



CRNA GORA

MINISTRY OF SUSTAINABLE DEVELOPMENT
AND TOURISM

NATIONAL BIODIVERSITY STRATEGY
WITH THE ACTION PLAN FOR THE PERIOD 2016 - 2020

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PREFACE:

The **Convention on Biological Diversity** represents the basic international legal instrument for the protection of global biodiversity accepted by 194 countries. The Convention includes three binding objectives: 1. conservation of biological diversity, 2. sustainable use of its components and 3. fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

The Convention requires from "Contracting Parties" to implement various activities aimed at implementation of adopted objectives (including implementation of decisions made at regular conferences of Contracting Parties). One of important mechanisms for the implementation of the Convention is the obligation of Contracting Parties to "... *develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity ...*" (Article 6)

After regaining its independence, Montenegro ratified by succession the Convention on Biodiversity on 3 June 2006 and, at the same time, ratified the Cartagena Protocol on Biosafety). In 2016, Montenegro should become a signatory to the Protocol on Access to Genetic Resources and Fair and Equitable Sharing of Benefits Arising from their Utilization (Nagoya Protocol).

The **Environment Act** (Official Gazette of Montenegro 51/08, 21/09, 40/11, 62/13, 06/14), which is the main law governing the protection and conservation of the environment, including, *inter alia*, the conservation and improvement of biological diversity and limiting and preventing adverse impacts on biological diversity, envisages **also the obligation to develop the Biodiversity Strategy with the Action Plan** as one of the basic documents for the nature protection.

Since 2010, when the first National Biodiversity Strategy with the Action Plan for the period 2011-2015 was adopted, new mechanisms, measures and binding decisions which should stop the loss of biodiversity have been adopted at international level.

At the same time, the existing pressures on biodiversity at national levels not eliminated entirely in the past period call for the review of the first National Biodiversity Strategy for the period 2010-2015, in particular the corresponding Action Plan. Finally, the Nature Protection Act envisages that the National Biodiversity Strategy should be reviewed every five years.

Finally, the document is aimed at reaffirming the strategic orientation of Montenegro in the field of conservation and sustainable use of biodiversity. In addition to the policy at national level, this document will align local biodiversity actions plans, which local self-governments are obliged to adopt under the law.

TABLE OF CONTENTS:

I INTRODUCTION	7
1. BIODIVERSITY	7
1.1 What is biodiversity	7
1.2 Importance of biodiversity for the society	8
1.3 Economic evaluation of the value of biodiversity and ecosystem services in Montenegro	11
1.4 Vulnerability of biodiversity	12
2. INTERNATIONAL FRAMEWORK FOR BIODIVERSITY PROTECTION	15
2.1 Global Convention on Biological Diversity (CBD) and Aichii Targets	15
2.2 EU biodiversity policy	17
3. NATIONAL FRAMEWORK FOR BIODIVERSITY PROTECTION	18
3.1 Legal framework	18
3.2 Strategic directions in biodiversity conservation	19
4. REVISION OF THE STRATEGY	21
4.1 Reasons for reviewing the Strategy	21
4.2 Methodological approach	22
II STATUS OF BIODIVERSITY	24
1. BRIEF OVERVIEW OF BIODIVERSITY OF MONTENEGRO	24
1.1 Ecosystem diversity	25
1.2 Diversity of species	30
1.3 Genetic diversity	34
Agricultural biodiversity of animals	35
2. BIODIVERSITY PROTECTION SYSTEM	36
2.1 Protection of ecosystems, species and genes	36
2.2 Implementation of NBSAP (2010-2014)	43
2.3 Identified problems in the system of protection	47
2.4 Direct factors endangering biodiversity in Montenegro	47
2.5 Indirect drivers of factors endangering biodiversity	51
III STRATEGIC DIRECTIONS	54
1. VISION AND STRATEGIC TARGETS	54
The vision for Montenegro until 2050:	54
STRATEGIC TARGET A: UNTIL 2020, BIODIVERSITY PROTECTION IS IN PRACTICE ("de facto")	
ONE OF THE SEVERAL MOST IMPORTANT SOCIAL AND POLITICAL PRIORITIES IN THE	
OVERALL DEVELOPMENT	57

STRATEGIC TARGET B: BIODIVERSITY IS PROTECTED BY ALL STAKEHOLDERS AND BY MULTISECTOR APPROACH	59
STRATEGIC TARGET C: AN EFFICIENT MECHANISMS FOR FINANCING OF BIODIVERSITY PROTECTION ACHIEVED, AS WELL AS A SWITCH TO SUSTAINABLE BIODIVERSITY ECONOMY (as a part of green economy) UNTIL 2020	61
STRATEGIC TARGET D: SIGNIFICANT REDUCTION OF IDENTIFIED DIRECT PRESSURES ON BIODIVERSITY UNTIL 2020 REGISTERED	64
STRATEGIC TARGET E: UNTIL 2020 PRECONDITIONS CREATED AND TARGETED MEASURES FOR BIODIVERSITY PROTECTION IMPLEMENTED	67
STRATEGIC TARGET F: ENVIRONMENTAL INFRASTRUCTURE AS THE BASIS FOR CONSERVATION OF NATIONAL BIODIVERSITY CREATED UNTIL 2020	68
STRATEGIC TARGET G: KNOWLEDGE OF BIODIVERSITY IMPROVED, SYSTEMATIZED AND WIDELY AND EQUALLY AVAILABLE THROUGH DEVELOPED MECHANISMS	70
BIODIVERSITY STRATEGY ACTION PLAN 2016-2020	72
LITERATURE:	79

LIST OF BOXES:

- Box 1: Definition of biodiversity
- Box 2: Andrena Morio Brulle approaches the Ophrys flower
- Box 3: Basic value of biodiversity and ecosystem services
- Box 4: Excerpt from BDO, 2006
- Box 5: Decision X/2, 10th Conference of the Contracting Parties to the Conference on Biological Diversity (2010)
- Box 6: Skadar oak (*Quercus robur scutariensis*)
- Box 7: Rare species of the Boka Bay
- Box 8: Biodiversity of the Moraca Canyon
- Box 9: Comparison of the total number of species of vascular flora of some European countries relative to their size
- Box 10: "Living fossil" *Congerius kusceri* in the Montenegrin underground
- Box 11: Fauna of mammals in Montenegro
- Box 12: Definition of agricultural biodiversity
- Box 13: Extinction of domestic varieties and breeds
- Box 14: Montenegrin beaches - monuments of nature
- Box 15: Areas of Montenegro of importance for the protection under international agreements/programmes
- Box 16: Overview of Emerald network in Montenegro
- Box 17: Overview of the existing network of protected areas, 2014
- Box 18: Overview of planned network of protected areas (according to SPMNE) by 2020
- Box 19: Coastal ecosystems are some of the most vulnerable in Montenegro
- Box 20: Financing of monitoring of biodiversity
- Box 21: Economic return of funds invested in protected areas in Montenegro is significant
- Box 22: Economic potential of protected areas in Montenegro is large and untapped
- Box 23: What is green economy?
- Box 24: Example of establishment of PES in France

LIST OF FIGURES:

- Figure 1: Global Living Planet Index: Source: WWF Living Planet Report 2012
- Figure 2: Assessment of the overall progress in implementing the NSBAP 2010-2014 measures
- Figure 3: Assessment of the overall progress in implementing the NSBAP 2010-2014 measures against set operational goals

LIST OF TABLES:

- Table 1: International classification of ecosystem services
- Table 2: a) basic value of biodiversity and ecosystem services for 2011 and b) percentage share of various categories of ecosystem services in the basic value
- Table 3: Area and percentage of protected areas at national and international level
- Table 4: Number of protected species by taxa

LIST OF ABBREVIATIONS:

CBD	Convention on Biological Diversity
CHM	Mechanism for the exchange of information of the Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EU	European Union
GEF	Global Environment Facility
IBA	Important Bird and Biodiversity Area
IPA	Important Plant Area
LSGU	Local self-government units
KAP	Aluminium Plant Podgorica
LBDAP	Local Biodiversity Action Plan
MDG	Millennium Development Goals
N2000	Natura 2000: Network of protected sites of the European Union
NBSAP	National Biodiversity Strategy with Action Plan
NSDS	National Sustainable Development Strategy
NGO	Non-governmental organisations
PES	Payment for ecosystem services
SPMNE	Spatial Plan of Montenegro
SPSPGZMNE	Special Purpose Spatial Plan for the Coastal Zone of Montenegro
RAC SPA	Regional Activity Centre for Specially Protected Areas of the Barcelona Convention
SDG	Sustainable Development Goals
SEA	Strategic Environmental Assessment
UNDP	United Nations Development Programme
UNESCO	United Nations Organization for Education, Science and Culture
UNFCCC	United Nations Framework Convention on Climate Change
WFD	EU Water Framework Directive
UNWWTD	EU Urban Waste Water Treatment Directive

I INTRODUCTION

In addition to the irreplaceable role that biodiversity has in the survival of life on Earth, it also provides numerous important services for people (ecosystem services). In 2011 in Montenegro, these services were estimated to be more than twice the overall value of the Montenegrin production in agriculture, forestry and fishery in the same year. Still, this important resource is critically endangered by human actions which is closely related to the illusion that these services are free and inexhaustible. For this reason, serious and synchronized actions are taken by the international community within which every responsible nation is trying to stop the loss of biodiversity at national level thus contributing to global efforts towards stopping the loss of biodiversity.

1. BIODIVERSITY

1.1 What is biodiversity

Biodiversity is an irreplaceable resource which supports our life on Earth¹. The diversity of the living world (biological diversity, biological variety or **biodiversity**) allows all living creatures (including human population) to adapt to inevitable changes, as well as the more efficient use of resources available to them. The entire life on Earth, in all of its diversity and inter-connections, represents a global biodiversity.

Biodiversity is not an abstract phenomenon of interest only to a narrow circle of people. Biodiversity describes a complex system of all living organisms, and disappearance of only single species may sometimes cause many serious changes to it². All living beings (including, of course, modern humans) are permanently inter-connected, connected with resources and each has a specific role in the system. Therefore, it is unreasonable to believe that biodiversity can continue to be endangered (by humans) without any (or at least substantial) consequences for the well-being of modern humans.

Biodiversity, as well as other complex values, must be considered in its entirety. Biodiversity is consisted of: diversity of species (species diversity, for example: various species of birds, microorganisms, fish, etc.), site diversity (ecosystem

Box 1: Definition of biodiversity

Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and ecological complexes, as well as the diversity within species, between species and of ecosystems.

#Article 2 of the Convention on Biological Diversity and Article 6 of the Nature Protection Act (51/08, 21/09, 40/11, 62/13, 06/14)

¹ Anthropogenic approach to biodiversity is used, which is inevitable given the nature and purpose of the document, without neglecting the essential role of biodiversity for the overall life on Earth.

² For example: disappearance of habitats of wild fig may cause the disappearance of fig wasp, the only natural pollinator of "domestic" popular fig variety (Petrovaca), which affects the drop in yield and economic well-being of growers. Pollination services by insects in the EU has the estimated economic value of 15 billion EUR/year.

diversity, for example: swamps, rocky land, bays, etc.) and diversity of genes (gene diversity) (see: Box 1).

Examples of diversity of the living world, often breathtaking (see: Box 2), are all around us and create a network for our survival on Earth. This diversity provides us with many essential services (production of food, medicines, clean air, drinking water and many more) which we often take as guaranteed, free and inexhaustible.

The focus of the Government and the public on the matters of biodiversity protection (as a part of the environment) is relatively new (since the '90s of the 20th century) and it matches the publication of many scientific evidence on its vulnerability. It has been established for the first time that human irreversible negative effects seriously degrade one of the basics of life on Earth.

More about the values of biodiversity for the society, its vulnerability and the efforts made to stop the loss of biodiversity is given in the following chapters.

Box 2: *Andrena morio* Brulle approaches the *Ophrys* flower



Ophrys flowers evolved in a very specific manner so their appearance and scent imitate perfectly females of a bee species. When male individuals attempt to "mate", a special mechanism ensures transmission of pollen.

#Species of *Orchys* genus are protected by the law in Montenegro (Official Gazette of the Republic of Montenegro 76/06)

1.2 Importance of biodiversity for the society

As already indicated, biodiversity provides many irreplaceable services to the society. Save for direct benefits, biodiversity also provides us with many indirect benefits which are closely linked with the well-being of humans. Therefore, preventing the loss of biodiversity has been identified as an important target for achieving sustainable development goals (SDG) (goal 15).

The biodiversity services can be classified into three categories (Table 1):

Provisioning services or direct provision of goods contributing to the well-being of humans, which often have a clearly expressed monetary value such as, for example: timber, edible plants, fungi and animals, etc.

As for Montenegro, the following provisioning services are important:

Food production in Montenegro represents an important economic activity. The larger part of livestock breeding depends on biomass produced by natural ecosystems (pastures), while

some wild species of plants and animals are hunted and collected from natural habitats for direct consumption or sale and processing to generate economic benefit. This primarily includes many species of fish, crawfish, molluscs and other organisms in freshwater and marine ecosystems, then wild fruits (blueberries and other forest fruits, chestnuts, wild pomegranate) and various species of fungi. In addition, many species of medicinal and aromatic herbs used for food are important, both in traditional medicine or as raw material for pharmaceutical industry. A particular importance in food production is attributed to agricultural biodiversity, i.e. to genetic resources of autochthonous plant varieties and animal breeds which are traditionally used for food, which constitute the basis for organic and traditional agriculture. These resources and their conservation are particularly important in the context of climate change, because autochthonous genotypes will be better adapted to the expected climate change.

Source of energy - forests constitute one of the most important natural resources of Montenegro. In addition to numerous general-purpose functions of forests (CO₂ absorption, regulation of water sources, prevention of erosion, absorption of particles and dust from the air, wind-protection function, recreational function, radiation protection, aesthetic function, educational and health function), their role as a habitat for particular animal and plant species is important. Also, forests have a very important function as a source of energy for heating or direct use of wood for heating of households, or generation of thermal or electrical energy, and account for 4.5% of gross domestic consumption of energy and fuel (data for 2010).

Timber - In addition to utilization for industrial purposes, forest resources are also used for heating. Other biological raw materials, such as reed, corn stover, etc.

Biodiversity contributes substantially to the quality and quantity of water resources. Particular ecosystems, such as wetland sites along the northern coast of the Skadar Lake or along river banks perform filtration thus preventing various forms of contamination from reaching water ecosystems. Along with wetland ecosystems, forest ecosystems in catchment area also perform this function, and they also influence feeding of underground freshwater aquifers thus contributing its accessibility for utilization by humans.

Regulation and support services do not contribute to direct material benefits, but are the key to functioning of ecosystems and, thus, indirectly responsible for all natural services that we receive. They include a wide range of vital functions of ecosystems which rarely have monetary value on the commercial market (climate regulation, carbon storage, control

of precipitation on micro locations, water purification, stabilization of landslides, creating fertile land, etc.).

In Montenegro, forests, wetlands and marine ecosystems provide carbon storage services and thus contribute to the mitigation of climate change. The Skadar Lake, for example, is one of the largest peat bogs in Europe and, as such, represents carbon storage which should be maintained in the long run (Schneider-Jacoby et al., 2010).

Except that some species are used directly for food, the importance of biodiversity in the context of food production is also reflected in the provision of particular services such as pollination of both cultivated and wild plant species, various species of insects and other animals, then primary production in grassy ecosystems (pastures) which allows for engaging in and developing cattle breeding, and providing functionalities of land as an agricultural resource, through the presence of diverse biological communities, primarily microorganisms which enter mutualistic relationships with cultivated cultures.

The presence of preserved ecosystems, particularly forest, prevents land erosion, while swamp ecosystems influence flood prevention.

Cultural services do not contribute direct material gain, but contribute to broader needs and desires of the society and thus the willingness of the society to pay for biodiversity protection. These services are the general need of humans and include spiritual values such as: beauty of the landscape, appearance of the coast which attracts tourists, etc.

The mosaic of preserved ecosystems and the presence of particular species in Montenegro provides aesthetic and cultural values which, as such, constitute the basis for the development of recreational activities. Marine and coastal ecosystems, then preserved mountain and water ecosystems, with the diversity of species populating them, create the basis for tourism which is one of the main economic sectors in Montenegro.

Table 1: International classification of ecosystem services

Services		
Area	Class	Group
Provisioning	Food	Embryophyta and feed
		Hydrophytes and feed
		Marine plants and feed
		Drinking water
	Materials	Biotic materials
		Abiotic materials
	Energy	Renewable biofuels
Renewable abiotic energy sources		
Regulation and support	Waste regulation	Bio-remediation
		Dilution and storage
	Flow regulation	Air flow regulation
		Water flow regulation
		Mass flow regulation
	Abiotic environment regulation	Atmosphere regulation
		Water quality regulation
		Pedogenesis and soil quality regulation
	Biotic environment regulation	Maintaining life cycle and protection of habitats
		Pest and disease control
		Gene pool protection
Culture	Symbolic	Aesthetic, heritage
		Religious and spiritual
	Intellectual and experimental	Recreational and community activities
		Information and knowledge

Source: *The Common International Classification of Ecosystem Services (CICES) Classification (V3, 2011), modified*

Although it provides very important services to the society, biodiversity has distinct characteristics of a public resource (non-rivalrous and non-excludable). For this reason, market economy cannot, on its own, achieve optimum biodiversity measure. To regulate this field efficiently, the country must have information about the status of biodiversity, valuing of changes to biodiversity and the implication of these two parameters on policy making.

1.3 Economic evaluation of the value of biodiversity and ecosystem services in Montenegro

A systematic evaluation of economic values of biodiversity and the services it provides has never been performed for Montenegro. Sporadically, some targeted surveys of estimation of monetary value of ecosystems and services have been conducted in recent years for the River Tara (Mrdak, 2005) and protected areas (Emerton, 2011). However, until now, the most comprehensive attempt of national evaluation of biodiversity and ecosystem services has been provided in the 2013 Report (Emerton, 2013). The main value of particular components of biodiversity and related ecosystem services in the Montenegrin

Box 3: *Main value of biodiversity and ecosystem services*

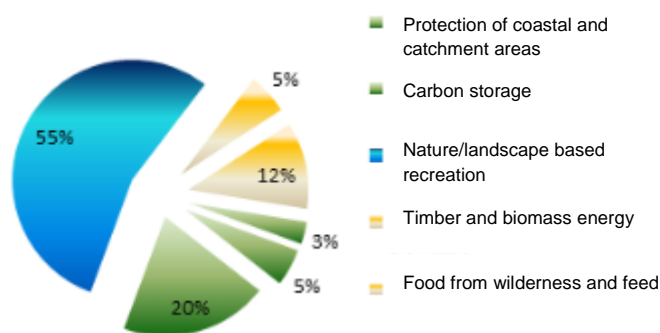
*The main value of biodiversity and ecosystem services in Montenegro for 2011 is estimated at **982 million EUR.***

economy in 2011 was estimated at 982 million EUR.³

Provisioning services (food from the wilderness and feed, wood biomass and energy) contribute around 169 million EUR or 17%, maintenance and regulation services (land fertility on farms, pollination, protection of the coast and catchment areas and carbon storage) 276 million EUR or 28% and cultural services (landscape and nature based recreation) 537 million EUR or 55%.

