest Ecosystems	Klek peninsula, surroundings of Stolac, mounts Prenj, Čvrsnica, Orjen, upper Neretva, mounts Velež, Veliki Stolac, Konjuh, Majevica, Kozara, Plješevica, Cincar, Bjelašnica, Vlašić, Vrataljica (Konjic)

The primary objective of the Strategy is to identify and classify the types of ecosystems and habitats of Bosnia and Herzegovina, after which it would be necessary to attain the objectives relating to conservation of biologically most valuable ecosystems, which are situated in the high mountain, relict-refugial, karst and marsh landscapes, and in the forest ecosystems of the mountain zones of Bosnia and Herzegovina.

Target 6 – At least 30 percent of productive land is administered in the way consistent with the conservation of plant diversity

Achievement of this target in Bosnia and Herzegovina is connected almost exclusively with the possibility of establishing Natura 2000 network. This network in the territory of Bosnia and Herzegovina should include all agricultural and forest areas which cover the types of habitats referred to in Annex I, or the habitats of the species from the other annexes to the Habitat Directive, which are found to have met the required criteria. Certain activities on the establishment of this network in the territory of Bosnia and Herzegovina have already started, primarily at the level of aligning the national legislation with the European standards.

Target 7 – 60% of the world's endangered species conserved in-situ

Bosnia and Herzegovina has not yet implemented the projects of identification of the Red List of Plants, which would by all means include the world's endangered species dwelling in the territory of our country, which are found to have the adverse status of populations.

This project represents a precondition for realisation of Target 7 of the GSPC.

Target 8 – 60% of endangered plant species in accessible ex-situ collections, preferably in the country of origin, and 10 percent of them included in recovery and restoration programs

As far as the *ex-situ* conservation is concerned, Bosnia and Herzegovina is not currently in a position to provide for the conditions of such conservation of species, and also the programs for recovery of endangered species have not yet been developed.

The Botanical Garden of the National Museum started with its work immediately after the Museum was established (in 1888), and it was formally established by Karlo Maly. Many collections were completely destroyed in the past war. After that period no funds were allocated for the Garden's revitalisation and reconstruction, and thus this part of the Museum, like other important cultural and scientific institutions, is not capable of undertaking any activities of the efficient *ex-situ* conservation.

On the northern slopes of Mount Trebević there is an *Alpinetum*, or a mountain botanical garden, that stopped to serve its purpose a long time ago. The Alpinetum was established by V. Gligić and it was used for conservation of many glacial-relict species.

A *Mediterranetum* or a Mediterranean botanical garden on Klek peninsula was established fifty years ago for the purpose of conserving the Mediterranean flora and fauna. Nowadays, it no longer serves its original purpose either.

Target 9 – 70% of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained

It is considered that over time Bosnia and Herzegovina has lost the elemental data about the onetime extremely rich genetic diversity of plants and animals. When it comes to the diversity of plant genetic resources, we can still speak of a substantial gene pool. Bosnia and Herzegovina is known for its abundance of valuable sorts of vegetables, fruit and grains, which today exist in specific forms in the particular parts of its territory.

However, the legislation that would regulate the issues of inventory and protection of this type of gene pool still does not exist. Particularly important is the fact that the scientific inventory taking about genetic diversity has yet to be done, and that the gene bank has not been established, where Bosnia and Herzegovina's gene pool would be permanently conserved in accordance with the applicable international regulations.

The onetime immeasurable abundance of the indigenous (or deep-rooted and assimilated) sorts of apples, pears, plums and other fruit, vegetables, „white wheat" and other cereals, have left their trace also in the folk songs and traditional narratives, which at the same time also illustrates the formerly invaluable cultural assets and ethnologic diversity.

However, the war events, which took place in the territory of Bosnia and Herzegovina in the period of 1992-1995, had and still have far-reaching consequences in terms of its demographic developments. Major parts of its rural population, which prior to the war devotedly maintained their tradition of farming and agricultural production, were expelled from their homes during the war. When the war was over, in the post-war period the large-scale return to their former ways of life did not take place. Rather the contrary, major part of the population, which continued to live in this environment, has soon thereafter headed over to the local towns and cities or migrated outside the country in pursuit of greater safety and earnings. Thus, the war events worked as an extremely strong factor of loss of the traditional knowledge and experiences.

