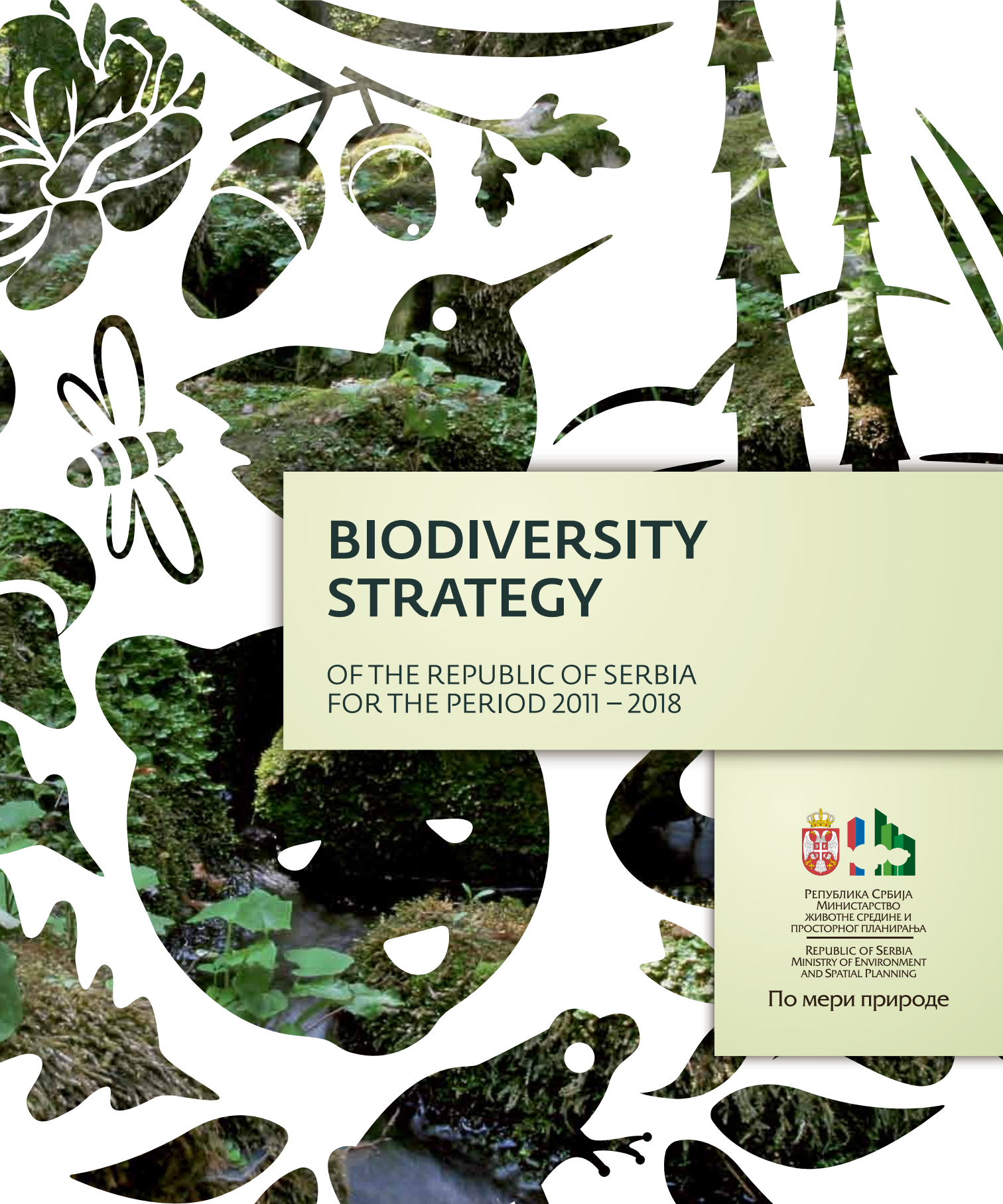

BIODIVERSITY STRATEGY

OF THE REPUBLIC OF SERBIA FOR THE PERIOD 2011 – 2018

Република Србија
Министарство
животне средине и
просторног планирања

Republic of Serbia
Ministry of Environment
and Spatial Planning

По мери природе

БИОДИВЕРЗИТЕТ

Србије

MINISTRY OF ENVIRONMENT AND SPATIAL PLANNING

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FOREWORD

"Because of the items that satisfy his fleeting greed, he destroys large plants that protect the soil everywhere, quickly leading to the infertility of the soil he inhabits and causing springs to dry up, removing animals that relied on this nature for their food and resulting in large areas of the once very fertile earth that were largely inhabited in every respect, being now barren, infertile, uninhabitable, deserted. **One could say that he is destined, after making the earth uninhabitable, to destroy himself**" Jean Baptiste Lamarck (Zoological Philosophy, 1809).

Two centuries after Lamarck recorded these thoughts, it is as if we were only a step away from fulfilling his alarming prophecy. Today, unfortunately, it is possible to state that man's influence over the environment has never been as intensive, extensive or far-reaching. The explosive, exponential growth of the world's population, coupled with a rapid depletion of natural resources and incessant accumulation of various pollutants, provides a dramatic warning of the severity of the situation at the beginning of the third millennium. Essential conditions for the functioning of biogeochemical cycles, biological diversity, the composition of the atmosphere and the global climate are all changing at a tremendous rate.

The focus of our attention regarding man's multiple and diverse destructive influences over the environment should most certainly include the problem of disappearing species. Other forms of negative human influence can be even overcome in some ways, but the disappearance or extinction of organic species represents an irrevocable loss for our planet for ever. It is believed that man's negative influence on the environment increases the number of species that are irrevocably lost to a staggering 27,000 species annually, or 74 species lost per day. With 100 organic species becoming extinct within a single day, the extinction rate becomes 1,000 times higher than the estimated "normal" evolutionary extinction rate. If extinction continues at its current rate, 20% of today's species could disappear over the next 30 years. In terms of magnitude, this could be compared only to the disaster of 65 million years ago that saw the dinosaurs disappear from the face of the earth.

In this context, it is no coincidence that during the last twenty years we have increasingly heard mention – in the area of environmental protection, and more widely – of biological diversity, or biodiversity, and the necessity to protect it. The actual term 'biodiversity' is relatively young, having been born as BioDiversity at the National Forum on BioDiversity in Washington in September 1986, organised by the US National Academy of Sciences and the Smithsonian Institute. The Convention on Biological Diversity, which was officially adopted at the historic United Nations Conference on Environment and Development in Rio de Janeiro in 1992, saw the term biodiversity gain a central position not only in a more specific biological and ecological sense, but also in a wider social, economic and political sense.

The Rio Conference adopted the **Convention on Biological Diversity (Biodiversity)** and defined this term as: **the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems**. The subject of regulation and objective of the Convention on Biodiversity is: (1) conservation of biological diversity (biodiversity); (2) sustainable use of its components (biological resources) and; (3) the fair and equitable sharing of benefits arising from the utilisation of genetic resources.

What is the importance of biodiversity conservation and protection? There are two main areas of importance: fundamental and applicative.

The fundamental importance of biodiversity lies in the fact that the sum of all forms of life on our planet is a considerably more complex phenomenon than the total sum of individual organic species. Biodiversity, as a phenomenon, includes diversity of ecological relations established in the years of evolution between different organic species that actually formed the basis of existence, complexity, stability and the functioning of each individual ecosystem, biome, that is, biosphere as a whole, as well as the survival, future and evolution of each species, including *Homo sapiens*. Without biodiversity there are no biogeochemical cycles or disintegration of organic matter. Conserved biodiversity contributes to climate regulation, reduces the greenhouse effect, maintains air and water quality, controls droughts and floods etc.

The applicative importance relates to the fact that the overall evolution of the *Homo sapiens* species, i.e. human civilisation as a whole, is, has and will certainly continue to be, dependent on the use of a wide range of biological resources. Biological resources form the foundation of life on our planet. The social, ethical, cultural and economic value of biological resources has been recognised through religion, art, literature and economics from the early days of human civilisation up to the present.

A total of ten meetings, staged in the form of conferences between the signatory parties of the Convention on Biological Diversity, have been held since the Rio Conference. The Tenth Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 10, CBD) was held in Nagoya, Japan, between 18th and 29th October 2010. The importance of this conference is evidenced by the fact that 18,000 delegates from 193 UN Member States participated in the Meeting (the closing was attended by five national presidents and 130 environment ministers), as well as representatives of international organisations, non-governmental organisations and civil society organisations, the international science forum and other interested parties.

A Strategic Plan for the 2011-2020 period was adopted at this Conference, otherwise referred to as the *Aichi Target* and including 20 targets organised under five strategic goals. Member states were invited to create their own targets within a flexible framework, taking into consideration national needs and priorities and taking into account the attainment of global targets. The member states agreed, among other things, to halve, or where feasible reduced to close to zero, the rate of loss of natural habitats including forests, as well as to set a target of 17 per cent of terrestrial and inland water areas and 10 per cent of marine and coastal areas by 2020. Moreover, one of the targets is to prevent the extinction of known threatened species and improve their conservation status.

Taking all of the above into account, the social, economic and scientific importance of the adoption of the **Biodiversity Strategy of the Republic of Serbia for the period 2011-2018** is more than clear, from both an international and a national perspective.

The importance of this document should primarily be recognised in the fact that Serbia's territory is characterised by high genetic, species and ecosystem diversity, which appeared as a response from living beings to the geological, climatic, hydrological and oragraphic diversity of Serbia, with all the complexity of historical changes that have occurred in this area during the past. Today the high-mountain and mountain massifs of Serbia, as part of the Balkan Peninsula, represent one of six centres of European biodiversity.

The Republic of Serbia has become a signatory of the Rio Declaration on Environment and Development by succession. Namely, the Federal Government of the then FR Yugoslavia adopted its Resolution on Biodiversity Conservation Policy in FR Yugoslavia on 31st December 1993, while the Law on Ratification of the Convention on Biological Diversity was adopted in 2001. Since that moment this normative act has represented the basis and the framework for adequate action and development towards biodiversity conservation on the territory of Serbia.

Let us remember that the signatories' responsibilities are defined by Article Six of the Convention on Biological Diversity, which states that they should, in accordance with their possibilities and conditions, develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity so that they reflect the measures set out in the Convention and integrate principles of conservation and the sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies, as far as possible and appropriate.

It is also necessary to note that during the Millennium Summit in 2000, with the aim of recognising the high importance of this Strategy, the Republic of Serbia, together with another 189 signatory countries, adopted the Millennium Declaration setting out fundamental values and eight development goals for international relations in the 21st century. One of them is to protect and promote the environment by insisting that the loss of biodiversity and natural resources can endanger the

future of humankind.

Equally so, the efforts of the Republic of Serbia in the area of biodiversity conservation are in accordance with the government's aim of EU accession and the EU decision to halve the loss of biodiversity on its territory.

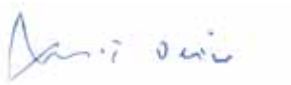
EU requirements, as described in the relevant part of the *acquis communautaire* that is to be transferred to domestic legislation, as well as a range of principles and institutions in international agreements, sustainable development principles and principles to prevent certain activities that present a risk or threat to animal and plant life, are defined and applied in the text of the National Biodiversity Strategy of the Republic of Serbia for the period 2011 – 2018.

The Biodiversity Strategy and its Action Plan are in full accordance with the Serbian National Sustainable Development Strategy, which envisages the achieving of the level of allocation for environmental protection at 1.5% of GDP by 2014, whereas this allocation for environmental protection is set at 2.5% in 2017, which corresponds to the level of investment in environmental protection by new EU member states from central Europe during the pre-accession period.

Finally, we are confident of the Strategy's maximum contribution – not only with respect to biodiversity conservation, but also promotion of the quality of the general environment in Serbia – and believe it is possible to conclude that, since the Rio Conference, the adoption of the Convention on Biological Diversity and the Nagoya Conference, man's awareness has slowly and gradually moved towards understanding, accepting and respecting the basic ecologic principles and global importance of conserving biological diversity.

However, having learned from previous experiences in the environmental protection domain, we must not be unrealistically optimistic. On the contrary, concern, caution and care may be the most powerful motives for immediately approaching the Strategy's implementation, through the realisation of its Action Plan and to the benefit of current and future generations of Serbian citizens.

In Belgrade,



Oliver Dulic, MD
Minister of Environment
and Spatial Planning
of the Republic of Serbia

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ACRONYMS AND ABBREVIATIONS

ABS - Access and Benefit Sharing

AP - Autonomous Province

BD - Bilateral Donors

CBD - Convention on Biological Diversity

CITES - Convention on International Trade in Endangered Species of Wild Flora and Fauna

CR - Critically Endangered

DD - Data Deficient

DDT - Dichlorodiphenyltrichloroethane

EBRD - European Bank for Reconstruction and Development

EEA - European Environmental Agency

EIONET - European Environment Information and Observation Network

EN - Endangered

EPF - Environment Protection Fund

EU - European Union

EUF - European Union Funds

EUNIS - European Nature Information System

EUR - The Euro

EW - Extinct in the Wild

EX - Extinct

FAO - Food and Agriculture Organization of the United Nations

FP 7 - 7th Framework Programme for Research and Technological Development

GDP - Gross domestic product

GEF - Global Environment Facility

GIS - Geographical information system

GMO - Genetically modified organism

GTZ - German Organization for Technical Cooperation

GPS - Global Positioning System

IBA - Important Bird Area

IF - International funds

INC - Republic Institute for Nature Conservation

IPA - Important Plant Area

IPA - Instrument for Pre-Accession Assistance

IPARD - Instrument for Pre-Accession for Rural Development

IPGRI - International Plant Genetic Resources Institute

IUCN - International Union for Conservation of Nature

LC - Least Concern

MAB - Man and Biosphere Programme

MAFWM - Ministry of Agriculture, Forestry and Water Management

MDG - Millennium Development Goals

MEd - Ministry of Education

MERD - Ministry of Economy and Regional Development

MESP - Ministry of Environment and Spatial Planning

MFin - Ministry of Finance

MH - Ministry of Health

MME - Ministry of Mining and Energy

MOH - Ministry of Health

MSTD - Ministry of Science and Technological Development

NBIS - National Biodiversity Information System

NE - Not Evaluated

NGO - Non-governmental organization

NIP - National Investment Plan

NT - Near Threatened

OGFRY - Official Gazette of the Federal Republic of Yugoslavia

OGRS - Official Gazette of the Republic of Serbia

PA - Protected Areas

PBA - Prime Butterfly Areas

PE - Public enterprise

PEEN - Pan-European Ecological Network

PINC - Provincial Institute for Nature Conservation,

PSEPSD - Provincial Secretariat of Environmental Protection and Sustainable Development

RB - Republic Budget

REC - Regional Environmental Centre

RS - Republic of Serbia

RSD - Republic of Serbia dinar

SEPA - Serbian Environmental Protection Agency

SEED - Net Regional Network for Plant Genetic Resources of South East Europe

SIDA - Swedish International Development Cooperation Agency

SRI - Scientific and Research institutions

UN - United Nations

UNDP - United Nations Development Programme

UNCBD - United Nations Convention on Biological Diversity

UNESCO - United Nations Educational, Scientific and Cultural Organization

UNFCCC - United Nations Framework Convention on Climate Change

USD - United States dollar

USAID - United States Agency for International Development

VU - Vulnerable

WWF - World Wildlife Fund

Based on Article 45, Paragraph 1, of the Law on Government, ("Official Gazette of the Republic of Serbia", Issue 71/05-amendment, 101/07 and 65/08), and in accordance with the Law on Ratification of the Convention on Biological Diversity ("Official Gazette of the Federal Republic of Yugoslavia" – International Agreements, Issue 11/01 and "Official Gazette of Serbia and Montenegro", Issue 16/05).

Government adopts

BIODIVERSITY STRATEGY OF THE REPUBLIC OF SERBIA FOR THE PERIOD 2011 – 2018

INTRODUCTION

The United Nations Convention on Biological Diversity (hereinafter: the Convention) recognizes that each State has sovereign rights over its resources and biodiversity[1]. However, countries that have signed the Convention are expected to support the three basic objectives of the Convention:

1) Conservation of biological diversity,

2) Sustainable use of its components, and

3) Fair and equitable sharing of benefits arising from the utilisation of genetic resources.

Article 6 of the Convention defines some of the key obligations of the Parties, stating that each Contracting Party, in accordance with its particular conditions and capabilities, shall:

· Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned; and

· Integrate, as far as possible and appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

The Republic of Serbia recognizes and supports global strategic goals for biodiversity – "Aichi targets", adopted during the Conference of the Parties of the Convention in Nagoya in October 2010. Through the strategic framework of this document, goals will be defined at the country level in line with national needs and possibilities.

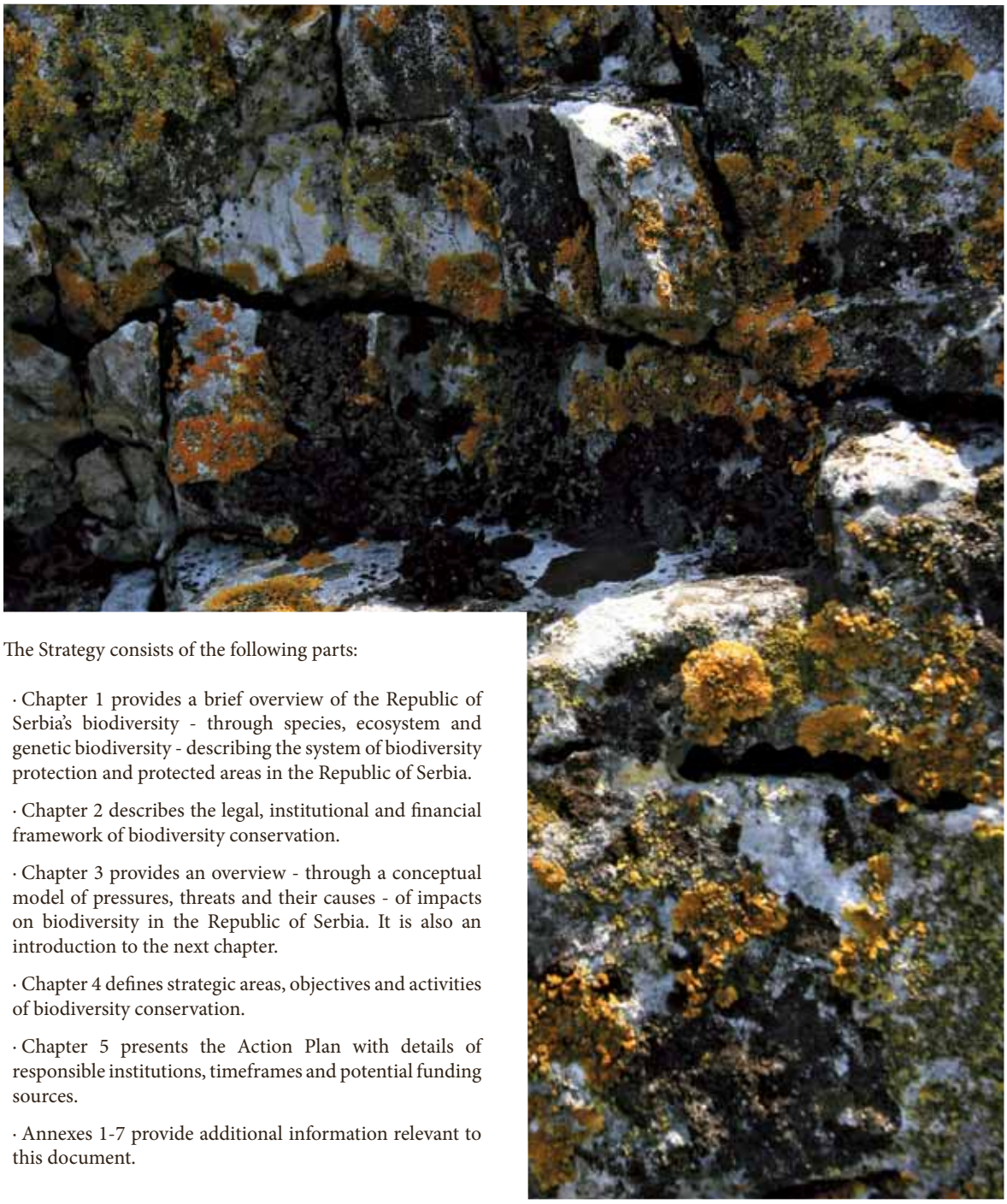
The legal basis for adoption of the Biodiversity Strategy in the Republic of Serbia (hereinafter: the Strategy) is the Law on Government, in accordance with the Law on Ratification of the Convention on Biological Diversity.

The Strategy is being adopted for a period of seven years (2011-2018), while activities are defined as: short-term, with an implementation period of 1-3 years, medium-term of 3-5 years, long-term, 5-7 years, and continually.

The Strategy's development was initiated by the Ministry of Environment and Spatial Planning and United Nations Development Programme (UNDP). Funds for the development of the Strategy were provided by the Global Environment Fund (GEF) through UNDP as an implementing agency.

Development of the Strategy began in June 2008 when the working team was established and the document structure defined. In February 2009 the first national consultations were held to inform all relevant stakeholders regarding strategy and action plan development activities. Representatives of relevant ministries, government agencies and institutes, protected area managers, as well as representatives of universities, research institutes and public enterprises participated in consultations. The second national consultations were held in May 2009 for the representatives of government institutions. In August 2010 the draft Strategy was considered by the Working Group established by the Ministry of Environment and Spatial Planning and all recommendations set by the working group members were adopted. Consultations with the public, academic and NGO sectors were held in October and November 2010, after which the draft Strategy was submitted for the consideration of relevant ministries of the Government of the Republic of Serbia.

1 The terms biological diversity and biodiversity are used interchangeably in this document and refer to the totality of genes, species and ecosystems of the Earth or a given region



The Strategy consists of the following parts:

· Chapter 1 provides a brief overview of the Republic of Serbia's biodiversity - through species, ecosystem and genetic biodiversity - describing the system of biodiversity protection and protected areas in the Republic of Serbia.

· Chapter 2 describes the legal, institutional and financial framework of biodiversity conservation.

· Chapter 3 provides an overview - through a conceptual model of pressures, threats and their causes - of impacts on biodiversity in the Republic of Serbia. It is also an introduction to the next chapter.

· Chapter 4 defines strategic areas, objectives and activities of biodiversity conservation.

· Chapter 5 presents the Action Plan with details of responsible institutions, timeframes and potential funding sources.

· Annexes 1-7 provide additional information relevant to this document.

PRINCIPLES OF BIODIVERSITY CONSERVATION

The basic principles of biodiversity protection shall be:

1) Principle of preservation *in-situ* – Biological diversity is most effectively conserved *in-situ*.

2) Integration principle – State authorities, authorities of the autonomous province and local self-governance units shall promote and facilitate the integration of biodiversity protection and enhancement in all sectoral policies by implementing mutually harmonized plans and programmes and by implementing regulations through a permit system, technical and other standards and norms, as well as by financing biodiversity protection through incentives and other measures.

3) Principle of prevention and precaution – Every activity must be planned and implemented in a way that: causes minimal possible change to the environment; represents the least risk to biodiversity and native ecosystems; reduces spatial burdens and the consumption of raw materials and energy in construction, production, distribution and utilization; includes the possibility for recycling and prevents or limits environmental impact at the source of pollution.

The principle of proximity shall be realized through environmental impact assessment with consideration of biodiversity and through use of the best available and accessible technologies, techniques and equipment.

The absence of comprehensive knowledge and scientific reliability cannot be a reason for non-performance of measures for the prevention of biodiversity loss, habitat loss or degradation in the case of possible or existing significant impacts on the environment.

4) Principle of natural value preservation – Natural values shall be used under conditions and in a manner ensuring preservation of the values of geodiversity, biodiversity, protected areas and native ecosystems.

Renewable natural resources shall be used under conditions that ensure their permanent and efficient renewal and permanent quality enhancement.

Non-renewable natural resources shall be used under conditions that ensure their long-term, economical and reasonable utilization, including limited utilization of strategic or rare natural resources and substitution for other available resources, composite or artificial materials.

5) International cooperation principle – The conservation of the Republic of Serbia's biological diversity is influenced by international activities and requires cooperation and actions extending beyond the Republic of Serbia's national borders.

6) Protected areas system principle – The designation of protected areas is one of the most important tools for protecting biological diversity. Central to the conservation of the Republic of Serbia's biological diversity is the establishment of a comprehensive, representative and adequate system of ecologically viable protected areas, integrated with environmentally sound management of all other areas, including agriculture and other resource production systems.

7) Principle of sustainable development – Sustainable development is a system of technical/technological, economic and social activities harmonized with the overall development, whereby natural and acquired assets are used in a cost efficient and reasonable manner that preserves and enhances the quality of the environment, including native habitats and biodiversity, for present and future generations.

The biodiversity protection system will be implemented through the promulgation and implementation of decisions that create a balance between environmental protection and economic development interests.

8) Principle of polluters 'and legal successors' liability – Any legal entity or private individual involved in environmental degradation through illegal activities shall be liable in accordance with the law.

The polluter (or "operator") shall be liable for damage caused to protected species, protected and natural habitats and sites of special scientific interest (biodiversity), also in the case of liquidation or bankruptcy of said company or other legal entities, in accordance with the law.

The polluter, or its legal successor, shall be required to eliminate the cause of damage and the consequences of direct or indirect harm to protected species and natural habitats.

Changes to the ownership of companies or other legal entities, or other changes to ownership structure, shall include an assessment and allocation of liability for damage, as well as the settlement of debts (charges) incurred by the previous owner due to pollution of, or damage to, protected species and habitats.

9) Principle of "polluter pays" – the polluter (or "operator") shall pay charges for any damage, or threat of damage, to protected species, protected and natural habitats and sites of special scientific interest (biodiversity), as well as harm to water and land that it causes, or may cause, through its operations or activities.

The polluter, in accordance with legal regulations, shall bear the total costs of measures to prevent and reduce habitat degradation, as well as the costs of direct harm to protected species and habitats, including risk costs to the environment and costs of reversing environmental damage previously caused.

10) Principle of "user pays" – any person who utilizes natural resources shall pay real costs for their utilization and the recultivation of the area.

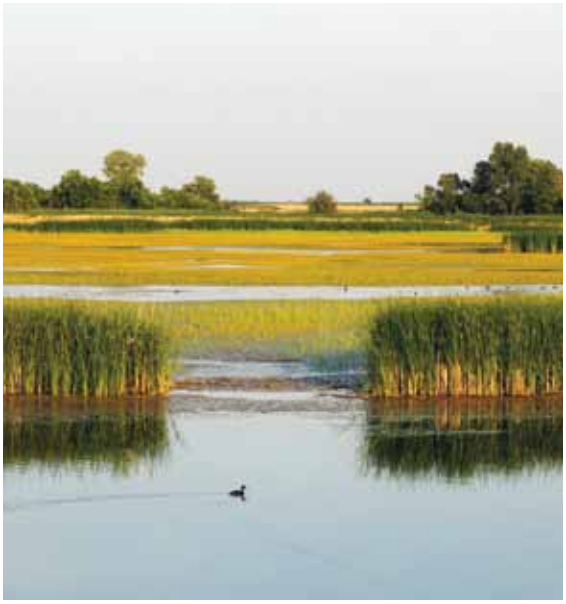
11) Principle of subsidiary liability – State authorities shall, within their financial capacities, eliminate the consequences of habitat degradation and biodiversity loss and reduce damage when the operator is unknown and when the sources of said damage originated beyond the territory of the Republic.

12) Principle of incentives – State authorities, i.e. those of the Autonomous Province of Vojvodina or units of local self governance, shall take measures to preserve and sustainably manage environmental capacities, particularly through reduced utilization of raw materials and energy, prevention or reduction of habitat degradation and biodiversity loss – carried out via economic instruments and other measures, employing the best available techniques, facilities and equipment - that should not require excessive costs - and through the selection of products and services.

13) Principle of public information and participation – in accordance with the universal right to a healthy and biologically diverse environment, anyone shall be entitled to access information on environmental status and participate in the decision making process when implementation of said decision may have an effect on the environment.

14) Principle of protection of right to healthy environment and access to justice – any citizen or groups of citizens, civic associations, professional or other organizations, shall be entitled to exercise their right to enjoy a healthy environment before the competent authority or court in accordance with the law.

1. BIOLOGICAL DIVERSITY OF THE REPUBLIC OF SERBIA



The Republic of Serbia became a signatory of the Rio Declaration on Environment and Development upon succession in 1992, and ratified it via the Law on Ratification of the Convention on Biodiversity in 2001. The previous period saw emphasis given to collecting qualitative and quantitative information on the status of species, habitats and ecosystems. Nevertheless, the biological inventory of the Republic of Serbia remains incomplete.

"Biodiversity of Yugoslavia" (Stevanović and Vasić eds., 1995) currently provides the most comprehensive review of biodiversity in the Republic of Serbia, yet it requires updating with more recent information about certain taxa and ecosystems available in published literature, manuscripts or government databases.

The Ministry of Environment and Spatial Planning coordinates the majority of activities related to biodiversity management and protection, in cooperation with other ministries and institutions, scientific, expert, academic and non-governmental organizations.

The aim of this chapter is to present information regarding the status of biological diversity in the Republic of Serbia: existing knowledge about genetic, species and ecosystem diversity and how it is managed and protected. Subsequent chapters will present analysis of the direct and indirect threats to biological diversity and underlying causes of those threats, then propose strategic areas of intervention, with objectives and actions identified for each area.

1.1 INTRODUCTION

The Republic of Serbia is characterized by high genetic, species, and ecosystem diversity. The highland and mountainous regions of the Republic of Serbia, as a part of Balkan Peninsula, are one of six European biodiversity centres. Moreover, in terms of the wealth of its flora, the Republic of Serbia is potentially one of the global centres of plant diversity. Although the Republic of Serbia's 88,361 km^2 represent only 2.1% of European territory, biodiversity of different groups of organisms remains high.

The Republic of Serbia hosts:

- 39 % of European vascular flora,
- 51 % of European fish fauna,
- 49 % of European reptile and amphibian fauna,
- 74 % of European bird fauna,
- 67 % of European mammal fauna.

The following biomes are found in the Republic of Serbia: steppe zonobiome, deciduous forests zonobiome, coniferous forests zonobiome and zonobiome of high mountain tundra. The Republic of Serbia has heterogeneous flora and fauna, which includes both widespread and endemic species (Balkan, local and stenoendemic).

Diverse climatic vegetation zones, including a large number of extrazonal, intrazonal and azonal ecosystems, such as wetlands, peat lands, salt marsh lands and sands, strongly influence the high biodiversity of the Republic of Serbia. During the last ice age the territory of modern Serbia provided numerous refugia (parts of a species' range less influenced by climate change) for a number of species. As a result, Serbia is inhabited by many relict and endemorelict species.

The Republic of Serbia's genetic resources are very rich and include a large number of autochthonic cultivated plant and domestic animal species. Genetic resources important for food and agriculture are maintained through traditional

agricultural systems or in *ex-situ* conditions.

Even though more than 1,200 plant communities have been described in the Republic of Serbia, it is assumed that there are actually between 700 and 800 plant communities. Balkan endemics comprise approximately 14.94% of Serbian flora (547 species), while local endemics comprise 1.5% (59 species).