Table 2: a) the main value of biodiversity and ecosystem services for 2011 and b) percentage share of various categories of ecosystem services in the main value (modified Emerton, L. 2013)

Ecosystem services	Main value (in mil. EUR)
Food from wilderness and feed	114.42
Timber and biomass energy	54.39
Pollination and spreading of seeds	28.69
Maintenance of agricultural land and its fertility	0.41
Protection of catchment areas	47.81
Protection of coastal zone	1.34
Carbon storage	197.5
Nature/landscape based recreation	537.28
TOTAL	981.83



The registered gross value of production of the overall Montenegrin economy in 2011 amounted to 5.24 billion EUR (MONSTAT 2012a), and the calculated gross value of ecosystem services which allowed evaluation (for 2011) accounts for almost one fifth of this value. Ecosystem services are worth $2\frac{1}{4}$ times more than the total registered gross value of production from agricultural, forestry and fishery sectors (425 million EUR) in the same year (Emerton, 2013).

1.4 Vulnerability of biodiversity

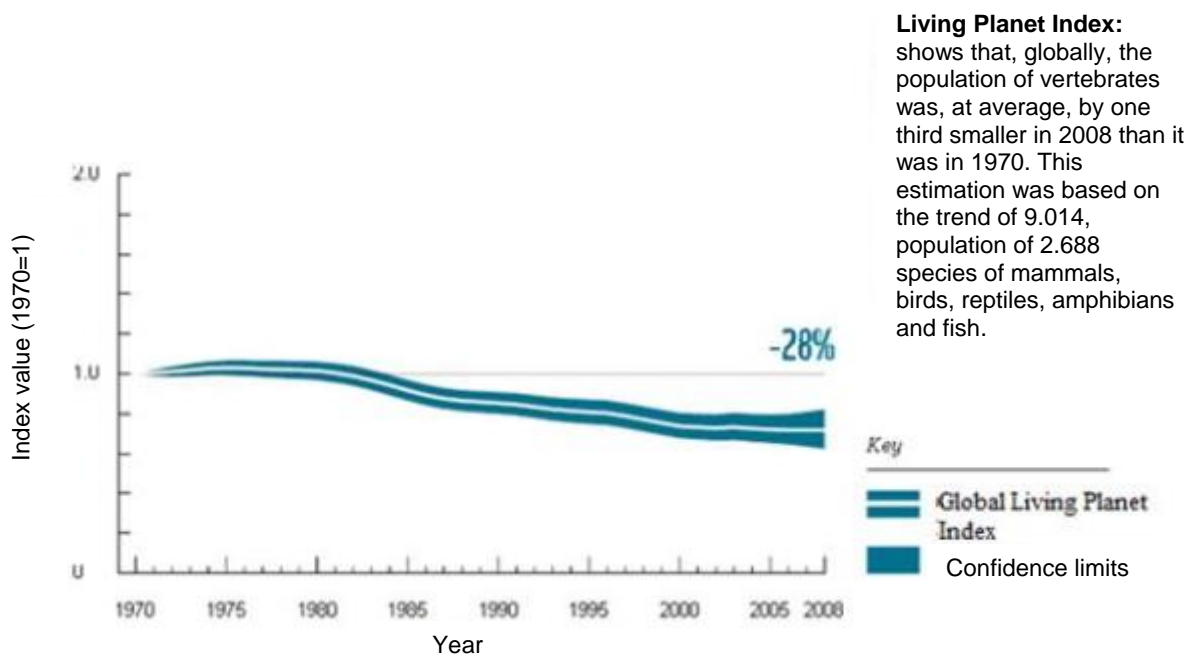
The life was created around 4 billion years ago, and more complex forms of life (as we know them today) around 530 million years ago (Cambrian period). Our kind, *Homo sapiens*, exists for only 0.2 million years using disproportionate amount of resources, which is one of the main reasons for the loss of biodiversity.

³ The author of the Study states that it is the first rough and preliminary economic evaluation which should have illustrative value. However, it can be said that it is "conservative" in nature and that the main value of ecosystem services in Montenegro can be substantially higher.

This situation has led many scientists to claim that we are near the top of the sixth wave of great extinction in the history of Earth (Edward O. Wilson, 1992; Lord Robert May, 2001). This time, the reasons of extinction are not external, but the human behaviour, i.e. the fact that we consume somewhere between $\frac{1}{4}$ and $\frac{1}{2}$ of all plants grown during one year (Lord Robert May, 2001). This is caused by the growing needs of people for food, energy and infrastructure.

Information about biodiversity are incomplete. Many groups of organisms have not been explored thoroughly, and many have not been discovered yet. However, based on the comparison of information about the loss of biodiversity in the near past and historical (fossil) indicators, it can be claimed that organisms are extinct 100-1000 times faster than normally. In the long-term, 50% of all species could disappear in the next 70-7000 years (Smith et al., 1995; May, 1988). Unfortunately, there are numerous indicators that confirm these scientific claims. Globally, regardless of the growing protection efforts, biodiversity continues to drop. The loss of biodiversity has been registered through all indicators, mostly because pressures on biodiversity continue to grow. There are no indication of a substantial drop of the rate of the loss of biodiversity, nor a substantial decrease of pressures causing it (GBO 3). The Global Living Planet Index, as an indicator of the status of global diversity, also shows the alarmingly negative trend (Figure 1).

Figure 1: Global Living Planet Index: Source: WWF Living Planet Report 2012



In Europe, despite great efforts, around half of the species listed in Annexes II, IV and V of the Habitats Directive have unfavourable conservation status⁴.

Having in mind the current situation and trends, development perspectives of the humanity, and the fact that most of the damage that has already occurred and the future damage is irreversible, there is no room for indifference and failure to take further serious measures at global and local levels.

Box 4: *Excerpt from BDO, 2006*

"Actions that we take in the next two decades will determine whether a relatively stable surrounding, which human population has depended on in the last 10 000 years, will continue to exist beyond this century. If we miss this opportunity, many ecosystems on the planet will transform into new, previously unknown forms, where their capacities to meet the needs of the existing and future generations will be completely uncertain."

⁴ EIA, Species of European Interest (SEBI 003/CSI 007) - Assessment published May 2010

2. INTERNATIONAL FRAMEWORK FOR BIODIVERSITY PROTECTION

2.1 Global Convention on Biological Diversity (CBD) and Aichii Targets

Only in the '70s of the 20th century, the society begins to understand that the global development goals are closely related to the capacities of the environment. This quickly results in placing "sustainable development" high on the list of political priorities of many countries⁵ and then, in 1992, in formal adoption of the Rio Declaration and the Agenda 21 by 178 countries at the UN Conference on Environment and Economic Development in Rio de Janeiro, Brazil. On that occasion, an agreement was reached concerning the text of the binding Convention on Biological Diversity, which entered into force at the end of 1993.

The Convention on Biological Diversity represents the main international legal instrument for the protection of global biodiversity which has been accepted by 194⁶ states. The Convention has three binding objectives:

1. conservation of biological diversity;
2. sustainable use of its components; and
3. fair and equitable sharing of the benefits arising from genetic resources.

The Convention requires from the "Contracting Parties" to implement various activities for the purpose of implementation of adopted objectives (including implementation of decisions made on regular conferences of the Contracting Parties). One of important mechanisms for the implementation of the Convention is the obligation of Contracting Parties to "*... develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity ...*" (Article 6).

After regaining its independence, Montenegro ratified by succession the Convention on Biodiversity on 3 June 2006, and at the same time ratified the Cartagena Protocol on Biosafety⁷. In 2016, Montenegro should become a signatory to the Protocol on Access to Genetic Resources and Fair and Equitable Sharing of Benefits Arising from their Utilization (Nagoya Protocol).

Implementation of provisions of the Convention on Biological Diversity is a process which contributes strongly to the

⁵ Burndtland Report, 1987, see ref:57

⁶ <http://www.cbd.int/information/parties.shtml>, September 2014

⁷ <http://www.cbd.int/information/parties.shtml#tab=1>, October 2014

protection of biodiversity and in which two main phases can be singled out so far:

In April 2002, Contracting Parties to the Convention committed to "achieve significant reduction of current rate of loss of biodiversity (see Chapter 1.1.3) at global, regional and national level as a contribution to poverty alleviation and benefits for the entire life on Earth". This has been formulated by the adoption of the Strategic Plan implementing the Convention on Biological Diversity⁸ with 4 strategic areas and 19 objectives. However, this ambitiously set objective has not been achieved.

Therefore, given the obstacles and challenges to achieving the initial objective, the revised Strategic Biodiversity Plan (2011-2020) was adopted in 2010 in Nagoya, Aichi Prefecture, Japan⁹. It promotes a strategic approach with a shared vision, mission and redefined strategic targets and objectives. They should inspire all parties to invest additional efforts so that this time around the newly established targets are achieved.

The revised strategic plan constitutes a framework for the establishment of national and regional objectives and improvement of cohesion in the implementation of provisions of the Convention and the corresponding decisions. The revised strategic plan includes 5 strategic areas (with 20 targets):

- A) Address the underlying causes of biodiversity loss by mainstreaming biodiversity across the government and the society
- B) Reduce the direct pressures on biological diversity and promote sustainable use
- C) Improve the status of biological diversity by safeguarding ecosystems, species and genetic diversity;
- D) Enhance the benefits to all from biodiversity and ecosystem services.

In addition to the Convention on Biological Diversity, Montenegro is a signatory country to many other international agreements closely related to the protection of nature and biodiversity such as: Convention concerning the Protection of World Cultural and Natural Heritage (UNESCO Convention), Convention on the Conservation of Migratory Species of Wild Animals (Bon Convention), Convention on the Conservation of Wildlife and Natural Habitats (Bern Convention), Convention on International Trade in Endangered Species of Wild Fauna and

⁸ COP 6 Decision VI/26

⁹ COP 10 Decision X/2

Flora (CITES Convention), Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), etc.

2.2 EU biodiversity policy

The protection of biodiversity in the EU has a long tradition and largely relies on the jointly created largest network of protected areas in the world - N2000¹⁰ network. The legal basis for the establishment of this network is created by two EU Directives: Habitats Directive¹¹ and Birds Directive¹². However, this network cannot ensure conservation of biodiversity without integration and achieving of sustainability in other EU policies such as agriculture, energy and transport.

The new EU Biodiversity Strategy to 2020 (2011), in addition to the importance of the reduction of biodiversity loss, places a particular emphasis, for the first time, on the irreplaceable value of ecosystem services and the urgent need for their maintenance and renewal for the benefit of both nature and the society. The main objective for 2020 is to "halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the European Union contribution to averting global biodiversity loss".

The EU Biodiversity Strategy to 2020 is based on six related and interdependent strategic directions which respond to the main reasons for biodiversity loss:

1. The full implementation of the EU nature legislation;
2. Better protection and restoration of ecosystems and the services they provide, and greater use of green infrastructure;
3. More sustainable agriculture and forestry;
4. Better management of EU fish stocks and more sustainable fisheries;
5. Tighter controls on Invasive Alien Species; and
6. A greater EU contribution to averting global biodiversity loss.

¹⁰ 26 000 of protected areas which account for 18% of the EU territory

¹¹ 92/43/ECC

¹² 2009/147/EC

3. NATIONAL FRAMEWORK FOR BIODIVERSITY PROTECTION

3.1 Legal framework

The Constitution of Montenegro, as the supreme law, defines Montenegro as the civil, democratic, ecological and the state of social justice, based on the rule of law (Article 1), and then establishes that everyone shall have the right to a sound environment, to receive timely and full information about the status of the environment, to influence the decision-making regarding the issues of importance for the environment, and to legal protection of these rights.

The Constitution establishes that everyone, the state in particular, shall be bound to preserve and promote the environment (Article 23), and that ratified and published international agreements shall make an integral part of the internal legal order, which shall have the supremacy over the national legislation.

The Nature Protection Act (Official Gazette of Montenegro 51/08, 21/09, 40/11, 62/13, 06/14) is the main law governing the nature protection and conservation including, *inter alia*, conservation and improvement of biological diversity and limiting and preventing negative impacts on biodiversity. This Act introduces the prohibition to use space and natural resources and goods in a way that, *inter alia*, disturbs permanently biological diversity, and establishes that biological diversity is achieved by implementing measures for the conservation of biological diversity in utilization of natural resources and spatial planning, and the protection of habitat types (Article 16).

Among others, the Act introduces measures for conservation of species, ecosystems, and also defines the establishment of gene banks and manners to use genetic material.

The Act also envisages **the obligation to prepare Biodiversity Strategy with the Action Plan** as one of the main documents for nature protection (Article 10).

The Act on National Parks (Official Gazette of Montenegro 28/14) regulates matters of protection, improvement and development of national parks as the activity of public interest.

Also, some **sector laws** are directly related to the protection of biodiversity components in sectors in the field of forestry, agriculture, fishery and hunting (for example: Forest Act provides that forest protection is achieved, *inter alia*, by conservation and improvement of biological diversity of forests,

and the Act on Marine Fisheries and Mariculture provides that fish and other marine organisms, as well as biodiversity, must be protected against endangering of their vital environment and excessive utilization).

It is important to say that **numerous other laws** and documents are relevant for biodiversity protection since they regulate fields whose activities generate possible causes of biodiversity loss.

3.2 Strategic directions in biodiversity conservation

In 1991, Montenegro set its state orientation and placed high on the list of priorities the problem of endangering of nature and the need for its urgent and timely protection by **adopting the Declaration of Ecological State Montenegro**¹³. The Declaration was a political message concerning the type of the state that Montenegro aspires to and it was presented at the World Summit on Environment and Development in Rio in 1992. Right after that, the Monograph "Ecological State Montenegro - Definition and Main Strategies" was adopted. Ten years later (2001), the Government of the Republic of Montenegro adopted the Study **Development Directions of Montenegro as the Ecological State** which represents a long-term development document implementing the concept of the ecological state. Natural resources which is reflected in the environmental and biological wealth are indicated as one of the three key objectives for implementing this concept.

The **National Strategy for Sustainable Development of Montenegro** (NSSD) was adopted in 2007 and represented a step in the efforts towards implementation of the orientation of Montenegro to be ecological state. At the time it was prepared, it relied on the guidelines and objectives of strategic documents of the time (such as Development Directions of Montenegro as the ecological state). The Strategy, as well as the corresponding Action Plan, is based on the concept of balancing of three pillars of sustainable development - economic, social and ecological - by defining two additional pillars of sustainable development of Montenegro.

NSSD was adopted with the Action Plan for the period 2007-2012. Priority tasks of the NSSD are: increase the territory of national protected areas to 10% of the territory and protect at least 10% of the territory in the coastal zone until 2009; when identifying protected areas of nature, use European typology of habitats important for protection (EMERALD, Natura 2000) taking into account covering of all representative ecosystems; b) establish an efficient system of management of protected areas (harmonized with IUCN management categories, and

¹³ The Parliament of Montenegro adopted the Declaration on 20 November 1991

ensure participative approach in management); and c) improve the legislative framework for biodiversity protection; build human capacities and build an effective system for monitoring of biodiversity.

The process of NSSD review is ongoing (2015), i.e. development of the new Strategy which should define long-term goals of sustainable development which Montenegro has committed to implement until 2020, all in line with SDGs. The NSSD constitutes an important development framework according to which all other sector strategies and plans should be aligned.

The **Biodiversity Strategy with the Action Plan** for the period 2010-2015 formulates its main principles, and long-term and operational goals for biodiversity protection. These goals and principles represent the framework which summarizes the existing needs and opportunities for implementing activities to protect biological diversity in Montenegro in the period 2010-2015.

Particularly important matters (cross-cutting) have been identified for the protection of biodiversity and its sustainable utilization concerning the sectors of tourism, spatial planning and infrastructure. The Strategy places a special emphasis on the threats and factors endangering biological diversity, and the Action Plan for the period 2010-2015 with 7 measures and 54 activities has been proposed in response to these. The Strategy addresses goals and requirements of the Convention on Biological Diversity (see I-2.1).

In addition to these key documents, there is a large number of other strategic documents establishing the development policy and plans in specific areas and influence directly the environment and biodiversity of Montenegro (Spatial Plan of Montenegro, Special Purpose Spatial Plans, Energy Development Strategy, Forestry Development Strategy, etc.).

4. REVISION OF THE STRATEGY

Since 2010, when the first NBSAP was adopted, new mechanisms, measures and binding decisions (Box 5: Decision X/2, 10) have been adopted at international level, which should stop biodiversity loss, after the ambitious plan to achieve substantial reduction of the existing biodiversity loss rate at global level until 2010 had not produced the desired success.

At the same time, the existing pressures on biodiversity at national level call for the review of the first NBSAP, in particular the corresponding Action Plan. Therefore, the level of implementation and efficiency of existing goals and measures should be assessed through the revision process. Finally, the Nature Protection Act envisages that the NBSAP is reviewed every five years.

4.1 Reasons for reviewing the Strategy

Starting from the efforts of the international community towards achieving the identified biodiversity protection targets until 2010, and given the obstacles and challenges, the new Strategic Biodiversity Plan (2011-2020) was adopted in the same year in Nagoya, Aichii Prefecture, Japan, at the 10th conference of Contractual Parties. It identifies 20 new (Aichii) targets which should be achieved by 2020 at the latest and which should be supported by all Contractual Parties. In accordance with this, they are invited to develop national and regional targets in line with globally set targets, as well as to improve the main instruments of implementation - their national biodiversity targets.

In national context, considering the progress in biodiversity protection since 1991¹⁴, it is suggested that the development that followed has not, in those terms, provided the expected transformation of relationship of the society towards the environment, and that biodiversity of Montenegro is (still) exposed to pressures¹⁵. Also, the analysis of the implementation of the Strategy for Sustainable Development (2007) indicates that it is necessary to expand substantially the efforts towards its implementation since particular goals have not been achieved¹⁶.

Box 5: *Decision X/2, 10
Conference of Contractual
Parties to the Convention on
Biological Diversity (2010):*

*Urges the Contractual Parties
and other Governments to
"...develop national and regional
targets, using the Strategic Plan
and its Aichii targets, as a
flexible framework, in
accordance with national
priorities and capacities and
taking into account both the
global targets and the status and
trends of biological diversity in
the country... and report on
these at the 12th meeting of the
Conference of the Contractual
Parties"*

¹⁴ Adoption of the Declaration of Ecological State Montenegro.

¹⁵ Analysis of achievements and challenges of the Ecological State, 20 years of the Ecological State Montenegro, 2011

¹⁶ Fifth Annual Report on the implementation of the National Strategy for Sustainable Development of Montenegro, 2013

Progress in the implementation of the first Biodiversity Strategy with the Action Plan is assessed as mixed¹⁷ on the basis of the assessment of the level of implementation of the Action Plan.

Finally, the Nature Protection Act (Article 101) defines, *inter alia*, mandatory elements of the Strategy and sets its validity at 5 years. In accordance with the Act, the validity of the first NBSAP expires in 2015.

All of the above represent main reasons for development of the second Biodiversity Strategy with the Action Plan for the period 2016-2020.

4.2 Methodological approach

The second NBSAP follows the strategic orientation of the country concerning the need to preserve national biodiversity as expressed in applicable strategic documents (see Chapter 3.2). On the basis of the analysis of the current status of biodiversity and the threatening factor, implementation of strategic documents (primarily the first NBSAP), identified obstacles and gaps in its implementation, as well as the need to fulfil globally identified targets (Aichii), the Strategy improves this relationship by redefining strategic targets and measures. In this way, it allows their quicker and more efficient fulfilment in the next five-year period.

The Strategy also adopts a new conceptual approach based on the need to work on education, communication, awareness raising in the field of biodiversity and more efficient integration of biodiversity protection into other sector policies and activities.

In relation to the above, the **Strategy adopts the approach that it needs to be prepared in a way to allow its easy understanding and acceptance by the widest range of stakeholders** who are not, in most cases, professionally involved in the matters concerning biodiversity and nature protection. Information is presented only to the extent necessary to accept the presented strategic targets by the largest part of the society and to fully understand implementation of envisaged measures for achieving such commonly adopted targets.