Target 10 – Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems

A project was recently launched in Bosnia and Herzegovina of management over one of the strongest invasive species in the territory of our country (*Ambrosia artemisiifolia*). This project assembled the leading experts from the domains of plant ecology and agriculture, and it seeks to develop an action plan by which, for the beginning, the expansion of this species in Bosnia and Herzegovina would be placed under control and monitored.

Target 11 – No species of wild flora endangered by international trade

During 2008 Bosnia and Herzegovina ratified the CITES Convention. Through implementation of the CITES Strategic Plan, the trade in a number of plant species from Bosnia and Herzegovina should be placed under control. In this sense, particularly affected are medicinal, aromatic and spice species of plants, whose collection is also not regulated through protocols on sustainable use.

Target 12 – 30 percent of plant-based products derived from sources that are sustainably managed

Since GSPC Target 12 primarily refers to plantation forests, agricultural land, nearly natural and those natural forest communities that are eligible for sustainable exploitation, it would be necessary to point out the following: there are no plantation forests in Bosnia and Herzegovina. In the territory of our country there are certain younger or older forest sylvicultures, which were gradually being used as a substitute for the cut down timber and forest stock. The number of quality of currently existing sylvicultures is almost negligible compared with other forest stands characterised by an extremely high level of primary structure conservation.

The fact is that recently the forestry sector undertakes certain projects whereby it seeks to introduce the principles of sustainability in the forest exploitation. However, even here we need to emphasize the role of war and post-war developments. In the post-war period, also the society's transition process was launched in the circumstances of very difficult and unregulated socio-economic relations. Over that period a great number of private sawmills were also opened, which, similarly to the public companies, were exploiting the current forest stock on a large-scale, which, as a result of that exploitation, is today considerably depleted compared with the pre-war period.

In the transitional conditions, the agriculture sector is also at a standstill. Recovery of these two sectors, which are most important for the sustainable exploitation of plant

resources in Bosnia and Herzegovina, runs with many difficulties even in spite of the efforts made by the State in order to direct the activities towards sustainability.

Target 13 – 30 percent of plant-based products derived from sources that are sustainably managed

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C. Promoting education and awareness about plant diversity

Target 14 – The importance of plant diversity and the need for its conservation incorporated into communication, educational and public-awareness programmes

The degree of environmental awareness among the citizens of Bosnia and Herzegovina is generally unsatisfactory. The reasons for such situation may include: the level of environmental education, poor presence of environmental issues in the media, the level information about civil rights, the level of information about the duties of responsible government structures, the legislative grounds for environmental protection.

There is no continued environmental education as the integral part of permanent educational process. Also, the printed and electronic media in Bosnia and Herzegovina do not show enough interest for and education in the local environmental issues and problems.

The paper called the Strategy for Protection of Biological and Landscape Diversity of Bosnia and Herzegovina has identified a separate objective 3.4. Raising Public Awareness, as part of the third strategic direction (Reduction of Pressures on Biological Diversity of Bosnia and Herzegovina). Within this objective the following tasks have been designated: System of environmental education, Strengthening the operations of non-governmental organisations, Connecting the NGO sector with the system of monitoring and reporting and Program of continued media presentation of biological diversity.

Through the completion of these tasks and establishment of a system enabling their completion Bosnia and Herzegovina will be able to respond actively to the targets set by the GSCP.

D. Building up capacities for the conservation of plant diversity

Target 15 – The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy

The capacities for professional conservation of plant diversity of Bosnia and Herzegovina are absolutely insufficient.

During their education a great number of students acquire solid knowledge in the domains such botanics, taxonomy, conservational biology, ecology and each year they graduate from the Faculties of Sciences and Mathematics in Sarajevo, Tuzla, Mostar, Banja Luka, etc.

However, there are no professional institutions in Bosnia and Herzegovina capable of admitting the younger generations and providing them with further guidance in their lines of profession. On the other hand, there are a relatively high numbers of non-governmental organisations, but few of them are in fact focused on the implementation of the particular projects in the area of plant conservation.