1.2 SPECIES DIVERSITY

Species diversity in the Republic of Serbia is not well researched or documented, as evidenced by a review of information on described species within the five kingdoms of living things (*Monera* – prokaryotic organisms; *Protista* – all algae, protozoa, as well as water and slime moulds; *Fungi* – fungi; *Plantae* – plant life, and *Animalia* – animals):

1) No precise data exists on the number of prokaryotic species belonging to the *Monera* kingdom; 220 species of cyanobacteria, also belonging to this kingdom, are listed for the territory of the Republic of Serbia and Montenegro.

2) Diversity in the Republic of Serbia of the most heterogeneous kingdom, *Protista*, is largely unknown. Limited information is available concerning the diversity of freshwater algae (1,400 species) and *Rhizopoda* – amoebas with shells (236 species). However, data about other protozoa groups is not available, nor for water or slime moulds.

3) The situation is similar with the *Fungi* kingdom. Although reports indicate that between 3,000 and 6,000 species of macromycetes exist in the Republic of Serbia, only 625 have been described. Recent research on lichen diversity (*Lichenes*) indicates that there are 586 species of lichens found in the Republic of Serbia.

4) The *Plantae* kingdom is probably the most researched kingdom in the Republic of Serbia. There are 400 species of moss widespread in the Republic of Serbia (*Bryophyta*) and a total of 3,662 taxa (rank of species and subspecies) of vascular flora (*Pterydophyta*, *Pinophyta* and *Magnoliophyta*).

5) Data on species diversity within the *Animalia* kingdom in the Republic of Serbia is available for roundworms (*Nematodes*) – 139 species, *Anostraca*, *Notostraca* and *Conchostraca* – 18 species, *Amphipoda* – 33 species, fish (*Osteichthyes*) – approximately 100 species, amphibians (*Amphibia*) – 21 species, reptiles (*Reptilia*) – 25 species, birds (*Aves*) – approximately 360 species and mammals (*Mammalia*) – 94 species.

6) Additional data related to species diversity in other groups of animals is available for the former FR Yugoslavia, but incomplete for the Republic of Serbia.

Approximately 44,200 taxa (species and subspecies) have been officially registered in the Republic of Serbia. Considering that many groups of organisms have not been adequately researched, experts assume that approximately 60,000 taxa may occur in the Republic of Serbia.

1.2.1 ENDANGERED SPECIES

The Red List of Threatened Species is the world's most comprehensive inventory of the global conservation status of plants and animals. The Red List assesses the risk of extinction for species and subspecies using a range of established criteria applied equally to all species and regions. The Red List relies on scientific knowledge, which makes it a reliable and important source of information on the conservation status of species throughout the world.

The Republic of Serbia developed its first Red Book - *Red Data Book of Flora of Serbia* in 1999, covering extinct and critically endangered plant species[2]. This list contains 171 plant taxa (species and subspecies), which comprise approximately 5% of the total flora in the Republic of Serbia. Of that number, four taxa endemic to the Republic of Serbia

[2] The Red Data Book of Flora of Serbia, Volume 1: Extinct and Critically Endangered Taxa, Stevanovic et al., Ministry for Environmental Protection, Faculty of Biology of the University of Belgrade, Institute for Nature Conservation of Serbia, Belgrade, 1999.

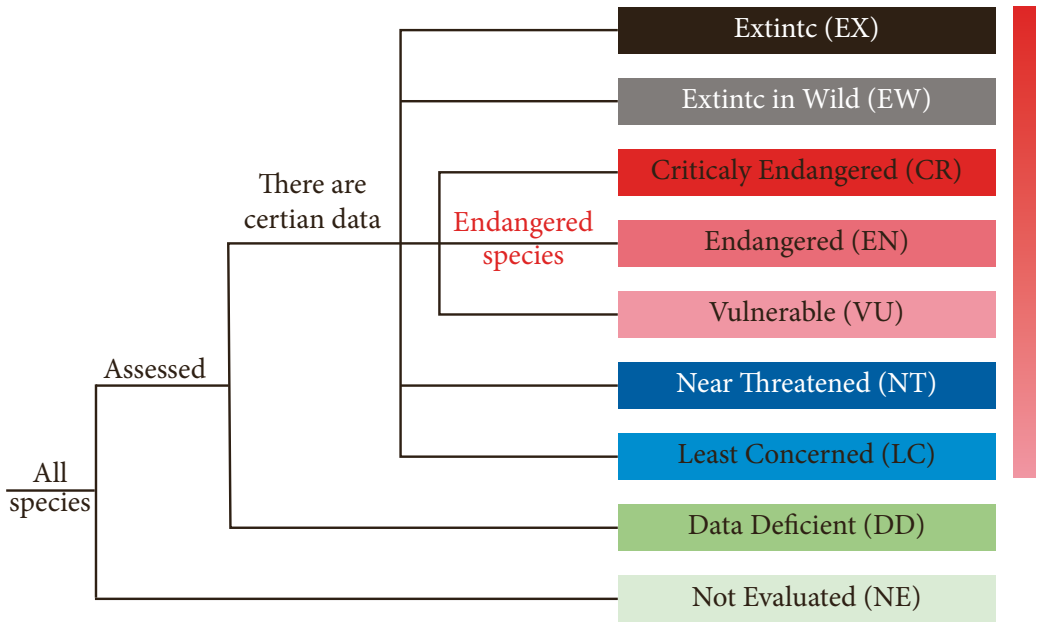
have become extinct; 46 taxa have been extirpated from the Republic of Serbia, but can be found in neighbouring areas or in *ex-situ* conditions (botanical gardens); 121 species are highly endangered, with a high probability of disappearing from the region in the near future or becoming extinct if not given appropriate attention.

The second Red Book - *Red Book of Butterflies for Serbia* was published in 2003[3]. The butterfly red list report evaluates the conservation status of 57 species of butterflies, accounting for 34% of butterfly fauna in the Republic of Serbia. The report identifies one extinct species of butterfly, Fenton's Wood White (*Leptidea morsei*), and several endangered species, including Alpine Grizzled Skipper (*Pyrgus andromedae*), Swallowtail (*Papilio machaon*), Eastern Dappled White (*Euchloe ausonia*), Almond-eyed Ringlet and Yellow-spotted Ringlet (*Erebia alberganus* and *Erebia manto*), Apollo (*Parnassius Apollo*), Danube Clouded Yellow (*Colias myrmidone*), Lesser Purple Emperor (*Apatura ilia*) and Purple Emperor (*Apatura iris*), False Heath Fritillary (*Melitaea diamina*) and Lesser Marbled Fritillary (*Brenthis ino*).

With regard to vertebrates, only a preliminary red list of species - *Preliminary List of Species of Vertebrate Red Book* was published in 1990-1991[4]. This list provides a starting point for the development of a comprehensive vertebrate red list for the Republic of Serbia. The list identifies one species of cyclostomes and 30 species of fish, 22 species of amphibians, 21 species of reptiles, 72 species of mammals and a large number of birds (353 species) as being threatened and in need of conservation attention.

There are nine categories within the Red List: Extinct, Extinct in Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concerned, Data Deficient, Not Evaluated (Figure 1). Classification within the group under threat of extinction (Extinct, Extinct in Wild, and Critically Endangered) is carried out on the basis of five criteria: degree of decline (in numbers), population size, geographic distribution and degree of population and distribution fragmentation.

Figure 1: Red List Categories



*Source: IUCN, The Red List 2008

[3] Red Data Book of Serbian butterflies (Lepidoptera: Hesperioidea and Papilionoidea), Jaksic P., Institute for Nature Conservation of Serbia, Belgrade, 2003.
[4] Preliminary List of Species of Vertebrate Red Book, Vasić et al., Zaštita prirode 43-44: 121-132, Beograd, 1990-1991.

1.3 ECOSYSTEM DIVERSITY

Nearly all characteristic terrestrial biomes of Europe (and four of the world's twelve terrestrial biomes) are found within the territory of the Republic of Serbia:

1) Zonobiome of deciduous (broadleaf) forests. In the Republic of Serbia, this zonobiome primarily occurs as oak and beech forests;
2) Steppe zonobiome – with muck land as zonal soil and steppe (in the Republic of Serbia mostly with forest-steppe) vegetation;
3) Zonobiome (orobiome) of conifer boreal forests – in the mountain climate of the Republic of Serbia's western, south-western and south-eastern parts;
4) Zonobiome (orobiome) of highland "tundra" – in the Alpine climate of the Republic of Serbia's highlands.

A range of cross and mutual impacts occur between these zonobiomes, due to the geographic, petrographic and orographic characteristics of the Republic of Serbia's territory. The majority of the Republic of Serbia is of a highland nature, characterized by a low level of economic development, low population density and explicit depopulation processes. The specific bio-geographic position and natural features of the region, historical florogenesis and faunogenesis processes, and socio-economic phenomena and processes, have all played a role in the presence and maintenance of a high level of biological diversity.

The Republic of Serbia's ecosystem diversity may be observed through diversity of vegetation and plant associations, which represent the primary structural and production component of all land ecosystems. The territory of the Republic of Serbia is characterized by a diversity of habitats, hence a diversity of biocenoses that makes this region a significant European centre of ecosystem diversity. A map of the natural potential vegetation of the Republic of Serbia presents an "ecosystem mosaic" composed of forests, shrubs, meadows, swamps, marshes and lakes. The Republic of Serbia's vegetation contains between 700 and 800 plant communities (associations) that have been classified into 114 orders, 59 classes and 10 basic types of climate zonal ecosystems and three pedoclimate types of land ecosystems. The Republic of Serbia has harmonized

its national nomenclature with international community standards on the basis of the EUNIS[5] classification system.

The primary types of zonal ecosystems in the Republic of Serbia are:

1) Ecosystems of thermopile sub-Mediterranean deciduous forests of Oriental Hornbeam and Hop hornbeam forests (*Ostyo-Carpinion orientalis*);
2) Ecosystems of mesophile deciduous forests of Sessile Oak, Hornbeam and Beech (clusters of *Carpinion betuli* and *Fagion moesiacum*);
3) Ecosystems of thermopile deciduous oak forests of the central and eastern Balkan Peninsula (*Quercion frainetto*);
4) Ecosystems of thermopile deciduous forests in the forest-steppe area of north-eastern parts of the Republic of Serbia (*Aceri tatarici-Quercion*);
5) Ecosystems of xerophile steppes (*Festucion rupicolae*);
6) Ecosystems of hygrophilous lowland Pedunculate Oak forests (*Alno-Quercion roboris*);
7) Ecosystems of frigophile conifer forests of boreal type (*Vaccinio-Piceion*);
8) Ecosystems of frigophile conifer forests of Balkan endemorelict pines (clusters of *Pinion peucis* and *Pinion heldreichii*);
9) Ecosystem sub-Alpine shrubs vegetation (*Pinion mugo* and *Vaccinion uliginosi*);
10) Ecosystems of Alpine mountain glades, pastures and stony ground (classes of *Festuco-Seslerietea* and *Juncetea trifidii*).

[5] EUNIS data on Biological Diversity is collected and maintained by the European Topic Centre for the EEA and the EIONET, to be used for environmental reporting and for assistance to the NATURA2000 process (EU Birds and Habitats Directives) and coordinated to the related EMERALD Network of the Bern Convention. EUNIS consists of information on Species, Habitat types and Sites.

The diversity of the Republic of Serbia's ecosystems may be observed through an overview of basic vegetation types:

1) Forest and shrub vegetation:

- Forests: broadleaf deciduous forests; mixed deciduous–conifer forests; conifer forests;
- Shrubs: broadleaf deciduous shrub vegetation;
- Conifer shrub vegetation; mixed shrub-herbaceous type vegetation.

2) Herbaceous vegetation:

- Terrestrial herbaceous vegetation: meadows, pastures and continental stony ground; continental rocks, sands and salty ground; highland glades, rock creeps, screes and seams; rocks and cliffs; highland snow deposits and other similar vegetation types;
- Aquatic herbaceous vegetation.

The Republic of Serbia's ecosystems are characterized by the presence of both endemic and relict plant associations. Most plant associations with endemic features are found within rocky areas, mountain glades and rock creeps. A number of ecosystems contain many endemic species and therefore rank highly in terms of conservation attention. These include thermopile serpentine stone grounds, Pannonian salty grounds, mountain peat land, high greenery and mountain mezophile meadows. The forest and shrub communities with endemic woody plants are of particular importance within the Republic of Serbia. These include *omorika* spruce forests (*Piceion omorikae*), Fritillaria gracilis (*Pinion heldreichii*), Pinus peuce (*Pinion peucis*), Greek maple (*Aceretum heldreichii*, *Aceri-Fagetum* type), polidominating forests with Pancic acer (e.g. *Fago-Aceri intermedii-Coryletum colurnae, Querco-Aceri intermedii-Coryletum colurnae and Fraxino-Aceri intermedii-Coryletum colurnae*), hazelnut seedlings (*Fago-Corylenion colurnae*) and lilac shrub land (*Syringion*), among others.

The most important local and regional centres of ecosystem diversity in the Republic of Serbia are found within its mountain ranges: Kopaonik, Tara, Sar Mountain, Prokletije, Stara Mountain and Suva Mountain. It is also necessary to mention important refugial areas, which represent critical areas for preserving biological diversity during times of widespread climate change. These include canyons and gorges, such as Djerdap Gorge, Sicevac Gorge and the Drina Canyon, as well as the river valley of Pcinja in southern Serbia and other areas with large numbers of endemic, relict and endemorelict plant communities. Specific centres of ecosystem diversity located in AP Vojvodina must be stressed here, with their continental sand, steppe and salty ground communities that are only found in several areas: Deliblato and Subotica-Horgos Sands, "mosaic" salty grounds in Banat and Backa.

Although implementation of comprehensive management at the ecosystem level is necessary, such management is insufficient for the protection of all biological diversity. Ecosystem management may conserve the majority of species in an ecosystem, but some specialized species require special habitat conditions and specialized management regimes. In such cases, comprehensive ecosystem management may actually be inappropriate for the protection of the type of species in question. Thus, there will be situations in which specialized management regimes must be developed specific to the survival needs of at-risk species.

Recent findings in biological diversity protection have demonstrated that maintaining local populations at minimal viable levels may be inadequate for the long-term survival of a species, especially with regard to "highly interactive species"[6], such as predators and other keystone species. Thus, appropriate goals for conservation must be established at both ecosystem and species levels.

[6] Highly interactive species have been defined as a species whose "virtual or effective absence leads to significant changes in some feature of its ecosystem(s)" (Soule et al. 2003)

1.3.1 HABITAT TYPES

The Republic of Serbia's Law on Nature Protection ("Official Gazette of the Republic of Serbia", Issues 36/09, 88/10 and 91/10 - amendment) defines habitats and species as follows: "habitats (biotope) are land or water areas that are distinguished by their geographical, abiotical and biotical properties, whether fully ecological or semi-ecological" and "habitat of a species is an environment determined by special abiotical and biotical factors in which the species lives throughout all phases of its biological cycle". In 2003 the Ministry of Science and Environmental Protection initiated the project "Harmonization of the national nomenclature in habitats classification with international community standards". One result of this project was the formation of the first integral Classification System of the Republic of Serbia's Habitats, based on the EUNIS Habitat Classification System, which is itself based on analysis of phytocenological, ecological and bio-geographic data, as well as of other relevant data related to nature in the Republic of Serbia. This project also resulted in the development of a manual containing basic information about the Republic of Serbia's habitats and comprising all natural and semi-natural habitats in the Republic of Serbia. The manual does not contain descriptions and data about artificial habitats, which include habitats in urban, industrial and agricultural grounds, nor does it contain data about artificially-erected stands of various forestry cultures. The Republic of Serbia is currently preparing its National Habitat Classification.

1.4 GENETIC DIVERSITY

Genetic diversity broadly refers to variations in alleles, or forms of genes, present in a population of organisms. Natural selection acts upon this variation to select forms better able to survive and reproduce. Genetic diversity within species consists of genetic diversity of individuals within the same population and genetic diversity of different populations, and can be expressed through the degree of species' genetic structure.

The genetic potential of the Balkan populations of plant and animal species has yet to be thoroughly investigated or estimated. To date, there have not been coordinated research efforts in the Republic of Serbia concerning genetic diversity of species, largely due to a lack of required expertise in the area of genome mapping.

Nonetheless, some research and analysis has been carried out with relation to genetic diversity within and between certain groups and species of plants. Most of these are part of larger, regional projects, typically focusing on continental and global scale analysis. To this end, some results have been achieved in the genetic differentiation of species of genera: *Asyneuma, Cerastum, Edraianthus*, *Hypericum*, as well as for some species of moss. Results are expected from analyses still underway on genetic variability for species of genera: *Thymus, Ramonda, Vaccinium* etc. The genetic diversity of certain populations or groups of populations of animal species inhabiting the Republic of Serbia is determined based on the results of genetic variability analyses of populations within the entire distribution areal. As such, the level of genetic differentiation between populations is known for some wild species currently under an exploitation regime in the Republic of Serbia (e.g. viper – *Vipera ammodytes* and green frogs – *Rana synklepton esculenta*) or hunting species of game/mammals (*Capreolus capreolus* and others). Studies indicate that these populations need special conservation attention, because they are an important part of the overall genetic diversity of this particular species.

Additionally, genetic diversity has been characterized for the fish species *Salmo trutta*, as well as for some species of the *Barbus* genus.

1.4.1 GENETIC RESOURCES

The term "genetic resources" refers to the overall diversity of DNA structure in species that are directly or indirectly used by, or of value to, humans. Genetic resources are a key component of agro-biodiversity.

Agro-biodiversity in the Republic of Serbia includes species and habitats of cultivated plants and animals, as well as species and ecosystems of importance to the production of food and fodder (species in agro-ecosystems, pastures and meadows, forest and aquatic ecosystems). Traditional knowledge and cultural heritage are also important agro-biodiversity components in the Republic of Serbia. The role of agro-biodiversity lies in increasing food production and safety, reducing pressure on different, including vulnerable, ecosystems, forests and endangered species. Agro-biodiversity also contributes to the stability and sustainability of agro-ecosystems, the diversity of organisms in nature, conservation of soil fertility, conservation of other ecosystems etc.

There are more than 700,000 agricultural farms registered in the Republic of Serbia and about 44% of the total population lives in rural areas - of which 33% are involved in agricultural activities. Plant and animal genetic resources are, therefore, of key importance to sustainable development in many rural areas of the Republic of Serbia. Nonetheless, conservation of those resources is conditioned, *inter alia*, by the currently insufficiently active role of rural populations in the cultivation, sustainable use and economic valuation of agro-biodiversity.

Plant Genetic Resources

The Republic of Serbia has significant genetic resources in the area of agriculture (Table 1), due to a variety of bio-geographic, historic-economic and cultural factors.

The number of cultivated plant species in the Republic of Serbia exceeds 150. However, it is extremely difficult to estimate overall agro-biodiversity, due to the need to account for thousands of genotypes (populations), hybrids and sorts in use. The Department for Recognition and

Table 1: Agricultural land within the Republic of Serbia (without Kosovo and Metohija)

№	Agricultural land within the Republic of Serbia			Territory (in ha)
1.	Arable fields and gardens	a.	Grain crops	1,937,000
		b.	Industrial crops	416,000
		c.	Vegetables	281,000
		d.	Forage crops	466,000
		e.	Nurseries	1,000
		f.	Fallows and uncultivable arable lands	199,000
			Sub-total (1a,1b,1c,1d,1e,1f)	3,302,000
2.	Orchards			242,000
3.	Vineyards			58,000
4.	Meadows			621,000
5.	Pastures			833,000
			Total (1,2,3,4,5)	5,093,000

*Source: Statistical Office of the Republic of Serbia, Statistical Yearbook of the Republic of Serbia 2009.

Protection of Agricultural Plant Sorts within the Ministry of Agriculture, Forestry and Water Management has developed lists for a number of sorts (register of recognized sorts and register of temporarily recognized sorts), as well as guidelines for the recognition of sorts (e.g., the total number of recognized sorts of small grains exceeds 450). Over the past five decades more than 1,200 sorts of agricultural plants have been developed in the Republic of Serbia (Table 2).

Maze is the most common crop in the Republic of Serbia. The most commonly grown small grain crops are wheat, barley and oats. Among vegetables, potato is the most common crop, while strawberry, raspberry, plum, apple and sour cherry are the most commonly grown fruits. The most commonly grown industrial crops are sunflower, soy, rape plant, sugar beet, hops, flax, hemp and tobacco.

Conservation of plant genetic resources in the Republic of Serbia is implemented in two basic ways: *in-situ* and *ex-situ*. Measures of *in-situ* protection are also applied to protect autochthonic and old sorts of cultivated plants in their natural habitats through so-called 'on farm' protection, typically on the grounds of individual agricultural producers. There is no legislation regulating genetic resources' protection or 'on farm' conservation efforts.

Genetic resources of fruit plants and vines in the Republic of Serbia are usually grown *in-situ* on private properties and/or in cooperation with state institutions. The national gene fund of fruit plants includes five sub-groups: apple-like fruit, stoned fruit, nuts, soft fruit and sub-tropical fruit. Most genetic resources are currently protected *ex-situ*, i.e., outside of their natural habitats in gene banks and breeders' collections. Although botanical gardens and arboreta are important components of *ex-situ* protection, they mostly provide housing for samples at the species level. Current protection programmes do not extend to these *ex-situ* conservation efforts.

In *ex-situ* protection, plant gene banks and national collections kept within various scientific institutions (institutes and faculties) receive the highest priority.
Such institutions include:

- Institute for Field and Vegetable Crops, Novi Sad;
- Institute for Forage Crops, Krusevac;
- Institute for Small Grains, Kragujevac;
- Institute for Vegetables, Smederevska Palanka;
- Institute for Potatoes, Guca;
- Faculties of Agriculture of the Universities of Novi Sad and Belgrade.

The national collection of the Plant Gene Bank (Table 3), initiated in the 1990s, is temporarily housed in the Institute for Maze Zemun Polje until the Bank in Batajnica is made functional as part of the Directorate for Nationally Referent Laboratories.

Given that the law (and bylaws) on genetic resources has not yet been adopted at the national level, matters of

Table 2: Plant sorts developed in the Republic of Serbia

Type of culture	# of sorts
Small and millet-like grains	>740
Industrial crops	>170
Forage crops	>70
Vegetables	>120
Fruit	>40
Vine	>50
Horticulture and medicinal herbs	6

*Source: Savremena poljoprivreda, 1997

Table 3: Current status of the national collection of plant genetic resources

Plant genetic resources	#
Grain crops	2,983
Industrial crops	367
Vegetables	214
Forage	285
Medicinal and aromatic herbs	389
Total	4,238

*Source: Department of the Plant Gene Bank, MAFWM

conservation, access to, and use of, genetic resources are not governed appropriately.

Domestic Animal Genetic Resources

Statistical data shows that generally far less livestock is registered on the territory of Central Serbia and AP Vojvodina (Table 4) than in the period prior to the collapse of Yugoslavia.

The Republic of Serbia possesses unique breeds and varieties of domestic animals created through long-term selection processes conducted by humans and influenced by natural conditions present in particular regions. However, the depopulation of mountainous areas, coupled with the neglect and abandonment of livestock production in marginal areas, has led to the extinction of many breeds and varieties of domestic animals.

In addition to the indigenous breeds presented in Table 5, Regulation on the List of genetic reserves of domestic animals, conservation methods of genetic resources of domestic animals and the List of indigenous breeds of domestic animals and endangered indigenous breeds ("Official Gazette of the Republic of Serbia", Issue 38/10) indicates that the following autochthonic breeds of domestic animals in the Republic of Serbia are still in existence: domestic turkey, domestic duck, Danubian goose, domestic guinea fowl, Serbian High-flyer pigeon and the Serbian Sarplaninac (Sar Mountain) Sheppard dog. The status of the following breeds is unknown: baljusa (Black-head Pramenka from Metohija), East-Serbian chicken, Novi Pazar goose, as well as non-standardized breeds of dogs used to protect herds (Serbian Sheppard) or those used as working dogs for herd management (pulini). The Republic of Serbia also has an autochthonic breed of bee, *Apis melifera carnica,* with its varieties. It is one of most valuable breeds of honeybee in the world. Between 400 and 500 individual agricultural farms, entrepreneurs, state institutions and public enterprises own endangered breeds of domestic animals.

Table 4: Livestock numbers in the Republic of Serbia

Livestock	#
Cattle	1,002,000
Pigs	3,631,000
Sheep	1,504,000
Goats	143,000
Horses	14,000
Poultry	22,821,000

*Source: Statistical Office of the Republic of Serbia, 2009

Activities on the conservation of domestic animal genetic resources and endangered autochthonic breeds are

implemented with the goal of breed conservation and can be applied in one of the following ways:

1) *In-situ* or 'on-farm' – implies the conservation or cultivation of living animals in the production systems where they were developed or are currently located, which equally includes both farm and extensive production systems, and;

2) *Ex-situ* implies conservation of external production systems where animals are developed, which can be:

- *In vivo* - cultivation of live animals in a zoo, nature park, museum, research institute etc., and;

- *In vitro* – cryopreservation of embryos, sperm, fertilized egg cells, DNA, somatic cells and other biological materials that may be used for the reconstitution of animals.

Other Genetic Resources

In addition to cultivated plant types, the overall agro-biodiversity of the Republic of Serbia includes wild plant species that represent important components of food production and agriculture (forage crops, medicinal and aromatic herbs, decorative plants, honey plants, wild fruit). Various agro-ecosystems (arable farms, orchards, vineyards, meadows, pastures, brink and ruderal habitats) and components thereof, including weed flora and vegetation, also contribute to the overall agro-biodiversity of the Republic of Serbia.

The diversity of species that exist in natural fields (meadows and pastures) has not been studied or estimated well, but the number of species within the 273 plant associations has been estimated at more than 1,000. The total number of medicinal and aromatic plant species in

Table 5: Number of endangered autochthonic breeds and sorts in the Republic of Serbia

Species	Breed	Sort	Population size	Number of locations
Horse	Domestic mountain horse		80	15
	Nonius		90	15
Donkey	Balkan donkey		350	5
Cow	Busha		750	50
	Podolian cattle		350	6
Ox	Domestic ox		1100	40
Pig	Mangulica		2000	40
	Moravka		100	5
	Resavka		35	5
Sheep	Pramenka	Krivovirski	250	5
		Pirotski	60	2
		Lipski	250	7
		Metohijski (bardoka)	40	2
		Karakacanski (kucovlaški)	125	3
		Vlasko vitorogi	450	3
	Cigaya	Cokanski	400	4
Goat	Balkan		250	4
Chicken	Svrljig		200	2
	Sombor kaporka		200	3
	Banat naked-necked		1000	5

*Source: Assessment based on data of the MAFWM and the main breeding organisations

the Republic of Serbia is estimated at around 700, of which 420 have been officially registered and 280 are traded as commodities, according to data from the Strategy for Medicinal Plants Protection of the Republic of Serbia. Honey plant species are primarily found in meadow, forest and agro-ecosystems, while the number of species in the Republic of Serbia has been estimated at 1,800. In general, flora agro-biodiversity includes weed and ruderal plants as agro-ecosystem components. Studies conducted to date on weed flora diversity in the Republic of Serbia reveal that weed species in the broadest sense represent 28% of total flora (more than 1,000 species), which is an indicator of high generated biodiversity.

Forested areas in the Republic of Serbia are shown in Table 6.

Table 6: Forests in the Republic of Serbia by type

Type	Territory (in ha)	%
Deciduous forest	1,988,869	88.3
Conifer forests	209,473	9.3
Mixed forests	54,058	2.4
Total	2,252,400	100

*Source: National forest inventory of the Republic of Serbia - Forest Fund of the Republic of Serbia, MAFWM, Directorate for Forests, 2009

With regard to autochthonic forest genetic resources, the greatest value is seen in endemic and endemorelict taxa (*Pinus peuce, Pinus heldreichii, Pinus nigra subsp. gocensis, Picea omorika, Taxus baccata, Prunus laurocerasus, Acer heldreichii, Fraxinus pallisiae, Forsythia europaea, Corylus colurna, Daphne blagayana, Daphne mesereum* and others). Within forest genetic resources great importance is given to wild fruit species, as genetic resources for food and agriculture, especially in fruit tree breeding, grafting, and as a collectible resource. Some 88 species of wild fruit have been identified within the natural forest associations of the Republic of Serbia, 12 of which are in significant population decline and display reduced genetic diversity. Other important genetic and economic resources include truffles, which can be found as symbionts in many deciduous forests.

The greatest importance among genetic resources of medicinal and aromatic herbs is given to the genetic diversity of commercially important species (chamomile, mint, sage, hypericum, yarrow, oregano, bearberry, valerian, plantain, primula etc.), as well as sorts of limited geographic distribution and those in decline. Little attention has been paid to genetic resources of medicinal and aromatic herbs or the need for population monitoring, evaluation and conservation.

The wild relatives of domesticated crops are of particular importance, as a genetic resource, to improving cultivated plants, especially their resistance to various abiotic and biotic stressors. More than half the currently cultivated plants have direct relatives within forest and herbaceous plant associations. There have been no known attempts to develop an inventory and characterize these genetic resources in the Republic of Serbia, except for wild relatives of fruit species.

1.5 PROTECTION OF BIOLOGICAL DIVERSITY

The protection of nature within the Republic of Serbia, as well as basic categorization of protected resources, is defined by the Law on Environmental Protection ("Official Gazette of the Republic of Serbia", Issues 135/04 and 36/09) and the Law on Nature Protection.

Protected natural goods are:

1) protected landscapes (strict nature reserve, special nature reserve, national park, monument of nature, protected habitat, landscape of exceptional characteristics, nature park);

2) protected species (strictly protected wild species, protected wild species);

3) mobile protected natural specimens.

1.5.1 PROTECTED AREA SYSTEM

Areas of exceptional geological, biological, ecosystem, and/or landscape diversity can be declared as protected areas of general interest.

According to the Law on Nature Protection, there is a three-level protection regime in protected areas with strictly defined activities that are prohibited or limited. The government can prescribe protection regimes in greater detail, as well as procedures and their implementation methods. The Law also envisages public participation in protected areas' designation and adoption of their management plans. Such a protection regime helps avoid previous uncertainties and situations in which some institutions and organizations could decide to carry out activities prohibited or not allowed within protected areas.

The total area currently covered by the protected area system (Table 7) amounts to 518,204 ha and represents 5.86% of the Republic of Serbia's territory.

The list and map of protected areas are provided in Annex 1 and 2.

The preliminary list of proposals for UNESCO world heritage contains five protected areas: National Parks Djerdap, Tara and Sar Mountain; Monument of Nature Djavolja varos and Special Nature Reserve Deliblato Sands.

Table 7: Protected area system in the Republic of Serbia

Protected area system	No. of sites	Territory (in ha)	%
Protected areas	464	518,204	5.86
UNESCO MAB	1	53,804	0.61
Ramsar sites	9	55,627	0.63
IBA	42	1,259,624	14.25
IPA	61	747,300	8.5
PBA	40	903,643	10.22

*Source: Institute for Nature Conservation of Serbia, 2010

Within the UNESCO "Man and Biosphere" programme, Nature Park "Golija" joined the biosphere reserve network in 2001 when it was named "Golija-Studenica". Another nine natural areas have been nominated for biosphere reserve status.

Based on the Ramsar Convention on Wetlands of International Importance, nine areas have gained Ramsar Area status, of which eight are protected. These include: Special Nature Reserves "Obedska bara", "Carska bara", "Ludasko jezero", "Slano kopovo", "Labudovo okno" (part of the Deliblato Sands Special Nature Reserve), "Gornje Podunavlje" and "Zasavica", Landscape of Exceptional Characteristics "Vlasinsko jezero" and "Karajukica bunari" in Pester field, covering an area of 55,627 ha.