In that sense, the Strategy **strongly emphasises the importance of biodiversity and services it provides for sustainable economic development and well-being of all citizens**. Consequently, special attention is also paid to the

¹⁷ The Fifth Report of Montenegro to the United Nations Convention on Biological Diversity, 2014

application of adequate economic incentives for achieving biodiversity targets.

It is already clear that the targets set by this Strategy cannot be achieved merely through actions of line institutions, but it requires a broad national mobilisation of resources concerning this matter and involvement of all segments of the society to achieve common success.

The process of the development of the Strategy also follows the requirements and the guidelines of national legislation (see I-3), as well as the commitments and the guidelines of relevant international biodiversity Conventions and policies (see I-2).

II STATUS OF BIODIVERSITY

The territory of Montenegro is characterized by extraordinary genetic and ecosystem diversity of species, which makes it one of the most important centres of biological diversity not only in Europe, but in the entire Palaearctic¹⁸. Although biodiversity in Montenegro is not fully explored, given the available data of institutions, it can be claimed that biodiversity of Montenegro is still preserved substantially, but there is also a growing trend of numerous direct pressures on biodiversity values. Some of the most important are: urbanization, pollution, infrastructure development, changing land purpose, excessive use of resources and climate change. The national targets set in the previous period for biodiversity protection have not been achieved entirely. The continuous limited funding is a serious threatening factor, although it is clear that the decision to invest in natural capital can create a stable and growing added value for the Montenegrin economy and the population compared to maintaining of the "current business activities", by generating additional benefit worth more than 1.5 billion EUR in the next 25 years.

1. BRIEF OVERVIEW OF BIODIVERSITY OF MONTENEGRO

Mapping of distribution of plant and animal species on the Balkan Peninsula indicates that almost the entire territory of Montenegro can be treated as the centre of biological diversity (Stevanovic & Vasic 1995). Also, almost all mountainous regions of Montenegro can be treated as the centre of vascular flora diversity (particularly including Durmitor, the Prokletije Massif, and coastal mountains Orjen, Lovcen and Rumija). The regions with 1200 to 1400 taxa (species and sub-species) are: Durmitor with Bioce, including canyons of the Rivers Tara, Piva and Susica; Bjelasica, Komovi and Prokletije with Visitor, Zijovo, Hum Orahovski, canyons of the Rivers Cijevna and Mrtvica; Skadar Lake with northern slopes of the Mountain Rumija. The region of the Massifs of Prokletije, Moracke Mountains, Bjelasica and Komovi has been recognized as the centre of endemic vascular flora (Stevanovic, 2000, Bulic 2008).

The most important centres for birds biodiversity are the regions of the Skadar Lake and Ulcinj, as well as mountainous regions of Durmitor and Prokletije. The centres of diversity of mammals are mountainous regions of Durmitor, Sinjajevina, western side of Prokletije, Komovi and Bjelasica, with the lowest concentration of species on the eastern side of Prokletije,

¹⁸ Vasic, V. (1995); Palaearctic (Palaearctic realm): zoographic region covering Europe, North Africa and North and Central Asia.

northern parts of the Boka Bay and Orjen and coastal Dinarides (Lovcen and Rumija, with the Skadar Lake).

It is considered that the coastal zone of Montenegro with the inland, Skadar Lake, Lovcen and Prokletije are the most important centres of diversity of reptiles and amphibians in the Balkans and in Europe.

1.1 Ecosystem diversity

There are two main biological-geographic regions in Montenegro: Mediterranean and Alpine, with very different types of ecosystems and habitats. There is no formal, widely accepted classification of ecosystems, which is why a review of characteristic ecosystems, habitats and geological formations was done in the previous NBSAP. **On the basis of this analysis, the following ecosystems have been singled out: Alpine, forest, dry grasslands, freshwater and marine, and among habitats: coastal, caves, canyons, and karst as a specific geological formation.**

Alpine ecosystem

This includes high mountain area of the continental part of Montenegro, with dominant mountain peaks (above 1.500 m.a.s.l.) of Durmitor, Komovi, Prokletije, Sinjajevina and Bjelasica, and coastal mountains of Orjen, Lovcen and Rumija. Areas in which these ecosystems are present are characterized by short cool summers and long and severe winters with abundant snow. These ecosystems are situated above the upper forest line and include the following habitat types: Alpine pastures, cliffs, screes, and rocky areas with scarce vegetation and heaps of sandy and rocky materials, the so-called "sipari" (screes).

The status of this ecosystem can be assessed as satisfactory without a distinct deterioration trend. A characteristic threat¹⁹ is caused by abandoning of traditional cattle breeding and climate change.

Forest ecosystem

Statistically, forests are the most widespread system in Montenegro. Forests cover 59.5%, and forest land covers 9.9%, which combined accounts for 69.4% of the territory of Montenegro. (Source: National Forest Inventory 2011). More

Box 6: *Rock creeps in the Mountain Komovi*



Public discussions for declaring the Nature Park Komovi were finalized in 2014

¹⁹ Here, and with the next ecosystems/habitats, assessments of trends of endangering and elements of endangering are based on the data contained in the Reports on implementation of NBSAP, Reports on implementation of CBD Convention and Reports on the status of the environment by the Environmental Agency published during the implementation of NBSAP in the period 2010-2014.

than 99% of forest stands is of natural origin, which places the Montenegrin forests among the most natural ones in Europe²⁰. The structure of forests is very diverse as a consequence of diversity of bioregions in the country, and the emerging and development of the stands themselves. In total, 12 conifer and 59 broadleaved tree species have been registered. Conifer species, primarily spruce as the most represented conifer species in Montenegro, followed by fir, black and white pine, are dominant in the forests at higher altitudes. Also, it is worth mentioning that in several locations in Montenegro, as a tertiary relict and endemite of the Balkan Peninsula and a part of the Apennine Peninsula, there are stands of whitebark pine (*Pinus heldreichii*), such as: Stitovo - as the largest in its area, followed by Sinjajevina, Komovi, Maganik, as well as several smaller sites in Orjen and Rumija. Also, Macedonian pine stands (*Pinus peuce*) occur as tertiary relict and endemite of the Balkan Peninsula on Prokletije, Hajla, Smiljevica, Cakor, Visitor, Bogicevica. Broadleaved forests in higher areas consist mostly of beech forests which are widespread between 700 m.a.s.l. and 1.800 m.a.s.l. There are also oak, hornbeam and ash forests. Greek maple (*Acer heldreichii*) occurs, in smaller stands or as admixture to other species, as endemite of the Balkan Peninsula, mostly on Bjelasica and Komovi. Chestnut forests (*Castanea sativa*) are characteristic for (sub)Mediterranean region of Montenegro, but they do not extend continuously (they are found on several location in the Boka Bay, on northern slopes of the Mountain Rumija - Ostros, Livari).

Despite harvesting of forests in the past, some forest areas, such as Durmitor, Bjelasica and Prokletije, have retained relatively pristine forests which are under protection. In the National Park Durmitor, as the forests with the extraordinary natural value, the following forest reserves have been identified: Crna Poda, Mlinski Potok and Susica, as well as forest complexes in the far south surrounding of the Zabojsko Lake. The rainforest Crna Poda, located in the canyon valley of the River Tara, between Bistrica and Dobrilovina, represents the black pine rainforest around 500 years old, which represents a planetary value in this area, with the greatest height in Europe (51.1 m measured by a geodetic instrument), thickness of 147 cm and volume on the test plot no. I 1444.9 m³/ha, black pine and beech, maple and other species 207.7 m³/ha, or 1.645 m³/ha in total, which is the largest volume per hectare measured in Europe. (Source: Management Plan for the National Park Durmitor 2011-2015). In the National Park Biogradska Gora, a special value is represented by the rainforest reserve Biogradska Gora, which covers 1.600 ha and is located in the basin of the Biogradska River, Biogradsko Lake and Jezerstica. Sixteen forest communities and almost 90

²⁰ Source: National Forest Strategy, 2014

species of trees and bushes have been identified in the reserve. It has been established that in-breast diameter of some trees reaches as much as 147 cm, tree height even above 44 m, and the volume even up to 1.325,5 m³/ha. The age of some measured trees is estimated at more than 400 years. A special protection regime is applied in the reserve, which has the nature of the strict environmental protection. (Source: Management Plan for the National Park Biogradska Gora 2011-2015).

According to the data of the National Forest Inventory 2011, the overall standing volume is estimated at 122 million m³, with the current volume increment of 2.9 million m³.

The registered threat is caused by illegal harvesting, fires, diseases, air pollution, etc.

Dry grassland ecosystem

Dry grasslands are found on alluvial land, but are now very rare. Small remnant areas still exist at Cemovsko Field, including Karabusko, Tusko and Dinosko Fields, and in the lower part of the canyon of the River Cijevna.

These ecosystems are endangered and rare. The registered most characteristic threats are caused by: construction, change of land purpose, agriculture and infrastructure development.

Freshwater ecosystem

These comprise lakes, rivers, streams, swamps and wetlands, artificial lakes and river forests. Wetland habitats occur in the lowlands and along the coast, and most important ones are found in the surrounding of the largest and the richest (in terms of biological diversity) Skadar Lake.

Skadar Lake is estimated as a refuge for many species that survived the glaciation, and the Lake and its vicinity are rich in relict and endemic plant and animal species. This is a relatively shallow lake, with dominant reed, but also includes flooded meadows and flooded forests. South banks and numerous islets are steep, rocky, with scarce sub-Mediterranean pseudo-macquis. The community of algae of the Lake is very diverse which characterizes only tropical and sub-tropical freshwater systems.

Mountain lakes are predominantly oligotrophic and have a specific flora and fauna, including neotenic form of the crested newt *Triturus alpestris*. Barno Lake on Durmitor is specific because of its mountain mire (peat) vegetation.

The overall status of these ecosystems can still be assessed

Box 7: Skadar oak

*In some areas in the vicinity of the north shore of the Lake, there are still fragments of forests of endemic sub-species of Skadar oak *Quercus robur scutariensis*.*

as good (with some exceptions), although they are seriously endangered by numerous activities: construction on banks, land conversion, waste and wastewater pollution, intense gravel extraction from the basin, intense tourism, hydrotechnical activities and infrastructure, agricultural activities, climate change, unplanned and unsustainable hunting and illegal harvesting.

Marine ecosystem

Montenegro's maritime zone extends out to 12 nautical miles (22.26 km) from the shore, covers 2.504,80 km², and reaches a maximum depth of 1.233 m. The average sea depth in the coastal zone is 27.3 m, and the maximum is 60 m. Algae, plankton and benthic vegetation are characteristic vegetation for the coastal zone, with widespread base of sea grass which serves as a shelter for reproduction of numerous forms of marine fauna. The fauna of the Adriatic Sea has not been sufficiently investigated yet, however, according to the most recent data²¹, there are more than 300 species of algae, 40 species of sponges, 150 species of crustaceans, 340 species of molluscs, more than 400 species of fish, 3 species of marine turtles and 4 species of dolphins in the Montenegrin part of the Adriatic. Most of the known and economically important species are distributed along the littoral zone (up to 200 m deep), but some of them can be found in the transitional bathing zone (200-300 m of depth), such as Norway lobster (*Nephrops norvegicus*) and *Thenaea muricata*. The main areas for conservation of biodiversity are Boka Kotorska and Bojana mouth, which are important spawning sites and a source of food for economically important species. Bojana estuary is an important station for nutrition of migratory bird species.

The status of marine ecosystem can be assessed as satisfactory. The registered most characteristic threats are caused by waste and wastewater (undersea outlets), climate change, pollution from ships, invasive species and marine accidents.

Coastal ecosystems

The Montenegrin coast is 313 km long, and characterized by rocky shores (cliffs), with numerous natural sandy beaches and eight smaller islands. The longest beach is in Ulcinj (more than 12 km long) with sand dunes with unique halophyte vegetation. The southern slopes of coastal mountains are covered by typical Mediterranean vegetation, macquis and garrigue, and the lower terrains and the very coast with salty vegetation. Also, cultivated areas with olive groves and orchards are found here.



A tree of Skadar oak in Curioc, Danilovgrad is protected by the law as a monument of nature

Box 8: Rare species of the Boka Bay

In Boka Kotorska one can find rare species such as molluscs: *Tijsira orahoviciana* and *Mitra zonata*.

²¹ (Regner et al., 2003)

Some rare and endemic species with limited range of distribution are also present here, including Skadar oak in Stoj near Ulcinj, as well as the rare community of laurel and oleander *Antropogoni-Nerietum* above the Sopot aquifer near Risan. The Salt Pans in Tivat and the Saline in Ulcinj together with the neighbouring salinas and lagoons comprise a very important site for wintering of wetland birds and the survival of halophyte vegetation.

Coastal ecosystems can be assessed as endangered and devastated to a certain extent. The registered most characteristic threats are caused by urbanization and intense tourism, construction, land conversion, infrastructure development, waste and wastewater, and climate change as well.

Caves

Due to its geology, Montenegro has numerous caves and sinkholes some of which are of special aesthetic value (for example, Lipska Cave, Djalovica Cave), while others are among the deepest in the Balkans (for example, sinkholes at Vjetrena Hills on Durmitor, Duboki Do on Lovcen). In many cases, they have an exceptionally complex and rich fauna, with many endemic and relict (particularly tertiary) forms, especially among invertebrate groups.

Caves and sinkholes have not been explored systematically, nor there are comprehensive data on their natural characteristics and, therefore, it is impossible to present an assessment of their status. The most characteristic threats are caused by wastewater (cesspools), municipal waste, agriculture and unauthorized visits and utilization.

Canyons

Canyons give an impressive image to Montenegro. Some are under the influence of Mediterranean climate (Moraca and Cijevna canyons), and others are dominated by cold continental climate, such as the River Tara Canyon, the remains of the Piva and Komarnica Canyons and gorges such as: Ibarska, Tifranska and Djalovica Gorge, which have very different and often endemic species combined with neighbouring mountainous regions. The Tara River Canyon with the maximum depth of 1300 m is the deepest in Europe. A very distinct biodiversity is the main characteristic of all Montenegrin canyons.

Canyons in Montenegro are well preserved, and characteristic threatening factors begin with construction of hydrotechnical and road infrastructure, pollution caused by waste and

Box 9: *Biodiversity of the Moraca Canyon*

The Moraca Canyon is a habitat for around 1600 species of vascular flora, more than 60 Balkan endemata of plant species and more than 85 permanently protected plant species.

The Moraca Canyon area is a home to more than 1/3 of plant species of Montenegro.

wastewater, as well as illegal and unplanned hunting and fishing.

Karst

Montenegro's karst region lies generally at elevations of 1000 m.a.s.l., although some areas rise to 1900 m.a.s.l. such as Mountain Orjen (1894 m), the highest massif among the coastal limestone ranges. The vegetation which is composed of underbrush and bushes and herbaceous vegetation (with vast areas which are dominated by sage *Salvia officinalis*) is mostly weak, but has numerous endemic forms. The most characteristic animals in the karst region are reptiles which are characterized by a high degree of endemism. Specific bird fauna is also present.

The specific karst biodiversity has not been sufficiently explored and it is impossible to provide the status assessment. Specific karst forms are most frequently found in rural and unpopulated areas under limited anthropogenic influence. The most characteristic threats are caused by wastewater (cesspools), municipal waste and agriculture.

1.2 Diversity of species

For such a small European country, Montenegro has a large number of species due to its geographic position, distribution and diversity of habitats, topographic variations, geological history and climate conditions. Despite this, the basic knowledge of many taxa are still not available and the exact number of species which populates Montenegro cannot be established with certainty.

Algae

Freshwater algae of Montenegro exhibit high diversity, 1200 species and varieties have been described so far (with silicate algae (Bacillariophyta) and green algae as dominant groups). The freshwater systems they inhabit differ in conditions. The northern lakes and rivers are oligothropic with a relatively few species, while those in the south are generally mesophile to eurothropic and are richer in species of algae.

The most significant site for freshwater algae in Montenegro is the Skadar Lake, and other lakes in Montenegro are also known for substantial diversity of algae. Regarding sea algae, more than 300 species of macro algae have been registered in the Montenegrin waters (although there are probably many more). Most of these species are widespread in the Adriatic Sea and the Mediterranean Sea.

Moss and liverwort (biophytes) and lichens

In Montenegro, 589 biophyte species have been registered so far, i.e. 483 moss species and 106 liverwort species. This is less than for most of the surrounding countries, but is probably a reflection of limited research on these groups and many more species are likely to be recorded in Montenegro. The largest numbers of species are associated with beech and plane tree forests. Moss is largely associated with watercourses and are particularly diverse in peat bogs in Montenegro. Lichens in Montenegro are also underexplored, and 693 species have been registered.

Vascular plants

The Balkan Peninsula, which includes Montenegro, is the most diverse part of Europe in terms of vascular plants (7000 - 8000 registered species). With 3250 species, Montenegro is one of the regions with the most diverse plant world. The number of endemic species is also high - there are as many as 392 endemic species (in the region), which account for more than 70% of the Montenegrin flora. In addition to these, local endemic species are very important - there are 46 of them in Montenegro, mostly tertiary relicts.

Fungi

Around 2000 species of fungi (more than 1000 Micromycete species and approximately 920 Macromycete species) have been recorded in Montenegro, although it has been estimated that there could be between 15000 and 21000 species, of which around 4500 are Macromycetes (Kasom, 2008).

Invertebrates

Terrestrial invertebrates are a very large group of animals with many sub-groups, most of which have been poorly studied in Montenegro. As a result, comprehensive registries of species are missing, and there is not even a widely accepted, approximate number of species. This also applies even to the species whose members are very important from the point of view of human health (for example, Protozoa, lobworms, fluke, planktons, leeches). To date, the best-studied are the type of molluscs, *Mollusca*, with 323 registered species and 136 species of terrestrial snails, which are considered to be species of international importance (mostly endemic species), ringworms (*Oligochaeta* - with 27 recognized species) and arthropod (*Arthropoda* - with an estimated 16.000-20.000 species although, according to some assessment, only the number of insects exceeds 25.000). Researches of these groups suggest that they are of high levels of endemism, and a

Box 10: Comparison of the total number of species of vascular flora of some European countries relative to their size

Country	No. species	No. species/km ²
Montenegro	3250	0.2353
Slovenia	3216	0.15881
Albania	3031	1.10543
Croatia	4275	0.07561
Switzerland	2696	0.0653
Slovakia	2500	0.0508
Austria	2950	0.03518
Hungary	2411	0.02592
Check Republic	1826	0.02316
Germany	2742	0.00771
Great Britain	1623	0.00665
Finland	1102	0.00389

Source: taken and updated from ref: 40

Box 11: "living fossil" *Congerius kusceri* in the Montenegrin underground

Congerius kusceri - the only known underground molluscs with two shells - belongs to the genus which used to be considered extinct since Miocene (23 to 5.3 million years ago).

high diversity of species. Particularly important caves with endemic invertebrates are: Lipska, Bobotusa Cave near Trnovo, Obodska Cave and Megara Cave near Podgorica.

The existing data suggest a relatively high diversity, although low endemism of marine invertebrates (as in the entire Adriatic Sea). For example, some 50% of all Echinoderms occurring in the Adriatic Sea are registered in Montenegro, while the presence of 127 species of shells has been registered in the inner part of Boka Bay (Kotor-Risan Bay) with an estimated 250-300 species in the Montenegrin waters, and 17 species of Chepalopod registered in the open part of the Montenegrin coast. Commercially exploited species include squid (*Loligo vulgaris*) and cuttlefish (*Sepia officinalis*), which comprise the majority of the Chepalopod catch in the Montenegrin waters, as well as species of crab and shrimp (*Crustacea*), shrimp (*Parapenaeus longirostris*), and several species of shells (*Molluscs*). However, despite their commercial importance, the ecology of these groups is still rather poorly known.