Accordingly, in order to achieve this objective of the Strategy, certain activities should be initiated within the institutional framework, within the scope of raising public awareness, and in the areas of continued environmental education.

The Strategy for Protection of Biological and Landscape Diversity of Bosnia and Herzegovina sets different objectives of relevance for the said areas, the purpose of which is to build up the capacities for protection and conservation of biological diversity.

Target 16 – Networks for plant conservation activities established or strengthened at national, regional and international levels

For a number of years Bosnia and Herzegovina has been actively involved in the process of reporting to the European Environmental Agency. Among particularly important reports, each year a report is made on the CDDA database progress and on Bosnia and Herzegovina's protected areas. Thus Bosnia and Herzegovina joins the international data exchange and plant diversity conservation networks. Establishment of the BH-Clearing House Mechanism is also one of the tasks seriously assigned under the Strategy for Protection of Biological and Landscape Diversity. The process of the NBSAP establishment has clearly distinguished the need for information exchange at the local level, which is particularly important in the local framework due to the administrative complexity of all structures including those scientific ones. Under such conditions the information exchange at the local level is underdeveloped and therefore it is set as one of the future priorities.

II. b Programme of Work on Protected Areas

Is the current system of the national protected areas comprehensive, ecologically representative and effectively managed (please indicate the number of the currently protected areas, their size and type and the percentage of included biomes)?

Is the current system of protected areas comprehensive, ecologically representative and effectively managed?

• What are the definitions for the terms "comprehensive", "ecologically representative" and "effectively managed" in your country?

• What qualitative and quantitative progress has been made in respect of the national targets relating to „comprehensiveness", "ecological representativeness" and "effective management"?

• What kinds of biomes are adequately represented?

• What kinds of biomes are poorly represented or not represented at all?

• Which IUCN categories of protected areas are included?

Some areas in Bosnia and Herzegovina are placed under protection pursuant to the Law on Nature Protection (OG FBiH no. 33/03 and OG RS no. 34/08,113/08) and the work and preparation are underway for further engagement in these activities. Likewise, it is necessary to make a revision of protected objects of nature in Bosnia and Herzegovina designated as such pursuant to the Law on nature Protection („Official Gazette of the SR BiH", no. 4/56 of 5 February 1965). Some of these protected objects of nature were recently re-categorised, the past war events also left discernible traces in the field of nature protection in Bosnia and Herzegovina, but also some of the protected objects contained in the 1965 Inventory List do not currently exist (these are some solitary tree species, etc).

According to this Inventory the protected areas occupy the size of 30,766.82 ha, which amounts to 0.60% of the total area (5,120,976 ha).

By all means we should proceed with the establishment of a network of protected parts and their networking for the purpose of better coordination, exchange of experiences, new knowledge, scientific data and the like.

According to the Law on Nature Protection („Official Gazette of the SR BiH", no. 4/56 of 5 February 1965), the following classification of nature objects was made by the criteria of groups and categories:

- 5 strict nature reserves
- 3 managed nature reserves
- 2 national parks
- special reserves
    a) 6 geological
    b) 6 botanical (16 sites with Pančić fir)
    c) 2 ornithological
- 16 reserves of natural landscapes
- 7 individual plant species
- individual animal species
    a) mammals – 1
    b) amphibians – 1
    c) singing birds – 153
    d) marsh birds – 66
    e) birds of prey – 38
- monument of nature
    a) geological - 9
    b) geomorphologic - 93

c) paleontologic - 2
d) trees – 39
e) groups of trees – 5
f) tree-lined paths and alleys – 1

- 7 memorial monuments of nature.

We should mention that this survey includes only the objects of nature registered so far, whereas it will be amended by further series of research.

Among the protected areas the largest total size belongs to the national parks (20.744 ha). The number of protected areas compared with the level of biological diversity and other natural values of Bosnia and Herzegovina is very small, so it would be necessary to prepare and use a new approach to the management of the special purpose areas, by using some professional and scientific indicators.