Detailed lists of IBA, IPA and PBA areas are provided in Annex 3.

1.5.2 ECOLOGICAL NETWORKS

The Law on Nature Protection defines an ecological network as "a unique system of functionally connected natural and semi-natural spatial units, which establish and restore ecological functions in order to preserve

biological diversity and provide appropriate conditions for sustainable use of space and resources at the national and regional level".

The Regulation on Ecological Networks ("Official Gazette of the Republic of Serbia", Issue 102/10) established the ecological network and its management. An ecological network is a composite of connected and interrelated areas of ecological importance. It consists of ecologically important areas, corridors connecting ecologically important areas and buffer zones necessary to protect ecologically important areas and corridors from possible adverse external influences.

An ecological network can comprise:

1) Areas declared as protected by law, areas in the process of being protected and areas earmarked for protection by relevant strategic documents with biodiversity protection as a priority aim;
2) Sites of special interest for conservation, such as the Emerald Network, indentified by the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention);
3) Internationally Important Bird Areas, in accordance with EU priorities (IBA);
4) Internationally Important Plant Areas (IPA);
5) Prime Butterfly Areas in accordance with international regulations (PBA);
6) Sites listed by the Convention on Wetlands of International Importance (Ramsar Convention) or planned/nominated for inclusion on this list;
7) Speleological objects;
8) Transboundary sites connecting ecological networks of neighbouring countries in accordance with international regulations;
9) Sites of priority habitat types indentified according to the Regulation on Habitat Types' Distinguishing Criteria, Habitat Types, Sensitive, Threatened, Rare and Priority Habitats for Protection, as well as Protection Measures for Habitat Types Conservation;
10) Habitats of wild species that are rare or endangered at national, European and global levels, as well as habitats of endemic species determined by the Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi;
11) Other ecologically relevant sites not described herein but determined as ecologically important by spatial plans.

Pan-European Ecological Network (PEEN)
The aim of this network is to provide long-term conservation of ecosystems, habitats and species of importance for protection at a European level. PEEN stipulates the existence of a central zone, which would be made of Natura 2000 and Emerald areas. It also stipulates the existence of corridors that connect central zones and enable the migration and dispersion of species, as well as transitional zones and recovery areas, which would be subject to a lower degree of protection than the central zone.

NATURA 2000
Natura 2000 is a network of areas obliging every EU member state to provide adequate status for endangered species and habitat types within its territory, as stated in the Appendices of the Birds Directive (Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds) and the Habitat Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora), which in practice implies adequate management of these areas. The Natura 2000 network should be established in the Republic of Serbia by EU accession date.

Emerald Network
The Emerald Network is an ecological network comprising Areas of Special Conservation Importance (ASCI), i.e., spatial entities and habitats of special national and international importance in terms of biological diversity conservation. A total of 61 areas in the Republic of Serbia have been nominated for inclusion in the Emerald Ecological Network. The areas nominated are particularly important for the protection and conservation of wild plant and animal species and their habitats. The list of potential Emerald areas in the Republic of Serbia is provided in Annex 4.

1.5.3 PROTECTED SPECIES

Wild species that are endangered, or may become endangered, and that are particularly significant for genetic, ecological, eco-systemic, scientific, health and economic reasons, shall be protected as strictly protected wild species or protected wild species.

The List of protected species is established by the Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi ("Official Gazette of the Republic of Serbia", Issue 5/10).

Strictly protected wild species may be declared in the following cases:

1) species extinct in the Republic of Serbia and reintroduced through a reintroduction programme;

2) extremely endangered wild species;

3) endangered wild species;

4) relict species;

5) local endemite;

6) stenoendemite;

7) internationally significant and protected wild species;

8) species requiring strict protection for other reasons.

Table 8: Strictly protected wild species in the Republic of Serbia

Fauna	Order	Family	Species
Mammals (*Mamalia*)	4	15	50
Birds (*Aves*)	17	57	307
Reptiles (*Reptilia*)	2	6	18
Amphibians (*Amphibia*)	2	6	18
Fish and Lampreys (*Pisces* and *Cephalaspidomorphi*) ( )	8 (1)	10 (1)	30 (4)
Invertebrates	27	95	609
· Spiders (*Arachnida*)	3	10	73
· *Branchiopoda*	1	2	4
· *Chilopoda*	1	1	2
· *Diplopoda*	4	6	27
· *Entognatha*	2	7	25
· Insects (*Insecta*)	9	51	377
· *Malacostraca*	3	8	35
· Mollusks (*Mollusca*)	1	1	1
· Snails (*Gastropoda*)	2	8	60
· Annelids (*Annelidae*)	1	1	5
Fauna	60	189	1032
Fungi and Lichens	15	31	75
· Fungi	7	17	38
· Lichens	8	14	37
Plants	56	100	628
· Mosses (*Bryophyta*)	12	15	47 (24 + 23 species of genus *Sphagnum*)
· Ferns (*Pteridophyta*)	5	9	22
· Seed plants (*Spermatophyta*)	39	76	559
Algae	5	7	25
· Charales (*Charophyta*)	1	2	15
· Red algae (*Rhodophyta*)	4	5	10

*Source: Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi

There are a total of 1,760 strictly protected wild species of algae, plants, animals and fungi (Table 8).

The following wild species may be declared as protected:

1) vulnerable wild species;
2) endemic species;
3) indicator, key and umbrella species;
4) relict species;
5) internationally significant and protected wild species;
6) species that are not endangered, but can easily be confused with an endangered species, due to appearance.

There are a total of 868 protected wild species of plants, animals and mushrooms (Table 9).

Of the species listed above, 112 species of plants and animals are under use and trade control[7].

Table 9: Protected wild species in the Republic of Serbia

Fauna	Order	Family	Species
Mammals (*Mammalia*)	6	14	30
Birds (*Aves*)	9	12	35
Reptiles (*Repilia*)	2	2	2
Amphibians (*Amphibia*)	1	1	3
Fish (*Pisces*)	8	10	34
Invertebrata	14	40	154
· Spiders (*Arachnida*)	1	4	4
· Insects (*Insecta*)	10	33	145
· Snails (*Gastropoda*)	1	1	3
· Annelids (*Annelidae*)	2	2	2
Animals	40	79	258
Fungi	6	10	37
· Fungi	5	9	26
· Lichens	1	1	11 (3 + 8 species of genus *Usnea*)
Plants	43	78	573
· Mosses (*Bryophyta*)	3	6	10
· Ferns (*Pteridophyta*)	5	8	9
· Seed plants (*Spermatophyta*)	35	64	554 (514+ 32 species of genus *Alchemilla* and 8 species *Euphrasia*)

*Source: Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi

[7] 78 plant species (2 species of fern and 76 seed plant species), 15 mushroom species and 10 species of lichene (8 species of genus *Usnea*, exept those species that are strictly protected) and 9 animal species (2 reptile species, 3 ampibian species and 4 invertebrate species)

1.5.4 OTHER PROTECTED NATURAL GOODS

Areas that are significant for their geological and paleontological heritage, as well as biological documents of significant scientific, educational and cultural importance, may be protected as mobile protected natural specimens.

Mobile protected natural specimens may include the following:

1) all specimens of holotypes, syntypes and genotypes of fossils, as well as typical kinds of fossils;
2) all individual minerals and/or crystals and mineral druses within a bed;
3) all holotypes and syntypes of fossils, typical kinds of fossils of individual minerals and crystals;
4) mycological, botanical and zoological collections, as well as individual conserved preparations of organic species, their holotypes and syntypes.

It is prohibited to collect and/or destroy mobile natural specimens, or destroy or damage their contents.

2. INSTITUTIONAL, LEGAL AND FINANCIAL FRAMEWORKS FOR BIOLOGICAL DIVERSITY PROTECTION IN THE REPUBLIC OF SERBIA

Biodiversity is one area in which the country has initiated the restructuring of strategic, legal, institutional and economic frameworks. Current activities in this area are largely dictated by the EU stabilization and accession processes. Current priorities reflect real needs related to the solving of long-term and ever-growing problems in this area.

Biodiversity management and protection remains under the control of the state at both the national and Autonomous Province of Vojvodina levels, although certain institutional and legal activities have been transferred to the local self-government level. Most non-governmental organizations working on biodiversity protection operate at the local level, while a few NGOs are exclusively active at the national level. NGOs are often associations of experts, rather than civil society associations. NGOs also serve as a means for experts to obtain additional funding, considering that funds allocated by the Ministry of Science and Technological Development and the Ministry of Environment and Spatial Planning for basic and applied research are usually insufficient.

2.1 INSTITUTIONAL FRAMEWORK FOR BIODIVERSITY PROTECTION

2.1.1 GOVERNMENT INSTITUTIONS

The Ministry of Environment and Spatial Planning performs state administration activities related to the system of protection and sustainable use of natural resources; inspections in the area of sustainable use of natural resources and environmental protection; nature protection, establishment and implementation of protection of natural areas important for the Republic of Serbia; establishment of environmental protection conditions in spatial planning and construction; approval of transboundary trade in protected plant and animal species; all other activities stipulated by law. The Ministry of Environment and Spatial Planning has competence over the conservation and development of biodiversity and protected areas; monitoring and sustainable use of biodiversity and landscape; internal and international trade in endangered and protected species of wild flora and fauna.

Besides the Ministry of Environment and Spatial Planning, certain competencies relating to nature protection are entrusted to the Ministry of Agriculture, Forestry and Water Management, through its Directorate for Forests, Directorate for Plant Protection, Directorate for Veterinarian Medicine, Sector for Rural Development, Directorate for Waters and Directorate for Nationally Referent Laboratories - which includes the Plant Gene Bank. This Ministry is in charge of the preservation of genetic resources of domestic animals and cultivated plants, all GMO matters, implementation of Kartagena Protocol on Biosafety, Mechanism of Biosafety Information Exchange and organization of the Biosafety Expert Council; Ministry of Economy and Regional Development (including sectors of industry, tourism and complementary activities); Ministry of Health (implementation of sanitary regulations pertaining to environmental protection and biosafety); Ministry of Science and Technological Development (main financial source for various basic and applied research related to the application and management of bio-technologies, as well as biodiversity monitoring); Ministry of Infrastructure (including road, air, railroad and water transport); Ministry of Mining and Energy (sectors for energy efficiency, permits for exploitation of mineral resources, renewable energy sources) and other ministries.

Under existing laws, certain competences in the area of environmental protection have been decentralized to provincial or self-government unit level. Since 2009, according to the Law on Determination of Competences of the AP Vojvodina ("Official Gazette of the Republic of Serbia", Issue 99/09), competences of the Provincial Secretariat for Environmental Protection and Sustainable Development have included activities related to environmental protection on the territory of AP Vojvodina, the protection of natural resources, in compliance with the law regulating nature protection, development and adoption of an environmental protection programme for AP Vojvodina territory, adoption of plans and programmes related to natural resources and goods management, control of utilization and protection of natural resources and areas of its territory and continual monitoring and control of the environmental status of the Province.

Local self-governments have competences over land usage planning, environmental protection and development, as well as utility services. Local level environmental secretariats have competences over environmental protection, including air quality protection, noise protection, municipal waste management, urban planning and permitting for construction of facilities other than those at the national level. Their statutory tasks also include strategic assessments of plans and programmes, environmental impact assessment and integrated permits.

The Environmental Protection Agency, established in 2004, is part of the Ministry of Environment and Spatial Planning. The agency performs state administration jobs regarding development, harmonization and management of the national information system related to environmental protection, development of polluters' cadastre, state of environment and environmental policy implementation data collection, analysis and reporting. The agency also cooperates with and reports to the European Environmental Agency (EEA) and the European Environment Information and Observation Network (EIONET).

The Environmental Protection Fund, established in 2004, provides funds for incentives and environmental development in the Republic of Serbia. The Fund manages projects and performs financial mediation in the area of conservation, sustainable use, protection and development of the environment and the use of renewable energy sources, in compliance with the National Environmental Protection Plan and other strategic plans, programmes and concluded international agreements.

The Institute for Nature Conservation, established in 1948, is a public expert institution entrusted to perform activities on the protection and development of the Republic of Serbia's national heritage. The Institute for Nature Conservation performs professional activities of natural goods' protection and research. It also studies natural resources in order to put them under protection, implements measures and protection regimes, prepares studies to propose protection and valuation of natural resources, monitors natural goods' endangerment and proposes protective measures, determines protection conditions and provides data on protected areas for the development of spatial and other plans. The institute performs other professional activities, as prescribed by regulations; it studies and protects the biological and geological diversity of the Republic of Serbia through its activities and also provides professional supervision and assistance for the management and development of

protected areas.

The Provincial Institute for Nature Conservation was first established in 1966, but became part of the Institute for Nature Conservation of Serbia in 1992. On the basis of the 2009 Law on Nature Protection, it was again established as the Provincial Institute for Nature Conservation in 2010, tasked with performing activities regarding nature protection and the protection of natural goods located entirely on the territory of AP Vojvodina.

In addition to the aforementioned ministries, Provincial Secretariat, Institute for Nature Conservation of Serbia and Provincial Institute for Nature Conservation, certain competences relating to nature protection are entrusted to public enterprises that manage the national parks: Tara, Djerdap, Kopaonik, Fruska Gora and Sar Mountain. PE "Srbijasume", PE "Vojvodinasume", PE "Vode Vojvodine" and other managers of protected areas operate in compliance with the Bylaw on Conditions to be Fulfilled by a Protected Areas' Manager ("Official Gazette of the Republic of Serbia", Issue 85/09).

2.1.2 RESEARCH AND EDUCATIONAL INSTITUTIONS

The Republic of Serbia has a long scientific-research tradition in the area of natural sciences. Scientific research is performed through various activities in universities, institutes and other organizations. There are research and education programmes in the area of ecology and biology which, through various aspects, address issues of biodiversity and nature protection.

The country's most significant scientific-research institutions for biodiversity protection are:

Faculty of Biology, University of Belgrade (*http://www.bio.bg.ac.rs*): the largest and oldest faculty of biological sciences in the Republic of Serbia, established in 1853. Nowadays the faculty has the following departments: Department for Plant Morphology, Department for Plant Physiology, Department for Ecology and Geography of Plants, Department for Microbiology, Department for Algology, Mycology and Lichenology, Department for Morphology, Systematic and Phylogeny of Animals, Department for Ecology and Geography of Animals, Department for Genetics and Evolution, Department for Dynamics of Animal Development, Department for General Physiology and Biophysics, Department for Comparative Physiology and Ecophysiology and Department for Biochemistry and Molecular Biology.

Faculty of Agriculture, University of Belgrade (*http://www.agrif.bg.ac.rs*): established in 1919, nowadays it is an academic-scientific institution which includes educational and scientific-research activities in the following areas: farming, fruit growing and viticulture, cattle breeding, horticulture, soil melioration, plant and food products protection, mechanization in agriculture, food processing technology and agro-economy. The faculty includes the "Radmilovac" experimental farm, where a collection of fruit and vine grape genetic resources is stored.

Faculty of Forestry, University of Belgrade (*http://www.sfb.bg.ac.rs*): founded in 1920 within the Faculty of Agriculture, it has been an independent faculty since 1949. The faculty is composed of four sections: forestry, wood processing, landscape architecture and horticulture and ecological engineering in the field of land and water resources.

Faculty of Veterinarian Medicine, University of Belgrade (*http://www.vet.bg.ac.rs*): established in 1936, today this is a highly renowned high school and scientific institution educating veterinarians. The faculty performs educational, scientific and research activities in the field of identification, characterization and conservation of genetic resources of farm animals.

Natural Science and Mathematical Faculty, University of Novi Sad (*http://www.pmf.uns.ac.rs*): established in 1969, this faculty is now an educational and scientific institution which educates and performs scientific research in the fields of biology, chemistry, physics, mathematics, informatics, geography, tourism studies and environmental protection.

Natural Science and Mathematical Faculty, University of Kragujevac (*http://www.pmf.kg.ac.rs*): established in 1972, by 1973 it had already established its biology study group. Today this faculty is the biggest and best equipped educational-scientific institution in Central Serbia, successfully educating experts in the natural sciences, mathematics and informatics.

Faculty of Natural Science and Mathematics, University of Nis (*http://www.pmf.ni.ac.rs*): established in 1999, it is

composed of five sections: mathematics, physics, chemistry, geography and biology with ecology.

Faculty of Agriculture, University of Novi Sad (*http://www.polj.uns.ac.rs*): established in 1954, it is one of the country's biggest educational and scientific institutions in the agriculture area, contributing to the development of technological processes in agricultural production: farming, cattle breeding, fruit growing and viticulture, plant protection and other branches of agriculture.

Institute for Biological Research 'Sinisa Stankovic', Belgrade (*http://www.ibiss.bg.ac.rs*): functions as an independent research institution studying all of the most significant issues faced by modern biological science globally today. This institution's scientific projects include complex, multidisciplinary research in molecular biology and biochemistry, cytology, physiology, plant physiology, neurobiology, immunology, genetics, ecology, evolution biology, taxonomy, biogeography and environmental protection.

Institute for Multidisciplinary Studies, University of Belgrade (*http://web.imsi.rs)*: founded in 1970 with the aim of promoting research and postgraduate scientific studies in multidisciplinary areas of science and research.

Faculty of Pharmacy, University of Belgrade (*http://www.pharmacy.bg.ac.rs*): established in 1945, this faculty's Institute of Botany is conducting fundamental and applicative research of the flora of the Republic of Serbia.

Institute for Medicinal Herbs Dr Josif Pancic, Belgrade (*http://www.mocbilja.com*): the only Serbian institution dealing with the studying, producing, processing and trading of medicinal herbs and herbal preparations, with a tradition dating back more than 50 years. The institute's activities are performed through scientific-research, production processes and commercial activities, including herbal pharmacies.

Institute for Cattle Breeding, Belgrade (*http://www.istocar.bg.ac.rs*): established as a scientific institution specializing in modern cattle breeding, the Institute represents the main cultivating organization, maintaining master records on domestic animals per species, i.e. breeds (including autochthonic breeds). It also processes and issues certificates of origin and production properties of quality breeding cattle, performs examinations of productivity of quality breeding cattle and the transfer of characteristics to offspring, develops plans for the use and distribution of seed from quality male breeding cattle, maintains records on producers of quality breeding cattle and new breeds, hybrids of cattle and bees etc.

Institute for Field and Vegetable Crops in Novi Sad (*http://nsseme.com*): conducts basic and applied research work on the creation of sorts and hybrid vegetable, forage, industrial, medicinal, aromatic and field crops. In addition to making improvements, this institute develops technologies of its own sorts and hybrids. So far more than 1,000 sorts and hybrids have been developed at the institute, almost 500 of which have been registered and are cultivated abroad.

Institute for Lowland Forestry and Environment (*http://www.ilfe.org*): established in 1958, numerous projects within this institute relate to improving the cultivation of lowland woody plants, protective greenery, forest management plans and the recultivation of degraded land. Planting stock production is also implemented.

Institute for Maze in Zemun Polje (*http://www.mrizp.co.rs*): through scientific and research activities, this institute deals with the creation, production and introduction of new high-yield, quality hybrids of maze and soy sorts for different agro-ecological growing conditions, different needs and purposes.

Institute for Molecular Genetics and Genetic Engineering, Belgrade (*http://imgge.bg.ac.rs*): its basic research mostly

deals with the analysis of genome organizations and regulation of genetic expression in various organisms. It is also oriented to biotechnological commercial applied research in human and veterinarian medicine, agriculture, food production and the pharmaceutical industry.

2.1.3 NON-GOVERNMENTAL ORGANIZATIONS

The exact number of environmental NGOs registered in the Republic of Serbia is unknown. However, it is presumed to exceed 500. According to data from the Provincial Secretariat for Environmental Protection and Sustainable Development, there are 147 environmental NGOs registered in AP Vojvodina. Environmental NGOs account for 12% of the total number of NGOs in the Republic of Serbia and represent the third group in terms of size, following development NGOs and those active in the social sector. The majority of NGOs active in the environmental protection area were established during the process of non-governmental sector development that followed the establishing of the country's democratic regime. They were not established as a response to specific ecological problems, but rather because of the accessibility of donations and other financial sources. In situations when an NGO is established because of certain local problems, non-permanent financial sources and dependence on foreign donations have often influenced the focus of the organization's activities. The support received from official institutions and the private sector remains insufficient, though it is growing year on year.

After the 1990s NGOs began to play a more important role in the area of environmental protection in the Republic of Serbia. According to some estimates made by the Regional Environmental Centre, there are around 115 NGOs in the Republic of Serbia active in the area of environmental protection, with membership of 55,000 people. This number includes highly professional associations and local voluntary organizations that are active through local initiatives for waste clearance, the protection of certain species and other similar activities. The majority of eco NGOs in the Republic of Serbia may be classed as local, while a fifth are active at the national level. A few NGOs are active in international and transboundary projects. Some NGOs gather experts and have a significant impact on environmental policy, while others advocate the interests of smaller local communities.

NGOs' capacities differ significantly according to location; organizations located in cities have higher capacities than those located in rural areas, mostly because of the concentration of main donors in cities. The main university offices and other research institutions are also located in bigger cities. Furthermore, NGOs differ according to their budgets, which range from several hundred Euros to more than €100,000 at annual level. The average annual budget per organization rose from €4,081 to €14,456 in 2001, while 28% of organizations do not have a budget at all or have a budget of less than €500 annually. Only four NGOs had a budget exceeding €100,000 in 2006.

Despite the many challenges faced by NGOs in the Republic of Serbia, they have the advantage of a higher than average

level of education among their members. Data shows that 58% of activists in the NGO sector have a university degree, 5% are educated to masters' level and even 4% are educated to PhD level. This is more than in any other sector in the Republic of Serbia and is as much as ten times higher than the average education level among adults in the Republic of Serbia.

The role of NGOs is important in all aspects of environmental protection and is especially recognized in awareness raising activities, through the provision of information to the public and promoting environmental protection, but also through highlighting environmental problems and the need to find solutions.

Moreover, several international NGOs dealing with the protection of nature and biodiversity are functioning actively in the Republic of Serbia, the most significant of which is the World Wide Fund for Nature (WWF). The International Union for Conservation of Nature (IUCN) is an active inter-governmental organization, while the Regional Environmental Centre for Central and Eastern Europe (REC) is a regional organization present in the Republic of Serbia.

2.2 LEGAL FRAMEWORK FOR BIODIVERSITY PROTECTION

The legal framework for the area of environmental protection is based on the Constitution of the Republic of Serbia ("Official Gazette of the Republic of Serbia", Issue 98/06), which defines the rights of all citizens to a healthy environment, as well as the duty of all citizens to protect and develop the environment in compliance with law.

2.2.1 LAWS AND STRATEGIES

Laws

The basic principles of nature protection and development are provided in the Law on Environmental Protection, which covers the following areas:

- Criteria and conditions for sustainable management (use and protection) of natural resources and goods;
- Ecological protection of air, water, soil, land, forests, protected areas and national parks; protection against waste, ionizing radiation, noise and vibrations;
- Measures and conditions of environmental protection (prevention), in terms of national ecological programmes and plans; land use and construction; conditions for plants and installations operation; ecological standards of quality and emissions (emission limit values and ambient limit values); prohibitions and restrictions; environmental management systems; standards of technologies, products, processes and services; ecological labelling;
- Remediation;
- Systems for ecological permitting and approvals;
- Protection against dangerous substances (production, transport and handling);
- Environmental monitoring (monitoring and information systems);
- Access to information and public participation in decision making processes;
- Economic instruments for environmental protection;
- Responsibility for environmental pollution;
- Supervision and penalties.

Law on Nature Protection regulates the protection and conservation of nature, biological, geological and landscape diversity. It sets the following goals:

- Protection, conservation and development of biological (genetic, species and ecosystem), geological and landscape diversity;
- Harmonization of human activities, economic and social development plans, programmes, bases and projects with sustainable use of renewable and non-renewable natural resources and long-term conservation of natural ecosystems and a natural balance;
- Sustainable use and/or management of natural resources and goods, maintenance of their function, along with conservation of natural values and the balance of natural ecosystems;
- Timely prevention of human activities and actions which may lead to permanent depletion of biological, geological and landscape diversity, as well as disturbances with negative consequences for nature;
- Determination and monitoring of nature status;

- Improvements in the status of degraded parts of nature and landscape.

This law also defines the obligations of protected area managers to develop management plans for a 10-year period. The law also stipulates that said management plans for shorter periods can be adopted for certain protected areas (single trees, avenue, etc.). A management plan defines the mode of implementation of protection, use and management of a protected area; policies and priorities for the protection and conservation of natural values of protected areas and development policies, considering the needs of the local population. A manager is required to ensure internal order within the protected area and guard said order, in accordance with the Regulations of internal order and guardian service, which are to be developed and adopted by the manager with the consent of the competent authority. A protected area may be managed by a manager who meets requirements in terms of expertise, personnel and organizational capacity for carrying out protection, improvement, promotion and sustainable development activities for the protected area, based on the Regulation on Conditions to be Fulfilled by a Protected Area Manager.

In addition to the Law on Environmental Protection and the Law on Nature Protection, other relevant laws in the field of biodiversity include the Law on Strategic Environmental Impact Assessment ("Official Gazette of the Republic of Serbia", Issue 135/04), the Law on Environmental Impact Assessment ("Official Gazette of the Republic of Serbia", Issues 135/04 and 36/09), Law on National Parks ("Official Gazette of the Republic of Serbia", Issues 39/93, 44/93, 53/93, 67/93, 48/94, 101/05 and 36/09 – the other law), Law on Protection and Sustainable Use of Fish Stocks ("Official Gazette of the Republic of Serbia", Issue 36/09), Law on the Spatial Plan of the Republic of Serbia from 2010 until 2020 ("Official Gazette of the Republic of Serbia", Issue 88/10), and others.

In addition to laws under the jurisdiction of the Ministry of Environment and Spatial Planning, laws and regulations brought by the Ministry of Agriculture, Forestry and Water Management also regulate the protection of biodiversity, especially in the domain of utilization and protection of forest, hunting, fishing and genetic resources for food and agriculture. These include: the Law on Food Security ("Official Gazette of the Republic of Serbia", Issue 41/09), the Law on Agriculture and Rural Development ("Official Gazette of the Republic of Serbia", Issue 41/09), the Law on Animal Husbandry ("Official Gazette of the Republic of Serbia", Issue 41/09), the Law on Protection of Rights of Breeders of Plant Varieties ("Official Gazette of the Republic of Serbia", Issue 41/09), the Law on Genetically Modified Organisms ("Official Gazette of the Republic of Serbia", Issue 41/09), the Law on Welfare of Animals ("Official Gazette of the Republic of Serbia", Issue 41/09), the Law on Forests ("Official Gazette of the Republic of Serbia", Issue 30/10) and the Law on Game and Hunting ("Official Gazette of the Republic of Serbia", Issue 18/10).

The Law on Animal Husbandry regulates the conservation of genetic reserves of domestic animals and biological diversity in livestock breeding (animal husbandry), as one of the areas. The Law, among other things, establishes the following areas related to animal husbandry: conservation of genetic variability and biodiversity in livestock breeding, conservation of agricultural land used for the prescribed purpose; implementation of organic production in animal husbandry; conservation of autochthonic breeds of domestic animals and breeding of domestic animals with respect to environmental norms. The Law stipulates the establishment of a List of Genetic Reserves of Domestic Animals, as well as the manner of their conservation by maintaining an appropriate Registry of Autochthonic Breeds. The Law also stipulates the adoption of the Programme on Biodiversity Conservation in Animal Husbandry for a five-year period, which should include

assessment of the situation in terms of biodiversity in animal husbandry. The Law pays special attention to the breeds of bees *Apis mellifera carnica* and prohibits the cultivation and trade of breeding material from other breeds of bees on the territory of the Republic of Serbia.

The Law on Genetically Modified Organisms of the Republic of Serbia is based on the EU Council Directive of 23 April 1990 regarding the deliberate release of genetically modified organisms into the environment 90/220/EEC. Related bylaws were also developed and adopted: Bylaw on the limited use of genetically modified organisms; Bylaw on the placement of genetically modified organisms and genetically modified organism products on the market; Bylaw on the introduction of genetically modified organisms and genetically modified organism products in the production; Bylaw on the contents and data contained in genetically modified organisms and genetically modified organism products Register.

A detailed list of laws and bylaws closely defining biodiversity protection is provided in Annex 5.

Strategies

The strategic framework related to biodiversity protection is defined through strategic documents and the government's determination to join the EU, through the National Environmental Protection Programme and sectoral strategies (agriculture, forestry, etc.). The most important strategic documents include:

The National Strategy of Serbia for the EU Accession of Serbia and Montenegro contains a chapter on social and economic development that focuses on increasing GDP through direct investments based on sustainable development principles. The same chapter determines priority activities, among others to: "Finalize development and adopt strategic documents (defined by the Law on Environmental Protection, sustainable development, climate change, forests, wastewaters, protection of air against pollution, sustainable use of water resources etc.), adopt strategies on nature protection and biodiversity protection, sustainable utilization of natural resources and other documents important to the development of the environmental protection system".

National Sustainable Development Strategy for the period 2009-2017 ("Official Gazette of the Republic of Serbia", Issue 57/08) defines principles based on three pillars of sustainability: environment, society and economy. Chapter 5, Environment and Natural Resources, contains sectoral aims in the area of biodiversity, such as: adoption of the law on nature protection and ratification of international agreements, development of the National Strategy for Sustainable Use of Natural Resources and Goods, development of the National Strategy on Biodiversity Conservation and related action plans, increase of areas under protection up to 10% of the country's territory, establishment of bio-monitoring, an information system, inventory, biodiversity monitoring, GMO control and establishment of a Gene Bank.

Development of the National Environmental Protection Programme was initiated within the Programme on Environmental Capacity Building in the Republic of Serbia, financed by the European Commission. The Programme was adopted by the government in January 2010 ("Official Gazette of the Republic of Serbia", Issue 12/10). In addition to describing environmental status, this programme defines the basic aims and criteria for implementation of environmental protection in general, within certain areas and spatial sections with priority protective measures, conditions for the application of most favourable economic, technical, technological, commercial and other measures for sustainable development and environmental management, long and short term measures for pollution prevention, mitigation and control, key players, implementation manners and schedules, as well as funds needed for the implementation of the aforementioned. The Programme will be implemented through the Action Plan, which will be developed by the Ministry of Environment in cooperation with other ministries. The Action Plan will be brought for a five-year period. Once in two years, and in cooperation with other competent ministries, the Ministry will prepare a report on implementation of the National Plan and submit said report to the government.

National Strategy for Sustainable Use of Natural Resources and Goods was also initiated within the Programme on Environmental Capacity Building in the Republic of Serbia and addresses the use of natural resources. The development of the Strategy was continued in 2010

through the bilateral cooperation programme between the Ministry of Environment and Spatial Planning and the Swedish Environmental Protection Agency. The document is under development.

The Law on the Spatial Plan of the Republic of Serbia from 2010 until 2020 ("Official Gazette of the Republic of Serbia", Issue 88/10) is adopted in 2010. The Spatial Plan primarily directs and controls spatial organization and regulation in the Republic of Serbia, but also contains propositions from other development areas.