Fish

Freshwater systems of Montenegro belong to the Black Sea basin, where around 30 species of fish have been registered and the Adriatic Sea with 60 species of fish. Disparities in the distribution of species between these two basins are the consequence of geological past of the Adriatic basin which survived glaciation and became a refuge for many species of freshwater fish. The Adriatic basin and the southern Mediterranean part of Montenegro is rich in the number of endemic species and a high level of genetic diversity, not only fish but of other organisms as well.

One of the most important places for breeding freshwater fish in the country is the Skadar Lake, which has more than 40 species of fish, including species that migrate between marine and freshwater systems, such as the eel (*Anguilla anguilla*), herring (*Alosa falax nilotica*), etc.

The fish fauna of the Adriatic Sea is considered diverse with 117 registered families, but has a low level of endemism. To date, 407 species have been registered in Montenegro (Jardas, I.1999; Dulcic, J. and Lipej, L 2004), which represents around 70% of those registered in the Mediterranean. However, this is not likely to be a full list, as some species have been registered only once and their status in the Montenegrin waters is unknown (for example, the eastern Adriatic is the deepest part of the Sea and largely unexplored, so records of new species are expected).

The habitats richest in fish species (both in terms of diversity and biomass) are abysses and ridges of coastal areas, which provide high structural diversity and different microhabitats for fish. Sandy bottoms, such as at the mouth of the River Bojana, are relatively poor in fish species, although shallow-water settlements of the Mediterranean sea grass are important spawning sites of fish.

Reptiles and amphibians (herpetofauna and batrahofauna)

There is a relatively high diversity of terrestrial and water amphibians and reptiles in Montenegro, including lizards, snakes, turtles, frogs, toads, salamanders and sea turtles. There are currently 56 species (18 species of amphibians and 38 species of reptiles), and 69 registered sub-species from 38 genera, and this list is unlikely to be final. This is especially the case for the green frog (*Rena esculenta*) species complex and the complex of large triturus (*Triturus cristatus*) for which this region is the centre of speciation, and records of more species and sub-species are likely.

Mountainous regions of Lovcen and Prokletije stand out as particular "hot spots" in terms of diversity of amphibians and reptiles, as well as endemism in Montenegro. Aquatic habitats in the Lovcen region are particularly interesting as they host communities of amphibians and reptiles with numerous relict and endemic species. Lakes of the mountainous region Prokletije (Bukumirsko and Hridsko Lakes) are notable for their populations of neotenic Alpine triturus (*Triturus alpestris*), as well a significant number of Balkan endemic species. Also, islands of the Skadar Lake are important, of which each is populated by different species of lizards, then the region of the National Park Durmitor.

Other important sites for rare amphibians and reptiles include Poscenska Lakes, Komarnica River Canyon, from Skakavica to Duzi Village, Zminicko Lake, a part of the Tara River Canyon - Celije site, Kotor - Risan Bay, Cemovsko Field, Buljarica, Mrtvice Canyon, Ada Bojana. Mala Rijeka Canyon, Rumija Mountain, Tivat Saline.

Birds

Montenegro's position along the main migratory route (the Adriatic flyway) and diversity of natural habitats result in high avian diversity. Of a total of 526 European bird species, 333 (63%) species can be regularly present in Montenegro (Vasic, 1997), and several additional species which occur occasionally have been registered as well. Of these, 204 species nest in the country. Montenegro has a large number of bird species, many of which are predators, forest species and wetland birds, and

provides important shelters for numerous rare and endangered bird species, such as Dalmatian Pelican (*Pelecanus crispus*) and pygmy cormorant (*Phalacrocorax pygmeus*). Important birds habitats are: Buljarica, Velika Plaza, Ada Bojana, Tivat and Ulcinj Salines, Sasko Lake in the Mediterranean region, pastures and flooded forests along the Bojana River and in the inland, Durmitor, Bjelasica, Komovi and canyons: Piva, Tara, Moraca and Cijevna, as well as mountains Maglic and Prokletije. More than 281 bird species have been registered on the Skadar Lake, around 250 around Ulcinj and 172 on Durmitor.

Mammals

Montenegro also has a rich mammal fauna. The largest number of species appear in the mountainous region in the north. Apart from some researches on individual species, and estimations of users of hunting grounds concerning hunting population, there are no data about the size of the population of mammals in Montenegro.

Box 12: *Fauna of mammals in Montenegro*

*The fauna of mammals consists of: (i) carnivores: for example wolf (*Canis lupus*), brown bear (*Ursus arctos*), fox (*Vulpes vulpes*), lynx (*Lynx lynx*), otter (*Lutra lutra*); (ii) unglulates: (for example, wild boar (*Sus scrofa*), deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), chamois (*Rupicapra rupicapra*); (iii) rodents: including endemic species (*Pitymus thomasi*), which can be found only around Podgorica (Beri, Vranici), and mole rat (*Spalax leucodon*) in Vilusi, as well as several species of bats; (iv) sea mammals: common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*), bottlenose dolphin (*Tursiops truncatus*); and (v) rabbit (*Lepus concolor*), common rabbit (*Lepus europaeus* Pall.).*

1.3 Genetic diversity

A large number of endemic species has been registered in the flora and fauna of Montenegro, as well as diversity of phenotypes between populations, which indicates a high level of genetic diversity. Still, this aspect of biodiversity is poorly studied and insufficiently valued. The existing studies mostly relate to agricultural biodiversity. While small in size, Montenegro has very diverse agricultural and ecological conditions and a number of characteristic domestic varieties and breeds.

Box 13: *Definition of biodiversity*

Agricultural biodiversity includes diversity of animals, plants and microorganisms which are needed for maintaining agricultural production and food and feed.

Plant agricultural biodiversity

The existing important domestic varieties of grains, bean, onion, potato, tomato, fruit, vine and other fruit and vegetables which are still grown and consumed in the country. However, intensification of agriculture has affected adversely the diversity, and some genetic types have already disappeared from nature (for example, some varieties of wheat do not exist any longer where they had been grown originally). Still, the most important genetic potentials which are important for food and agriculture are mostly preserved and constitute a good source of new germplasm for the development of seed selection and growing.

Agricultural biodiversity of animals

In a relatively small space, Montenegro has almost all domestic breeds which are grown throughout the Balkans. The populations are genetically and phenotypically specific and small in size. Some of them are found in such a small number that they are at risk of extinction.

Some breeds or small groups can be found in the hinterland of the Skadar Lake and around the River Bojana delta. The most common breed of sheep is "pramenka" with several species in the entire country adapted to local environmental conditions, including Zeta "zuja" which was originally grown around Podgorica (Zeta, Ljeskopolje, Cemovsko Field, all the way to Bjelopavlici region), resilient to hot summers, "bardoka" grown around the border between Kosovo and Albania (Plav, Gusinje and a part of the Capital Podgorica), Piva sheep which is grown in a wider region of Durmitor and Sinjajevina Mountain, Ljaba which was originally grown in the territory of Ulcinj, Krajina, Bar and Malesija, Sjenica sheep and Vasojevic ruda which are grown in the north-east region of Montenegro. However, Zeta "zuja" is close to be extinct, and other species exist in a very small number. Besides, domestic Balkan goat is mostly grown in the south of the country, in areas which are unfavourable for sheep growing, and particularly for cattle breeding. Such areas include karst areas in municipalities Niksic, Cetinje, Podgorica and coastal municipalities with bushes and low broadleaved trees. The red breed is considered to be a representative of this species in Montenegro. Small mountain horse is also still used in Montenegro, particularly in remote and inaccessible mountainous regions, while donkeys, although in a smaller number, can be found in some areas in the south (municipalities Ulcinj, Bar, partly Old Royal Capital Cetinje and the Capital Podgorica).

Box 14: *Extinction of domestic varieties and breeds*

"Busa", small, resilient cow breed, low maintenance, adapted to rough, remote regions with poor pastures in the north and north-east region of the country is present in a small number and at risk of extinction.

Local domestic pig breed - "siska" - is already extinct in Montenegro.

2. BIODIVERSITY PROTECTION SYSTEM

The protection of nature in Montenegro has a long tradition. Accepting the gift, the King Nikola established back in 1878 the reserve "Biogradska Gora" (now National Park Biogradska Gora). After 1945, following the practice of developed countries, a protection system is established based on declaration of national parks regulated by special Act on National Parks (National Parks Biogradska Gora, Durmitor and Lovcen were declared in 1951, Skadar Lake in 1983, and Prokletije in 2009), and the first Nature Protection Act was adopted in 1961 on the basis of which new categories of protected areas (protected structures) were declared, which primarily include reserves and monuments of nature, individual plant and animal species, memorial monuments of nature, nature parks and regions.

The protection system designed in such a manner has lived through numerous changes and amendments in the following years, but still constitutes the basis of the existing system for biodiversity protection in Montenegro.

2.1 Protection of ecosystems, species and genes

The protection of ecosystems, species and genes is ensured by implementation of relevant legal provisions and policies, and particularly by the existence of a system of national protection areas.

The establishment of the national network of protected areas is an integral part of the policy of the Government of Montenegro aimed at ensuring protection of all representative types of habitats, ecosystems and plant and animal species. The extension of the network of national protected areas is linked with the system of spatial planning and its highest planning document - Spatial Plan of Montenegro (SPMNE).

In the last several years this matter has become a subject of interest of other national strategies and sector policies as well. In addition to the projection of protected areas of nature in the source of marine resources, as established by the Special Purpose Spatial Plan for the Coastal Zone of Montenegro (SPSP CZ MNE), the national system of protected areas was also considered through drafting of the National Strategy for Sustainable Development (NSSD) (which set for the first time the target concerning increasing protected areas of nature to 10% of the state territory and placing under protection 10% of the coastal zone over the planning period of 3 years). In that respect, NSSD has highlighted priority areas for protection. Similarly to NSSD and SPSP CZ MNE, the matter of the network of protected areas on the Montenegrin coast is also

considered by the National Strategy for Integral Management of the Coastal Zone of Montenegro which has been prepared for adoption by the Government of Montenegro.

National system of protected areas

The national network of protected areas currently covers 1763.62 km² or 12.768% of the territory of Montenegro, most of which (101.733 ha or 7.77%) consists of five national parks: Durmitor, Skadar Lake, Lovcen, Biogradska Gora and Prokletije. The remaining part is consisted of more than 40 protected areas within the following categories: nature monument, areas of special natural characteristics, (general and special) reserves.

Table 3: Size and percentage of protected areas at national and international level

Level	Protected natural resource	Area
National level of protection	National parks	101.733 ha
	Nature monuments	13.638,54 ha
	Areas of special natural characteristics	354.7 ha
	Other protected areas - protected under municipal regulations	15.000 ha
	Strict nature reserves	650 ha
	Regional park	51.398
	Total under protected	176.362,0 ha
International protected area	Catchment area of the River Tara, M&B UNESCO biosphere reserve, including NP Durmitor with the River Tara Canyon	182.889 ha
	NP Skadar Lake and Tivat Saline - Ramsar site	20.150 ha
	Kotor - Risan Bay	15.000 ha

On the basis of ratified international agreements, the following national areas are subjects to international protection:

- *Ramsar Convention*²² (*Convention on Wetlands of International Importance especially as Waterfowl Habitat*): National Park Skadar Lake (20.000 ha) since 1995 and special flora - fauna reserve Tivat Saline (150 ha) since 2013.

- *UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage*²³: National Park Durmitor with the River Tara Canyon (33.895 ha) has been on the UNESCO World Heritage List since 1980, and Kotor-Risan Bay (15.000

Box 15: Montenegrin beaches - nature monuments

Montenegrin beaches: on the Skadar Lake, Velika Plaza in Ulcinj, Mala Plaza in Ulcinj, Valdanos, Velji Pijesak, Topolica in Bar, Sutomore, Lucica in Petrovac, Canj, Pecin, Buljarica, Petrovac, Drobni Pijesak, Sveti Stefan, Milocer and Becici Beach are protected in the category by the Decision on the Protection of Nature Structures (Official Gazette of FRMNE 30/68)06/68)



Buljarica - nature monument, one of rare coves with distinct preserved natural characteristics.

²² Ratified: Official Gazette of the Federal Republic of Yugoslavia 009/77-675

²³ Ratified: Official Gazette of the Federal Republic of Yugoslavia 056/74-1771

ha) since 1979. The River Tara basin (182.899 ha) has the status of the World Biosphere Reserve under the criteria of UNESCO Programme "Human and Biosphere" since 1977.

In addition to the above areas, there are many other parts of nature of important and valuable biological diversity in Montenegro which have met the criteria of other international agreements that Montenegro is a contractual party to (signatory). One of them is, for example, the Convention for the Protection of the Mediterranean Sea (Barcelona Convention) and its Protocol concerning Mediterranean Specially Protected Areas which allows placing under protection marine protected areas, but to date there are no declared protected marine areas in the Montenegrin waters. Combine, regardless of the existence and the form of management, protected natural values (protected parts of nature) under national (176.362,0 ha) and international (123.594 ha) regulations (excluding doubling and overlapping), the total area placed under protection amounts to 268.558,24 ha, which accounts for 19.44% of the national territory.

Among existing and planned protected areas, there are also areas of cross-border nature. At the moment, only Skadar Lake, which is shared between Montenegro and Albania, is recognized as a cross-border protected areas and as a cross-border development zone (SPMNE 2008). SPMNE includes a proposal for the establishment of new cross-border protected nature areas, primarily through the link of the National Park Durmitor with the National Park Sutjeska in Bosnia and Herzegovina and planned Regional Park Bioc-Maglic-Volujak in Montenegro (the Regional Park Piva has been established in the same area of the territory). Opportunities for new protected cross-border areas has been recognized in the SPMNE and through the establishment of potentially new national parks: (i) NP Orjen in Montenegro which could be connected with areas of Orjen and Sniježnica in B&H and Croatia and (ii) NP Prokletije (established in 2009) which could be connected with neighbouring areas in Albania (Theti, Bjeshket e Nemuna), Kosovo and Serbia.

Protection of habitats

At the moment, there are no comprehensive targeted programmes, plans and projects implemented by Montenegrin institutions in the field of biodiversity aimed at immediate protection of individual plant and animal species, particular groups of habitats or ecosystems. Due to the lack of funds from national sources, the projects aimed at the protection of species and habitats in Montenegro are mostly implemented by international organizations, or they are funded from international funds.

Until now, the most important projects funded from international sources (which allowed strengthening of capacities of the country to establish a new system for the protection of nature (based on the EU policy and international standards) are:

Regional project: IPA in South East European Countries (2003) funded by the international community (Plantlife International), and implemented by NGO and institutions in the countries of South East Europe, supported identification of internationally important sites for plants (IPA). For Montenegro, 27 locations have been identified and described.

The project supported by the international organization Birdlife International (2004) in Montenegro - NGO identified the following areas of international importance for birds (IBA) in Montenegro: Skadar Lake, Ulcinj Saline, Sasko Lake, Durmitor and Biogradska Gora.

The project for the establishment of Emerald network through the programme of the Council of Europe (2005-2007) was aimed at strengthening the capacities of the country to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The project established the national team composed of representatives of institutions which worked on the identification of habitats and species (of importance for the EU), and on the assessment of their representation. The Emerald database was established within the project in which 32 areas of Montenegro of importance for the protection were entered. This project constituted a form of preparation for the future work on the establishment of N2000 sites in accordance with the requirements arising from the process of accession to the European Union and includes the most comprehensive assessment conducted to date.

- "Serbia, Montenegro and Natura 2000" (2009-2012) - Strengthening capacities of public and civil sector for the implementation of European nature protection legislation": the project funded by the Government of Norway and implemented by WWF, NGO sector and the Institute for Nature Protection. The objective was to

Box 16: Overview of Emerald network in Montenegro



1. Kotor-Risan Bay, 2. Platomuni, 3. Katici Island with Donkova and Velja Seka, 4. Tivat Saline, 5. Buljarica, 6. Brdo Spas, 7. Pecin Beach, 8. Orijen, 9. Lovcen, 10. Rumija, 11. Velika Plaza, 12. River Bojana, 13. Skadar Lake, 14. Cemovsko Field, 15. Djalovica Gorge, 16. Cijevna, 17. Mala Rijeka, 19. Komarnica, 20. Rest of the Piva Canyon, 21. Golija and Lednica, 22. Komovi, 23. Durmitor, 24. Bjelasica, 25. Visitor and Zeletin, 26. Prokletije, 27. Hajla, 28. Sinjajevina, 29. Maglic, Volujak and Bioc, 30. Ljubisnja, 31. Cehotina River Valley, 32. Lim Valley.

strengthen capacities of NGOs to take an active role in the development of Natura 2000 in Montenegro, and to train institution for mapping N2000 sites. Literature data were collected about sites and species in Montenegro of importance for the EU, and the Catalogue of types of sites of Montenegro of importance for the European Union was prepared (2012). The data are entered into a separate database, including the data obtained by limited surveys in the field.

- "National Forest Inventory" (FODEMO Project) (2011) implemented by the Ministry of Agriculture and Rural Development was aimed at collecting data for forest sites in Montenegro and adapting them for mapping in GIS compatible software.
- Pilot project (DBU) which is in the final phase of implementation concerning the development of a methodology for mapping of forest sites and land in Montenegro, supported by the German foundation and the University in Freiburg. DBU will contribute to potential application for the implementation of credit support of IPA funds for the implementation of projects aimed at mapping of sites throughout Montenegro.

These projects have contributed largely to strengthening of capacities of institutions and non-governmental sector for the implementation of the EU legislation in the field of nature protection, identification of sites and species (primarily of importance for the EU) and the knowledge of their distribution.

However, comprehensive and complete knowledge of important sites in Montenegro which could be used systematically for planning and monitoring of their protection have not been achieved. This particularly applies to the establishment of N2000 network, as a legal obligation and one of the key requirements in the EU accession process.

Protection of species

The Nature Protection Act ensures placing under protection endemic, rare and endangered plant and animal species. On the basis of special Decision on placing under protection particular plant and animal species (Official Gazette of the Republic of Montenegro 76/06) 873 species have been placed under protection regime (Table 4).

Table 4: The number of protected taxa by taxons, Source: Official Gazette of the Republic of Montenegro 76/06

Group	Number of protected species	Group	Number of protected species
Fern	2	Mammals	35
Higher plants	272	Birds	298
Algae	6	Reptiles	26
Moss	27	Amphibians	16
Fungi	111	Fish	11
Corals	7	Molluscs	18
Sponges	9	Insects	14
Anelids	6	Arachnids	5
Echinoderms	6	Crustacea	4

The protection of rare, important monumental trees has been traditionally a part of the activities aimed at protection of biological diversity, so that numerous trees of olives, oak and other species have been placed under protection over time.

Particular species are also protected by the implementation of CITES Convention.

Analogous to the situation concerning protection of habitats, the measures and activities which have been taken in Montenegro for the purpose of protection plant and animal species are rather isolated and targeted than a systematic set of actions aimed at long-term conservation of species (and their sites) of importance for the overall biodiversity of Montenegro.

Protection of genes

As for *ex situ* protection of biodiversity, a limited number of activities has been implemented in Montenegro. First, three botanical gardens have been established which ensure the conditions for growing of substantial number of plants: (i) botanical garden of mountain flora in Dulovina in Kolasin; (ii) botanical garden of mountain flora in Brezjojevice near Plav and (iii) Arboretum Gerenal Vojo Kovacevic in Grahovo. There are no zoos or programmes for growing of rare and endangered species in isolation or captivity.