The post-war laws applicable in the domain of protection have failed to clearly highlight the transfer of formerly protected areas and they are not in conformity with the IUCN categorisation.

Under the Law on Nature Protection (OG FBiH no. 33/03 and OG RS nos. 34/08,113/08), there are currently 3 national parks in Bosnia and Herzegovina (NP „Una"- newly-designated park, its establishment is underway), 4 nature monuments, 2 protected landscapes/seascapes and 2 nature parks. Further protection activities in Bosnia and Herzegovina will follow the guidelines for enactment of a new Law on Nature Protection, uniform categorisation and implementation of new priorities.

Table10. Currently protected areas and their size

Name	Entity	Category under IUCN	Size (ha)
National Park			
NatP „Sutjeska"	RS	II	17,250.00
NatP „Kozara"	RS	II	3,494.00
NatP „Una"	FBiH	II	19,800.00
Monument of Nature			
MoN „Skakavac"	FBiH	III	1,430.70
MoN „Prokoško jezero"	FBiH	III	2,119.00
MoN „Vrelo Bosne"	FBiH	III	603.00
MoN „Tajan"	FBiH	III	3,591.35
Nature Park			
NaturP „Hutovo blato"	FBiH	? V	7,411.00
NaturP „Blidinje"	FBiH	? V	35,800.00
Protected land(sea)scaape			
PL „Bijambare"	FBiH	V	367.36
PL „Bentbaša"	FBiH	V	147.70
		Total:	**92,014.11 (1.8%)**

In a number of the protected areas in Bosnia and Herzegovina the current efforts are being made towards expanding and defining the boundaries and towards zoning the areas in accord with the IUCN – regulations. In this way and by establishing also new protected areas, the plan is to expand the territories of land under protection by around 15%.

In the territory of Bosnia and Herzegovina there are strictly protected areas and they are maintained in their natural condition, or specifically without any direct human impact. These areas are associated with virgin woods, and some of them are part of already designated protected areas. Under the IUCN categorisation these areas fall within IA and IB categories.

Among other landscapes Bosnia and Herzegovina also has at its disposal a sea coast (littoral zone) around 21 km long and a part of the seawater surface.

It is important to highlight the RAMSAR habitats (Hutovo blato, Bardača and Livanjsko Field) characterised and identified as special protection zones pursuant to the Habitat Directive 79/409/EEC from 1992 and the Directive on Birds CD92/43/EEC from 1979. The Ramsar habitat zones in Bosnia and Herzegovina occupy 56,779 ha, and they are characterised in particular by its specific flora and fauna, whereas at this point we can distinguish the migratory species of birds in particular.

The terms such as *comprehensive*, *ecologically representative* and *effective management* of protected areas have firm grounds in the legislation of FBiH and RS.

On the basis of the Rapid Assessment and Prioritization of Protected Areas Management *(*RAPPAM*)* methodology – a rapid assessment within the WWF (Mediterranean Programme Office), from the point of view of the assessment of status and management of the protected areas due consideration has been given to: pressures, threats, planning, investments, processes and results. This methodology shows the current status relating to the protected areas in Bosnia and Herzegovina. The document is at the development stage.

By establishing the GIS database of habitats in Bosnia and Herzegovina and through Natura 2000 we will be able to provide the detailed indicators about the size of the particular types of habitats and their percentage compared with the total size of the country's territory.

The Law on Nature Protection has established the following four protected area management categories recognised by the IUCN categorisation:

- Protected natural areas established mainly for scientific purposes or for wilderness protection,
- National parks established mainly for ecosystem protection and recreation,
- Natural monuments established mainly for conservation of specific natural features,
- Protected landscape/seascape established mainly for conservation of landscape/seascape natural areas and recreation.

The following categories under the IUCN categorisation are currently applicable in Bosnia and Herzegovina: II, III, and V category, but there are some plans towards designating new protected areas and re-categorising the current areas so that other IUCN categories will also be incorporated into the protection system of Bosnia and Herzegovina.