Agriculture Development Strategy of the Republic of Serbia ("Official Gazette of the Republic of Serbia", Issue 78/05) stipulates instruments for the provision of an adequate level of protection and control in GMO-related activities. It also obliges relevant institutions to harmonize legislation in the area of GMO with EU legislation. The agriculture development strategy stresses the importance of biodiversity conservation, particularly in relation to the conservation and management of forests, as well as the need for conservation of agro-biodiversity and plant and animal genetic resources. The Action Plan of the Strategy stipulates adoption of the National Programme for Conservation and Sustainable Use of Genetic Resources in Agriculture; harmonization of the existing national database on plant and animal genetic resources with the international standards (FAO and IPGRI); support to the production based on autochthonic breeds of domestic animals and plant sorts, studying of agro-biodiversity and functioning of the national plant gene bank.

National Rural Development Programme (in the adoption procedure) proposes measures for rural development during the 2011-2013 period. It includes measures which address agro-biodiversity conservation. The second co-mponent of the Programme contains measures for environmental improvement, while one of the sub-measures is "support to traditional breeds of domestic animals".

The Republic of Serbia has not introduced a hunting development strategy to this day, but this area has been defined through legal regulations and certain strategic documents that form a basis for sector development. The Spatial Plan of the Republic of Serbia and the Law on Game and Hunting provide a legal framework for the sector's development. This law defines conditions of the use, management, protection and development of game

populations and their habitats. The Law stipulates the adoption of the Game and Hunting Management Strategy of the Republic of Serbia, adoption of planning documents, as well as development of monitoring and information systems on game populations and their habitats.

One of the aims of the Forestry Development Strategy ("Official Gazette of the Republic of Serbia", Issue 59/06) is biodiversity conservation and development within forested areas, which is part of the forest management concept. The Strategy envisages development of the National Forestry Programme, as an action plan.

The following strategic documents have also been developed: The Action Plan for Wetland Protection in the Republic of Serbia and Action Plans for Protection and Conservation of the Brown Bear (*Ursus arctos*), Wolf (*Canis lupus*) and Lynx (*Lynx lynx*); the Action Plan for the Management of Sturgeon Species in Fishing Waters of the Republic of Serbia (2005). The Action Plan for Invasive Species on the territory of the Republic of Serbia was adopted in 2007.

The Animal Husbandry Development and Improvement Programme in the Republic of Serbia (2008-2012) proposes intensification of cattle breeding aimed at provision of rational use of agricultural resources. It also proposes the conservation of autochthonic breeds' genetic potential.

2.2.2 INTERNATIONAL TREATIES, CONVENTIONS AND AGREEMENTS

At the Millennium Summit of September 2000, the Republic of Serbia, together with 189 other signatory countries, adopted a Millennium Declaration specifying basic values upon which international relations in the 21st century should be based: liberty, equality, solidarity, tolerance, respect for nature and the division of responsibility. The eight Millennium Development Goals arising from the Declaration include (1) the fight against poverty, (2) ensuring universal primary education, (3) the promotion of gender equality, (4) the reduction of child mortality, (5) the improvement of maternal health, (6) the fight against serious diseases, (7) environmental protection and (8) the building of global partnerships for development. The loss of biodiversity and natural resources may jeopardise efforts to achieve the eight Millennium Development Goals (MDGs). When viewed in the context of other goals, the sustainable use of biodiversity and natural resources contributes and is closely related to the achieving some other MDGs.

The Republic of Serbia's biodiversity conservation efforts are in line with its EU accession aspirations and the government recognizes the EU decision to entirely halt the loss of biodiversity within the EU by 2010.

The 10 European objectives include:

Biodiversity and the EU

- To protect the EU's most important habitats and species.
- To conserve and restore biodiversity and ecosystem services in EU rural areas.
- To conserve and restore biodiversity and ecosystem services in EU marine environments.
- To reinforce the compatibility of regional and territorial development with biodiversity in the EU.
- To substantially reduce the impact of invasive alien species and alien genotypes on EU biodiversity.

The EU and global biodiversity

- To substantially strengthen the effectiveness of international governance over biodiversity and ecosystem services.
- To substantially strengthen support for biodiversity and ecosystem services in EU external assistance.
- To substantially reduce the impact of international trade on global biodiversity and ecosystem services.

Biodiversity and climate change

- To support biodiversity adaptation to climate change.
- To substantially strengthen the knowledge base for conservation and sustainable use of biodiversity in the EU and globally.

The Strategic Plan of the Convention, or the "Aichi Target" for the period of 2011 – 2020, was adopted at the Nagoya Biodiversity Summit in 2010. The Plan includes 20 headline targets, organized under five strategic goals. The countries that are signatories of the Convention are invited to establish their own goals within a flexible framework, taking into account national needs and priorities, but also reaching the global goal. Among other elements, the countries agreed to halve or, where feasible, reduce the rate of loss of all natural habitats to zero, including forests, and establish at least 17% of protected terrestrial and inland water areas by 2020. Moreover, another of the goals is to prevent the extinction of known threatened species by 2020 and improve and sustain their conservation status, particularly those most in decline.

The "Aichi Target" comes under five strategic goals:

1) Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society;
2) Reduce direct pressures on biodiversity and promote sustainable use;
3) Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity;
4) Enhance the benefits for all from biodiversity and ecosystem services;
5) Enhance implementation through participatory planning, knowledge management and capacity building.

The Republic of Serbia is a signatory of a number of other international treaties related to biodiversity and nature protection: the Ramsar Convention on Wetlands with International Importance, the Convention of Protection of

the World Cultural and Natural Heritage, the Convention on International Trade in Endangered Species of Wild Flora and Fauna CITES, the Convention on Biodiversity and its Cartagena Protocol, the Convention on the Conservation of Migratory Species of Wild Animals (Bon Convention), the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and others.

The Law on Environmental Protection contains a number of provisions relating to biodiversity protection and taking international treaties into account. In 2009 the Republic of Serbia adopted its Law on Nature Protection, which is harmonized with relevant EU directives. The Ministry of Environment and Spatial Planning's Sector for Nature Protection monitors implementation of the Ramsar

Convention, the Convention on Biodiversity, the CITES, Bon and Bern Conventions. Several more institutions have been additionally nominated as scientific bodies for the CITES. The Republic of Serbia regularly submits annual reports to the CITES and also regularly submits national reports on implementation of the Ramsar Convention. The first, second, third and fourth national reports for the Convention on Biodiversity are developed and submitted to the UNCBD Secretariat. The Republic of Serbia also submits its National Report on the implementation of the Bon Convention.

The Republic of Serbia became a signatory of the UN Framework Convention on Climate Change in 2001 and in 2007 ratified the Convention on Combating Desertification and the Kyoto Protocol.

A detailed list of international treaties in the area of environmental protection is provided in Annex 6.

2.3 FINANCIAL FRAMEWORK FOR BIODIVERSITY PROTECTION

Environmental financing sources in the Republic of Serbia involve funds from the national budget which are allocated through ministries, institutions and funds, local self government budgets and funds sourced from many bilateral and multilateral treaties. The most significant international funds are EU pre-accession funds.

Basic competences in this area lie within the Ministry of Environment and Spatial Planning. This institution has passed through many transformations since its foundation in 1991 (it was merged with other sectors, was a directorate etc.), and often found itself marginalized and observed as a "cost" by higher level decision makers and other economically stronger sectors. This also affected funding of this area and it was only when the Environmental Protection Fund was established that activities in this area

began being financed in an organized manner, in addition to receiving regular budget allocations for the operation of competent institutions. The majority of sectors still see biodiversity only declaratively as an economic category, thus substantial changes to strategic orientation are still lacking. The Law on Environmental Protection Fund ("Official Gazette of the Republic of Serbia", Issue 72/09) stipulates utilization of earmarked finances.

The Fund's resources are used in compliance with the law, the statute and the Fund's working programme. They are used, *inter alia*, for the following:

1) Protection, conservation and improvement of air quality, water, soil and forest quality, as well as mitigating climate change and protecting the ozone layer;
2) Protection and conservation of biodiversity and geodiversity;
3) Encouraging sustainable use of protected areas;
4) Encouraging sustainable development of rural areas;
5) Incentives for education, research and development studies, programmes, projects and other activities, including demonstration activities;
6) Financing eco education programmes and public awareness raising related to environmental issues and sustainable development.

Of the Fund's total 2008 budget of 1.5 billion RSD, about 20 million RSD was allocated for the protection and sustainable use of biodiversity, which is only 1.3% of total funds. In 2009 the Fund's total budget for all activities amounted to approximately 2 billion RSD.

Protected area funding is mostly provided from the budget, utilization of natural resources, revenues gained from tourism, donations and other sources. Most of the budget funds which flow into the protected areas are spent to cover current costs of institutional financing and staff salaries. The Ministry of Environment and Spatial Planning, as the ministry responsible for protected areas at the national level, finances activities in protected areas through various projects, thus contributing to a higher degree of utilization of funds intended for the protection and development of biodiversity in natural areas. Activities financed through such projects include the marking and maintenance of paths, rehabilitation of degraded areas, development of information systems, the construction of visitor centres, monitoring, reintroduction programmes and general status improvement in protected areas. In order to obtain funds for such activities, protected area managers submit their projects to the Ministry. The Ministry of Environment and Spatial Planning allocated about €2.5 million for protected areas in 2007, about €1 million in 2008, and a total of €1.3 million allocated in 2009.

Average amounts received from the government at the protected areas system level through competent institutions vary by around 25%. In total, protected areas with currently available funds still lack about 50% needed to cover basic functioning costs and about 75% for optimal functioning.

The Ministry of Environment and Spatial Planning also finances the development of applied projects in the area of biodiversity protection, primarily within protected areas, as well as financing the development of individual action plans for the protection of endangered species, development of Red Books and Red Lists of endangered plant and animal species.

It is worth noting that although the country has significant external debt (in 2009 it was estimated at €22.2 billion, with external public sector debt amounting to €7.1 billion), there have been no attempts to introduce a debt conversion mechanism or any bilateral negotiations about such a mechanism.

Certain funds are allocated from the budget of the government of AP Vojvodina to the Provincial Secretariat for Environmental Protection and Sustainable Development. Funds allocated in 2009 for biodiversity and protected area development amounted to approximately 30 million RSD. The Provincial Secretariat financially supports various project activities in protected areas, such as sanitation and revitalization of sensitive, variable ecosystems (saline, steppe, old forests, wet meadows, grasslands and shallow ponds), monitoring of sensitive ecosystems of strictly protected and protected wild species of plants and animals, protection of biodiversity, infrastructure development for eco tourism in protected areas, capacity building and education of protected area managers and rangers.

The Ministry of Agriculture, Forestry and Water Management provides financial support to protected areas

for certain activities. The Directorate for forests, which is part of the Ministry, approves and finances projects related to afforestation, improvement of habitat conditions, production of seeds and seedlings, nurseries, construction of forest roads for afforestation and protection against fire, as well as for scientific projects. In 2009 the available budget for these activities amounted to around 450 million RSD.

The Ministry of Agriculture, Forestry and Water Management also finances the work of the Expert Council for Biosafety. This Ministry uses incentives to support the conservation of autochthonic plant sorts and animal breeds. For example, conservation of animal genetic resources is based on the principle of direct payment per domestic animal head and until 2008 it also encouraged the development of farms with autochthonic breeds, the procurement of new breeding heads, preservation and maintenance of the national and reserve seed collections, maintenance of the national database for plant genetic resources, quality control and multiplication of samples in the national seed collection for gene bank needs, maintenance and sustainable use of collection nurseries of fruit and vines, collections of forage, industrial and medicinal and vegetable crops, as well as maintenance of autochthonic plant genetic resources in small husbandries. The Ministry also provides financial support for organic production development through the introduction of direct payments per head or per hectare.

On the basis of competition procedure, the Ministry of Science finances the development of basic, technological and innovation projects in various scientific areas, thus supporting research related to biodiversity protection and biosafety.

In 2008, financial support from the National Investment Plan (NIP) for environmental projects amounted to 455 million RSD. About 60% of that amount was allocated for six regional landfill projects.

The European Commission introduced a unified financial instrument for pre-accession assistance – IPA – for the budgeting period 2007-2013, which consolidated all previous pre-accession funds. This unique instrument is intended to support EU candidate countries and potential candidate countries. The Republic of Serbia, as a potential candidate for EU membership, currently has access to the first two IPA components: 1) support to transition process and development of institutions and 2) regional and cross-border cooperation. In 2009 the Republic of Serbia gained access to €190 million from IPA funds for development projects. The planned measures contained in the Rural Development Programme relating to the conservation of traditional breeds should be financed through IPARD funds as of 2011, in the amount of €937,500 annually (compared to €600,000 in 2007). This would support 1,000 agricultural husbandries, i.e. between 4,000 and 10,000 endangered autochthonic breeds. A significant contribution to the preservation of plant genetic resources has been achieved through participation of the Republic of Serbia in the Regional Network for Plant Genetic Resources of South East Europe (SEEDNet), funded by SIDA.

In addition to IPA funds, the Republic of Serbia obtains certain funding for environmental projects from donations, loans, international assistance funds, UN funds and instruments, programmes and funds of international organizations, such as the Global Environmental Facility (GEF), the World Bank, the European Bank for Reconstruction and Development (EBRD), the United Nations Development Programme (UNDP), the United States Agency for International Development (USAID), the German Organization for Technical Cooperation (GTZ) and others. The Memorandum of Understanding signed with the EU in June 2007 enabled the Republic of Serbia to legally participate in the 7th Framework Programme for Research and Technological Development (FP 7).

The level of environmental investments in the Republic of Serbia is currently low (between 2001 and 2005 it was about 0.3% of GDP, while estimates of the revised Memorandum on Budget and Economic and Fiscal Policy were 0.4% of GDP in 2008), while financing from industry and the private sector is insufficient. During their pre-accession period, new EU member states from Central Europe invested between 1.5 and 2.5% of GDP in the environment. Based on the Sustainable Development Strategy, it is planned that 1.5% of GDP be allocated for environmental investments in 2014, while achieving target allocation of 2.5% of GDP for the environment is foreseen by 2017.

3. THREATS TO BIODIVERSITY IN THE REPUBLIC OF SERBIA AND UNDERLYING CAUSES

3.1 INTRODUCTION: BUILDING A CONCEPTUAL MODEL OF STRESSES, THREATS AND CAUSES

In order to plan and conduct effective conservation of biological diversity activities, protected area managers and others who are directly and indirectly involved in conservation activities across the country, need to understand not only the ecosystems in which they are working, but also the cultural, social, economic and political systems that influence the behaviour of the many stakeholders influencing the state of biodiversity. This part of the Strategy provides a review of the most important threats to biological diversity in the Republic of Serbia, as well as the pressures and forces driving the human activities behind those threats.

Ecological and human factors interact in dynamic and unpredictable ways. Nevertheless, at this planning stage it is important to clearly distinguish between the direct and indirect roles of different factors and conditions that have an impact on biological diversity, as well as interactions between those factors and how they related to, or depend on, variations in local conditions.

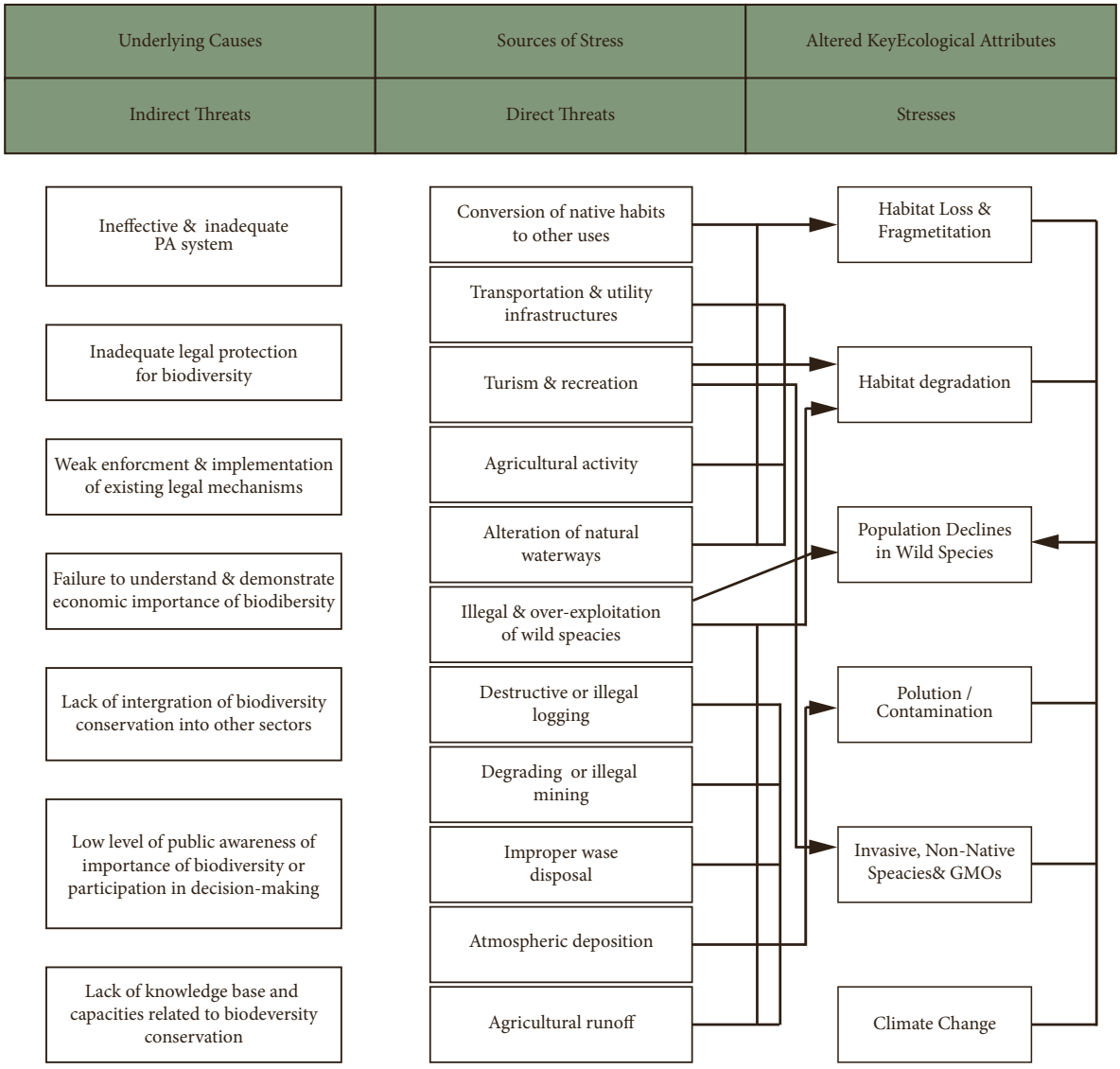
Given this complexity, one of the best ways of quickly developing an understanding of threats and their causes is to develop a conceptual model: a simplified version of reality. Models help us organize and prioritize information, while providing a framework for comparing alternative courses of action. Similarly, they allow transparency of the chain of logic used to select a particular action or response.

The conceptual model presented in this chapter (see Figure 2) is highly simplified for the purposes of identifying the most significant direct and indirect threats to biological diversity at a national or regional level, while allowing for further refinement and expansion of the model. In this model we classify impaired attributes of biodiversity and natural systems as "stresses", which are in turn caused directly or indirectly by human activities. Thus, one stress could be reduced population size or the fragmentation of forest habitat. A stress is not a threat in and of itself, but rather a degraded condition or "symptom" of the target that resulting from a direct threat.

The model in Figure 2 shows only the most important causal links between direct threats and the stresses they create in

wild populations and ecosystems. In this section we first discuss the primary stresses on biodiversity and ecosystems in the Republic of Serbia, followed by a discussion of the sources of those stresses or direct threats. We subsequently present a discussion of the indirect threats or underlying causes of direct threats to biodiversity in the Republic of Serbia. Considering the lack of comprehensive data on the impact of direct threats and stresses on biodiversity in the Republic of Serbia, they were considered in the general context.

Figure 2: Diagram of stresses, threats and causes



3.2 STRESSES AND DIRECT THREATS TO BIODIVERSITY

3.2.1 STRESS - HABITAT LOSS, FRAGMENTATION AND DEGRADATION

Over time humans have made significant changes to the landscapes and adapted their surroundings to their own needs. Some places have experienced the total conversion of natural areas to man made environments. In other places, activities have resulted in degraded ecosystems, i.e., ecosystems that lack components (species or processes) and, thus, do not function as they would naturally.

The causes (direct threats) of habitat loss, fragmentation and degradation in the Republic of Serbia include the conversion of native habitats, alteration of natural waterways, transportation infrastructures, use of land and other natural resource activities, invasive species and pollution. Invasive species and pollution/contamination are dealt with as distinct stresses, due to their origins, complexity and consequent significance. The following discussion is limited to habitat conversion, alteration of waterways, transportation infrastructure and activities using land and resources.

3.2.1.1 DIRECT THREAT - CONVERSION OF NATIVE HABITATS FOR AGRICULTURAL, FORESTRY, RESIDENTIAL AND COMMERCIAL USES

Land conversion resulting in habitat loss, fragmentation and degradation is arguably the single most significant factor responsible for the endangerment of species in the Republic of Serbia. Land has been, and continues to be, converted for agricultural, commercial and residential

purposes. Land use conversions include draining wetlands, logging, encroachment of residential or commercial areas into native habitats and the creation of recreation areas, such as ski resorts; etc. Such conversions of native habitats to human-dominated environments reduce the area of habitat available to biodiversity, while fragmenting and degrading remaining areas.

Rates of conversion within the Republic of Serbia have previously been associated with population growth, the development of technologies and extensions and improvements to transportation systems. The conversion of native habitats is most pronounced in sensitive systems, such as steppes and saline lands in Vojvodina, certain wetlands (e.g. bogs) and mountain pastures. Unfortunately there is no systematic monitoring of these phenomena, thus it is difficult to estimate the extent to which original habitats have changed or disappeared.

3.2.1.2 DIRECT THREAT - ALTERATION OF FLOW REGIMES OF NATURAL WATERWAYS

Changes to the natural flow regimes of rivers and streams, and their floodplains and wetlands, is recognized as a major contributing factor to the loss of biological diversity and ecological functions in aquatic ecosystems, including floodplains. Natural flow regimes can be altered as a result of reductions or increases in flows, changing seasonality of flows, changing the frequency, duration, magnitude, timing, predictability and variability of flow events, altering surface and groundwater levels and changing the rate that water levels rise or fall.

The alteration of waterways' natural flow regimes has a range of impacts, including:

a) Reductions in area and degradation of habitat, due to changes to the extent, frequency and duration of the flooding of floodplains and terminal wetlands. Habitat quality is degraded by these processes through changes to the distribution of organic matter (which aquatic and semi-aquatic flora and fauna rely on) in rivers and floodplain wetlands;

b) Increased flows causing more permanent flooding of some wetlands. The use of floodplain wetlands to store water from rivers changes the natural flow regime from intermittent to permanent inundation, killing vegetation that relies on intermittent flooding and degrading habitats mainly for invertebrates and water birds;

c) Riparian zone degradation, including bank erosion, reduced nutrient filtering and changes to stream behaviour;

d) Aquatic communities throughout catchments are impacted by sedimentation and other changes that follow the clearing of native vegetation, which in turn alters flows to and from wetlands on floodplains;

e) Increased habitat for invasive species through the creation of deeper, more permanent and disturbed habitats. Additionally, the disturbance of riparian zones through changes to water regimes may facilitate the establishment and spread of semi-terrestrial species, for example Willows (*Salix spp.*);

f) Important ecological processes through which many species and communities are lost or disrupted by changes to flow regimes. Disruption of ecological processes may continue long after initial flow alteration, causing continued decline in biological diversity.

The four primary ways humans alter flow regimes in natural waterways are: a) building dams, b) diverting flows by structures or extraction, c) altering flows on floodplains with levees and structures (including those on wetlands to allow water storage), and d) extracting gravel and alluvial sands and dredging.

3.2.1.3 DIRECT THREAT - CONSTRUCTION, USE AND MAINTENANCE OF TRANSPORTATION INFRASTRUCTURE

The transportation sector, primarily roads and railways, contributes to biodiversity loss in three primary ways: 1) direct damage and reduction to native habitat area s, 2) habitat fragmentation, and 3) disturbance of natural ecosystems.
Habitat loss is an inevitable consequence of land use change during the construction of a transportation infrastructure.

Even well planned road construction can destroy or seriously damage the functionality of natural ecosystems, thus causing direct harm through loss of the habitats of sensitive plant and animals, which is the main cause of biodiversity loss. Transportation infrastructure fragments habitats, restricting or preventing the natural movement of animals and exchange of genetic material. Habitat fragmentation damages ecosystems' stability and health, particularly when they restrict the movement of keystone species important to ecosystem integrity (e.g. large predators). Many wildlife species that need to move to breed or find food are either reluctant to cross roads or are killed while crossing. It is also the case that some animals are attracted to roads for various reasons: more abundant food, shelter from predators or easier movement, which often leads to increased mortality through accidental deaths.

Transportation infrastructure also degrades native habitats and harms native species in key ways. For example, the construction of roads and railroads (as well as construction of electricity, water and similar utility infrastructure) facilitate invasions by non-native species, many of which disrupt the ecological balance of ecosystems by out-competing native species. Noise, lights and runoff of hazardous compounds from roads and railways also cause ecosystem disturbance and lower animal reproduction rates.

3.2.1.4 DIRECT THREAT - LOGGING

Global timber harvest practices have had a significant impact on biodiversity and forest ecosystems, including reductions of forest area, fragmentation, degradation and changes to forests' age structure patterns and species composition across the landscape. Timber practices have generally created forests that are younger, more even in age

structure and biologically less diverse. The mix of wildlife and plant species within forests has changed along with changes to overstory tree composition. In many areas this has involved replacing mixed broadleaf and conifer forests with conifer monocultures. In most cases the forest practice in AP Vojvodina has led to the replacement of natural willow and poplar forests with floristically poor hybrid poplar plantations. This kind of forest management has resulted in the gradual disappearance of certain species of plants and animals, as well as reduction of biodiversity in these areas. Fire suppression and the inability to prevent and control fires caused naturally and by humans has also resulted in changes to the species composition of many forests. In some instances forests are now more susceptible to damage from insects, disease and fire. The construction of roads to facilitate timber harvests has increased sedimentation in streams, affected the movement of wildlife species by fragmenting and degrading habitat and provided an avenue for the invasion of non-native plant species.

3.2.1.5 DIRECT THREAT - LIVESTOCK GRAZING AND ABSENCE OF GRAZING

Livestock grazing in (semi)natural ecosystems changes the qualitative and quantitative mix of native species in grasslands, shrub-steppe and saline ecosystems. Additionally, forest grazing reduces the shrub and forb understory, resulting in the development of dense, fire-prone forests. Grazing also has negative impacts on stream, riparian and wetland systems, including increased sedimentation, altered stream flow patterns and increased nutrient loads. Ecosystems hardest hit by past excessive grazing practices - where there has been near total replacement of certain native species by non-native species - may never fully recover. However, grazing today does not have major negative environmental impacts in the Republic of Serbia, as most livestock is kept in stable systems and livestock numbers have reduced significantly. Nonetheless, there are tendencies to restore grazing practices, though this is unlikely to have major negative impacts on grasslands and shrub-steppe ecosystems. In some mountainous and steppe regions of the Republic of Serbia, the absence of traditional pasturing can lead to biodiversity degradation in semi-natural grasslands. This is largely due to the invasion of woody perennials (juniper, mountain willow, wild rose, blackberry, hawthorn, cornel, birch, blueberry or similar) or, for example, the ground squirrel in steppe regions. Livestock grazing has been recognized in a few areas as a measure for sustaining high-mountain pastures and, in accordance with this, the MAFWM allocates incentive funds to agricultural farms for grazing on Stara Mountain pastures.

3.2.1.6 DIRECT THREAT - MINING

Mining activities can have a negative impact on biodiversity in the following ways: a) Damage to, or clearing of, native vegetation leading not only to fragmentation of habitats but also direct losses and landscape degradation; b) rainfall runoff from disturbed land leading to soil erosion, turbidity, siltation or the pollution of local streams; c) introduction or the spread of weeds (including agricultural and commercially exotic species), pests and diseases of native flora and fauna; d) alteration of groundwater levels through mine de-watering, resulting in vegetation impacts; e) exposure of acid-generating minerals or subsoil leading to the contamination of waterways with acid and metals, and f) disturbance of wildlife, due to blasting noise and vibrations.

3.2.1.7 DIRECT THREAT - TOURISM AND OUTDOOR RECREATION

Pressure from tourism and outdoor recreation on natural and semi-natural ecosystems contributes to biodiversity loss and habitat degradation directly and indirectly. Direct

impacts include the construction of tourism and recreation-related infrastructure: ski areas, roads, trails, hotels, lodges, campsites, artificial lakes created for the production of artificial snow etc., which replace natural ecosystems with human dominated environments. Furthermore, the trampling of vegetation, compact of soils, alteration of runoff and erosion patterns, increased likelihood of non-native species invasions and changes to animal behaviour are all impacts that have been associated with recreational uses. The impact of tourism on biodiversity is the subject of an Environmental Impact Assessment.

3.2.2 STRESS - POPULATION DECLINES IN WILD SPECIES

3.2.2.1 DIRECT THREAT - OVEREXPLOITATION AND ILLEGAL HARVESTING OF PLANT AND WILDLIFE SPECIES

One major human activity leading to biodiversity loss is the overexploitation of certain plant and animal species.

Overexploitation occurs when human harvest of a species outpaces said species' ability to reproduce. Overexploitation can lead to the endangerment or extinction of species, as well as reductions in the genetic variability of others. Moreover, the loss of one species can affect many other species within a single ecosystem.

3.2.2.1.1 HUNTING & FISHING

Wildlife, in particular mammal, bird and fish species, has always been hunted by humans: for fur, feathers, food, sport and their trophies. Individual specimens of many wildlife species are also taken from nature for the pet trade, zoos and biomedical research. Today, illegal or unregulated hunting, fishing and trapping still threatens many species, especially large mammals and birds.

3.2.2.1.2 GATHERING

Overexploitation also threatens many plant and wildlife species that are collected for medicinal, artisanal or culinary purposes. For example, many medicinal plants are excessively or improperly harvested, leading to local and regional population declines and the erosion of genetic variability. All wild species gathered for commercial purposes are regulated in order to limit harvest rates and timing in a manner that ensures sustainability, population viability and minimal impact on ecosystems and other species. Although wild species collection control is performed by the Republic inspectorate, results are still unsatisfactory.

3.2.3 STRESS - POLLUTION/CONTAMINATION

Pollution growth is likely to accompany projected economic growth and development in the Republic of Serbia and surrounding regions. Increased environmental contamination, particularly via discharges of wastewater, storm water runoff and atmospheric deposits of pollutants, such as those in automobile emissions, can be anticipated. As additional land in the region is converted to intensive agriculture, there is greater potential for contamination from the application of fertilizers and pesticides. In addition, there is a lack of adequate manure management, especially on big farms, thus leading to soil and water nitrification. New chemicals and the inadequacy of assessing the impacts of chemicals on the environment are also risks.

Major sources of pollution/contamination include mining, energy and industry, waste disposal and treatment, agriculture and atmospheric deposition. The cumulative effect on species and ecosystems in certain regions is manifested by the legacy of past contamination (e.g., accumulation of heavy metals, such as lead, or chemicals, such as DDT, which persist and can accumulate in the food chain).