On the other hand, a whole set of collections has been developed with commercially important fruit and grain species for the purpose of conservation of their genetic diversity and they are considered important potential for the development and conservation of agricultural and biological diversity. These collections are mostly funded by the Ministry of Agriculture and Rural Development through the Programme of conservation

and use of genetic sources in agriculture. The most important of them are:

- Collection of vine of *Vitis* genus on Ljeskopolje near Podgorica, where almost 500 species have been conserved, including 303 old sub-types, 13 important genotypes, 165 newly developed sub-types and 10 clones. This collection is included in the international bank of genes of *Vitis* genus (reg. no. YU 03 - Podgorica);
- Wheat collection (*Triticum*) at the Biotechnical Faculty which contains 200 grown and wild sub-types of which 113 samples from domestic Montenegrin population, 47 samples from other parts of former Yugoslavia (Herzegovina, Krajina, etc.), while 40 samples are from Italy;
- Collections of continental and subtropical fruits in centres of the Biotechnical Faculty in Bar and Bijelo Polje. The collection of continental fruit (Agency in Bijelo Polje) includes 6 species of fruit (apples *Malus domestica*, pears *Pyrus communis*, plums *Prunus domestica*, cherries *Prunus avium*, plums *Prunus cerasifera* and walnut *Juglans regia*) with 36 sub-types in total. The collection of subtropical fruit (Agency in Bar) includes 3 species of fruit (olives *Olea Europaea*, fig *Ficus carica* and pomegranate *Punica granatum*) with 44 sub-types. The Biotechnical Faculty also grows eight genotypes of potato, 7 genotypes of clover and 7 feed types of *Medicago* genus.
- The collection of holotypes of Montenegrin endemic taxa is kept at the Faculty of Science and Mathematics, study group biology.

There have been attempts to develop a collection of local sub-types of other important plant species, but they have been unsuccessful due to the lack of equipment and very limited funds. Some previous collections have been lost as well, and the knowledge is insufficient concerning the values and importance of local species/sub-species which are considered less fertile than the new alien species of hybrids. In the last several years, Montenegro has participated in several important projects in the field of agricultural biodiversity which were aimed at improvement of the current situation, but limited results have been achieved.

The Government of Montenegro, via the Ministry of Agriculture and Rural Development, is implementing the programme for conservation of genetic diversity of domestic animals in Montenegro, which has been aimed at encouraging breeding of domestic types of cattle (busa) in Ulcinj, sheep (*pramenka*) in Piva in a rural household in the Pisce place and sheep (*zuja*)

from Zeta, and ensuring funds for purchasing domestic types of cattle for breeding. For the purpose of conservation of genetic potential of agricultural biodiversity, the Government of Montenegro adopted the Action Plan for conservation of agricultural genetic potentials for the period 2009-2013 in June 2008.

2.2 Implementation of NBSAP (2010-2014)

The Action Plan of the National Biodiversity Strategy 2010-2014 contains 54 measures and activities grouped around 7 topics (operational goals) which correspond to key challenges identified in the process of development of NBSAP. On the basis of regular annual reports that the Environmental Agency prepares and submits to the Ministry of Sustainable Development and Tourism, which submits them to the Government for consideration and adoption, an assessment has been conducted concerning the extent to which the Action Plan has been implemented until now. In addition to a short description of implemented activities and the results achieved, an attempt was made to assess the overall progress in the implementation of all 54 measures by giving a corresponding mark in one of the categories²⁴:

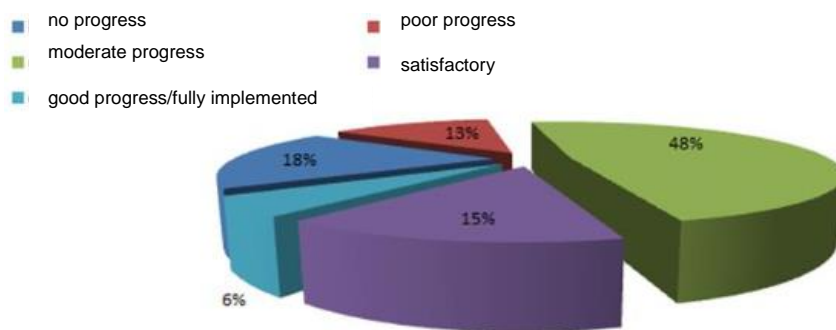


Figure 2: Assessment of the overall progress in the implementation of measures of NBSAP 2010-2014 (Source: Fifth national report on CBD implementation)

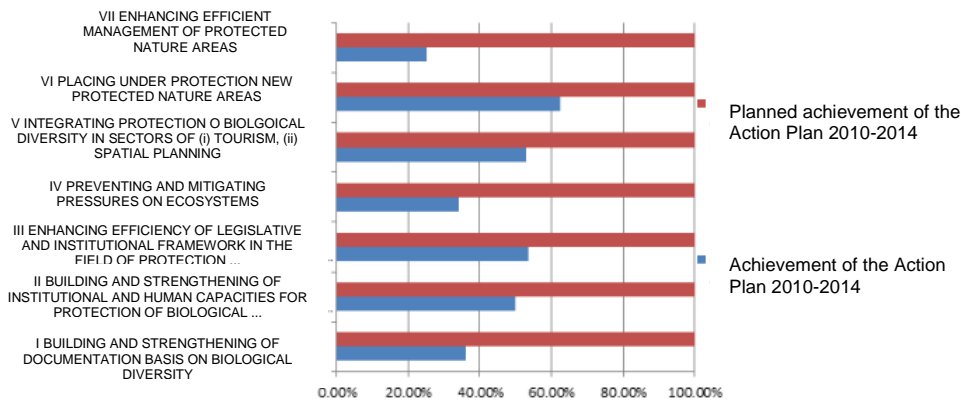
Only 6% of SBAP measures have been implemented fully after three years of implementation of this document, and there has been any progress concerning approximately 1/5 of the total number of measures. A moderate progress has been achieved for most SBAP measures. The assessment of the extent of implementation of the Action Plan suggests that a mixed progress has been achieved concerning achievement of operational goals.

²⁴ Taken from the 5th National Report on CBD implementation

Concerning individual achievement of identified operational goals, the lowest progress has been achieved in: (i) building and strengthening of documentation basis concerning biological diversity, (iv) preventing and mitigating pressures on ecosystems and (vii) enhancing efficient management of protected nature areas.

The greatest progress has been achieved in implementing activities for the following goals: (vi) placing under protection the new protected nature areas; (v) integration of protection of biological diversity in the sectors of tourism, spatial planning and transportation; and (iii) enhancing efficiency of legal and institutional framework in the field of environmental protection.

The operational goal (ii) contained only one measures in which a moderate progress has been made.



Planned strengthening of base data on biodiversity and monitoring programmes are some examples where achievements have been rather modest. For example, there have been no activities concerning the development of red books of species due to the lack of funds. Long-term programme for exploring biodiversity has not been prepared and, despite the SBAP measure requiring expanding of the scope and greater funds for biodiversity monitoring programmes, the opposite trend has been observed (drop of funds and covered areas). However, the biodiversity monitoring programmes and the data collected under them have contributed to the overall level of base information on biodiversity in Montenegro (which particularly applies to the 2011 monitoring programme which was implemented in 22 locations).

A moderate progress has been achieved for most SBAP measures. This applies to the progress concerning inventory of species (endemic, protected, invasive) and establishment of ecological network (Natura 2000), development of capacities for biodiversity protection and its sustainable use, action planning

in the field of biodiversity protection at local level, public participation in making decisions concerning biodiversity, analysis and integration of climate change issues, etc.

Implementation of a number of measures concerning preventing and mitigation of pressures on biodiversity within SBAP topic 4 has also been assessed as moderately successful (this includes activities concerning combating illegal activities in forestry, studies concerning forest sites, effectiveness of impact assessments and assessment of acceptability of interventions in forestry and water exploitation, developing the remaining assessments in fishery, etc.).

This assessment is different and can be considered a moderate result since improved records and the introduction of GIS in forestry and the process of FIS establishment, improved FMP methodology, monitoring of forestry operations, protection of forests from fires, establishment of ecological database have provided certain effects concerning reduction of pressures on biodiversity.

Concerning topic 5 which is related to biodiversity integration, it has been assessed that a moderate progress was achieved for implementation of most (60%) measures. The efforts towards integration of biodiversity in sector policies and plans are visible in tourism, forestry and transportation, but there is still more to be done to ensure that strategic guidelines are appropriately brought down to the operational level and implemented. Inter-sector cooperation also needs to be improved.

A satisfactory progress has been achieved in terms of improvement of legislative framework and harmonization with the EU regulations, and concerning some activities in forestry (for example, protection of seed stands, GIS application, etc.), identification of marine habitats of importance for protection, efforts to develop eco tourism and include biodiversity in development plans in transportation (the latter is more related to a comparison with the previous period than to the level of success), preparations for declaring new protected areas, etc. It is important to point out that a substantial contribution to the implementation of SBAP measures and activities has been provided through several projects, such as the regional project concerning Ohrid, Prespa and Skadar Lakes, the Programme for coastal zone management (CAMP), IPA projects, GEF/UNDP projects in the field of planning in forestry, etc. Within the project "Conservation and Sustainable Use of Biodiversity at Lakes Prespa, Ohrid and Skadar" implemented by GIZ, monitoring of fauna and flora at the Skadar Lake has been identified as Component 1. Monitoring is established in line with the EU Directives.

On the basis of assessment of the level of implementation of the Action Plan, it can be said that a mixed progress has been achieved in terms of achievement of SBAP operational goals. Significant improvements have been identified in the efforts to identify important biodiversity and protect all biodiversity components (SBAP operational goal 1). If ongoing activities are finalized as planned, the achievement (and exceeding) the 10% target for terrestrial ecosystems is likely, which has been achieved in reality (while this is less likely for the 10% target concerning coastal and marine ecosystems). Harmonization with the EU legislation (operational goal 5) is another SBAP goal where substantial progress has been made, but the implementation of new regulations still needs to be improved.

The efforts aimed at the development of capacities have produced certain results in terms of institutional organization and the ability/competences to implement policies (although they are still at insufficient level). Similarly, movements in the right direction have been observed in education and public participation. However, a lot still remains to be done to educate all parties and raise awareness of the importance of biodiversity in Montenegro and to create conditions for full and efficient involvement of public in decision-making processes which are relevant for biodiversity management (goals 6 and 7).

Limitations of the biodiversity monitoring programme (i.e. poor availability of data series for particular locations, habitats and species) aggravate assessment of the progress achieved concerning measures for eliminating/mitigating pressures (goal 2) or even make it impossible. The availability of indicators (goal 3) is also adversely affected by weakness of the monitoring programme. The assessment of progress in the implementation of measures of the Action Plan and SBAP operational goals is also aggravated due to a lack of specific process indicators and quantified goals which would enable a more precise assessment of achievements. The funds for biodiversity protection have not been increased in the past several years (as it was envisaged by the SBAP operational goal 4). This particularly applied to allocation of funds from public sources where biodiversity continues to receive little attention within strict budget limitations and competing priorities.

Reports on SBAP implementation in the last three years have identified a number of obstacles to a successful implementation of the Strategy and its Action Plan, including: insufficient priority given to environmental protection; the level of limitations and incentives connected with biodiversity protection; demographic, social and economic changes which affected biodiversity; insufficient alignment of legal and institutional competences; lack of awareness of biodiversity (at the level of adoption of policies and with the broadest public); and a low level of involvement of public in biodiversity protection. Implementation is also aggravated by inadequate information (explorations, monitoring) for decision making.

2.3 Identified problems in the system of protection

The existing system of protected nature areas in Montenegro is facing numerous challenges. The process of establishment of the network of protected areas has not been completed, and majority of protected areas are fragmented in territorial terms. The Spatial Plan of Montenegro envisages to consider protection of another around 113 ha (or additional 8.2% of the territory) by establishing one more national and 6 regional parks until 2020. Montenegro does not have any marine protected areas. This indicates that declaration of new protected areas is faced with challenges (NP Skadar Lake was declared in 1986, and only 23 years later, in 2009, the NP Prokletije; in the meantime, the Regional Park Piva was declared in 2015 and activities are ongoing towards the establishment of the Regional Park Komovi). The protected areas (except National Parks, Trebjesa Hill, arboretum in Grahovo, City Park in Tivat and Lipska Cave) are protected only *de jure*, because managers do not exist for them, or the possibility of actual protection.

Finally, the system of protected areas is based on the knowledge acquired within traditional doctrine of nature protection which still ensures representation of the most important representative ecosystems in Montenegro.

2.4 Direct factors endangering biodiversity in Montenegro

Despite the availability of limited number of data, it can be claimed that biodiversity of Montenegro is still preserved substantially, but that there is also a growing trend of the number of direct pressures on the values of biodiversity. The overview of the most important pressures is given below.

Box 17: Overview of the existing network of protected areas, 2014



Five national parks: Durmitor, Skadar Lake, Lovcen, Biogradska Gora and Prokletije.

Box 18: Overview of planned network of protected (under SPMNE) until 2020



Although envisaged in the SPMNE, the following protected areas have not been declared yet: National Park Orjen (light green) and 6 regional parks/nature parks (dark yellow): Rumija, Komovi (partly), Sinjajevina, Bioc, Maglic and Volujak, Ljubisnja and Turjak with Hajla.

Changes to habitats

The accelerated development of tourism, particularly on the coast and in Podgorica, followed by the construction of roads and hydro-technical infrastructure, can lead to the loss, degradation and fragmentation of particular natural sites, particularly coastal and wetlands.

Modifications in the practice of the use of land, connected with urban development and tourism development, as well as introduction of new practice in agricultural production, may lead not only to the loss of natural and semi-natural habitats, but also to the loss of agricultural biodiversity, i.e. local varieties and breeds.

It is considered that flora and fauna of the coastal zone are the most endangered in Montenegro. This region is under pressure of tourism development and intense urban development which, due to increased discharge of polluted and untreated wastewater into the sea, endangers marine ecosystem particularly in tourist zones such as Boka Kotorska. The most endangered habitats on the coast are: (i) dunes on Velika Plaza in Ulcinj (one of the last shelters of the unique and rare halophyte vegetation) and (ii) the remaining parts of the Skadar oak forest (*Quercus robur scutariensis*) in Stoj in the hinterland of Velika Plaza. Ornithofauna which gravitates towards these habitats is endangered by hunting.

The greatest danger for water and wetland habitats is created by eutrophication, which is a consequence of pollution from human settlements. Except for the practice of direct use of biological resources from freshwater ecosystems, the plans for their drainage are a possible threatening factor for plant and animal communities, fish population in particular. Threats to water and wetland sites, and hunting of waterfowl, represent one of the main threats for biodiversity.

Dry meadows in Montenegro are very rare in terms of size and that is why they are considered one of the most vulnerable sites in Montenegro. Their conversion into arable orchards and vineyards have led to their reduction and disappearance.

The development of new practices in agriculture and market pressures have led to erosion of agricultural biodiversity, primarily domestic varieties and breeds which are reducing and disappearing from households or their genetic basis has been modified due to crossbreeding with other varieties and breeds introduced from other regions.

Box 19: Coastal ecosystems are some of the most vulnerable in Montenegro

Intense urbanisation of the coastal zone of Montenegro has caused the loss, degradation and fragmentation of typical Mediterranean habitats. At the same time, it has multiplied pressures on the environment (for example, wastewater, water use, etc.)



Budva in 1925 and 80 years later

Population of protected tree spurge on the Spas Hill above Budva is directly endangered by intense urbanisation.

Excessive exploitation

Forest exploitation shows a growing trend in the size of harvested wood mass in the previous ten-year period. Forest policy considers that harvesting should not exceed 2/3 of annual increment. The activities can cause a particular threat to the quality, whereby the highest quality trees carrying wood volume are harvested for economic reasons, but such trees also drive the quality genetic material, which degrades the quality of future stands. However, despite this, areas under forests have been extending in the past years, and the biological survival of species is not threatened, not only due to afforestation, but also due to natural regeneration and expansion of forests due to abandoning of agricultural land. This creates a specific situation where areas under forests increase with reduction of wood volume and the quality of wood assortments. The National Forest Policy underlines the importance of sustainable harvesting in the future and places an increasing emphasis on multiple use of forests, including protection of biodiversity in forest ecosystems, protection of water zones, development of tourism and recreational activities.

Gravel exploitation in some areas (particularly in Lim and Moraca River Valleys) has a very distinct adverse impact on biodiversity.

Illegal hunting and fishing, as well as unplanned harvesting of forest and other fruit, can be additional threatening factors. The status of game in Montenegrin hunting grounds has not been easy to assess until now due to undetermined respective methodology. The data on numbers and the status of game at the moment are based on the data received from users of hunting grounds, who collect data on the basis of the methods given in Hunting Development Programmes. Adopting of the Act on Changes and Amendments to the Game and Hunting Act created the legal framework for adopting secondary legislation which will regulate the matters of use of a single methodology for establishing the number of game. Also, there is little reliable data on the fish stock and its productivity in the last 15 years. While ships practicing marine fishing are requested to keep ship logs with data on catches, species and fishing efforts in accordance with FAO standards, it is not done properly and catches are often not reported. Also, there is a certain level of illegal fishing in the coastal zone and it is difficult to assess whether marine fishery is currently sustainable.

The data on changes to the number and structure of fish populations in the Skadar Lake are also limited (detailed data and estimations of fish stocks have not been published since the '80s). Experts' estimations concerning fishing indicate that fish populations in the Lake have dropped due to increasing

pollution from the basin, illegal/uncontrolled fishing, interruption of migratory route of marine species on Bojana and the lack of protection measures for the fish stock in the Albanian part of the Lake.

Utilization of natural waters for irrigation (mountain lakes) pose an additional threat to biodiversity.

Pollution

Freshwater and marine ecosystems are mostly polluted by wastewater and solid waste which not only harms organisms directly, but leads to accelerated eutrophication in these ecosystems. Industrial waste can also be discharged into waters and affect directly the functioning of ecosystems. Discharging of untreated wastewater from sewerage networks of municipalities on the Montenegrin coast into the sea represent an important source of threats to the quality of bathing water and marine biodiversity. Only Budva municipality (since November 2014) of all municipalities on the coast has a wastewater treatment plant for the water collected from urban parts. In the central and northern part, the wastewater treatment plants operate only in Podgorica, Zabljak and Mojkovac. However, there are ongoing activities concerning designing and construction of wastewater treatments plants in many municipalities. It is particularly concerning that, currently, rivers Ibar, Cehotina, Zeta, Lim, Plavsko and Pivsko Lakes, as well as the Adriatic Sea, are direct recipients of untreated wastewater.

Currently, around half of municipal waste in Montenegro is disposed on unregulated disposal sites, and less than 15% of municipal waste is processed (National Waste Management Strategy).

There are locations in Montenegro with stored hazardous waste which is a direct threat to biodiversity (for example, impact of unregulated disposal site for hazardous waste in KAP on the Skadar Lake ecosystem).

Climate change

According to the Second National Communication to UNFCCC for Montenegro (2015), it is expected that climate change in Montenegro will lead to the increase of temperature and a drop of precipitation, which will affect ecosystems and their biodiversity. The data on phenology of woody species indicate indirectly the presence of consequences of climate change on the productivity of some ecosystems in Montenegro. The available data show that flushing of some species (acacia, linden, oak, maple, poplar, pine and maritime pine) starts several days earlier than usual. According to this scenario, the

populations of amphibians and reptiles in karst areas of Montenegro and on the coastal mountains will be particularly affected. As for marine ecosystems, it is expected that envisaged climate change will lead to a quicker eutrophication of shallow and limited parts of sea waters, and the introduction of new thermophilic (invasive) species from southern biogeographic zones (the Second National Communication to UNFCCC, 2015).