• *Are the new protected areas, which were established after COP-7, encompassed by presentation of ecosystems and biomes. (What is the number of the new COP-7 protected areas, their size, type and percentage of biomes included into them)?*

Some of the protected areas existed even before, but there has been the re-categorisation, that is to say, harmonisation under the Law on Nature Protection and the IUCN categorisation. The National Park „Una", whose size is 19.800 ha, was designated in 2008 – the spatial plan is at the development stage. Apart from the specific flora and fauna, particularly important are also calcareous sinter barriers and water cascades of Una River.

• *Are there any plans for the establishment of additional protected areas by 2010 (terrestrial) and by 2012 (maritime)?*

• *Have the plans been made or actions taken for the system of protected areas (inclusion of elements to fill the ecological gaps, financial assets provided, construction of buildings, legal and institutional barriers).*

Do the government authorities in Bosnia and Herzegovina recognise the importance of an efficient implementation of the objectives of the CBD Programme of Work on Protected Areas in building up a network of ecologically representative protected areas in the region.

The Ministry of Environment and Tourism of the Federation BiH, in cooperation with the Ministry of Urban Planning, Construction and Ecology of the Republika Srpska will continue to work on the following:

1. Development of a list of natural habitat types in Bosnia and Herzegovina
2. Creation of the GIS map of identified habitats
3. Substantial enlargement of the network of protected areas in Bosnia and Herzegovina and the establishment of new ones through the following:
   - Support for the enlargement of the NP Kozara and development of a plan for management of this park
   - Support for the expansion of the NP Sutjeska and development of a Business Plan for this NP
   - Support for the process to establish protected areas in the area of mounts Prenj-Čabulja-Čvrsnica –Vran
   - Support for the process to establish the NP Bjelašnica-Igman
   - Support for the establishment of main functions of the NP Una
   - Support for the establishment of a protected area that covers Lom and Janj virgin woods
   - Support for the establishment of Nature Park Jahorina
4. Supporting the process of preparation of Red Lists of species in the Republika Srpska and the Federation of Bosnia and Herzegovina
5. Enlargement of representative habitats in the system of the national protected areas
6. Supporting the conservation of humid areas in Bosnia and Herzegovina, particularly peatland bogs of the Dinaric Arc
7. Achieving valorisation of a number of less valuable areas, aimed at establishing new protected areas with the corresponding IUCN category
8. Initiation of the process of evaluation of endangered species in the territory of Bosnia and Herzegovina, according to the criteria of Annex III of EU Habitat Directive, aimed at recognising the appropriate sites Natura 2000
9. Development of legal instruments for all types of habitats
10. Examination of possibilities for cross-border cooperation:
    - Sutjeska NP, (BiH) – Durmitor NP (Montenegro)
    - Drina (BiH) – Tara NP (Serbia)
    - Una NP (BiH) – Plitvička Lake NP (Croatia)
    - Dinaric Alps (BiH-Croatia)
11. Improvement of cross-sectoral cooperation through harmonisation of development plans and by recognising different types of vulnerable habitats in BiH involved in the process of spatial planning
12. Improvement sub-national institutional cooperation concerning the issues of conservation of biological diversity in institutionally protected areas at the entity and state levels
13. Reinforcement of institutional capacities for management/administration of protected areas at the entity and state levels.

Representing the member States to the Convention on Biological Diversity (CBD), the governments of the countries in the region have recognized the need for joint and coordinated efforts towards efficient fulfilling of the commitments contained in the Program of Work on Protected Areas. The cross-border cooperation between the countries, implementation of the Program of Work on Protected Areas aimed at creating a well-managed and ecologically representative network of protected areas, are the key for conservation of eco-regional exceptional natural and cultural value of the Dinaric Arc.

• *What measures have been taken towards developing an eligible environment (legislation, business operation policy, tools) for integration of protected areas into*

more extensive terrestrial and maritime (littoral) landscapes/seascapes and other sectoral interests (i.e. agriculture, infrastructure, energy)?

In July 2000 the Governments of the Federation of Bosnia and Herzegovina and of the Republika Srpska received grants from the International Development Fund (IDF) from the World Bank for purposes of environmental and human resource strengthening. The National Environmental Action Plan (NEAP) for Bosnia and Herzegovina was completed and adopted in 2003 by the Governments of both entities in Bosnia and Herzegovina. Consequently, there followed the implementation of (some) cantonal (KEAP) and local programmes (LEAP).