3.2.4 STRESS - INVASIVE, NON-NATIVE SPECIES AND GENETICALLY MODIFIED ORGANISMS (GMOs)

Non-native, invasive plant and animal species cause significant biological impacts on native species and ecosystems. Non-native species often out-compete native species for resources (water, nutrients, pollinators etc.), change nutrient cycling (e.g., in the case of nitrogen-fixing species that may be affected) and alter disturbance patterns (e.g., the invasion and spread of many non-native grass species is associated with increased fire frequency, severity and size).

Exotic species can also have negative economic impacts, particularly in the agricultural sector, but also for aquaculture, fishing, forestry and hunting sectors. Economic impacts include reduced yields and population declines in marketed products and species, out-competing of native pollinators with non-native species and the cost of controlling and/or eradicating non-native species. Certain exotic species introduced for the needs of breeding centres and pet stores represent a special problem, as these can form populations in nature and push out native species (e.g. Red-Eared Slider, *Piscia stratiotes* in thermal water ecosystems, etc.).

The invasion and spread of non-native species is most commonly facilitated by changes or disturbances to ecosystems, such as forest fires, vegetation clearance (for construction of residential areas, roads, electricity transmission lines etc.) and alteration of waterways. Major disturbances to vegetation in an intact ecosystem allow introduced non-native species to multiply and spread

faster than native species.

Although invasive species are a significant threat to biodiversity, their distribution is not typically uniform throughout a region or country. Invasive plant species tend to be a greater threat in instances where there is a significant pre-existing disturbance to the ecosystem. Notable exceptions can be found in many ecosystems, including some fish species (e.g. American catfish and Prussian carp), as well as plant species (e.g. Indigo bush, Ragweed, Redroot Pigweed, Wild Balsom Apple, Tree of Heaven and Boxelder). The Boxelder is even threatening the Oak in its native habitats. Invasive animal species are more likely to pose a threat to intact ecosystems, due primarily to their mobility.

Growing evidence suggests that genetically modified organisms (GMOs) may present threats to autochthonous biodiversity when deliberately or accidentally released into an environment. In some cases, such as endangered species, such threats could be significant. Risks are centred on possibilities of gene flow and hybridization between GMOs and autochthonous species, as well as impacts that GMOs may have on ecosystem food webs and human health. These impacts could in turn result in further chain reactions and negative overall impacts to conservation and the sustainable use of biological diversity.

3.2.5 STRESS - CLIMATE CHANGE

It is predicted that climate change will have dramatic impacts on biodiversity and ecosystem integrity worldwide. However, regional and local impacts are extremely difficult to predict. A great deal will depend on impacts on ecosystem processes, such as the rates and magnitudes of disturbance. The resilience to change of many ecosystems is also extremely uncertain. Natural ecosystems throughout Europe are generally fragmented, disturbed and confined to poor soils. This situation renders them more sensitive to climate change.

High-elevation ecosystems are particularly vulnerable, as inhabiting species have a reduced migration framework. Although the diversity of freshwater species may increase in warmer climates, particularly in middle and high latitudes, there may be an initial reduction in species diversity in cool temperate regions. The ecosystems of southern Europe would mainly be threatened by reduced precipitation and subsequent increases in water scarcity.

Within the Republic of Serbia we can expect significant changes to grasslands, riparian habitats and forested ecosystems, due largely to changes in the amount and seasonal distribution of precipitation. The most vulnerable ecosystems also include wetland and steppe habitats. Forests will change in terms of their composition, structure and distribution patterns, as some species shift their geographic range and others simply decline. These impacts are largely due to the fact that projected movement of climatic zones will be faster than migration of some species and forest types. Rising temperatures could increase the frequency and intensity of fire and pest outbreaks, which could in turn reduce the diversity and extent of forests.

Climate is an important factor in determining where a species can flourish: where they can grow, feed and breed. Paleoecological evidence shows that most species have responded to past climate changes by moving: changes to geographic distribution through dispersal. In general, as temperatures rise, species' "climate envelopes"[8] are predicted to shift upward and poleward towards cooler climatic conditions. In some areas, such as mountain zones, species movements may not be simple upslope or downslope shifts; other relevant factors include soils, slope, topography, and light.

Numerous studies focusing on the movements of wildlife species over the past several decades have already documented poleward and upslope movements of range boundaries consistent with these predictions. One of the greatest concerns facing conservation planners and managers will be the inevitability of massive extirpations of plants and animals in isolated protected areas. Today, suitable areas of habitat, as well as the ability to move between them using natural corridors, is limited as a result of the fragmented nature of the landscape. This is particularly the case throughout most of Europe. As two thirds of the Republic of Serbia's territory is mountainous, there are species with populations limited to mountain peaks ("islands") that have no natural migration corridors. These species will be among those most affected by climate change, as they are already vulnerable due to low population size and isolation. Most of these mountaintop species are either endemic or steno-endemic and their

[8] A climate envelope is the range of suitable climatic conditions a species needs to survive.

disturbance and/or disappearance will result in biodiversity loss, including genetic loss.

3.3 SUMMARY OF KNOWN SECTORAL IMPACTS

3.3.1 IMPACTS OF THE AGRICULTURAL SECTOR

The greatest impacts of agriculture activity on biodiversity in the Republic of Serbia are a result of the intensification of agricultural production, conversion of large areas to monocultures and use of chemical agents. The post-WWII policy of merging small farms to form larger ones led to serious fragmentation and degradation of natural habitats, most prominently in Vojvodina, as the country's major agricultural production region. The post-WWII period focused investment and policies on high external input production systems using exotic breeds, sorts and varieties. Moreover - and largely as a result of these policies - traditional low-input production systems began to disappear.

Vojvodina's high prevalence of arable land, coupled with extremely low forest coverage, has facilitated massive farmland complexes. Additional pressures on biodiversity originate from the accelerated privatization of farmland without clearly defined obligations for landowners concerning the application of biodiversity protection measures.

The disappearance of traditional low input production systems in mountain areas also leads to the degradation of native habitats and biodiversity, since semi-natural grasslands and mosaic diverse croplands depend on human activity and domestic animals for maintenance. The increasing abandonment of areas used for farming or grazing has resulted in the disappearance of many areas of native grasslands, due to natural ecological succession processes (shifting from grassy to bushy or forest vegetation as woody species take over). Therefore, both intensive/high input agriculture (low diversification and/or a small number of traditional cultures and cultivars tend to overuse pastures and monocultures, pollution due to overuse of pesticides and mineral fertilizers) and the decrease and disappearance of low input, traditional agriculture practices, insufficient use of pasture and

abandonment of pastures and farmland) causes significant stresses on biodiversity, including agro-biodiversity.

The loss of genetic variability in domesticated livestock breeds is another important biodiversity concern in the Republic of Serbia. Negative socio-economic changes to rural areas, high external input production systems and one-way selection of domestic livestock breeding has led to a reduction in genetic variability. For example, the introduction of new selection methods, hybridization and the preference for uniformity of poultry for the purposes of slaughter and the egg industry has led to the significant erosion of genetic diversity in domestic poultry breeds. A legal act from 1951 proved extremely harmful by prohibiting goat breeding in the country and resulting in the permanent disappearance of a considerable genetic wealth of the Balkan goat breed. A similar impact resulted from mandatory merinization, i.e., the cultivation of domestic pramenka species of sheep with merino species for the purpose of obtaining higher yields of more delicate wool. In addition, previous agricultural policies led to serious population declines among the autochthonous horse breed (especially Domestic mountain horse), cattle breeds (Busha Cattle and Podolian Cattle), pig breeds (Mangulica, Moravka, Resavka) and the disappearance of the Kolubarac cattle and Siska and Sumadinka pig breeds. Social changes to the Republic of Serbia's rural areas also result in the disappearance of many autochthonous crop, fruit and vegetable plant sorts and varieties. There is a lack

of comprehensive policies and measures to stop the further decline and support the maintenance of the Republic of Serbia's agro-biodiversity.

3.3.2 IMPACTS OF THE FORESTRY SECTOR

In the early 19th century forest ecosystems covered between 75 and 80% of the total central area of the Republic of Serbia. However, forest-clearing activities had brought this percentage down to below 40% by the mid-20th century.

The total area of the Republic of Serbia currently covered by forests is 2.2 million ha (Table 6), while forested areas in Vojvodina cover 154,000 ha. The forested area owned by the State and managed by public enterprises is 1.4 million ha, which represents 51.4% of the total area under forests and forestland in the Republic of Serbia. The general condition of forests is categorized as "unsatisfactory" and state-owned forests are plagued by the following problems: insufficient production fund, unfavourable age structure, unsatisfactory overgrowth and woodiness, a high proportion of stands with trees not favoured by markets, weedy areas and unsatisfactory health status.

The negative impacts of forestry practices on biodiversity include the establishment of monoculture poplar plantations (currently approximately 39,000 ha) and pine plantations (100,000 ha of white pine). Monoculture stands of trees reduce overall biodiversity and degrade habitat quality for many species.

3.3.3 IMPACTS OF THE WATER RESOURCES MANAGEMENT SECTOR

Water Management Sector activities in the Republic of Serbia impact approximately 6,508,100 ha, excluding Vojvodina. Approximately 600,000 ha are under some form of flood protection regime: 2,248 km of river banks are regulated and 34 dams have been constructed for artificial lakes. Irrigation measures cover 481,000 ha, with 4,500 km of irrigation canals. Although the official reports of water management institutions focus on urban, industrial and agricultural areas, there is no reference to conservation issues. Most of the nation's irrigation systems are found in the catchment areas of the rivers Sava and Danube. There are currently 1,553,693 ha of drained areas in the Republic of Serbia.

One of main activities of this sector in Vojvodina relates to the maintenance of the Danube-Tisa-Danube Canal, which boasts a network 649 km long. Approximately 1,000,000 ha of land is below the level of main rivers in Vojvodina and is subject to drainage and flood protection.

Changes to, and disappearances of, aquatic habitats and destruction of riverbank vegetation in the Republic of Serbia are primarily the result of industrial and agricultural pollution, water flow channelling and riverbank regulation, swamp draining for agricultural use, as well as the process of eutrophication. Artificially created canals have not been maintained for the past 30 years and contain deposits of mostly organic material from waste waters and neighbouring arable land, but also waste material. Living creatures that spontaneously populated these canals have disappeared, while certain canals host some threatened species requiring important protection.

The construction of dams and creation of the "Djerdap" I and II artificial lakes on the River Danube has had a significant impact on the migration and reproduction of sturgeon species since the 1970s. This has led to a decrease in harvest rates of this species in the Republic of Serbia's section of the Danube. Energy from hydropower provides approximately a third of all energy used in the Republic of Serbia and is primarily generated from hydroelectric plants located on the rivers Danube and Drina. Some smaller rivers, such as Vlasina, Uvac and Visocica, are also used for energy production purposes.

3.3.4 IMPACTS OF THE TRANSPORTATION SECTOR

The impacts of the transportation sector in the Republic of Serbia include direct destruction of habitats and habitat fragmentation, disturbances, pollution and the introduction and/or expansion of non-native species. Habitat loss is an inevitable consequence of land use change for infrastructure construction. Transportation infrastructure causes habitat fragmentation, as well as preventing the free movement of animals and exchange of genetic material. Construction of infrastructure also allows non-native species to spread by disturbing the ecological balance of ecosystems.

3.3.5 IMPACTS OF THE MINING SECTOR

There is very limited information on the direct impacts of mining activities on biodiversity in the Republic of Serbia. Nonetheless, it is assumed that the extent of mining in the Republic of Serbia ensure that mining activities could have negative impacts on biodiversity. These impacts are analyzed in due diligence studies and environmental impact assessment studies, while measures for impact reduction have to be proposed. Practice and experience to date have shown that the area of biodiversity has been treated rather informally and measures are usually inadequate.

3.3.6 IMPACTS OF THE NATURAL RESOURCES MANAGEMENT SECTOR

3.3.6.1 HUNTING

Considering that official data on the biodiversity impacts of hunting are unavailable, information based on expert estimates indicate that poaching (particularly of birds and their development forms) is one of the most significant factors endangering biodiversity.

There are 323 hunting areas on the territory of the Republic of Serbia, comprising 8,828,588.29 ha (73.6% hunting areas and 26.4% non-hunting areas). Some 94 species of mammals are registered, of which only 22 species have the status of hunting game, and of the registered total of 360 bird species, only 24 have the status of hunting bird species.

3.3.6.2 FISHING

There are 98 species of *Agnatha* and *Osteichthyes* in the Republic of Serbia's waters, which accounts for 16.93% of European fish fauna. Of these species, 23 are non-native (23.5%), while 12 can be characterized as invasive species. Of the total number of species, 53 species (54.1%) of fish (including 10 non-native species) are subject to commercial and recreational fishing. There are 29 species of economic importance to commercial fishing, of which 12 are targeted for fishing. The remaining species represent a secondary catch of less economic importance. Recreational fishing covers around 45 species, though only half of this number is targeted for fishing. Commercial fishing is conducted in lowland rivers: Danube, Sava and Tisa. Recreational fishing is carried out in all waters of the Republic of Serbia, with the exception of waters where fishing is banned. The

number of recreational and commercial fishermen, as one of the indicators of fishing pressure, varies annually and totals around 100,000.

Six species of fish are the most commercially significant for fishing: carp, cat fish, perch, pike, bream and sterlet.

3.3.6.3 GATHERING OF WILD FLORA AND FAUNA

The gathering of medicinal and aromatic plants is widespread and has resulted in a number of species populations being put under pressure, due to excessive and/or inadequate collection methods (Table 10). However, there is insufficient data concerning harvest levels and the biological status of many collected species. This lack of data makes planning and implementation of active protection measures extremely difficult, thus gathering and traffic control is insufficient. There is additional concern that a lack of professional experience and knowledge on the part of harvesters may pose additional threats to certain species, such as accidental substitution of similar, and related species may endanger some rare species.

Some mushroom species are under greater pressure due to intensive gathering and export. Several mushroom species are currently endangered and face increasing pressure, as most other European countries have restricted their

Table 10: Species under overexploitation pressure in the Republic of Serbia

Species under overexploitation pressure (species collected in accordance with the Decree and/or illegally collected species)	Species that might be endangered over the long term due to the collection of their underground parts (roots, rhizome, tuber, bulb)
Gentiana lutea L. subsp. *symphyandra* Murb.	*Symphytum officinale* L.
Acorus calamus L.	*Carlina acaulis* L.
Salvia officinalis subsp. *multiflora* L.	*Inula helenium* L.
Centaurium umbellatum Gilib.	*Gentiana asclepiadea* L.
Hypericum perforatum L.	*Petasites hybridus* (L.) G. M. Sch.
Arctostaphylos uva-ursi (L.) Spreng.	*Orchis morio* L.
Satureja kitaibelii Wierzb.	
Satureja montana L.	
Teucrium montanum L.	
Lycopodium clavatum L.	
Gypsophila paniculata L.	
Ruscus aculeatus L.	
Ruscus hypoglossum L.	
Vaccinium myrtillus L.	
Allium ursinum L.	
Boletus edulis Bull. Fr.	
Cantharellus cibarius L. Fr.	

*Source: Institute for Nature Conservation of Serbia, 2010.

collection – thus placing additional pressure on their populations in the Republic of Serbia.

Furthermore, recent decades have seen increasing and uncontrolled harvests of edible snails (*Helix spp*.) and green frogs (*Rana* synklepton *esculenta*) lead to severe population declines throughout most of the Republic of Serbia. There is still no analysis of the impacts of exploitation of the Viper (*Vipera ammodytes*) on its population status in the Republic of Serbia. Precise conditions for the collection, use and trade of these species are prescribed in the Decree on Control of Use and Trade of Wild Flora and Fauna ("Official Gazette of the Republic of Serbia", Issues 31/05, 45/05, 22/07, 38/08 and 9/10).

3.3.7 IMPACTS OF INVASIVE SPECIES

Information on non-native and invasive species is only available through data from scientific and research activities. Organized mapping of these species in the Republic of Serbia is initiated through MAFWM projects on mapping of invasive species in agro-ecosystems and the Institute for Nature Conservation on mapping certain invasive species habitats, mainly plants. Also, a lack of education and knowledge of environmental issues and biology of many invasive species, as well as the quality of so-called sensitive habitats susceptible to biological invasions, represent an integral part of the problem. The basic problem is the absence of a programme of control and suppression, as well as an early warning system for biological invasions.

According to some estimates, the percentage of non-native species in the Republic of Serbia is approaching 10% in certain ecosystems. In some aquatic ecosystems (standing waters) the percentage of non-native species is significantly higher, due to inadequate fish replacing with Grass Carp (*Ctenopharyngodon idella*), Silver Carp and Bighead Carp (*Hypophthamichthys molitrix* and *Arystichthys nobilis*), due to aquaculture (*Ictalurus nebulosus* and *Ictalurus melas*) and other means (river infrastructure). Invasive species have been identified among aquatic and terrestrial plants, invertebrates and vertebrates, including mammals. The aquatic ecosystems of the Republic of Serbia, particularly in the country's north, are seriously threatened by the invasion of non-native organisms.

Non-native plant species believed to threaten biodiversity in the Republic of Serbia include: Bastard Indigo, Common Ragweed, Redroot Pigweed, Tree of Heaven, Box Elder and Wild Balsom Apple. Most remaining sand and steppe habitats are threatened by the spontaneous spread of the Black Locust.

3.3.8 IMPACTS OF CLIMATE CHANGE

There is no systematic monitoring of the impacts of climate change on biodiversity within the Republic of Serbia. Current research and planning has primarily been based on global findings and the experiences and recommendations of other countries. There is, however, some data on forests where changes to underground water levels have been monitored, as have their impacts on forest drying and impacts on stand compositions (monitored for Narrowleaf ash and oak species).

3.4 INDIRECT THREATS TO BIODIVERSITY IN THE REPUBLIC OF SERBIA

Behind the aforementioned direct threats to biodiversity, there are a number of indirect threats or underlying causes that interact in complex ways to cause human-induced changes to biodiversity. These include demographic, economic, socio-political, cultural, scientific and

technological factors, which influence human activities that impact directly on biodiversity. The following factors have been identified as the most important causes underlying threats to biodiversity in the Republic of Serbia.

3.4.1 INEFFECTIVE AND INADEQUATE PROTECTED AREAS SYSTEM

The Republic of Serbia has recently taken steps to reinforce its biodiversity conservation framework and is seeking to develop better ecological representation and a sustainably funded Protected Areas system. The former national Spatial Plan (1996-2008) prescribed the expansion of protected areas to encompass 10% of the territory by 2010, in order to ensure better ecosystem representation in the PA system. The Law on the Spatial Plan of the Republic of Serbia from 2010 until 2020 envisage the protection of biodiversity and landscapes as strategic priorities, while protecting 10% of the country's territory remains one of the goals.

The legal framework for protected areas is elaborated in the Law on Nature Protection. Seven types of protected areas have been defined by this law and there are three levels of protection within protected areas. The seven basic types of Protected Areas (PAs) in the Republic of Serbia include: (1) strict nature reserves, (2) special nature reserves, (3) national parks, (4) monument of nature, (5) protected habitat, (6) landscape of outstanding features and (7) nature parks.

The governance of PAs is carried out at multiple levels and with multiple organizations, including: (i) the national government; (ii) regional and local administrations (AP Vojvodina and municipalities); (iii) public enterprises; (iv) non-governmental organizations (and local chambers); and (v) other entities including individuals and private companies. PAs are managed by: public enterprises, companies, communal enterprises, museums, faculties, tourism organizations, ecological NGOs, foundations etc.

The country's five national parks comprise approximately 30% of the area under protection in the Republic of Serbia. All national parks have two main functions: 1) protection of nature, i.e. implementation of necessary measures for the conservation of rare species and habitats, and 2) utilization of forests. As a result of limited government funding for conservation activities, the public enterprises managing national parks are in a conflicting situation that requires they exploit natural resources in order to finance the conservation of natural resources. This financial and programmatic tension leads to compromises that are not necessarily in the best interests of biodiversity conservation.

In addition to the public enterprises for forests and national parks that represent an overwhelming majority of the protected area estate, there is a large number of other protected area managers – over 30. The diversity of the types of institutions managing PAs (see Annex 1) poses challenges for coordination and communication.

Financial data from 2009[9] shows that protected area financing is generated from the government, resource use, tourism, other fees and service payments and donations. Funding from the central government is provided through various sources and averages 25% of PA funding. The Protected Areas Financial Scorecard, developed by UNDP in 2009, estimated the annual shortfall in protected areas financing at around 8.7 million USD for basic costs (50% shortfall) and 24.7 million USD for optimal functioning (75% shortfall).

3.4.2 FAILURE TO UNDERSTAND AND DEMONSTRATE THE ECONOMIC VALUE OF BIODIVERSITY

Knowledge and understanding of tools and techniques for economic valorisation of biodiversity is lacking in the Republic of Serbia. Biodiversity is the base upon which all ecosystem services rest, providing a "support system" without which the production of all other services would be impossible. Many other sectors, especially agriculture, forestry, fisheries, water, hydropower and recreation and tourism, rely heavily on ecosystem services and contribute significantly to national GDP and employment, as well as being especially important for the country economically. The loss of ecosystem services can incur enormous economic costs and these services are likely to become even more important as global food prices rise, urban centres expand, demands on water supplies increase and climate change impacts accumulate. Moreover, the role of, and costs to, communities most involved in providing biodiversity and ecosystem services (e.g., poorer rural

[9] UNDP Serbia PA Financial Scorecard, 2009

communities living in and around protected areas) has largely gone unrecognized or undervalued in the country.

Despite their economic, social and environmental importance, ecosystem services are poorly understood and undervalued by markets, decision makers, and civil society, and do not receive adequate attention, resources or investment. As a result, the contribution of ecosystem services is not fully internalized within the price of most products and areas important for these services (e.g. many protected areas, forest reserves, low intensity agricultural areas, wetlands and other high biodiversity areas) are undervalued and often managed in ways that undermine or degrade the provision of such services. The need to integrate ecosystem services' assessment into key sector policy and planning processes will have to be addressed by the Republic of Serbia as the country moves towards EU membership.

3.4.3 INADEQUATE LEGAL MECHANISMS AND FINANCING FOR BIODIVERSITY CONSERVATION; WEAK ENFORCEMENT AND IMPLEMENTATION OF EXISTING MECHANISMS

Many threats to biodiversity and natural ecosystems arise from a constant and growing need for resources, or the need to convert native habitats for production purposes. Institutional, legal or policy deficiencies with regard to biodiversity protection in the area of production sectors, as well as a lack of enforcement of existing biodiversity protection mechanisms, are leading to ineffective conservation. No national policy currently defines a vision and long-term plan for securing stable and long-term financial resources for biodiversity conservation. It is, therefore, critical to the long-term protection of biodiversity and native ecosystems that these deficiencies be identified and plans be developed to address them through the creation and implementation of new mechanisms or the refinement of existing ones.

3.4.4 LACK OF INTEGRATION OF BIODIVERSITY ISSUES INTO SECTORAL LAWS AND POLICIES

The activities of all economic sectors impact on biodiversity in some way and at some level. These impacts can be far-reaching, in terms of both time and space. Biodiversity conservation has traditionally been the business of the environment sector. However, even the best conservation efforts are likely to fail if biodiversity concerns are not mainstreamed into other sectors.

Through mainstreaming, biodiversity concerns should be fully internalized into the development and operation of economic sectors, development models, policies and programmes. Integrating biodiversity concerns into the way sectors operate can have immediate benefits by improving environmental quality and productivity, as well as serving as a long-term safeguard for sustainable development.

3.4.5 LACK OF INFORMATION, CAPACITIES AND COORDINATION RELATED TO BIODIVERSITY CONSERVATION AND MANAGEMENT

There is a need to improve technical and managerial capacities for biodiversity conservation and land use management at all institution levels. Capacity building is needed in the areas of conservation biology: fundamental principles, research methodology and project development strategies and tools; use of GIS tools for biodiversity conservation and PA management; endangered species recovery planning, involving local communities in PA

planning and management; design and implementation of sustainable development projects and biodiversity-friendly land use strategies, designing and implementing climate change adaptation strategies etc.

With particular respect to climate change, the Republic of Serbia currently has a low level of interaction between networks of researchers, policy makers and stakeholders dealing with climate change and those dealing with biodiversity and ecology. There is great potential for them to achieve closer collaboration. In terms of preserving biodiversity and ecosystem services, this collaboration should be directed towards creating a more efficient policy and finding ways to attenuate the rapid growth and potentially harmful impact of climate change.

3.4.6 LOW LEVEL OF PUBLIC AWARENESS OF THE IMPORTANCE OF BIODIVERSITY

Biodiversity is a concept that is poorly understood among the general public in the Republic of Serbia. This is primarily due to a broad lack of information about biodiversity and limited inclusion of the topic within formal academic curricula and the media. Campaigns aimed at raising public awareness and the understanding of biodiversity have been sporadic, geographically limited and incomprehensive in their treatment of the subject. Because biodiversity protection has broad implications for all residents of the Republic of Serbia, it is important to raise public awareness of, and support for, biodiversity protection, so that they may add their voices - including those of local communities - to those of the NGO and scientific communities.

4. STRATEGIC AREAS, OBJECTIVES AND ACTIVITIES FOR BIODIVERSITY CONSERVATION IN THE REPUBLIC OF SERBIA

4.1 BIODIVERSITY CONSERVATION

Biological diversity provides the ecosystem services that form our natural capital and is fundamental to the future sustainability of our economy. Therefore, conservation of biodiversity, on purely economic grounds, needs to become the core business in the management of our natural resources. Biodiversity is under threat, both nationally and globally, because the world is facing the extinction of plant and animal species at a scale never before seen in human history. The Republic of Serbia has a unique responsibility to conserve biodiversity, as it hosts a certain number of endemic plant and animal species found nowhere else in the world.

4.1.1 THREATENED BIOLOGICAL DIVERSITY

Objective 1.1: Enable the Republic of Serbia's extinction threatened species and ecological communities to survive and thrive in their natural habitats and retain their genetic diversity and potential for evolutionary development. Restore biological diversity in degraded areas. Complement *in-situ* conservation measures by maintaining *ex-situ* facilities and conducting *ex-situ* conservation measures.

Activities:

1) Ensure the provision of adequate resources and training for both the public and private sectors on biodiversity conservation efforts beyond protected areas.

4.1.1.1 THREATENED SPECIES

1) Develop or improve mechanisms enabling the identification and monitoring of threatened, rare or vulnerable species;
2) Create a registry of threatened, rare, and vulnerable species, including their locations, biological status, recovery strategies and threats, within the National Biodiversity Information System (NBIS);
3) Develop a nationally-mandated programme of recovery planning for threatened species (where necessary, coordinate planning and implementation with other

institutions and/or neighbouring countries);

4) Prepare and submit all red lists (flora, fauna and fungi);

5) Develop Red Books of the Republic of Serbia's flora and fauna;

6) Develop emergency response procedures for threatened or rescued wildlife;

7) Establish wildlife rescue centres;

8) Plan and implement active field measures for the protection and improvement of endangered species' populations (e.g. protection, provision of additional food, setting artificial nests etc.);

9) Provide mechanisms for resolving cases of conflict regarding the use of land, which could lead to the destruction of endangered species (e.g. orchids in bloom on private land during harvest time, nests in a private forest etc.).

4.1.1.2 THREATENED ECOLOGICAL COMMUNITIES AND HABITATS

1) Identify, describe and map threatened, vulnerable and rare habitat types in accordance with the EU Habitat Directive;

2) Legally regulate the protection and recovery of threatened ecological communities;

3) Establish threat status for endangered ecological communities and develop monitoring indicators and protection measures.

4.1.1.3 ECOLOGICAL RESTORATION

1) Develop and implement techniques, guidelines and standards for restoring biological diversity in degraded systems;

2) Evaluate ongoing restoration efforts and support positive restoration examples;

3) Work collaboratively with private landowners and regional institutions to identify and restore degraded systems of national concern;

4) Promote the use of native species in habitat restoration efforts.

4.1.1.4 *EX-SITU* CONSERVATION

1) Conduct a national assessment of potentials and priorities for *ex-situ* conservation;

2) Strengthen and expand *ex-situ* conservation, including the provision of adequate resources and training to relevant institutions and organizations by:

   • Establish *ex-situ* conservation programmes or offices within relevant institutions;

   • Establish 'on-farm' conservation farms and plantations for rare species, breeds and varieties;

   • Establish new 'on-farm' conservation centres, inventory and connect existing such centres;

   • Increase support to national gene banks;

3) Integrate *ex-situ* with other measures for the conservation of threatened species, particularly through a programme of captive breeding, rehabilitation and reintroduction of each such species to its natural habitat.

4.1.2 MANAGING THREATENING PROCESSES

Objective 1.2: Monitor, regulate and minimize processes and activities that have, or are likely to have, significant adverse impacts on biological diversity.

4.1.2.1 NON-NATIVE SPECIES AND GENETICALLY MODIFIED ORGANISMS (GMOs)

1) Conduct a national-level baseline assessment of non-native species and GMOs. This assessment should:

   • Provide information on the biology and ecology of non-native species and GMOs;

   • Assess the types and levels of impacts and likely extent of harm to native biological diversity;

   • Identify indicators for monitoring the status of non-native species and their impacts on biological diversity;

2) Develop biological and other methods for the control and eradication of non-native species of concern;

3) Monitor non-native species and GMOs and their threat to biodiversity;

4) Establish control over exotic species' breeding centres, implement the marking of animals and ban the entry of exotic species that can become invasive;

5) Establish a non-native species and GMO warning system and procedures for responding to threats caused by such species.

4.1.2.2 POLLUTION/ CONTAMINATION

1) Conduct a national-level assessment of the cumulative impacts of pollution on biological diversity;

2) Develop bio-indicators for monitoring the impacts of pollution on biological diversity with an emphasis on species vulnerable to, or threatened by, pollution;

3) Review and increase environmental monitoring of currently used pesticides, other hazardous chemicals and industrial runoff;

4) Review laws, bylaws and guidelines for pollution prevention and control, in order to ensure criteria are in place to minimize adverse impacts on biological diversity and ecological communities;

5) Strengthen existing, or create new, control mechanisms for the manufacture, importation and use of chemicals that have been shown to adversely affect biological diversity, with the goal of minimizing their impacts;

6) Encourage the development and use of alternatives to processes, agents and activities known to have adverse affects on biological diversity through pollution or contamination.

4.1.2.3 FIRE

1) Support research into the role of fire in native ecosystems;

2) Develop management guidelines for minimizing adverse impacts and maintaining the positive impacts of fire on biological diversity at natural levels;

3) Promote public and private property owner awareness of the impacts of fire on biological diversity and advise on the timing and pattern of fire use.

4.2 PROTECTED AREA SYSTEM

Article 8 of the Convention, regarding *In-situ* conservation, states that "Each Contracting Party shall, as far as possible and as appropriate, establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity". As part of the Strategy, the Government is supporting the establishment of a national network of protected areas and the expansion of this network to ensure that all ecosystems are represented under a formal protection regime.

4.2.1 PROTECTED AREA SYSTEM EFFECTIVENESS

Objective 2.1: Establish and manage a comprehensive, adequate and representative system of protected areas covering the Republic of Serbia's biological diversity.