If there is no good protection and care, the threat to biodiversity will weaken further the functions of ecosystems and their ability to mitigate and adapt to climate change and provide other services which are required for the well-being of humans.

Introduced invasive species

Systematic studies of invasive species in Montenegro have not been implemented, but some individual studies suggest the presence and expansion of introduced species, although there are no assessments concerning their impact on local ecosystems and autochthonous species.

Invasive species and their routes are known in the Mediterranean (Zenetos et al., 2012). Ballast waters from ships arriving to the Montenegrin coast are treated. Nine marine invasive species have been identified until now, five of which have a stable presence (RAC SPA Centre). The species considered to have the potential to cause the greatest damages is *Caulerpa racemosa* var. *cylindracea*.

Development of inventory of alien species was planned under the previous NBSAP but, until now, coordinated steps at national level have not been taken to that end. It has been proposed to prepare a list of alien species in Montenegro. The European Environment Agency has established information system and the early warning system for invasive species in which Montenegro does not participate at the moment.

2.5 Indirect drivers of factors endangering biodiversity

The causes of factors which endanger biodiversity, i.e. indirect drivers of identified threatening factors, are various economic activities, as well as weaknesses in the environmental management system.

Lack and unavailability of data

The lack and unavailability of data for reliable decision-making, as well as the lack of coordination and cooperation between sector also affect the found situation and contribute to problems

resulting in degradation of biodiversity and its values. Insufficient financial and human capacities also influence this situation.

Financing

The above is connected with an extremely low level of public financing in the field of nature and biodiversity protection. The total amount of 2 million EUR/year (or 1.800 EUR/km²) which is current investment in protected areas, is not sufficient for efficient management of the network of protected areas. This is less than in many other countries of central and eastern Europe.

For illustration purposes, 60.000 EUR was allocated in 2011 for biodiversity status assessment through the environmental monitoring programme, while NBSAP 2010-2015 assessment was that 80.000-200.000 EUR needed to be allocated. The amount of 60.000 EUR in 2011 was the record amount allocated for this purpose during the implementation of NBSAP 2010-2015. This amount was reducing progressively in the following years and amounted to 10.000 EUR in 2014. This clearly indicates that the assessment of biodiversity status could not have been conducted due to the lack of funds.

The continued practice of giving the protected areas a low priority in terms of policy and investments will produce economic losses. The continuation of this trend of no investments in the natural capital, the cost for the economy and the population of Montenegro can exceed 35 mil. EUR in the next 25 years (Emerton, L. 2011).

According to recent studies²⁵, there is a high economic return from public investments in protected areas. So, the decision on investment in natural capital implies a significantly larger scope of public investments than the continuation of "current practice". These costs are largely exceeded by generated economic benefits. Net benefits will be more than doubled in the next 25 years, and protected areas will generate the total return of almost 29 EUR per 1 EUR of invested public funds.

The decision to invest in natural capital may create a stable growing added value for the Montenegrin economy and population compared to the continuation of "current activities" thus generating added benefits worth more than 1.5 billion EUR in the next 25 years.

One of the main essential causes to direct pressure on biodiversity and one of the main reasons for insufficient progress in the implementation of protection measures is a low awareness of the importance and values of biodiversity at all levels (from citizens to decision-makers), which results in biodiversity matters always having low priority.

There seems to be general public awareness in Montenegro concerning the wealth and beauty of the country and its potential for tourism, and the need for its conservation has been well-accepted. The Ministry of Sustainable Development and Tourism, as well as the Environment Agency of Montenegro, has supported numerous projects and activities aimed at raising awareness of the importance of biodiversity.

However, understanding of the need for protection and investing in the natural capital needs to be addressed better with decision-makers so as to raise the level of priority concerning addressing biodiversity matters and funding in the next period. The first substantial step in this direction is to include economic assessment of the value of biodiversity and protected areas.

Box 20: Funding of monitoring of biodiversity status

Only 10.000 EUR is the total amount allocated for monitoring the status of biodiversity in Montenegro through the environment monitoring programme in 2014

Box 21: Economic return of investments in protected areas in Montenegro is substantial

"Protected areas will generate the total return of almost 29 EUR per 1 EUR of invested public funds"

Box 22: Economic potential of protected areas in Montenegro is large and unused

"Tourists and visitors who come for recreation are willing to pay almost 19 million EUR/year more than is currently charged for tickets"

²⁵ Emerton, L.: The economic value of protected areas in Montenegro, 2011

III STRATEGIC DIRECTIONS

The Strategy identifies 7 strategic directions (strategic targets) for the period until 2020 which are reflected in the need for: (i) biodiversity to be "de facto" among social and political priorities; (ii) multidisciplinary and multi-sector approach to biodiversity protection; (iii) establishment of an efficient mechanism of funding and switch to sustainable biodiversity economy; (iv) substantial reduction of identified direct pressures on biodiversity; (v) creating preconditions and implementation of targeted measures for the protection of the most endangered parts of biodiversity; (vi) creating an efficient ecological network as the main mechanism for biodiversity conservation and (vii) improvement of knowledge of biodiversity and its broad and equal accessibility.

For the purpose of monitoring of achievement of strategic targets, a set of 21 operational targets and 71 corresponding measures (in the Action Plan) has been provided, and indicators are also given for measures which should enable easier monitoring of their achievement. In accordance with the progress in the implementation of measures, the need for changes to the Action Plan will be reviewed periodically so as to achieve the defined targets more efficiently.

1. VISION AND STRATEGIC TARGETS

The vision for Montenegro until 2050:

"Functional ecosystems and wealth of biodiversity are the basis for a sustainable and harmonic framework for the development of Montenegro and its citizens."

Achieving the vision requires achieving the following targets:

STRATEGIC TARGET A: UNTIL 2020, BIODIVERSITY PROTECTION IS IN PRACTICE ONE OF SEVERL MOST IMPORTANT SOCIAL AND POLITICAL PRIORITIES IN THE OVERALL DEVELOPMENT		
1.	Operational target	a) The society recognizes benefits from biodiversity and the need for priority protection
2.		b) Make biodiversity become a "positive" and priority topic for decision-makers
STRATEGIC TARGET B: BIODIVERSITY IS PROTECTED BY MULTIDISCIPLINARY AND MULTISECTOR APPROACH		
3.	Operational target	a) Existing mechanisms are fully used thus allowing integration of biodiversity at all levels
4.		b) General mobilization of resources achieved, as well as efficient multi-sectoral monitoring of NBSAP implementation
STRATEGIC TARGET C: AN EFFICIENT MECHANISM FOR FINANCING OF BIODIVERSITY PROTECTION ACHIEVED, AS WELL AS A SWITCH TO SUSTAINABLE BIODIVERSITY ECONOMY (AS A PART OF GREEN ECONOMY) AND NECESSARY CAPACITIES BUILT UNTIL 2020		
5.	Operational target	a) Achieving sustainable financing of biodiversity protection
6.		b) Integration of sustainable biodiversity economy into main flows of national and sector policies, strategies, plans
7.		c) Use of specific fiscal, market and policy instruments based on prices as a support to conservation of biological diversity, sustainable production and consumption
7.		d) Establishing a legal, institutional and implementation framework for introducing PES
STRATEGIC TARGET D: SIGNIFICANT REDUCTION OF IDENTIFIED DIRECT PRESSURES ON BIODIVERSITY UNTIL 2020 REGISTERED		
8.	Operational target	a) Reduction of pressures from sectors: spatial planning/civil engineering
9.		b) Reduction of pressures from sectors: environmental protection/public utilities
10.		c) Sustainable agriculture, forestry and water management
11.		d) Reduction of pressures from sectors: transportation, energy and infrastructure development
12.		e) Achieving sustainable tourism
13.		f) Measures to mitigate impact of invasive species
14.		g) Measures to mitigate impacts of climate change
STRATEGIC GOAL E: UNTIL 2020 PRECONDITIONS CREATED AND TARGETED MEASURES FOR BIODIVERSITY PROTECTION IMPLEMENTED		
15.	Operational target	a) Activities implemented to protect the most endangered species
16.		b) Activities implemented to protect the most endangered habitats
17.		c) Support conservation of genes
STRATEGIC TARGET F: ENVIRONMENTAL INFRASTRUCTURE AS THE BASIS FOR CONSERVATION OF NATIONAL BIODIVERSITY CREATED UNTIL 2020		
18.	Operational target	a) Establish an integral and efficient green network which also includes new protected areas
19.		b) Ensure efficiency of the network by improving management
STRATEGIC TARGET G: KNOWLEDGE OF BIODIVERSITY IMPROVED, SYSTEMATIZED AND WIDELY AND EQUALLY AVAILABLE THROUGH DEVELOPED MECHANISMS		
20.	Operational target	a) Develop researches and organize an efficient system for data collection and processing
21.		b) Make information about biodiversity publicly available, compile

		knowledge and ensure equitable distribution of benefits of genetic diversity
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STRATEGIC TARGET A: UNTIL 2020, BIODIVERSITY PROTECTION IS IN PRACTICE ("de facto") ONE OF THE SEVERAL MOST IMPORTANT SOCIAL AND POLITICAL PRIORITIES IN THE OVERALL DEVELOPMENT

While nature and biodiversity protection has been declaratively very high among the national political priorities since 1991 and reinforced by adopting the Strategy for Sustainable Development (2007) and the Biodiversity Strategy with the Action Plan (2010-2015), the current situation in the field of biodiversity protection indicates that the set targets and measures have not been always supported by systemic actions.

Consequently, the targets set by the Strategy for Sustainable Development (for example, 10% of protected areas should be marine habitats) and the Biodiversity Strategy (most measures implemented partly²⁶) have not been implemented fully, and the projection of protected areas from the SPMNE has not been achieved. The reasons for such performance are numerous, but can be divided into three most important groups:

(i) The reasons caused by targets set too ambitiously: Biodiversity Strategy 2010-2015 is the "first generation" of biodiversity strategies which, generally (for many other countries) placed a distinct emphasis on the implementation of activities which are necessary or missing in the biodiversity protection system. Often, and particularly in the case of Montenegro, these weaknesses result from decades without actions, and the desire to have them achieved in a short period such is the period for the Strategy implementation²⁷ can be considered ambitious.

(ii) The Biodiversity Strategy was not a priority in making decisions. This Strategy (and proposed supporting measures) emphasized economic indicators of biodiversity value, services that it provides, as well as economic potentials to assist decision-makers in reviewing all positive sides of biodiversity conservation.

(iii) A lack of public financing to the extent necessary for implementation of measures. The services provided by ecosystems are numerous and very important, but often have no market value. Therefore, in order to protect its natural capital, the country cannot leave the care for biodiversity and nature protection to market principles, but it is necessary for investments in the shared "natural capital" to be constant and one of the priorities in budget planning, which has not been the case until now. Additionally, there are many other reasons why

²⁶ Taken from the Fifth National Report on CBD Implementation.

²⁷ Although the matter of necessity for implementation of such measures are not challenged.

it is economically justified to raise the level of public investments in biodiversity protection.

In the field of strengthening of public awareness for biodiversity protection, a significant step has been made in the previous implementation period. However, a lot more targeted actions and continuous efforts will be needed to improve understanding of the need to protect biodiversity, particularly the benefits of biodiversity for the society.

For this reason, the emphasis in the next period will be placed on integrating economic indicators of biodiversity value into the existing policies and their quantitative expression for the purpose of simpler understanding of the overall social benefits from biodiversity.

The second Biodiversity Strategy aims to eliminate the (listed) obstacles which are assessed as particularly important for failure to meet the targets from the previous implementation period and thus allow achieving preconditions for the implementation of this Strategy. Once envisaged measures have been implemented (until 2020), biodiversity protection should be a positive topic, high on the list of priorities of decision-makers when making the decisions, which will reflect in the implementation of planned activities.

STRATEGIC TARGET B: BIODIVERSITY IS PROTECTED BY ALL STAKEHOLDERS AND BY MULTISECTOR APPROACH

The introductory part of the Strategy suggests that it cannot be applied if its implementation relies only on several institutions which have biodiversity protection in the description of their main tasks. Biodiversity protection, and its benefits, belong to all. **Therefore, achieving targets set by this Strategy is possible only through mobilisation of all existing resources.**

As already stated, the level of public financing for biodiversity protection is extremely low (not more than 2 million EUR/year) and, consequently, there are limited capacities (human and financial) for the implementation of necessary measures by the public sector for the purpose of nature protection.

On the other hand, there are substantial investments by international institutions/donors who fund activities in the field of nature/biodiversity protection through numerous activities implemented by the non-governmental sector, Universities, project offices, etc. These institutions/organisations also have or are able to mobilise significant capacities which contribute to improvement of the situation in this field. The potentials for financing and mobilising capacities are multiple times greater if the activities implemented in the sectors whose activities influence the status of biodiversity (tourism, transportation, energy, etc.) are taken into account, as well as individual capacities and the capacities of civil society organisations.

The goal of this Strategy is to compile the above potentials for the purpose of more efficient implementation of biodiversity protection objectives, i.e. to ensure a wide mobilisation of resources so as to ensure timely implementation and division of responsibilities to all entities (whether they are protecting, endangering, directly or indirectly use biodiversity). This is the only way to conserve biodiversity and benefits it provides to the society.

In those terms, the Strategy proposes the following groups of activities:

It is necessary to continue integrating biodiversity protection measures into other sector Strategies. To this end, the progress achieved through the implementation of EIA and SEA should be strengthened through the obligation of full integration of biodiversity protection into SEA, including expressing of specific values and services provided by the respective biodiversity and consistent application of the acceptability assessment mechanism.

A particular role in continuous monitoring of the implementation of this strategic target B (in addition to existing mechanisms) and strengthening of inter-sector cooperation is envisaged for the National Council for Sustainable Development and Climate Change (NCSD). The NCSD should consider implementation of this goal at least once a year. On the basis of progress in the implementation of set targets, and newly-created circumstances, the Council proposed to the Ministry changes or amendments to the measures established in the Action Plan. By default, targets of this Strategy remain unchanged, while changes or proposals of new measures which will contribute more efficiently to achievement of targets is desirable.

It is necessary to strengthen further and institutionalize cooperation between line institutions and non-governmental sector, Universities, institutions and professional individuals who have substantial knowledge and experience (often lacking) so as to create the platform (and mechanisms) for a coordinated integration of the targets of the Strategy into broader social activities, timely exchange of information, achieving a synergy effect, professional discussion concerning biodiversity, as well as technical assistance (particularly JLS). This cooperation will be particularly important for successful fulfilment of complex obligations in the EU accession process (for example, NATURA 2000 network) which require mobilisation of all available resources.

Regarding vertical harmonization, full transposition of this Strategy into LAPBD in all municipalities, **whereby a functional mechanism will be established to monitor implementation of local plans**, the level of financing of activities in the field of biodiversity protection at local level, as well as provision of technical and other support in the implementation from the state level.

In order to improve vertical and horizontal communication, the coordination between the Environmental Agency and the Ministry of Sustainable Development and Tourism concerning communication and exchange of information on biodiversity with other state institutions/sectors and JLS when developing plans and programmes. A special role will be the provision of assistance concerning information about biodiversity for the needs to parties which are obliged to apply some of the mechanisms for biodiversity integration into development activities (SEA, acceptability assessment, etc.).

STRATEGIC TARGET C: AN EFFICIENT MECHANISMS FOR FINANCING OF BIODIVERSITY PROTECTION ACHIEVED, AS WELL AS A SWITCH TO SUSTAINABLE BIODIVERSITY ECONOMY (as a part of green economy) UNTIL 2020

The trend of reduction of public financing is not a problem of only sectors of biodiversity protection and conservation, but it influences other sector policies. Therefore, the level of public investments in biodiversity protection needs to be raised (and reverse a decreasing trend in the last 5 years) because investing in natural capital is economically justified (the return of 25 EUR can be expected in the next 25 years for every 1 EUR of public finances invested in the system of protected areas)²⁸.

According to the operational target B and the fact that biodiversity protection is the interest of all, and that it is impossible without a broad mobilisation of all available resources, the existing sources of financing need to be consolidated further through strengthening of a partnership relationship with relevant institutions, which includes implementation of measures and achieving targets of this Strategy by its systemic integration into the existing and planned activities which are implemented with financial assistance of international donors, projects implemented by NGO sector, activities of the Montenegrin Academy of Sciences and Arts, University and private companies. In this way, the line Ministry will build partnerships to address multiplier effects of the activities in the field of biodiversity protection and averting overlapping of activities and results for which financing has been provided. Also, the burden of financing of measures for conservation and protection of biodiversity will be diversified by their integration into budgets of other relevant Ministries/institutions and possibilities will be explored for environmental-fiscal transfers or more efficient allocation of funds from the state budget for locations or sectors which play a key role in maintaining biodiversity and ecosystems producing broader benefits for the society and the economy.

Innovative financing mechanisms will be developed as well. These innovative mechanisms should include encouraging the development of the green economy, biodiversity-business partnerships and mechanisms for public raising of funds.

²⁸ See 2.5

One of the main targets of this Strategy is the switch to sustainable biodiversity economy within the green economy in accordance with the existing economic policy (particularly Development Directions of Montenegro in the period 2013-2016). This is a way to ensure that the Strategy is incorporated and supportive, and not separate or conflicting with other, national and sector strategies and plans. That ensures implementation of comprehensive activities for integrating biodiversity into development policy and practice.

To this end, the Strategy particularly proposes implementation of three sets of measures:

a) Integration of sustainable biodiversity economy (as a part of green economy) into main courses of national and sector policies, strategies and plans

This NBSAP explicitly recognizes and attempts to address the needs for:

- Sustainable utilization of land and resources, and production and consumption which takes account of natural wealth by making them relatively more profitable than biologically and ecologically unsustainable options;
- Improvement and expansion of the market by green products and services making them more attractive for producers and consumers with respect to the price;
- Opening of green jobs and acquiring professional knowledge to, at the same time, generate income and reallocate workforce in the activities and sectors which are of use for biodiversity, and ensure the capacities necessary for growth in these sectors;
- Promoting public and private investments in green infrastructure, including options for developed infrastructure which averts adverse effects on biodiversity or which serve improvement of biodiversity, as well as encouraging investments in maintaining "natural infrastructure", and means to ensure key services and amenities; and
- Encouraging investments of public and private funds in businesses, technology and innovation in the field of biodiversity, working on prevailing obstacles to access to funds and improvement of return from such investments.

b) Use of specific fiscal, market and policy instrument based on prices as a support to conservation of biological diversity, sustainable production and consumption

It is recommended (Emerton, L. 2013a) to use specific fiscal, market and policy instruments based on prices as a support to

Box 23: What is green economy?

"Approach which not only attempts to manage economic sector environmental impact, but tries to use opportunities provided by the environment in order to stimulate and accelerate economic growth". Emerton, 2013a

Box 24: Example of PES establishment in France:

conservation of biological diversity, sustainable production and consumption. This concerns also ensuring of positive incentives and achieving sustainable production and consumption (Aichii Targets 3 and 4), as well as the establishment of necessary economic and financial requirements for addressing the risks which threaten individual sectors, species, habitats and biome (strategic target D of this Strategy and strategic targets: B, C and D of global Aichii Targets).

c) Establishing a legal, institutional and implementation framework for introducing PES (payment for ecosystem services)

The development and establishment of PES can support directly the achieving of Aichii targets 3 and 4 and represent a positive addition to the protection and sustainable use of biodiversity, as well as sustainable production and consumption. Additionally, if applied in a targeted manner to specific sectors, species, habitats and biome, PES is potentially a powerful tool in contributing to the implementation of the strategic target D of this Strategy as well.