Through the adoption of a set of environmental laws in 2003, a legal aspect of environmental protection was established in Bosnia and Herzegovina.

Through the development of a new spatial plan of the Federation BiH, while the same plan was already developed in the Republika Srpska, the guidelines for protection and development in the territory of Bosnia and Herzegovina were defined.

However, a better coordination between the sectoral activities and the establishment of specialised nature protection agencies would both help considerably in planning and implementation of all activities in the field of that protection in Bosnia and Herzegovina.

• *What kind of cooperation is being promoted outside the country in relation to the protected areas?*

• *Has any process of consultation been established in order to identify potential cross-border cooperation including also the maritime protected areas?*

• *How many protected areas are taking part in the regional networks and how many of them are cross-border?*

• *Has the regional cooperation potential been used for the establishment of migration corridors?*

Cooperation outside the country is conducted through various government institutions, independently in coordination with NGOs, some parks from BiH work together with the protected areas (regions) of other countries.

Within the WWF Dinaric Arc Ecoregion project, the following areas have been identified as eligible for cross-border cooperation:

- Sutjeska NP, (BiH) – Durmitor NP (Montenegro)
- Drina (BiH) – Tara NP (Serbia)
- Una NP (BiH) – Plitvička Lake NP (Croatia)
- Dinaric Alps (BiH-Croatia)

Within the Neretva Delta Forum (NDF) and the REC there is a permanent and continuing cooperation in implementation of the projects between the Nature Park ”Hutovo blato” and protected areas in the delta of the Neretva River in the Republic of Croatia, whereas one of the priorities also for the Republic of Croatia is to designate the Neretva Delta Nature Park.

The establishment of Natura 2000 will open more opportunities for cross-border integration with other protected areas, including the networking into the regional and European networks of protected areas.

The WWF Dinaric Arc Ecoregion project is engaged specifically in conserving biological diversity, supporting local communities through the support to the work of protected areas, where NP „Sutjeska“ and Nature Park „Hutovo blato“ were selected as pilot project locations to participate in the project.

The potential for regional cooperation has still not been used to the full extent for establishment of migration corridors and this issue is being dealt with also in an

unsolicited way together with volunteers and NGOs. Likewise, the cooperation has started with some of the EU member States, with their institutions and members of staff active on the projects of bird-ringing which will also help to further define the migration corridor.

• *What percentage of the protected areas (area and number) is in possession of the state-of-the-art and scientifically-based plans of management that are:*

a) at the development stage?

b) at the stage of effective implementation?

Around 30% of protected areas in BiH have their management plans, whereas the remaining 70% are still at the stage of developing or improving such plans due to the change in boundaries of the protected areas.

• *Have the consultations been held with the directors of protected areas, local stakeholders and researchers in order to identify scientifically-based objectives of biological diversity conservation?*

• *What measures have been taken in order to identify, prevent and/or reduce adverse effects of threats?*

• *What measures have been taken to restore and rehabilitate the integrity of protected areas?*

In most of the protected areas in Bosnia and Herzegovina relations with local communities are not at a satisfactory level, while in some of them there is no communication at all. At the same time, in all of them there are well-developed channels of cooperation with scientific experts and institutions, through implementation of important projects about the status of flora and fauna upon which the objectives of biological diversity conservation are normally based.

The public institutions managing the protected areas have their own internal acts and staff on the basis of which they conduct the measures of protection and promotion of the areas. However, there are certain pressures that currently keep high positions at the scale, but also in the future these pressures pose a threat of an ever-increasing intensity. Some of them, particularly those that come from among alien invasive species of flora, fauna and fungi, can hardly be controlled in aquatic systems. Also, some of these threats may come from fire, vegetation succession, poaching, etc. The particular pressures and threats and their intensity are identified and defined at the RAPPAM workshop held on 15 and 16 January 2009 in the Nature Park „Hutovo blato“ with participation of protected areas from Bosnia and Herzegovina – the follow-up document is at the stage of development. Action plans should be developed in any case for the particular pressures and threats in order to alleviate and/or remove them, but the priority in terms of developing specific action plans depends on the situation in the filed, intensity of the particular pressures and threats for each of the protected areas respectively.