Activities:

1) Conduct national ecological gap analysis (also referred to as a protected area system gap analyses). This analysis should be based on requirements for representative systems of protected areas that adequately conserve terrestrial freshwater biodiversity and ecosystems. Gap analyses should take into account Annex I of the Convention and other relevant criteria, such as the irreplaceable nature of target biodiversity components, ecological effectiveness size and viability requirements, species migration requirements, integrity, ecological processes and ecosystem services;

2) Conduct national climate change vulnerability analysis using existing geographically explicit models for evaluating the climate change vulnerability of terrestrial and freshwater ecological systems. This analysis will guide the future allocation of resources, while conservation management practices may need to change across both protected areas and the wider environment in order to accommodate potential climate change vulnerability;

3) Develop a plan for the expansion of the PA system to address deficiencies identified in ecological gap and climate change vulnerability analyses. The plans

should also provide interim measures to protect highly threatened or highly valued areas wherever necessary;

4) Ensure that the range of PA types has a consistent nomenclature and associated management regimes, in line with European Union standards and the IUCN classification of protected areas;

5) Establish a national ecological network of the Republic of Serbia, as part of the European ecological network NATURA 2000, and a management system adhering to international and EU standards;

6) Develop a map of the national ecological network;

7) Develop guidelines and criteria for preparing, evaluating and revising PA management plans. Guidelines should address the following aspects of PA management:

- Assessing PA management effectiveness;
- Integrating the Convention Programme on Work in Protected Area priority activities;
- Developing a standardized system for reporting on annual programmes;
- Promoting public participation in development and implementation of management plans;
- Developing and implementing climate change adaptation strategies;

8) Develop or update management plans for all PAs;

9) Establish a comprehensive park ranger services programme within PAs and ensure training for rangers in all areas;

10) Promote information exchange and communication among PA managers;

11) Provide opportunities for PA managers and other relevant public agency representatives to carry out international learning and exchange information.

4.2.2 PROTECTED AREA SYSTEM FINANCING

Objective 2.2: Ensure the availability of sufficient financial resources for maintenance and expansion of the PA system of the Republic of Serbia, while enhancing the long-term financial sustainability of the system.

Activities:

1) Conduct national level PA financial analysis;
2) Develop a sustainable PA system financing plan;
3) Prepare guidelines for the development of individual PA financial plans;
4) Prepare or update individual PA financial plans;
5) Provide and maintain sufficient resources, including trained staff, to implement management plans;

4.3 SUSTAINABLE USE OF BIODIVERSITY, ACCESS AND BENEFIT SHARING AND ECONOMIC VALUATION

Prior to initiation of the Convention in 1992, access to genetic resources and associated traditional knowledge was free for all. Genetic resources and knowledge were often taken from communities and countries by organisations and individuals who monopolised the benefits. The commercialisation of genetic resources and associated traditional knowledge has existed in many forms for hundreds of years. There was little or no exchange of knowledge and no offer of compensation for such communities.

Today genetic resources are no longer considered a common heritage of mankind and cannot be treated as freely accessible commodities. Every country has a sovereign right to regulate access to their genetic resources and associated traditional knowledge. Article 15 of the Convention provides a framework for governments to implement Access and Benefit Sharing mechanisms to regulate and protect knowledge and genetic resources to facilitate access and ensure the fair and equitable sharing of benefits.

The sustainable use of genetic resources has economic, ecological and socio-cultural dimensions. It also contributes to food security, rural development, increased employment opportunities and improving local living standards. Sustainable agricultural production systems allow the conversion of available resources in food and agricultural products without reducing the availability of these resources in the future or causing environmental degradation.

4.3.1 SUSTAINABLE USE OF BIODIVERSITY

Objective 3.1: Develop new, and strengthen existing, mechanisms to ensure the sustainable use of the Republic of Serbia's biological diversity. Promote these mechanisms widely within public and private sectors.

Activities:

1) Adopt a National strategy for Sustainable Use of Natural Resources and Goods;
2) Develop and promote best practice guidelines for the sustainable use of biological diversity;
3) Conduct research and monitoring of ecologically and economically important species, including rare, vulnerable and threatened species (fauna and flora) to determine ecological sustainability;
4) Develop management plans for economically and ecologically important species.
5) Ensure harvesting levels are established on the basis of the long-term viability of the species concerned or long-term ecological effectiveness (i.e., large predators and other keystone species).

4.3.2 ACCESS AND BENEFIT SHARING

Objective 3.2: Ensure that social and economic benefits of the use of genetic resources and other products and services originating from the Republic of Serbia's biological diversity are accrued by the Republic of Serbia.

Activities:

1) Generate broad public awareness of the concept of access and benefit sharing (ABS) as it relates to biodiversity;
2) Develop mechanisms to ensure fair access and distribution of benefits gained through use and conservation of biodiversity and that benefits are accrued by the Republic of Serbia;
3) Develop mechanisms to distribute economic benefits of PAs and biodiversity conservation outside PAs to local communities, landowners and residents;
4) Develop guidelines, criteria and mechanisms for compensating owners of land and forest concessions within PAs.

4.3.3 ECONOMIC VALUATION OF BIODIVERSITY

Objective 3.3: Increase national awareness and use of economic valuation of biodiversity techniques as a mechanism for more accurately assessing and accounting for economic trade-offs between biodiversity protection and human activities that may result in biodiversity loss.

Activities:

1) Conduct a national assessment of ecosystem services provided by natural areas (designated PAs and large intact natural areas);
2) Increase awareness among policy makers and business leaders regarding the range of economic values that biodiversity offers and the array of economic techniques available to estimate these values;

3) Establish mechanisms for the economic valuation of biodiversity, natural areas and ecosystem services and the integration of these values into national policies, planning, budgets and strategies in relevant sectors.

4.4 POLICY, LEGAL, INSTITUTIONAL AND FINANCIAL FRAMEWORKS FOR BIODIVERSITY CONSERVATION

The Republic of Serbia's fundamental strategic and political aspiration is EU integration, accession and then full membership. In order to achieve this goal, the country must fulfil numerous conditions, including the establishment of policy, legal, institutional and financial frameworks for biodiversity conservation.

4.4.1 POLICY FRAMEWORK

Objective 4.1: Strengthen and expand the policy framework for biodiversity conservation.

Activities:

1) Eliminate or reform policies that encourage unsustainable resource use or the degradation or conversion of forest and other ecosystems to other less valuable uses;
2) Eliminate or reform policies that result in the degradation and loss of biodiversity in terrestrial and freshwater ecosystems;
3) Eliminate or reform agricultural and forestry policies that promote excessive uniformity of crops and crop varieties or that encourage the overuse of chemical fertilizers and pesticides;
4) Reform breeding policies of only specialized breeds in animal husbandry, which reduce the multifunctional role of local indigenous breeds and lead to biodiversity degradation and reduction.

4.4.2 LEGAL FRAMEWORK

Objective 4.2: Strengthen the legal framework for biodiversity conservation and ensure enforcement and compliance of biodiversity related legislation.

Activities:

1) Evaluate existing legal mechanisms for biodiversity conservation in relation to the EU legal framework, identify gaps and areas where existing mechanisms encourage or result in degradation and loss of biodiversity;
2) Develop a plan for creating new legal mechanisms for biodiversity conservation where gaps exist or integrating biodiversity conservation into existing mechanisms (e.g., Environmental Impact Assessment and Strategic Impact Assessment);
3) Improve the implementation and enforcement of existing legal mechanisms and agreements concerning biodiversity conservation.

4.4.3 INSTITUTIONAL FRAMEWORK

Objective 4.3: Strengthen the institutional framework for biodiversity conservation.

Activities:

1) Perform a functional review of the biodiversity conservation sector and develop clear and detailed institutional mandates and policies in this area;
2) Establish an Inter-Ministerial Biodiversity Council;
3) Establish a National Council for Genetic Resources.

4.4.4 FINANCIAL FRAMEWORK

Objective 4.4: Strengthen and expand financing for biodiversity conservation and provide incentives for biodiversity conservation within all sectors.

Activities:

1) Research and develop financial and other incentives for biodiversity conservation in all relevant sectors (e.g., tax deductions for conservation easing, biodiversity-friendly or organic farming in areas surrounding Pas, combined with promotion of organic products as a value-added approach to increasing income from such strategies; value-added activities in areas surrounding PAs ,such as sustainably harvested non-timber forest products);
2) Diversify funding for biodiversity conservation at all levels and in all sectors by seeking funding from a range of public and private sources, bilateral and multilateral donors;
3) Incorporate expenditure and revenue projections resulting from biodiversity conservation (economic valuation) into the budgets of relevant institutions;
4) Strengthen the capacities of MESP, PSEPSD, INC, PINC, local authorities and PA managers to find funding for biodiversity conservation activities (e.g., training in the preparation of proposals and implementation of projects financed by bilateral and multilateral donors);
5) Increase contributions from the National Environmental Protection Fund for biodiversity conservation projects;
6) Promote the financing of biodiversity conservation programmes and activities within the private sector.

4.5 INTEGRATION OF BIOLOGICAL DIVERSITY CONSERVATION INTO OTHER SECTORS

Article 6(b) of the Convention calls on the Parties to "integrate, as far as possible and appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies". Mainstreaming biodiversity involves the integration of biodiversity conservation and sustainable use

principles into policies, plans, programmes and production systems, where the primary focus has previously been on production, economic activity and development - rather than on biodiversity conservation losses or gains.

The mainstreaming of biodiversity should occur on the ground in production landscapes and within economic sectors, particularly those directly related to natural resource use and management – agriculture, forestry, fisheries, wildlife utilization, mining, energy production and tourism.

4.5.1 INTEGRATED POLICIES AND GUIDELINES

Objective 5.1: Develop and implement national integrated policies for the conservation and sustainable use of biological diversity.

Activities:

1) Assess other sectors' impacts on biodiversity (forestry, natural resource management, agriculture, water management, tourism and recreation, spatial planning, transportation, mining, energy etc.);
2) Develop guidelines to integrate biodiversity conservation principles and factors into relevant national legislation, policies, regulations and standards;

3) Assess current sectoral strategies, policies, standards and practices relevant to biodiversity and provide recommendations to integrate conservation biology principles;

4) Develop and promote best practice guidelines for sustaining biodiversity for all relevant sectors (forestry, natural resource management, agriculture, water resource management, tourism and recreation, spatial planning, transportation, mining, energy etc.) and support their implementation.

4.5.2 INTEGRATION OF BIODIVERSITY INTO OTHER SECTORS

Objective 5.2: Improve the integration of biodiversity concerns into all relevant sectors.

4.5.2.1 AGRICULTURE

1) Develop a national strategy and programme for sustainable use, development and conservation of plant genetic resources;

2) Develop a national strategy and programme for sustainable use, development and conservation of domestic animal genetic resources;

3) Develop a national programme for organic farming;

4) Establish an efficient national agri-environmental programme;

5) Develop and promote best practices guidelines for sustaining biodiversity for agriculture and support their implementation.

4.5.2.2 FORESTRY

1) Promote the conservation of forest biodiversity, including genetic diversity, through the development of a forest certification programme and best practice guidelines for ecosystem-based sustainable forestry;

2) Develop forest management measures and guidelines to prevent genetically modified tree species, as well as non-native and invasive species, from negatively impacting on forest and general biodiversity.

4.5.2.3 WILDLIFE RESOURCES

1) Develop best management practices for sustainable resource use and biodiversity conservation for the hunting and fishing sectors;

2) Ensure implementation of fish stock monitoring, as prescribed by law, and standardize monitoring procedures in accordance with water types;

3) Develop risk assessment protocols for the introduction of potentially invasive fish species and other aquatic organisms;

4) Prevent GM and non-native fish from threatening fish and freshwater.

4.5.2.4 MINING

1) Develop and promote best practice guidelines for sustaining biodiversity for mining operations and support their implementation.

4.5.2.5 WATER RESOURCES

1) Develop and promote best practice guidelines for sustaining biodiversity for water management projects and support their implementation.

4.5.2.6 TOURISM AND OUTDOOR RECREATION

1) Develop a national ecotourism programme;

2) Develop and promote best practice guidelines for sustaining biodiversity for tourism and support their implementation;

3) Monitor and control the impacts of tourism on biodiversity and ecosystems in protected areas.

4.6 KNOWLEDGE BASE

A well-functioning biodiversity information system is a prerequisite for achieving a good nature protection paradigm and developing a national biodiversity information system is an essential step towards increased and more effective biodiversity conservation. The development of an information system is crucial to supporting and informing

the biodiversity policy and decision making. There is no organized monitoring or mapping of biodiversity or its status on a national level and current available data is generated through work carried out for other purposes, mostly scientific. However, unsatisfactory financial and other supporting mechanisms in the area of biodiversity inventories still remain an obstacle.

4.6.1 NATIONAL BIODIVERSITY INFORMATION SYSTEM

Objective 6.1: Collect, review and synthesize available data and information on biological diversity to provide a basis for assessing the status of, monitoring, conserving and sustainably using biological diversity.

Activities:

1) Design a comprehensive National Biodiversity Information System (NBIS) within SEPA, including:
   - National set of indicators on biodiversity status;
   - Standardized protocol for monitoring, reporting and updating.
2) Compile and review existing biodiversity data from collections, databases and geographic information systems in all sectors;
3) Populate NBIS with existing data from all sectors;
4) Develop and implement a plan for addressing NBIS deficiencies;
5) Inventory and map threatened and rare habitat types (as per annex 1 of Habitat Directive);
6) Using internationally-accepted methods and standards, classify, describe and map vegetation communities throughout the Republic of Serbia, starting with protected areas;
7) Develop a GIS map of protected area boundaries, with vegetation community classification and other relevant geographic information (trails, buildings etc.);
8) Map habitats of key flora and fauna species (ecologically or economically important species, rare, vulnerable or threatened species).

4.6.2 BIODIVERSITY MONITORING

Objective 6.2: Establish a national programme to identify and monitor priority species, habitats, and genetic components of biodiversity, as well as the effects of activities and processes that threaten biodiversity components and their causes.

Activities:

1) Develop a biodiversity monitoring programme to monitor biodiversity status and threats at genetic, species and ecosystem levels in coordination with all relevant sectors;
2) Establish a biodiversity clearinghouse mechanism with web portal;
3) Establish a biosafety clearinghouse mechanism with web portal;
4) Establish plans and teams to monitor the implementation of sectoral strategies relevant to biodiversity.

4.6.3 BIODIVERSITY RESEARCH

Objective 6.3: Support aimed at understanding and maintaining biological diversity in the Republic of Serbia.

Activities:

1) Establish criteria for determining priorities of research needs;
2) Initiate and support inventorization and further research of diversity of flora, fauna and fungi and publish data on other under-studied groups of organisms in the Republic of Serbia;
3) Establish and promote mechanisms for integrating biodiversity research results into the NBIS.

4.7 CAPACITY BUILDING

Building the capacity of the Republic of Serbia's public and private sectors for biodiversity conservation, coupled with awareness of its critical role in sustainable development, is essential if conservation and long-term development are to be effective and lasting. An integrated approach to capacity building that encompasses institutional, human and social capacity building at national, regional and local levels is required in order to strengthen country's biodiversity conservation capacities.

4.7.1 TECHNICAL CAPACITY BUILDING

Objective 7.1: Build and strengthen capacities within all relevant public and private institutions for biodiversity conservation and sustainable use.

Activities:

1) Develop a national programme and training centre to provide training in biodiversity monitoring, assessment, management and conservation in public and private sectors, with special emphasis on:
   - Institutional capacities of relevant national institutions and local authorities to review programmes and projects considering impacts on biodiversity;
   - PA management, planning and evaluation;
   - Use of geographic information systems for planning, monitoring and management;
   - Best practice guidelines for sustaining biodiversity in the utilization of biological resources (targeted at resource use sectors);
   - Regional scale conservation and sustainable development planning;
   - *Ex-situ* protection of genetic resources and genetic resource management
   - Implementation of CITES regulations (targeted at judiciary level and customs agents);
   - Basic training in conservation biology principles for local, regional and national authorities.
2) Develop opportunities for exchanges between biodiversity conservation practitioners.

4.7.2 INFRASTRUCTURE AND EQUIPMENT

Objective 7.2: Develop necessary infrastructure and provide essential equipment for biodiversity monitoring, conservation and sustainable use within relevant

institutions.

Activities:

1) Provide necessary equipment to public sector agencies responsible for biodiversity conservation:

   • Surveillance, fire fighting, transportation and monitoring equipment for rangers;

   • Computers, GIS and GPS technologies, and internet access for PA managers;

2) Equip SEPA and INCs with comprehensive, up-to-date GIS systems to facilitate biodiversity conservation activities both within and beyond PAs.

4.8 EDUCATION, PUBLIC AWARENESS AND PARTICIPATION

Article 13(a) on Public Education and Awareness of the Convention stipulates that all Parties shall "promote and encourage understanding of the importance of, and measures required for, the conservation of biological diversity, as well as its propagation through media and the inclusion of these topics in educational programmes".

Public information and communication are important in order to support biodiversity related actions and policies. All stakeholders must be involved in exploring nature conservation options. People's acceptance of nature conservation activities and their behaviour is highly dependent on adequate communication. An operational framework for education, public awareness and participation, thus, needs to be established.

4.8.1 FORMAL EDUCATION

Objective 8.1: Generate a greater understanding of the importance of biodiversity and develop skills for studying and protecting biodiversity through the integration of information on biodiversity in formal academic curricula.

Activities:

1) Develop an educational module on biodiversity conservation for preschool and nursery school levels;
2) Integrate information about biodiversity – origins, status, value and protection – into primary and secondary school curricula;
3) Develop or improve academic programmes and courses on biodiversity, agro-biodiversity and bio-safety;
4) Develop programmes for training teachers and teaching associates on biodiversity.

4.8.2 PUBLIC AWARENESS

Objective 8.2: Foster public understanding, support and action for biodiversity conservation through integration of biodiversity information in formal academic curricula.

Activities:

1) Develop a communication system for biodiversity conservation;
2) Develop and implement a campaign for raising public awareness of biodiversity – value, threats and conservation;
3) Create an informative web portal on biodiversity of the Republic of Serbia;
4) Raise awareness within the business sector about the importance of biodiversity;
5) Generate public awareness of the importance of implementing the Biosafety Protocol;
6) Ensure training on biodiversity conservation for PA inhabitants;
7) Ensure training on biodiversity conservation for hunters and fishermen, medicinal plant collectors, tourism organisations and others;
8) Provide training about biodiversity for media and journalists;
9) Generate awareness related to the impacts of climate change on biodiversity.

4.8.3 PARTICIPATION

Objective 8.3: Involve local residents and communities in planning, decision-making and implementation related to biodiversity conservation.

Activities:

1) Promote the participation of local communities and residents in PA planning, management and creation;
2) Promote public participation in decision making processes on GMO-related issues;
3) Establish mechanisms of cooperation between state agencies and NGOs on biodiversity conservation;
4) Support NGO sector projects that pertain to the promotion of biodiversity conservation.

4.9 INTERNATIONAL COOPERATION

Article 5 of the Convention states that "Each Contracting Party shall, as far as possible and as appropriate, cooperate with other Contracting Parties directly or, where appropriate, through competent international organizations, in respect of areas beyond national jurisdiction and on other matters of mutual interest, for the conservation and sustainable use of biological diversity".

In order to fulfil obligations and ensure effective biodiversity conservation, in particular on sustainable use of biodiversity, both international and regional cooperation must be established.

4.9.1 COORDINATION WITH OTHER INTERNATIONAL INSTRUMENTS FOR BIODIVERSITY CONSERVATION

Objective 9.1: Ensure coherency and coordination between this strategy and other international biodiversity-related commitments and agreements.

Activities:

1) Harmonize national legislation with the Convention requirements;
2) Establish national level targets for biodiversity protection according to the Strategic Plan of the Convention (Aichi targets);
3) Align biodiversity conservation legislation with EU legislation;
4) Align GMO legislation with the EU Protocol on Biosafety;
5) Develop mechanisms (bodies, documents, instruments) for harmonization and application of multilateral international agreements related to biodiversity;
6) Prepare a plan for the nomination of PAs of international importance (Ramsar, World Heritage, MAB etc.).

4.9.2 REGIONAL AND INTERNATIONAL COOPERATION

Objective 9.2: Ensure continued and effective international cooperation for the protection of biodiversity.

Activities:

1) Establish a forum of all parties involved in biodiversity conservation on all levels and between all stakeholders;
2) Collaborate with neighbouring countries on the exchange of information and reproduction of material for the recovery of native and cross-border species;
3) Establish and maintain cross-border cooperation with neighbouring countries on biodiversity conservation initiatives, such as conservation of key species (e.g. large carnivores and others);
4) Exchange genetic resources with other international institutions and gene banks;
5) Promote and provide support for communication and information exchanges on biodiversity conservation at the international level (e.g. participation of reasearchers and scientists in international biodiversity forums).

4.10 CLIMATE CHANGE

It is now widely accepted that climate change and biodiversity are interconnected. Biodiversity is affected by climate change, but biodiversity also provides an important

contribution to both climate-change mitigation and adaptation through the ecosystem services it supports.

Conserving natural ecosystems and restoring degraded ecosystems (including their genetic and species diversity) is essential to the overall goals of both the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change (UNFCCC), because ecosystems play a key role in the global carbon cycle and in adapting to climate change, whilst also providing a wide range of ecosystem services that are essential to human well-being and development. Furthermore, biodiversity can support efforts to reduce the negative effects of climate change. Conserved or restored habitats can remove carbon dioxide from the atmosphere, thus helping to address climate change by reducing carbon emissions.

4.10.1 NATIONAL ACTION ON CLIMATE CHANGE

Objective 10.1: Develop national strategies and mechanisms to understand, plan for and minimize the potential impacts of climate change on biological diversity.

Activities:

1) Develop and implement a National Biodiversity and Climate Change Action Plan;
2) Develop climate change adaptation strategies for PAs based on results of national climate change vulnerability analysis.

4.10.2 CLIMATE CHANGE RESEARCH, MONITORING, AND EVALUATION

Objective 10.2: Increase capacity among relevant institutions to monitor and predict impacts of climate change on biodiversity and evaluate the effectiveness of adaptation strategies and actions.

Activities:

1) Conduct a national climate change vulnerability assessment focused on protected areas and vulnerable, rare or threatened ecosystems;
2) Identify information requirements and priorities for the long-term monitoring of climate change impacts on biodiversity;
3) Incorporate climate change impact monitoring requirements into the national biodiversity monitoring programme and NBIS;
4) Conduct regular evaluations and refinements of adaptation strategies and actions.

4.10.3 CLIMATE CHANGE AWARENESS

Objective 10.3: Increase awareness of climate change impacts and adaptation strategies among all sectors and the general public.

Activities:

1) Integrate climate change information into the national biodiversity web portal to facilitate learning and information exchange regarding climate change by resource and land managers, decision-makers and the general public. The web portal should include information about the actual and potential impacts of climate change and relevant policies, strategies and programmes;

2) Conduct a national campaign to increase awareness of the causes and impacts of global climate change.

4.11 IMPLEMENTATION OF THE STRATEGY

The responsibility of the entire government is crucial to implementing the Strategy. Therefore each Ministry, and especially the Ministry of Environment and Spatial Planning, should promote actions necessary for the full implementation of this strategy and establish mechanisms for its application, follow-up, evaluation and review.

4.11.1 FINANCING THE STRATEGY

Objective 11.1: Ensure a diverse portfolio of sources and strategies for the long-term funding of the Strategy. Ensure that the costs of biological diversity conservation are shared equitably among institutions and stakeholders so that they reflect contributions to degradation and benefits from protection or use.

Activities:

1) Develop a strategic financial plan to fund the implementation of the Strategy that identifies a diverse range of funding sources (in-country and international, private and public) and strategies for ensuring long-term implementation, monitoring and refinements of the Strategy and coordination with other relevant strategies and policies. The financial plan should provide a multi-year budget that includes:

• Anticipated costs of priority activities of the Biodiversity Strategy of the Republic of Serbia;

• Amount of funding that can be expected for implementation from the national government's budget;

• Identification of additional fundraising opportunities associated with sustainable activities depending on biodiversity (tourism, sustainable sport fishing and hunting, scientific tourism etc.);

• Mechanisms for collecting revenue from these activities (e.g. annual rent, permit fees, visitor entrance fees, levies for utilities etc.);

• Mechanisms to ensure that revenue collected will be channelled to the correct agency and used to implement the Strategy and its relevant activities.

2) Incorporate expenditure and revenue projections resulting from the implementation of the Strategy into the budgets of relevant institutions.

4.11.2 COORDINATION, REVIEW AND UPDATING OF THE STRATEGY

Objective 11.2: Establish appropriate mechanisms and develop necessary capacities to implement, monitor and refine the Strategy.

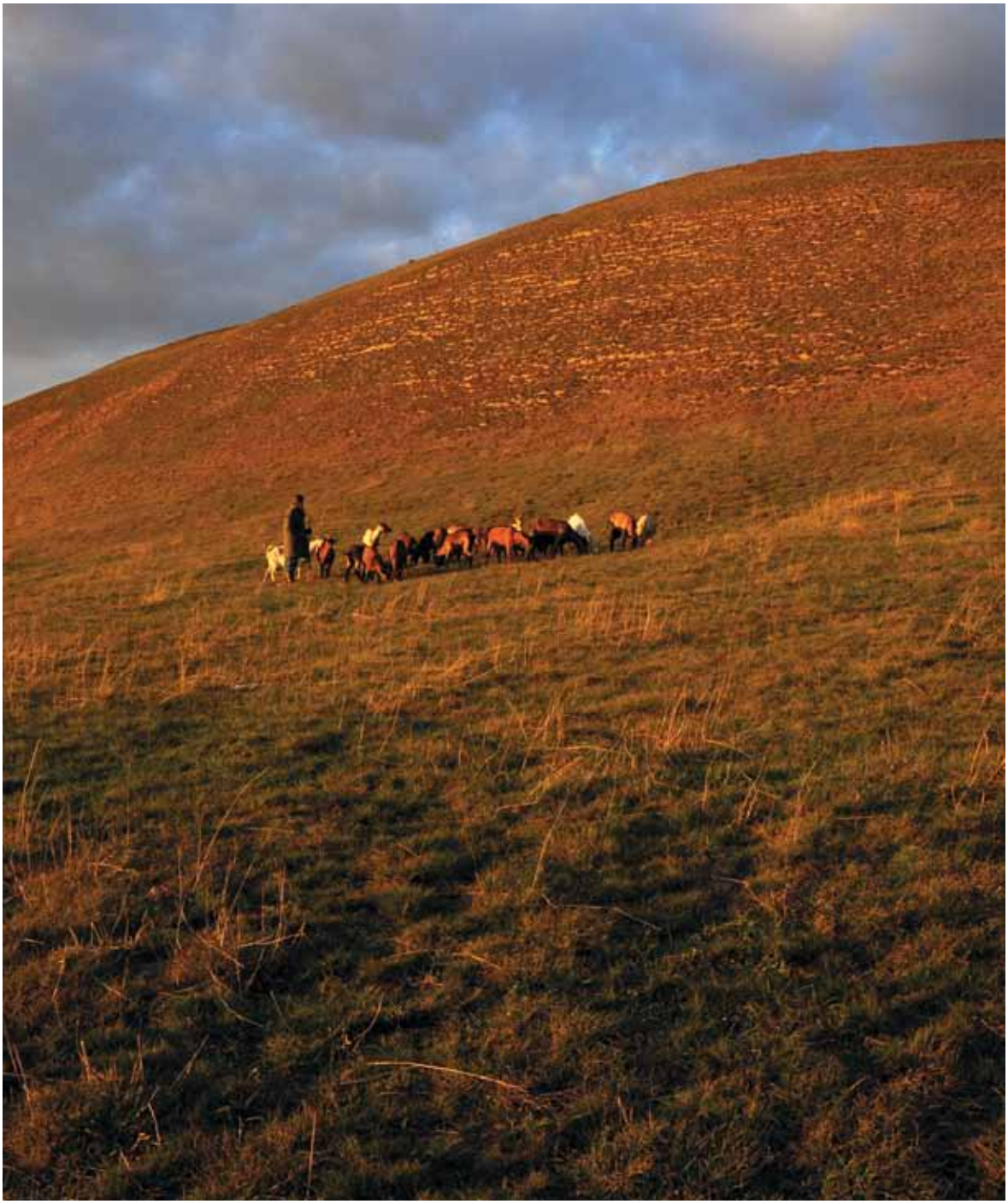
Activities:

1) Establish a multi-institutional body to oversee the implementation, monitoring, evaluating and updating of the Strategy;

2) Develop quantitative targets and indicators for monitoring the success of the Strategy;

3) Identify lead sections and/or individuals in key institutions to coordinate the monitoring, evaluation and refinement of the Strategy;

4) Conduct annual evaluations and refinements of all components of the Strategy in coordination with all participating sectors and institutions.



5. ACTION PLAN

The Action Plan of the Biodiversity Strategy of the Republic of Serbia for the period 2011 - 2018 contains activities, responsible institutions and timeframes, as well as potential source of financial resources for implementation of the Strategy.

Activities	Responsible institution	Timeframe	Financial resources
1. Biodiversity Conservation			
1.1 Threatened Biological Diversity			
Ensure the provision of adequate resources and training forboth the public and private sectors on biodiversity conservation efforts beyond protected areas	MESP	Continually	RB, IF
1.1.1 Threatened Species			
Develop or improve mechanisms enabling the identification and monitoring of threatened, rare or vulnerable species	INC, PINC	Long-term	RB, IF, EPF
Create a registry of threatened, rare and vulnerable species, including their locations, biological status, recovery strategies and threats, within the National Biodiversity Information System (NBIS)	MESP, SEPA, INC, PINC, SRI	Long-term	RB, EUF, EPF
Develop a nationally-mandated programme of recovery planning for threatened species (where necessary, coordinate planning and implementation with other institutions and/ or neighbouring countries)	MESP	Short-term	RB, EUF, BD
Prepare and submit all red lists (flora, fauna and fungi)	MESP, INC, PINC, MSTD, SRI	Mid-term	RB, EPF, EUF
Develop Red Books of the Republic of Serbia's flora and fauna	MESP, INC, PINC, MSTD, SRI	Mid-term	RB, EPF, EUF
Develop emergency response procedures for threatened or rescued wildlife	INC, PINC, PA	Short-term	RB
Establish wildlife rescue centres	MESP	Mid-term	RB, BD

Activities	Responsible institution	Timeframe	Financial resources
Plan and implement active field measures for the protection and improvement of endangered species' populations (e.g. protection, provision of additional food, setting artificial nests etc.)	INC, PINC, PA	Short-term	RB, EPF, BD
Provide mechanisms for resolving cases of conflict regarding the use of land, which could lead to the destruction of endangered species (e.g. orchids in bloom on private lands during harvest time, nests in a private forest etc.)	MESP, PSEPSD, INC, PINC	Mid-term	RB, EPF
1.1.2 Threatened Ecological Communities			
Identify, describe and map threatened, vulnerable and rare habitat types in accordance with the EU habitat directive	MESP, MSTD, INC, PINC, SRI	Mid-term	RB, EPF
Legally regulate the protection and recovery of threatened ecological communities	MESP	Short-term	RB
Establish threat status for endangered ecological communities and develop monitoring indicators and protection measures	MESP, INC, PINC, SEPA, SRI	Short-term	RB, EPF
1.1.3 Ecological Restoration			
Develop and implement techniques, guidelines and standards for restoring biological diversity in degraded systems	MESP, INC, PINC	Short-term	RB

MESP – Ministry of Environment and Spatial Planning, MAFWM – Ministry of Agriculture, Forestry and Water Management, MME – Ministry of Mining and Energy, MFin – Ministry of Finance, MERD – Ministry of Economy and Regional Development, MSTD – Ministry of Science and Technological Development, MEd – Ministry of Education, PSEPSD – Provincial Secretariat of Environmental Protection and Sustainable Development, EPF – Environmental Protection Fund, SEPA – Serbian Environmental Protection Agency, INC – Republic Institute for Nature Conservation, PINC – Provincial Institute for Nature Conservation, PA – Protected Areas, SRI – Scientific and Research institutions, RB – Republic Budget, EUF – EU Funds, GEF – Global Environmental Facility, BD – Bilateral donors, IF – International funds.

Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Evaluate ongoing restoration efforts and support positive restoration examples	MESP, PSEPSD, INC, PINC	Mid-term	RB, EUF, EPF
Work collaboratively with private landowners and regional institutions to identify and restore degraded ecological communities of national concern	INC, PINC	Mid-term	RB
Promote the use of native species in habitat restoration efforts	INC, PINC	Mid-term	RB, EPF
1.1.4 *Ex-Situ* Conservation			
Conduct a national assessment of potentials and priorities for *ex-situ* conservation	MESP, MAFWM, INC, PINC	Mid-term	RB
Strengthen and expand *ex-situ* conservation, including the provision of adequate resources and training to relevant institutions and organizations by:	MESP, MAFWM, INC, PINC, PA	Mid-term	RB, EPF, EUF, BD
• Establish *ex-situ* conservation programmes or offices within relevant institutions	MESP, MAFWM, INC, PINC, PA	Mid-term	RB, EPF, EUF, BD
• Establish 'on-farm' conservation farms and plantations for rare species, breeds and varieties	MAFWM	Mid-term	RB
• Establish new 'on-farm' conservation centres, inventory and connect existing such centres	MAFWM	Mid-term	RB
• Increase support to national gene banks	MAFWM	Mid-term	RB, EUF, BD

MESP – Ministry of Environment and Spatial Planning, MAFWM – Ministry of Agriculture, Forestry and Water Management, MME – Ministry of Mining and Energy, MFin – Ministry of Finance, MERD – Ministry of Economy and Regional Development, MSTD – Ministry of Science and Technological Development, MEd – Ministry of Education, PSEPSD – Provincial Secretariat of Environmental Protection and Sustainable Development, EPF – Environmental Protection Fund, SEPA – Serbian Environmental Protection Agency, INC – Republic Institute for Nature Conservation, PINC – Provincial Institute for Nature Conservation, PA – Protected Areas, SRI – Scientific and Research institutions, RB – Republic Budget, EUF – EU Funds, GEF – Global Environmental Facility, BD – Bilateral donors, IF – International funds.

Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Integrate *ex-situ* with other measures for the conservation of threatened species, particularly through a programme of captive breeding, rehabilitation and reintroduction of each such species to its natural habitat	MESP, MAFWM, INC, PINC	Mid-term	RB
1.2 Managing Threatening Processes			
1.2.1 Non-Native Species and Genetically Modified Organisms (GMOs)			
Conduct a national-level inventory of non-native species and GMOs. This assessment should:	MAFWM, MESP	Short-term	RB
• Provide information on the biology and ecology of non-native species and GMOs	MAFWM, MESP, SRI	Short-term	RB
• Assess the types and levels of impacts and likely extent of harm to native biological diversity	MAFWM, MESP, SRI	Short-term	RB
• Identify indicators for monitoring the status of non-native species and their impacts on biological diversity	SRI	Short-term	RB
Develop biological and other methods for the control and eradication of non-native species of concern	SRI, INC, PINC	Mid-term	RB, EUF, BD
Monitor non-native species and GMOs and their threat to biodiversity	SEPA	Short-term	RB

MESP – Ministry of Environment and Spatial Planning, MAFWM – Ministry of Agriculture, Forestry and Water Management, MME – Ministry of Mining and Energy, MFin – Ministry of Finance, MERD – Ministry of Economy and Regional Development, MSTD – Ministry of Science and Technological Development, MEd – Ministry of Education, PSEPSD – Provincial Secretariat of Environmental Protection and Sustainable Development, EPF – Environmental Protection Fund, SEPA – Serbian Environmental Protection Agency, INC – Republic Institute for Nature Conservation, PINC – Provincial Institute for Nature Conservation, PA – Protected Areas, SRI – Scientific and Research institutions, RB – Republic Budget, EUF – EU Funds, GEF – Global Environmental Facility, BD – Bilateral donors, IF – International funds.

Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Establish control over exotic species breeding centres, implement the marking of animals and ban the entry of exotic species that can become invasive	MESP, INC, PINC	Mid-term	RB, FEU, BD
Establish a non-native species and GMO warning system and procedures for responding to threats caused by such species	MAFWM, MESP	Mid-term	RB
1.2.2 Pollution/Contamination			
Conduct a national assessment of the cumulative impacts of pollution on biodiversity	MAFWM, INC, PINC, SEPA, SRI	Mid-term	RB, EPF, EUF, BD
Develop bio-indicators for monitoring the impacts of pollution on biodiversity, with an emphasis on species vulnerable to, or threatened by, pollution	SEPA	Mid-term	RB
Review and increase environmental monitoring of currently used pesticides, other hazardous chemicals and industrial runoff	SEPA	Mid-term	RB
Review laws, bylaws and guidelines for pollution prevention and control in order to ensure criteria are in place to minimize adverse impacts on biodiversity and ecological communities	MESP, MAFWM	Short-term	RB

MESP – Ministry of Environment and Spatial Planning, MAFWM – Ministry of Agriculture, Forestry and Water Management, MME – Ministry of Mining and Energy, MFin – Ministry of Finance, MERD – Ministry of Economy and Regional Development, MSTD – Ministry of Science and Technological Development, MEd – Ministry of Education, PSEPSD – Provincial Secretariat of Environmental Protection and Sustainable Development, EPF – Environmental Protection Fund, SEPA – Serbian Environmental Protection Agency, INC – Republic Institute for Nature Conservation, PINC – Provincial Institute for Nature Conservation, PA – Protected Areas, SRI – Scientific and Research institutions, RB – Republic Budget, EUF – EU Funds, GEF – Global Environmental Facility, BD – Bilateral donors, IF – International funds.

Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Strengthen existing or create new control mechanisms for the manufacture, importation and use of chemicals that have been shown to adversely affect biological diversity	MESP, MAFWM	Mid-term	RB
Encourage the development and use of alternatives to processes, agents and activities known to have adverse affects on biological diversity through pollution	MESP	Long-term	RB
1.2.3 Fire			
Support research into the role of fire in native ecosystems	MESP, MSTD	Mid-term	RB, EUF, IF, BD
Develop management guidelines for minimizing adverse impacts and maintaining the positive impacts of fire on biological diversity at natural levels	MESP, INC, PINC	Mid-term	RB, IF
Promote public and private property owner awareness of the impacts of fire on biological diversity and advise on the timing and pattern of fire use	MESP, INC, PINC	Long-term	RB, EPF
2. Protected Areas System			
2.1 Protected Area System Effectiveness			
Conduct national ecological gap analysis	MESP	Short-term	RB, GEF
Conduct national climate change vulnerability analysis	MESP	Short-term	RB, EPF, EUF, IF

MESP – Ministry of Environment and Spatial Planning, MAFWM – Ministry of Agriculture, Forestry and Water Management, MME – Ministry of Mining and Energy, MFin – Ministry of Finance, MERD – Ministry of Economy and Regional Development, MSTD – Ministry of Science and Technological Development, MEd – Ministry of Education, PSEPSD – Provincial Secretariat of Environmental Protection and Sustainable Development, EPF – Environmental Protection Fund, SEPA – Serbian Environmental Protection Agency, INC – Republic Institute for Nature Conservation, PINC – Provincial Institute for Nature Conservation, PA – Protected Areas, SRI – Scientific and Research institutions, RB – Republic Budget, EUF – EU Funds, GEF – Global Environmental Facility, BD – Bilateral donors, IF – International funds.

Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Develop a plan for expansion of the PA system	MESP, INC, PINC	Short-term	RB, GEF
Ensure the range of PA types is consistent with EU and IUCN classification of PAs	MESP	Short-term	RB, GEF
Establish a national ecological network of the Republic of Serbia as part of the European ecological network NATURA 2000 and a management system adhering to international and EU standards	MESP, INC, PINC	Mid-term	RB, EUF, BD
Develop a map of the national ecological network	MESP, INC, PINC	Mid-term	RB, EPF, BD
Develop guidelines and criteria for PA management plans	MESP, INC, PINC	Short-term	RB, EUF, GEF
Develop or update management plans for all PAs	INC, PINC, PA	Short-term	RB, FEU
Establish a comprehensive of park ranger services programme within PAs and ensure training for rangers in all areas	MESP, PSEPSD	Short-term	RB
Promote information exchange and communication among PA managers	PA, MESP	Short-term	RB, GEF
Provide opportunities for PA managers and others to carry out international learning and exchange information	PA, MESP, MSTD	Mid-term	RB, FEU, BD

MESP – Ministry of Environment and Spatial Planning, MAFWM – Ministry of Agriculture, Forestry and Water Management, MME – Ministry of Mining and Energy, MFin – Ministry of Finance, MERD – Ministry of Economy and Regional Development, MSTD – Ministry of Science and Technological Development, MEd – Ministry of Education, PSEPSD – Provincial Secretariat of Environmental Protection and Sustainable Development, EPF – Environmental Protection Fund, SEPA – Serbian Environmental Protection Agency, INC – Republic Institute for Nature Conservation, PINC – Provincial Institute for Nature Conservation, PA – Protected Areas, SRI – Scientific and Research institutions, RB – Republic Budget, EUF – EU Funds, GEF – Global Environmental Facility, BD – Bilateral donors, IF – International funds.

Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
2.2 Protected Area System Financing			
Conduct national level PA financial analysis	MESP	Short-term	RB, GEF
Develop a sustainable PA system financing plan	MESP, PSEPSD	Short-term	GEF
Prepare guidelines for the developing individual PA financial plans	MESP, PSEPSD	Short-term	GEF, EUF
Prepare or update individual PA financial plans	PA	Short-term	RB
Provide and maintain sufficient resources, including trained staff, to implement PA management plans	MESP	Continually	RB, FEU
3. Sustainable Use of Biodiversity, Access and Benefit Sharing, and Economic Valuation			
3.1 Sustainable Use of Biological Diversity			
Adopt a National Strategy for Sustainable Use of Natural Resources and Goods	MESP	Short-term	RB, BD
Develop and promote best practice guidelines for the sustainable use of biological diversity	MESP	Mid-term	RB, EPF
Conduct research and monitoring of ecologically and economically important species, including rare, vulnerable and threatened species (fauna and flora), in order to determine ecological sustainability	INC, PINC, SEPA, SRI	Long-term	RB, EUF

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Develop management plans for economically and ecologically important species	MESP	Mid-term	RB
Ensure harvesting levels are established on the basis of the long-term viability of the species concerned or long-term ecological effectiveness (i.e., large predators and other keystone species)	MESP, INC, PINC	Long-term	RB, BD, IF
3.2 Access and Benefit Sharing			
Generate broad public awareness of the concept of access and benefit sharing (ABS) as it relates to biodiversity	MESP, PSEPSD	Long-term	RB, EPF
Develop mechanisms to ensure fair access to, and distribution of, benefits gained through the use and conservation of biodiversity and ensure that benefits are accrued by the Republic of Serbia	MESP	Mid-term	RB, EUF, BD
Develop mechanisms to distribute economic benefits of PAs and biodiversity conservation outside PAs to local communities, landowners and residents	MESP, MFin	Mid-term	RB, EUF
Develop guidelines, criteria and mechanisms for compensating owners of land and forest concessions within PAs	MESP, MAFWM, MFin	Mid-term	RB
3.3 Economic Valuation of Biodiversity			
Conduct a national assessment of ecosystem services provided by natural areas	MESP	Long-term	RB, EPF, GEF, EUF

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Increase awareness among policy makers and business leaders regarding the economic values of biodiversity and the techniques to assess these values	MESP	Mid-term	RB, EPF
Establish mechanisms for economic valuation of biodiversity, natural areas and ecosystem services and integrate these values into national policies, planning, budgets and strategies in relevant sectors	MESP	Long-term	RB, EUF
4. Policy, Legal, Institutional and Financial Frameworks for Biodiversity Conservation			
4.1 Policy Framework			
Eliminate or reform policies that encourage unsustainable resource use or the degradation or conversion of forest and other ecosystems to less valuable uses	MESP	Mid-term	RB, EUF, BD
Eliminate or reform policies that result in the degradation and loss of biodiversity in terrestrial and freshwater ecosystems	MESP, MAFWM	Short term	RB, EPF
Eliminate or reform agricultural and forestry policies that promote excessive uniformity of crops and crop varieties or encourage the overuse of chemical fertilizers and pesticides	MAFWM, MESP	Mid-term	RB
Reform breeding policies of only specialized breeds in animal husbandry, which reduce the multifunctional role of local indigenous breeds and lead to biodiversity degradation and reduction	MAFWM	Mid-term	RB, EUF

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
4.2 Legal Framework			
Evaluate existing legal mechanisms for biodiversity conservation in relation to the EU legal framework	MESP	Short term	RB, EUF
Develop a plan to create new legal mechanisms for biodiversity conservation where gaps exist, or integrate biodiversity conservation into existing mechanisms	MESP	Mid-term	RB, EPF
Improve the implementation and enforcement of existing legal mechanisms and agreements concerning biodiversity conservation (e.g. Biosafety Protocol)	MESP	Short term	RB
4.3 Institutional Framework			
Perform a functional review of the biodiversity conservation sector and develop clear and detailed institutional mandates and policies in this area	MESP	Short term	RB, EPF, EUF, BD
Establish an Inter-Ministerial Biodiversity Council	MESP	Short term	RB
Establish a National Council for Genetic Resources	MAFWM, MESP	Short term	RB
4.4 Financial Framework			
Research and develop financial and other incentives for biodiversity conservation in all relevant sectors	MESP, MFin	Mid-term	RB, EUF

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Diversify funding for biodiversity conservation at all levels and in all sectors by seeking funding from a range of public and private sources, including bilateral and multilateral donors	MESP	Mid-term	RB
Incorporate expenditure and revenue projections resulting from biodiversity conservation measures (economic valuation) into the budgets of relevant institutions	MFin	Mid-term	RB
Strengthen the capacities of MESP, PSEPSD, INC, PINC, local authorities and PA managers to find funding for biodiversity conservation activities (e.g., training in the preparation of proposals and implementation of projects financed by bilateral and multilateral donors)	MESP, PSEPSD	Short term	RB, EUF, BD
Increase contributions from the National Environmental Protection Fund for biodiversity conservation projects	MESP, EPF	Short term	RB, EPF
Promote the financing of biodiversity conservation programmes and activities within the private sector	MESP	Mid-term	RB, EUF
5. Integration of Biodiversity Conservation into Other Sectors			
5.1 Integrated policies and guidelines			

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Assess other sectors' impacts on biodiversity (forestry, natural resource management, agriculture, water management, tourism and recreation, spatial planning, transportation, mining, energy etc.)	MESP, INC, PINC	Short-term	RB, EPF, EUF
Develop guidelines to integrate biodiversity conservation principles and factors into relevant national legislation, policies, regulations and standards	MESP, INC, PINC	Mid-term	RB, EUF, BD, IF, GEF
Assess current sectoral strategies, policies, standards and practices relevant to biodiversity and provide recommendations to integrate biodiversity conservation principles	MESP	Mid-term	RB, EUF, BD, IF, GEF
Develop and promote best practice guidelines for sustaining biodiversity for all relevant sectors (forestry, natural resource management, agriculture, water resource management, tourism and recreation, spatial planning, transportation, mining, energy etc.) and support their implementation	MESP	Short term	RB, EUF, BD, IF, GEF
5.2 Integration of biodiversity into other sectors			
5.2.1 Agriculture and livestock			
Develop a national strategy and programme for sustainable use, development and conservation of plant genetic resources	MAFWM	Mid-term	RB, EUF, IF, BD

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Develop a national strategy and programme for sustainable use, development and conservation of domestic animal genetic resources	MAFWM	Mid-term	RB, EUF, IF, BD
Develop a national organic farming programme	MAFWM	Mid-term	RB, EUF, IF, BD
Establish an efficient national agro-environmental programme	MAFWM, MESP	Mid-term	RB, GEF, EUF, IF, BD
Develop and promote best practice guidelines for sustaining biodiversity for agriculture and support their implementation	MESP, MAFWM	Short term	RB, GEF, EUF, IF, BD
5.2.2 Forestry			
Promote the conservation of forest biodiversity, including genetic diversity, through the development of a forest certification programme and best practice guidelines for ecosystem-based sustainable forestry	MAFWM	Mid-term	RB, EUF, IF
Develop forest management measures and guidelines to prevent genetically modified tree species, as well as non-native and invasive species, from negatively impacting on forest and general biodiversity	MAFWM	Mid-term	RB, EUF, IF
5.2.3 Wildlife Resources			

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Develop best management practices for the sustainable use of resources and biodiversity conservation for the hunting and fishing sectors	MESP, PSEPSD	Short-term	RB, EPF, EUF
Ensure implementation of fish stock monitoring as prescribed by law and standardize monitoring procedures in accordance with water types	MESP	Mid-term	RB, EUF
Develop risk assessment protocols for the introduction of potentially invasive fish species and other aquatic organisms	MESP, MAFWM	Mid-term	RB, EUF
Prevent GM and non-native fish from threatening fish and freshwater	MESP, MAFWM	Mid-term	RB, EPF, EUF
5.2.4 Mining			
Develop and promote best practice guidelines for sustaining biodiversity in the mining sector and support their implementation	MESP, MME	Short-term	RB, EPF, BD, GEF
5.2.5 Water Resources			
Develop and promote best practice guidelines for sustaining biodiversity in the water resources sector and support their implementation	MESP, MAFWM	Short-term	RB, EPF, BD, GEF
5.2.6 Tourism and outdoor recreation			

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Develop a national ecotourism programme	MERD	Mid-term	RB, EUF, BD
Develop and promote best practice guidelines for sustaining biodiversity in the tourism sector and support their implementation	MESP, MERD	Short-term	RB, EPF, BD, GEF
Monitor and control the impacts of tourism on biodiversity and ecosystems in protected areas	MESP, SEPA	Mid-term	RB, EUF, BD
6. Knowledge Base			
6.1 National Biodiversity Information System			
Design a comprehensive National Biodiversity Information System (NBIS) within SEPA, to include biodiversity indicators and protocol for monitoring, reporting and updating the database	SEPA	Mid-term	RB, EPF, EUF, GEF
Compile and review existing biodiversity data from collections, databases and geographic information systems in all sectors	SEPA, INC, PINC, SRI	Mid-term	RB, EPF
Populate NBIS with existing data from all sectors	SEPA	Mid-term	RB
Develop and implement a plan for addressing NBIS deficiencies	SEPA	Mid-term	RB
Inventory and map threatened and rare habitat types and ecological communities (as per Annex 1 of the Habitat Directive)	INC, PINC, SRI	Long-term	RB, EUF, GEF, IF

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Using internationally-accepted methods and standards, classify, describe and map vegetation communities throughout the Republic of Serbia, starting with PAs	INC, PINC, SRI	Long-term	RB, EUF, GEF, IF
Develop a GIS map of protected area boundaries, with vegetation community classification and other relevant geographic information (trails, buildings etc.)	INC, PINC, SRI	Long-term	RB, EPF, EUF, BD, IF, GEF
Map habitats of important flora and fauna species (ecologically and economically important species, rare, vulnerable and threatened species)	INC, PINC, SRI	Mid-term	RB, EPF, EUF, BD, IF, GEF
6.2 Biodiversity Monitoring			
Develop a biodiversity monitoring programme to monitor biodiversity status and threats at genetic, species and ecosystem levels, in coordination with all relevant sectors	MESP, SEPA	Short-term	RB, EUF, GEF
Establish a biodiversity clearinghouse mechanism with a web portal	SEPA	Short-term	RB, GEF
Establish a biosafety clearinghouse mechanism with a web portal	MAFWM	Short-term	RB, GEF
Establish plans and teams to monitor the implementation of sectoral strategies related to biodiversity	MESP	Mid-term	RB
6.3 Biodiversity Research			

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Establish criteria for determining priorities of research needs in the area of biodiversity conservation	MSTD, MESP	Short-term	RB
Initiate and support inventorization and further research of diversity of flora, fauna and fungi and publish data on other under-studied groups of organisms in the Republic of Serbia	MESP, MSTD, INC, PINC, SRI	Short-term	RB, EPF, EUF
Establish and promote mechanisms for integrating biodiversity research results into the NBIS	SEPA	Mid-term	RB, EPF
7. Capacity Building			
7.1 Technical Capacity Building			
Develop a national programme and training centre to provide training for the public and private sectors on biodiversity monitoring, assessment, management and conservation	MESP	Long-term	RB, EUF
• Institutional capacities of relevant national institutions and local authorities to review programmes and projects considering impacts on biodiversity	MESP	Short-term	RB, EUF, BD, IF
• PA management, planning and evaluation	MESP, INC, PINC, PA	Short-term	RB, GEF, BD
• Use of geographic information systems for planning, monitoring and management	MESP, INC, PINC, PA	Mid-term	RB, EPF, BD

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
• Best practice guidelines for sustaining biodiversity in the utilization of biological resources (targeted at resource use sectors)	MESP, INC, PINC	Short-term	RB, GEF, BD
• Regional scale conservation and sustainable development planning	MESP	Long-term	RB, EPF
• *Ex-situ* protection of genetic resources and genetic resource management	MAFWM	Mid-term	RB, BD
• Implementation of CITES regulations (targeted at judiciary level and customs agents)	MESP	Short-term	RB, EUF, BD
• Basic training in conservation biology principles for local, regional and national authorities	MESP	Short-term	RB, EPF, BD
Develop opportunities for exchanges among biodiversity conservation practitioners	MESP	Short-term	RB, BD
7.2 Infrastructure and Equipment			
Provide necessary equipment to public sector agencies responsible for biodiversity conservation	MESP	Mid-term	RB, EUF, BD, IF
• Surveillance, fire fighting, transportation and monitoring equipment for rangers	MESP, MAFWM, PA	Short-term	RB, EPF, GEF, IF
• Computers, GIS and GPS technologies, and internet access for PA managers	MESP, MAFWM, PA	Short-term	RB, EPF, GEF, IF

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Equip SEPA and INCs with comprehensive, up-to-date GIS systems to facilitate biodiversity conservation activities both within and beyond PAs	MESP, INC, PINC	Short-term	RB, EPF, GEF, IF
8. Education, Public Awareness and Participation			
8.1 Formal Education			
Develop an educational module on biodiversity conservation for preschool and nursery school levels	MESP, MEd, INC, PINC	Short-term	RB, EUF, BD
Integrate information about biodiversity - origins, status, value and protection - into primary and secondary school curricula	MESP, MEd, INC, PINC	Short-term	RB, EUF, BD
Develop or improve academic programmes and courses on biodiversity, agro-biodiversity and biosafety	MESP, MSTD, INC, PINC	Short-term	RB, EUF, BD
Develop programmes for training teachers and teaching associates on biodiversity	MESP, MEd, INC, PINC	Short-term	RB, EPF, EUF
8.2 Public Awareness			
Develop a communication system for biodiversity conservation	MESP	Mid-term	RB, GEF, EUF
Develop and implement a campaign to raise public awareness of biodiversity - value, threats and conservation	MESP, PSEPSD, INC, PINC	Short-term	RB, EPF, BD
Create an informative web portal on biodiversity in the Republic of Serbia	MESP, SEPA, INC, PINC	Short-term	RB, EPF, EUF, BD

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Raise business sector awareness about the importance of biodiversity	MESP	Mid-term	RB, EPF, EUF, BD
Generate public awareness of the importance of implementing the Biosafety Protocol	MAFWM	Short-term	RB, EPF, EUF, BD
Ensure training on biodiversity conservation for PA inhabitants	INC, PINC	Short-term	RB, EPF, BD
Ensure training on biodiversity conservation for hunters and fishermen, medicinal plant collectors, tourism organisations and others	INC, PINC	Short-term	RB, EPF, BD
Provide training about biodiversity for media and journalists	MESP, PSEPSD, INC, PINC	Short-term	RB, GEF, BD
Generate awareness related to the impacts of climate change on biodiversity	MESP, PSEPSD	Short-term	RB, IF, BD
8.3 Participation			
Promote the participation of local communities, residents and other stakeholders in PA planning, management and creation	MESP, INC, PINC, PA	Short-term	RB, EUF
Promote public participation in decision making processes on GMO-related issues	MAFWM	Short-term	RB, EUF, BD
Establish mechanisms of cooperation between state agencies and NGOs on biodiversity conservation	MESP, PSEPSD	Mid-term	RB, EPF

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Support NGO sector projects that pertain to the promotion of biodiversity conservation	MESP, PSEPSD, MAFWM	Short-term	RB, EPF, EUF, BD, IF
9. International Cooperation			
9.1 Coordination with other international instruments for biodiversity conservation			
Harmonize national legislation with the Convention requirements	MESP	Short-term	RB, EUF, GEF, IF
Establish national level targets for biodiversity protection according to the Strategic Plan of the Convention (Aichi targets)	MESP	Short-term	RB, BD, GEF
Align biodiversity conservation legislation with EU legislation	MESP	Short-term	RB, EUF
Align GMO legislation with the EU Protocol on Biosafety	MAFWM	Short-term	RB, EUF
Develop mechanisms to facilitate the harmonization and implementation of multilateral international agreements related to biodiversity	MESP	Mid-term	RB, GEF, EUF, IF
Prepare a plan for the nomination of PAs of international significance (Ramsar, World Heritage, MAB etc.)	MESP, INC, PINC	Short-term	RB, EUF, GEF
9.2 Regional and International Cooperation			
Establish a forum of all parties involved in biodiversity conservation at all levels and between all stakeholders	MESP	Short-term	RB, BD

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Collaborate with neighbouring countries on the exchange of information and reproduction of material for the recovery of native and cross-border species	MAFWM	Mid-term	RB, EPF
Establish and maintain cross-border cooperation with neighbouring countries on biodiversity conservation initiatives	MESP, PSEPSD, PA, INC, PINC	Short-term	RB, EUF
Exchange genetic resources with other international institutions and gene banks	MAFWM	Mid-term	RB, EUF
Promote and provide support for communication and information exchanges on biodiversity conservation at the international level	MESP	Short-term	RB, EUF, BD
10. Climate Change			
10.1 National Action on Climate Change			
Develop and implement a National Biodiversity and Climate Change Action Plan	MESP	Short-term	RB, EUF, BD, GEF
Develop climate change adaptation strategies for PAs based on the results of climate change vulnerability analysis	MESP	Short-term	RB, EPF, EUF, IF, GEF
10.2 Climate Change Research, Monitoring and Evaluation			

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
Conduct a national climate change vulnerability assessment focused on protected areas and vulnerable, rare and threatened ecosystems	MESP, INC, PINC	Mid-term	RB, EPF, EUF, IF, GEF
Identify indicators, information and equipment requirements and priorities for the long-term monitoring of climate change impacts on biodiversity	MESP, SEPA, INC, PINC	Short-term	RB, EPF, EUF, IF, GEF
Incorporate climate change impact monitoring indicators into the national biodiversity monitoring programme and NBIS	SEPA	Mid-term	RB, EUF
Conduct ongoing evaluations and refinements of adaptation strategies and actions	MESP	Continually	RB, BD
10.3 Climate Change Awareness			
Integrate climate change information into the national biodiversity web portal to facilitate learning and information exchange by resource and land managers, decision makers and the general public	MESP, INC, PINC	Short-term	RB, GEF, EUF, BD
Conduct a national campaign to increase awareness of the causes and impacts of climate change	MESP	Short-term	RB, EUF, BD, EPF
11. Implementation of the Strategy			

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Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

Activities	Responsible institution	Timeframe	Financial resources
11.1 Financing of the Strategy			
Develop a strategic financial plan to fund the implementation of this strategy that identifies a diverse range of funding sources and strategies to ensure long-term implementation, monitoring and refinements in coordination with other relevant strategies and policies	MESP, MFin	Short-term	RB
Incorporate expenditure and revenue projections resulting from the implementation of this strategy into the budgets of relevant institutions	MFin	Continually	RB
11.2 Coordination, Review and Updating of the Strategy			
Establish a multi-institutional body to oversee the implementation, monitoring, evaluation and updating of this Strategy	MESP	Short-term	RB
Develop quantitative targets and indicators for monitoring the success of this strategy	MESP	Short-term	RB
Identify lead sections and/or individuals in key institutions to coordinate the monitoring, evaluation and updating of this strategy	MESP	Short-term	RB
Conduct annual evaluations and refinements of all components of the strategy in coordination with all participating sectors and institutions	MESP	Annually	RB

MESP – Ministry of Environment and Spatial Planning, MAFWM – Ministry of Agriculture, Forestry and Water Management, MME – Ministry of Mining and Energy, MFin – Ministry of Finance, MERD – Ministry of Economy and Regional Development, MSTD – Ministry of Science and Technological Development, MEd – Ministry of Education, PSEPSD – Provincial Secretariat of Environmental Protection and Sustainable Development, EPF – Environmental Protection Fund, SEPA – Serbian Environmental Protection Agency, INC – Republic Institute for Nature Conservation, PINC – Provincial Institute for Nature Conservation, PA – Protected Areas, SRI – Scientific and Research institutions, RB – Republic Budget, EUF – EU Funds, GEF – Global Environmental Facility, BD – Bilateral donors, IF – International funds.

Short-term: 1-3 years, Mid-term: 3-5 years, Long-term: 5-7 years.