PES can be implemented through various models such as: ecologically fiscal transfers (earmarking a part of state revenues and allocating them to local government or a local manager for the purpose of award and incentive to preserve ecosystem services which are also used outside their territory-competence) or by introducing new tariffs or charging for ecosystem-dependent products or sectors (for example, supplying of water system from springs in protected areas) or by direct use of public funds for paying for private land of importance or owner-manager who supports ecosystem services if economically justified.

In order to allow efficient monitoring of the level of financing of biodiversity protection, as well as the efficiency of used funds, budgets need to have clearly designated items for these purpose, and it would be important to establish a separate Biodiversity Fund (possibly within the Eco Fund). Having in mind experiences with the establishment of the Eco Fund so far, an alternative could be sought in the opening of a special sub-account to which funds would be paid which are dedicated for biodiversity protection and collected through campaigns and other activities for raising funds, various partnerships, payment for ecosystem services of protected areas, etc. This account would finance particular activities in accordance with this Strategy.

Perrier Vittel S.A, the biggest world producer of natural mineral water, concluded that the protection of water sources was more cost-efficient than the construction of filtration plant or relocation to new springs. Therefore, Vittel designed and implemented PES scheme in order to improve the quality of water by reducing pollution originating from nitrates and pesticides and re-establishment of natural purification of water. For this purpose, at the prices higher than the market prices, purchased a part of the land from agricultural producers, and then established a payment scheme of around 230 US\$/ha for every farmer who agreed to use less invasive methods in their household in the next 7 years, as well as the mechanisms for free aid from the company in this field.

In this way, Vittel spent more than 25 mil. US\$ and contracted protection of around 10.000 ha.

STRATEGIC TARGET D: SIGNIFICANT REDUCTION OF IDENTIFIED DIRECT PRESSURES ON BIODIVERSITY UNTIL 2020 REGISTERED

The identified threatening factors for biodiversity have not changed in the last decade and, therefore, it is not realistic to expect their full elimination in the period of the Strategy implementation. The target is to register a substantial reduction in every identified pressures on biodiversity until 2020 (see Chapter 2).

Substantial reduction of adverse impacts on biodiversity requires implementation of a number of system measures which largely depend on inter-sector coordination and availability of funds. Starting from the above, but also from the fact that different sectors faced difficulties in obtaining valid information on biodiversity status in the previous period, this Strategy envisages a measure²⁹ for improvement of availability of information in the field of biodiversity for all sectors (including energy, transportation, tourism, etc.). This will contribute to more efficient integration and implementation of biodiversity protection measures and improve application of existing mechanisms (SEA, EIA).

a) Sector of spatial planning/civil engineering

Accelerated urban development represents an important pressure on biodiversity and it is the most distinct in the coastal zone, and in the most interesting locations from tourism aspect. In order to mitigate the impact of accelerated urban development on biodiversity, the proposal is to establish a mechanism of marketability permits in the civil engineering sector, an imperative application of the principle of compensation for a lost habitat and further full integration of biodiversity protection measures into the spatial planning policy. Mandatory consideration of biodiversity protection and services needs to be ensured in the development of state planning documents³⁰.

b) Sector of environmental protection/public utilities

Due to discharge of untreated wastewater, eutrophication occurs as an important problem, particularly in river, wetland and lake ecosystems. Threats to the following rivers has been registered: Moraca, Zeta, Lim, Boka Bay and the Skadar Lake. A significant reduction of the impact o this factor is expected after implementation of the relevant EU Directives (UWWTD). As a priority and completely, direct discharge of wastewater into

²⁹ Measure B5 in the Action Plan

³⁰

ivers, lakes and the sea without prior treatment must be eliminated. Also, Impact of point polluters on very sensitive karst ecosystems should be examine.

Municipal waste is a threat to biodiversity mostly through mechanisms of contamination of ground underground and running waters. It is expected that the implementation of the national waste management policy (National Waste Management Strategy until 2030 and the State Waste Management Plan 2015-2020) will attribute special attention and priority to eliminating of identified waste disposal sites which are located (or very close) to river banks as very sensitive ecosystems (primarily Lim and Tara).

Industrial waste is a serious threat to nature and, thus, for biodiversity in Montenegro. In particular, the locations where hazardous waste is located affect changes to biodiversity (such as impact of grit in Bijela on the coastal ecosystem or impact of the landfill of hazardous waste in KAP in the Skadar Lake). These threats need to be eliminated completely.

c) Agriculture, forestry and waste management

Further efforts should be continued so as to achieve sustainable forest management. Recent adopting of the National Forest Policy (2013) is a significant step forward in these terms. Combating illegal and unplanned activities in forestry must be continued. Substantially greater efforts are also needed to eliminate threats originating in illegal hunting and fishery. Impact of illegal undersea fishery on biodiversity of the coastal zone is particularly distinct. The control of and combating forest fires should improve further. In the next period, work should be aimed at improvement of control of harvesting of non-timber products so as to reduce pressures on biodiversity of specific species.

In the field of agriculture, biodiversity protection measures need to be integrated into the existing policy, particularly in the field of prevention of conversion of natural and semi-natural grass formation into agricultural areas.

Particular attention must be paid to reducing the impact of illegal exploitation of gravel and sand and sanctioning of registered illegal activities which are a serious biodiversity threatening factor, as well as a full integration of biodiversity protection matters into future plans of river basin management.

d) Transportation, energy and infrastructure development

The efforts towards further integration **and operationalization** of biodiversity protection measures when developing

infrastructure in the field of transportation and energy should be continued so as to achieve full integration of biodiversity protection matters into these policies. The cooperation with these sectors should be improved additionally and provide an additional level of information on biodiversity for the purpose of quicker and more efficient integration. The plan is to improve the cooperation with these sectors through the biodiversity information system and by appointing a contact person for cooperation in the Environmental Agency.

e) Tourism

Further integration of biodiversity protection measures into plans and programmes is necessary in the sector of tourism **through concretization** of measures for the protection and development and application of incentives for the development of ecological tourism.

f) Invasive species

A systematic exploration of invasive species needs to be implemented on the basis of the list of introduced species, including collection of data on the extent and nature of invasiveness. The capacities for control and treatment of ballast waters needs to be strengthened in particular.

g) Climate change

Recent studies³¹ on the impact of climate change in Montenegro have provided a general overview of mechanisms and potential impacts, with a particular reference to forest ecosystems. The preliminary identification of habitats and species which are likely to be exposed to the greatest pressures due to climate change (for example, karst habitats, reptiles and amphibians) has been conducted within the First National Communication to UNFCCC (2010). A whole set of potential impacts on different biodiversity components has been identified as well. This knowledge needs to be improved and expanded. Specific mechanisms and the impact of climate change needs to be explored thoroughly, particularly on sensitive areas/ecosystems (primarily marine and Alpine), and propose measures for their mitigation.

³¹ Including reports prepared by the Ministry of Sustainable Development and Tourism and the Ministry of Agriculture and Rural Development in 2013 (with UNDP support), which assess the vulnerability of the forestry sector to pests and forest diseases and analyze impacts of climate change on the future distribution of the most important tree species in Montenegro, as well as the data of the National Communication on Climate Change - the First National Communication from 2010 and the Second National Communication (February 2015).

STRATEGIC TARGET E: UNTIL 2020 PRECONDITIONS CREATED AND TARGETED MEASURES FOR BIODIVERSITY PROTECTION IMPLEMENTED

This target primarily encourages ensuring of information on habitats and species of importance for the protection at national and international level. Having in mind the level of existing information about species and habitats of importance, this target envisages improvement of this knowledge with additional information concerning the assessment of the status, vulnerability and distribution. This will form a professional basis for assessing vulnerability and, thus, the basis for a comprehensive planning of necessary protection measures - in the form of required Action Plans.

It is expected that, as a result of this activity, **until the end of the planning period, a specific number of Action Plans is implemented** for the protection of the most endangered species and habitats. By the implementation of these Action Plan, in addition to the measures aimed at reducing overall pressures³², targeted measures will be implemented as well which should contribute to the protection of individual species or habitats which are assessed as the most endangered ones.

A systemic activity for which it is necessary to consolidate all available scientific capacities is the development o the Red Book of Flora of Montenegro. It is envisaged that the lead role in the implementation of this activity belongs to scientific institutions with support from line ministries in mobilising resources, existing information and capacities.

Special activities are planned for the protection of genetic fund in terms of drafting of planning documents and implementation of measures for seed stands and supporting traditional breeding of particular domestic animal breeds and plant, fruit and vegetable varieties.

Also, it is necessary to improve substantially the management of existing collections so as to stop their degradation and allow lasting improvement.

³² See previous strategic target.

STRATEGIC TARGET F: ENVIRONMENTAL INFRASTRUCTURE AS THE BASIS FOR CONSERVATION OF NATIONAL BIODIVERSITY CREATED UNTIL 2020

The existing environmental infrastructure of the sea will improve substantially in the next period, although certain steps in this direction have already been made³³. **It is necessary to strongly and continuously pursue declaring of the remaining protected areas** (as per strategic provisions given in the SPMNE) **and have at least 17% of protected state territory by 2020**. The main role in this process should belong to the following processes: (i) establishing the remaining regional parks/nature parks through participation of all interested parties with an emphasis on the existing potential for the development of green economy and well-being of the local population; and (ii) declaring (at least 10% of the total territory of protected areas) marine protected areas. Extending protection to the marine and coastal zone of Montenegro allows that the national biodiversity protection system is characterized as comprehensive and integral.

In parallel with declaration of new ones, it is necessary to strengthen capacities for managing the existing protected areas. The goal is that (until the end of implementation period of this Strategy) none of the larger protected areas is left without an appointed manager, management plan and source of funds.

One of the most complex activities in the next period will be the establishment of an environmental network which will consist of the network of species and habitats which are of national, but also of international importance (establishment of Natura 2000 network is one of the preconditions for Montenegro to join the EU). A certain number of activities in this direction has been implemented in the past period, mostly from the funds of international assistance. This **Strategy is aimed at finalizing the initiated processes and declaration of the ecological network not later than 2020** in accordance with national legislation. This complex task required mobilization of all available national resources (see measure B.6), as well as further support of international institutions. It is expected that a significant support for the implementation of this activity will be provided by IPA funds. It is reasonable to expect that this ecological network will be improved and harmonized in the

³³ This mainly refers to international projects which supported identification of important habitats and species and establishment of regional parks and marine protected areas in Montenegro in the past period (see more details in Chapter 2).

period following 2020 in the context of Montenegro's EU membership.

STRATEGIC TARGET G: KNOWLEDGE OF BIODIVERSITY IMPROVED, SYSTEMATIZED AND WIDELY AND EQUALLY AVAILABLE THROUGH DEVELOPED MECHANISMS

In order to allow for achieving of previously set strategic targets, it is necessary to ensure mechanisms for systematized collection, processing and sharing of information about biodiversity for all stakeholders. **The achievement of this target requires priority development of the biodiversity information system (in EPA) within the environment information system.** Important progress in this direction is expected after finalization of the implementation of the EU funded project: "Establishing and development of environment information system".

For the purpose of overcoming problems with the level and manner of biodiversity monitoring until now, **it is necessary to consider the preparation of the National Biodiversity Monitoring Programme until 2021.** This will allow systemic collecting of data on biodiversity status (as opposed to the existing partial collection) which allows following up on trends and, also, allows timely mobilisation of necessary resources (thus eliminating delays and unplanned reduction of the scope due to the lack of funds).

A particularly important activity is allowing unlimited access to biodiversity data for all stakeholders (from the central biodiversity information system). As an additional activity for improving communication and information sharing³⁴, a CHM mechanisms for Montenegro will corresponding portal will be established.

Implementation of these activities provides: (i) support to fulfilment of measures from other strategic targets (particularly target A of this Strategy), (ii) improving existing biodiversity information, and (iii) external control of the quality of existing official data.

The Strategy also envisages definition of special incentive measures for integration of all segments of the society into the process of collecting and sharing biodiversity information. A special emphasis is placed on the support to other professional organisations (for example, specific study programmes) to organize targeted biodiversity explorations. It is necessary to establish within this measure a precise system for monitoring biodiversity research activities in Montenegro, encourage (financially, organizationally and otherwise) authorized (and prevent unauthorized) research visits. This will ensure full

³⁴ As amendment to measures B6 and B5.

implementation of the requirement³⁵ concerning mandatory submission of biodiversity study results to a authorized body³⁶ and strengthening documentation basis for biodiversity.

Drafting of the analysis of implementation of the Nagoya CBD Protocol and preparation of the measures required for its ratification and implementation is planned as a special measure for ensuring equitable distribution of benefits arising from genetic diversity. The Nagoya Protocol is expected to enter into force during 2016, and these activities will also contribute to timely fulfilment of obligations in the EU accession process.

³⁵ Nature Protection Act (Official Gazette of Montenegro 51/08, 21/09, 40/11, 62/13, 06/14)

³⁶ For example, a requirement for obtaining every next study permit could be previous submission of data about conducted study which are then stored in the central information system and published by CHM in integral form.

BIODIVERSITY STRATEGY ACTION PLAN 2016-2020				
Strategic target	Time period	Deadline	Achievement indicator	Responsibilities*
A: UNTIL 2020, BIODIVERSITY PROTECTION IS IN PRACTICE ONE OF SEVERL MOST IMPORTANT SOCIAL AND POLITICAL PRIORITIES IN THE OVERALL DEVELOPMENT			<i>Biodiversity is not "unknown and incomprehensible" term which limits development</i>	
a) The society recognizes benefits from biodiversity and the need for priority protection				
A1. Preparation and implementation of education and training programmes for the protection, sustainable utilization and equitable distribution of benefits arising from biodiversity in schools	2016-2020	2016-2020	Education programme adopted	MSDT, MoE, EPA, NGO
A2. Establishing and formalizing (by RP Managers and NP) of bodies for cooperation with local population and business in protected areas (social-economic fora)	2016	2016	The number of national and regional parks which established the Advisory Body PENPMNE, MSDT, Managers, PECZ	PENPMNE, MSDT, Managers, PECZ
b) Make biodiversity become a priority topic for decision-makers				
A3. The basic assessment and analysis of scenarios o economic values of biodiversity and ecosystem conducted at the state level	2018	2018	A Study of assessment and analysis of scenarios of economic values of biodiversity developed	MSDT, MoF, MoE
B: BIODIVERSITY IS PROTECTED BY MULTIDISCIPLINARY AND MULTISECTOR APPROACH			<i>Care for conservation of biodiversity and its benefits belong to all.</i>	
a) Existing mechanisms are fully used thus allowing integration of biodiversity at all levels				
B1. Implementation of the acceptability assessment mechanisms	2016-2020	2020	Number of conducted acceptability assessments	EPA
B2. Full integration of biodiversity protection in SEA, including expressing of specific values and services provided by the respective biodiversity	2016-2020	2020	Number of SEA with included assessment of biodiversity values and services it provides	EPA,MSDT, Ministries and institutions
B3. Integration of measures and guidelines of biological diversity protection into strategies, laws, regulations, programmes and plans of development sectors	2016-2020	2020	Number of strategies, laws, regulations, plans and programmes with integrated measures and guidelines for biodiversity protection	Ministries and institutions
B4. New LAPBD adopted and applied	2016-2017	2017	23 municipalities adopted new-improved existing LAPBD	LSGU, MSDT
B5. Support to biodiversity integration when preparing SEA, plans and programmes and other documents by strengthening inter-sector cooperation	2016	2016	For the purpose of improving vertical and horizontal communication, provide support concerning biodiversity information for the needs of parties which are mandatory for the implementation of some of the mechanisms for integrating biodiversity into development activities (SEA, acceptability assessment, etc.)	EPA
b) Overall mobilisation of resources achieved, as well as efficient multi-sector monitoring of NSBAP implementation				
B6. The body for cooperation with scientific and professional audience, NGO and LSGU established and operational	2016-2017	2017	Forum established and operational	MSDT, EPA

(biodiversity forum)				
B7. Monitoring of implementation of NSBAP 2016-2020 by the National Council for Sustainable Development and Climate Change	2016-2017	2020	Implementation of the second NSBAP is reviewed at the National Council for Sustainable Development and Climate Change at least once a year	MSDT, EPA, MARD
C: AN EFFICIENT MECHANISM FOR FINANCING OF BIODIVERSITY PROTECTION ACHIEVED, AS WELL AS A SWITCH TO SUSTAINABLE BIODIVERSITY ECONOMY UNTIL 2020			<i>Invest in the future and our natural capital</i>	
a) Achieving sustainable financing of biodiversity protection				
C1. Continuous allocation of public funds for biodiversity protection	2016-2020	2016-2020	Increasing allocations will be done in accordance with the situation in public finances	MoF, MSDT, Ministries and institutions
C2. Public financing for biodiversity in the budgets of relevant state institutions clearly earmarked	2016-2020	2020	All budget units (those who have them) clearly earmarked in their budgets the allocations for biodiversity	MoF, Ministries and institutions
C3. Established coordination and monitoring of public and other (donations, NGO, Universities, etc.) financing of biodiversity protection	2016-2020	2016	Annual reports on implementation of the National Strategy contain detailed data on all implemented activities in financing of biodiversity	MSDT, Ministries and institutions, NGO, UNIV and others
C4. Exploration of models for establishing and financing of the biodiversity fund (or a special sub-account)	2016-2018	2018	Analysis prepared and agreement reached concerning creating of the biodiversity fund within the national fund for the environment or as a special sub-account	MoF, MSDT
b) Integration of sustainable biodiversity economy into the main courses of national and sector policies, strategies and plans				
C5. Measures for achieving sustainable biodiversity economy integrated into other national and sector strategies and plans	2016-2020	2020	Number of sector strategies and plans including measures for achieving sustainable biodiversity economy (as a part of green economy)	Ministries and institutions
b) Use of specific fiscal, market and policy instruments based on prices as a support for biological diversity conservation, sustainable production and consumption				
C6. Exploring possibilities or ecological-fiscal transfers or more efficient allocations of funds from the state budget for locations or sectors which play a key role in sustaining biodiversity and ecosystems producing broader benefits for the society and the economy	2016-2018	2018	The analysis prepared for possibilities for ecological-fiscal transfers or more efficient allocations of funds from the state budget for biodiversity needs	MoF, MSDT, Ministries and institutions
C7: Development and facilitation of eco labelling and certification as means for encouraging sustainable production and consumption thus supporting the development of positive products and markets in terms of biodiversity, and increasing their profitability.	2019-2020	2020	Number of products with eco labels	MoF, MSDT, MoE
d) Establishing a legal, institutional and implementation framework for PES introduction				
C8. Development of PES "White Paper" (as a concept or a strategy) for PES introduction through a broad consultative process	2018	2018	Concept for PES introduction harmonized	MSDT, all stakeholders
C9. Identification and establishing (if needed) institutional mechanisms for PES	2019	2019	The most applicable PES mechanisms identified	MSDT, CoC, all stakeholders