Restoration and rehabilitation of the protected areas is made possible through the legislative framework, the establishment of public institutions with their own internal acts and staff, planned protection, promotion and use of the areas.

• *What legislative and political operating frameworks are in force for purposes of establishing the operating frameworks for equitable sharing of costs and benefits arising out of the establishment and management of the protected areas?*

• *Have the assessments been made about economic and socio-cultural costs and benefits arising out of the protected areas, particularly for indigenous and local communities?*

• *What measures have been taken to avoid and reduce adverse effects on indigenous and local communities?*

A set of environmental laws represents a legislative and political operating framework, and a platform for enactment of the required legislation regulating the activities and participation of the local community in terms of the particular issues emerging in the protected areas.

The laws and bylaws define the measures and activities stipulated by the legislator, and they are of concern to inspection supervision (reinforcement required), mandatory development of environmental impacts studies, including also compliance with the requirements that are to be met in order to acquire the environmental permit.

• *What mechanisms have been put in place for identification and recognition of conserved areas in the community and how many such areas have been integrated into the system of national protected areas?*

• *What mechanisms are to be implemented in order to enable full and efficient participation of the indigenous and local communities, with full respect for their rights and recognition of their responsibilities, as provided by national legislation and international commitments/obligations, in the management of existing and the establishment of new protected areas?*

• *What measures have been taken to support the areas conserved by the indigenous and local communities?*

• *What mechanisms have been put in place in order to enable participation of the relevant stakeholders in the management of existing and the establishment and management of new protected areas?*

Value of the conserved areas is identified and recognised through scientific and expert research of natural, cultural, historical and socio-economic aspects. Before designating a new protected area, various studies are supposed to be made in the particular domains that draw the full picture of status in that area as well as perform the categorisation of the future protection.

Through the legislative framework the local communities operate by way of public debates mainly on the issue of establishing the new and expanding the boundaries of the existing protected areas. Likewise, support to the local community is provided through the right for the local population to have priority in getting employment during the establishment of a public institution, through various forms of support for development, conservation and delivery of authentic products and other activities fostered by the local community. All these activities neither satisfy nor provide the required support for the needs that exist in the field. Therefore it is necessary to establish a special Centre (institute) for rural, systematic development and conservation of traditional knowledge and practices through ecotourism activities.

• *Do the current political, institutional and socio-economic operating frameworks appreciate goods and services and enable efficient establishment and management of the protected areas?*

• *What types of socio-economic valuation and incentive methods have been made for the more efficient establishment and management of the protected areas and are they incorporated into the national business policies, institutional and socio-economic structures?*

• *What are the main obstacles standing in the way of efficient establishment and management of the protected areas?*

• *What kinds of measures have been taken to surmount such obstacles?*

The activity on the establishment of new protected areas is a slow process and it is affected directly by the absence of institutions at all levels which would otherwise deal with this matter professionally, but also by the lack of political will in regard to harmonisation of work on the designation of particular protected areas in Bosnia and

Herzegovina. This problem is exacerbated also by the lack of the Federation spatial plan that would precisely identify and define the purpose and role of these areas. In most of the protected areas in Bosnia and Herzegovina efficient management will depend on the budgetary funds of the founder (the Federation BIH, a canton or the Republika Srpska) until such time as the required resources have been developed to enable sustainability. Absence or abatement of the budgetary funds usually calls into question the main activities such as protection and supervision of the protected area.

Amendments to the Law on Nature Protection will enable the establishment of some professional institutions and other provisions that will enable easier, better and more proactive work on these issues.