ANNEXES

ANNEX 1: LIST OF PROTECTED AREAS IN THE REPUBLIC OF SERBIA

Type of Protected Area	Name of Protected Area	Area in Ha	Date of Establishment	Manager	Type of Manager
5 National Parks					
National Park	Fruška gora	25,393	1960	PE NP Fruška gora, Sremska Kamenica	Public Enterprise (Provincial)
National Park	Đerdap	63,608	1974	PE NP Đerdap, Donji Milanovac	Public Enterprise (Republic)
National Park	Tara	19,175	1981	PE NP Tara, Bajina Bašta	Public Enterprise (Republic)
National Park	Kopaonik	11,810	1981	PE NP Kopaonik, Kopaonik	Public Enterprise (Republic)
National Park	Šar planina	39,000	1986	PE NP Šar planina, Štrpce	Public Enterprise (Republic)
16 Nature Parks					
Nature park	Golija	75,183	2001	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
Nature park	Ponjavica	134	1995	Društveno vodoprivredno preduzeće "Tamiš - Dunav", Pančevo	Public Enterprise (Municipal)
Nature park	Begečka jama	379	1999	DTD Ribarstvo a.d. Petrovaradin	Shareholder Company
Nature park	Grmija	1,168	1995	JKP Komunalac,Priština	Public Communal Enterprise (Municipal)
Nature park	Palić	713	1996	JP "Palić-Ludaš", Palić	Public Enterprise (Municipal)

Type of Protected Area	Name of Protected Area	Area in Ha	Date of Establishment	Manager	Type of Manager
Nature park	Tikvara	508	1997	JP Sportsko rekreativni centar Tikvara, Bačka Palanka	Public Enterprise (Municipal)
Nature park	Sićevačka klisura	7,746	2000	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
Nature park	Šargan-Mokra Gora	10,814	2005	DOO Park prirode Mokra Gora, Užice	Limited Liability Company
Nature park	Kamaraš	268	2005	Udruženje građana za zašt.živ.sred. i poznavanje zavičaja IRINGO, Horgoš	NGO
Nature park	Jegrička	1,145	2005	JVP Vode Vojvodine, Novi Sad	Public Water Management Company (Provincial)
Nature park	Stara Tisa kod Bisernog ostrva	392	2008	Javno preduzeće za komunalne usluge "Komunalac", Bečej	Public Communal Enterprise (Municipal)
Nature park	Stara	114,332	2009	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
Nature park	Klisura reke Mileševke	457	1976	Šumsko-industrijski kombinat ''Zlatar", Prijepolje	Cooperative
Nature park	Kompleks PTK ''Panonija"	0	1975	DP PTK ''Panonija", Duboka	Cooperative
Nature park	PD Zobnatica	30	1976	PD Zobnatica, Bačka Topola	Cooperative

Type of Protected Area	Name of Protected Area	Area in Ha	Date of Establishment	Manager	Type of Manager
Nature park	Park instituta u Sremskoj Kamenici	35	1976	Institut za grudne bolesti i tuberkulozu, Sremska Kamenica	Health Care Institution
16 Landscape of extraordinary characteristics					
Landscape of extraordinary characteristics	Klisura reke Gradac	1,269	2001	Ekološko društvo Gradac, Valjevo	NGO
Landscape of extraordinary characteristics	Dolina Pčinje	2,606	1996	SPC - Pravoslavna eparhija Vranjska, Vranje	Orthodox Church
Landscape of extraordinary characteristics	Ovčarsko-Kablarska klisura	2,250	2000	Turistička organizacija Čačak, Čačak	Tourist Organization (Municipal)
Landscape of extraordinary characteristics	Miruša	330	1998	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
Landscape of extraordinary characteristics	Lepterija-Sokograd	406	2002	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
Landscape of extraordinary characteristics	Subotička peščara	5,370	2003	JP "Palić-Ludaš", Palić	Public Enterprise (Provincial)
Landscape of extraordinary characteristics	Veliko ratno ostrvo	168	2005	JKP Zelenilo Beograd - Sektor održavanja zelenih površina, Beograd	Public Communal Enterprise (City of Belgrade)
Landscape of extraordinary characteristics	Kosmaj	3,515	2005	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)

Type of Protected Area	Name of Protected Area	Area in Ha	Date of Establishment	Manager	Type of Manager
Landscape of extraordinary characteristics	Vlasina	12,741	2006	Javno preduzeće Direkcija za građevinsko zemljište opštine Surdulica, Surdulica	Directorate for Land Planning
Landscape of extraordinary characteristics	Vršačke planine	4,408	2005	Javno preduzeće za izgradnju, razvoj i uređenje grada i područja Opštine Vršac ‘’Varoš”, Vršac	Public Enterprise (Municipal)
Landscape of extraordinary characteristics	Avala	489	2007	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
Other: Landscapes of special natural beauty		12,106			Various
72 Special Nature Reserves					
Special Nature Reserves	Carska bara	4,726	1994	Ribarsko gazdinstvo Ečka a.d. Zrenjanin	Shareholder Company
Special Nature Reserves	Obedska bara	9,820	1994	JP Vojvodinašume, Petrovaradin	Public Enterprise (Provincial)
Special Nature Reserves	Jelašnička klisura	116	1995	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
Special Nature Reserves	Gornje Podunavlje	19,648	2001	JP Vojvodinašume, Petrovaradin	Public Enterprise (Provincial)
Special Nature Reserves	Pašnjaci velike droplje	979	1997	Lovačko društvo Perjanica, Mokrin	Hunting NGO
Special Nature Reserves	Karađorđevo	2,955	1997	Vojna ustanova “Morović”, Morovic	Military Institution

Type of Protected Area	Name of Protected Area	Area in Ha	Date of Establishment	Manager	Type of Manager
Special Nature Reserves	Klisura reke Trešnjice	595	1995	Centar za prirodne resurse NATURA, Valjevo	NGO
Special Nature Reserves	Koviljsko - Petrovara-dinski rit	5,895.3	1998	JP Vojvodinašume, Petrovaradin	Public Enterprise (Provincial)
Special Nature Reserves	Slano Kopovo	976	2001	Lovačko društvo Novi Bečej	Hunting NGO
Special Nature Reserves	Deliblatska peščara	34,829	2002	JP Vojvodinašume, Petrovaradin	Public Enterprise (Provincial)
Special Nature Reserves	Venerina padina	0	2005	Ugostiteljsko turističko preduzeće Hotel Mir, Zvonačka Banja	Hotel
Special Nature Reserves	Uvac	7,543	2006	Rezervat Uvac D.O.O.	Limited Liability Company
Special Nature Reserves	Ludaško jezero	846	2006	JP "Palić-Ludaš", Palić	Public Enterprise (Municipal)
Special Nature Reserves	Selevenjske pustare	677	1997	JP "Palić-Ludaš", Palić	Public Enterprise (Municipal)
Special Nature Reserves	Zasavica	671	1997	Pokret gorana, Sremska Mitrovica	NGO
Special Nature Reserves	Kraljevac	264	2009	Udruženje sportskih ribolovaca Deliblatsko jezero, Deliblato	NGO
Special Nature Reserves	Bagremara	118	2007	JP Vojvodinašume, Petrovaradin	Public Enterprise (Provincial)

Type of Protected Area	Name of Protected Area	Area in Ha	Date of Establishment	Manager	Type of Manager
General Nature Reserve	Vinatovača	37	1995	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
General Nature Reserve	Bukovo	10	2007	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
General Nature Reserve	Danilova kosa	7	2008	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
General Nature Reserve	Prokop	6	2008	JP Srbijašume, Novi Beograd	Public Enterprise (Republic)
Other Nature Reserves		2,542			Various
68 Monuments of Nature with Specific Geological Aspects		7,659			
244 Monuments of Nature with Specific Botanic Aspects		863			
168 Historical Sites		2,489			

ANNEX 2: MAP OF PROTECTED AREAS IN THE REPUBLIC OF SERBIA

ANNEX 3: LIST OF INTERNATIONALLY IMPORTANT BIRD AREAS (IBA), INTERNATIONALLY IMPORTANT PLANT AREAS (IPA) AND SELECTED AREAS FOR BUTTERFLIES (PBA) IN THE REPUBLIC OF SERBIA

Internationally Important Bird Areas (IBA): Gornje Podunavlje, Subotička jezera and pustare, Bečejski ribnjak, Jegrička, Karađorđevo, Titelski breg, Koviljski rit, Pašnjaci velike droplje, Slano kopovo, Okanj and Rusanda, Carska bara, Gornje Potamišje, Srednje Potamišje, Vršačke planine, Deliblatska peščara, Labudovo okno, Ušće Save u Dunav, Dunavski lesni odsek, Fruška gora, Obedska bara, Bosutske šume, Zasavica, Donje Podrinje, Cer, Valjevske planine, Tara, Uvac and Mileševka, Pešter, Golija, Gornje Pomoravlje, Ovčarsko - kablarska klisura, Kopaonik, Sitnica, Prokletije, Šar planina, Pčinja, Vlasina, Suva planina, Sićevačka klisura, Stara planina, Đerdap and Mala Vrbica.

Internationally Important Plant Areas (IPA): Subotička peščara, Selevenjske pustare, Palićko jezero, Ludaško jezero, Gornje Podunavlje, Severni Banat II, Severna Bačka I, Telečka, Rimski Šanac, Koviljsko-petrovaradinski rit, Žabalj, Titelski breg, Severni Banat I, Stepe severnog Banata, Pašnjaci velike droplje, Slano kopovo, Srednji Banat I, Srednji Banat II, Carska bara, Vršačke planine, Deliblatska peščara, Ponjavica, Fruška Gora, Obedska bara, Zasavica, Tara, Mokra gora and Šargan, Zlatibor, Mučanj, Golija, Pešter, Štavalj, Kanjon Mileševke, Klisura Ibra, Đerdap, Kladovo-Radujevac, Veliki krš and stol, Klisura Lazareve reke, Brđanska klisura, Rtanj, Lalinačka slatina, Jelašnička klisura, Sićevačka klisura, Šljivovički vis, Ozren, Suva planina, Stara planina, Klisura Jerme, Rogozna, Kopaonik, Vlasinska visoravan, Grmija, Klisura Miruše sa Koznikom, Rudine, Aleksandrovačka slatina, Rujan, Dolina Pčinje, Prokletije, Paštrik, Koritnik and Šar planina.

Selected areas for butterflies (PBA): Avala, Deli Jovan, Deliblatska peščara, Dimitrovgrad, Đerdap, Golemi Vrh, Fruška Gora, Goč-Studena-Stolovi, Golija, Gornje Podunavlje, Grmija, Ibarska klisura, Klisura Jerme, Klisura Đetinje, Povlen, Kopaonik, Kosmaj, Kukavica, Lazarev kanjon, Mali Krš, Metohijske Prokletije, Zlatar, Ošljak, Paštrik, Tara, Radan, Resava, Rtanj, Rudina planina, Zlatibor, Šar planina, Sićevačka klisura, Devica, Stara Planina, Stol-Veliki Krš, Suva planina, Pešter, Besna Kobila, Maljen-Suvobor and Zasavica.

ANNEX 4: LIST OF POTENTIAL "EMERALD AREAS" IN THE REPUBLIC OF SERBIA

№	Site Code	Site Name	National Status Protection	Ramsar	MAB	IPA	IBA	PBA
1	RS0000001	GORNJE PODUNAVLJE	SRP			x	x	x
2	RS0000002	KOPAONIK	NP			x	x	x
3	RS0000003	OBEDSKA BARA	SRP	x		x	x	
4	RS0000004	PROKLETIJE	UPZ-NP			x	x	x
5	RS0000005	DELIBLATSKA PEŠČARA	SRP	x		x	x	x
6	RS0000006	VLASINA	PIO			x	x	x
7	RS0000007	FRUŠKA GORA	NP			x	x	x
8	RS0000008	ŠAR PLANINA	NP			x	x	x
9	RS0000009	TARA	NP			x	x	x
10	RS0000010	SLANO KOPOVO	SRP	x		x	x	
11	RS0000011	STARA PLANINA	PP			x	x	x
12	RS0000012	ĐERDAP	NP			x	x	x
13	RS0000013	LUDAŠKO JEZERO	SRP	x		x	x	
14	RS0000014	ZASAVICA	SRP	x		x	x	x
15	RS0000015	DOLINA PČINJE	PIO			x	x	
16	RS0000016	SUBOTIČKA PEŠČARA	PIO			x	x	
17	RS0000017	VRŠAČKE PLANINE	PIO			x	x	
18	RS0000018	ŠARGAN-MOKRA GORA	PIO				x	
19	RS0000019	SUVA PLANINA	UPZ-SRP			x	x	x

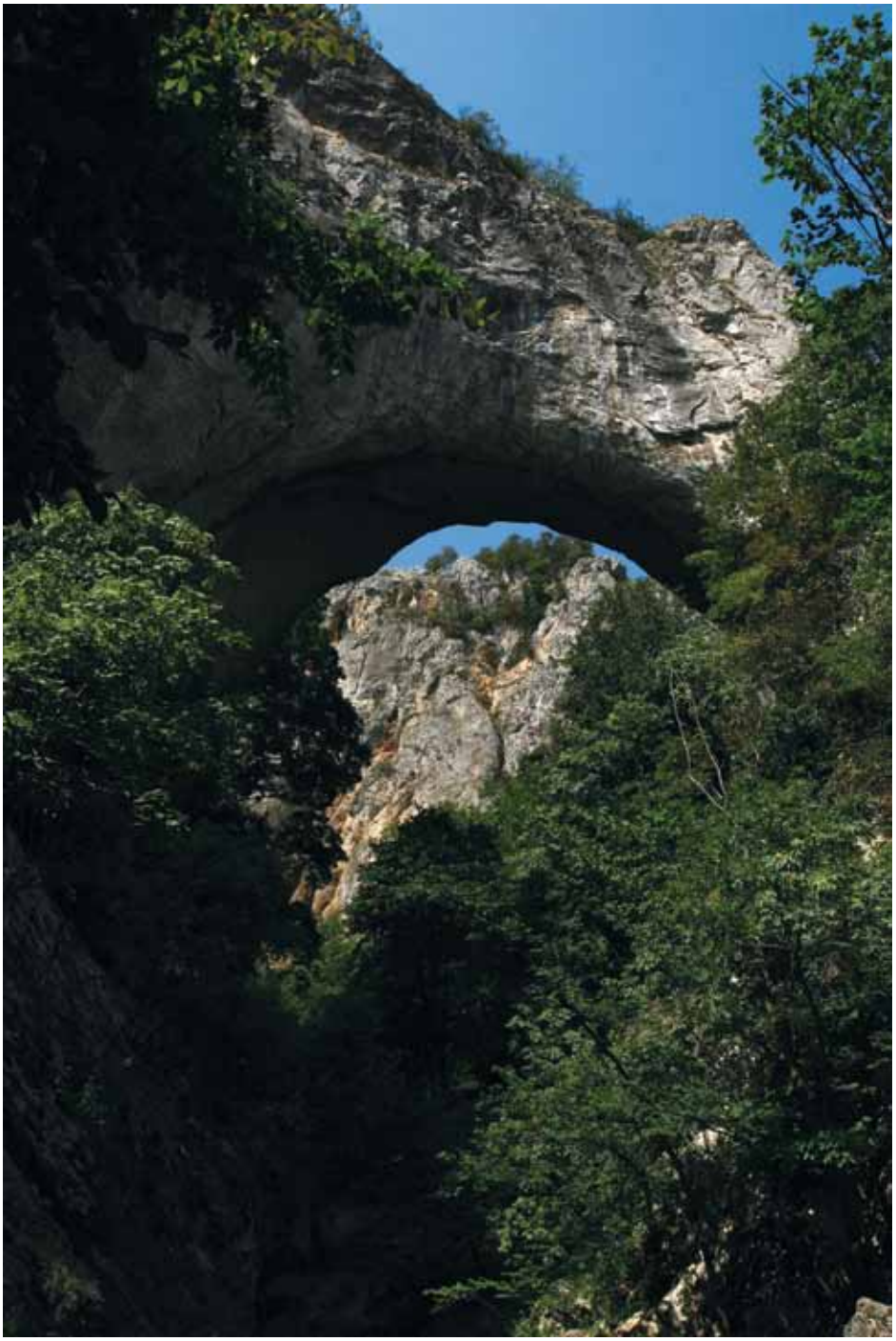
No	Site Code	Site Name	National Status Protection	Ramsar	MAB	IPA	IBA	PBA
20	RS0000020	JELAŠNIČKA KLISURA	SRP			x		
21	RS0000021	KOVILJSKO - PETROVARADINSKI RIT	SRP			x	x	
22	RS0000022	PAŠNJACI VELIKE DROPLJE	SRP			x	x	
23	RS0000023	SELEVENJSKE PUSTARE	SRP			x	x	
24	RS0000024	CARSKA BARA	SRP	x		x	x	
25	RS0000025	KLISURA REKE UVAC	SRP				x	
26	RS0000026	KLISURA REKE MILEŠEVKE	RPP-UPZ-SRP			x	x	x
27	RS0000027	RTANJ	StPR-UPZ-SRP			x		x
28	RS0000028	GRMIJA	PP			x		x
29	RS0000029	PALIĆ	PP			x	x	
30	RS0000030	GOLIJA	PP		x	x	x	x
31	RS0000031	SIĆEVAČKA KLISURA	PP			x	x	x
32	RS0000032	MIRUŠA	PIO			x		
33	RS0000033	OVČARSKO - KABLARSKA KLISURA	PIO				x	
34	RS0000034	ZLATIBOR	UPZ-PP					x
35	RS0000035	JERMA	UPZ-SRP			x		x
36	RS0000036	SUVOBOR	PI				x	x

No	Site Code	Site Name	National Status Protection	Ramsar	MAB	IPA	IBA	PBA
37	RS0000037	PEŠTER	PI	x		x	x	x
38	RS0000038	KARAĐORĐEVO	SRP				x	
39	RS0000039	KLISURA REKE TREŠNJICE	SRP				x	
40	RS0000040	VENERINA PADINA	SRP					
41	RS0000041	FELJEŠANA	StPR-UPZ-RP					
42	RS0000042	MUSTAFA	StPR					
43	RS0000043	LAZAREV KANJON	SP			x		x
44	RS0000044	PROKOP	RP					
45	RS0000045	ŠALINAČKI LUG	SP					
46	RS0000046	TESNE JARUGE	StPR-UPZ-SRP					
47	RS0000047	VINATOVAČA	ORP					
48	RS0000048	ZELENIČJE	StPR-UPZ-SRP					
49	RS0000049	ZELENIKA	StPR-UPZ-SRP					
50	RS0000050	KLISURA OSANIČKE REKE	SP					
51	RS0000051	MALA JASENOVA GLAVA	StPR-UPZ-SRP					
52	RS0000052	OZRENSKE LIVADE	PNL-UPZ-PIO					x
53	RS0000053	TIKVARA	PP					
54	RS0000054	KLISURA REKE GRADAC	PIO				x	x

No	Site Code	Site Name	National Status Protection	Ramsar	MAB	IPA	IBA	PBA
55	RS0000055	KUČAJSKE PLANINE	PI					x
56	RS0000056	PANČEVAČKE ADE	PI					
57	RS0000057	ZAOVINE	UPZ-PIO					
58	RS0000058	AVALA	PIO					x
59	RS0000059	KOSMAJ	PIO					x
60	RS0000060	RADAN	PI					x
61	RS0000061	BUSOVATA	StPR					

Key

NP - National Park, PIO - Landscape of Outstanding Features, PNL - Landscape of outstanding beauty, PP - Nature Park, RPP - Regional Nature Park, RP - Nature Reserve, ORP - General Nature Reserve, SRP - Special Nature Reserve, StPR- StPR - Strict Nature Reserve, SP - Monument of Nature, UPZ - Protection under way, PI - Preliminary research, Ramsar - Ramsar Site, MAB - Biosphere Reserve, IPA - Important Plant Area, IBA - Important Bird Area, PBA - Prime Butterfly Area



ANNEX 5: LIST OF REGULATIONS RELEVANT FOR BIODIVERSITY PROTECTION IN THE REPUBLIC OF SERBIA

- Constitution of the Republic of Serbia ("Official Gazette of the Republic of Serbia", Issue 98/06).

Laws:

- Law on Environmental Protection ("Official Gazette of the Republic of Serbia", Issues 135/04 and 36/09);
- Law on Environmental Protection Fund ("Official Gazette of the Republic of Serbia", Issue 72/09);
- Law on Nature Protection ("Official Gazette of the Republic of Serbia", Issues 36/09, 88/10 and 91/10 - amendment);
- Law on National Parks ("Official Gazette of the Republic of Serbia", Issues 39/93, 44/93, 53/93, 67/93, 48/94, 101/05 and 36/09 – the other law);
- Law on Strategic Environmental Impact Assessment ("Official Gazette of the Republic of Serbia", Issue 135/04);
- Law on Environmental Impact Assessment ("Official Gazette of the Republic of Serbia", Issues 135/04, 36/09);
- Law on the Protection and Sustainable Use of Fish Stocks ("Official Gazette of the Republic of Serbia", Issue 36/09);
- Law on Food Security ("Official Gazette of the Republic of Serbia", Issue 41/09);
- Law on Agriculture and Rural Development ("Official Gazette of the Republic of Serbia", Issue 41/09);
- Law on Animal Husbandry ("Official Gazette of the Republic of Serbia", Issue 41/09);
- Law on the Protection of Rights of Breeders of Plant Varieties ("Official Gazette of the Republic of Serbia", Issue 41/09);
- Law on Genetically Modified Organisms ("Official Gazette of the Republic of Serbia", Issue 41/09);
- Law on the Welfare of Animals ("Official Gazette of the Republic of Serbia", Issue 41/09);
- Law on Forests ("Official Gazette of the Republic of Serbia", Issue 30/10);
- Law on Game and Hunting ("Official Gazette of the RS", Issue 18/10);
- Law on Tourism ("Official Gazette of the Republic of Serbia", Issue 36/09);
- Law on the Spatial Plan of the Republic of Serbia from 2010 until 2020 ("Official Gazette of the Republic of Serbia", Issue 88/10).

Bylaws:

- Decree on Control of the Use and Trade of Wild Flora and Fauna ("Official Gazette of the Republic of Serbia", Issues 31/05, 45/05, 22/07, 38/08, 9/10);
- Decree on the Ecological Network ("Official Gazette of the Republic of Serbia", Issue 102/10);
- Regulation on Contents and Operational Methods of the Protected Areas' Register ("Official Gazette of the Republic of Serbia", Issue 81/10);
- Regulation on the Appearance (look) of the Nature Protection Logo and Procedure and Conditions for its Use ("Official Gazette of the Republic of Serbia", Issue 84/09);
- Regulation on Protected Area Rangers' Identity Cards ("Official Gazette of the Republic of Serbia", Issue 84/09);
- Regulation on Conditions to be Fulfilled by Protected Area Managers ("Official Gazette of the Republic of Serbia", Issue 85/09);
- Regulation on Cross-border Traffic and Trade of Protected Species ("Official Gazette of the Republic of Serbia", Issue 99/09);
- Regulation on Proclamation and Protection of Strictly Protected and Protected Species of Wild Plants, Animals and Fungi ("Official Gazette of the Republic of Serbia", Issue 5/10);
- Regulation on Distinguishing Criteria of Habitat Types, Habitat Types, Sensitive, Threatened, Rare and Priority Habitats for Protection, as well as Protection Measures for the Conservation of Habitat Types ("Official Gazette of the Republic of Serbia", Issue 35/10);
- Regulation on Compensation Tariffs for Determining Compensation Levels for Damage Caused through an Unauthorized Act in Relation to Strictly Protected and

Protected Wild Species ("Official Gazette of the Republic of Serbia", Issue 37/10);

- Regulation on Methods, Tools and Resources for Commercial Fishing, as well as Methods, Tools and Resources for Recreational Fishing ("Official Gazette of the Republic of Serbia", Issue 73/10);
- Regulation on License Form Content for Recreational Fishing ("Official Gazette of the Republic of Serbia", Issue 73/10);
- Regulation on Methods of Marking Fishing Ground Boundaries ("Official Gazette of the Republic of Serbia", Issue 79/09);
- Regulation on License Form Content for Commercial Fishing ("Official Gazette of the Republic of Serbia", Issue 82/09);
- Regulation on Legitimisation Form for Fishing Ground Guards ("Official Gazette of the Republic of Serbia", Issue 82/09);
- Regulation on the Method of Determining Costs and their Amount for Damage Caused to Fish Stock ("Official Gazette of the Republic of Serbia", Issue 84/09);
- Ordinance for Measures of Conservation and Protection of Fish Stocks ("Official Gazette of the Republic of Serbia", Issues 104/09 and 49/10);
- Regulation on Conditions and Procedures for Issuing and Confiscating Licenses and Methods of Maintaining Accounts of the Register of Issued Licenses ("Official Gazette of the Republic of Serbia", Issue 07/10);
- Regulation on Conditions, Programme and Methods for Fishing Guard Examinations and Professional Examinations for Fishermen ("Official Gazette of the Republic of Serbia", Issue 07/10);
- Regulation on Conditions and Procedures for Issuing and Confiscating Fishing Guard Licenses ("Official Gazette of the Republic of Serbia", Issue 07/10);
- Regulation on Categorisation of Fishing Waters ("Official Gazette of the Republic of Serbia", Issue 13/10);
- Regulation on Conditions and Methods for OrganisAing Fishing Guards, Legitimisation Form for Fishing Guards and Appearance (look) of the Fishing Guards Badge ("Official Gazette of the Republic of Serbia", Issue 07/10);
- Decree on Determination of the Programme for the Development and Improvement of Animal Husbandry in the Republic of Serbia from 2008 until 2012 ("Official Gazette of the Republic of Serbia", Issue 99/2007);
- Regulation on the List of Domestic Animal Genetic Reserves, Methods of Conservation of Domestic Animal Genetic Resources and the List of Indigenous Breeds of Domestic Animals and Endangered Indigenous Breeds ("Official Gazette of the Republic of Serbia", Issue 38/10);
- Regulation on Breeding and Trade Conditions of Autochthonic Breeds of Domestic Animals, as well as Contents and Ways of Conducting the Register of Autochthonic Breeds of Domestic Animals ("Official Gazette of the Republic of Serbia", Issue 56/10);
- Regulation on Limited Use of Genetically Modified Organisms ("Official Gazette of the Federal Republic of Yugoslavia", Issue 62/02);
- Regulation on Contents and Data of the Register of Genetically Modified Organisms and Products of Genetically Modified Organisms ("Official Gazette of the Federal Republic of Yugoslavia", Issue 66/02);
- Regulation on the Trading of Genetically Modified Organisms and Products of Genetically Modified Organisms ("Official Gazette of the Federal Republic of Yugoslavia", Issue 62/02);
- Regulation on Entering into the Production of Genetically Modified Organisms and Products of Genetically Modified Organisms ("Official Gazette of the Federal Republic of Yugoslavia", Issue 62/02 and ("Official Gazette of the Republic of Serbia", Issue 29/09).

ANNEX 6: LIST OF INTERNATIONAL TREATIES AND CONVENTIONS

Year	Global agreements	Year of signing	Status
1949	(GENEVA) Convention on Road Traffic		
1951	International Plant Convention	1955	R
1954	International Convention for the Prevention of Pollution of the Sea by Oil	1973	R
1957	(BRUSSELS) International Convention on Limitation of Liability of Owners of Sea-going Ships		
1958	(GENEVA) Convention on Fishing and Conservation of Living Resources of the High Seas	1966	R
1958	Convention on the Continental Shelf	1966	R
1958	Convention on the Territorial Sea and the Contiguous Zone	1958	R
1958	Convention on the High Seas	1965	R
1960	International Convention for the Safety of Life at Sea	1964	R
1960	(GENEVA) Convention concerning the Protection of Workers against Ionising Radiations		
1963	(VIENNA) Convention on Civil Liability for Nuclear Damage	1977	R
1997	(VIENNA) Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage		
1963	(MOSCOW) Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water	1964	R
1969	(BRUSSELS) Convention on Civil Liability for Oil Pollution Damage	1976	R
1976	(LONDON) Protocol		
1969	BRUSSELS) Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties	1976	R
1971	(RAMSAR) Convention on Wetlands of International Importance Especially as Waterfowl Habitat 1977	2001	Su R
1982	(PARIS) Amendment		

Year	Global agreements	Year of signing	Status
1987	(REGINA) Amendments		
1971	(GENEVA) Convention on Protection against Hazards from Benzene (ILO 136)	1975	R
1971	(BRUSSELS) Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	1978	R
1971	(LONDON, MOSCOW, WASHINGTON) Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-bed and the Ocean Floor and in the Subsoil thereof	1973	R
1972	(PARIS) Convention on the Protection of the World Cultural and Natural Heritage	2001 su	R
1972	(LONDON) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1978 Amendments (incineration) 1980 Amendments (list of substances)	1976	R
1972	Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, and their Destruction	1973	R
1972	International Convention on the International Regulations for Preventing Collision at Sea	1975	R
1972	(GENEVA) International Convention for Safe Containers		
1973	(WASHINGTON) Convention on International Trade in Endangered Species of Wild Fauna and Flora 1983 (GABORONE) Amendment	2002	R
1973	(LONDON) Convention for the Prevention of Pollution from Ships (MARPOL) 1978 (LONDON) Protocol (segregated ballast) 1978 (LONDON) Annex III on Hazardous Substances carried in packaged form 1978 (LONDON) Annex IV on Sewage 1978 (LONDON) Annex V on Garbage	 1980 1983	 R R
1977	(GENEVA) Convention on Protection of Workers against Occupational Hazards from Air Pollution, Noise and Vibration (ILO 148)	1983	R

Year	Global agreements	Year of signing	Status
1979	(BONN) Convention on the Conservation of Migratory Species of Wild Animals1991 (LONDON) Agreement Conservation of Bats in Europe 1992 (NEW YORK) Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) 1995 (THE HAGUE) African/Eurasian Migratory Waterbird Agreement (AEWA) 1996 (MONACO) Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)	2007	R
1979	(BERN) Convention on the Conservation of European Wildlife and Natural Habitats	2007	R
1980	Convention on the Physical Protection of Nuclear Material	1986	R
1981	Convention Concerning Occupational Safety and Health and the Working Environment	1987	R
1982	(MONTEGO BAY) Convention on the Law of the Sea 1994 (NEW YORK) Agreement Related to the Implementation of Part XI of the Convention 1994 (NEW YORK) Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks	2001 Su	R
1985	Convention Concerning Occupational Health Services (VIENNA) Convention for the Protection of the Ozone Layer 1987 (MONTREAL) Protocol on Substances that Deplete the Ozone 1990 (LONDON) Amendment to Protocol 1992 (COPENHAGEN) Amendment to Protocol 1997 (MONTREAL) Amendment to Protocol 1999 (BEIJING) Amendment to Protocol	1990 1992 Su 1992 Su	R R R
1986	Convention Concerning Safety in the Use of Asbestos (VIENNA) Convention on Early Notification of a Nuclear Accident (VIENNA) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1989 1989 1991	R R R
1989	(BASEL) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1995 Ban Amendment 1999 (BASEL) Protocol on Liability and Compensation	2000 2002	R
1990	(LONDON) Convention on Oil Pollution Preparedness, Response and Cooperation		
1992	(RIO) Convention on Biological Diversity 2000 (CARTAGENA) Protocol on Biosafety	2002 2006	R Ac

Year	Global agreements	Year of signing	Status
1992	(NEW YORK) Framework Convention on Climate Change 1997 (KYOTO) Protocol	2001 Su 2008	R
1992	(HELSINKI) Convention on the Protection and Use of Transboundary Waters and International Lakes 1999 (LONDON) Protocol on Water and Health	2010	R
1993	Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction	2000	R
1994	(VIENNA) Convention on Nuclear Safety		
1994	(PARIS) Convention to Combat Desertification	2008	
1997	(VIENNA) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management		
1997	(VIENNA) Convention on Supplementary Compensation for Nuclear Damage		
1998	(ROTTERDAM) Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade		
2001	(STOCKHOLM) Convention on Persistent Organic Pollutants	2002	Si

Year	Regional and sub-regional agreements	Year of signing	Status
1980	Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources	1990	R
1982	Protocol Concerning Mediterranean Specially Protected Areas	1985	R
1986	Agreement for the Environmental Protection from Pollution of the Tisza River and Tributaries	1990	R
1991	(ESPOO) Convention on Environmental Impact Assessment in a Transboundary Context 2003 (KIEV) Protocol on Strategic Environmental Assessment	2008 2003	 Si
1992	(HELSINKI) Convention on the Transboundary Effects of Industrial Accidents		
1992	(HELSINKI) Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992		
1992	(PARIS) Convention for the Protection of the Marine Environment of the North-East Atlantic		
1993	(OSLO and LUGANO) Convention - Civil Liability for Damage from Activities Dangerous for the Environment		
1994	(LISBON) Energy Charter Treaty 1994 (LISBON) Protocol on Energy Efficiency and Related Aspects		
1998	2003 (KIEV) Protocol on Pollutant Release and Transfer Register		
1999	Agreement for the Establishment of a General Fisheries Council for the Mediterranean		
2000	(FLORENCE) Convention on European Landscape	2007	Si

Ac - Accession; Ad - Adherence; De - denounced; Si - Signed; Su - Succession; Ra - Ratified.

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