C10. PES pilot project	2020	2020	1 PES project implemented successfully	All stakeholders, PENPMNE, PECZ, Managers
D: SIGNIFICANT REDUCTION OF IDENTIFIED DIRECT PRESSURES ON BIODIVERSITY UNTIL 2020 REGISTERED				
a) Reduction of pressures from sectors: spatial planning/civil engineering				
D1. Imperative use of compensation measures or a lost habitats	2016-2020	2016-2020	Size of modified protected areas (habitats) whose protection status (of the area) has been degraded and the size of new areas (habitats) which result from a compensatory measure	MSDT, EPA, LSGU
D2. Obligation to prepare a base study (professional background) of biodiversity when preparing planning documents so as to reduce the impact of urbanisation on biodiversity	2017-2018	2018	The obligation to prepare the background incorporated into the legal framework	MSDT
b) Reduction of pressures from sectors: environmental protection/public utilities				
D3. The level of wastewater treatment in the coastal zone (particularly Boka Bay) guarantees conservation of marine biodiversity	2016-2098	2019	The level of wastewater treatment for all coastal municipalities higher than 90%	MSDT, PROCON, LSGU
D4. Reduced impact of pollution of natural recipients in Montenegro	2016-2020	2020	The level o wastewater treatment at the national level higher than 70%	MSDT, PROCON, LSGU
D5. Improvement of knowledge of wastewater impact on karst ecosystems	2018	2018	Development of the study of the impact of wastewater pollution on the most sensitive karst ecosystems	MSDT, PE IGS
D6. Registered waste disposal sites located on river banks (primarily Lim and Tara) removed entirely and/or where removal is not an efficient method, they are re-cultivated and secured from further environmental impact.	2020	2020	100% of temporary disposal sites and dumpsites on river banks rehabilitated	MSDT, PROCON, LSGU
D7. Reduction of pollution caused by industrial-hazardous waste disposal sites	2016-2018	2018	At least two locations with hazardous waste (Bijela and KAP) rehabilitated and do not pose a threat to biodiversity of the coastal zone and NP Skadar Lake	EPA, MSDT, Ministries and institutions
c) Sustainable agriculture, forestry and water management				
D8. Integrate targets for protection of species and habitats into forest development plans	2016-2018	2018	Number of plans with integrated targets concerning the protection of species and habitats	MARD, EPA, MSDT
D9. Identify measures for protection against forest fires and protected areas and integrate them into national fire protection policies	2016-2020	2020	Number of Management Plans containing harmonized and agreed fire protection measures at national level.	PENPMNE, protected areas managers, MARD, Mol, LSGU
D10. Implementation of Action Plan measures to combat illegal activities in forestry	2016-2020	2020	Increasing the percentage of wood mass harvested with orderly documentation and markation seal	MARD, FA
D11. Termination of concession contracts in the areas were concession holders are not able to fulfil contractual	2016-2020	2020	Number of terminated concession relative to the number of	MARD, FA, MSDT,

obligations (particularly concerning implementation of all necessary measures in the forest management system)			unimplemented plans	EPA
D12. Meeting the requirements for FSC	2018	2018	Certified forest area	MARD, FA
D13. Improve sustainable use of non-timber products	2016-2018	2018	Annual volumes of collected non-timber products are parts of reports on the environmental status	MARD, FA, MSDT, EPA
D14. Combating illegal hunting and fishery	2016-2020	2020	Number of submitted complaints by years	AIA, MoI
D15. Reduction of impact of undersea activities on biodiversity	2017-2018	2018	The programme of harmonized activities for combating illegal undersea activities adopted and implemented	MSDT, PE CZ, MARD, MoI, RDCB, MoI
D16. Measures for conservation of important natural and semi-natural grassy formations are integrated into applicable agricultural policy	2018-2019	2019	Number of plans and programmes with integrated measures	MARD, MSDT, EPA
D17. Reduction of impact of illegal exploitation of gravel and sand	2016-2020	2020	Number of submitted complaints by years	AIA, MoI
D18. Integration of biodiversity protection measures into future river basins management plans	2016-2020	2020	RBMP contains biodiversity protection measures	MARD, MSDT, EPA
d) Reduction of pressures from sectors: transportation, energy and infrastructure development				
D19. Integration of biodiversity protection measures into the process of planning and construction of transportation infrastructure (planning and construction of bio-corridors, passages, green belt along roads and reduction of pollution from roads), particularly the Bar-Boljare and Adriatic-Ionian Highway	2016-2020	2020	Number of planned and constructed structures on the road infrastructure for the purpose of biodiversity protection	MoT, EPA, MSDT, MoE, MoF
D20. Supporting full integration of biodiversity into plans for construction of energy facilities and energy infrastructure	2016-2020	2020	Preparatory documents for construction of energy facilities contained a sufficient level of information concerning biodiversity for making decisions	MoE, MoF, MSDT, EPA
e) Achieving sustainable tourism				
D21. Further integration, concretization and operationalization of biodiversity protection measures and sustainable biodiversity economy into plans and programmes of tourism sector	2016-2020	2020	Number of plans and programmes with integrated measures and the number of measures implemented	MSDT, MoE, MoF
D22. Assessment of tourism bearing capacity of a protected areas and impact by visitors	2016-2020	2020	Assessment implemented for at least 2 National Parks	MSDT, LSGU, Managers
f) Measures for mitigating impacts of invasive species				
D23. Improving knowledge of invasive species in Montenegro	2016-2018	2018	Number and characteristics of invasive species are a part of information system on biodiversity status to the extent allowing a comprehensive review of the problem	EPA
D24. Improving monitoring and treatment of ballast waters	2016-2020	2020	Number of ports equipped to monitor and process ballast waters relative to the number of ports	MoT, AMT, EPA, MSDT

g) Measures for mitigating impact of climate change				
D25. Implementation of the National Climate Change Strategy	2016-2020	2020	Report on the implementation of measures of the National Climate Change Strategy	MSDT, EPA
E: UNTIL 2020 PRECONDITIONS CREATED AND TARGETED MEASURES FOR BIODIVERSITY PROTECTION IMPLEMENTED			<i>Conserve the most endangered forms of life</i>	
a) Activities implemented to protect the most endangered species				
E1. Development of the Red Book of Flora of Montenegro	2016-2020	2020	The Red Book of Flora of Montenegro published	UNIV, CANU, MSDT, MARD, PENPMNE
E2. Assessment of the status, vulnerability and distribution of legally protected and N2000 species	2016-2020	2020	At least completely processed 70% of species relative to the number of protected species in Montenegro	EPA, PENP, MSDT
E3. Development and implementation of Action Plans for the most vulnerable species	2016-2020	2020	At least 3 Action Plans for the protection of the most vulnerable species prepared and implemented	EPA, PENP, MSDT
a) Activities implemented to protect the most vulnerable habitats				
E4. Assessment of the status, vulnerability and distribution of habitat types and nationally and internationally ecologically important sites	2016-2020	2020	At least 50 habitat types processes (in accordance with the Catalogue of Habitat Types of Montenegro)	EPA, PENPMNE, Managers, UNIV
E5. Development of Action Plans for the most vulnerable habitats	2016-2020	2020	At least 2 Action Plans for the protection of the most vulnerable habitats prepared and implemented	EPA, PENP, MSDT
c) Support gene conservation				
E6. Preparation of planning documents and implementation of measures for seed stand	2016-2020	2020	Planning documents prepared and measures implemented for seed stands MARD	MARD
E7. Maintain traditional breeding of particular domestic breeds of animals and varieties of plants, fruit and vegetable	2016-2020	2020	Traditional breeding of particular domestic breeds of animals and varieties of plants, fruit and vegetables maintained	MARD
E8. Enhanced management of ex situ collections (botanical gardens, arboretum and commercial collections)	2016-2020	2020	Botanical gardens in Dulovina and Brezjojevice, Arboretum of General Kovacevic, as well as collections of commercially important fruit and crops, have appointed managers, budgets and management plans	MSDT, LSGU, MARD
F: ENVIRONMENTAL INFRASTRUCTURE AS THE BASIS FOR CONSERVATION OF NATIONAL BIODIVERSITY CREATED UNTIL 2020			<i>Construct efficient safety network</i>	
a) Establish an integral and efficient green network which includes new protected areas as well				
F1. Increase the size of protected areas to at least 17% of the state territory (primarily areas from SPMNE)	2016-2020	2020	At least 17% of the state territory is protected	MSDT, EPA, LSGU, MARD
F2. Declare coastal and marine protected areas (size of least 10% of the total size of protected areas)	2016-2018	2018	At least 2 MPAs declared and the total size is higher than 10% of the total size of the national protected areas	EPA, MSDT, PECZ, LSGU

F3. Ecological network established in Montenegro, including adequate ecological corridors	2016-2020	2020	National ecological network declared by the Government's decision	EPA, MSDT, MARD
b) Ensure efficiency of the network by enhancing management				
F4. Reorganize and improve management of protected areas	2016-2018	2018	100% of protected areas larger than 100 ha have managers, management plans and annual budgets	EPA, MSDT, PENPMNE
G: KNOWLEDGE OF BIODIVERSITY IMPROVED, SYSTEMATIZED AND WIDELY AND EQUALLY AVAILABLE THROUGH DEVELOPED MECHANISMS				
a) Develop researches and organize an efficient system of data collection and processing				
G1. Establish biodiversity information system within the Environmental Information System	2016-2018	2018	A centralised biodiversity information system (including, but not limited to the information about characteristics of species, habitats and protected areas)	EPA, MSDT
G2. Facilitating general and unlimited availability of official biodiversity data	2018	2018	Information from the biodiversity database, and other official biodiversity information available 24/7	EPA, MSDT
G3. Improve systemic monitoring of biodiversity	2017	2017	Long-term biodiversity monitoring plan until 2020 adopted	EPA, MSDT, MoF
G4. Encourage biodiversity researches	2017-2020	2020	Measures to encourage researches of biodiversity by students, organisations, NGO sector, Universities, research centres defined and integrated into the plans and programmes, including protected areas management plans	MSDT, MARD, PENPMNE, PECZ, Managers
b) Make biodiversity information publicly available, consolidate knowledge and ensure equitable distribution of benefits arising from genetic diversity				
G5. Improvement and exchange of biodiversity information with all interested parties (NGO sector, students, local communities, etc.) through the CHM establishment	2018	2018	CHM mechanism established (including portal) as a broad platform for exchange of information and knowledge concerning biodiversity	EPA, MSDT
G6. Ensure the principle of equitable distribution of benefits arising from genetic diversity in plans and programmes	2016	2016	The process of ratification of the Nagoya Protocol initiated	MARD, MSDT, EPA

* The first listed institution is responsible for implementation

EPA	Environmental Protection Agency
CANU	Montenegrin Academy of Sciences
LSGU	Local Self-Government Unit
PECZ	Public Enterprise Coastal Zone
PENPMNE	Public Enterprise National Parks of Montenegro
OSD	Office for Sustainable Development
MoE	Ministry of Economy
MoF	Ministry of Finance
Ministries and institutions	Other Ministries and institutions
MSDT	Ministry of Sustainable Development and Tourism
MARD	Ministry of Agriculture and Rural Development
MoT	Ministry of Transportation
Mol	Ministry of Interior

NGO
CoC
PROCON
RDCB
AIA
Managers
FA
IGS

Non-Governmental Organisation
Chamber of Commerce
National Project Implementation Unit in the Field of Communal Infrastructure
Regional Diving Centre in Bijela
Administration for Inspection Affairs
Managers of Protected Areas
Forest Administration
Institute for Geological Survey

LITERATURE:

Environmental Protection Agency (2011). *Information about the status of the environment for 2010, Podgorica*

Environmental Protection Agency (2012). *Information about the status of the environment for 2011, Podgorica*

Environmental Protection Agency (2013). *Information about the status of the environment for 2012 with proposal of measures, Podgorica*

Environmental Protection Agency (2014). *Information about the status of the environment in Montenegro for 2013, Podgorica*

BirdLife International (2014). *Country profile: Montenegro*, available from <http://www.birdlife.org/datazone/country/montenegro> (assessed: 2014-10-07)

Cadjenovic N., (2006). *Flora of old Tivat Salines (Montenegro) comparative analysis of flora, assessment of diversity and importance of their conservation*, Faculty of Natural Sciences and Mathematics, Novi Sad

EMERALD database (2010). Institute for Nature Protection, Podgorica

Emerton, L. (2011). *The economic value of protected areas in Montenegro*; report for: GEF/UNDP PIMS 4279: Catalyzing Financial Sustainability of Protected Areas in Montenegro, UNDP Montenegro, Podgorica

Emerton, L. (2011). *The economic value of biodiversity and ecosystem services*; report for: GEF/UNDP PIMS 5024: National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan in Montenegro, UNDP Montenegro, Podgorica

Emerton, L. (2013a). *Mechanisms for mainstreaming a sustainable biodiversity economy, including payments for ecosystem services*; technical report for: GEF/UNDP PIMS 5024: National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan in Montenegro, UNDP Montenegro, Podgorica

European Commission (2011). *The EU Biodiversity Strategy to 2020*, Publication Office of the European Union, Luxembourg

European Environmental Agency (2010): *Species of European Interest (SEBI 003/CSI 007) - Assessment*, Copenhagen

Gantioler S., Rayment M., Bassi S., Kettunen M., McConville A., Landgrebe R., Gerdes H., ten Brink P. (2010)/ *Costs and Socio-Economic Benefits associated with the Natura 2000 Network*. Final report to the European Commission, DG Environment on Contract ENV.B.2/SER/2008/0038

Green home (n.d), *Natura 2000 info centre - Brochure*, Green home, Podgorica

- Grimes, A. et al. (2005). *Biodiversity assessment update for Serbia and Montenegro*, USAID, 2005
- Grooten, M. (eds), (2012). *Living Planet Report 2012: Biodiversity, biocapacity and better choices*, WWF International, Gland
- Hadziablahovic S. (2010). *The vascular flora of Cemovsko Polje*, *Natura Montenegrina* 9 (1), Nature Museum, Podgorica
<http://ec.europa.eu/environment/nature> (assessed: September 2014)
- Milan Janak & Pavol Polak (2010). *Serbia, Montenegro and Natura 2000: Strengthening the Capacity of Governments and Civil Sector to Adapt to EU Nature Protection Acquis: BASELINE REVIEW*, n.d.
- Ministry of Economy (2011). *Strategy for Regional Development of Montenegro 2010-2014*, Podgorica
- Ministry of Finance (2013). *Development Directions of Montenegro 2013-2016*, Podgorica
- Ministry of Sustainable Development (2011). *First report on the implementation of the National Biodiversity Strategy with the Action Plan*, Podgorica
- Ministry of Sustainable Development (2012). *Second national report on the implementation of the National Biodiversity Strategy (2010-2015) for the period 2011-2012 - Summary*, Podgorica
- Ministry of Sustainable Development (2013). *The programme for monitoring the environment of Montenegro for 2014 - Summary*, Podgorica
- Ministry of Sustainable Development (2013). *Third national report of Montenegro to the United Nations Convention on Biological Diversity*, Podgorica
- Ministry of Sustainable Development (2013). *Report on the situation in the fields of water supply and wastewater management in 2012*, Podgorica
- Ministry of Sustainable Development (2013). *Environment monitoring programme for 2014 - Summary*, MSDT, Podgorica
- Ministry of Sustainable Development (2015). *Second national report of Montenegro on climate change to the United Nations Framework Convention on Climate Change UNFCCC*, prepared within UNDP/GEF project "Activities for the preparation of the Second National Communication of Montenegro to UNFCCC", Podgorica
- Ministry of Sustainable Development (2014). *Waste Management Strategy - Draft*, Podgorica
- Ministry of Agriculture and Rural Development (2013). *Strategy with the Plan for the Development of Forests and Forestry - National Forest Strategy - Draft*, Podgorica
- Ministry of Tourism and Environment (2009). *National Biodiversity Strategy with the Action Plan for the Period 2010-2015*, Podgorica

- Ministry of Tourism and Environment (2007). *National Strategy for Sustainable Development of Montenegro*, Podgorica
- Ministry of Spatial Planning and Environment (2010). *Fourth National Report of Montenegro on the Implementation of the Convention on Biological Diversity*, Podgorica
- Ministry of Spatial Planning and Environment (2010). *First National Report of Montenegro on Climate Change under the United Nations Framework Convention on Climate Change UNFCCC*, Podgorica
- Ministry of Economic Development (2008). *Spatial Plan of Montenegro for the period until 2020*, Podgorica
- National Council for Sustainable Development (2011). *Analysis of achievements and challenges of the ecological state, 20 years of the Ecological State of Montenegro*, Podgorica
- Nikolic, T., Topic, J. (2005) *Red Book of Vascular Flora of Croatia*, Ministry of Culture, State Institute for Nature Protection of Croatia, Zagreb
- P. Cortis, N.J.Vereecken, F.P. Schiestl, M. R. Barone Lumaga, A. Scrugli and S. Cozzolino (2009): *Pollinator convergence and the nature of species' boundaries in sympatric Sardinian Ophrys (Orchidaceae)*. *Annals of Botany*. doi: 10.1093/aob/mcn219
- Petrovic D., Stesevic, D. Vukanovic S. (2008). *Materials for the Red Book of Montenegro*, *Natura Montenegrina* 7 (2), Nature Museum, Podgorica
- Petrovic D. ed (2008): *Important plant habitats in Montenegro* (IPA project), Podgorica?
- Petrovic D., Stesevic D. (2010). *Materials for the Red Book of vascular flora of Montenegro (second contribution)*, *Biologica Nyssana*, Nis
- Petrovic, D., Hadziablahovic, S., Vukanovic, S., Macic, V., Lakusic, D. (2012). *Catalogue of types of habitats of Montenegro important for the European Union*, n.d., Podgorica-Belgrade-Zagreb
- Regner, S., Vukanic, D., Vuksanovic, N., Jerkovic, L., Kljajic, Z., Mandic., V., Milojevic, S., Radovic, I. & Regner, D., (2003). *Genetic resources of marine organisms*, Yugoslav Engineering Academy, Bulletin No. 1., Belgrade
- Roger Perman Yue Ma James McGilvray Michael Common (2003). *Natural Resources and Environmental Economics*. 3rd edition, Pearson education limited, Essex
- Roy Haines-Young and Marion Potschin (2011). *Common International Classification of Ecosystem Services (CICES): 2011 Update*, European Environmental Agency, Copenhagen
- Secretariat of the Convention on Biological Diversity (2010). *Global Biodiversity Outlook 3*, Montreal

Secretariat of the Convention on Biological Diversity (2011). *NBSAP training modules version 2.2 - Module 2. Using the Biodiversity Planning Process to Prepare or Update a National Biodiversity Strategy and Action Plans*, Montreal

Secretariat of the Convention on Biological Diversity (2011). *NBSAP training modules version 2.1 - Module 1. An Introduction to National Biodiversity Strategies and Action Plans*, Montreal

Secretariat of the Convention on Biological Diversity (2011). *NBSAP training modules version 2.1 - Module 3. Mainstreaming biodiversity into national sectoral and cross-sectoral strategies, policies, plans and programmes*, Montreal

Secretariat of the Convention on Biological Diversity (2011). *NBSAP training modules version 2.1 - Module 4. Setting National Biodiversity Targets in line with the Framework of the Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets*, Montreal

Stevanovic, V. (n.d.). *Biodiversity estimation - from interpretation to conservation - example of endemic vascular flora of the Balkans*, n.d., n.d.

The World Commission on Environment and Development (1987): *Our Common Future*, Report of the World Commission on Environment and Development (Brundtland Report), United Nations

UNDP Montenegro (n.d.). *Development of National Protected Area Financial Plan (NPAFP) to assist in improving the cost-effectiveness of PA institutions*, UNDP Montenegro, Podgorica

WWF *Living Planet Report (2012)*
http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/

WWF medPo (2006). *The Northern Montenegro Green Belt - Biodiversity Assessment Study on Durmitor-Tara-Prokletije Landscape*, n.d

Z. Bulic (2008). *Vascular flora of the canyon and gorges of the River Moraca in Montenegro*. University in Belgrade. Faculty of Biology (doctoral dissertation)

Institute for Nature Protection (2009): *Study for protection of nature of protected natural resources "Brdo Spas" (Toplis), Budva Municipality*, Podgorica

Institute for Nature Protection (2012): *Professional background - Feasibility Study for reviewing borders of the National Park Durmitor*, Podgorica