• *Has the complete assessment been undertaken to determine the required capacities or management of the protected areas?*

• *What kinds of capacity building programs have been or are still being undertaken? How successful the completed programmes are?*

• *Does your country take as granted a multidisciplinary approach to management of the protected areas?*

As far as the assessment of the required capacities and management is concerned, in Bosnia and Herzegovina it is different from one protected area to another. The assessments are conducted partially and so in regard to the parks that possess all relevant documents, skilled personnel, equipment for work and other means that are required for adequate management. Some of the protected areas in Bosnia and Herzegovina do not have the required documentation-internal acts and therefore they do not have any exact indicators from the field that are required for management of the protected zones. More recently designated protected areas possess their spatial plans, management plans and other important documents required for management of these zones. However, the protected areas that were designated much earlier or in the era of the Socialist Federative Republic of Yugoslavia, even though they have their spatial and management plans, should undergo a radical revision. Due to the lack of budgetary funds required for the development of these documents, the protected areas are forced to work on their defining through implementation of certain projects in cooperation with international organisations.

According to the opinion of the managers of protected areas, a common property for most of them is the problem of financing and adequate labor force.

• *What kinds of innovative approaches and technologies have been identified, developed and implemented in order to establish and manage the protected areas at the State and regional levels?*

• *Is there any cooperation in the country and/or with other countries in sharing the information and technologies?*

• *Have the financial needs been identified? What are results of the assessment of such needs (quantitative and qualitative)?*

• *What kinds of strategies are being implemented in order to satisfy these needs and, in particular, to provide for a long-term funding of the system of the national protected areas?*

• *What kind of financial support is provided to developing countries, transitional countries and small island States?*

• *What proportion of the budget has been allocated or earmarked as assistance to the system of national protected areas (in what proportion the funding of the national protected areas comes from private and public sources and how much from the state budget?)*

• *Have the studies of effective use of funds been developed as a contribution to financial sustainability of the protected areas?*

Judging from all questions asked above the situation in the protected areas in Bosnia and Herzegovina is differing. While in some of the protected areas the access to and utilisation of new technologies is provided through the support of the funds obtained from the founders, some of the protected areas have come to such achievements through various projects funded by international institutions. Networking of the protected areas in BiH is deficient, communication exists at the private level, but certain protected areas have cooperation with other countries (Italy) in implementation of various projects including exchange of information and transfer of technologies.

Financial needs are also defined by the financial plans, while the protected areas that do not have such plans will define their needs under their annual financial plans for funding of priority activities. Funds required for implementation of the development plans were being used by the EU Funds, the World Bank, other international organisations, budgetary funds, etc., with the aim of funding the priority activities leading to self-sufficiency/self-sustainability of the protected areas.

All parks in Bosnia and Herzegovina are partially or entirely funded from the state budget. There are some funds (the Federation Ministry of Environment and Tourism) implemented through funding of the projects of protection of biological diversity, development of tourist and other activities in the protected areas. Participation of private funding is still negligible, but this matter deserves more attention in any case.

• *Is there a mechanism for verification of the public education programs in order to estimate whether they are efficient in communicating ideas about the fundamental values of biological diversity of the protected areas?*

• *Which measures and programs of education have been undertaken and implemented in relation to the protected areas, including also the public awareness raising?*

In the educational system of primary and secondary schools in Bosnia and Herzegovina, efforts should be made towards changing the education curricula and syllabi. It would indeed be necessary to introduce mandatory and proactive outdoor classes in wilderness/in nature, by designating a certain number of school hours for this purpose.

The protected areas have prepared some education programmes on their own designated for the targeted groups of visitors. There are thematic programs of education, information points with printed handouts, foot paths with information boards that show detailed information about the protected area.

Equally, the higher education at the university level should give its own contribution by providing qualified and skilled staff, which is currently employed in insufficient numbers, and in particular by carrying out the activities that are to be performed at the national level and constitute a condition for EU accession.

Some of the protected areas have established a solid and continued cooperation with NGOs whose volunteers provide their support in educating the visitors and the local community.

• *Has your country assessed the effectiveness of management of the protected areas in a systematic way?*

If yes,

(a) What percentage of the national protected areas has been assessed?

(b) What are the conclusions for the system of national protected areas and to what extent the results have been incorporated into the management plans and strategies?

No systematic evaluation of the effectiveness of the protected areas' management was ever made in BiH, other than in the areas which have their management plans already in place.